DEPARTMENT OF THE ARMY TECHNICAL MANUAL

DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

TM5-9128-1

TO36A12-17-13-1

OPERATION AND MAINTENANCE INSTRUCTIONS

SHOP, MOBILE GENERAL PURPOSE REPAIR, SET NO. 1 HEAVY, 12-TON SEMITRAILER-MOUNTED

COUSE MODEL MED

DEPARTMENTS OF THE ARMY AND THE AIR FORCE

NOVEMBER 1955

SAFETY PRECAUTIONS

Keep fire extenguisher filled and in good operating condition.

Observe all safety measures to prevent fires when handling fuel. Always provide a metallic contact between container and tank when filling the gasoline tank.

Use only clean fuel, lubricants, oils, and water. Make sure that containers used for handling fuel and other liquids are absolutely clean and dry.

Be sure there is adequate clearance before attempting to move the mobile shop under trees, bridges, power line, or other low objects.

Stand clear of struts when raising lifting sides to open shop. When lifting sides are at full open height, make sure that strut ends fit into safety sockets on the shop body drip moulding.

Always use ladders (mounted on the sides of the fuel tank) connected together in A position to hook up the triangular rear panel to the hoist rail when opening the rear panel assembly. Always use ladders (one at each side) and handholds to reach the engine for servicing. Do not jump.

Always disengage the engine clutch before starting or stopping the engine and before closing the shop body.

Before connecting to external power supply lines, make certain that the main switch controlling the power to these lines has been placed in the OFF position. Do not handle live electric wiring. High voltages will cause serious injury and death.

Do not leave the engine clutch in the engaged position when connected to external power-supply lines. If the clutch is engaged, the dynamotor-welder will crank the engine at fully governed speed and may cause serious damage to the engine.

All safety guards on belts, gears, shafts, and other rotating parts must be installed before operating the equipment. Do not remove guards while machinery is in operation.

Always use safe lifting apparatus of adequate capacity to hoist the work into position on the shop equipment. Do not exceed the maximum lifting capacity of the trolley hoist.

Never exceed the capacities of the equipment.

Start all equipment carefully. Apply loads gradually to avoid undue strains and possible damage.

Keep an approved type fire extinguisher nearby while welding or flame cutting. Do not use water- or foam-type extinguishers on fires in live electric equipment (such as motors, generators, switches, wiring).

Do not lubricate or make adjustments while the machinery is in operation.

TECHNICAL MANUAL
No. 5–9128–1
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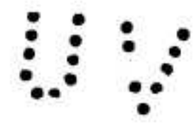
DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
WASHINGTON 25, D. C., *7 November 1955*

SHOP, MOBILE, GENERAL PURPOSE REPAIR, SET NO. 1, HEAVY, 12-TON SEMITRAILER MOUNTED, COUSE MODEL MED



CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. This manual is published for the information and guidance of the personnel to whom this mobile shop is issued. It contains information on the operation and organizational maintenance of the mobile shop as well as a description of the major units and their functions in relation to other components of the materiel. This manual applies only to the Shop, Mobile, General Purpose Repair, Set No. 1, Heavy, 12-Ton Semitrailer Mounted, Couse Model MED.

b. Supply manuals, technical manuals, and other publications applicable to the equipment covered by this manual are listed in appendix I. Appendix II includes illustrations of the complete shop load arranged according to the proper location and storage position for each item; lists all shop equipment and tools and is referenced to figures 215 through 338, and lists all shop equipment and tools in strict alphabetical order.

2. Record and Report Forms

The maintenance record forms listed in *a* through *t* below will be used in the maintenance of this equipment.

a. DA Form 5–13, Spot Check Inspection Report of Organizational Maintenance of Engineer Equipment.

b. DA Form 5–14, Annual Technical Inspection Report of Engineer Equipment.

c. DA Form 9–71, Locator and Inventory Control Card.

d. DA Form 9–75, Daily Dispatching Record of Motor Vehicles.

e. DA Form 9–77, Job Order Register.

f. DA Form 9–79, Parts Requisition.

g. DA Form 9–81, Exchange Part or Unit Identification Tag.

h. DA Form 285, Accident.

i. DA Form 446, Issue Slip.

j. DA Form 447, Turn-in Slip.

k. DA Form 460, Preventive Maintenance Roster.

l. DA Form 464, Work Sheet for Preventive Maintenance and Technical Inspection of Engineer Equipment.

m. DA Form 468, Unsatisfactory Equipment Report.

n. DA Form 478, Organizational Equipment File.

o. DD Form 518, Accident-Identification Card.

p. DA Form 811, Work Request and Job Order.

q. DA Form 867, Status of Modification Work Order.

r. DD Form 6, Report of Damaged or Improper Shipment.

s. DD Form 110, Vehicle and Equipment Operational Record.

t. Standard Form 91, Operator's Report of Motor-Vehicle Accident.

Section II. DESCRIPTION AND DATA

3. Description

a. General. The mobile shop (figs. 1–4) is an all-welded steel inclosure mounted on a 12-ton semitrailer. The weatherproofed shop body incloses machine shop equipment, a gasoline engine that drives a dynamotor-welder and air compressor, and has storage compartments containing complete toolkits and accessories that are used in the repair and overhaul of electrical and mechanical military equipment in the field. The dynamotor-welder can also be driven by an external source of power supply and can be used as an auxiliary power plant.

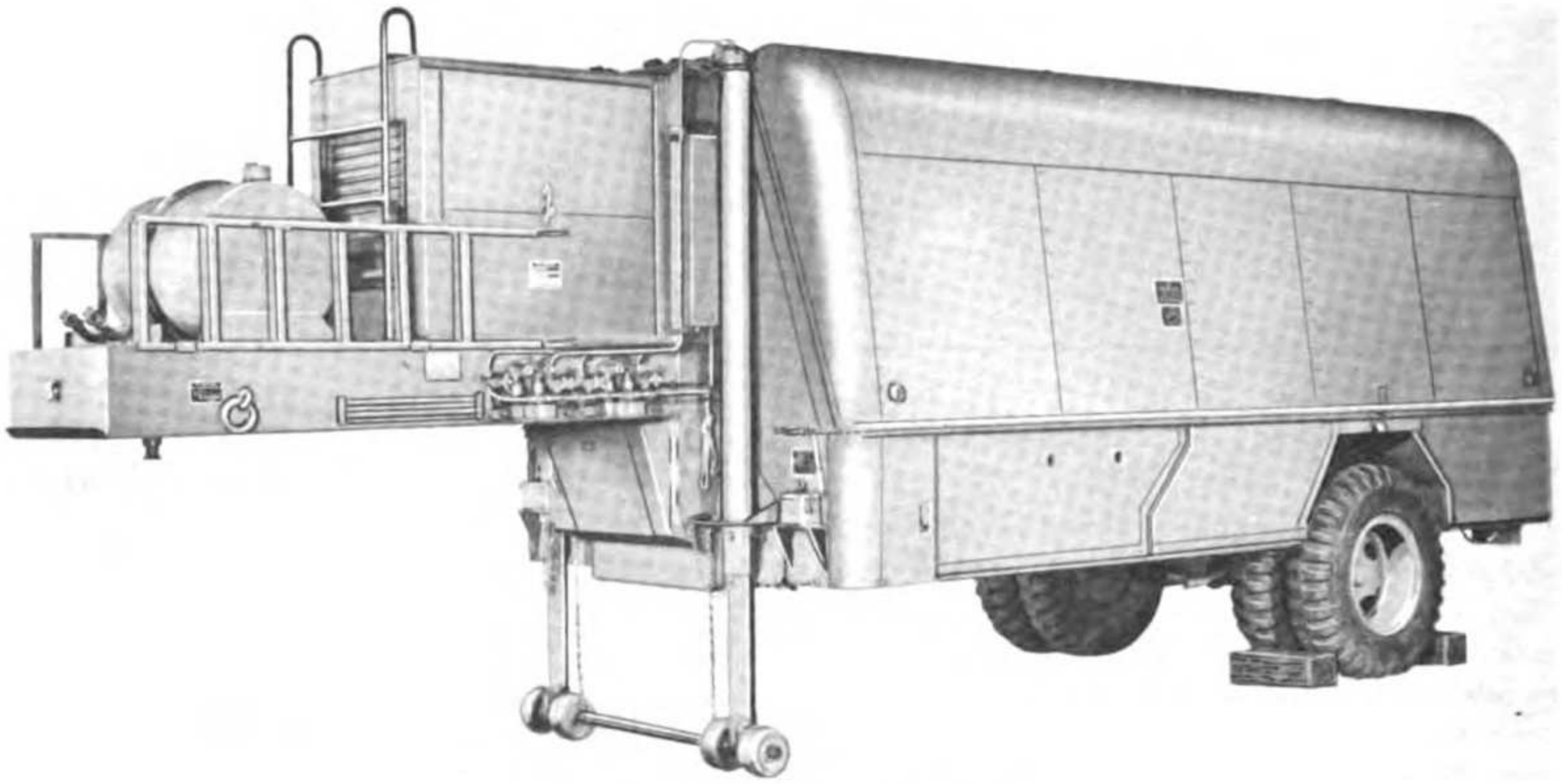


Figure 1. Mobile shop, left front view.

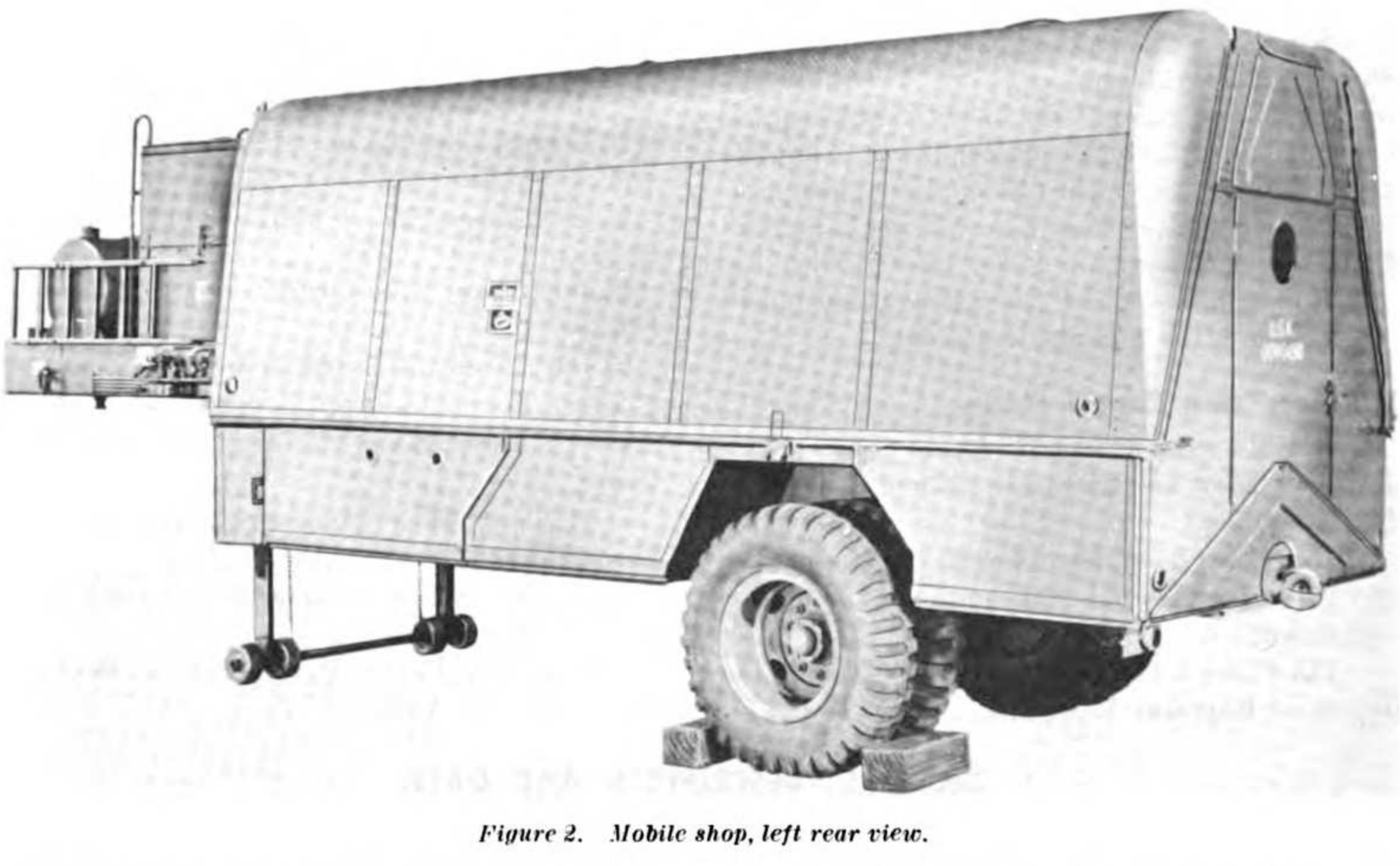


Figure 2. Mobile shop, left rear view.

b. Semitrailer. The Kingham semitrailer Model S4C (12, fig. 5) is equipped with pneumatic-tired wheels and axle assembly (8) and airbrake system.

c. Engine. The dynamotor-welder and air compressor are driven by a Hercules engine that is covered by engine enclosure (4). The engine is a six-cylinder, 4-cycle, L-head, water-cooled, gasoline engine developing 40 hp (horsepower) at governed speed of 1,800 rpm (revolutions per minute).

d. Shop Body. The Couse shop body Model

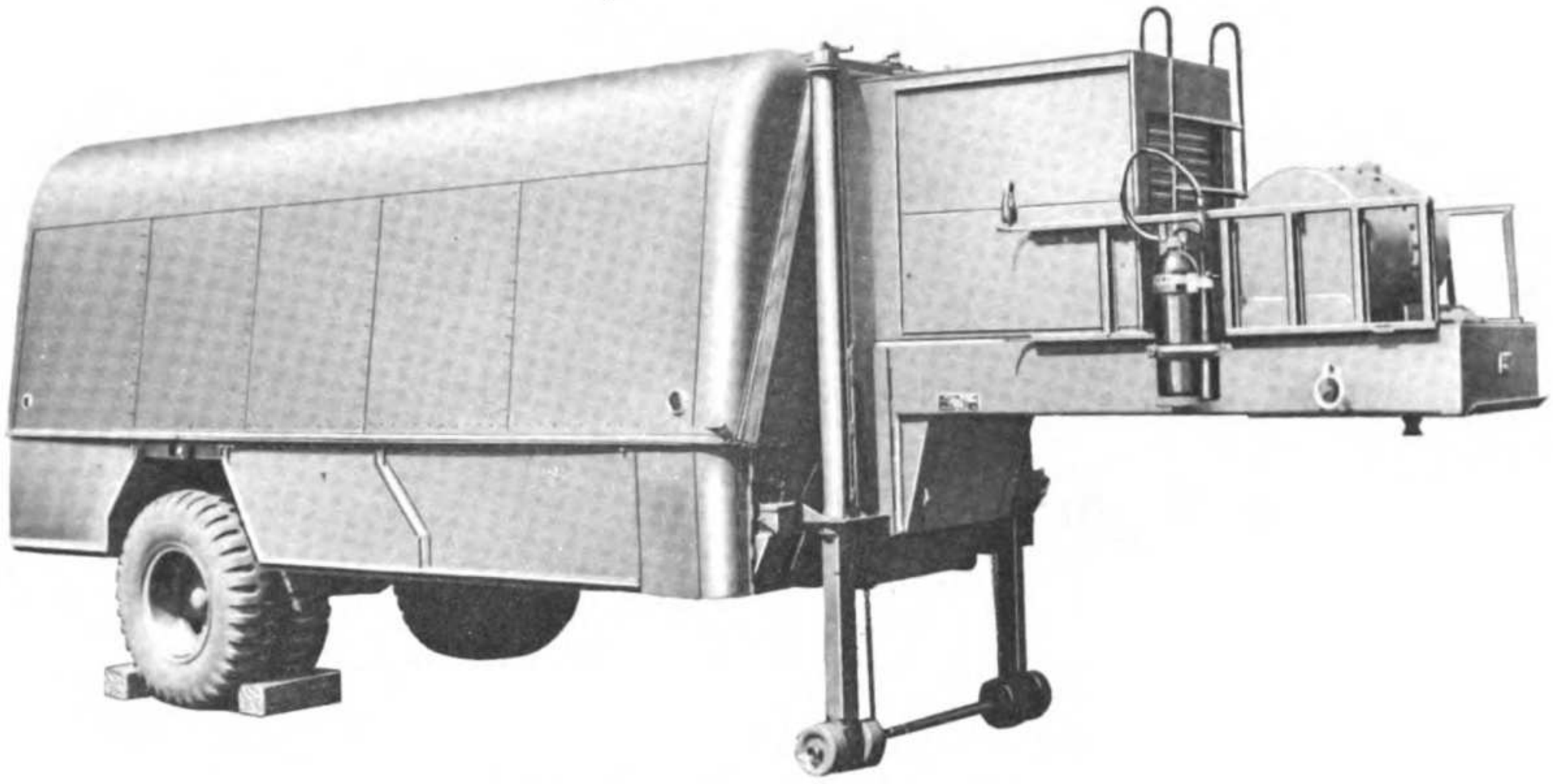


Figure 3. Mobile shop, right front view.

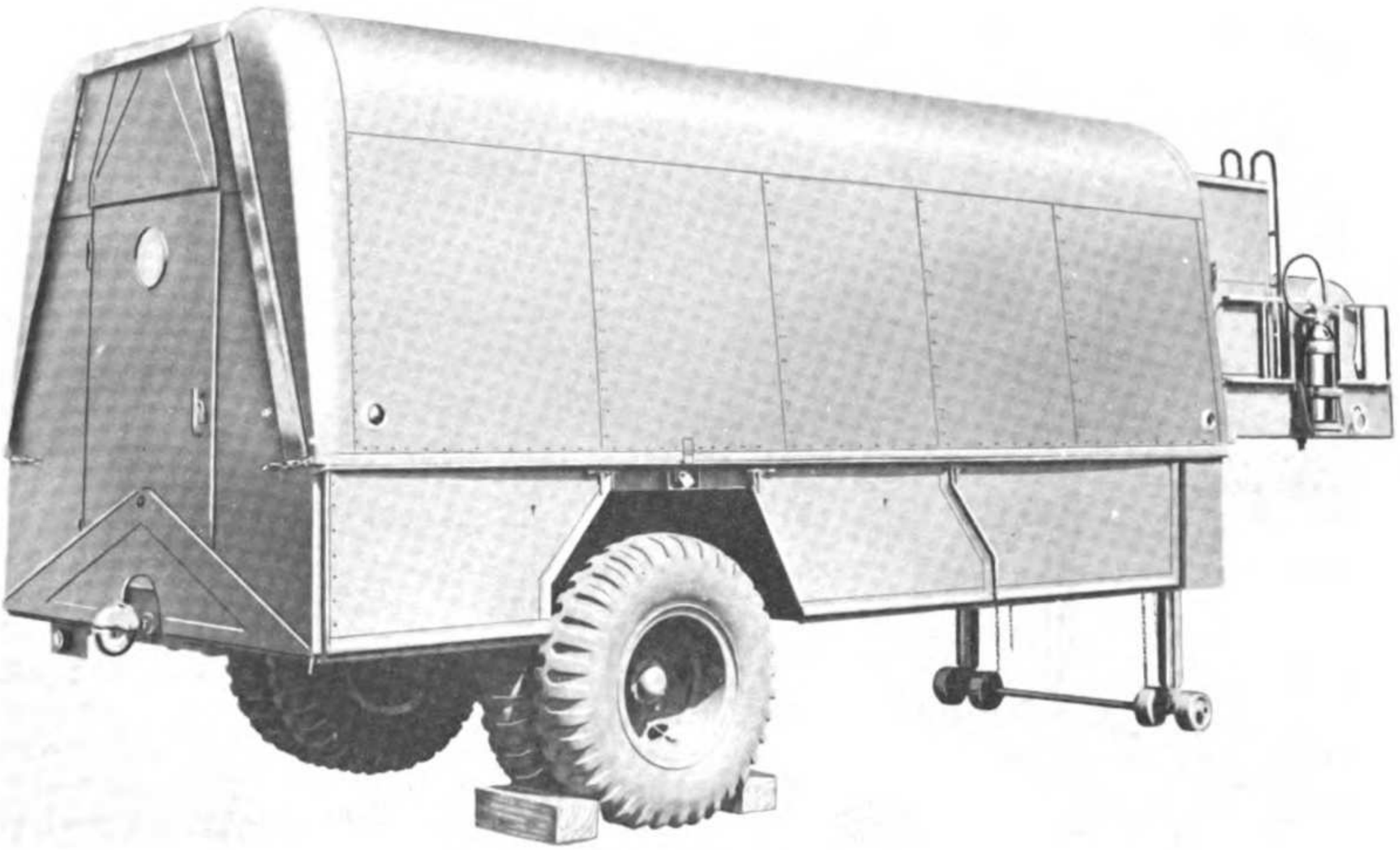
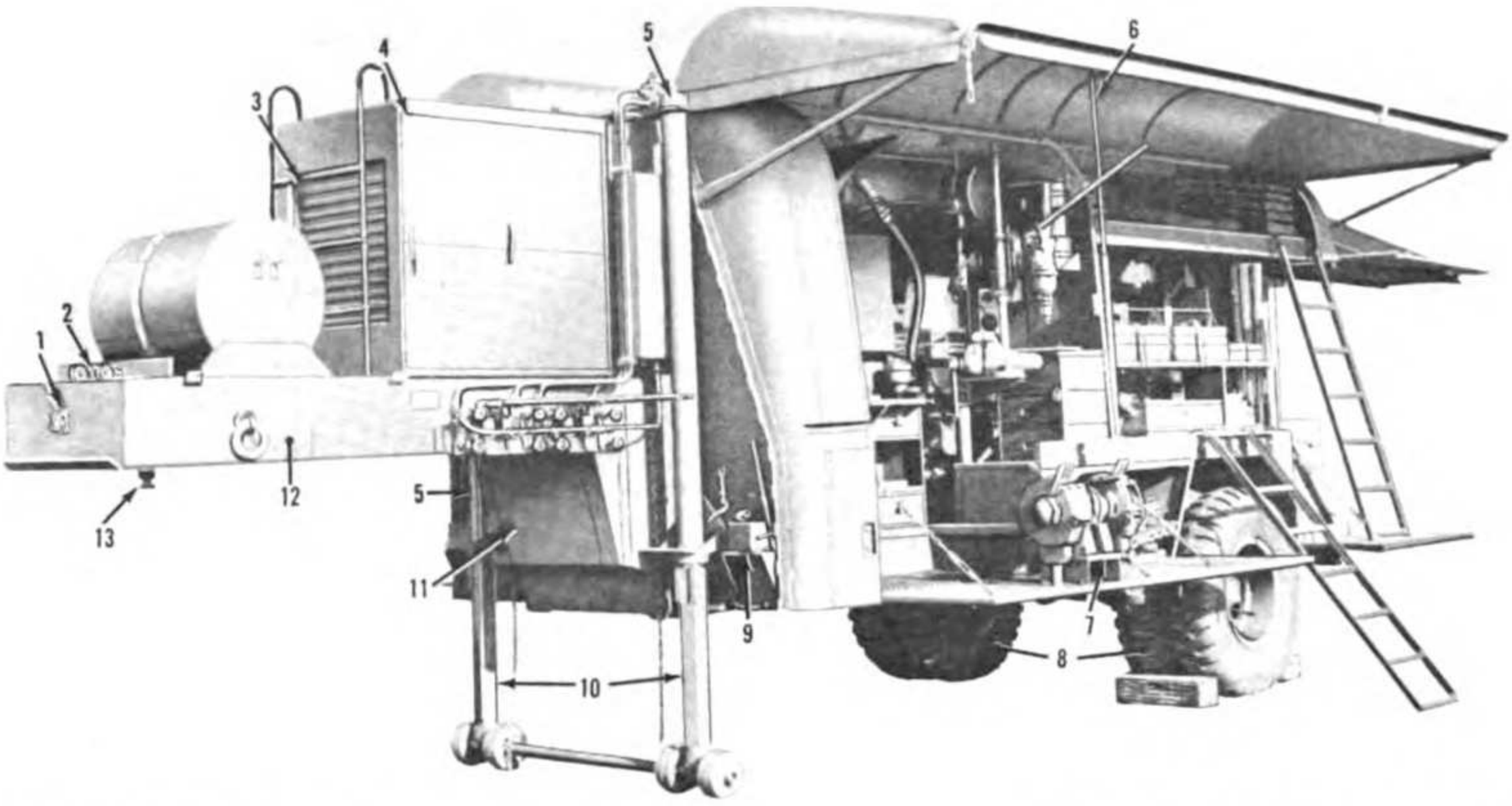


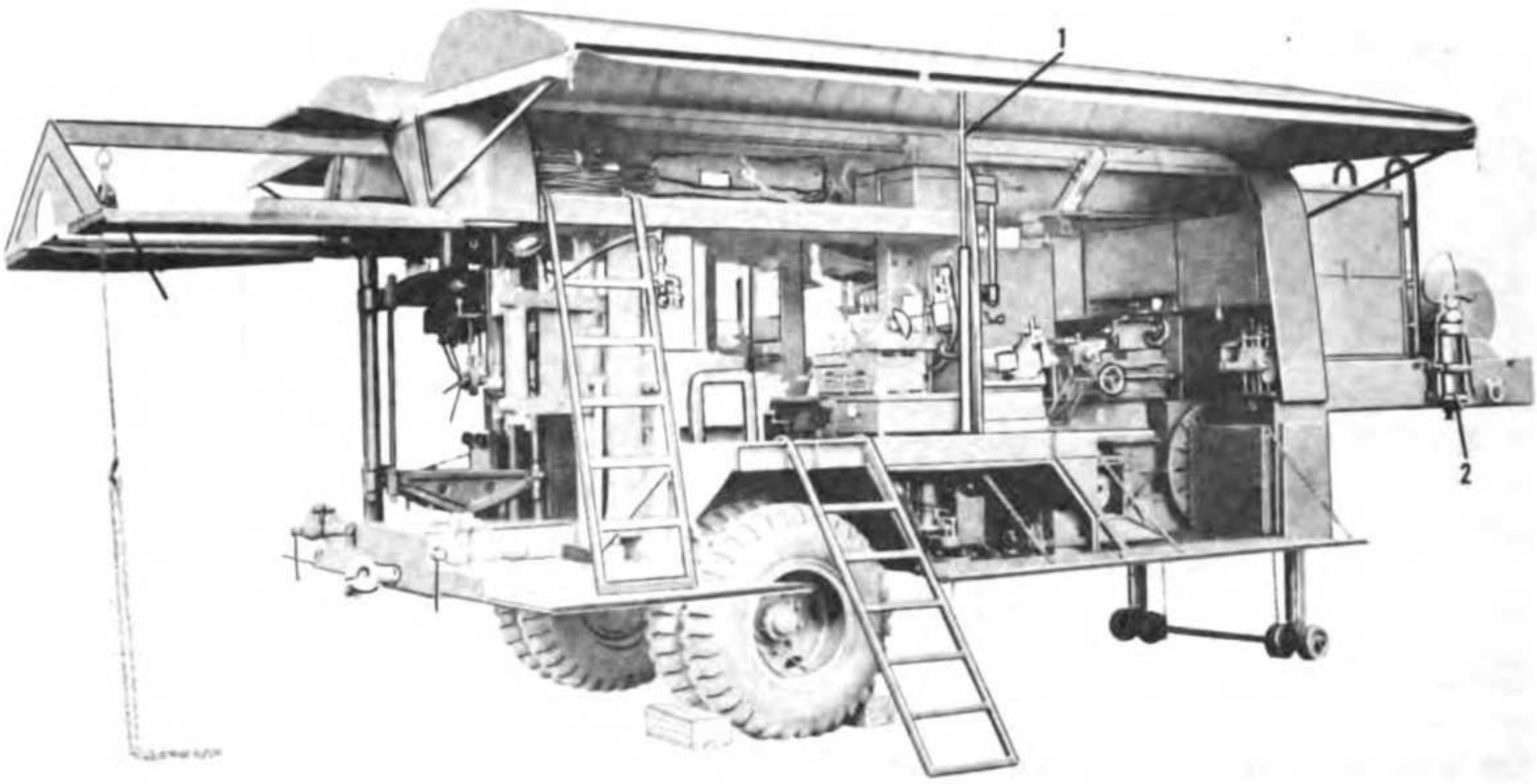
Figure 4. Mobile shop, right rear view.

MED is a completely enclosed, all-welded steel shelter housing the shop equipment. The shop body is opened (figs. 5, 6, and 7) to provide access to all shop equipment. The shop sides are raised and lowered by hydraulic side-lifting jacks (6, fig. 5) and (1, fig. 6). Four trailer-supporting jacks (5, fig. 5) and (2, fig. 7) provided with the shop body, are used to level and support the mobile shop



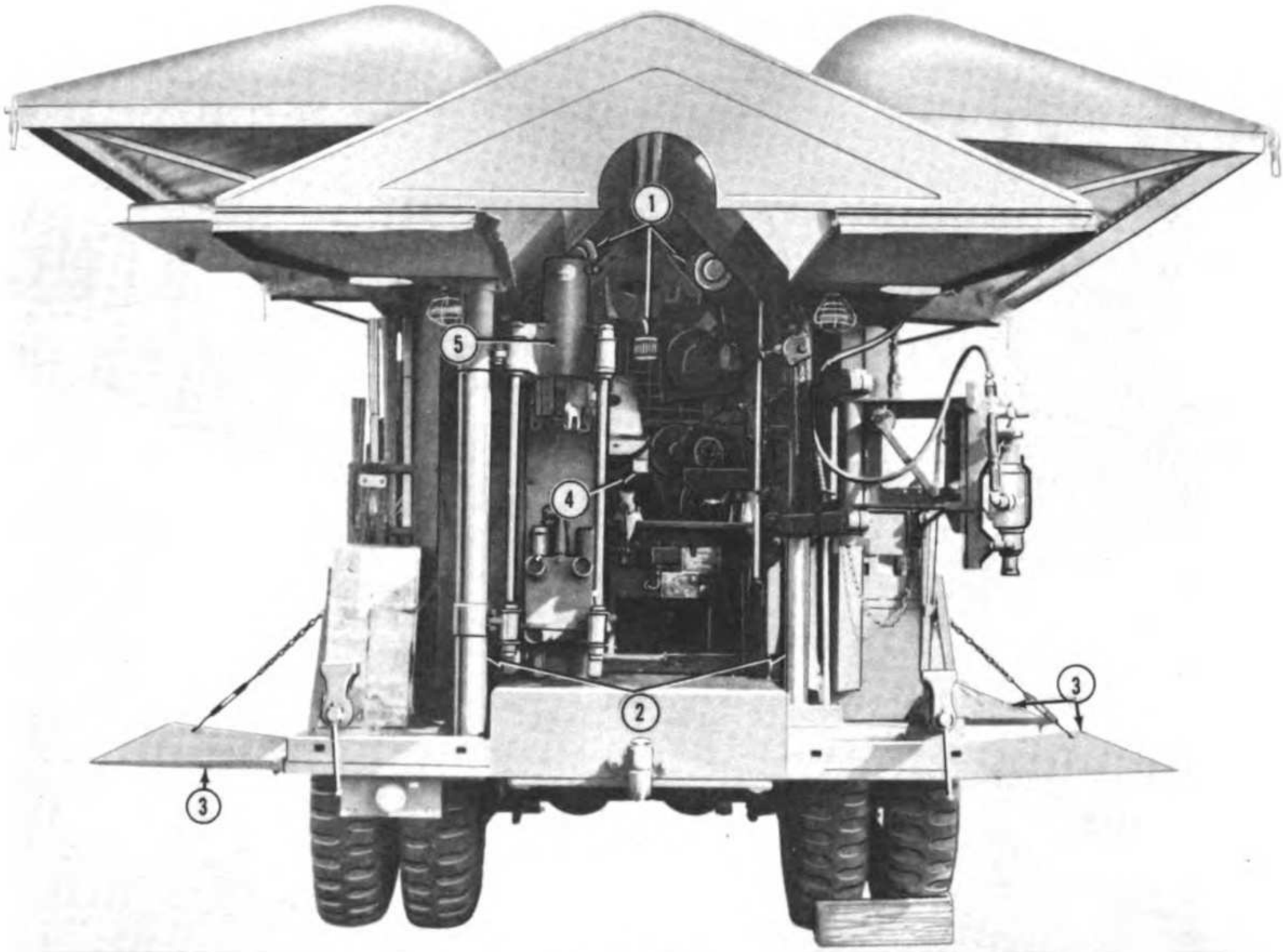
1 Traveling-lights receptacle
2 Airbrake connections
3 Radiator shutter
4 Engine enclosure
5 Trailer-supporting jack
6 Side-lifting jack
7 Bench grinder
8 Wheels and axle assembly
9 Side-lifting jack pump
10 Jack safeties
11 Battery compartment access plate
12 Semitrailer
13 Kingpin

Figure 5. Mobile shop open for operation, left front view.



1 Side-lifting jack 2 Fire extinguisher

Figure 6. Mobile shop open for operation, right rear view.



1 Ventilating blowers
2 Trailer-supporting jacks
3 Catwalks
4 Hotplate
5 100-ton hydraulic press

Figure 7. Mobile shop open for operation, rear view.

on the selected work site. Two heaters and three ventilating blowers (1) are installed in the shop body. The canvas tenting when erected (figs. 8 and 9) completely encloses the shop body and a working area 18 feet long and 27 feet wide.

e. Dynamotor-Welder and Electric-Control System. The dynamotor-welder (4, fig. 10), when driven by the engine (1) through six drive belts (3), is utilized as a 12-kw, 208-volt, 3-phase, ac generator. When an external power source is connected to the dynamotor-welder, the front end is used as a 25-hp, ac motor. The rear of the dynamotor-welder is always used as a 300-ampere, 40-volt, dc arc welder. The dynamotor-welder is controlled by the electric-control cubicle (10). Connections for arc welding are provided in the welding-connector panel (9).

f. Air Compressor. The Schramm-Wisconsin air compressor (6) Model WD50 is a four-cylinder, air-cooled, reversed rotation, rubber-mounted unit that supplies 50 cfm (cubic feet per minute) of air at 1,800 rpm. The air compressor is regulated to maintain pressure of 100 psi (pounds per square inch) for operating pneumatic tools and equipment.

g. Shop Load. The shop load provided with the mobile shop consists of electric-powered tools; pneumatic tools; hydraulic-powered tools; complete toolkits for machinist, welder, electrician, and master mechanic; and general shop tools. Shop load is listed in appendix II.

4. Identification

a. Corps of Engineers Identification Plate. The Corps of Engineers identification plate (fig. 11) located on the right front side of the shop

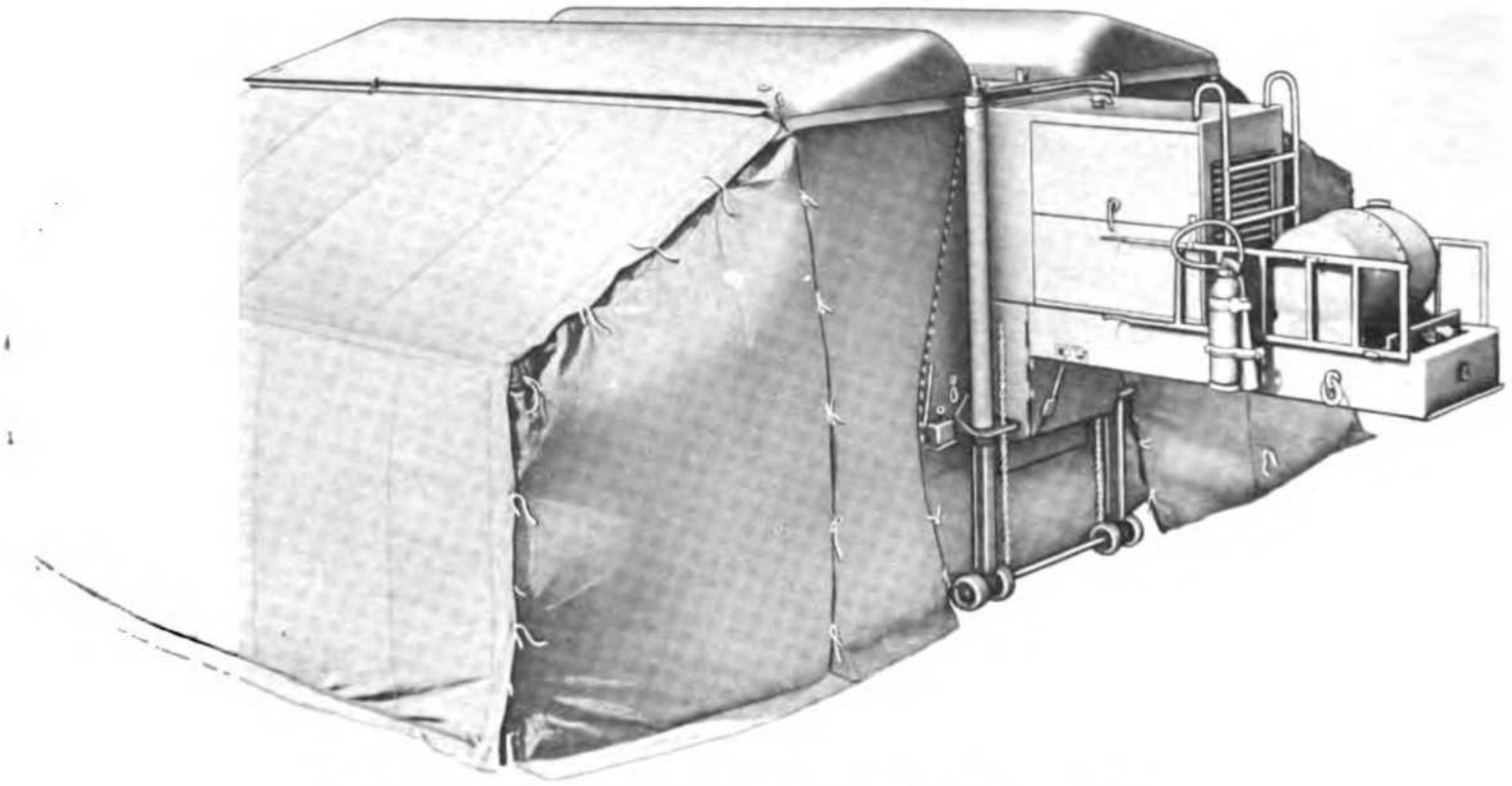
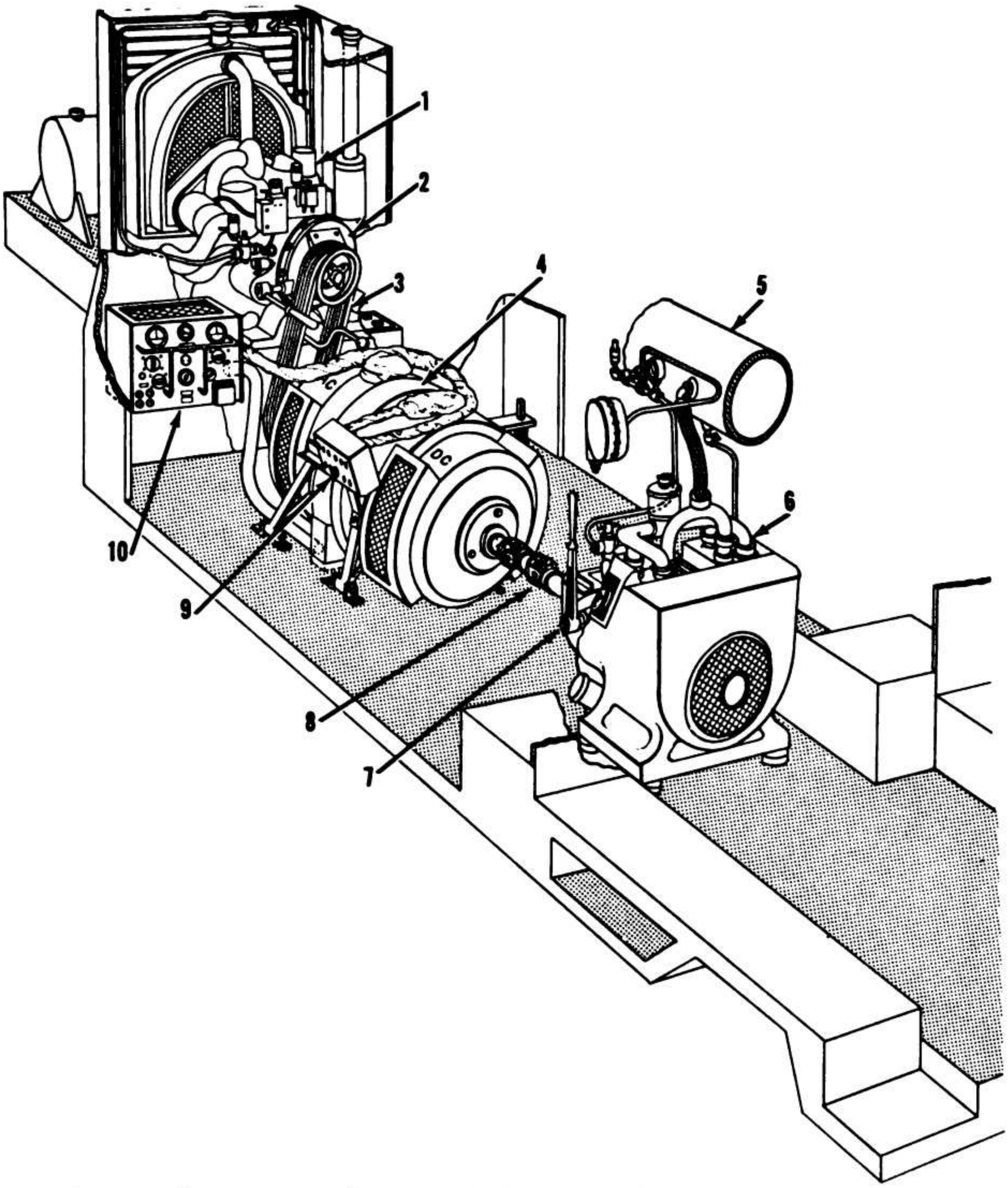


Figure 8. Mobile shop with tenting erected, right front view.

Figure 9. Mobile shop with tenting erected, right rear view.



1	Engine	4	Dynamotor-welder	7	Compressor clutch	10	Electric-control cubicle
2	Engine clutch	5	Air tank	8	Drive shaft		
3	Drive belts	6	Air compressor	9	Welding-connector panel		

Figure 10. Power supply and drives, pictorial view.

body, specifies the official nomenclature, the model number, and the serial number of the mobile shop.

b. Semitrailer, Heater, and Side-Lifting Pump Identification Plates. The semitrailer data plate (A, fig. 12), located on the right front side of the trailer frame, specifies the rating, model number, and serial number. The heater data plate (B, fig. 12), located on the front of each heater, specifies the model number and provides operating instructions for the heater. The side-lifting hydraulic pump data plate (C, fig. 12), located on top of the pump, specifies model number, serial number, and manufacturer.

c. Engine and Accessories Identification Plates. The engine data plate (A, fig. 13), located on the left side of the flywheel housing, specifies the model number and engine number, engine specifications, and manufacturer. The generator data plate (B, fig. 13), located on the side of the unit, specifies the manufacturer, operating speed range, specification, type, class, grade, model, and serial numbers. The starting motor data plate (C, fig. 13), located on the side of this unit, specifies the rating, ordnance part, specification, type, model and serial numbers. The generator regulator data plate (D, fig. 13), located on the side of the unit,

specifies the rating, model, serial, ordnance, and specification numbers. The governor data plate (E, fig. 13), located on the top of this unit, specifies the model and serial numbers and manufacturer.

Figure 11. Corps of Engineers identification plate.

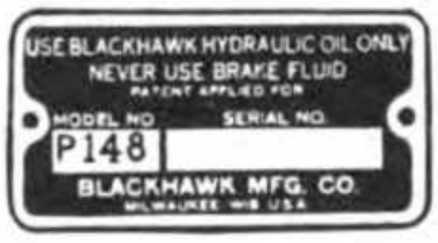
d. Engine Clutch Identification Plate. The engine clutch identification plate (fig. 14), located on the clutch-access plate under the instrument panel, specifies the model and specifications numbers.

e. Dynamotor-Welder Identification Plates. The dynamotor-welder has two identification plates. The Hobart welder data plate (A, fig. 15), located on the side of the unit, specifies the rating, manufacturer and model number. The Couse dynamotor-welder patent plate (B, fig. 15), located on the side of the unit, specifies the patent numbers.

f. Air Compressor and Clutch Identification Plates. The air compressor data plate (A, fig. 16), located on the left shroud, specifies the rating, model and serial numbers. The compressor clutch

A

B

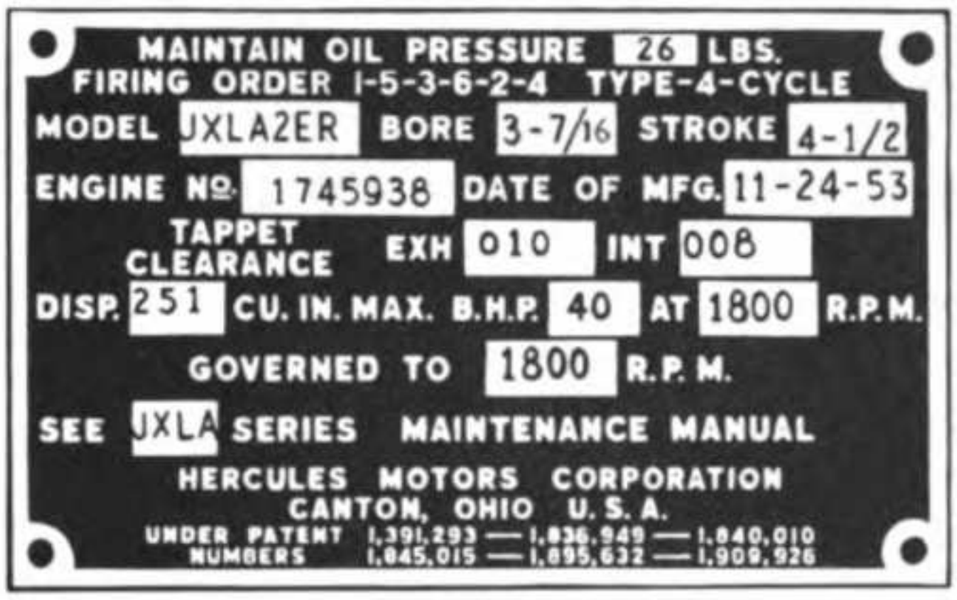


C

Figure 12. Semitrailer, heater, and side-lifting pump identification plates.

data plate (B, fig. 16), located on the clutch-access plate, specifies the model and serial numbers.

g. Lathe, Drive, and Attachment Identification Plates. The lathe data plate (A, fig. 17), located on the rear gearcase of the headstock assembly, specifies the model and serial numbers. The lathe drive data plate (B, fig. 17), located on the motor



A

B

C

D

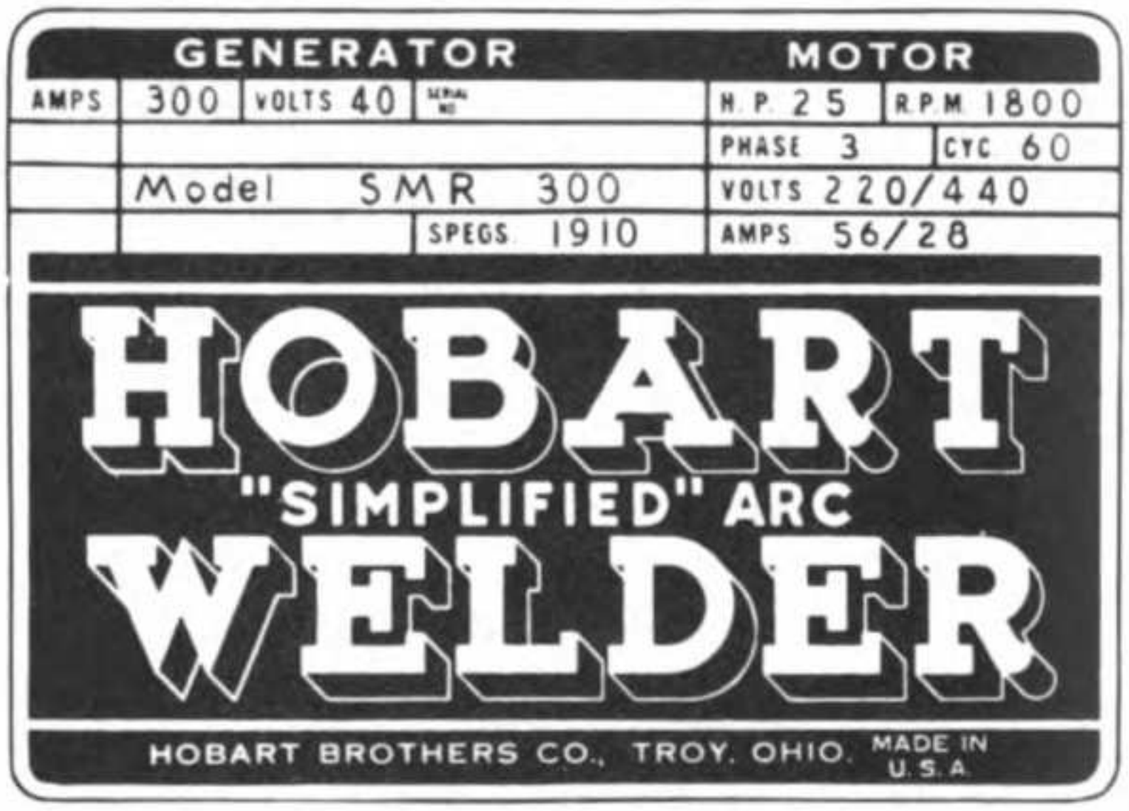
E

Figure 13. Engine and accessories identification plates.

Figure 14. Engine clutch identification plate.

end of the drive unit, specifies the rating, type, model, and serial numbers. The lathe-reversing switch data plate (C, fig. 17), located on the bottom of the reversing switch, specifies the rating, style number, and switch positions. The milling-and-grinding attachment has two identification plates. The milling-and-grinding attachment identification plate (D, fig. 17), located on the base of the unit, specifies the model and serial numbers. The milling-and-grinding attachment motor data plate (E, fig. 17), located on the motor, specifies the rating, serial number, and manufacturer.

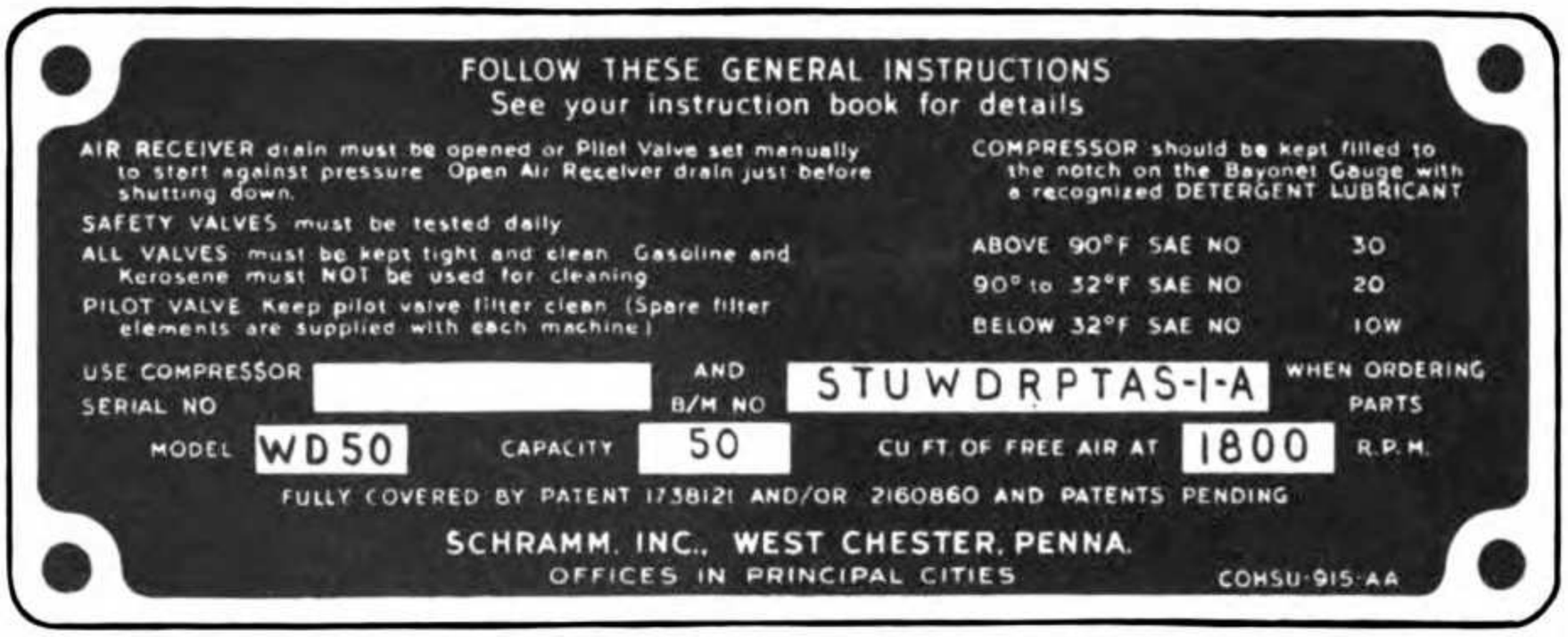
h. Electric-Powered Shop Equipment Identification Plates. The impact wrench data plate (A, fig. 18), located on the back end of the impact wrench, specifies the rating, size, and model number. The honing machine identification plate (B, fig. 18), located on the front of the unit, specifies the model number and manufacturer. The bench grinder data plate (C, fig. 18), located on the front end of the unit, specifies the rating, specifi-



A

B

Figure 15. Dynamotor-welder identification plates.



A

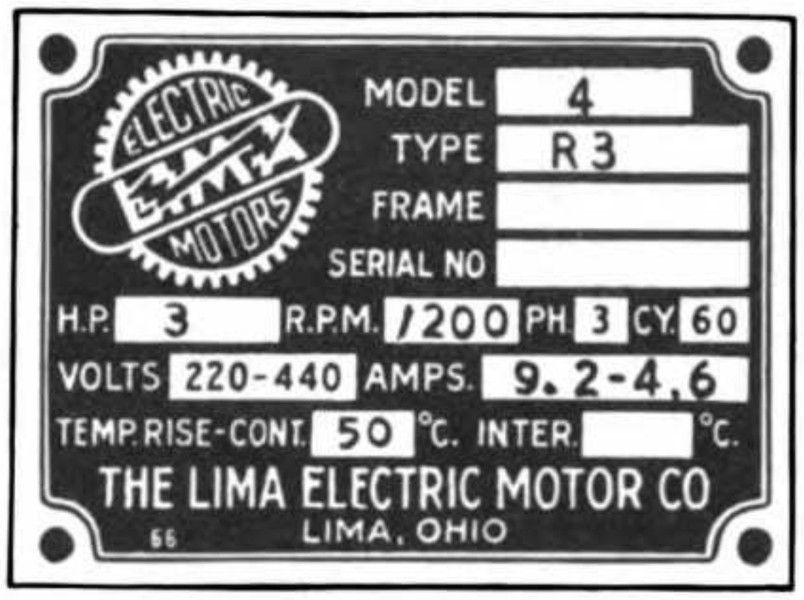
B

Figure 16. Air compressor and clutch identification plates.

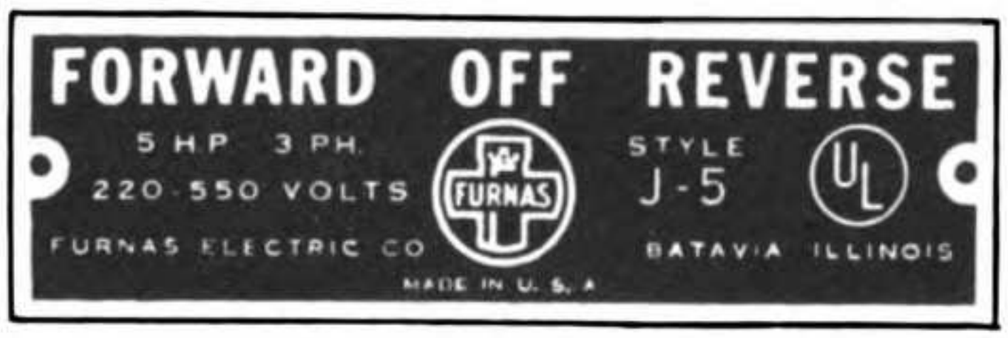
cation, frame, model, and serial numbers. The electric drill, ¼-inch, data plate (D, fig. 18), located on the side of the unit, specifies the rating, model and serial numbers. The battery charger data plate (E, fig. 18), located on the side of the unit, specifies the rating, model and serial numbers. The cylinder boring bar identification plate (F, fig. 18), located on the body of the unit, specifies the model and serial numbers. The valve refacer data plate (G, fig. 18), located on the front of the unit, specifies the rating, type, catalog, and serial numbers. The boring-bar motor data plate (H, fig. 18), located on the side of the motor, specifies the rating, model, and serial numbers. The bandsaw data plate (I, fig. 18), located on the top of the unit, specifies the model and serial numbers. The bandsaw-motor data plate (J, fig. 18), located on the motor, specifies rating, model, and serial numbers. The valve seat grinder data plate (K, fig. 18), located on the body of the unit, specifies the rating, type, catalog, and serial numbers. The electric drill, ⅝-inch, data plate (L, fig. 18), located on the body of the unit, specifies the rating, type, and serial number. The electric-drill, ⅝-inch, stand data plate (M, fig. 18), located on the front of the stand, specifies the type and serial number. The brake-relining machine identification plate (N, fig. 18), located on the body of the unit, specifies the model and serial numbers. The brake-relining-machine motor data plate (O, fig. 18), located on the side of the motor, specifies the rating, type, and serial number. The grinder data plate (P, fig. 18), located on the body of the unit, specifies the rating, type, catalog, and serial numbers. The hotplate data plate (Q, fig. 18), located on the back of the unit, specifies the rating, model, and serial numbers.

i. Air-Powered Shop Equipment Identification Plates. The radial-drill arm has two identification plates. The manufacturer's identification plate (A, fig. 19), located on the lower swing section, specifies the manufacturer and model number. The radial-drill arm identification plate (B, fig. 19), located on the upper swing section, specifies the model and serial numbers. The pneumatic drill, ¾-inch, identification plate (C,

A



B



C

D

E

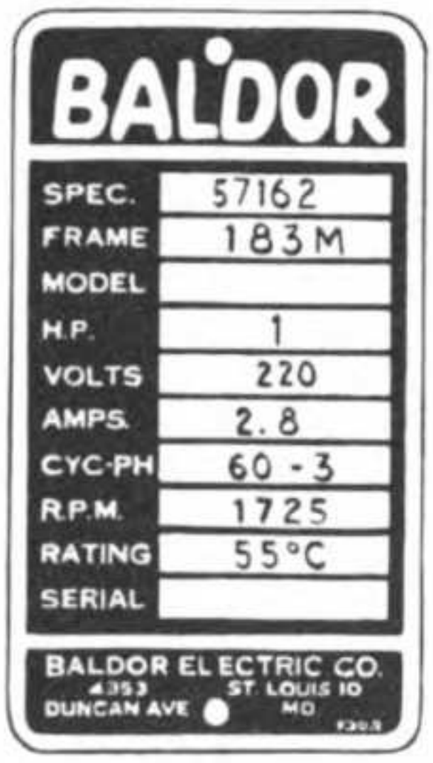
Figure 17. Lathe, drive, and attachment identification plates.

fig. 19), located on the body of the unit, specifies the size and serial numbers. The pneumatic drill, 1½ inch, data plate (D, fig. 19), located on the body of the unit, specifies the size and serial numbers. The pneumatic hacksaw identification plate (E, fig. 19), located on the body of the unit, specifies the manufacturer and serial number.

j. Hydraulic-Powered Shop Equipment Identification Plates. The hydraulic press, 100-ton, has three identification plates. The ram plate (A, fig. 20), located on the body of the ram, specifies the rating, model, and serial numbers. The frame identification plate (B, fig. 20), located on the main frame member, specifies the model and serial numbers. The pump identification plate (C, fig. 20), located on the body of the pump, specifies the model

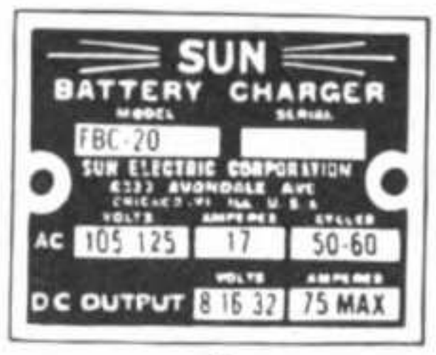
A

B

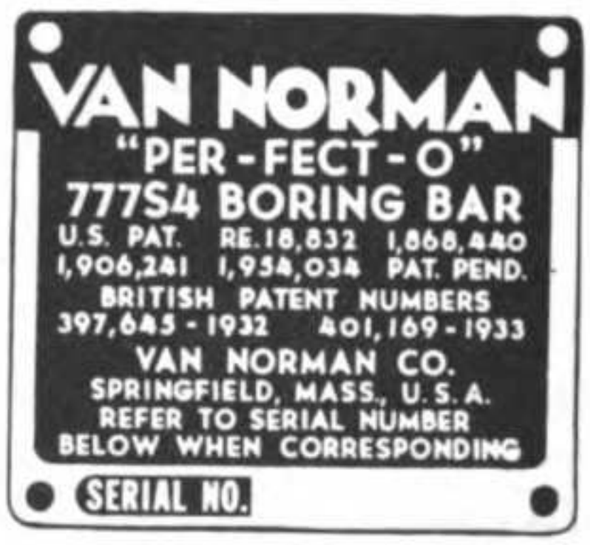


C

D

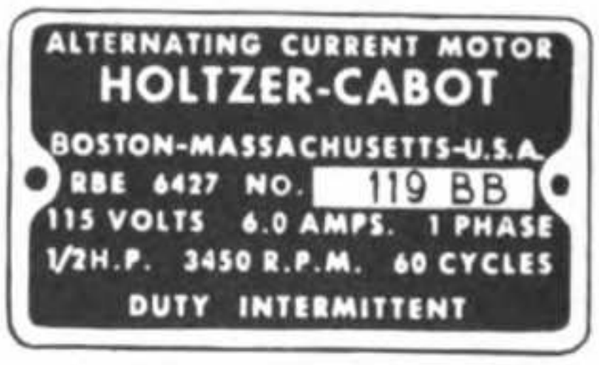


E



F

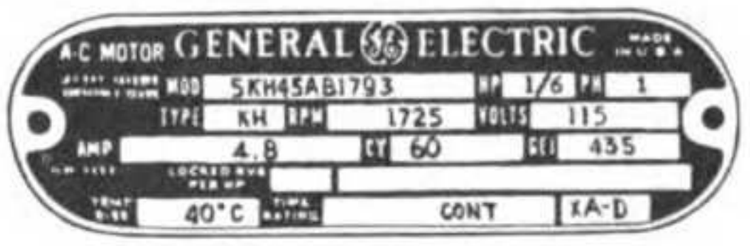
G



H

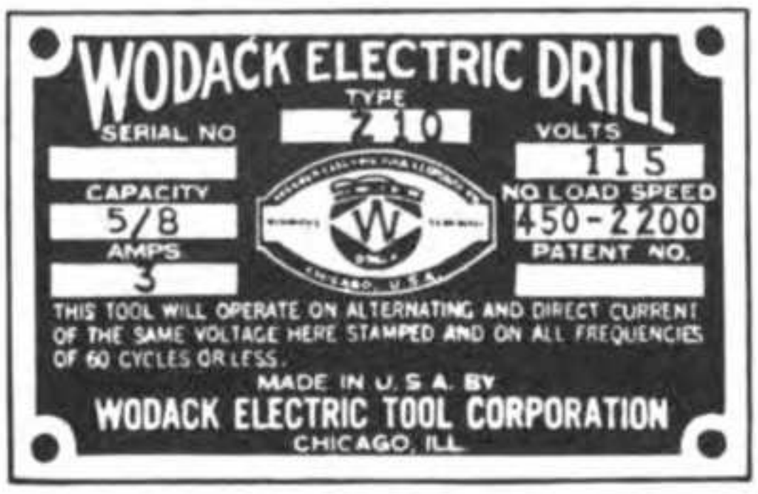
Figure 18. Electric-powered shop equipment identification plates.

I

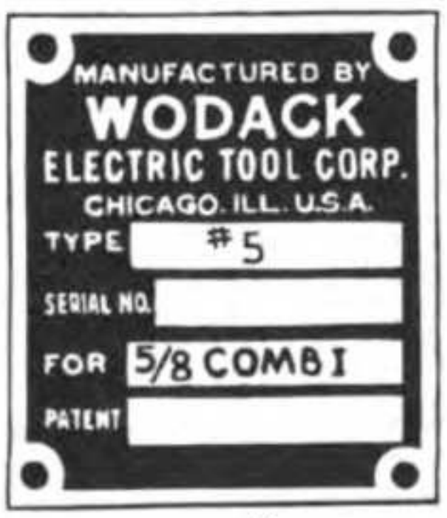


J

K

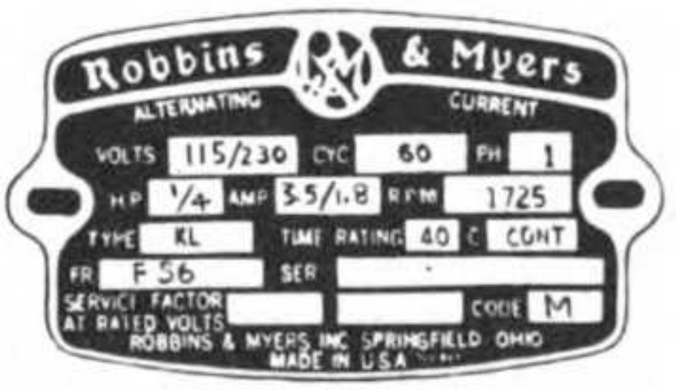


L



M

N



O

P

Q

Figure 18—Continued.

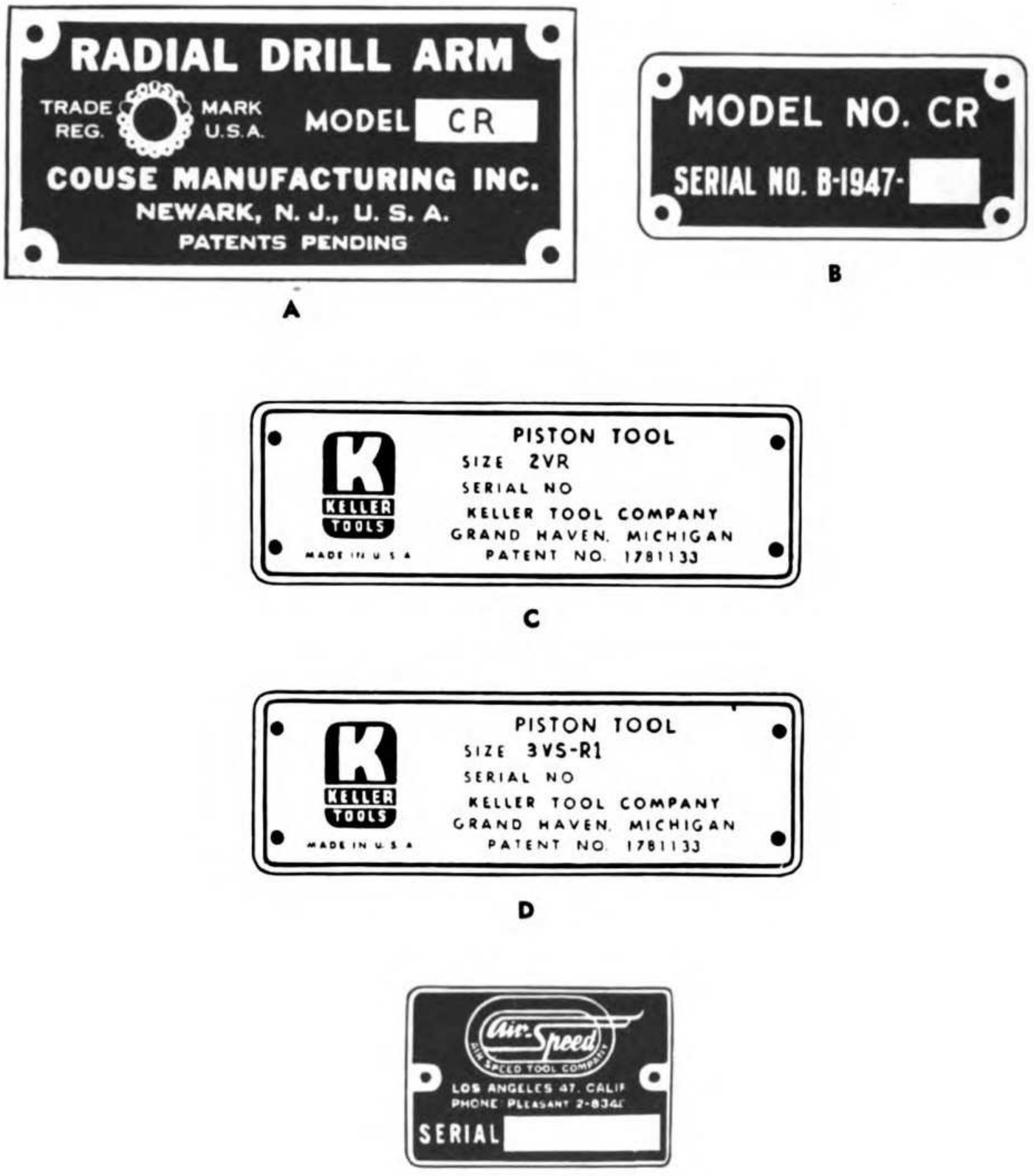


Figure 19. Air-powered shop equipment identification plates.

and serial numbers. The hydraulic press, 10-ton, data plate (D, fig. 20), located on the body of the unit, specifies the rating, model, and serial numbers.

5. Differences in Models

The serial numbers of the mobile shops covered by this manual are Couse serial numbers 5 to 114, inclusive. These mobile shops are all designated Model MED and are all alike.

6. Tabulated Data

a. General.

Manufacturer	Couse Mfg., Inc.
Model	MED
Type	Set No. 1, Heavy

b. General Dimensions.

Length, overall	26 ft 9 in.
Width, overall	8 ft 1 in.
Height, overall	9 ft 10 in.
Gross weight	23,000 lb

c. Shipping Dimensions.

Length	26 ft 9 in.
Width	8 ft 1 in.
Height	9 ft 10 in.
Height (wheels and axle assembly removed).	7 ft 9 in.
Cubage	2,126 cu ft
Tonnage	11.5 short tons

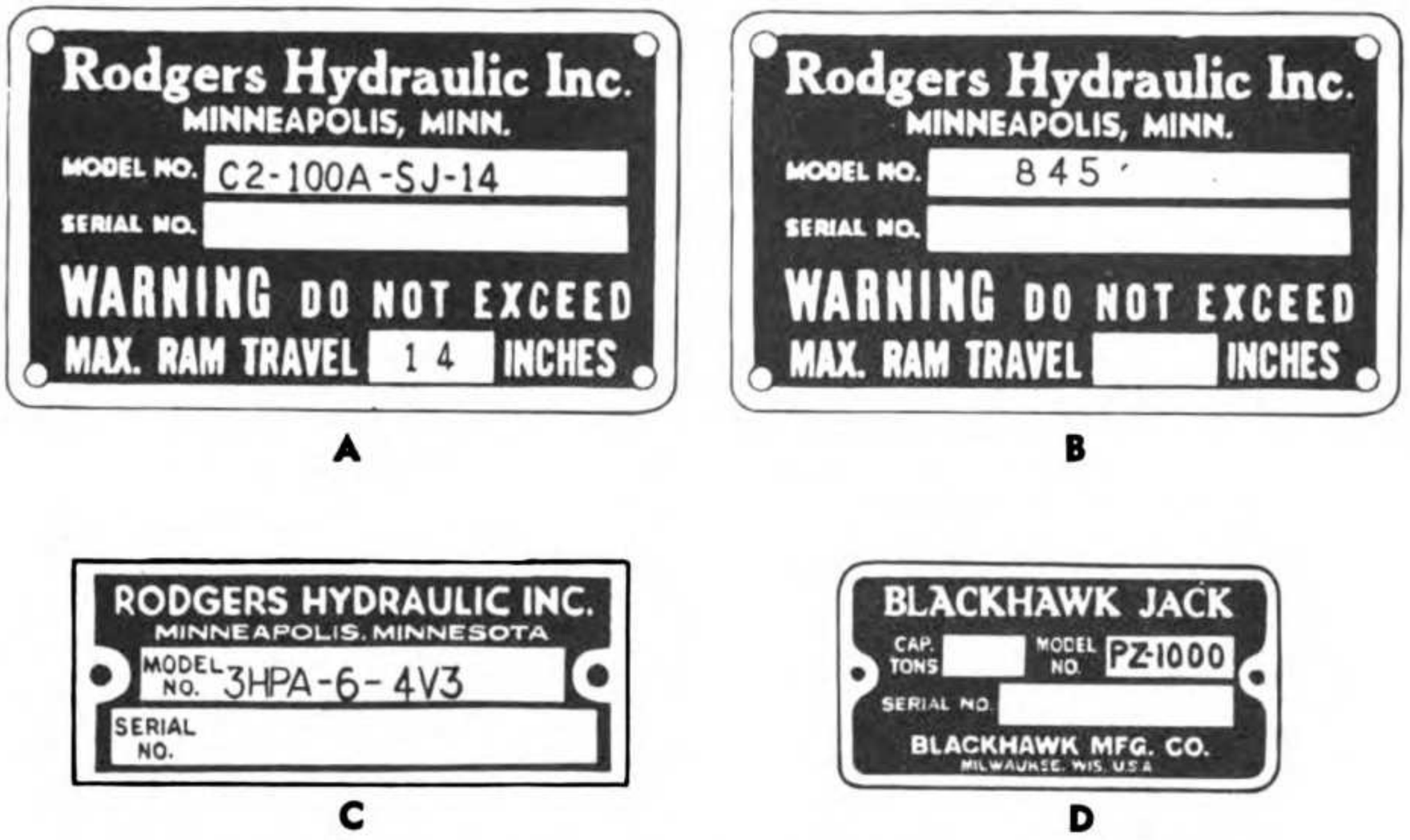


Figure 20. Hydraulic-powered shop equipment identification plates.

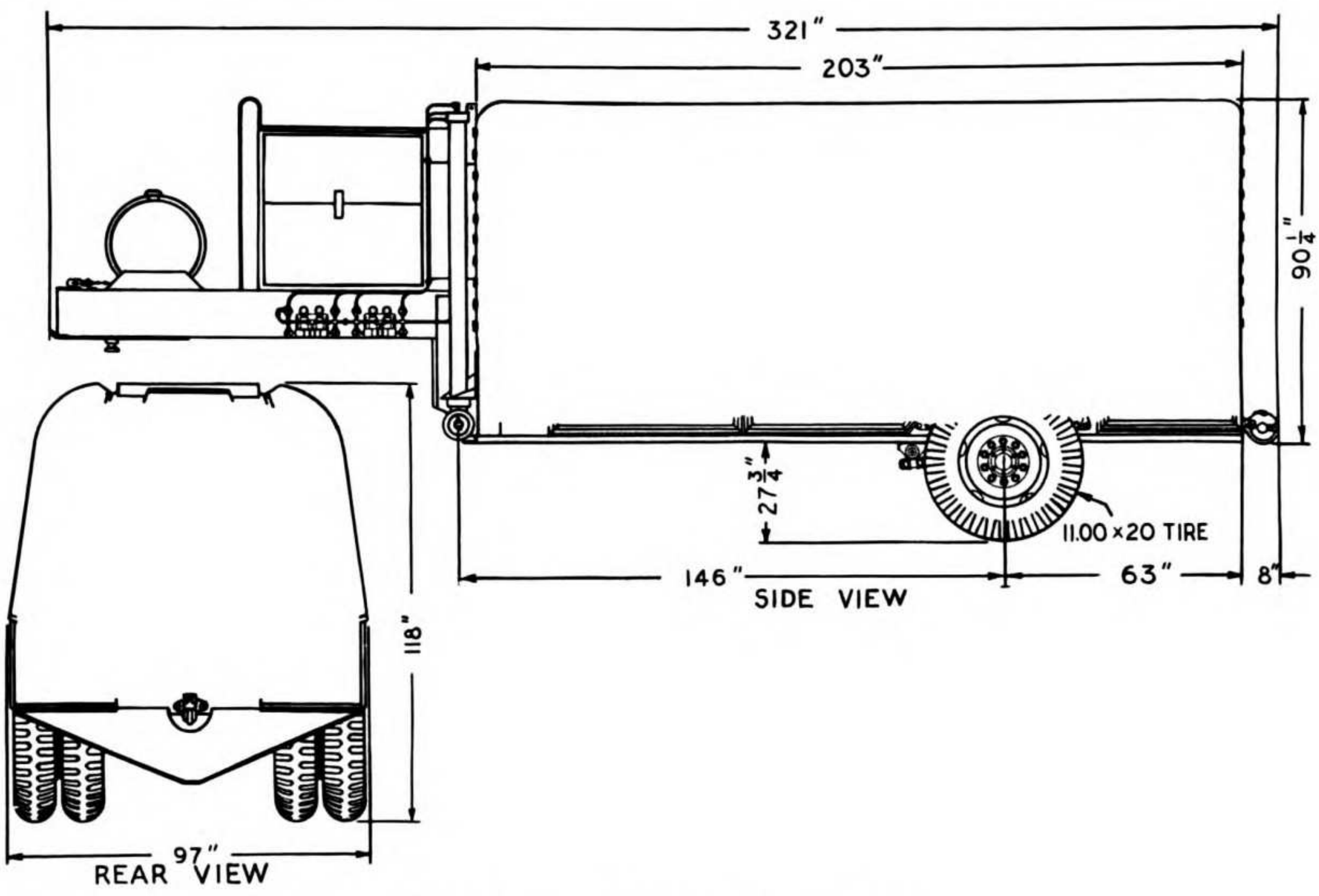


Figure 21. Overall dimensions of mobile shop.

d. Semitrailer, Shop Body, and Accessories.

	Type	Model	Make
Semitrailer	Single axle	S4G	Couse Kingham
Wheels	Mil. Std. Disk 10 Stud	ORD 7589495	Goodyear
Brake system	Full air mechanical	----------	Bendix-Westinghouse
Heaters	South Wind	978NR24	Stewart-Warner
Ventilators	Rotary	1080FM	Couse-Dayton
Fire extinguisher	CO_2	15T–1	Kidde

e. Engine and Accessories.

	Type	Model	Make
Engine	6-cyl, gasoline fuel	JXLA2ER	Hercules
Radiator	Water tube	220590DS	Perfex
Radiator shutter	Automatic and manual control	M–1004	Kysor
Fan	4-blade	A–125767	Switzer-Cummins
Fuel pump	Mechanical	D–1539989	A. C.
Oil filter	Removable cartridge	140225DS	Fram
Air cleaner	Oil-bath	G65&6703	Vortex
Carburetor	Updraft	63AW10	Zenith
Magneto	Impulse coupling, shielded	53798CS	Fairbanks-Morse
Governor	Centrifugal	GC–113	Pierce
Generator	24-volt, 18-amp	1105970	Delco-Remy
Generator regulator	18-amp, carbon resistor	1926196	Delco-Remy
Starting motor	24-volt, overrunning clutch	1108575	Delco-Remy
Spark plugs	14-mm	XEJ–8	Champion
Batteries	12-volt 20-amp-hr	----------	Delco
Engine clutch	Dry single plate, over center	110HP	Twin-Disc
Drive belts	Vee C size X81	M–3404	Dayton
Primer pump	Hand-operated	K–2405–⅛B	Kohler
Coolant-temperature gage	Electric	1512676	AC
Oil-pressure gage	Electric	1507975	AC
Tachometer and hour-meter	Mechanical	1548168	AC
Battery ammeter	Electric	1501244	AC
Fuel gage	Electric	358–E	Stewart-Warner

f. Dynamotor-Welder and Electric-Control System.

	Type	Model	Make
Dynamotor-welder	Dual (ac, dc)	SMR–300	Couse-Hobart
Electric-control cubicle	Dead front	MED	Couse
Welding-connector panel	Plug-in	----------	Couse

g. Air Compressor.

	Type	Model	Make
Air compressor	4-cylinder, reverse rotation	WD50	Schramm-Wisconsin
Compressor clutch	Wet, over-center	S5½–15	Rockford
Oil-pressure gage	Bellows 0–10 lbs	2-in.	Rochester
Air-pressure gage	Bellows 0–200 lbs	3½-in.	Ashcraft

h. Air Compressor Drive Shaft.

	Type	Model	Make
Drive shaft	Automotive	1350 Series	Spicer

i. Shop Equipment.

	Type	Model	Make
Lathe	Extension gap	HK–A–1	Smith-Drum
Lathe base	Tubular	----------	Couse
Lathe drive	Selective 4-speed	R–3	Lima
Milling-and-grinding attachment.	4-post	B	Master
Bench grinder	10-in	57162	Baldor
Bandsaw	Metal cutting 3½-in. capacity	49A	Wells
Honing machine	Wet	2500	Ammco
Sander	Electric, 7-in. dia disk	93E	Black and Decker
Drill, ¼-in	Electric universal	6935	Thor
Drill, ⅜-in	Electric 2-speed	Z–10	Wodack

i. Shop Equipment—Continued

	Title	*Model*	*Make*
Drill stand	Handpress	#5	Wodack
Impact wrench set	Electric	8–U	Ingersoll-Rand
Valve refacer	Electric, 2-motor, wet, PGEE	550E	Black and Decker
Valve seat grinder	Electric vibrocentric	331–E	Black and Decker
Cylinder boring bar	Electric portable	777–S4	Van Norman
Brake-relining machine	Electric	38–M	Star
Battery charger	Electric portable	FCB20	Sun
Hotplate	Electric 208-volt element	2100	Temco
Pneumatic drill, ¾-in	Piston	2VR	Keller
Pneumatic drill, 1½-in	Piston	3VS–R1	Keller
Radial-drill arm	Folding	CR	Couse
Pneumatic-hammer set	Portable	OX–3	Keller
Pneumatic hacksaw	Portable	V–154	Air Speed
Pneumatic tool set	General purpose	7425	Aro
Pneumatic drill 5/16-in	Pistol-grip handle	CE–7426	Aro
Pneumatic grinder, 2-in	Button-type handle	CE–7427	Aro
Spray gun	Air pressure	MEC	De Vilbiss
Spray gun suction-feed-cup attachment.	1 qt	KR	De Vilbiss
Spray gun transformer	Series 50	HLD	De Vilbiss
Blowgun	Hand	7184A	Schrader
Tire-inflation tool	Chuck	5499	Schrader
Hydraulic press, 10-ton	Porto-power	PZ–1000	Blackhawk
Hydraulic press, 100-ton	Portable	TS–100A–14–3	Rodgers
Hydraulic jack, 12-ton	Portable, type VII, class B	FS GGG J–51	Star

j. Capacities.

Trailer-supporting hydraulic jacks and pumps.	36 qt
Side-lifting hydraulic jacks and pumps.	2 qt per side
Tires (1100 x 20)	65 psi
Fire extinguisher (CO_2)	11.66 lb
Fuel tank	55 gal
Engine crankcase (including filter).	8 qt
Engine air cleaner	1 qt
Cooling system	30 qt
Air tank	4 cu ft
Compressor crankcase	4 qt
Compressor air cleaner	0.5 ft
Compressor clutch	1 pt
Lathe-drive gearbox	5 pt
Hydraulic press, 10-ton	1 qt
Hydraulic press, 100-ton	7 qt
Honing machine	2.5 gal

k. Engine Performance.

Governed speed	1,800 rpm
Horsepower	40 at 1,800 rpm

l. Dynamotor-Welder Performance.

AC motor:	
Amperes	56 at 1,800 rpm
Volts	208 at 1,800 rpm
Horsepower	25 at 1,800 rpm
Welding generator:	
Amperes	300 at 1,800 rpm
Working voltage	40 at 1,800 rpm
Open circuit voltage	80 at 1,800 rpm
Kilowatts	12 at 1,800 rpm
Welding range	0 to 350 amperes

m. Air Compressor Performance.

Output	50 cfm at 1,800 rpm
Regulated pressure	100 psi
Horsepower consumed	15 hp

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

7. New Equipment

a. General. The mobile shop is loaded and secured on a flatcar (fig. 22) for normal domestic shipment. The mobile shop can be shipped by air, if necessary. The wheels and axle assembly must be removed (par. 147) before loading mobile shop into aircraft.

b. Unloading.

(1) *Rail shipment.* Move mobile crane to flatcar and position boom over center of mobile shop. Use special lifting slings (1, fig. 23), stowed on top of mobile shop, and attach crane hook through slings. Take up all slack in slings.

Caution: Be certain to use mobile crane or other suitable lifting equipment capable of safely lifting 12 tons.

Remove wood blocking, staybars, and web straps securing mobile shop on flatcar.

Note. Do not remove tie-down rings from mobile shop.

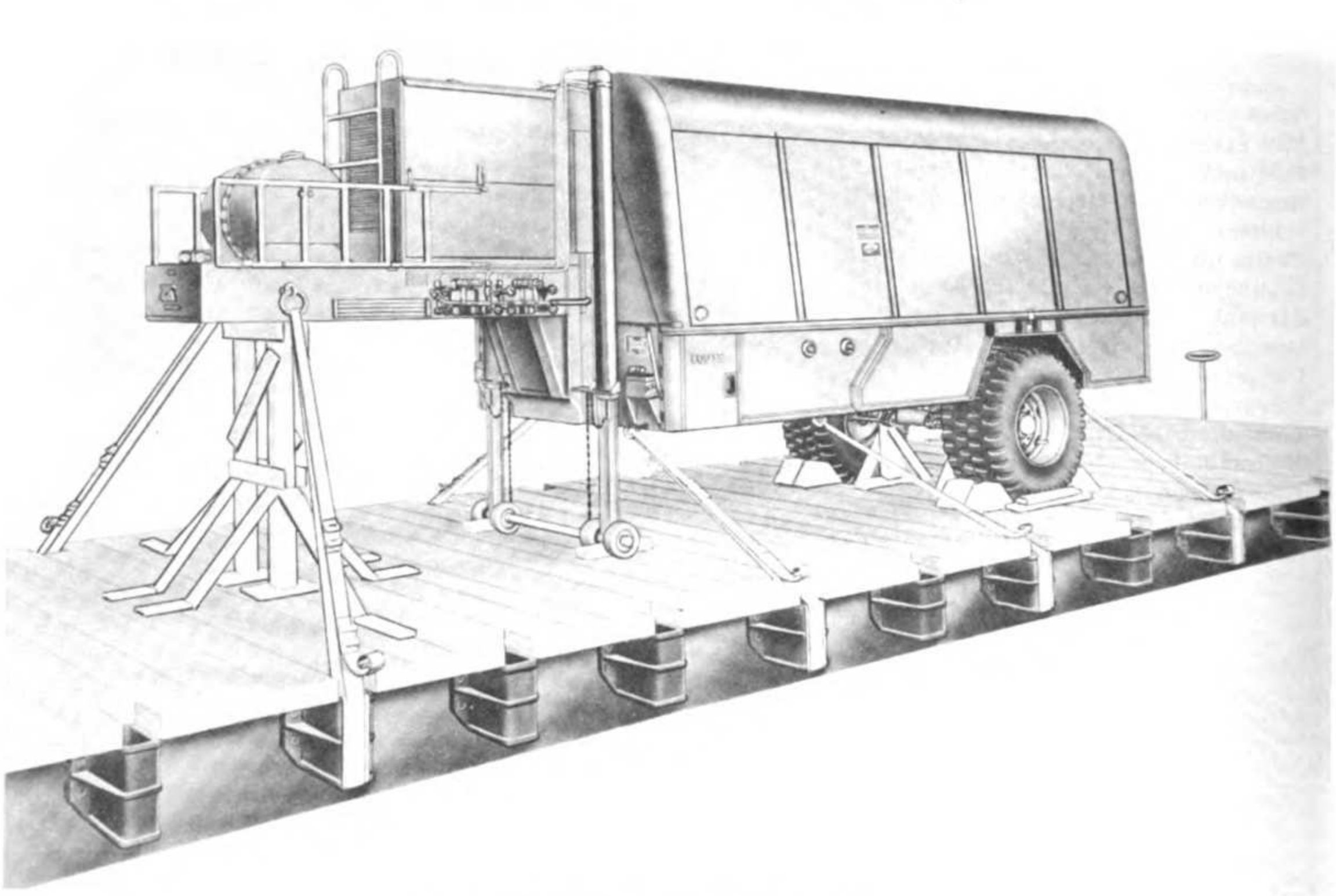


Figure 22. Mobile shop secured to flatcar.

Carefully lift mobile shop off flatcar (fig. 24) and lower shop to ground. If a mobile crane is not available, unload mobile shop with use of ramp and a prime mover. Lock brakes of flatcar and block wheels of flatcar (2, fig. 25) to prevent movement. Construct suitable ramp (1) at front of flatcar. Remove wood blocking, staybars, and web straps securing mobile shop on flatcar. Leave wheel chocks in position. Back prime mover up ramp and connect prime mover to mobile shop (par. 51). Remove wheel chocks from shop wheels. Pull mobile shop off flatcar to ground. Disconnect prime mover (par. 38) and level mobile shop.

Caution: Use lowest speed of prime mover when pulling mobile shop off flatcar.

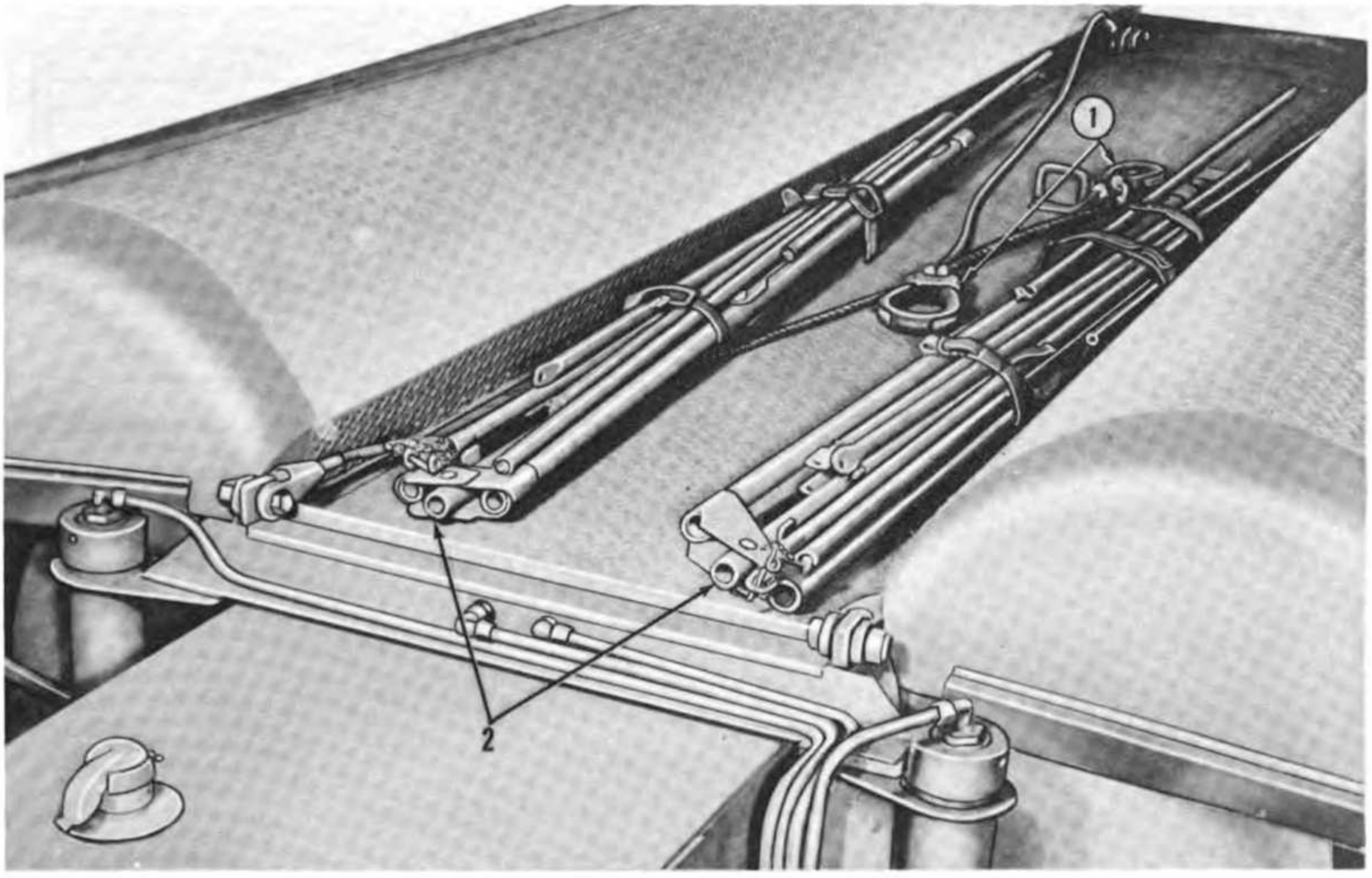
(2) *Air shipment.* Unload wheels and axle assembly from aircraft.

Note. For air shipment the wheels and axle assembly is removed from the mobile shop (par. 147), loaded into the aircraft, and secured under the gooseneck of the mobile shop.

Remove material used for securing mobile shop in aircraft. Slide mobile shop out of aircraft, using rollers. Operate trailer-supporting jacks to raise and level shop (par. 38*h*). Install wheels and axle assembly (par. 148).

c. Uncrating. The major components of the mobile shop do not require crating or any other special shipment preparations. The mobile shop is shipped with the contents of all compartments secured and the compartments padlocked. The miscellaneous storage compartments are shown fully loaded for shipment or travel in figures 26 through 29. Welding equipment, gages, and hoses are packed in a paper carton which can be discarded upon unpacking.

d. Removal of Preservative Compounds, Lubricants, and Devices. The preservative materials used on the mobile shop consist of VPI (vapor-phase inhibitor) crystals and VPI-treated paper. VPI is a slowly vaporizing corrosion inhibitor which preserves the surface of the metal by form-



1 Lifting slings 2 Tenting frames

Figure 23. Mobile shop, top view.

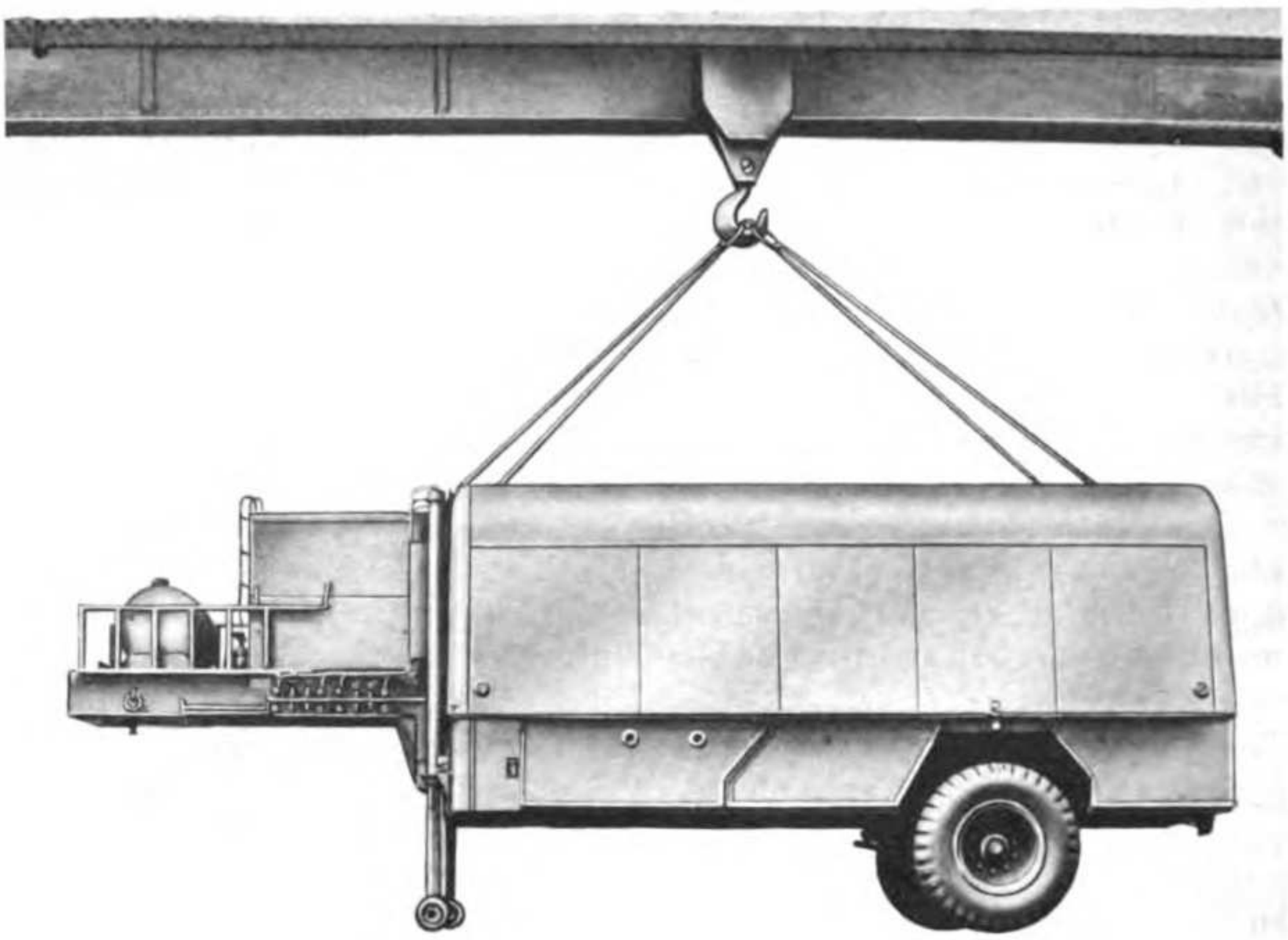
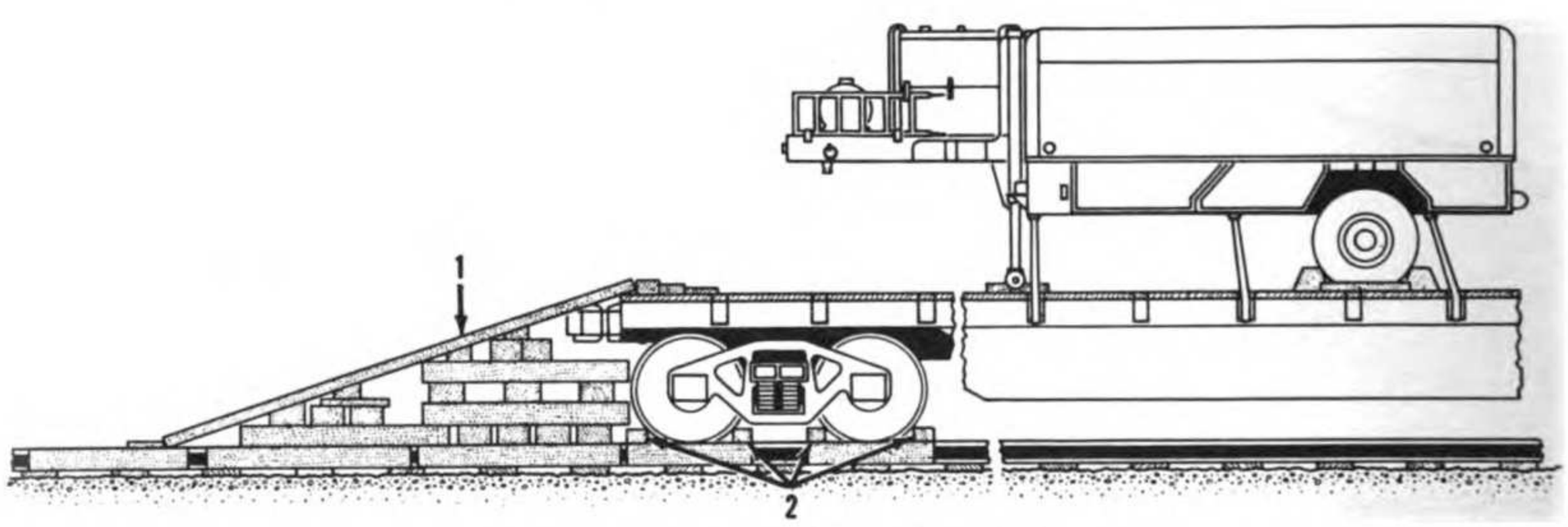
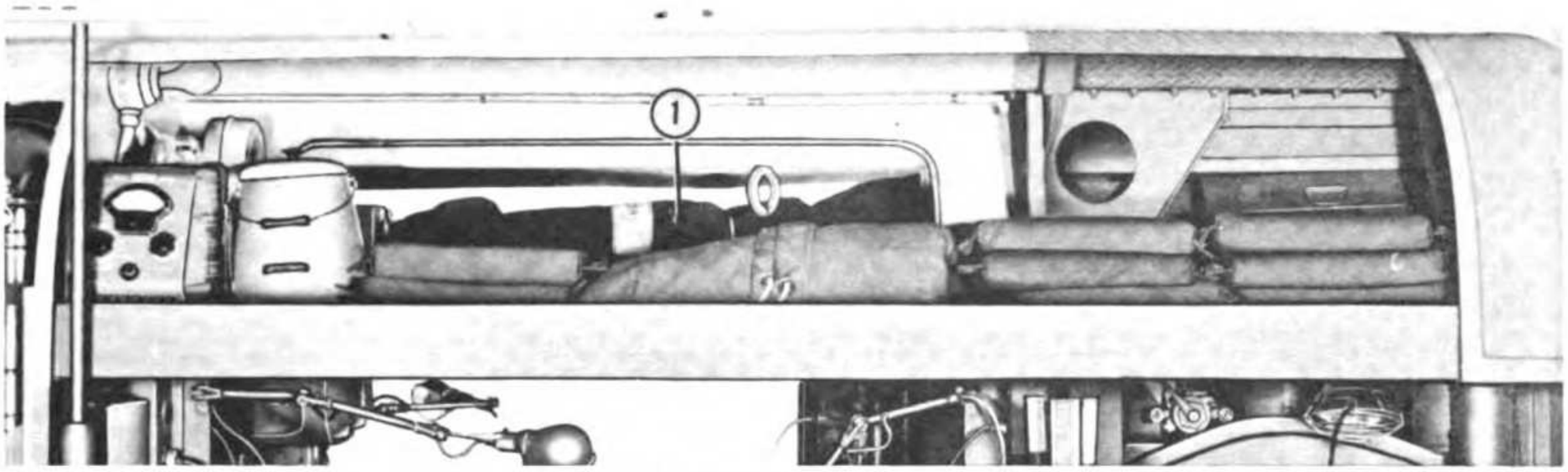


Figure 24. Mobile shop lifted for unloading.



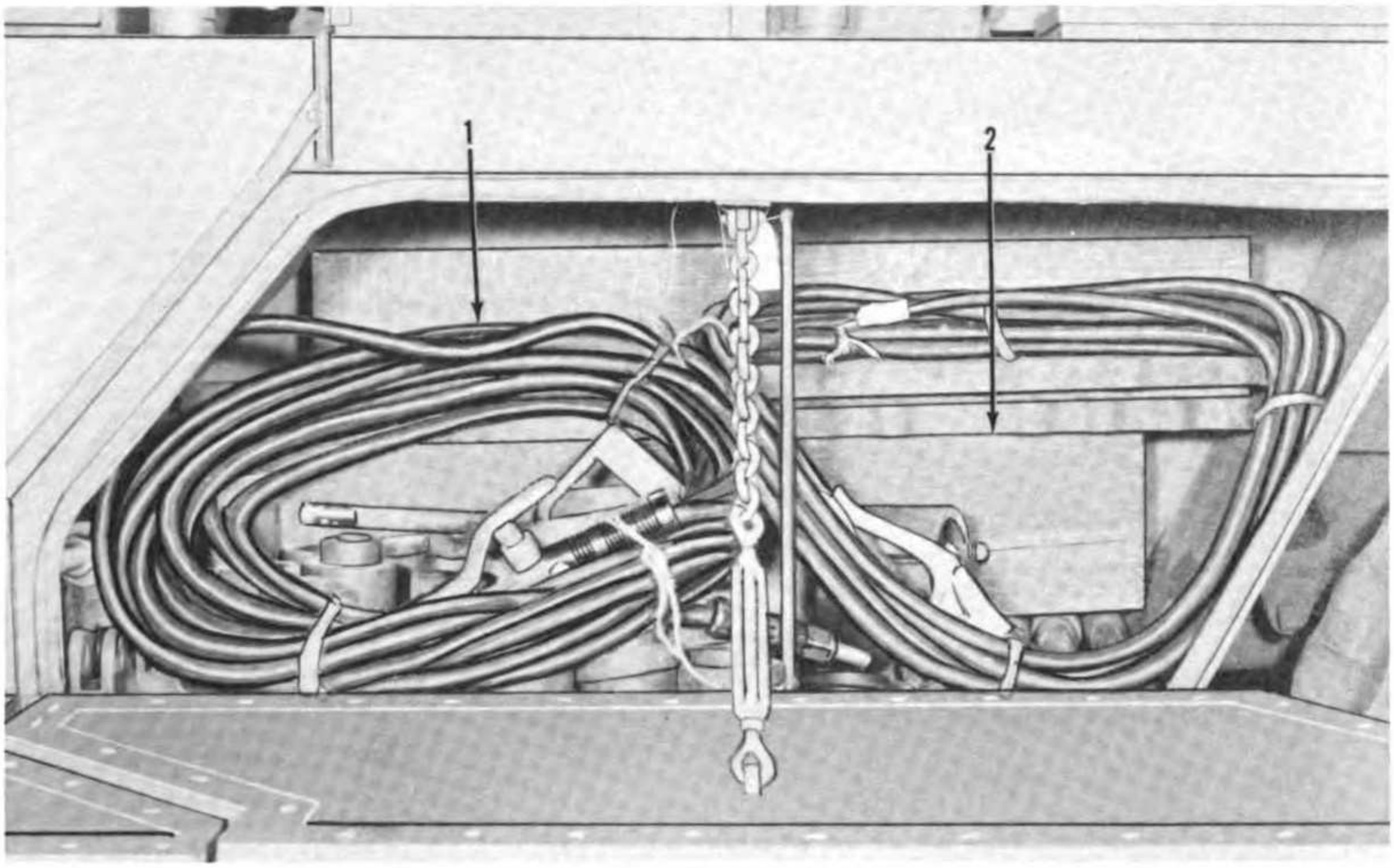
1 Ramp 2 Flatcar wheel blocking

Figure 25. Flatcar with ramp in place.



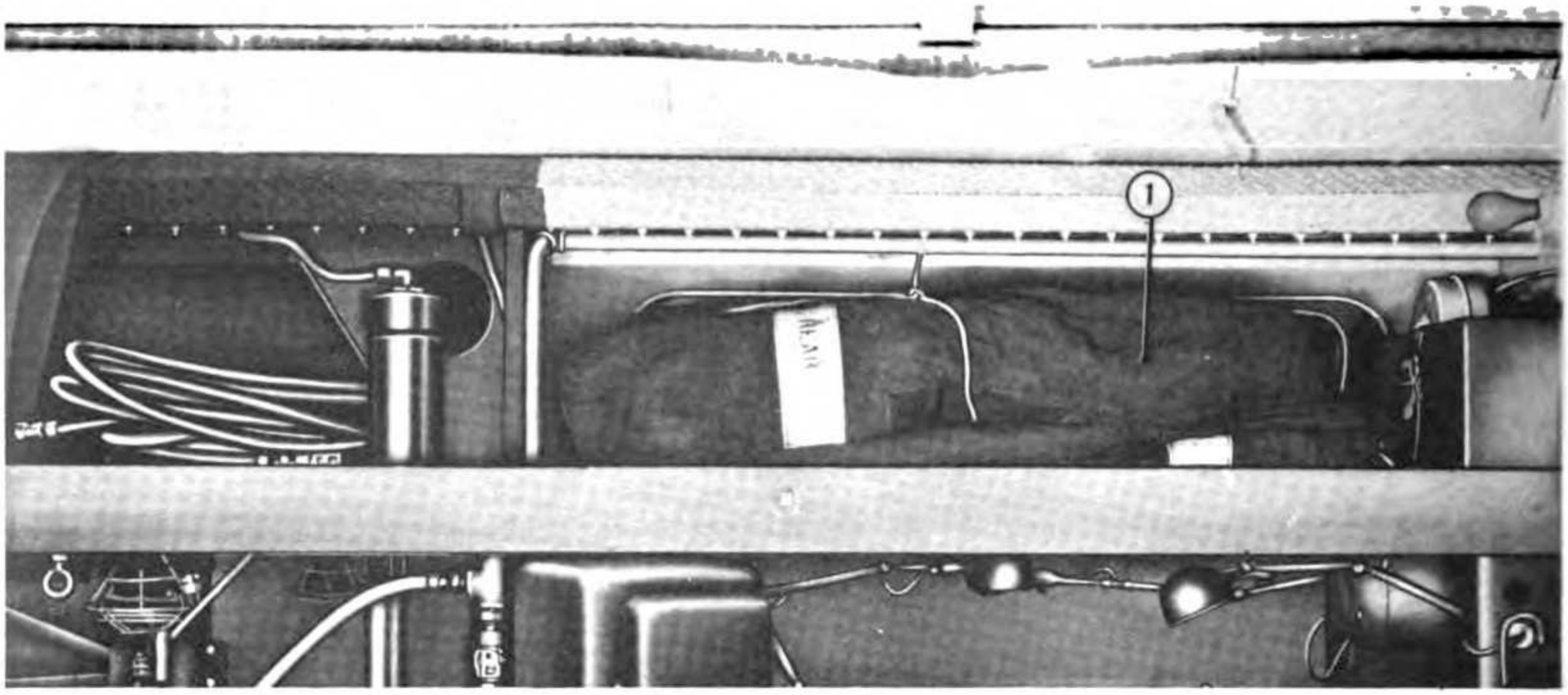
1 Left Front, Left Side, and Windbreaker canvas sections

Figure 26. Storage compartment, upper left.



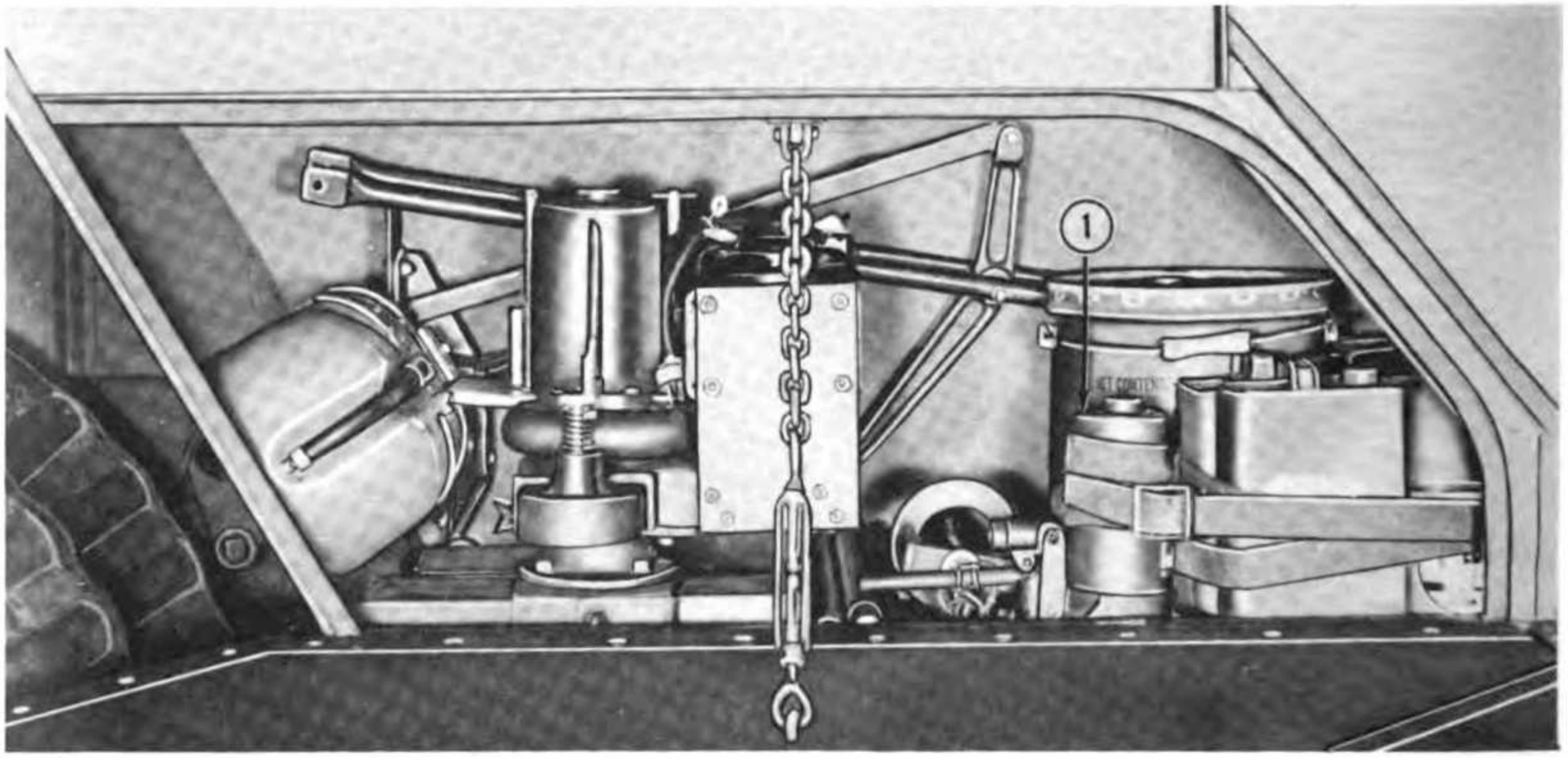
1 Welding cables 2 Wheel chocks

Figure 27. Storage compartment, lower left.



1 Right Front, Right Side, and Rear canvas sections

Figure 28. Storage compartment, upper right.



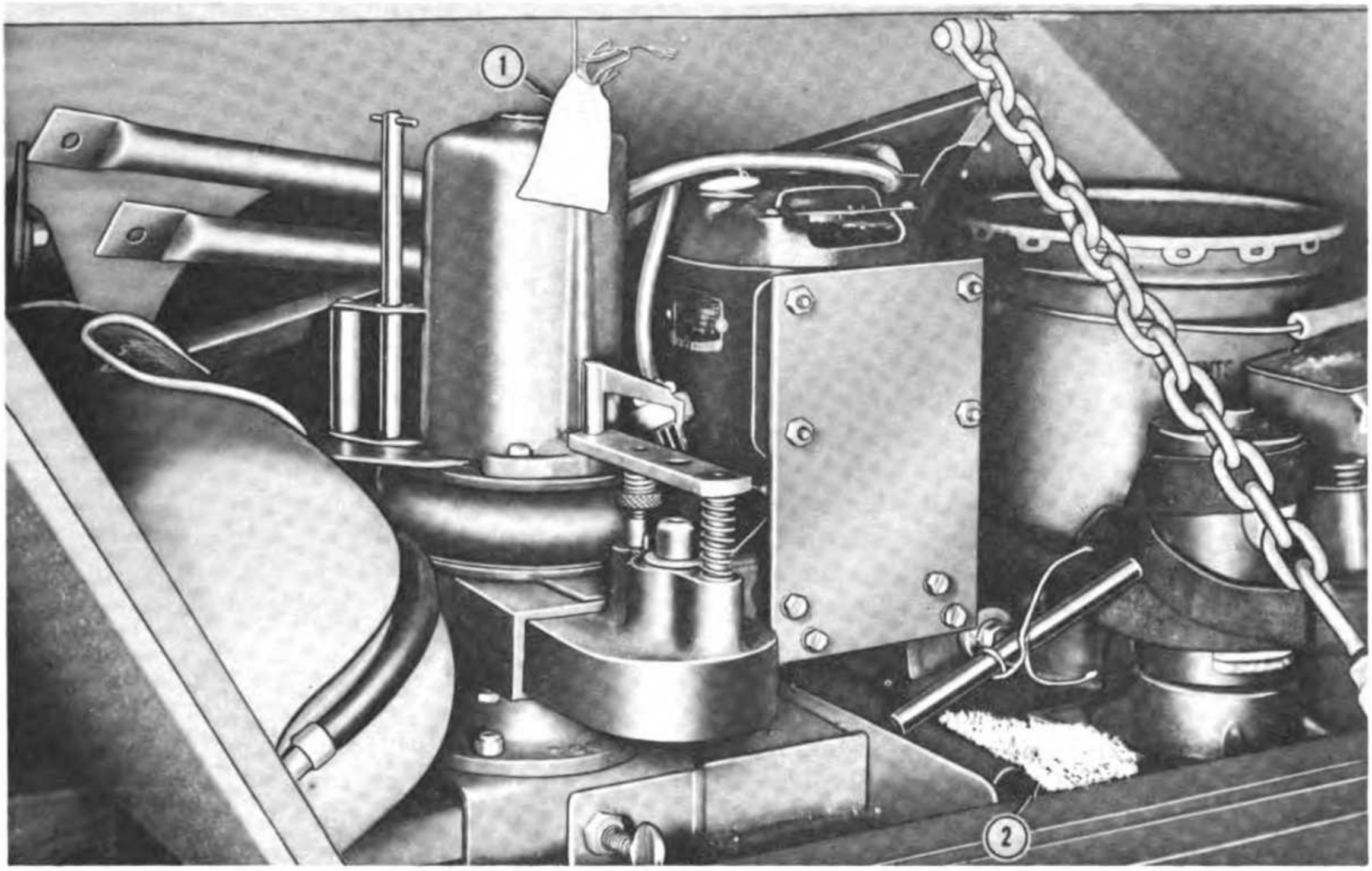
1 Hydraulic jack, 12-ton

Figure 29. Storage compartment, lower right.

ing an invisibly thin protective film. It does not act by removing moisture or oxygen, but functions on the surface of the metal in the presence of these corrosion-inducing agents. VPI crystals are sprinkled (2, fig. 30) in all storage compartments, and on equipment stored. Small bags of VPI (1) are hung in drawers, compartments, and on equipment stored.

Caution: Place the VPI at the top of the space to be protected, because the VPI vapor is heavier than air and moves downward.

Wherever practicable, small tools and accessories are wrapped in VPI-coated paper. VPI is free from objectionable characteristics and does not require removal before the equipment is used. VPI will retain its protective power for several years and should be replaced when the bags are empty, and when there is no evidence of sprinkled crystals in drawers or compartments. VPI is nontoxic and nonirritating in small quantities.



1 Corrosion preventive (VPI) compound bag
2 Corrosion preventive (VPI) sprinkled on stored items

Figure 30. Corrosion preventive in storage compartment.

Caution: Handle VPI carefully near foodstuffs and clothing.

e. Assembling of Items Removed for Shipment. No items are removed for shipment. The following items of equipment are secured for shipment: brake-relining machine (par. 62), radial drill and arm (par. 65), bandsaw (par. 59), hydraulic press, 100-ton (par. 67), and hydraulic press, 10-ton (par. 66).

f. Inspection.

(1) *Visual.* Immediately upon receipt of a new mobile shop, make a thorough examination and inspection of the shop. Identify the mobile shop by checking identification plates (par. 4) and data (par. 6). Check the mobile shop for any visible signs of damage incurred during shipment or storage.

(2) *Mechanical.* Be sure that mobile shop is completely and securely assembled. Perform routine before-operation services (par. 80*c*) to determine the mechanical condition of the engine, engine clutch, drive belts, dynamotor-welder, drive shaft, compressor clutch, and air compressor. Check the mechanical condition of all shop equipment.

g. Servicing Instructions.

(1) *Preliminary lubrication.* Perform complete lubrication service in accordance with LO 5–9128–1, LO 5–9128–2, and LO 5–9128–3 (par. 76).

(2) *Preventive maintenance services.* Perform all required preventive maintenance services (par. 79).

h. Setting-up Instructions. Refer to paragraphs 36 through 47 for selecting a work site, setting-up the mobile shop, and operating the engine and dynamotor-welder.

8. Used Equipment

a. General. When a used mobile shop is received and is being serviced for operation, follow the general instructions for new equipment as outlined in paragraph 7, and also perform all special instructions added below.

b. Inspection. Immediately upon receipt of a used mobile shop, make a thorough examination

and inspection of the shop. During the inspection, look for missing, broken, bent, or worn parts and equipment.

(1) *Semitrailer.* Inspect tires, wheels, and axle for signs of grease due to wheel-bearing seal leaks. Check airbrake system for leaks. Inspect airbrake flexible hose, air line tubing, connections, and fittings for deterioration and damage. Inspect kingpin for damage.

(2) *Shop body.* Inspect shop body weatherseals for good condition and secure mounting. Inspect hinges and panels of lifting sides, rear panel assembly, catwalks, storage compartments and cabinets for good condition. Inspect bulkheads, workbenches, and deckplates for damage and missing bolts. Check trolley and hoist rail assembly for good operating condition. Inspect shop lights for good condition.

(3) *Engine.* Inspect for water and oil leaks. Inspect fan belts, water hose, flexible fuel lines, and electrical wiring for wear, deterioration, and damage. Examine drive belts for wear, deterioration, and correct adjustment (par. 191). Check condition and cleanness of the engine air cleaner and oil filter.

(4) *Dynamotor-welder and electric-control cubicle.* Inspect wiring and insulation for good condition and secure connections. Inspect brushes and commutator for dirt, wear, corrosion, or other damage. Inspect air filters for cleanness.

(5) *Air compressor and drive shaft.* Inspect drive shaft for loose mounting, excessive bearing wear, or loose slip joint. Check condition and cleanness of air cleaner. Inspect air compressor, air lines, tank, and fittings for leaks.

(6) *Shop load and miscellaneous.* Inspect tightness of mounting of all major components and shop equipment. Examine hydraulic equipment for leaks. Make certain shop load is secure and complete. Refer to appendix II for complete listing, location, and illustrations of shop load.

c. Servicing Instructions.

(1) *Lubrication.* When lubricating the used mobile shop, make sure that fittings and oil lines are not broken, bent, or obstructed. Replace all damaged fittings and lines.

(2) *Shop body.* Replace all deteriorated or damaged weatherseals. Repair all damaged or worn sheetmetal parts and hardware. Replace burned out or broken light bulbs.

(3) *Wheels and axle assembly.* Check the lubrication and adjustment of the wheel bearings. Pack the wheel bearings with proper lubricant (par. 77*h*) and adjust (par. 150) if necessary.

(4) *Airbrakes.* Open the draincock at the bottom of the reservoir and drain condensed moisture. Adjust brakes (par. 152), if necessary. Replace deteriorated or damaged flexible hoses and rubber parts.

(5) *Engine.* Replace deteriorated or damaged fan belts (par. 159*a*), water hoses (par. 158*b*(2) and *d*(4)), fuel lines (pars. 166, 167, and 168), and electric wiring. Clean and refill the air cleaner (par. 77*e*), with proper grade of oil. Replace the oil filter element (par. 77*g*), if necessary.

(6) *Drive belts.* Replace deteriorated or damaged drive belts with a matched set (pars. 192 and 193). Adjust the drive belts (par. 191), if required.

(7) *Dynamotor-welder.* Disassemble and clean the dynamotor-welder air filters (par. 195), if required. Replace deteriorated or damaged wiring. Clean and tighten all loose or corroded electrical connections. Clean commutators (par. 198) and replace brushes (pars. 196 and 197), if required.

(8) *Air compressor.* Repair or replace all leaking lines and connections. Clean and refill the air cleaner with proper grade of oil (par. 77*f*). Replace the oil filter (See LO 5–9128–1), if needed.

(9) *Shop load.* Repair or replace damaged shop equipment and tools. Notify maintenance personnel if shop equipment or tools are missing or damaged.

d. Running-In Procedures. After starting any item of equipment, listen for unusual noises which might be caused by broken or excessively worn parts such as bearings and bushings. Pay par-

ticular attention to the oil pressure and coolant temperature of the engine, oil and air pressures of the compressor, dynamotor-welder voltages, and other meter readings.

Caution: After the engine, dynamotor-welder, air compressor, or other major component has been overhauled or rebuilt, observe the same special precautions required with new units.

Section II. CONTROLS AND INSTRUMENTS

9. General

This section describes, locates, illustrates, and furnishes the operators sufficient information about the various controls and instruments for the proper operation of the materiel.

10. Trailer-Supporting-Jacks Controls

a. Location. All controls for the four trailer-supporting jacks are mounted on the front left side of the mobile shop.

b. Description and Purpose. The controls consist of four red valves (1, fig. 31), four green valves (6), and four hand-operated pumps (2, 3, 4, and 5). Each jack is individualy controlled by a red valve and a green valve on its respective pump. Four handles, one for each pump, are stored in a rack at the left of the pumps and valves. The controls enable the operator to lower and raise the jacks individually.

11. Side-Lifting Jacks Controls

a. Location. All controls for the two side-lifting jacks are located on the pumps at each side of the front bulkhead of the mobile shop.

b. Description and Purpose. The controls consist of a hand-operated pump (2, fig. 32) with a handle (1) and valve control lever (3). The handles are stored in racks at the side of the pumps. The controls enable the operators to raise the shop sides individually, providing access to all components and equipment.

12. Front Heater Controls

a. Fuel Shutoff Valve.

(1) *Location.* The heater fuel shutoff valve (1, fig. 33) is installed in the fuel line to the heaters, located in the right supporting frame member of the engine.

(2) *Description and purpose.* The fuel shutoff valve controls fuel flow to both front and rear heaters.

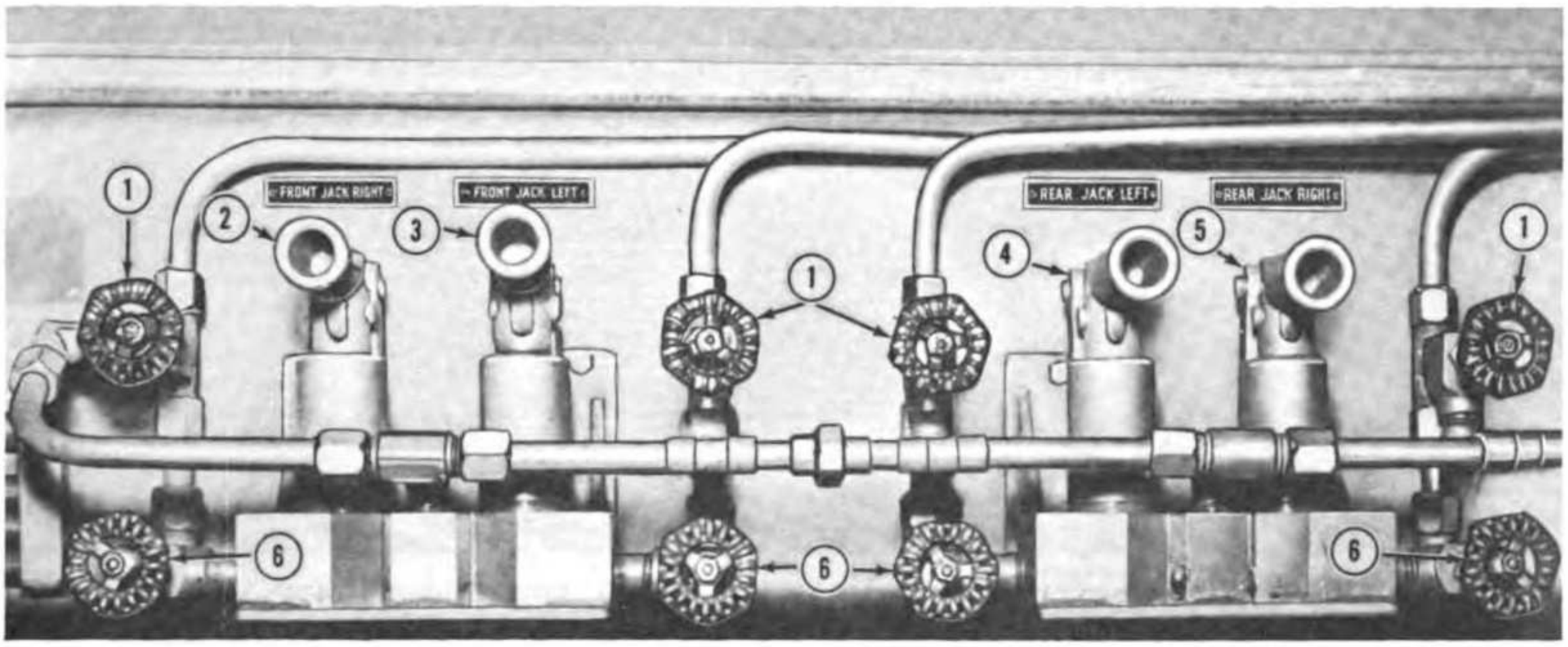
b. Heater Switch.

(1) *Location.* The heater switch (3, fig. 34) is located on the heater control box.

(2) *Description and purpose.* The heater switch has four positions which permit the operator to place the heater in the ON, START, RUN, or OFF position.

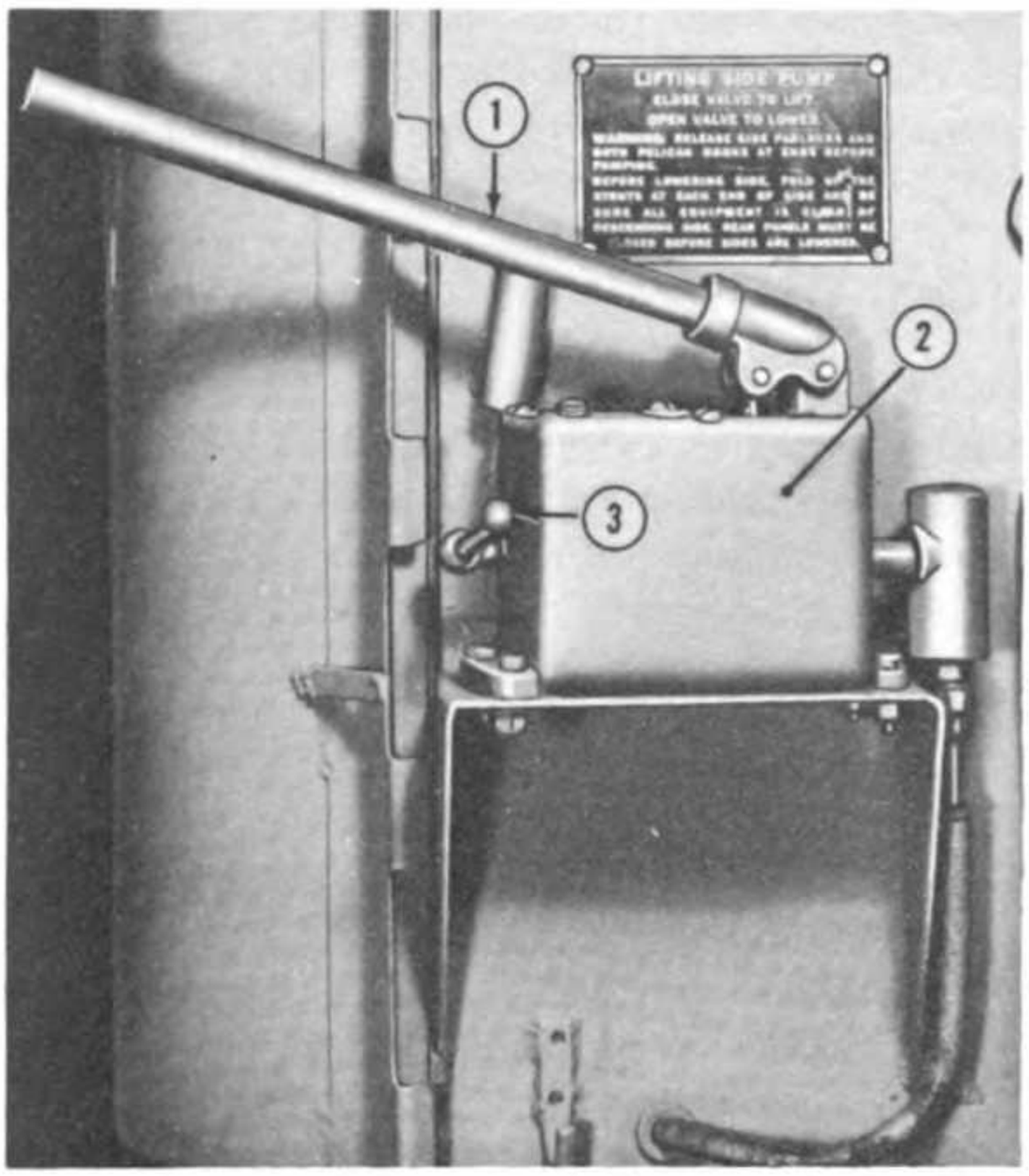
c. Indicator Light.

(1) *Location.* The indicator light (2) is lo-



1 Red valves
2 Right front jack pump
3 Left front jack pump
4 Left rear jack pump
5 Right rear jack pump
6 Green valves

Figure 31. Trailer-supporting jacks controls.

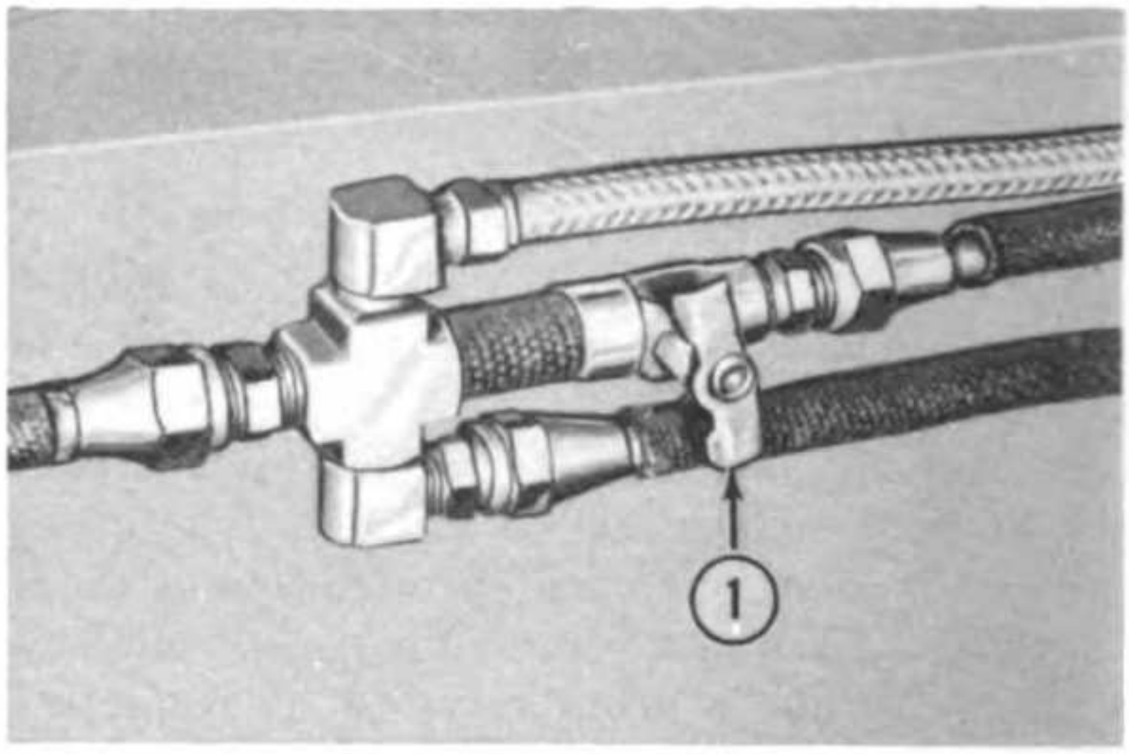


1 Handle
2 Pump
3 Valve control lever

Figure 32. Side-lifting-jack pump controls.

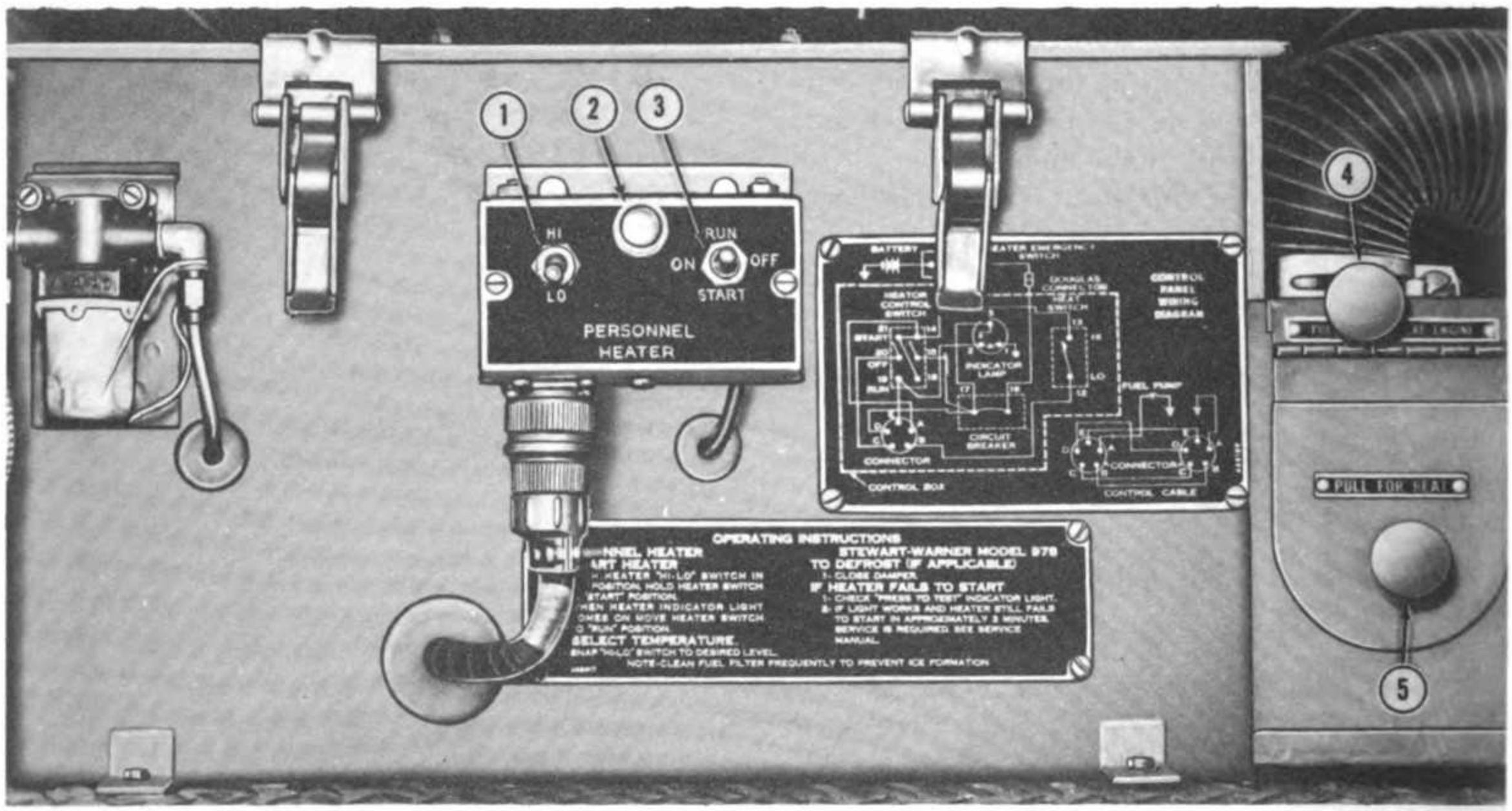
cated on the heater control box to the left of the heater switch.

(2) *Description and purpose.* The indicator light will light when the heater starts. It is a press-to-test type of light and is used to check the light, when in doubt about the condition of bulb and when heater fails to start.



1 Fuel shutoff valve

Figure 33. Heater fuel shutoff valve



1 Hi-lo switch
2 Indicator light
3 Heater switch
4 Engine heat control
5 Personnel heat control

Figure 34. Front heater controls.

d. Hi-Lo Switch.

(1) *Location.* The hi-lo switch (1) is located on the heater control box to the left of the indicator light.

(2) *Description and purpose.* The hi-lo switch is of the toggle type and controls the temperature of the heater.

e. Engine Heat Control.

(1) *Location.* The engine heat control (4) is located at the top of the heater duct.

(2) *Description and purpose.* The engine heat control opens a damper allowing heat to pass through a duct to the engine compartment.

f. Personnel Heat Control.

(1) *Location.* The personnel heat control (5) is located on the heater duct.

(2) *Description and purpose.* The personnel heat control opens a damper allowing heat to enter the front section of the mobile shop.

13. Rear Heater Controls

The heater fuel shutoff valve (fig. 33) controls flow of fuel to both heaters.

a. Heater Switch.

(1) *Location.* The heater switch (3, fig. 35) is located on the heater control box.

(2) *Description and purpose.* Refer to paragraph 12*b*(2).

b. Indicator Light.

(1) *Location.* The indicator light (2) is located on the heater control box to the left of the heater switch.

(2) *Description and purpose.* Refer to paragraph 12*c*(2).

c. Hi-Lo Switch.

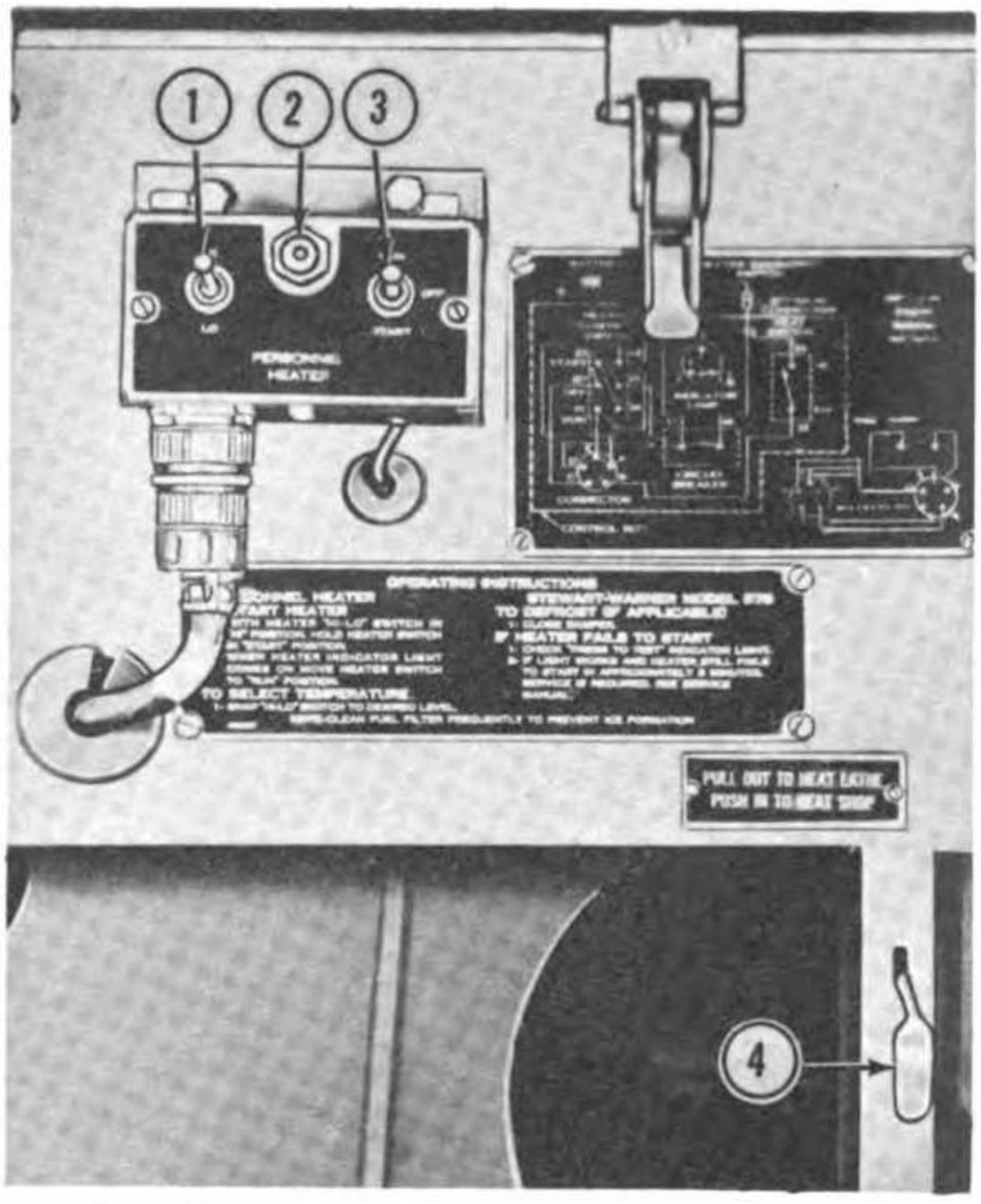
(1) *Location.* The hi-lo switch (1) is located on the heater control box to the left of the indicator light.

(2) *Description and purpose.* Refer to paragraph 12*d*(2).

d. Duct Control.

(1) *Location.* The heater duct control (4) is located on the right front leg of the heater support.

(2) *Description and purpose.* The heater duct control operates a damper that permits heat to enter a duct heating the tubular lathe base or permits heat to enter the rear section of the mobile shop.



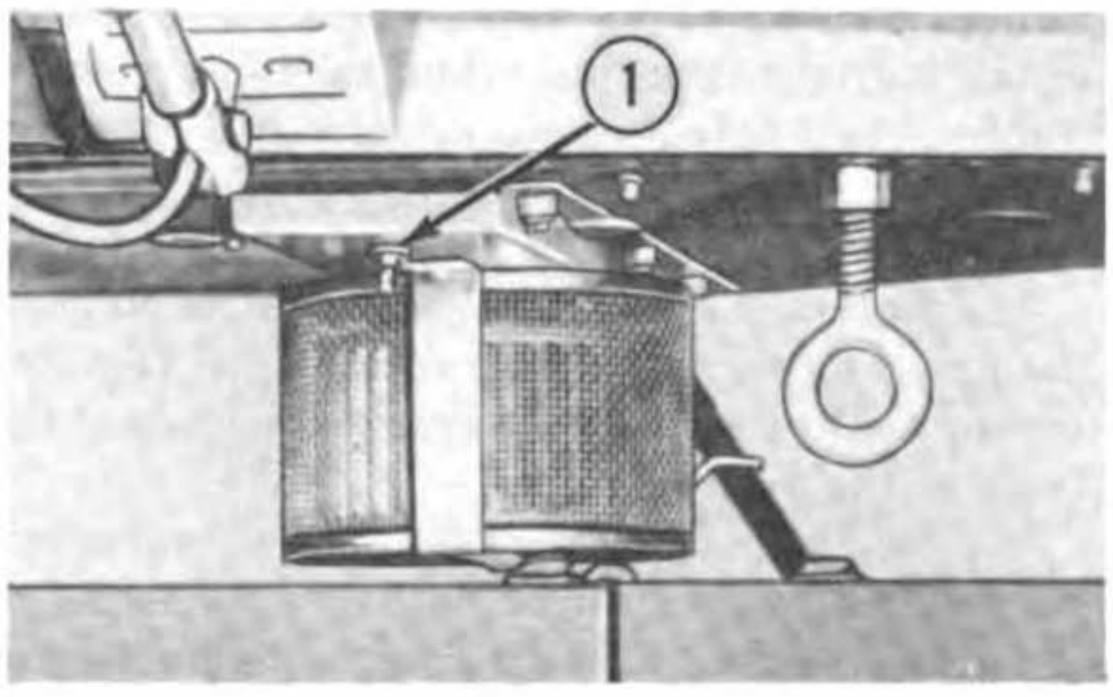
1 Hi-lo switch
2 Indicator light
3 Heater switch
4 Duct control

Figure 35. Rear heater controls.

14. Front Ventilator Control

a. Location. The front ventilator control is a switch (1, fig. 36), located on the mounting plate of the ventilator.

b. Description and Purpose. The toggle type switch in the ON position starts the blower which circulates air throughout the front section of the mobile shop.



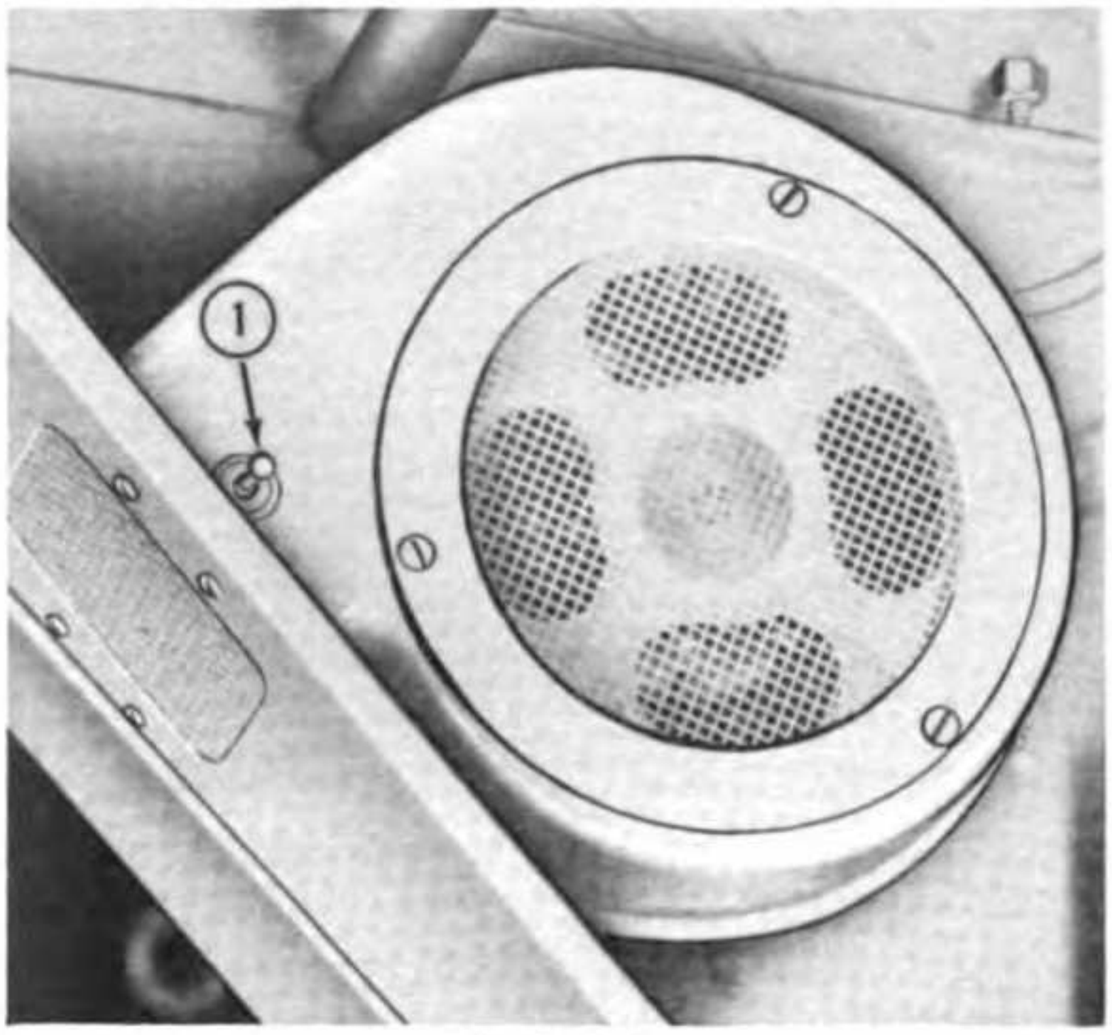
1 Switch

Figure 36. Front ventilator control.

15. Rear Ventilator Control

a. Location. Each rear ventilator has a control switch (1, fig. 37), located on the mounting plate of the ventilator.

b. Description and Purpose. The toggle type switches in the ON position start the blowers which circulate air throughout the rear section of the mobile shop.



1 Switch

Figure 37. Rear ventilator control.

16. Traveling-Lights Controls

a. Location. The 24-volt traveling lights are controlled from the prime mover. A connection (fig. 38) to the traveling-lights circuit is made at the front of the mobile shop.

b. Description and Purpose. The traveling lights are used only when the mobile shop is connected to the prime mover. A 24-volt electric connection is made to provide power for the operation of the four clearance lights and the tail-and-stop-light.

17. Airbrake Controls

a. Location. The airbrakes are controlled from the prime mover. Air hose connections (fig. 39) for the semitrailer airbrake system are made at the front of the mobile shop.

b. Description and Purpose. The airbrakes can be used only when the mobile shop is connected to the prime mover. Two air hoses are connected to provide service and emergency brakes for the trailer.

Figure 38. Traveling-lights connection.

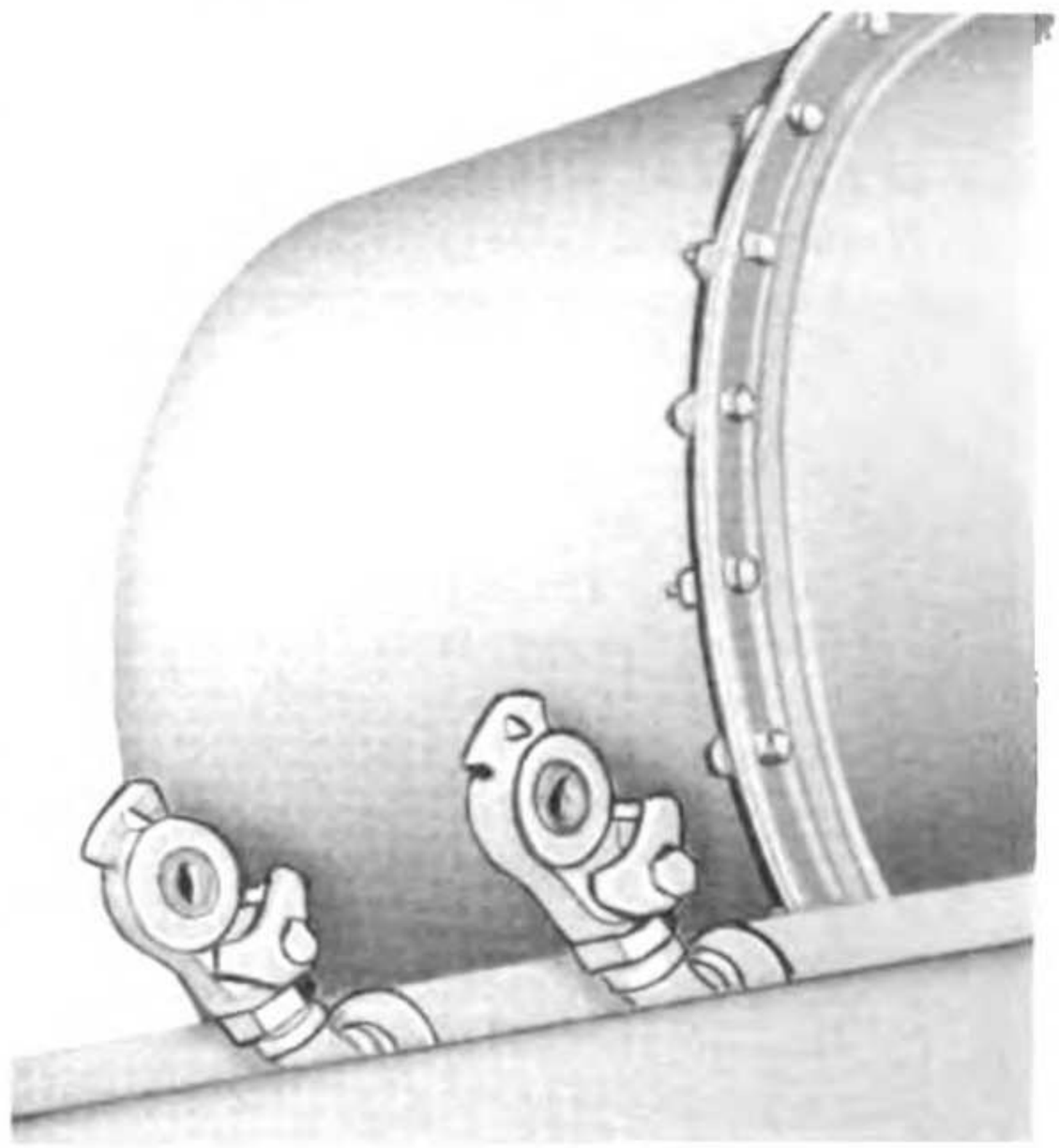
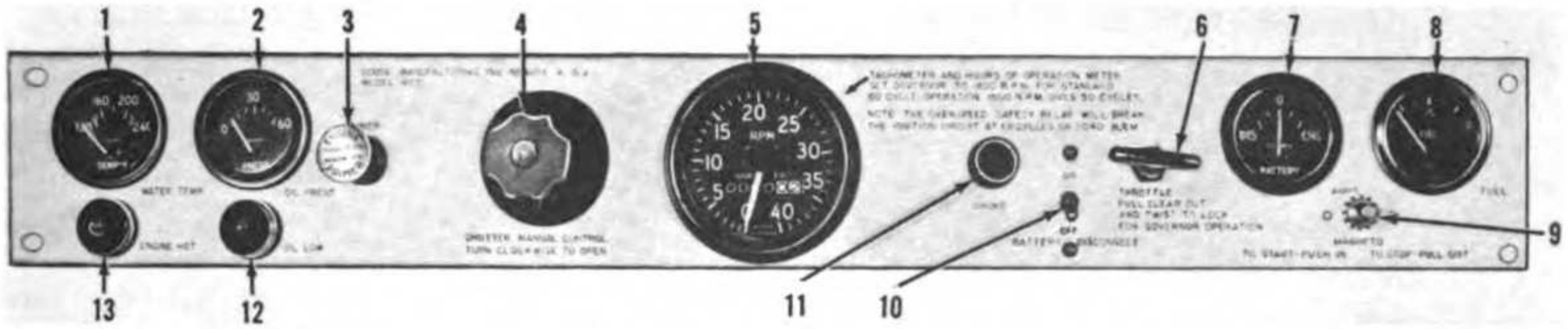


Figure 39. Airbrake connections.

18. Engine Controls and Instruments

a. Engine Instrument and Control Panel.

(1) *Location.* The engine instrument and control panel (fig. 40) is mounted on the front bulkhead, to the left of the forward end of the lathe and over the dynamotor-welder.



1 Coolant-temperature gage
2 Oil-pressure gage
3 Primer control handle
4 Radiator-shutter manual control
5 Tachometer and hour-meter
6 Throttle control handle
7 Battery ammeter
8 Fuel gage
9 Magneto switch
10 Battery-disconnect switch
11 Choke-control handle
12 Low-oil-pressure warning light
13 Engine-overheat warning light

Figure 40. Engine instrument and control panel.

(2) *Description and purpose.* The engine instrument and control panel mounts the necessary controls and instruments to start, stop, control, and check engine operation.

b. Coolant-Temperature Gage.

(1) *Location.* The coolant-temperature gage (1) is located in the upper left of the instrument panel.

(2) *Description and purpose.* It registers engine coolant temperatures between 120° and 240° F. Normal operating temperatures range from 160° to 180° F.

c. Oil-Pressure Gage.

(1) *Location.* The oil-pressure gage (2) is located in the upper left of the instrument panel adjacent to the coolant-temperature gage.

(2) *Description and purpose.* The oil-pressure gage indicates lubricating oil pressure in the engine. The gage registers pressures between 0 and 60 psi. Normal operating oil pressure is 15 to 30 psi at 1,800 rpm. However, the oil pressure will vary with changes in oil viscosity.

Note. The oil-pressure gage does not show the amount of oil in the engine crankcase. It only measures the pressure of the oil.

d. Primer Control.

(1) *Location.* The primer control handle (3) is located in the left end of the instrument panel. It is the first control handle on the left.

(2) *Description and purpose.* The primer provides an extra supply of fuel for starting the engine in cold weather. The handle is used to pump the extra fuel to the engine.

e. Radiator-Shutter Manual Control.

(1) *Location.* The radiator-shutter manual control (4) is located in the left center of the instrument panel.

(2) *Description and purpose.* The radiator-shutter prevents engine overcooling and assists in cold weather starting. Normally, the radiator-shutter (3, fig. 5) is operated automatically by engine oil pressure through thermostatic controls. When desired, the shutter can be operated manually by the use of the shutter manual-control handle.

f. Tachometer and Hour-Meter.

(1) *Location.* The tachometer and hour-meter (5, fig. 40) is located in the center of the instrument panel.

(2) *Description and purpose.* The tachometer and hour-meter are combined in one gage. The tachometer indicates engine speed in rpm. Normal engine speed is 1,800 rpm. The hour-meter indicates the length of time in hours and tenths of hours that the engine is in operation.

g. Throttle Control.

(1) *Location.* The throttle control handle (6) is located in the right center of the instrument panel.

(2) *Description and purpose.* The throttle control handle is used to regulate the engine speed and to control the governor.

h. Battery Ammeter.

(1) *Location.* The battery ammeter (7) is located in the right end of the instrument panel. It is the second gage from the right.

(2) *Description and purpose.* The ammeter indicates whether the battery is receiving or discharging current. The center point of the dial is the point of zero current flow, and the two extremes of pointer travel indicate maximum current charge and discharge.

i. Fuel gage.

(1) *Location.* The fuel gage (8) is located

in the upper right of the instrument panel.

(2) *Description and purpose.* The fuel gage indicates the amount of fuel in the supply tank.

j. Magneto Switch.

(1) *Location.* The magneto switch (9) is located in the lower right of the instrument panel.

(2) *Description and purpose.* The magneto switch opens and closes the engine ignition circuit.

k. Battery-Disconnect Switch.

(1) *Location.* The battery-disconnect switch (10) is located in the lower right center of the instrument panel.

(2) *Description and purpose.* The battery-disconnect switch connects and disconnects the batteries from the 24-volt engine and accessories circuit.

l. Choke Control.

(1) *Location.* The choke control handle (11) is located in the right center of the instrument panel.

(2) *Description and purpose.* The choke control operates the choke valve which regulates the amount of air that can enter the carburetor, resulting in a richer or leaner fuel mixture.

m. Low-Oil-Pressure Warning Light.

(1) *Location.* The low-oil-pressure warning light (12) is located in the lower left of the instrument panel, below the oil pressure gage.

(2) *Description and purpose.* The low-oil-pressure warning light goes on when engine oil pressure is below safe limits.

Warning: The engine must be stopped immediately if the low-oil-pressure warning light goes on while the engine is in operation. Investigate the cause of the low oil pressure before restarting the engine.

n. Engine-Overheat Warning Light.

(1) *Location.* The engine-overheat warning light (13) is located in the lower left of the instrument panel.

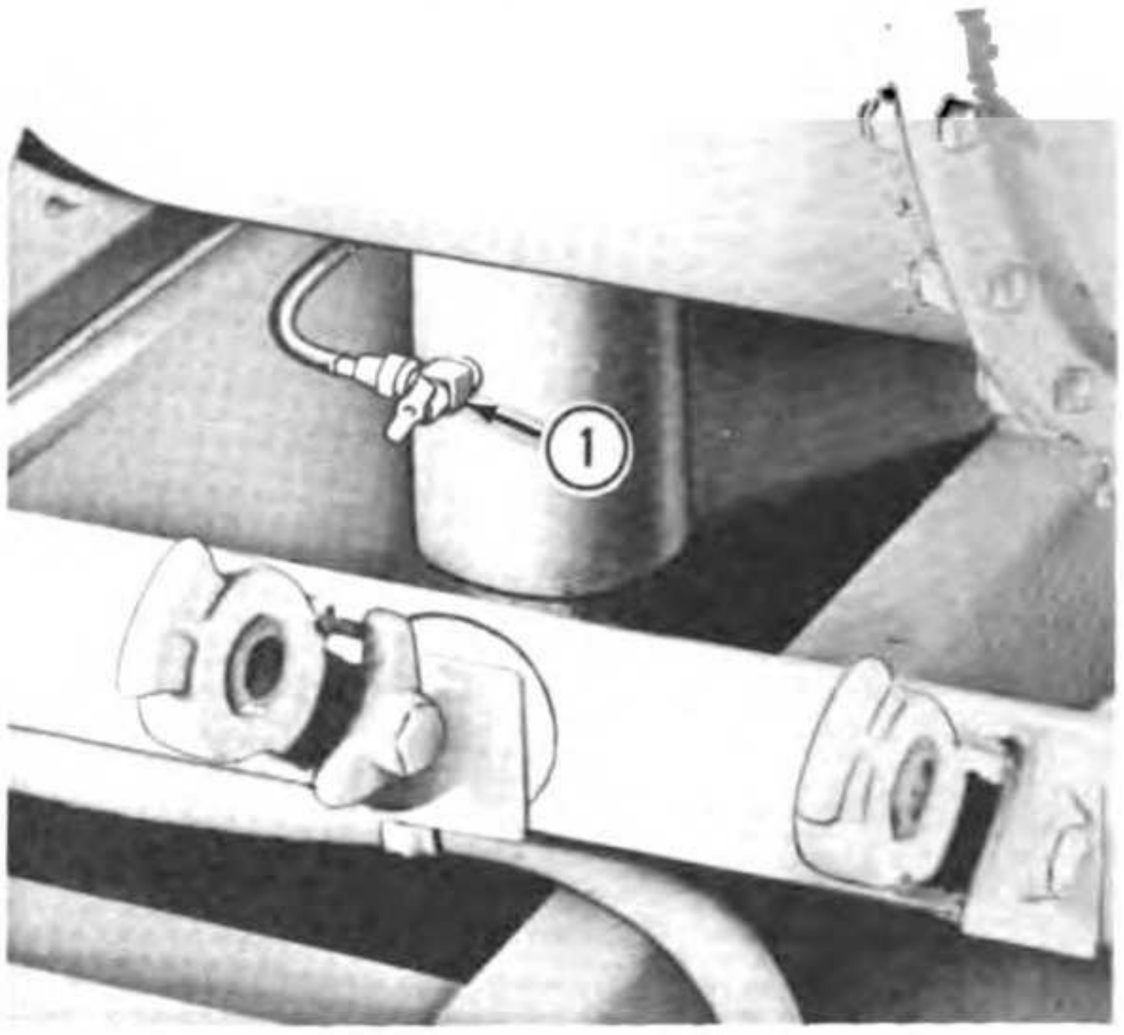
(2) *Description and purpose.* The engine-overheat warning light goes on when the engine coolant temperature rises above safe limits.

Warning: The engine must be stopped immediately when the engine-overheat warning light goes on. Do not restart until the cause of overheating has been corrected.

o. Engine Fuel Shutoff Valve.

(1) *Location.* The engine fuel shutoff valve (1, fig. 41) is located in the outlet fuel line at the bottom of the fuel tank.

(2) *Description and purpose.* The engine fuel shutoff valve controls fuel flow from the tank to the fuel pump.



1 Fuel shutoff valve

Figure 41. Engine fuel shutoff valve.

p. Engine Clutch Control Lever.

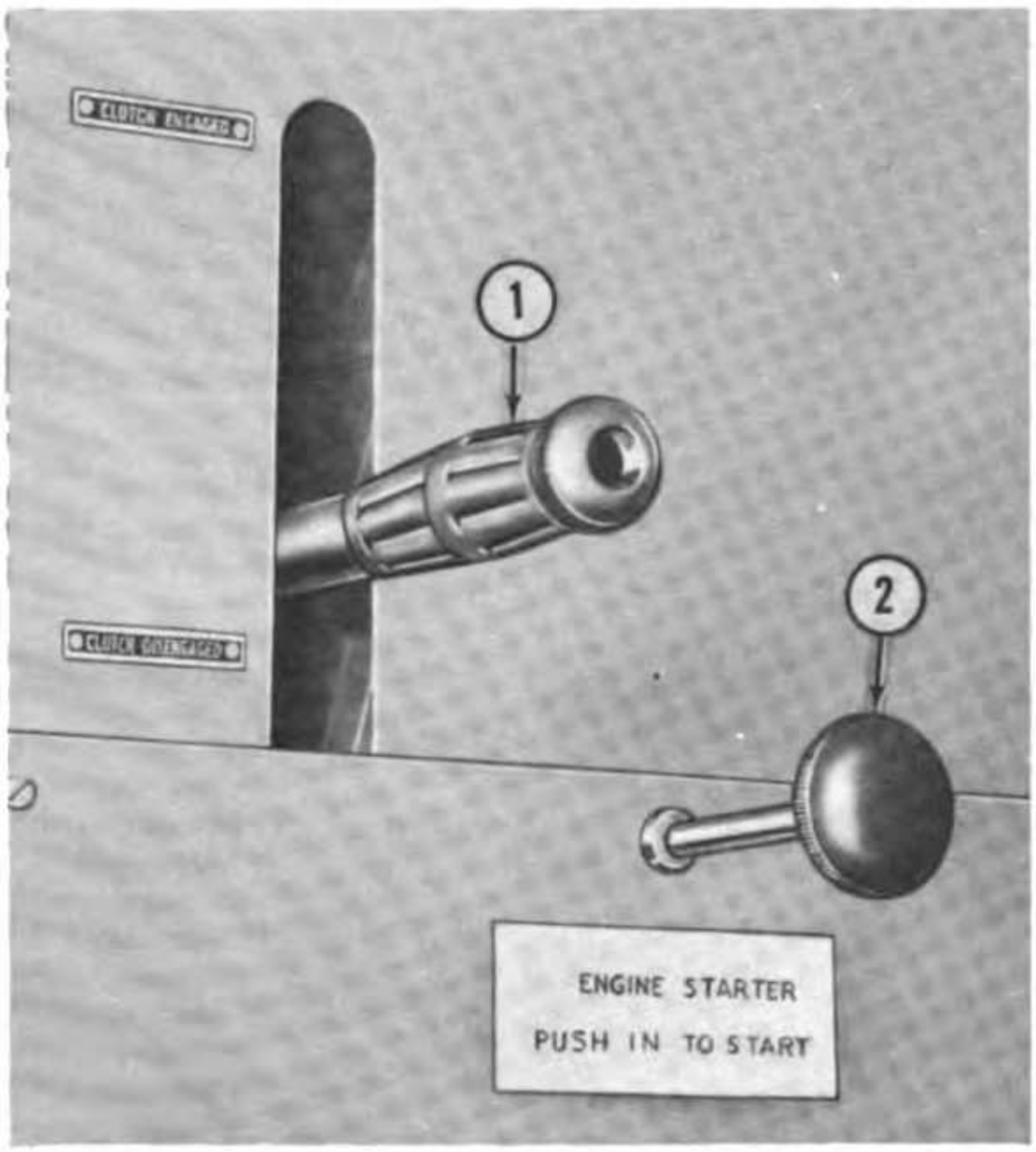
(1) *Location.* The engine clutch control lever (1, fig. 42) is located on the engine clutch access plate directly below the instrument panel.

(2) *Description and purpose.* The engine clutch control lever engages and disengages the engine clutch, enabling the operator to operate the dynamotor-welder.

q. Starting Motor Control.

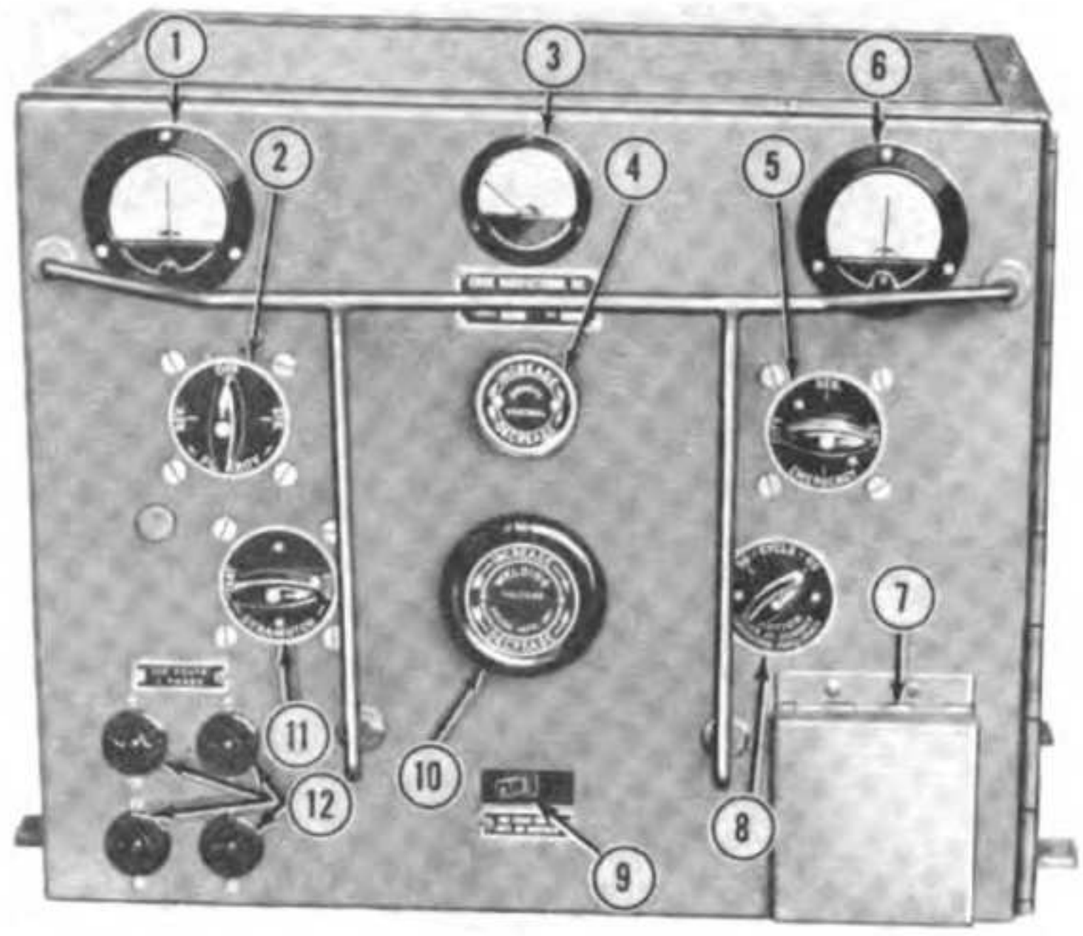
(1) *Location.* The starting motor control (2, fig. 42) is located on the engine clutch access plate below and to the right of the engine clutch control lever.

(2) *Description and purpose.* The starting motor control is used to crank the engine.



1 Clutch control lever 2 Starting motor control

Figure 42. Engine clutch and starting motor controls.



1 Dc ammeter
2 Polarity switch
3 Ac voltmeter
4 Generator rheostat
5 Selector switch
6 Dc voltmeter
7 Safety cover over 208-volt outlets
8 Cycle switch
9 Circuit-breaker switch
10 Voltage fine-adjustment control
11 Start-stop switch
12 110-volt outlets

Figure 43. Electric-control cubicle.

19. Dynamotor-Welder Controls and Instruments

a. Electric-Control Cubicle Front Panel.

(1) *Location.* The electric-control cubicle (fig. 43) is mounted in the shop body on the left front deck plate. All controls and instruments for dynamotor-welder operation are located on the front panel of the electric-control cubicle.

(2) *Description and purpose.* The hinged front panel containing switches, rheostats, voltmeters, ammeters and outlets control the dynamotor-welder output.

b. Dc Ammeter.

(1) *Location.* The dc ammeter (1) is located in the upper left corner of the electric-control cubicle front panel.

(2) *Description and purpose.* The ammeter has a 400–0–400 amperes scale and indicates both STR and REV polarity current.

c. Polarity Switch.

(1) *Location.* The polarity switch (2) is located below the dc ammeter on the electric-control cubicle front panel.

(2) *Description and purpose.* The polarity switch is a three-position switch used to set the polarity of the dc current.

d. Ac Voltmeter.

(1) *Location.* The ac voltmeter (3) is located in the top center of the electric-control cubicle front panel.

(2) *Description and purpose.* The ac voltmeter indicates generator output or voltage of the outside source on a scale calibrated from 0–500 volts. Normal operating voltage is 208 volts.

e. Generator Rheostat.

(1) *Location.* The generator rheostat (4) is located below the ac voltmeter on the electric-control cubicle front panel.

(2) *Description and purpose.* The generator-rheostat is manually controlled to increase or decrease the ac generator output.

f. Selector Switch.

(1) *Location.* The selector switch (5) is located to the right of the generator rheostat on the electric-control cubicle front panel.

(2) *Description and purpose.* The selector switch is a four-position switch which controls: the connection of an external, 208-volt, 3-phase, electric-power supply

for the operation of the mobile shop; the use of the dynamotor-welder as a generator of electric power for shop use; the connection of an external, 110-volt, electric-power supply for emergency shop lighting and outlets; and the shutting off of mobile shop electric power.

g. Dc Voltmeter.

(1) *Location.* The dc voltmeter (6) is located in the upper right corner of the electric-control cubicle front panel.

(2) *Description and purpose.* The dc voltmeter has a 100–0–100 voltage scale and indicates both STR and REV polarity of open circuit and working voltage.

h. Outlets, 208 Volt.

(1) *Location.* Four 208-volt outlets are located in the lower right corner of the electric-control cubicle front panel beneath a safety cover (7).

(2) *Description and purpose.* The outlets supply 208-volt, 1-phase electric power.

i. Cycle Switch.

(1) *Location.* The cycle switch (8) is located below the selector switch (5) on the electric-control cubicle front panel.

(2) *Description and purpose.* The two-position cycle switch is used to synchronize the dynamotor-welder with the operating frequency of the outside source of current or with the generator current. The cycle switch is marked 50 and 60 cycles.

j. Circuit-Breaker Switch.

(1) *Location.* The circuit-breaker switch (9) is located in the bottom center of the electric-control cubicle front panel.

(2) *Description and purpose.* The circuit-breaker switch is an on-off switch used to control and protect the 110-volt circuit serving the shop lights and outlets.

k. Voltage Fine-Adjustment Control.

(1) *Location.* The voltage fine-adjustment control (10) is located above the circuit-breaker switch on the electric-control cubicle front panel.

(2) *Description and purpose.* The voltage fine-adjustment control is used to increase or decrease the dc voltage for final adjustment.

l. Start-Stop Switch.

(1) *Location.* The start-stop switch (11) is located below the polarity switch (2) on the electric-control cubicle front panel.

(2) *Description and purpose.* The start-stop switch is used to start and stop the dynamotor.

m. Outlets, 110-Volt.

(1) *Location.* The 110-volt outlets (12) are located in the lower left corner of the electric-control cubicle front panel.

(2) *Description and purpose.* The four 110-volt outlets supply 110-volt, 1-phase electric power.

20. Air Compressor Controls and Instruments

a. Compressor Clutch Control Lever.

(1) *Location.* The compressor clutch control lever (1, fig. 44) is located on the left of the compressor clutch.

(2) *Description and purpose.* The compressor clutch control lever engages and disengages the compressor clutch.

b. Pilot Valve.

(1) *Location.* The pilot valve (2) is located on the top front of the air compressor.

(2) *Description and purpose.* The pilot valve controls the unloading and loading of the compressor. The unloading pressure is normally set to 100 psi.

c. Oil-Pressure Gage.

(1) *Location.* The oil-pressure gage (3) is located on a bracket mounted on the air-compressor left shroud.

(2) *Description and purpose.* The oil-pressure gage indicates the oil pressure in the air compressor. The gage is calibrated from 0–10 psi. Normal operating oil pressure is 3 psi.

Note. The oil-pressure gage does not show the amount of oil in the compressor but only measures the pressure of the oil.

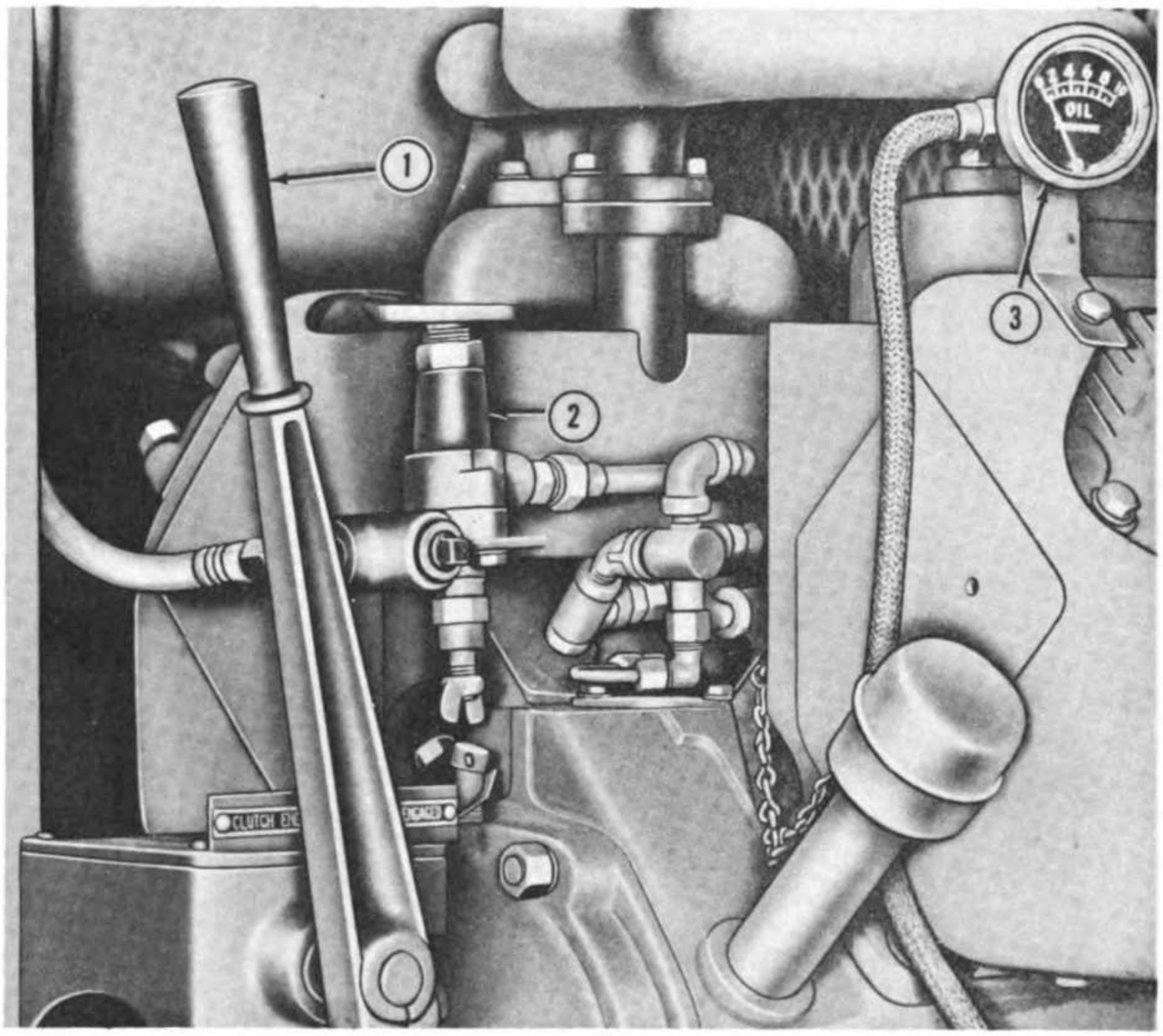
d. Safety Valve.

(1) *Location.* The safety valve (1, fig. 45) is located on the left side of the air tank. The air tank is mounted in the mobile shop above the air compressor.

(2) *Description and purpose.* The pop-type safety-valve protects the air compressor from damage by relieving pressures in excess of 110 psi.

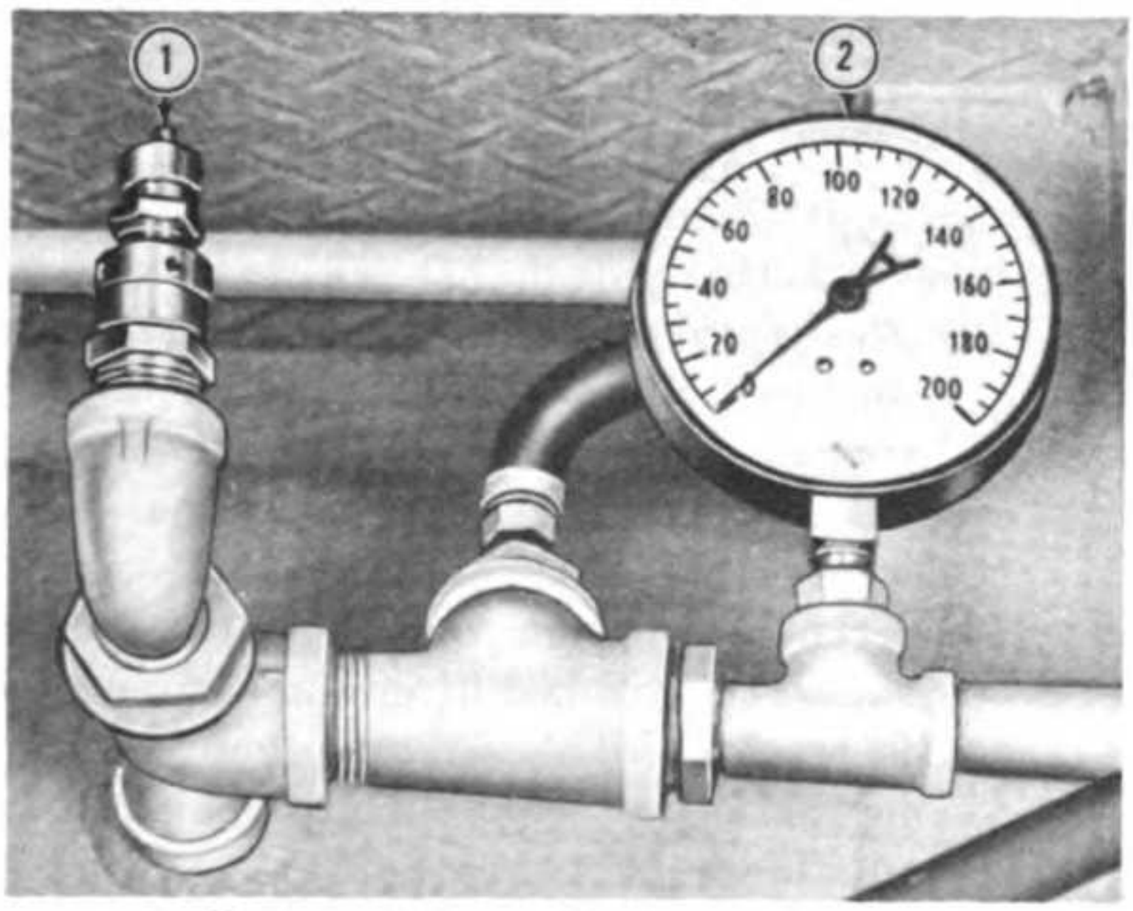
e. Air-Pressure Gage.

(1) *Location.* The air-pressure gage (2) is mounted adjacent to the safety valve.



1 Clutch control lever 2 Pilot valve 3 Oil-pressure gage

Figure 44. Air compressor controls.



1 Safety valve 2 Air pressure gage

Figure 45. Air compressor safety valve and air pressure gage.

(2) *Description and purpose.* The air-pressure gage is calibrated from 0 to 200 psi. Normal operating pressure is 100 psi. Air pressure is regulated by the adjustment of the pilot valve (see *b* above).

21. Lathe Controls

a. Backgear Lever.

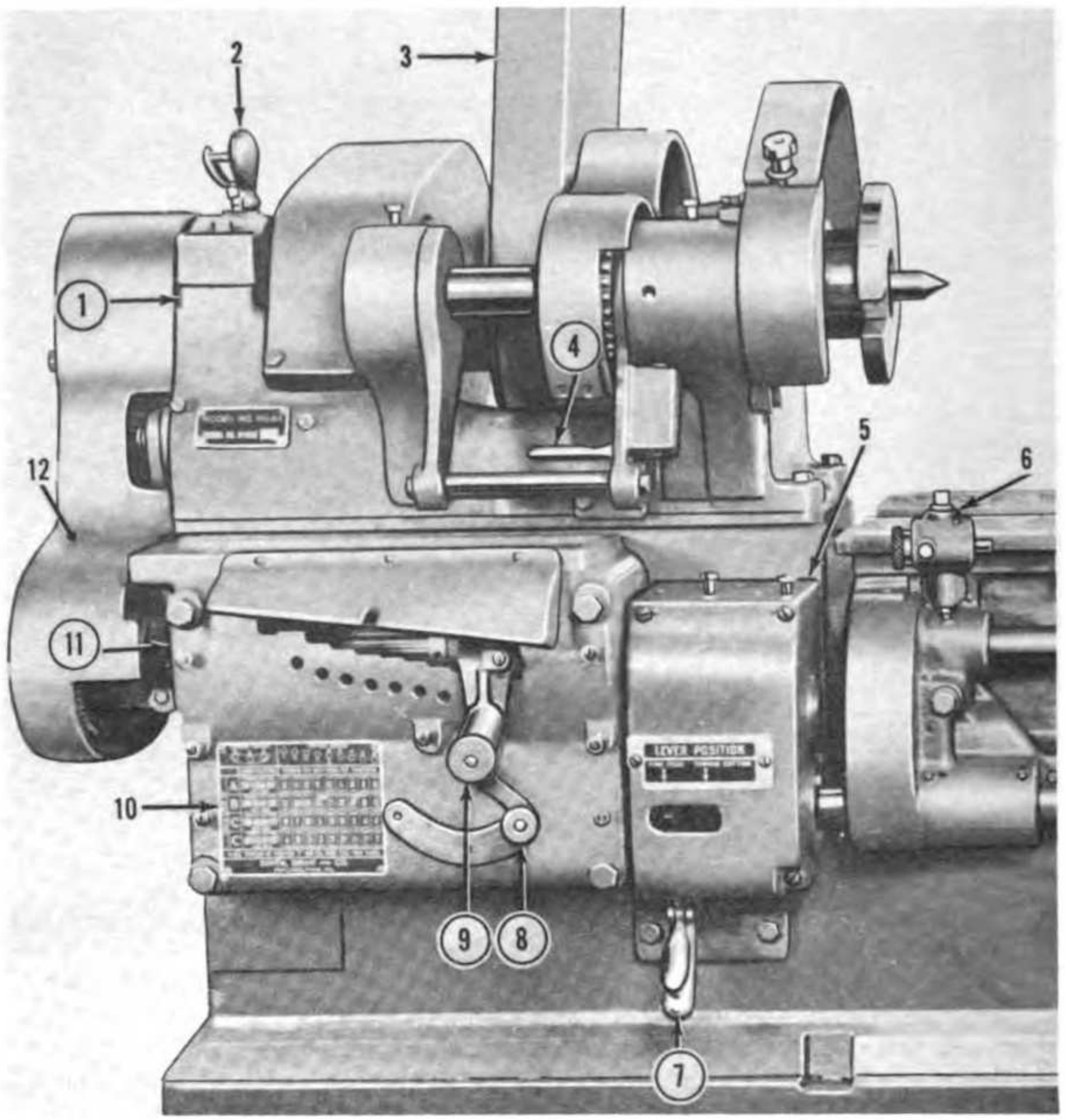
(1) *Location.* The backgear lever (2, fig. 46) is located on the left rear of the headstock (1).

(2) *Description and purpose.* The backgear lever is a single-throw latch lever controlling the backgears. The backgears are stepdown gears providing slow, powerful spindle speeds for heavy machining.

b. Triple-Gear Lever.

(1) *Location.* The triple-gear lever (4) is located on the center front of the headstock.

(2) *Description and purpose.* The triple-gear lever is a single-throw latch lever controlling the triple gears. The triple gears provide an extra slow drive used only to turn the 28-inch faceplate.



1	Headstock	4	Triple-gear lever	7	Fine-feed lever	10	Direct-reading index plate
2	Backgear lever	5	Fine-feed gearbox	8	Feed-rod slipgear lever	11	Quick-change gearbox
3	Drive-belt	6	Micrometer carriage stop	9	Slipgear lever	12	Tumbler and change gear guard

Figure 46. Lathe controls, left side.

c. Sliding Nut.

(1) *Location.* The sliding nut is clamped to a driving disk inside the ram gear that is mounted to the right of the drive belt (3).

(2) *Description and purpose.* The sliding nut is a three-position clamp that controls power from the drive belt pulley to the spindle. Power from the drive belt can be used at three speeds: one, direct drive to the spindle; two, through the backgears (*a* above); and three, through the triple gears (*b* above).

d. Extension Gap Controls.

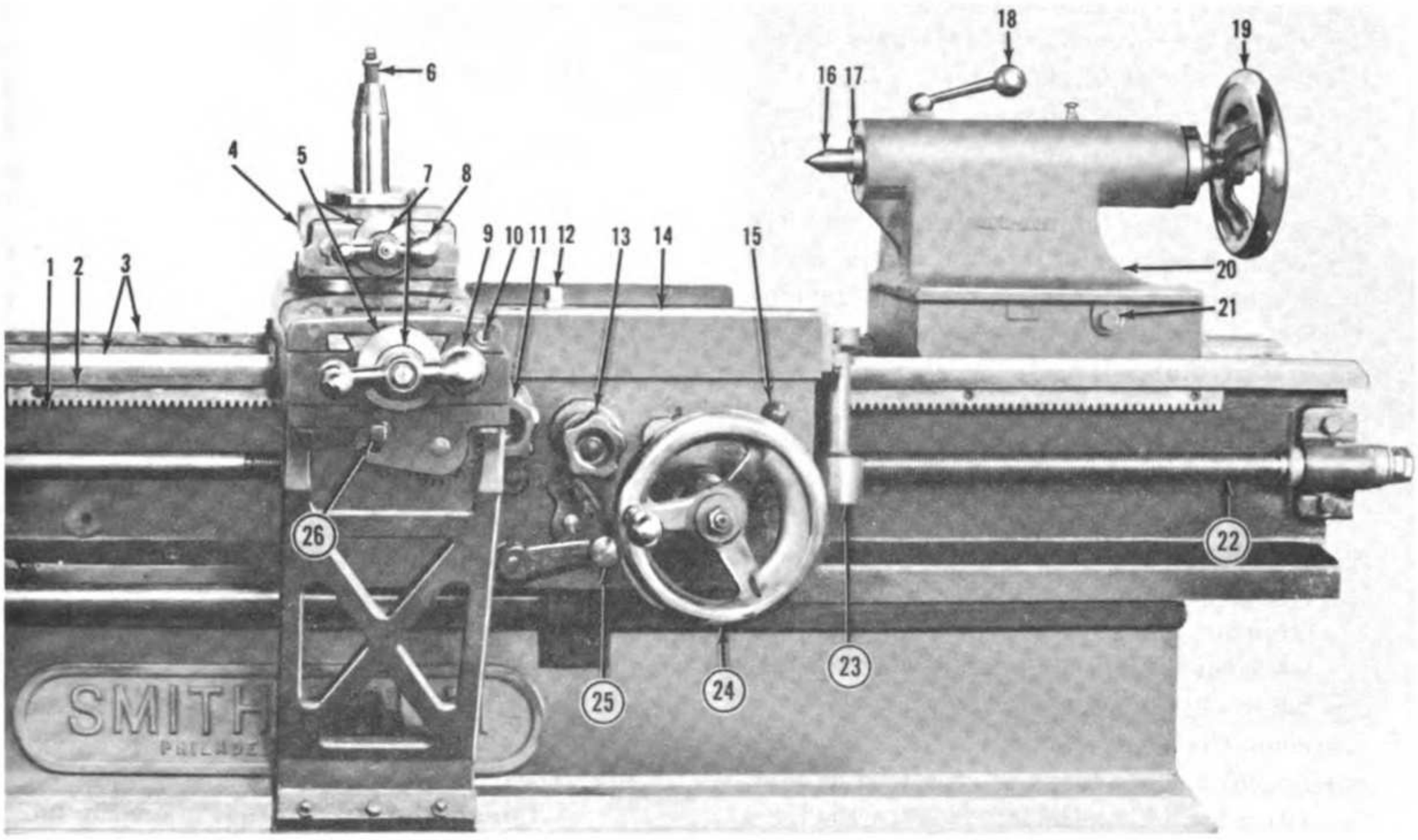
(1) *Location.* The extension-gap controls are located on the rear of the movable bed (1, fig. 47) of the lathe.

(2) *Description and purpose.* A manually operated pinion gear, mounted on the rear of the movable bed, is used to move the movable bed. Two hexagonal bolts on the rear of the movable bed, operate eccentrics to clamp the movable bed to the stationary bed after the desired gap is reached. The extension-gap controls permit adjustment of the movable bed to provide a greater swing.

e. Micrometer Carriage Stop.

(1) *Location.* The micrometer carriage stop (6, fig. 46) is clamped on the front lathe way.

(2) *Description and purpose.* The micrometer carriage stop has a micrometer adjustment which is used to accurately limit



1	Movable bed	10	Stop gage	19	Handwheel
2	Rack	11	Crossfeed knob	20	Tailstock
3	Ways	12	Carriage-clamping screw	21	Lateral-adjustment screw
4	Compound rest	13	Longitudinal-feed knob	22	Lead screw
5	Micrometer index collar	14	Longitudinal carriage	23	Thread dial indicator
6	Toolpost	15	Cam lever	24	Carriage handwheel
7	Locknuts	16	Dead center	25	Feed-reverse lever
8	Compound-rest screw handle	17	Spindle	26	Power-crossfeed locking screw
9	Carriage-crossfeed handle	18	Binding lever		

Figure 47. Lathe controls, right side.

the travel of the longitudinal carriage (14, fig. 47) during turning, facing, or boring operations.

f. Fine-Feed Lever.

(1) *Location.* The fine-feed lever (7, fig. 46) is located on the fine-feed gearbox (5) mounted below the headstock.

(2) *Description and purpose.* A fine-feed lever is a two-position latch lever used to control multiplier-gears to produce feeds less than 0.0143 inch.

g. Feed-Rod Slipgear Lever.

(1) *Location.* The feed-rod slipgear lever (8) is located on the quick-change gearbox (11).

(2) *Description and purpose.* The feed-rod slipgear lever is a three-position lever used to change gears in the quick-change gearbox to control the speed of the power feed. The correct positions of the feed-rod slipgear lever for different power feeds are given on the direct-reading index plate (10), in columns below LOWER LEVER.

h. Slipgear Lever.

(1) *Location.* The slipgear lever (9) is located on the upper front of the quick-change gearbox.

(2) *Description and purpose.* The slipgear lever is a nine-position lever that is used to change the gears in the quick-change gearbox, controlling the speed of the power feed. The correct positions of the slipgear lever for different power feeds are given on the direct-reading index plate in columns below UPPER LEVER.

i. Binding-Bolt Nuts.

(1) *Location.* The two binding-bolt nuts are located one on each side of the base of the compound rest (4, fig. 47).

(2) *Description and purpose.* The binding-bolt nuts are two hexagonal nuts used to clamp the compound rest to the crossfeed carriage. The binding-bolt nuts must be loosened to permit rotation of the compound rest. The base of the compound rest is graduated in degrees to permit measured angular settings.

j. Compound-Rest Screw Handle.

(1) *Location.* The compound-rest screw handle (8) is located on the front of the compound rest.

(2) *Description and purpose.* The compound-rest screw handle is equipped with a micrometer index collar (5). The collar is set to the zero mark at any position of the handle by loosening the locknuts (7).

k. Carriage-Crossfeed Handle.

(1) *Location.* The carriage-crossfeed handle (9) is located on the left front of the longitudinal carriage.

(2) *Description and purpose.* The carriage-crossfeed handle is equipped with a micrometer index collar (5) and a locknut (7) for the index collar. The compound rest is moved at right angles to the lathe bed by rotation of the carriage-crossfeed handle.

l. Stop Gage.

(1) *Location.* The stop gage (10) is located above the carriage-crossfeed handle on the carriage.

(2) *Description and purpose.* The stop gage is a metal block that fits over the dovetail of the crossfeed carriage. It is equipped with a knurled adjusting nut and a screw which are used when cutting threads, to regulate the depth of each successive cut.

m. Crossfeed Knob.

(1) *Location.* The crossfeed knob (11) is located on the front of the carriage apron.

(2) *Description and purpose.* The crossfeed knob is a star-shaped knob used to start and stop the powered motion of the crossfeed carriage.

n. Carriage-Clamping Screw.

(1) *Location.* The carriage-clamping screw (12) is located in the center of the top of the longitudinal carriage.

(2) *Description and purpose.* The carriage-clamping screw is a squareheaded cap screw which is used to lock the longitudinal carriage to the lathe ways when operating the power crossfeed for facing or cutting off operations only.

o. Longitudinal-Feed Knob.

(1) *Location.* The longitudinal-feed knob (13) is located on the front of the carriage apron.

(2) *Description and purpose.* The longitudinal-feed knob is a start-shaped knob used to start and stop the powered motion of the longitudinal carriage.

p. Cam Lever.

(1) *Location.* The cam lever (15) is located behind the carriage handwheel (24) on the carriage apron.

(2) *Description and purpose.* The cam lever is a single-throw lever that is used to operate the split-nut. In the down position, the split-nut is closed on the lead screw (22). In this position the crossfeed knob and the longitudinal feed knob become ineffective.

Warning: Do not engage the cam lever unless the feed-reverse lever (25) is in the neutral position.

q. Binding Lever.

(1) *Location.* The binding lever (18) is located at the top of the tailstock (20).

(2) *Description and purpose.* The binding lever is used to lock the position of the spindle (17) in the tailstock.

r. Handwheel.

(1) *Location.* The handwheel (19) is located on the right end of the tailstock.

(2) *Description and purpose.* The handwheel is a large wheel used to move the spindle and the dead center (16) back and forth.

s. Lateral-Adjustment Screws.

(1) *Location.* The lateral-adjustment screws (21) are located in the base of the tailstock, one in the front of the base and the other in the rear of the base.

(2) *Description and purpose.* The two lateral adjustment screws are hexagonal-headed cap screws used to set the tailstock on center for maintaining perfect alinement and to set the tailstock off center for taper operations.

t. Thread Dial Indicator.

(1) *Location.* The thread dial indicator (23) is located on the right end of the longitudinal carriage.

(2) *Description and purpose.* The thread dial indicator has eight marked lines that will indicate the relation between the lead screw and the headstock drive spindle. It is used when cutting odd-numbered or long screw threads.

u. Carriage Handwheel.

(1) *Location.* The carriage handwheel (24) is located in front of the lathe apron.

(2) *Description and purpose.* The carriage handwheel is a large wheel with a handle which is used to move the longitudinal carriage along the lathe ways (3) on rack (2).

v. Feed-Reverse Lever.

(1) *Location.* The feed-reverse lever (25) is located to the left of the carriage handwheel in front of the lathe apron.

(2) *Description and purpose.* The feed-reverse lever is a three-position lever used to control the direction of feed of the crossfeed carriage or the longitudinal carriage. The feed-reverse lever also disconnects the rough feed for thread-cutting operation.

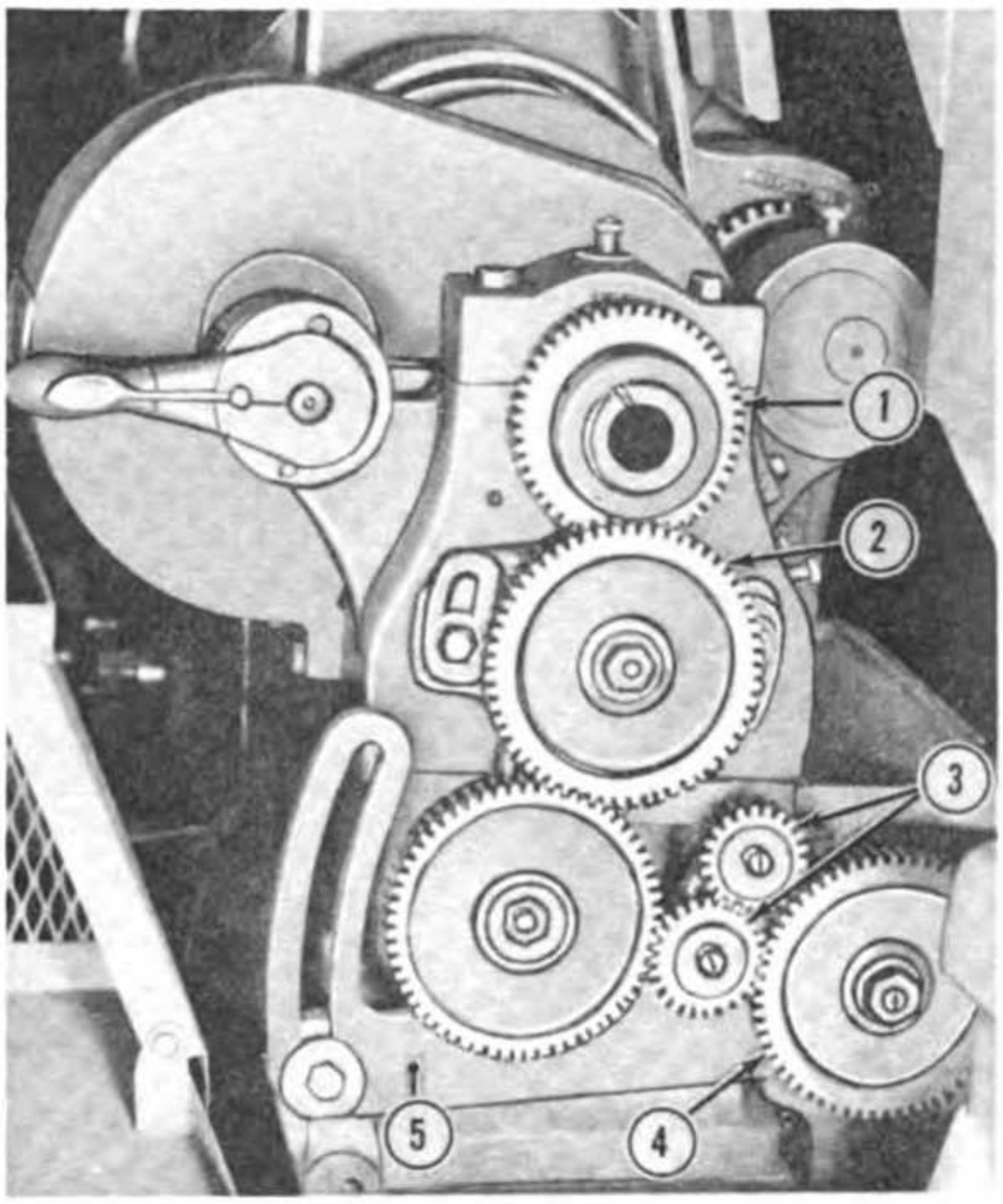
w. Power-Crossfeed Locking Screw.

(1) *Location.* The power-crossfeed locking screw (26) is located in the front of the longitudinal carriage below the carriage crossfeed handle.

(2) *Description and purpose.* The power-crossfeed locking screw is a squareheaded cap screw that clamps in two positions. In upper position, the power-crossfeed locking screw directs the power to the crossfeed drive, and in the lower position, power is directed to the longitudinal drive.

x. Change Gear.

(1) *Location.* The change gear (2, fig. 48) meshes with the spindle gear (1) which is located under the tumbler-and-change gear guard (12, fig. 46) on the left side of the lathe.



1 Spindle gear
2 Change gear
3 Tumbler pinions
4 Driving gear
5 Tumbler-gear quadrant

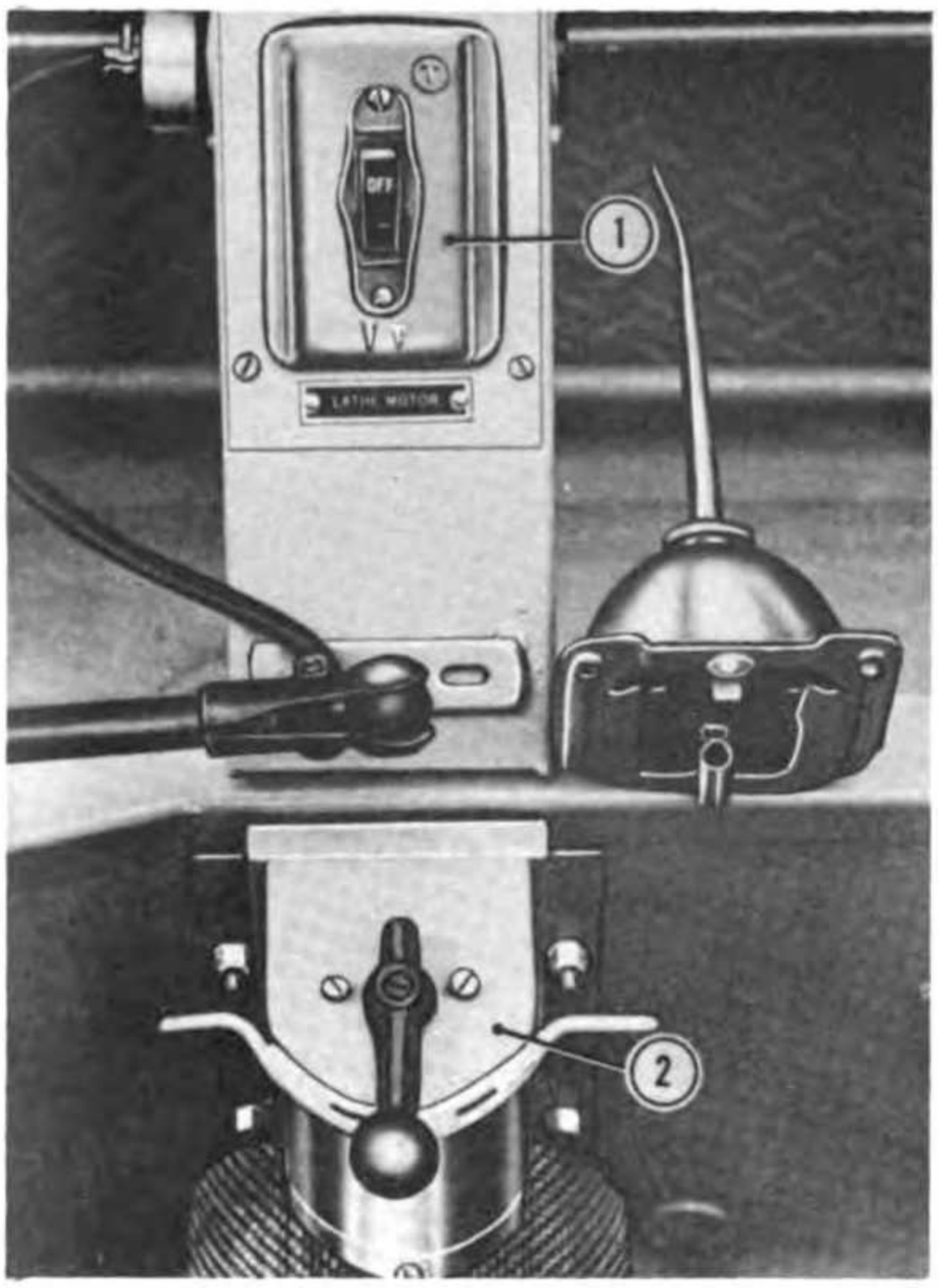
Figure 48. Lathe gear train.

(2) *Description and purpose.* The change gear provides the proper gear ratio required to cut metric threads. The correct change gear to use when cutting different metric threads is specified on a plate located on the right side of the air tank directly over the lathe. Change gears are stored in the mobile shop (see app. II).

y. Tumbler-Gear Quadrant.

(1) *Location.* The tumbler-gear quadrant (5, fig. 48) is located below the gear train.

(2) *Description and purpose.* The tumbler-gear quadrant carries the driving gear (4) and the tumbler pinions (3). The tumbler-gear quadrant is a two-piston quadrant which is used to change the lead screw direction of rotation when cutting left- or right-hand threads. Two quadrants and six transposing drive gears are provided with the lathe for mounting in the gear train. They are used for cutting metric screw threads.



1 On-off switch 2 Reversing switch

Figure 49. Lathe-drive-motor controls.

22. Lathe Drive Controls

a. Motor On-Off Switch.

(1) *Location.* The motor on-off switch (1, fig. 49) is located in the shop body directly over the center of the lathe.

(2) *Description and purpose.* The motor on-off switch is a toggle type switch used to turn on or off the 208-volt ac power for the lathe drive motor.

b. Reversing Switch.

(1) *Location.* The reversing switch (2) is mounted on the bottom of the air tank directly above the center of the lathe.

(2) *Description and purpose.* The reversing switch has a three-position lever. The switch lever is moved to change the direction of rotation of the lathe drive motor and the lathe spindle.

Caution: Allow the switch lever to remain in neutral position for a few seconds before reversing direction of rotation of the lathe.

c. Speed-Selector Handle.

(1) *Location.* The speed-selector handle (1, fig. 50) is located on the front of the lathe drive.

(2) *Description and purpose.* The speed-selector handle can be shifted to four positions. Each position will provide a different speed. The positions of the lever and its corresponding gear ratios are given on the speed-selection plate (3).

Caution: Stop lathe drive motor before shifting to new speed or damage will result.

d. Handwheel.

(1) *Location.* The handwheel (2) is located on the right end of the drive motor shaft.

(2) *Description and purpose.* The handwheel is a black spokeless wheel used to turn the shaft of the lathe drive to aline the gear teeth in the speed-selector assembly before shifting to different gear ratio.

23. Milling-and-Grinding Attachment Controls

a. Feed-Screw Handle.

(1) *Location.* The feed-screw handle (1, fig. 51) is located on top of the feed screw (2).

(2) *Description and purpose.* The feed-screw handle is of the crank type and is used to move the working head up or down.

b. On-Off Switch.

(1) *Location.* The on-off switch (4) is located at the rear of the motor (3).

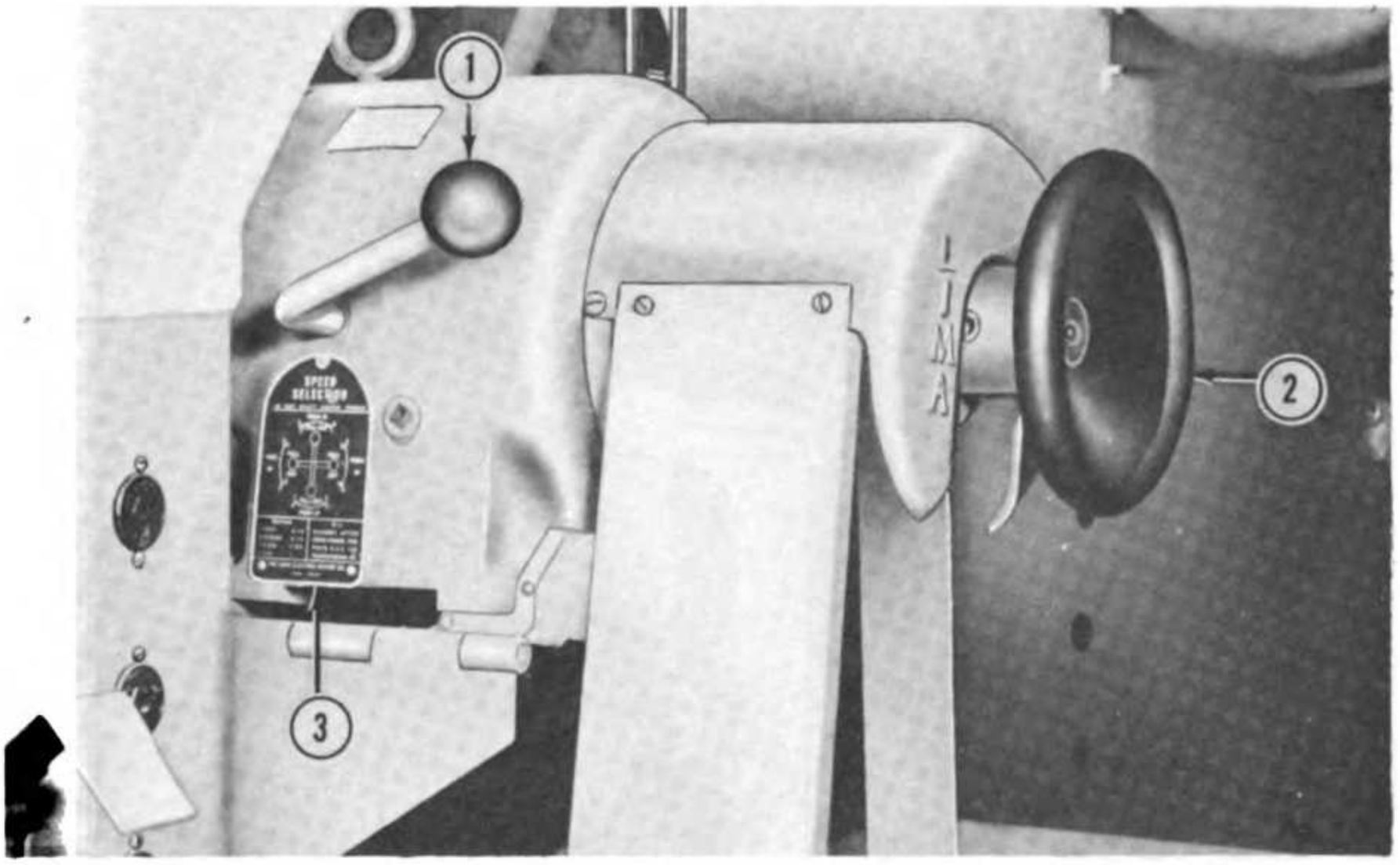
(2) *Description and purpose.* The on-off switch is a push-button type switch and is used to start and stop the motor of the milling-and-grinding attachment.

24. Electric Drill, ⅝-Inch, and Stand Controls

a. Depth Gage.

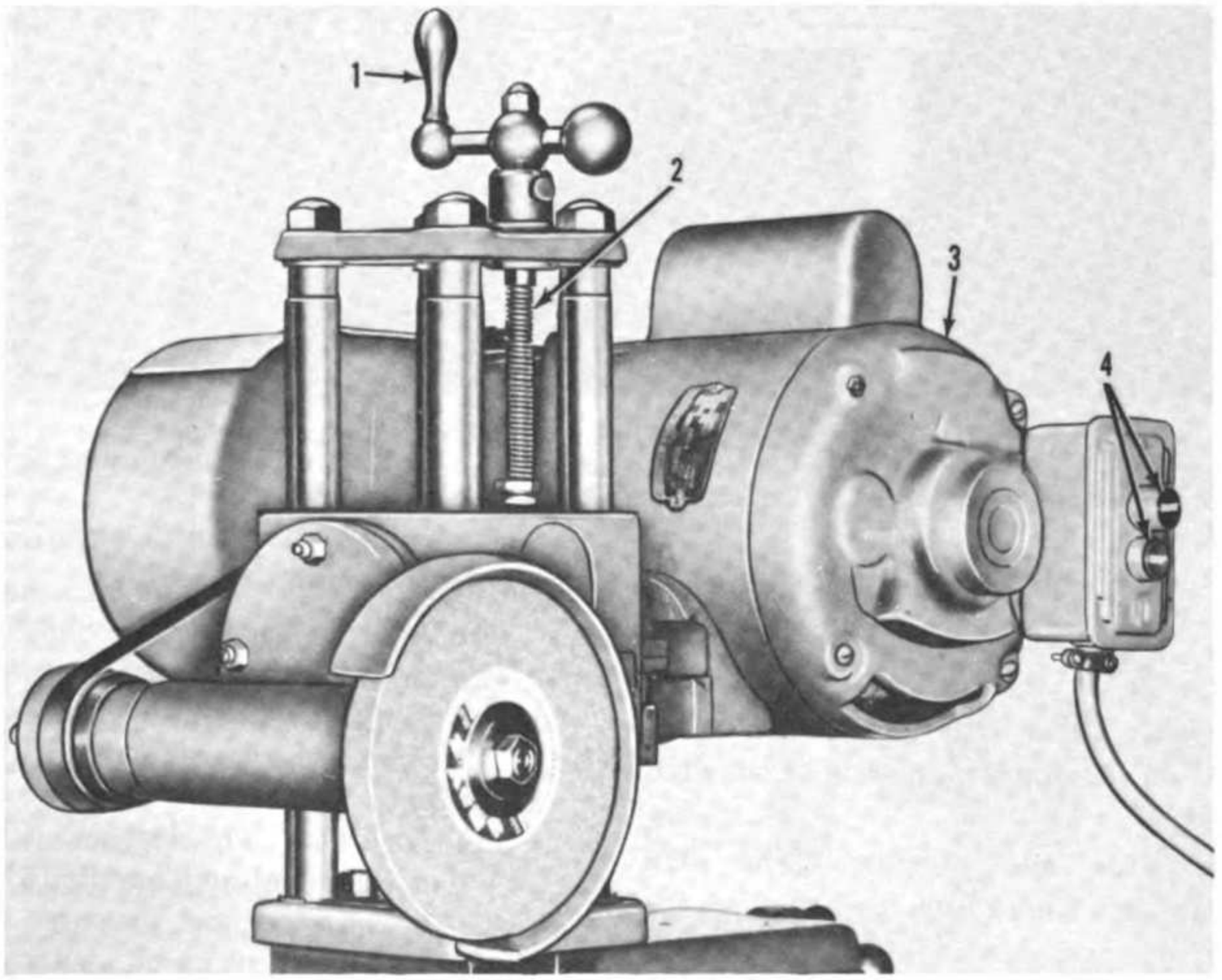
(1) *Location.* The depth gage (2, fig. 52) is located in the rear yoke of the drill stand (11).

(2) *Description and purpose.* The depth gage is a rod with a setscrew (3) that is used to limit the depth of the drilling operation.



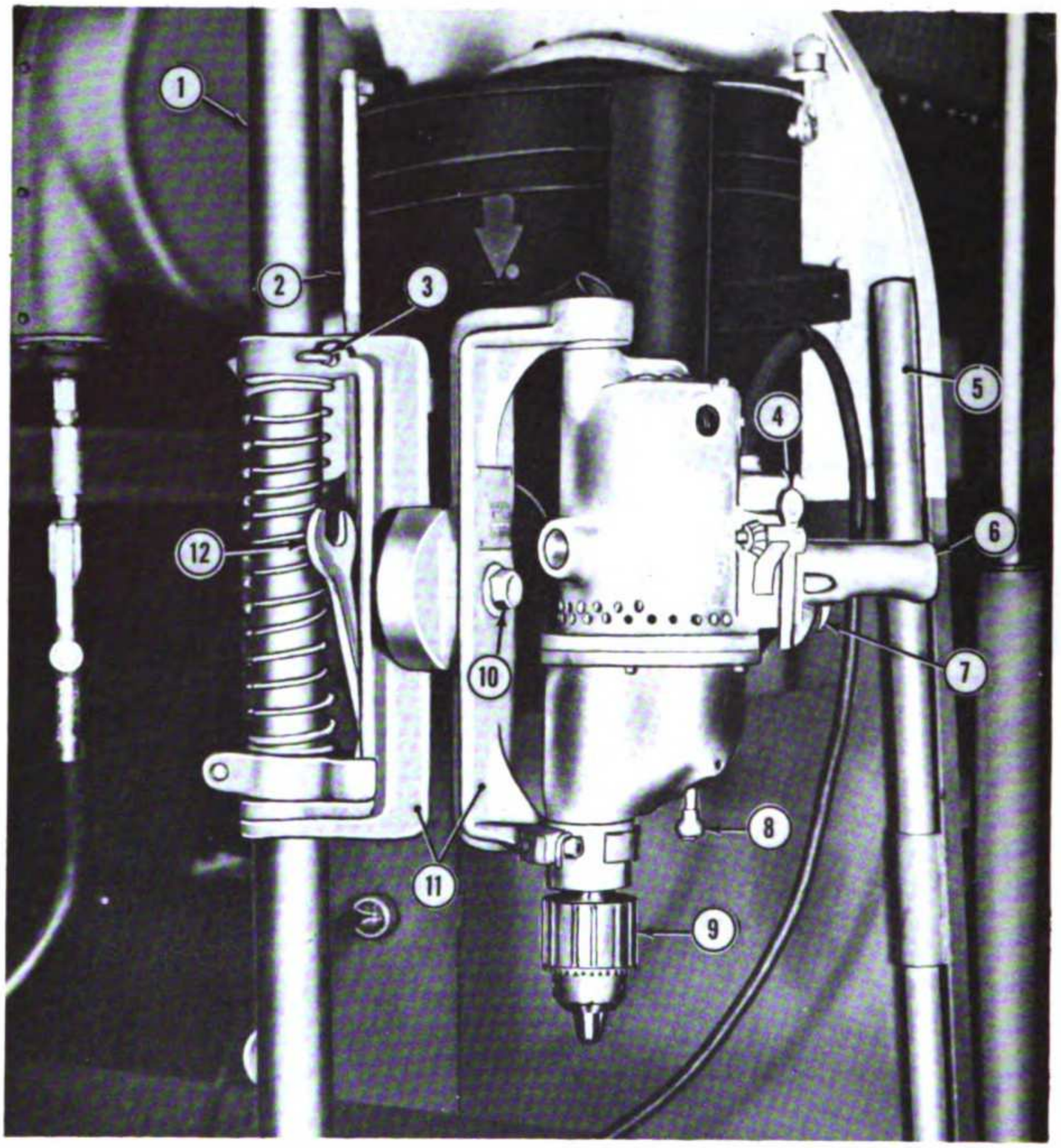
1 Speed-selector handle 3 Speed-selection plate 2 Handwheel

Figure 50. Lathe-drive controls.



1 Feed-screw handle 2 Feed screw 3 Motor 4 On-off switch

Figure 51. Milling-and-grinding attachment controls.



1	Drill-stand column	5	Drill handle	9	Geared chuck
2	Depth gage	6	Pistol-grip handle	10	Drill-stand adjusting screw
3	Depth gage setscrew	7	Trigger	11	Drill stand
4	Key	8	Speed change control	12	Wrench

Figure 52. Electric-drill, 5/8-inch, and stand controls.

b. Drill Handle.

(1) *Location.* The drill handle (5) is located on the upper right side of the drill stand.

(2) *Description and purpose.* The drill handle is a round pipe used to move the drill up and down on the drill-stand column (1).

c. Key.

(1) *Location.* The key (4) is located in a spring clamp mounted on the left side of the drill body.

(2) *Description and purpose.* The key is a gear with a handle used to loosen and tighten the geared chuck (9).

d. Trigger.

(1) *Location.* The trigger (7) is located on the pistol-grip handle (6) of the drill.

(2) *Description and purpose.* The trigger is a lever-type on-off switch used to start and to stop the drill.

e. Speed-Change Control.

(1) *Location.* The speed-change control (8) is located on the left side of the gear housing of the drill, near the geared chuck.

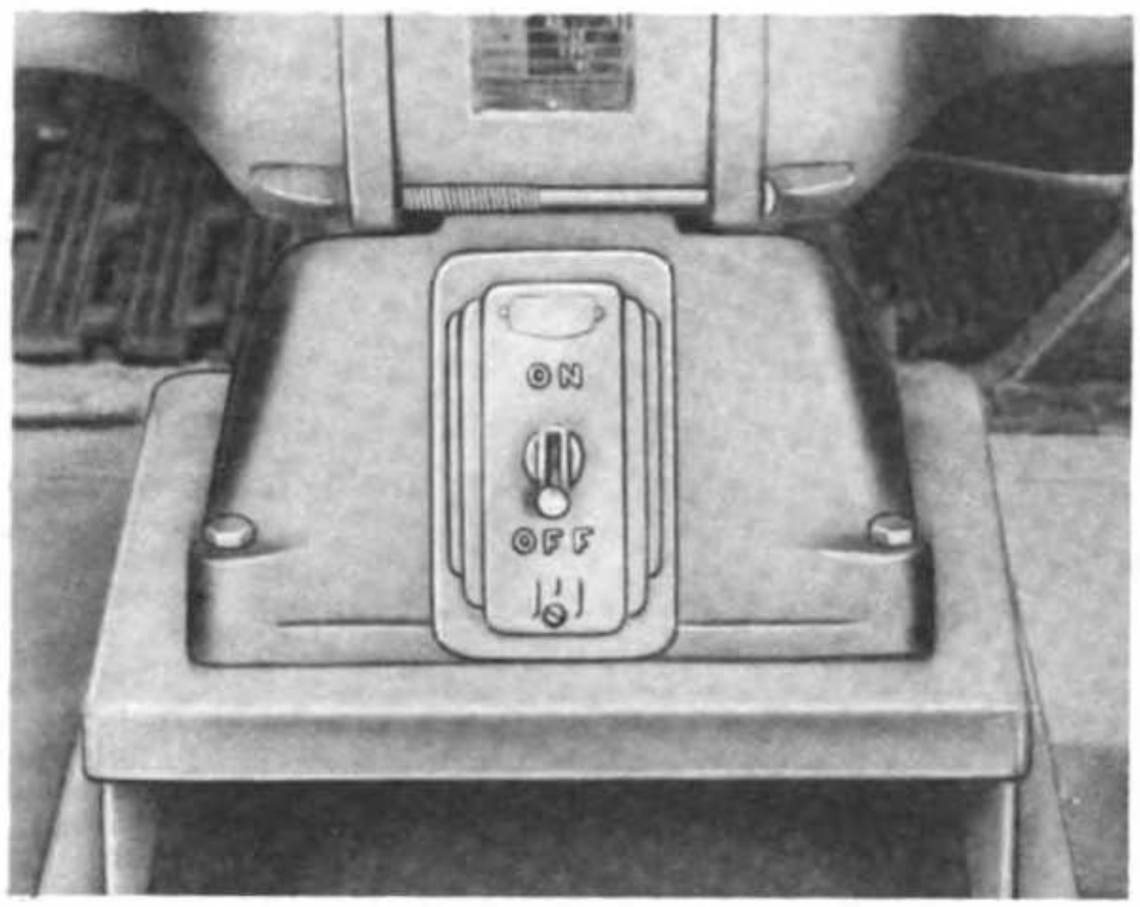


Figure 53. Bench-grinder switch.

(2) *Description and purpose.* The speed-change control is a ball-capped, two-position, push-pull switch used to select high- or low-speed operation. The inner position of the switch is the high-speed position.

f. Drill-Stand Adjusting Screw.

(1) *Location.* The drill-stand adjusting screw (10) is located inside the front yoke of the drill stand (11).

(2) *Description and purpose.* The drill-stand adjusting screw is a cap screw used to change the working angle of the drill.

Note. A wrench (12) stored on the drill stand is used to loosen and to tighten the adjusting screw.

25. Bench-Grinder Control

a. Location. The on-off switch (fig. 53) is located on the front of the bench-grinder base.

b. Description and Purpose. The on-off switch is a toggle-type switch used to start and stop the bench grinder.

26. Bandsaw Controls

a. Blade-Tension Handwheel.

(1) *Location.* The blade-tension handwheel (1, fig. 54) is located on the free end of the bandsaw frame.

(2) *Description and purpose.* The blade-tension handwheel is a notched wheel used to tighten or loosen the bandsaw blade.

b. Pitch-Adjusting Screw.

(1) *Location.* The pitch-adjusting screw (2) is located near the free end of the bandsaw frame above the bandsaw identification plate.

(2) *Description and purpose.* The pitch-adjusting screw is a socket-head screw used to change the pitch of the bandsaw blade.

c. On-Off Switch.

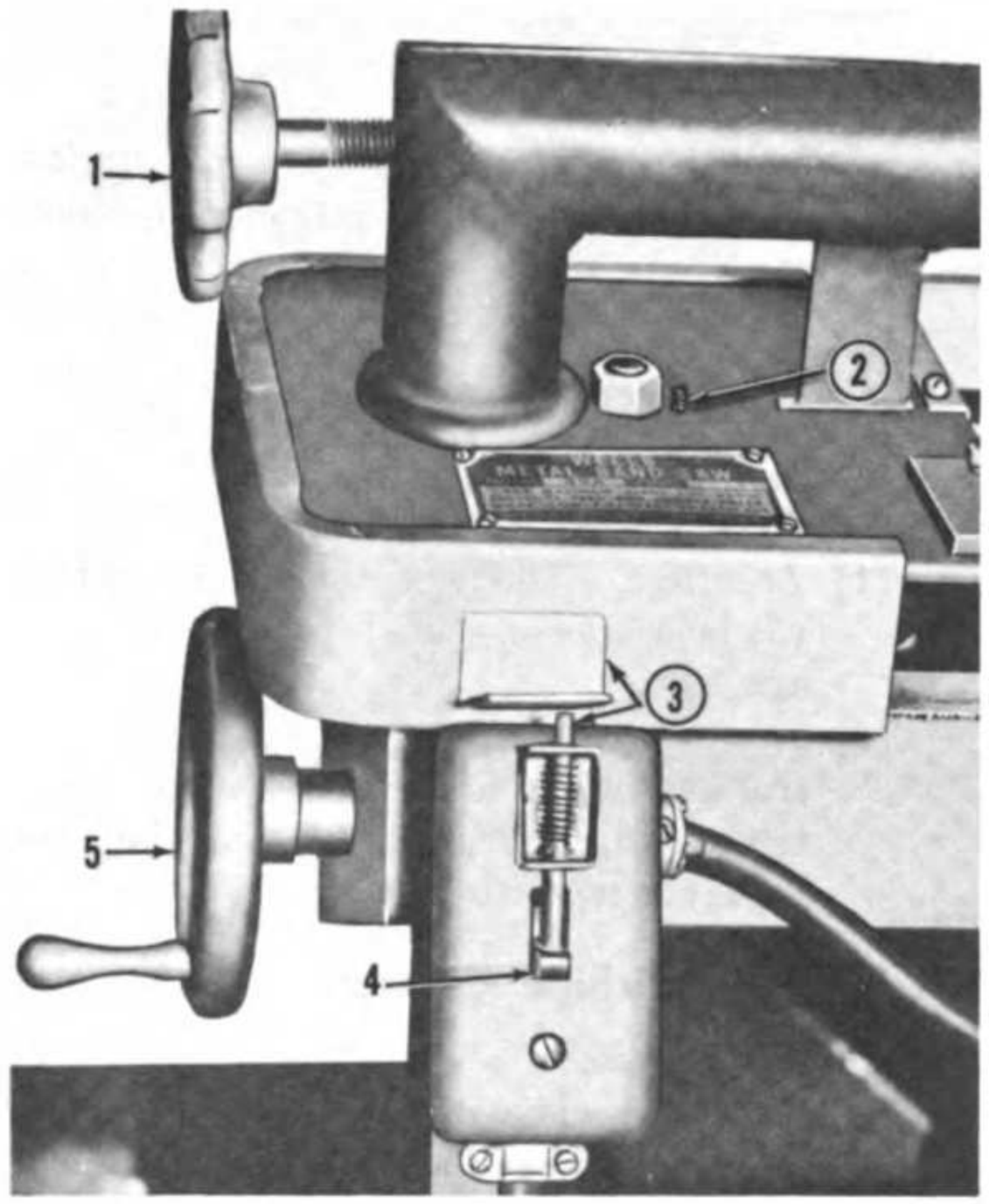
(1) *Location.* The on-off switch (4) is located on the front left side of the bandsaw base.

(2) *Description and purpose.* The on-off switch is a toggle-type switch used to start and stop the bandsaw.

d. Automatic Shutoff Control.

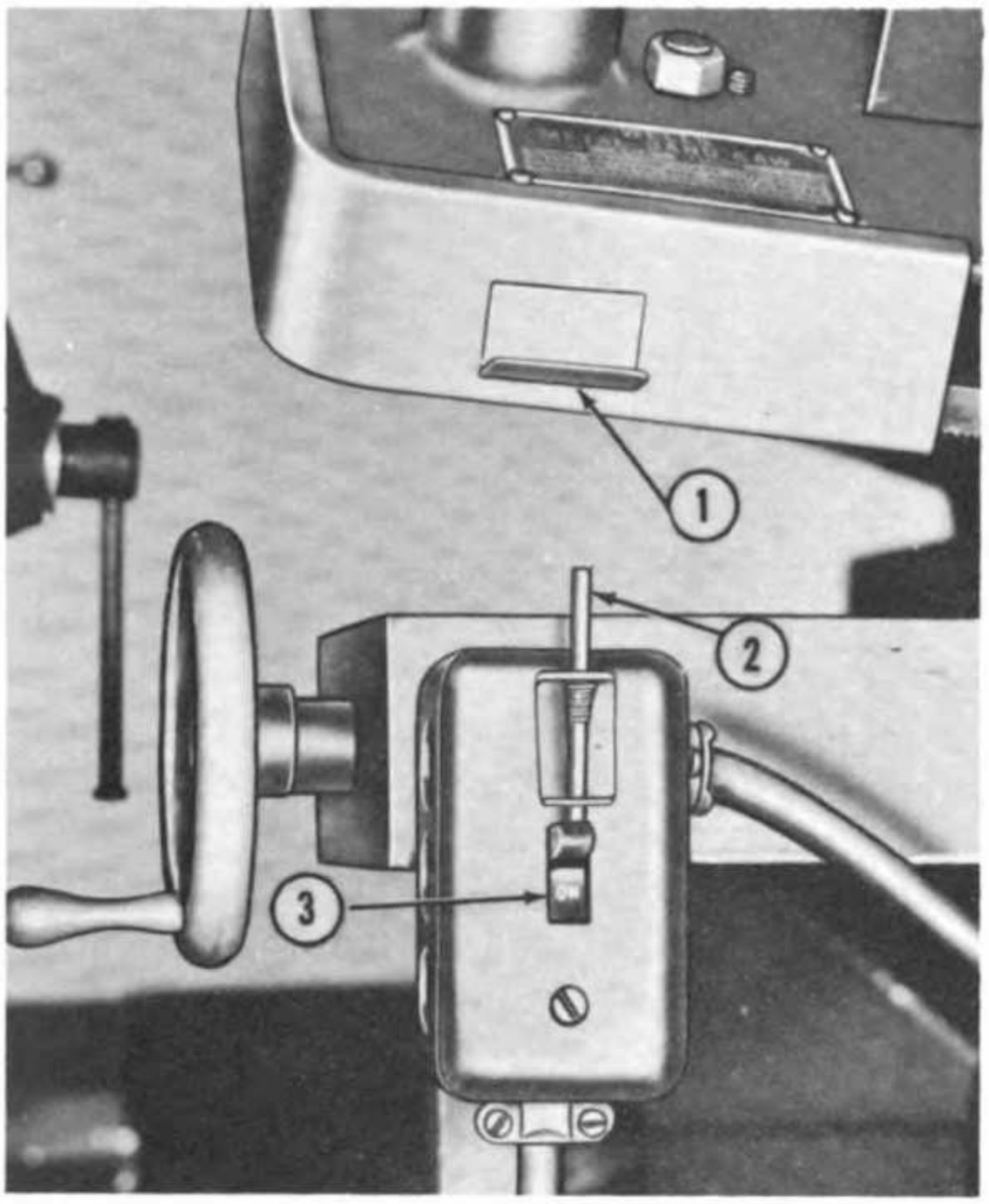
(1) *Location.* The automatic shutoff control (3) is located on the front left side of the bandsaw.

(2) *Description and purpose.* The automatic shutoff control consists of a spring-



1 Blade-tension handwheel
2 Pitch-adjusting screw
3 Automatic shut-off control
4 On-off switch (off position)
5 Vise-control handwheel

Figure 54. Bandsaw controls, off position.



1 Bracket
2 Plunger
3 On-off switch (on position)

Figure 55. Bandsaw controls, on position.

loaded plunger (2, fig. 55) and bracket (1). The bracket is attached to the bandsaw frame and the plunger is mounted on the on-off switch (3). After a cut has been completed, the bracket contacts the plunger which pushes the switch down to the OFF position (4, fig. 54).

e. Vise-Control Handwheel.

(1) *Location.* The vise-control handwheel (5) is located on the left side of the bandsaw base.

(2) *Description and purpose.* The vise-control handwheel has a knob-handle and is used to tighten or loosen the vise that holds the work to be sawed.

27. Honing Machine Controls

a. Dry-Wet Switch.

(1) *Location.* The dry-wet switch (2, fig. 56) is located at the right front center of the honing machine.

(2) *Description and purpose.* The dry-wet switch is a toggle type switch used to start or to stop the motor that pumps coolant through the flexible hose (1).

b. Dial.

(1) *Location.* The dial (3) is located in the front center of the honing machine.

(2) *Description and purpose.* The dial is graduated in increments of 0.001 inch and is used to contract and to set the amount of expansion of the honing stones. The honing stones are mounted in a mandrel that is held in the spindle-drive socket (4).

c. Foot Pedal.

(1) *Location.* The foot pedal (7) is located on the floor at right front of the honing machine.

(2) *Description and purpose.* The foot pedal is a foot-controlled lever attached by the clutch chain (6) to the operating lever (5). The foot pedal is used to start and stop the spindle drive and to control the cutting tension of the honing stones up to the size set by the dial (*b* above).

28. Valve Refacer Controls

a. Coolant Control.

(1) *Location.* The coolant control (3, fig. 57) is located on the top of the wheelhead assembly (2).

(2) *Description and purpose.* The coolant control is a handknob used to adjust the flow of coolant on the work.

b. Collet Knurled Collar.

(1) *Location.* The collet knurled collar (4) is located on the front end of the workhead assembly (1).

(2) *Description and purpose.* The collet knurled collar is used to hold the collets in place in the workhead and is removed to change collets.

c. Swivel Nut.

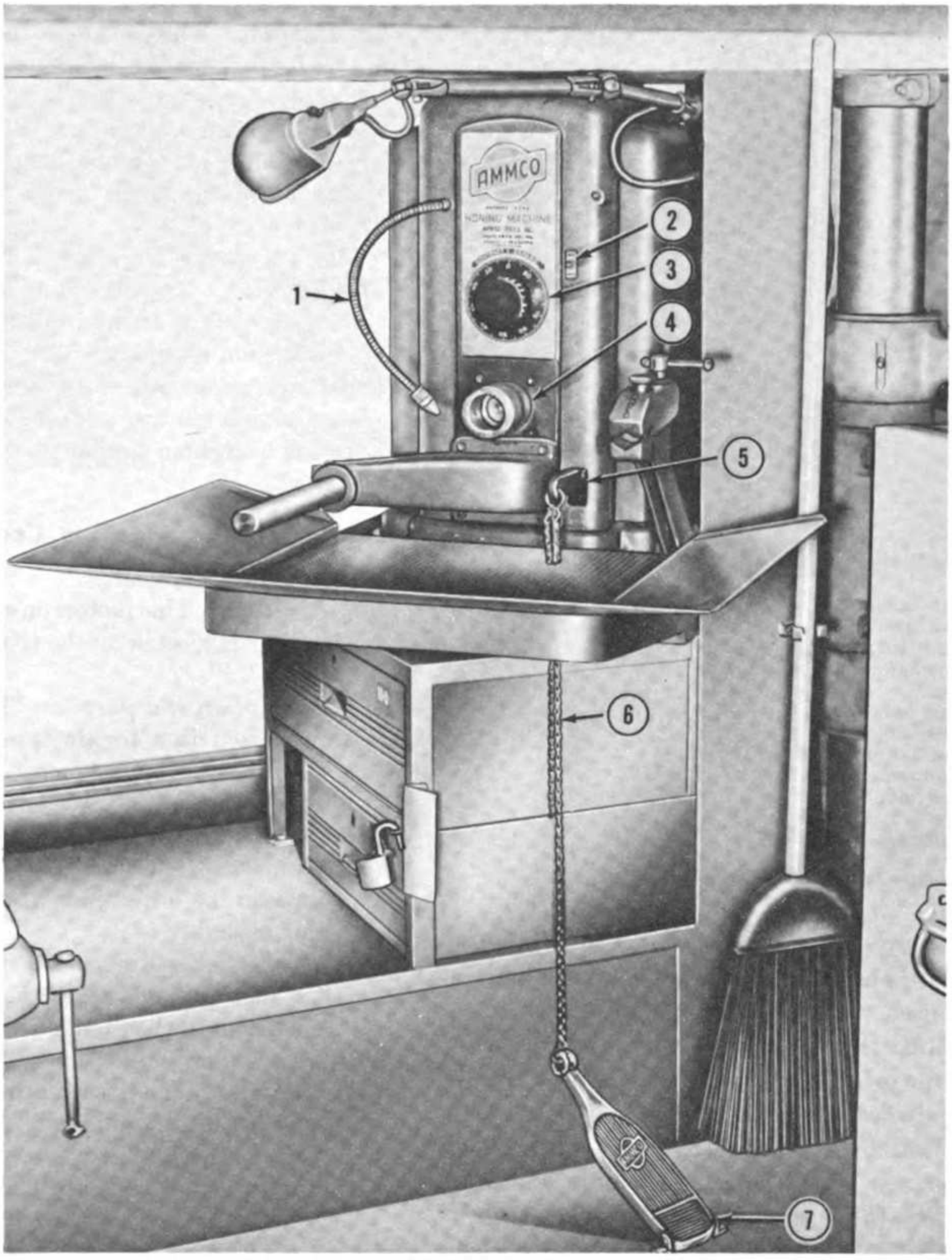
(1) *Location.* The swivel nut (5) is located on the base of the workhead assembly.

(2) *Description and purpose.* The swivel nut is a round nut used for adjustment of the grinding angle. Grinding angles are marked on the angle indicator that is mounted on the worktable (11).

Note. A pin wrench is provided for loosening and tightening the swivel nut.

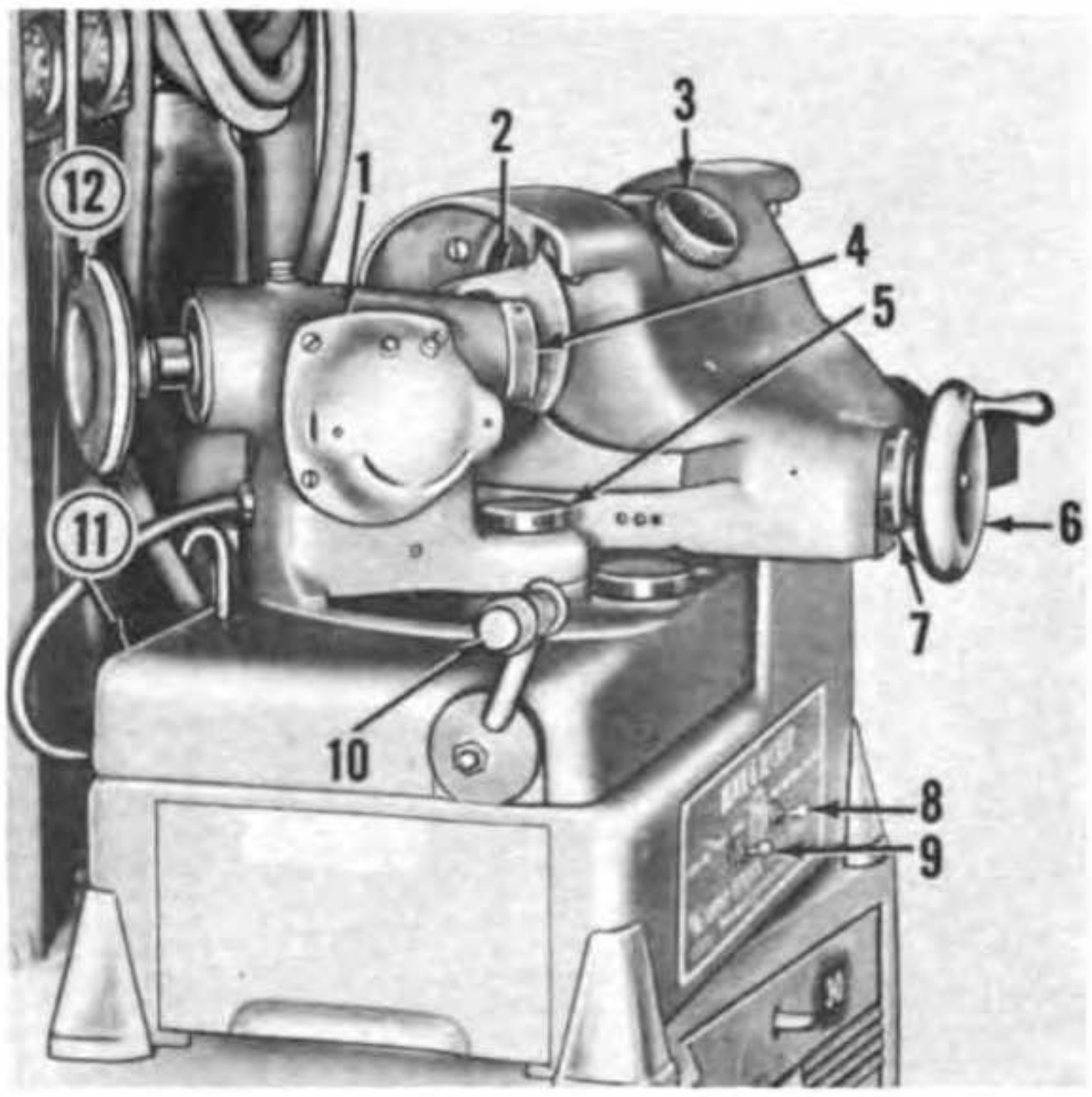
d. Wheelhead Handwheel.

(1) *Location.* The wheelhead handwheel (6) is located on the front of the wheelhead assembly.



1 Flexible hose
2 Dry-wet switch
3 Dial
4 Spindle-drive socket
5 Operating lever
6 Clutch chain
7 Foot pedal

Figure 56. Honing machine controls.



1 Workhead assembly
2 Wheelhead assembly
3 Coolant control
4 Collet knurled collar
5 Swivel nut
6 Wheelhead handwheel
7 Handwheel indicator
8 Wheelhead-motor on-off switch
9 Workhead-motor on-off switch
10 Worktable handlever
11 Worktable
12 Collet-adjusting handwheel

Figure 57. Valve refacer controls.

(2) *Description and purpose.* The wheelhead handwheel has a knob-handle and is used to move the grinding wheel against the work. The forward motion of the grinding wheel is measured on the handwheel indicator (7).

e. Wheelhead-Motor On-Off Switch.

(1) *Location.* The wheelhead-motor on-off switch (8) is the right switch of the two switches on the front of the valve refacer.

(2) *Description and purpose.* The wheelhead-motor on-off switch is a toggle type switch used to start and stop the grinding wheel.

f. Workhead-Motor On-Off Switch.

(1) *Location.* The workhead-motor on-off switch (9) is the left switch of the two switches on the front of the valve refacer.

(2) *Description and purpose.* The workhead-motor on-off switch is a toggle type switch used to start and stop the rotation of the work.

g. Worktable Handlever.

(1) *Location.* The worktable handlever (10) is located on the left side of the worktable.

(2) *Description and purpose.* The worktable handlever has a crank-handle and is used to move the work across the grinding wheel.

h. Collet-Adjusting Handwheel.

(1) *Location.* The collet-adjusting handwheel (12) is located on the rear of the workhead assembly.

(2) *Description and purpose.* The collet-adjusting handwheel is a spokeless wheel used to tighten the collet which holds the work.

29. Brake-Relining Machine Controls

a. Motor On-Off Switch.

(1) *Location.* The motor on-off switch (1, fig. 58) is located on the top of the motor (2).

(2) *Description and purpose.* The motor on-off switch is a toggle type switch used to start and stop the motor-driven grinding drum (3).

b. Foot Pedal.

(1) *Location.* The foot pedal (5) is located between the lower ends of the pedal-support assembly (4).

(2) *Description and purpose.* The foot pedal is a foot-operated lever that controls the movement of the plunger.

c. Lift-Arm Thumbscrew.

(1) *Location.* The lift-arm thumbscrew (6) is located at the end of the push rod.

(2) *Description and purpose.* The lift-arm thumbscrew is a hand-turned screw used to limit the movement of the plunger.

30. Battery-Charger Controls

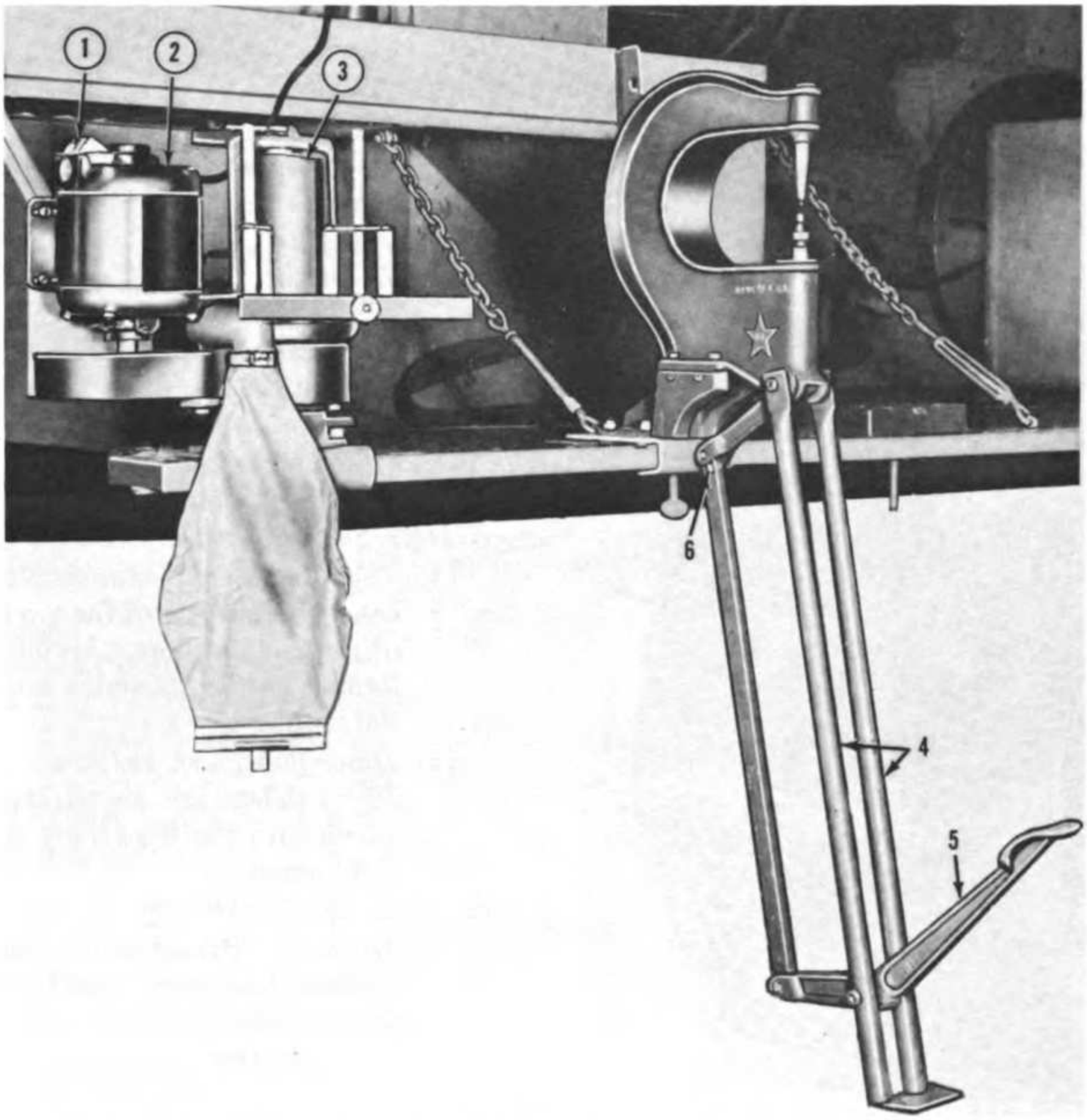
a. Ammeter.

(1) *Location.* The ammeter (1, fig. 59) is located at the top front center of the battery charger.

(2) *Description and purpose.* The ammeter is a 0–75 ampere, dc registering gage used to measure the charging current.

b. Charge Switch.

(1) *Location.* The charge switch (2) is located at the right front center of the battery charger.



1 On-off switch
2 Motor
3 Grinding drum
4 Pedal support assembly
5 Foot pedal
6 Lift-arm thumbscrew

Figure 58. Brake-relining machine controls.

(2) *Description and purpose.* The charge switch has a notched knob which is turned to regulate the charging current.

c. Battery-Voltage-Selecting Switch.

(1) *Location.* The battery-voltage-selecting switch (3) is located at the bottom front center of the battery charger.

(2) *Description and purpose.* The battery-voltage-selecting switch has a small notched knob which is turned to select the charging voltage.

d. Time Switch.

(1) *Location.* The time switch (4) is located at the left front center of the battery charger.

(2) *Description and purpose.* The time switch has a notched knob which is turned to set the length of time the battery charger will operate.

31. Hotplate Controls

a. On-Off Switch.

(1) *Location.* The on-off switch (3, fig. 60) is located on the right side of the dial plate, on the front of the hotplate.

(2) *Description and purpose.* The on-off switch is a toggle type switch used to turn the hotplate on and off.

b. High-Low Rheostat.

(1) *Location.* The high-low rheostat (2) is located in the center of the dial plate.

(2) *Description and purpose.* The high-low rheostat has a knob with a pointer

1 Ammeter
2 Charge switch
3 Battery-voltage-selecting switch
4 Time switch

Figure 59. Battery-charger controls.

and is turned to control the temperature of the hotplate.

c. Pilot Light.

(1) *Location.* The pilot light (1) is located on the left side of the dial plate.

(2) *Description and purpose.* The pilot light is a red light that will go on when the hotplate is operating.

32. Working-Lights Controls

a. Floodlights.

(1) *Location.* Two floodlights, one on each side, are located in the ceiling of the rear section of the mobile shop. The on-off switch for each floodlight is located beside the reflector of each light.

(2) *Description and purpose.* The on-off switch is a toggle type switch which turns the 300-watt, inside-frost floodlights on or off.

b. Bunk Lights.

(1) *Location.* Two lights are located on top of the rear of the center bulkhead, one above each bunk. The on-off switch is located at the side of each light base.

(2) *Description and purpose.* The on-off switch is a toggle type switch which turns the 100-watt bunk lights on or off.

c. Main Shop Lights.

(1) *Location.* Two main shop lights are located on each side of the top front section of the mobile shop. An on-off switch is located on the stanchion on each side of the shop.

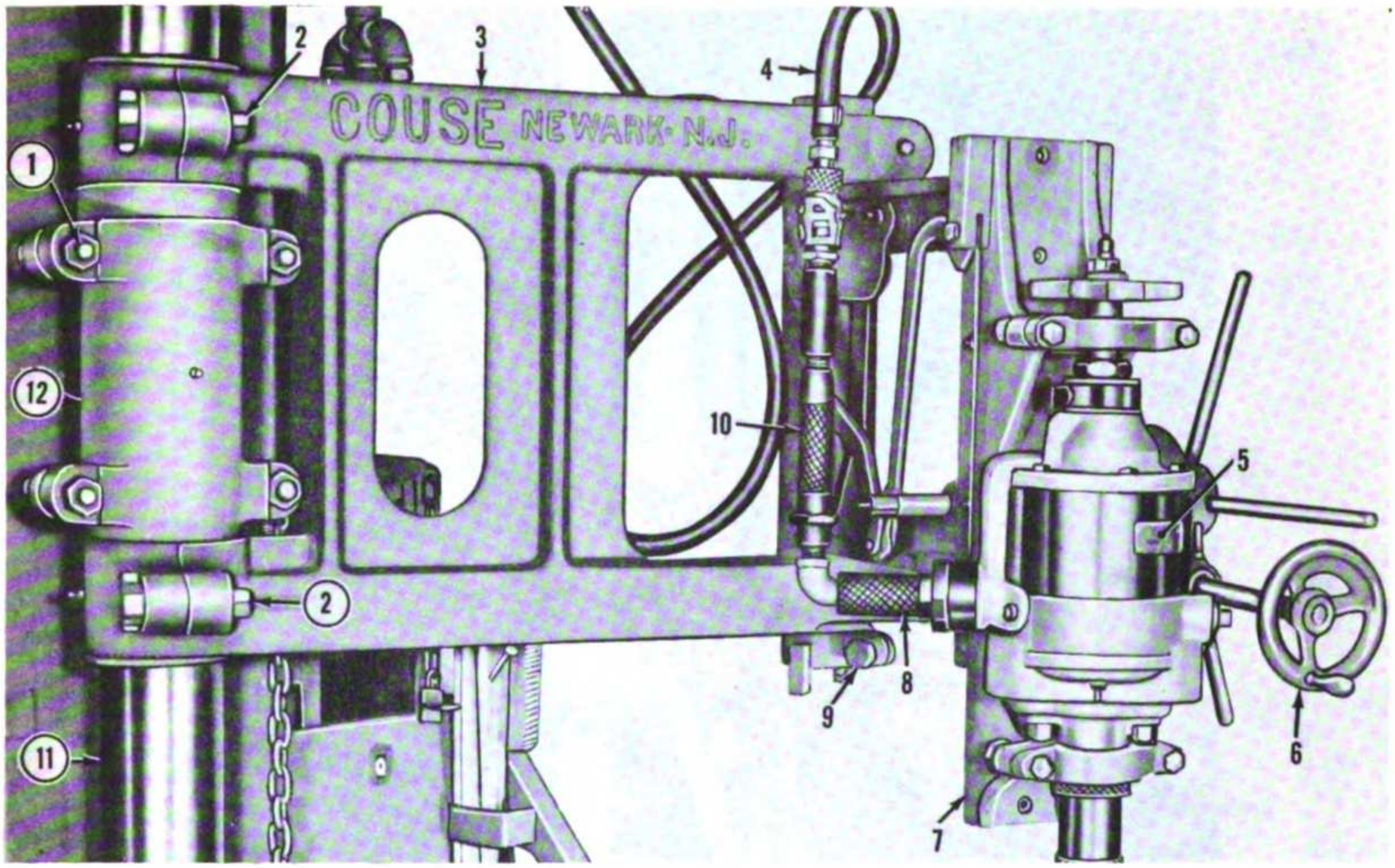
(2) *Description and purpose.* The two on-off switches are toggle type switches which turn the four 100-watt main shop lights on or off.

d. Adjustable Lights.

(1) *Location.* Six adjustable lights are used in the mobile shop. One light is fastened to each side of the air tank in the front section of the mobile shop. One light is

1 Pilot light
2 High-low rheostat
3 On-off switch

Figure 60. Hotplate controls.



1 Sleeve-binding cap screws
2 Arm-binding cap screws
3 Radial-drill arm
4 Flexible air hose
5 Drill
6 Fine-feed handwheel
7 Sliding bracket
8 Speed control
9 Locking nut
10 Throttle lever
11 Right rear jack cylinder
12 Sleeve

Figure 61. Radial-drill and radial-drill arm controls.

installed at each corner of the center section of the mobile shop. The on-off switch for each adjustable light is located on the side of each light socket.

(2) *Description and purpose.* The on-off switches are rotary type switches which turn each adjustable light on or off.

33. Radial Drill and Radial-Drill Arm Controls

a. Sleeve-Binding Cap Screws.

(1) *Location.* The sleeve-binding cap screws (1, fig. 61) are located on the flanges of the sleeve (12).

(2) *Description and purpose.* The sleeve-binding cap screws are used to prevent vertical movement of the radial-drill arm (3) on right rear jack cylinder (11).

b. Arm-Binding Cap Screws.

(1) *Location.* The arm-binding cap screws (2) are located on the flanges in the end of the radial-drill arm.

(2) *Description and purpose.* The arm-binding cap screws are used to prevent horizontal movement of the radial-drill arm.

c. Fine-Feed Handwheel.

(1) *Location.* The fine-feed handwheel (7, fig. 62) is located on the right side of the feed frame (2).

(2) *Description and purpose.* The fine-feed handwheel is a wheel with a handle and is used to drive the worm gear moving the drill (5, fig. 61) up or down the rack on the sliding bracket (7).

d. Speed Control.

(1) *Location.* The speed control (8) is located on the air inlet at the left side of the drill.

(2) *Description and purpose.* The speed control is a knurled sleeve used to vary the speed and to change the direction of rotation of the drill.

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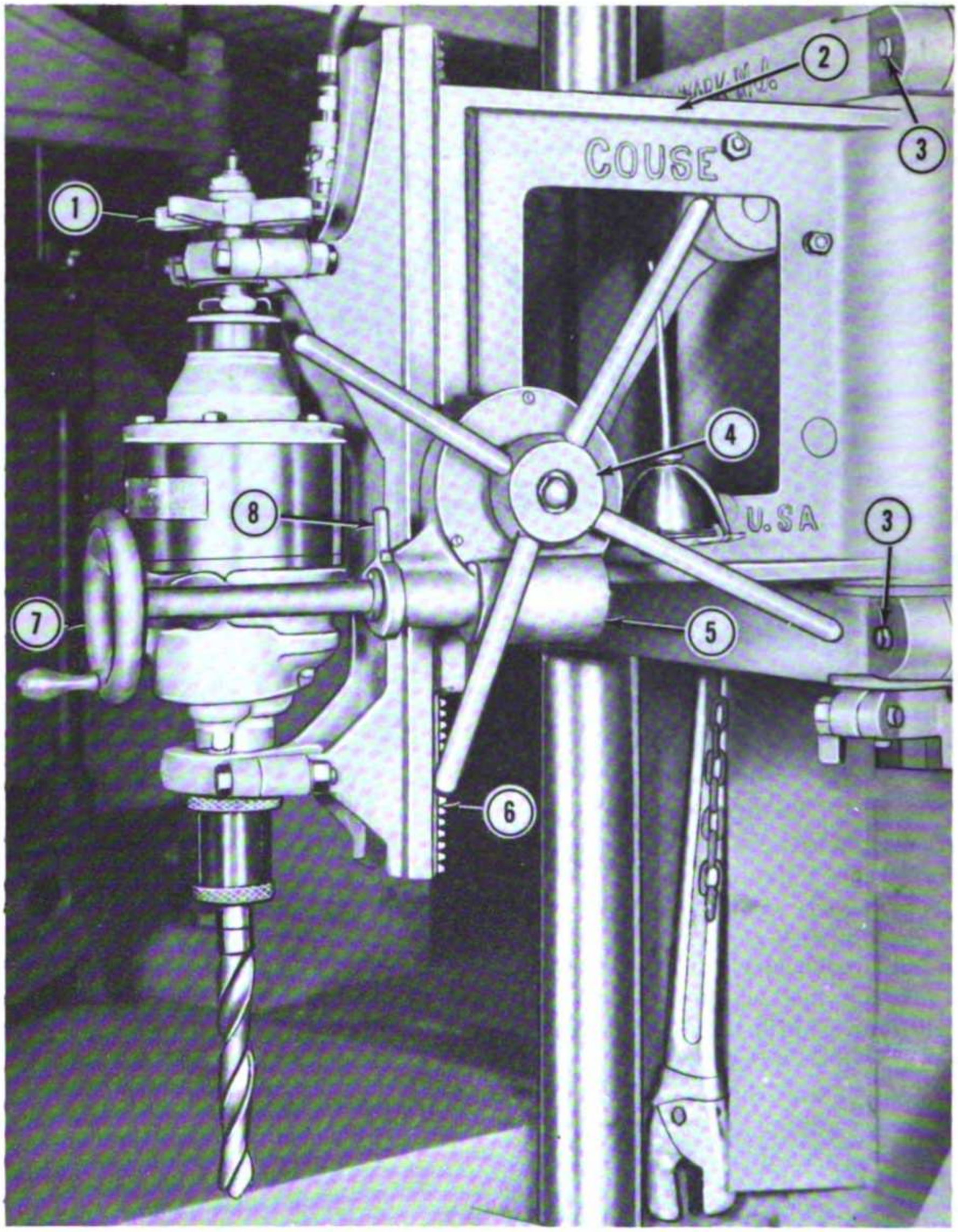


1 Portable feed-screw control
2 Feed frame
3 Feed-frame-binding cap screws
4 Coarse-feed lever
5 Feed gearcase
6 Rack
7 Fine-feed handwheel
8 Feed-shifting lever

Figure 62. Radial-drill feed and feed-frame controls.

e. Locking Nut.

(1) *Location.* The locking nut (9) is located at the base of the radial-drill arm.

(2) *Description and purpose.* The locking nut is split and has a handle for each side. A cap screw is used to secure the locking nut after tightening. Tightening the split nut is a quick method of preventing the feed frame from swinging.

f. Throttle Lever.

(1) *Location.* The throttle lever (10) is located in the air inlet above the speed control and the flexible air hose (4) is connected to the throttle lever with a coupling.

(2) *Description and purpose.* The throttle lever is a finger-pressure lever used to

control the airflow to start or to stop the drill.

g. Portable Feed-Screw Control.

(1) *Location.* The portable feed-screw control (1, fig. 62) is located on top of the drill.

(2) *Description and purpose.* The portable feed-screw control is a four-spoke wheel used to control the feed when the drill is operated as a portable drill.

h. Feed-Frame-Binding Cap Screws.

(1) *Location.* The feed-frame-binding cap screws (3) are located in the split ends of the radial-drill arm.

(2) *Description and purpose.* The feed-frame-binding cap screws are used to secure the feed frame and prevent swinging.

i. Coarse-Feed Lever.

(1) *Location.* The coarse-feed lever (4), on the feed gearcase (5), is located on the right side of the feed frame.

(2) *Description and purpose.* The coarse-feed lever is a four-spoked wheel used to move the drill up and down the rack (6).

j. Feed-Adjustment Cap Screws.

(1) *Location.* The two feed-adjustment cap screws are located on the side of the feed frame behind the feed gearcase.

(2) *Description and purpose.* The two large feed-adjustment cap screws are used to lock the fine-feed handwheel and feed gearcase in either a horizontal or a vertical position.

k. Feed-Shifting Lever.

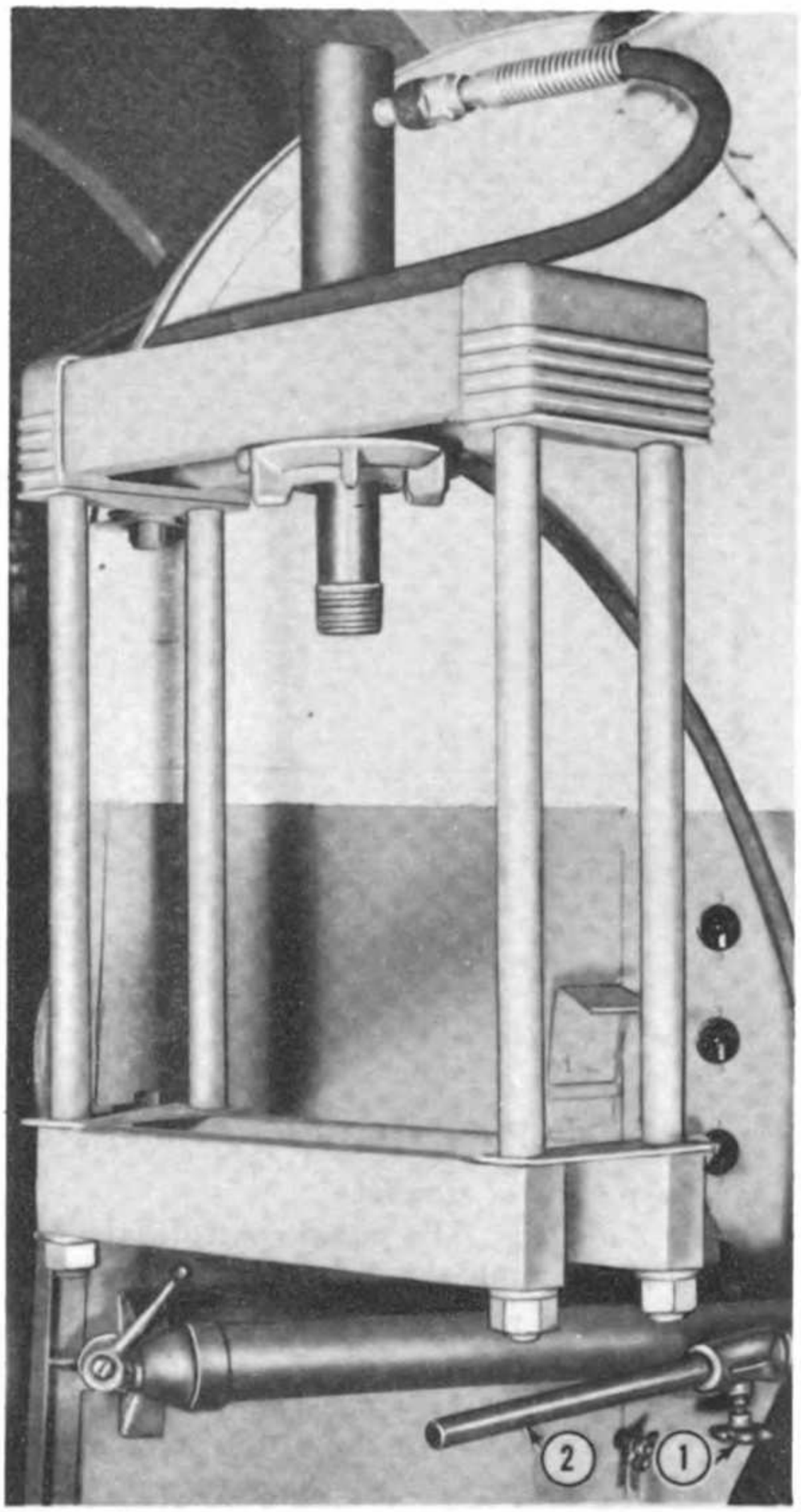
(1) *Location.* The feed-shifting lever (8) is located on the fine-feed handwheel shaft to the left of the feed frame.

(2) *Description and purpose.* The feed-shifting lever is a two-position lever that is shifted to the coarse- or fine-feed position before operating the feed controls.

34. Hydraulic Press, 10-Ton, Controls

a. Valve Control Knob.

(1) *Location.* The valve control knob (1, fig. 63) is located in the right end of the pump. The pump is mounted below the hydraulic-press mount on the center bulkhead of the mobile shop.



1 Valve control knob 2 Pump control handle

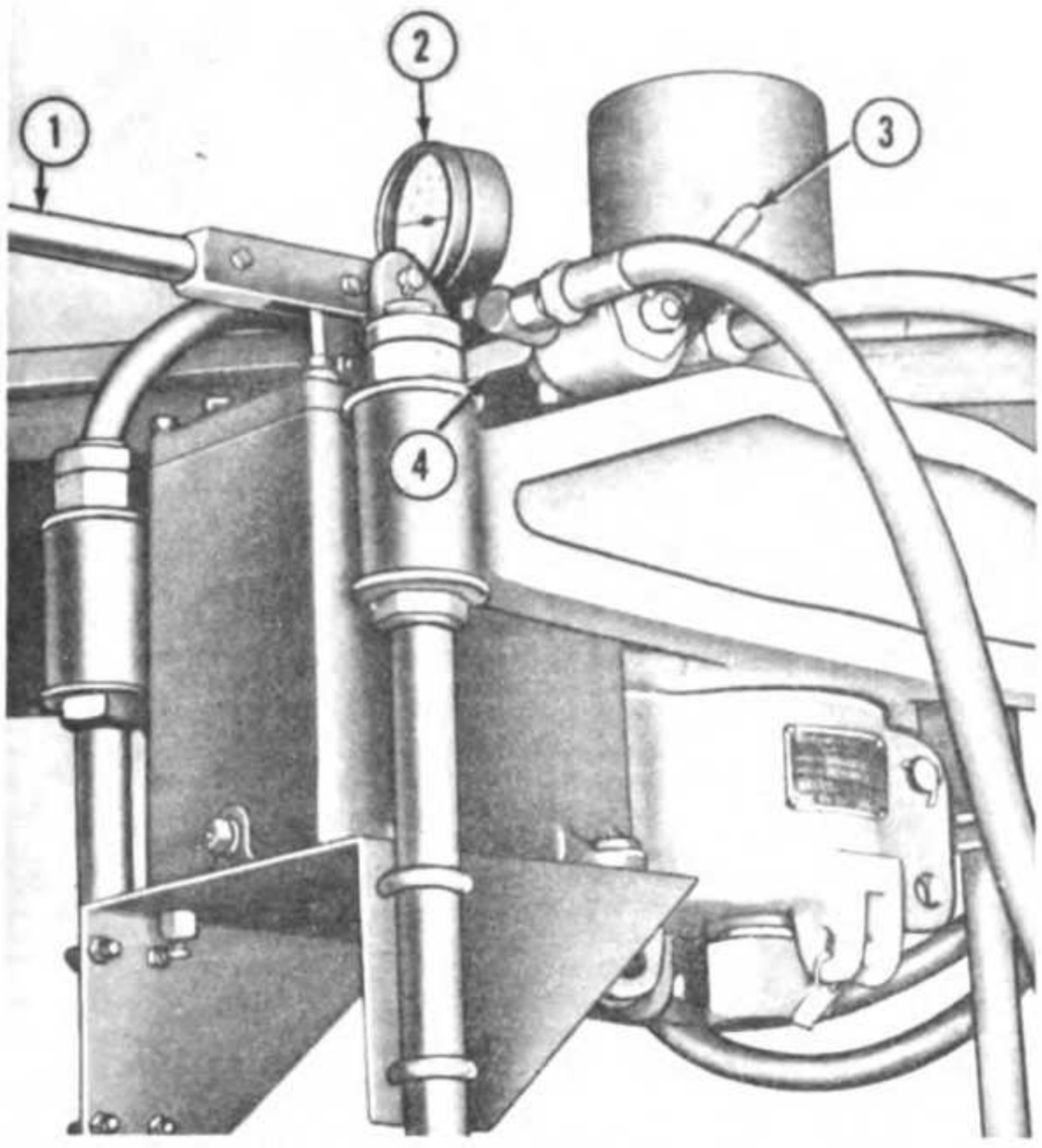
Figure 63. Hydraulic press, 10-ton, controls.

(2) *Description and purpose.* The valve control knob is a notched wheel used to control the flow of hydraulic fluid from the pump to the ram and return.

b. Pump Control Handle.

(1) *Location.* The pump control handle (2) is located in a socket above the valve control knob.

(2) *Description and purpose.* The pump control handle is used to build up pressure in the pump. Hydraulic fluid under pressure forces the ram to extend.



1 Pump control handle
2 Pressure gage
3 Reversing control
4 Three-speed control

Figure 64. Hydraulic press, 100-ton, controls.

35. Hydraulic Press, 100-Ton, Controls

a. Pump Control Handle.

(1) *Location.* The pump control handle is stored with the accessories for the hydraulic press in the lower left storage compartment. For use, the pump control handle (1, fig. 64) is inserted into a socket located on top of the pump on the upper section of the hydraulic-press frame.

(2) *Description and purpose.* The pump control handle is used to operate the pump. The hydraulic fluid in the pump is then forced out to the ram.

b. Pressure Gage.

(1) *Location.* The pressure gage (2) is located on top of the pump.

(2) *Description and purpose.* The pressure gage indicates psi developed by the pump against the ram. The gage dial is divided into two sections. The upper section indicates pushing pressure and the lower section indicates pulling pressure.

Caution: The maximum hydraulic pressure for the pushing operation is 100 tons. The maximum hydraulic pressure for the pulling operation is 80 tons.

c. Reversing Control.

(1) *Location.* The reversing control (3) is located on top of the pump on the upper section of the hydraulic-press frame and in front of the pressure gage.

(2) *Description and purpose.* The reversing control is a two-position lever used to reverse direction of hydraulic fluid to the ram cylinder, depending on the operation required.

d. Three-Speed Control.

(1) *Location.* The three-speed control (4) is located on top of the pump on the upper section of the hydraulic-press frame and immediately in front of the pump-handle socket.

(2) *Description and purpose.* The three-speed control has a lever that can be set to any one of three positions to control the rate of travel of the ram.

Section III. OPERATION UNDER USUAL CONDITIONS

36. General

a. The instructions in this section are published for the information and guidance of the personnel responsible for the operation of this mobile shop.

b. It is essential that the operators know how to perform every operation of which the mobile shop is capable. This section gives instructions on selecting a work site and opening and closing the mobile shop; instructions on the operation of power-producing equipment and shop equipment; and instructions on how to coordinate the shop body, power-producing equipment, and shop equipment to perform the specific tasks for which the mobile shop is designed. Since nearly every job presents a different problem, the operators may have to vary the given procedure to fit the individual job.

37. Selecting Work Site

a. Proper Location. Choose an accessible location on fairly level solid ground to provide a firm footing for the wheels and trailer-supporting jacks of the mobile shop.

Note. Locate the mobile shop near the work to be done whenever possible to reduce the need for moving heavy

equipment. If welding is to be done, consider length of the welding and ground cables supplied with the shop in choosing the work site.

Caution: Wet ground may support the trailer wheels and jacks for a short period of time, but if the mobile shop remains in the same position for several hours, the wheels and jacks will slowly sink down. The use of planks or blocking beneath the wheels and jacks will prevent sinking. The work site should be level to keep the equipment, workbenches, and catwalks on the shop in a level position. It will be much easier to work and operate equipment when tools and materials are not sliding around on an inclined surface.

Warning: Special precautions must be taken with site selection when the mobile shop is to be operated under unusual conditions. Refer to paragraphs 70 through 73 for special instructions on the selection of work sites in extreme cold, extreme heat, dusty or sandy conditions, and in high humidity or salt water areas.

b. Indoor Location. If available, use a section of a building or hangar to locate the shop indoors and avoid weather hazards.

c. Size of Site. The work site should be clear of obstructions (such as trees, buildings, low wires, etc.) and large enough to allow easy erection of the canvas-tenting (par. 40) with ample area for safe approach by vehicles or items of equipment to be serviced.

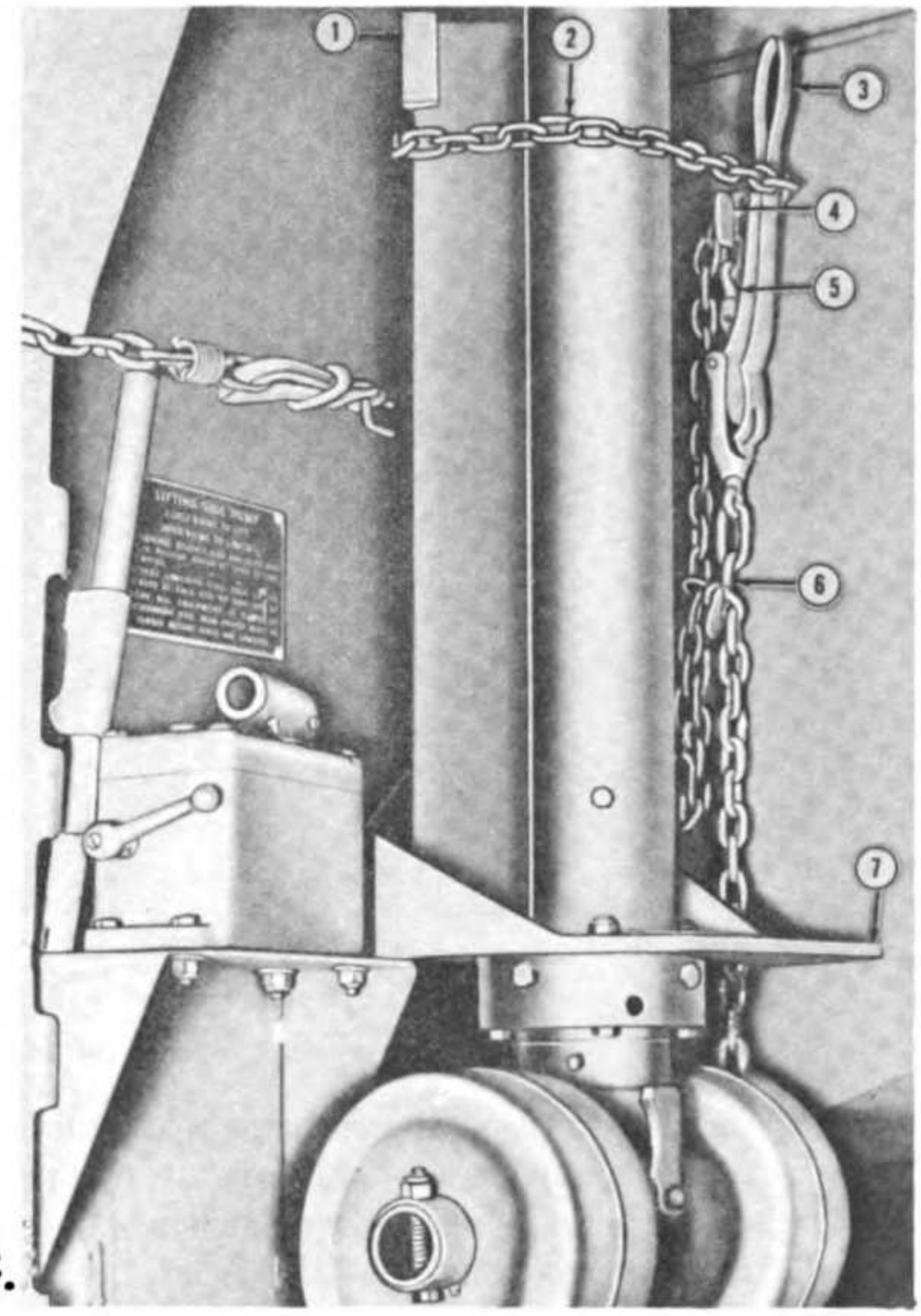
d. External Power Connection. When connection is to be made to an external power source, it is advisable to locate the mobile shop close to the power source to keep the length of the power lines as short as possible. Attention must be given to the connection of the power lines so that they will not obstruct work or passing vehicles.

Caution: The external power lines are dangerous. Work site must be selected so that the electric wiring can be installed in positions that will protect personnel and equipment from this hazard.

e. Shop Leveling. The shop will operate satisfactorily when it is not level, but for convenience, comfort, and ease of working, locate the shop so that it will be as nearly level as possible. If a proper location is selected (*a* above), the two rear trailer-supporting jacks will seldom have to be used for leveling the shop.

38. Disconnecting from Prime Mover

a. Position Shop. Use the prime mover to drive the shop into position on the work site. Refer to paragraph 37 for instructions on selecting the proper work site.



1	Jack safety	5	Safety link
2	Chain	6	Hook
3	Binder handle	7	Jack cylinder base
4	Bracket		

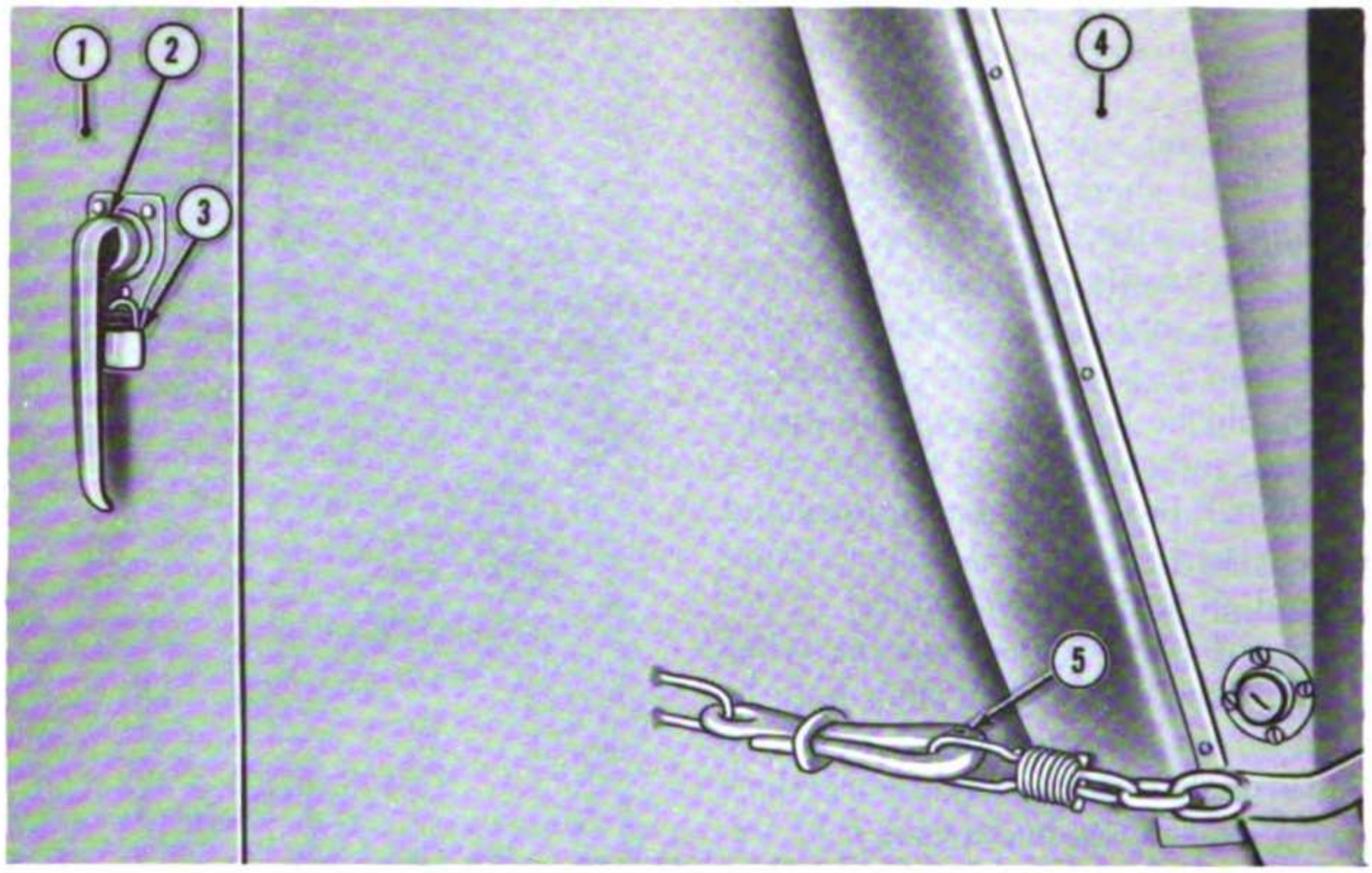
Figure 65. Jack safety in stowed position.

b. Secure Rear Wheels. Place the wheel chocks in front of and behind the semitrailer wheels to keep the mobile shop from moving.

c. Lower Front Trailer-Supporting Jacks.

(1) *Release safety.* Remove chain (2, fig. 65) from safety link (5) and from bracket (4) and remove chain securing jack safety (1) and binder handle (3) around jack cylinder. Lower binder handle to provide slack on bottom part of chain and remove chain from hook (6). Be sure chain is free to pass through hole in jack cylinder base (7) as the jack is lowered.

(2) *Lower jacks.* Close RED valves (1, fig. 31) and open GREEN valves (6) on right front jack pump (2) and left front



1 Rear door
2 Handle
3 Padlock
4 Lifting side
5 Pelican hook

Figure 66. Lifting side and rear door locking hardware.

jack pump (3). Insert the pump handles in the pump sockets and operate pumps until the jacks are lowered sufficiently to take up the weight of the front end of the trailer. As a safety precaution, lock the hydraulic system by closing the GREEN valves. This prevents any leakage through the check valve in each pump.

d. Install Jack Safeties. Place the jack safeties (10, fig. 5) around the front jacks.

Caution: Be sure that the safeties snap around the jack ram. A sharp blow may be necessary to put the jack safeties in place.

e. Disconnect Airbrake Hoses. Disconnect two airbrake hoses from airbrake connections (2) in front of semitrailer.

f. Disconnect Traveling Lights. Disconnect the traveling-lights power supply cable from traveling lights receptacle (1), at front of semitrailer.

g. Move Prime Mover. Make a final check of the trailer supports and footing. Release kingpin lock on fifth wheel and drive the prime mover away from the mobile shop.

h. Level Shop.

(1) *Lower rear trailer-supporting jacks.* If a good level location has been selected (par. 37), it may not be necessary to use the rear jacks for leveling. If they are required, close the RED valve (1, fig. 31) and open the GREEN valve (6) on the left rear jack pump (4) and on the right rear jack pump (5). Take the pump handles from their rack on the left front side of the trailer, insert the handles in the pumps, and operate pumps to lower the rear trailer jacks. Lock the hydraulic system by closing the GREEN valves.

(2) *Desired level.* The jacks can be raised or lowered individually until the mobile shop is at the desired level.

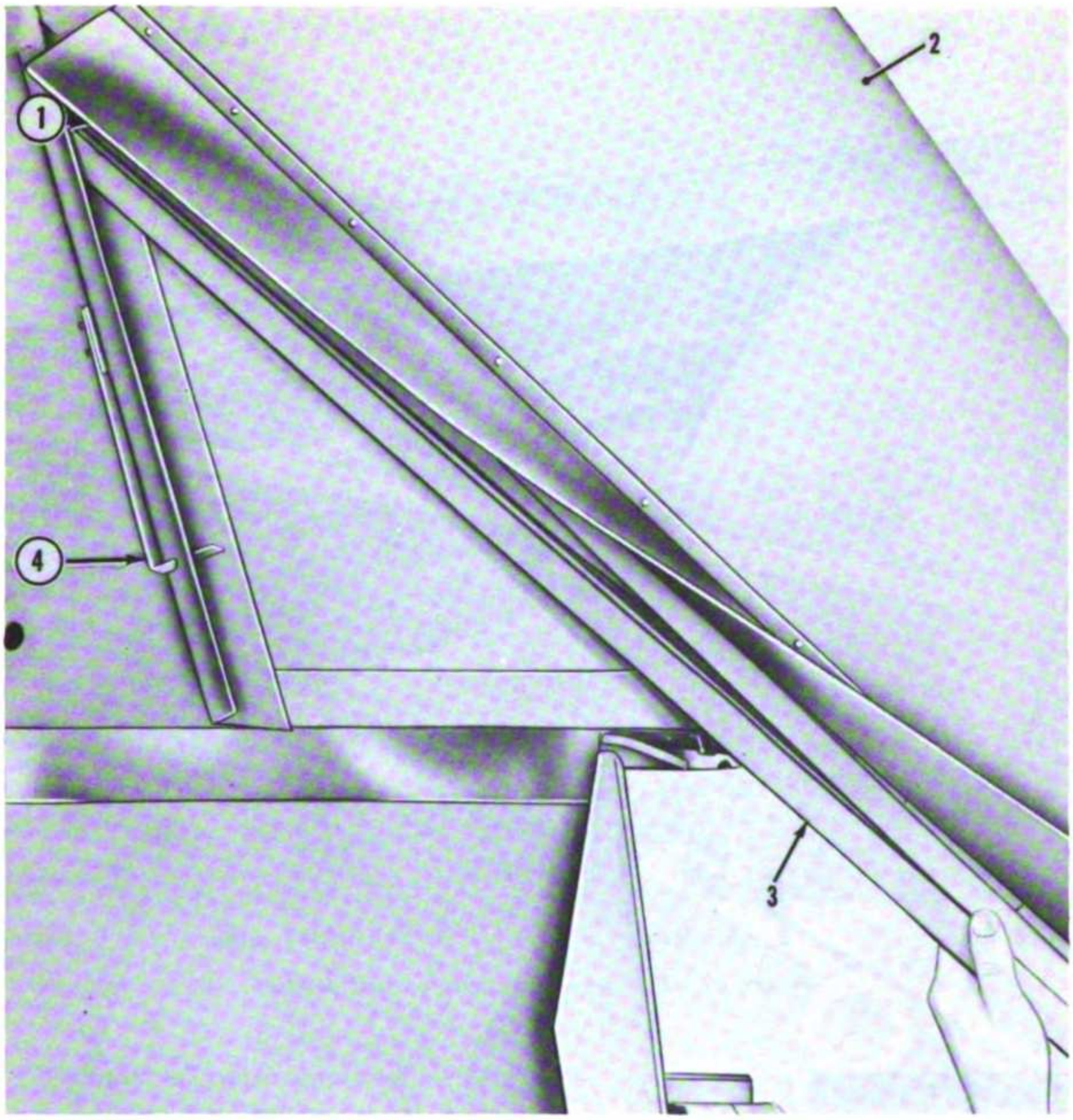
(*a*) To raise the shop, close the RED valves, open the GREEN valves, and operate the pumps until the mobile shop is raised to the proper height. Then close the GREEN valves.

(*b*) To lower the shop, open the RED valves until the shop drops to the proper height. Then close the RED valves.

39. Opening Shop

a. Raise Shop Sides.

(1) *Open locks.* Unlatch pelican hook (5, fig. 66) securing each end of lifting side (4) to mobile shop. Unlock and remove padlock securing lifting side to mobile shop. Open hasp.



1 Weatherseal
2 Lifting side
3 Side strut
4 Spring stop

Figure 67. Removing side strut from lifting side.

(2) *Operate side-lifting jack pump.* Close valve on side-lifting jack pump (2, fig. 32) by turning valve control lever (3) clockwise. Insert pump handle (1) in pump and operate pump to lift side.

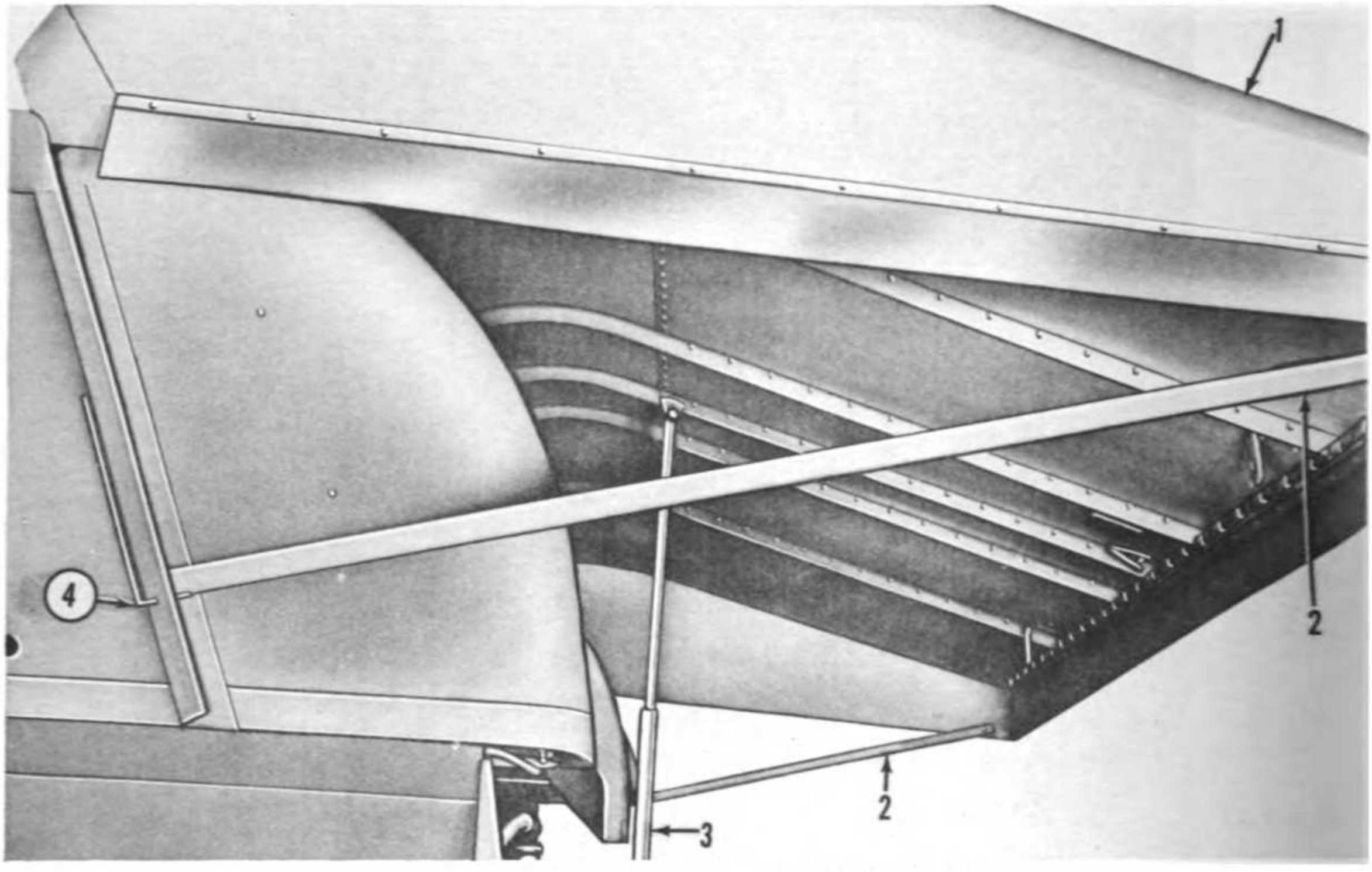
(3) *Release and secure side struts.* Free side strut (3, fig. 67) from each side of sifting side (2). Spring stop (4) on each side of shop prevents the side struts from dropping past the sockets in which they rest. As lifting side is raised, the side struts will fall into position against the spring stops.

Caution: Do not damage weatherseals (1) on the shop sides in the lifting operation. The weatherseals prevent the entrance of dust and moisture into the shop when the shop is closed.

Seat side struts (2, fig. 68) in drip mouldings by turning valve control lever (3, fig. 32) on pump (2) counterclockwise. Open valve slowly until struts come to rest on spring stops (4, fig. 68); close valve at once so that side-lifting jack (3) supports the center of the lifting side and the struts support the ends of the lifting side.

b. Lower Catwalks. Release latches (fig. 69) and lower six catwalks (3, fig. 7).

Caution: Lower left front catwalk carefully. The bench grinder mounted on the catwalk is heavy.



1 Lifting side **2 Side strut** **3 Side-lifting jack** **4 Spring stop**

Figure 68. Lifting side in fully opened position.

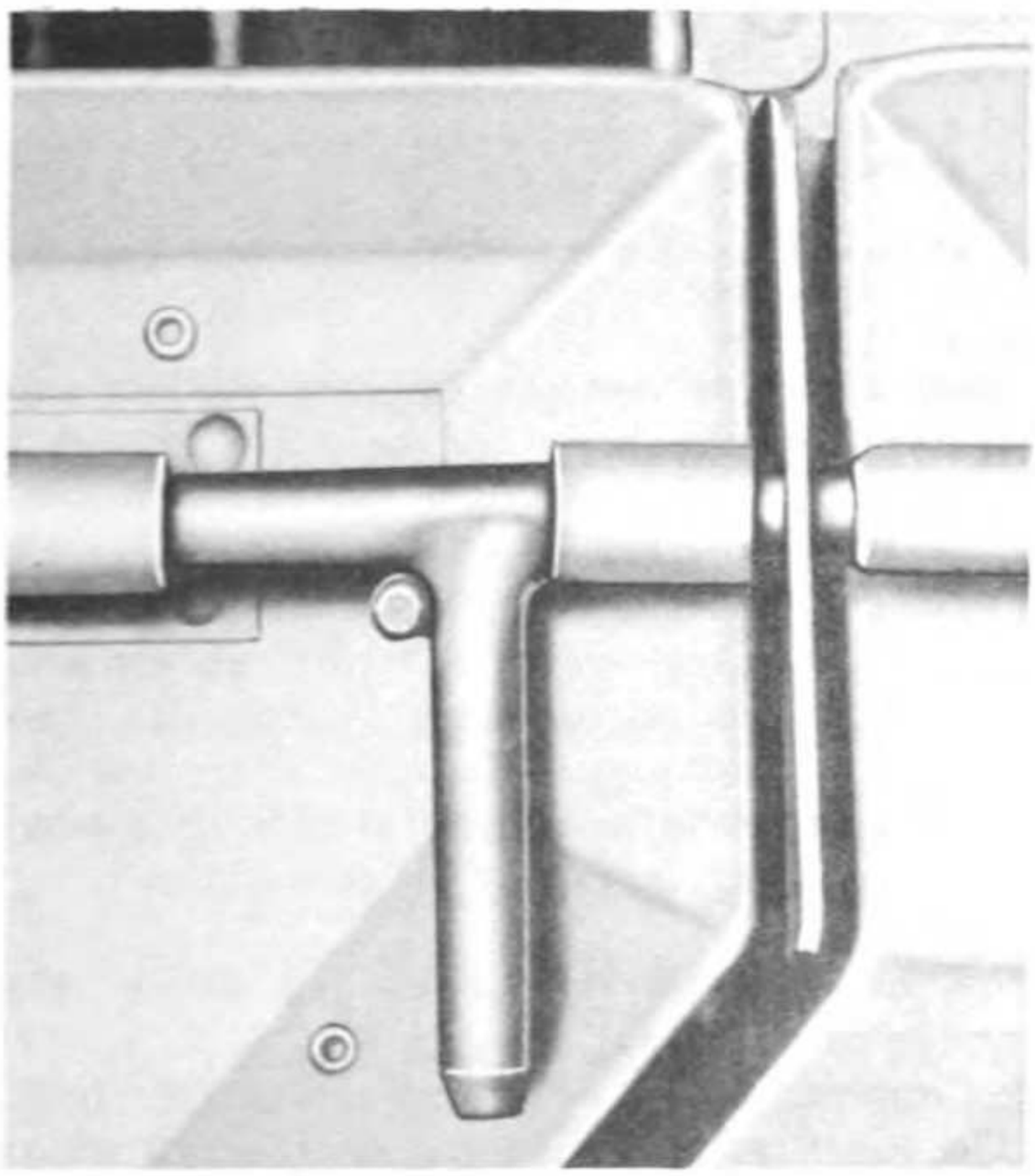


Figure 69. Catwalk latch.

After lowering catwalks, connect adjacent front catwalks by reinserting latches.

Note. **The catwalks are used as workbenches and also serve as a step for admittance to the shop. The lifting sides form a roof over the workbench area.**

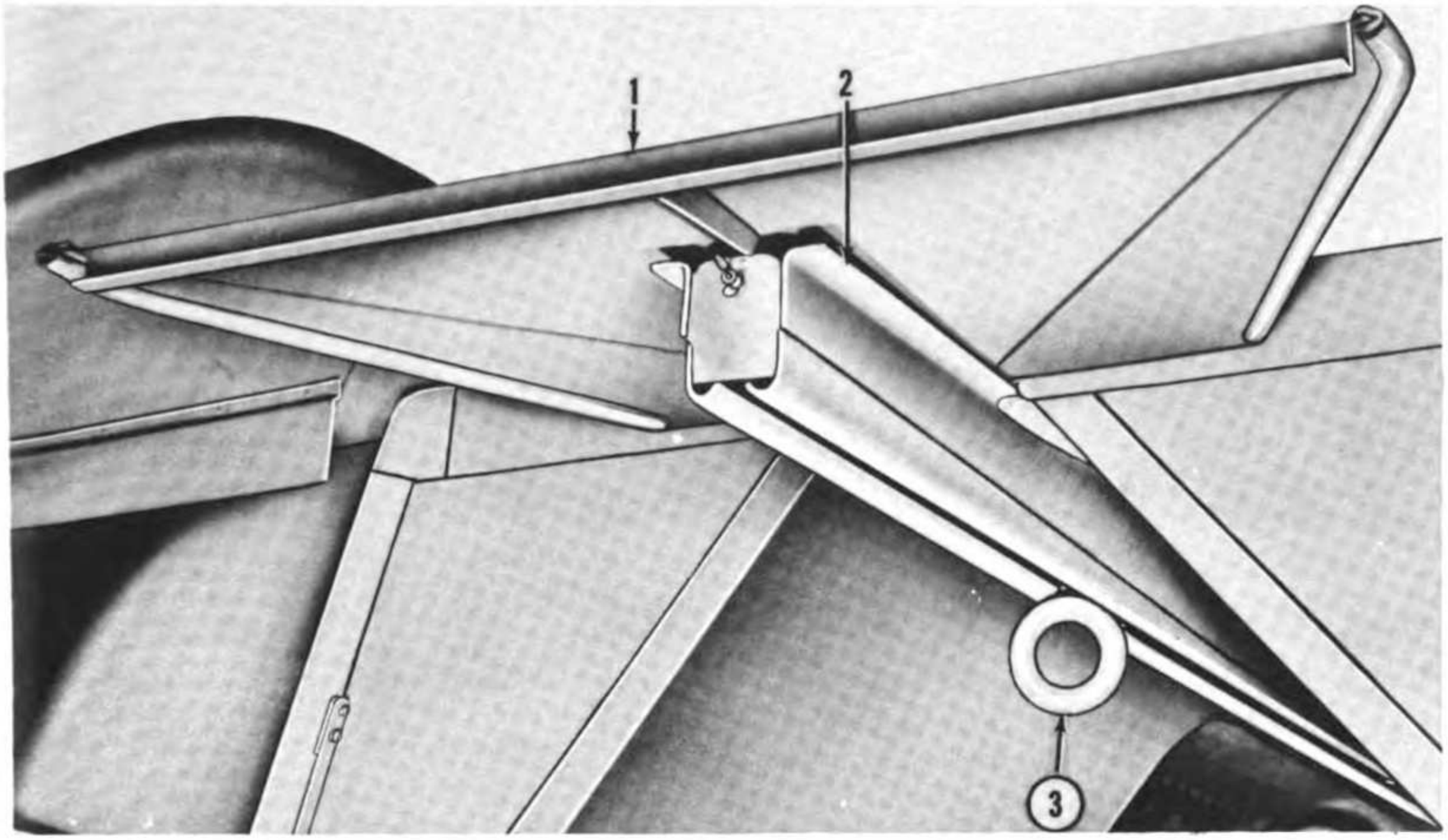
c. Open Rear Panel Assembly.

(1) *Release triangular rear panel.* Turn clamp securing triangular rear panel to bottom of rear door and lower triangular rear panel.

(2) *Open rear door.* Remove padlock (3, fig. 66), turn handle (2) and open rear door (1).

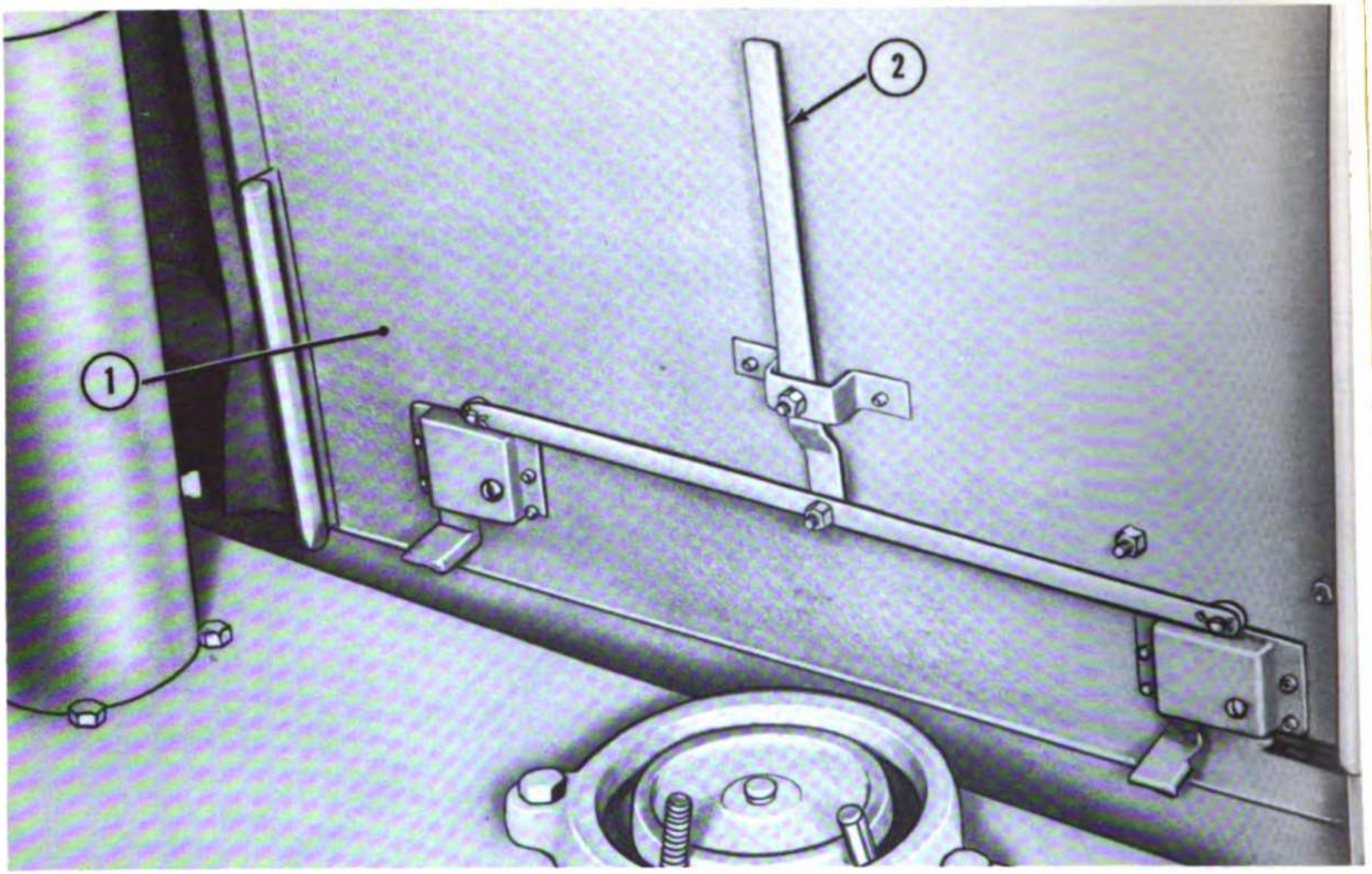
(3) *Open top rear panel.* Raise top rear panel (1, fig. 70) and move hoist rail (2) to its fully extended position by pulling trolley ring (3) to the rear of the shop. Allow top rear panel to rest on hoist rail.

(4) *Release rear side panels.* Release side panel (1, fig. 71) of rear panel assembly by operating handle (2) located on the inside of each side panel.



1 Top rear panel 2 Hoist rail 3 Trolley ring

Figure 70. Top rear panel in open position.



1 Side panel 2 Handle

Figure 71. Side rear panel latch released.

(5) *Raise rear panel assembly.* Raise rear panel assembly (fig. 72) and hook triangular rear panel on stud (1, fig. 73) at end of hoist rail.

Caution: Stand on ladders (2) connected together in A position to reach stud.

d. Shop Partially Opened. Normally the rear panel assembly and lifting sides are raised to open the mobile shop completely, but under moderately bad weather conditions, the shop may be opened partially. Raise lifting sides high enough to allow side rear strut (1, fig. 74) to rest on rear catwalk and side front strut (2) to rest on socket in front side of mobile shop. Open rear door (3).

40. Erection of Tenting

a. Remove Tenting Frames. Loosen two straps securing two sets of tenting frames (2, fig. 23) to top of mobile shop. Remove tenting frames and lay on ground, one set on each side, parallel to the shop. Remove two straps securing poles together.

Note. The two sets of tenting frames are identical and will fit either side of the mobile shop. Assemble and erect tenting frame for each side of shop as outlined in *b* and *c* below.

b. Assemble Tenting Frame.

(1) *Open tenting frame.* Open up and lay out tenting frame as shown in figure 75. The tenting frame must be opened at the center hinge (8) and alined with connecting points on shop body before erecting.

(2) *Secure center diagonal braces.* Fasten loose ends of two center diagonal braces (6) to center upright (7), using toggle pin as shown in figure 76.

(3) *Secure end diagonal braces.* Fasten loose end of end diagonal brace (5, fig. 75) to frame using toggle pin as shown in figure 77. Repeat at opposite end of frame.

c. Erecting Tenting Frames.

(1) *Connect swivel poles to lifting side.* Raise assembled tenting-frame set with five attached swivel poles (3, fig. 75). Keep end uprights (4) perpendicular to

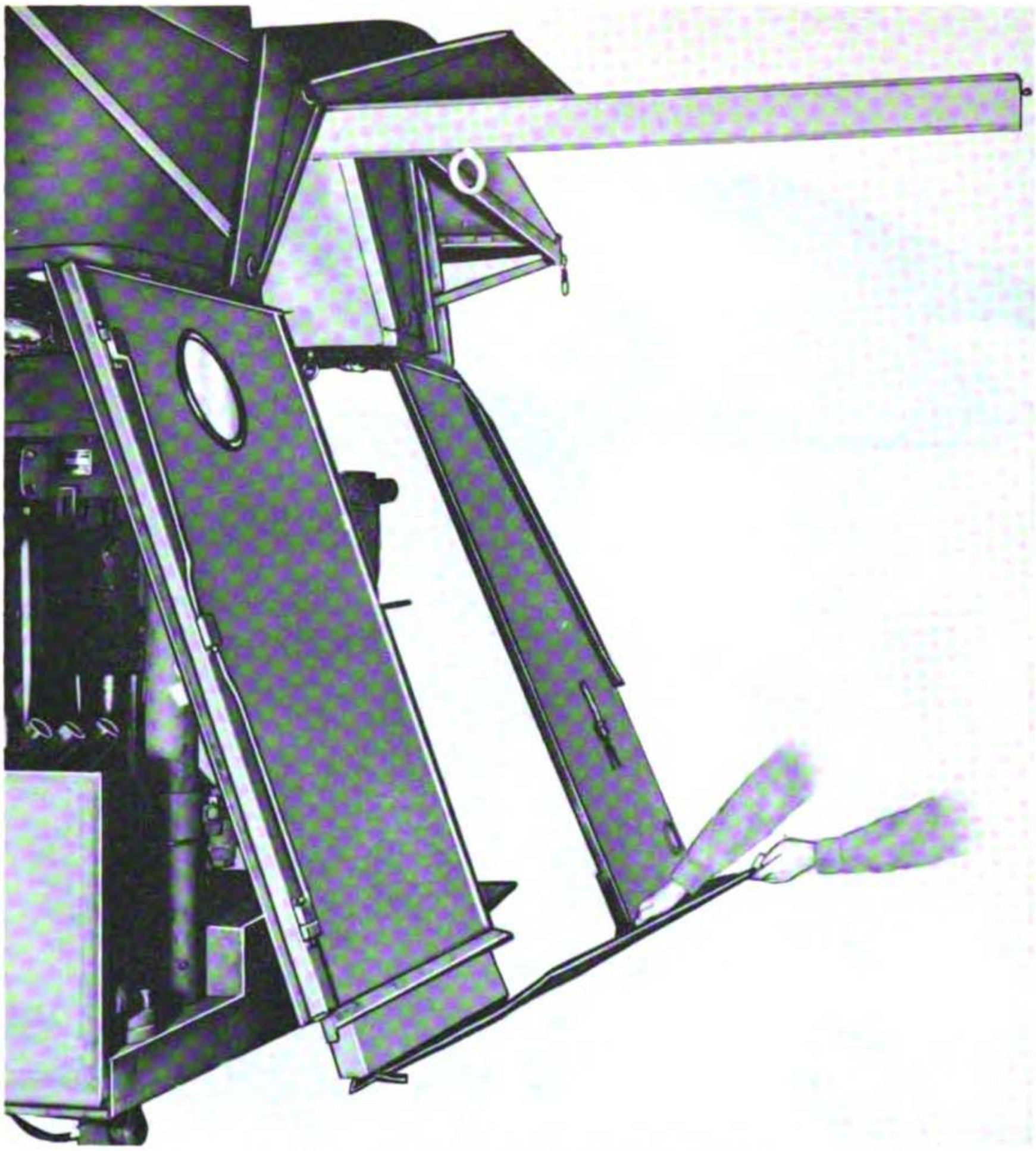


Figure 72. Raising rear panel assembly.

ground. Aline wingnut (1, fig. 78) on end of each swivel pole (3) and insert stud and wingnut end of swivel pole through the specially shaped hole in bracket (2) marked CONNECT CANVAS POLE HERE located on underside of lifting side. Secure swivel pole by tightening wingnut. Connect four remaining swivel poles in the same manner.

Note. **Refer to tenting frame installation plate (fig. 79), located on the underside of the lifting side, for correct erecting of tenting frame.**

(2) *Install loose pole.* Aline loose pole (2, fig. 75) with attached loose pole diagonal brace (10) between raised rear panel assembly (2, fig. 80) and rear upright (9). Remove loose pole nut (9, fig. 75) and insert stud end of loose pole (1, fig. 80) through hole in end of rear panel. Install and tighten nut. Remove nut from stud on end of rear upright and aline hole end of loose pole (1, fig. 75) over stud. Install nut loosely on stud.

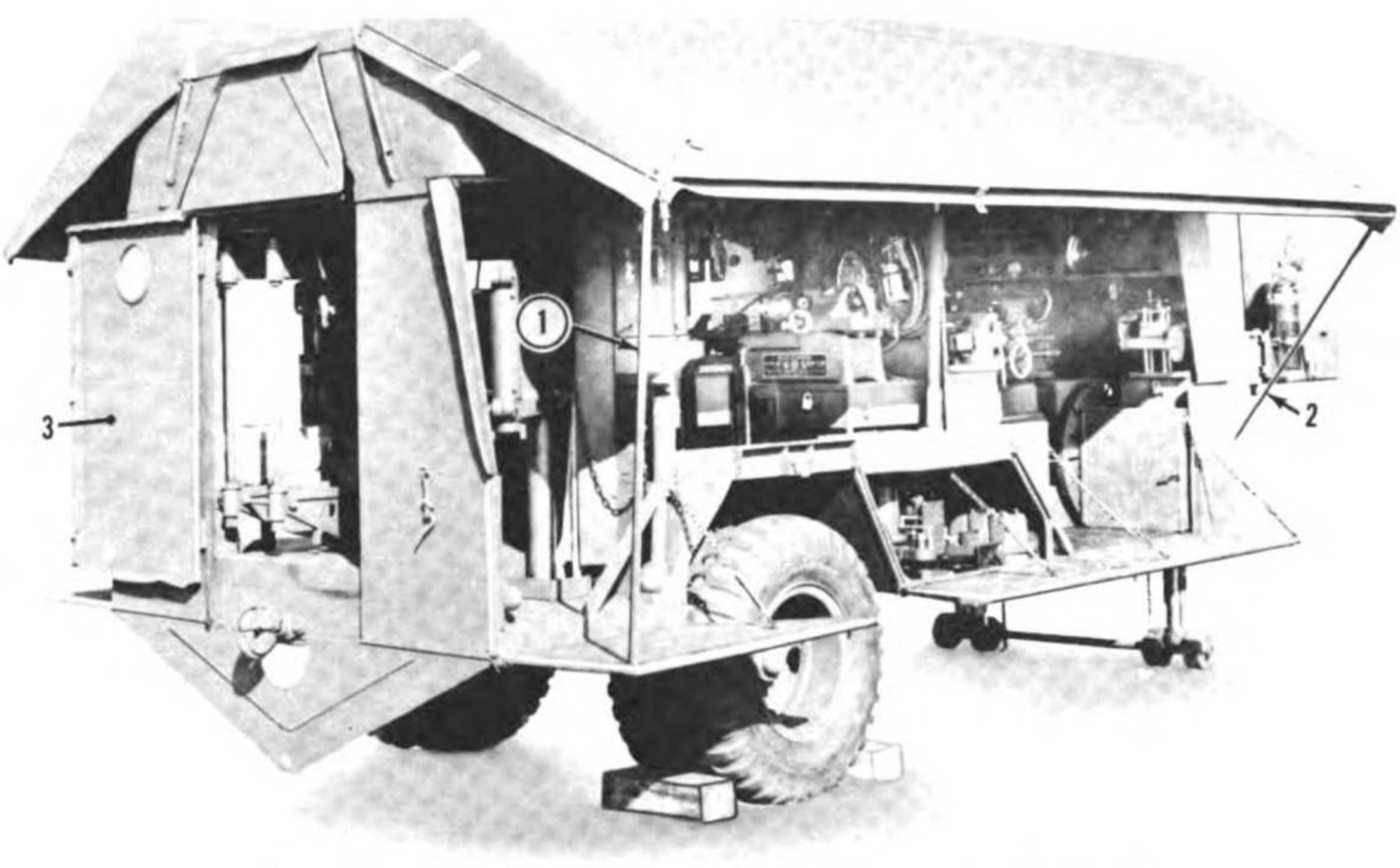
Note. **Do not tighten nut securely as it must be removed when the canvas is installed.**

Aline diagonal brace (10, fig. 80) of loose pole to rear upright (9) and secure, using toggle pin that is chained to end of brace.

d. Remove Canvas Sections from Storage Compartments. Remove the LEFT FRONT, LEFT SIDE, and WINDBREAKER canvas sections (1, fig. 26) from the upper left storage compartment. Remove the RIGHT FRONT, RIGHT SIDE,

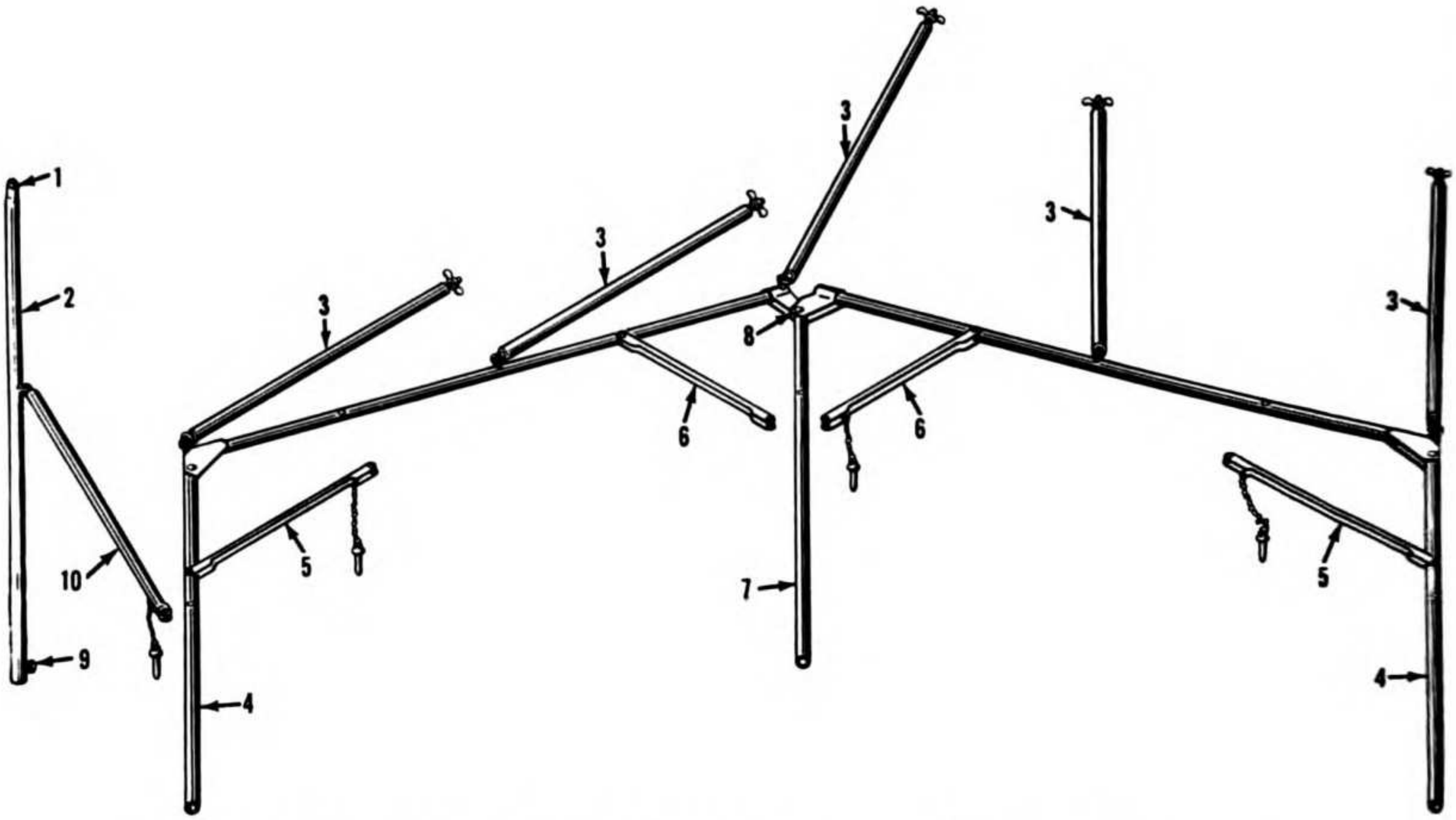
1 Stud 2 Ladders

Figure 73. Rear panel assembly in open position.



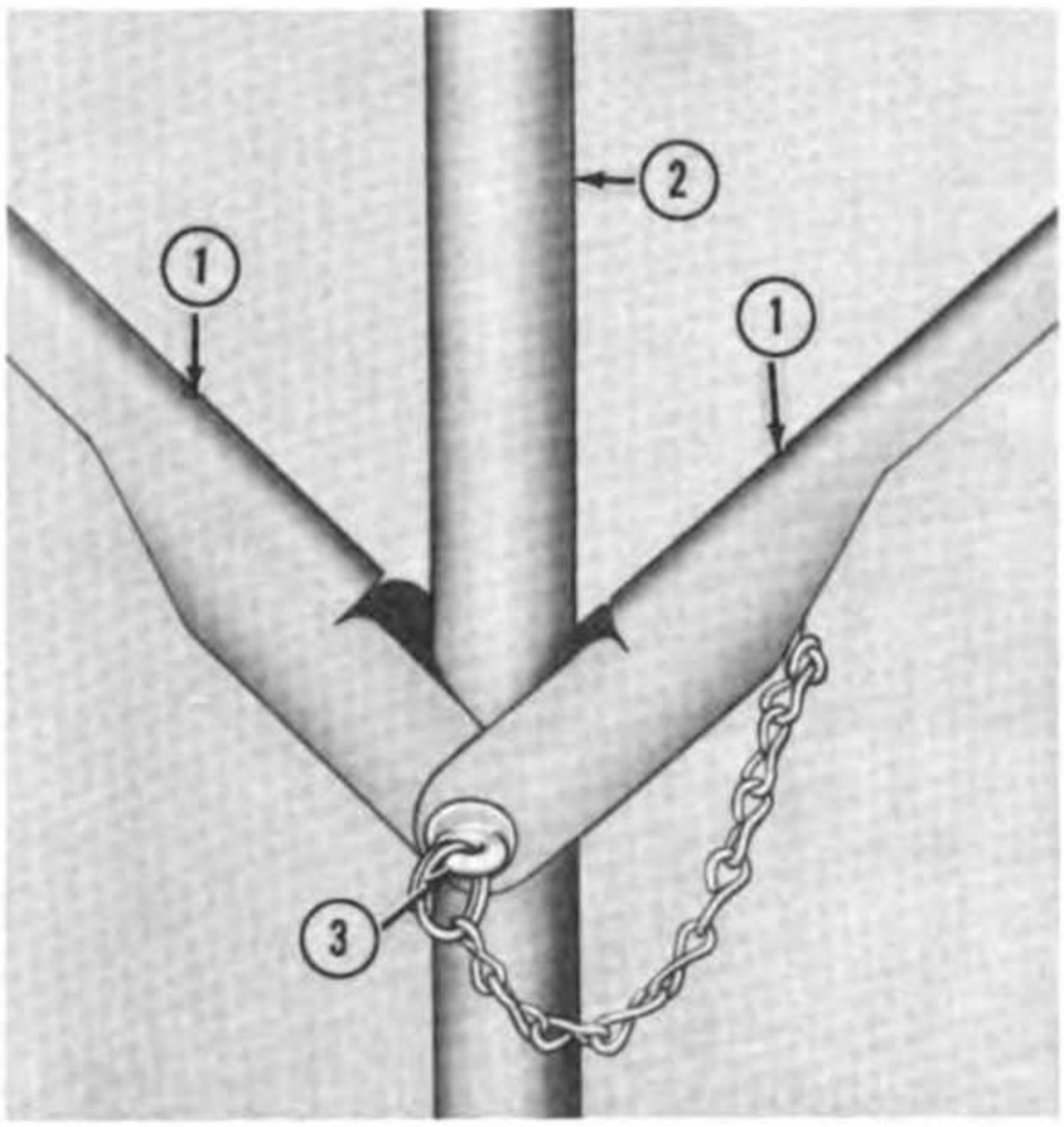
1 Side rear strut 2 Side front strut 3 Rear door

Figure 74. Mobile shop partially opened.



1 Hole end of loose pole
2 Loose pole
3 Swivel poles
4 End uprights
5 End diagonal braces
6 Center diagonal braces
7 Center upright
8 Center hinge
9 Loose pole nut
10 Loose pole diagonal brace

Figure 75. Tenting frame ready for erection, pictorial view.



1 Diagonal braces
2 Center upright
3 Toggle pin

Figure 76. Center diagonal braces secured to center upright.

and REAR canvas sections (1, fig. 28) from the upper right storage compartment.

Note. All canvas sections are clearly marked by large legible black stencil on white sewed-on tags. Canvas should be stored with the nametags easily visible.

e. Position Canvas Sections.

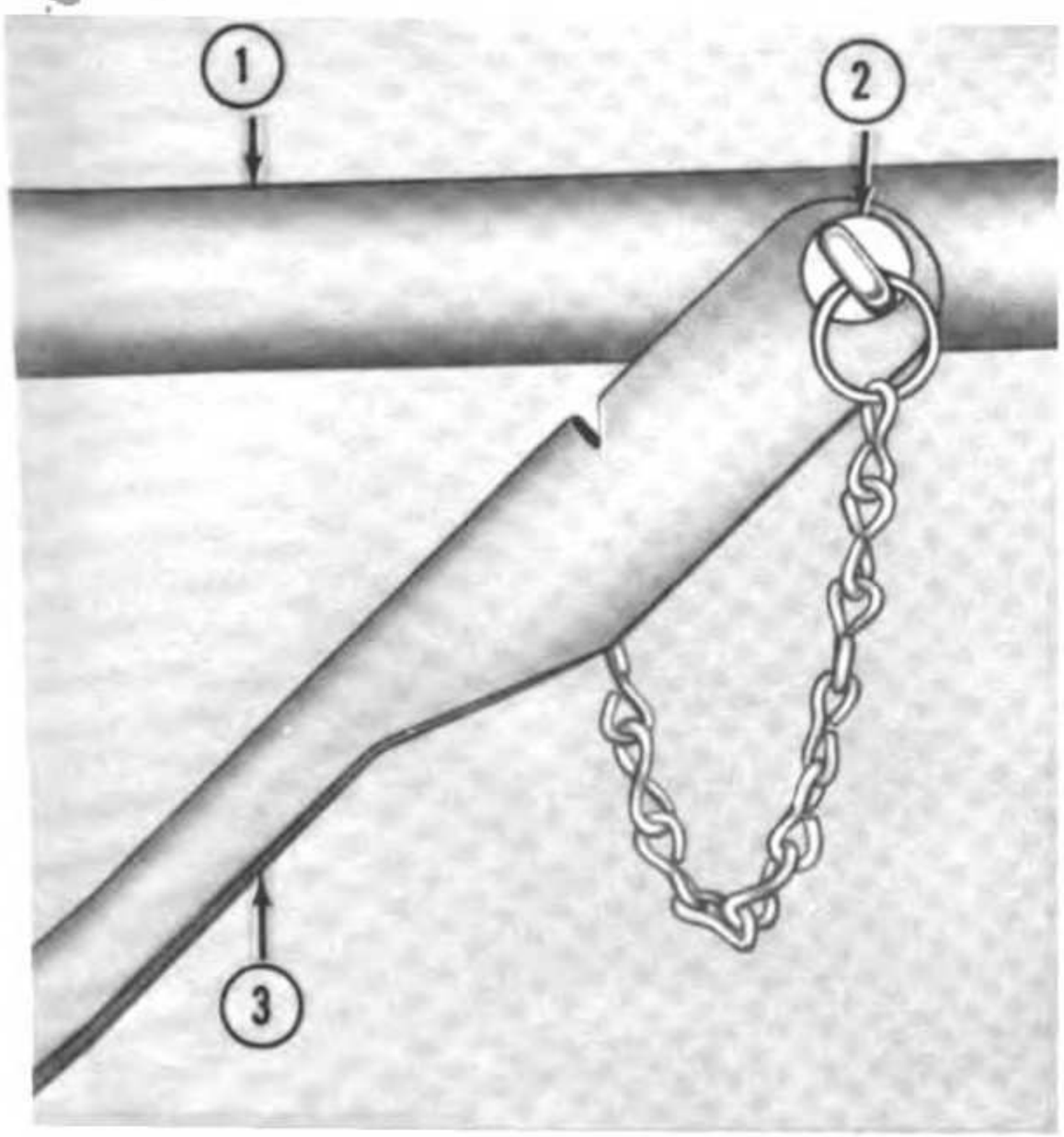
(1) Place the LEFT SIDE canvas section (3, fig. 80) on the ground at left of mobile shop.

Note. Place all canvas sections on ground with the nametags facing up.

(2) Place LEFT FRONT canvas section (4) on the ground in front of left lifting side of mobile shop.

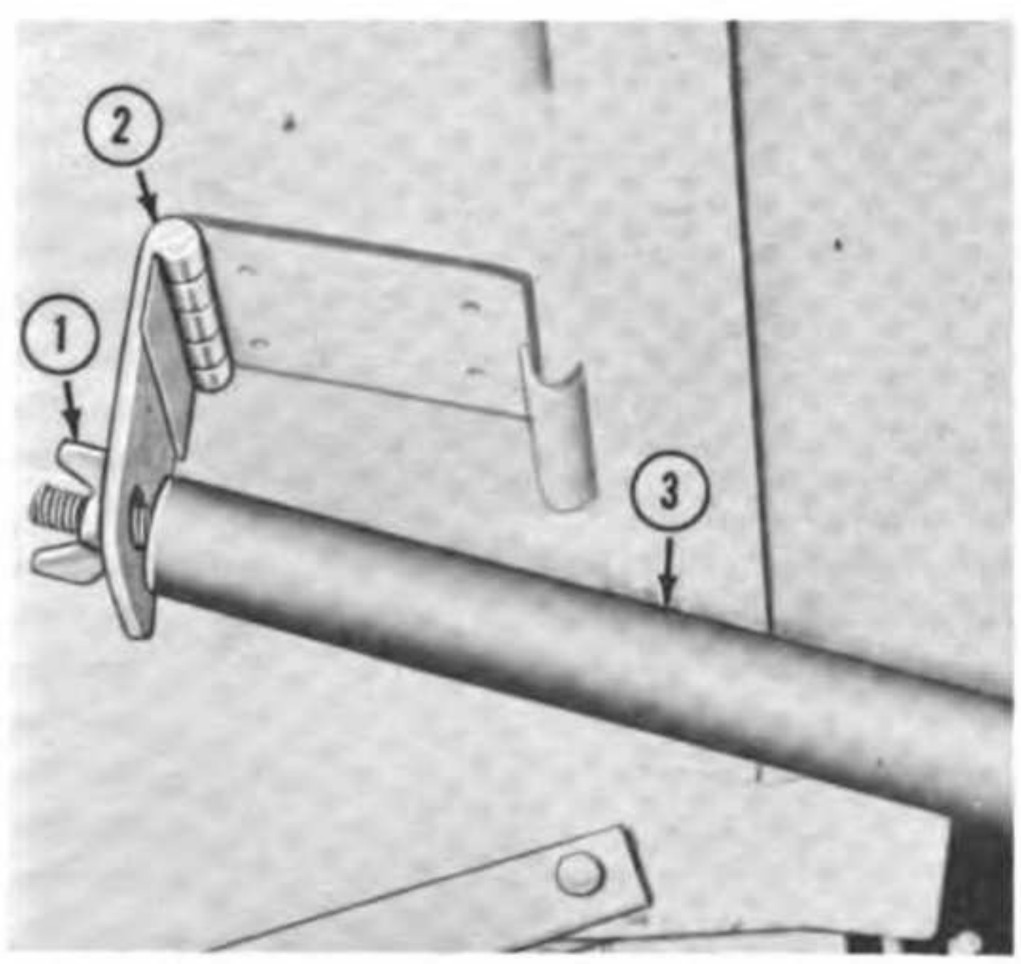
(3) Place WINDBREAKER canvas section (5) on the ground in front of mobile shop.

(4) Place RIGHT FRONT canvas section (6) on the ground in front of right lifting side of mobile shop.



1 Frame
2 Toggle pin
3 End diagonal brace

Figure 77. End diagonal brace secured to frame.



1 Wingnut
2 Bracket
3 Swivel pole

Figure 78. Swivel pole secured in lifting side bracket.

(5) Place RIGHT SIDE canvas section (7) on the ground in front of mobile shop.
(6) Place REAR canvas section (8) on the ground behind mobile shop.

f. Install SIDE Canvas Sections. Start on either left or right side of mobile shop and follow procedures given below to install the two SIDE canvas sections.

(1) Open canvas section marked (LEFT or RIGHT) SIDE. Keep nametag up and end of canvas with sewed-in loops away from tenting frame.
(2) Pull sewed-in loop edge of SIDE canvas section up and over tenting frame. Keep nametag on the inside of the enclosure.
(3) Start at front of mobile shop and place sewed-in loops (4, fig. 81) over hooks (1) on lower inside edge of lifting side.
(4) Fold back flap (6, fig. 82) at front and rear of SIDE canvas section. Remove nut (5) from upright stud (3); aline grommet (4) over stud and loosely install nut. Repeat procedure on other upright.
(5) Secure SIDE canvas section (2, fig. 81) to three center swivel poles by snaking ties (3) through row of grommets in small canvas flaps.
(6) Fasten inside ties (1, fig. 83) around tenting frame.

Note. **Do not tie single-ties (2) to front or rear upright if FRONT or REAR canvas section is to be installed.**

g. Install FRONT Canvas Sections. Start on either left or right side of mobile shop and follow procedures given below to install (LEFT or RIGHT) FRONT canvas sections after SIDE canvas sections have been installed.

(1) Open canvas section marked (LEFT or RIGHT) FRONT.

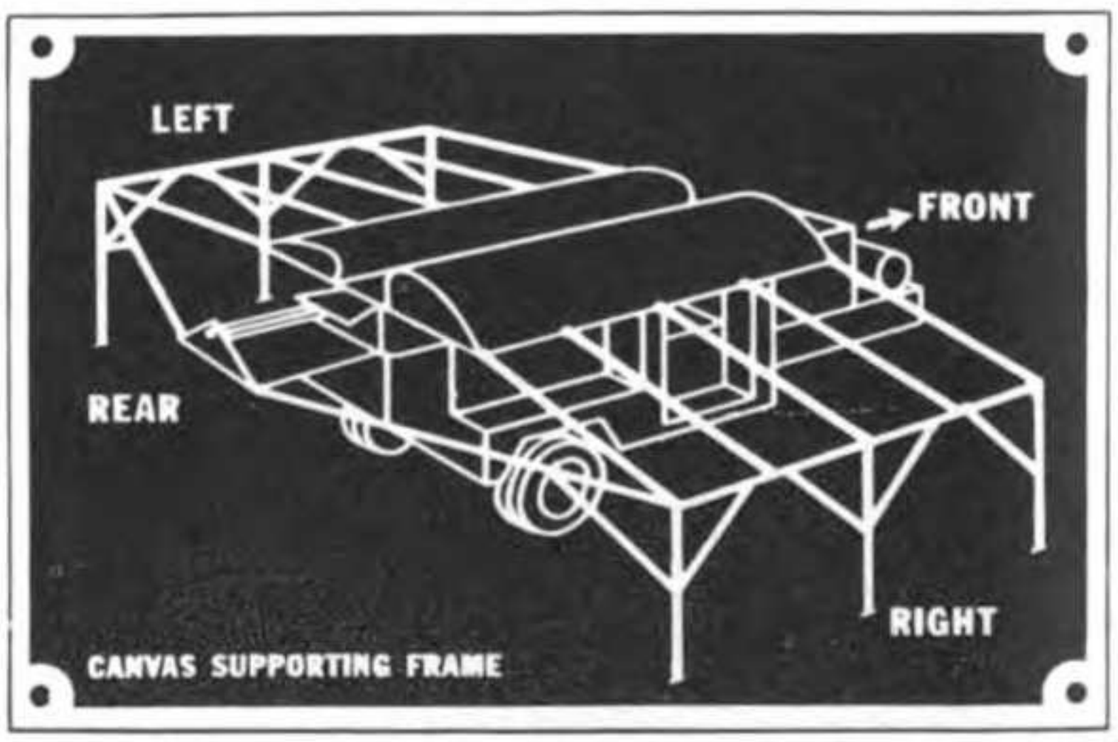
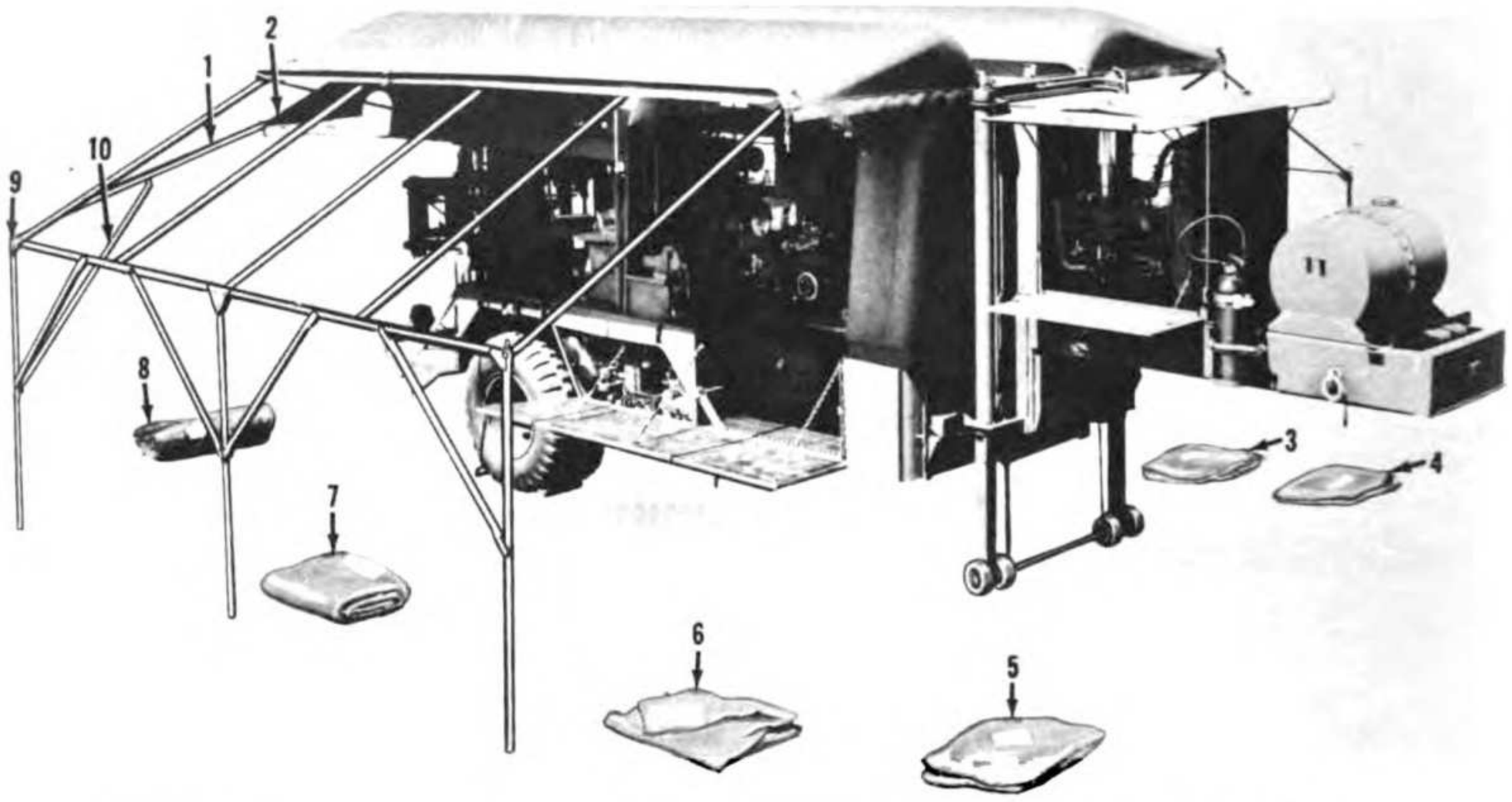
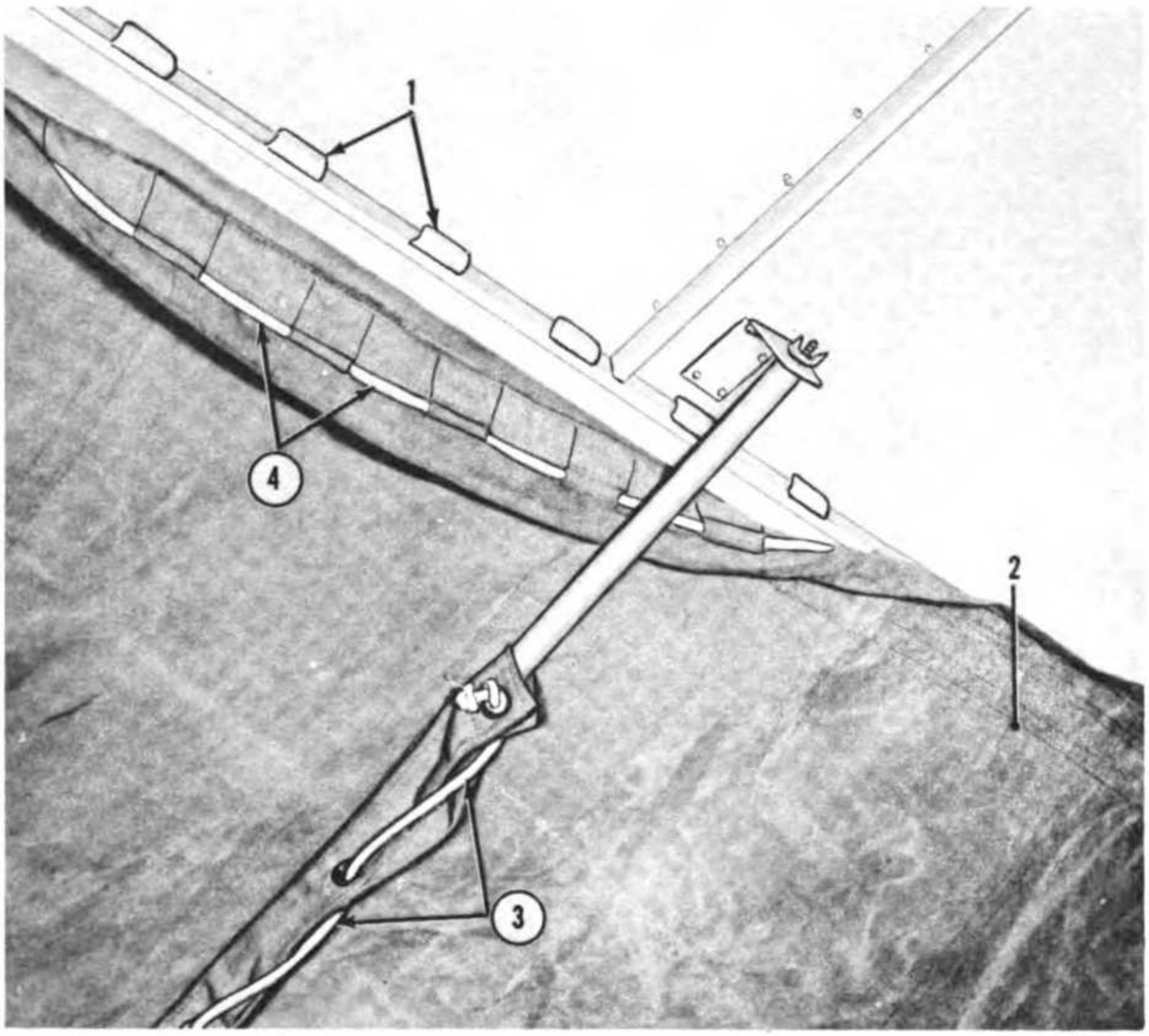


Figure 79. Tenting frame installation plate.



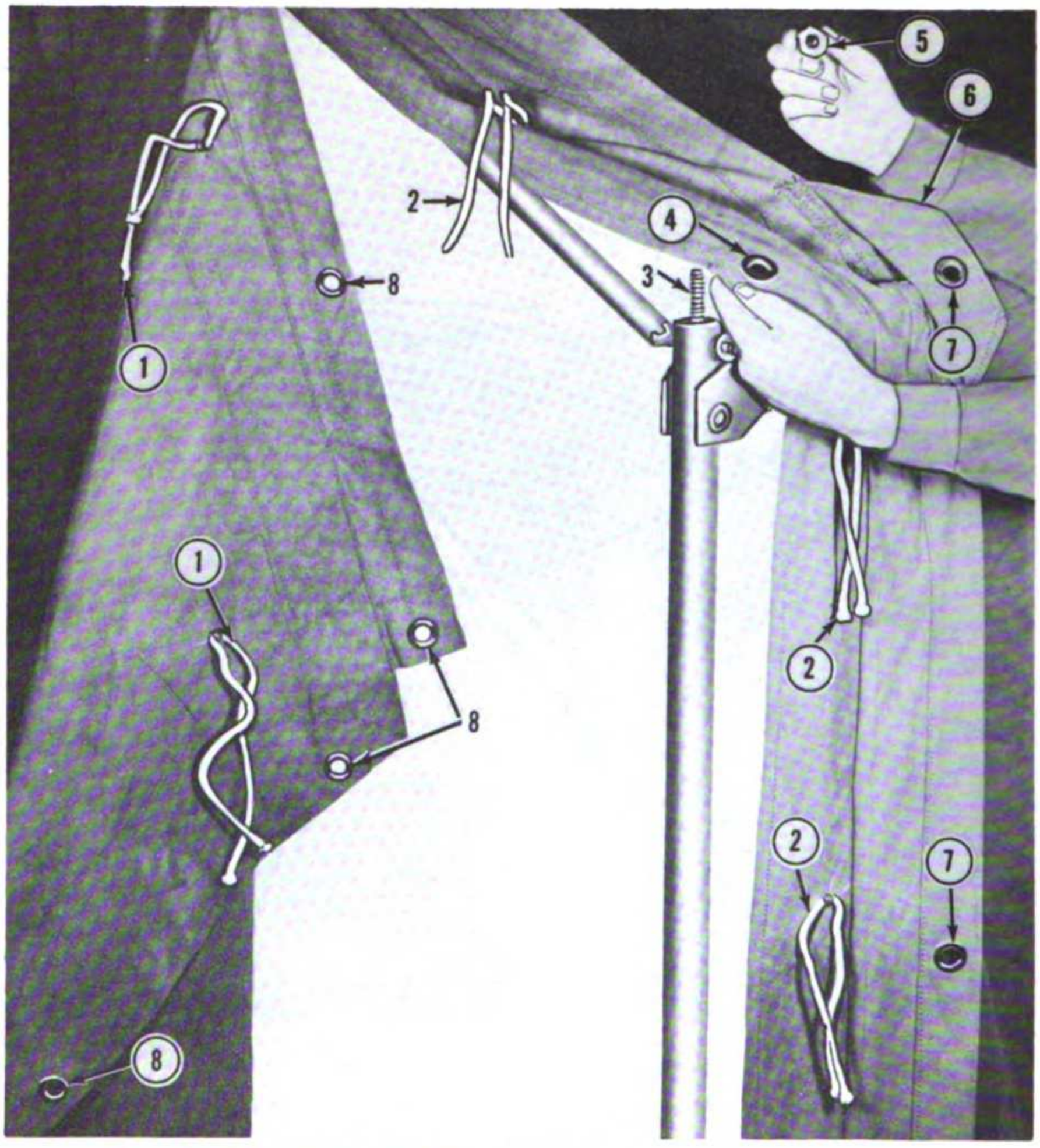
1 Loose pole
2 Rear panel assembly
3 LEFT SIDE canvas section
4 LEFT FRONT canvas section
5 WINDBREAKER canvas section
6 RIGHT FRONT canvas section
7 RIGHT SIDE canvas section
8 REAR canvas section
9 Rear upright
10 Diagonal brace

Figure 80. Tenting frame erected.



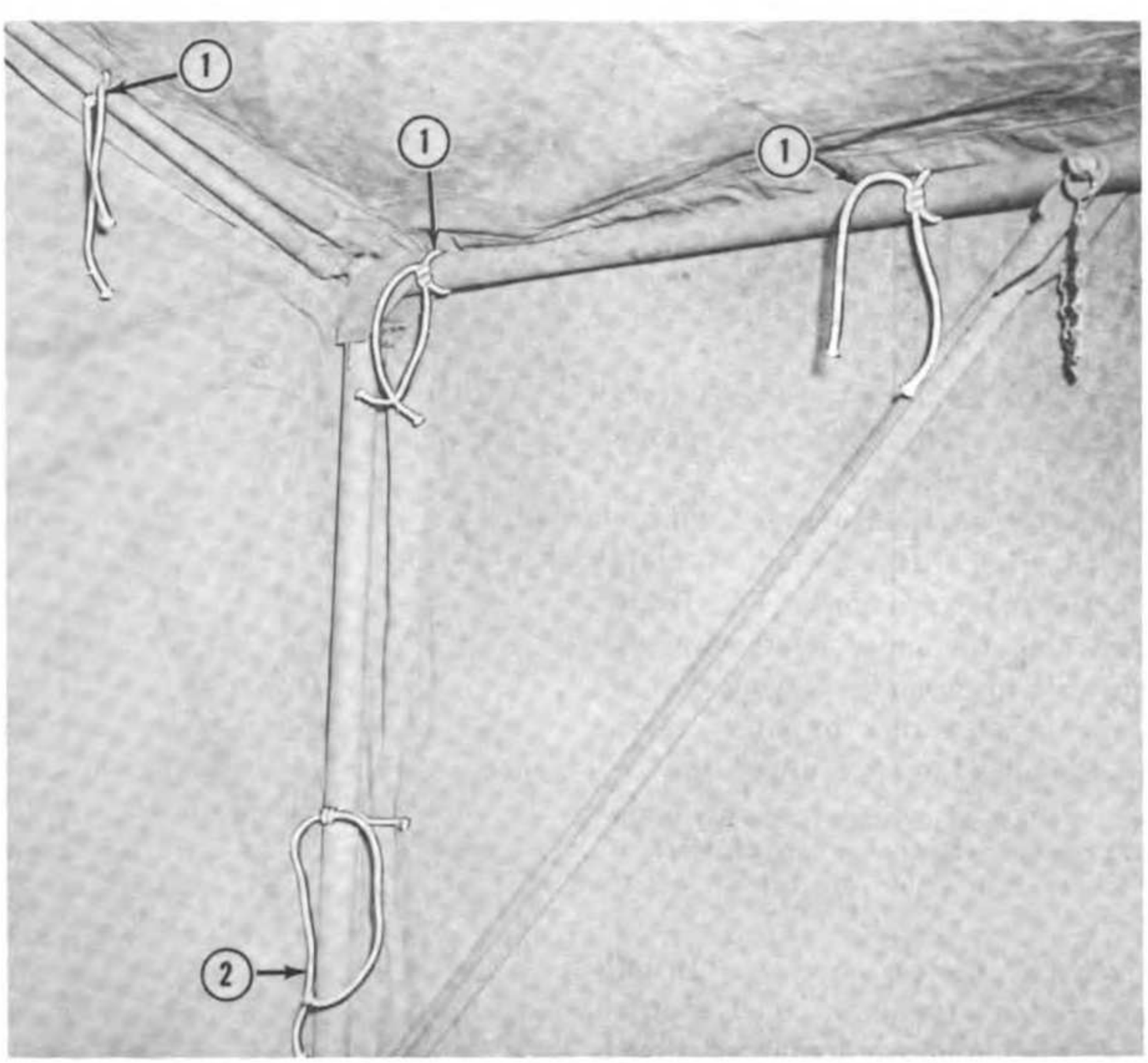
1 Hooks
2 SIDE canvas section
3 Ties
4 Sewed-in loops

Figure 81. Swivel pole and canvas attachment to lifting side.



1 Ties, FRONT or REAR canvas
2 Ties, SIDE canvas
3 Upright stud
4 Grommet, SIDE canvas
5 Nut
6 Flap, SIDE canvas
7 Grommets, flap
8 Grommets, FRONT or REAR canvas

Figure 82. Corner canvas fastenings.



1 Inside ties, SIDE canvas 2 Single tie, FRONT and SIDE canvas

Figure 83. SIDE canvas inside ties.

(2) Place ladders in A position directly in front of lifting side.

(3) Hang FRONT canvas section, with nametag on inside of enclosure, by placing sewed-in-loops over top hooks (1, fig. 84), located on outside front of lifting side, under weatherseal.

(4) Remove nut (5, fig. 82) from upright stud (3). Place grommet (8) over grommet of SIDE canvas (*f*(4) above) and install nut securely.

(5) Secure two single-ties, on inside of FRONT canvas, around front upright to two single ties (2, fig. 83) on inside of SIDE canvas.

(6) Hook sewed-in-loops along edge of FRONT canvas to side hooks (2, fig. 84) on bulkhead.

(7) Secure FRONT canvas to SIDE canvas by passing ties (2, fig. 82) through grommets (8) and knotting.

(8) Pull flap (6) over ties and over front upright of tenting frame.

(9) Secure ties (1) to grommets (7). Begin by fastening tie under weatherseal on lifting side to grommet in long flap of side canvas at corner of lifting side. Stand on ladders to reach upper ties.

Note. The access openings (4, fig. 85) in the FRONT canvas sections have flaps for blackout use. Fasten both inside and outside ties to close openings.

h. Install REAR Canvas Section. Install REAR canvas section after both SIDE canvas sections are installed. Follow procedures outlined below.

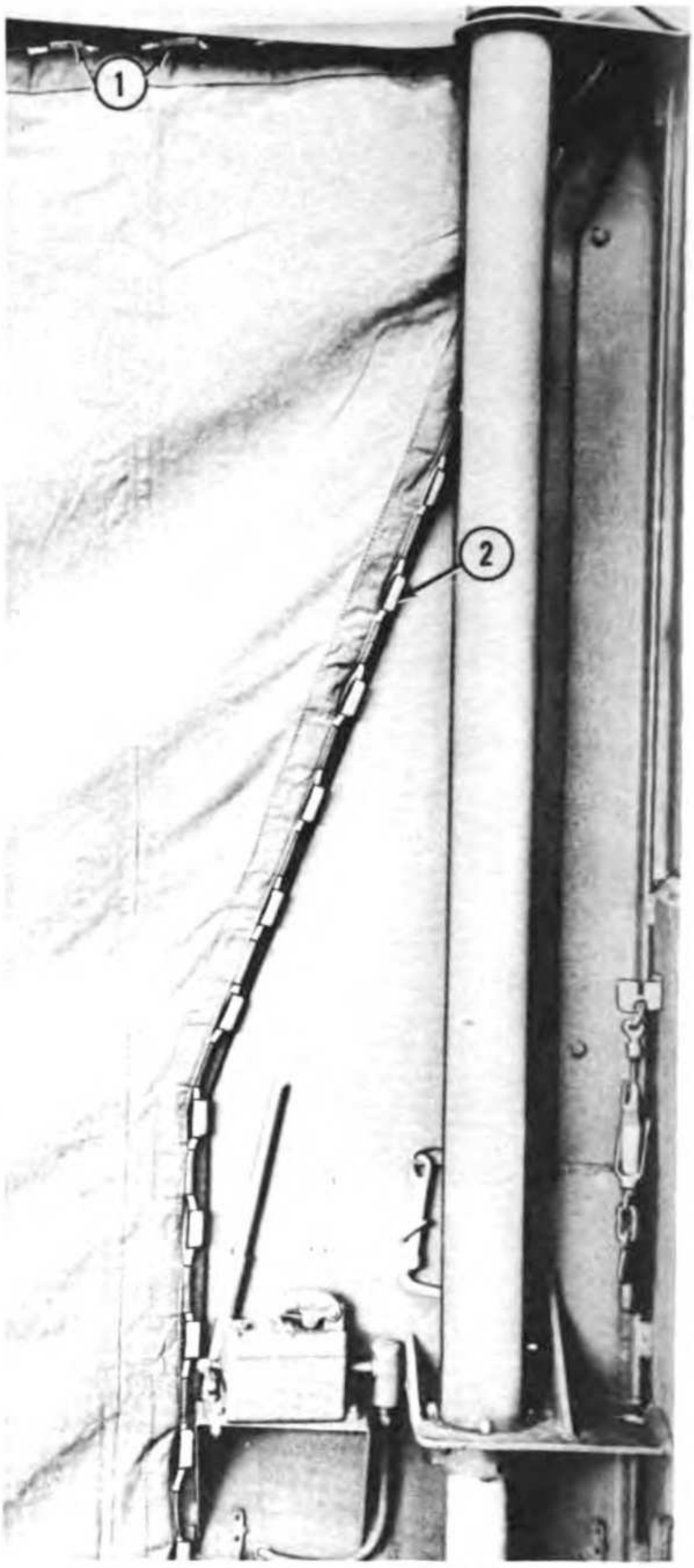
(1) Open canvas section marked REAR (2, fig. 86) and spread canvas with nametag down and rope (1) extending toward mobile shop.

(2) Pass rope up and over raised rear-panel assembly to a man on roof of mobile shop. Carefully raise canvas into position over rear-panel assembly and loose poles.

Caution: Do not allow canvas to catch on rear panel. Canvas will tear.

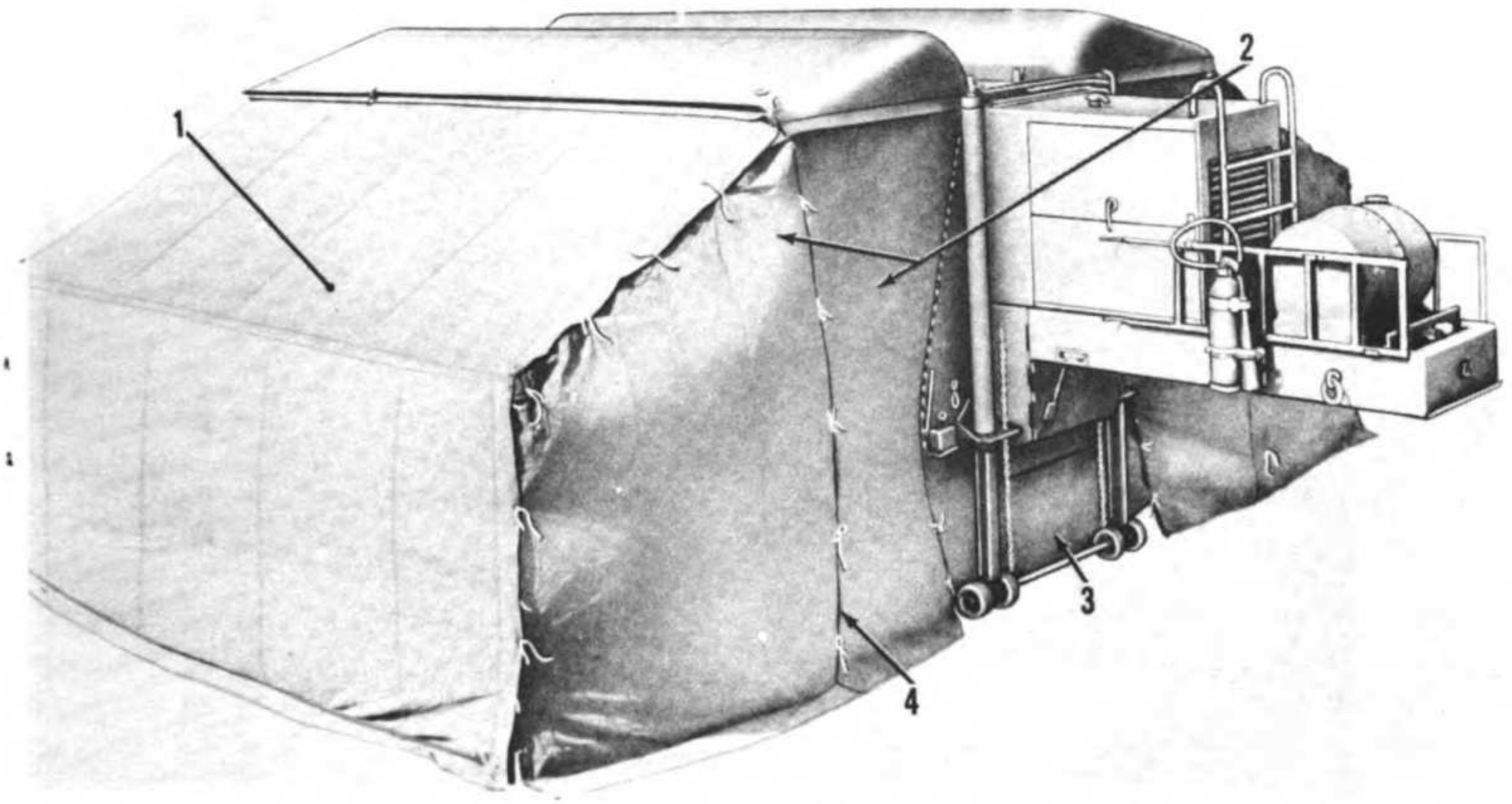
(3) Tie rope (1, fig. 87) to ring (2) on roof of shop.

(4) Remove nut (5, fig. 82) from upright stud (3) on each rear upright. Place grommet (8) over grommet in SIDE can-



1 Top hooks 2 Side hooks

Figure 84. FRONT canvas fastenings.



1 SIDE canvas section
2 FRONT canvas section
3 WINDBREAKER canvas section
4 Access opening

Figure 85. SIDE, FRONT, and WINDBREAKER canvas sections installed.

vas and over stud. Install nut securely. Secure other corner in the same manner.

(5) From inside of tenting, hook sewed-in loops to metal hooks on rear edge of lifting sides.

(6) Stand on ladders; reach through top opening between SIDE canvas and REAR canvas and secure grommets of REAR canvas to SIDE canvas using ties (2). Reach through top openings and secure two grommets (7) with two ties on outside of REAR canvas.

(7) From outside of tenting, secure REAR canvas with ties on rear of SIDE canvas.

(8) Pull flap down, over side of REAR canvas, and secure grommets (7) with REAR canvas outside ties (1).

Note. The access openings (3, fig. 87) have flaps for blackout use. Fasten both inside and outside ties to close openings.

i. Install WINDBREAKER Canvas Section.

(1) Open canvas section marked WINDBREAKER (5, fig. 80) and place canvas with nametag on inside, across front of mobile shop, behind the trailer-supporting jacks.

(2) Hook four grommets, in upper corners of WINDBREAKER canvas section, over large hooks on lower part of mobile shop bulkhead.

(3) Secure WINDBREAKER canvas section to FRONT canvas section, using two ties on each side of WINDBREAKER canvas.

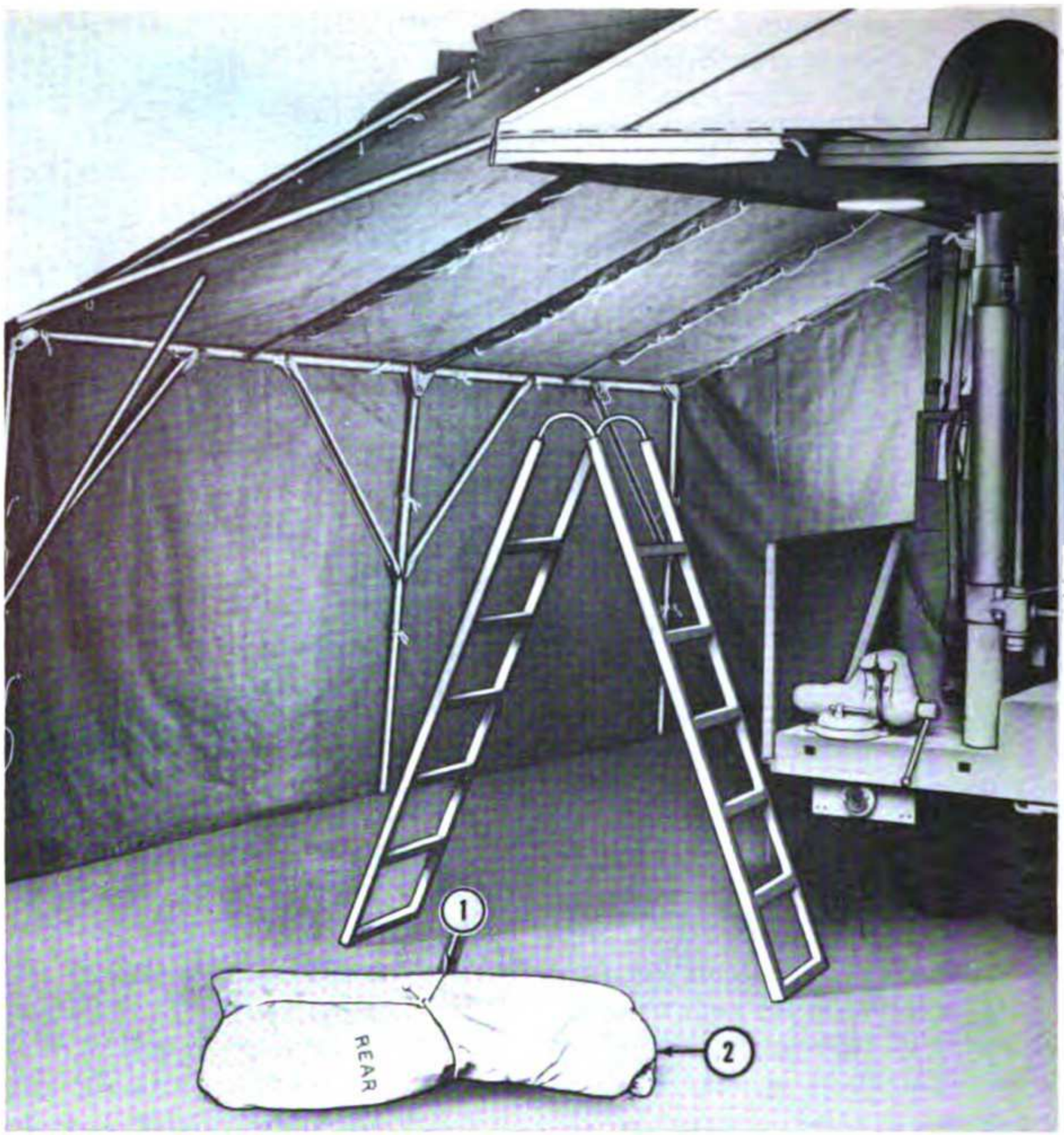
41. Starting Engine

a. General. Perform before-operation services (par. 80*c*) before starting engine.

Note. Special procedures are provided for starting engine under unusual conditions. Refer to paragraphs 70 through 73 for special instructions on engine starting in extreme cold, extreme heat, dusty or sandy conditions, and in high humidity or salt water areas.

b. Disengage Clutch. Move down engine clutch control lever (1, fig. 42) to CLUTCH DISENGAGED position.

c. Open Fuel Shutoff Valve. Turn engine fuel shutoff valve (fig. 41) counterclockwise.



1 Rope 2 REAR canvas section

Figure 86. LEFT SIDE canvas installed, inside view.

d. Turn Battery-Disconnect Switch On. Move battery-disconnect switch (10, fig. 40) to the ON position.

Note. **The low-oil-pressure warning light (12) will light as soon as the battery-disconnect switch is moved to the ON position, and the warning light will remain on until the engine starts and oil pressure builds up to 5 psi or higher. The light will then go out.**

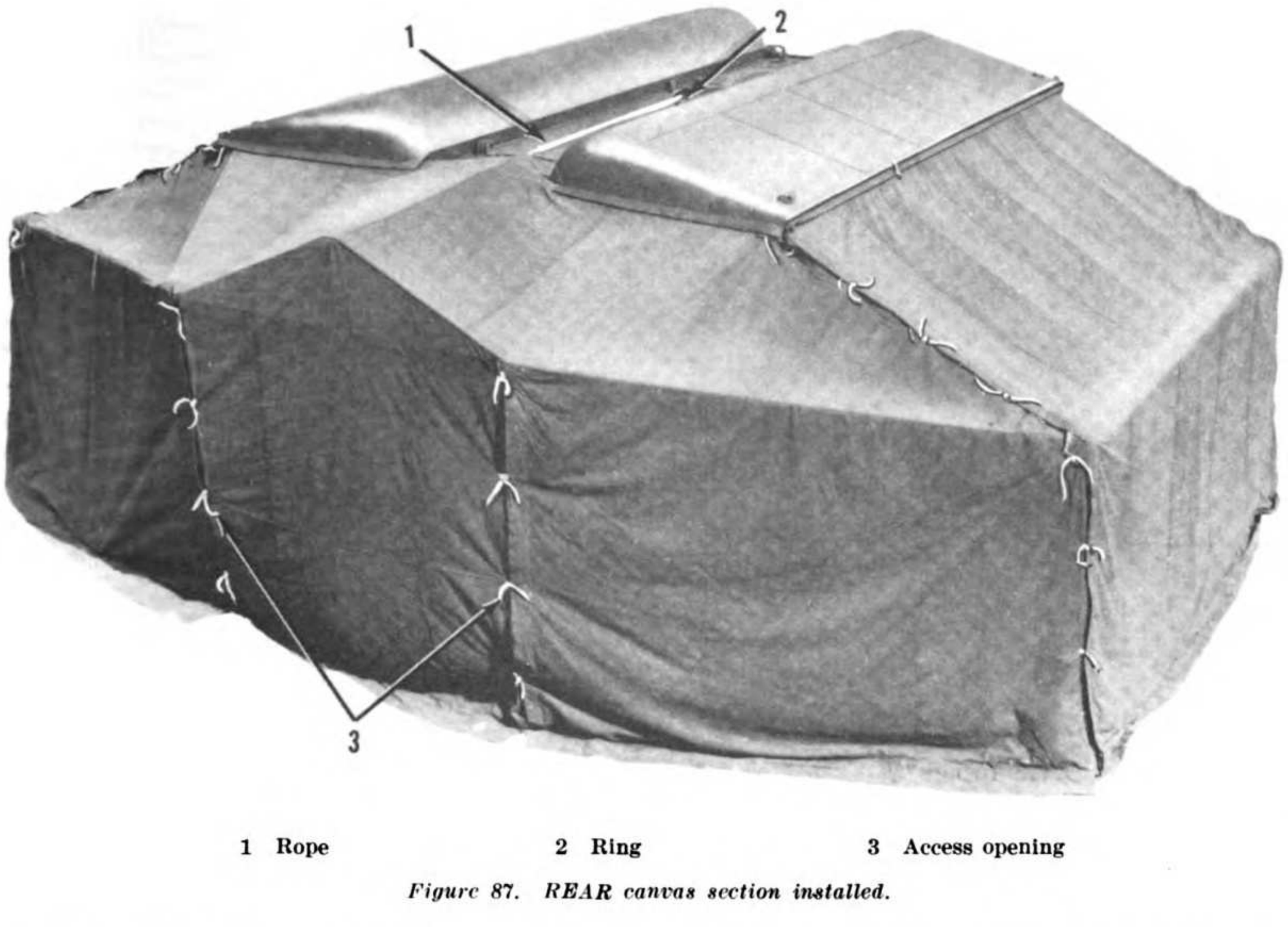
e. Pull Choke-Control Handle. Pull out choke-control handle (11) as far as it will go. As choke-control handle is pulled out, the choke valve in the carburetor closes. This decreases the amount of air that can enter the carburetor, resulting in a "rich" mixture. When the engine is cold, it will start more readily with a "rich" mixture.

f. Pull Throttle-Control Handle. Pull out throttle-control handle (6) about one-fifth of its full travel and turn handle to lock it in position. This will regulate the engine speed to a fast idle upon starting and will prevent stalling.

g. Turn Magneto Switch On. Push in magneto switch (9).

h. Push Starting Motor Control. Push in starting motor control (2, fig. 42) to engage starting motor and to crank the engine. Release control immediately after engine starts.

Caution: **Never operate starting motor for more than 30 seconds at one time. Allow a rest period of at least one minute before attempting to start again. Failure to observe this caution may result in serious damage to the motor.**



1 Rope **2 Ring** **3 Access opening**

Figure 87. REAR canvas section installed.

i. Warm-Up Engine. After engine starts, leave choke-control handle out until engine warms up enough for normal operation. The engine may run unevenly for a short time until all cylinders are warm. After engine is warm, push in choke-control handle all the way for more efficient operation.

j. Adjust Throttle-Control Handle. Adjust throttle-control handle to have engine operate at 800 rpm. Check engine speed on tachometer (5, fig. 40).

Warning: Do not operate engine over 1,000 rpm until it has reached normal operating temperatures (*l* below). Excessive rpm while cold will cause serious damage to internal parts of the engine.

k. Check Oil Pressure. Check oil-pressure gage (2) indication. Engine conditions should be considered when checking oil pressure. Oil pressure will be high after engine is started and oil is cold. As the oil warms up, the pressure will reduce. Pressure at idling speed will vary from 5 to 10 psi, depending upon conditions. At governed speed with engine at operating temperature, normal oil pressure should be 15 to 30 psi.

Caution: If oil pressure drops to zero suddenly or fluctuates violently, or if low-oil-pressure warning light (12) goes on while engine is under load, stop the engine immediately and investigate the trouble.

l. Check Operating Temperature. Check coolant-temperature gage (1) indication. The electrically-operated gage registers only when the battery-disconnect switch (10) is turned on. Normal operating temperatures of the engine will range from 160° to 180° F.

Caution: If for any reason the engine should overheat, the overheat warning light (13) will go on. Stop the engine immediately. Do not restart until cause of the overheating has been corrected. Continued engine operation at temperatures lower than 160° F. is abnormal, and the causes of this condition should be investigated and corrected at once.

m. Check Radiator Shutter Operation. Check radiator shutter (3, fig. 5) to see that it has opened.

The shutter is factory preset to open automatically when the coolant temperature reaches 180° F. Failure of the automatic shutter-operating system will result in the shutter remaining closed. If the automatic control fails, open the shutter manually by turning clockwise the radiator-shutter manual-control handle (4, fig. 40).

n. Check Battery Ammeter. Check battery ammeter (7) indication. The pointer should move to the charge side of the dial as engine speed increases. The ammeter should indicate a slight charge when the engine is running steadily. It will show a high charge if batteries are in a discharged condition. The charging rate is adjusted to the battery condition through the generator regulator.

Caution: If the ammeter indicates discharge when engine is running normally, trouble is indicated. Continuous operation of the engine in this condition will exhaust the batteries. Investigate and correct cause.

o. Operate Engine at 1,800 Rpm. Pull throttle-control handle (6) all the way and turn handle to lock throttle in position. The governor will then control engine speed. If tachometer does not indicate 1,800 rpm, adjust governor (par. 169*a*).

42. Dynamotor-Welder Operation

a. Mobile-Shop Engine Connection.

(1) *Starting.*

(*a*) Perform before-operation services (par. 80*c*) before starting dynamotor-welder.

(*b*) Turn selector switch (5, fig. 43) on front panel of electric-control cubicle to the GEN position.

(*c*) Turn polarity switch (2) to the OFF position.

(*d*) Turn cycle switch (8) to the 60-cycle position.

(*e*) Start engine (par. 41). The engine governor will control the engine speed at 1,800 rpm. At this speed, the dynamotor-welder will generate 60-cycle current.

(*f*) Move engine clutch control lever (1, fig. 42) up to the CLUTCH ENGAGED position.

(2) *Obtaining dc power for welding.*

(*a*) Turn polarity switch (2, fig. 43) to either the STR or the REV position (par. 47*c*).

(*b*) The dc voltmeter (6) will indicate open circuit dc voltage.

Note. Up to 300 amperes of 40-volt d-c is now available at the welding connector panel (par. 47).

(3) *Obtaining ac power for lights and electric equipment.*

(*a*) Turn start-stop switch (11) to the START position.

Note. The start- stop switch will always return to neutral (center) position when released from either START or STOP position.

(*b*) The ac voltmeter (3) should indicate output of 208 volts. If 208 volts is not indicated on voltmeter, adjust the voltage by turning generator rheostat (4), marked MANUAL CONTROL clockwise to increase voltage and counterclockwise to decrease voltage until ac voltmeter indicates 208 volts.

Note. The 220V 1 PHASE OUTPUT terminals (4, fig. 88) are used to supply alternating current for extensive lighting (par. 44) and for any electrically operated equipment requiring 1-phase 208-volt power.

(*c*) The output of the ac generator is connected to a 5kw transformer (1) located in the electric-control cubicle. The transformer converts 208-volt, 1-phase ac to 110 volt, 1-phase ac. The 110-volt circuit is schematically illustrated in figure 89.

(4) *Stopping.*

(*a*) Turn polarity switch (2, fig. 43) to the OFF position.

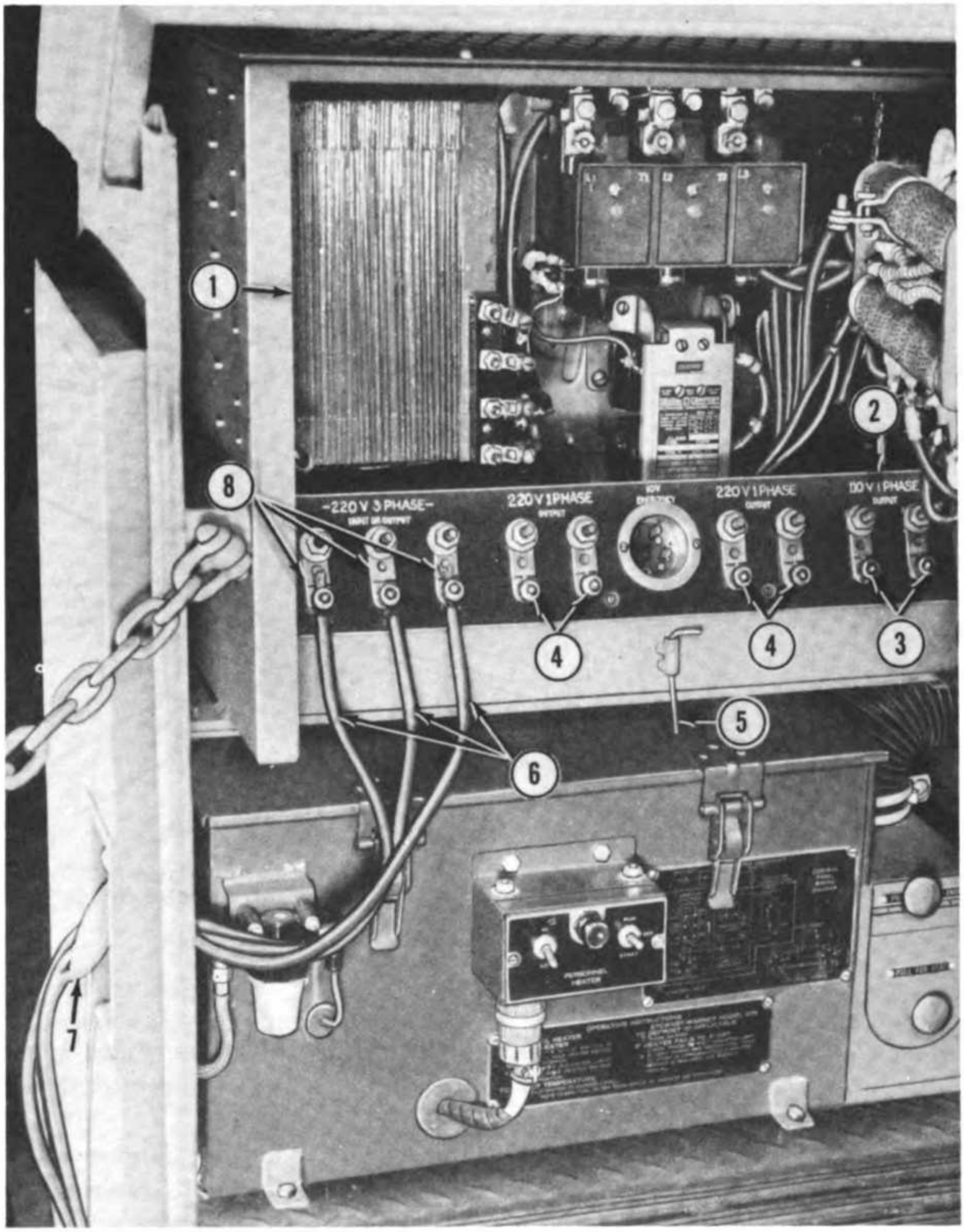
(*b*) Turn start-stop switch (11) to the STOP position.

(*c*) Move engine clutch control lever (1, fig. 42) down to the CLUTCH DISENGAGED position.

(*d*) Stop engine (par. 48).

b. External-Power Supply Connection. When a 208-volt, 3-phase, 50- or 60-cycle source of power is available, operate the dynamotor-welder from this external source. Dynamotor-welder operation from an external power supply will be more economical and will save engine wear.

Caution: Only 208-volt, 3-phase, 50- or 60-cycle current can be used to power the dynamotor-welder. Three-phase ac is usually found on three- or four-wire systems (figs. 90 and 91). Two wire



1 Transformer
2 Terminal panel
3 110 V 1 PHASE OUTPUT terminals
4 220 V 1 PHASE OUTPUT terminals
5 Wrench for terminals
6 External power-supply lines
7 Opening for power lines
8 220 V 3 PHASE INPUT OR OUTPUT terminals

Figure 88. Electric-control cubicle terminal panel.

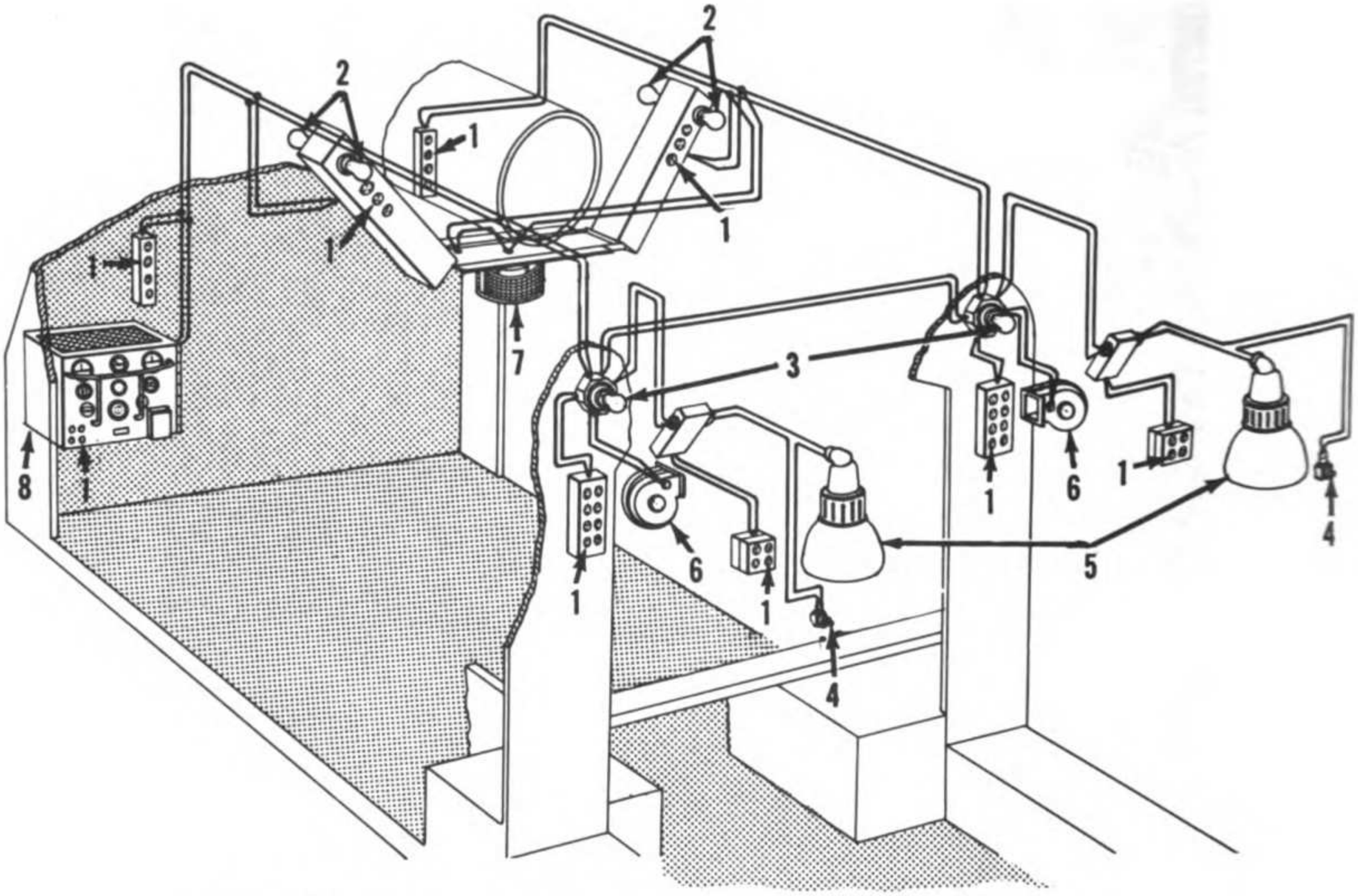


Figure 89. Ac circuit, 110-volt, 1 phase.

systems are either 1-phase ac or dc and must not be used.

(1) *Connect external power lines.*

(*a*) Make certain that the external source of power is of correct voltage and frequency.

Warning: High voltages are deadly. All cross-country power lines are high-voltage lines. Find out what voltages are carried by any external power wires or poles before attempting to connect to them. If possible, make connection to external source at main switch in a building or at a convenient power-line box.

(*b*) Install a main switch of 25-hp capacity at the point where connections to the external power line will be made.

(*c*) Check fuses in the external power-supply line. Fuses must be rated at 150 amps to protect the electric equipment.

Caution: Higher rated fuses must not be used. Overheating will result causing damage to equipment.

(*d*) Use three lengths of No. 4 B & S gage wire to connect external power lines to electric-control cubicle if leads are no more than 200 feet long.

Note. No. 4 B & S gage wire has a cross-sectional area of 0.0327 square inch. If this gage wire is not available, use a larger size wire or combine two or three smaller size wires. The total cross-sectional area of the smaller wires must be the same as or larger than 0.0327 square inch. Refer to Table I for wire sizes and copper cross-sectional areas.

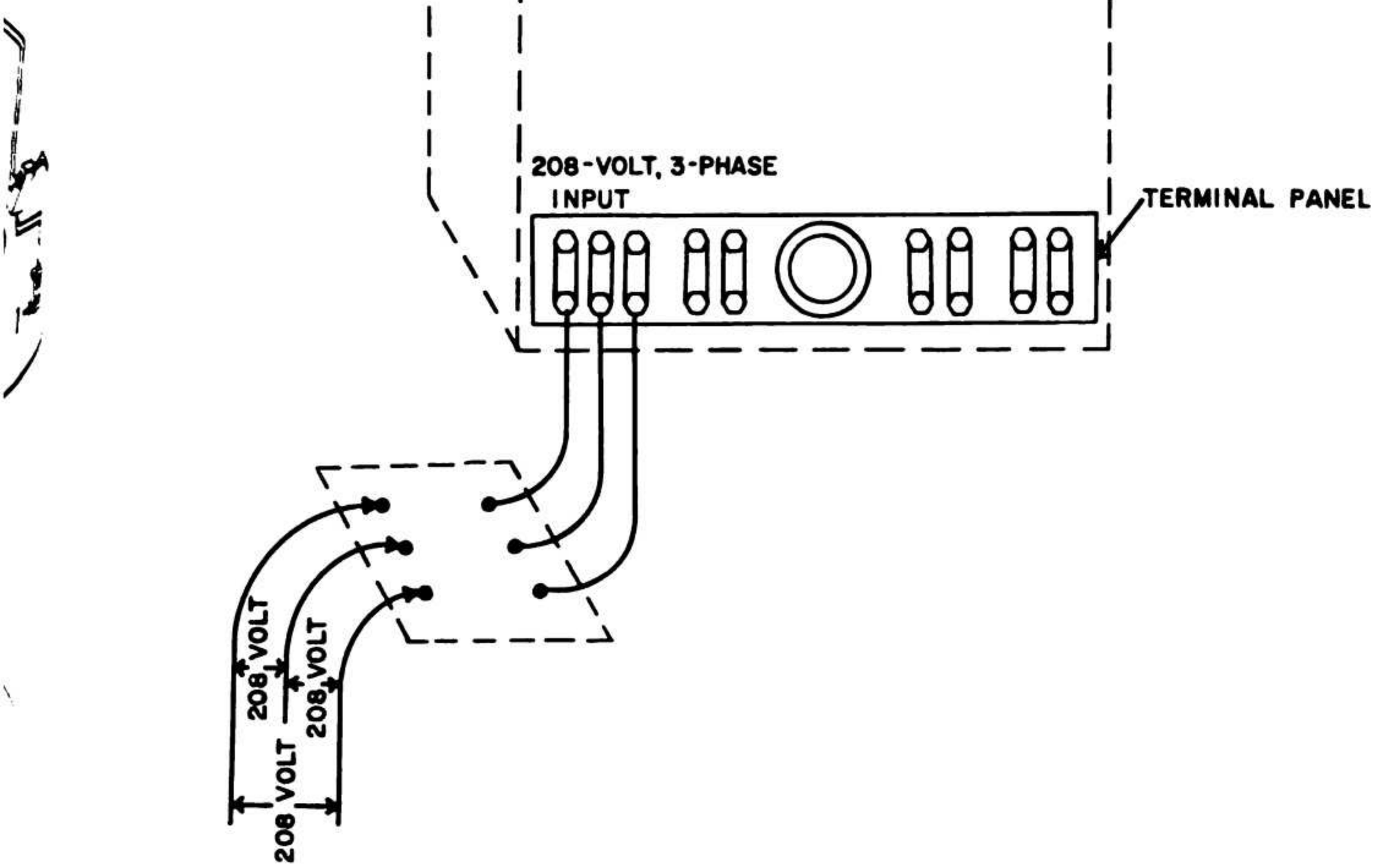


Figure 90. Three-wire system, 208-volt, 3-phase connections.

Table I. Wire Sizes

(Brown and Sharpe wire gages)

B & S Gage	*Wire Diameter	Copper Area
Number	*Inches*	*Square inches*
3/0	0. 410	0. 1320
2/0	0. 365	0. 1046
1/0	0. 325	0. 0855
1	0. 290	0. 0660
2	0. 258	0. 0523
3	0. 230	0. 0416
4	0. 204	0. 0327
5	0. 182	0. 0260
6	0. 162	0. 0206
7	0. 144	0. 0163
8	0. 129	0. 0130
9	0. 114	0. 0102
10	0. 102	0. 0082

*Does not include insulation.

(*e*) Connect three lengths of wire to the three terminals in the 25-hp capacity main switch (*b*(1)(*b*) above).

Warning: Be sure power is off in the external power lines before making connections.

(*f*) Pass external power supply lines (6, fig. 88) through opening (7) in side of mobile shop and connect wires to three terminals (8) marked 220 V 3 PHASE, INPUT OR OUTPUT on the electric-control cubicle terminal panel (2). A wrench (5) for the terminals is stored in a holder directly under the terminal panel.

(2) *Obtaining ac power.*

Warning: Make certain engine clutch control lever is in the CLUTCH DISENGAGED position before operating dynamotor-welder with external source of power. Engine will be damaged when driven at full speed.

(*a*) Turn cycle switch (8, fig. 43) on front panel of electric-control cubicle to

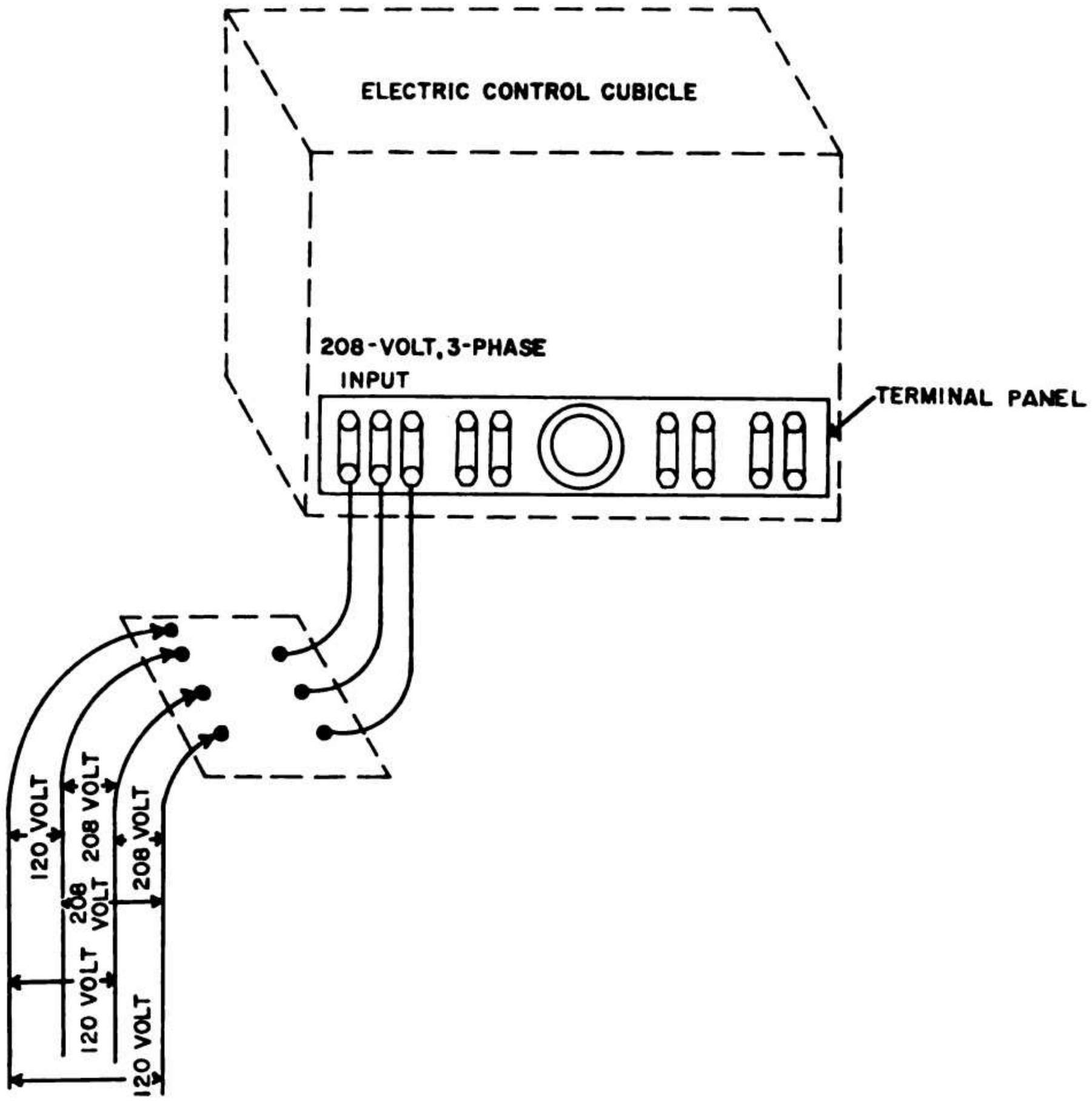


Figure 91. Four-wire system, 208-volt, 3-phase connections.

either 50 or 60 cycle position, depending on the frequency of the external power source.

(*b*) Turn selector switch (5) to the CITY position.

(*c*) Turn on 25-hp capacity main switch installed in the external power-supply line. The ac voltmeter (3) should indicate at least 208 volts.

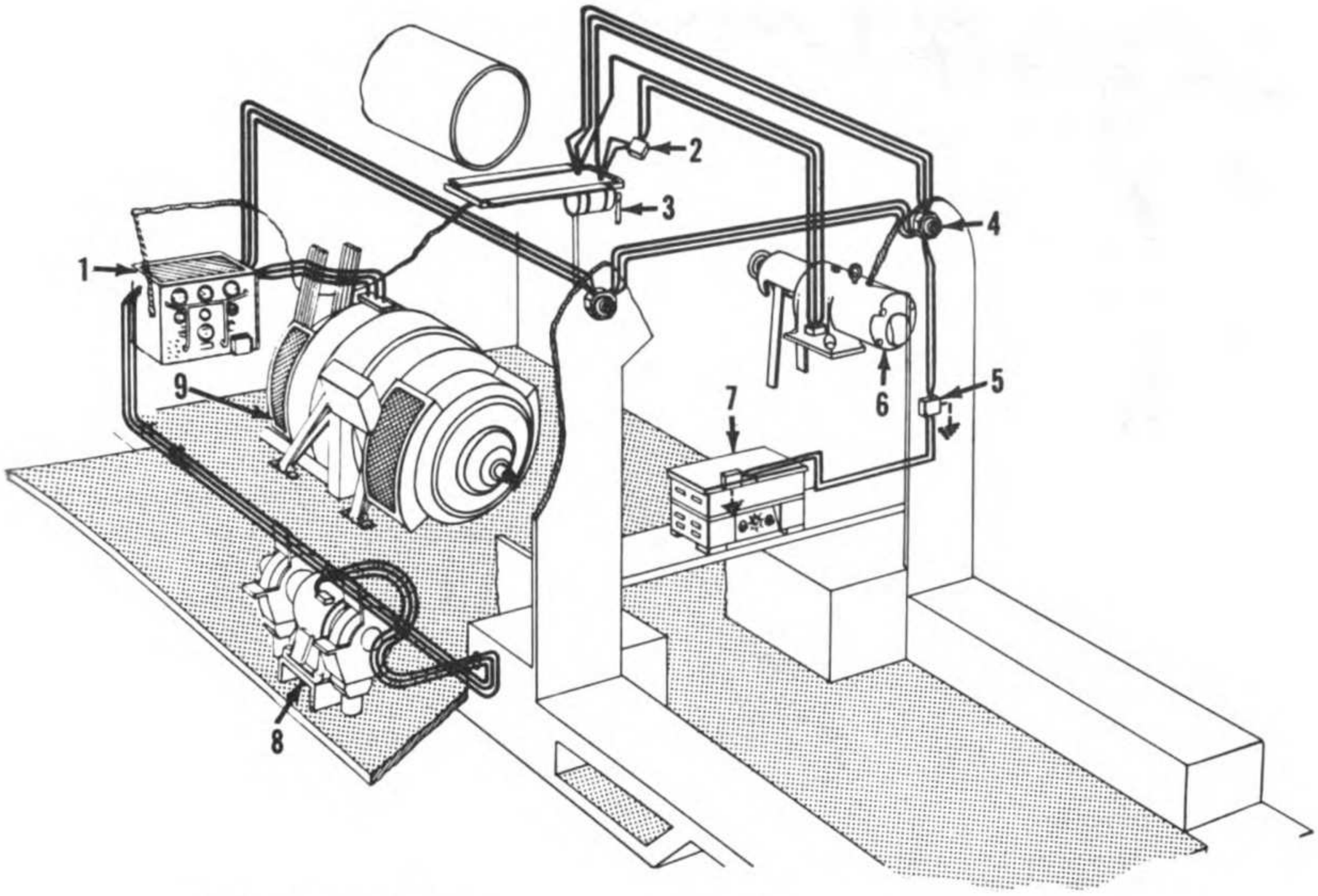
Warning: All terminals, connections, and wiring inside the electric-control cubicle are now "live." Make sure that power is turned off before handling wires or making connections at terminals.

(*d*) Power is now available at 220 V 1 PHASE OUTPUT terminals (4, fig. 88) (see Warning under *c* above), at outlets under safety cover (7, fig. 43), and for equipment shown on figure 92.

(*e*) Check for proper rotation of dynamotor-welder by operating bench grinder (8) on left front catwalk and watching direction of rotation of grinding wheels. If wheels of bench grinder rotate toward the operator, 208-volt, 3-phase power connections are correct. If wheels of bench grinder rotate in opposite direction (away from operator), power connections are wrong.

(*f*) Change direction of rotation by interchanging any two of the three external power lines either at terminals (8, fig. 88) or at terminals of main switch.

Warning: Be sure that power has been turned off at main switch before interchanging lines.



1 Electric-control cubicle	4 Splice box	7 Hotplate
2 Lathe motor on-off switch	5 Outlet	8 Bench grinder
3 Lathe motor reversing switch	6 Lathe drive	9 Dynamotor-welder

Figure 92. Ac circuit, 208-volt.

(*g*) Turn circuit-breaker switch (9, fig. 43) to the ON position (right).

Caution: The circuit-breaker switch is on a 30-ampere heat-activated circuit-breaker that protects the 110-volt circuit. If the circuit-breaker opens the circuit, find and correct trouble before turning on 110-volt circuit. To turn power on, close circuit-breaker by pushing circuit-breaker switch to the OFF position (left) and then pushing switch to the ON position.

(*h*) The transformer (1, fig. 88) is now supplying 110-volt, 1-phase, ac power to 110 V 1 PHASE OUTPUT terminals (3), to outlets (12, fig. 43), and to the mobile shop 110-volt circuit (fig. 89).

(3) *Obtaining dc power.* After 208-volt, 3-phase, ac power is obtained, the dynamotor-welder may be operated to generate dc power for welding.

(*a*) Turn start-stop switch (11, fig. 43) to the START position. Hold switch in START position for a few seconds until the dynamotor-welder picks up speed. Then release switch.

(*b*) Turn polarity switch (2) to either STR or REV position (par. 47*c*).

(*c*) The dc voltmeter (6) will indicate open circuit dc voltage.

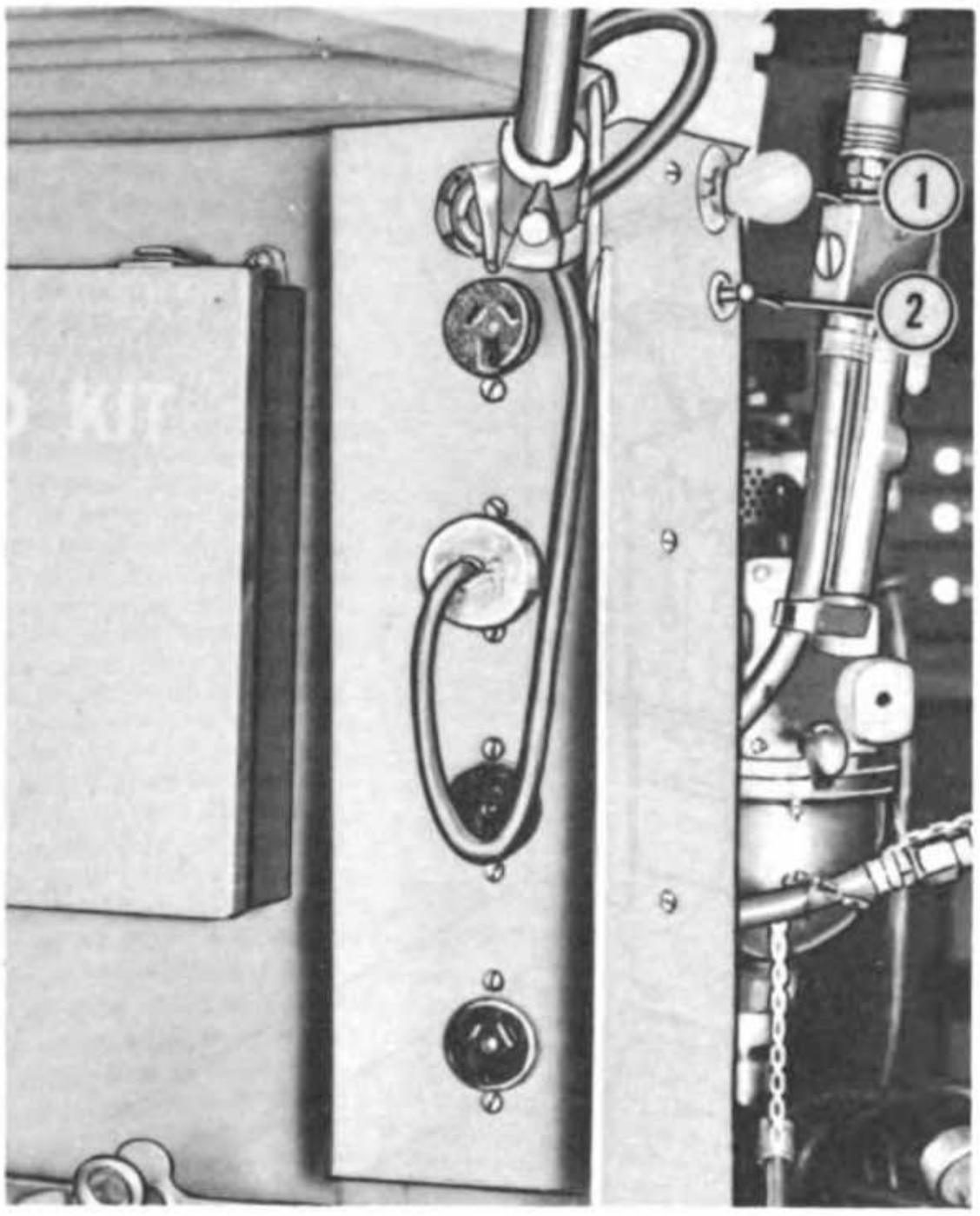
Note. Up to 300 amps of 40-volt dc is now available at the welding connector panel.

(4) *Disconnect external power lines.*

(*a*) Turn polarity switch (2, fig. 43) to the OFF position.

(*b*) Turn start-stop switch (11) to the STOP position. Hold the switch in the STOP position for a few seconds until the dynamotor-welder stops. Then release switch.

(*c*) Turn circuit-breaker switch (9) to the OFF position (left).



1 Emergency light 2 Switch

Figure 93. Emergency light and switch, 24-volt.

(*d*) Open the 25-hp capacity main switch installed in the external power supply line.

(*e*) Turn the selector switch (5) to the OFF position.

(*f*) Disconnect wires at three 220 V 3 PHASE, INPUT OR OUTPUT terminals (8, fig. 88) on the electric-control cubicle terminal panel. A wrench (5) for the terminals is stored in a holder directly under the terminal panel.

(*g*) Pull external power supply lines (6) out of the opening (7) in the side of the mobile shop and disconnect them from the three terminals in the 25-hp capacity main switch.

(*h*) Disconnect the main switch from the external power lines.

43. Lighting Shop

a. General. Two 24-volt emergency lights (*b* below) are used to light the inside of the mobile shop before starting the engine and the dynamotor-welder, or when light is needed to make power line connections. The 110-volt working lights (par. 43*c*) are used to light the shop after the normal power connections have been made. If external, 110-volt, 1-phase, ac power is available, an emergency connection (*d* below) can be made at the electric-control cubicle.

b. Operating 24-Volt Emergency Lights. Two emergency lights (1, fig. 93) are connected to the batteries and are controlled by a toggle switch (2).

(1) Move battery-disconnect switch (10, fig. 40) up to the ON position.

(2) Move emergency-light switch to the left for dim lighting and to the right for bright lighting. Move emergency-light switch to center position to turn off light.

c. Operating 110-Volt Working Lights. After starting dynamotor-welder with engine (par. 42*a*) or with external power-supply connection (par. 42*b*), the 110-volt working lights can be turned on.

(1) Turn circuit-breaker switch (9, fig. 43) to the ON position.

(2) Turn on working lights (par. 32).

d. Connecting 110-Volt ac Emergency Power. In an emergency, the mobile shop 110-volt circuit can be operated from any external 110-volt, 1-phase, ac power supply.

(1) Insert female plug (1, fig. 94) of the external power-supply extension cord (2), supplied with shop, into male socket (3), marked 110 V EMERGENCY, on the electric-control cubicle terminal panel.

Warning: Be sure power is turned off at the main switch before handling extension cord.

(2) Insert male end of extension cord into any external 110-volt, 1-phase, ac power supply. Complete the circuit by closing switch or circuit breaker in the external power line.

(3) Turn selector switch (5, fig. 43) to the EMERGENCY position.

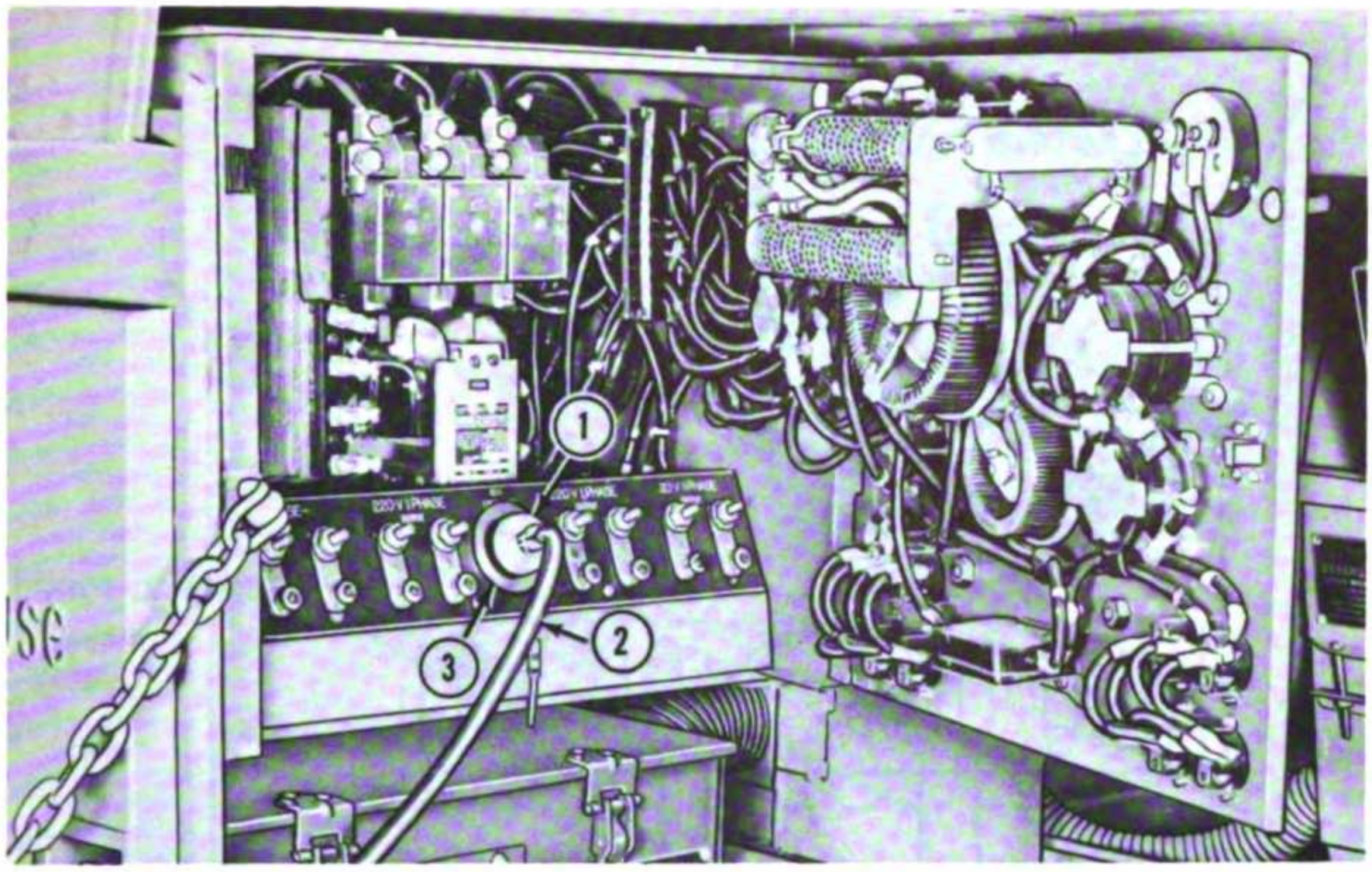
(4) Turn circuit-breaker switch (9) to the ON position.

Note. Up to 3.5 kw of 110-volt, 1-phase, ac power is available for use.

(5) To shut off the emergency power, turn selector switch to the OFF position.

44. Lighting Work Area

a. General. The dynamotor-welder supplies 110-volt, 1-phase, ac power for shop lighting. If



1 Female plug 2 Extension cord 3 Male socket

Figure 94. Emergency power connection, 110-volt circuit.

more power is needed to light a large work area which requires more than 5 kw, use terminals (4, fig. 88) which supply 208-volt, 1-phase, ac power.

b. Method of Terminal Connection. Two types of lighting connections to be used, utilizing 220-volt bulbs or 120-volt bulbs.

(1) *Connecting 220-volt bulbs.* Connect 220-volt bulbs in parallel (fig. 95) before connecting leads to 220 V 1 PHASE OUTPUT terminals (4, fig. 88).

Warning: Make certain source of power is turned off before making connections to terminals.

(2) *Connecting 120-volt bulbs.* Connect two 120-volt bulbs in series (fig. 95) before connecting leads to 220 V 1 PHASE OUTPUT terminals (4, fig. 88).

Warning: Balance output of ac generator by dividing load equally between each pair of terminals as shown in figure 95.

45. Heater Operation

a. General. The front heater (fig. 34) and the rear heater (fig. 35) are operated in the same manner. The heating system is schematically illustrated in figure 96.

b. Start Heater.

(1) Open engine fuel shutoff valve (fig. 41).

(2) Open heater fuel shutoff valve (fig. 33).

Note. The heater fuel shutoff valve controls fuel flow to both front and rear heaters. Turn valve to closed position when heaters are not in use.

(3) Turn battery-disconnect switch (10, fig. 40) to the ON position.

Note. The heaters are connected in the engine 24-volt circuit (fig. 97). Each heater circuit is protected by a 20-ampere fuse.

(4) Turn hi-lo switch (1, fig. 34) to the HI position.

(5) Hold heater switch (3) on the START position until indicator light (2) comes on.

Note. The heater switch is spring-loaded and must be held in position.

c. Regulate Heater.

(1) Move heater switch (3) to the RUN position.

(2) Regulate heat output according to heating needs of mobile shop by placing hi-lo switch (1) in either HI or LO position.

d. Control Heat. Pull personnel heat control (5) to direct heat from front heater to front section of mobile shop. Pull engine heat control (4) to direct heat through duct to engine compart-

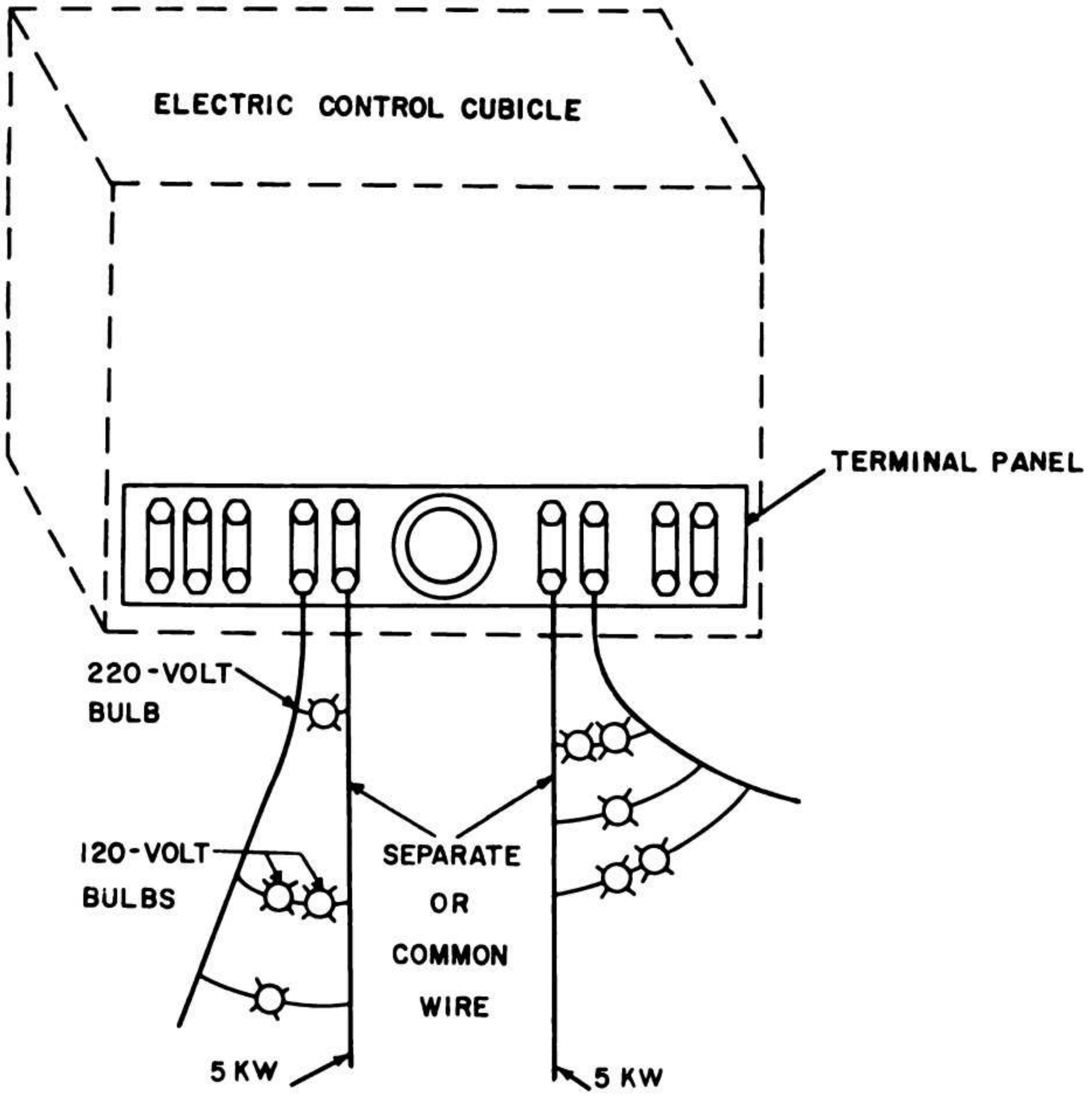


Figure 95. Lighting connections.

ment. Pull up duct control (4, fig. 35) on rear heater to direct heat to rear section of mobile shop. Push down duct control to direct heat through heat outlet pipe (9, fig. 96) to lathe base (6).

e. Stop Heater. Move heater switch (3, fig. 34) to the OFF position.

Note. Heater will stop burning within a few seconds after heater is turned off, but blowers will continue to run for 2 or 3 minutes, allowing heater to cool and to blow out unburned gases. When heater cools blowers will stop automatically.

Caution: If heater switch is placed in the ON position while unburned gases are being cleared, the heater will not start until all the unburned gases have been blown out.

46. Ventilator Operation

Note. Two rear ventilators (6, fig. 89) and front ventilator (7) are components of the 110-volt circuit. They are protected by the 30-ampere heat-activated circuit-breaker in the electric-control cubicle (8).

a. Move circuit-breaker switch (9, fig. 43) to the ON position.

b. To start ventilators, move switches (1, figs. 36 and 37) to the ON position.

Note. Make certain that ventilator blowers are not obstructed so that maximum air circulation is obtained.

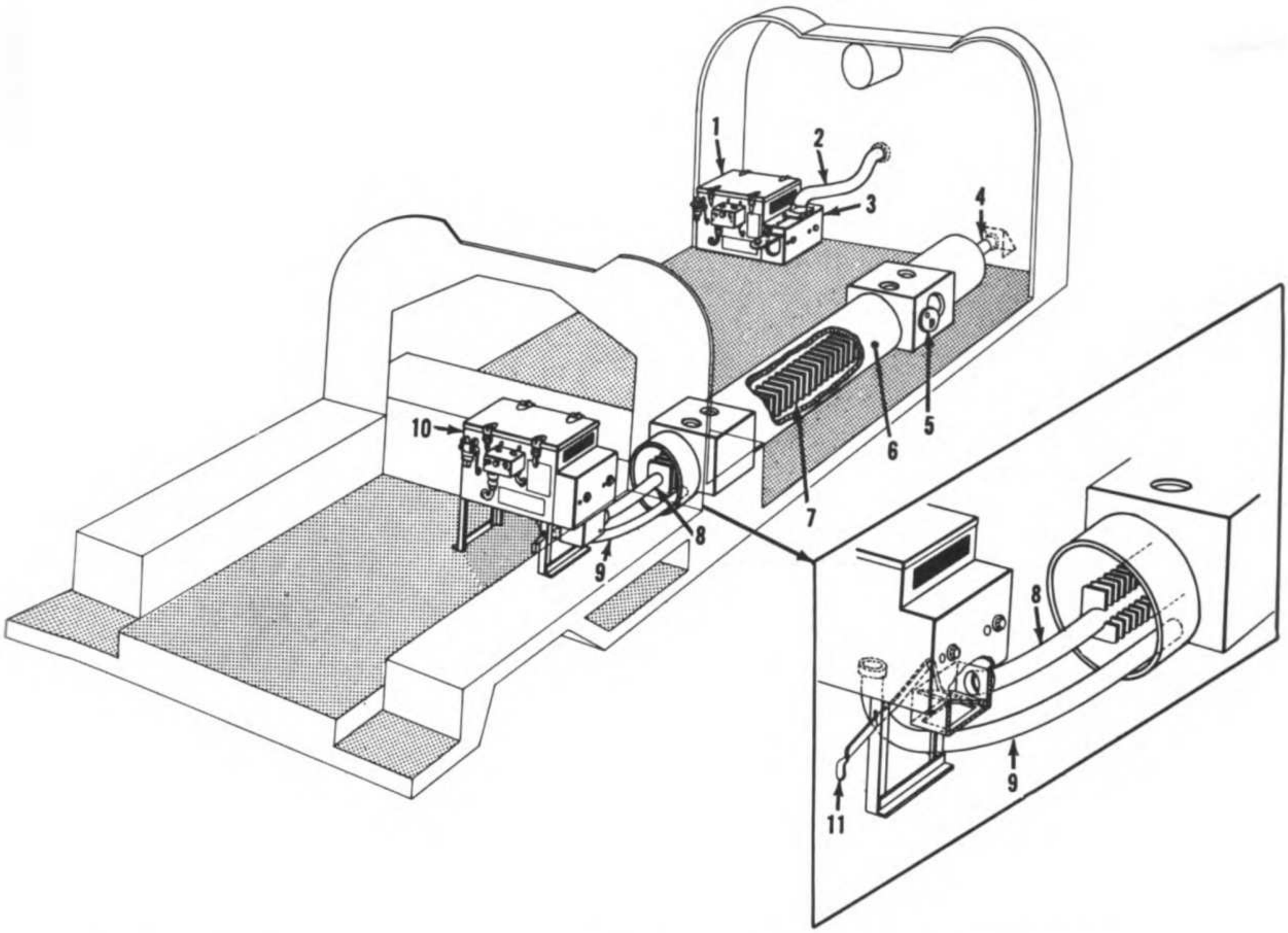
c. To stop ventilators, move switches to the OFF position.

47. Welding-Connector Panel Operation

a. General. Select site (par. 37) close to work so that standard welding and ground cables supplied with mobile shop can be used.

Caution: If long cables are needed, use cables of large diameter to cut down voltage drop.

Warning: Turn polarity switch (2, fig. 43) to the OFF position before using welding-connector panel (fig. 98). Never handle live leads or connections.



1	Front heater	5	Heat supply port	9	Heat outlet pipe
2	Duct to engine compartment	6	Lathe base	10	Rear heater
3	Front heater duct	7	Exhaust baffles	11	Rear heater duct control
4	Exhaust	8	Heater exhaust pipe		

Figure 96. Heating system.

b. Connect Welding Cables.

(1) Attach one end of ground cable to work metal with a clamp.

Caution: A good electric contact must be made at all welding cable connections. Clean contact surfaces before attaching cables.

(2) Remove wingnut from GROUND terminal on welding-connector panel and attach opposite end of ground cable to terminal. Install and tighten wingnut.

(3) Attach electrode holder to welding cable.

(4) Plug welding cable into required socket (*c* below) in welding-connector panel.

c. Set Polarity of Welding Current.

(1) *Straight-polarity welding.*

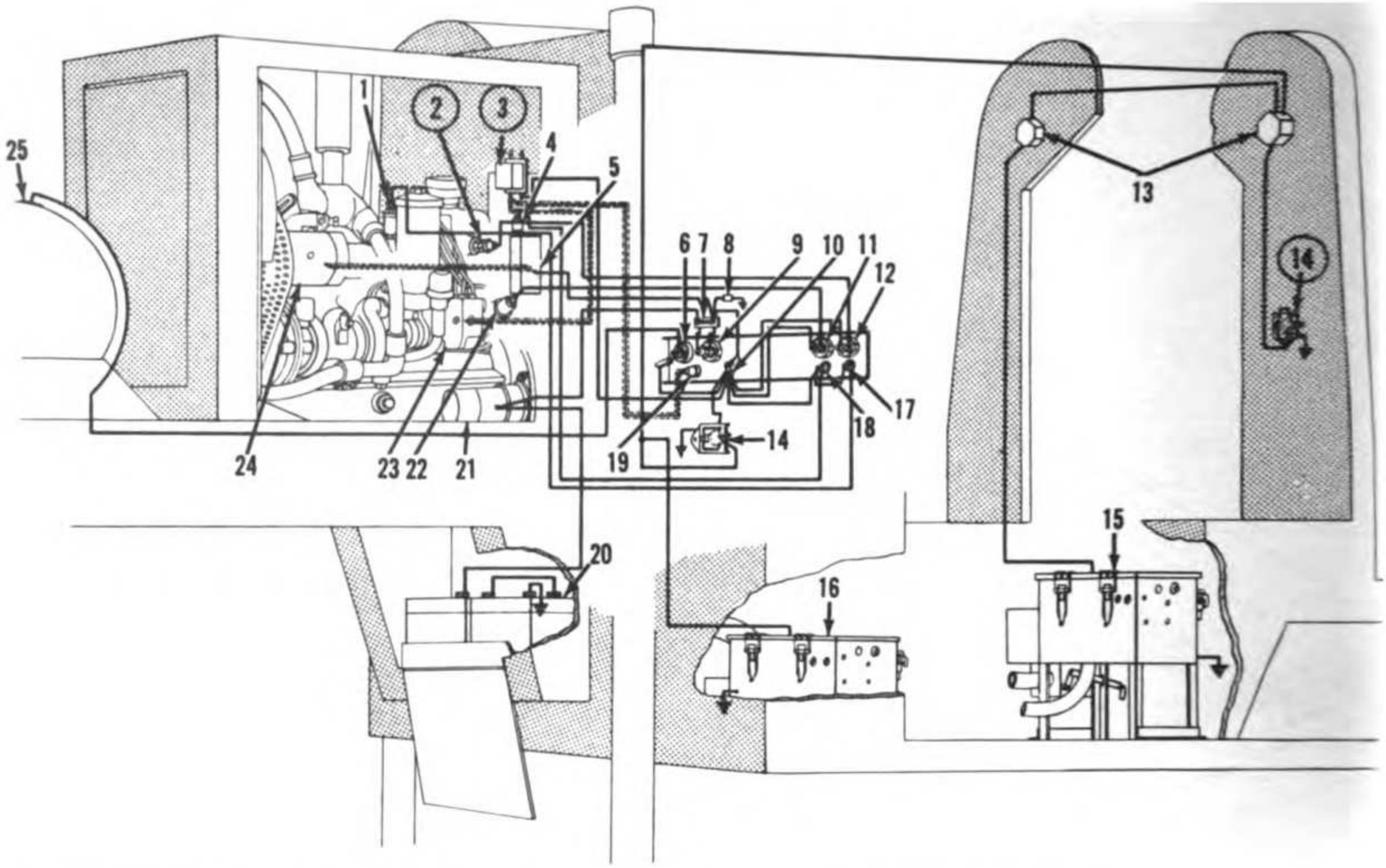
Note. Use straight-polarity current to weld with bare electrodes, with carbon electrodes, with powdered-flux electrodes, and with any other electrodes intended for straight-polarity welding.

(*a*) Turn polarity switch (2, fig. 43), on front panel of electric-control cubicle, to STR position for straight polarity welding.

(*b*) The needle of dc voltmeter (6) will swing to the right when straight-polarity current is set on polarity switch. The needle on dc ammeter (1) will swing to the right when straight-polarity current is drawn.

(2) *Reverse-polarity welding.*

Note. Use reverse-polarity current to weld with most coated electrodes, nonferrous electrodes, and other electrodes intended for reverse-polarity welding.



1 Overheat-warning light sending unit
2 Temperature-gage sending unit
3 Overspeed relay
4 Low-oil-pressure warning light sending unit
5 Generator regulator
6 Fuel gage
7 Resistor
8 Fuse
9 Ammeter
10 Battery-disconnect switch
11 Oil-pressure gage
12 Coolant-temperature gage
13 Splice boxes
14 Emergency light and switch
15 Rear heater
16 Front heater
17 Overheat warning light
18 Low-oil-pressure warning light
19 Magneto on-off switch
20 Batteries
21 Starting motor
22 Oil-pressure-gage sending unit
23 Magneto
24 Generator
25 Fuel-gage sending unit

Figure 97. Engine 24-volt circuit.

(*a*) Turn polarity switch (2) to the REV position for reverse-polarity welding.

(*b*) The needle on dc voltmeter (6) will swing to the left when reverse-polarity current is set on polarity switch. The needle on dc ammeter (1) will swing to the left when reverse-polarity current is drawn.

d. Control Welding Current.

(1) Turn voltage fine-adjustment control (10) clockwise to increase open circuit voltage, making it easier to maintain an arc.

(2) Insert welding-cable plug into socket 1 of the welding-connector panel (fig. 98).

Caution: Check that work is grounded.

(3) Turn polarity switch to desired polarity (*c* above).

(4) Strike an arc with the electrode.

Warning: Observe all the usual welder's safety precautions to prevent eyeburn or skinburn. All injuries must be treated and reported to proper authority.

(5) If welding current is too low to weld, move welding cable plug to socket 2, of the welding-connector panel. Then, adjust voltage fine-adjustment control (10) to obtain highest open circuit voltage output. Continue to move welding cable plug to consecutively higher num-

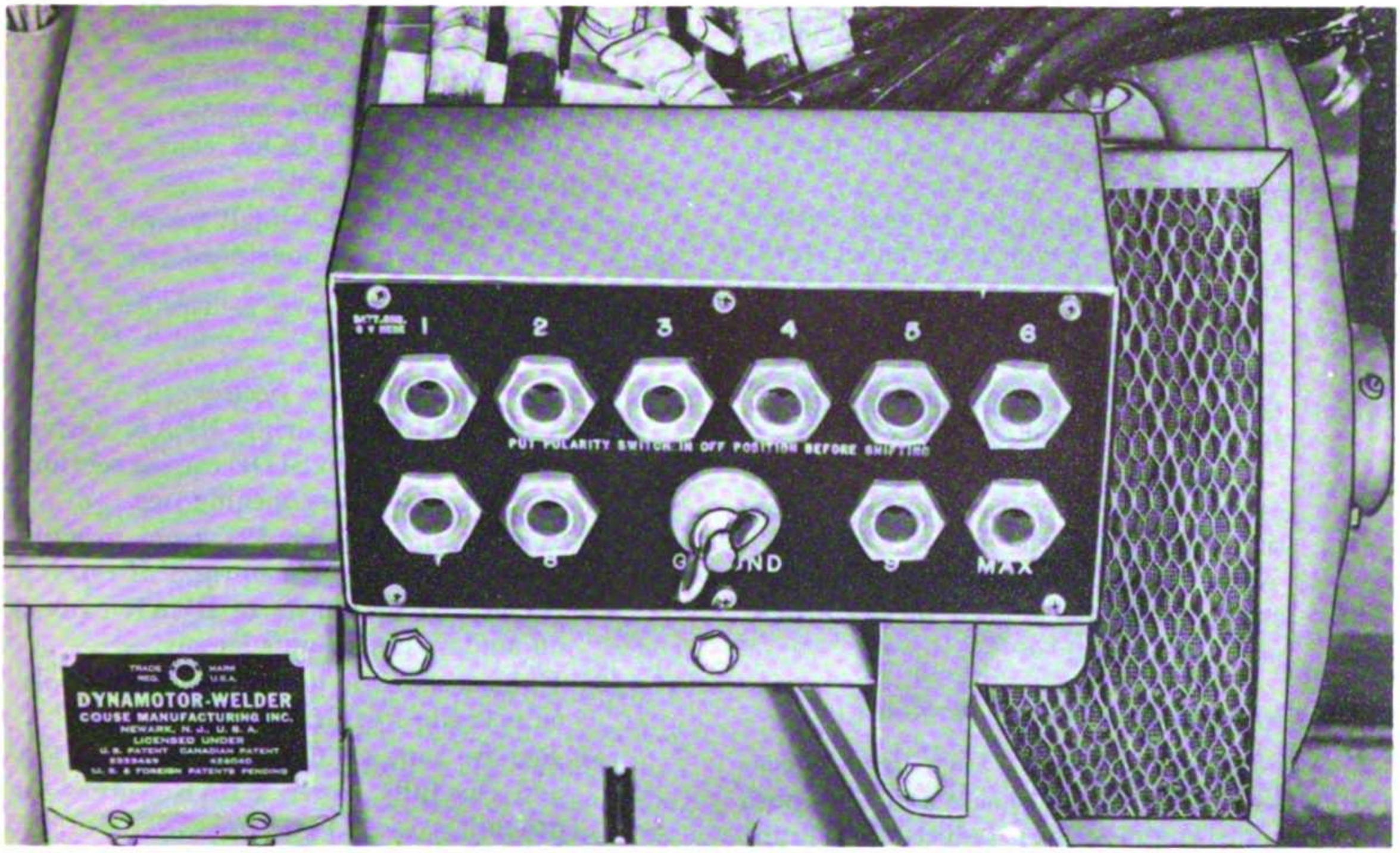


Figure 98. Welding-connector panel.

bered sockets and adjust voltage fine-adjustment control until proper welding current is obtained.

Warning: Turn polarity switch to the OFF position before moving welding cable plug to the next numbered socket.

To increase open-circuit voltage and welding current, turn voltage fine-adjustment control clockwise. To decrease open circuit voltage and welding current, turn voltage fine-adjustment control counterclockwise.

Note. Experience will help operator to choose the proper socket and to make fine adjustments for each type of welding job. Consider size and type of welding rod, type and thickness of metal to be welded, type of joint to be used, and length of welding cable.

e. Charging Batteries. Batteries rated from 6 to 40 volts can be charged by the dynamotor-welder, using welding cables.

(1) Connect batteries to be charged in series. Make certain each battery in series has the same voltage output. For example, six 6-volt batteries or three 12-volt batteries can be charged at one time.

Caution: Do not charge batteries that have a total output of more than 40 volts.

(2) Turn polarity switch (2, fig. 43) to the OFF position.

(3) Attach welding cable to positive terminal of battery and secure opposite end of cable to GROUND on welding-connector panel. Attach another welding cable to negative terminal of battery and plug opposite end of cable into socket 1 on welding-connector panel.

(4) Turn polarity switch to the STR position.

(5) Adjust charging rate by turning voltage fine-adjustment control (10).

Note. Excessive gassing of batteries during charging operation indicates too high a charging rate. Observe dc ammeter (1) indication.

(6) Remove caps from battery cells during charging unless battery manufacturer cautions against their removal. Take hydrometer readings periodically to determine charged condition of battery.

(7) When batteries are fully charged, turn polarity switch to the OFF position, and

disconnect welding cables from welding-connector panel and from batteries.

f. Starting Engines. The dynamotor-welder can be used to start engines that fail to start because of a dead battery.

(1) Connect welding cables to dead battery and to welding-connector panel (*e*(3) above).

(2) Turn polarity switch (2, fig. 43) to the STR position.

(3) Adjust boosting charge by turning voltage fine-adjustment control (10).

Caution: Observe dc ammeter (1) and do not increase charging current more than capacity of the battery.

(4) After engine is started, turn polarity switch to the OFF position and disconnect welding cables.

48. Stopping Engine

a. Reduce Engine Speed. Turn throttle control handle (6, fig. 40) to release and then push handle in until engine speed is reduced to 800 rpm.

b. Disengage Clutch. Move engine clutch control lever (1, fig. 42) to the CLUTCH DISENGAGED position.

c. Push Throttle-Control Handle. Push throttle-control handle all the way in to idle the engine (400 rpm).

d. Turn Magneto Switch Off. Pull out magneto switch (9, fig. 40). This will ground ignition circuit and stop engine.

e. Turn Battery-Disconnect Switch Off. Move battery-disconnect switch (10) to the OFF position.

Note. **The battery-disconnect switch in the OFF position shuts off all electrical instruments and warning lights on the instrument panel and shuts off the 24-volt emergency lights in the mobile shop.**

f. Close Fuel Shutoff Valve. Turn engine fuel shutoff valve (1, fig. 41) clockwise.

g. At-Halt and After-Operation Services. Perform at-halt (par. 80*e*) or after-operation services (par. 80*f*).

49. Striking of Tenting

a. Remove WINDBREAKER Canvas Section.

(1) Untie four ties securing WINDBREAKER canvas sections (3, fig. 85) to FRONT canvas sections (2).

(2) Unhook WINDBREAKER canvas from four metal hooks on bottom of front bulkhead and remove canvas.

(3) Fold WINDBREAKER canvas so that name tag is on outside.

(4) Store WINDBREAKER canvas in upper left storage compartment (fig. 26).

Note. **Store all canvas sections with nametags easily visible.**

b. Remove REAR Canvas Section.

(1) Untie all ties securing REAR canvas section (fig. 87) to SIDE canvas sections and untie all access opening ties.

(2) Remove nut (5, fig. 82) from upright stud (3) on each rear upright of tenting frame; lift grommets in REAR canvas off studs. Install nuts loosely.

(3) Unhook sewed-in loops from metal hooks on rear edges of lifting sides.

(4) Remove rope (1, fig. 87) from ring (2) and carefully lower REAR canvas to ground.

(5) Fold REAR canvas so that nametag is on outside.

(6) Store REAR canvas in upper right storage compartment (fig. 28).

c. Remove FRONT Canvas Sections.

(1) Untie all ties securing FRONT canvas sections (2, fig. 85) to SIDE canvas sections (1).

(2) Remove nut (5, fig. 82) from upright stud (3) on each front upright of tenting frame; lift grommets in FRONT canvas sections off studs. Install nuts loosely.

(3) Unhook FRONT canvas sections from metal hooks along sides of front bulkhead.

(4) Unhook FRONT canvas sections from metal hooks on front edges of lifting sides.

(5) Fold FRONT canvas sections so that nametags are on outside.

(6) Store RIGHT FRONT canvas section in upper right storage compartment (fig. 28).

(7) Store LEFT FRONT canvas section in upper left storage compartment (fig. 26).

d. Remove SIDE Canvas Sections.

(1) Untie all ties securing SIDE canvas sections to tenting frame.

(2) Remove nuts from studs on front and rear uprights of tenting frame. Lift grommets in SIDE canvas sections off studs. Install nuts loosely.
(3) Unhook sewed-in loops (4, fig. 81) from metal hooks (1) on lower inside edges of lifting sides and remove SIDE canvas section from tenting frames.
(4) Fold SIDE canvas sections so that name-tag is on outside.
(5) Store RIGHT SIDE canvas section in upper right storage compartment (fig. 28).
(6) Store LEFT SIDE canvas section in upper left storage compartment (fig. 26).

e. Remove Tenting Frame.

(1) *Remove loose poles.* Remove nut securing loose pole (1, fig. 80) on rear upright (9). Remove nut securing opposite end of loose pole to rear panel assembly (2). Install nuts on upright studs. Remove toggle pin securing diagonal brace (10) of loose pole to rear upright. Remove loose pole. Remove loose pole from opposite side of shop in the same manner.
(2) *Disconnect swivel poles.* Loosen wing-nut (1, fig. 78) securing swivel pole (3) in bracket (2), on underside of lifting side. Remove swivel pole from bracket. Disconnect remaining swivel poles in the same manner.
(3) *Disconnect end diagonal brace.* Remove toggle pin (2, fig. 77) securing end diagonal brace (3) to frame (1). Repeat procedure at each end upright. Remove toggle pin (3, fig. 76) securing diagonal braces (1) to center upright (2).
(4) *Fold tenting frame and store.* Fold tenting frames and secure poles and frame, using two straps. Store tenting frames (2, fig. 23) on top of mobile shop and secure, using two straps.

50. Closing Shop

a. Close Rear Panel Assembly.

(1) *Lower rear panel assembly.* Unhook rear panel from stud (1, fig. 73) on end of hoist rail and lower rear panel assembly.

Caution: Stand on ladders (2), connected together in A position, to unhook rear panel from hoist rail.

(2) *Close top rear panel.* Push hoist rail to its fully retracted position and allow top rear panel to close.
(3) *Lock side panels.* Lock rear panel side latches by operating handle (2, fig. 71), located on inside of each side panel (1).
(4) *Lock rear door.* Close rear door (1, fig. 66), turn handle (2), and install and lock padlock (3).
(5) *Secure triangular rear panel.* Raise triangular rear panel and secure to rear door, using clamp provided.

b. Lower Shop Sides.

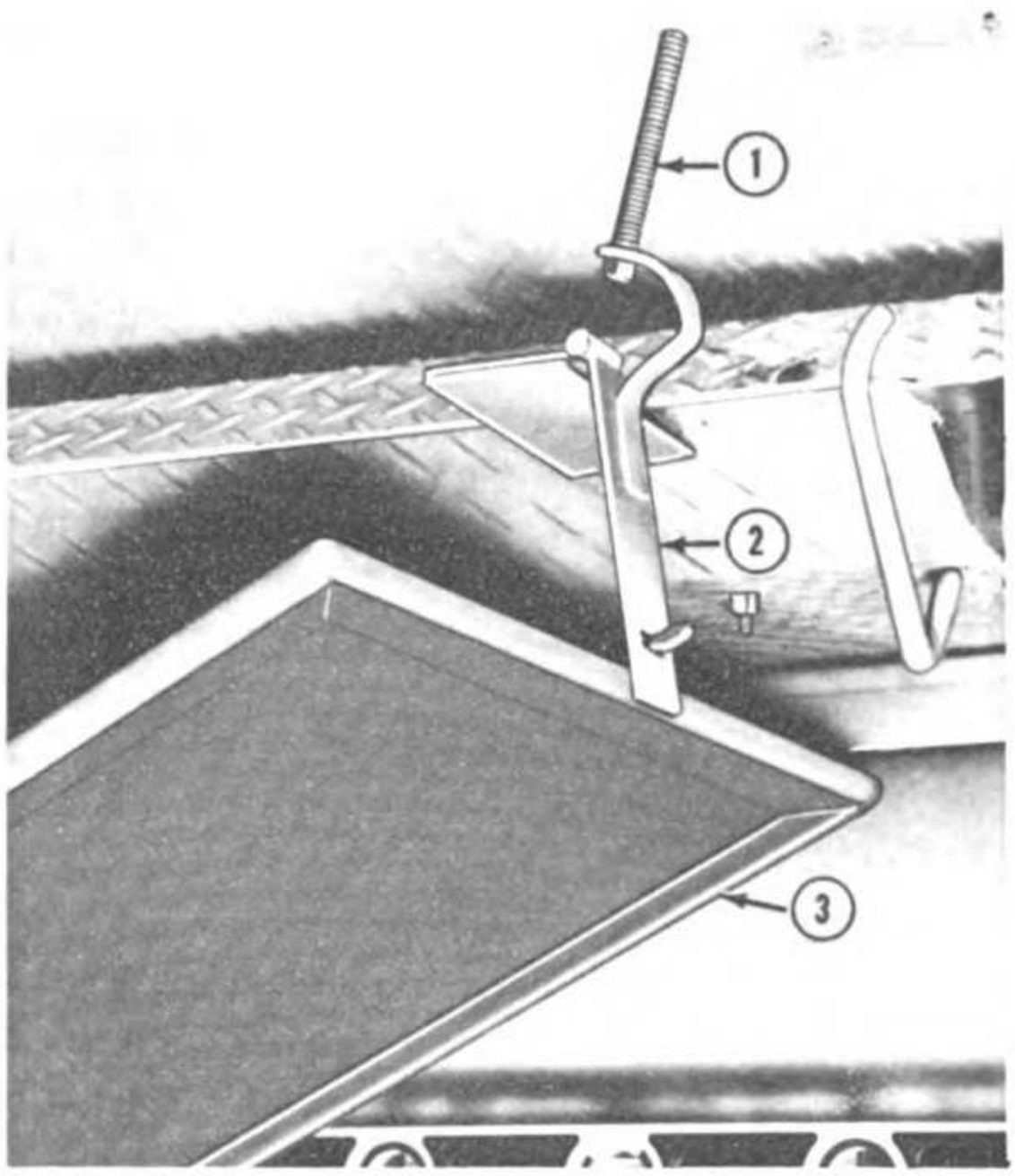
(1) *Operate side-lifting pump.* Close valve on pump (2, fig. 32) by turning valve control lever (3) clockwise. Operate handle (1) until side struts (2, fig. 68) are clear of sockets. Do not raise side too high as struts will then clear spring stops (4) and swing downward.
(2) *Secure side struts.* Stand on catwalk and push up side struts, snapping them in place on ends of lifting side.
(3) *Lower lifting side.* Turn valve control lever (3, fig. 32) clockwise. When side is within two feet of being closed, turn valve control lever counterclockwise and raise catwalks (*d* below) before fully closing sides. After catwalk are closed, open valve until lifting side is completely closed. Lower other lifting side in the same manner.

Note. If compartment door (3, fig. 99) is left open, lifting side will contact spring (1) releasing hinged safety latch (2), and allow compartment door to close.

c. Raise Catwalks. Release latches (fig. 69) to separate adjacent front-catwalk sections. Raise catwalks and lock them in position with latches.

Caution: Clear left front section of shop to provide clearance for bench grinder mounted on left front catwalk.

d. Lock Sides. Secure pelican hook (5, fig. 66) at each end of lifting sides and install and lock padlocks on hasps above wheels, securing lifting sides to mobile shop.



1 Spring
2 Latch
3 Compartment door

Figuree 99. Compartment door in open position.

51. Connecting to Prime Mover

a. Position Prime Mover. Position prime mover at front of mobile shop so that fifth wheel on prime mover and kingpin (13, fig. 5) on semitrailer are in line.

Warning: Place wheel chocks in front of and behind the semitrailer wheels and raise the two rear trailer-supporting jacks (par. 38*h*.) before connecting the prime mover to prevent damage to the shop and jacks.

b. Remove Trailer-Supporting Jack Safeties. Remove jack safeties (10, fig. 5) from the two front trailer-supporting jacks.

c. Adjust Semitrailer Height. Raise or lower front end of the semitrailer (par. 38*h*) until kingpin is at correct height.

d. Connect Prime Mover to Semitrailer. Slowly back prime mover until fifth wheel engages kingpin (13, fig. 5). Wheel chocks must be in place to keep semitrailer from moving.

Warning: Do not ram mobile shop when backing prime mover.

e. Connect Airbrake Hoses. Connect two airbrake hoses to airbrake connections (2, fig. 5) in front of semitrailer.

f. Connect Traveling Lights. Connect traveling-lights power supply cable to traveling-lights receptacle (1) in front of semitrailer.

g. Remove Wheel Chocks. Remove wheel chocks from in front of and behind semitrailer wheels.

h. Raise Front Trailer-Supporting Jacks. Retract jacks by opening RED valves. Raise both jacks evenly to prevent binding. If jacks are sluggish or stick, pull up on chain and binder handle to assist in raising jacks.

i. Secure Trailer-Supporting Jacks. When jacks are fully retracted, attach chain (2, fig. 65) on hook (6) of binder handle. Raise binder handle to eliminate slack in chain. Place jack safety (1) on cylinder base (7) and loop chain around jack safety, jack binder handle and secure to bracket (4).

52. Movement to New Location

a. Turn off all shop equipment and portable tools.

b. Shut down power-generating systems by stopping the engine (par. 48) or disconnecting external-power-supply lines (par. 42*b*(4)).

Warning: Do not disconnect external power lines before making certain that the main switch in the external power lines is turned off.

c. Disconnect, clean, and store all portable equipment in the proper storage compartments (app. II).

d. Clean, inspect, and store all handtools in their proper kits and sets (app. II).

e. Clear the shop of all work, stock, and other materials.

f. Disassemble and store canvas-tenting (par. 49).

g. Close shop (par. 50).

h. Connect prime mover to mobile shop (par. 51) and transport to new location.

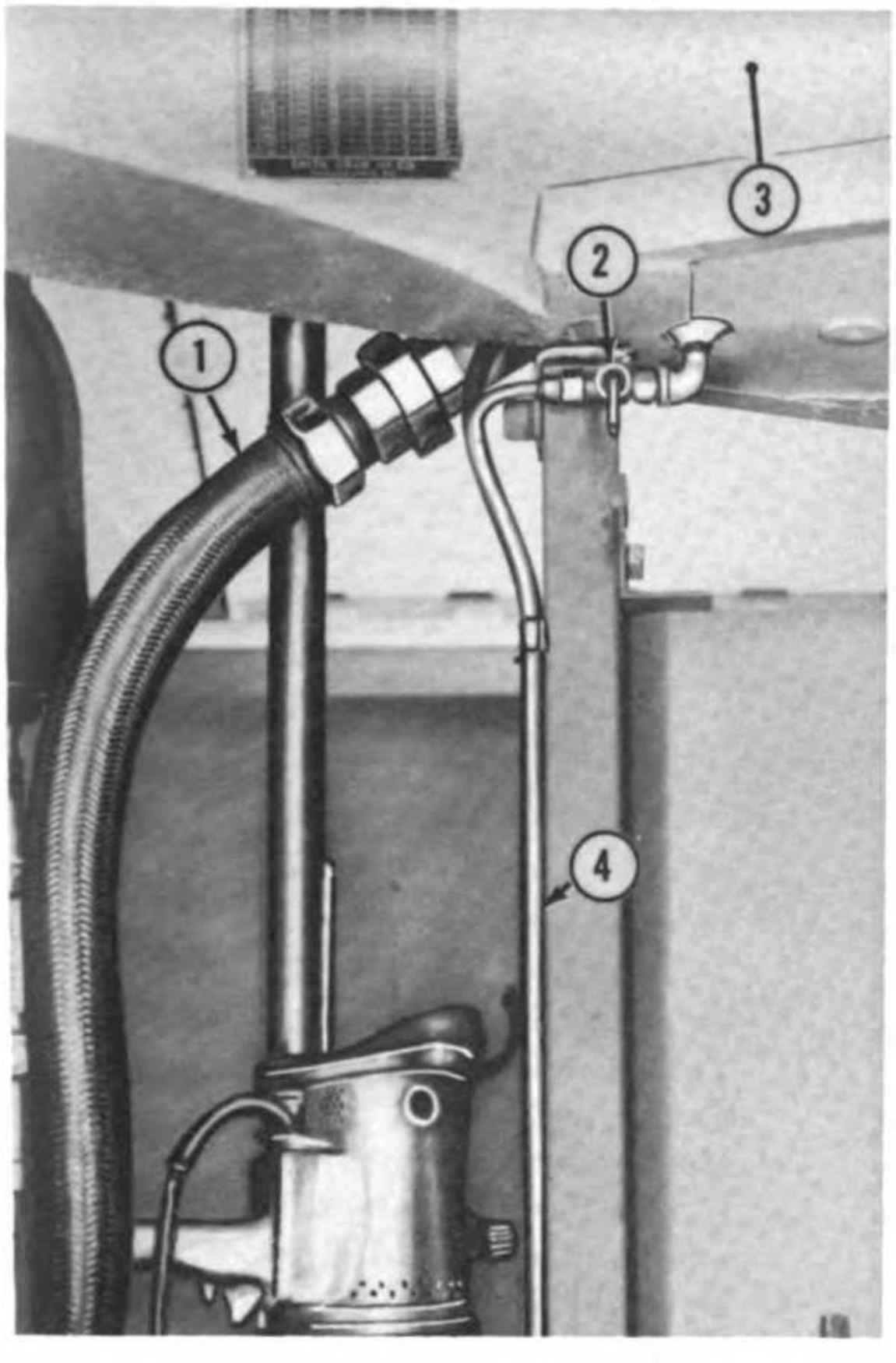
53. Air Compressor Operation

a. Starting.

(1) Perform before-operations services (par. 80*c*) before starting air compressor.

(2) Move compressor clutch control lever (1, fig. 44) to the CLUTCH DISENGAGED position.

(3) Start the dynamotor-welder (par. 42).



1 Flexible air line
2 Draincock
3 Air tank
4 Drain line

Figure 100. Air tank, draincock, and lines.

(4) Make sure draincock (2, fig. 100), on the bottom of the air tank (3), is open.
(5) Move compressor clutch control lever to the CLUTCH ENGAGED position.
(6) Check oil pressure on oil-pressure gage (3, fig. 44). The gage should indicate at least 3 psi.

Warning: Stop the compressor at once if no pressure is indicated. Investigate and correct the cause of the trouble before restarting.

(7) Close draincock (2, fig. 100).
(8) Check air pressure on air-pressure gage (2, fig. 45).

Note. **Compressor should unload when air pressure reaches 100 psi. If the air compressor does not maintain correct air pressure, adjust pilot valve (par. 204).**

(9) Check operation of safety valve (1, fig. 45) by lifting up plunger stem. Air will escape and pressure will drop. Release plunger stem. Safety valve must close tightly and not leak.

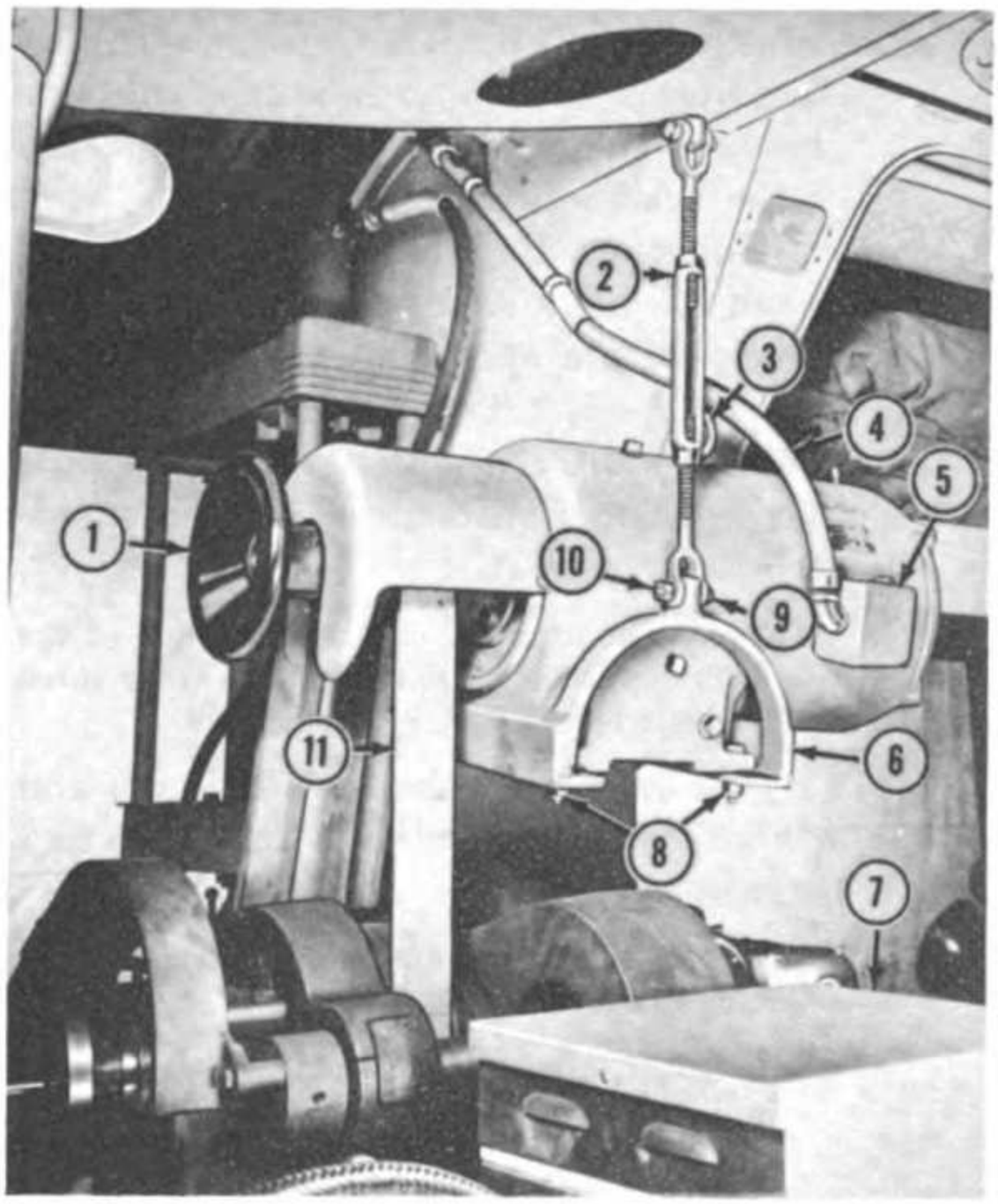
b. Stopping.

(1) Move compressor clutch control lever (1, fig. 44) to the CLUTCH DISENGAGED position.
(2) Open draincock (2, fig. 100) allowing accumulated moisture and oil to drain through drain line (4).

Note. **Leave draincock open until next start.**

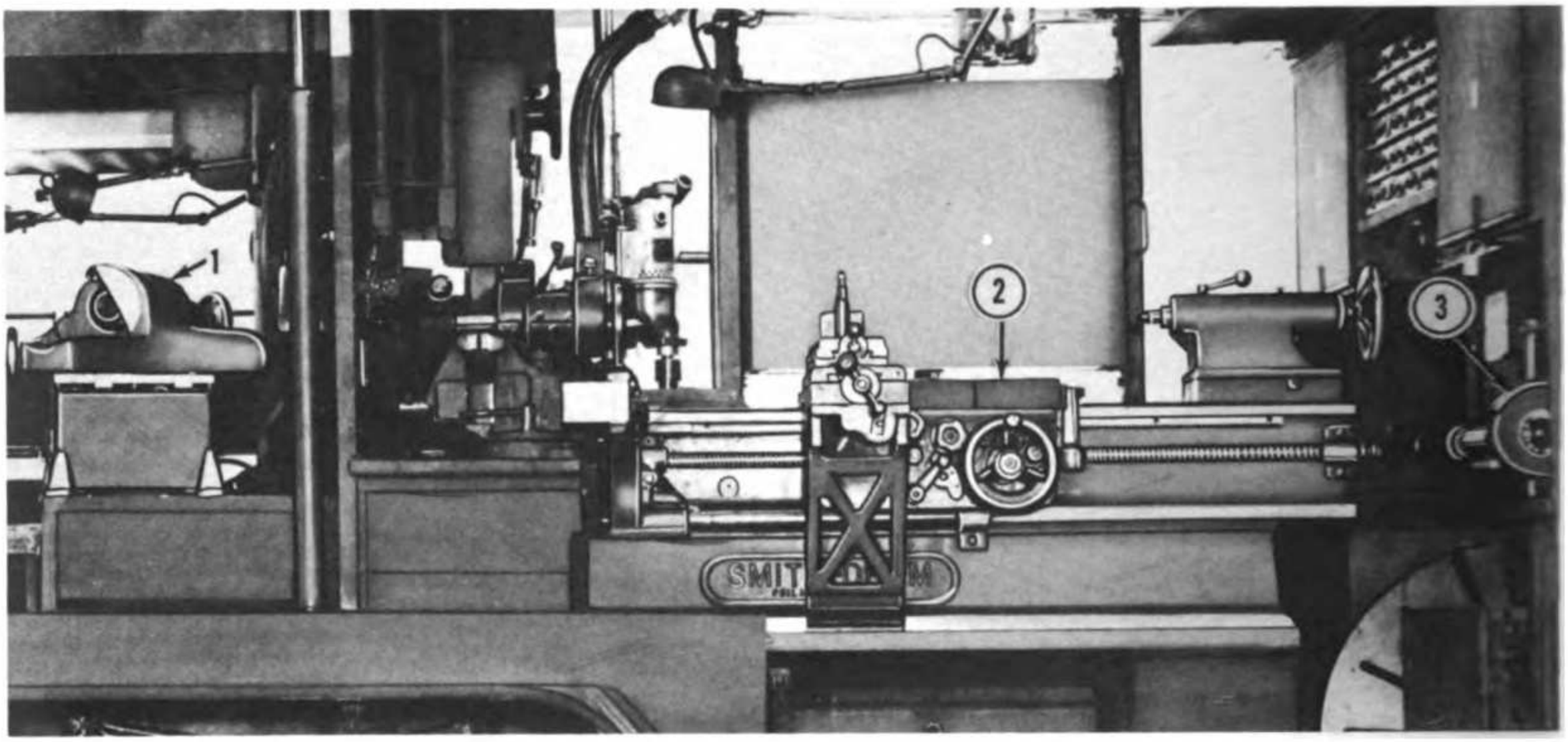
54. Lathe Drive Operation

a. General. The lathe drive (fig. 101) is an enclosed, 4-speed, gear-type, 2-hp, 208-volt, 3-phase, 50/60 cycle, instant-reversing unit, complete with operating controls. The lathe drive is hinge-mounted above the lathe to facilitate drive belt adjustment.



1 Handwheel
2 Turnbuckle
3 Eyebolt
4 Motor cable
5 Receptacle
6 Mounting bracket
7 Hotplate
8 Nut, hex, ⅜ NC (4 rqr)
9 Screw, cap, ⅜ x 1¾ NC
10 Nut, hex, ⅜ NC
11 Lathe drive belt

Figure 101. Lathe drive installed, right rear view.



1 Valve refacer machine 2 Lathe 3 Milling and grinding attachment

Figure 102. Lathe, milling-and-grinding attachment, and valve refacer installed.

b. Preparation for Operation.

(1) *Check and adjust drive belt.* Rotate turnbuckle (2) until lathe drive belt (11) is adjusted to about 1-inch play midway between the lathe drive spindle and the lathe headstock spindle.

Warning: Rotate the drive belt by hand to make sure that the lathe runs freely before operating the lathe drive.

(2) *Select speed.* The applicable shifting pattern for the speed-selector handle (1, fig. 50) is illustrated on the speed-selection plate (3).

Note. The diagram on the right side of the plate is applicable. Disregard the other three diagrams when selecting speeds.

(*a*) Pull out speed-selector handle (1) and move to shift position 1 for a 4.15 to 1 ratio.

Note. Turn handwheel (1, fig. 101) to aline gears before shifting.

(*b*) Pull out the speed-selector handle and move to shift position 2 for a 3.15 to 1 ratio.

(*c*) Push in the speed-selector handle and move to shift position 3 for a 1.85 to 1 ratio.

(*d*) Push in the speed-selector handle and move to shift position 4 for a 1 to 1 ratio.

c. Operate Lathe Drive Motor.

(1) Turn motor on-off switch (1, fig. 49) to the ON position.

(2) Move reversing switch (2) to the FORWARD position (left) to rotate the lathe spindle in a forward direction.

(3) Move the reversing switch to the REVERSE position (right) to rotate the lathe spindle in a reverse direction.

Caution: When changing the direction of rotation of the lathe-drive motor hold the reversing switch in the OFF position (center) for a few seconds before moving the switch to the desired position.

(4) To stop lathe drive, turn the reversing switch to the OFF position and turn the motor on-off switch to the OFF position.

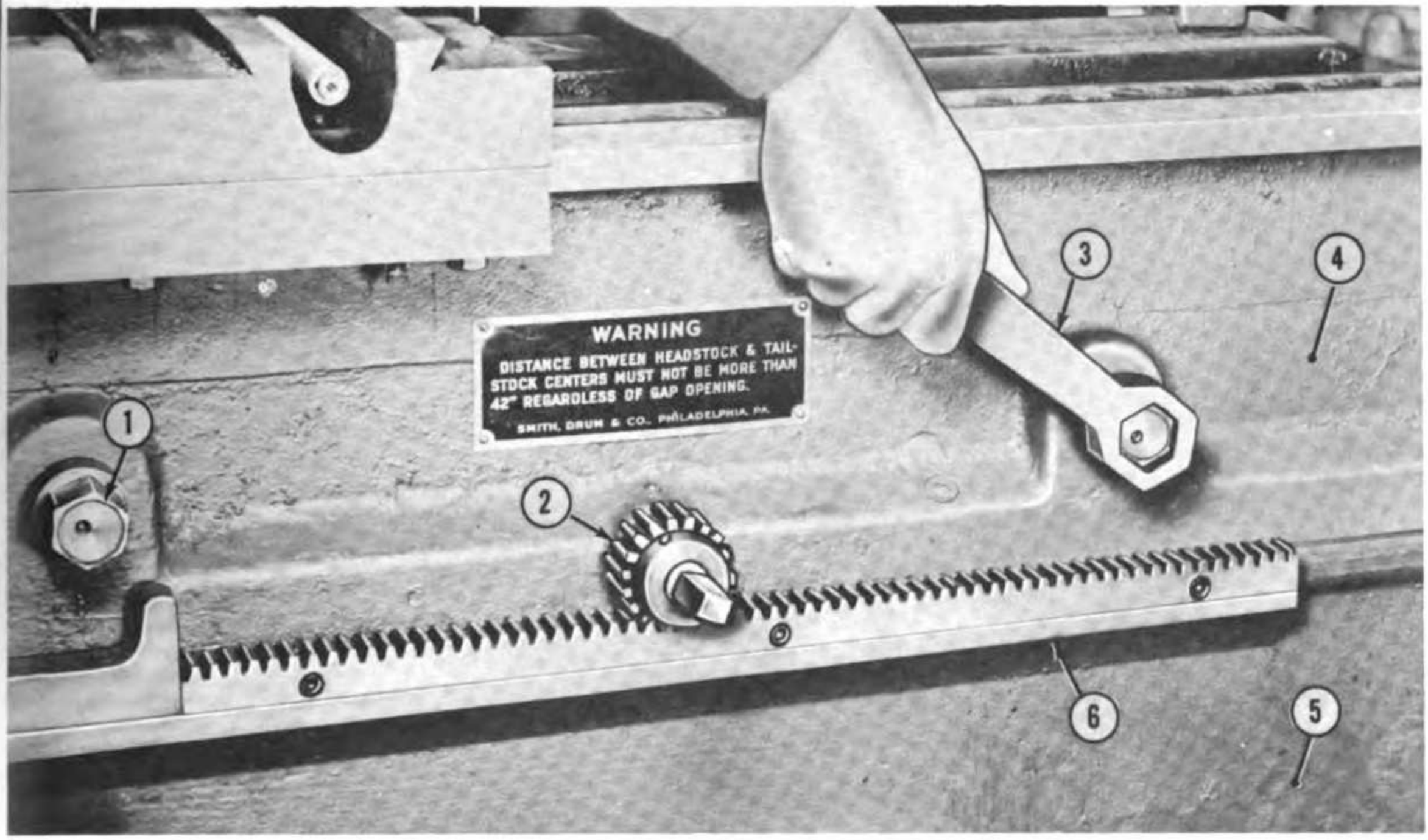
55. Lathe Operation

a. General. The Smith-Drum lathe (2, fig. 102) is a standard extension-gap, triple-back-geared, 14- and 28-inch swing unit. The lathe is heated by the Couse tubular lathe base for cold weather operation. A complete set of accessories (app. II) is provided for all lathe operations.

b. Extension-Gap Adjustment.

(1) Use tailstock wrench (3, fig. 103) and loosen two bed clamping bolts (1).

(2) Using a suitable wrench, rotate pinion gear (2). Rotate pinion gear clockwise



2 Pinion gear
1 Bed clamping bolt
3 Tailstock wrench
4 Movable bed
5 Stationary bed
6 Rack

Figure 103. Lathe extension-gap operation.

to slide the movable bed (4) away from the headstock thereby increasing the gap. Rotate pinion gear counterclockwise to slide the movable bed toward the headstock thereby decreasing the gap. The pinion gear meshes with a rack (6) that is mounted on the stationary bed (5).

(3) After adjusting gap to desired distance, tighten bed clamping bolts.

Warning: Distance between headstock and tailstock centers must be not more than 42 inches, regardless of gap opening.

c. Installation of 28-Inch Faceplate.

(1) Adjust extension-gap (*b* above) to provide sufficient clearance for 28-inch faceplate (3, fig. 104).

(2) Loosen turnbuckle (2) securing 28-inch faceplate to lathe base (1). Swing aside turnbuckle and roll faceplate out of stored position.

(3) Hook 1-ton hoist (2, fig. 105) to trolley ring (1). Pass a length of heavy rope (4) or cable through the faceplate and attach rope to lifting hook (3). Carefully lift faceplate into position. Use pilot (2, fig. 106) to aline 28-inch faceplate (1) on lathe spindle.

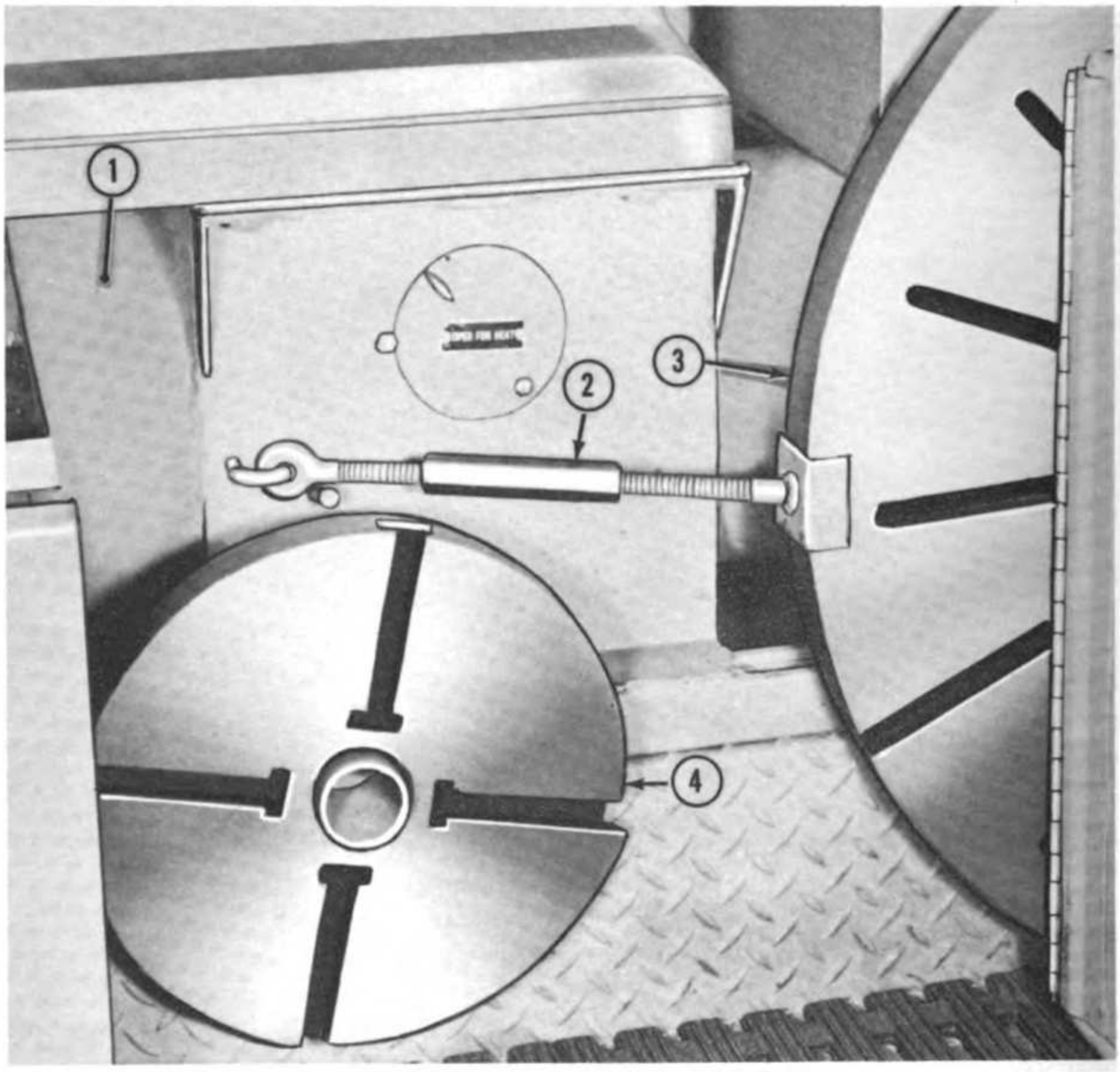
(4) Rotate faceplate clockwise until it is securely tightened on lathe spindle. Remove pilot and rope from faceplate. Remove 1-ton hoist from trolley ring.

Caution: Prevent damage to faceplate and lathe by placing wood blocking on lathe ways, when removing and installing faceplates.

(5) Remove 28-inch faceplate and store when not in use. Use 1-ton hoist to remove faceplate from lathe spindle and to lower faceplate to stored position.

56. Milling-and-Grinding Attachment Operation

a. General. The Master milling-and-grinding attachment (3, fig. 102) is driven by a 110/208-volt, 1-phase, 60-cycle, ½-hp electric motor. The attachment is used as a lathe tool grinder in its stored position, to the right of the lathe. The attachment is demountable and can be installed



1 Lathe base
2 Turnbuckle
3 28-inch faceplate
4 14-inch faceplate

Figure 104. Lathe faceplates stored.

on the compound rest or on the crossfeed carriage of the lathe for milling, drilling, reaming, boring, and facing operations.

b. General Operating Details.

(1) When used as a lathe tool grinder, plug cable connector into any 110-volt outlet. Push on-off switch (4, fig. 51) to the ON position.

(2) To use attachment on lathe, remove two stopnuts and cap screws securing the attachment on cabinet and install attachment on lathe. Secure attachment on lathe, using two cap screws and stopnuts. Plug cable connector into any 110-volt outlet and push on-off switch to the ON position.

Note. A complete set of accessories is provided with the attachment (App. II).

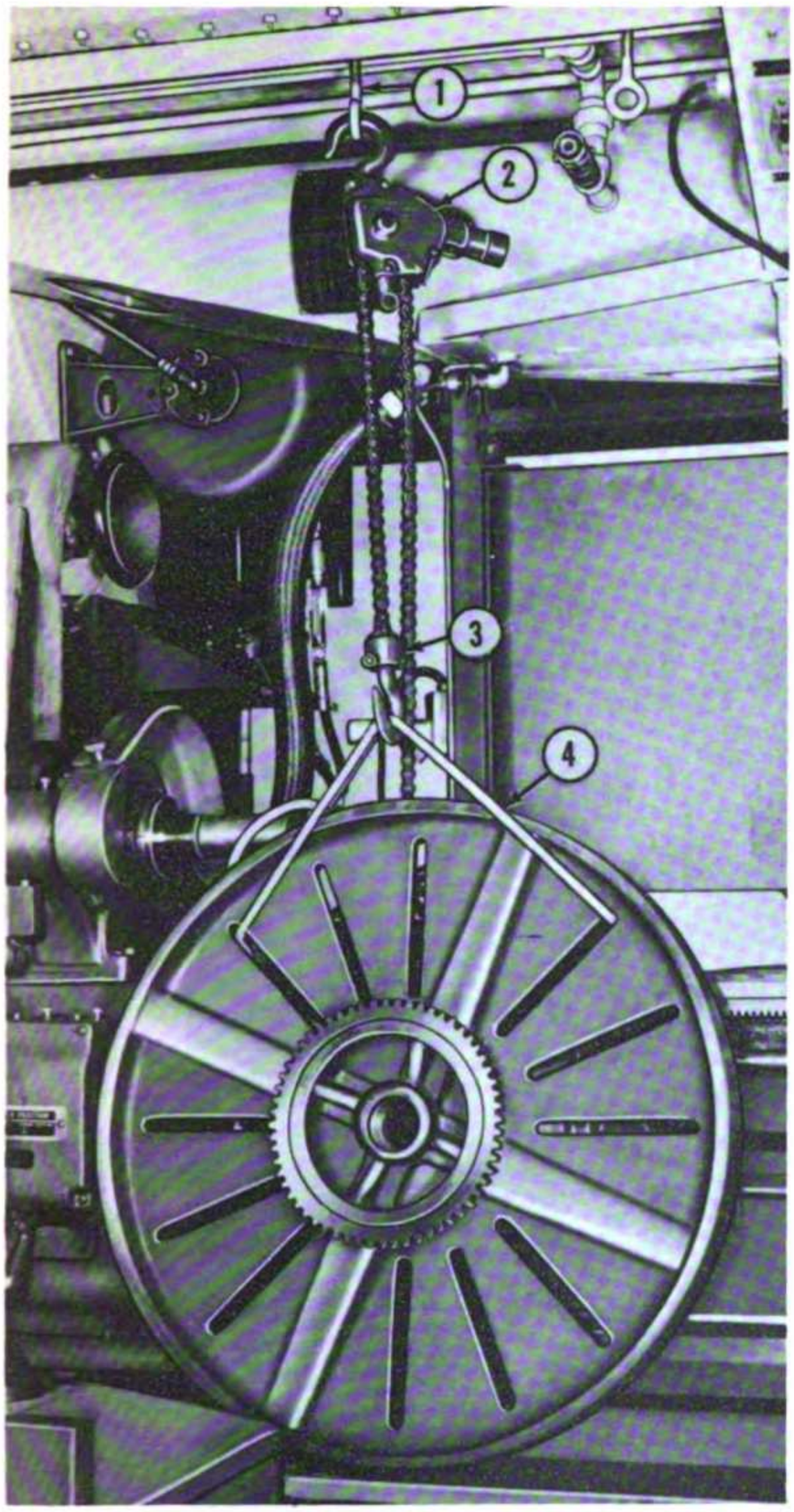
57. Electric Drill, ⅝-Inch, and Stand Operation

a. General. The Wodack ⅝-inch drill (fig. 107) is driven by a 110-volt, 2-speed (450–2,000 rpm) electric universal motor. The drill is mounted on a swivel-type drill stand and is normally used in this position. The drill can be removed for use as a portable drill.

b. Preparation for Operation.

(1) *Adjust height of drill.* Remove drill handle (5) from bracket (6) and insert in handle socket (2). Loosen thumbnut (4). Raise or lower drill stand on column (1) to desired height. Tighten thumbnut and store drill handle.

(2) *Adjust angle of drill.* Using wrench (12, fig. 52), loosen drill-stand adjusting screw (10) and move front yoke of drill



1 Trolley ring
2 1-ton hoist
3 Lifting hook
4 Rope

Figure 105. Lifting 28-inch lathe faceplate.

stand (11) to desired angle. Tighten drill-stand adjusting screw and store wrench.

(3) *Adjust for drilling depth.* Loosen depth-gage setscrew (3) and adjust depth gage (2) to desired drilling depth. Tighten depth-gage setscrew.

(4) *Adjust vise.* Loosen stopnut (8, fig. 107) securing vise (7) in position on telescopic stand, and raise, rotate, or lower vise to desired position.

c. General Operating Details. Plug cable (3) into nearest 110-volt outlet. Pull out speed change control (8, fig. 52) to the low speed position or push in speed change control to the high speed position, whichever is desired. Squeeze trigger (7) to start drill. Release trigger to stop drill.

d. Portable Drill Operation. Remove two cap screws (10, fig. 107) and clamp (9) securing drill on stand. Lower drill and place on workbench. Remove handle (app. II) from storage compartment and install on top of drill. Operate drill (*c* above). Remove and store handle after operation. Raise drill and aline top of drill in drill-stand yoke. Aline clamp (9) around base of drill and secure to drill stand, using two cap screws (10).

58. Bench Grinder Operation

a. General. The Baldor bench grinder (7, fig. 5) is driven by a 208-volt, 3-phase, 60-cycle, 1½-hp motor. The bench grinder is equipped with one fine and one coarse 10-inch grinding wheel.

b. Preparation for Operation. Clean dust chutes (5, fig. 108). Loosen two bolts (2) securing each eyeshield (1) to frame, adjust eyeshields to protect eyes from sparks and metal, and tighten bolts. Loosen cap screws (4) securing steady rests (3) to base of frame, and adjust steady rest to desired working angle. Tighten cap screws.

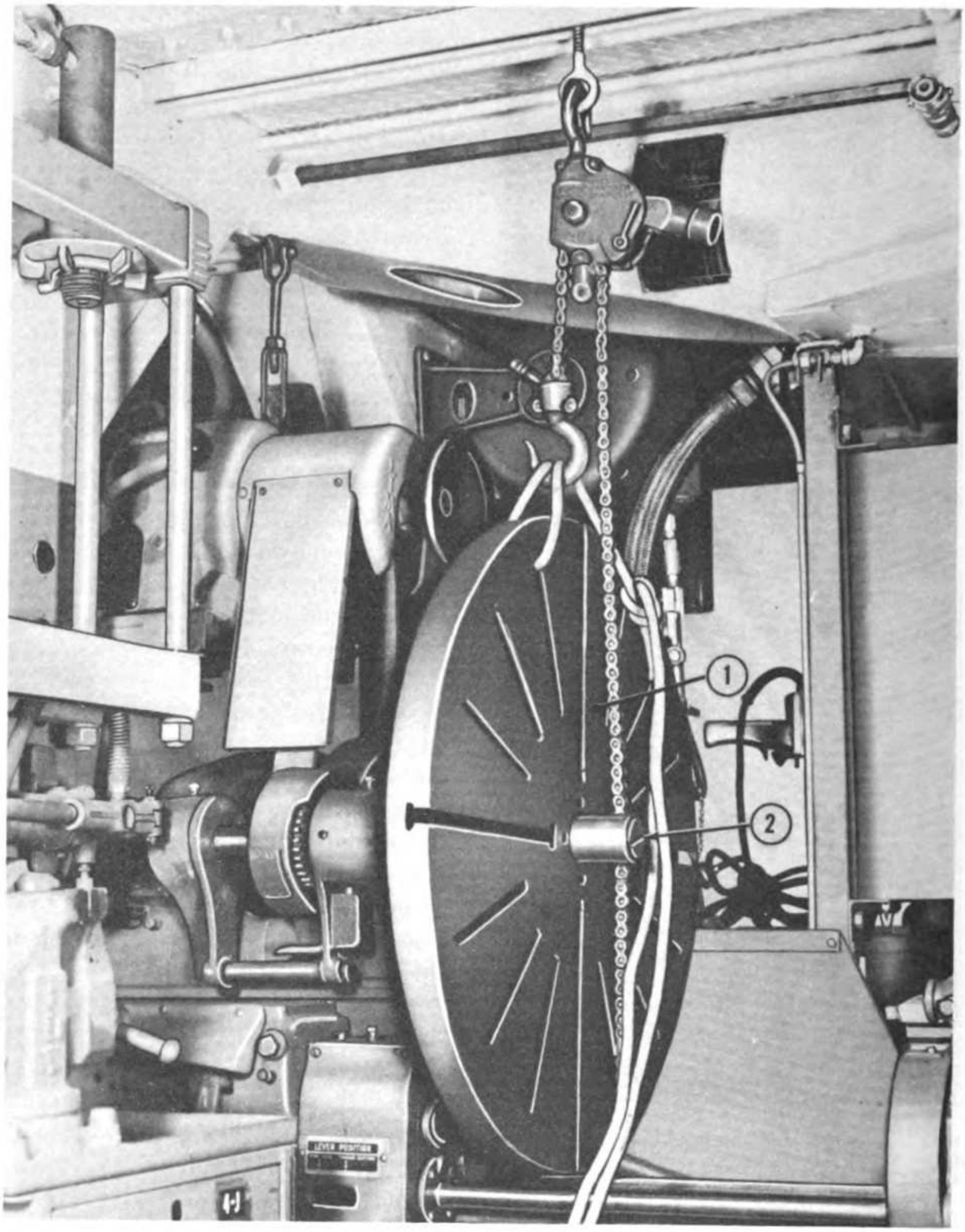
c. General Operating Details. To start bench grinder, push up switch (fig. 53) to the ON position. To stop bench grinder, push down switch to the OFF position.

59. Bandsaw Operation

a. General. The Wells metal bandsaw (fig. 109) is driven by a 110-volt, 60-cycle, 1-phase, ⅙-hp motor (1). The bandsaw has a 3½-inch cutting capacity.

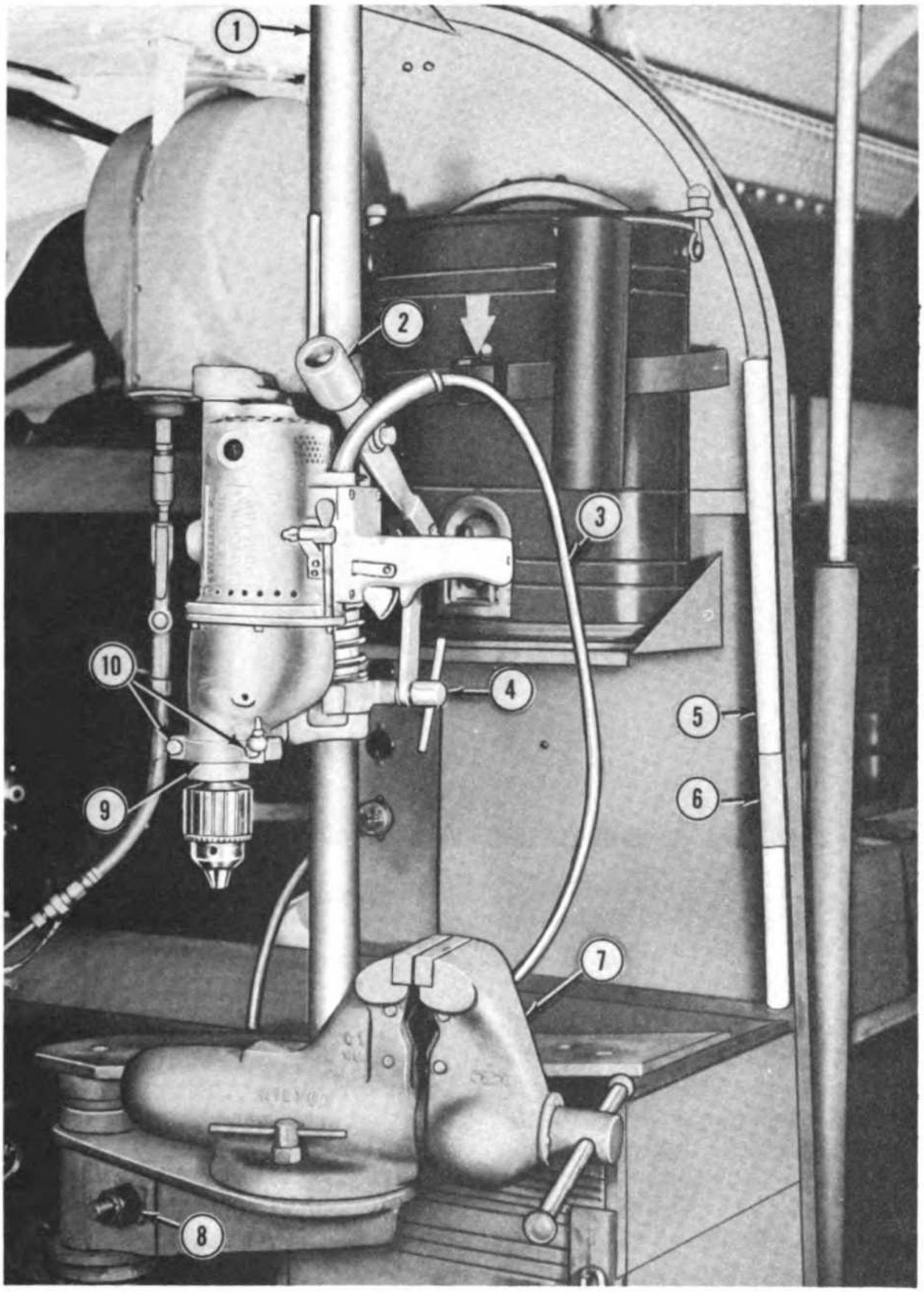
b. Preparation for Operation. Remove rope (3) securing upper section of bandsaw to leg of bin adjacent to bandsaw. Secure work in vise (4) and tighten vise-control handwheel (5, fig. 54). Adjust angle of bandsaw blade by loosening or tightening pitch-adjusting screw (2). Use blade-tension handwheel (1) to loosen or tighten bandsaw blade.

c. General Operating Details. Connect cable plug (2, fig. 109) to nearest 110-volt outlet and move switch (3, fig. 55) to the ON position. After cut is made, the automatic shutoff control (3, fig. 54) pushes the switch to the OFF position.



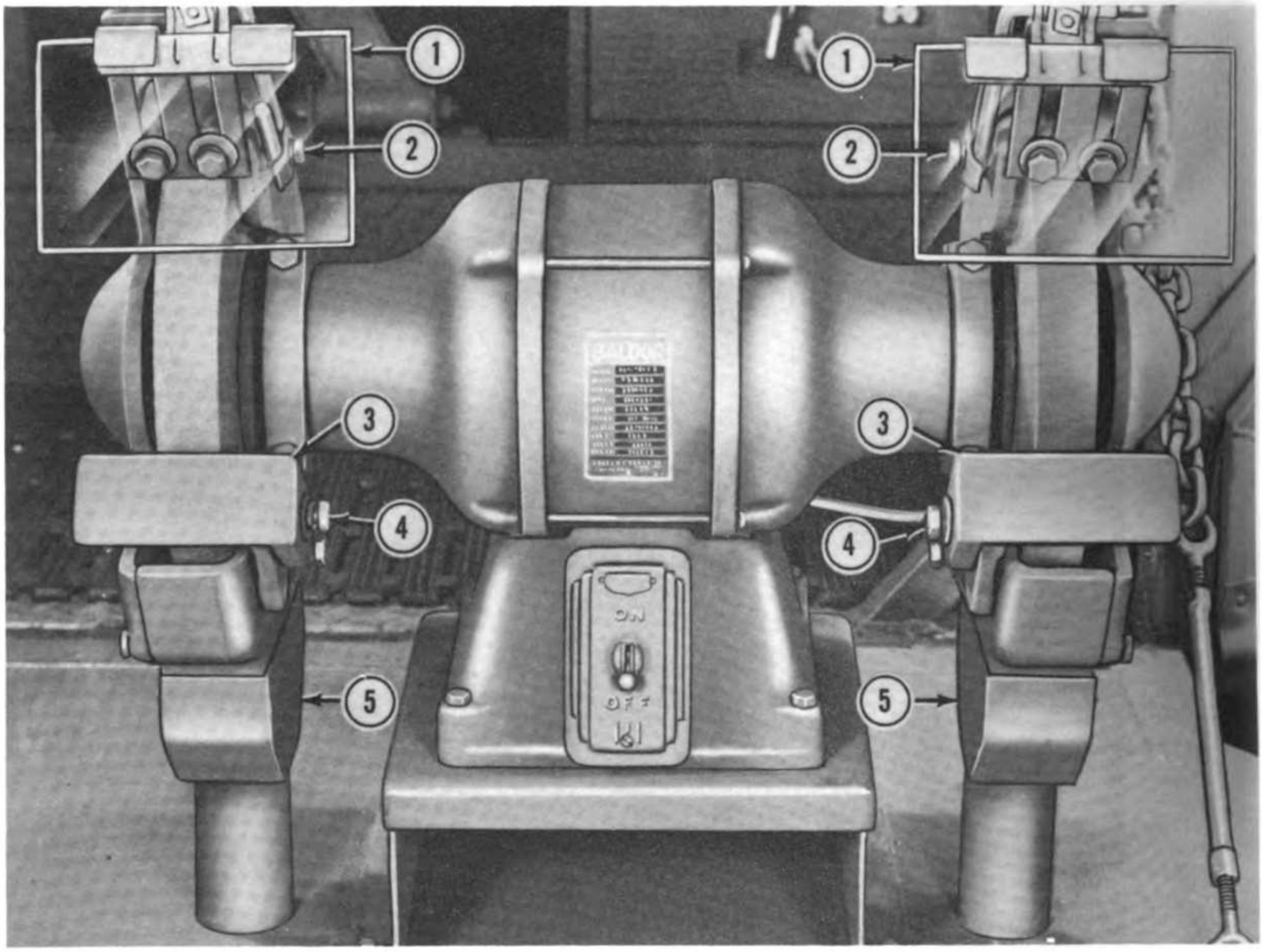
1 28-inch faceplate 2 Pilot

Figure 106. Installing lathe faceplate.



1	Column	5	Handle	9	Clamp
2	Handle socket	6	Bracket	10	Cap screws
3	Cable	7	Vise		
4	Thumbnut	8	Stopnut		

Figure 107. Electric drill, 5/8-inch, and vise installed.



1 Eye shields
2 Bolt, ⅜ x 1¼ NC (4 rqr)
3 Steady rests
4 Screw, cap, ⅜ x 1¼ NC (2 rqr)
5 Dust chutes

Figure 108. Bench grinder installed.

d. Secure Bandsaw for Travel. Make certain switch is in the OFF position. Disconnect cable plug from 110-volt outlet and lower upper section of bandsaw on table. Loop rope around blade-tension handwheel and secure to leg of bin adjacent to bandsaw.

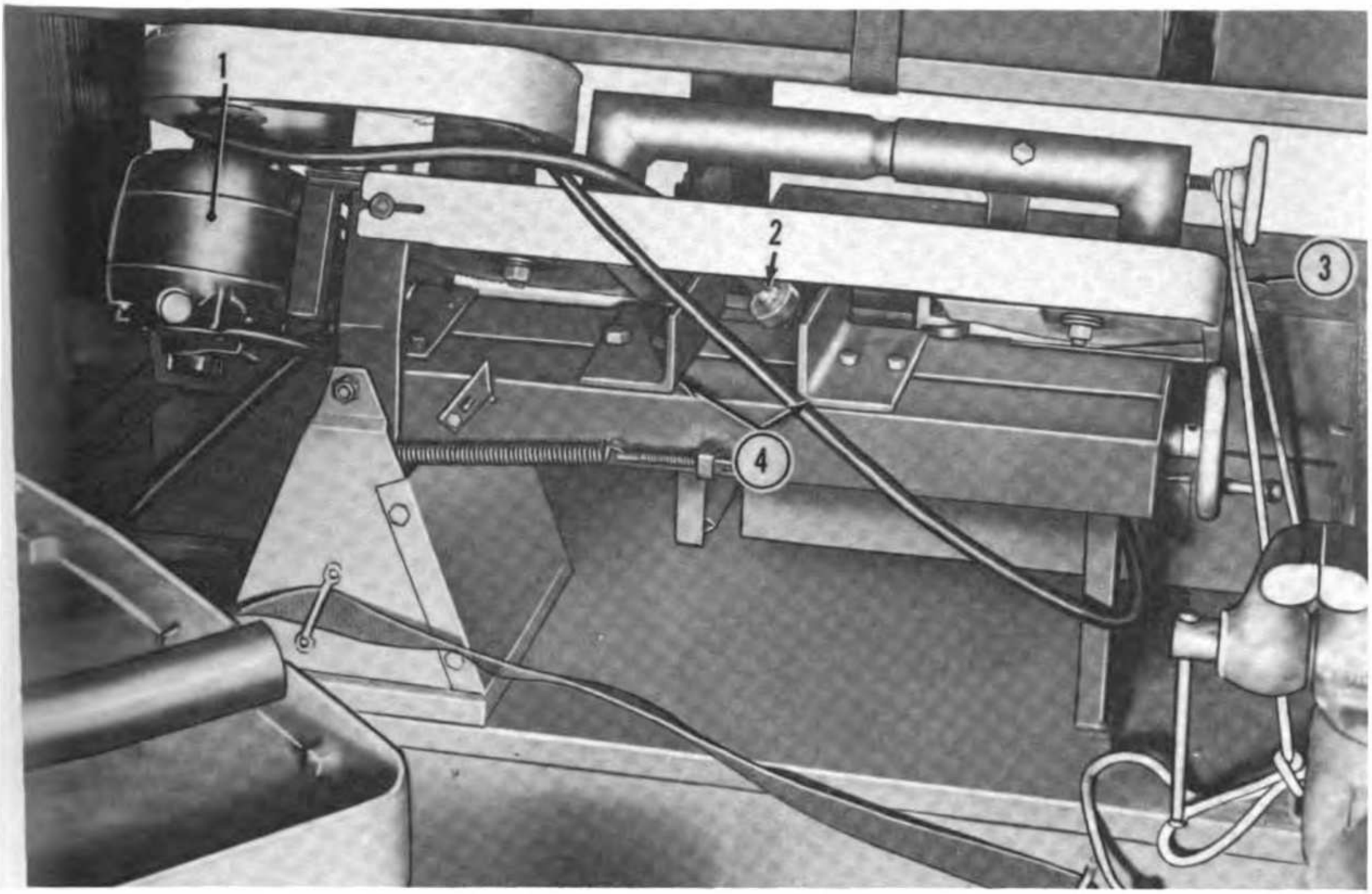
60. Honing Machine Operation

a. General. The Ammco wet-type honing machine (fig. 56) is driven by a 110-volt, 1-phase, 60-cycle, ⅓-hp motor. The honing machine is bench-mounted and is supplied with a set of honing stones ranging from 0.480 to 3.000 inches (app. II).

b. Preparation for Operation. Assemble splash pan in position on honing machine. Remove foot pedal with chain from storage compartment (app. II). Pass chain up through hole in splash pan and secure to operating lever (5). Make certain the coolant reservoir is full. Adjust lights above honing machine and turn on lights.

c. General Operating Details. Install desired honing head and stone in spindle-drive socket (4). Index dial (3) to desired honing size. Apply pressure to the foot pedal (7) to start spindle drive. Turn dry-wet switch (2) to the WET position when coolant is needed.

d. Storing Equipment After Operation. Turn dry-wet switch (2) to the DRY position. Remove stone and honing head from spindle drive socket and store (app. II). Disconnect chain (6) from operating lever (5) and pull chain down through splash pan. Store foot pedal with chain



1 Motor
2 Cable plug
3 Rope
4 Vise

Figure 109. Bandsaw secured for travel.

(app. II). Remove splash pan and store beside cabinet near honing machine.

61. Valve Refacer Operation

a. General. The wet-type Black and Decker valve refacer (1, fig. 102) is driven by two 110-volt motors. Valve refacer accessories and abrasive wheels are stored in the mobile shop (app. II). The valve refacer is capable of refacing valves up to 3½ inches in head diameter.

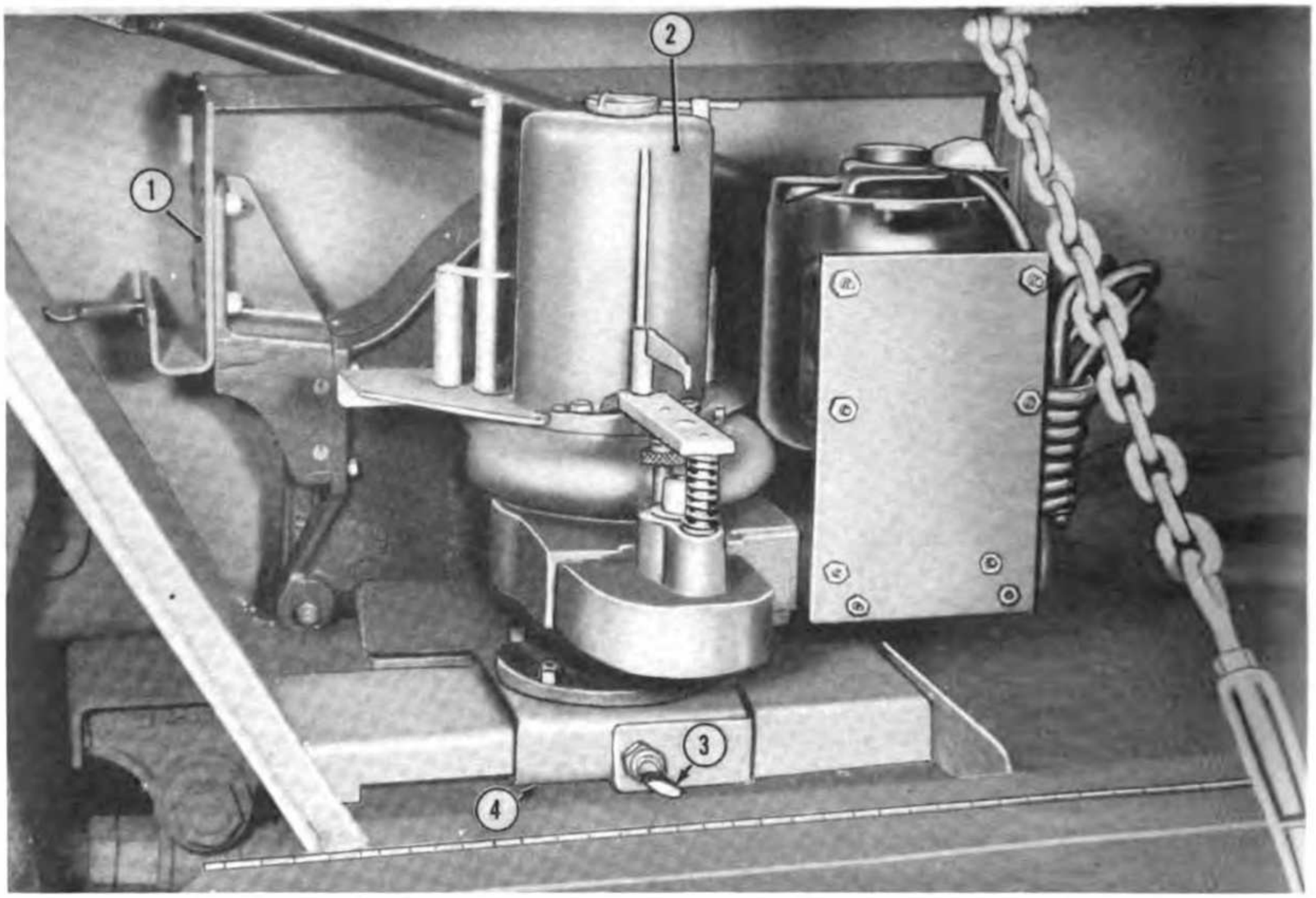
b. Preparation for Operation. Secure proper size collet (app. II) in collet knurled collar (4, fig. 57) and install valve in collet and tighten collet-adjusting handwheel (12). Adjust work to desired grinding angle, using swivel nut (5). Degree of angle desired is marked on angle indicator on worktable (11). Assemble desired grinding wheel (app. II) on wheelhead assembly (2).

c. General Operating Details. Turn workhead motor switch (9) to the ON position to rotate valve. Turn wheel head motor switch (8) to the ON position to rotate grinding wheel. Operate worktable handlever (10) to move work across grinding wheel. Operate wheelhead handwheel (6) to move grinding wheel against valve. Forward motion of the grinding wheel is indicated on handwheel indicator (7). Operate coolant control (3) during refacing operation to regulate flow of coolant on valve.

d. Storing Equipment After Operation. Close coolant control. Operate worktable handlever and back off valve from grinding wheel. Turn both motor switches to the OFF position. Remove grinding wheel and store (app. II). Remove refaced valve from collet and remove collet from workhead. Store collet (app. II).

62. Brake Relining Machine Operation

a. General. The Star heavy-duty, bench-type brake-relining machine (fig. 58) is driven by a 110-volt, 1-phase, 60-cycle induction motor. Accessories for grinding, countersinking, riveting, and deriveting are stored in the mobile shop (app. II).



1 Riveting head
2 Grinding attachment
3 Thumbscrew
4 Clamp

Figure 110. Brake-relining machine stored.

The brake relining machine is stored (fig. 110) when not in use.

b. Preparation for Operation. Remove thumbscrew (3) securing grinding attachment (2) in storage compartment and slide grinding attachment to edge of right center catwalk. Remove pedal support assembly (2, fig. 111). Loosen wingnut (4) and clamp (3) securing riveting head (1) against wall of right center storage compartment and remove riveting head. Slip riveting-head mounting clamp over edge of catwalk and tighten thumbscrew. Slip grinding attachment mounting clamp over edge of catwalk and tighten thumbscrew. Assemble pedal support assembly (4, fig. 58) to base of riveting head and rest support on ground. Attach dust bag to grinder, using clamp provided. Make certain clip at bottom of dust bag is closed.

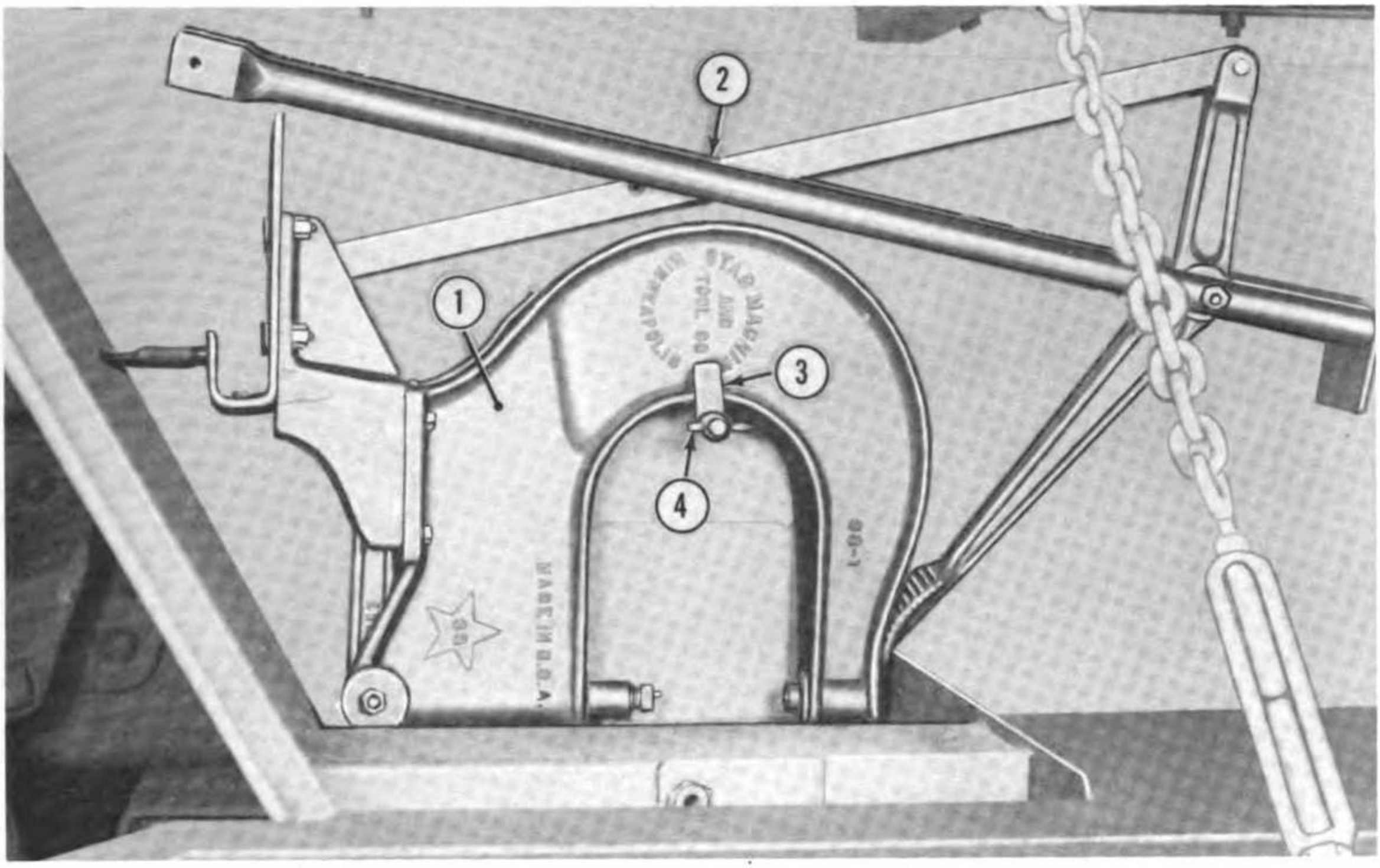
c. General Operating Details.

(1) *Replace rivets.* Attach proper size accessories (app. II), depending on size of rivets and operation, to riveting head.

Note. This machine is designed for tubular rivets only.

Adjust lift arm thumbscrew (6, fig. 58) to limit movement of bottom plunger. Step down on foot pedal to operate rivet head.

(2) *Grinding brake lining.* Adjust grinder, loosen two wingnuts so that rollers are free and table is far enough forward so that when brakeshoe is against rollers it will clear grinding sleeve. Place brakeshoe against four rollers and tighten wingnuts. Adjust table until work contacts grinding sleeve. Connect cable plug to any 110-volt outlet and turn mo-



1 Riveting head
2 Pedal support assembly
3 Clamp
4 Wingnut

Figure 111. Riveting head stored.

tor switch (1) to the ON position. To stop grinder, turn motor switch to the OFF position.

d. Storing Equipment After Operation. Disconnect cable plug from 110-volt outlet. Loosen clamp and remove dust bag from grinder. Empty and clean dust bag. Remove nut and bolt securing pedal support assembly to base of riveting head and remove pedal support. Loosen thumbscrew on clamps and slide grinder and riveting head off catwalk. Store riveting head (1, fig. 111) and secure to wall of right center storage compartment, using clamp (3) and wingnut (4). Store pedal support assembly (2) in front of riveting head. Store grinding attachment by sliding mounting clamp (4, fig. 110) over bracket in storage compartment and tightening thumbscrew (3).

63. Battery Charger Operation

a. General. The Sun battery charger (fig. 59) operates on a 90- to 115-volt, 60-cycle, 1-phase ac. The dry-plate rectifier, battery charger will charge all 6-, 12-, and 24-volt lead-acid type storage batteries. The battery charger is complete with ammeter, automatic-reset overload protection for both ac and dc circuits, timer and selector switches.

b. Preparation for Operation. Remove battery charger from stored position on left bunk. Connect charger lead clips to battery terminal posts.

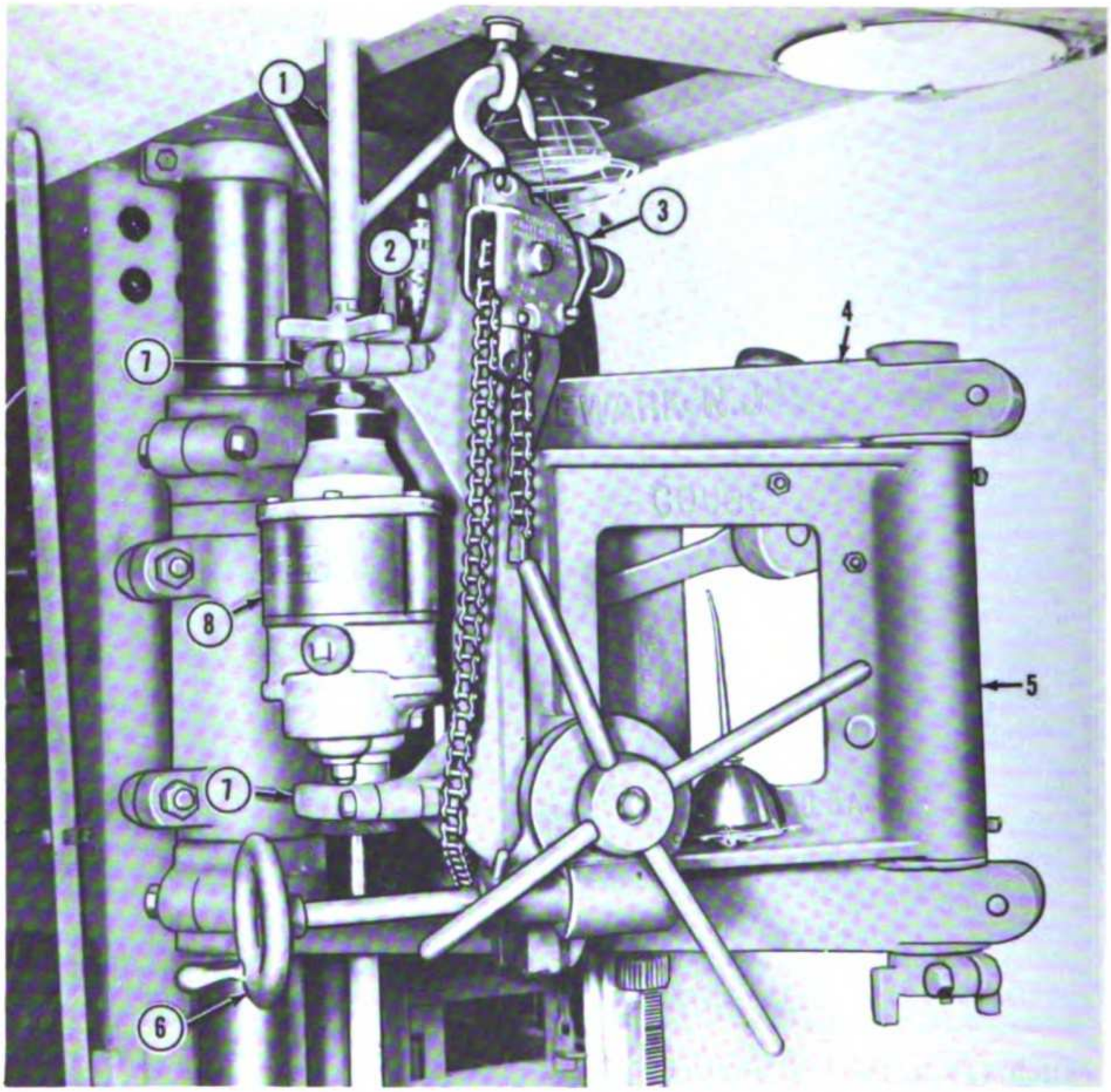
c. General Operating Details. Turn battery-voltage-selector switch (3) to desired charging voltage. Turn charge switch (2) to regulate charging current. Set time switch (4) to limit time of charge. The ammeter (1) will indicate the charging current. After battery is charged, turn charge switch to the OFF position and disconnect charger lead clips from battery.

d. Storing Equipment After Operation. Coil the charger leads around clips provided on side of charger and store charger on left bunk.

64. Hotplate Operation

a. General. The Temco hotplate (4, fig. 7) operates on a 208-volt, 1-phase circuit. The hotplate is complete with pilot light, on-off switch and high-low rheostat.

b. Operating Details. Connect twist-lock cable plug into special 208-volt, 1-phase outlet on mobile



1 Bracket	3 Hoist	6 Fine-feed handwheel
1 Portable feed-screw control	4 Radial drill arm	7 Clamp
	5 Feed frame	8 Drill

Figure 112. Radial drill and arm secured for travel.

shop. Turn switch (3, fig. 60) to the ON position. Regulate temperature of hotplate with high-low rheostat (2).

Note. Pilot light (1) when on, indicates hotplate is operating.

65. Radial Drill and Arm Operation

a. General. The Keller 1½-inch capacity, 3-hp pneumatic drill (5, fig. 61) is mounted on the Couse folding-type radial drill arm (3). The radial drill arm is mounted on the right rear trailer-supporting jack cylinder (11). The arm has a 48-inch swing radius, a 36-inch vertical movement and has a 20-inch feed by sensitive rack and pinion or by positive worm and handwheel. The pneumatic drill is of the piston-type, having a free speed sufficient for drilling ¼-inch holes. Full torque is available at zero speed which allows drills to be run at any desired speed by throttle control. The drill has a safety-reversible throttle lever which permits instant reversing for tapping operations. The drill has an integral feed screw and is removable for use on outside jobs.

b. Preparation for operation. Remove 1-ton hoist (3, fig. 112) securing radial drill arm in stored position. Rotate fine-feed handwheel (6) counterclockwise and lower drill. This will free portable feed screw control (2) from hollow bracket (1). Swing out feed frame (5) with drill (8) and then swing radial drill arm (4) to desired position.

Note. Feed frame and radial drill arm are adjusted independently.

Connect Quik-as-wink (QAW) female coupling (1, fig. 113) to throttle lever (2).

1 QAW female coupling 2 Throttle lever

Figure 113. Connecting air hose.

c. General Operating Instructions.

(1) *Basic operation.* Operate air compressor (par. 53*a*). Squeeze throttle lever (10, fig. 61) to start pneumatic drill. Rotate speed control (8) to regulate speed of drill and to reverse direction of rotation of drill. Release throttle lever to stop drill.

(2) *Adjust drill feed.* Shift feed-shifting lever (8, fig. 62) to the fine or coarse feed position. For fine feed, operate fine-feed handwheel (7). For coarse feed, operate coarse-feed lever (4). The feed gearcase (5) will operate in a vertical or horizontal position. Loosen two feed-adjustment cap screws, located behind the feed gearcase, and push fine-feed handwheel down to a vertical position. Tighten cap screws.

(3) *Adjust height of radial drill arm.* Use 1-ton hoist (1, fig. 114) and secure chain to radial drill arm; take up slack. Loosen arm-binding screws (2) and sleeve-binding screws (3). Operate hoist and raise or lower radial drill arm to desired height. Tighten arm and sleeve-binding screws. Remove 1-ton hoist.

(4) *Adjust swing of feed frame.* Loosen feed-frame-binding cap screws (3, fig. 62) and swing feed frame (2) to desired position. Tighten screws.

(5) *Adjust swing of radial drill arm.* Loosen arm-binding cap screws (2, fig. 61) and swing radial drill arm to desired position. Tighten screws.

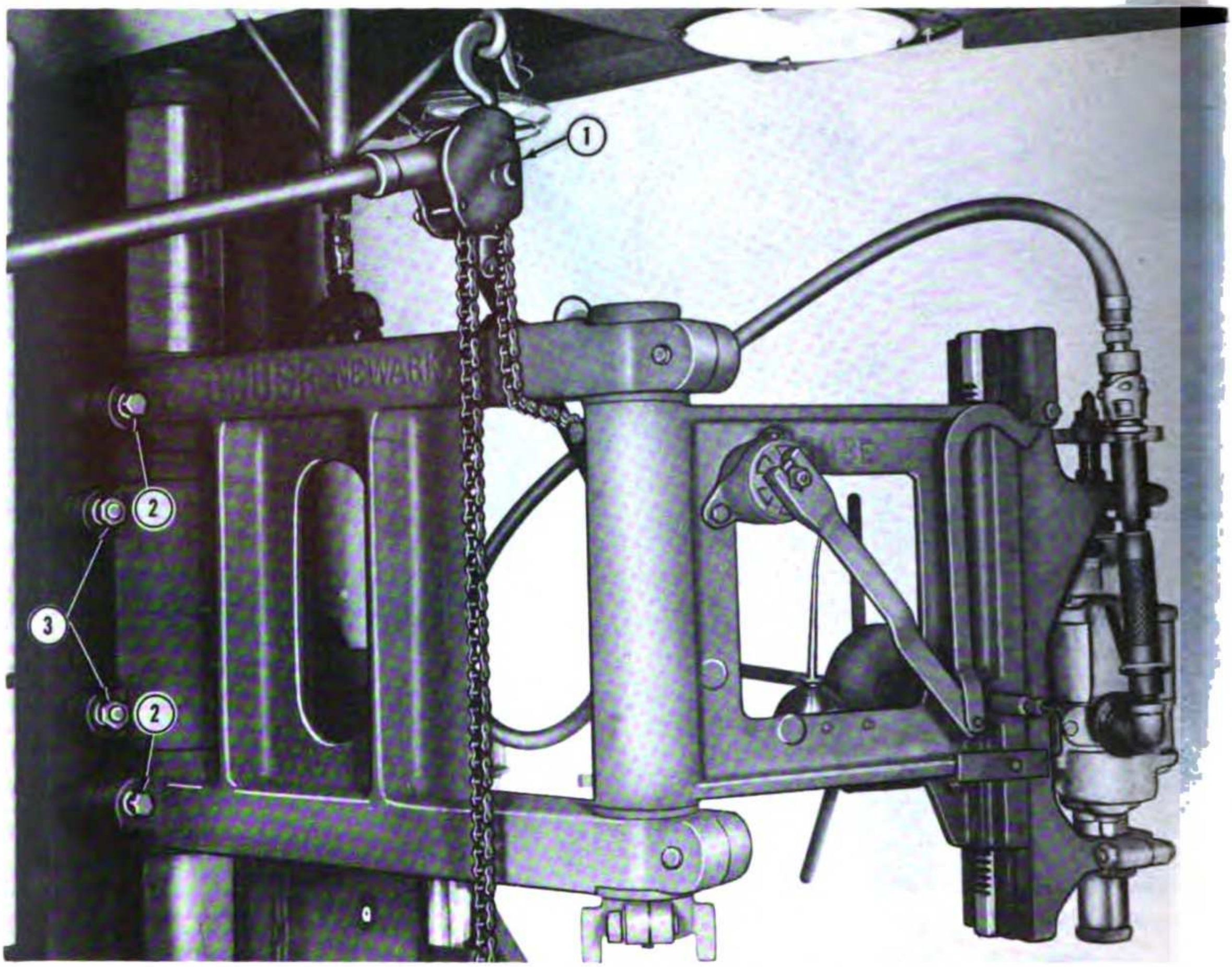
(6) *Portable use of drill.* Remove two nuts and cap screws from each clamp (7, fig. 112) securing drill (8) in mount. Remove clamps and lower drill to work bench. Install handle (app. II) in body of drill. Connect air hose and drill is ready for portable use. The drill may be set up so that the portable feed screw control (2) can be used to regulate drill feed. Throttle lever and speed control are operated in the same manner as when drill is mounted on radial drill arm.

d. Storing of Equipment After Operation. Stop air compressor (par. 53*b*). Disconnect air hose at QAW female coupling (1, fig. 113). Lift drill in position on mount and secure, using two clamps (7, fig. 112) and four cap screws and nuts. Swing feed frame against radial drill arm. Operate fine-feed handwheel (6) and raise drill until top of portable feed screw control (2) enters bracket (1). Use 1-ton hoist (3); hook chain under radial drill arm and take up slack.

66. Hydraulic Press, 10-Ton, Operation

a. General. The Blackhawk 10-ton hydraulic press (fig. 63) is hinge-mounted on the rear of the center bulkhead. The press can be used on or off the mobile shop. A complete set of accessories (app. II) is provided to perform pushing, pulling, pressing, bending, spreading, and clamping operations.

b. Preparation for Operation. Raise hinged clamp (6, fig. 115) securing frame (2) in the stored position. Swing frame away from bulkhead. Maximum swing is 90°. Operate hydraulic press



1 Hoist 2 Arm-binding screws 3 Sleeve-binding screws

Figure 114. Raising or lowering radial drill arm.

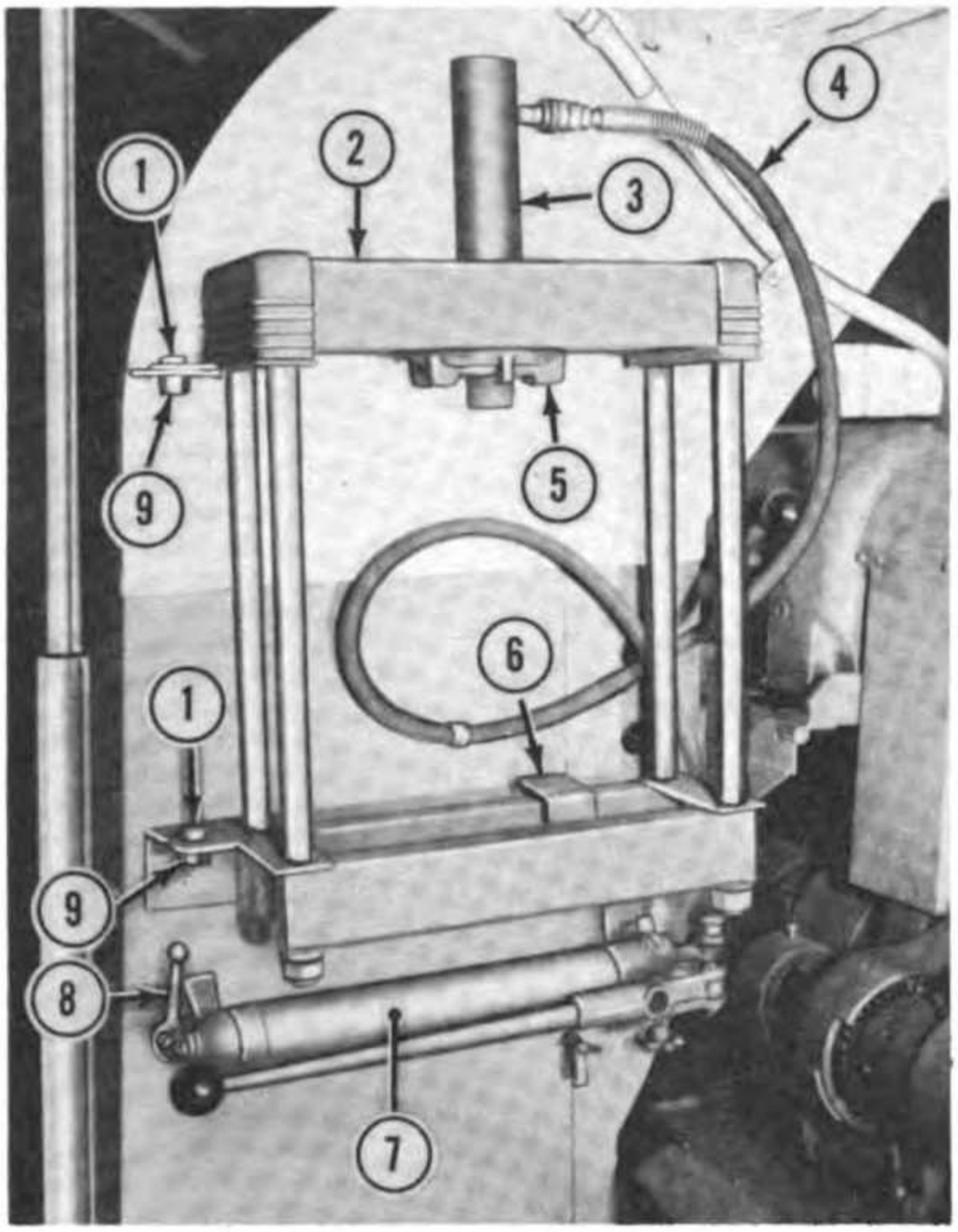
in this position (*c* below). To use hydraulic press off mobile shop, loosen retaining nut (5) securing ram (3) in top of frame and lift ram out of frame. Release locking lever (8) securing pump (7) to mounting bracket and remove pump with hose (4) and ram from center bulkhead. To remove frame, remove two mounting nuts (9) and bolts (1) securing frame to mounting brackets. Lower frame to ground. Install ram through top of frame and secure, using retaining nut. The ram, hose, and pump can be used without the frame for miscellaneous operations.

c. General Operating Details. Close valve by turning valve control knob (1, fig. 63) and operate pump control handle (2) to lower ram. To retract ram, open valve by turning valve control knob. The ram will retract automatically. Use of accessories (app. II) is adequately covered in manufacturer's manual.

d. Storage After Operation. Lift frame (2, fig. 115) in position on mounting brackets and secure, using two mounting bolts (1) and nuts (9). Swing frame against center bulkhead and secure with hinged clamp (6). Aline pump (7) in mounting bracket, below frame, and tighten locking lever (8). Install ram (3) through top of frame and tighten retaining nut (5). Store 10-ton hydraulic press accessories (app. II).

67. Hydraulic Press, 100-Ton, Operation

a. General. The Rodgers 100-ton hydraulic press (5, fig. 7) has a 100-ton push, 80-ton pull,



1 Bolt, ½ x 1 NC (2 rqr)
2 Frame
3 Ram
4 Hose
5 Retaining nut
6 Hinged clamp
7 Pump
8 Locking lever
9 Nut, hex, ½ NC (2 rqr)

Figure 115. Hydraulic press, 10-ton, secured for travel.

double-acting ram with a 14-inch travel. The press is hinge-mounted on the left rear trailer-supporting jack cylinder. The ram can be removed from the frame and used off the mobile shop for miscellaneous heavy-duty operations.

b. Preparation for Operation. Open rear panel assembly (par. 39*c*). Turn retaining sleeve (1, fig. 116) counterclockwise, until left front leg (2) of press frame is free. Swing 100-ton press on hinged mounting brackets (3, fig. 117) to desired working position. The pump (7) and ram cylinder (2) may be removed from the press frame for operations away from the mobile shop. To remove ram, disconnect hydraulic line (1) from fitting at top of ram cylinder and disconnect hydraulic line (4) from fitting at bottom of ram cylinder.

Note. Cap hydraulic lines with dust caps provided to prevent entry of foreign material.

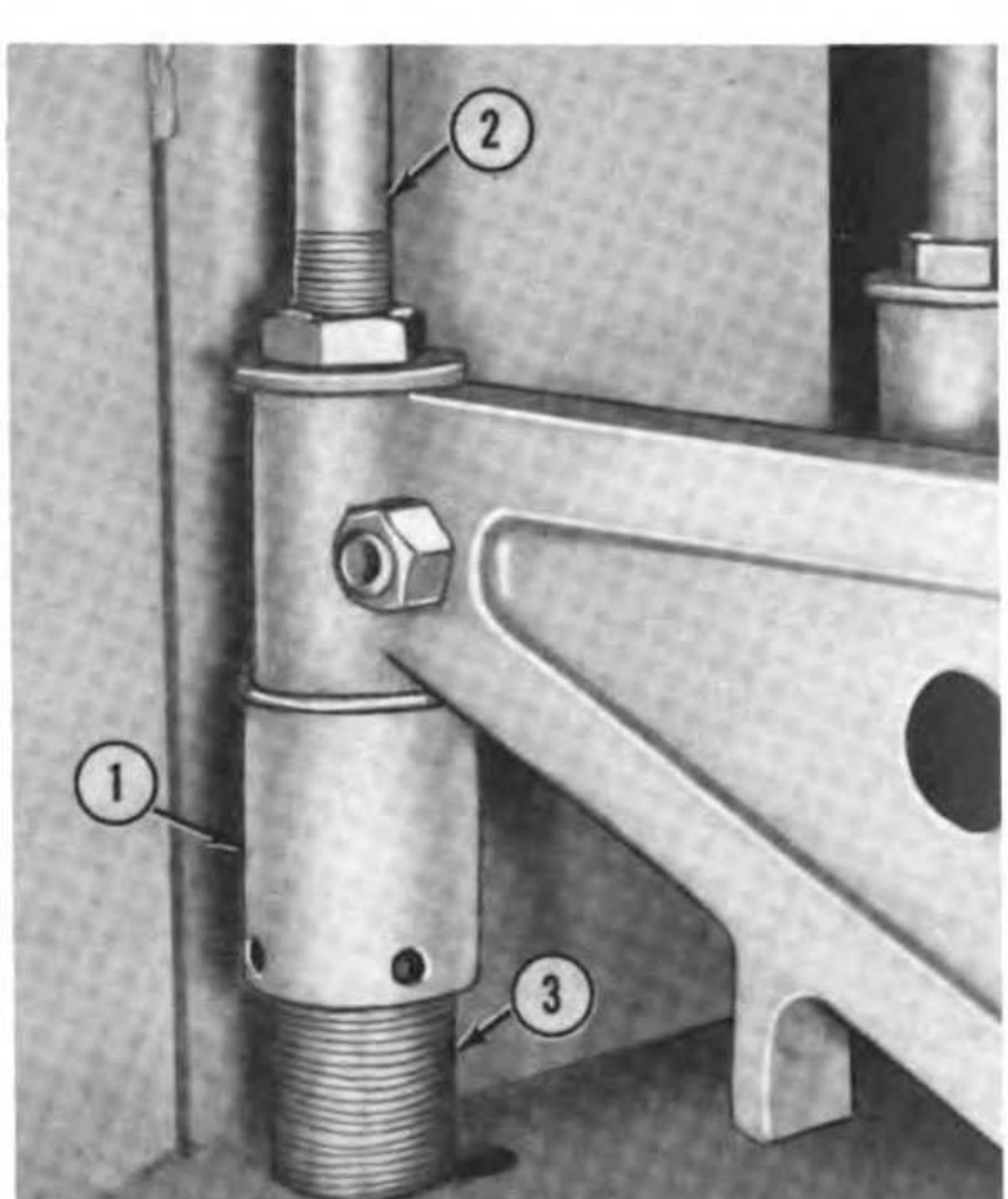
Loosen nut on each side of spreader (5) and remove spreader from base of cylinder. Lift ram out of press frame. To remove pump, remove four nuts and bolts securing pump on pump mounting bracket (6). Lift pump with hydraulic lines off mounting bracket. Mount pump on block of wood, high enough to obtain full use of pump handle. Remove dust caps and connect hydraulic lines to their respective fittings on ram cylinder.

c. General Operating Instructions. Place reversing control (3, fig. 64) in the push or pull position. Shift three-speed control (4) to desired operating speed and operate pump control handle (1). Pressure gage (2) will indicate operating pressure.

Caution: Do not exceed ram travel of 14 inches.

When press has been idle for a period of time, before operating extend ram an inch or two and retract ram several times to eliminate air in the hydraulic lines and ram cylinder.

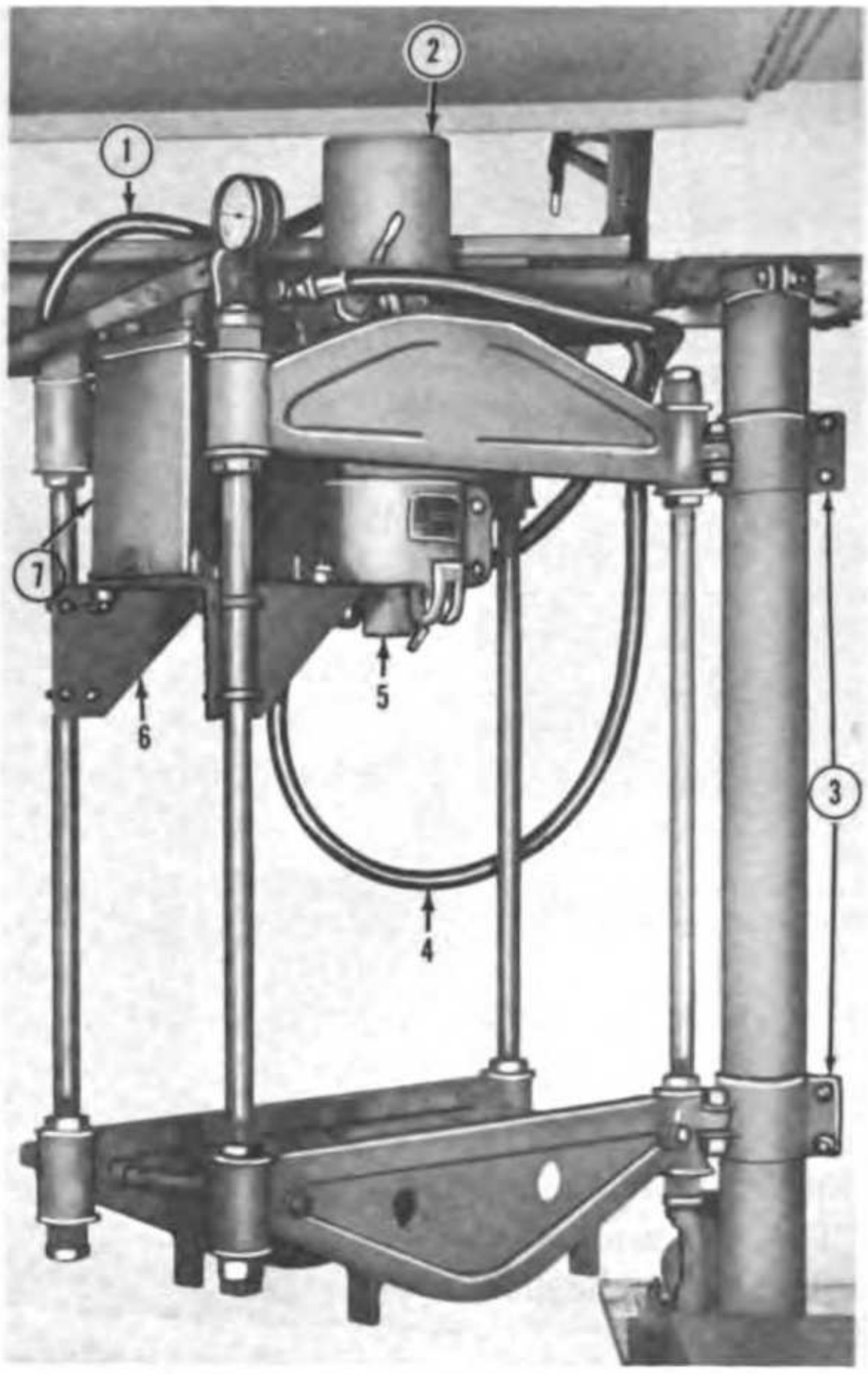
d. Storage After Operation. Disconnect hydraulic lines from ram cylinder and install dust



1 Retaining sleeve
2 Leg
3 Retaining stud

Figure 116. Hydraulic press, 100-ton, secured for travel.

caps on lines. Install ram cylinder (2, fig. 117) through top of press frame. Aline spreader (5) over bottom of cylinder and secure with two nuts. Aline pump (7) with hydraulic lines on pump mounting bracket (6) and secure, using four bolts and nuts. Remove dust caps and connect hydraulic lines (1 and 4) to ram cylinder. Swing 100-ton press into mobile shop and aline left front leg (2, fig. 116) over retaining sleeve (1) and retaining stud (3). Turn retaining sleeve clockwise until it encloses leg, securing 100-ton press for traveling. Close rear panel assembly (par. 50*a*).



1 Hydraulic line
2 Ram cylinder
3 Hinged mounting brackets
4 Hydraulic line
5 Spreader
6 Pump mounting bracket
7 Pump

Figure 117. Hydraulic press, 100-ton, ready for operation.

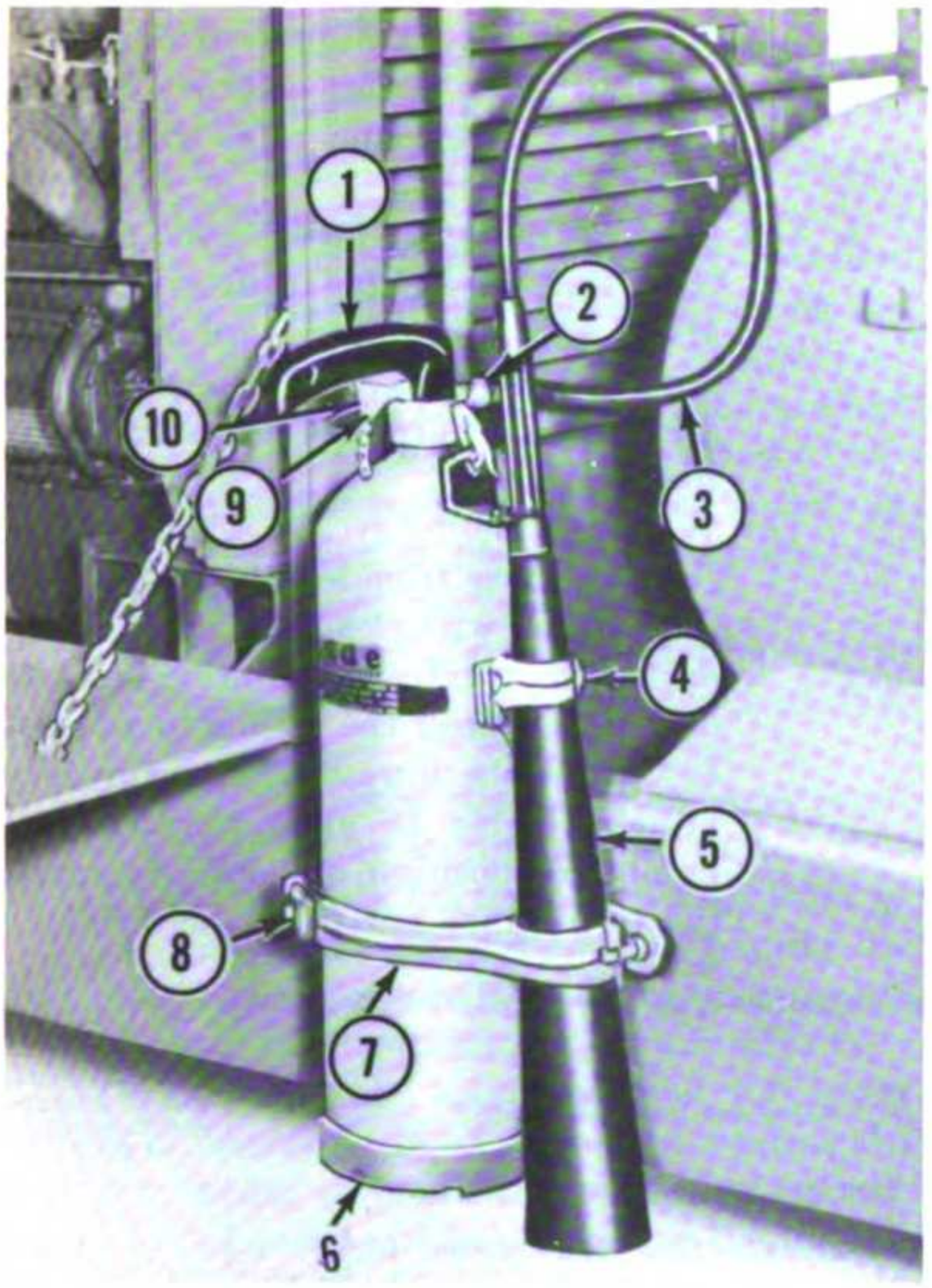
Section IV. OPERATION OF MATERIEL USED IN CONJUNCTION WITH MOBILE SHOP

68. Description

The only materiel used in conjunction with the mobile shop is the fire extinguisher. The Kidde portable fire extinguisher (fig. 118) Model 15T–1 is charged with 11.66 pounds (by weight) of carbon dioxide. The fire extinguisher is equipped with 3-foot length of $\frac{5}{16}$-inch (inside diameter) hose (3) and a discharge horn for directing the carbon dioxide on fires. The completely enclosed working parts of the squeeze grip valve (2) retain the gas and release the gas when the trigger (10) is squeezed.

69. Fire Extinguisher

a. Location. The fire extinguisher (2, fig. 6) is bracket-mounted on the right front side of the semitrailer.



1	Carrying handle	6	Bracket base
2	Squeeze grip valve	7	Bracket arm
3	Hose	8	Latch
4	Horn clip	9	Locking pin
5	Discharge horn	10	Trigger

Figure 118. Fire extinguisher stored.

b. General Operating Details.

(1) Release latch (8, fig. 118) and swing out bracket arm (7). Lift fire extinguisher off bracket base (6).

(2) Carry fire extinguisher by carrying handle (1) to scene of fire.

(3) Release horn clip (4); remove discharge horn (5) and direct horn so that discharged gas will cover base of flames.

(4) Remove locking pin (9), breaking safety seal, and squeeze trigger (10).

Warning: Do not tip fire extinguisher. Extinguish one section of the fire completely before directing discharge horn to another section.

(5) Cover burned area with discharged gas after flames have been extinguished. Discharge time of fire extinguisher is 25 seconds.

Warning: Thoroughly ventilate area of extinguished fire. Carbon dioxide is suffocating but not poisonous.

(6) Release trigger to stop gas discharge.

(7) Refill fire extinguisher (*c* below).

c. Maintenance. Check the amount of charge in the fire extinguisher often. The amount of charge may be determined by holding the extinguisher in the hand, shaking it, and judging the amount of charge by the sound and weight. The average charged weight of the extinguisher is 41 pounds. For refilling instructions, refer to TM 5–687 and TM 9–1799.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

70. Operation in Extreme Cold (Below 0° F.)

a. Mobile Shop.

Warning: Use extreme care during operation on wet, snow- or ice-covered roadways. Improper application of brakes may cause the semitrailer to jackknife into the prime mover. Follow instructions provided in (1) below for safe application of trailer brakes.

(1) *Airbrakes.*

Warning: Inspect for frozen brakeshoes before moving mobile shop.

(*a*) Apply trailer brakes gradually and release them if they grab or lock. A grabbing brake is not operating with maximum efficiency. A locked brake results in skidding or jackknifing.

(*b*) For maximum braking efficiency, apply brakes just short of locking pressure.

(2) *Shop location.* Locate the mobile shop in a building, hangar, or other suitable shelter, if available, to protect the shop from wind and cold. Observe safety precautions against hazards from indoor fires, exhaust fumes, leaking fuel and oils, etc. If shelter is not available, park the mobile shop with its rear into the wind to protect the engine from the cold.

(3) *Tenting.* Erect tenting enclosure (par. 40) to provide a more comfortable working area and to prevent the rapid loss of heat from the heaters, and to protect the

equipment from the bad effects of cold and uneven cooling.

(4) *Weatherseals.* Make sure that all weatherseals are in good condition and are properly installed.

(5) *Heaters.* Operate heaters (par. 45).

Note. The front heater is used to preheat the battery and engine compartments and the rear heater is used to preheat the lathe base and warm up the lathe before operating in cold weather.

(6) *Special lubrication.* Lubricate in accordance with note 2 of LO 5–9128–1.

b. Engine.

(1) *Cooling system.* If temperatures below 32° F. are expected, protect the cooling system by adding proper antifreeze compound. The following procedures must be followed.

(*a*) Make sure that cooling system is completely free from rust or other foreign material. Drain and refill with clean water.

(*b*) Inspect radiator hoses and replace hoses that show signs of deterioration. Make sure that there are no leaks around hose clamps, drain plugs, or draincocks. Carefully check radiator for leaks.

(*c*) When the cooling system is found to be clean and free from leaks, partially fill the radiator with clean soft water. Add approved antifreeze solution as required to protect the engine to at least 10° below the lowest temperature expected. Table II gives the freezing points, composition, and specific gravities of military antifreeze materials.

Table II. Freezing Points, Composition and Specific Gravities of Military Antifreeze Materials

Lowest expected ambient temp. ° F.	Pints of inhibited glycol per gal of coolant [1]	Compound, Antifreeze, Arctic [2]	Ethylene glycol coolant solution specific gravity at 68° F.[3]
+20	1½	Issued full-strength and ready mixed for 0° to −65° F. temperatures for both initial installation and replenishment of losses. *DO NOT DILUTE WITH WATER OR ANY OTHER SUBSTANCE.*	1. 022
+10	2		1. 036
0	2¾		1. 047
−10	3¼		1. 055
−20	3½		1. 062
−30	4		1. 067
−40	4¼		1. 073
−50	Arctic Antifreeze preferred		
−60			
−75			

[1] Maximum protection is obtained at 60 percent by volume, that is 4.8 pints of ethylene glycol per gallon of solution.

[2] Military Specification MIL–C–11755 Arctic type, nonvolatile antifreeze compound is intended for use in the cooling system of liquid-cooled internal combustion engines for protection against freezing primarily in Arctic regions where the ambient temperature remains for extended periods of time close to −40° F. or drops below, to as low as −90° F.

[3] Use an accurate hydrometer. To test hydrometer, use one part ethylene glycol type antifreeze to two parts water. This should produce a hydrometer reading of 0° F.

Note. Fasten a tag near the radiator filler cap indicating the type of antifreeze.

(*d*) After adding antifreeze solution, fill the cooling system to slightly below filler neck of radiator. Start and operate engine (par. 41) until it reaches normal operating temperature.

(*e*) Stop engine (par. 48) and test the strength of the antifreeze solution with a hydrometer. Add more antifreeze solution if required.

(*f*) Observe the following precautions for handling antifreeze solution. Keep containers free from dirt, rust, and oil. When testing strength of solution, be sure the hydrometer is accurate (table II). Do not spill the solution on painted surfaces.

(2) *Fuel system.* In cold weather, condensation of moisture in the air will cause water to accumulate in tanks, drums, and containers. This water will freeze and form ice crystals that will clog fuel lines and carburetor jets unless the following precautions are taken.

(*a*) Use filter paper or other type of strainer when filling fuel tank or when transferring fuel from one container to another.

Caution: When handling gasoline, always provide a metallic contact between container and fuel tank to prevent a spark from being generated as gasoline flows over the metallic surface.

(*b*) Remove snow or ice from fuel tank fillercap and dispensing equipment before filling the fuel tank.

(*c*) Keep fillercaps tightened properly to keep snow, rain, and dirt out of fuel tanks.

(*d*) Thoroughly clean gasoline cans (app. II) before storing fuel in them.

(*e*) To reduce hazard of ice formation in the fuel tank, add one-half pint of denatured alcohol, grade 3, each time 25 or more gallons of fuel are added.

(*f*) If possible, keep fuel tank full when operating in extreme cold weather, in order to prevent an excessive amount of moist air from entering the tank.

(3) *Electric System.*

(a) *Batteries.* Coat battery terminals with a thin film of oil or grease. Make sure that the batteries are fully charged. Hydrometer readings should be between 1.275 and 1.300. Batteries deliver maximum cranking power at about 80° F. At 32° F. the batteries deliver only about 65 percent of available power, and at 0° F. only 40 percent of this power is available. This makes longer cranking periods necessary in cold weather, or when batteries are unduly exposed. To make up for this loss in available power, and to prolong battery life, batteries used at low temperature must be kept fully charged at all times. A fully charged battery will withstand severe low temperatures, but a partially charged battery will freeze and crack the battery case.

Caution: Do not add water to a battery in freezing temperatures unless the battery is to be charged immediately. If water is added and the battery not charged, the added water will stay at the top and freeze before it can mix with the acid.

(*b*) *Starting motor, generator, generator regulator, and ignition system components.* Inspect, clean, and tighten all wiring and connections. Keep the exterior of the starting motor, generator, generator regulator, magneto, spark plugs, and wiring free of water, snow, and ice.

(4) *Engine starting.* If the engine is in good condition and all mechanisms are properly adjusted, it will start and operate efficiently in extreme cold weather. Perform the following steps before attempting to start the engine in extreme cold.

(*a*) Make sure that the vanes on the radiator shutter assembly are closed. Operate the front heater (par. 45) for at least one hour to preheat the engine compartment.

(*b*) Make certain the crankcase oil is not too heavy for the engine to turn over. Check to see that the proper lubricating oil is in the engine as specified in LO 5–9128–1.

(*c*) Inspect the starting motor to see that the operating mechanism is free of heavy grease or dirt.

(*d*) Make sure the batteries are fully charged as specified in *b* (3) (*a*) above.

(*e*) If the engine has been idle for several days, remove and dry the spark plugs. Before installing spark plugs, pour a tablespoon of oil in each engine cylinder through spark plug opening.

(*f*) Be sure the air cleaner is filled with the proper grade of oil (See LO 5–9128–1) to avoid congealing and interfering with airflow.

(*g*) Never attempt to start the engine under extreme cold conditions with wide open throttle. The throttle should be set to about one-fifth or less of its full opening.

(*h*) Before starting engine, close carburetor choke and crank the engine several times before closing the magneto switch.

(*i*) Start engine (par. 41), leaving the choke partially open. After the en-

gine is warmed up and running normally, open the choke fully.

Caution: Do not operate the engine more than 800–1,000 rpm until the engine has reached normal operating temperature. The engine will be damaged by high-speed operation during the warmup period unless the oil is allowed to warm and circulate.

(5) *Special lubrication.* Lubricate the engine in accordance with note 1 of LO 5–9128–1.

c. Air Compressor. During extreme cold weather moisture will tend to collect in the air supply and freeze, forming particles of ice in the air lines and compressor. To avoid moisture in pneumatic tools, drain the air tank regularly and blow out all air supply lines before connecting tools. See note 1 of LO 5–9128–1 for special instructions on cold weather lubrication of the air compressor.

d. Shop Equipment.

(1) Make sure that all metal surfaces are dry and clean. Remove snow and ice from all shop equipment and adjacent areas. Cover bare metal surfaces with a film of approved corrosion preventive. Replace all specially treated VPI wrappers.

(2) Metal parts and insulators, such as rubber and plastics, become brittle in extreme cold. Make sure all mountings are secure. Exercise care in handling or bending wiring to avoid breaking insulation.

(3) Make sure that all electrical connections are clean and tight. Check to see that brushes and commutators are clean and make good contact.

(4) Do not subject drills and other cutting tools to a high starting torque as this can cause breakage of drills and cutting tools and damage work metal.

(5) Make sure honing machine and valve refacer coolant is removed when not in use. Warm coolant before using.

(6) Lubricate shop tools in accordance with note 1 of LO 5–9128–2 and LO 5–9128–3.

71. Operation in Extreme Heat

a. Mobile Shop.

(1) *Airbrakes.* Brakes will have a greater tendency to fade, overheat, burn, grab, and lock during prolonged application in hot weather. For maximum braking efficiency and protection of brakeshoes and drums in extreme heat, apply the brakes for short intervals only, whenever possible. Proper downshifting of the prime mover transmission on long downgrades and when approaching a stop will help avoid prolonged use of the brakes.

(2) *Shop location.* To protect the shop from the direct heat of the sun, locate the mobile shop in a building, hangar, or other suitable shelter, if available. Observe safety precautions against hazards from indoor fires, exhaust fumes, and leaking fuel and oils. If shelter is not available, locate the mobile shop in the shade or face it so that the direct rays of the sun do not reach the shop equipment.

(3) *Tenting.* For extreme hot weather operation, erect the tenting enclosure (par. 40) to provide shade for the comfort of personnel and to avoid overheating of equipment.

(4) *Ventilators.* Operate ventilators (par. 46) to clear the mobile shop of fumes and to circulate the air within the shop.

b. Engine.

(1) *Cooling system.* If high temperatures are expected, protect the cooling system by checking all hoses and connections for tightness. Check the hoses, hose clamps, drain plugs, and draincock for evidence of rust. Make sure that the radiator is completely free from dirt and corrosion. Repair or replace all leaking or deteriorated parts. Drain and refill cooling system with clean water. Make certain radiator shutter is open.

(2) *Fuel system.* In extremely hot weather, defective fuels or overheated fuel system components may cause vapor locks which will stall the engine. Keep the fuel tank near full and fillercap tight. Shade fuel system components from sun.

(3) *Electric system.* The electric system is subject to greater corrosion in hot climates and the battery will deteriorate rapidly if the electrolyte is allowed to evaporate and become overconcentrated. Check the electrolyte level of the batteries daily and fill to proper level with pure water if required. In tropic climates, lower the specific gravity to about 1.210 to 1.230 for a fully charged battery. A battery will leak off a charge at an increased rate at high temperatures. Do not allow self-discharging to exhaust the battery. Check the specific gravity readings of the batteries frequently and recharge a battery whenever the reading is 1.160 or less. Inspect electric-wiring insulation for deterioration.

(4) *Special lubrication.* Lubricate in accordance with LO 5–9128–1.

c. Dynamotor-Welder and Electric-Control System. Check the dynamotor-air duct to make certain it is properly installed. Check the flexible air hose leading to the electric-control cubicle for damage and deterioration. Cooling air passes through the duct to cool the components of the electric-control cubicle.

d. Air Compressor. Check the air compressor shrouds to make certain that they are properly installed and not bent or damaged in any way.

Warning: Do not operate air compressor with shrouds off.

e. Shop Equipment. Lubricate shop equipment in accordance with LO 5–9128–1 and LO 5–9128–2. Do not allow equipment to overheat during operation.

72. Operation Under Dusty or Sandy Conditions

a. Mobile Shop.

(1) *Shop location.* To protect the shop from blowing sand and dust, locate the mobile shop in a building, hangar, or other suitable shelter, if available. Observe safety precautions against hazards from indoor fires, exhaust fumes, leaking fuel and oils. If shelter is not available, park mobile shop with its rear into the wind to protect the engine and shop equipment from the climatic conditions.

(2) *Weatherseals.* Make sure that all weatherseals are in good condition and are properly used to prevent the entrance of dust or sand into the shop.

(3) *Tenting.* Erect tenting (par. 40) to prevent blowing sand or dust from entering work area.

(4) *Ventilators.* Operate ventilators (par. 46) to circulate air within the shop.

b. Engine. Protect the engine by keeping the engine enclosure tightly closed. Clean the radiator shutter to keep any accumulation of dust or sand from interfering with the operation of the vanes. Use extreme care to keep dust or sand out of fuel and engine parts when filling the fuel tank or servicing the engine. Service air cleaner daily and refill with proper grade of oil (par. 77*e*). Wipe all sand and dust from the engine and accessories. When removing any parts for service, cover engine openings and close engine enclosure until ready to install. Check tightness of bands and dust covers on generator, starting motor, and other electric components.

c. Dynamotor-Welder and Electric-Control System. Inspect air filters daily. Clean filters (par. 195) if required. Sand must be kept out of the electric-control cubicle and welding-connector panel. Cover these components when not in use.

d. Air Compressor and Pneumatic Tools. Blow out all air supply lines before connecting pneumatic tools. Service air cleaner daily (par. 77*f*).

e. Shop Equipment. Clean all equipment carefully. Wipe all grit from around bearings, gear assemblies, motors, levers, linkages, and other moving parts. Cover equipment when not in use.

73. Operation in High Humidity and in Salt Water Areas

a. Mobile Shop.

(1) *Shop location.* If the mobile shop is being located in a high humidity area, park the mobile shop as far from salt water bodies as possible and face the shop so that winds do not blow damp air or salt spray on the equipment.

(2) *Tenting.* Erect tenting (par. 40) to shield equipment from any damp wind and spray.

(3) *Heaters.* Operate heaters (par. 45) to dry equipment whenever possible.

(4) *Ventilators.* Operate ventilators (par. 46) to circulate air within the shop and to assist in keeping air dry.

b. Engine. Engine lubrication must be checked frequently when the engine is exposed in high humidity or salt water areas. Keep all lubricant containers tightly closed to prevent the accumulation of moisture. Service air cleaner daily (par. 77*e*). All salt-laden moisture must be wiped off electric, fuel, and cooling system components thoroughly and often. Keep the engine enclosure tightly closed except when the engine is being serviced. Wipe off the exterior of the engine, engine enclosure, and fuel tank, each morning and after each working period.

c. Dynamotor-Welder and Electric-Control System. Keep dynamotor-welder air filters clean and tightly installed. Inspect filters daily for accumulated moisture or salt. Clean filters, if required. Moisture must be kept out of the electric-control cubicle and welding-connector panel. Cover these components when not in use.

d. Air Compressor. Moisture will tend to collect in the air tank and lines. Blow out air tank and all supply lines before connecting pneumatic tools. Remove moisture from air compressor daily.

e. Shop Equipment. Lubricate shop equipment in accordance with LO 5–9128–1 and LO 5–9128–2. Give special care to the removal of moisture and corrosion from all machine parts. Cover all machined surfaces with approved corrosion preventive. Replace all specially treated VPI wrappers on equipment in storage.

CHAPTER 3

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. ORGANIZATIONAL TOOLS AND EQUIPMENT

74. Organizational Tools and Equipment

Complete organizational maintenance may be performed by using the tools and equipment provided with the mobile shop. Tools and equipment provided with the mobile shop are listed and illustrated in appendix II. Tools and equipment other than common mechanic's handtools are specified in the text of the maintenance procedure.

75. Special Organizational Maintenance Tools and Equipment

No special organizational maintenance tools and equipment are required for use with the Model MED mobile shop.

Section II. LUBRICATION AND PAINTING

76. General Lubrication Information

a. LO 5–9128–1, LO 5–9128–2, and LO 5–9128–3 prescribe first and second echelon lubrication maintenance for the Shop, Mobile, General Purpose Repair, Set No. 1, Heavy, 12-ton Semitrailer Mounted, Couse Model MED.

b. A lubrication order is issued with each item of equipment and is to be carried with it at all times. The lubrication orders shown in figures 119 through 121 are reproductions of the approved lubrication orders for this materiel. For the current LO 5–9128–1, LO 5–9128–2, and LO 5–9128–3, refer to DA Pam 310–4.

c. Lubrication orders prescribe approved first and second echelon lubrication procedures. The instructions contained therein are mandatory.

77. Detailed Lubrication Information

a. Care of Lubricant. Exercise care and attention in the storage, handling, and use of all lubricants. The prime consideration in lubricant storage, care, and handling is cleanness. Keep dirt, water, corrosion, and other contaminants out of lubricants, containers, equipment, storage facilities, and tools. Do not mix lubricants having different characteristics.

b. Points of Lubrication. The circled reference numbers on LO 5–9128–1, LO 5–9128–2, and LO 5–9128–3 (figs. 119, 120, and 121) refer to the detailed lubrication instructions given beneath each lubrication point illustration indicating procedures to be followed at each point. Apply the lubricant indicated on the lubrication chart.

c. Cleaning.

(1) The lubricant storage facilities and equipment must be inspected before new lubricant is stored and inspected periodically during long periods of operation. The inspection is to determine the need to clean the lubrication containers, guns, adapters, wrenches, and other lubricating apparatus.

(2) Do not use unclean lubricants. Discard all contaminated lubricants.

(3) Use clean rags for wiping lubricant storage facilities and equipment. Cleaning solvent may have to be used for the removal of sludge and scum. After cleaning, care should be taken that all traces of any chemicals used in cleaning, as well as any other cleaning materials or extraneous matter, are removed. When chemical solvents have been used, the containers and equipment should be thoroughly flushed with a quantity of lubricant before being filled with the new lubricants.

(4) The general area where the lubrication is to be done should be as clean as possible.

LUBRICATION ORDER

LO 5-9128-1

20 August 1954

SHOP, MOBILE, GENERAL PURPOSE REPAIR, SET NO.1, HEAVY, 12-TON SEMITRAILER MOUNTED, COUSE MODEL MED

Reference — TM5-9128-1, TM5-9128-2, TB5-9128-1, LO5-9128-2, LO5-9128-3

Intervals given are maximums for normal 8-hour day operation. For abnormal conditions or activities, intervals should be shortened to compensate.

Clean fittings before lubricating.

Relubricate after Washing or Fording.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Lubricate points indicated by dotted arrow shafts on both sides of the equipment.

Drain crank and gear cases only when hot after operation; check level and replenish when cool.

KEY

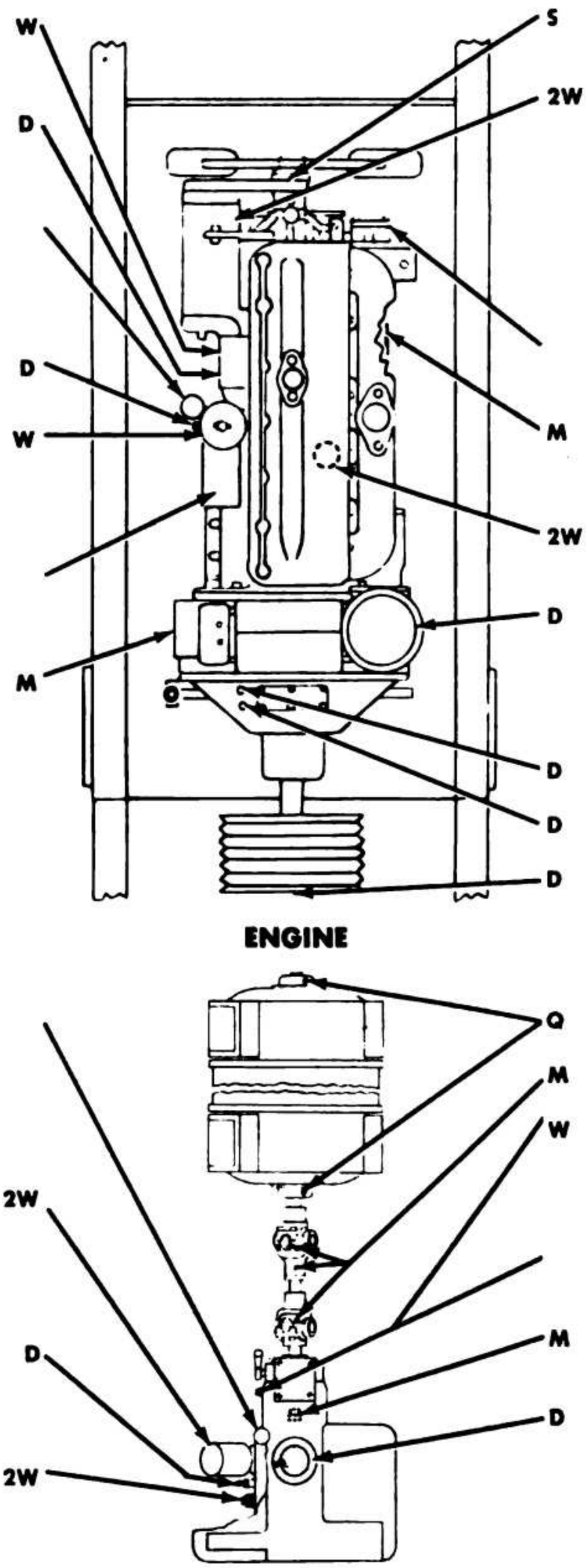
LUBRICANT	CAPACITY	EXPECTED TEMPERATURE			INTERVALS
		Above +32°F	+32° to −10°F	Below −10°F	
OE—OIL, Engine, Heavy Duty		OE 30 or 9250	OE 10 or 9110	See note 1	
Engine Crankcase	6 qts				
Compressor Crankcase	4 qts				D—Daily
Air Cleaners		OE 30 or 9250	OE 10 or 9110	OHA	W—Weekly
Other Points					
Compressor Clutch	½ qt	OE 30 or 9250	OE 10 or 9110	OE 10 or 9110	2W—2 Weeks
GO—LUBRICANT, Gear, Universal		GO—90	GO—75	GO—S	M—Monthly
Lathe Gearcase	2½ qts				Q—Quarterly
BR—LUBRICANT, Ball and Roller Bearings					S—Semi-annually
GAA—GREASE, Automotive and Artillery					
OHA—OIL, Hydraulic, Aircraft, Petroleum Base					
WP—GREASE, Lubricating, Automotive and Industrial					

CONTINUED ON FOLLOWING PAGE

Figure 119.—Lubrication Order 5–9128–1.

CONTINUED FROM PRECEDING PAGE

	LUBRICANT	INTERVAL
Tachometer Drive Shaft (Turn down cup one full turn, refill as necessary)	GAA	W
Water Pump Bearings (Turn down cup one full turn, refill as necessary)	WP	D
1 — Crankcase Fill and Breather Cap (See key) (Every week remove breather cap, clean and re-oil)	OE	
Crankcase Level Gage (Check level)		
2 — Engine Oil Filter (Remove plug and drain sediment. Every 2 weeks, clean inside case and renew element)		
Magneto Cam Wick (No lubrication required; replace wick at disassembly)		
3 — Starter Bearings (Sparingly) (When equipped with life-seal bearings or oil impregnated bushings, no lubrication required; CAUTION: Do not use solvents in cleaning. Wipe with oil dampened cloth only)	OE	M
4 — Compressor Crankcase Fill and Breather (See key) (Every week remove breather cap, clean and re-oil)	OE	
5 — Compressor Oil Filter (Every two weeks unscrew entire cartridge, discard and replace with new unit)		
Compressor Crankcase Level Gage (Check level)		D
Compressor Crankcase Drain Plug (Drain and refill)		2W



ENGINE

	INTERVAL	LUBRICANT
	S	BR — Fan Bearing (Replace plug) — 6
	2W	OE — Generator Bearings (Sparingly) (When equipped with life-seal bearings or oil impregnated bushings, no lubrication required; CAUTION: Do not use solvents in cleaning. Wipe with oil dampened cloth only) — 2
		Governor (Lubricated from engine) — 7
	M	OE — Breather Metering Valve (Remove, clean and re-oil sparingly) — 8
	2W	Crankcase Drain Plug (Drain and refill) — 9
	D	OE — Air Cleaner (Daily, clean top screen and re-oil) (Weekly, drop lower shell, clean and refill oil reservoir to level mark) — 10
	D	GAA — Throw-out collar — 11
	D	GAA — Shaft Bearing — 11
	D	BR — Pilot Bearing — 12
	Q	BR — Dynamotor-Welder Shaft (Sparingly) — 13
	M	GAA — Drive Shaft Universal Joints — 14
	W	Compressor Clutch Level Plug (Check level) (Maintain level at plug opening) — 15
		OE — Compressor Clutch Fill Plug (See key) — 15
	M	Compressor Clutch Drain Plug (Drain and refill) — 15
	D	OE — Compressor Air Cleaner (Daily clean and refill oil reservoir to level mark) (Every week disassemble, clean screens, re-oil, fill reservoir and re-assemble) — 16

DYNAMOTOR—WELDER, DRIVE SHAFT, AIR COMPRESSOR

Figure 119—Continued

LUBRICANT • INTERVAL | **INTERVAL • LUBRICANT**

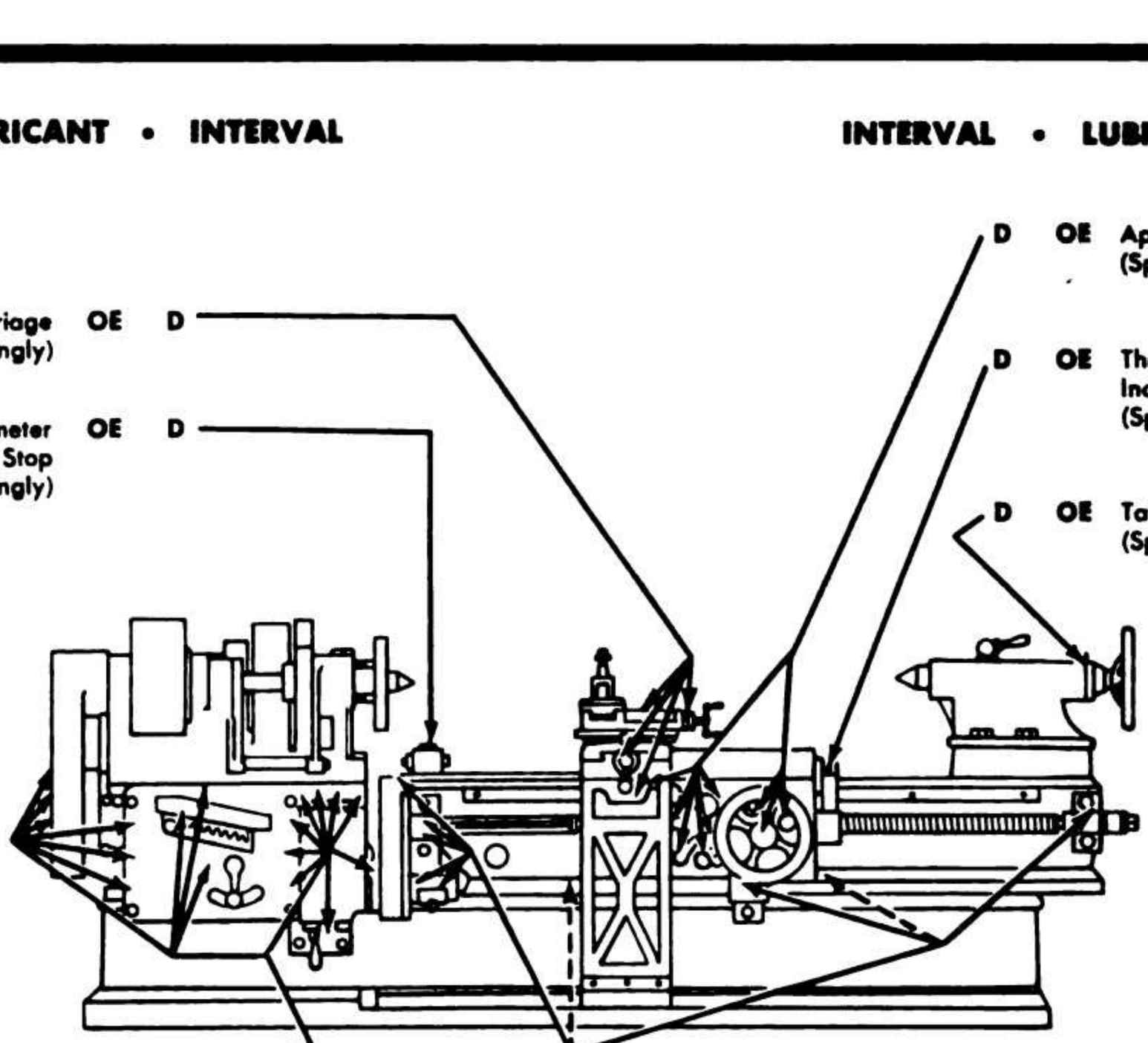
17 — Carriage (Sparingly) — OE — D

18 — Micrometer Carriage Stop (Sparingly) — OE — D

D — OE — Apron (Sparingly)

D — OE — Thread Dial Indicator (Sparingly) — 17

D — OE — Tailstock (Sparingly)

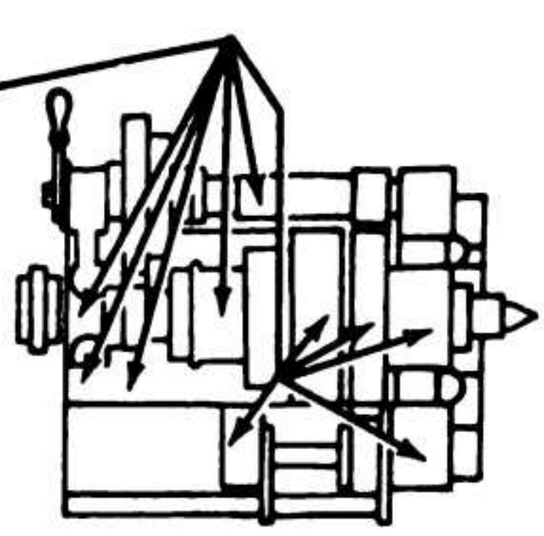


Quick Change Gearbox (Sparingly) — OE — D

D — OE — Bed (Sparingly) — 17, 18, 21

LATHE

19 — Headstock (Sparingly) — OE — D

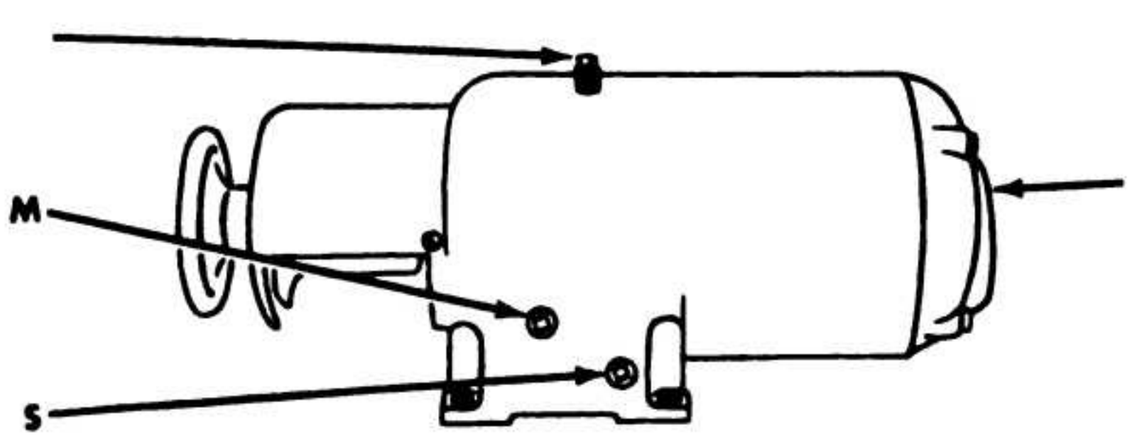


HEADSTOCK

20 — Gearcase Fill Plug — GO

Gearcase Level Plug (Check Level) — M

Gearcase Drain Plug (Drain and refill) — S



Motor Bearings (When equipped with life-seal bearings, no lubrication required) — 20

LATHE GEARCASE AND MOTOR

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Figure 119—Continued

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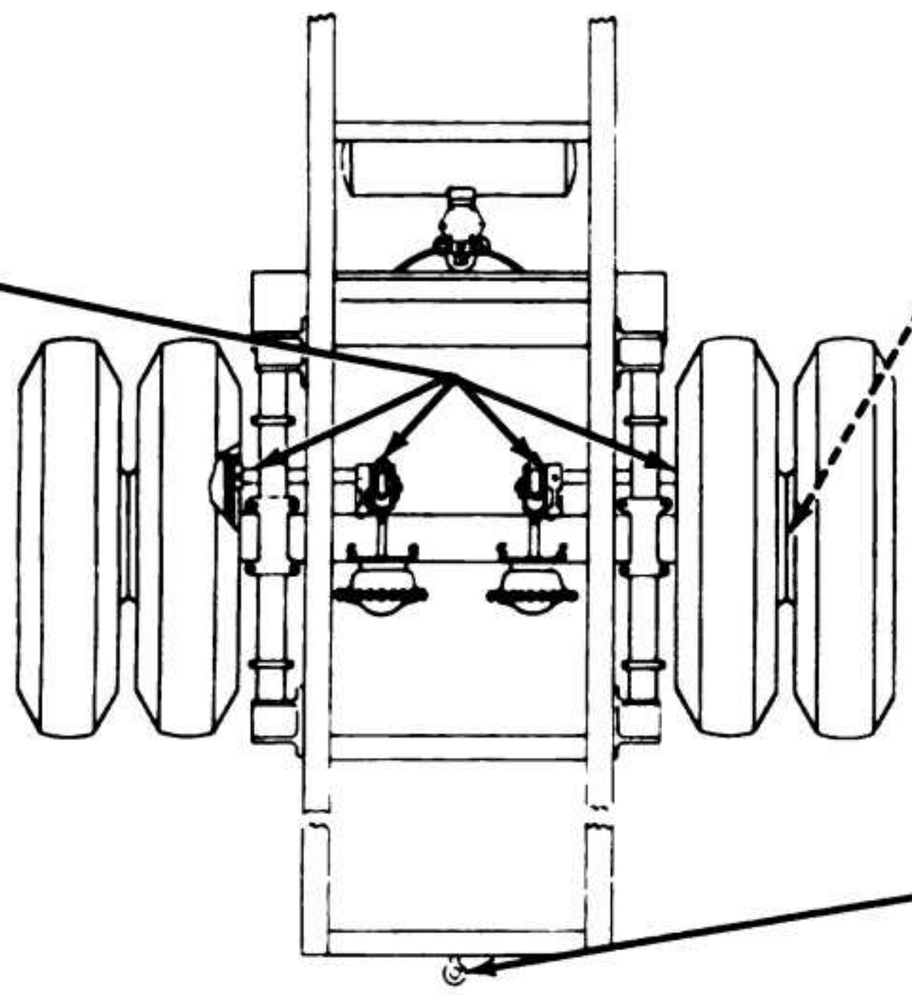


TRAILER

NOTES:

1. COLD WEATHER.

(When winterization kit is not available) Every 3 days, drain the engine and compressor crankcases and refill to "FULL" mark with OE 10. Add 1½ qts of gasoline to the engine crankcase, and 1 qt of gasoline to the compressor crankcase and run engine 5 minutes to mix. Mark the new level on the oil gages for future reference. CAUTION: Every ½ day, check levels and fill to "FULL" mark with OE 10. If engine is to be shut down for ½ day or more, add gasoline in proportions specified above to reach new level mark and run engine 5 minutes to mix. NOTE: OIL, fuel, Diesel may be used as a temporary diluent only when sufficient gasoline is not available. WARNING: Diluent used is inflammable; do not service equipment near heater or open flame.

2. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW —10°F.

Remove the lubricant prescribed in the key for above —10°F. Clean parts with diesel fuel oil, and drain gearcase. Relubricate with lubricants indicated in the key for below 10°F temperatures.

3. OIL CAN POINTS.

Lathe — All of the points indicated including the bed ways, lead and feed screws should be oiled with OE sparingly twice daily for first week of operation and once daily thereafter.
Engine — Every week lubricate throttle, choke and carburetor connections sparingly with OE.

4. CAUTION: Do not lubricate lathe while running.

Copy of this lubrication order will remain with the equipment at all times; instructions contained herein are mandatory and supersede all conflicting lubrication instructions dated prior to the date of this lubrication order.

BY ORDER OF THE SECRETARY OF THE ARMY:

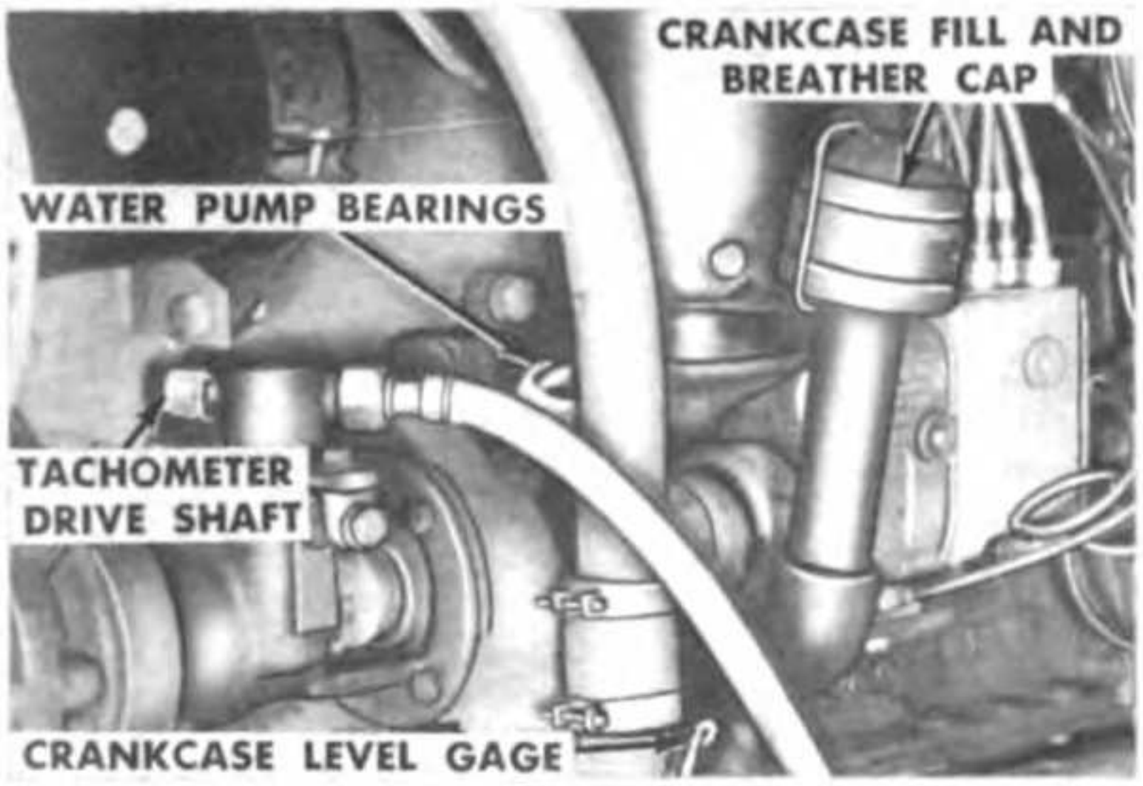
M. B. RIDGWAY,
General, United States Army,
Chief of Staff.

OFFICIAL:
JOHN A. KLEIN,
Major General, United States Army,
The Adjutant General.

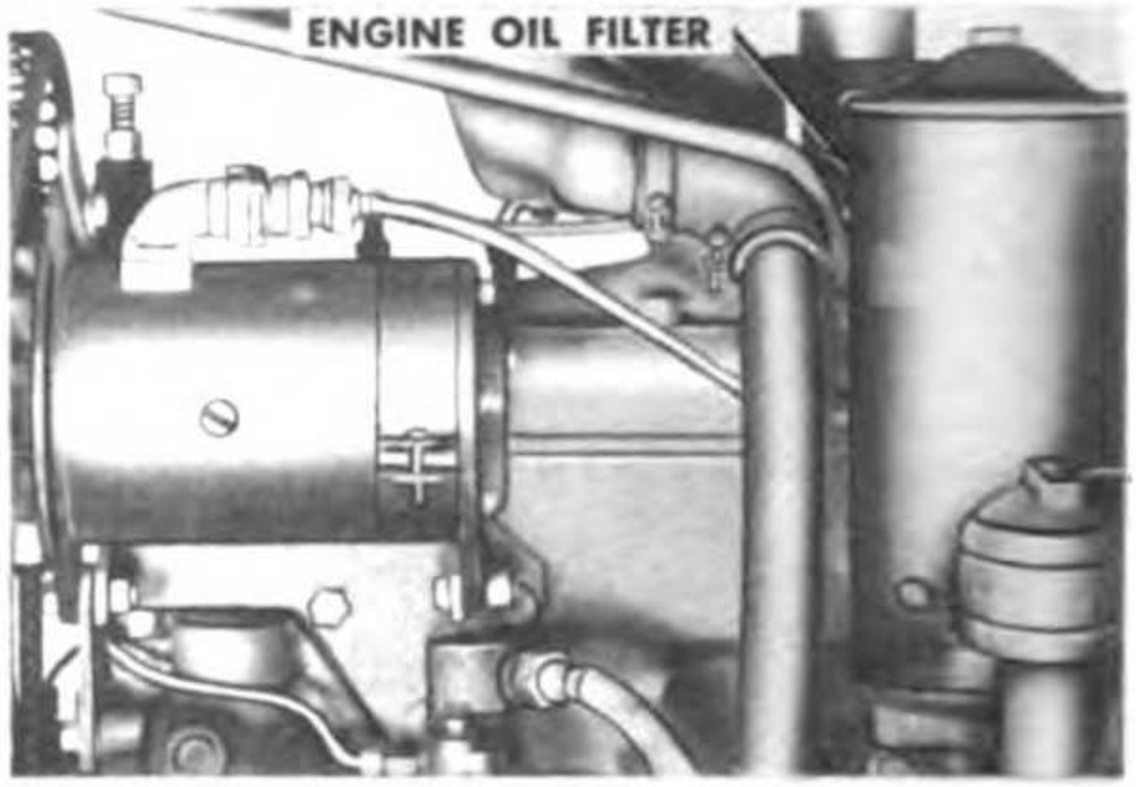
④

Figure 119—Continued

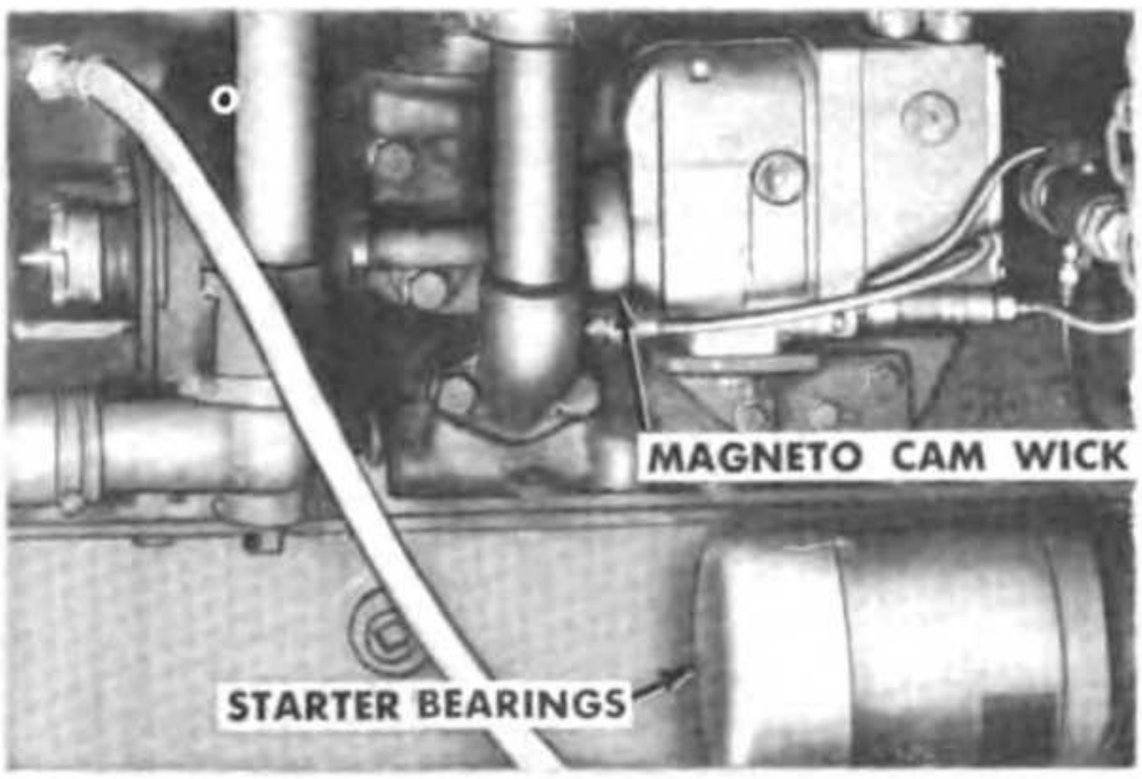
366424 O—56——8



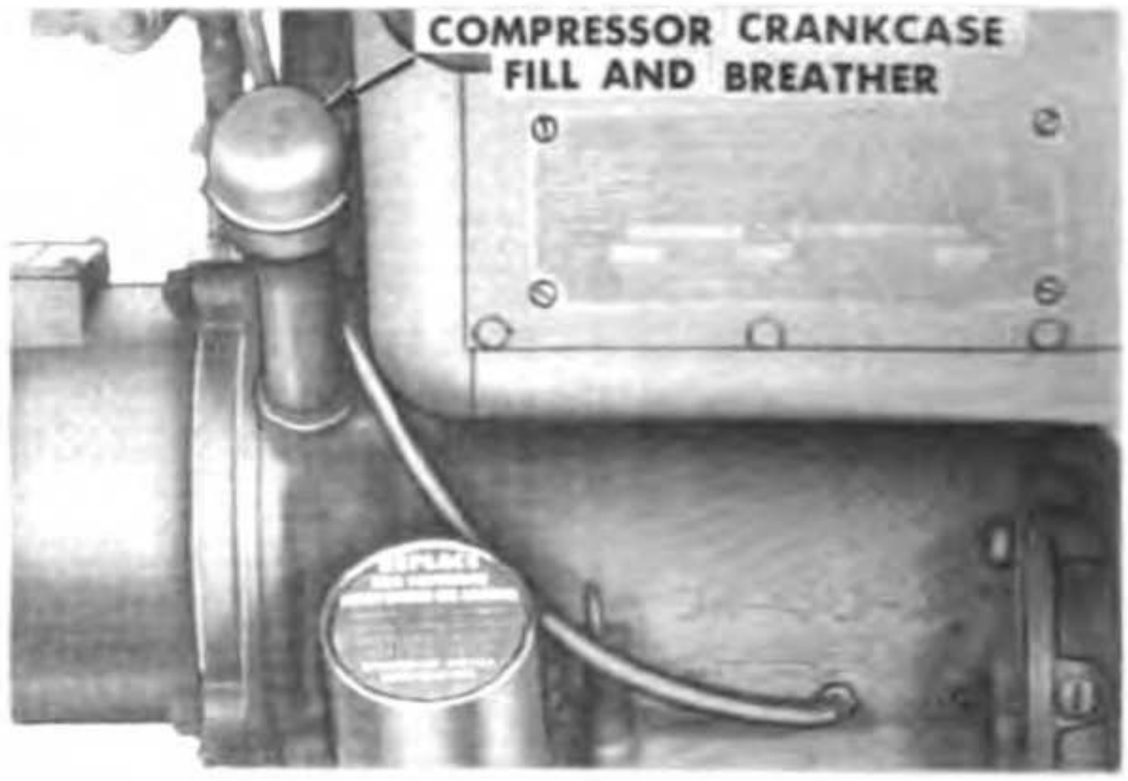
REFERENCE 1: Clean breather and reoil. Turn grease cups down one turn.



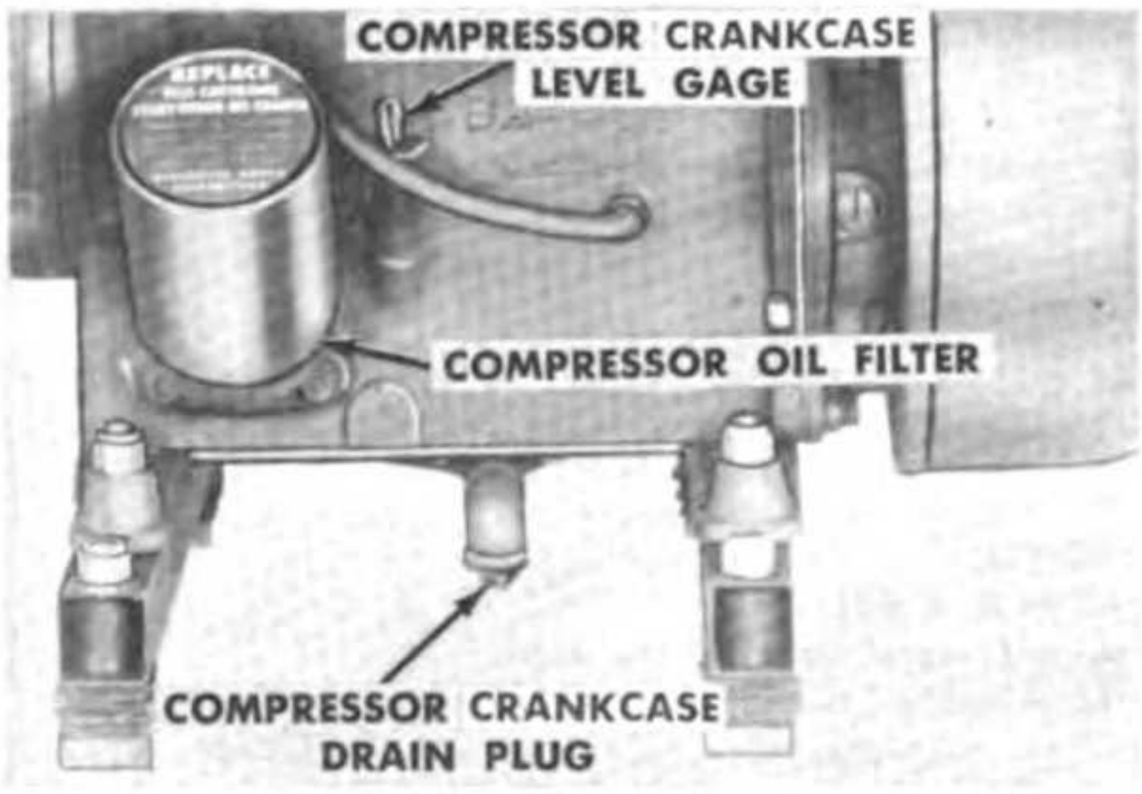
REFERENCE 2: Replace cartridge.



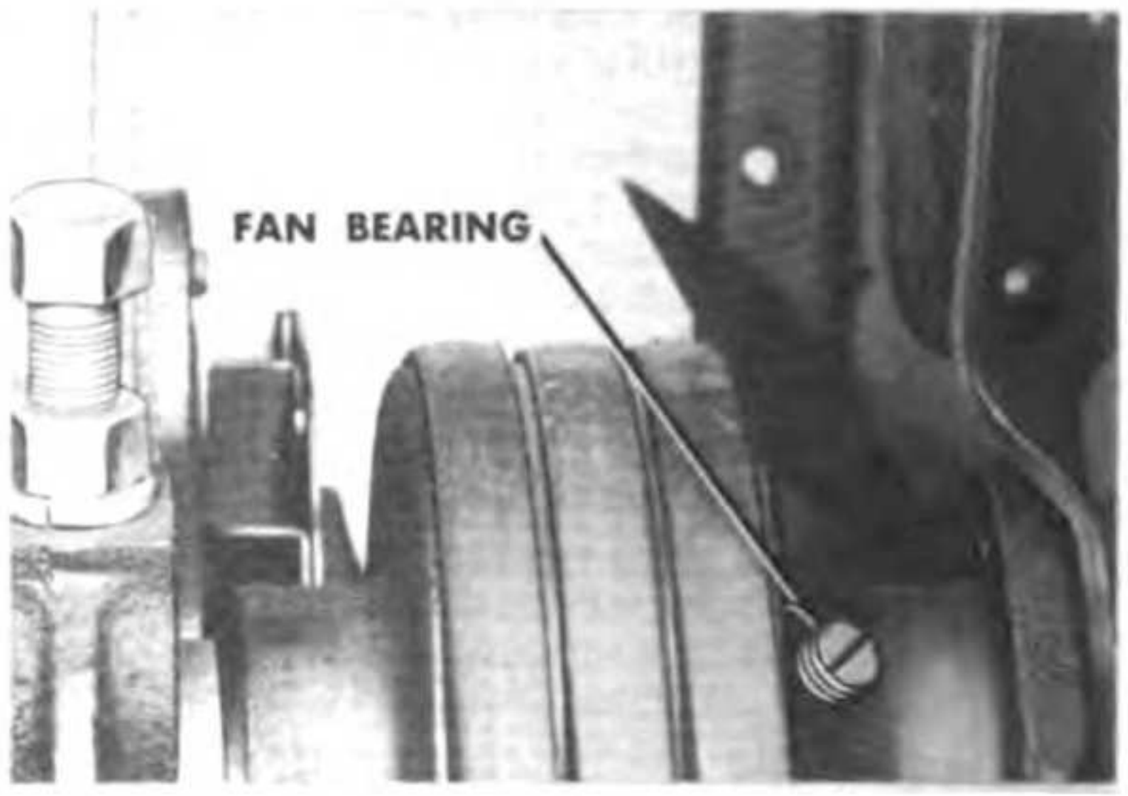
REFERENCE 3: No lubrication required.



REFERENCE 4: Clean breather and reoil.



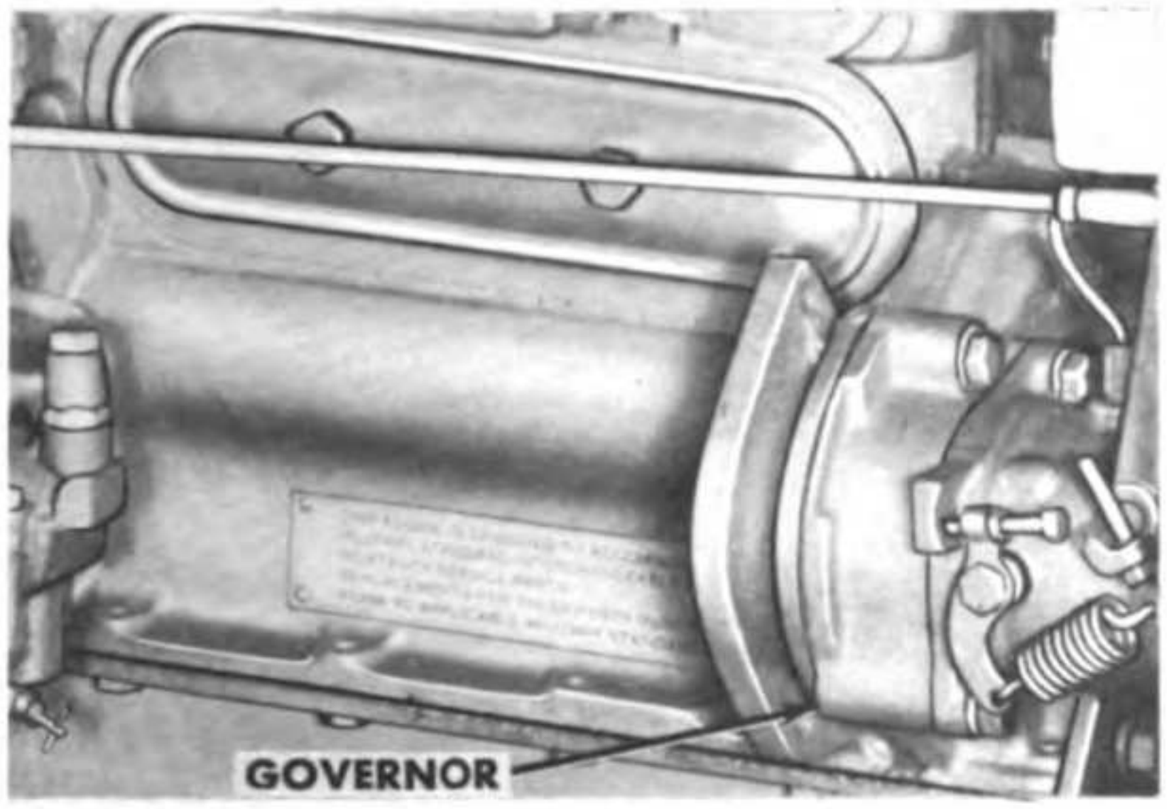
REFERENCE 5: Replace cartridge.



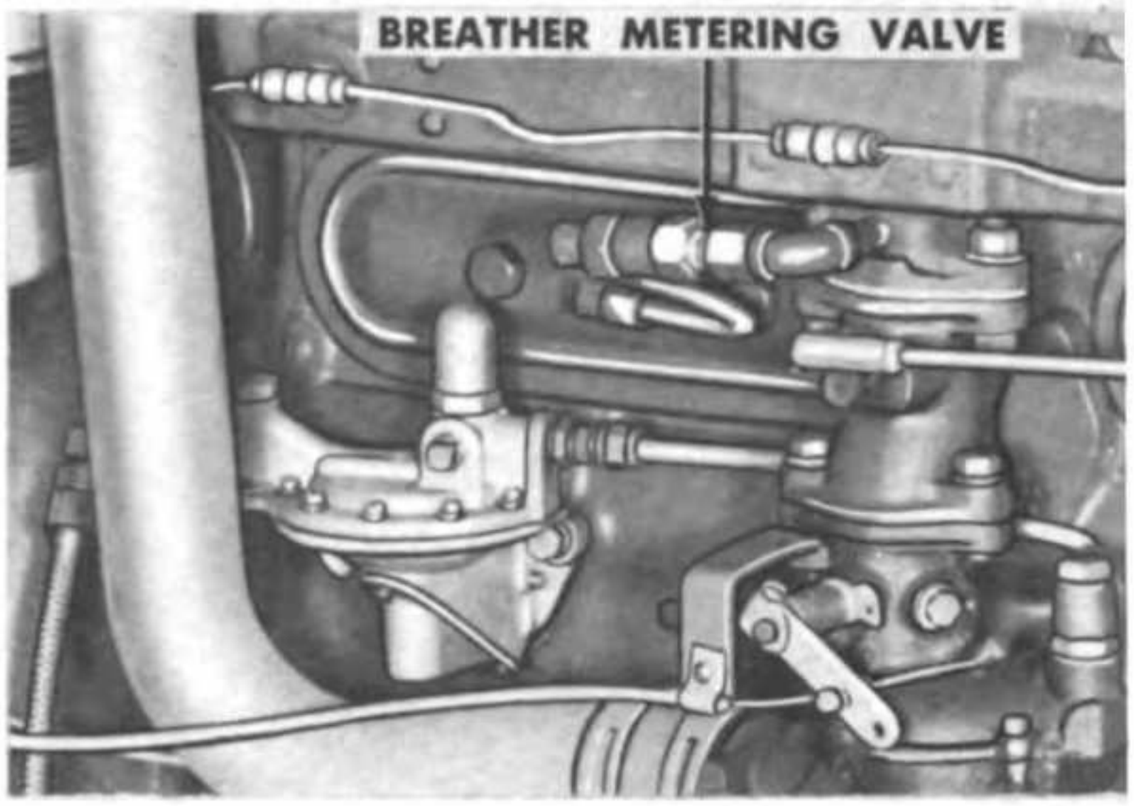
REFERENCE 6: Replace plug.

⑤

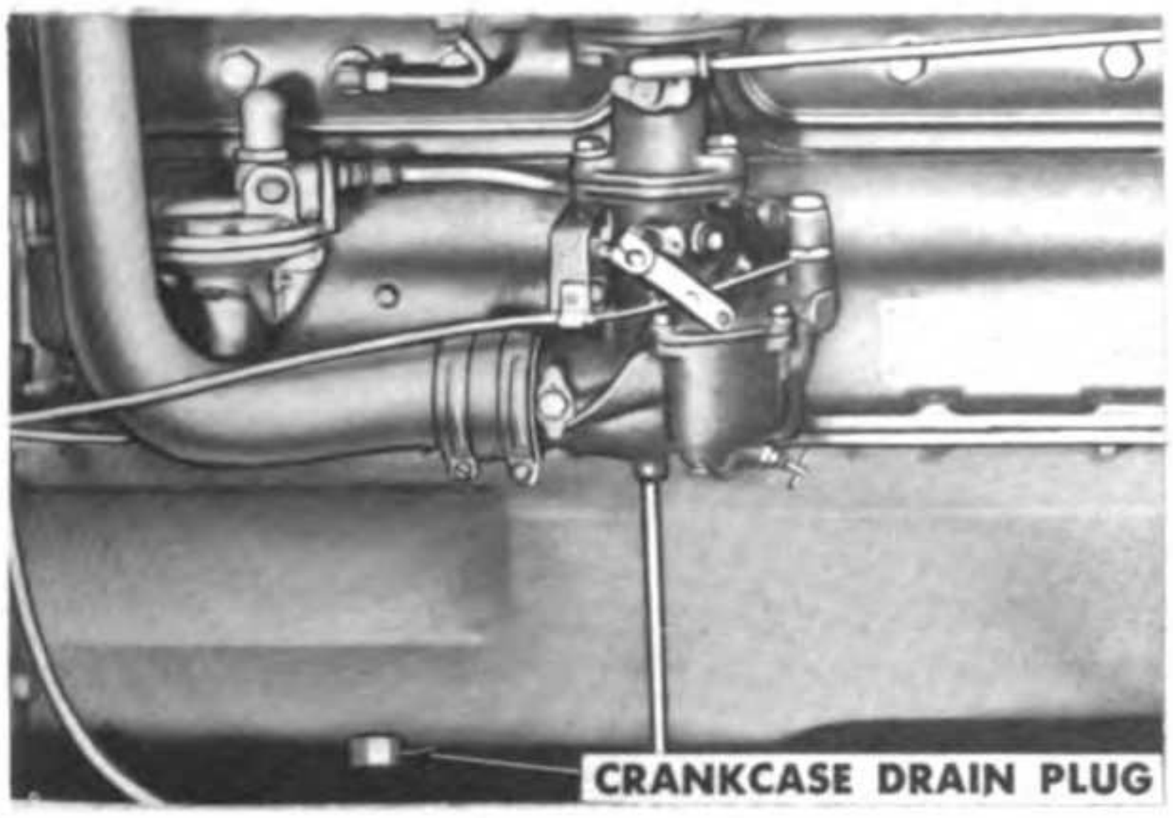
Figure 119—**Continued**



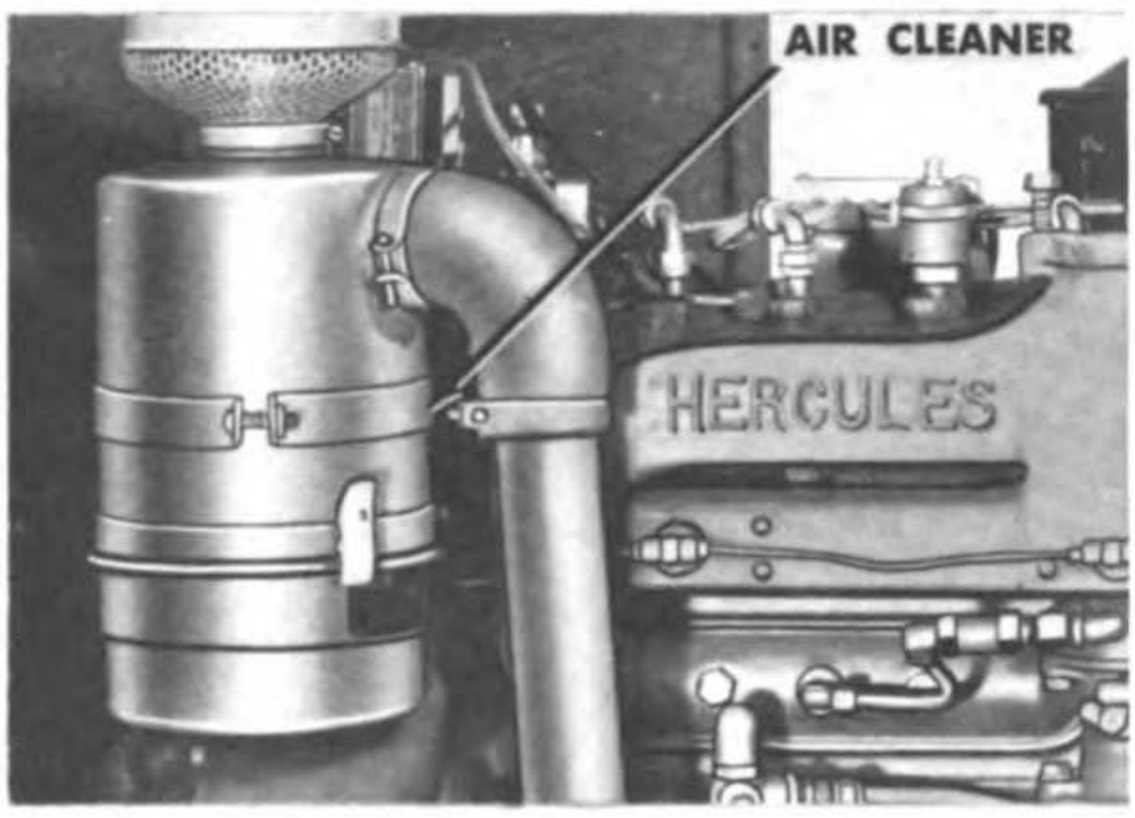
REFERENCE 7: Lubricated from engine.



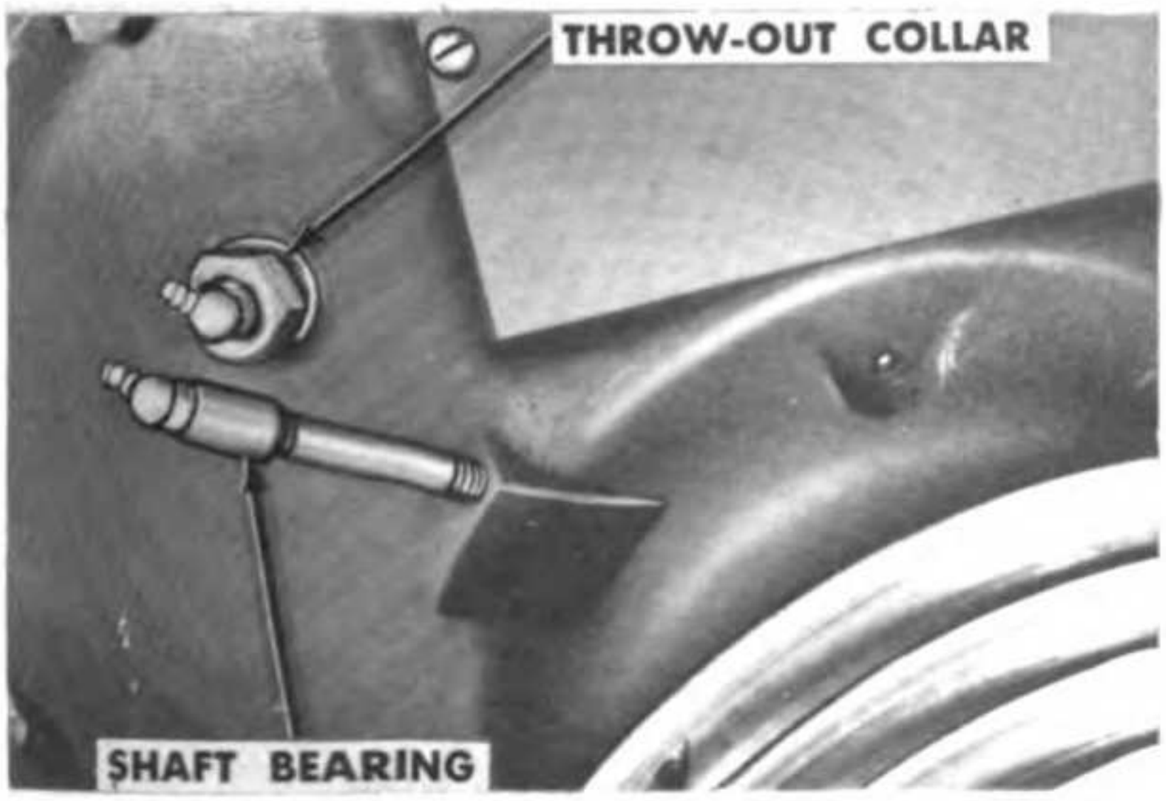
REFERENCE 8: Remove, clean and reoil sparingly.



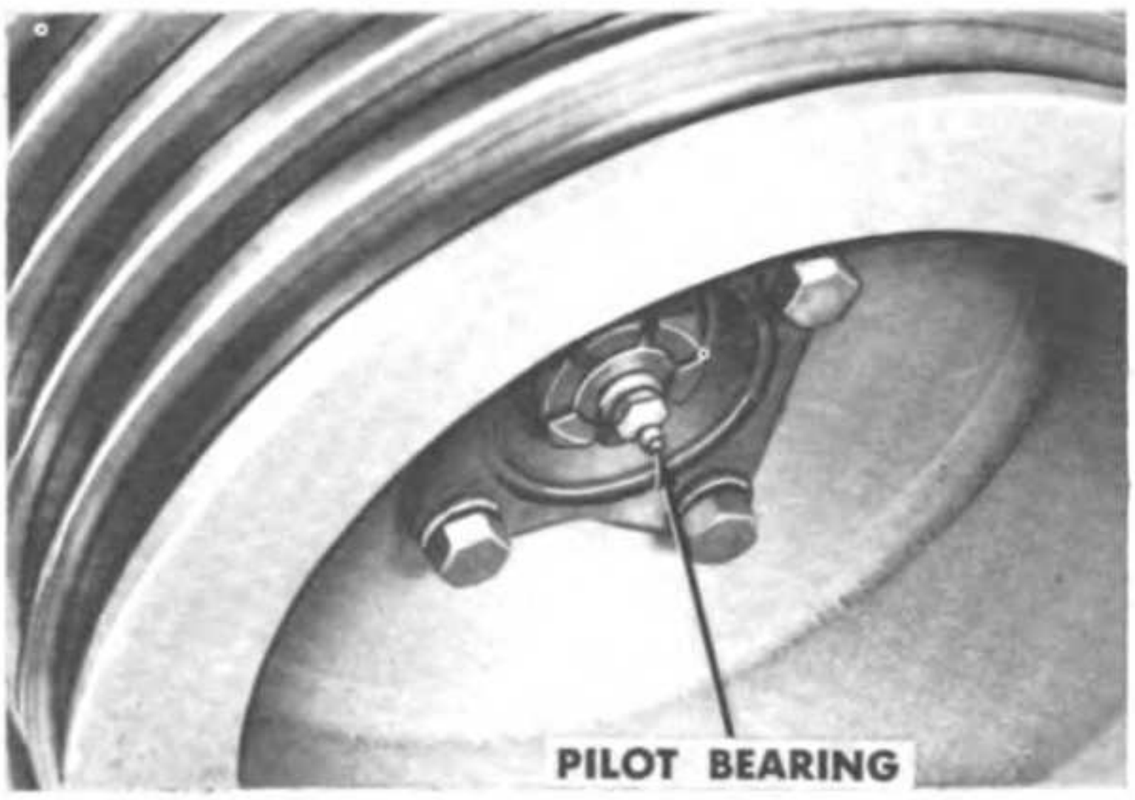
REFERENCE 9: Drain and refill.



REFERENCE 10: Clean breather and reoil.

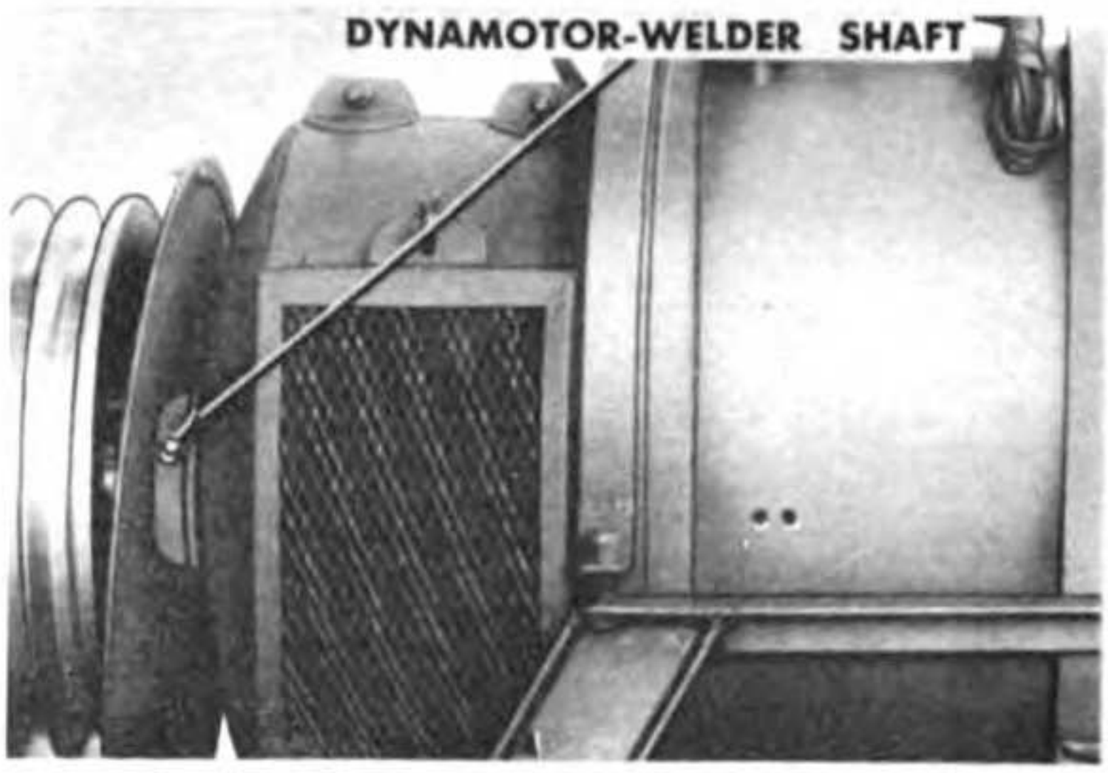


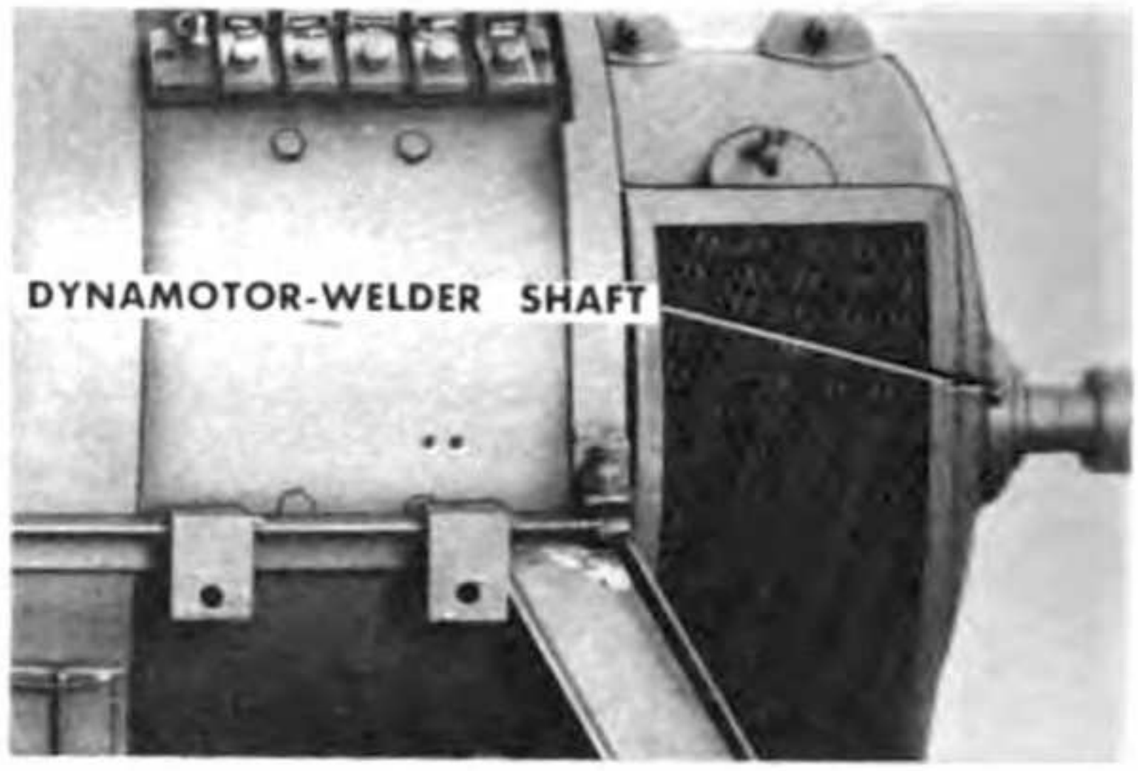
REFERENCE 11: Use grease gun.



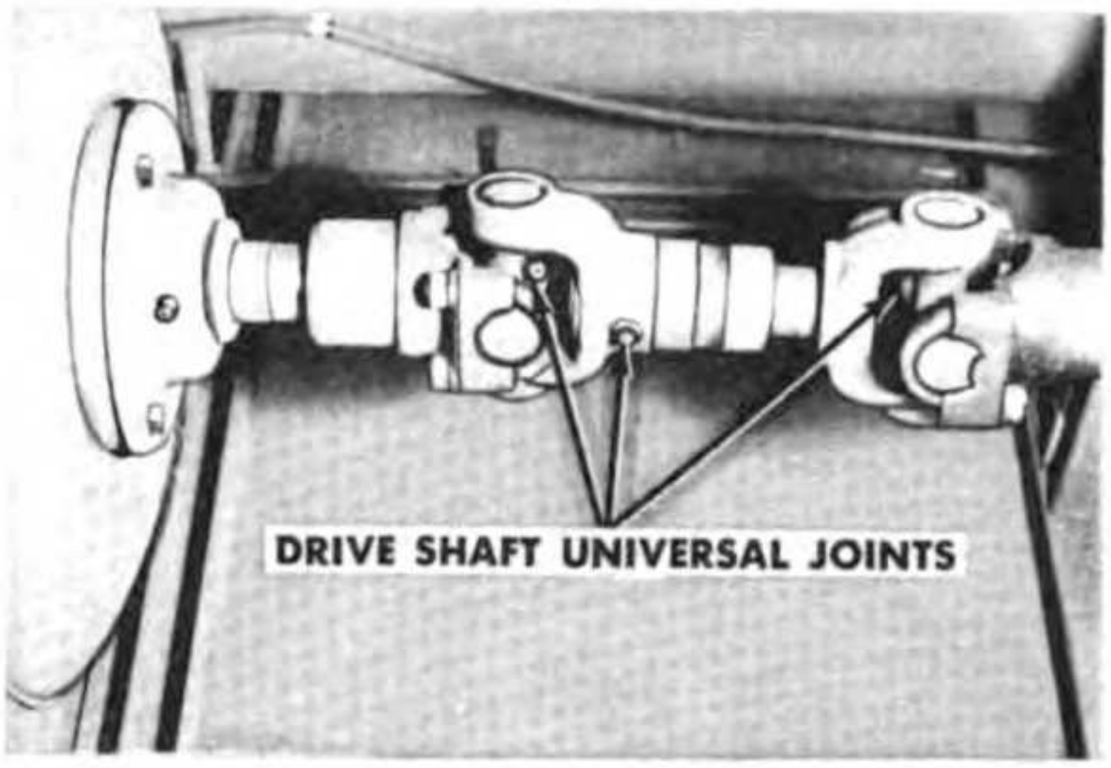
REFERENCE 12: Use grease gun.

Figure 119—Continued

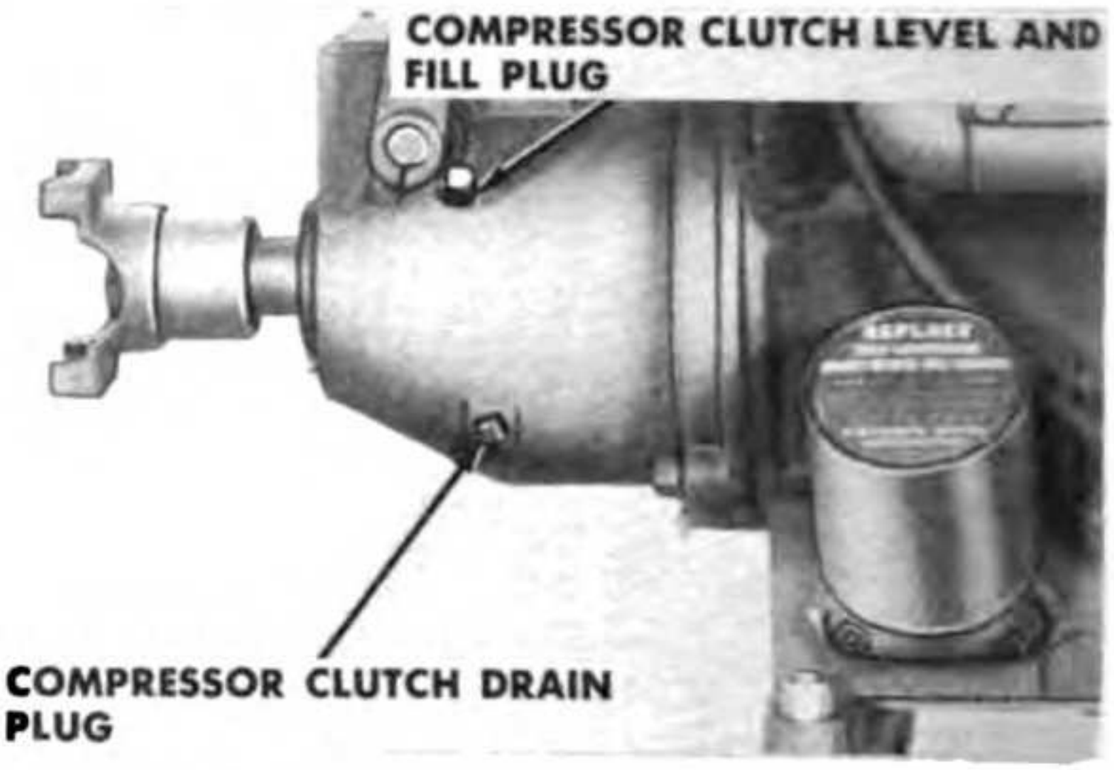




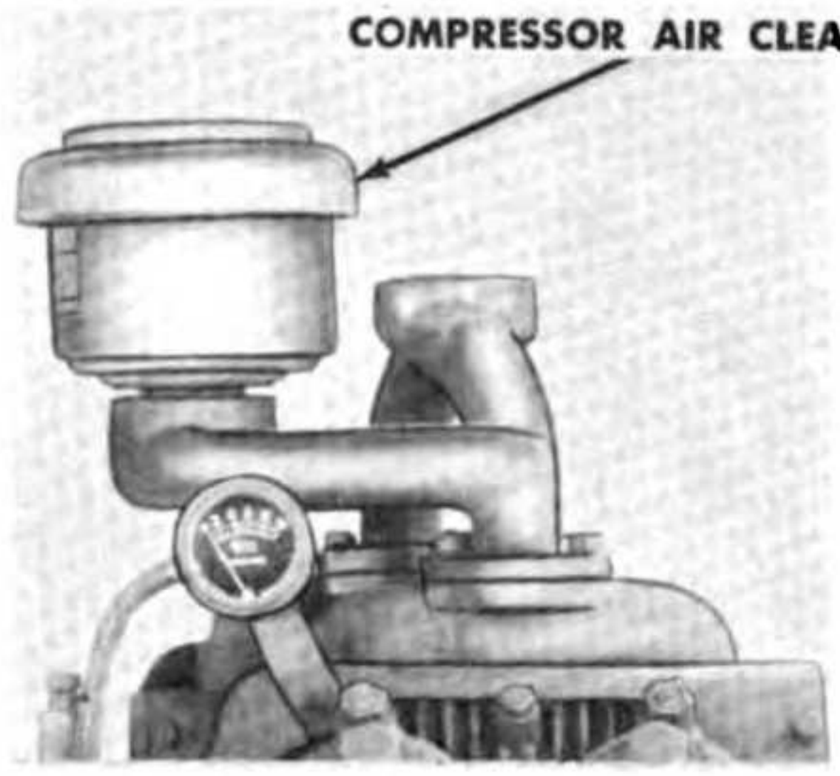
REFERENCE 13: Use grease gun.



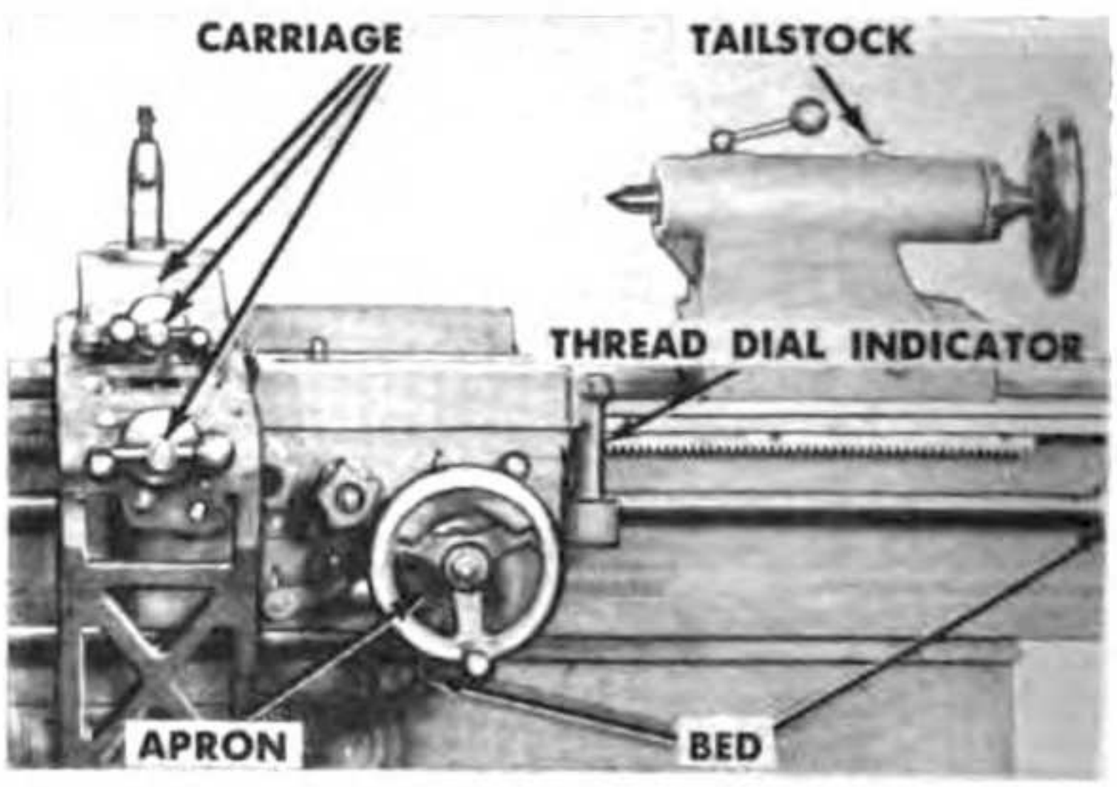
REFERENCE 14: Use grease gun.



REFERENCE 15: Drain and refill.

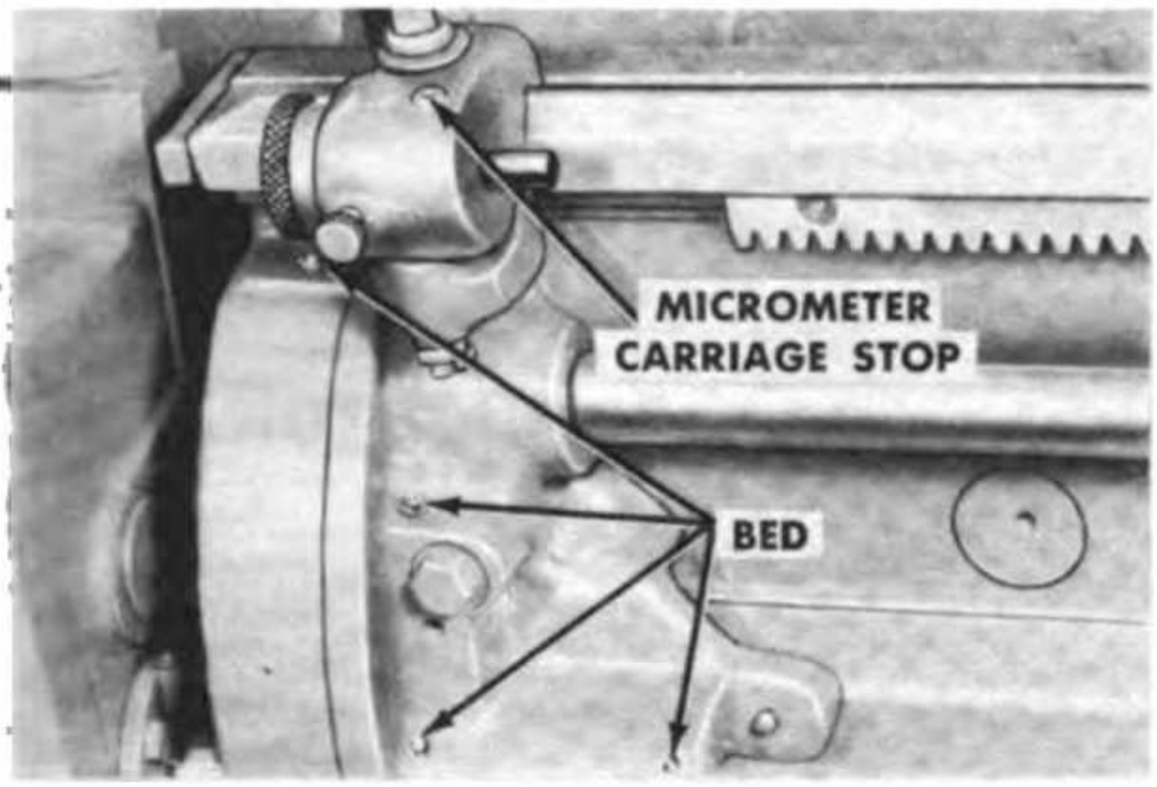


REFERENCE 16: Refill.

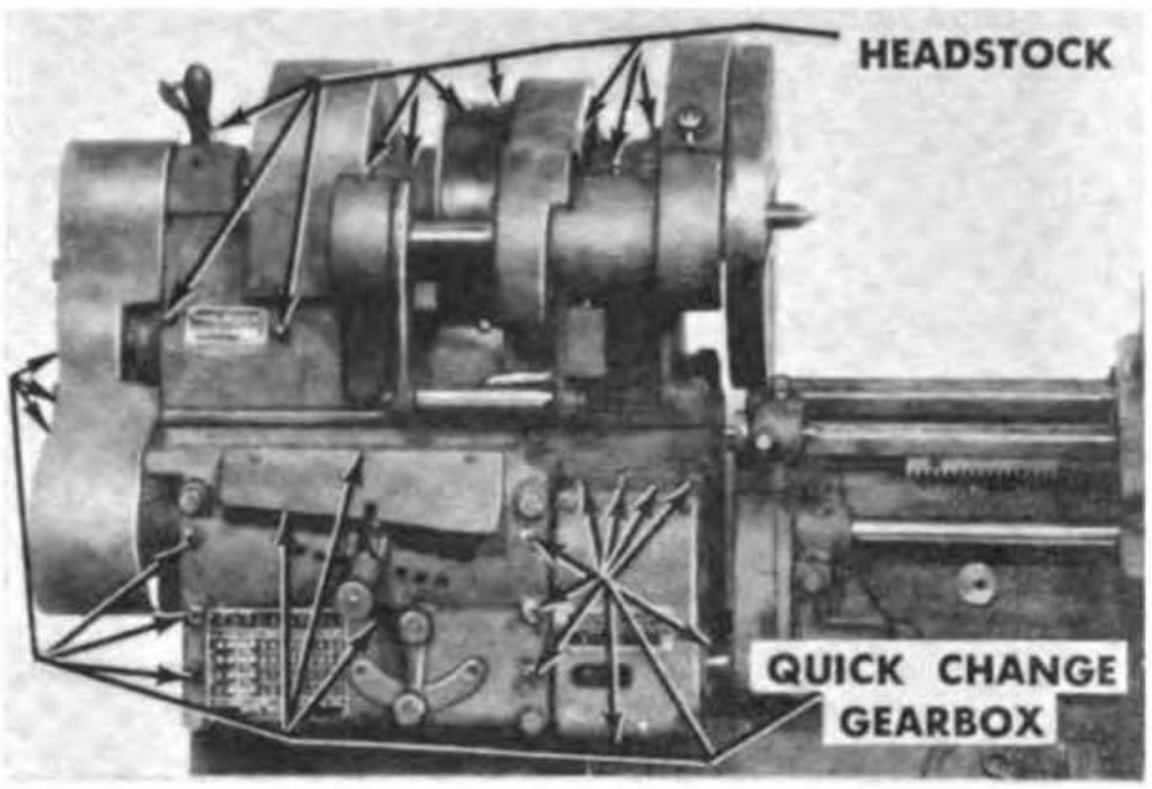


REFERENCE 17: Use OE sparingly.

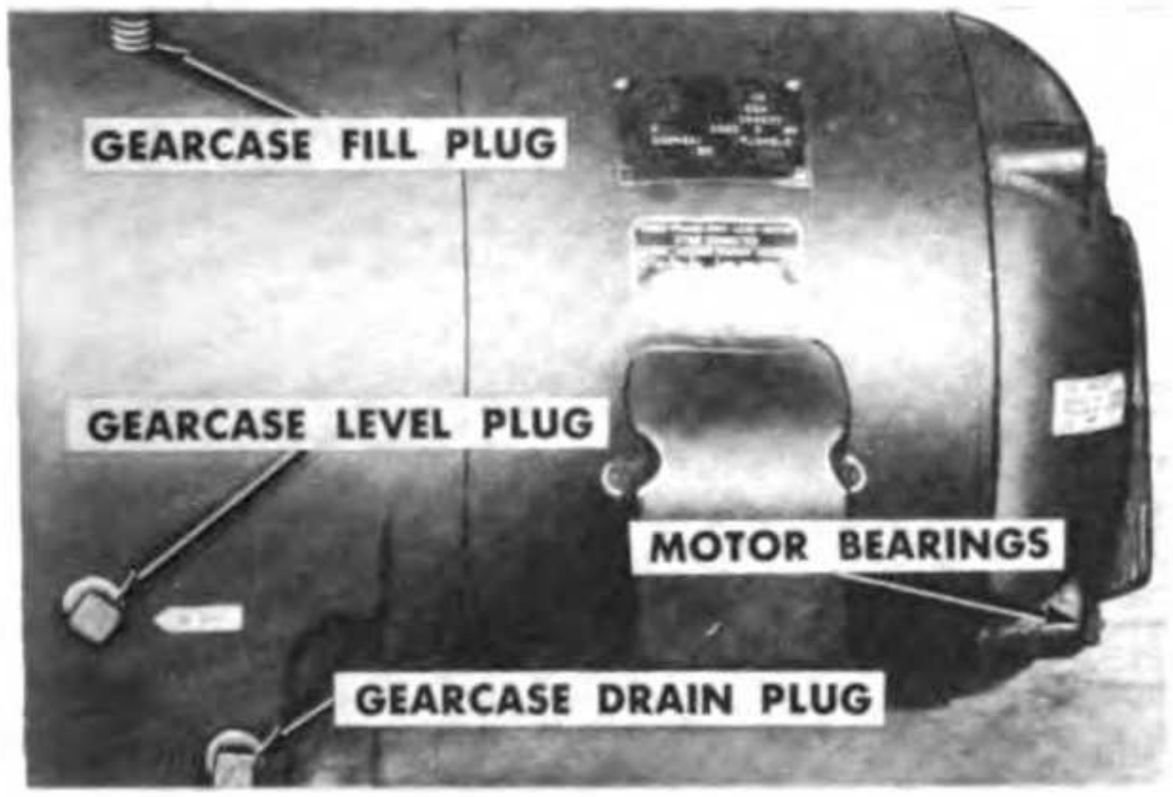
Figure 119—Continued



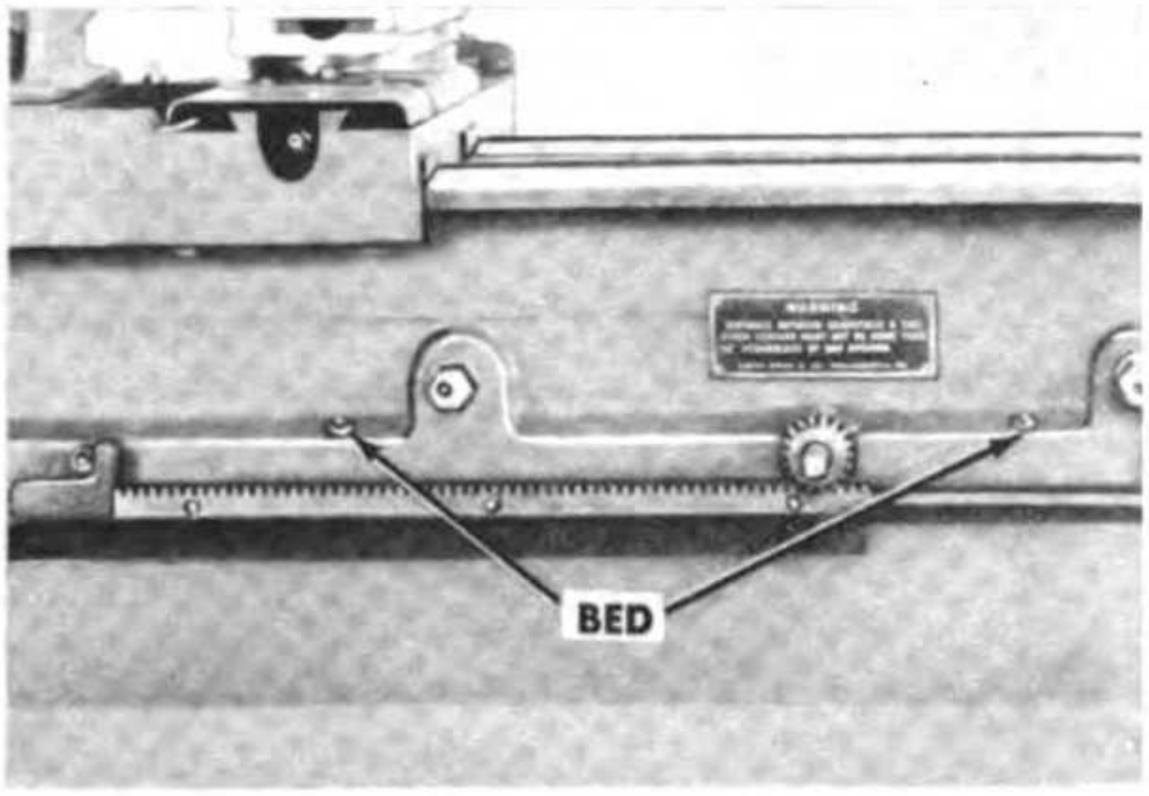
REFERENCE 18: Use OE sparingly.



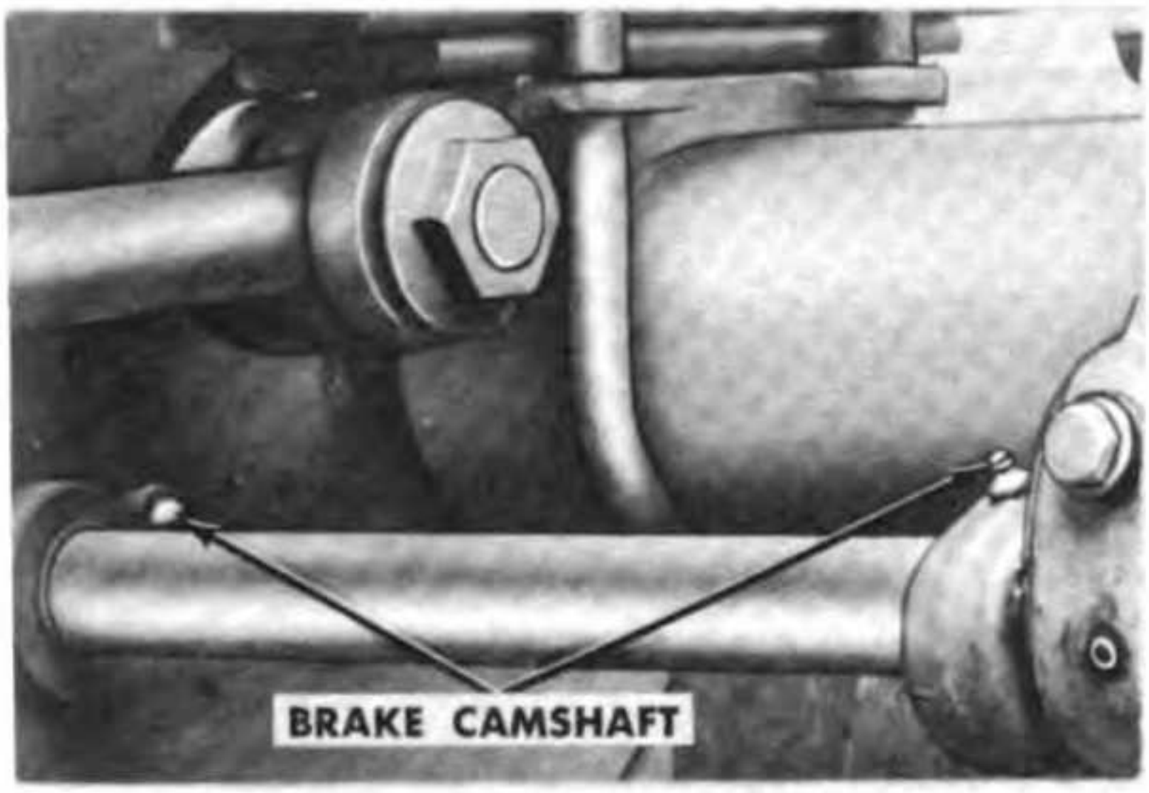
REFERENCE 19: Use OE sparingly.



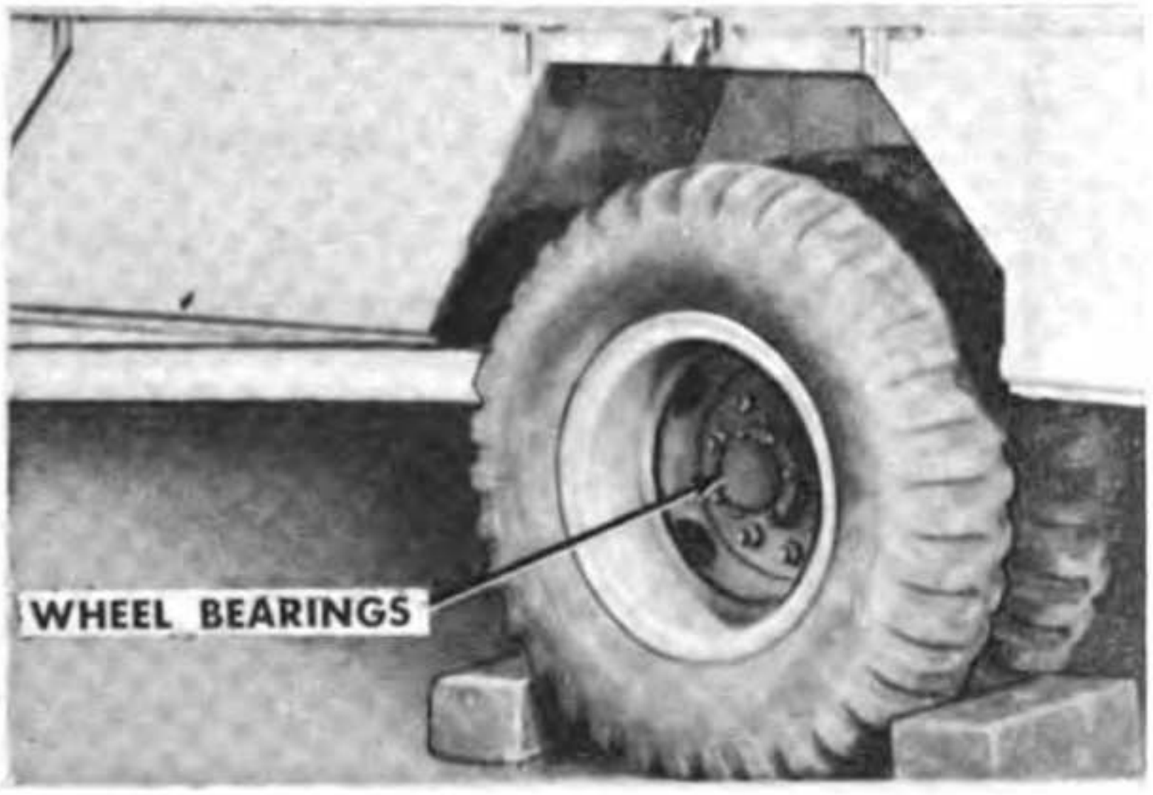
REFERENCE 20: Replace plugs.



REFERENCE 21: Use OE sparingly.

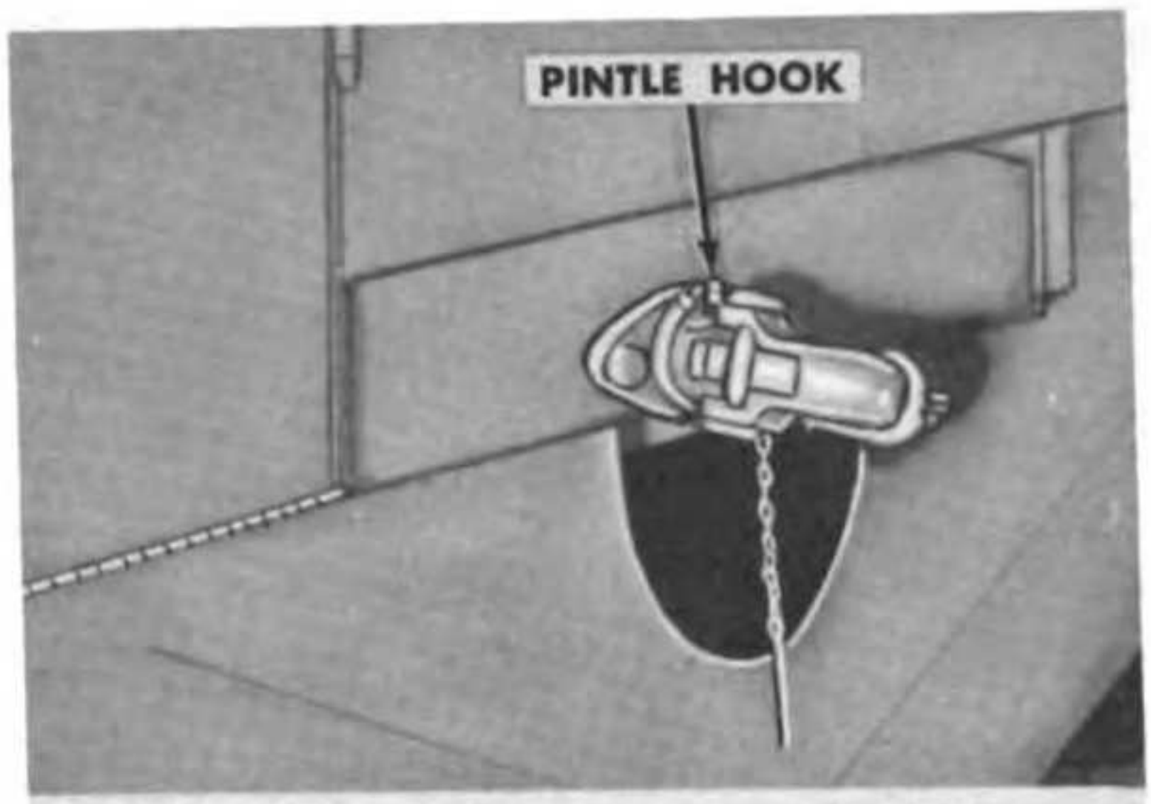


REFERENCE 22: Use grease gun.



REFERENCE 23: Remove wheels, clean and repack bearings.

Figure 119—Continued



REFERENCE 24: Use grease gun.

⑨

Figure 119—Continued

LUBRICATION ORDER

LO 5-9128-2

20 August 1954

SHOP, MOBILE, GENERAL PURPOSE REPAIR, SET NO.1, HEAVY, 12-TON SEMITRAILER MOUNTED, COUSE MODEL MED

Reference — TM5-9128-1, TM5-9128-2, TB5-9128-1, LO5-9128-1, LO5-9128-3

Intervals given are maximums for normal 8-hour day operation. For abnormal conditions or activities, intervals should be shortened to compensate.

Clean fittings before lubricating.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Drain gearcases only when hot after operation; check level and replenish when cool.

KEY

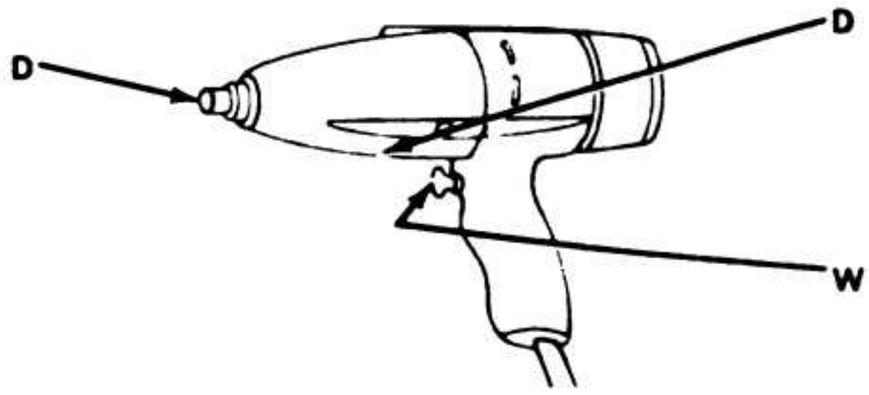
LUBRICANT	CAPACITY	EXPECTED TEMPERATURE			INTERVALS
		Above + 32 F	+ 32 to - 10 F	Below - 10 F	
OE—OIL, Engine, Heavy Duty		**OE** 10 or 9110	**OE** 10 or 9110	**OHA**	**D**—Daily
All Points					
GO—LUBRICANT, Gear, Universal		**GO**—90	**GO**—75	**GO**—S	**W**—Weekly
Workhead Housing					
Drivehead					**M**—Monthly
OSM—OIL, Lubrication, Steam Cylinder, Mineral		**OSM**—1	**OSM**—1	**OSM**—1	**Q**—Quarterly
Gearbox					**S**—Semi-annually
BR—LUBRICANT, Ball and Roller Bearings					
GAA—GREASE, Automotive and Artillery					
OHA—OIL, Hydraulic, Aircraft, Petroleum Base					

LUBRICANT • INTERVAL

① Anvil Shank (Sparingly) (Hold in upright position when lubricating) — OE D

INTERVAL • LUBRICANT

D — BR Hammercase (Sparingly) (Every 2 days remove case, lubricate jaws, cam balls, and bearing surfaces sparingly) ①



W — OE Trigger (Sparingly) ①

IMPACT WRENCH

CONTINUED ON FOLLOWING PAGE

①

Figure 120. Lubrication Order 5–9128–2.

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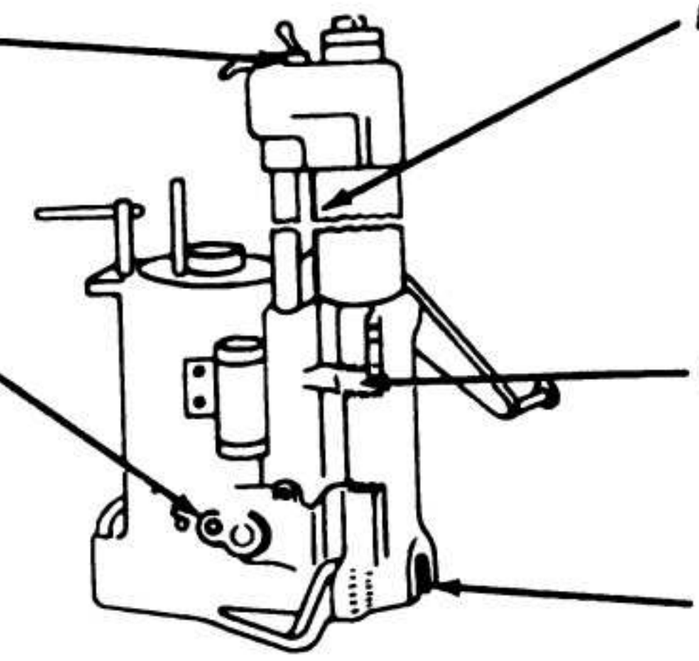


2 — Gearcase (Sparingly) — BR M

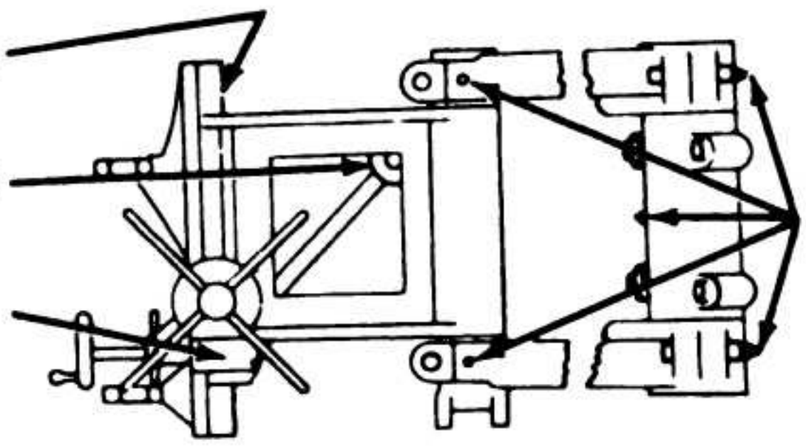
3 — Gearbox Fill and Level (See Key) (Maintain level at fill opening, fill in a vertical position only.) — OSM M

M OE Column (Lubricate in horizontal position, allow to run down casting to felt washers) (Wipe bar dry after lubrication) — 2

Q GAA Feed Mechanism (Remove plate on crank hand side, repack) — 8

Q BR Cutterhead Bearing (Disassemble, clean and repack) — 3

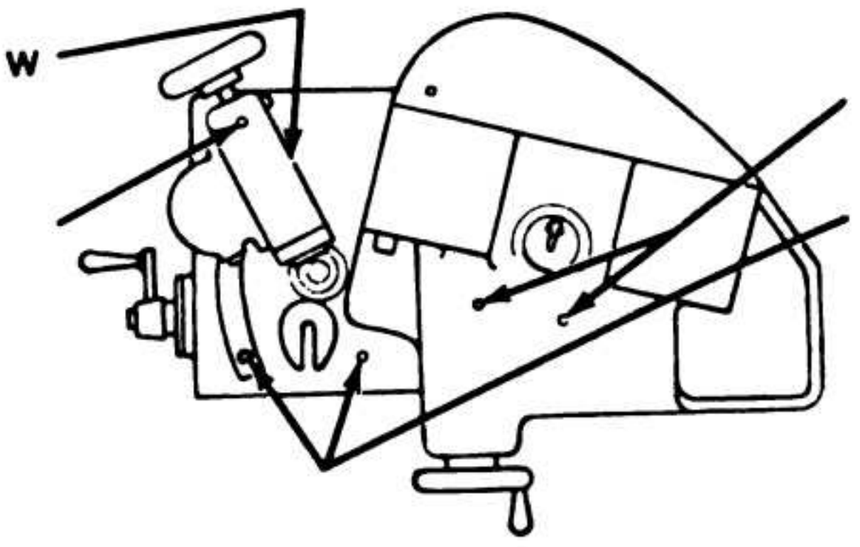
CYLINDER BORING BAR



4 — Slide and Rack (Sparingly) OE D; Shock Absorber (Sparingly) OE D; Gearbox (Only on disassembly) GAA

M GAA Collar Bearings — 9

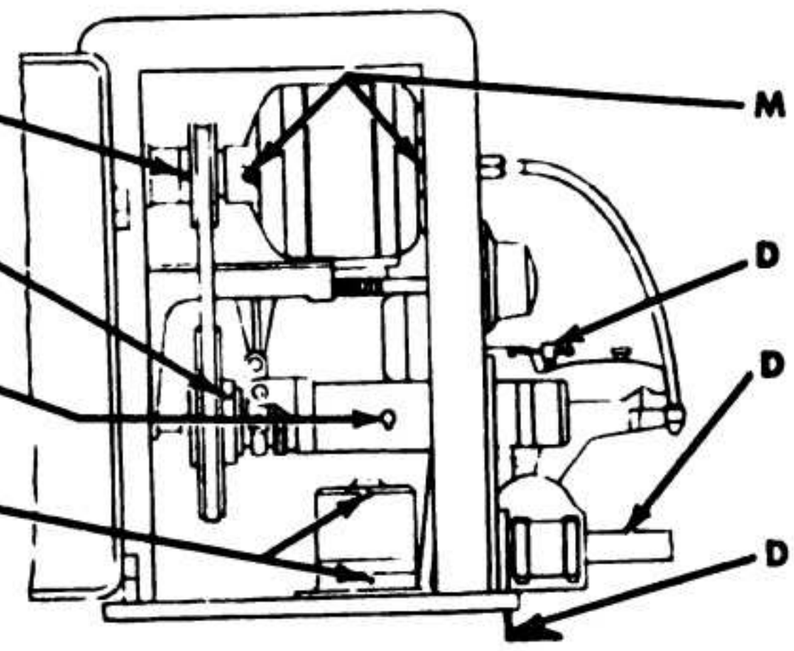
RADIAL DRILL ARM



5 — Workhead Housing Level Plug (Check level); Workhead Housing Fill Plug (See Key) GO — W

D OE Wheelhead; D OE Worktable — 5

VALVE REFACER



6 — Main Drive Pulley GAA M

7 — Clutch GAA M; Spindle OE M; Pump Motor (Sparingly) OE M

M OE Drive Motor (Sparingly) — 6

D OE Pin Vise Assembly; D OE Support Bar (Keep clean, lubricate sparingly) — 10

D OE Foot Pedal — 11

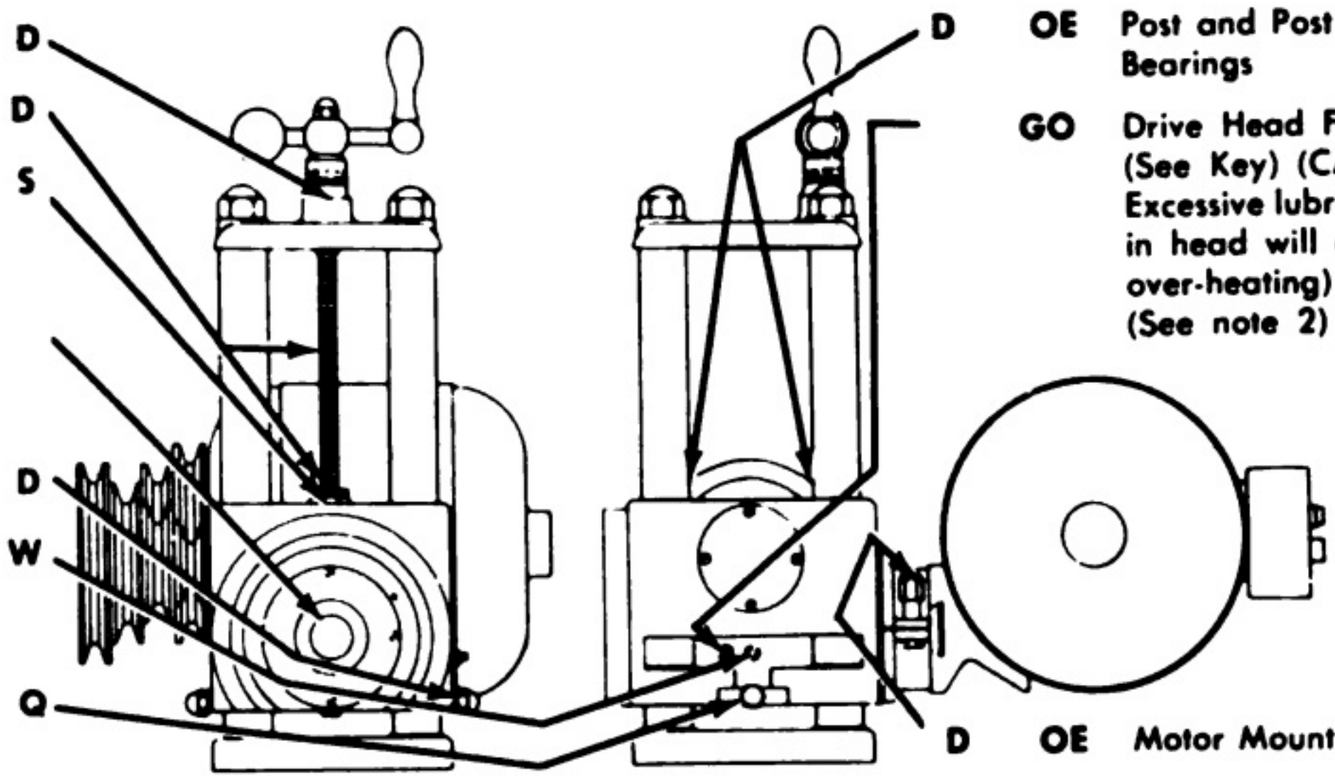
HONING MACHINE

Figure 120—Continued

LUBRICANT • INTERVAL | **INTERVAL • LUBRICANT**

12

Thrust Bearing	BR	D
Lead Screw and Nut	OE	D
Lead Screw Bearing (Remove screw, clean and repack)	BR	S
Arbor Taper (When adapted to machine)	BR	
Post Lock Threads	OE	D
Drive Head Level Plug (Check level) (See note 2)		W
Drive Head Drain Plug (Drain and refill)		Q



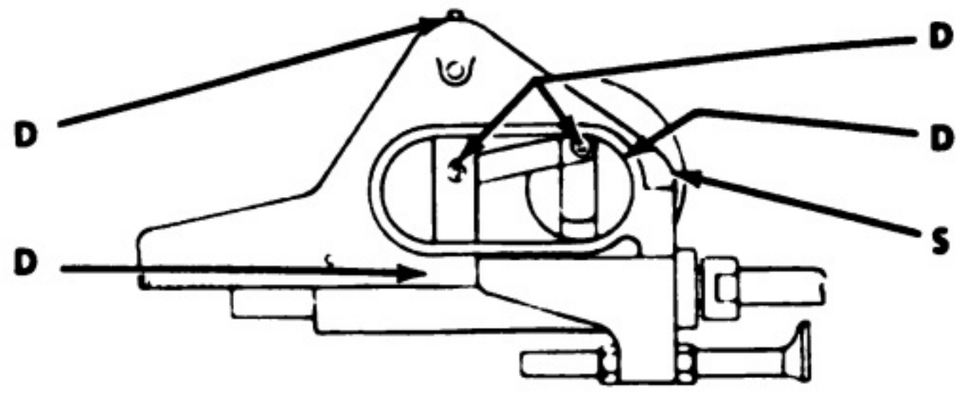
D	OE	Post and Post Bearings
GO		Drive Head Fill Plug (See Key) (CAUTION: Excessive lubricant in head will cause over-heating) (See note 2)
D	OE	Motor Mount Locknut

15

BASIC HEAD AND POST ASSEMBLY

13

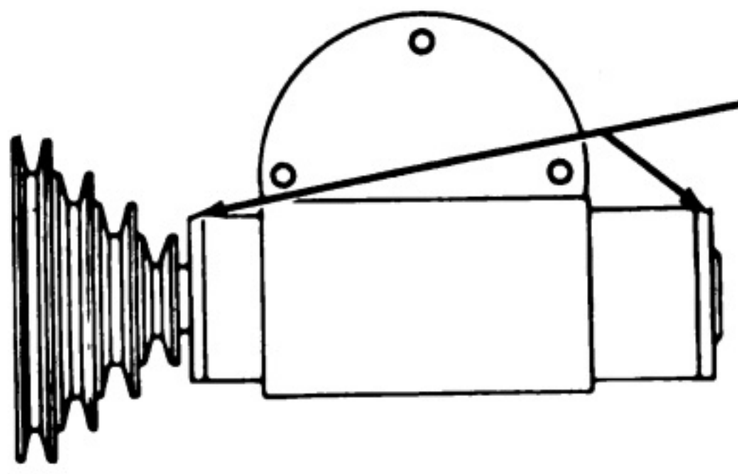
Arm Bearing (Sparingly)	OE	D
Ram Bearing	OE	D



D	OE	Rod Bearing (Sparingly)
D	OE	Cam Surface (Sparingly)
S	BR	Spindle Bearing (Clean and repack)

13

SLOTTING-AND-KEYSEATING HEAD

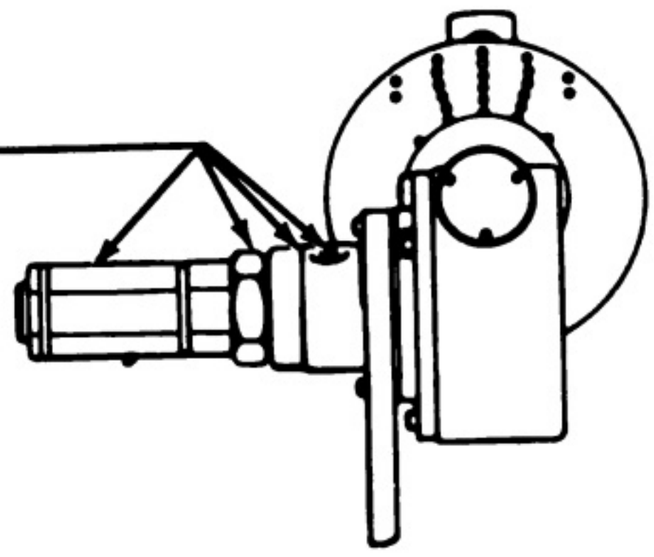


S	BR	High-Speed Head (Clean and repack bearings)

16

HIGH-SPEED HEAD

14 — Gear-Dividing Head (Clean and repack gear housing and bearings) (Thrust faces, threads, lock screws, oil daily with OE) — BR — S



GEAR-DIVIDING HEAD

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③

Figure 120—Continued

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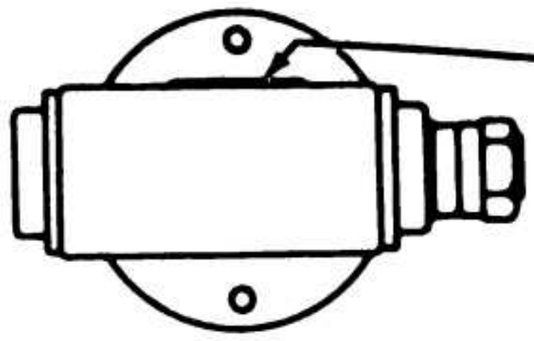
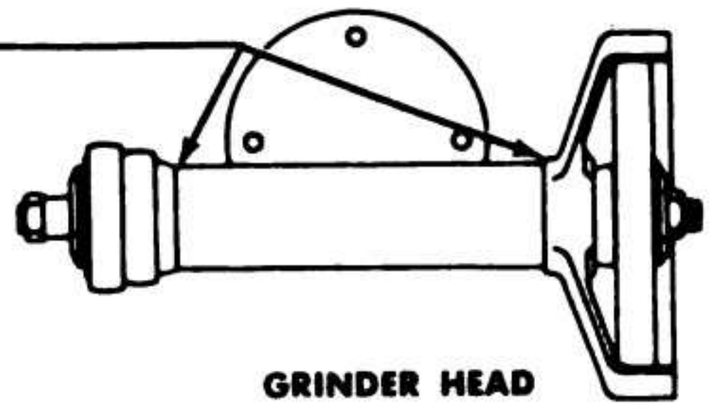


90° MILLING HEAD

S BR 90 Milling Head (Remove inspection plate, check level, clean and repack ½ full. Recheck for vertical use) — 19

17 — Grinder Assemblies (Remove spindle bearings. Clean and repack) (CAUTION: Extreme cleanliness and care in disassembly and assembly is important)

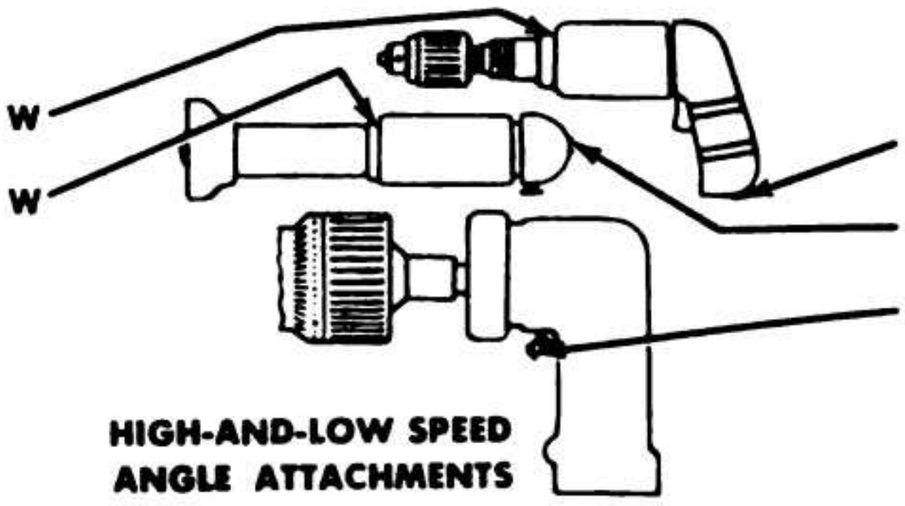


S BR

GRINDER HEAD

MILLING-AND-GRINDING ATTACHMENT

18 — Gearcase BR W
Gearcase BR W



D OE Air Inlet
D OE Air Inlet
W BR Gearcase — 18

HIGH-AND-LOW SPEED ANGLE ATTACHMENTS

AIR TOOLS

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW —10 F. Clean parts with Diesel fuel oil, and drain all oil housings. Relubricate with lubricants indicated in the key for below —10 F.

2. SPECIAL PROCEDURE. Milling-and-grinding attachment. When spindle is used in vertical position, add lubricant until it reaches level plug. (CAUTION: Excess lubricant must be drained off when returning spindle to horizontal position).

3. DO NOT LUBRICATE. The Cylinder boring-bar motor, Valve-refacer Workhead and Wheelhead motors, Milling-and-grinding attachment motor, Brake-relining machine motor and Bench-grinder motor.
These motors are equipped with life-seal bearings and require no lubrication. CAUTION: Do not use solvent in cleaning. Wipe with oil dampened cloth only.

4. OIL CAN POINTS. Weekly, lubricate the pivot points and foot pedal on Brake-relining machine, side door hinges on Honing machine and the column of the Cylinder boring bar with OE.

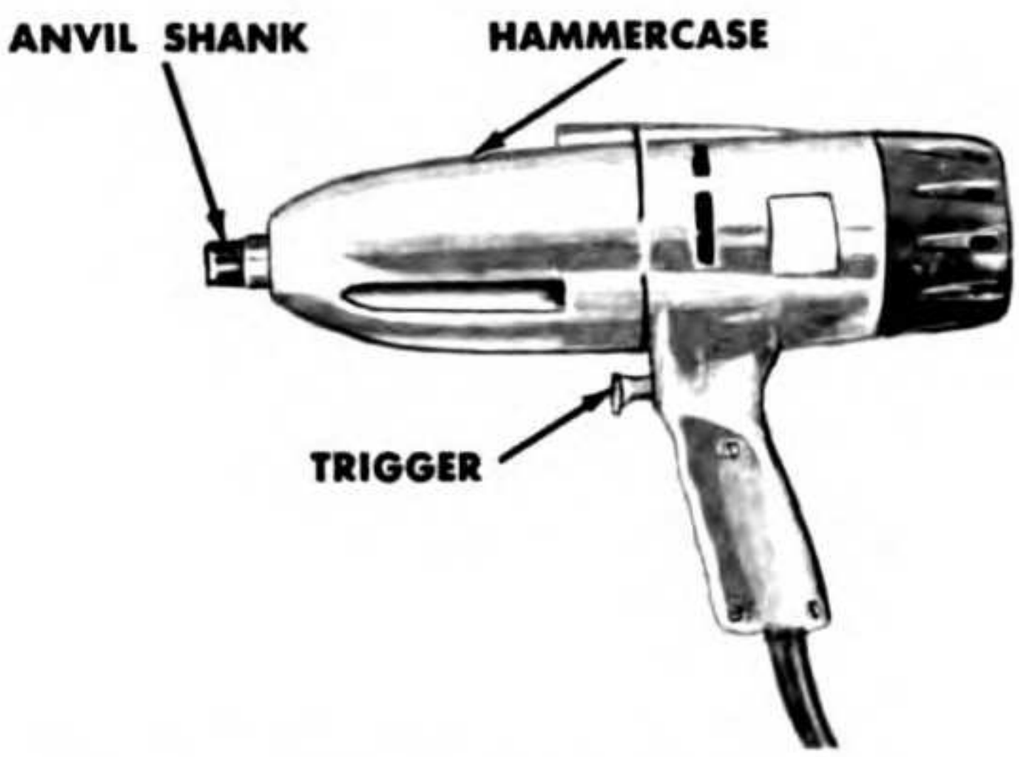
Copy of this lubrication order will remain with the equipment at all times; instructions contained herein are mandatory and supersede all conflicting lubrication instructions dated prior to the date of this lubrication order.

BY ORDER OF THE SECRETARY OF THE ARMY:

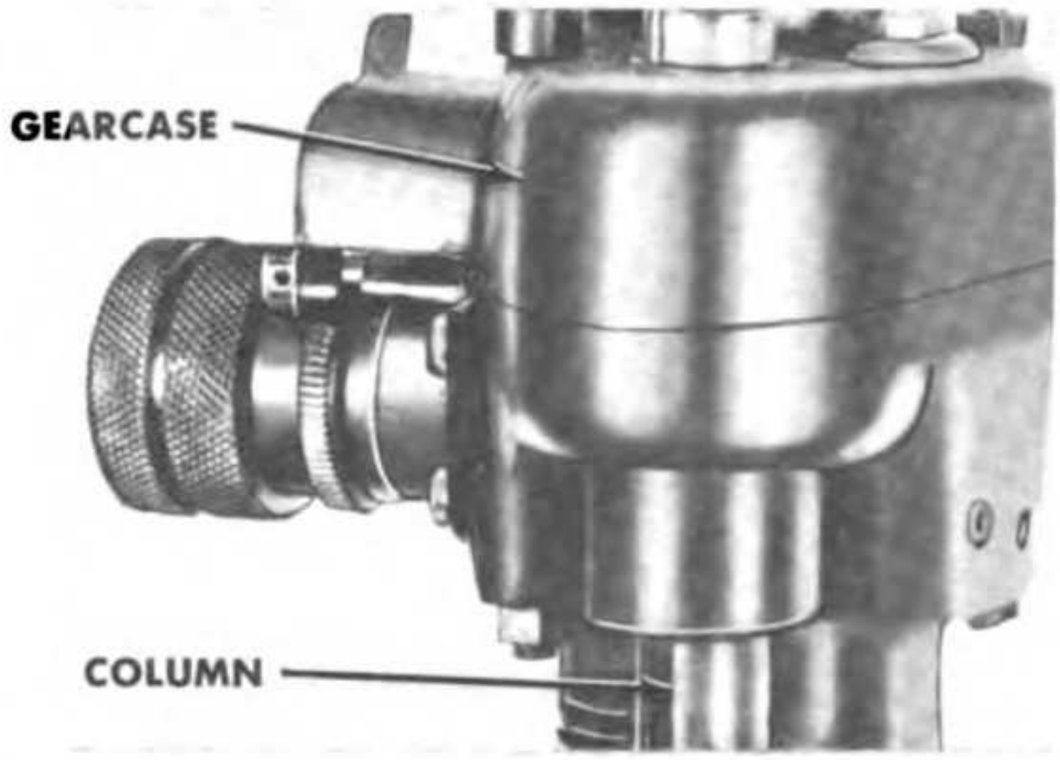
M. B. RIDGWAY,
General, United States Army,
Chief of Staff.

OFFICIAL:
JOHN A. KLEIN,
Major General, United States Army,
The Adjutant General.

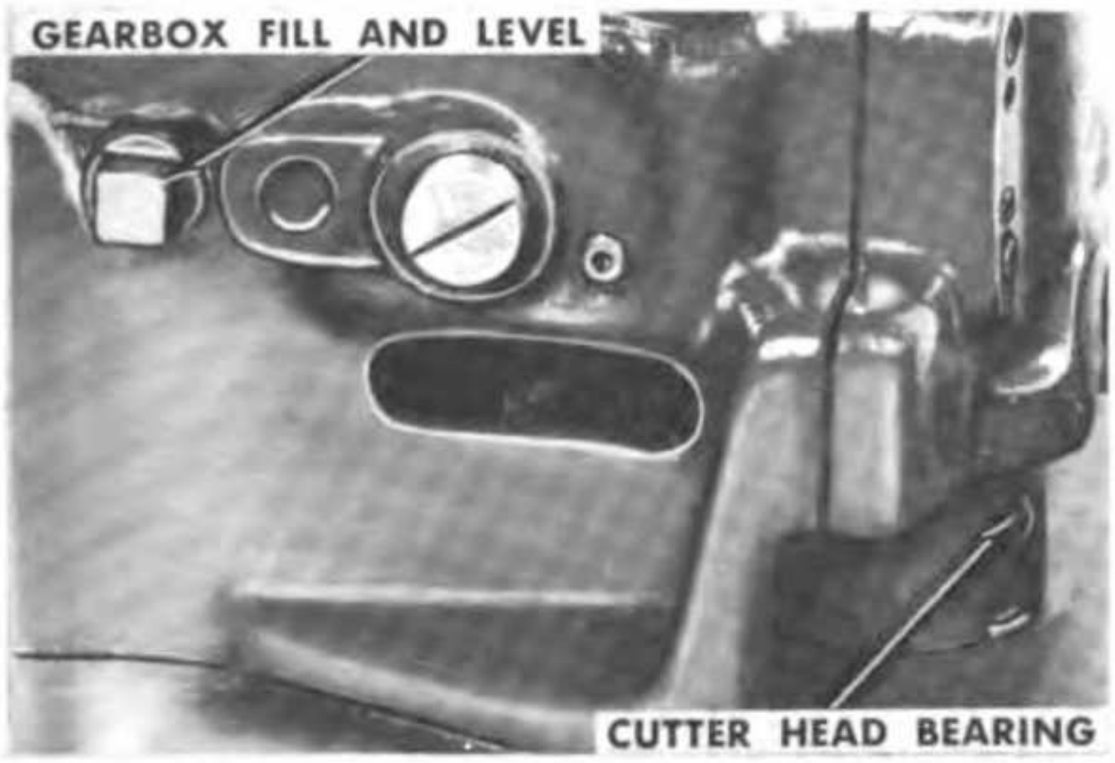
Figure 120—Continued



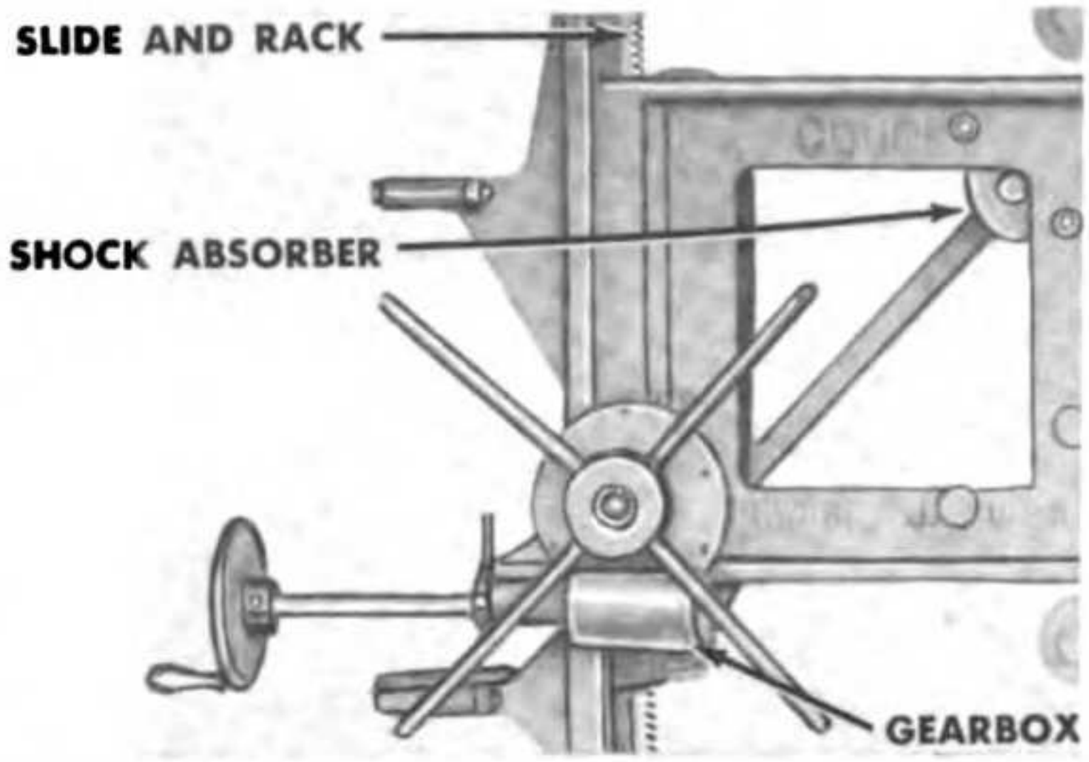
REFERENCE 1: Use lubricant sparingly.



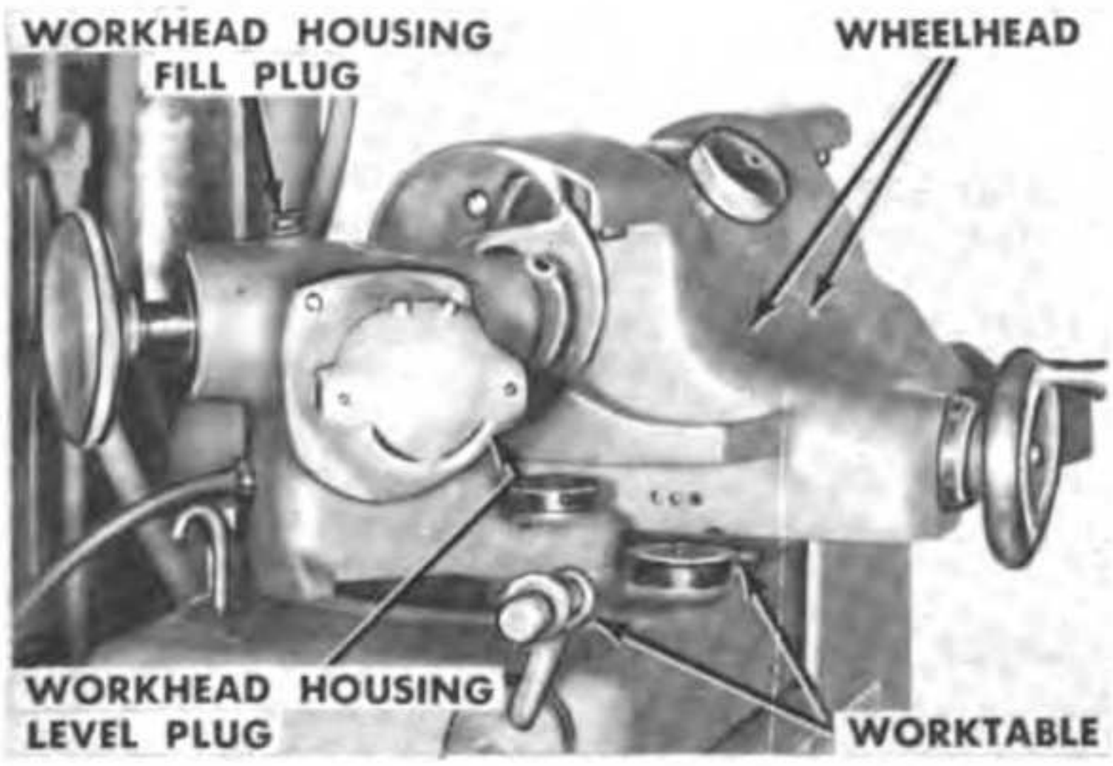
REFERENCE 2: Lubricate in vertical position.



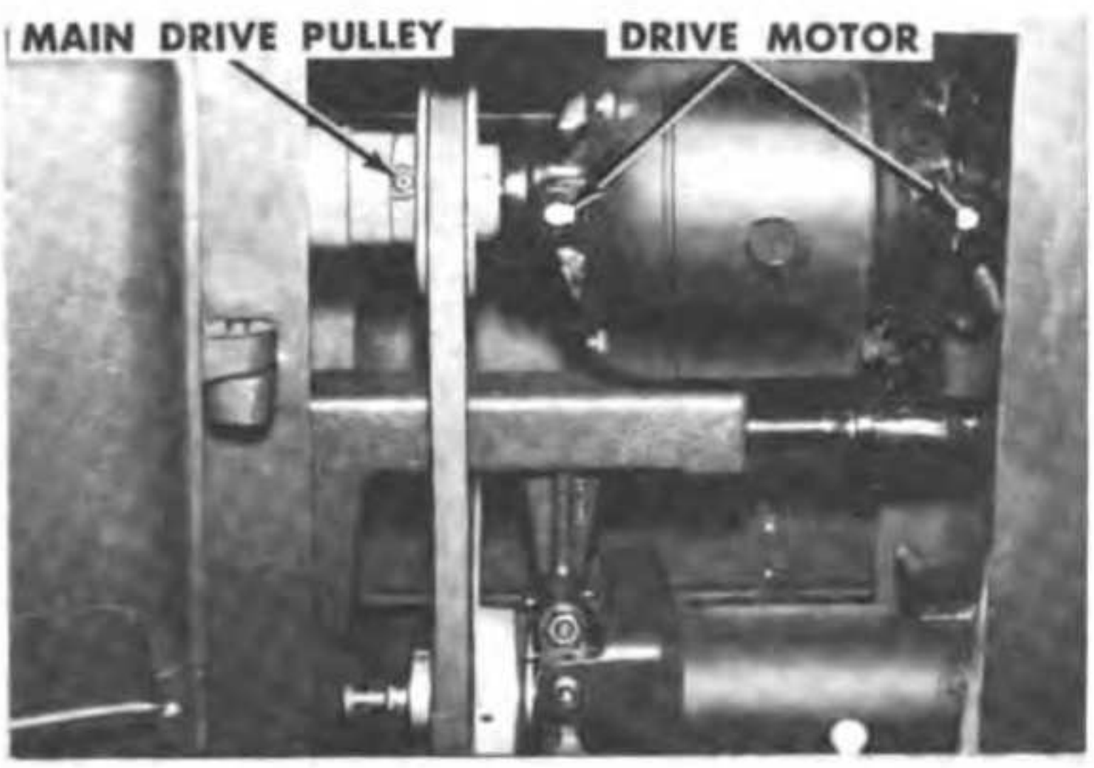
REFERENCE 3: Replace plug.



REFERENCE 4: Use lubricant sparingly.



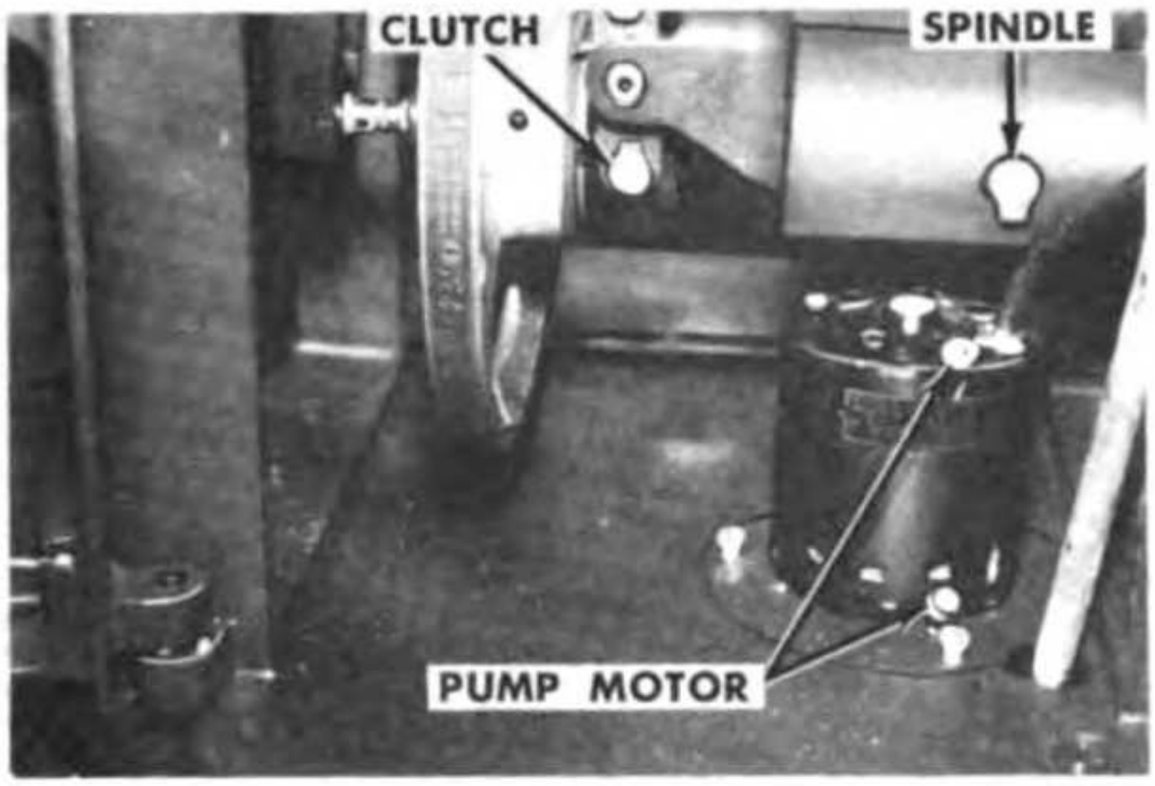
REFERENCE 5: Use lubricant sparingly.



REFERENCE 6: Use OE sparingly at oil cups.

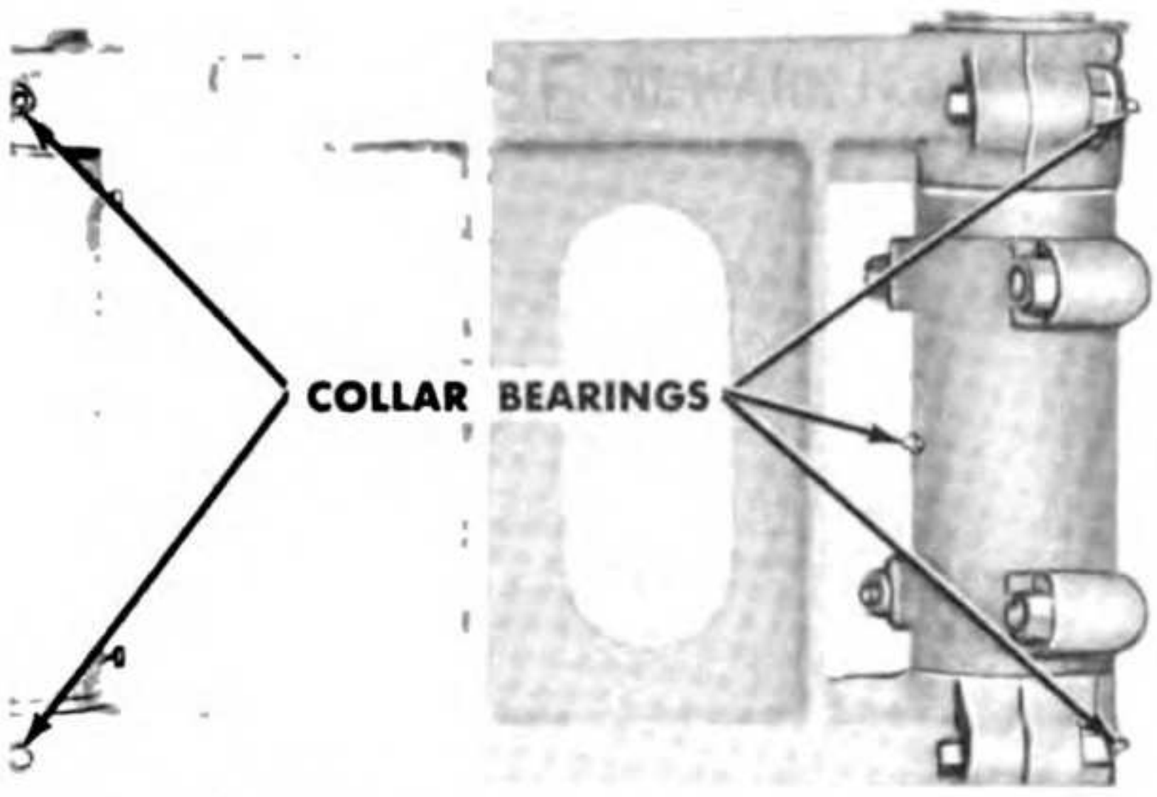
⑤

Figure 120—Continued

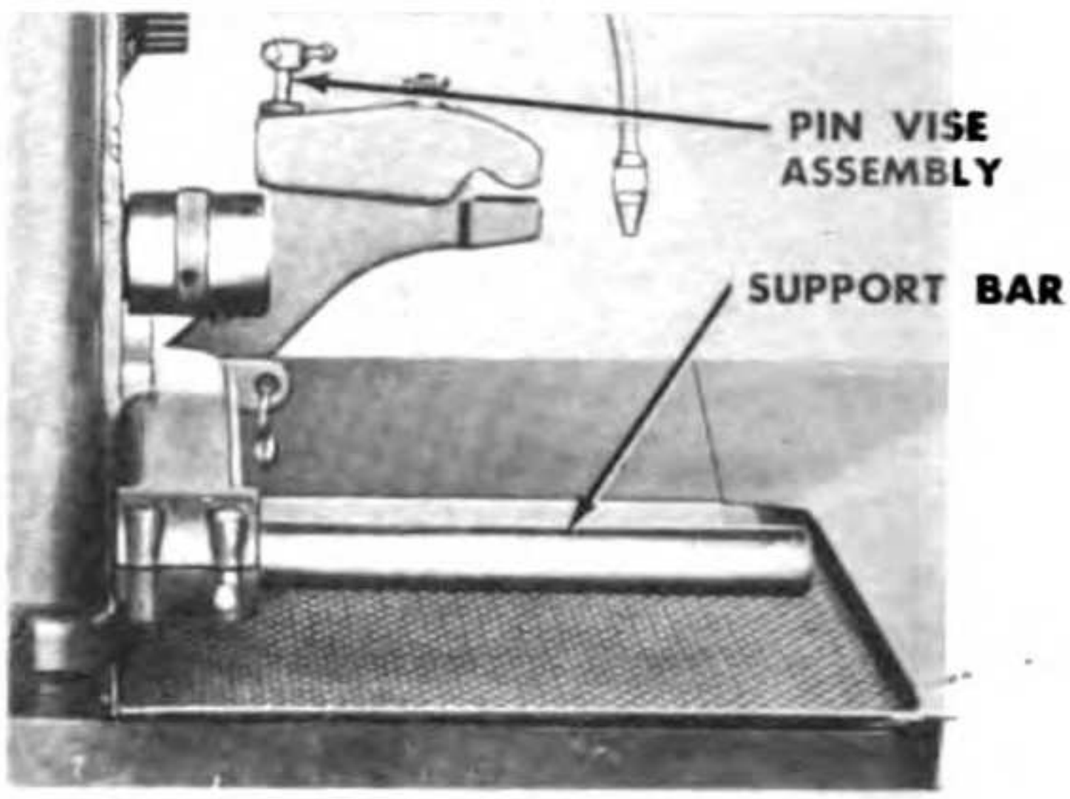


REFERENCE 7: Use OE sparingly at oil cups.

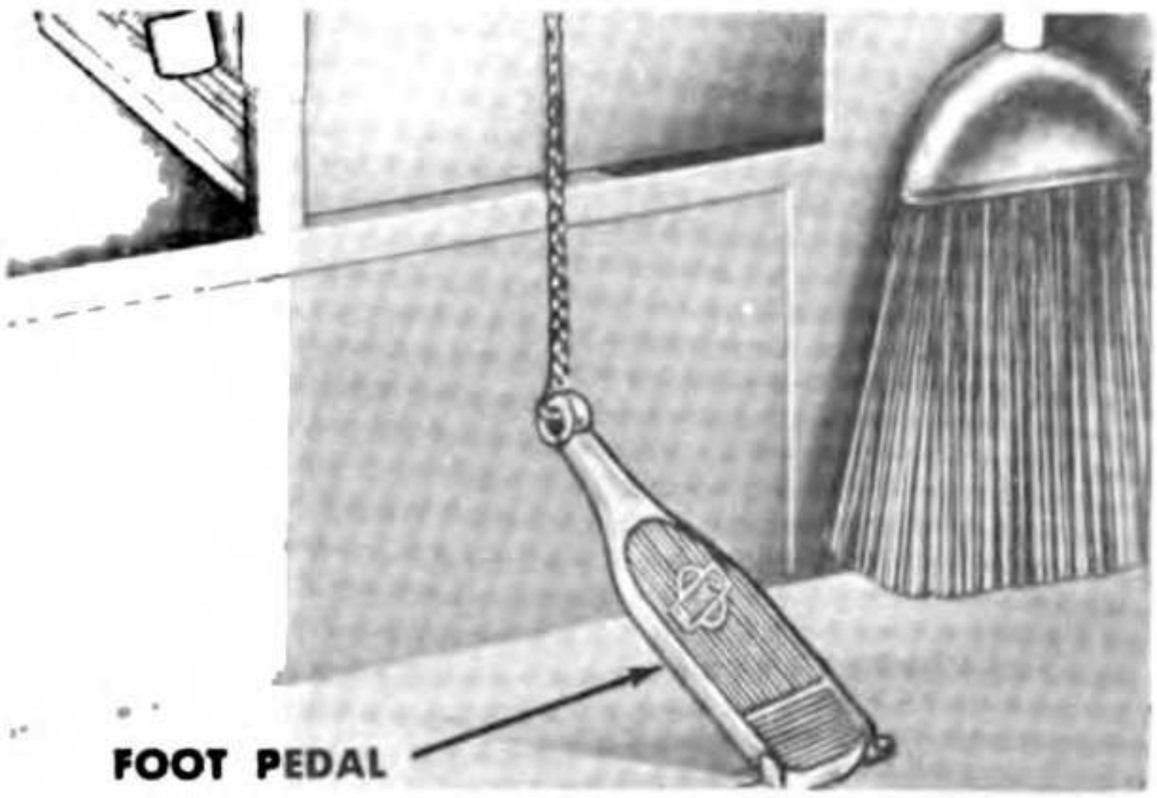
REFERENCE 8: Remove plate to lubricate.



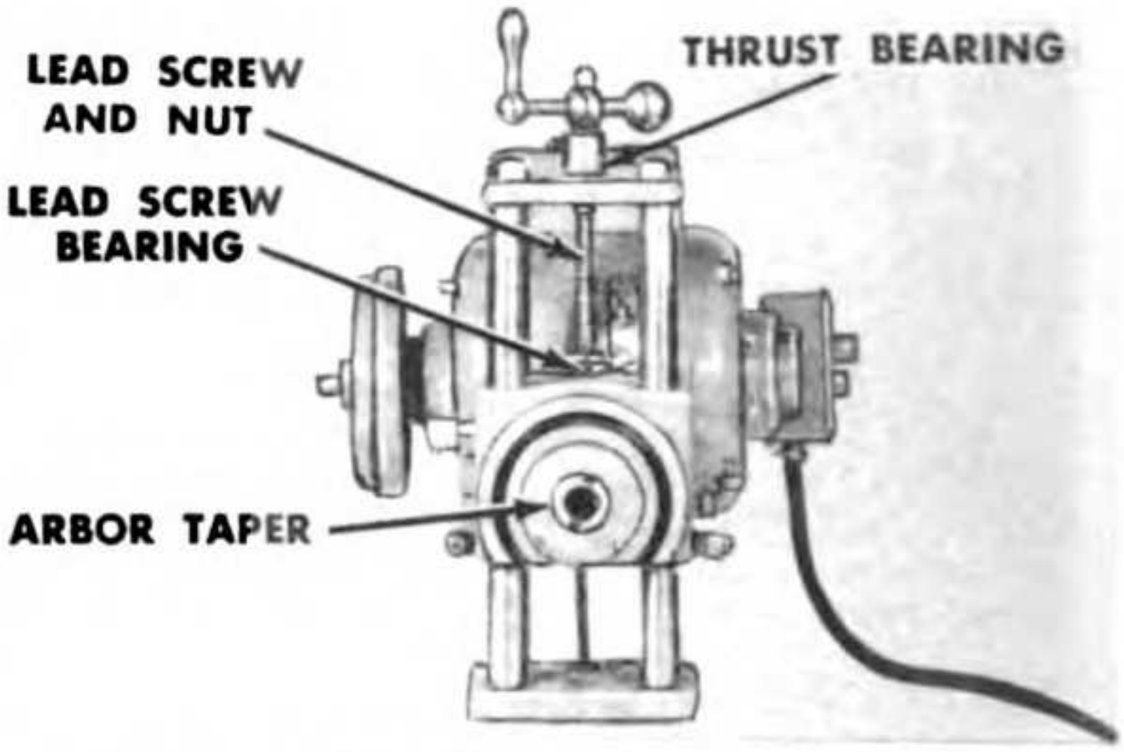
REFERENCE 9: Use grease gun.



REFERENCE 10: Use OE sparingly.



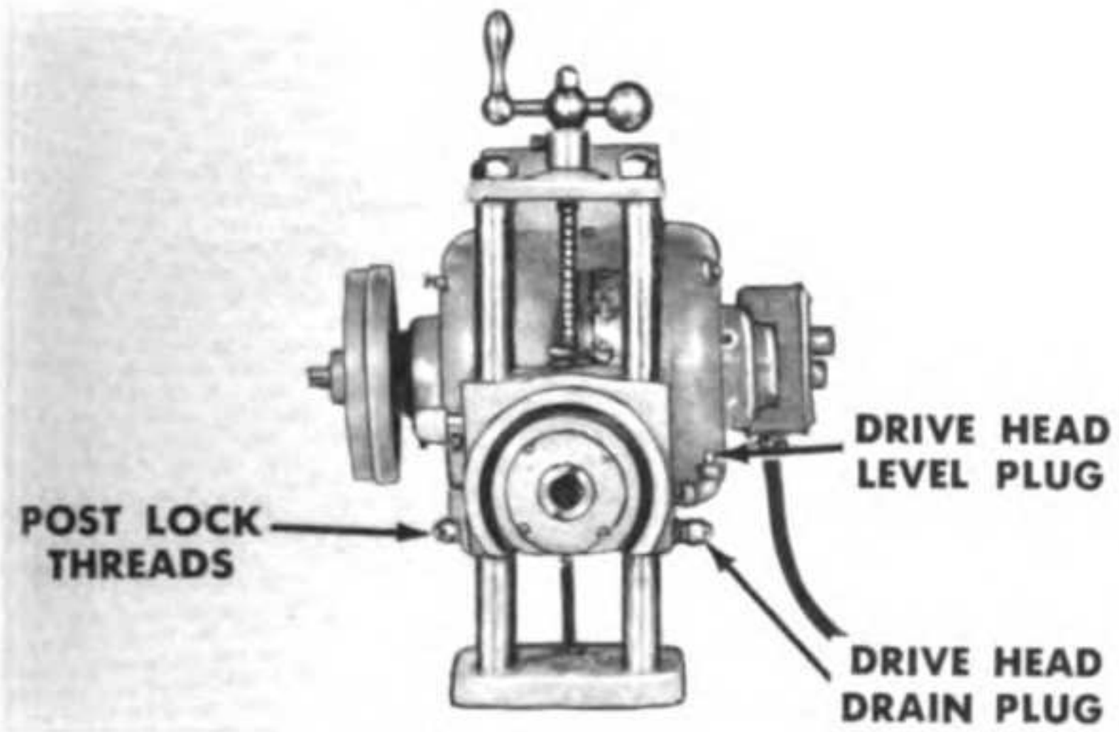
REFERENCE 11: Use OE sparingly.



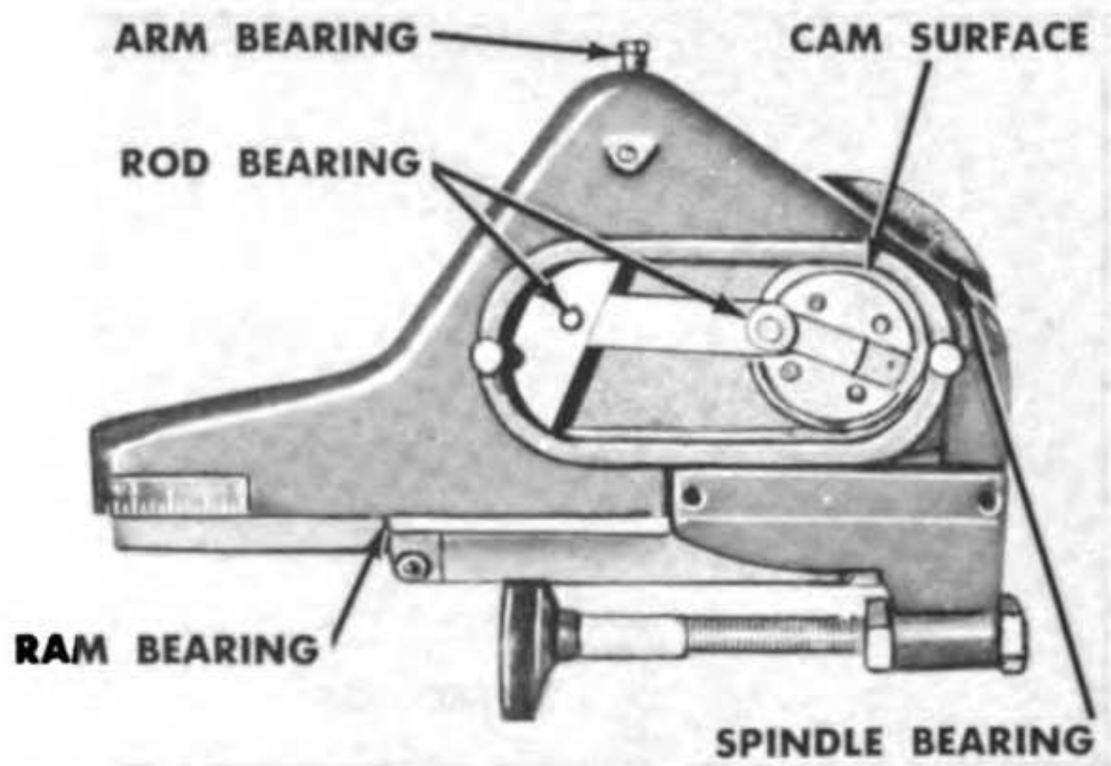
REFERENCE 12: Use OE sparingly.

⑥

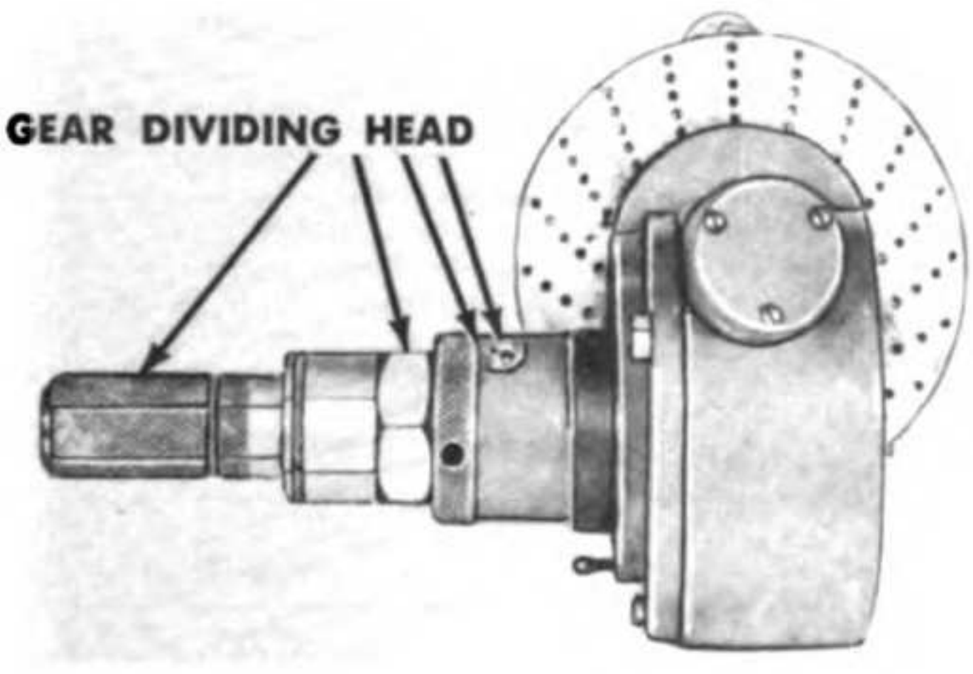
Figure 120—Continued



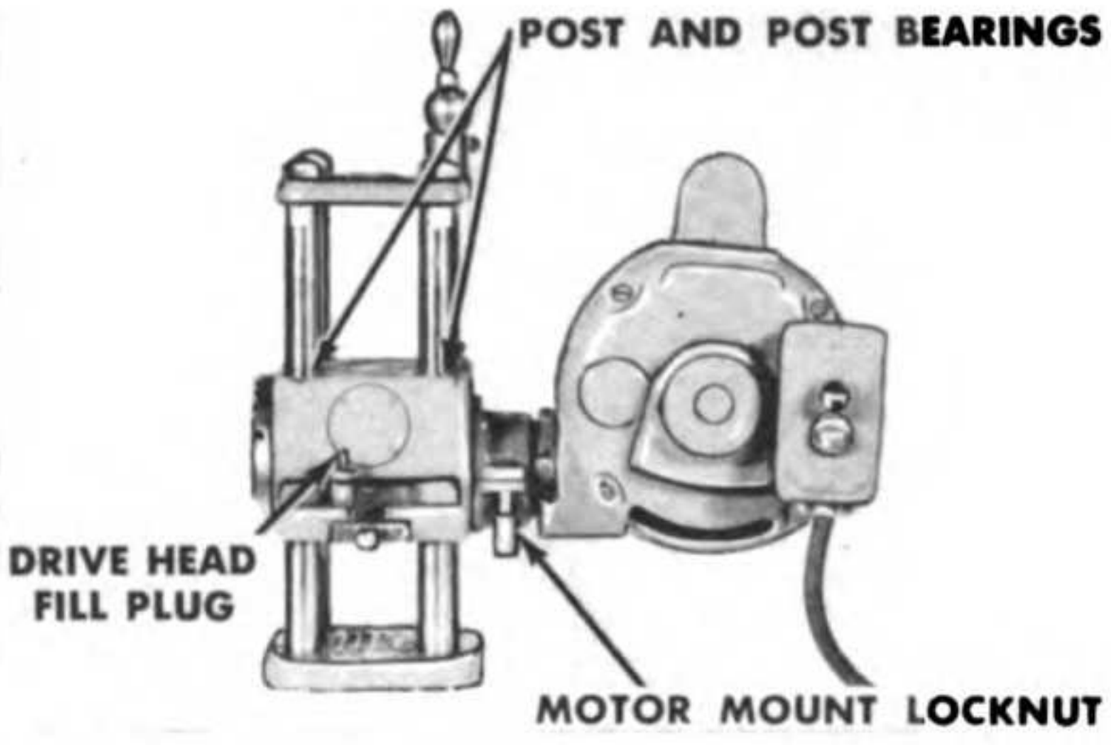
REFERENCE 12: (continued) Replace plugs.



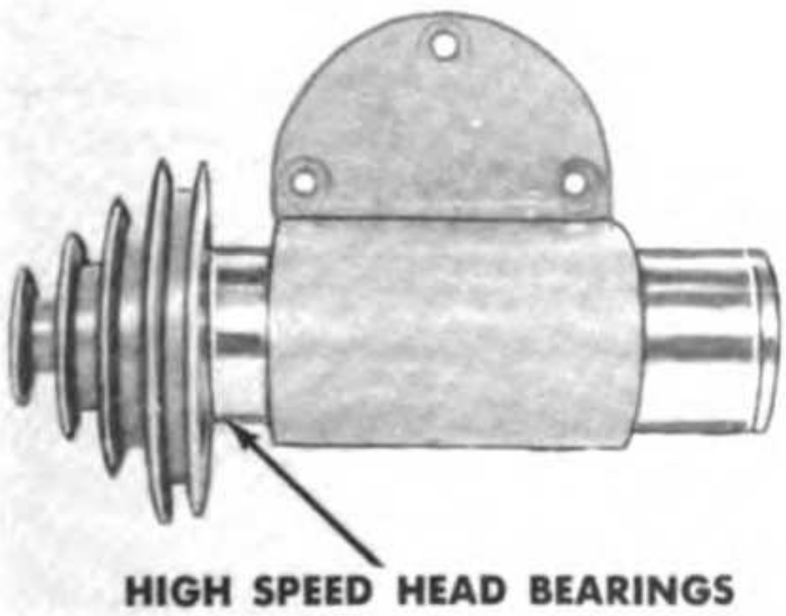
REFERENCE 13: Use OE sparingly.



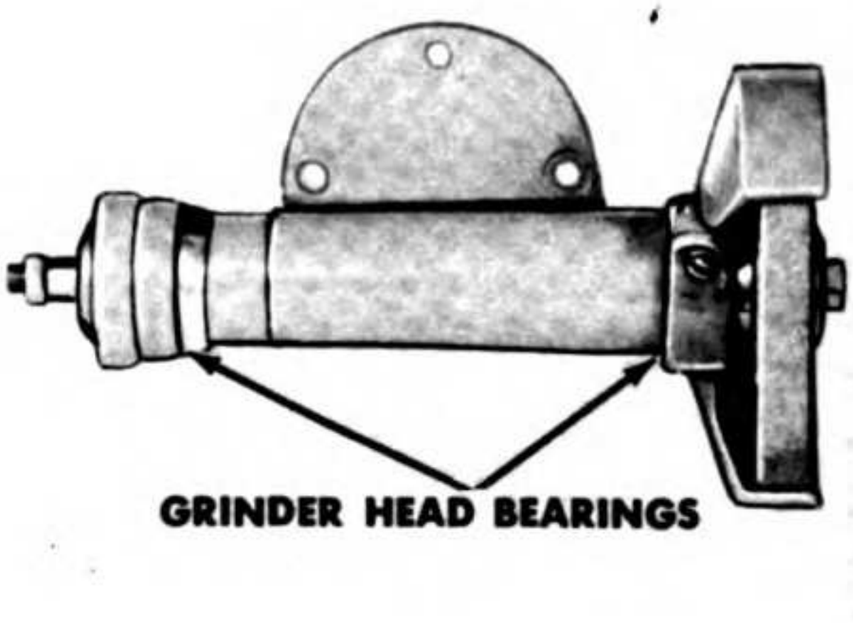
REFERENCE 14: Use OE sparingly.



REFERENCE 15: Use OE sparingly.



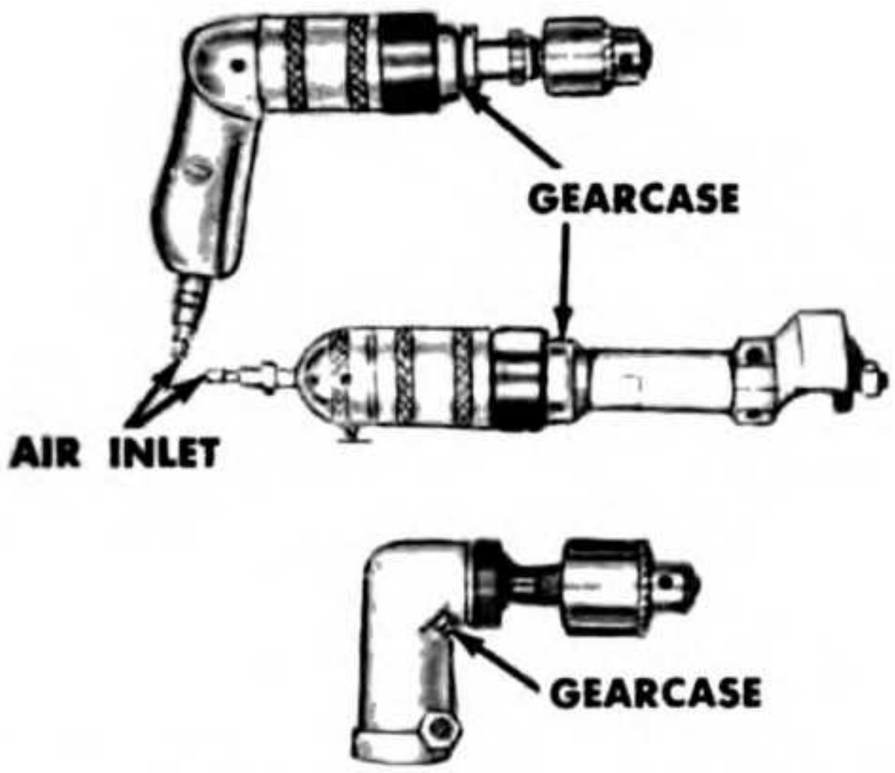
REFERENCE 16: Use OE sparingly.

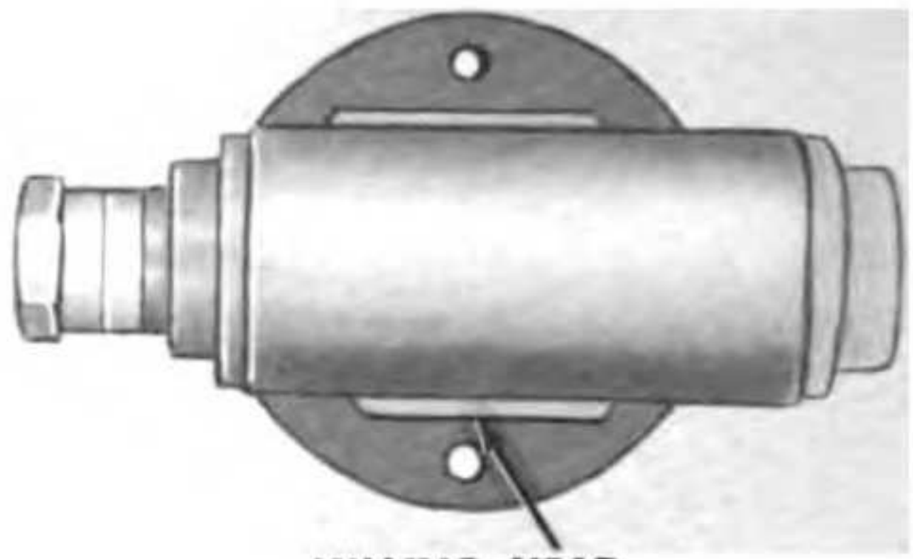


REFERENCE 17: Use OE sparingly.

⑦

Figure 120—Continued





REFERENCE 18: Use OE sparingly in air inlet.

REFERENCE 19: Remove inspection plate, clean and repack ½ full.

Figure 120—Continued

LUBRICATION ORDER

LO 5-9128-3

20 August 1954

SHOP, MOBILE, GENERAL PURPOSE REPAIR, SET NO.1, HEAVY, 12-TON SEMITRAILER MOUNTED, COUSE MODEL MED

Reference — TM5-9128-1, TM5-9128-2, TB5-9128-1, LO5-9128-1, LO5-9128-2

Intervals given are maximums for normal 8-hour day operation. For abnormal conditions or activities, intervals should be shortened to compensate.

Clean fittings before lubricating.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

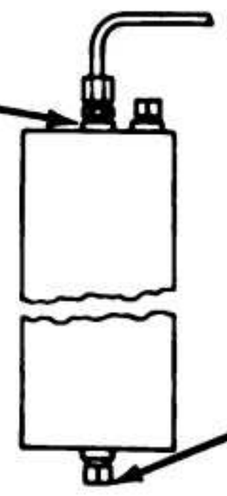
Drain gearcases only when hot after operation; check level and replenish when cool.

KEY

LUBRICANT	CAPACITY	EXPECTED TEMPERATURE			INTERVALS
		Above +32°F	+32° to −10 F	Below −10°F	
OE—OIL, Engine, Heavy Duty		**OE 10 or 9110**	**OE 10 or 9110**	**OHA**	**D**—Daily **W**—Weekly **M**—Monthly **2M**—2 Months **Q**—Quarterly **S**—Semi-annually
All Points					
OH—OIL, Hydraulic		**OH**	**OH**	**OHA**	
Hydraulic Tank For Trailer-Supporting Jacks	36 qts.				
Side-Lifting Jacks	2 qts. each				
100-Ton Hydraulic Press	7 qts.				
10-Ton Hydraulic Press	1 qt.				
BR—LUBRICANT, Ball and Roller Bearings					

LUBRICANT • INTERVAL **INTERVAL • LUBRICANT**

(1) Fill and Level Plug (See Key) (Maintain level to 1" of plug with jacks in retracted position) — OH — M



Q

Drain Plug (Drain and refill) (Monthly, drain off water accumulation) — (1)

HYDRAULIC TANK, TRAILER-SUPPORTING JACKS

CONTINUED ON FOLLOWING PAGE

①

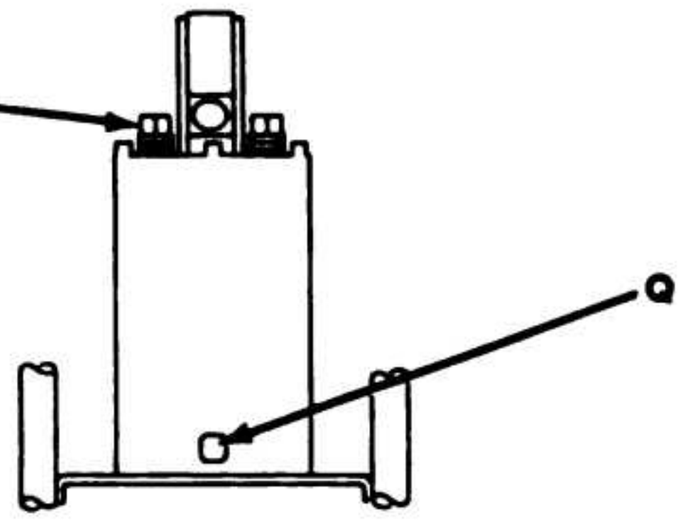
Figure 121. Lubrication Order 5–9128–3.

CONTINUED FROM PRECEDING PAGE

(2) Fill and Level Plug (See Key) (Right and Left side) (Maintain level to top of plug with sides in closed position) — OH — M

SIDE-LIFTING JACKS

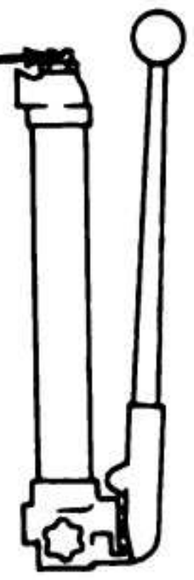
(3) Fill and Level Plug (See Key) (Maintain level to top of plug) — OH — M



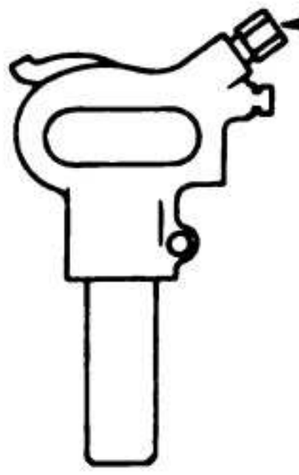
Drain Plug (Drain and refill) — (3)

100-TON HYDRAULIC PRESS

(4) Fill and Level Gage (See Key) (Check level only with ram in collapsed position) (Fill in vertical position) — OH — M

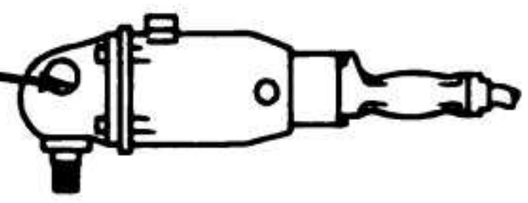


10-TON HYDRAULIC PRESS



AIR HAMMER

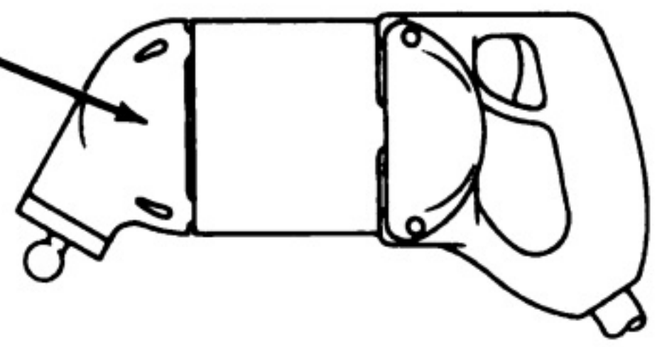
(5) Gearcase (Disassemble, clean, repack ⅓ full, reassemble) — BR — S



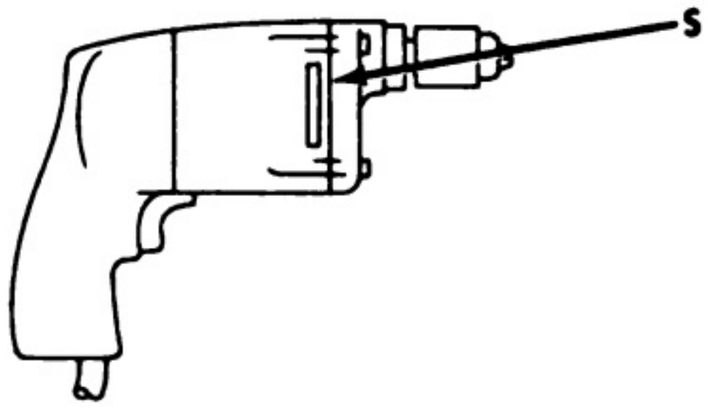
SANDER

Figure 121—Continued

LUBRICANT • INTERVAL			INTERVAL • LUBRICANT		
(7) Gearcase (Disassemble, clean, repack ½ full, reassemble)	BR	2M			



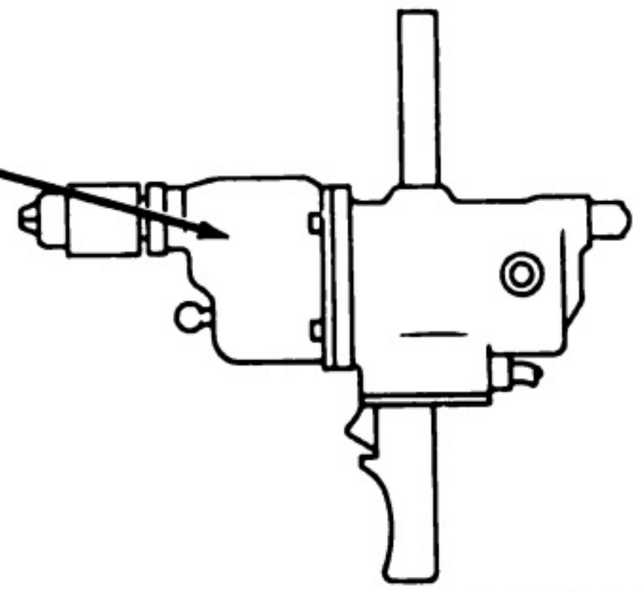
VALVE-SEAT GRINDER



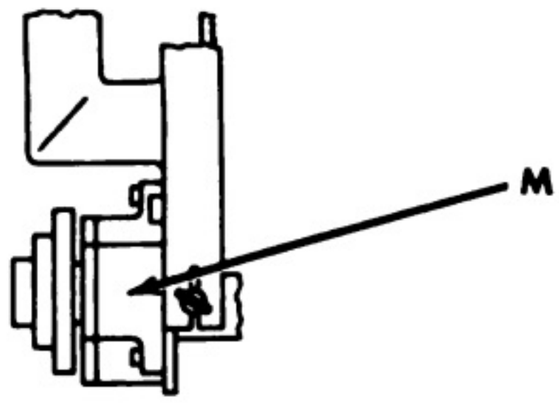
			S	BR	Gearcase (Disassemble, clean, repack ⅓ full, reassemble) (10)

DRILL (Thor model 6935)

(8) Gearcase (Disassemble, clean, repack ½ full, reassemble)	BR	S			



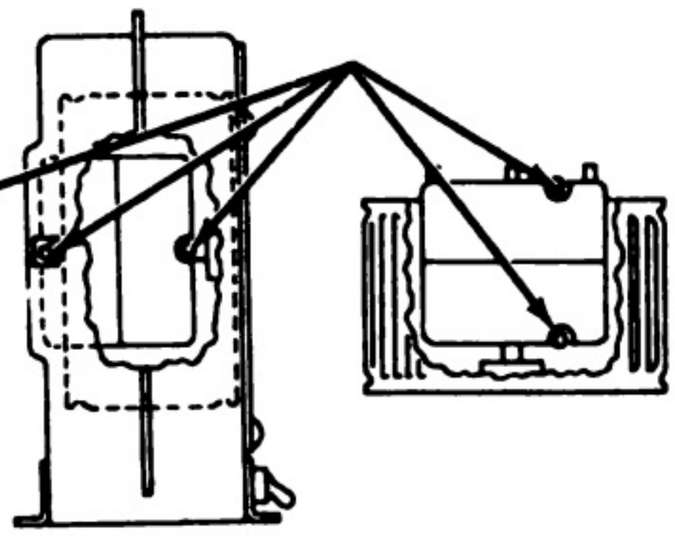
DRILL (Wodak model Z-10)



			M	OE	Gearcase (11)

BANDSAW

(9) Motor Bearings (Two Oil Cups in each)	OE	M			



VENTILATING FANS

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Figure 121—Continued

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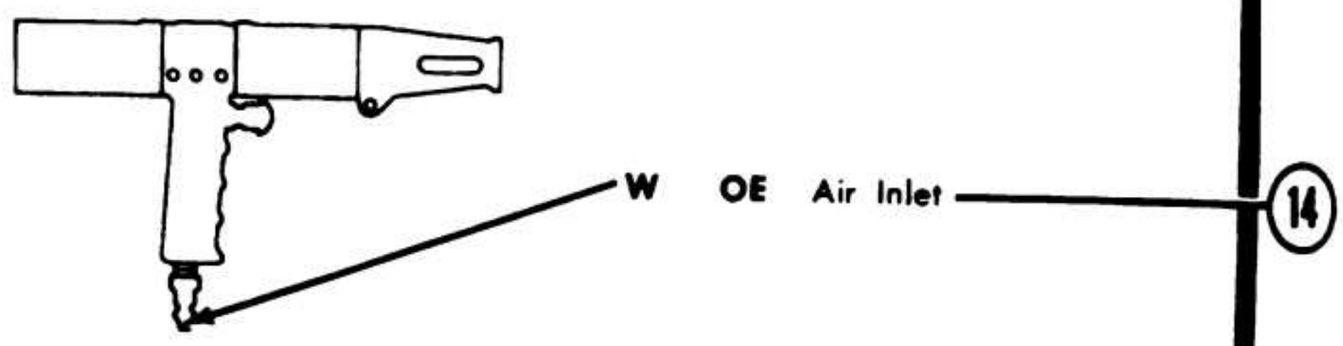


AIR DRILLS

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW —10°F. Clean parts with Diesel fuel oil, and drain all oil housings. Relubricate with lubricants indicated in the key for below —10°F.

2. DO NOT LUBRICATE. The electric drill motor (Wodak model Z-10), valve seat grinder motor (Black and Decker model 331-E), sander motor (Black and Decker model 93E), and band saw motor (Wells model 94A). These motors are equipped with life-seal bearings and require no lubrication. CAUTION: Do not use solvent in cleaning. Wipe with oil dampened cloth only.

3. OIL CAN POINTS. Weekly, lubricate the tension screw and vise threads on band saw with OE.

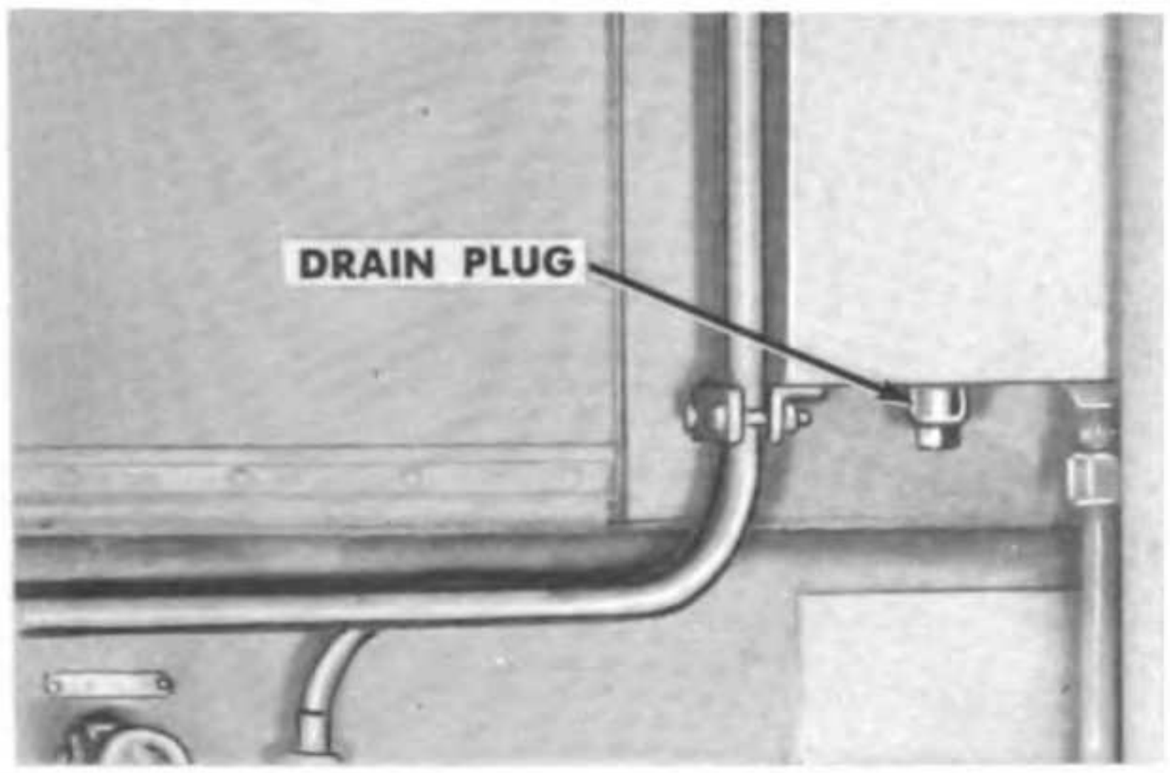
Copy of this lubrication order will remain with the equipment at all times; instructions contained herein are mandatory and supersede all conflicting lubrication instructions dated prior to the date of this lubrication order.

BY ORDER OF THE SECRETARY OF THE ARMY:

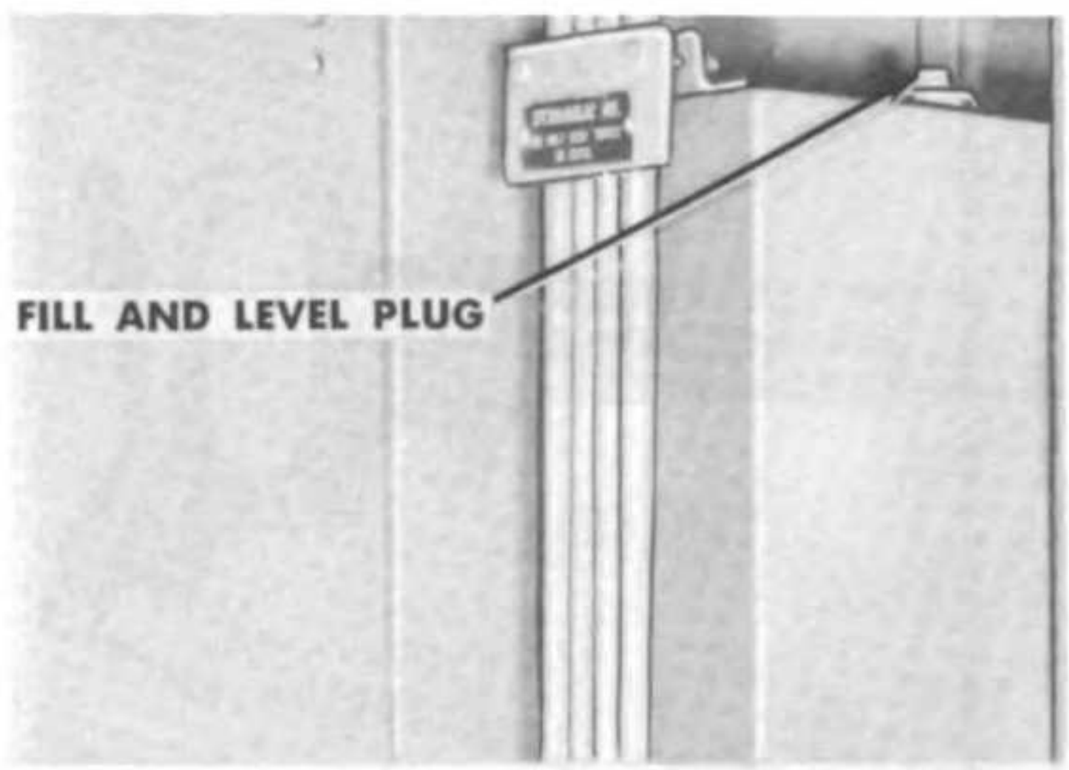
M. B. RIDGWAY,
General, United States Army,
Chief of Staff.

OFFICIAL:
JOHN A. KLEIN,
Major General, United States Army,
The Adjutant General.

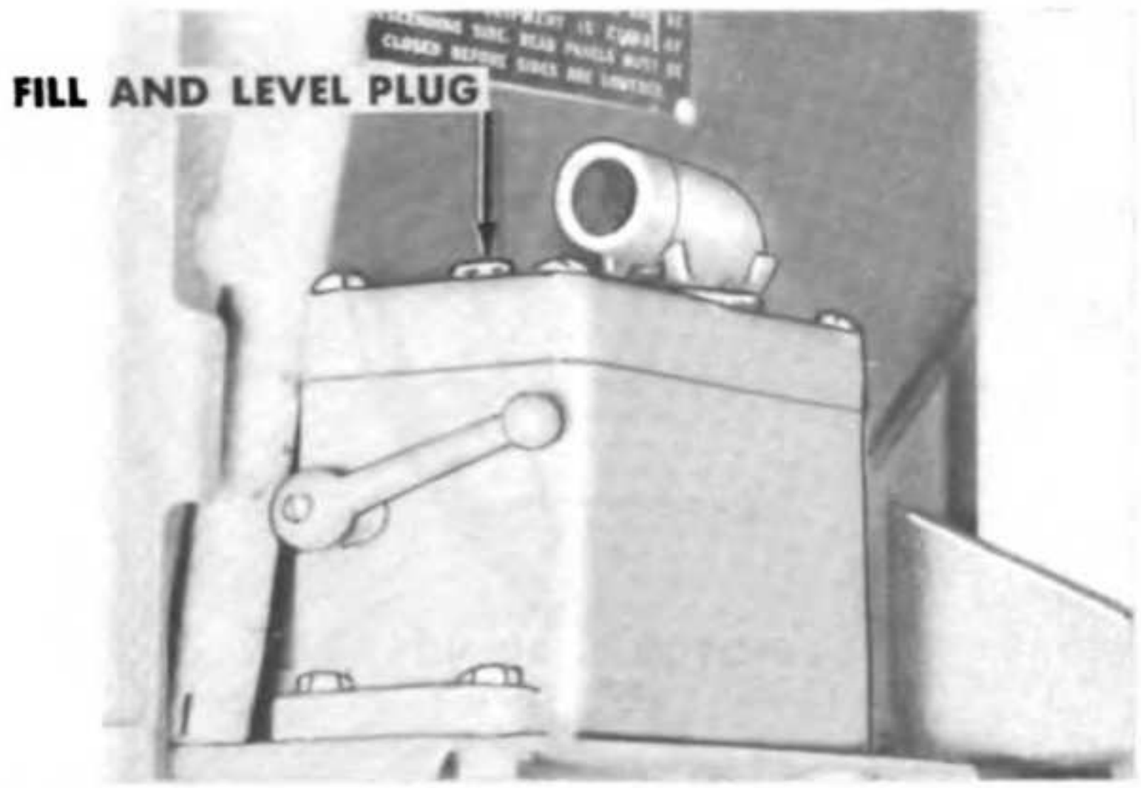
Figure 121—Continued



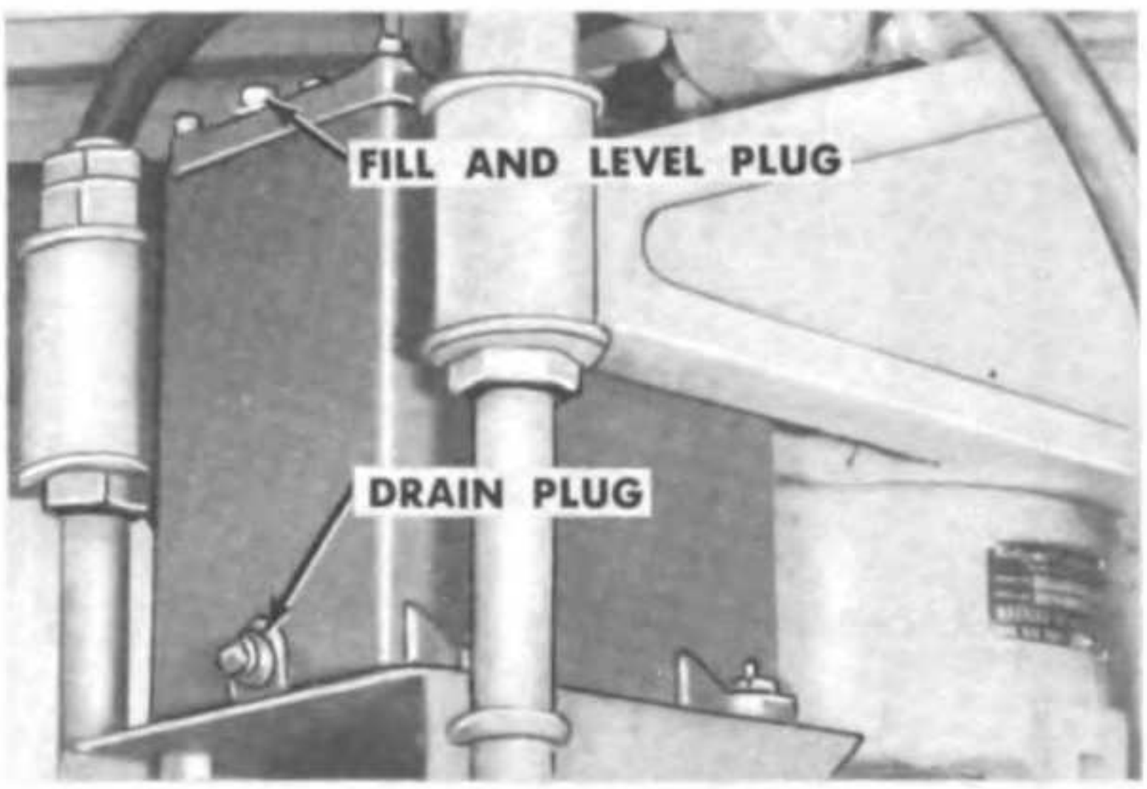
REFERENCE 1: Monthly, drain off water accumulation.



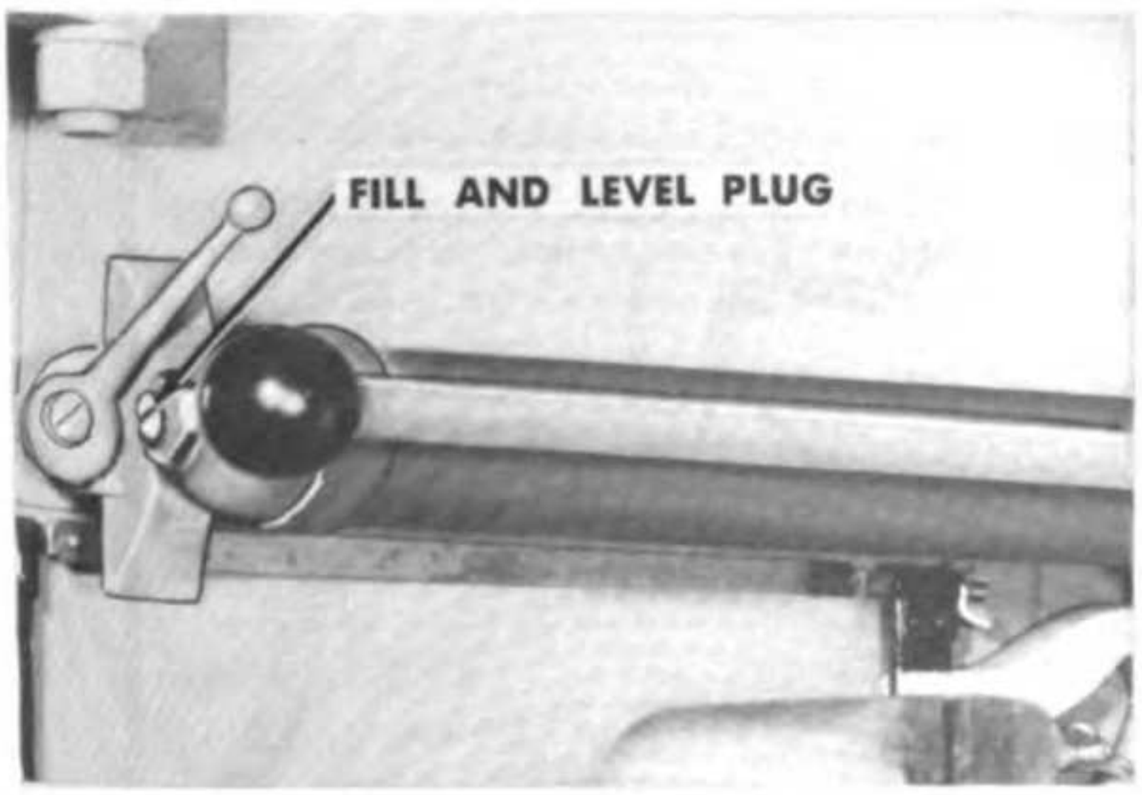
REFERENCE 1: Fill to 1-in. with jacks in retracted position.



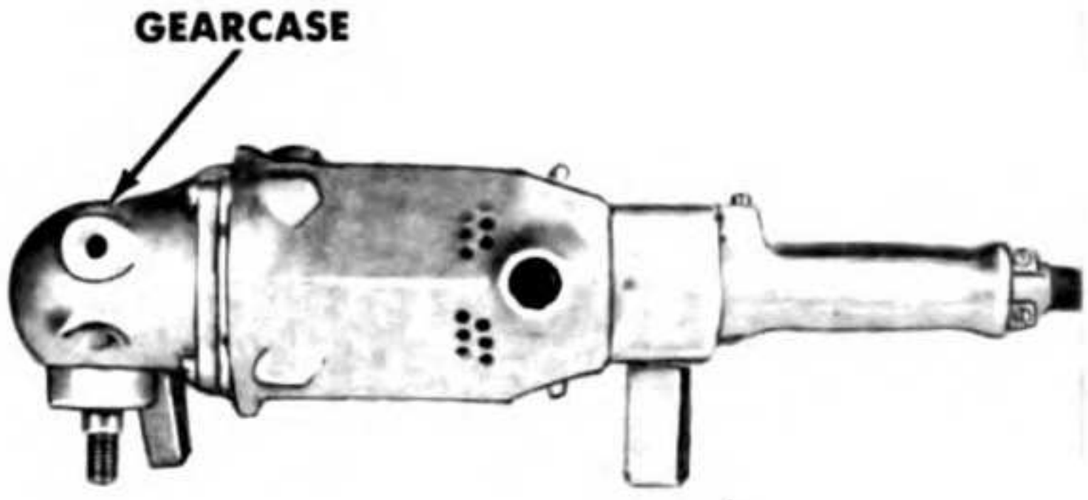
REFERENCE 2: Fill with sides in closed position.



REFERENCE 3: Drain and refill.

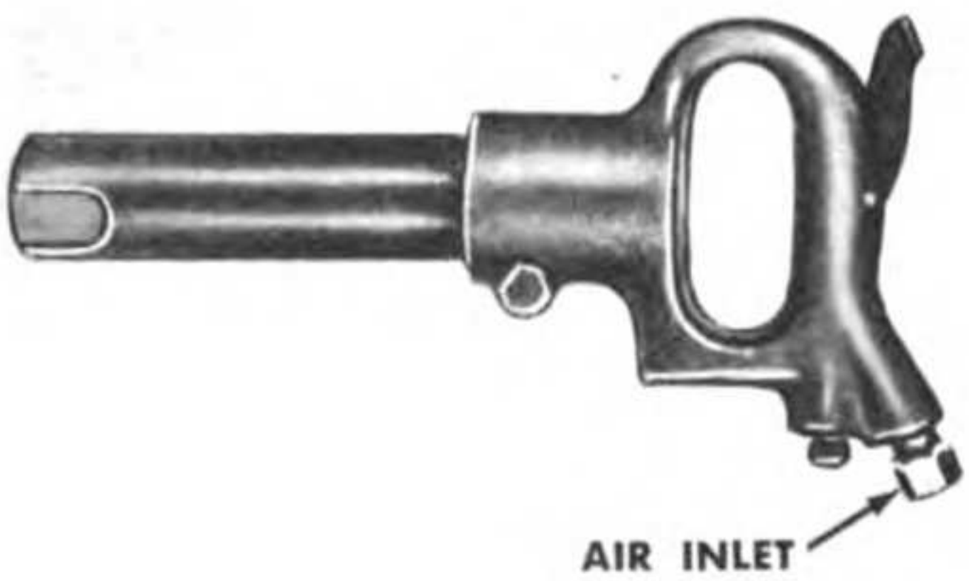


REFERENCE 4: Check level only with ram in collapsed position.

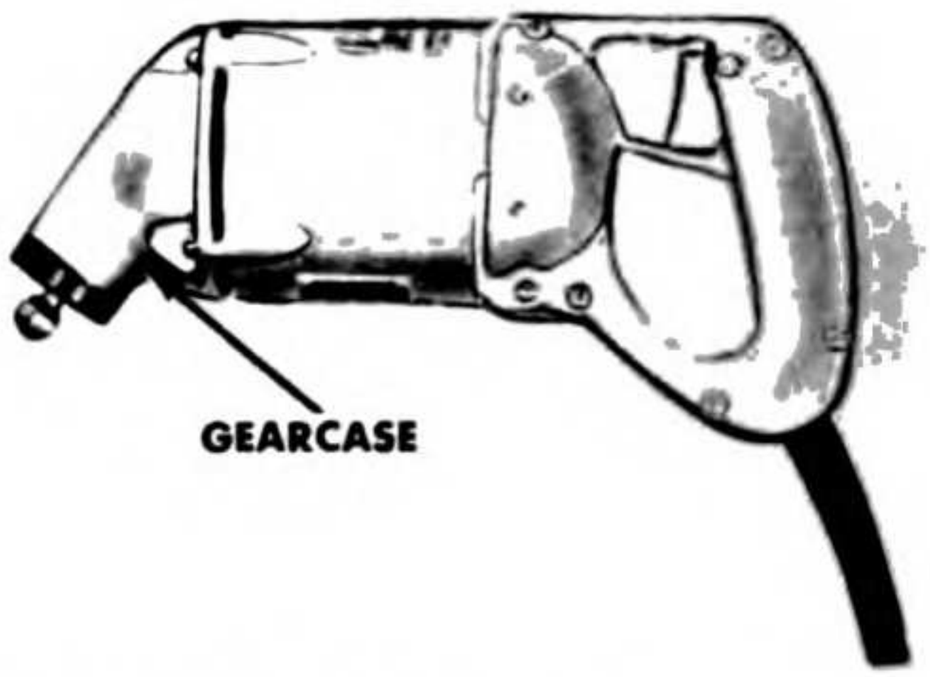


REFERENCE 5: Repack 2/3 full.

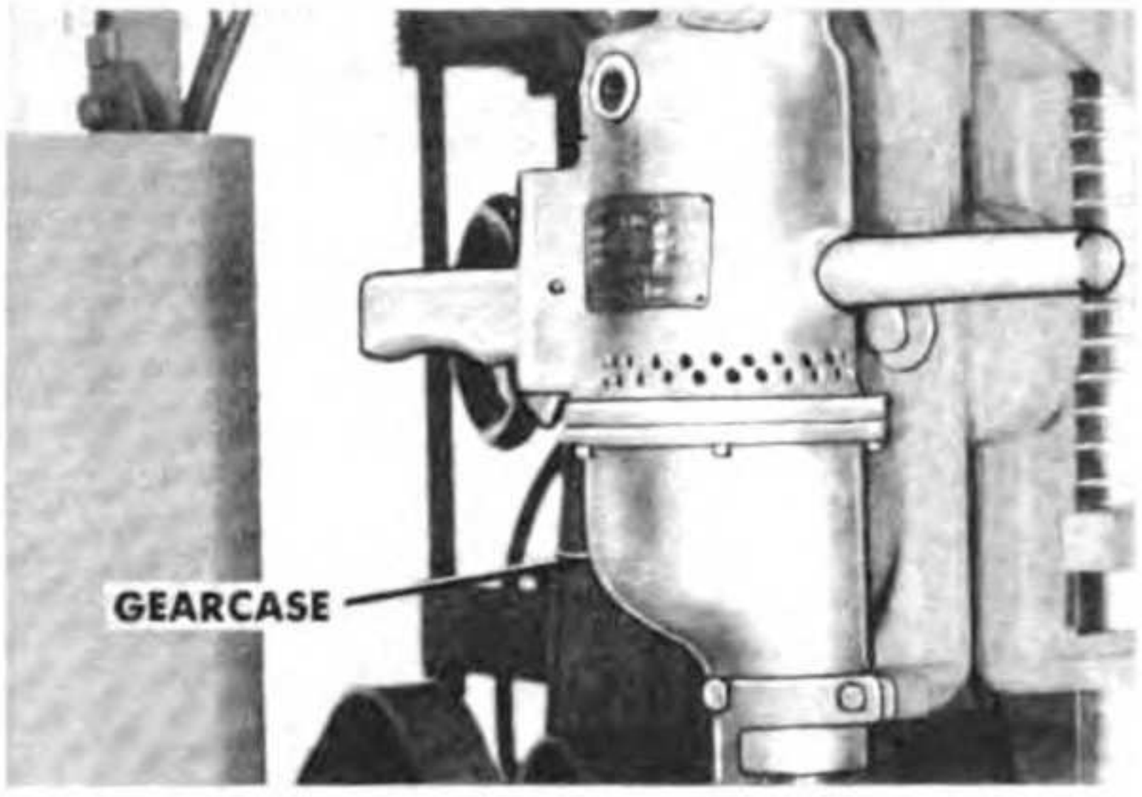
Figure 121—Continued



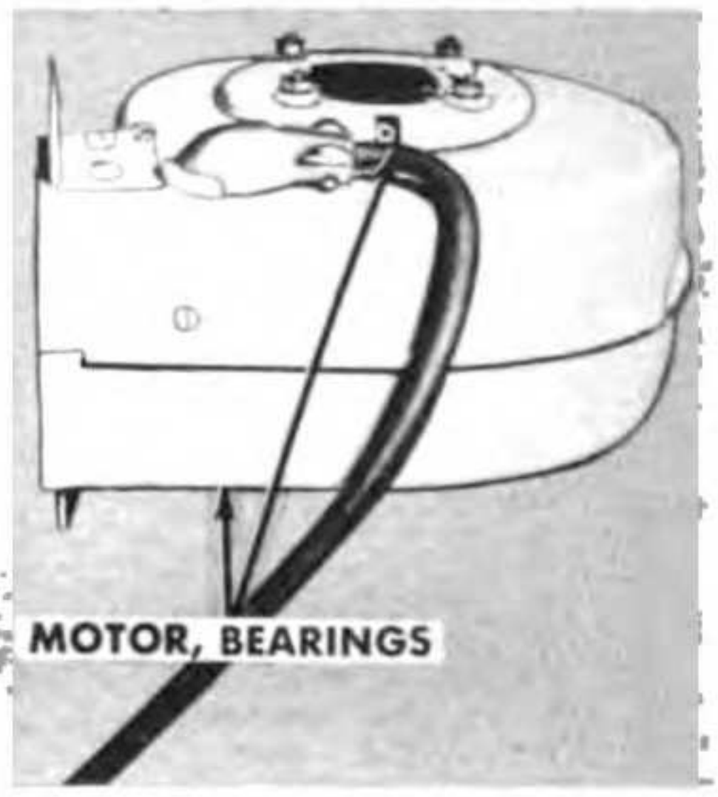
REFERENCE 6: Use OE sparingly.



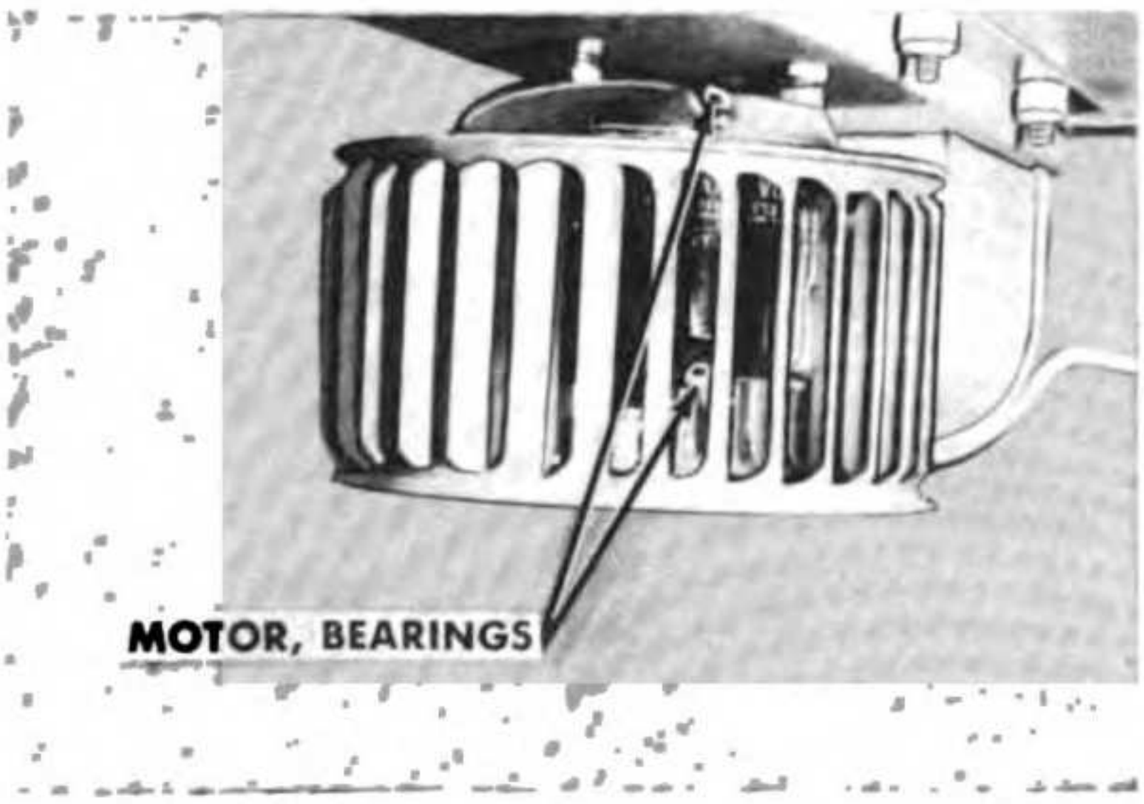
REFERENCE 7: Repack ½ full.



REFERENCE 8: Repack ½ full.



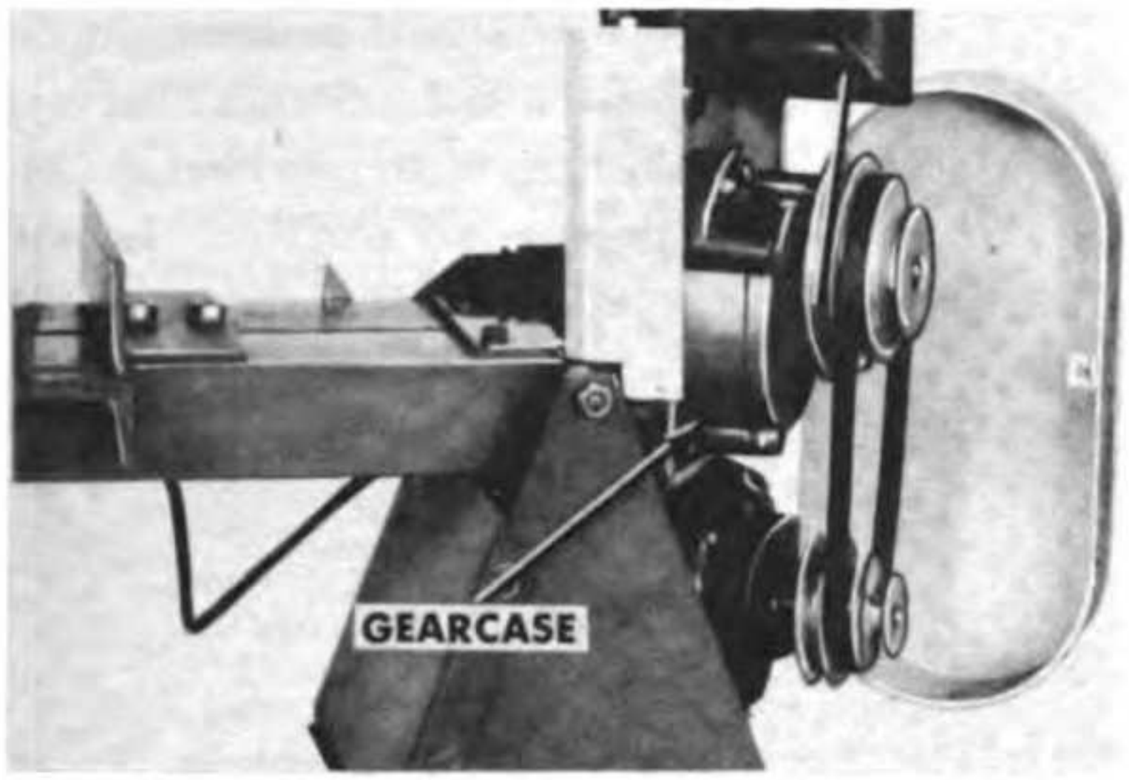
REFERENCE 9: Use OE sparingly at oil cups.



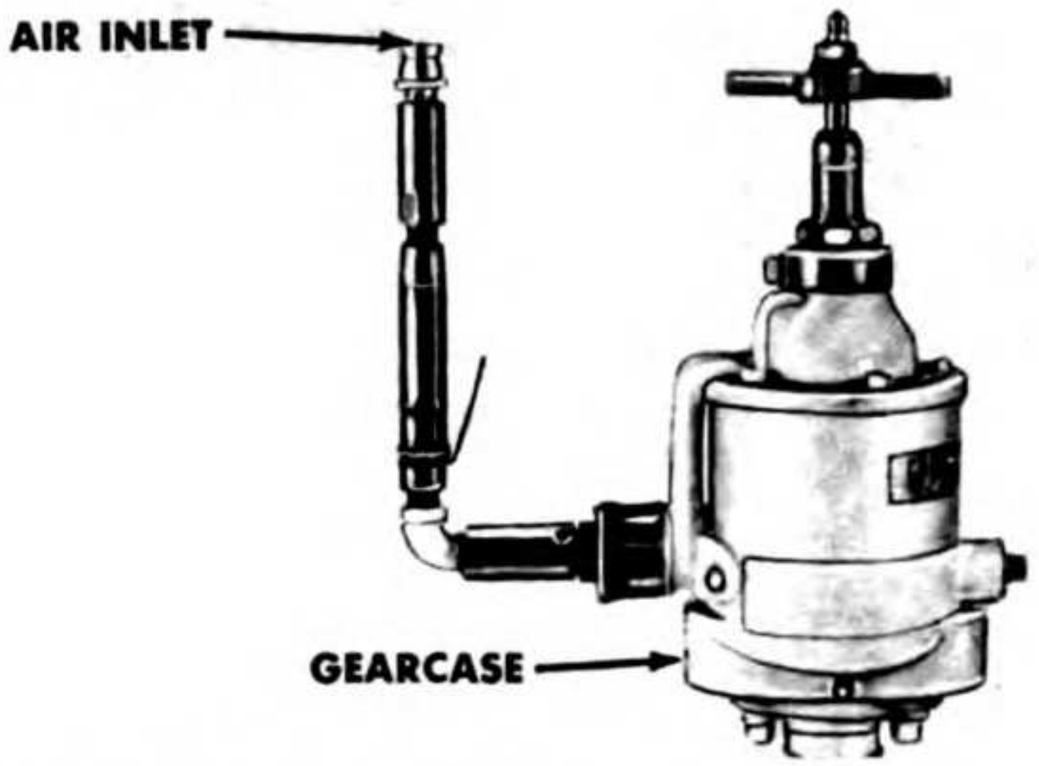
REFERENCE 9: Use OE sparingly at oil cups.

REFERENCE 10: Repack ½ full.

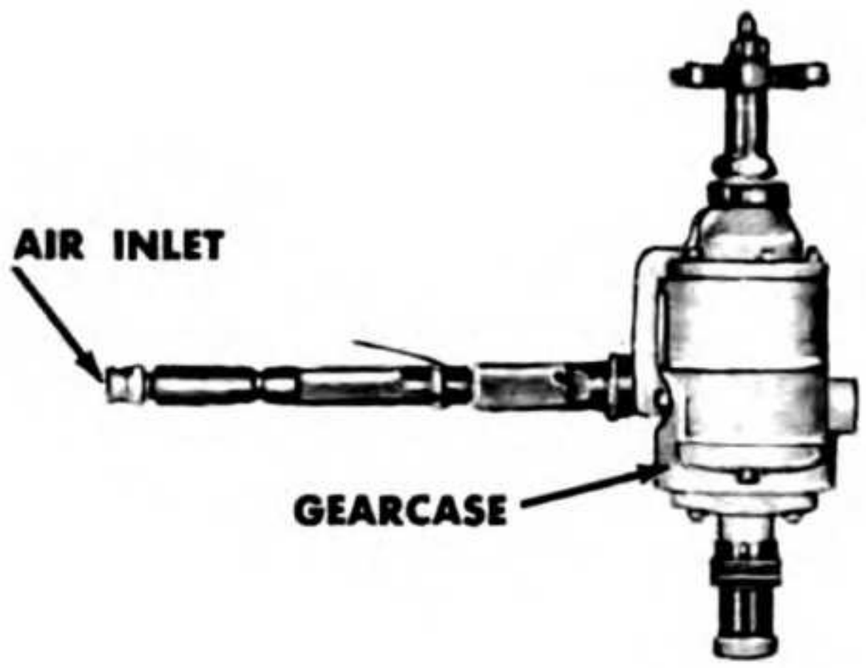
Figure 121—Continued



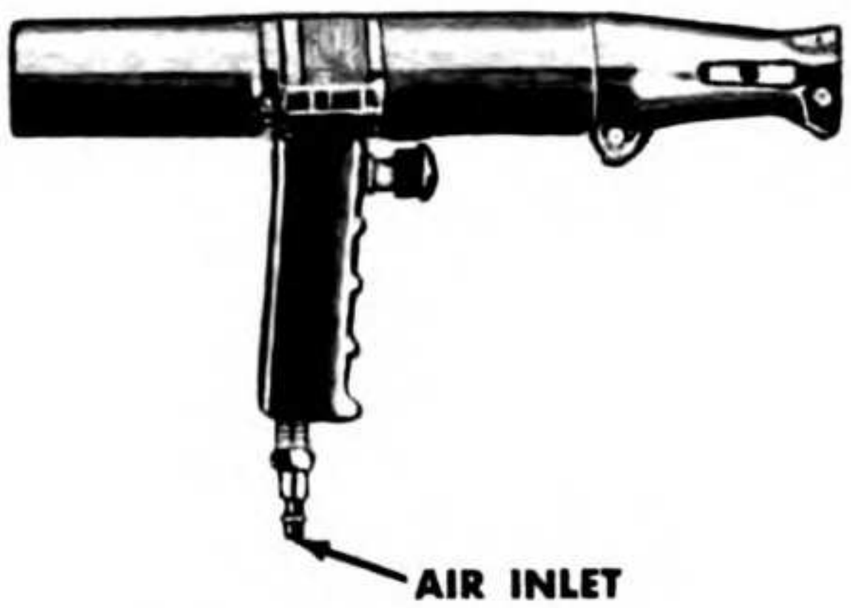
REFERENCE 11: Grease gearcase sparingly.



REFERENCE 12: Grease gearcase sparingly.



REFERENCE 13: Grease gearcase, sparingly.



REFERENCE 14: Oil sparingly.

Figure 121—Continued

Keep a safe receptacle for oily and greasy rags nearby. Spilled oil or grease must be wiped up immediately for safety.

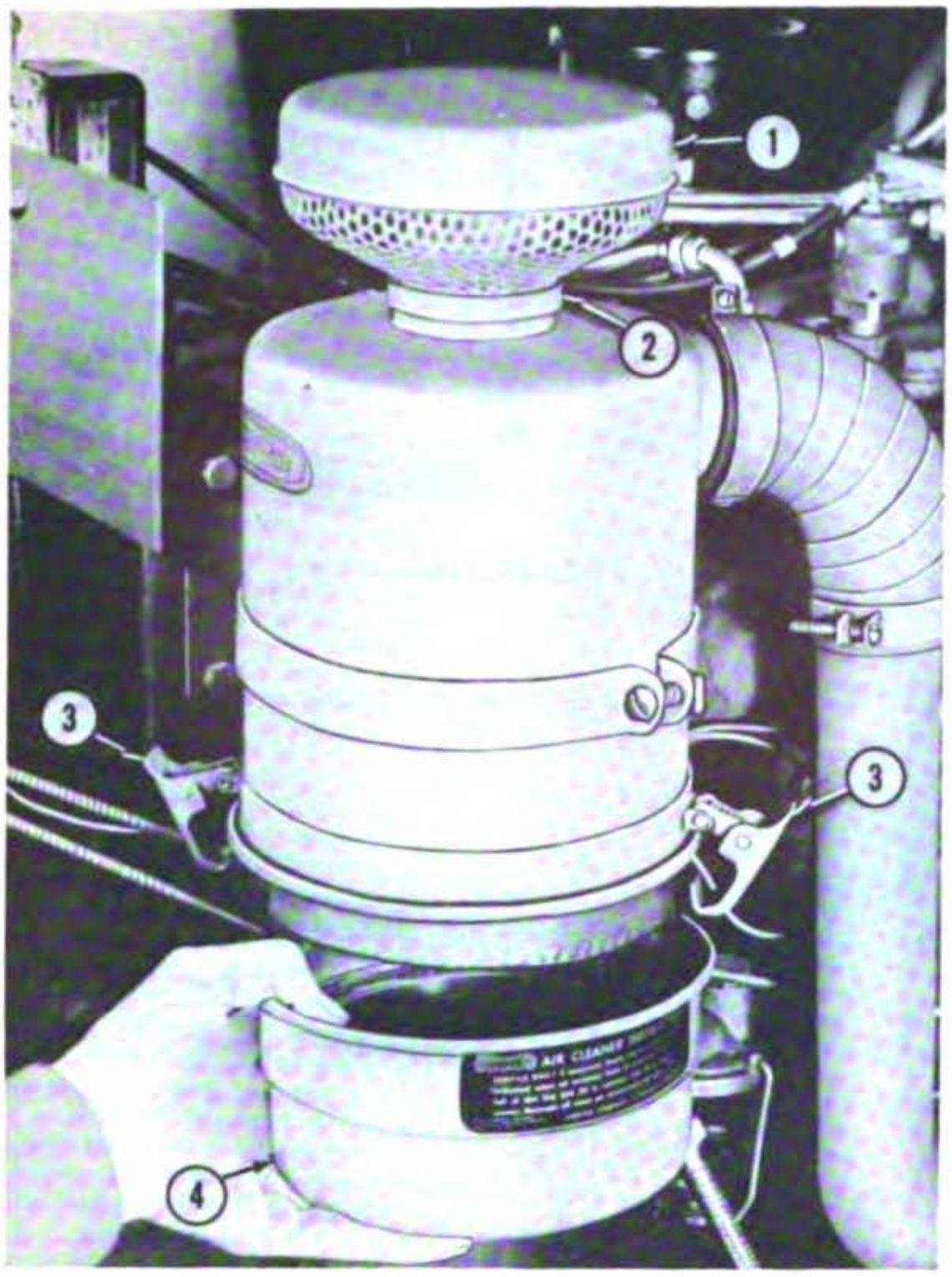
(5) Keep plugs, inspection covers, and guards clean and in place. Keep stop, work, tools, and oily or dirty rags away from the shop equipment during lubrication. Wipe dirt, water, and cleaning solvent from gears, chains, fittings, and all machinery parts before lubricating the equipment.

d. Operation Immediately After Lubrication. Immediately upon completion of lubrication, operate the equipment to determine whether lubrication has been done properly. Look for lubricant leaks at gaskets, seals, and fittings. Listen for squeaks from dry bearing surfaces and other inadequately lubricated parts. Report all defective conditions that cannot be corrected by lubrication.

e. Servicing Engine Air Cleaner.

(1) *Clean and oil top screen.* Remove top screen (1, fig. 122) by loosening screw on clamp (2) and lifting top screen off air cleaner. Wash screen in approved cleaning solvent and place several drops of light oil on screen. Install top screen on air cleaner and secure by tightening screw on clamp.

(2) *Clean and refill reservoir.* Remove reservoir (4) by opening two latches (3) and separating reservoir from air cleaner



1 Top screen
2 Clamp
3 Latch
4 Reservoir

Figure 122. Removing air cleaner reservoir.

body. Lift lower screen from reservoir and empty dirty oil from reservoir.

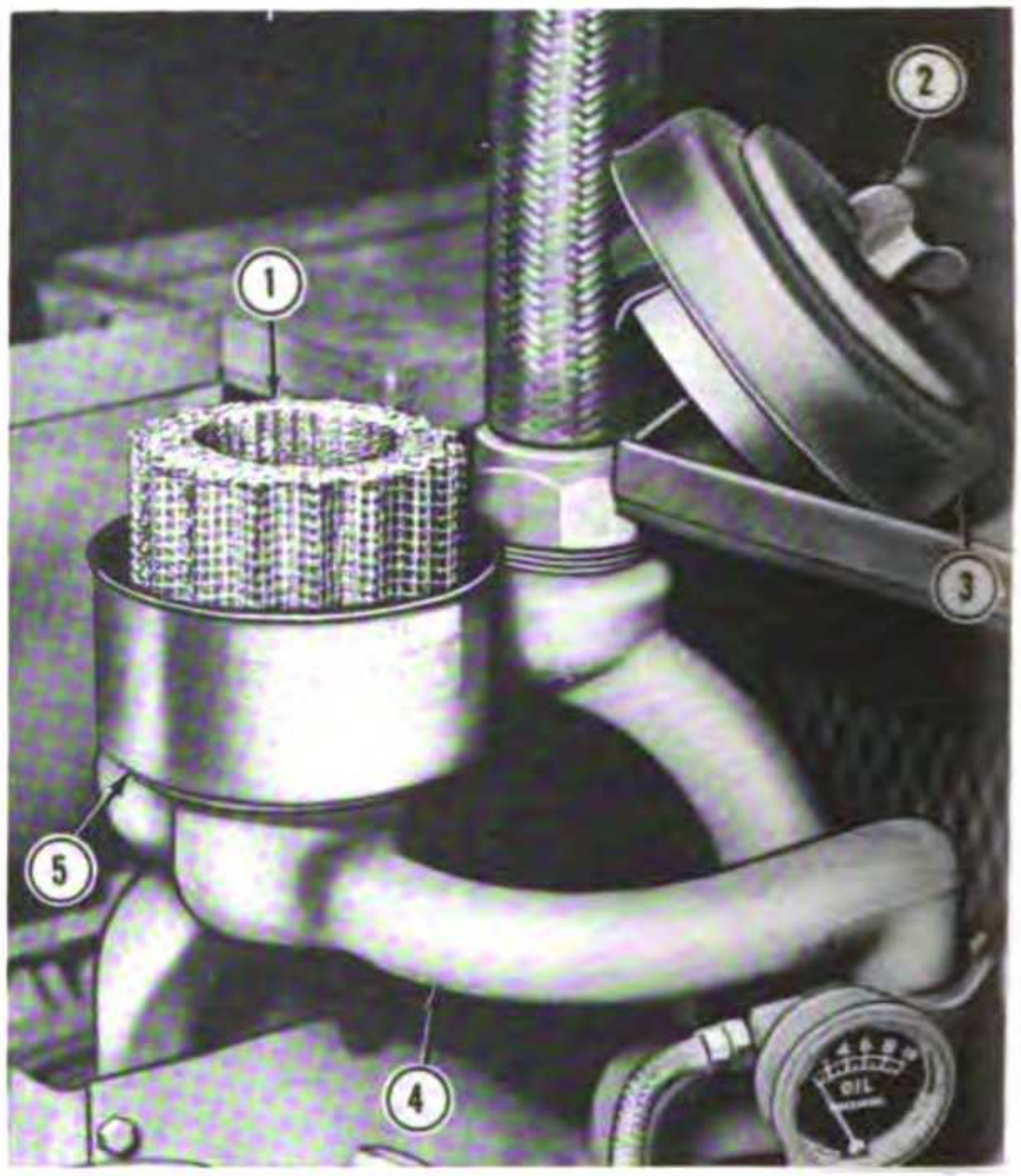
Caution: Do not spill oil during servicing. As a safety measure, immediately wipe up any spilled oil.

Wipe out reservoir with clean waste or cloth. Inspect reservoir for leaks due to corrosion or damage. Replace a leaking, damaged, or badly corroded reservoir. Refill reservoir with proper grade of oil (See LO 5–9128–1) to level mark.

Caution: Do not overfill air cleaner reservoir. Excess oil will restrict passage of air into carburetor and result in over-rich mixtures causing inefficient engine operation or stalling.

Clean lower screen with approved cleaning solvent and dry with compressed air. Install lower screen in reservoir and aline reservoir (4) on bottom of air cleaner body. Make certain that reservoir is level and seated on seal. Secure reservoir on air cleaner body with two latches (3).

f. Servicing Compressor Air Cleaner. Loosen wing screw (2, fig. 123) and remove cover (3)



1 Screen
2 Wing screw
3 Cover
4 Intake manifold
5 Reservoir

Figure 123. Compressor air cleaner cover removed.

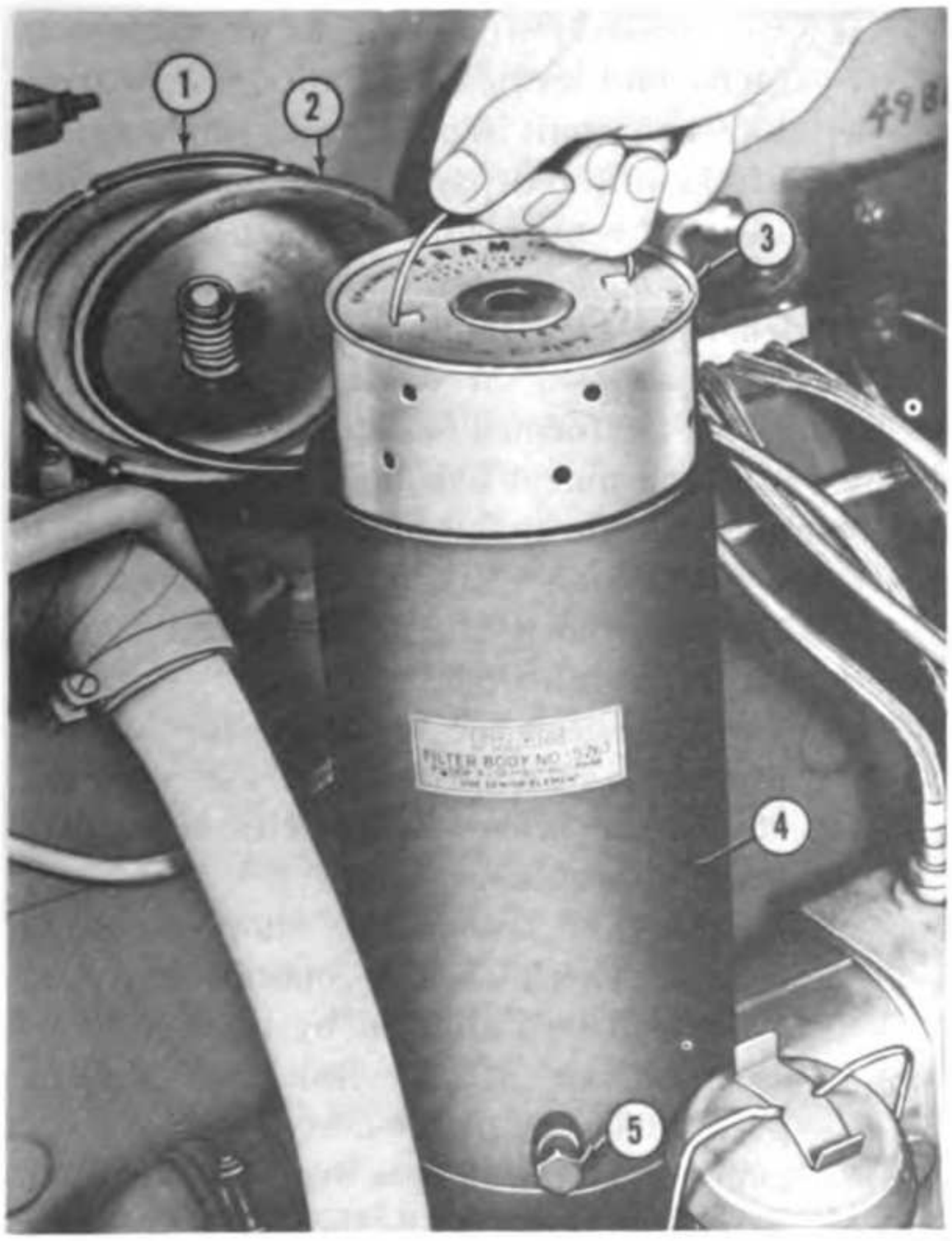
from reservoir (5). Remove screen (1) from reservoir. Empty dirty oil from reservoir. Wipe out reservoir with clean waste or cloth. Inspect for leaks due to corrosion or damage. Replace a leaking, damaged, or badly corroded reservoir. Inspect gasket on intake manifold (4). Replace damaged or deteriorated gasket. Refill reservoir with proper grade oil (LO 5–9128–1) to level mark. Immerse screen in approved cleaning solvent, wash clean, and allow to dry. Inspect condition of screen to make certain that it is not clogged or damaged. Replace damaged screen. Place several drops of light oil on screen and install screen in reservoir. Aline cover over screen and secure by tightening wing screw.

g. Servicing Engine Oil Filter.

(1) *Remove filter element.* Remove drain plug (5, fig. 124) and allow oil to drain.

Caution: Use suitable container to catch drained oil. Wipe up all spilled oil immediately.

Back out screw and remove cover (1). Pull out element (3). Discard dirty element and gasket (2).



1 Cover
2 Gasket
3 Element
4 Body
5 Drain plug

Figure 124. Removing oil filter element.

(2) *Install filter element.* Remove dirty oil and sediment from inside of filter body (4) and cover, using clean waste or cloth. Install drain plug (5). Install new element (3) in filter body. Fit new gasket in cover.

Caution: Use care when fitting new gasket in cover. This seal must be oiltight.

Install cover on filter body. Add two quarts of proper grade oil (LO 5–9128–1) to engine crankcase. Start engine (par. 41) and carefully check the oil filter for leaks. Operate engine until it has reached normal operating temperature and recheck the oil filter for leaks. Stop engine (par. 48) and check oil level. Add oil if required.

h. Servicing Wheel Bearings. Remove wheel bearings (par. 150*a*). Clean and inspect bearings (par. 150*b*). Repack bearings with proper grease (LO 5–9128–1) by pushing grease into all the spaces around the rollers and cages as each roller is rotated by hand. Install and adjust bearings (par. 150c).

78. Painting

Repaint the mobile shop when the finish has been damaged, or when evidence of corrosion is observed. Refinish with approved paint, noting the following special instructions.

a. Masking. Use approved masking tape to prevent overspray, or accidental painting of machined surfaces, bearing surfaces, screw threads, glass, nameplates, rubber, data plates, plastic, or fabric. Do not paint lubrication fittings, bearings, breather caps, and vents. Protect electrical parts, including switches, sockets, and similar items from paint.

b. Cleaning. Remove all excess paint from surrounding surfaces before it dries and hardens.

c. Mobile Shop Parts. Remove all paint and corrosion from the following surfaces:

(1) *Shop body.* Glass, lights, reflectors, weatherseals, padlocks, ventilating fans, heaters, and exposed surfaces on extended hydraulic jack and pump rams.

(2) *Engine.* Batteries, wiring magneto, generator regulator, generator, overspeed relay, carburetor, fuel pump, sending units, flexible fuel hoses, radiator, fan, fan pulleys, fan belts, breather caps, vents, instruments; and control cables of choke, throttle, and radiator shutter.

(3) *Dynamotor-welder and electric-control system.* Dynamotor-welder air filters, pulleys, drive belts; electric-control cubicle knobs, switches, dials, rheostats, fuses; electric-circuit outlets, lights, bulbs, cables or plugs (emergency cord, welding cables, extension cords, and similar items).

(4) *Air compressor.* Oil-pressure gage, oil filler-cap, pilot valve, braided metal pipe, flexible hoses, safety valve, and air outlets.

(5) *Shop equipment.* Lathe ways and other machined or bearing surfaces and screw threads; lathe motor spindle, belt, and handwheel; electric drill, 5/8-inch, stand column and feed; hydraulic equipment pumps, rams, and hoses; radial drill arm column and rack, and air hoses.

d. Additional Painting Instructions. Refer to TM 9–2851 for additional painting instructions.

Section III. PREVENTIVE MAINTENANCE SERVICES

79. General

The operator or crew and the organizational maintenance personnel must perform their preventive maintenance services regularly, to make sure the mobile shop operates well and to reduce the chances of failure.

80. Crew Maintenance

a. Inspections. Inspection must be made before operation, during operation, at halt, and after operation, as described in this section. All inspection of assemblies, subassemblies, or parts, must include any supporting members or connections and must determine whether the unit is in good condition, correctly assembled, secure, or excessively worn. Any mechanical condition which may result in further damage to the unit must be corrected before the equipment is operated.

(1) The inspection for "good condition" is usually an external visual inspection to determine whether the unit is damaged beyond safe or serviceable limits, or to determine if it is in such condition that damage will result from operation. The term "good condition" is further defined as: not bent or twisted; not chafed or burned; not broken or cracked; not bare or frayed; not dented or collapsed; not torn or cut; adequately lubricated.

(2) Inspection of a unit to see that it is "correctly assembled" is usually an external visual inspection to determine whether it is in its normal assembled position in the equipment.

(3) Check of a unit to determine if it is "secure" is usually an external inspection, a hand-feel, or a pry bar or wrench check for looseness in the unit. Such an inspection will include all brackets, lockwashers, locknuts, locking wires, or cotter pins used in the assembly.

(4) "Excessively worn" means worn close to or beyond serviceable limits, a condition likely to result in a failure if replacement of the affected parts is not made before the next scheduled inspection.

b. Reporting Deficiencies. The crew will report all deficiencies on DD Form 110.

c. Before-Operation Services. The following services will be performed to determine if the condition of the equipment has changed since it was last operated, and to make sure the equipment is ready for operation. Any deficiencies must be corrected or reported to the proper authority before the unit is put into operation.

(1) *Tires.* Check the four tires for low air pressure, cuts, bruises, grease and oil stains, or other deficiencies that may cause blowouts.

(2) *Brakes.* If the mobile shop is to be moved, check brake operation. Any leaks will be indicated by the sound of escaping air at the leak and falling pressure on the prime-mover air-pressure gage when the brakes are held applied. Adjust brakes (par. 152) if necessary. If properly adjusted brakes grab, fail to hold, or cause the mobile shop to pull to one side, remove brakedrums (par. 150*a*) and check for excessively worn, dirty or greasy brake linings.

(3) *Positioning shop.* Check footing for firmness. Place chocks under all wheels before disconnecting the prime mover (par. 38) or when releasing the trailer airbrakes. Lower trailer supporting jacks and adjust to level shop (par. 38*h*). Make sure jack safeties are in position. Check position and security of the sides, and that side-fitting jacks are functioning properly. Make sure side-lifting struts are in place.

(4) *Shop enclosure.* Check that canvas-tenting enclosure (if being used) is secure. Check tenting frames and canvas sections to see that they are correctly assembled (par. 40). Tighten loose ropes. Make sure that heater exhausts are clear of all obstructions (mud, stock, items to be repaired, or other objects).

(5) *Fuel.* Check fuel supply. See that fuel tank is full. Battery-disconnect switch must be ON to read gage. Check reserve supply of fuel and replenish if necessary. Check to see that fuel shut-off valve at the bottom of the fuel tank is in its open position before attempting to start the engine.

(6) *Water.* Check coolant level in radiator. Add coolant if necessary. When filling radiator containing antifreeze, allow room for expansion.

(7) *Lubrication.* Check oil level in engine crankcase, compressor crankcase, compressor clutch, and lathe-motor gearbox. Add oil if necessary. Check for signs of improper lubrication. If necessary lubricate as specified in LO 5–9128–1, LO 5–9128–2, and LO 5–9128–3.

(8) *Instruments.* Check all gage readings. Engine temperature gage should show a gradual rise during the warmup period until it reaches the operating temperature range of 160° to 180° F. The engine oil-pressure gage should register 15 to 30 psi at full engine speed after warmup. Oil pressure will be above normal when the engine is cold, or may drop below normal at idling speed when the engine is warm. If the low-oil-pressure warning light goes on, or the oil-pressure gage shows an unusual drop or no pressure, stop the engine immediately and report condition to the proper authority. Allow engine to warm up at a fast idling speed, but do not race the engine. Ammeter pointer should be in the charge range throughout warmup.

(9) *Leaks, general.* Check for leaks. Pay particular attention to the engine cooling system, to oil and fuel lines and connections, and to signs of leaks under the engine.

(10) *Visual inspection.* Check that shop is in good order, that loose tools and stock are in place, and that shop is clean. Pay particular attention to see that all electric units are clean and secure. See that safety guards, covers, stops, and switches are properly set. Be sure the chassis is properly grounded.

(11) *Starting.* All clutches should be disengaged before starting engine. See that moving parts are clear of tools and obstructions. Check radiator shutter, shop controls, and engine controls. Start engine (par. 41) and warm up to operating temperature.

d. During-Operation Services. The operator is responsible for correcting or reporting unusual sounds or odors, deficiencies in performance, or other signs of abnormal operation. He will perform the following specific services.

(1) *Instruments.* Check all gage and meter readings frequently. At normal operating speeds, temperature, and load, the readings should be as follows:

Engine oil pressure	15 to 30 psi
Coolant temperature	160° to 180° F.
Tachometer	1,800 rpm for 60 cycles
	1,500 rpm for 50 cycles
Battery-ammeter	In charging range
Ac voltmeter (Shop power supply voltage).	208 to 220 volts
Dc voltmeter (With polarity switch at REV or STR).	80 volts at no load
	40 volts at rated working load
Dc ammeter (With polarity switch at REV or STR).	0 amperes at no load
	300 amperes at rated working load
Air-compressor oil pressure.	10 psi
Air pressure	90 to 100 psi

Check all gage and meter readings connected with each piece of shop equipment, noting that the readings correspond with those given in the operating instructions.

Caution: If any warning device (such as the engine-overheat warning light, or low-oil-pressure warning light) or

safety device (such as engine-overspeed relay, air-pressure safety valve, or circuit breaker) operates, stop the engine, or equipment immediately. Locate and remedy the cause of the trouble before putting the equipment back in operation. Report deficiency to proper authority if condition cannot be corrected.

(2) *Unusual operation and noises.* Check for unusual operation such as engine misfiring, excessive vibration, lack of power, overheating, smoking exhaust, or low oil pressure. Listen for unusual noises such as explosions in muffler; knocks; and valve, bearing, or other mechanical noises from engine. Check shop equipment for unusual vibration, brush sparking, overheating, smoking, failure to respond to controls, knocking, or other mechanical noises. Stop operation and locate and correct trouble, if possible. Report deficiency to the proper authority if condition cannot be corrected.

e. At-Halt Services. During halts, even if only for short periods, the operator should make a general check of the equipment and correct or report any deficiencies noted, in addition to performing the following specific duties.

(1) *Fuel.* Check fuel supply. Replenish fuel supply if necessary (par. 162*b*).

(2) *Lubrication.* Check oil level in engine crankcase, compressor crankcase, compressor clutch, and lathe-motor gearbox. Add oil if necessary. Check all equipment for signs of improper lubrication. Lubricate, if necessary, as specified in LO 5–9128–1, LO 5–9128–2, and LO 5–9128–3.

(3) *Water.* Check coolant in radiator to see that it is at the proper level. Add coolant if necessary (par. 158*d*(5)).

Caution: If the engine overheats because of lack of coolant, allow it to cool before filling the radiator; otherwise, there is a danger of cracking the cylinder head and block. If it is necessary to fill the radiator before the engine has cooled, be sure to fill it slowly with the engine running at fast idling speed.

(4) *Leaks, general.* Check for leaks, paying particular attention to fuel, oil, coolant, hydraulic, and air lines and connections. Look for signs of leaks under the engine and air compressor.

(5) *Visual inspection.* Make a visual inspection of the entire mobile shop. Check that chocks under the wheels are secure, and that the supporting jacks and safety struts on the lifted sides are secure. Examine the tenting frames and canvas for good condition and security of the canvas. Check condition of engine fan belts and dynamotor drive belts. If operating under extremely dusty conditions, inspect air cleaners, filters, and vents on engine, dynamotor-welder, and air compressor. Service these units as specified in LO 5–9128–1, LO 5–9128–2, and LO 5–9128–3.

f. After-Operation Services. To insure that the mobile shop is ready to operate at any time, the following services must be performed by the operator or crew immediately after any operating period of eight hours or less. All deficiencies must be corrected or reported to the proper authority.

(1) *Shutdown precautions.* Shut off all electric and pneumatic-powered shop equipment. Disengage air-compressor clutch. Carefully follow all instructions for shutting down the dynamotor-welder (par. 42*a*(4) and stopping the engine (par. 48).

(2) *Fuel, oil, and water.* Fill fuel tank with clean fuel. Close fuel shutoff valves. Check oil levels in engine crankcase, compressor crankcase, compressor clutch, and lathe-motor gearbox. Add oil if necessary. Check coolant in radiator. Proper level is at or near overflow with the engine at operating temperature. Add coolant if necessary. Change coolant if it is contaminated with rust, oil, or dirt. If antifreeze is used, check freezing point of coolant. When adding antifreeze, mix solution thoroughly by running the engine.

(3) *Clean equipment.* Remove all dirt and grease from mats, floor, panels, bulkheads, and sides of the shop body. Remove all dirt, oil, and grease from the exterior of the engine and components, dynamotor-welder, air compressor, and

clutch. Remove all waste and scrap from shop.

(4) *Shop equipment, toolkits, and tool sets.* See that all shop equipment assigned to the mobile shop is in serviceable condition, clean, and properly stowed or mounted.

(5) *Lights.* Check lights for proper operation. See that they are clean. Check condition and mounting of all lamps and reflectors.

(6) *Lubrication.* Lubricate as required by LO 5–9128–1, LO 5–9128–2, and LO 5–9128–3.

(7) *Fire extinguisher.* Check condition of fire extinguisher and inspect for full charge (par. 69*c*) and secure mounting. Do not discharge any of its contents.

(8) *First aid kit.* Check condition of the first aid kit, and inspect for cleanness, good order, and complete contents.

(9) *Water carrier.* Check condition of the water carrier and inspect for cleanness, good working order, and secure mounting.

(10) *Visual inspection.* Make a visual inspection of the entire mobile shop. Check for loose or missing bolts, nuts, screws, and parts; loose electrical, air, and hydraulic connections; and damaged wiring, hoses, tubing, and other parts.

(11) *Protection.* See that the engine compartment and the battery compartment are closed and fastened. If the canvas-tenting is not erected, close and lock the lifting-sides. If the tenting is erected, make certain that all the canvas sections and frames are secure and tight. Check the security of all ropes and lacings. If there is any danger of water freezing in the engine cooling system, and antifreeze solution is not being used, drain the cooling system (par. 158*b*(1)) and leave all drains open.

81. Maintenance and Safety Precautions

a. Always correct or report any mechanical deficiencies that may result in damage to the mobile shop or equipment if operation is continued.

b. Keep the fire extinguisher filled and in good operating condition.

c. Observe all safety measures against fires in the handling of fuel. Always provide a metallic contact between container and tank when filling the gasoline tank.

d. Use only clean fuel, lubricants, and coolant. Make sure that containers used for handling fuel and other liquids are absolutely clean and dry.

e. Be sure there is adequate clearance before attempting to move mobile shop under trees, bridges, power lines, or other low objects.

f. Stand clear of struts while raising sides to open shop. When sides are at full open height make certain that strut ends fit into safety sockets on the body drip molding.

g. Always use ladders (stored at the forward end of the trailer) connected together in A position to hook up the triangular rear panel to the hoist rail when opening the shop. Always use ladders (one at each side) and handholds to reach the engine for servicing. Do not jump.

h. Always disengage the engine clutch before starting or stopping the engine and before leaving the mobile shop.

i. Before connecting to external power supply lines, be sure that the main switch or breaker controlling the power to these lines has been placed in OFF position. Do not handle live electric wiring. High voltages will cause serious injury or death.

j. All safety guards on belts, gears, shafts, and other rotating parts must be installed before operating the equipment. Do not remove guards from moving parts.

k. Always use safe lifting apparatus of adequate capacity to hoist the work into position on the shop equipment. Do not exceed the maximum lifting capacity of the trolley hoist.

l. Never exceed the capacities of the equipment.

m. Start all equipment carefully. Apply loads gradually to avoid undue strains and possible damage.

n. Keep an approved type fire extinguisher nearby while welding or flame cutting. Do not use water or foam type extinguishers on fires in live electric equipment (motors, switches, wiring, and so on).

o. Do not lubricate or make adjustments while the machinery is in operation.

Note. Complete DD Form 110 and report any worn or damaged parts requiring replacement or repair. Responsibility for performance of preventive maintenance services rests not only with operators, but with the entire chain of command from section chief to commanding officer (AR 700–105).

82. Organizational Maintenance

a. Organizational preventive maintenance is performed by organizational maintenance personnel, with the aid of the operator, at weekly and monthly intervals. The weekly interval will be equivalent to 60 hours of use. The monthly interval will be equivalent to 4 weeks, or 240 hours of use, whichever occurs first.

b. The column headed technical inspection is provided for the information and guidance of personnel performing technical inspection, and constitutes the minimum inspection requirements for the equipment.

c. The preventive maintenance services to be performed at these regular intervals are listed and described below. The numbers appearing in the columns opposite each service refer to a corresponding number appearing on DA Form 464, and indicate that a report of the service should be made at that particular number of Form 464. These numbers appear in either second, third, or both columns, as an indication of the interval at which the service is to be performed.

Technical inspection	Services		GENERAL
	Monthly	Weekly	
1	1	1	*Before-operation services.* Check and perform services listed in paragraph 80*c*.
2	2	2	*Lubrication.* Inspect the mobile shop and each item of shop equipment for missing and damaged lubrication fittings, lines, and grease cups and for indication of insufficient or excessive lubrication. Check gearboxes for correct lubricant level. Check for leaking or damaged seals and gaskets.
	2	2	Replace missing or damaged fittings and grease cups. Carefully perform all necessary lubrication procedures as specified in LO 5–9128–1, LO 5–9128–2, and LO 5–9128–3. Remove all excess lubricants. Replace all leaking or damaged seals and gaskets or report deficiency to proper authority.
3	3	3	*Tools and equipment.* Inspect condition and completeness of all toolkits and toolsets assigned to the mobile shop. Check condition and mounting of toolboxes and compartments.
	3	3	See that all toolkits and toolsets assigned to the mobile shop are complete, clean, oiled, serviceable, and properly stowed or mounted. See that toolboxes and compartments are in good condition and that they close and fasten properly.
4	4	4	*Fire extinguisher.* Carbon tetrachloride type: Check that the extinguisher is securely mounted. Check for full charge by removing filler plug. Inspect the condition of the handle and controls by looking for dirt, corrosion, or damage. Carbon dioxide (CO_2) type: Inspect for insecure mounting, kinked or damaged hose, and missing or broken seal. If the seal is missing or broken, the extinguisher must be weighted to determine the amount of charge. The empty and full weights are stamped on the valve body. Check date of last hydrostatic test stamped on the tank just below the neck. Time since test should not exceed five years.
	4	4	See that any deficiencies are corrected or reported to the proper authority.
5	5	5	*Publications.* See that a copy of this technical manual, TB 5–9128–1, LO 5–9128–1, LO 5–9128–2, and LO 5–9128–3, and DA Form 285 are on the mobile shop and in serviceable condition.
6	6	6	*Appearance.* Inspect the general appearance of the mobile shop, paying particular attention to the cleanness, legibility of identification markings, and condition of the paint.
	6	6	Correct or report any deficiencies noticed.
7	7	7	*Modifications.* See that all available modification work orders applying to this mobile shop have been completed and are recorded on DA Form 478.
8	8	8	*First aid kit.* Check installation and condition of the first aid kit and inspect for cleanness, good order, and complete contents.
	8	8	Replace missing or damaged first aid kit. Replace all unclean, missing, or used items.

Technical inspection	Services		ENGINE AND ACCESSORIES
	Monthly	Weekly	
14	14	14	*Crankcase, breathers.* Inspect the crankcase for leaks. Check the condition of crankcase breather and caps.
	14	14	Correct or report any oil leaks noticed.
15	15	15	*Oil filters.* Inspect the oil filter assembly and connections for leaks while the engine is running.
	15	15	Repair all leaks. Report any uncorrected deficiency to proper authority.
16	16	16	*Radiator.* Inspect the radiator for leaks, obstructions in core air passages, and loose mounting belts. Check radiator cap and pressure seal for tight fit. Check all cooling-system hoses for leaks, excessive deterioration, and loose connections. Check manual operation of radiator shutter. Check operating temperature and condition of coolant. If coolant temperature remains below 160° F. or rises above 180° F. during operation, thermostats may be defective. If antifreeze is used, check the freezing point of the coolant.
	16	16	Drain, flush, and refill the cooling system (par. 158) if coolant is contaminated with rust or dirt. See that core air passages are clean. Renew damaged or defective cooling-system cap, hose, clamps, and gaskets. See that mounting bolts and connections are tight. Protect the coolant from freezing, and record its freezing point on DA Form 464.
17	17	17	*Water pump, fan, guards.* Inspect the water pump for leaks and for loose mounting and assembly bolts. Check the condition and mounting of fan and guards.
	17	17	Tighten or replace loose or missing bolts and screws. If the pump leaks, tighten the packing gland (par. 160*a*) only enough to stop the leak; replace pump if necessary (par. 160*b* and *d*).
18	18	18	*Belts and pulleys.* Inspect for excessively worn, cracked or frayed fan belts. Check belt tension and condition and alinement of pulleys.
	18	18	Adjust the tension of the fan belts (par. 159*a*) if necessary. If the belts are badly worn, replace them with a matched set (par. 159). New and old belts should not be installed on the same pulley.
20	20	20	*Governor and linkage.* Check the governor adjustments. Correct governor setting is 1,800 rpm. If the engine surges when running at top speed without load, the governor is out of adjustment.
	20	------	Adjust the governor if necessary (par. 169*a*).
21	21	------	*Exhaust pipe and muffler.* Inspect the exhaust pipe and muffler for leaks, loose mounting clamps, bolts, and nuts, and defective raincap.
	21	------	Tighten any loose muffler-and-exhaust-pipe-mounting clamps, bolts, and nuts. Replace leaking muffler, exhaust pipe, or defective raincap (pars. 186 and 187).
22	22	22	*Radiator shutter.* Check that shutter vanes and linkages are not bent, broken, or obstructed. Check operation of radiator shutter and see that it opens automatically when the engine reaches operating temperature. Test manual operation of shutter by turning handle on control panel.
	22	22	Clean and adjust radiator shutter vanes and linkages (par. 157*c*). Turn radiator shutter manual control (par. 41*m*), if radiator shutter does not open automatically and report deficiency to proper authority.
			FUEL SYSTEM
38	38	38	*Fuel pump and housing.* Inspect fuel pump and lines for leaks, Check for loose mounting screws. Check fuel filter bowl for water and dirt.
	38	38	Tighten any loose screws and connections. Clean fuel filter bowl if it contains water or dirt (par. 162*c*). Replace defective pump (par. 165) with a new or reconditioned one.

Technical inspection	Services		FUEL SYSTEM—Continued
	Monthly	Weekly	
39	39	39	*Carburetor and linkage.* Check for loose and missing carburetor mounting bolts and screws. Check flexibility and operation of cable controls.
	39	39	Tighten any loose mounting bolts and screws. Replace excessively worn or damaged cable controls (par. 178).
40	40	40	*Filters.* Check oil filter for dirt and sludge. Check for leaks and loose connections.
	40	------	Clean and replace oil filter element if necessary (par. 77*g*).
41	41	41	*Air cleaner.* Inspect air cleaner for loose connections.
	41	41	Make sure there are no air leaks between the air cleaner and the carburetor.
43	43	43	*Fuel tank, cap, and gaskets.* Inspect frame and mounting of fuel tank. Check tank, gaskets, and connections for leaks and damage.
	43	43	See that the tank is securely mounted, air vent open, and fillercap clean and tight-fitting. Repair or replace leaky or damaged gaskets and connections. Check wiring connection on fuel-gage sending unit. Report all uncorrected deficiencies to the proper authority.
44	44	44	*Fuel lines.* Check the fuel lines for leaks, loose connections, and damage.
	44	44	Repair or replace damaged or collapsed fuel lines (pars. 166, 167, and 168). Tighten loose connections. Report all uncorrected deficiencies to the proper authority.
			ELECTRIC SYSTEM
46	46	46	*Spark plugs.* Inspect spark plugs for dirty or cracked insulators.
	46	46	Clean dirt and oil from spark plug insulators. Replace defective plugs (par. 176).
	46	------	Remove, clean, and adjust spark plugs (par. 176). Proper gap is 0.025 inch. See that plugs and gaskets are in good condition before they are installed.

Technical inspection	Services		ELECTRIC SYSTEM—Con.
	Monthly	Weekly	
47	47	47	*Batteries.* Inspect batteries for cracked or leaky case, for loose holddowns, and for dirt and corrosion on top of batteries. Check for loose, corroded, or damaged terminals and cables. Check level of electrolyte.
	47	47	Clean all dirt and corrosion from batteries, posts, cables, and cable terminals (par. 171*a*). Test batteries (par. 171*b*). See that batteries are securely mounted, fillercaps are tight, and vent holes are open. Replace damaged cables. Apply a thin film of chassis grease over cable terminals. Add distilled water, if needed, to bring solution up to proper level (par. 171*a*). If freezing temperatures prevail, battery must be charged for a period long enough to mix solution thoroughly. Where possible, water should be added before operation.
48	48	48	*Generator and starting motor.* Inspect generator and starting motor for loose mounting bolts and cable connections.
	48	48	Tighten any loose mounting bolts and cable connections. Replace or free brushes and clean commutators if necessary (pars. 172*a* and 174*a*).
	48	------	Inspect commutator and brushes for excessive wear, dirt, and oil deposits (pars. 172*a* and 174*a*). See if brushes are free in their holders and if brush wires are secure. Replace generator brushes, if necessary (par. 172*a*). Inspect magneto for cracks and for tightness of mounting. Test magneto (par. 175*a*).
50	50	50	*Electric units, wiring, and switches.* Inspect all units and radio-suppression material for loose or corroded holddowns, connections, and mountings. Inspect wiring for oil-soaked, cracked, or frayed insulation; broken wires, and loose or corroded connections.
	50	50	Tighten any loose mounting bolts and wire connections on electric-

Technical inspection	Services		ELECTRIC SYSTEM—Con.
	Monthly	Weekly	
			system units. See that all radio-suppression material, switches, and wiring conduits are securely mounted. Repair, replace, or report defective or damaged radio-suppression material, switches, and external wiring to the proper authority.
51	51	51	*Generator regulator.* Check the generator regulator for proper operation and secure mounting. See that cable connections are tight. The generator regulator should allow an appreciable charge to go into the battery after the starting motor is used. After the battery is fully charged, the ammeter should indicate only a slight charge.
	51	51	Tighten any loose, or replace any missing, screws. Replace the generator regulator if it is defective (par. 173).
52	52	52	*Lights, switches, and receptacles.* Check lights, light wiring, switches, plugs, and receptacles for loose mounting and damaged or defective parts.
	52	52	Replace defective or damaged lights, wiring, switches, plugs, and receptacles. See that connections are clean and tight. See that all lights, switches, plugs, receptacles, and wiring conduits are securely mounted.
53	53	53	*Traveling lights, 24-volt.* Check operation of all clearance lights and stop-and-taillight. Inspect all lights for loose mounting bolts or screws, defective bulbs, and cracked or broken lenses.
	53	53	Tighten or replace loose or missing mounting screws or bolts. Replace defective bulbs, receptacles, sockets, cracked or broken lenses, faulty wiring and connections (pars. 140–145).
54	54	54	*Electric-control cubicle.* Check for loose connections, cracked or frayed wire insulation, corroded terminals, and loose or missing mounting bolts and nuts. Inspect instruments for cracked or broken glass, loose mounting screws, and defective operation. Check controls and switches for broken handles, insecure mounting, and defective operation.
	54	54	Check condition and connections of terminal panel and outlets.
	54	54	Replace damaged wiring and terminals. Replace or report any damaged or inoperative instruments, controls, or outlets. Tighten any loose mountings and connections.
55	55	55	*Welding-connector panel.* Inspect the welding-connector panel for any signs of damage and for insecure mounting. Check the sockets for accumulation of corrosion, dirt, and grease.
	55	55	See that the welding-connector panel is securely mounted. Clean the panel, if necessary. If any damage is noted, report deficiency to the proper authority.
			CONTROL SYSTEM
57	57	57	*Gages.* Inspect fuel, temperature, oil, air, and hydraulic-pressure gages for cracked or broken glass, insecure mounting, and defective operation.
	57	57	See that gages are securely mounted. Report damaged or defective gages to the proper authority.
58	58	58	*Meters.* Inspect ammeters, voltmeters, tachometer and hourmeter for cracked or broken glass, loose mounting screws, and defective operation.
	58	58	Tighten or replace loose or missing mounting screws. Report damaged or defective meters to the proper authority.
61	61	61	*Trailer-supporting and side-lifting jacks.* See that all components are in good condition and securely mounted. Check fluid level in reservoirs. Inspect hydraulic hoses and lines for leaks, loose connections, and loose or missing clamps and fittings. Check flexible hoses for excessive deterioration, cracks, and wear. Inspect all connections, fittings, and clamps for excessive wear and damage.
	61	61	Tighten any loose mounting bolts and connections and correct any leaks noted. Replace defective side-lifting jacks, hoses, lines, fittings, clamps, and pump (pars.

Technical inspection	Services		
	Monthly	Weekly	
			CONTROL SYSTEM—Con.
			128 and 129). Report any uncorrected deficiencies to proper authority. Always bleed air from systems (pars. 124 and 127) after lines or hoses have been replaced.
62	62	62	*Levers, cables, and linkages.* Check control handles (engine clutch, compressor clutch, and radiator shutter manual control) for ease of operation. Check the flexible cables (throttle, choke, radiator shutter manual control, and tachometer) for breaks and correct assembly. Check the linkages (engine clutch, starting motor and governor) for tightness of conditions. Inspect the condition of the cables and linkages and see if they are properly adjusted and that all connecting parts, cotter pins, locknuts, and bolts are in place and secure.
62	62		Adjust control linkages and flexible cables if necessary. Replace or tighten any loose or missing parts, cotter pins, locknuts, and bolts. Straighten or replace bent or damaged linkages.
			FRAMES AND MOUNTINGS
76	76	76	*Tires.* Inspect all tires for low air pressure, excessive wear, cuts, embedded foreign material, and missing valve caps. The correct air pressure is 65 psi.
	76	76	Remove any foreign material from tires. See that all tires are inflated to correct pressure and that all valve caps are in place.
78	78	78	*Wheels.* Check wheel cap screws and lug nuts for tightness. Check locking rim assembly for security.
	78	78	Tighten any loose nuts or cap screws.
80	80	80	*Frame.* Inspect semitrailer frame for cracks and breaks, bent members, and loose or missing bolts and nuts. Check condition of tenting frames and safety struts.
	80	80	Tighten or replace loose or missing bolts and nuts. See that cracks, breaks, and broken welds are repaired before further damage

Technical inspection	Services		
	Monthly	Weekly	
			FRAMES AND MOUNTING—Continued
			results. Report bent members to the proper authority.
82	82	82	*Rear axle assembly.* Check for cracks, bent parts and secure mounting of axle. Check for lubricant leaks.
	82	82	Tighten mounting bolts securely (par. 147). Correct or report other deficiencies noticed to the proper authority.
83	83	83	*Springs, channel, and radius rods.* Inspect springs for cracked, broken, or fatigued leaves. Check for missing or damaged U-bolts, rebound clips or mounting parts. Check channel and radius rods for worn bearings and bushings, insecure mounting, and misalinement.
	83	83	Replace or tighten any missing or loose bolts. Report broken springs to proper authority. Report excessively worn radius rod bushings. Report any misalinement.
			POWER SYSTEM
94	94	94	*Drive belts and pulleys.* Inspect for excessively worn, cracked, or frayed drive belts. Check cotter pins and castellated shaft nuts for good condition and security. Check alinement of pulleys. Drive belts are properly adjusted when they can be deflected approximately one inch from normal position at a point midway between the pulleys.
	94	94	Adjust the tension of the drive belts (par. 191) if necessary. Replace all six belts (pars. 192 and 193) in a matched set if any are frayed or badly worn. New and old belts should not be installed on the same pulley.
95	95	95	*Master clutch (engine clutch).* Check operation, condition, and adjustment of clutch. The clutch should not grab or chatter while being engaged and should not slip when fully engaged. Engine clutch adjustment is correct when a reasonably firm pressure is required to get the clutch lever to snap over center to fully en-

Technical inspection	Services		
	Monthly	Weekly	
			POWER SYSTEM—Continued
			gaged position. Check condition of lever connection on clutch shaft.
	95	95	Adjust clutch if necessary (par. 189). If clutch slips when properly adjusted, disks may need renewing. Report deficiency to proper authority. See that bolt and key connecting the clutch lever to shaft are secure.
98	98	98	*Operating clutch (compressor).* Check fluid level, condition, operation, and adjustment of compressor clutch. The clutch should drive the compressor load without slipping when it is fully engaged. Compressor clutch adjustment is correct when a reasonably firm pressure is required to get the clutch lever to snap over center to fully engaged position.
	98	98	Adjust clutch if necessary (par. 203). If the clutch slips, grabs, or chatters when properly adjusted it may require oil, repair or replacement. Report deficiency to proper authority.
108	108	108	*Drive shaft and universal joints.* Inspect drive shaft for damage. Check universal joints and slip joint for excessive wear and see if any companion-flange or bearing-cap bolts are loose or missing.
	108	108	Tighten or replace any loose or missing bolts and nuts. Report excessively worn or damaged parts.
			MISCELLANEOUS ITEMS
133	133	------	*Heaters.* See that the heaters are mounted securely and horizontally with the fuel control valve on top. Check electric connections at terminal strip for wiring code matching and for firm connections. Make certain exhaust is clear of obstructions.
	133	------	Tighten any loose bolts and nuts. Replace faulty wires. Remove all obstructions from the exhaust. Replace defective parts (pars. 131–135).
134	134	------	*Ventilators.* Inspect the blowers and ducts for cracks, breaks, bent housing, broken welds, and loose or missing bolts and nuts.

Technical inspection	Services		
	Monthly	Weekly	
			MISCELLANEOUS ITEMS—Continued
			Check condition and security of mountings. Check fan alinement and clearances. See that guards are securely mounted and free of damaged parts. Inspect electric wiring, switches, and connections.
	134	------	Replace damaged ventilators (pars. 138 and 139). Replace and tighten missing or loose bolts and nuts. Replace faulty wiring and connections.
135	135	135	*Canvas-tenting enclosure.* Inspect tenting frames for cracks, breaks, bent poles, and loose or missing parts. Inspect all braces and toggle pins to see that they are in good condition and fastened properly. Inspect the six canvas sections for tears, worn spots, mildew, leaks, and damaged or missing pieces. Inspect canvas for missing, broken, or frayed ropes, grommets, and lacings.
	135	135	See that all bent poles, cracks, and breaks are repaired before further damage results. Repair or replace faulty braces, toggle pins, and missing or damaged parts, canvas, and ropes. Erect or store all parts properly (pars. 40 and 49).
136	136	136	*Shop equipment.* Inspect the condition of each unit of shop equipment assigned to the mobile shop. Check the units for cracks breaks, and loose mounting and assembly bolts and nuts. Examine frame members, gears, racks, shafts, machined surfaces, joints, hinges, pins, sheet metal, adjusting screws, keys and keyways for excessive wear or other damage. Check the condition and completeness of all safety devices, protective coverings, and accessories for shop equipment.
	136	136	See that all units of shop equipment assigned to the mobile shop are clean, serviceable, and properly mounted. Tighten or replace all loose or missing bolts and nuts. See that all cracks or breaks are repaired before further damage results. Replace all excessively worn parts. See that all shop equipment acces-

Technical inspection	Services		MISCELLANEOUS ITEMS—Continued
	Monthly	Weekly	
			sories are complete, clean, serviceable, and properly stored. See that all safety shields, guards, protective covers and other safety devices are in good condition and correctly installed
			COMPRESSOR
141	141	141	*Pneumatic tools and accessories.* Inspect all air lines and hoses for leaks, loose connections and loose or missing mounting bolts and clamps. Check hose for excessive deterioration, cracks, and worn parts. Inspect all pneumatic tools for good condition, cleanness, and proper mounting or stowing. Check lubrication of pneumatic tools. Inspect compressor air cleaner for secure mounting and tight connection.
	141	141	Tighten all loose air line and hose connections, mounting bolts, brackets, and clamps. Replace all defective hose and lines (pars. 205 and 206). Clean and repair defective pneumatic tools. Report uncorrected deficiencies to proper authority.
144	144	144	*Valves (discharge only).* Check valves for leaks or faulty valve seats (par. 202).
	144	144	Remove valves (par. 202), if necessary and clean thoroughly. Replace all broken or damaged parts.
145	145	145	*Unloader.* Check pilot valve for proper operation. Compressor should unload at approximately 100 psi.
	145	145	Adjust pilot valve if necessary (par. 204).
146	146	146	*Mountings and bearings.* Check the mounting of the air compressor for tightness and wear. Check for unusual noises while compressor is operating.
	146	146	Tighten any loose mounting bolts and connections. Report any unusual noises to proper authority.
147	147	147	*Crankcase and oil filter.* Inspect crankcase and oil filter for leaks.
	147	147	See that all connections are tight.
148	148	148	*Fan and shroud.* Inspect shroud, fan, and air passages for obstructions. Check fan and shroud for good condition, proper alinement, and secure mounting.
	148	148	Clean fan, shroud, and air passages (par. 201*a*), if necessary, and tighten any loose mounting bolts and connections.
			GENERATOR
172	172	172	*Armature, commutators, sliprings, and brushes.* Inspect dynamotor-welder armature, commutators, sliprings, and brush ring assemblies for dust, dirt, and oil deposits. Check brushes for wear and loose wire connections. Brushes should be renewed before brush tension arms contact brush holders. See if brushes are free in holders, and make good contact with commutator and sliprings.
	172	172	Clean dust, dirt, or oil from inside the dynamotor-welder, if necessary. See that brushes, commutators, and slipring are clean. Replace excessively worn or damaged brushes (pars. 196*b* and *c* and 197*c* and *d*). Be sure that brushes are free in the holders and that brush leads are in good condition, and that connections are tight. If slipring or commutators are rough or pitted or if mica is high between segments, report condition to proper authority.
	172	------	Inspect the slipring and commutators for wear, rough spots, and pitting, and for high mica between the commutator segments (par. 198).
173	173	173	*Controls, instruments, and wiring* Check for loose connections, cracked or frayed wire insulation, corroded terminals and loose or missing mounting bolts and nuts. Check electric-control cubicle for good condition and secure mounting.
	173	173	Report any damaged or inoperative instruments and controls. Tighten any loose mounting bolts and connections. Replace damaged wiring and terminals.
175	175	175	*Generator mountings.* Check dynamotor-welder for loose or missing mounting bolts or nuts.
		175	Tighten any loose mounting bolts. Replace any missing bolts or nuts.

Section IV. TROUBLESHOOTING

83. Use of Troubleshooting Section

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the mobile shop or any of its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause.

Note. All references in this section to TM 5–9128–2 pertain to maintenance and repair that are the responsibility of field and depot maintenance personnel. Organizational maintenance personnel should not proceed without proper authority.

84. Airbrakes Fail

Probable cause	*Possible remedy*
Air leaks	Check entire airbrake system for leaks and replace defective lines, hoses, relay-emergency valve (par. 155), or brake chambers (par. 154). Refer to TM 5–9128–2 for instructions on repair of airbrake components (see Note in paragraph 83).
Low air pressure	Check operation of air compressor and governor on prime mover and report deficiency to proper authority.
Brakes incorrectly adjusted.	Adjust brakes (par. 152).
Brake chamber push rods incorrectly adjusted.	Adjust length of brake chamber push rods (par. 153*b*(3)).
Failure of mechanical parts.	For repair and replacement of mechanical parts, refer to TM 5–9128–2 (see Note in paragraph 83).

85. Airbrakes Drag, Bind, or Lock

Probable cause	*Possible remedy*
Brakes incorrectly adjusted.	Adjust brakes (par. 152).
Worn or sticking mechanical parts.	Check condition and operation of mechanical parts. Replace defective slack adjuster (par. 153), brake chamber (par. 154), or relay-emergency valve (par. 155). Refer to TM 5–9128–2 for additional instruction on airbrake repairs (see Note in paragraph 83).
Brake linings wet, oily, or dirty.	Replace brake linings. Refer to TM 5–9128–2 (see Note in paragraph 83).

86. Airbrakes Pull to One Side

Probable cause	*Possible remedy*
Tires incorrectly inflated	Inflate tires to 65 psi.
Brake linings dirty, greasy, worn or wet.	Replace brake linings. Refer to TM 5–9128–2 (see Note in paragraph 83).
Brakes incorrectly adjusted.	Adjust brakes (par. 152).
Brake chamber push rods are not the same length.	Adjust length of push rods (par. 153*b*(3)).
Failure of mechanical parts.	For repair and replacement of mechanical parts, refer to TM 5–9128–2 (see Note in paragraph 83).

87. Airbrakes Noisy

Probable cause	*Possible remedy*
Lack of lubrication	Lubricate camshaft (LO 5–9128–1).
Worn brake lining	Replace brake lining. Refer to TM 5–9128–2 (See Note in paragraph 83).
Failure of mechanical parts.	Check condition and operation of mechanical parts. Replace defective slack adjuster (par. 153) or brake chamber (par. 154). Refer to TM 5–9128–2 for instructions on repair of other airbrake parts (See Note in paragraph 83).

88. Mobile Shop Rides Hard

Probable cause	*Possible remedy*
Tires incorrectly inflated	Inflate tires to 65 psi.
Shop overloaded	Unload excessive work, stock, or other materials.
Too high speed over rough terrain.	Reduce traveling speed.
Weak or broken springs	Replace springs. Refer to TM 5–9128–2 (See Note in paragraph 83).

89. Mobile Shop Does Not Track Properly

Probable cause	*Possible remedy*
Radius rods incorrectly adjusted.	Adjust. Refer to TM 5–9128–2 (See Note in paragraph 83).
Channel loose	Tighten mounting bolts (par. 148*c*).
Bent axle assembly	Replace axle assembly. Refer to TM 5–9128–2 (See Note in paragraph 83).

90. Mobile Shop Rides Low on One Side

Probable cause	*Possible remedy*
Tires incorrectly inflated	Inflate tires to 65 psi.
Shop overloaded on one side.	Unload or redistribute load. (See appendix II for loading locations of shop equipment and tools.)
Weak or broken spring leaves.	Replace weak or broken spring. Refer to TM 5–9128–2 (See Note in paragraph 83).

91. Traveling and Clearance Lights Do Not Light

Probable cause	*Possible remedy*
Electric power failure on prime mover.	Check electrical connection on the prime mover. Report deficiencies to proper authority.
Burned-out bulbs	Replace bulbs.
Defective electric connection in sockets, 24-volt receptacle, terminal board or at ground connections.	Locate open or corroded connection and clean or repair as required (par. 143).
Broken or defective wiring.	Replace wiring.

92. Trailer-Supporting Jacks Fail, Bind, or Operate Slowly

Probable cause	*Possible remedy*
Hydraulic fluid supply low	Fill hydraulic oil tank and bleed system (par. 124).
Air in system	Bleed air from hydraulic system (par. 124).
Bent ram, broken retracting spring or other mechanical failure.	Refer to TM 5–9128–2 (See Note in paragraph 83).

93. Side-Lifting Jacks Fail, Bind, or Operate Slowly

Probable cause	*Possible remedy*
Hydraulic fluid supply low.	Fill reservoir and bleed system (par. 127).
Air in system	Bleed air from hydraulic system (par. 127).
Bent ram, stuck check valve, or other mechanical failure.	Replace defective jack, check valve, hose, tubing, or pump (par. 128).

94. Engine Fails To Start

Probable cause	*Possible remedy*
Ignition is off	Push in magneto switch to the ON position.
No fuel in tank	Fill fuel tank (par. 162*b*).
Choke misused (carburetor flooded).	Correct condition and operate choke properly (par. 41*e*).
No fuel in carburetor	Open engine fuel shutoff valve (par. 41*c*). Clean any obstructed fuel lines (par. 167*b*). Test fuel pump (par. 165). Replace defective carburetor (par. 164).
Weak ignition spark	Test ignition and magneto spark (par. 175*a*). Clean and adjust spark plugs (par. 176). Time magneto to engine (par. 175*d*).
Cold weather	Use choke properly (par. 41*e*). Remove water from fuel. Use lighter grade engine oil. Charge low battery (par. 171). Thaw cooling system.
Cranking speed too slow	Charge low battery (par. 171). Tighten battery and starting motor cables. Replace defective starting motor (par. 174).
Excessively long period of not operating.	Charge low battery (par. 171). Refill tank with fresh fuel (par. 162*b*). Test fuel pump (par. 165*a*). Check ignition spark (par. 175*a*) and clean and reset gap in spark plugs (par. 176). Remove corrosion from battery ground and other electric cables and connections.
Mechanical failure within engine.	Report condition to proper authority (See Note in paragraph 83).

95. Engine Oil Pressure Too Low

Probable cause	*Possible remedy*
Oil level too low	Add proper grade engine oil as specified in LO 5–9128–1.
Improper grade of oil used	Drain crankcase and refill with proper grade oil as specified in LO 5–9128–1.
Oil diluted	Drain crankcase and refill with proper grade oil as specified in LO 5–9128–1.
Oil-pressure gage defective.	Refer to TM 5–9128–2 (See Note in paragraph 83).
Mechanical failure within engine, such as defective or damaged oil pump, incorrectly adjusted oil-pressure relief valve, or worn main, connecting rod, and camshaft bearings.	Report condition to proper authority.

96. Engine Oil Pressure Too High

Probable cause	*Possible remedy*
Improper grade of oil used.	Drain crankcase and refill with proper grade oil as specified in LO 5–9128–1.
Oil dirty	Drain crankcase and refill with proper grade oil as specified in LO 5–9128–1.
Oil-pressure gage defective.	Refer to TM 5–9128–2 (See Note in paragraph 83).
Mechanical failure in engine, such as obstructed oil lines, improperly adjusted oil-pressure relief valve, etc.	Report condition to proper authority.

97. Battery-Ammeter Shows Improper Readings

Probable cause	*Possible remedy*
Generator does not charge.	Adjust fan drive belts (par. 159*a*(1)) or replace fan belts (par. 159*a*(2) and (3)). Tighten belt pulley on armature shaft. Test generator brush spring tension (par. 172*a*). Replace stuck, oily, or improperly seated brushes (par. 172*a*). Clean commutator (par. 172*a*). Replace defective generator regular (cutout relay fails to close, voltage or current control units inoperative (par. 173). Replace defective generator (par. 172*b* and *c*).
Generator charging rate too low.	*Note.* Charging rate will be low when battery is fully charged. Adjust or replace fan belts (par. 159). Clean dirty or corroded connections to reduce resistance in charging circuit. Replace worn, sticking, or dirty generator brushes (par. 172*a*). Replace defective generator regulator (par. 173). Replace defective generator (par. 172b and *c*).
Generator charging rate too high.	Cool battery if overheated. Replace battery if test shows shorted cell (par. 171*b*). Replace defective generator regulator (par. 173). Replace defective generator (par. 172).
Ammeter defective	Refer to TM 5–9128–2 (See Note in paragraph 83).

98. Engine Speed Too Fast

Probable cause	*Possible remedy*
Governor setting too high.	Adjust governor to 1,800 rpm (par. 169*a*).
Improper carburetor idle adjustment.	Adjust carburetor (par. 164*a*)
Mechanical failure in governor.	Replace defective governor (par. 169*b* and *c*).

99. Engine Speed Too Slow

Probable cause	*Possible remedy*
Governor setting too low.	Adjust governor to 1,800 rpm (par. 169*a*).
Improper carburetor adjustments.	Adjust carburetor (par. 164*a*).
Choke and throttle controls improperly installed.	Correct installation of choke and throttle controls (par. 164*c*).
Mechanical failure in governor.	Replace governor (par. 169*b* and *c*).

100. Engine Speed Unsteady

Probable cause	*Possible remedy*
Dirty spark plugs	Clean and adjust spark plugs (par. 176).
Improperly adjusted carburetor.	Adjust carburetor (par. 164*a*).
Defective or dirty carburetor.	Replace carburetor (pars. 164*b* and *c*).
Binding or loose throttle control rod.	Clean, oil, and free joints and connections on throttle control rod. Remove all lost motion.
Mechanical failure within engine (burned valve, leaking head gasket, and similar troubles).	Report condition to proper authority.

101. Engine Overheats

Probable cause	*Possible remedy*
Radiator shutter does not open.	Use manual control to open shutter. Find, correct, or report defect in automatic control to proper authority.
Not enough coolant in cooling system.	Add fresh water or antifreeze solution to radiator.
Slipping fan belts	Adjust fan belts (par. 159*a*).
Obstructed radiator	Clean and flush radiator (par. 158*a*).
Cooling system leaks	Tighten loose draincock. Replace damaged radiator (pars. 158*b* and *d*). Tighten loose hose clamps. Replace deteriorated hoses. Tighten water pump mounting screws. Replace pump and gasket if necessary (pars. 160*b* and *d*). Tighten or replace packing (par. 160*a*).

Probable cause	*Possible remedy*
Mechanical failure of water pump.	Replace defective water pump (pars. 160*b* and *d*).
Fuel mixture too lean_____	Adjust carburetor (par. 164*a*).
Late ignition timing_____	Adjust magneto timing (par. 175*d*).
Cracked engine block or cylinder head or leaky head gasket.	Report to proper authority. (See Note in paragraph 83.)

102. Stop Lights Do Not Go On

Probable cause	*Possible remedy*
Circuit-breaker switch in the OFF position.	Place circuit-breaker switch in the ON position.
Burned-out bulb_____	Replace bulb.
Short in 110-volt circuit__	Locate and correct short circuit. Report uncorrected deficiency to proper authority.

103. Heater Does Not Operate

Probable cause	*Possible remedy*
Battery-disconnect switch in the OFF position.	Place battery-disconnect switch in the ON position.
No fuel_____	Open engine fuel shutoff valve and heater fuel shutoff valve. Check fuel supply in tank and replenish if needed.
Battery in discharge condition.	Test battery condition and recharge if required (par. 171*b*).
Obstructed duct_____	Clean obstruction from duct.
Mechanical or electrical failure within heater.	Replace heater (pars. 131–135).

104. Ventilator Does Not Operate

Probable cause	*Possible remedy*
Circuit-breaker switch in the OFF position.	Place circuit-breaker switch in the ON position.
Short circuit in 110-volt circuit.	Locate and eliminate short circuit.
Bent fan, duct, or screen causing jammed ventilator.	Straighten or replace bent or damaged parts.
Obstructed screen or duct__	Remove obstruction away from screen or duct.
Mechanical or electrical failure within ventilator.	Replace ventilator (pars. 138 and 139).

105. Engine Clutch Slips, Heats, or is Hard to Engage

Probable cause	*Possible remedy*
Clutch improperly adjusted.	Adjust clutch (par. 189).
Mechanical failure within clutch.	Replace clutch. Refer to TM 5–9128–2 (See Note in paragraph 83).

106. Dynamotor-Welder Has No Output

Probable cause	*Possible remedy*
Start-stop switch in wrong position.	Turn start-stop switch to START position.
Dirty commutator_____	Clean commutator (par. 198*a*).
Burned or excessively worn brushes.	Replace brushes (pars. 196 and 197).
Improper brush spring tension.	Adjust brush spring tension (par. 196*a*).
Exciter has lost residual magnetism.	Restore residual magnetism (par. 199).
External power failure___	Drive dynamotor-welder with mobile shop engine.

107. Dynamotor-Welder Output Too Low

Probable cause	*Possible remedy*
Ac generator rheostat incorrectly adjusted.	Turn rheostat to correct adjustment (par. 42).
Cycle switch in wrong position.	Turn cycle switch to correct position (par. 42).
Engine speed too slow_____	Check tachometer reading and increase speed by adjusting governor setting (par. 169*a*).
Drive belts slipping_____	Adjust drive belts (par. 191) or replace defective drive belts (pars. 192 and 193).
Engine clutch slipping_____	Adjust engine clutch (par. 189).
Dirty commutator_____	Clean commutator (par. 198*a*).
Burned or worn brushes__	Replace brushes (pars. 196 and 197).
Improper brush spring tension.	Adjust brush spring tension (par. 196*a*).
Other mechanical or electrical failure within dynamotor-welder or engine.	Refer to TM 5–9128–2 (See Note in paragraph 83).

108. Dynamotor-Welder Output Too High

Probable cause	*Possible remedy*
Ac generator rheostat incorrectly adjusted.	Turn rheostat to correct adjustment (par. 42).
Cycle switch in wrong position.	Turn cycle switch to correct position (par. 42).
Engine speed too high____	Check tachometer reading and decrease speed by adjusting governor setting (par. 169*a*).

Probable cause	*Possible remedy*
Mechanical or electrical failure within dynamotor-welder.	Refer to TM 5–9128–2 (See Note in paragraph 83).

109. Dynamotor-Welder Overheats

Probable cause	*Possible remedy*
Poor ventilation	Clean air filters (par. 195).
Improper lubrication	Lubricate properly. Refer to LO 5–9128–1.
Mechanical or electrical failure in dynamotor-welder.	Refer to TM 5–9128–2 (See Note in paragraph 83).

110. No Air Pressure in Air Tank

Probable cause	*Possible remedy*
Compressor clutch not engaged.	Engage clutch (par. 53*a*).
Air leaks	Check all hoses and couplings for secure connections. Inspect air tank for leaks.
Air tank draincock open	Close draincock.
Safety valve remains open	Check safety valve operation (par. 52*a*(9)). Replace defective valve (par. 205*a*-(2) and *c*(6)).
Defective air-pressure gage.	Replace gage (par. 205*a*(2) and *c*(4)).
Sheared drive shaft or mechanical failure in air compressor.	Report to proper authority. (See Note in paragraph 83.)

111. Air-Compressor Clutch Slips, Heats, or is Hard to Engage

Probable cause	*Possible remedy*
Not enough oil in clutch gearbox.	Add oil as specified in LO 5–9128–1.
Improper grade of oil in clutch gearbox.	Drain and refill with proper grade oil as specified in LO 5–9128–1.
Clutch improperly adjusted.	Adjust clutch (par. 203).
Mechanical failure within clutch.	Refer to TM 5–9128–2 (See Note in paragraph 83).

112. Air-Compressor Oil Pressure Too Low

Probable cause	*Possible remedy*
Not enough oil in crankcase.	Add proper grade engine oil as specified in LO 5–9128–1.
Improper grade oil used or oil diluted.	Drain crankcase and refill with proper grade oil as specified in LO 5–9128–1.
Oil pressure gage defective.	Refer to TM 5–9128–2 (See Note in paragraph 83).
Mechanical failure within compressor such as: defective, damaged, or incorrectly adjusted oil pump; defective oil-pressure relief valve; or worn main, connecting rod, and camshaft bearings.	Refer to TM 5–9128–2 (See Note in paragraph 83).

113. Air-Compressor Oil Pressure Too High

Probable cause	*Possible remedy*
Improper grade oil used or oil dirty.	Drain crankcase and refill with proper grade oil as specified in LO 5–9128–1.
Oil pressure gage defective.	Refer to TM 5–9128–2 (See Note in paragraph 83).
Mechanical failure within compressor such as: incorrectly adjusted oil pump or defective oil pressure relief valve.	Refer to TM 5–9128–2 (See Note in paragraph 83).

114. Air-Compressor Air Pressure Too Low

Probable cause	*Possible remedy*
Pilot valve setting too low.	Adjust pilot valve (par. 204).
Air leaks	Check entire system for leaks and repair, replace, or report defective parts. Refer to TM 5–9128–2 (See Note in paragraph 83).
Safety valve damaged or defective.	Replace safety valve (par. 205*a*(2) and *c*(6)).
Compressor discharge valves dirty or not operating properly.	Clean and inspect discharge valves (par. 202).
Compressor air cleaner clogged.	Clean and refill air cleaner (par. 77*f*).
Drive belts slipping	Adjust drive belts (par. 191).
Compressor clutch or engine clutch slipping.	Adjust compressor clutch (par. 203). Adjust engine clutch (par. 189).
Mechanical failure within the air compressor, compressor clutch, or drive shaft.	Refer to TM 5–9128–2 (See Note in paragraph 83).

115. Air-Compressor Air Pressure Too High

Probable cause	*Possible remedy*
Pilot valve setting too high.	Adjust pilot valve (par. 204).
Pilot valve defective	Refer to TM 5–9128–2 (See Note in paragraph 83).
Pressure above 110 psi indicates safety valve inoperative.	Replace safety valve (par. 205*a*(2) and *c*(6)).

Section V. RADIO SUPPRESSION

116. Definition of Suppression

Radio noise suppression is the elimination or minimizing of electrical disturbances within the equipment which interfere with radio reception and disclose the location of the mobile shop to sensitive electrical detectors.

117. Sources of Interference

Spark plugs, high-tension wires to the magneto, magneto breaker points, ac and dc generators, welding arcs, universal motors, and poor electrical joints between adjacent parts on the semitrailer frame are possible sources of electrical interference.

118. Methods Used to Suppress Interference

a. Dynamotor-Welder. The rf (radio frequency) output generated by the dynamotor-welder (A, fig. 125) is by-passed to electrical ground by six capacitors. Two 0.10 microfared capacitors are used at the ac end of the dynamotor-welder. Four 0.25 microfarad capacitors are used at the dc end of the dynamotor-welder.

b. Engine. The rf output from the spark plugs, generator, generator regulator, magneto, and starting motor is suppressed by capacitors, resistors, and shielding on electric wires and around components of the engine (B, fig. 125). There is a 0.47 microfarad capacitor used in the magneto and a 0.5 microfarad capacitor used in the starting motor for by-passing rf to electrical ground. The cables between the spark plugs, magneto, generator, and generator regulator are shielded, and connection to those components is made with shielded fittings. The shielded electric cable at the spark plugs has built-in resistance wire. The magneto, starting motor, generator, and generator regulator are enclosed in metal cases which serve as rf shielding.

c. Electric Drill, 5/8-Inch. The rf output from the 5/8-inch electric drill (C, fig. 125) is by-passed to electrical ground through the electric power input line to the drill. Two 0.1 microfarad capacitors are used for rf suppression on the drill.

d. Electric Drill, 1/4-Inch. The rf output from the 1/4-inch electric drill (D, fig. 125) is by-passed to electrical ground through the electric power input line to the drill. Two 0.005 and two 0.1 microfarad capacitors are used for rf suppression on the drill.

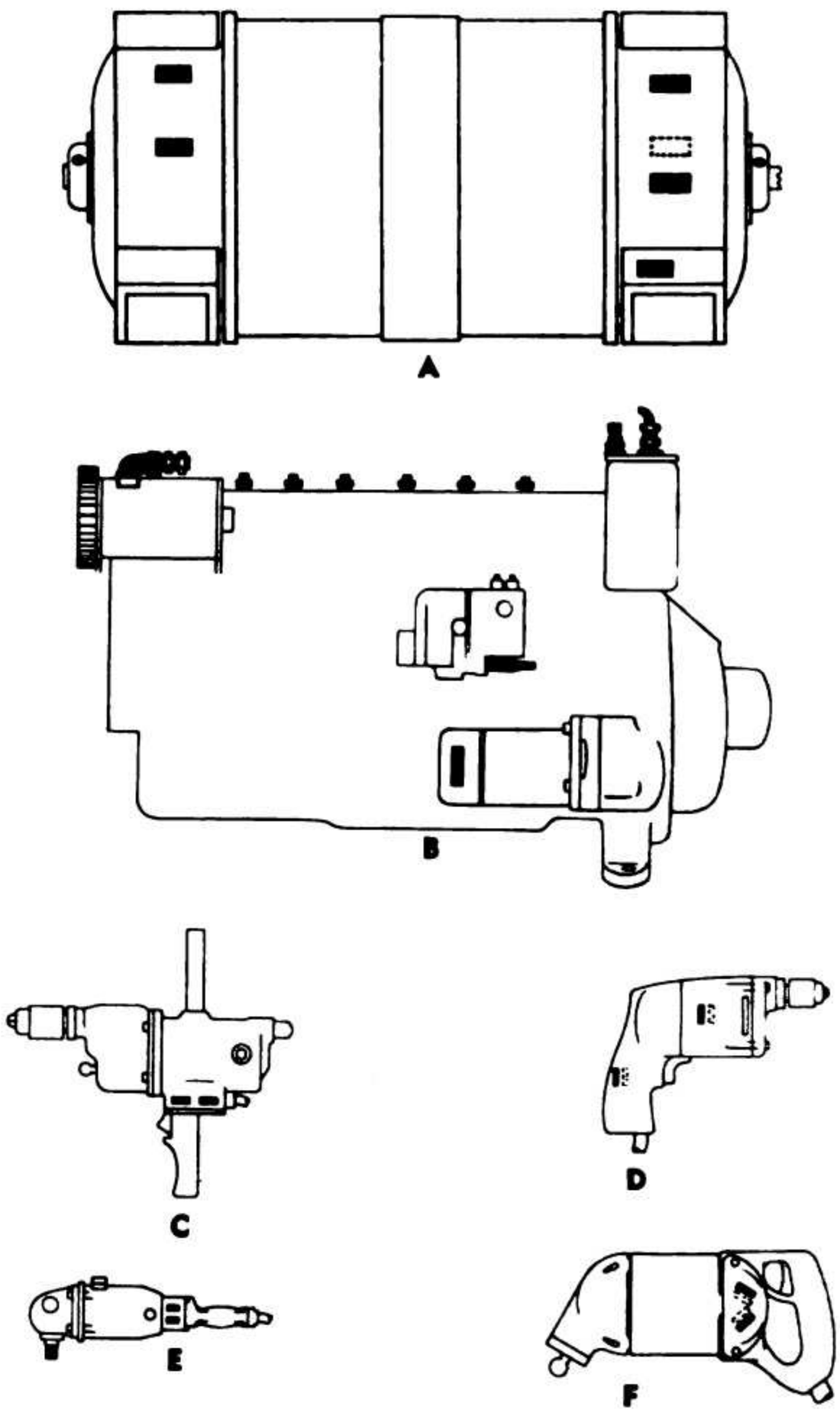


Figure 125. Radio suppressed equipment.

e. Sander. The rf output from the sander (E, fig. 125) is by-passed to electrical ground through the electrical power input line to the sander. Two 0.01 microfarad capacitors are used for rf suppression on the sander.

f. Valve-Seat Grinder. The rf output from the valve-seat grinder (F, fig. 125) is by-passed to electrical ground through the electric power input line to the grinder. Four 0.01 microfarad capacitors are used for rf suppression on the grinder.

119. Effects of Suppression

There is no interference from equipment satisfactorily suppressed for radiated and conducted interference over the frequency range of 0.55 to 156.0 megacycles at a distance of 25 feet from the mobile shop.

120. Suppression System Testing

a. Install a battery-powered radio receiver in good operating condition not more than 10 feet from the unit to be tested. A wide band receiver covering the frequency range of 0.55 to 156.0 megacycles is preferred.

b. Start equipment and tune receiver. Turn receiver volume control to maximum, and select three widely separated frequencies for listening. Use frequencies that are free from signals with strong carriers so that the receiver will be in its most sensitive operating condition.

c. In testing the suppression components, operate engine throttle, and listen to receiver speaker or headset. A regular clicking sound, which varies with engine speed and stops the instant the ignition is shut off, is caused by the ignition circuit.

d. A whining sound, which varies with engine speed and continues a few seconds after the ignition is shut off, is caused by the generator.

e. Systematically replace suppression components in the circuit causing trouble, testing after the replacement of each component to see if the trouble has been eliminated.

121. Suppression Component Replacement

a. Dynamotor-Welder. Replacement of defective capacitors in the dynamotor-welder requires disassembly of the unit beyond the scope of operating personnel. Report to the proper authorities defects in dynamotor-welder rf suppression as indicated by the tests performed in paragraph 120.

b. Engine. Examine the cable between the spark plugs, magneto, generator regulator, starting motor, and generator for broken leads, badly cut or frayed shielding, or fittings with stripped or crossed threads. Replace the defective cable wherever necessary. The rf shielded cables are removed by unscrewing the hex nuts attaching the cable to the fittings at the various components. Spark plug cables are secured to the engine by a pair of brackets. Remove the top half of each bracket when removing these cables. Replacement of defective capacitors in the generator and starting motor requires disassembly beyond the scope of operating personnel. Report to the proper authorities defects in generator and starting motor rf suppression as indicated by the tests performed in paragraph 120.

c. Shop Equipment. Replacement of defective capacitors in the electric drills, sander, and valve seat grinder requires disassembly beyond the scope of operating personnel. Report to the proper authorities defects in rf suppression as indicated by the tests performed in paragraph 120.

Section VI. TRAILER-SUPPORTING JACKS HYDRAULIC SYSTEM

122. Description

Four trailer-supporting jacks (1, 5, 6, and 7, fig. 126) are controlled hydraulically by four manually operated pumps (9, 10, 11, and 12). A 36-quart capacity hydraulic oil tank (4) supplies hydraulic oil to each pump. Each jack pump is independently controlled by two valves (2, 3, 8, and 13).

123. Cleaning and Inspection of Trailer-Supporting Jacks Hydraulic System

a. Cleaning. Clean jacks, pumps, valve, hydraulic oil tank, and hydraulic piping with an approved cleaning solvent. Remove corrosion with an approved rust remover and coat machined surfaces with light oil.

b. Inspection. Inspect for leaks at all pipe connections, valves, pumps, jacks, and hydraulic oil tank.

Note. A leak is evident when frequent adding of oil to hydraulic oil tank is necessary.

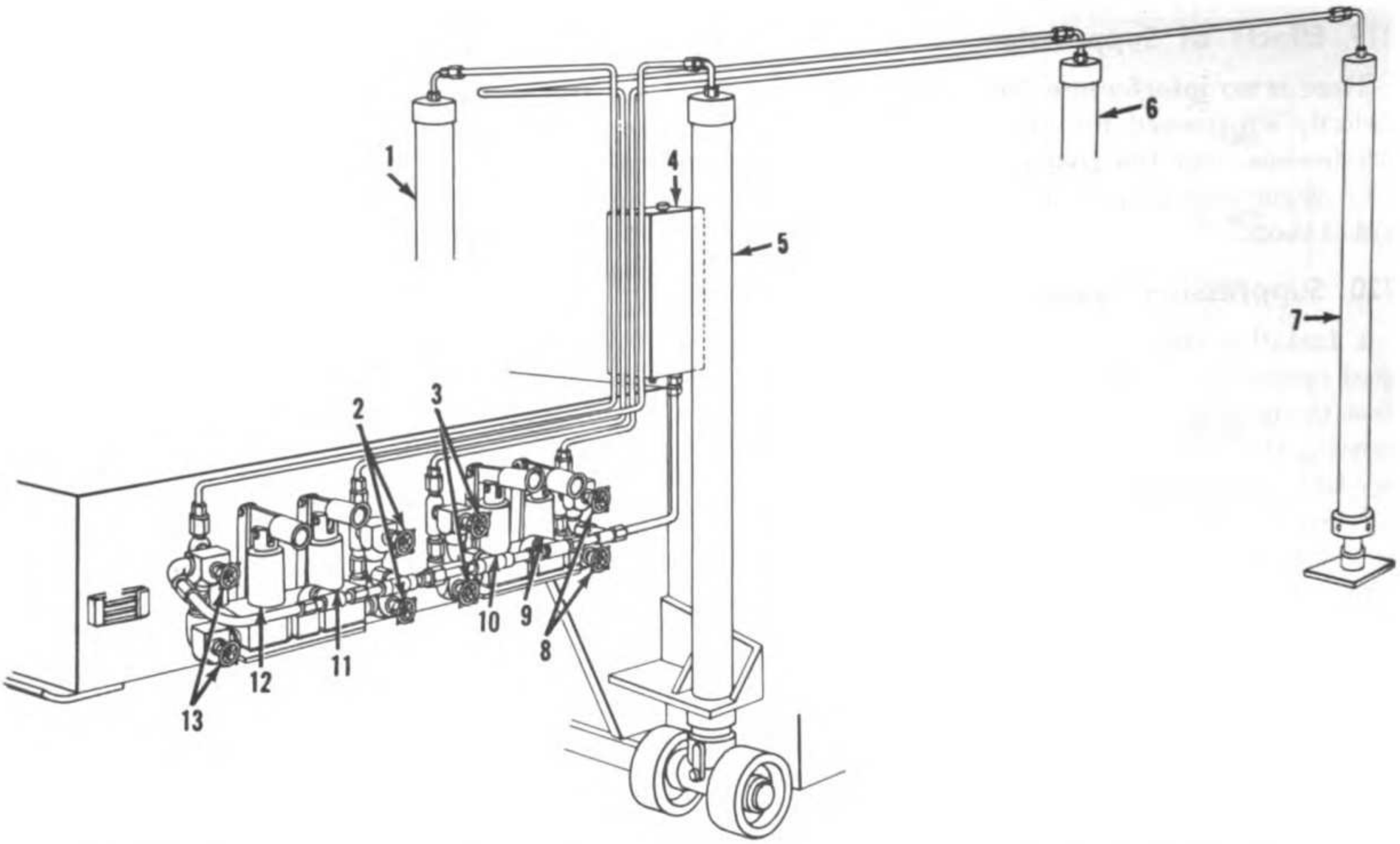
Check system with oil under pressure and jacks lowered. Report all leaky conditions to the proper authority (See Note in par. 83).

124. Bleeding Trailer-Supporting Jacks Hydraulic System

The system is self-bleeding. Bleed system of air as follows:

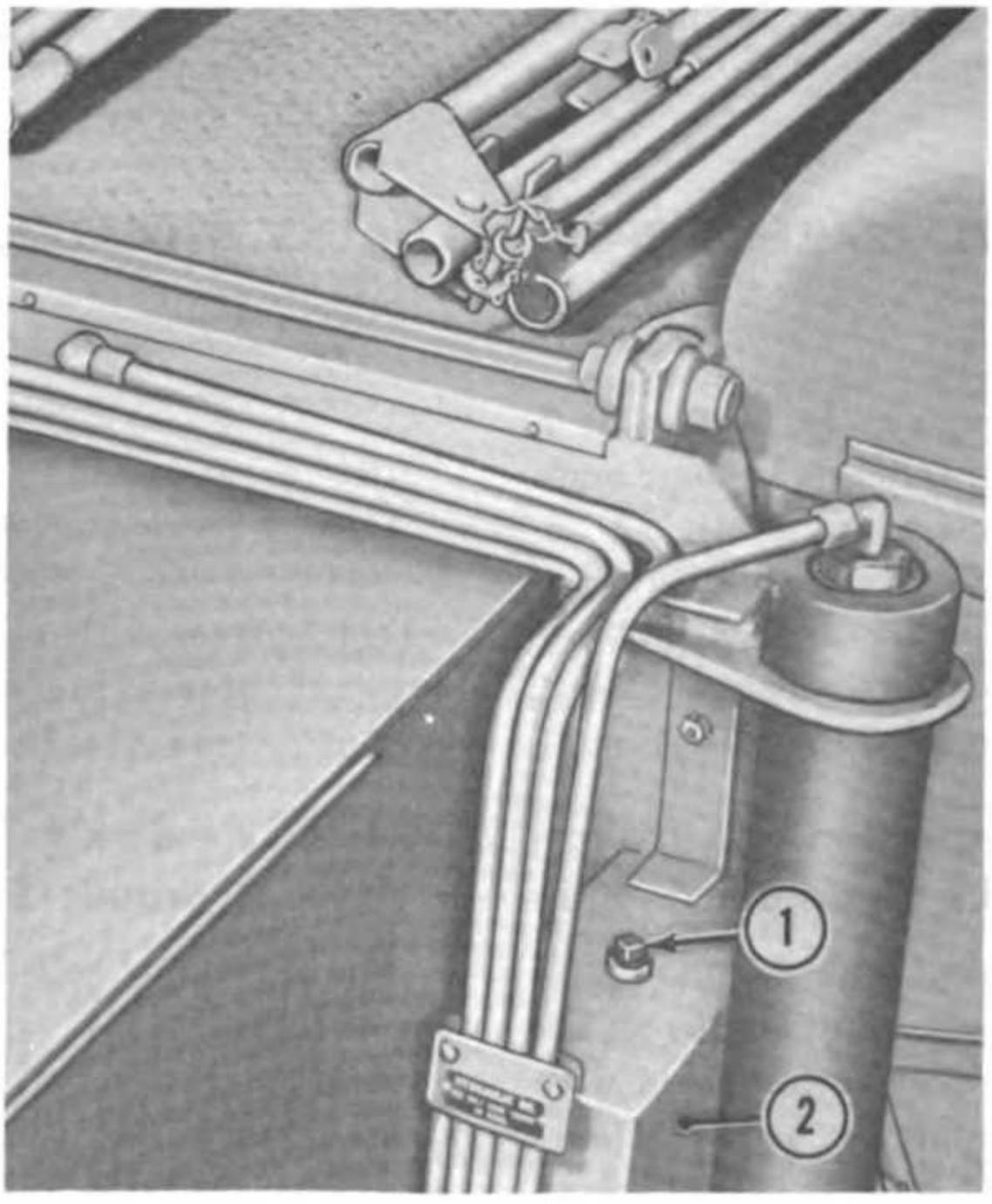
a. Make certain all leaks have been corrected.

b. Remove filler plug (1, fig. 127) from top of hydraulic oil tank (2) and check oil level. Add



1 Right front jack
2 Valve controls for left front jack
3 Valve controls for left rear jack
4 Hydraulic oil tank
5 Left front jack
6 Right rear jack
7 Left rear jack
8 Valve controls for right rear jack
9 Pump for right rear jack
10 Pump for left rear jack
11 Pump for left front jack
12 Pump for right front jack
13 Valve controls for right front jack

Figure 126. Trailer-supporting jacks hydraulic system.



1 Filler plug
2 Hydraulic oil tank

Figure 127. Top of hydraulic tank.

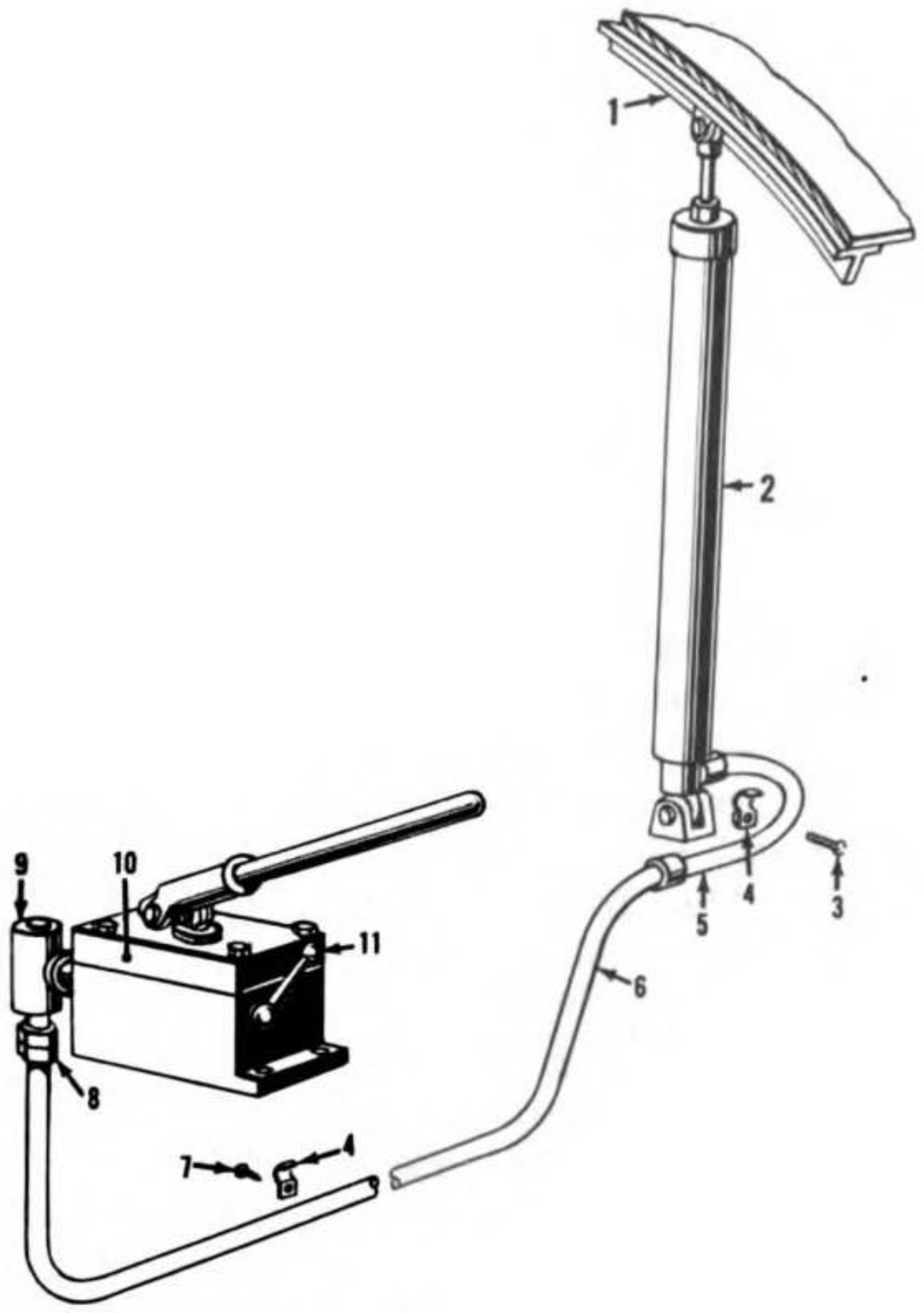
hydraulic oil (LO 5–9128–3) to bring level up to 1 inch below bottom of filler neck. Install and tighten filler plug.

c. Operate each pump in turn until each jack is fully extended. Air in system will be bled automatically through vent holes in filler plug.

Section VII. SIDE-LIFTING JACKS HYDRAULIC SYSTEM

125. Description

Each side-lifting jack (2, fig. 128) is controlled hydraulically by a manually operated pump (10). The pump supplies oil under pressure to the side-lifting jack which raises the lifting side (1). The jack is lowered by releasing the valve control lever (11). Pump and jack are connected by flexible hose (5) and piping (6).



1 Lifting side
2 Side-lifting jack
3 Screw, fl hd, ¼–20 x ¾ lg (2 rqr)
4 Clamp
5 Flexible hose
6 Piping
7 Screw, binding hd, No. 10 x ½ lg
8 Retaining nut
9 Valve
10 Pump
11 Valve control lever

Figure 128. Side-lifting jack hydraulic system.

126. Cleaning and Inspection of Side-Lifting Jacks Hydraulic System

a. Cleaning. Clean jacks, pumps, valves, flexible hose, and piping with an approved cleaning solvent. Remove corrosion with an approved rust remover and coat machined surfaces with light oil.

b. Inspection. Inspect for leaks at all connections, valves, pumps, and jacks. Inspect hose for deterioration. Inspect all components for physical damage and replace if necessary (pars. 128 and 129).

127. Bleeding Side-Lifting Jacks Hydraulic System

Each side-lifting jack hydraulic system is self-bleeding. Bleed each side as follows:

a. Make certain all leaks have been corrected.

b. Remove filler plug (2, fig. 129) from top of pump (3). Add hydraulic oil (LO 5–9128–3) to bring level up to one-eighth inch below filler plug opening. Install and tighten filler plug.

c. Turn valve control lever (4) clockwise and operate pump using handle (1). When jack reaches its fully extended position, air in the system will be bled automatically through vent holes in the filler plug.

128. Removal of Side-Lifting Jack and Pump

a. Remove Side-Lifting Jack.

(1) Raise lifting side (par. 39*a*).

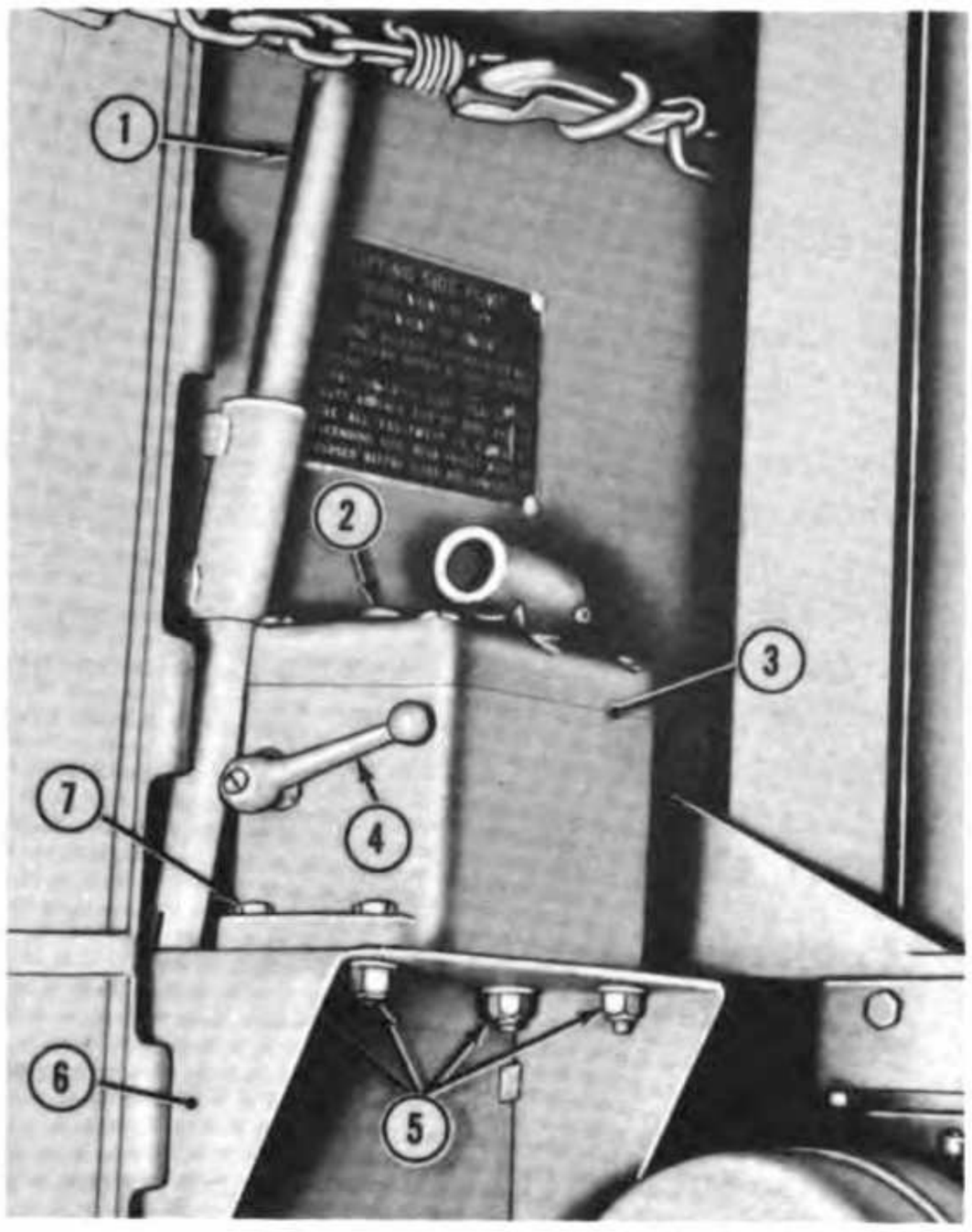
Caution: Make certain side struts are securely locked in position before removing jack.

(2) Turn valve control lever (4) counterclockwise to open valve, relieving pressure on jack ram.

(3) Remove cotter pin (1, fig. 130) and clevis pin (3) securing upper end of side-lifting jack to lifting side rib (2).

(4) Loosen tubing nut (2, fig. 131) on flexible hose (1) at bottom of jack, and lay aside hose.

(5) Remove cotter pin (3) and clevis pin (5) securing bottom of jack on mounting bracket (4) and remove side-lifting jack.



1 Handle
2 Filler plug
3 Pump
4 Valve control lever
5 Stopnut, elastic, 5/16 inch (4 rqr)
6 Mounting bracket
7 Screw, cap, 5/16–24 x 1¼ (4 rqr)

Figure 129. Side-lifting pump installed.

b. Remove Side-Lifting Pump.

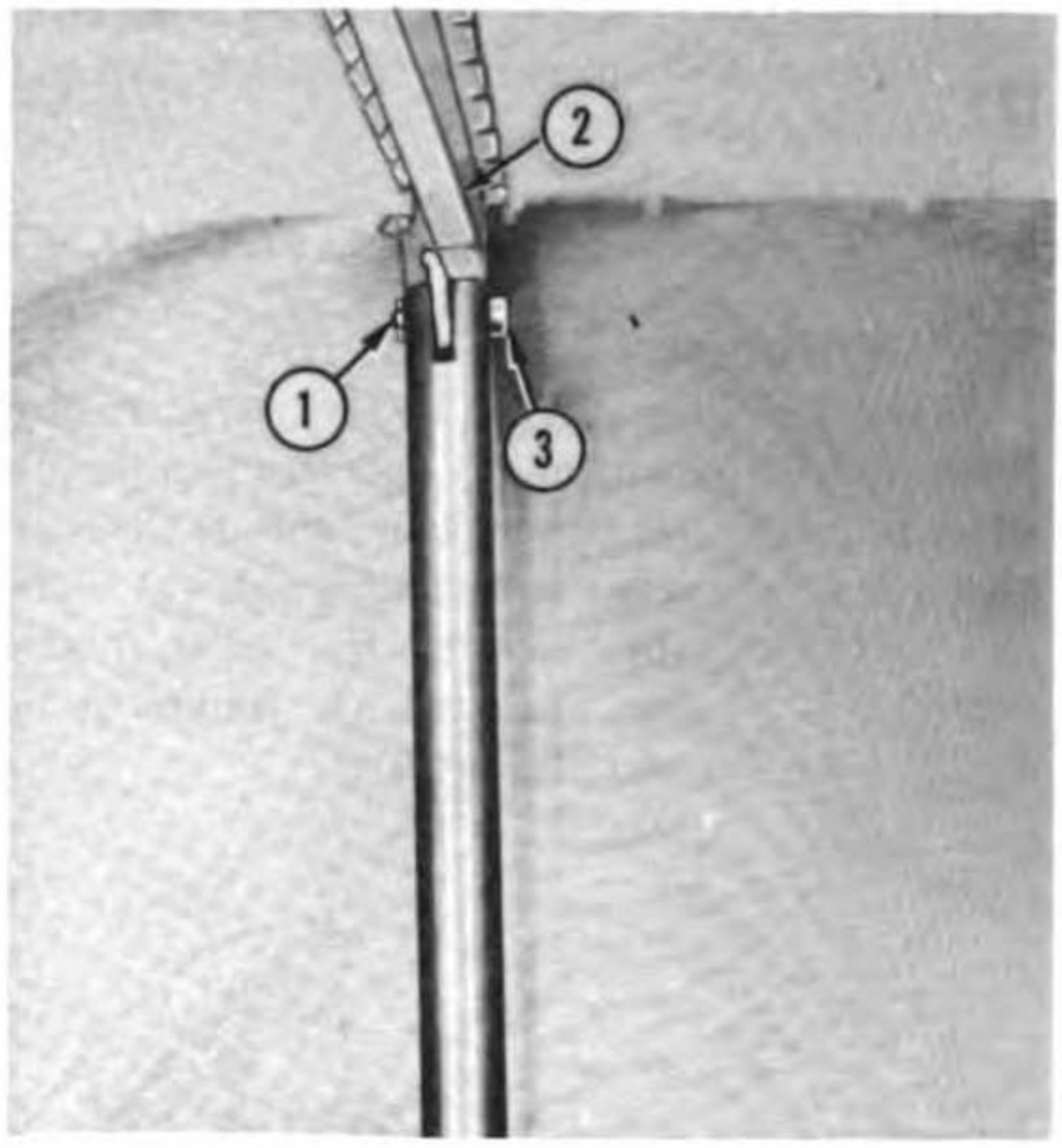
(1) Loosen retaining nut (8, fig. 128) securing piping (6) at base of valve (9).

(2) Remove four stopnuts (5, fig. 129) and four cap screws (7) securing pump on mounting bracket (6). Remove each side-lifting pump.

c. Remove Hose and Piping. Remove screw (3, fig. 128) and clamp (4) securing flexible hose (5) on shop body. Remove two screws (7) and two clamps (4) securing piping (6) on shop body. Remove piping and flexible hose. Loosen tubing nut and separate flexible hose from piping.

129. Installation of Side-Lifting Jack and Pump

a. Install Side-Lifting Pump. Aline pump (3, fig. 129) on mounting bracket (6) and secure,



1 Cotter pin, 3/32 x ¾ lg
2 Lifting side rib
3 Clevis pin, ⅜ x 1¼ lg

Figure 130. Top of side-lifting jack installed.

using four cap screws (7) and stopnuts (5).

b. Install Side-Lifting Jack.

(1) Aline bottom of side-lifting jack on mounting bracket (4, fig. 131) and secure, using clevis pin (5) and cotter pin (3).

(2) Aline top of side-lifting jack to lifting-side rib (2, fig. 130) and secure, using clevis pin (3) and cotter pin (1).

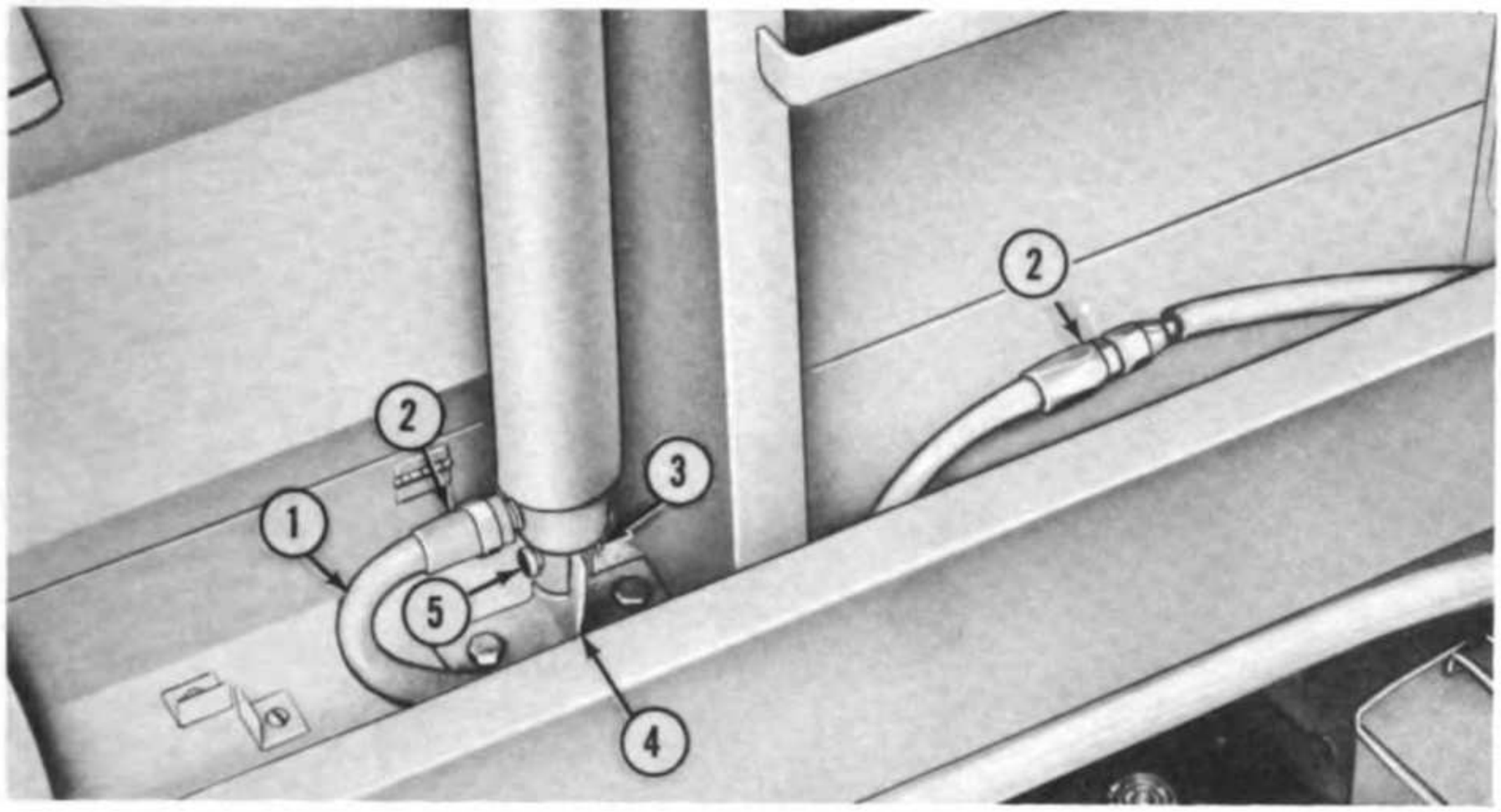
c. Install Piping and Hose.

(1) Aline front end of piping (6, fig. 128) to bottom of valve (9) and tighten retaining nut (8). Secure piping on shop body, using two clamps (4).

(2) Connect flexible hose (5) to rear end of piping (6) and tighten tubing nut. Connect opposite end of flexible hose to bottom of side-lifting jack (2) and tighten tubing nut. Secure flexible hose to shop body, using clamp (4) and screw (3).

d. Bleed System. Bleed system as outlined in paragraph 126.

e. Lower Lifting Side. Refer to paragraph 50*b*.



1 Flexible hose
2 Tubing nut
3 Cotter pin, 3/32 x 3/4 lg
4 Mounting bracket
5 Clevis pin, 3/8 x 1 1/4 lg

Figure 131. Bottom of side-lifting jack installed.

Section VIII. HEATING SYSTEM

130. Description

The heating system (fig. 96) provides heat throughout the shop body for comfort of personnel. The heating system also provides heat for the battery and engine compartments and for the lathe base in cold weather. Fuel is supplied to the heaters from the engine fuel system. After opening the heater fuel shutoff valve (fig. 33), fuel passes through a fuel filter on each heater before entering the combustion chamber of the heater. The fuel is ignited electrically and the gases from the combustion chamber are exhausted. Air is drawn in by the heater ventilating fan and is forced through the air passages around the heat exchanger. Heated air is then conducted to the desired ducts.

131. Removal of Front Heater

a. Preliminary Steps. Stop heater (par. 45*e*). Turn battery-disconnect switch (10, fig. 40) to the OFF position. Close heater fuel shutoff valve (fig. 33).

b. Disconnect Fuel Inlet Line. Loosen retaining nut securing fuel inlet line (1, fig. 132) to fuel filter (4) and disconnect fuel line.

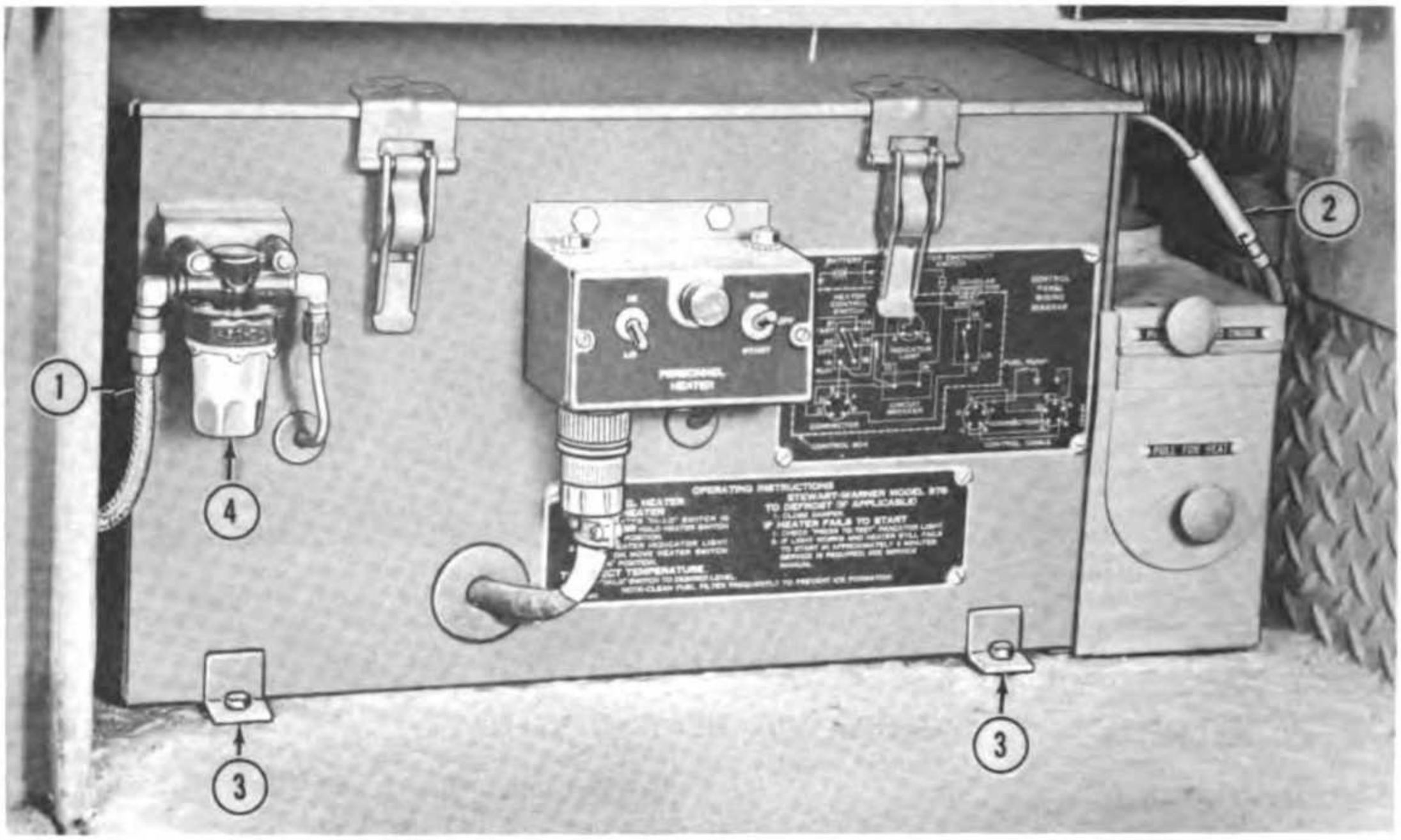
Caution: Observe all safety precautions for handling gasoline.

c. Remove Fuse. Separate fuse holder (2) and remove 20-amp fuse. Tape fuse holder end of power cable to prevent 24-volt circuit from being grounded if battery-disconnect switch is turned on.

d. Remove Heater with Duct. Working from below the shop body, remove two screws (11, fig. 133) from rear mounting flanges and remove two nuts (13) and lockwashers (9) from screws (14). From within shop body, remove two screws (14) from front mounting flanges (3, fig. 132). Twist heater until hose clamp (7, fig. 133) on top of duct (8), is accessible. Loosen clamp screw and remove flexible hose (2) from top of duct. Lift front heater (1) until exhaust outlet is free of shop floor and remove front heater with duct. Remove O-ring (12) from exhaust outlet and discard.

e. Separate Duct from Heater. Remove two screws (10) and lockwashers (9) securing duct to right side of front heater. Separate duct from front heater.

f. Remove Flexible Hose. Remove battery compartment access plate (11, fig. 5) and loosen hose clamp screw securing flexible hose in exhaust port of battery compartment. Remove engine clutch access plates (par. 89*b*). Remove four nuts (5, fig. 133), washers (4), screws (3), and two hose clamps (6) securing flexible hose to rear of battery compartment. From within mobile shop, pull flexible hose out of exhaust port and remove flexible hose from below dynamotor-welder pulley.



1 Fuel inlet line
2 Fuse holder
3 Front mounting flange
4 Fuel filter

Figure 132. Front heater installed.

132. Removal of Rear Heater

a. Preliminary Steps. Perform preliminary steps in paragraph 131*a*.

b. Disconnect Fuel Inlet Line. Loosen retaining nut securing fuel inlet line (1, fig. 134) to fuel filter (4) and disconnect fuel inlet line.

c. Remove Fuse. Separate fuse holder (2) and remove 20-amp fuse.

d. Remove Mounting Screws. From below shop body, remove four nuts (8, fig. 135) and lockwashers (9). From within shop body, remove four screws (10 and 3, fig. 134) securing rear heater to floor of shop body.

e. Disconnect Flexible Hoses. Pull heater away from bulkhead.

Note. Exhaust hose and duct will part from lathe base.

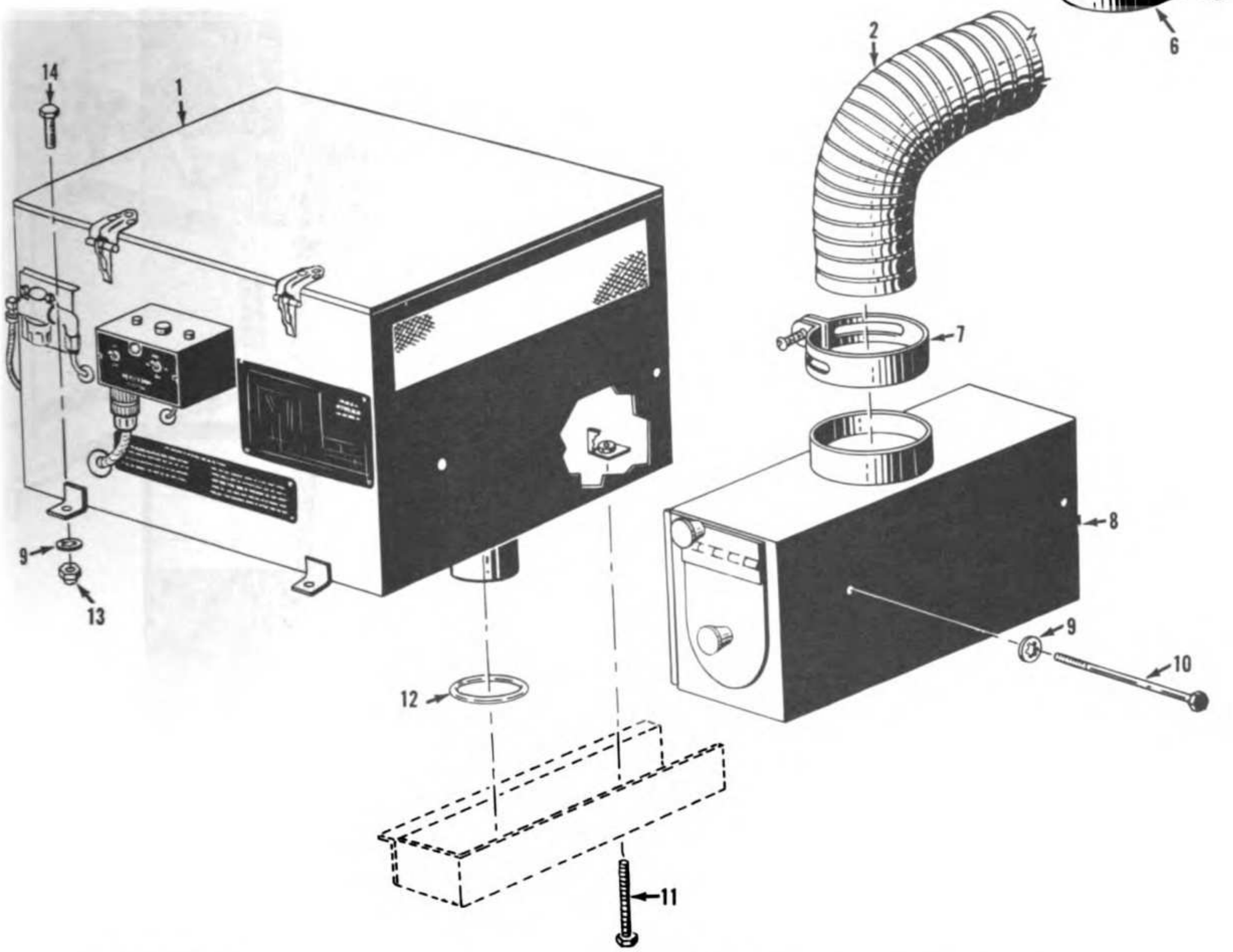
f. Remove Flexible Supply Hose. Loosen hose clamp (3) securing flexible supply hose (4) to rear of duct (2) and remove hose.

g. Separate Duct From Rear Heater. Remove cotter pin (7) securing damper lever (11) on duct and slide damper lever out of heater stand. Remove two screws (5) and lockwashers (6) securing duct (2) to right side of heater. Separate duct from rear heater.

133. Cleaning and Inspection of Heaters

a. Cleaning. Clean both heater exhaust outlets with a wire brush moistened with an approved cleaning solvent and dry with compressed air. Front heater exhaust outlet is located on left front side of shop body, below side-lifting pump. Rear heater exhaust outlet is located on right front of shop body. Clean ducts, hose clamps, and other parts removed with an approved cleaning solvent. Clean exhaust baffles (7, fig. 96) in lathe base (6) and flexible hoses with compressed air.

b. Inspection. Inspect ducts for corrosion, stuck dampers, and physical damage. Lubricate damper hinges and duct controls with a light lubricating oil. Inspect flexible hoses for tears, collapsed sections, and deterioration. Replace defective hoses. Discard old O-rings.



1 Heater
2 Flexible hose
3 Screw, mach, hex hd, ¼–20 (4 rqr)
4 Washer, ¼ (4 rqr)
5 Nut, hex, ¼–20 (4 rqr)
6 Hose clamp (2 rqr)
7 Hose clamp
8 Duct
9 Lockwasher, ¼ int-ext tooth (4 rqr)
10 Screw, mach, hex hd, ¼–20 x 4½ (2 rqr)
11 Screw, mach, hex hd, ¼–20 x 2¼ (2 rqr)
12 O-ring
13 Nut, hex, ¼–20
14 Screw, mach, hex hd, ¼–20 (2 rqr)

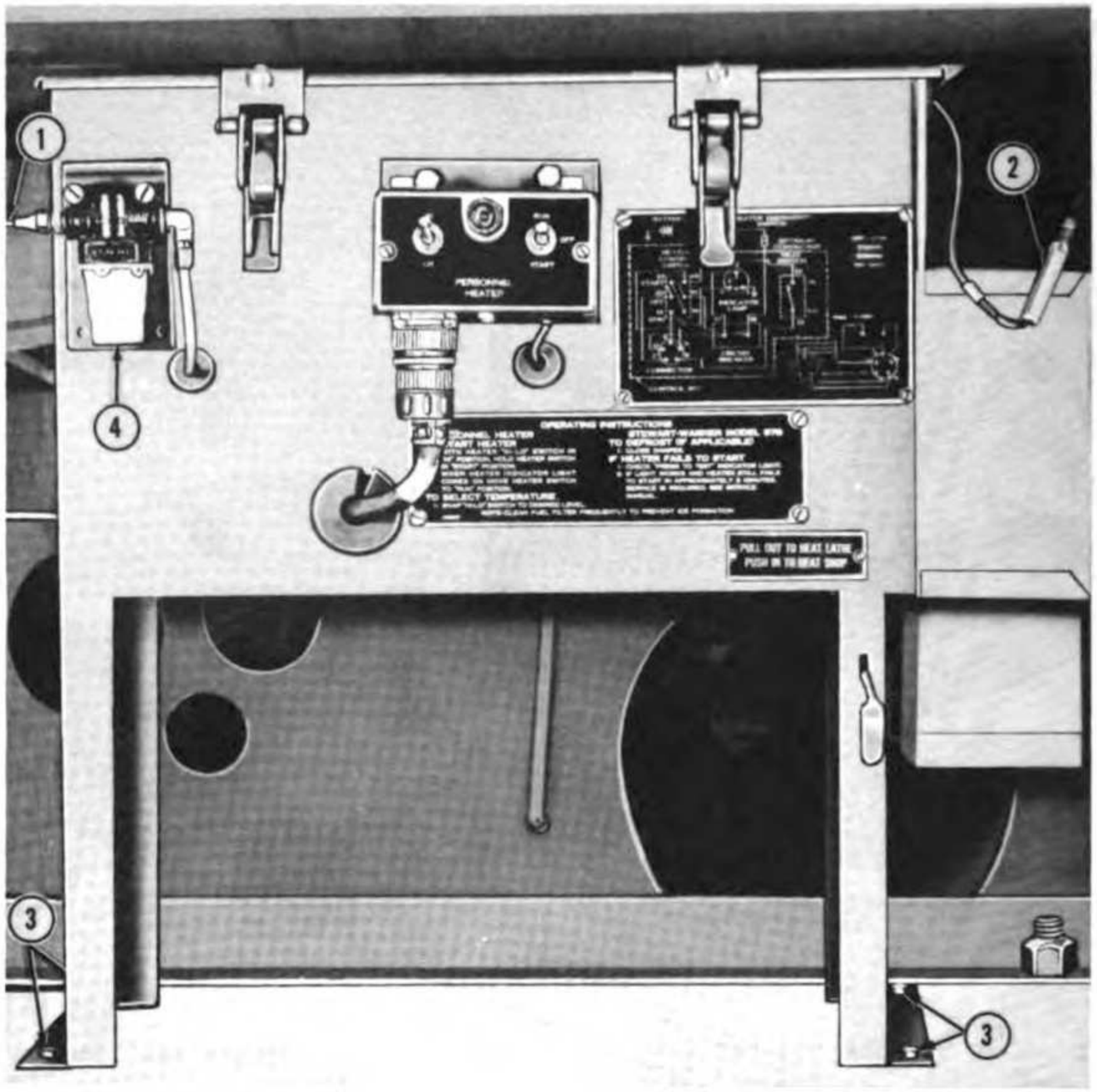
Figure 133. Front heater, partially exploded view.

134. Installation of Front Heater

a. Install Flexible Hose. From within shop body, push one end of flexible hose (2, fig. 133) into exhaust port at rear of battery compartment. From battery compartment, tighten hose clamp screw. Bend flexible hose to lay below dynamotor-welder pulley and pass opposite end through bulkhead, below instrument panel. Aline two hose clamps (6) around flexible hose and secure to rear of battery compartment, using two screws (3), washers (4), and nuts (5) for each clamp.

b. Install Duct. Aline duct (8) on right side of front heater (1) and secure, using two lockwashers (9) and two screws (10).

c. Install Front Heater. Slip new O-ring (12) around exhaust outlet, at bottom of heater, and aline heater on shop body floor with exhaust outlet passing through floor. Install free end of



1 Fuel inlet line
2 Fuse holder
3 Mounting screws
4 Fuel filter

Figure 134. Rear heater installed.

flexible hose on top of duct and tighten hose clamp (7).

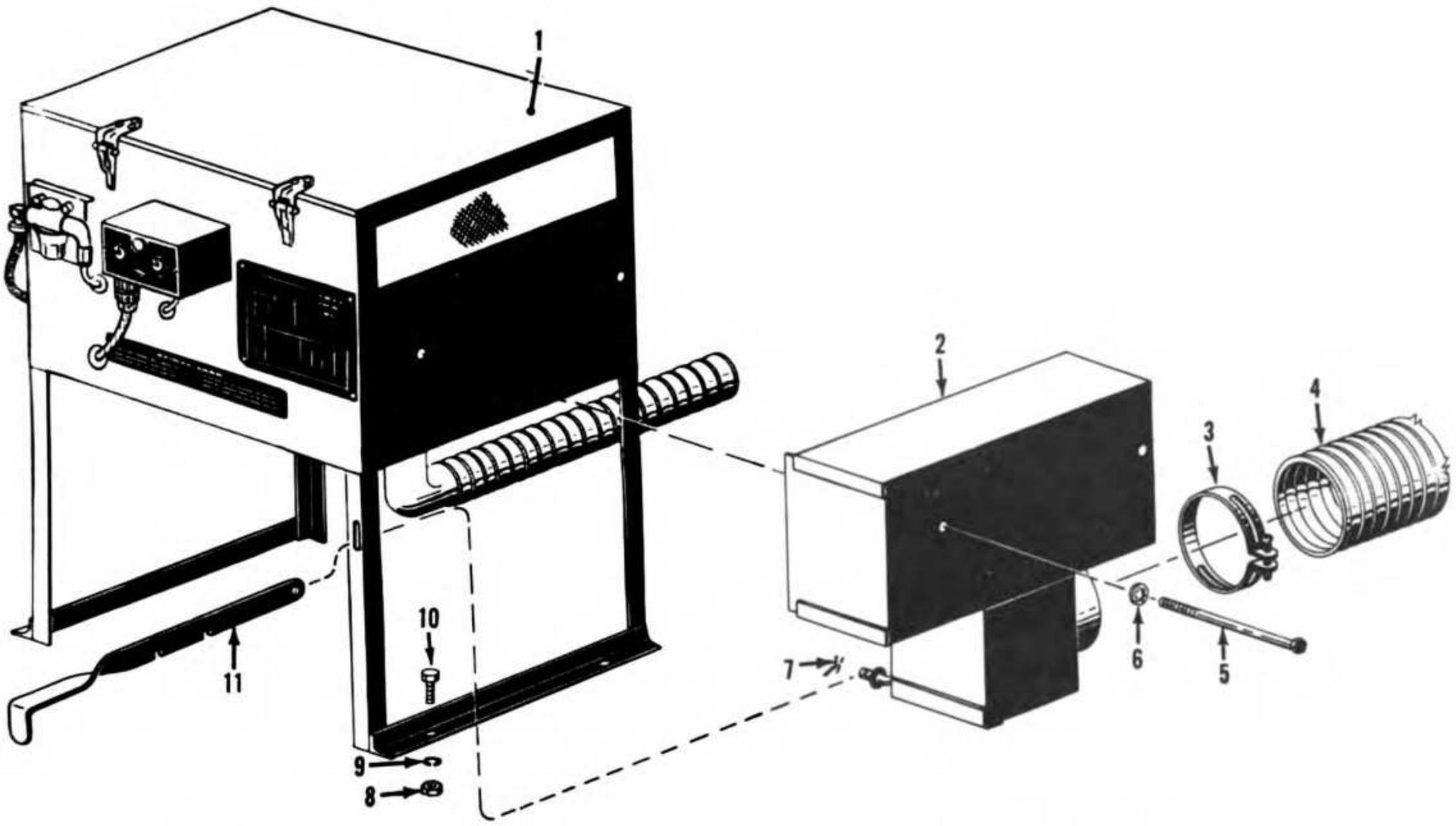
d. Install Mounting Screws. Aline mounting flanges of front heater with holes in floor of shop body and insert two screws (14) in front mounting flanges (3, fig. 132). From below shop body, install and tighten two lockwashers (9, fig. 133) and two nuts (13) and screws (14). Install and tighten two screws (11) in rear mounting flange.

e. Install Fuse. Remove tape from fuse holder end of power cable; insert 20-amp fuse and connect fuse holder (2, fig. 132).

f. Connect Fuel Inlet Line. Attach fuel inlet line (1) to fuel filter (4) and tighten retaining nut.

135. Installation of Rear Heater

a. Install Duct. Aline duct (2, fig. 135) on right side of rear heater (1) and secure, using two screws (5) and lockwashers (6). Insert damper lever (11) through slot in heater stand and secure end of control on damper rod of duct with cotter pin (7).



1 Heater
2 Duct
3 Hose clamp
4 Flexible supply hose
5 Screw, mach, ¼–20 x 4½ NC (2 rqr)
6 Lockwasher, ¼ int-ext tooth (2 rqr)
7 Pin, cotter, 3/32 x ½
8 Nut, hex, ¼–20 (4 rqr)
9 Lockwasher, ¼ inch (4 rqr)
10 Screw, cap, hex hd, ¼–20 (4 rqr)
11 Damper lever

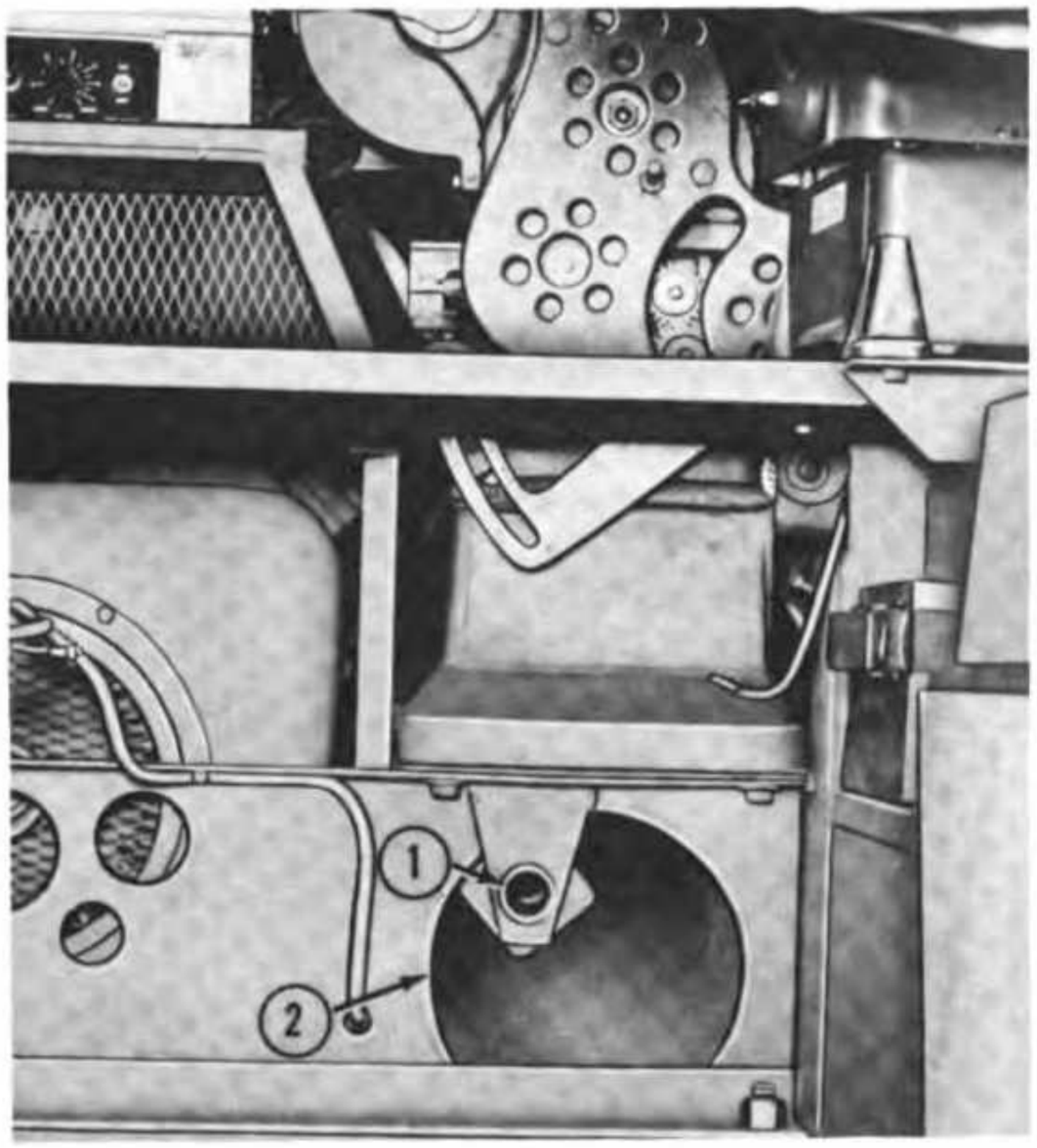
Figure 135. Rear heater, partially exploded view.

b. Install Flexible Supply hose. Install flexible supply hose (4) on duct outlet and secure with hose clamp (3).

c. Install Rear Heater. Slide rear heater forward, making certain flexible exaust hose enters exhaust hose opening (1, fig. 136) and flexible supply hose enters flexible supply hose opening (2) in the lathe base. Aline mounting holes with holes in floor of shop body. From within shop body, insert four mounting screws (3, fig. 134) through mounting holes. From below shop body, install and tighten four lockwashers (9, fig. 135) and nuts (8) on screws (10).

d. Install Fuse. Remove tape from fuse holder end of power cable; insert 20-amp fuse and connect fuse holder (2, fig. 134).

e. Connect Fuel Inlet Line. Attach fuel inlet line (1) to fuel filter (4) and tighten retaining nut.



1 Exhaust hose opening
2 Flexible supply hose opening

Figure 136. Lathe base heater hose openings.

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136. Description

The ventilating system consists of three rotary-type ventilating fan blowers (1, fig. 7) installed in the shop body. They are used to circulate air and prevent the accumulation of fumes in the mobile shop. The ventilators are powered through the 110-volt circuit.

137. Cleaning and Inspection of Ventilators

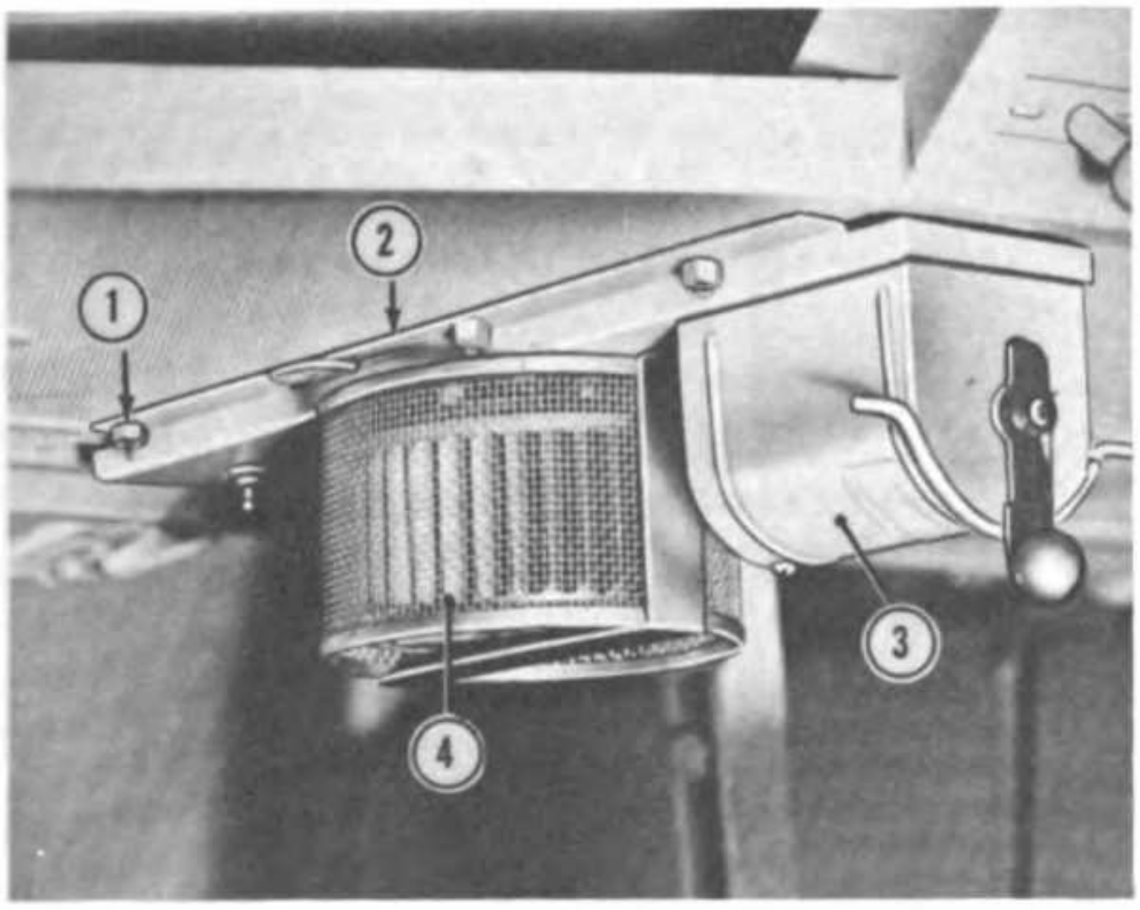
Clean all foreign material from the outside of ventilators. Make sure screens are not obstructed by work, stock, or other objects. Examine ventilator ducts, screens, and mountings for good condition. Listen for unusual noise when ventilators are operating. If blower strikes guard or duct, shut off ventilator and remove (pars. 138*a* and 139*a*). Check blower shaft for misalinement and looseness. Check guard and duct for damage. If necessary, replace guard, duct, and blower (pars. 138 and 139).

138. Front Ventilator

a. Removal.

(1) Place circuit-breaker switch (9, fig. 43) on electric-control cubicle in the OFF position.

(2) Remove six stopnuts (1, fig. 137) and cap screws securing mounting plate (2) to shop body and lower ventilator (4) with lathe reversing switch (3).



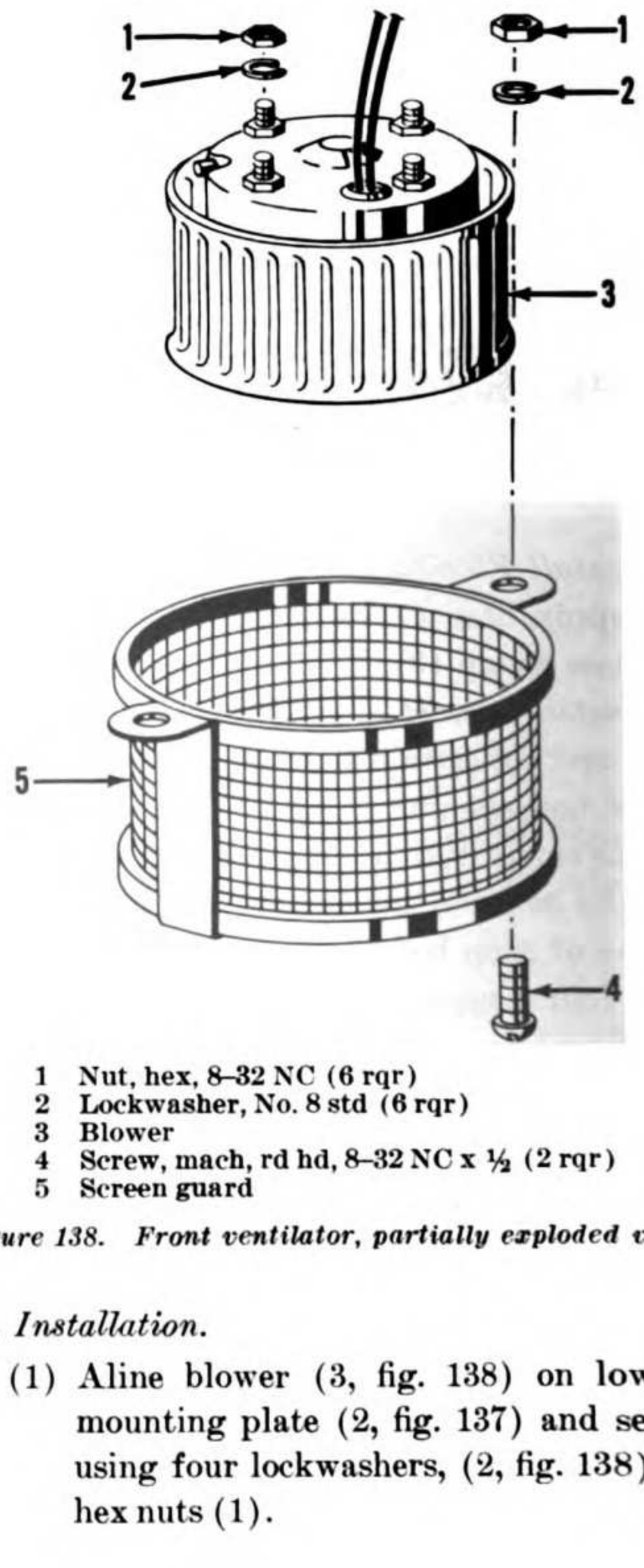
1 Stopnut
2 Mounting plate
3 Lathe reversing switch
4 Front ventilator

Figure 137. Front ventilator installed.

(3) Lower mounting plate enough to gain access to electric wiring and disconnect blower wires. Mark or tag wires to facilitate installation. Tape bare wires.

(4) Remove two hex nuts (1, fig. 138), lockwashers (2), and machine screws (4), and remove screen guard (5) from mounting plate.

(5) Remove four hex nuts (1) and lockwashers (2) from studs on blower (3) and remove blower from mounting plate.



1 Nut, hex, 8–32 NC (6 rqr)
2 Lockwasher, No. 8 std (6 rqr)
3 Blower
4 Screw, mach, rd hd, 8–32 NC x ½ (2 rqr)
5 Screen guard

Figure 138. Front ventilator, partially exploded view.

b. Installation.

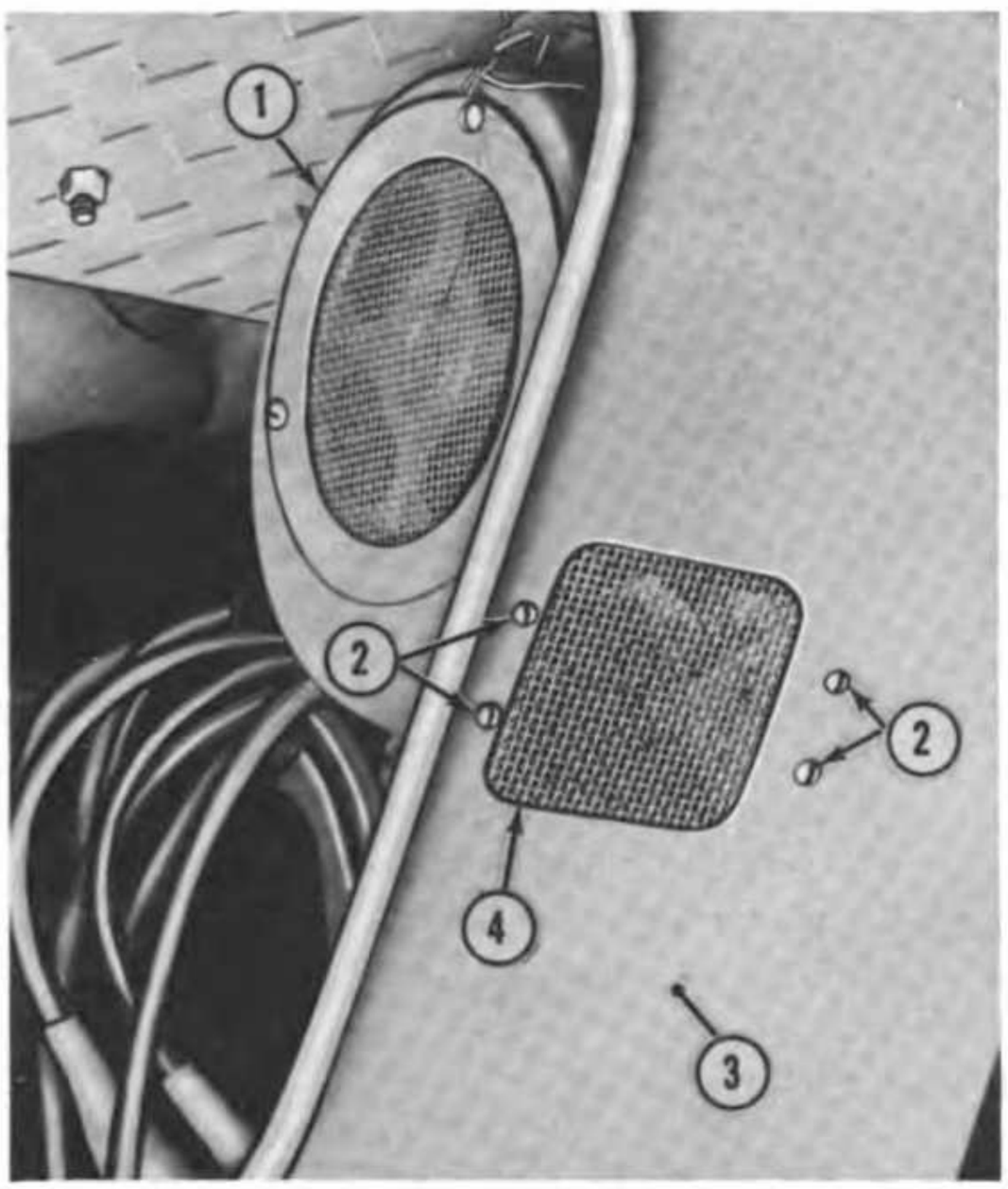
(1) Aline blower (3, fig. 138) on lowered mounting plate (2, fig. 137) and secure, using four lockwashers, (2, fig. 138) and hex nuts (1).

(2) Install screen guard (5) over blower and secure to mounting plate, using two machine screws (4), lockwashers (2), and hex nuts (1).
(3) Make certain that circuit-breaker switch (9, fig 43) is in the OFF position before connecting blower wires.
(4) Remove tape and connect wires. Raise mounting plate and aline holes with holes in shop body. Install and tighten six cap screws and stopnuts (1, fig. 137).

139. Rear Ventilators

a. Removal.

(1) Place circuit-breaker switch (9, fig. 43) in the OFF position.
(2) Remove four mounting screws (2, fig. 139), lockwashers, and hex nuts securing ventilator (1) to shop bulkhead (3).



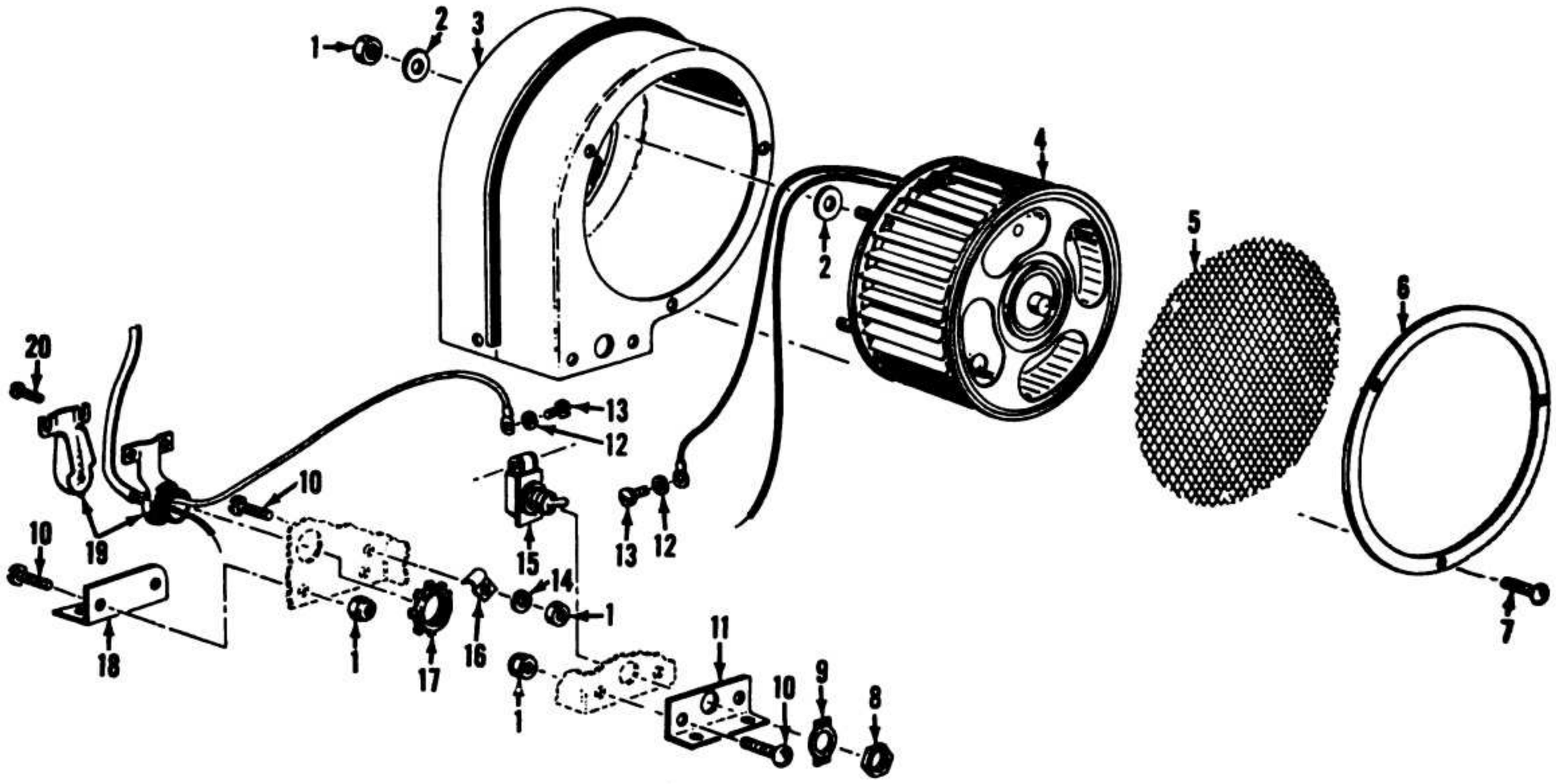
1 Ventilator
2 Mounting screws
3 Shop bulkhead
4 Exhaust screen

Figure 139. Rear ventilator installed.

(3) Lift ventilator off bulkhead enough to remove exhaust screen (4) and then lower ventilator on bulkhead.
(4) Remove switch nut (8, fig. 140) and switchplate (9) from switch (15). Reach into duct (3) and pull the switch from front mounting bracket (11) and out of duct.
(5) Remove two machine screws (13) and lockwashers (12) and disconnect blower wire and circuit wire from switch. Remove switch.
(6) Remove machine screw (10), hex nut (1), lockwasher (14), and clamp (16) securing circuit wiring to duct.
(7) Unsplice wires and tape bare end of circuit wire.
(8) Loosen two machine screws (20) and separate halves of connector (19). Pull circuit wires out of connector and remove ventilator from bulkhead for further disassembly on workbench.
(9) Remove retaining nut (17) and remaining half of connector from side of duct (3).
(10) Remove four hex nuts (1) and machine screws (10) securing front mounting bracket (11) and rear mounting bracket (18) to sides of duct.
(11) Remove three machine screws (7), retaining ring (6), and intake screen (5) from face of duct.
(12) Remove four hex nuts (1), four washers (2) securing blower in duct and pull blower (4) out of duct. Remove four washers (2) from blower studs.

b. Installation.

(1) Install four washers (2) on blower studs and install blower (4) in duct (3) and secure with four washers (2) and four hex nuts (1).
(2) Aline intake screen (5) and retaining ring (6) on face of duct and secure, using three machine screws (7).
(3) Aline front mounting bracket (11) on face of duct and aline rear mounting bracket (18) on rear of duct. Secure brackets, using two machine screws (10) and two hex nuts (1) for each bracket.
(4) Install half of connector (19) on rear of duct and secure with retaining nut (17).
(5) Place ventilator on shop bulkhead and insert circuit wire through connector.
(6) Connect blower wire and circuit wire to switch terminals, using two lockwashers (12) and two machine screws (13). Re-



1 Nut, hex, 8–32 (4 rqr)
2 Washer, plain, No. 8 std (8 rqr)
3 Duct
4 Blower
5 Intake screen
6 Retaining ring
7 Screw, mach, rd hd, 10–32 x ¼ (3 rqr)
8 Swith nut
9 Switchplate
10 Screw, mach, rd hd, 8–32 x ⅜ (5 rqr)
11 Front mounting bracket
12 Lockwasher, No. 10 std (2 rqr)
13 Screw, mach, 10–32 (2 rqr)
14 Lockwasher, No. 8 std
15 Switch
16 Clamp
17 Retaining nut
18 Rear mounting bracket
19 Connector
20 Screw, mach, rd hd, 8–32 x ¾ (2 rqr)

Figure 140. Rear ventilator, partially exploded view.

move insulating tape from bare wire and splice circuit wire and blower wire.

(7) Insert switch through duct and into front mounting bracket. Aline switchplate (9) over switch and secure with switch nut (8).

(8) Install clamp (16) over circuit wires and secure to duct, using machine screw (10), lockwasher (14), and hex nut (1).

(9) Aline other half of connector (19) over circuit wires and tighten two machine screws (20).

(10) Raise ventilator (1, fig. 139) and aline exhaust screen (4) on shop bulkhead (3). Lower ventilator over screen and secure ventilator and screen on shop bulkhead, using four mounting screws (2), lockwashers, and hex nuts.

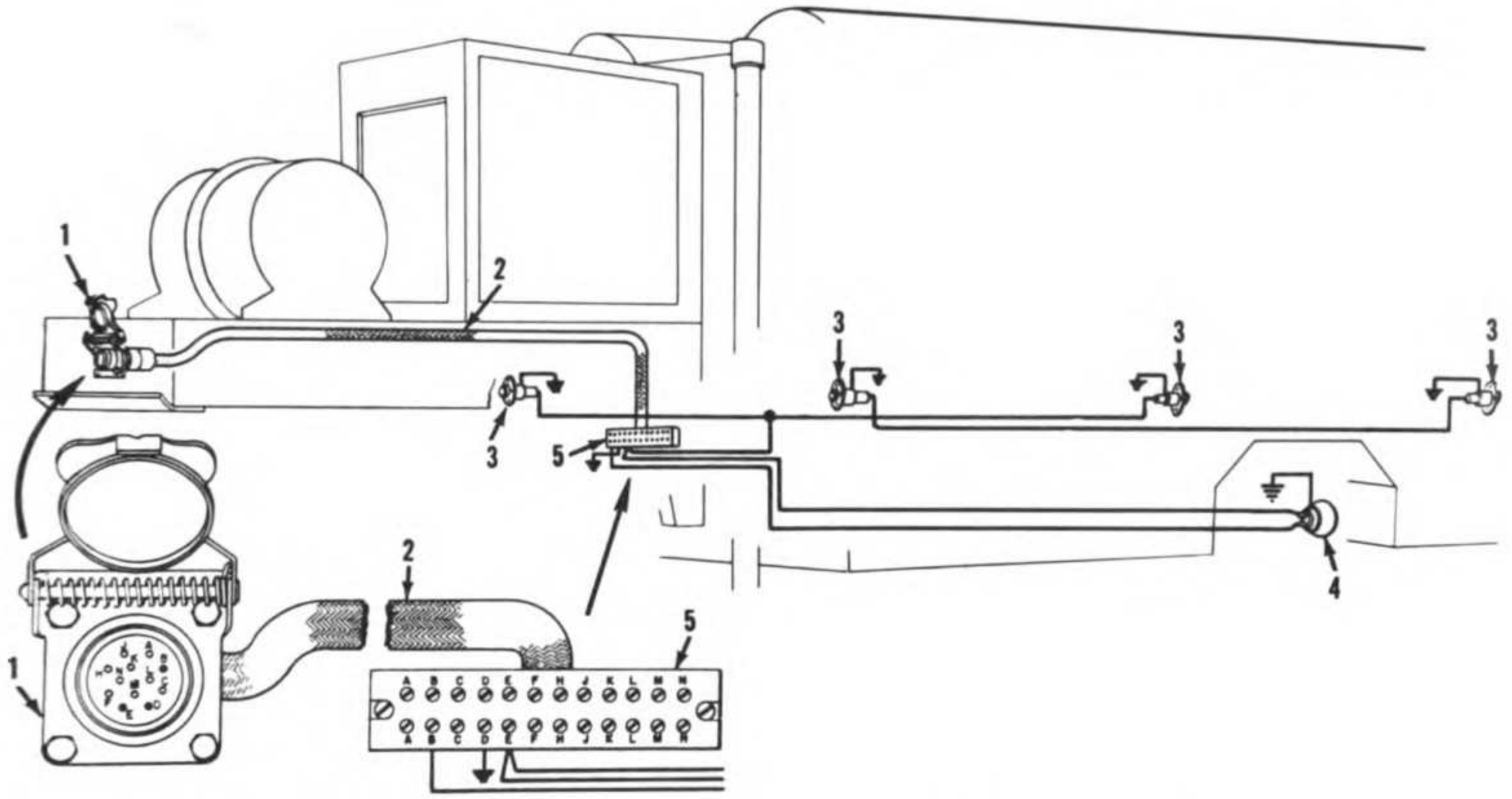
Section X. TRAVELING LIGHTS

140. Description

The 24-volt traveling-light circuit is used only when the mobile shop is connected to a prime mover. Electric energy is supplied to the four clearance lights (3, fig. 141) and tail-and-stoplight (4) after plugging the prime mover cable connector into the 12-pin traveling light receptacle (1). A rubber-covered cable (2) contains 12 wires which terminate in the terminal board (5), located in the battery compartment. As illustrated in figure 141, only three terminals are used; the unused terminals may be utilized as a source of 24-volt current for blackout lights or any other type light that may be installed in the mobile shop.

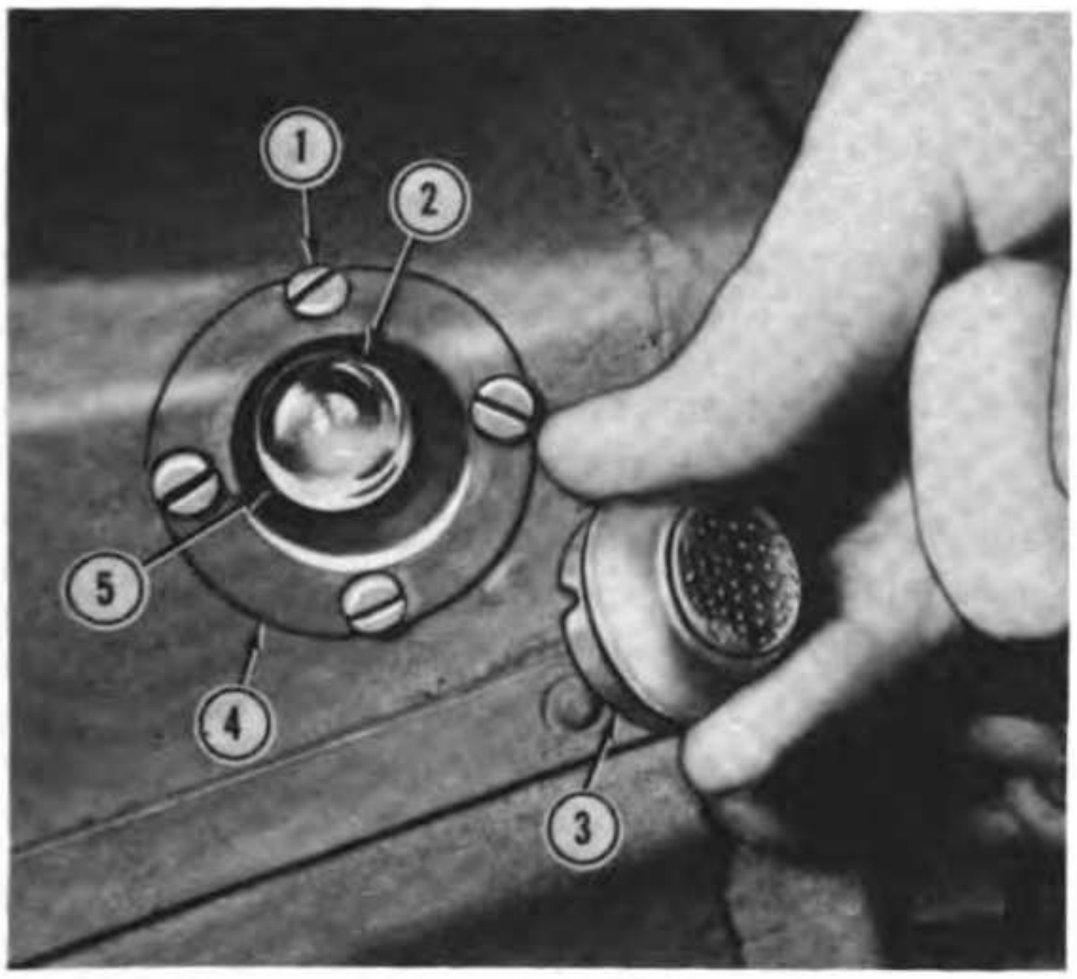
141. Removal of Clearance Lights

Caution: Disconnect prime mover cable connector from traveling lights receptacle (1) before working on traveling lights.



1 Traveling light receptacle
2 Cable
3 Clearance light
4 Tail-and-stoplight
5 Terminal board

Figure 141. Traveling light circuit, 24-volt.



1 Mounting screw (4 rqr)
2 Bulb
3 Lens cap
4 Light receptacle
5 Socket

Figure 142. Clearance light lens cap removed.

a. Raise lifting side (par. 39*a*) about two feet.

b. Pry out lens cap (3, fig. 142).

c. Press and twist bayonet-type bulb (2) and remove bulb from socket (5).

d. Disconnect wire at rear of socket. Remove four mounting screws (1) and remove light receptacle (4) from lifting side.

Note. All four clearance lights are removed in the same manner.

142. Removal of Tail-and-Stoplight

a. Remove two screws securing lens retainer to light receptacle and remove lens retainer, lens, and cork gasket.

b. Press and twist each bulb clockwise and remove two bulbs from sockets.

c. Disconnect wire at rear of light receptacle and remove two nuts and lockwashers securing receptacle to mounting bracket. Remove receptacle.

143. Cleaning and Inspection of Traveling Lights

a. Cleaning. Clean all parts of traveling lights with an approved cleaning solvent. Remove corrosion from sockets, bulbs, and traveling light receptacle pins with fine emery paper or sandpaper.

b. Inspection. Inspect all parts for cracks, breaks, or other physical damage. Inspect all

terminal board connections for tightness and good condition. Inspect rubber-covered cables for deterioration. Replace burned-out bulbs. Inspect all wiring for frayed or cut insulation.

144. Installation of Clearance Lights

a. Insert light receptacle (4, fig. 142) in lifting side and secure, using four mounting screws (1). Connect wire to rear of socket (5).

b. Insert bulb (2) in socket; press in and twist counterclockwise to secure.

c. Install lens cap (3) over bulb; press in with hand to secure.

d. Lower lifting side (par. 50*b*).

145. Installation of Tail-and-Stoplight

a. Install tail-and-stop light receptacle on mounting bracket and secure, using two lockwashers and nuts. Connect wire to rear of socket.

b. Insert bulbs in sockets; press in and twist bulbs counterclockwise to secure.

c. Aline cork gasket, lens, and lens retainer on light receptacle, and secure, using two screws.

Section XI. WHEELS AND AXLE ASSEMBLY

146. Description

The wheels and axle assembly consists of four disk-type wheels, four 14-ply tires, two leaf-type springs, two brake chambers, two slack adjusters, and two radius rods with channel mounted on a tubular dead axle. The wheels and axle assembly must be removed before shipping mobile shop by air.

147. Removal of Wheels and Axle Assembly

a. Lower Trailer-Supporting Jacks. Place mobile shop in a reasonably level position (par. 37*e*). Lower both front trailer-supporting jacks to ground (par. 38*c*). Place short wheel chocks (app. II) on ground below each rear trailer-supporting jack. Place wheel chocks with 6-inch face on ground and 8-inch face vertical. Lower both rear jacks (par. 38*h*) until they rest on wheel chocks. Lower all trailer-supporting jacks until weight of mobile shop is off springs.

b. Disconnect Airbrake Hoses. Turn airbrake hose couplings (7, fig. 143) one-quarter turn counterclockwise and disconnect airbrake hoses.

c. Remove Spring Mounting Bolts. Remove nut, lockwasher, and spring end bolt (2) securing each end of spring (8) under welded spring mounting bracket (1). Repeat procedure on other spring.

d. Remove Channel Mounting Bolts. Remove four nuts (4), lockwashers (5), and bolts (6) securing channel (3) to underside of semitrailer. Lower channel with attached radius rods to ground.

e. Roll Out Wheels and Axle Assembly. Operate all four jacks and raise mobile shop high enough to roll out wheels and axle assembly from the side. Roll out wheels and axle assembly (fig. 144).

f. Lower Mobile Shop.

Warning: Mobile shop must not be left standing on jacks alone.

Place long wheel chock (6 x 8 x 40 inches) on ground below rear of semitrailer. Operate all four jacks alternately and lower mobile shop evenly until rear of semitrailer rests on long wheel chock. Continue to operate jacks until short wheel chocks are free. Remove short wheel chocks.

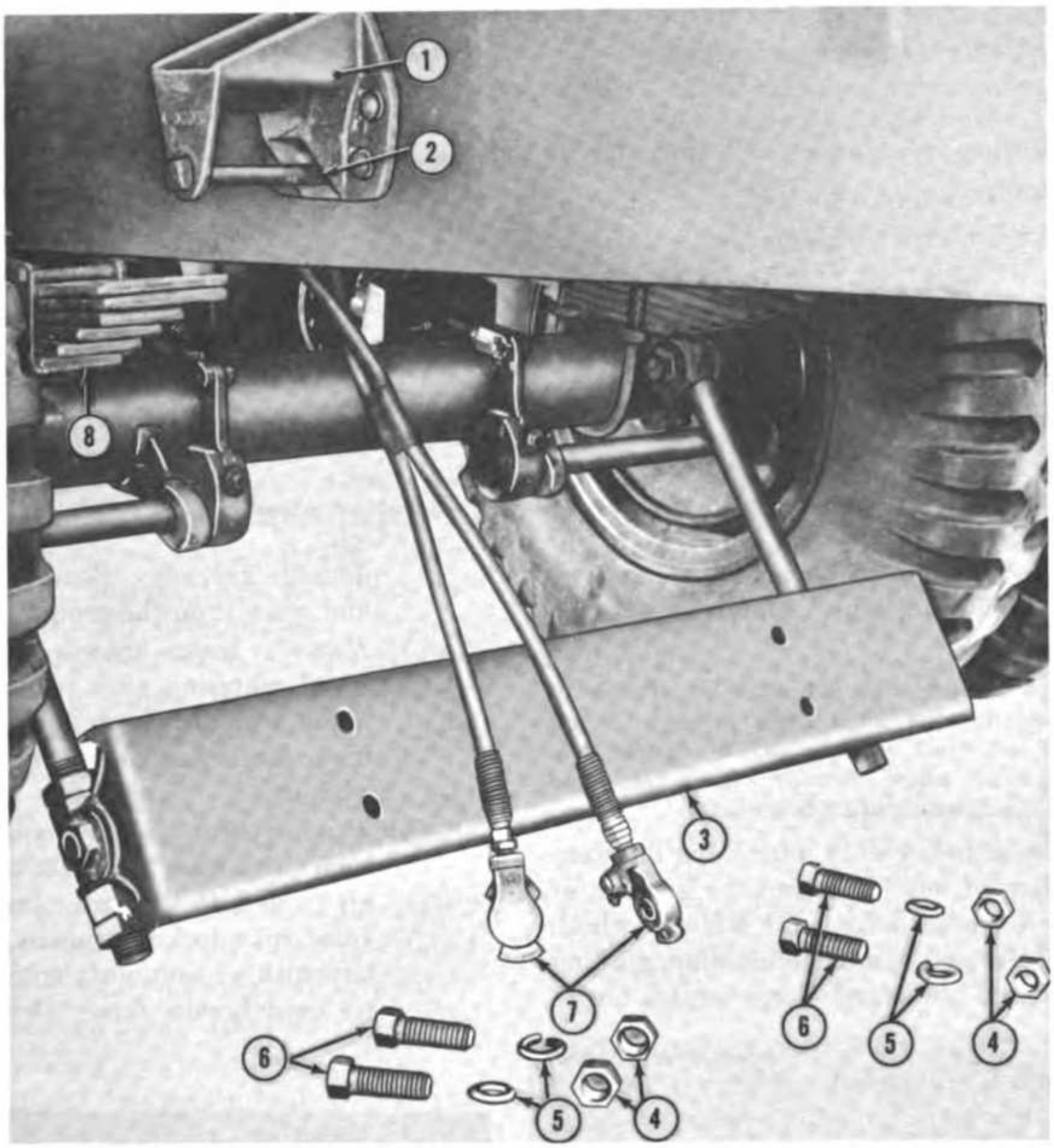
g. Rest Mobile Shop on Rollers. Operate all four jacks and raise mobile shop high enough to remove long wheel chock. Remove long wheel chock; operate jacks and lower mobile shop to ground or on rolers.

148. Installation of Wheels and Axle Assembly

a. Raise Mobile Shop. Operate all four trailer-supporting jacks (par. 38*c*, *d*, and *h*) and raise mobile shop evenly about two feet off the ground or off rollers. Place long wheel chock on ground below rear of mobile shop and operate jacks to lower mobile shop on long wheel chock. Raise rear jacks high enough to place short wheel chocks below them. Operate all four jacks and raise mobile shop high enough to provide clearance for wheels and axle assembly (fig. 144). Remove long wheel chock.

b. Roll Wheels and Axle Assembly Under Mobile Shop. Roll wheels and axle assembly under mobile shop with channel facing front of mobile shop.

c. Install Channel Mounting Bolts. Raise channel (3, fig. 143) with attached radius rods and



1 Spring mounting bracket
2 Spring end bolt
3 Channel
4 Nut, hex, 1 inch NC (4 rqr)
5 Lockwasher, 1 inch std (4 rqr)
6 Bolt, 1 inch NC (4 rqr)
7 Airbrake hose couplings
8 Spring

Figure 143. Wheels and axle assembly disconnected.

aline mounting holes with holes in semitrailer. Install and tighten four bolts (6), lockwashers (5), and nuts (4).

d. Install Spring Mounting Bolts. Lower mobile shop until ends of spring (8) slip under spring mounting brackets (1) and install spring end bolt (2), lockwasher, and nut in each spring mounting bracket.

e. Connect Airbrake Hoses. Connect airbrake hose couplings (7) and secure by turning couplings one-quarter turn clockwise.

f. Raise Rear Trailer-Supporting Jacks. Operate pumps and raise rear trailer-supporting jacks until they are fully retracted. Remove short wheel chocks.

149. Wheels and Tires

a. Removal.

(1) *Raise mobile shop.* Lower all four trailer-supporting jacks (par. 38*c*, *d*, and *h*) until wheels are lifted off the ground. Install jacks safeties on front jacks.

Caution: Place suitable blocking under the rear of the mobile shop since rear jacks do not have safeties.

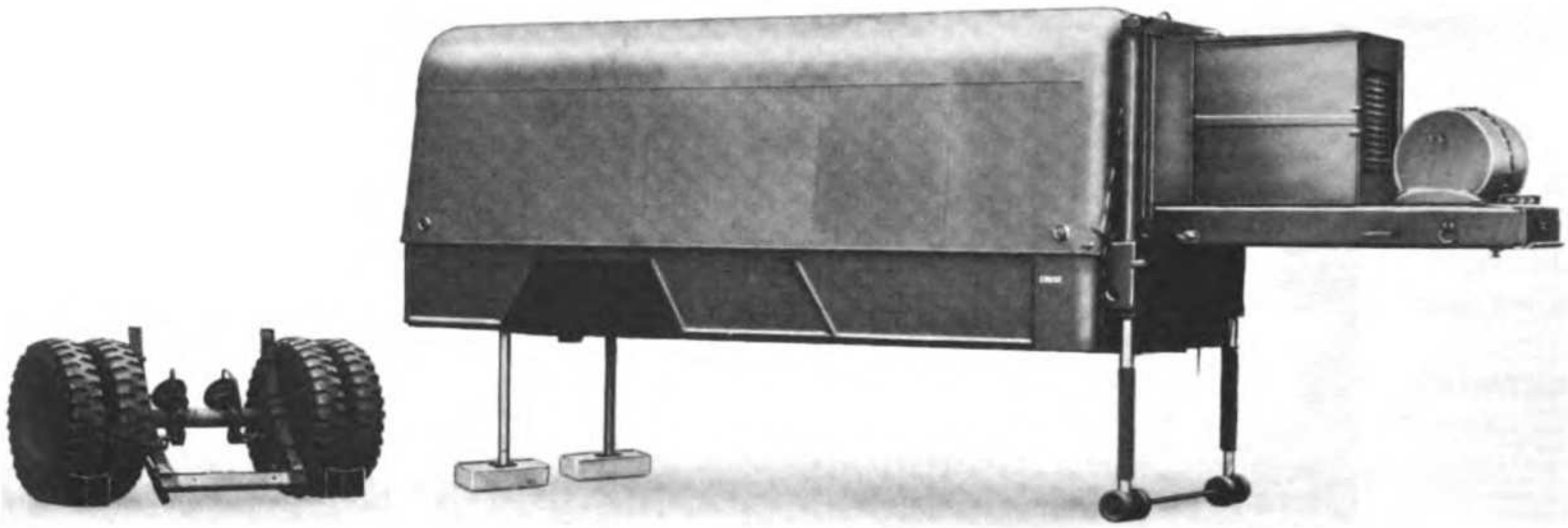


Figure 144. Wheels and axle assembly removed.

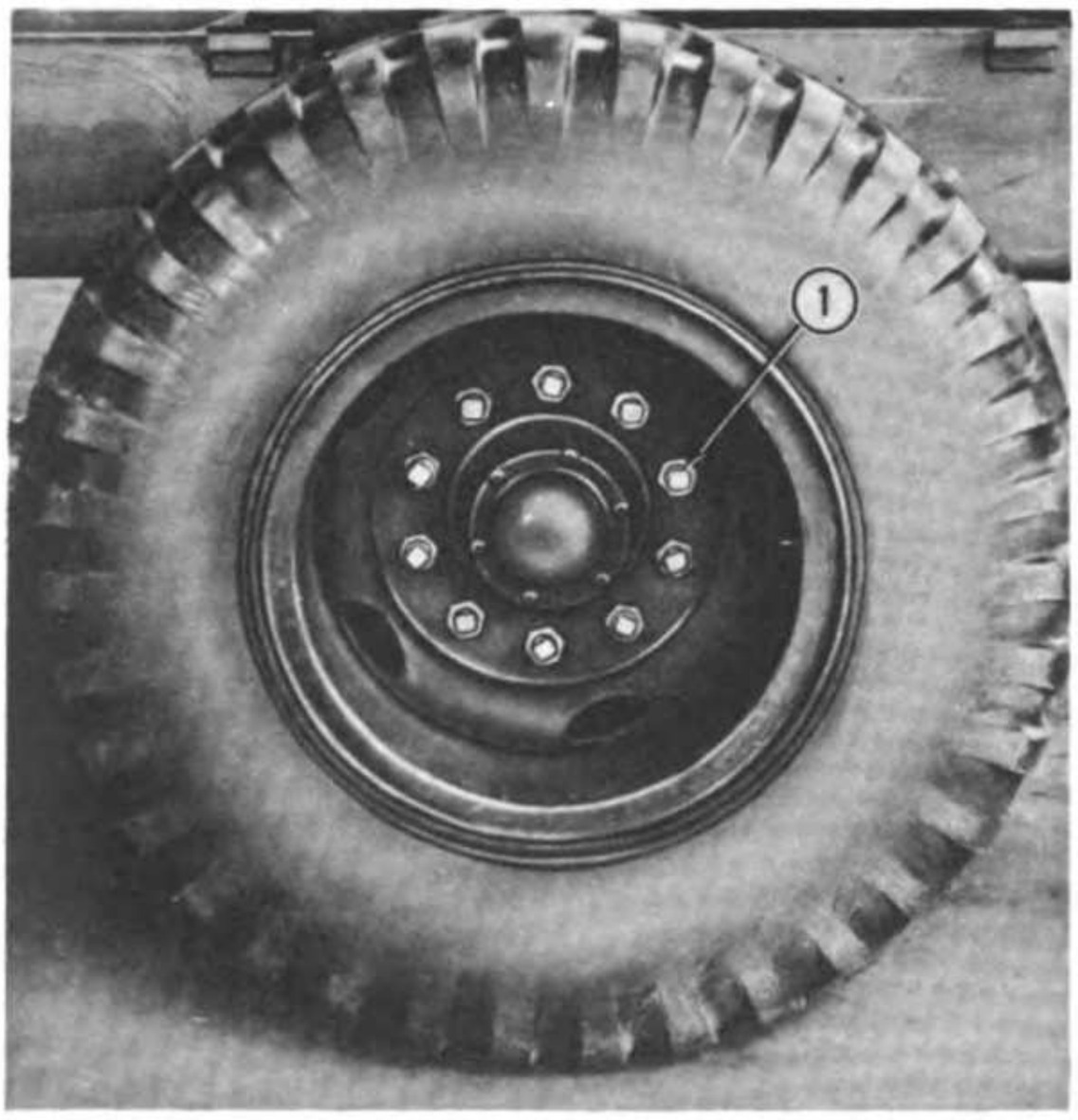
(2) *Remove outer wheel.* Loosen and remove 10 outer wheel centering nuts (1, fig. 145).

Note. **Wheel nuts and studs on left side of vehicle have left-hand screw threads. Wheel nuts and studs on right side of vehicle have right-hand screw threads. Keep left- and right-hand nuts and studs separate.**

Place a heavy-duty pinch bar between bottom of outer tire and the ground, or use a wheel dolly, and lift up wheel. Pull tire away from mobile shop, guiding wheel off studs and being careful not to damage threads. Remove outer wheel and place it on the ground clear of shop.

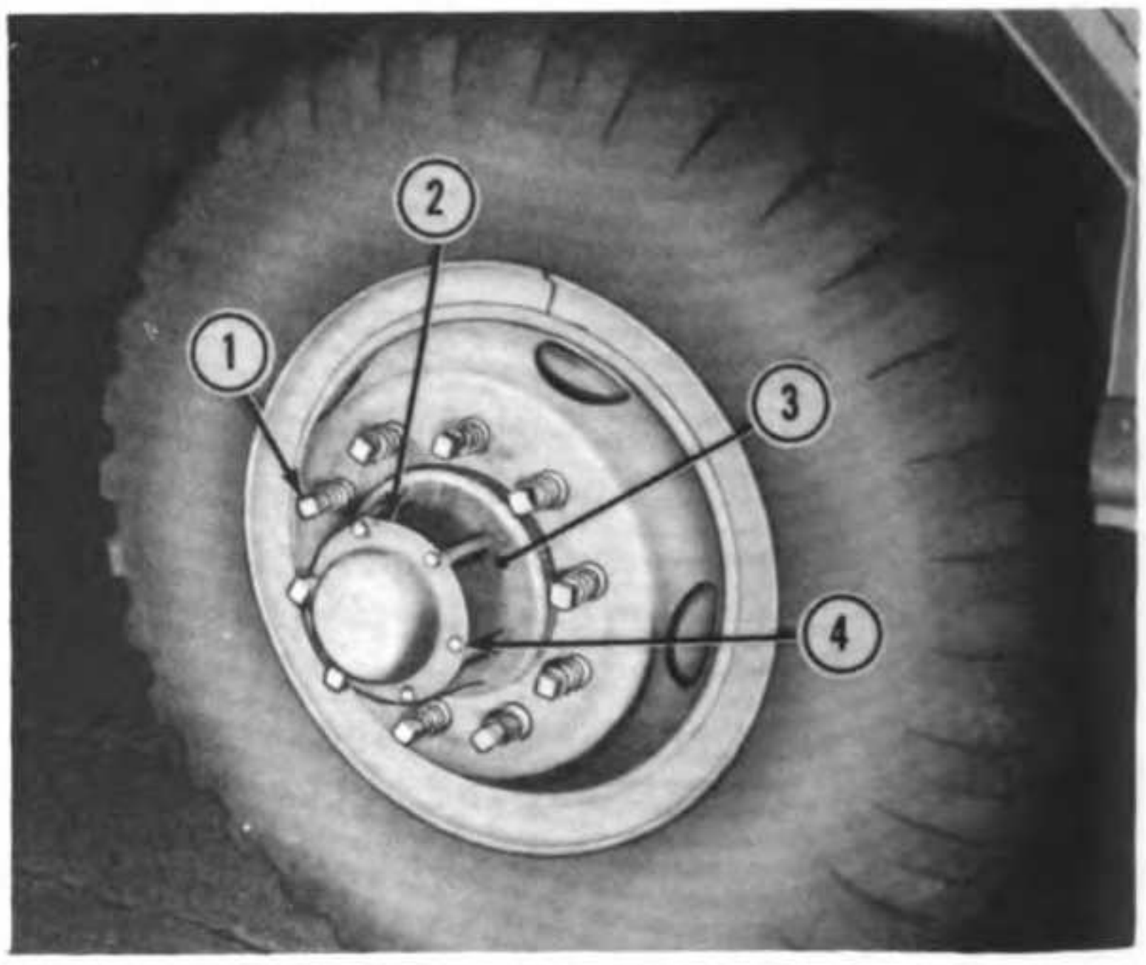
(3) *Remove inner wheel.* Remove inner wheel centering nuts (1, fig. 146). Use pinch bar or wheel dolly, and remove inner wheel and place it on ground clear of shop.

(4) *Remove tire.* Remove valve core from tube valve stem to deflate any remaining air from defective tire. Loosen tire bead from split locking rim by pounding on tire with a heavy-duty rubber mallet until bead breaks free. Drive a flat tire



1 Centering nuts (10 rqr)

Figure 145. Outer wheel installed.



1 Centering nuts (10 rqr)
2 Hub cap
3 Hub
4 Screw, Cap, 5/16 x 1/2 NC (6 rqr)

Figure 146. Inner wheel installed.

iron under one end of split locking rim and pry up until a tire iron can be placed under locking rim. Pry the locking rim loose from the wheel. Turn wheel and tire over and pound tire bead loose from inner side of wheel. Pound tire and tube off the wheel.

Caution: Do not damage tube valve stem when removing tire.

(5) *Remove tube.* Pull tube out of tire.

b. Cleaning and Inspection. Wash and wipe wheels clean with approved cleaning solvent. Check countersunk holes in wheels to be sure that they are free of foreign matter and undamaged. Inspect locking rims and wheels for damage. Replace bent and otherwise damaged wheels and locking rims. Remove all rust from rims with approved cleaning solvent and sandpaper. Paint wheels (par. 78). Inspect tires and tubes for cuts, breaks, wear, and deterioration. Remove stones and other objects stuck in tire treads. Repair small holes in tubes. Replace excessively worn, deteriorated, and damaged tires and tubes.

c. Installation.

(1) *Install tube.* Place tube inside tire and inflate until tube is held evenly inside tire.

(2) *Install tire.* Place tire and tube assembly on wheel with valve stem positioned properly. Start locking rim in position on wheel and using tire irons and mallet, force locking rim to locked position.

Caution: Be certain that locking rim is seated properly on wheel. If not properly installed, locking rim may fly off and cause injury to personnel when tire is inflated. For safety, turn wheel over so that locking rim faces down before inflating tire.

(3) *Inflate tire.* Inflate tire to about 30 psi. Inspect valve stem, locking rim, tire, and wheel for correct assembly. If assembly is correct, inflate tire to 65 psi.

(4) *Install inner wheel.* Use pinch bar or wheel dolly, and guide inner wheel into position over wheel studs. Install 10 centering nuts (1, fig. 146).

Note. **Wheel nuts and studs on left side of vehicle have left-hand screw threads. Wheel nuts and studs on right side of vehicle have right-hand screw threads.**

Tighten nuts alternately around the wheel. Be sure tapered seat on each nut is centering in countersunk hole in wheel.

(5) *Install outer wheel.* Use pinch bar or wheel dolly, and guide outer wheel into position over wheel studs. Install 10 outer wheel nuts (1, fig. 145). Tighten nuts alternately around the wheel. Be sure tapered seat on each nut is centering in countersunk hole in wheel.

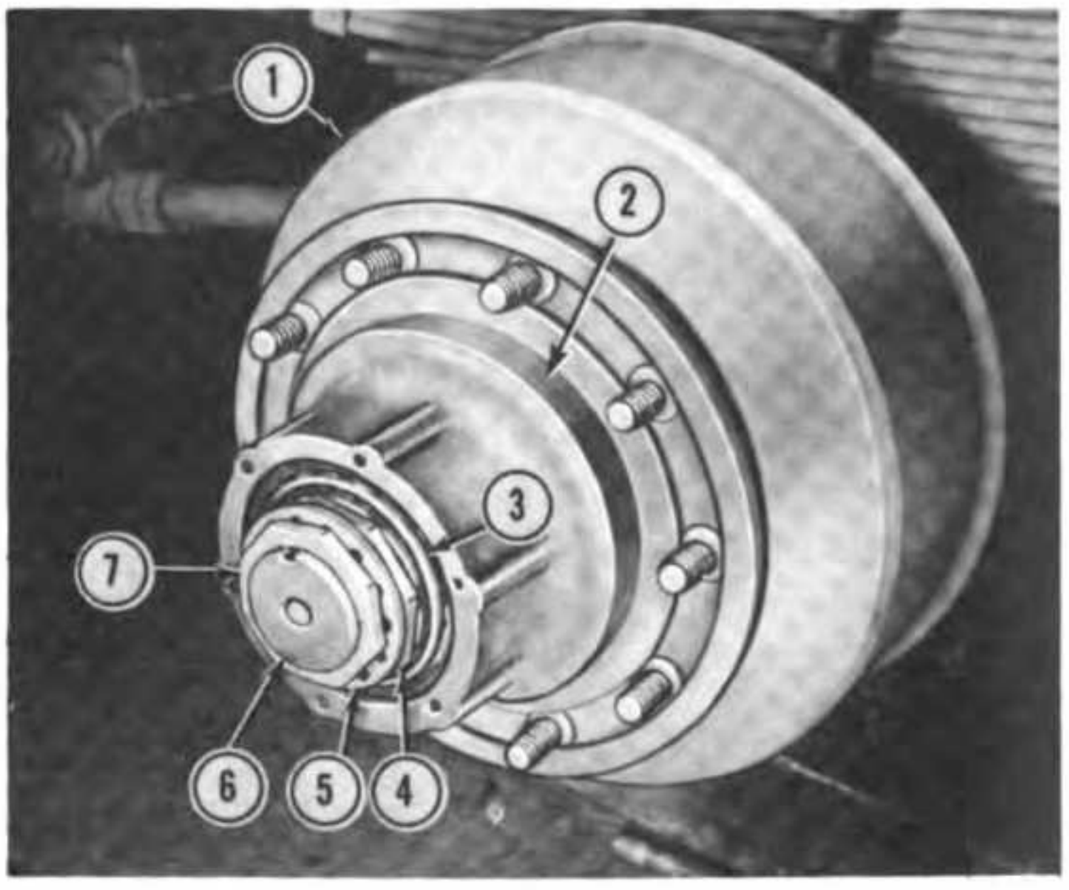
(6) *Remove blocking and lower mobile shop.* Lower jacks to raise mobile shop and remove blocking. Raise jacks to lower mobile shop on wheels. Check tightness of all wheel nuts.

150. Wheel Bearings

a. Removal.

(1) *Remove wheels.* Refer to paragraph 149*a*(1), (2), and (3).

(2) *Remove outer bearing cone.* Remove six cap screws (4, fig. 146) and lockwashers securing hub cap (2) to hub (3). Remove hub cap with gasket. Remove outer spindle nut (7, fig. 147), nut lock (5), and inner spindle nut (4) securing hub (2) and brakedrum (1) on axle spindle (6). Pull hub and brake drum assembly off spindle. Remove outer bearing cone (3) from hub.



1 Brakedrum
2 Hub
3 Outer bearing cone
4 Inner spindle nut
5 Nut lock
6 Axle spindle
7 Outer spindle nut

Figure 147. Hub and drum assembly installed.

(3) *Remove inner bearing cone.* Remove inner bearing cone and felt grease retainer off axle spindle.

(4) *Remove bearing cups.*

Note. Only remove bearing cups when necessary.

If necessary, press bearing cups from inner and outer bores of hub.

b. Cleaning and Inspection. Thoroughly clean bearing cones and cups in an approved cleaning solvent. Do not dry bearings with compressed air. Grease bearing cones (par. 77*h*). Inspect bearing cones, cups, and cup seats in hub for nicks, scores, pits, and excessive wear. Inspect cages on cones for cracks or other damage. Replace bearings as a set if either cone or cup is damaged. Replace damaged grease retainer.

c. Installation.

(1) *Install bearing cups.* Press bearing cups evenly into bores of hub to avoid misalinement and damage.

(2) *Install inner bearing cone.* Install felt grease retainer and inner bearing cone over axle spindle. Mount hub and drum assembly on axle spindle (6), locating the inner bearing cup over the inner bearing cone.

(3) *Install outer bearing cone.* Slide outer bearing cone (3, fig. 147) on axle spindle and into outer bearing cup. Install inner spindle nut (4) on spindle with dowel facing out. Tighten nut until bearings are snug. Aline nut lock (5) in slot of axle spindle and slide nut lock on spindle up to inner spindle nut. Back off inner spindle nut until dowel slips into hole of nut lock.

Note. Do not tighten inner spindle nut to aline dowel with nut lock.

Install outer spindle nut (7) to secure bearing adjustment. Aline gasket and hub cap (2, fig. 146) on hub and secure, using six cap screws (4) and lockwashers.

(4) *Install wheels.* Refer to paragraph 149*c* (4), (5), and (6).

Section XII. AIRBRAKE SYSTEM

151. Description

The airbrake system (fig. 148) is controlled from the prime mover. Air pressure from the prime mover enters the service line (7) and then to the relay valve of the relay-emergency valve (4). When the emergency brake is applied, air pressure enters the emergency line (5) by-passing the relay valve and entering the emergency valve of the relay-emergency valve. Air is stored in the reservoir (6). Air from the relay-emergency valve then enters the brake chambers (1) through air lines (3) and air hoses (2). The brake chambers convert the compressed air energy into mechanical energy, moving the push rods (5, fig. 149) and slack adjusters (9) which in turn rotate the brake camshafts (8) applying the brakes.

152. Brake Adjustment

a. General. Brake adjustments to compensate for brake lining wear are made entirely with the slack adjuster (1, fig. 150).

Note. Do not adjust push rod length (par. 153*b* (3)) unless necessary.

b. Remove Wheels. Refer to paragraph 149*a* (1), (2), and (3).

c. Insert Feeler Gage. Insert feeler gage (3) in brakedrum opening. The feeler gage should be between the brake lining and the braking surface of the brakedrum (2).

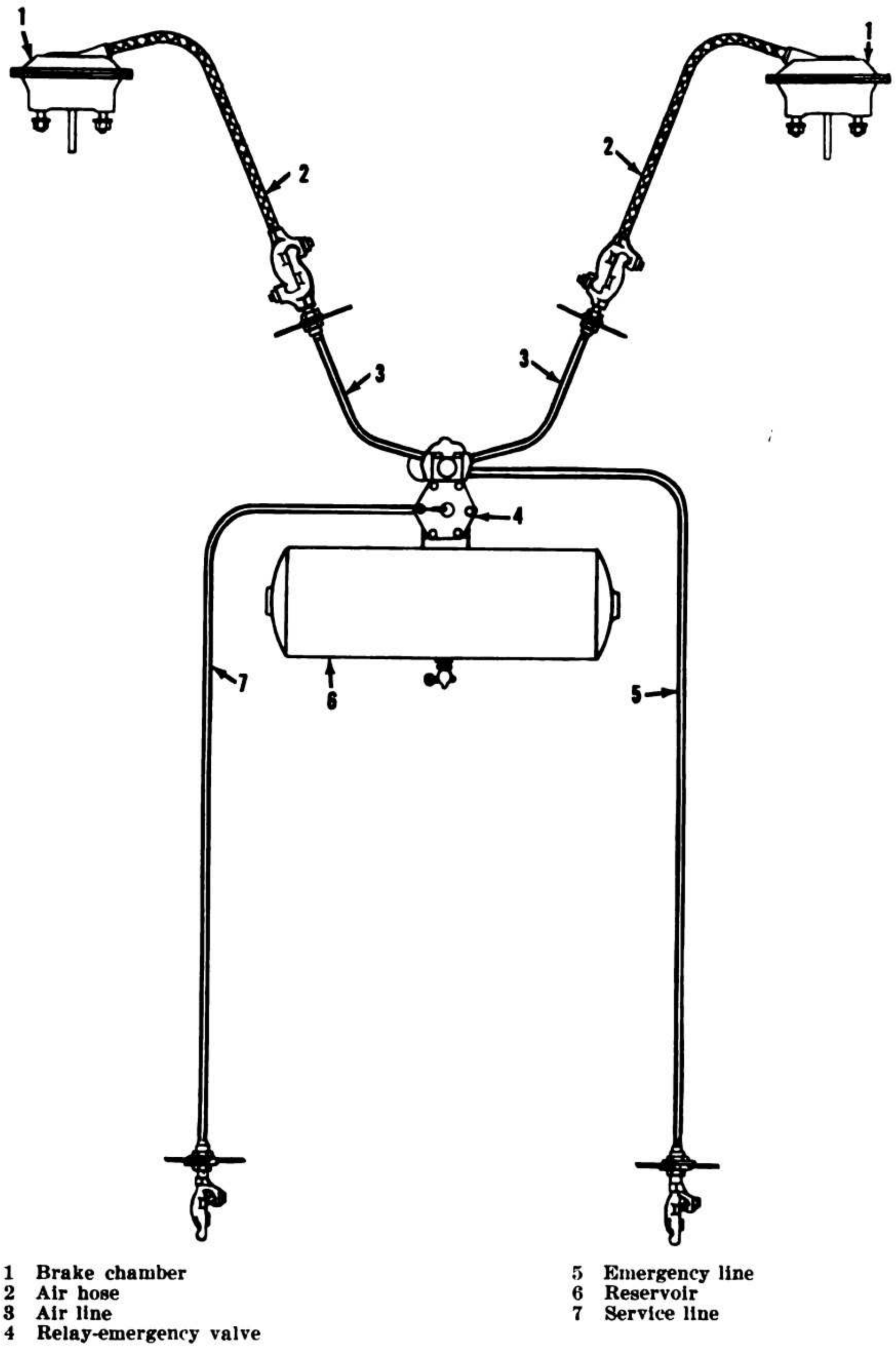
d. Adjust Slack Adjuster. Using a suitable wrench on end of slack-adjuster wormshaft, press down on wormshaft to release locking sleeve and turn wormshaft until 0.015-inch clearance is obtained between brake lining and brakedrum.

e. Check for Binding. Rotate brakedrum and feel if it turns freely. If brake lining binds on the drum at any point, readjust clearance, using the feeler gage at that point.

f. Adjust Other Brake. Refer to *b* through *e* above.

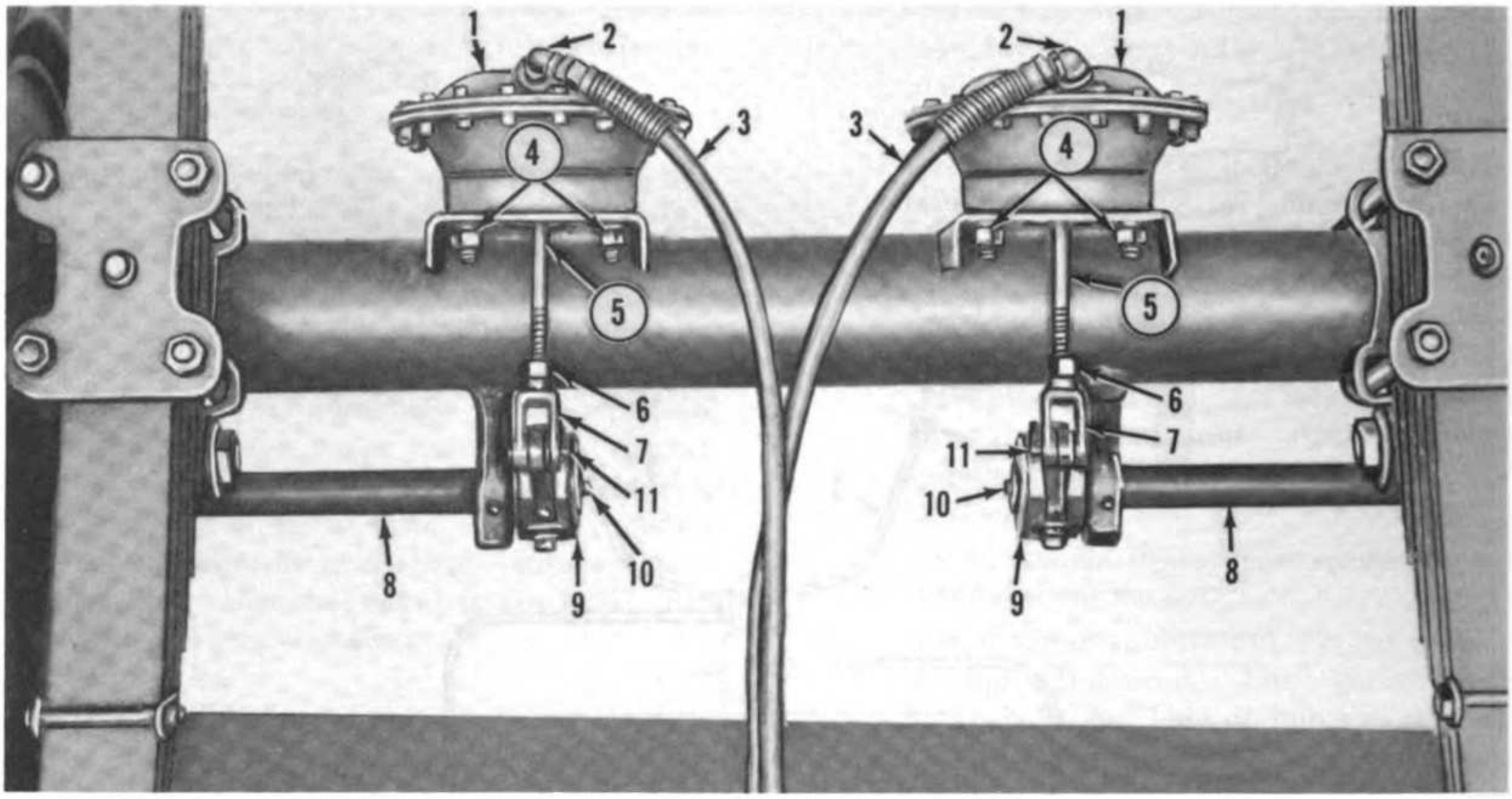
g. Install Wheels. Refer to paragraph 149*c* (4), (5), and (6).

h. Test Brake Adjustment. After connecting prime mover to mobile shop, apply brakes and check the included angle formed by the brake chamber push rod (1, fig. 151) and the slack adjuster arm (2) on both side of mobile shop. If the included angle is less than 90° or one angle differs from the other, adjust length of push rods (par. 153*b* (3)). Readjust brakes.



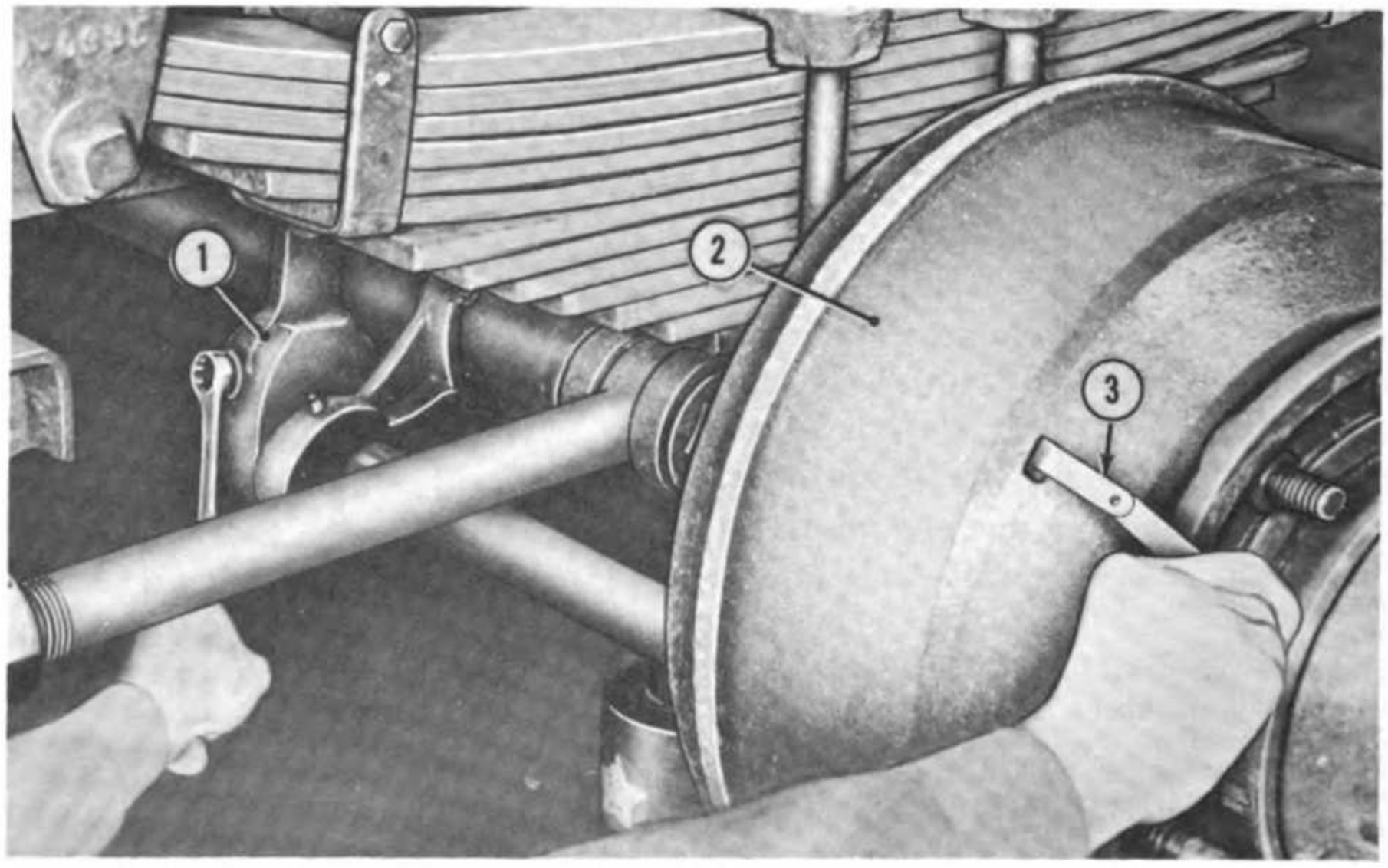
1 Brake chamber
2 Air hose
3 Air line
4 Relay-emergency valve
5 Emergency line
6 Reservoir
7 Service line

Figure 148. Airbrake system.



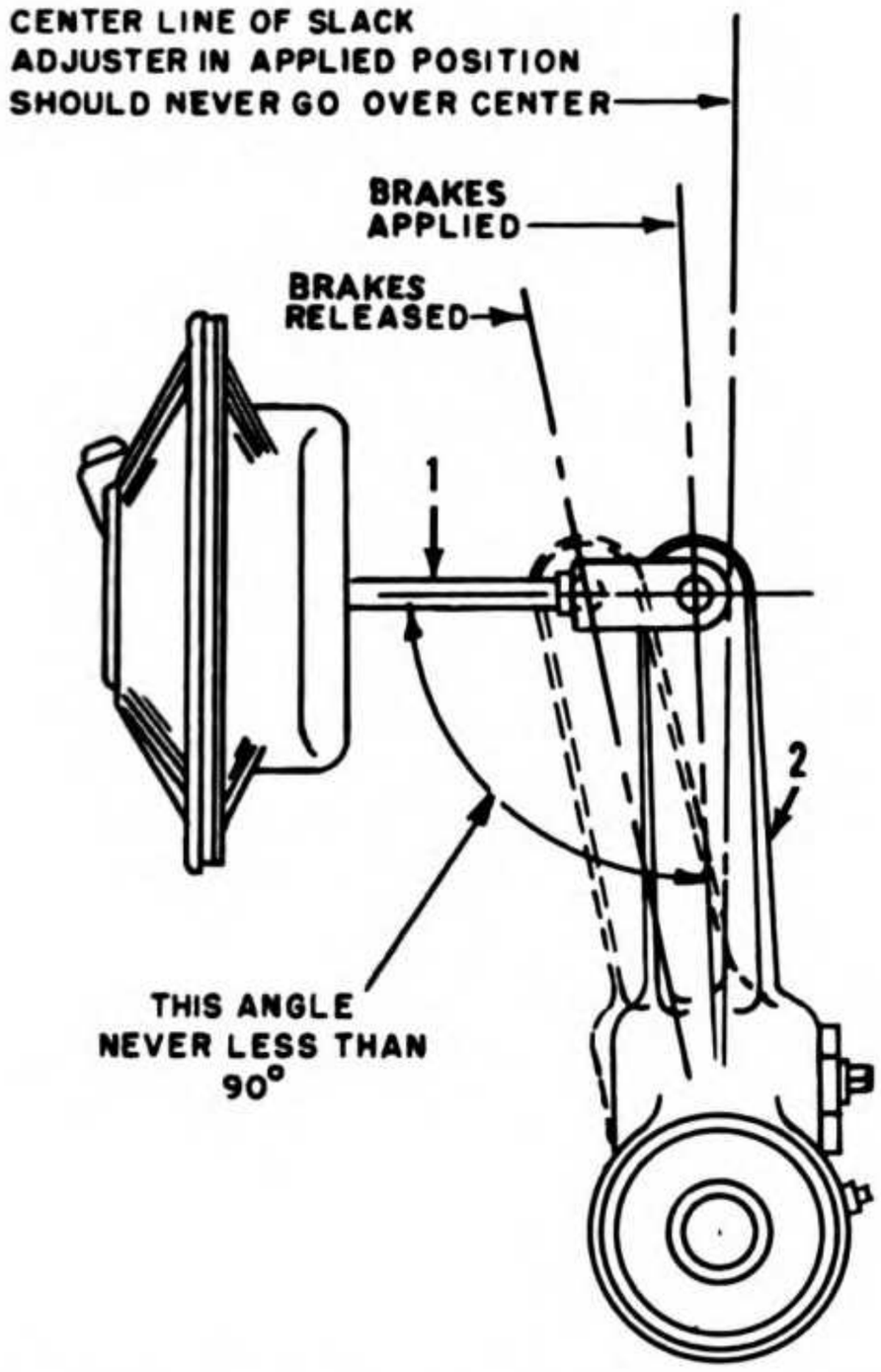
1 Brake chamber
2 Fitting
3 Air hose
4 Nut, hex, ½ NF (4 rqr)
5 Push rod
6 Locknut, ½ NF (2 rqr)
7 Push rod yoke
8 Brake camshaft
9 Slack adjuster
10 Screw, cap, 5/16 NC x ¾ (2 rqr)
11 Clevis pin, ½ x 1⅞ (2 rqr)

Figure 149. Brake chambers and slack adjusters installed.



1 Slack adjuster 2 Brakedrum 3 Feeler gage

Figure 150. Adjusting brake.



1 Brake chamber push rod 2 Slack adjuster arm

Figure 151. Relative positions of push rod and slack adjuster arm.

153. Slack Adjuster

a. Removal.

(1) *Disconnect push rod.* Remove cotter pin and clevis pin (11, fig. 149) securing push rod yoke (7) to slack adjuster (9) and disconnect push rod (5).

(2) *Remove slack adjuster.* Remove cap screw (10) and washer securing slack adjuster on end of brake camshaft (8) and slide slack adjuster off brake camshaft splines.

b. Installation.

(1) *Install slack adjuster.* Aline slack adjuster (9) on brake camshaft splines and secure, using washer and cap screw (10).

(2) *Connect push rod.* Aline push rod yoke (7) on slack adjuster arm and secure, using clevis pin (11) and cotter pin.

(3) *Check and adjust length of push rods.* After installation, compare length of push rod with length of push rod on other brake. If they are unequal or the slack adjuster arm is not positioned at the correct angle with relation to the push rod (fig. 151), it will result in uneven braking and loss of braking power.

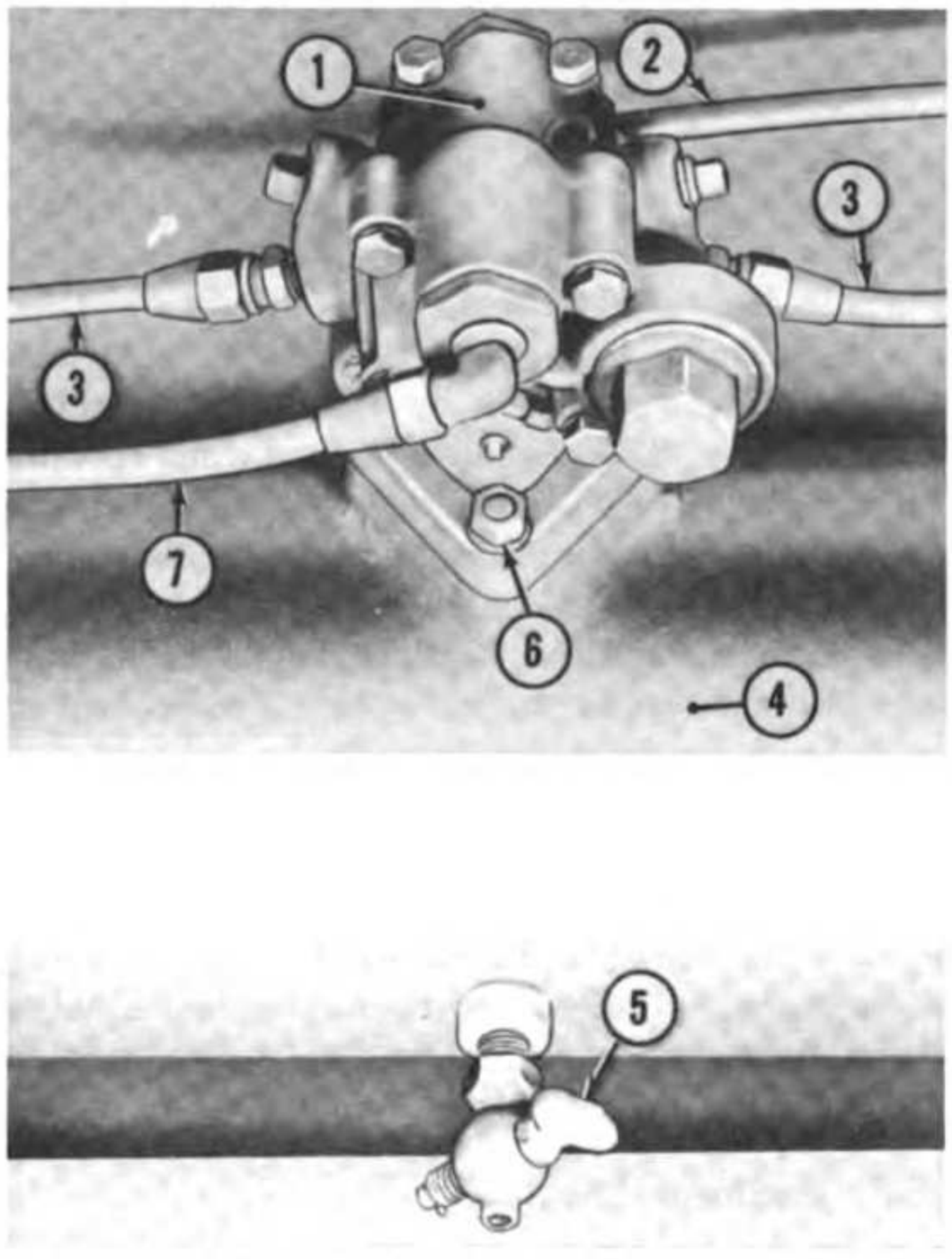
(*a*) To adjust push rod length, disconnect push rod (*a*(1) above), loosen locknut (6, fig. 149) and turn push rod yoke (7) clockwise to shorten push rod, or turn push rod yoke counterclockwise to lengthen push rod. Connect push rod (*b*(2) above).

(*b*) Apply brakes and check included angle between brake chamber push rod (1, fig. 151) and slack adjuster arm (2).

(4) *Adjust brakes.* Refer to paragraph 152.

154. Brake Chamber

a. Removal. Open draincock (5, fig. 152) at bottom of reservoir (4) to relieve airbrake system of pressure. Loosen retaining nut and disconnect air hose (3, fig. 149) from fitting (2) and lay aside air hose. Disconnect push rod (par.



1 Relay emergency valve
2 Service line
3 Air line
4 Reservoir
5 Draincock
6 Nut, ⅜–24 (3 rqr)
7 Emergency line

Figure 152. Relay-emergency valve installed

153*a*(1)). Remove two nuts (4) and lockwashers securing brake chamber (1) on mounting bracket and remove brake chamber with push rod and push rod yoke.

b. Installation. Insert push rod yoke and push rod through mounting bracket and aline brake chamber (1) on mounting bracket with fitting (2) facing up. Install and tighten two lockwashers and nuts (4). Connect air hose (3) to fitting and tighten retaining nut. Connect push rod (par. 153*b*(2)). Close draincock (5, fig. 152) at bottom of reservoir. Check and adjust length of push rod (par. 153*b*(3)).

155. Relay-Emergency Valve

a. Removal. Open draincock (5, fig. 152) at bottom of reservoir. Loosen retaining nuts and disconnect two air lines (3), and service line (2), and emergency line (7) from relay-emergency valve (1). Remove four nuts (6) and lockwashers securing relay-emergency valve on reservoir and remove relay-emergency valve.

b. Installation. Aline relay-emergency valve (1) on reservoir studs and secure, using two lockwashers and nuts (6). Connect service line (2), emergency line (7), and two air lines (3) to fittings on relay-emergency valve and tighten retaining nuts. Close draincock (5) and charge airbrake system. Cover line fittings and retaining nuts with a soap solution and check for air leaks. Tighten retaining nuts, replace fittings, as necessary, to eliminate leaks.

Section XIII. ENGINE COOLING SYSTEM

156. Description

A positive, centrifugal water pump (7, fig. 153) circulates coolant in a closed system between the engine block, cylinder head, and radiator (3). Temperature of the coolant is controlled by a by-pass thermostat (4) installed on top of the cylinder head. When the engine is cold, the coolant circulates within a closed cycle, starting from the water pump, then through the engine cylinder block, cylinder head, and thermostat. At the thermostat, the coolant is by-passed back into the water pump. The thermostat opens when coolant reaches 180° F. When the thermostat is open, the thermostat by-pass is closed and no coolant is recirculated through the water pump. The coolant flows from the cylinder head, through the thermostat into the top of the radiator. The coolant is cooled as it passes down through the radiator and begins the cycle again. When the coolant reaches 180° F., a shutterstat (5) installed in the engine oil system opens and allows oil under pressure to operate the radiator-shutter cylinder. The radiator-shutter cylinder operates mechanical linkage which opens the vanes, allowing the fan to draw cool air through the radiator.

157. Radiator Shutter

a. Removal.

(1) *Stop engine.* Refer to paragraph 48. Open engine enclosure.

(2) *Disconnect oil line.* Loosen tube nut (2, fig. 154) securing oil line (4) to rear of radiator shutter cylinder (1). Remove two screws and two clamps (3) securing oil line to side of radiator shutter (5) and lay aside oil line.

(3) *Remove manual control cable.* Loosen two screws securing manual control cable (5, fig. 155) in trunnion (6) and lay aside cable.

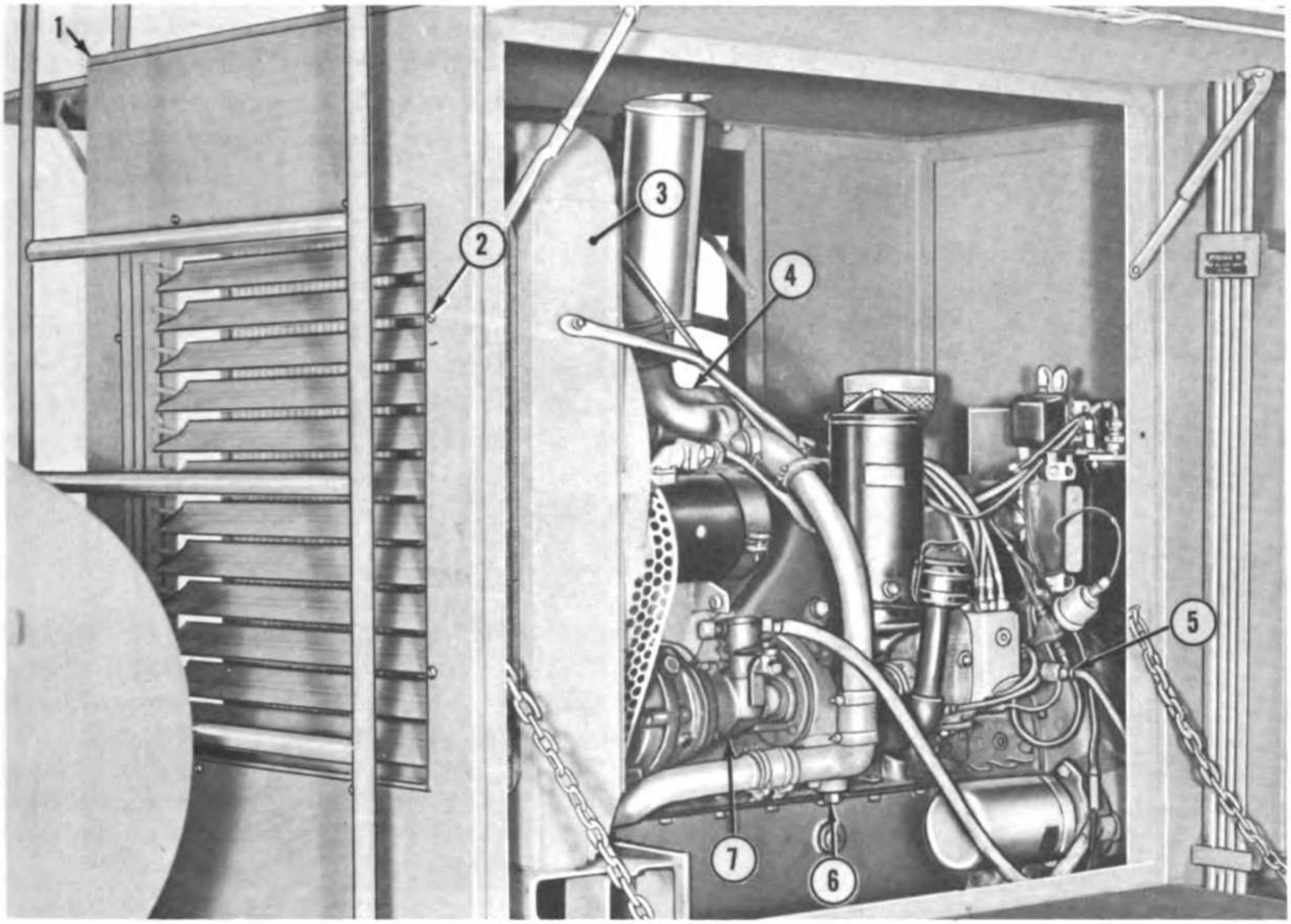
(4) *Remove radiator shutter.* Remove eight nuts from inside engine enclosure and remove eight screws (2, fig. 153) from outside engine enclosure securing radiator shutter to front of engine enclosure (1). Remove radiator shutter (7, fig. 155) from right side of engine compartment.

Caution: Use care when removing radiator shutter. Do not bump radiator shutter against radiator.

b. Cleaning and Inspection. Clean all parts of radiator shutter with an approved cleaning solvent. Inspect vanes for ease of operation and inspect all other parts for good condition. Repair or replace all bent, broken, or otherwise damaged parts. Refer to TM 5–9128–2 for overhaul of radiator shutter (See Note in paragraph 83).

c. Installation.

(1) *Install radiator shutter.* Install radiator shutter (7) from the right side of the engine enclosure; aline mounting holes, and secure radiator shutter to engine enclosure (1, fig. 153), using eight screws (2) and eight nuts.



1 Engine enclosure
2 Screw, mach, rd hd, ¼–20 NC x 1¼ (8 rqr)
3 Radiator
4 By-pass thermostat
5 Shutterstat
6 Drain plug
7 Water pump

Figure 153. Engine installed, left front view.

(2) *Adjust pull rod.* Close vanes and adjust pull rod (4, fig. 155), if necessary.

Note. Piston rod of radiator shutter cylinder (2) must be fully extended for correct adjustment of pull rod.

Loosen two jamnuts (3) and turn pull rod so that vanes are in a fully closed position; tighten jamnuts after adjustment.

(3) *Connect manual control cable.* Insert manual control cable (5) in trunnion (6) and tighten two screws.

Note. Make certain radiator shutter manual control (4, fig. 40) is turned counterclockwise before connecting cable.

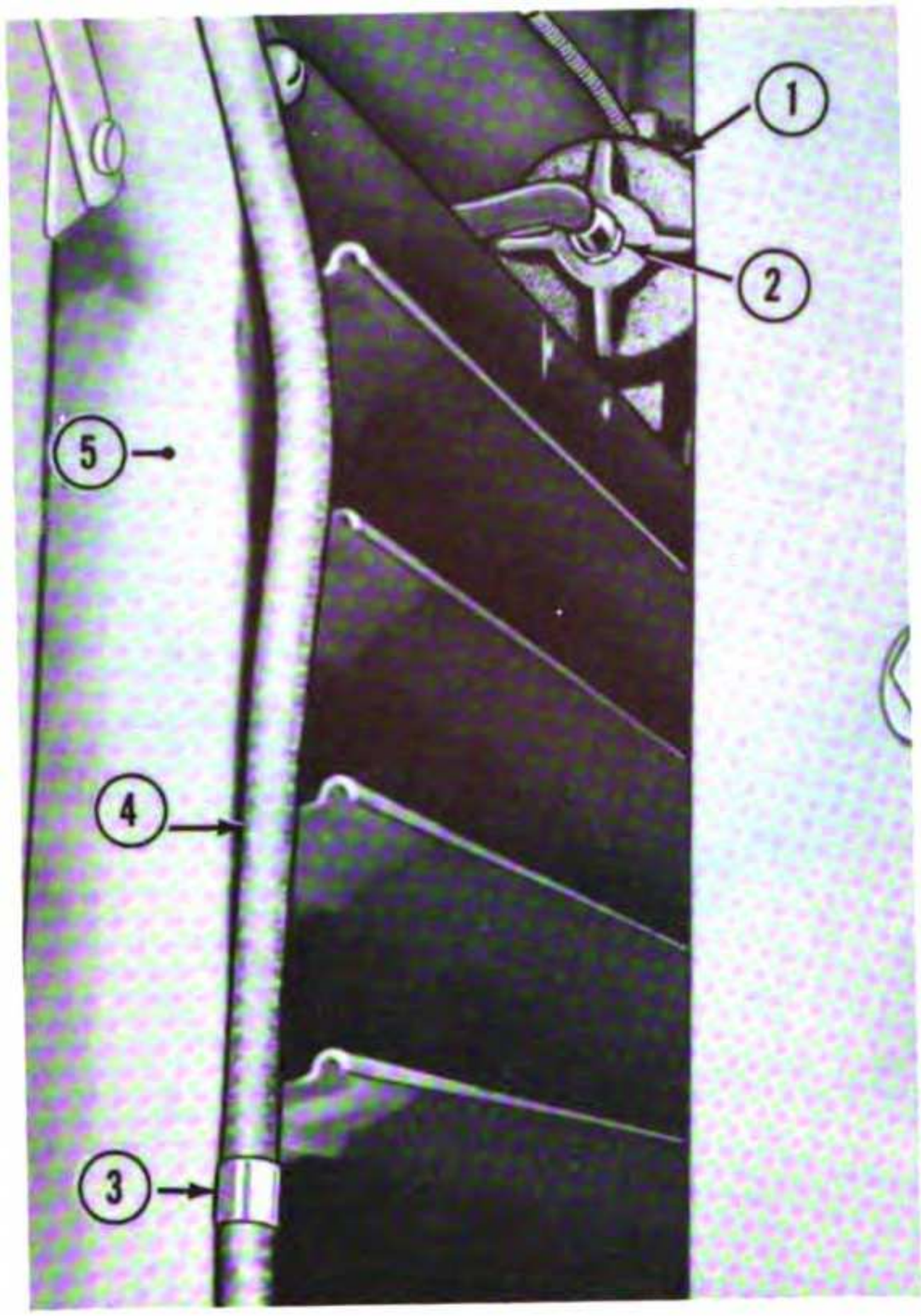
(4) *Connect oil line.* Connect oil line (4, fig. 154) to rear of radiator shutter cylinder (1) and tighten tube nut (2). Secure oil line to side of radiator shutter, using two clamps (3) and screws.

(5) *Test manual control.* Test operation of radiator shutter manual control by turning manual control clockwise and observing if vanes open.

(6) *Test automatic control.* Test operation of automatic control by starting engine (par. 41) and observing if vanes open when engine reaches normal operating temperature.

158. Radiator

a. Servicing. Flush cooling system ((1) and (2) below) to remove rust, scale, and sediment which clog water passages of the radiator prevent-



1 Cylinder
2 Tube nut
3 Clamp (2 rqr)
4 Oil line
5 Radiator shutter

Figure 154. Radiator shutter cylinder oil line.

ing proper dissipation of engine heat, resulting in overheating.

(1) *Flush cooling system.*

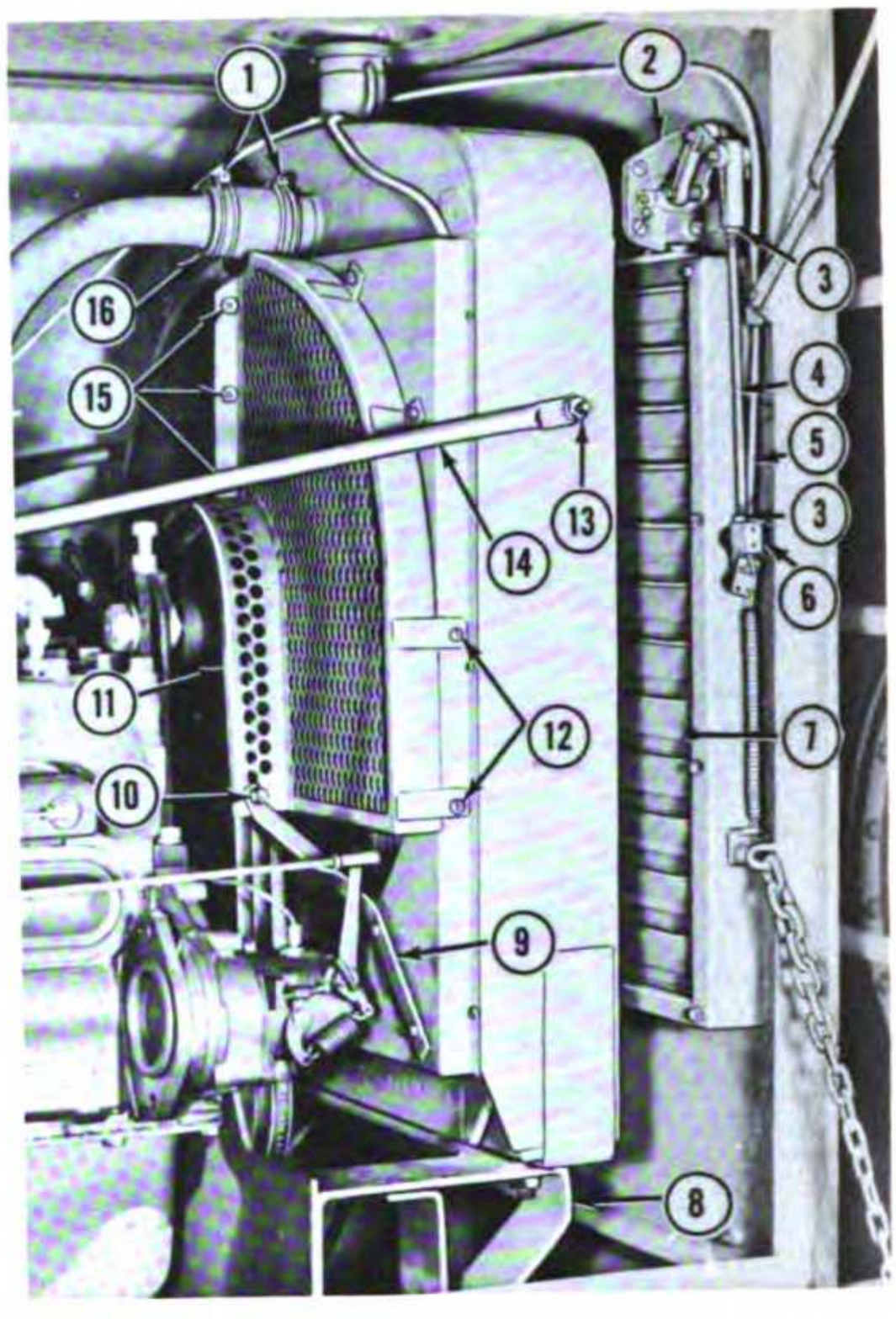
(*a*) Start engine (par. 41). Operate until normal operating temperature is reached to loosen sediment. Stop engine (par. 48).

(*b*) Drain cooling system by removing drain plug (6, fig. 153) from bottom of water pump.

Note. Engine must be level and radiator cap must be removed to drain the cooling system completely.

(*c*) Fill radiator with fresh water and operate engine simultaneously.

(*d*) When water drains clear, stop engine (par. 48), install drain plug, and refill cooling system with proper coolant.



1 Clamp, hose, 2⅜ ID (2 rqr)
2 Radiator shutter cylinder
3 Jam nut (2 rqr)
4 Pull rod
5 Manual control cable
6 Trunnion
7 Radiator shutter
8 Engine front support
9 Radiator bracket
10 Screw, cap, ¼–20 x ⅞
11 Fan guard, right side
12 Screw, ¼–20 x ½ (9 rqr)
13 Nut, hex, ⅜–16 (2 rqr)
14 Stabilizer rod (2 rqr)
15 Nut, hex, ¼–20 NC (3 rqr)
16 Hose, 2 ID x 3 lg

Figure 155. Radiator and radiator shutter installed, right side.

(*e*) If water does not drain clean, follow the procedures outlined below to reverse-flush the cooling system.

(2) *Reverse method of flushing.*

(*a*) Drain cooling system (*a*(1) (*b*) above). Remove thermostat (see engine manual).

(*b*) Install radiator cap.

(*c*) Remove water pump lower hose and radiator lower hose (*b*(2) below).

(*d*) Attach a lead-away hose to water pump inlet.

(*e*) Attach a hose to the radiator outlet and insert a water supply hose and air pressure line in the hose.

(*f*) Turn on the water, slowly at first, to fill the radiator.

(*g*) Turn on air pressure in short blasts to produce a pulsating action. Allow the radiator to fill with water between each blast.

Caution: Do not subject the radiator to pressure greater than 4 psi.

(*h*) Continue flushing until water from lead-away hose runs clear. Install hoses and thermostat. Refill cooling system with proper coolant.

(*i*) If the cooling system cannot be cleared of dirt and obstructions or if leaks are detected, remove the radiator (*b* below) for further inspection (*c* below).

b. Removal.

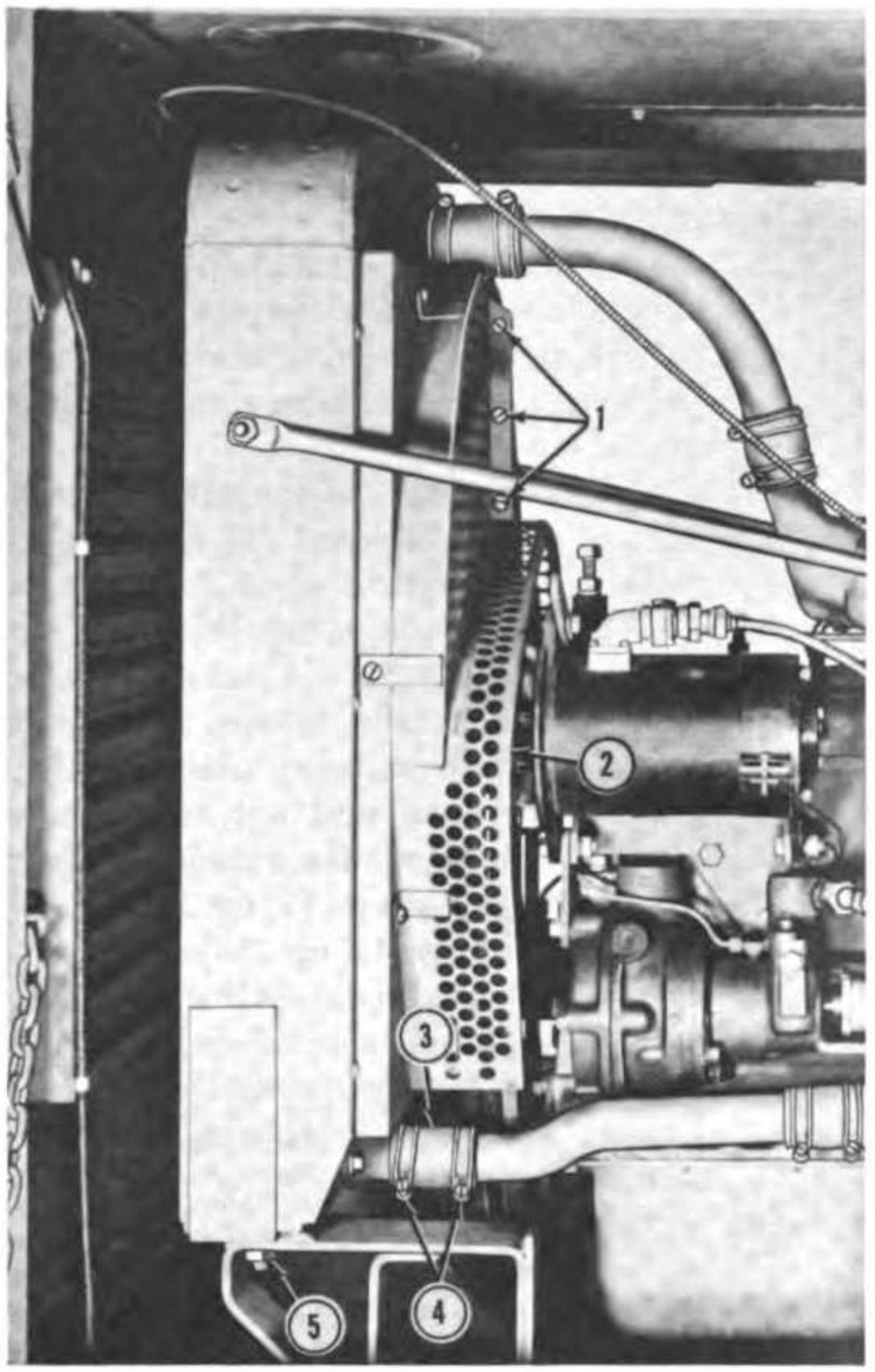
(1) *Drain cooling system.* Refer to *a*(1) (*b*) above.

(2) *Disconnect hoses.* Loosen hose clamps (1, fig. 155) and remove hose (16) from radiator inlet. Loosen hose clamps (4, fig. 156) and remove hose (3) from radiator outlet.

(3) *Remove stabilizer rods.* Remove nut (13, fig. 155) and lockwasher securing stabilizer rod (14) on each side of radiator. Loosen cap screws securing stabilizer rods on engine and swing aside stabilizer rods.

(4) *Remove fan guards.* Remove three nuts (15), lockwashers, and cap screws (1, fig. 156) securing two fan guards together. Remove nut, lockwasher, and cap screw (10, fig. 155) attaching bottom of right fan guard (11) to radiator bracket (9). Remove four screws (12) and lockwashers securing right fan guard to radiator and remove five screws and lockwashers securing left fan guard (2, fig. 156) to radiator, and remove fan guards.

(5) *Remove mounting nuts.* Remove two nuts (5) and lockwashers securing radiator on engine front support (8, fig. 155). Lift radiator to clear mounting studs and slide radiator on engine front support out the left side of the engine enclosure.



1 Screw, cap, ¼–20 NC x ½ (3 rqr)
2 Fan guard, left side
3 Hose, 1½ ID x 2½ lg
4 Clamp, hose, 1⅞ ID (2 rqr)
5 Nut, hex, ½–13 USS (2 rqr)

Figure 156. Radiator and radiator shutter installed, left side.

Caution: Radiator is heavy; do not bump fan or engine during radiator removal.

c. Cleaning and Inspection. Clean all foreign matter in the core between fins and tubes. Check radiator for leaks and unrestricted flow of water. To test for leaks, install fillercap, plug inlet and outlet and immerse radiator in a full tank of water. Apply air pressure to the overflow pipe. Bubbles present in the water indicate leaks. Remove radiator and remove fillercap and plugs. Replace radiator if leaks are indicated. To test radiator for unrestricted flow, fill radiator with

water under pressure (no more than 4 psi) and check output rate. An unrestricted radiator will allow 50 gallons of water per minute to pass through.

d. Installation.

(1) *Mount radiator.* Lift and slide radiator in engine enclosure on engine front support (8, fig. 155). Aline mounting studs and secure radiator, using two lockwashers and nuts (5, fig. 156).

(2) *Install fan guards.* Aline left fan guard (2) and right fan guard (11, fig. 155) on radiator and secure, using four screws (12) and lockwashers for the right fan guard and five screws and lockwashers for the left fan guard. Secure bottom of right fan guard with cap screw (10, fig. 155), lockwasher, and nut to radiator bracket (9). Secure fan guards together, using three cap screws (1, fig. 156), lockwashers and nuts (15, fig. 155).

(3) *Install stabilizer rods.* Aline stabilizer rod (14) on each side of radiator and secure with lockwasher and nut (13). Tighten cap screws securing stabilizer rods on engine.

(4) *Connect hoses.* Install hose (3, fig. 156) on radiator outlet and tighten hose clamps (4). Install hose (16, fig. 155) on radiator inlet and tighten hose clamps (1).

(5) *Fill cooling system.* Install drain plug (6, fig. 153) in bottom of water pump. Fill cooling system with proper antifreeze solution or clear water. Install fillercap.

159. Fan Drive Belts, Fan, and Fan Hub

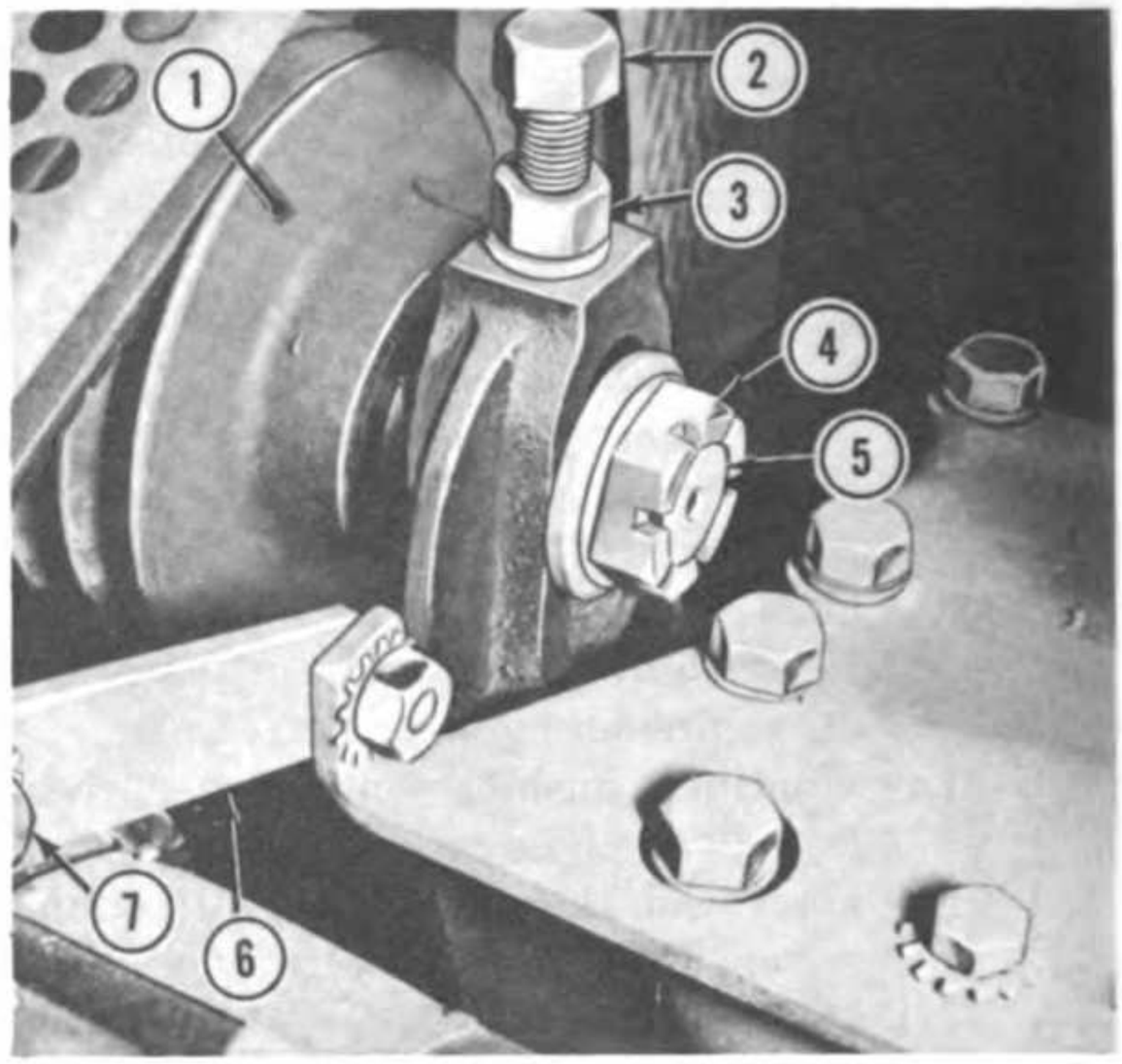
a. Fan Drive Belts.

(1) *Adjustment.*

(*a*) *Preliminary adjustment.* Loosen generator adjusting screw (7, fig. 157) on generator adjusting arm (6) and pivot generator on its mount so that finger pressure deflection on fan drive belts is approximately three-fourths of an inch midway between pulleys.

Caution: Do not pivot generator too far out or it will strike fan guard.

(*b*) *Final adjustment.* If tension on belt is not enough, loosen spindle nut (4) on spindle (5) and loosen locknut (3) on adjusting screw (2). Rotate adjusting screw counterclockwise to raise fan hub (1). Check belt deflection for proper tension and then tighten hex nut and locknut.



1 Fan hub
2 Adjusting screw
3 Locknut
4 Spindle nut
5 Spindle
6 Generator adjusting arm
7 Generator adjusting screw

Figure 157. Fan drive belts adjustment points.

(2) *Removal.* Loosen locknut (3) and spindle nut (4). Rotate adjusting screw (2) clockwise to lower fan hub (1). Loosen generator adjusting screw (7) on generator adjusting arm (6) and pivot generator towards engine. Remove three fan drive belts from fan-hub pulley, generator-drive pulley, and from crankshaft pulley.

(3) *Installation.*

Note. **If any one belt is damaged or worn, replace all three. Do not install new and old belts on the same pully.**

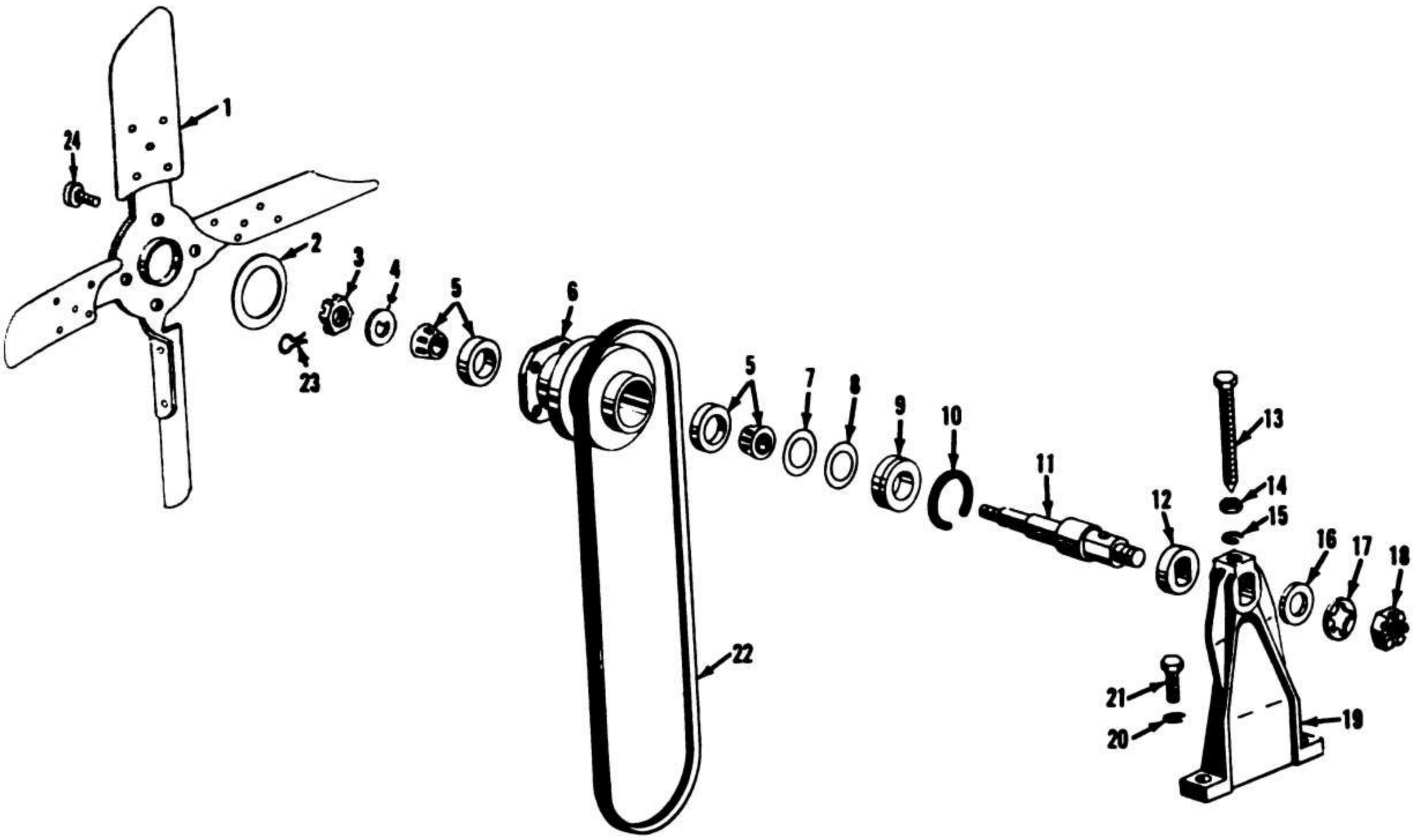
Assemble three fan drive belts around crankshaft pulley, fan-hub pulley, and generator-drive pulley. Adjust fan drive belts (*a*(1) above).

b. Fan and Fan Hub.

(1) *Removal.*

(*a*) *Remove fan guards.* Refer to paragraph 158*b*(4).

(*b*) *Remove fan.* Remove four cap screws with lockwashers (24, fig. 158) secur-



1 Fan
2 Gasket
3 Spindle nut
4 Special washer
5 Thrust bearing (2 rqr)
6 Fan hub
7 Gasket
8 Seal washer
9 Grease seal
10 Lock ring
11 Spindle
12 Clamp washer
13 Adjusting screw
14 Locknut, adjusting screw
15 Lockwasher, adjusting screw
16 Clamp washer
17 Internal tooth lockwasher
18 Spindle nut
19 Bracket
20 Lockwasher, ½ (2 rqr)
21 Screw, cap, ½–13 NC x 1½ lg (2 rqr)
22 Fan drive belt (Set of 3 rqr)
23 Pin, cotter, ⅛ x 1¼ lg
24 Screw, cap w/lockwasher (4 rqr)

Figure 158. Fan and fan hub, exploded view.

ing fan (1) to fan hub (6). Remove fan and gasket (2).

(*c*) *Remove fan hub.* Remove fan drive belts (22) (*a*(2) above). Remove spindle nut (18), lockwasher (17), and clamp washer (16) securing spindle (11) in bracket (19). Loosen locknut (14) and remove adjusting screw (13) with locknut and lockwasher (15) from bracket. Remove fan hub assembly and clamp washer (12) from bracket.

(*d*) *Disassemble fan hub.* Remove cotter pin (23), spindle nut (3), and special washer (4) from end of spindle (11) and tap spindle out of fan hub. Remove lock ring (10), grease seal (9), seal washer (8), and gasket (7) from fan hub.

(*e*) *Remove bracket.* Remove two cap screws (21) and lockwashers (20) securing bracket (19) on top of engine block and remove bracket.

(2) *Cleaning and inspection.* Wipe fan drive belts, grease seal, and gaskets with a cloth dampened in approved cleaning solvent. Wash fan, fan hub, fan guards, and all other parts in an approved cleaning solvent. Inspect thrust bearings for nicks, scores, and excessive wear. Replace worn or damaged fan drive belts. Discard old gaskets and grease seal. Replace cracked or otherwise damaged parts.

(3) *Installation.*

(*a*) *Install bracket.* Aline bracket (19) on top of engine block and secure, using

two lockwashers (20) and cap screws (21).

(*b*) *Assemble fan hub.* Press thrust bearings (5) into their respective bores of fan hub (6). Install gasket (7), seal washer (8), and grease seal (9) into bore of fan hub and secure with lock ring (10). Insert spindle (11) into fan hub and tap spindle until seated in thrust bearings. Secure spindle in fan hub with special washer (4), and spindle nut (3), and cotter pin (23).

(*c*) *Install fan hub.* Assemble clamp washer (12) on end of spindle and insert end of spindle through bracket (19). Install clamp washer (16), lockwasher (17), and spindle nut (18), securing spindle in bracket. Install lockwasher (15) and adjusting screw (13) with locknut (14) in top of bracket.

(*d*) *Install fan drive belts.* Install fan drive belts (22). Refer to *a*(3) above.

(*e*) *Install fan.* Aline gasket (2) and fan (1) on fan hub and secure, using four cap screws with lockwashers (24).

(*f*) *Install fan guards.* Refer to paragraph 158*d*(2).

160. Water Pump

a. Servicing.

(1) *Packing adjustment.* Tighten packing nut (10, fig. 159) only when water pump leaks.

Caution: Avoid overtightening; do not tighten packing nut more than two notches to stop leaks. Overtightening will score shaft and cause unnecessary wear on drive.

(2) *Repacking.* Replace packing when packing nut reaches limit of travel against packing. Use asbestos twine treated with graphite or molded split rings of asbestos and graphite for packing material. Back off packing nut (10); remove old packing and install new packing.

Caution: Examine water pump shaft for smoothness and proper alinement before repacking.

When installing the molded-split-ring type of packing, place joints between 120 and 180° apart to prevent a possible leak.

b. Removal.

(1) *Drain cooling system.* Remove drain plug (5, fig. 159) and drain cooling system (par. 158*a*(1)(*b*)).

(2) *Disconnect tachometer drive cable.* Loosen retaining nut (3) and disconnect tachometer drive cable (4) from tachometer adapter (2) at top of water pump.

(3) *Remove by-pass tube.* Loosen upper hose clamps (5, fig. 160) securing by-pass tube upper hose (2) to thermostat housing (1) and loosen lower hose clamps (5) securing by-pass tube lower hose (7) to water pump adapter (6). Remove by-pass tube (3) with upper and lower hoses.

(4) *Disconnect radiator outlet tube.* Loosen hose clamps (6, fig. 159) on hose (9) attaching radiator outlet tube (7) to water pump adapter. Slide hose back on outlet tube.

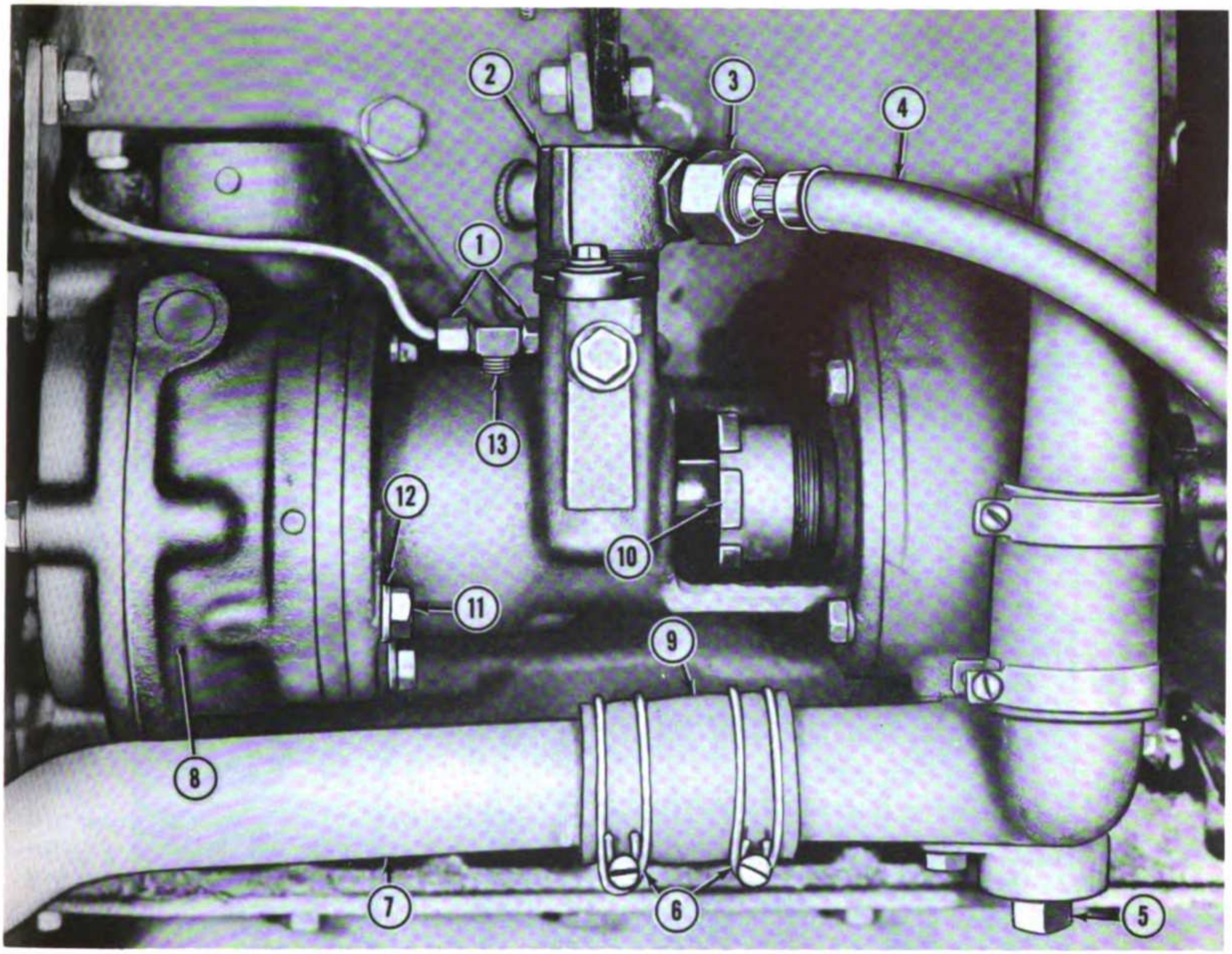
(5) *Disconnect oil lines.* Loosen retaining nuts (1) securing oil lines to tee fitting (13), on top of water pump, and disconnect oil lines.

(6) *Loosen water pump-to-engine hose.* Loosen hose clamps (5, fig. 160) securing hose (7) between water pump outlet and engine inlet.

(7) *Disconnect magneto coupling.* Disconnect magneto coupling (4) to provide clearance for water pump and magneto drive shaft (par. 175*b*(4) and (5)).

(8) *Remove mounting screws.* Remove three cap screws (11, fig. 159) and lockwashers (12) securing water pump on water pump and magneto drive assembly (8). Slide water pump towards magneto and remove water pump with water pump adapter from engine.

c. Cleaning and Inspection. Clean water pump and water pump adapter with an approved cleaning solvent. Inspect hoses for deterioration. Inspect by-pass tube for corrosion and damage. Inspect water pump and adapter for cracks, signs of leaks, and other damage. Adjust packing (*a*(1) above) or repack water pump (*a*(2) above), if necessary. Replace damaged or defective water pump.



1 Retaining nut
2 Tachometer adapter
3 Retaining nut
4 Tachometer drive cable
5 Drain plug
6 Clamp, hose, 1⅞ ID (2 rqr)
7 Radiator outlet tube
8 Water pump and magneto drive assembly
9 Hose, 1½ x 2½ lg
10 Packing nut
11 Screw, cap, ⅜–16 x 1⅜ (3 rqr)
12 Lockwasher, ⅜ inch std 3 (rqr)
13 Tee fitting

Figure 159. Water pump installed.

d. Installation.

(1) *Mount water pump.* Aline water pump on water pump and magneto drive assembly (8), making certain driven gear meshes with drive gear and secure, using three lockwashers (12) and cap screws (11).

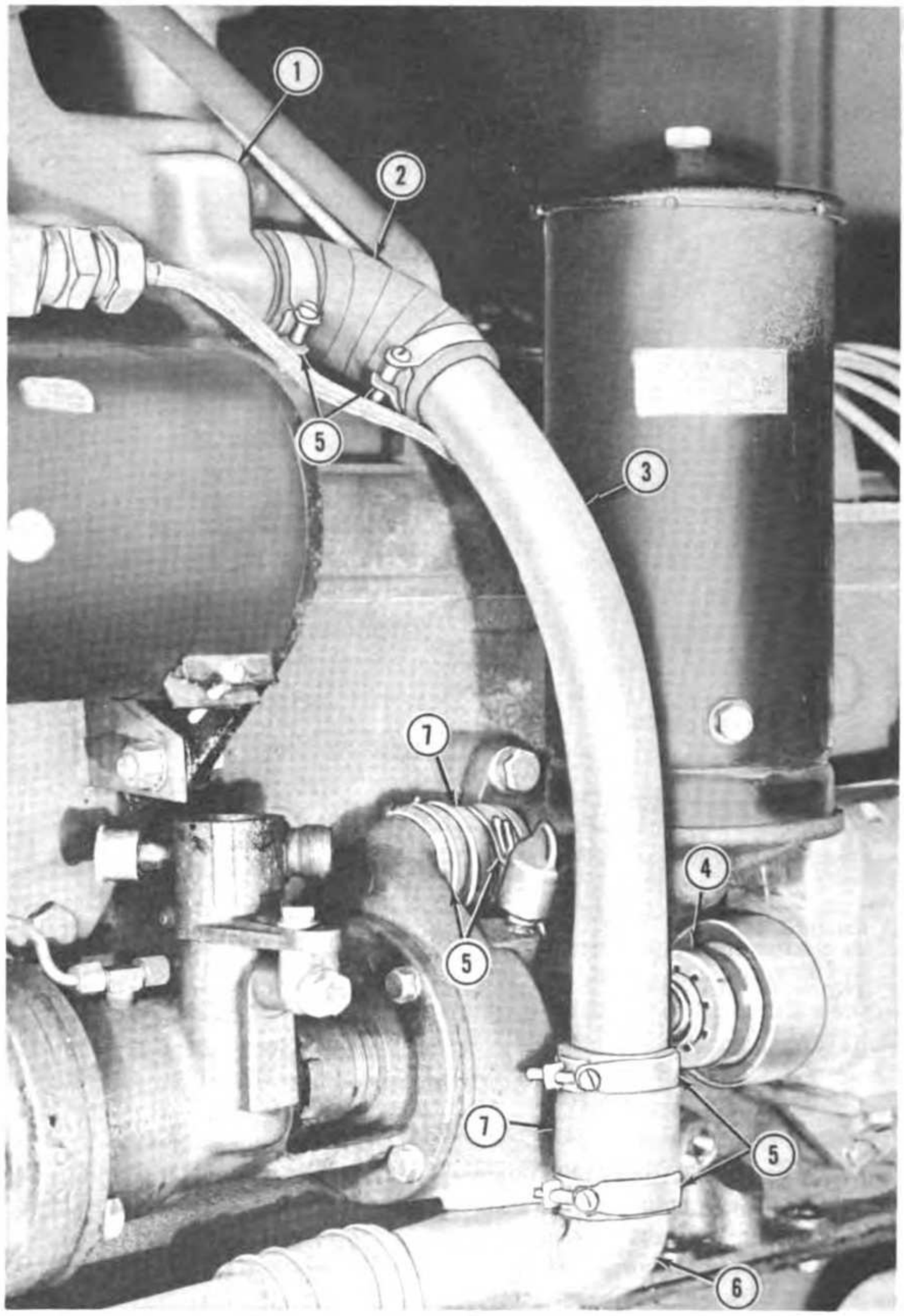
(2) *Connect magneto coupling.* Connect magneto coupling and time magneto to engine (par. 175*d*).

(3) *Connect water pump-to-engine hose.* Assemble hose (7, fig. 160) between water pump outlet and engine inlet and tighten hose clamps (5).

(4) *Connect oil lines.* Connect oil lines to tee fitting (13, fig. 159), on top of water pump, and tighten retaining nuts (1).

(5) *Connect radiator outlet tube.* Slide hose (9) on water pump adapter inlet and tighten hose clamps (6).

(6) *Install by-pass tube.* Aline by-pass tube (3, fig. 160) between thermostat housing (1) and water pump adapter (6). Slip hose (2) on thermostat housing inlet and tighten hose clamps (5). Slip hose (7) on water pump adapter outlet and tighten hose clamps (5).



1 Thermostat housing
2 Hose, 1½ ID x 4 lg
3 By-pass tube
4 Magneto coupling
5 Clamp, hose, 1⅞ ID (6 rpr)
6 Water pump adapter
7 Hose, 1½ ID x 2½ lg (2 rqr)

Figure 160. Coolant by-pass tube installed.

(7) *Connect tachometer drive cable.* Insert tachometer drive cable (4, fig. 159) in tachometer adapter (2) and tighten retaining nut (3).

(8) *Fill cooling sytem.* Install drain plug (5) and fill cooling system with proper antifreeze compound or clear water. Lubricate water pump (LO 5–9128–1).

(9) *Check for leaks.* Start engine (par. 41) and inspect water pump, hose by-pass tube, and connections for leaks. Check tachometer and hour-meter for proper operation. Inspect oil lines and fittings for leaks. After checks are made, stop engine (par. 48), and correct all leaks.

Section XIV. FUEL SYSTEM

161. Description

The fuel system consists of a 55-gallon fuel tank tank (fig. 161), a diaphragm-type fuel pump, an updraft-type carburetor, an engine primer, an air cleaner, and connecting fuel lines and hoses. A flyball-type governor controls maximum rpm of the engine by restricting fuel intake. The front and rear heater receive fuel from the same system.

162. Servicing Fuel System

a. Drain Fuel System. Place a suitable safety container below fuel tank. Open draincock (2, fig. 162), at bottom of fuel tank, and drain fuel system.

Warning: Observe all safety precautions when handling gasoline to prevent fires and explosions.

b. Fill Fuel System. Close draincock (2) at bottom of fuel tank. Remove fuel tank fillercap (1). Insert fuel supply hose into filler neck and ground fuel supply nozzle. Fill fuel tank with 55 gallons of gasoline. Install fillercap.

c. Clean Fuel Filter Bowl. To remove fuel filter bowl (9, fig. 163), loosen star nut (8) and swing aside bail (10). Remove fuel filter bowl, gasket, and screen. Clean fuel filter bowl with an approved cleaning solvent and wipe dry. Clean screen with an approved cleaning solvent and dry with compressed air.

Caution: Do not use a cloth to dry screen. Lint will cling to screen and will result in obstructed fuel flow.

163. Air Cleaner

a. Removal. Loosen clamps (1, fig. 164) securing tube elbow (2) on air cleaner outlet. Loosen hose clamps (5) securing hose (4) on carburetor

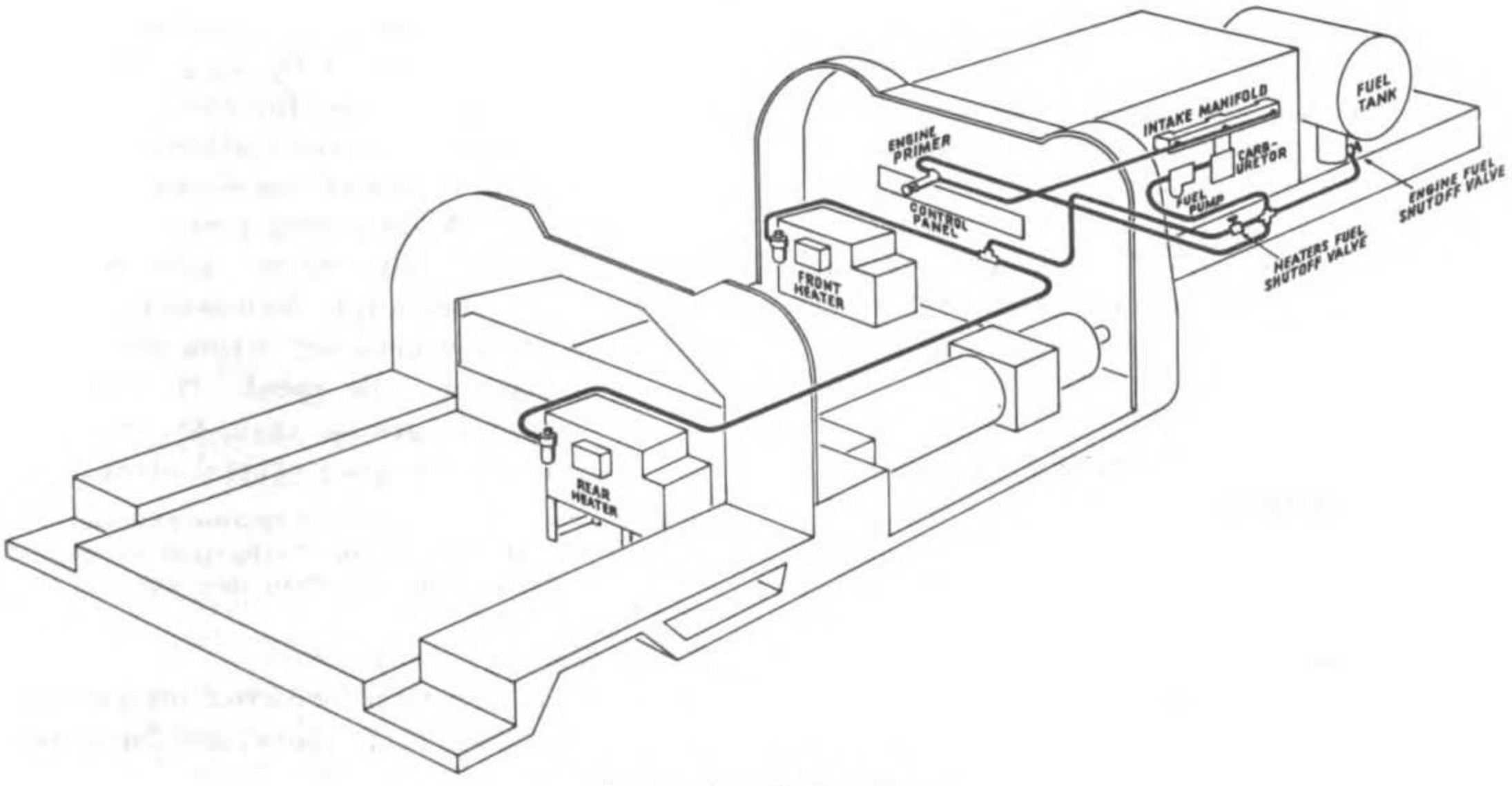
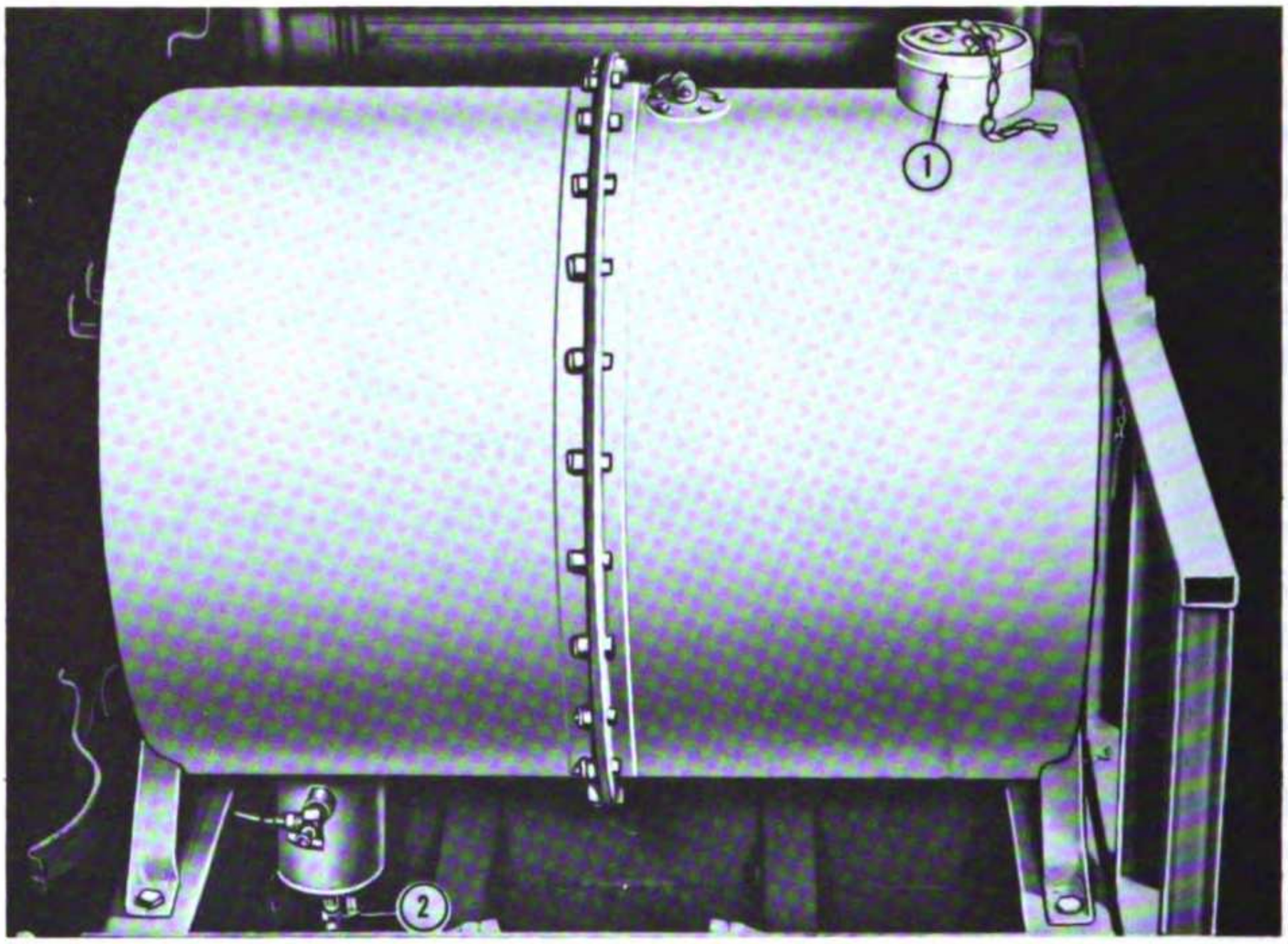


Figure 161. Fuel system.



1 Filler cap 2 Draincock

Figure 162. Fuel tank installed.

air inlet. Remove tube with hoses, tube elbow, and clamps. Remove nut (8) and bolt (7) securing band (6) around air cleaner. Spread band and remove air cleaner.

b. Cleaning and Inspection. Refer to paragraph 77*e* for cleaning and inspection of air cleaner reservoir.

c. Installation. Aline air cleaner in band (6) and squeeze band around air cleaner. Install and tighten bolt (7) and nut (8). Assemble tube (3) with hose (4) and tube elbow (2) between air cleaner outlet and carburetor air inlet. Tighten clamps (1 and 5) to insure an airtight connection.

164. Carburetor

a. Adjustments.

(1) *Idle speed adjustment.*

(*a*) Start engine (par. 41).

Note. Allow engine to reach normal operating temperature before making any carburetor adjustments.

(*b*) Make certain choke-control handle (11, fig. 40) and throttle-control handle (6) are pushed in.

(*c*) Turn in idle speed adjustment screw (16, fig. 165) to increase engine rpm, and back out idle speed adjustment screw to decrease engine rpm. Engine idle speed is between 400 and 425 rpm.

(2) *Idle mixture adjustment.*

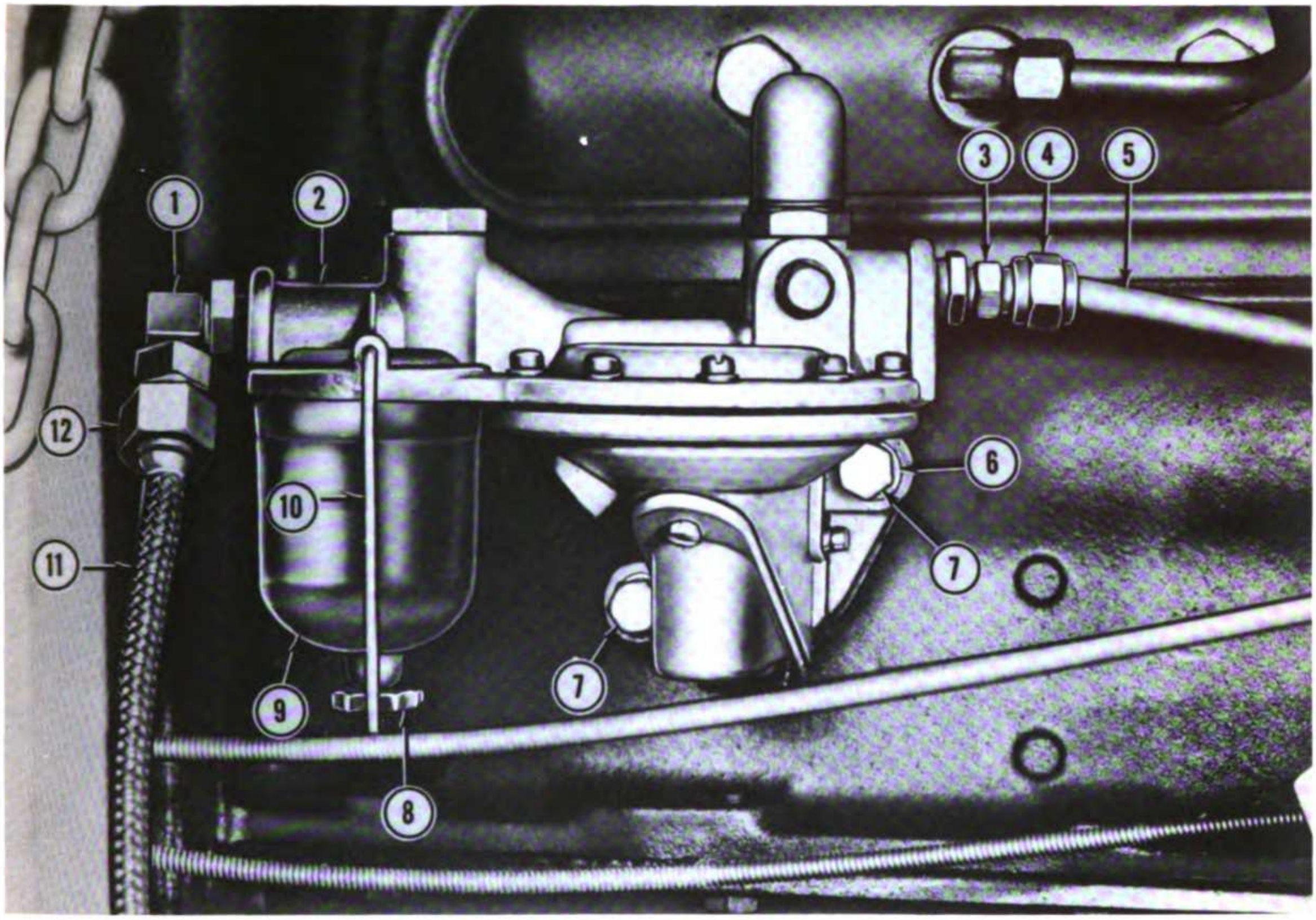
(*a*) Turn in idle mixture adjustment screw (6) until it is fully seated and then, back out screw one full turn.

(*b*) Turn in idle mixture adjustment screw in increments of one-eighth of a full turn. Allow engine rpm to level off before turning screw. Turn in screw until engine rpm decreases, then back out screw until engine rpm increases to maximum idle speed. If maximum speed is greater than 425 rpm, readjust idle speed ((1)(*c*) above).

Note. Normal idle mixture adjustment is obtained with the idle mixture adjustment screw backed out about three-quarters of a full turn.

(3) *High speed adjustment.*

(*a*) Set carburetor for correct idle speed adjustment (*a*(1) above) and for correct idle mixture (*a*(2) above).



1 Elbow, street, ⅛ PT
2 Fuel filter
3 Connector, male, ¼ x ⅛ PT
4 Retaining nut
5 Fuel pump-to-carburetor fuel line
6 Lockwasher, 5/16 inch std (2 rqr)
7 Screw, cap, 5/16–18 x 1 (2 rqr)
8 Star nut
9 Fuel filter bowl
10 Bail
11 Fuel pump inlet line
12 Retaining nut

Figure 163. Fuel pump installed.

(*b*) Pull out throttle control handle (6, fig. 40) one-quarter of full travel.

(*c*) Loosen packing nut (10, fig. 165).

(*d*) Turn high-speed adjustment screw (9) clockwise. This will restrict the carburetor main jet causing a lean fuel-air mixture which when excessive, will be indicated by misfiring, loss of engine power, and frequent stalling.

(*e*) Then, turn high-speed fuel-air mixture adjustment screw counterclockwise. This will open the carburetor pump-main jet causing rich fuel-air mixture which, when excessive, will be indicated by rough engine operation, engine exhausting black smoke, and surging.

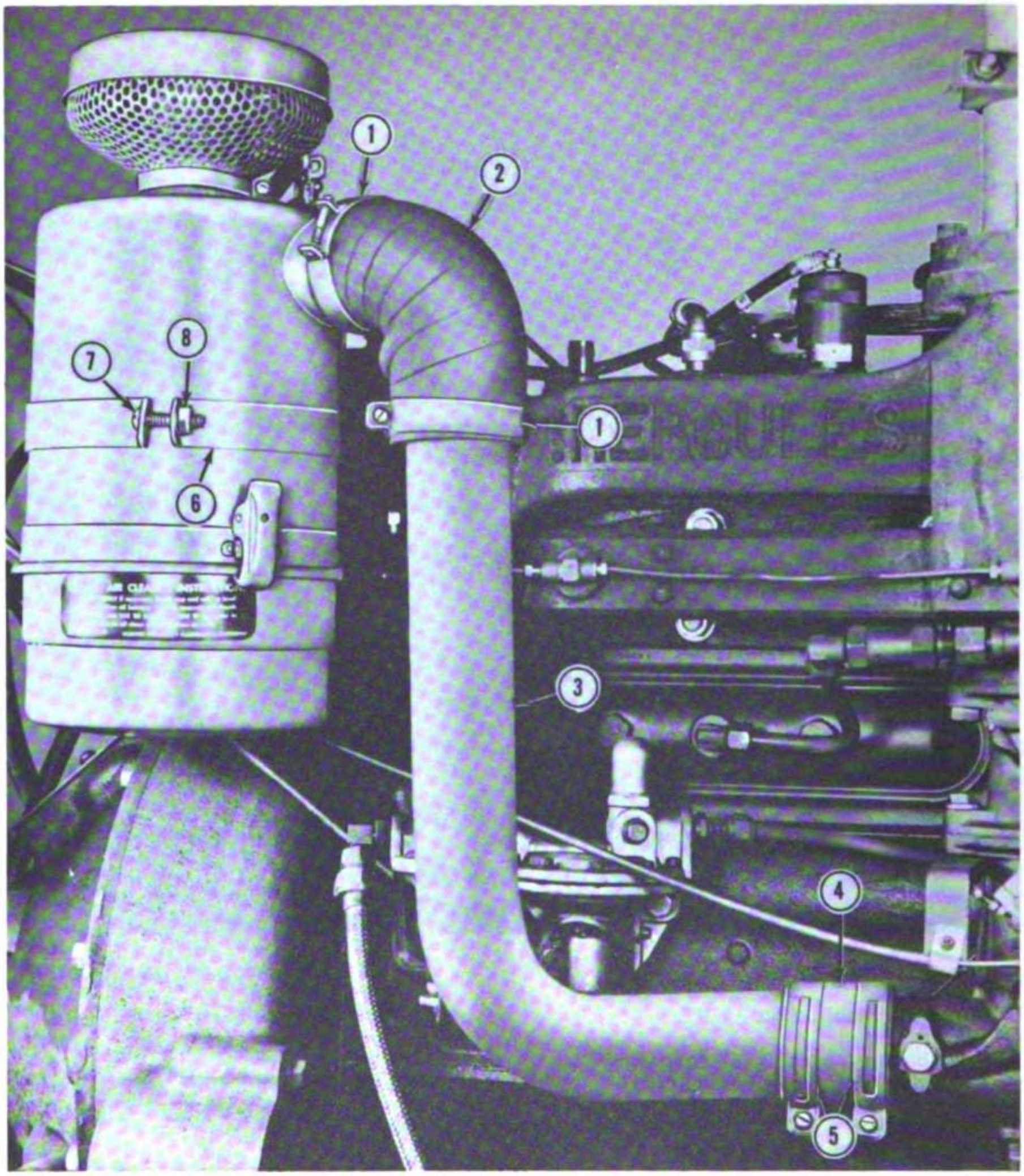
(*f*) At a point between an excessively rich and an excessively lean fuel-air mixture the engine will operate smoothly at the speed set by the throttle control handle (*b* above). At this point, hold high-speed adjustment screw and tighten packing nut.

(*g*) Check high-speed fuel-air mixture adjustment by restricting the carburetor air inlet. Pull out choke control handle gradually and observe tachometer. A slight increase in engine speed indicates a lean fuel-air mixture. Readjust high-speed adjustment screw.

b. Removal.

(1) Close engine fuel shutoff valve (fig. 41).

(2) Loosen retaining nut (4, fig. 165) securing fuel inlet line (3) to fitting (5) and lay aside fuel inlet line.



1 Clamp, flat type, 2⅝ ID (2 rqr)
2 Tube elbow
3 Tube
4 Hose, 2 ID x 2 lg
5 Clamp, hose, flat type, 2⅜ ID (2 rqr)
6 Band
7 Bolt stove, 5/16–18 x 1¼
8 Nut, square, No. 10–24 NC

Figure 164. Engine air cleaner installed.

(3) Loosen screw (8) securing throttle control cable (14) in throttle valve arm (7). Loosen screw (15) and clamp securing throttle control cable to bracket (17) and pull throttle control cable back. Coil and tape cable to prevent damage.

(4) Loosen screw securing choke control cable on choke valve arm and pull choke control cable back. Coil and tape cable to prevent damage.

Note. The choke valve arm is located on the inner side of the carburetor.

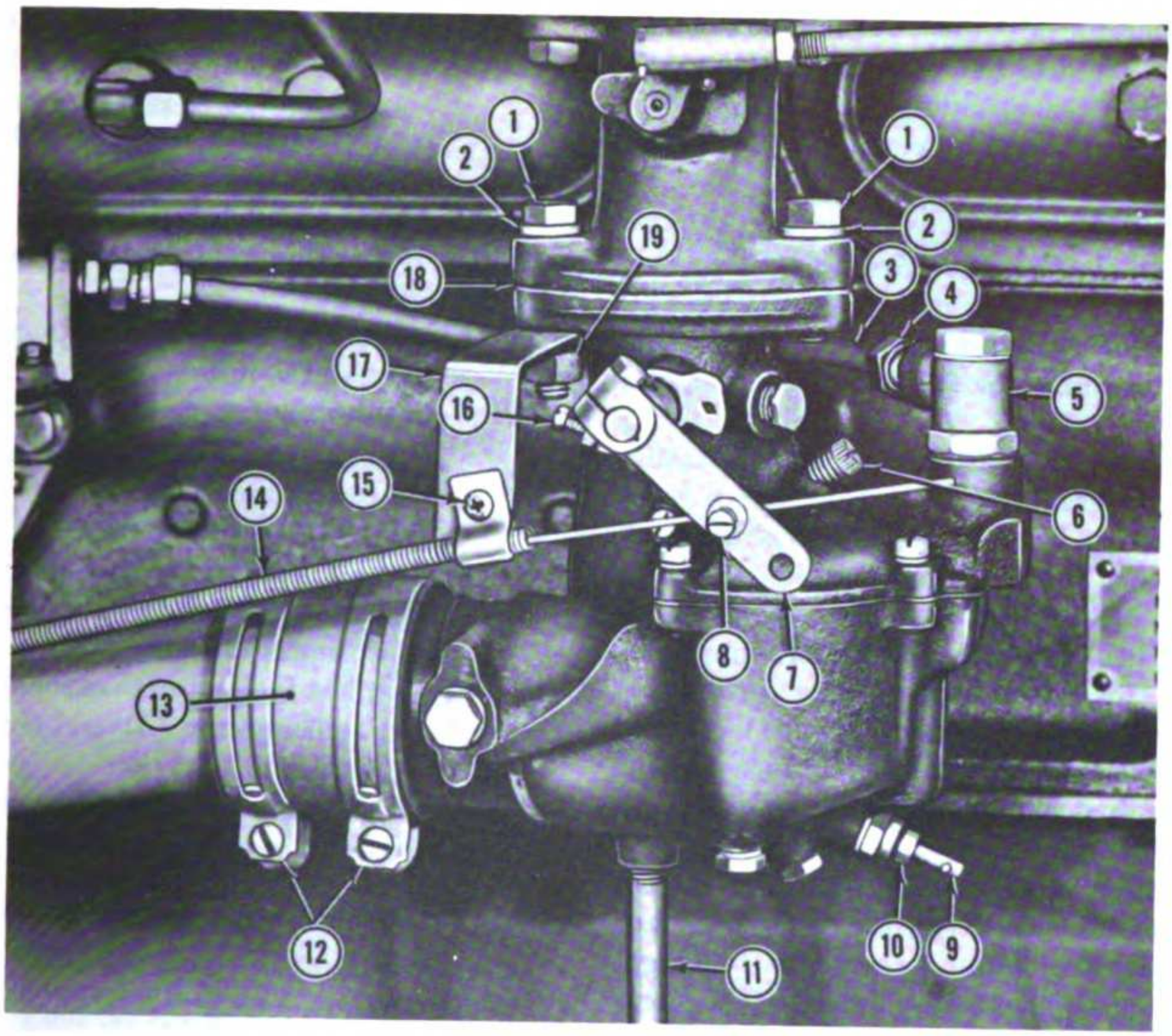
(5) Loosen hose clamps (12), securing hose (13) on carburetor air inlet and slide hose and clamps back on tube.

(6) Unscrew overflow pipe (11) from bottom of carburetor.

(7) Remove nut (19), two screws (1), and lockwashers (2) securing carburetor to intake manifold and remove bracket (17), carburetor, and gasket (18) from mounting flange. Discard gasket.

c. Installation.

(1) Aline new gasket (18) on carburetor mounting flange.



1 Screw, cap, ⅜–16 x 1¾ (2 rqr)
2 Lockwasher, ⅜ inch std (2 rqr)
3 Fuel inlet line
4 Retaining nut
5 Fitting
6 Idle mixture adjusting screw
7 Throttle valve arm
8 Screw, throttle cable
9 High speed adjustment screw
10 Packing nut
11 Overflow pipe
12 Clamp, hose, flat type, 2⅜ ID (2 rqr)
13 Hose, 2 ID x 2 lg
14 Throttle control cable
15 Screw, throttle cable
16 Idle speed adjustment screw
17 Bracket
18 Gasket
19 Nut, hex, ⅜–16

Figure 165. Carburetor installed.

Note. Make certain mounting surfaces on carburetor and on intake manifold are clean of old gasket.

Aline gasket and carburetor under intake manifold flange and install lockwasher (2) and screw (1) in front hole of flange. Aline bracket (17) under rear hole of carburetor mounting flange; install lockwasher (2) and screw (1) through rear hole of flange and through bracket and install nut (19).

(2) Remove tape, and uncoil choke control cable. Attach cable to choke valve arm and tighten screw. Make certain choke valve is fully open and choke control handle (11, fig. 40) is pushed in before tightening screw.

(3) Slide hose (13, fig. 165) with hose clamps (12) over carburetor air inlet and tighten hose clamps.

(4) Remove tape, and uncoil throttle control cable (14). Secure cable to bracket by tightening screw (15). Attach cable to throttle valve arm (7) and tighten screw (8). Make certain throttle valve is fully open and throttle control handle (6, fig. 40) is pushed in before tightening screw.

(5) Connect fuel inlet line (3, fig. 165) to fitting (5) and tighten retaining nut (4).

(6) Screw overflow pipe (11) in bottom of carburetor.

(7) Open engine fuel shutoff valve (fig. 41). Start engine (par. 41) and check fuel inlet line for leaks; check mounting and

carburetor air inlet for air leaks. If leaks are detected, stop engine (par. 48) and tighten retaining nut (4, fig. 165), screws (1), and hose clamps (12).

165. Fuel Pump

a. Test Fuel Pump Before Removal.

(1) Loosen retaining nut (4, fig. 163) securing fuel pump-to-carburetor fuel line (5) to connector (3) and disconnect fuel line.

(2) Push in starting motor control (2, fig. 42) to crank engine. Fuel pump is in good condition if large spurts of gasoline are forced from the fuel pump. If the fuel pump does not deliver large spurts of gasoline, check fuel pump inlet line for restrictions. Make certain engine fuel shutoff valve (fig. 41) is open. If fuel line is free of restrictions and engine fuel shutoff valve is open, replace fuel pump (*b*, *c*, and *d* below).

(3) Connect fuel pump-to-carburetor fuel line and crank engine. If carburetor floods, fuel pump pressure is too high. For a quick remedy, remove fuel pump (*b* below) and add another gasket between fuel pump mounting flange and engine crankcase. Install fuel pump (*c* below). If adding another gasket does not remedy the fuel pump high pressure, replace defective fuel pump.

b. Removal.

(1) Close engine fuel shutoff valve (fig. 41).

(2) Disconnect fuel pump-to-carburetor fuel line (*a*(1) above).

(3) Loosen retaining nut (12, fig. 163) and disconnect fuel pump inlet line (11) from elbow (1) of fuel filter (2). Tie inlet line in an upright position to prevent loss of gasoline.

(4) Remove two screws (7) and lockwashers (6) securing fuel pump to engine crankcase and carefully remove fuel pump with fuel filter and gasket. Discard gasket.

c. Test Fuel Pump Before Installation.

(1) Untie fuel pump inlet line (11) and connect inlet line to elbow (1) of fuel filter (2). Tighten retaining nut (12).

(2) Hold fuel pump on opened door of engine enclosure and operate rocker arm by hand. After fuel filter bowl fills, gasoline should spurt from fuel pump outlet.

Note. Operate rocker arm with short strokes. from one-quarter to one-half inch at tip of rocker arm.

If fuel pump does not deliver large spurts of gasoline, replace defective fuel pump.

d. Installation.

(1) Aline new gasket on fuel pump mounting flange and insert rocker arm in engine crankcase opening.

Note. Make certain camshaft eccentric does not contact rocker arm. If it does, crank engine one complete revolution.

(2) Install and tighten two lockwashers (6) and two screws (7) securing fuel pump to engine crankcase.

(3) Connect fuel pump to carburetor fuel line (5) to connector (3) and tighten retaining nut (4).

(4) Open engine fuel shutoff valve (fig. 41) if engine is to be operated.

166. Primer Pump and Primer Fuel Lines

a. Removal.

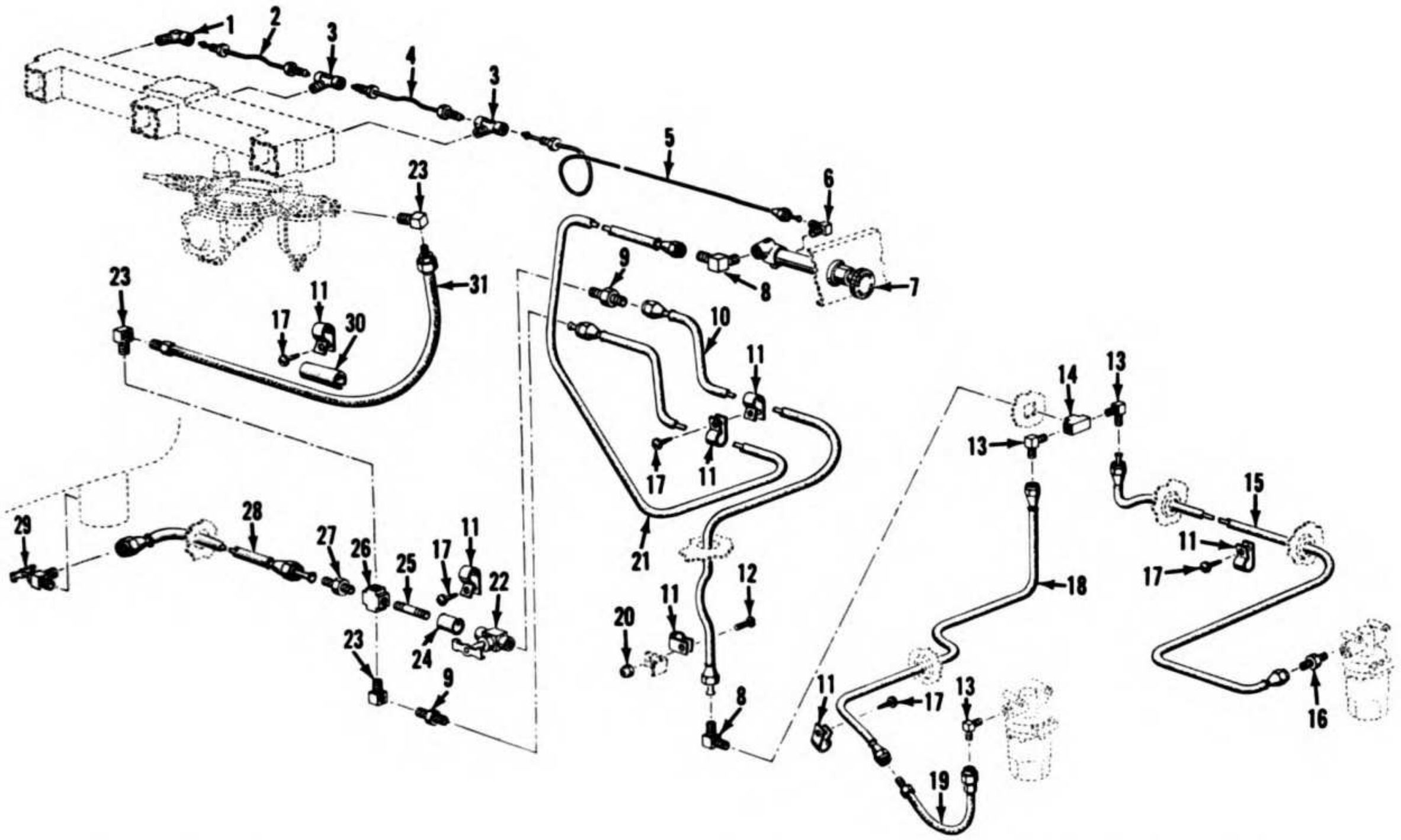
(1) *Remove primer pump.* Close engine fuel shutoff valve (fig. 41). Loosen flared fitting securing fuel line (21, fig. 166) to male elbow (8) on primer pump (7) and disconnect fuel line. Loosen flared fitting securing primer-to-intake manifold line (5) to male elbow (6) and disconnect line. Remove primer pump from control panel (par. 178*b*(2)).

(2) Remove primer fuel lines.

(a) *Remove inlet line.* Loosen flared fitting on opposite end of fuel line (21) and disconnect fuel line from male connector (9). Male connector is located on engine right support member. Remove screw (17) and clamp (11) securing fuel line to front bulkhead and remove fuel line.

(*b*) *Remove outlet lines.* Loosen flared fittings on ends of primer lines (2, 4, and 5) and remove primer lines from two tees (3) and from primer line elbow (1) on intake manifold.

b. Cleaning and Inspection. Clean all parts of primer pump and fuel lines with an approved cleaning solvent. Blow out and dry fuel lines



1 Primer line elbow
2 Primer line w/fittings
3 Primer line tee (2 rqr)
4 Primer line w/fittings
5 Primer-to-intake manifold line w/fittings
6 Elbow, male, 1/8 x 1/8 PT
7 Primer pump
8 Elbow, male, flared fitting, 1/4 x 1/8 PT
9 Connector, male, 1/4 x 1/8 PT
10 Fuel line, loom covered w/fittings, 1/4 OD x 65 lg
11 Clamp, fuel line (7 rqr)
12 Screw, mach, 8–32 x 3/8
13 Tlbow, male, flared fitting, 3/16 x 1/8 PT (3 rqr)
14 Tee, 1/8 pipe
15 Fuel line, loom covered w/ fittings, 3/16 OD x 168 lg
16 Connector, male, flared fitting, 3/16 x 1/8 PT
17 Screw, sheet metal, rd hd, No. 7 x 1/2 lg (5 rqr)
18 Fuel line, loom covered w/ fittings, 3/16 OD x 78 lg
19 Hose assembly
20 Nut, hex, 8–32
21 Fuel line, loom covered w/fittings, 1/4 OD x 86 lg
22 Heater fuel shutoff valve
23 Elbow, street, flared, 1/8 PT (3 rqr)
24 Loom, 3/8 ID x 1 1/2 lg
25 Nipple, 1/8 x 1 1/2 lg
26 Cross, 1/8 pipe
27 Connector, male, flared, 5/16 x 1/8 PT
28 Fuel line, loom covered w/ fittings, 5/16 OD x 68 lg
29 Engine fuel shutoff valve
30 Hose, 5/16 x 2 1/2 lg
31 Hose assembly, 3/16 OD x 25 lg

Figure 166. Fuel lines and related parts of fuel system, partially exploded view.

with compressed air. Inspect fuel lines for cuts, breaks, and frayed or damaged looms. Inspect fittings, elbows, and tees for stripped or crossed threads. Replace all defective parts.

Note. **Do not disassemble fuel lines unless fittings, loom, or copper tubing are damaged.**

c. Installation.

(1) *Install primer pump.* Install primer pump in control panel (par. 178*d*(11)).

(2) *Install primer fuel lines.*

(*a*) *Install inlet line.* Connect one end of fuel line (21) to male elbow (8) on primer pump (7) and tighten flared fitting. Connect opposite end of primer line to male connector (9) and tighten flared fittings. Secure primer line to front bulkhead with clamp (11) and screw (17).

(*b*) *Install outlet lines.* Connect one end of primer line (5) to male elbow (6) on primer pump and tighten flared fitting. Connect opposite end of primer line (5) to tee (3). Connect primer line (4) between two tees (3). Connect primer line (2) between primer line elbow, (1) and tee (3). Tighten all flared fittings.

167. Engine Fuel Lines

a. Removal.

(1) *Remove fuel pump inlet line.* Close engine fuel shutoff valve (fig. 41). Loosen flared fittings at both ends of hose assembly (31, fig. 166). Remove screw (17), clamp (11), and hose (30) securing hose assembly to front bulkhead. Remove hose assembly from between two street elbows (23).

(2) *Remove fuel tank outlet line.* Loosen flared fitting securing fuel line (28) to male connector (27) on cross (26). Loosen flared fitting securing opposite end of fuel line to engine fuel shutoff valve (29).

(3) *Remove engine fuel shutoff valve.* Unscrew engine fuel shutoff valve (29) from sediment trap at bottom of fuel tank.

b. Cleaning and Inspection. Clean fuel lines and fuel shutoff valve with an approved cleaning solvent. Blow out and dry fuel lines with compressed air. Inspect fuel shutoff valve for damage and ease of operation. Inspect all fuel lines for damage. Replace defective parts.

c. Installation.

(1) *Install engine fuel shutoff valve.* Screw engine fuel shutoff valve (29) in sediment trap at bottom of fuel tank.

(2) *Install fuel tank outlet line.* Connect one end of fuel line (28) to fuel shutoff valve and the opposite end to male connector (27) on cross (26). Tighten flared fittings.

(3) *Install fuel pump inlet line.* Connect one end of hose assembly (31) to street elbow (23) at top of cross and the opposite end to street elbow (23) in side of fuel pump filter. Tighten flared fittings. Install hose (30) around hose assembly (31) and secure to front bulkhead, using clamp (11) and screw (17).

168. Heater Fuel Lines

a. Removal.

(1) *Remove rear heater fuel line.* Loosen flared fittings securing fuel line (15) to male connector (16) in side of heater fuel filter. Loosen flared fittings securing opposite end of fuel line to male elbow (13) to tee (14), located on crossframe of semitrailer, and remove fuel line. Remove screw (17) and clamp (11) securing fuel line to shop body and remove fuel line.

(2) *Remove front heater fuel line.* Loosen flared fitting securing fuel line (18) to male elbow (13) in side of front heater fuel filter. Loosen flared fitting securing opposite end of fuel line to male elbow (13) in tee (14). Remove screw (17) and clamp (11) securing fuel line to front bulkhead and remove fuel line with hose assembly (19).

(3) *Remove heater fuel shutoff valve and outlet line.* Loosen flared fitting securing fuel line (10) to male elbow (8) on tee (14). Loosen flared fitting securing opposite end of fuel line to male connector (9) in heater fuel shut-off valve (22). Remove nut (20), screw (12), and two clamps (11) securing fuel line to front bulkhead and remove fuel line. Unscrew heater fuel shutoff valve with male connector from nipple (25) in cross (26). Remove screw (17) and clamp (11) securing nipple and cross to engine right support member. Remove cross with nipple, loom (24), and male connector (27).

b. Cleaning and Inspection. Refer to paragraph 167*b* for cleaning and inspection of fuel shutoff valve, lines, and fittings.

c. Installation.

(1) *Install heater fuel shutoff valve and outlet line.* Aline cross (26) with male connector (27), nipple (25), and loom (24) on engine right support member and secure, using clamp (11) and screw (17). Screw heater fuel shutoff valve (22) with male connector (9) on nipple. Connect one end of fuel line (10) to male connector and the opposite end to male elbow (8) in tee (14). Tighten flared fittings.

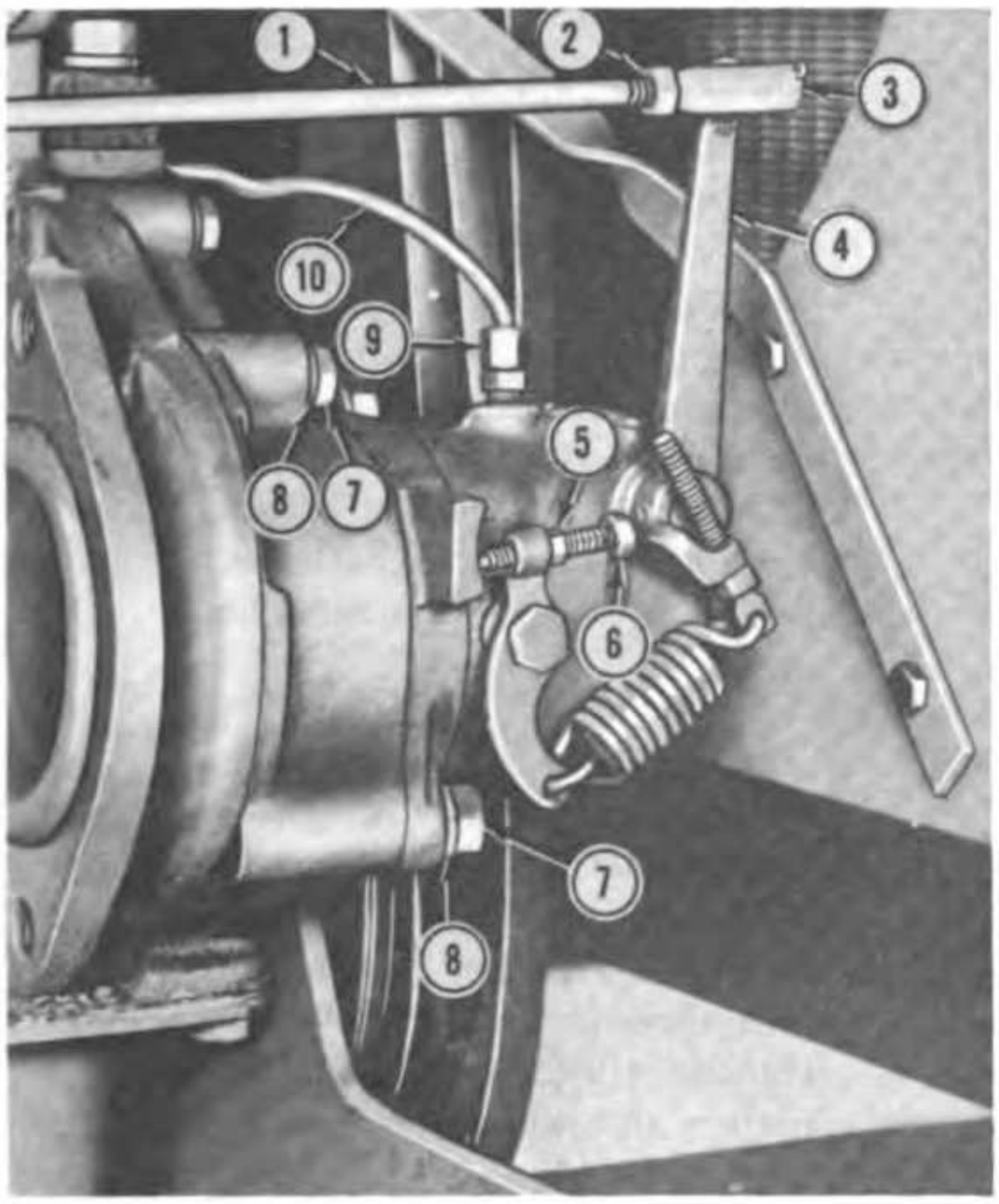
(2) *Install front heater fuel line.* Connect fuel line (18) to male elbow (13) inside of tee (14). Connect hose assembly (19) to opposite end of fuel line and to male elbow (13) inside of front heater fuel filter. Tighten flared fittings. Secure fuel line to front bulkhead with clamp (11) and screw (17).

(3) *Install rear heater fuel line.* Connect one end of fuel line (15) to male elbow (13) in side of tee (14). Connect opposite end of fuel line to male connector (16) in side of rear heater fuel filter. Tighten flared fittings. Secure fuel line to shop body with clamp (11) and screw (17).

169. Governor

a. Adjustments.

(1) *Adjust throttle rod.* If valve in intake manifold is not fully open with engine stopped, loosen locknut (2, fig. 167) on governor end of throttle rod (1) and remove nut securing ball joint (3) on governor arm (4). Remove ball joint with attached throttle rod. With governor arm held back, turn ball joint clockwise on throttle rod until stud on ball joint is in line with hole in governor arm. Insert ball joint stud in governor arm and secure with nut. Tighten locknut (2) on governor end of throttle rod.



1 Throttle rod
2 Locknut, throttle rod
3 Ball joint
4 Governor arm
5 Locknut, speed adjustment screw
6 Speed adjustment screw
7 Screw, cap, 7/16 x 1 NC (2 rqr)
8 Lockwasher, 7/16 std (2 rqr)
9 Retaining nut
10 Oil lubrication line

Figure 167. Governor installed.

(2) *Adjust engine speed.*

Note. When operating dynamotor-welder for 60-cycle current, adjust governor for maximum engine speed of 1,800 rpm. When operating dynamotor-welder for 50-cycle current, adjust governor for maximum speed of 1,500 rpm. Observe tachometer and hour-meter (5, fig. 40) to check engine rpm.

(*a*) To increase engine rpm, loosen locknut (5, fig. 167) and turn speed adjustment screw (6) clockwise. Tighten locknut after tachometer indicates desired engine rpm.

(*b*) To decrease engine rpm, loosen locknut (5) and turn speed adjustment screw (6) counterclockwise. Tighten locknut after tachometer indicates desired engine rpm.

Warning: Do not adjust governor for greater engine rpm than specified. Excessive speeds will damage dynamotor-welder.

(3) *Eliminate engine surging.* If engine surges, loosen locknut, at rear of governor, and turn surge adjustment screw counterclockwise three full turns. Then slowly turn surge adjustment screw clockwise until engine surging is eliminated. Tighten locknut.

Note. The surge spring should be compressed one-sixth of an inch when the governor arm (4) is in a vertical position. The governor arm in this position holds the valve in the intake manifold closed.

b. Removal.

(1) Loosen retaining nut (9) securing oil lubrication line (10) to fitting on top of governor and disconnect oil line.

(2) Remove nut securing ball joint (3) to governor arm (4) and remove ball joint with throttle rod from governor arm.

(3) Remove two cap screws (7) and lockwashers (8) securing governor on engine and remove governor.

c. Installation.

(1) Aline governor on engine and secure, using two lockwashers (8) and two cap screws (7).

(2) Connect oil lubrication line (10) to fitting on top of governor and tighten retaining nut (9).

(3) Hold governor arm back and check position of ball joint stud with relation to hole in governor arm. If they are not in line, adjust throttle rod (*a* above).

Section XV. ENGINE ELECTRIC SYSTEM

170. Description

The engine 24-volt circuit (fig. 97) consists of the engine electric system, two emergency shop lights (par. 43*b*), and two heaters (par. 130). The engine electric system consists of the following units.

a. Batteries. Two series-connected, 12-volt, wet-type storage batteries (20) furnish current to the starting motor for starting engine (par. 41).

b. Generator. The two-brush, shunt-type generator (24) furnishes current to recharge the batteries and also supplies current to carry the electrical load requirements of the emergency shop lights and heaters.

c. Generator Regulator. The three-unit generator regulator (5) controls the output of the generator.

d. Starting Motor. The 4-pole, 4-brush, overrunning clutch-type starting motor (21) cranks the engine when the starting motor circuit is closed.

e. Magneto. The radio-shielded, engine-driven magneto (23) supplies high voltage current to the spark plugs.

f. Spark Plugs. Six radio-shielded, 14-mm spark plugs deliver the high voltage current in the form of a spark to the engine cylinder igniting the fuel.

g. Overspeed Relay. The overspeed relay (3) will stop the engine when it reaches 2,040 rpm. This will only occur when the governor fails. The overspeed relay protects the dynamotor-welder from damage in case of governor failure.

h. Control Panel. The control panel consists of controls and instruments that are used to start and stop the engine, and to check the various systems of the engine during operation.

i. Sending Units. Fuel-gage, oil-pressure gage and coolant-temperature gage sending units are included in the 24-volt circuit. The low-oil-pressure-warning-light and overheat-warning-light sending units operate the warning lights on the instrument panel.

Note. When a warning light goes on, stop engine immediately.

171. Batteries

a. Servicing.

(1) *Cleaning and inspection.* Clean batteries and cable terminals with a mild solution of bicarbonate of soda and water.

Caution: Cover adjacent parts of mobile shop before cleaning. Acid will damage exposed surfaces.

Inspect cable terminals and battery posts for tightness and good condition. Inspect battery-cell fillercaps for unobstructed vent holes.

(2) *Adding water.* Remove battery-cell fillercaps and fill each cell with pure or distilled water to three-eighths of an inch above separators. Some batteries have special caps; fill batteries according to manufacturers' instructions. (See note, par. 70*b*(3).)

Note. Remove batteries (*c* below) if an excessive amount of water is needed and check battery case for cracks. Check generator charging rate (par. 173*a*) before installing new battery.

Install and tighten fillercaps. Make certain threads are not crossed. Crossed threads will cause vent failure and cause battery to overflow.

b. Testing. The following tests are performed with batteries installed and at normal operating temperature.

(1) *Specific gravity test.* The specific gravity of electrolyte in battery cells is an indication of state of charge of the battery. Use a suitable hydrometer and test all cells of the batteries. If the level of the electrolyte is too low for testing, add wa-

ter (*a*(2) above), and perform test after suitable period of operation.

Note. After adding water to batteries, the specific gravity cannot be measured accurately, as water is lighter than acid and will remain on top until mixed with the acid by charging.

(*a*) *Specific gravity too low.* If specific gravity is 1.225 or less, the battery must be recharged. If the battery will not take a charge (one or more cells will have low specific gravity after reasonable charging period), internal trouble is indicated and battery must be replaced. Immediately upon replacement of an undercharged battery, test the generator charging rate (par. 173*a*) to make certain that the cause is not due to defective generator, generator regulator, or other troubles in the battery-charging circuit.

(*b*) *Specific gravity too high.* If specific gravity is 1.300 or above, replace battery (*c* and *e* below) and check cutout relay of generator regulator (par. 173*a*(1).

Note. Overstrong electrolyte will damage the battery internally.

(2) *Capacity test.*

Note. The battery must have a specific gravity reading of at least 1.225 at normal operating temperature ((1) above) before starting capacity test.

(*a*) Place magneto switch (9, fig. 40) in the OFF position.

(*b*) Place the engine clutch control lever (1, fig. 42) in the CLUTCH DISENGAGED position.

(3) Push in starting motor control (2) to crank engine and place battery under load. While starting motor is operating, check voltage of each cell with a low-reading voltmeter. Voltage should not fall below 1.5 volts per cell. Variation of more than 0.2 volt between cells indicates a weak cell. If all cells are lower than 1.5 volts, the battery may need charging even though the specific gravity reading is high. If charging fails to increase battery cell voltage, replace battery (*c* and *e* below) and test generator charging rate (par. 173*a*).

c. Removal.

(1) Turn four captive screws counterclockwise and lift battery-compartment access plate (11, fig. 5) from front of mobile shop.

(2) Shut down all 24-volt engine electric circuit components and place battery-disconnect switch (10, fig. 40) in the OFF position.

(3) Disconnect ground cable (1, fig. 168) from negative battery post. Remove positive cable (3) from positive battery post.

Note. Before removing battery cables, note which battery posts are positive and negative, to avoid installing battery in reversed position.

Caution: Use suitable wrench to loosen cable bolt and nut. Do not use pliers. If cables stick to battery posts, do not pry off using battery as fulcrum. Use proper puller to avoid damaging battery.

(4) Remove interconnecting cable (2) connecting the two batteries.

(5) Remove wingnut (5) from eyebolt (6) and remove holddowns (4) securing batteries in battery compartment and remove one battery at a time.

Caution: Do not tip or drop batteries. Spilled acid will cause damage.

d. Clean and Inspect Battery Compartment. Clean acid and corrosion from battery compartment and battery holddowns. If corrosion has been excessive, paint battery compartment and holddowns with acidproof paint.

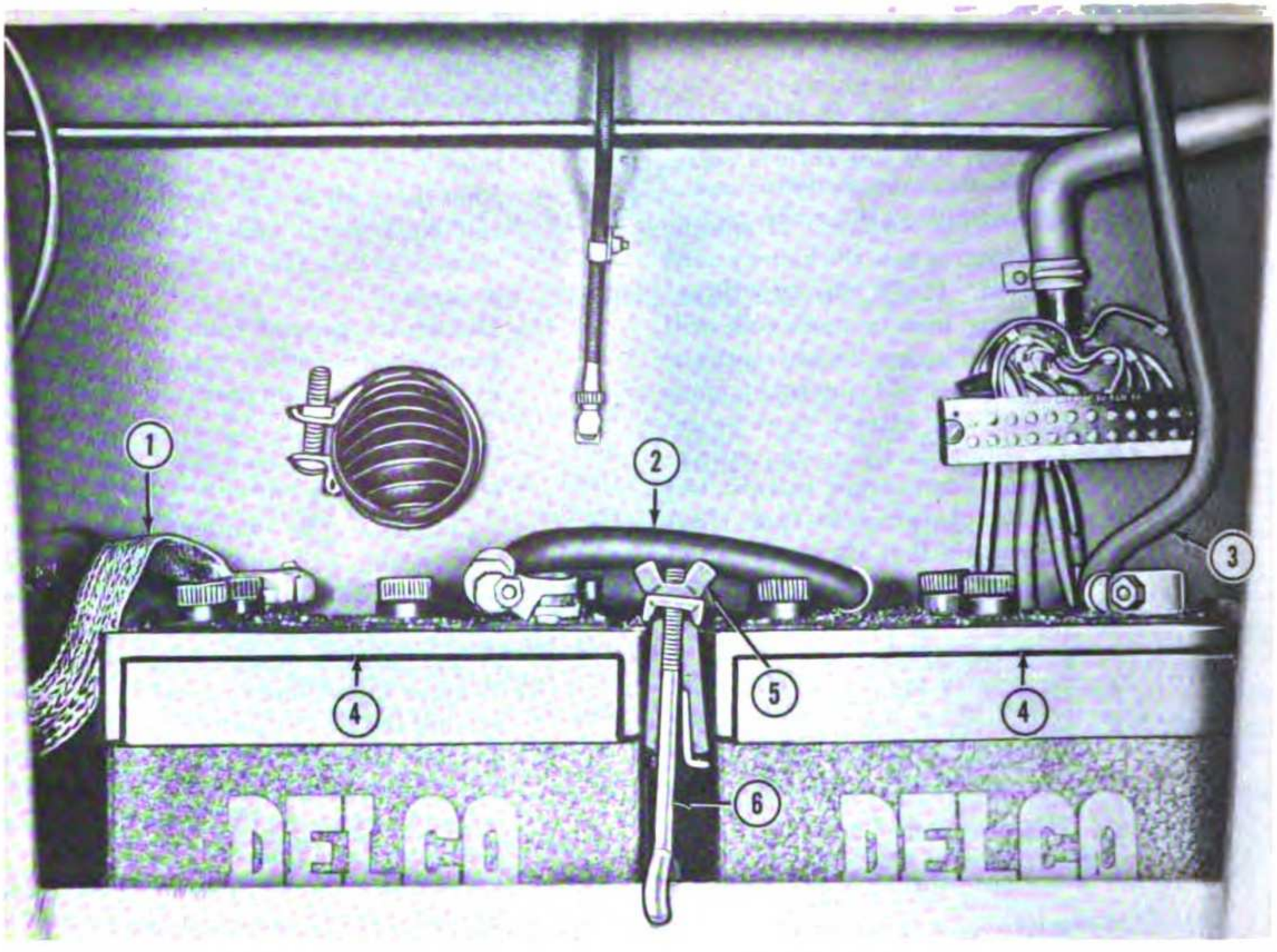
e. Installation.

(1) Lift fully charged batteries up and into battery compartment. Lift one battery at a time. Do not tip or drop batteries.

(2) Install interconnecting cable (2) between batteries and tighten cable terminal bolts and nuts.

(3) Check battery polarity by touching ground cable (1) and positive cable (3) to remaining battery posts. Turn on emergency shop light and observe battery ammeter (7, fig. 40). If battery ammeter pointer is on the charge side of the dial, batteries are reversed. Remove interconnecting cable (2, fig. 168) and reverse batteries. Reconnect cable.

(4) Install holddowns (4) over batteries. Insert eyebolt (6) through holddown and



1 Ground cable
2 Interconnecting cable
3 Positive cable
4 Holddown
5 Wingnut
6 Eyebolt

Figure 168. Batteries installed.

secure holddowns on batteries with wingnut (5).

(5) Connect positive cable (3) to positive terminal post and ground cable (1) to negative post. Tighten cable terminal bolts and nuts.

(6) Aline battery-compartment access plate (11, fig. 5) over battery compartment and tighten four captive screws.

172. Generator

a. Servicing.

(1) *Remove cover band.* Loosen cover band screw (7, fig. 169) and slide cover band (6) forward on generator.

(2) *Test brush spring tension.* Raise brush arms and release, and note if brush arm snaps back into position against the brush. If either brush arm does not snap back into position, replace the generator (*b* and *c* below).

(3) *Inspect brushes.*

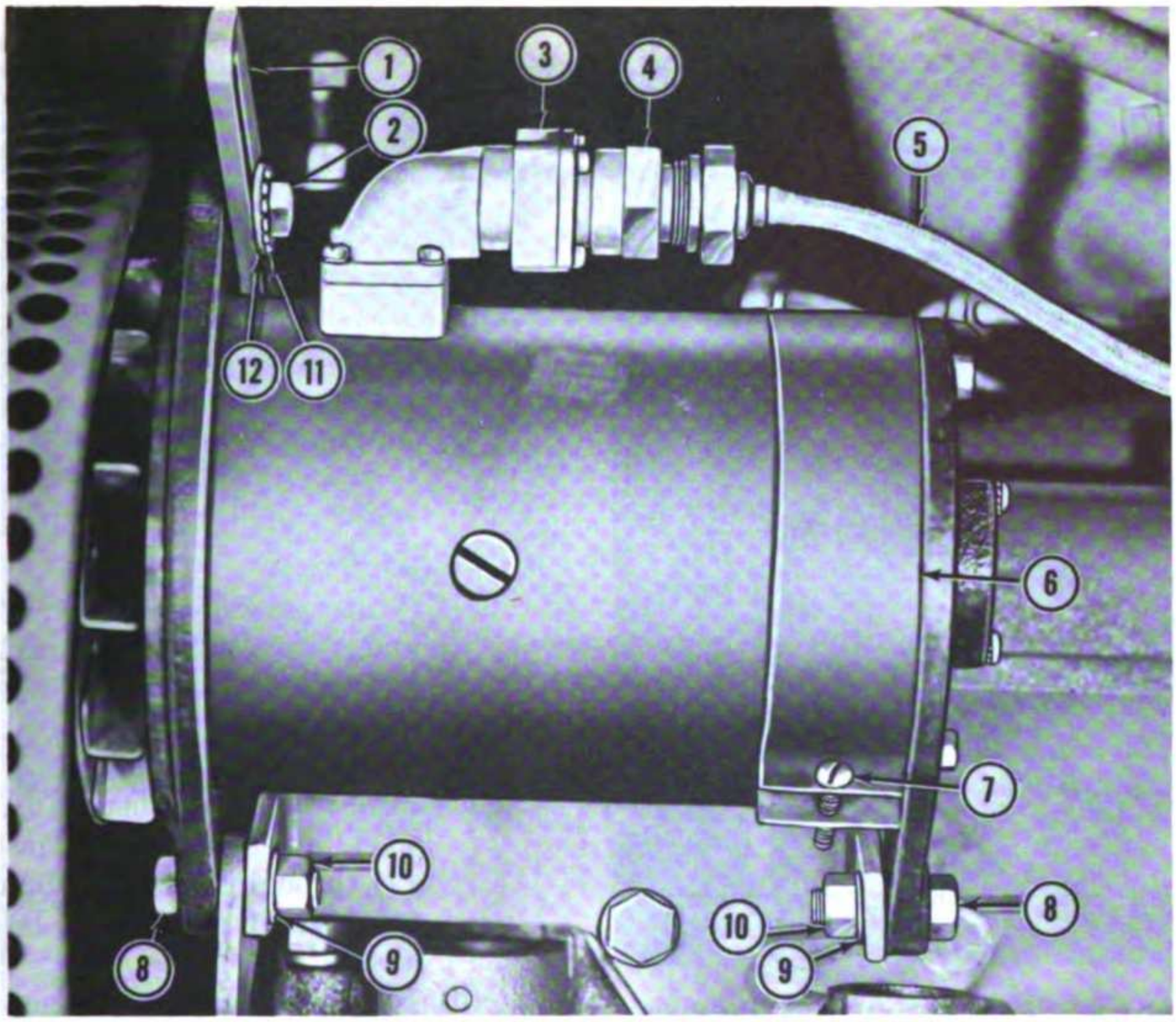
(*a*) Raise brush arms and pull brushes (5, fig. 170) out of brush holder (2).

(*b*) Compare brushes with a new one to determine extent of wear. If brushes are worn to less than half original length, replace brushes ((6) below).

(*c*) Inspect brush contact surface for evidence of burning, scoring, chipping, and other defects which would prevent brush from seating properly on commutator. Badly burned, chipped, or scored brushes must be replaced.

(4) *Inspect commutator.*

(*a*) Examine commutator for accumulated dirt, grease, carbon, and other foreign



1 Adjustment bracket
2 Generator adjustment screw, 3/8–16 x 3/4
3 Receptacle
4 Cable connector nut
5 Shielded cable
6 Cover band
7 Cover band screw
8 Screw, cap, 7/16–20 x 1½ (2 rqr)
9 Lockwasher, int tooth, 7/16 inch (2 rqr)
10 Nut, hex, 7/16–20 (2 rqr)
11 Lockwasher, ext tooth, 3/8 inch
12 Washer, plain, 3/8 inch std

Figure 169. Generator installed.

material. Wipe surface of commutator clean with cloth dampened in approved cleaning solvent.

(*b*) Inspect commutator for scoring, wear, nicks, ridges, thrown solder, and high mica between segments. If a serious deficiency is noted, replace the generator (*b* and *c* below).

(5) *Clean commutator.*

(*a*) If commutator is in good condition but dirty and dull, follow procedures outlined below to clean and brighten it.

(*b*) Wrap a strip of No. 00 sandpaper, brush width, around the end of a stick.

(*c*) Insert sandpaper end of stick into generator and press it against commutator. Rotate armature and move sandpaper back and forth across commutator until all dirt and gum have been removed. Surface of the commutator must be smooth and bright.

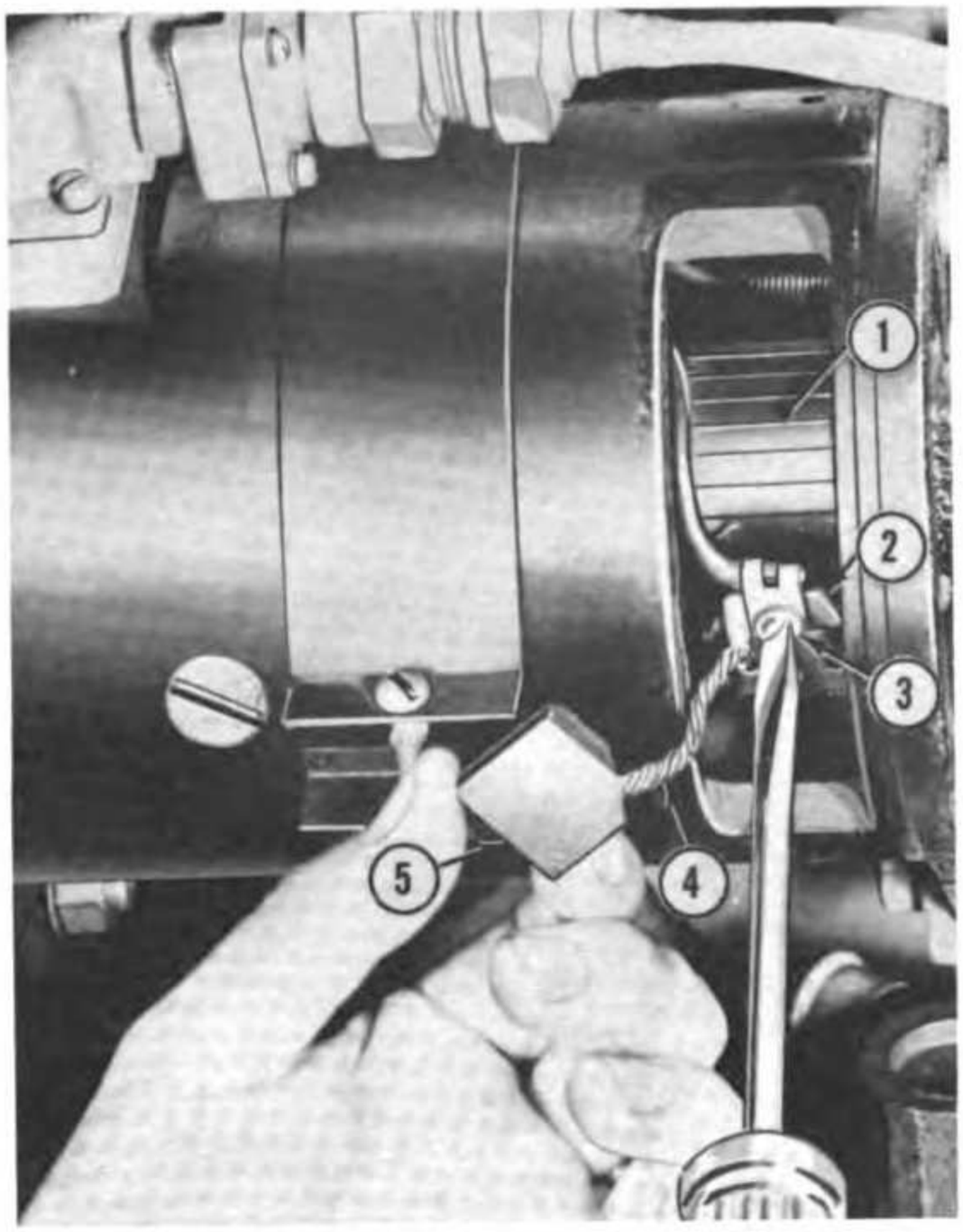
Caution: Never use emery paper to clean commutator. Metallic abrasive particles will tend to short circuit commutator.

(*d*) Use compressed air and blow all dust and dirt from generator.

(6) *Replace worn brushes.*

(*a*) Remove terminal screw (3, fig. 170) attaching brush lead (4) to brush holder (2) and remove worn brush (5).

(*b*) Install new brush by connecting brush lead to brush holder with terminal screw. Lift brush arm and fit brush into brush holder. Lower brush arm on top of brush.



1 Commutator
2 Brush holder
3 Terminal screw
4 Brush lead
5 Brush

Figure 170. Removing generator brush.

(7) *Seat new brushes.*

(*a*) Wrap a strip of No. 00 sandpaper around commutator (1) with grit side of sandpaper under both brushes.

Caution: Never use emery paper to seat brushes.

(*b*) Rotate armature back and forth until brushes conform to contour of commutator. Occasionally remove a brush and examine contact surface to see that it is seating. When contact surface of brush appears to be in full contact with the commutator, seating will be satisfactory.

(*c*) Remove sandpaper.

(*d*) Using compressed air, blow all dust and dirt from generator.

(8) *Install cover band.* Slide cover band (6, fig. 169) over brush opening and tighten cover band screw (7).

b. Removal.

(1) Back out cable connector nut (4) and separate shielded cable (5) from receptacle (3) at top of generator.

(2) Remove generator adjustment screw (2), lockwasher (11), and plain washer (12) securing top of generator to adjustment bracket (1).

(3) Push generator up against engine block.

(4) Remove three fan belts from grooves in generator pulley.

(5) Remove two hex nuts (10) and lockwashers (9) from cap screws (8) securing bottom of generator on mounting bracket.

(6) Hold generator securely and remove the two cap screws. Remove generator from engine.

c. Installation.

(1) Aline generator on mounting bracket and secure, using two cap screws (8), lockwashers (9), and nuts (10). Do not tighten nuts.

(2) Push generator up against engine and install plain washer (12), lockwasher (11), and generator adjustment screw (2) through adjustment bracket (1) into top hole of generator. Do not tighten screw.

(3) Slip three fan belts over generator pulley and lower generator until there is one-half to three-quarters of an inch play in fan belts, at a point midway between generator and fan pulleys.

(4) Tighten generator adjustment screw after fan belts are adjusted. Tighten two cap screws (8).

(5) Connect shielded cable (5) to receptacle (3), at top of generator, and tighten cable connector nut (4).

173. Generator Regulator

a. Testing.

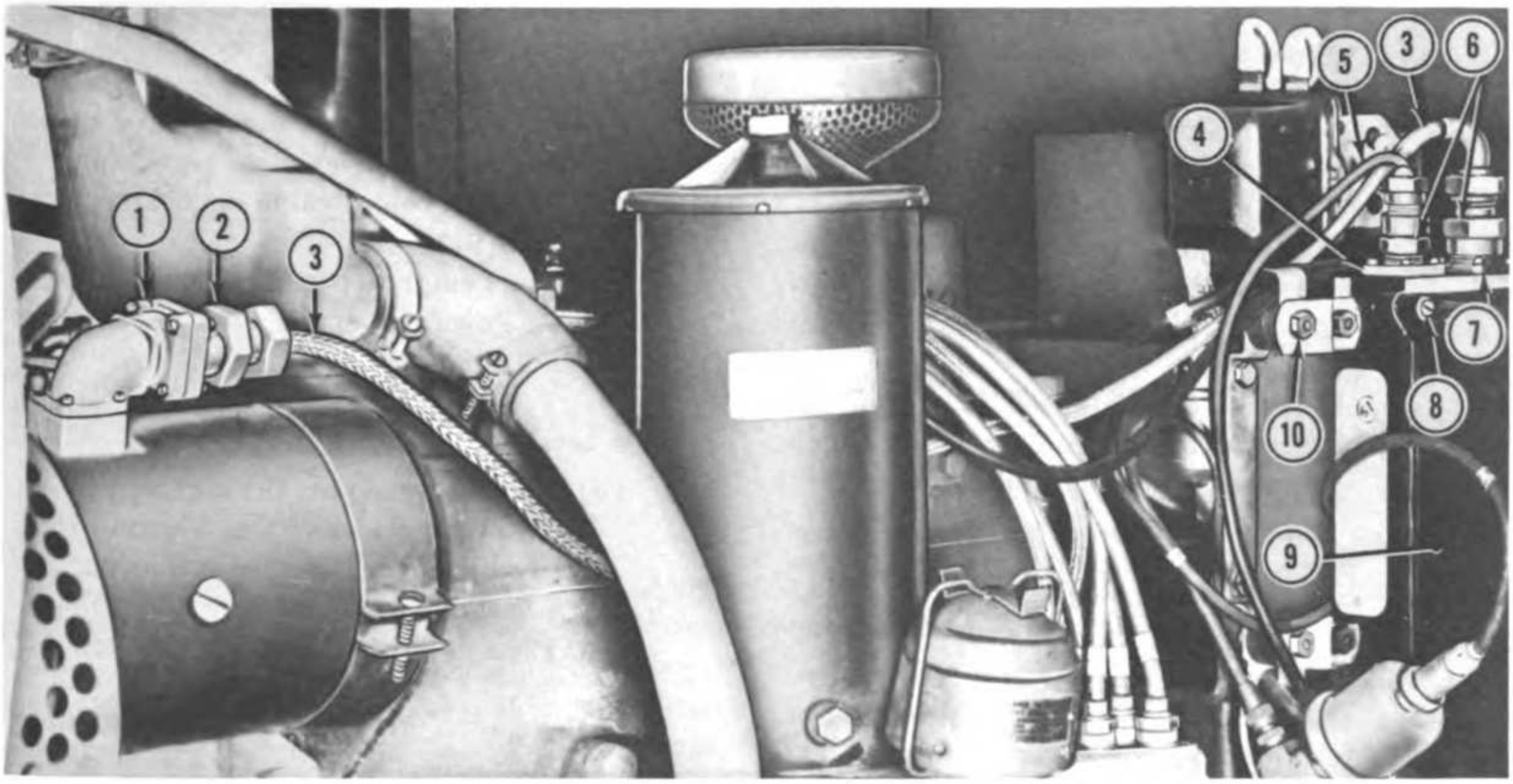
Note. The following tests are made with generator operating at specified speed and battery charging circuit at operating temperature.

(1) *Testing cutout relay.*

(*a*) Place battery-disconnect switch (10, fig. 40) in the OFF position.

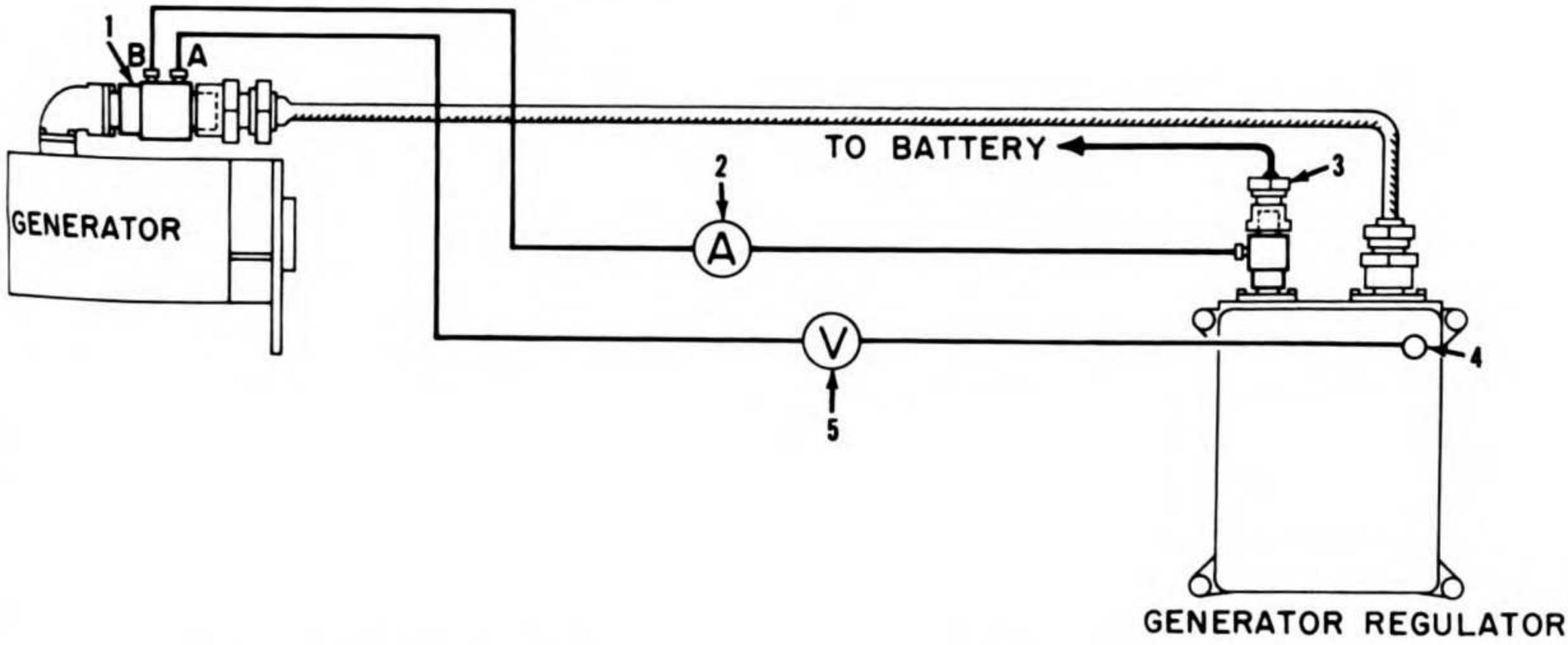
(*b*) Remove ground cable from batteries (par. 171*c*(3)).

(*c*) Loosen cable connector (6, fig. 171) and disconnect battery cable (5) from receptacle (4) at top of generator regulator. Install Allen Test Set adapter (3, fig. 172) (see app. II for location



1 Generator receptacle
2 Cable connector nut
3 Generator cable
4 Receptacle
5 Battery cable
6 Cable connector nut
7 Receptacle
8 Generator regulator cover screw (4 rqr)
9 Generator regulator cover
10 Mounting nut

Figure 171. Generator regulator installed.



1 Generator adapter, 2-prong
2 Ammeter, 0–30 ampere scale
3 Generator regulator adapter, 1-prong
4 Ground screw
5 Voltmeter, 0–32 volt scale

Figure 172. Cutout relay test connections.

of test set) in receptacle and connect battery cable to adapter.

(*d*) Loosen cable connector nut (2, fig. 171) and disconnect generator cable (3) from generator receptacle (1). Install Allen Test Set adapter (1, fig. 172) in generator receptacle and connect generator cable to adapter.

(*e*) Connect a 0–32 voltmeter (5) between A terminal of adapter (1) and ground

screw (4) of generator regulator. Connect a 0–30 ammeter (2) between B terminal of adapter (1) and terminal of adapter (3).

(*f*) Install ground cable on battery (par. 171*e*(3)).

(*g*) Start engine (par. 41). Slowly increase engine speed and note the voltage at which cutout relay contact points close.

(*h*) Decrease engine speed and note the generator discharge current at which cutout relay contact points open.

Note. Closing voltage for cutout relay contact points should be 27.5 to 30 volts. Cutout relay contact points should open with no more than 0 or less than minus 3 amperes.

(*i*) Stop engine (par. 48) and replace generator regulator (*b* and *c* below) if test results differ from specifications.

(2) *Testing voltage regulator.*

(*a*) Place battery-disconnect switch (10, fig. 40) in the OFF position.

(*b*) Remove ground cable from battery (par. 171*c*(3)).

(*c*) Loosen cable connector nut (6, fig. 171) and disconnect battery cable (5) from receptacle (4) at top of generator regulator. Loosen cable connector nut (2) and disconnect generator cable (3) from generator receptacle (1). Install adapter (1, fig. 173) in receptacle and connect generator cable to adapter. Leave battery cable disconnected.

(*d*) Connect a 0–32 voltmeter (2) between A terminal of adapter (1) and ground screw (3) on generator regulator.

(*e*) Install ground cable on battery (par. 171*e*(3)).

(*f*) Start engine (par. 41); operate engine at governed speed and note voltage setting.

Note. Voltage regulator setting should be between 28.0 and 29.5 volts.

(*g*) Stop engine (par. 48) and replace generator regulator (*b* and *c* below) if test results differ from specification.

(3) *Testing current regulator.*

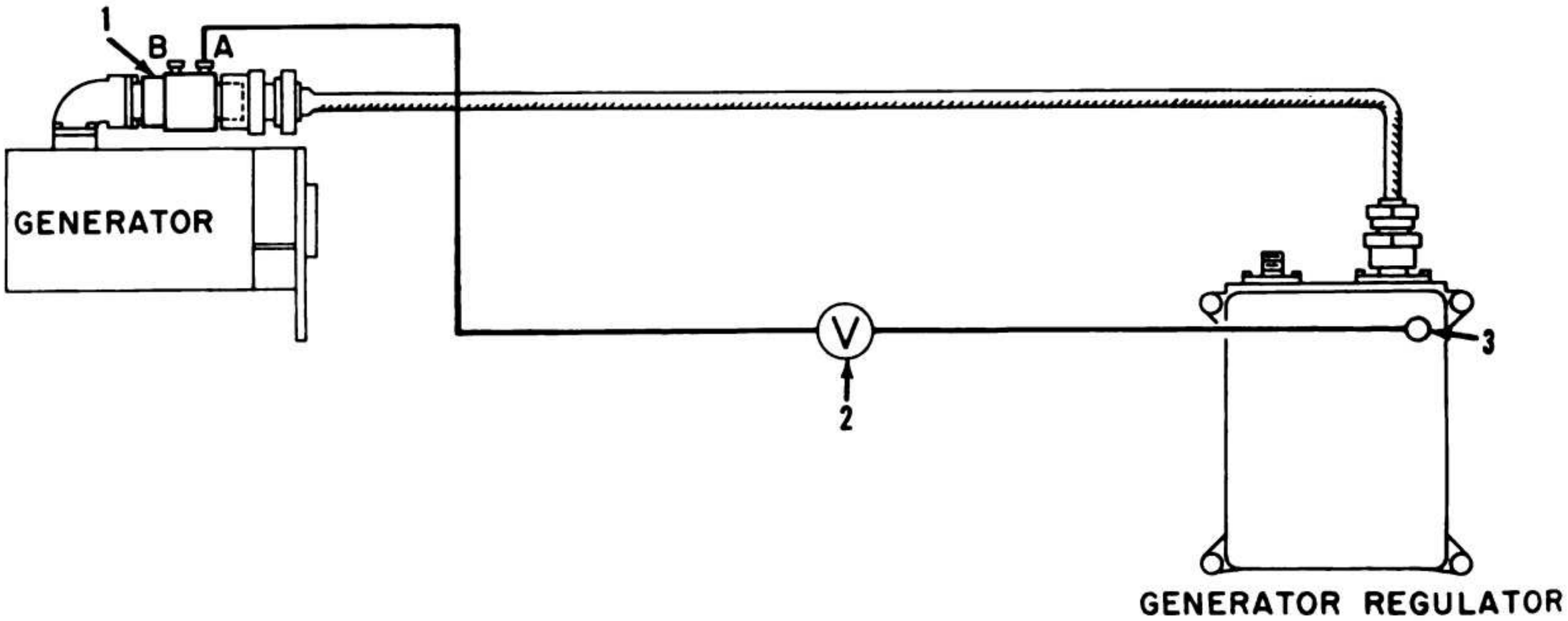
(*a*) Place battery-disconnect switch (10, fig. 40) in the OFF position.

(*b*) Remove ground cable from battery (par. 171*c*(3)).

(*c*) Loosen cable connector nut (1, fig. 174) and disconnect battery cable from receptacle (3) at top of generator regulator.

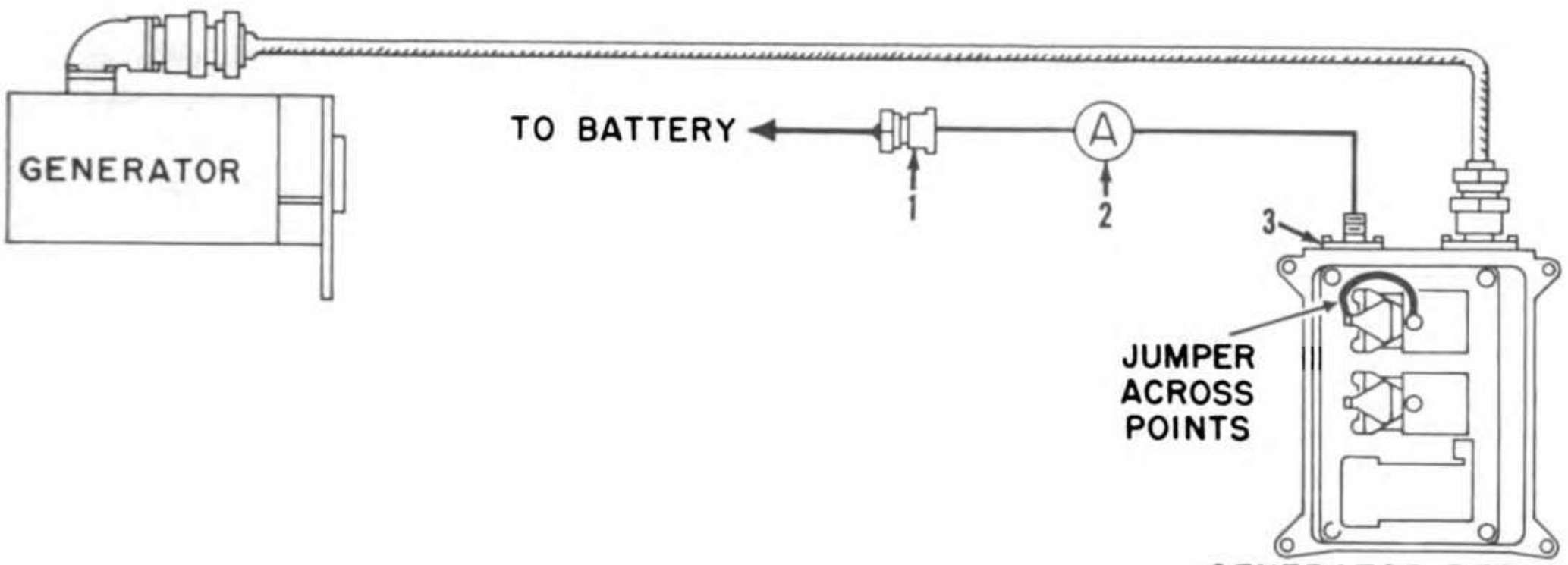
(*d*) Connect a 0–30 ammeter (2) in series, between battery cable and generator regulator receptacle.

(*e*) Remove four generator regulator cover screws (8, fig. 171) securing generator regulator cover (9) on generator regulator and remove cover. Connect a jumper lead (fig. 174) across the volt-



1 Adapter, generator 2 Voltmeter, 0–32 scale 3 Ground screw

Figure 173. Voltage regulator test connections.



GENERATOR REGULATOR

1 Cable connector nut 2 Ammeter, 0–30 ampere scale 3 Receptacle

Figure 174. Current regulator test connections.

age-regulator contact points. This prevents the voltage regulator from operating and increases the generator output to its maximum as determined by the current regulator setting.

(*f*) Turn on emergency shop lights and both heaters to prevent high voltage.

(*g*) Install ground cable on battery (par. 171*c*(3)).

(*h*) Start engine (par. 41); operate engine at governed speed and note current regulator setting.

Note. Current regulator setting should be between 16 and 19 amperes.

(*i*) Stop engine (par. 48), and replace generator regulator (*b* and *c* below) if test results differ from specifications.

b. Removal.

(1) Place battery-disconnect switch (10, fig. 40) in the OFF position.

(2) Remove ground cable from batteries (par. 171*c*(3)).

(3) Loosen cable connector nuts (6, fig. 171) and disconnect generator cable (3) and battery cable (5) from receptacles (4 and 7) at top of generator regulator.

Note. Remove test adapters if not already removed.

(4) Remove four mounting nuts (10), two on each side, securing generator regulator to shock mounting brackets, and remove generator regulator from engine enclosure.

c. Installation.

(1) Aline generator regulator on shock mounting brackets and secure, using four mounting nuts (10).

(2) Connect generator cable (3) to receptacle (7); connect battery cable (5) to receptacle (4); and tighten cable connector nuts (6).

(3) Install ground cable on batteries (par. 171*e*(3)).

Caution: On installing generator regulator, the generator must be repolarized after cables are connected but before engine is started. Failure to polarize generator will result in severe damage since reversed generator polarity causes vibration, heavy arcing, and burning of the cutout relay contact points.

(4) Disconnect battery cable and generator cable from generator regulator. Using a jumper lead, momentarily connect the "A" pin of the generator cable to the pin in the battery cable receptacle. This allows a momentary surge of current to flow through the generator field windings which correctly polarizes the generator.

174. Starting Motor

a. Servicing.

(1) *Remove cover.* Raise two clips on cover (1, fig. 175) and remove cover from starting motor.

(2) *Test brush spring tension.* Attach spring scale to brush and note tension required

to lift brush and brush holder slightly against pull of spring. Tension must be between 24 and 28 ounces. If brush spring tension does not meet requirements, replace starting motor (*b* and *c* below).

(3) *Inspect brushes.* If brushes are oil-soaked or worn to less than one-half of original length, replace starting motor (*b* and *c* below).

(4) *Inspect commutator.* Inspect commutator for roughness, out-of-round, excessive dirt, and high mica. If any of these conditions is found, replace starting motor (*b* and *c* below).

b. Removal.

(1) Remove ground cable from batteries (par. 171*c*(3)).

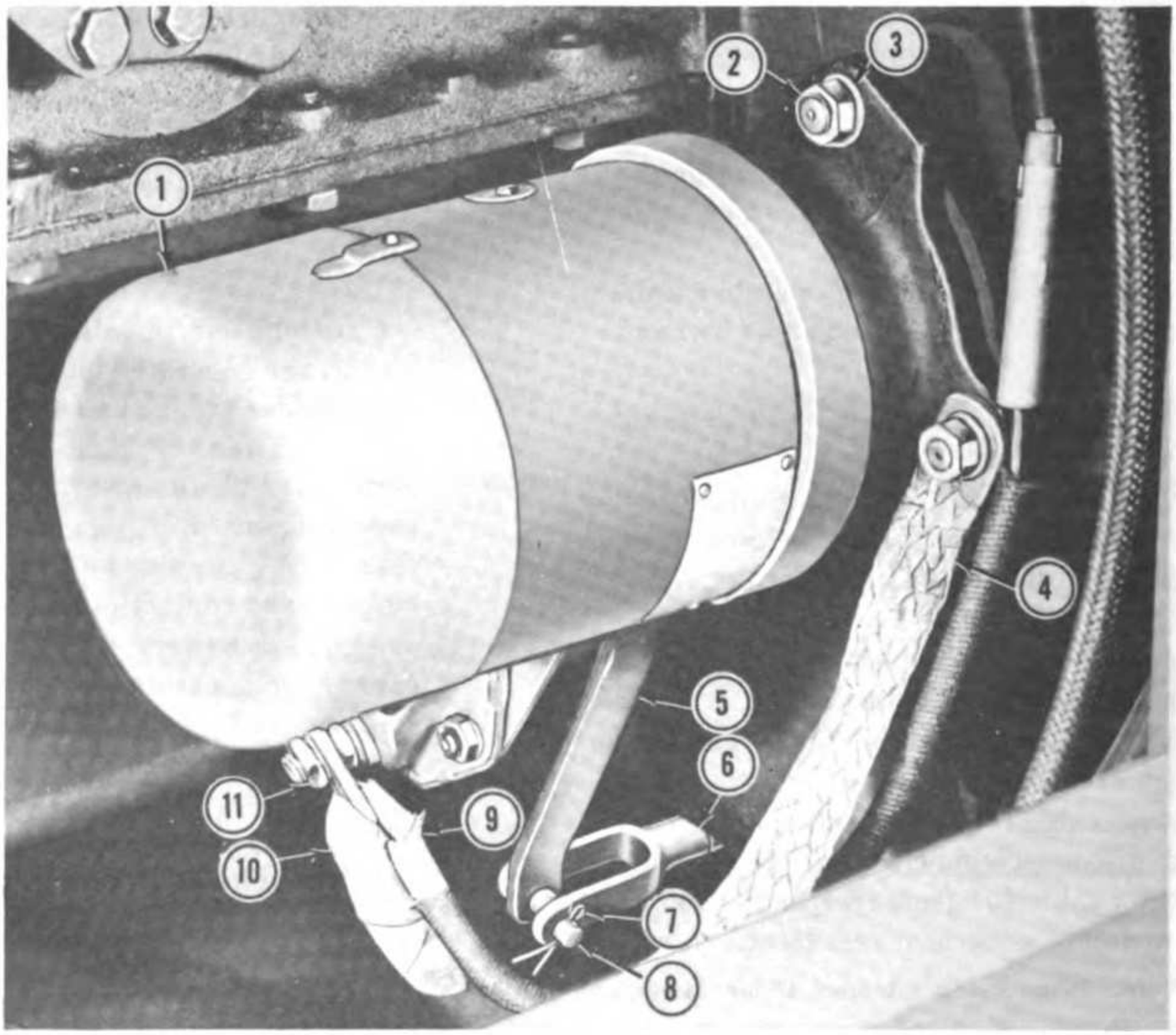
(2) Remove terminal nut (11) securing power cable (10) and magneto switch cable (9) to switch terminal and lay aside cables.

(3) Remove cotter pin (7) and clevis pin (8) securing starting-motor control rod (6) to lever (5) and allow control rod to drop.

(4) Remove three nuts (2) and lockwashers (3) securing starting motor to flywheel housing and remove ground cable (4) from mounting stud and remove starting motor from engine.

c. Installation.

(1) Aline starting motor on flywheel housing studs; install free end of ground cable (4) on one stud and secure starting motor



1 Cover
2 Nut, hex, 7/16–20 (3 rqr)
3 Lockwasher, 7/16 inch std (3 rqr)
4 Ground cable
5 Lever
6 Starting motor control rod
7 Cotter pin, 3/8 x 1 1/8 lg
8 Clevis pin, 3/32 x 3/4 lg
9 Magneto switch cable
10 Power cable
11 Terminal nut

Figure 175. Starting motor installed.

and ground cable, using three lockwashers (3) and nuts (2).

(2) Aline starting-motor control rod (6) on lever (5) and secure, using clevis pin (8) and cotter pin (7).

(3) Install magneto-switch cable (9) and power cable (10) on switch terminal and secure with terminal nut (11).

(4) Install ground cable on batteries (par. 171*e*(3)).

175. Magneto

a. Testing. If trouble occurs in the ignition system, check spark plugs (par. 176). If spark plugs are in good condition, test spark plug cables and magneto.

(1) *Ignition spark test.*

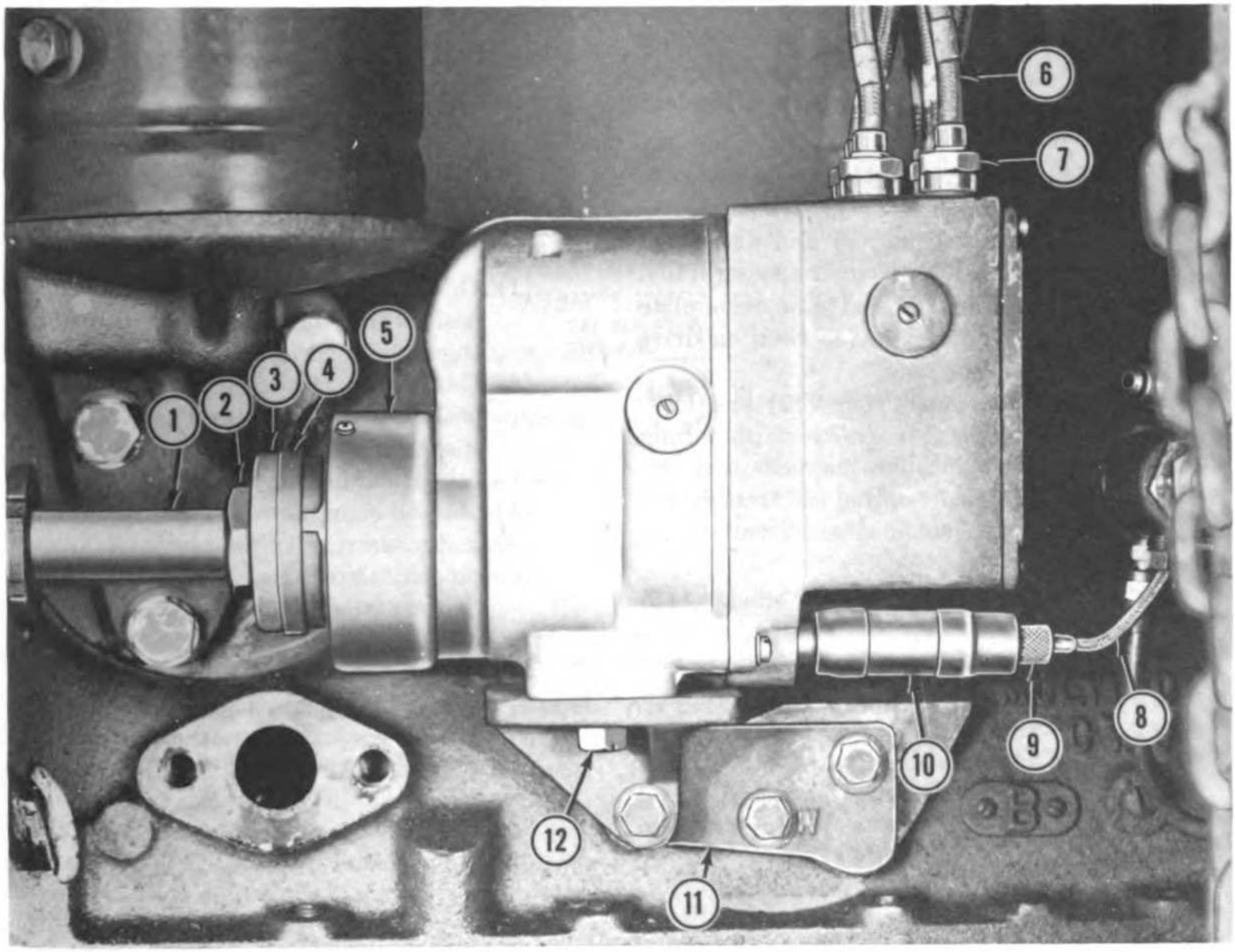
(*a*) Loosen cable nut on each spark plug.

(*b*) Start engine (par. 41). Operate engine until normal operating temperature is reached.

(*c*) In turn, hold spark plug cable approximately one-sixteenth of an inch away from spark plug. The engine should not misfire. If the engine misfires on any or all of the cylinders during this test, perform test outlined in (2) below. Tighten cable nut on each spark plug.

(2) *Magneto spark test.*

(*a*) Loosen cable nut (7, fig. 176) securing each spark plug cable (6) in top of magneto and pull spark plug cables out of magneto.



1 Drive shaft
2 Locknut
3 Drive plate
4 Driven plate
5 Impulse coupling
6 Spark plug cable
7 Cable nut
8 Ground cable
9 Knurled nut
10 Condenser
11 Mounting bracket
12 Screw, cap, 3/8–16 x 7/8 (2 rqr)

Figure 176. Magneto installed.

(*b*) Expose one-half inch of each end of a 12-inch cable. Insert one end of cable into a spark plug cable opening in top of magneto. Crank engine slowly and hold free end of cable one-eighth of an inch away from engine block. A strong spark should bridge the gap. Repeat test in each spark plug cable opening in magneto.

(*c*) If spark is evident, trouble is in the respective spark plug cable. Replace defective spark plug cable. If no spark is evident, replace magneto (*b* and *c* below).

b. Removal.

(1) Make certain battery-disconnect switch (10, fig. 40) and magneto switch (9) are off.

(2) Loosen cable nut (7, fig. 176) securing each spark plug cable (6) in top of magneto and pull six spark plug cables out of magneto.

Note. Spark plug cables are numbered to facilitate installation.

(3) Loosen knurled nut (9) and disconnect ground cable (8) from condenser (10).

(4) Loosen locknut (2) and slide drive plate (3) and driven plate (4) back on drive shaft (1).

(5) Remove two cap screws (12) and lockwashers securing magneto on mounting bracket (11). Slide magneto back releasing impulse coupling (5) from driven plate and remove magneto from engine.

c. Installation.

(1) Aline magneto on mounting bracket (11) and secure, using two lockwashers and cap screws (12).

(2) Connect ground cable (8) in condenser (10) and tighten knurled nut (9).

(3) Insert six numbered spark plug cables (6) in corresponding numbered spark plug cable openings in top of magneto and tighten cable nuts (7).

d. Timing Magneto to Engine.

(1) Crank engine until TDC mark on flywheel is in line with timing mark on engine bell housing.

(2) Disconnect No. 1 spark plug cable from spark plug in No. 1 cylinder. Remove spark plug and make certain No. 1 piston is at top dead center on the compression stroke. Install spark plug and leave spark plug cable disconnected.

(3) Rotate impulse coupling (5) towards the engine block until spark is noted at No. 1 spark plug cable.

(4) Rotate impulse coupling away from the engine block one-eighth of a full turn. Hold impulse coupling in this position and slide driven plate (4) and drive plate (3) in mesh with impulse coupling. Tighten locknut (2) to secure timing adjustment.

(5) Connect No. 1 spark plug cable to spark plug in No. 1 cylinder.

176. Spark Plugs

a. Removal.

(1) Loosen cable nut securing each spark plug cable to spark plug and disconnect spark plug cables.

(2) Using the correct size wrench, remove six spark plugs with gaskets from engine.

b. Inspection. Inspect each spark plug for indications of burning, overheating, and oil or gas fouling.

(1) Oil fouling leaves a wet, black, shiny deposit which indicates malfunctioning of engine or ignition system.

(2) Gas fouling leaves a black, dry, fluffy deposit which indicates the wrong type spark plug is being used or the engine is being operated improperly (par. 41).

(3) Burned or overheated spark plugs result in dry, shiny, glassy deposits on the spark plug insulators and cracks in the tips of the insulators. This condition indicates malfunctioning of engine or ignition system.

Note. Normal spark plugs will have a rusty brown to grayish tan powder deposit, or a white powdery or yellow glazed deposit, depending on the type of gasoline used.

(4) Check spark plugs for correct make, size, range, and type. The recommended spark plug is Champion XEJ–8 or equal.

(5) Report to the proper authority all indications of oil or gas fouling and burned or overheated spark plugs.

(6) Replace spark plugs if insulators are chipped, if electrodes are excessively worn, or if threads are damaged.

c. Cleaning. Clean spark plugs with an approved cleaning solvent. Dry spark plugs with compressed air. Make certain all carbon deposits are removed. Polish spark plug electrodes with No. 00 sandpaper. Discard all gaskets.

d. Setting Gap. Use a 0.025-inch feeler gage to check spark plug gap. If gap is incorrect, bend side electrode up or down to obtain correct clearance between center and side electrodes.

Caution: Do not bend center electrode to set gap. Bending center electrode will chip or crack the spark plug insulator.

e. Installation.

(1) Assemble new gaskets on spark plugs. Insert six spark plugs into openings at top of engine. Tighten spark plugs to a snug fit.

Caution: Do not overtighten; gap could possibly change and damage to spark plug could result.

(2) Insert spark plug cables into their respective spark plugs and tighten cable nuts.

Note. All spark plug cables are numbered to facilitate installation.

177. Overspeed Relay

a. Removal.

(1) Turn magneto switch (9, fig. 40) to the OFF position.

(2) Remove two terminal screws securing two electric-control cubicle cables (3, fig. 177) to top terminals of overspeed relay and lay aside cables.

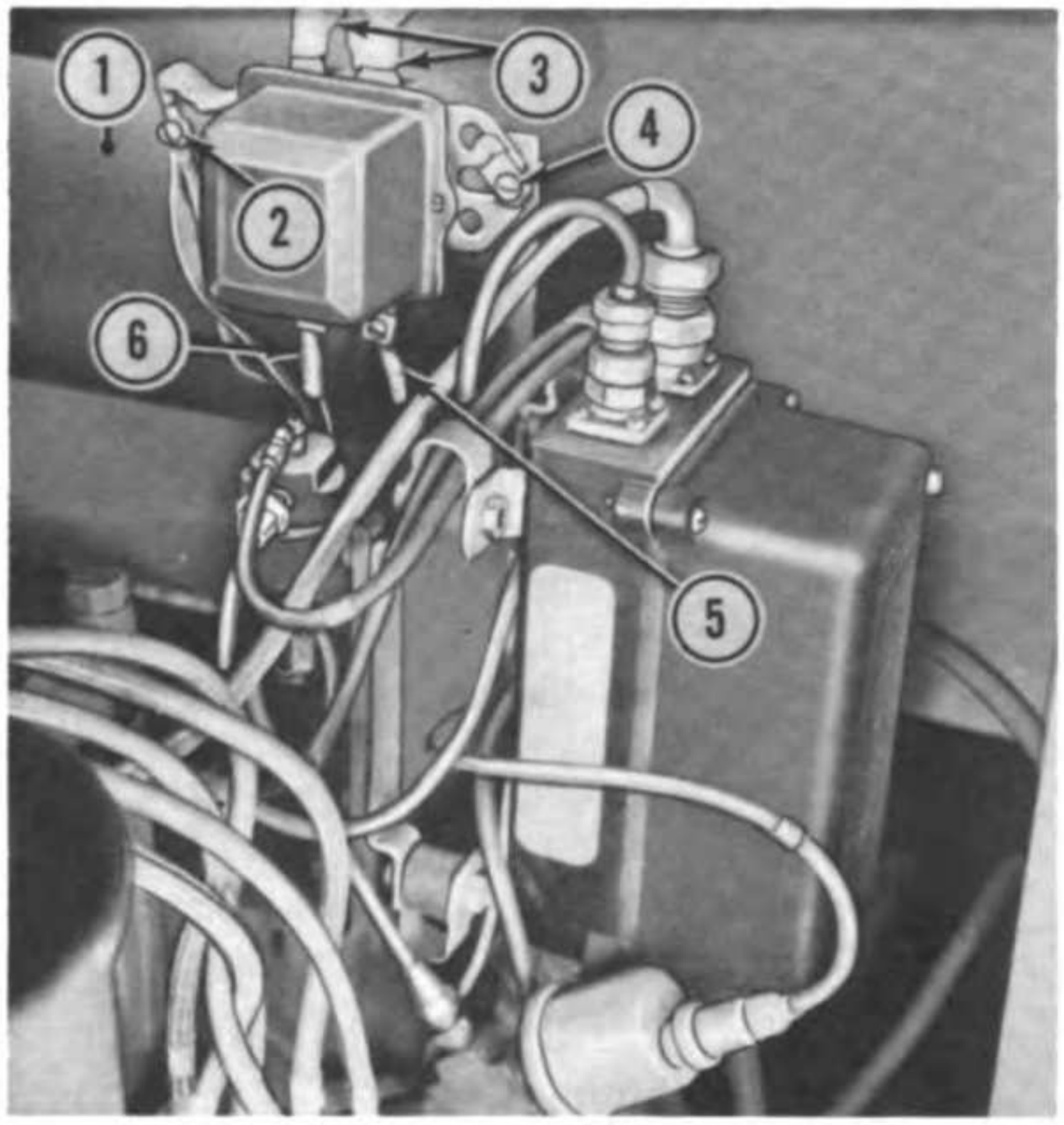
(3) Remove terminal screw securing magneto switch cable (5) to bottom terminal of overspeed relay and lay aside cable. Remove ground screw (2) releasing ground cable (6).

(4) Remove two mounting screws (4) and lockwashers securing over-speed relay to mounting bracket (1) and remove overspeed relay from engine.

b. Installation.

(1) Aline overspeed relay on mounting bracket (1) and secure, using two lockwashers and mounting screws (4).

(2) Connect magneto switch cable (5) to terminal at the bottom of the overspeed relay and secure with terminal screw. Secure ground cable (6) to mounting bracket with ground screw (2).



1 Mounting bracket
2 Gound screw
3 Electric control cubicle cables
4 Mounting screw
5 Magneto switch cable
6 Ground cable

Figure 177. Overspeed relay installed.

(3) Connect electric-control cubicle cables (3) to their respective terminals at the top of the overspeed relay and secure with two terminal screws.

(4) Before starting engine (par. 41), make certain holding coil in the overspeed relay is released. To release holding coil, place battery-disconnect switch (10, fig. 40) in the OFF position.

Note. If coil is not released, the ignition circuit is grounded and the engine will not start.

178. Control Panel

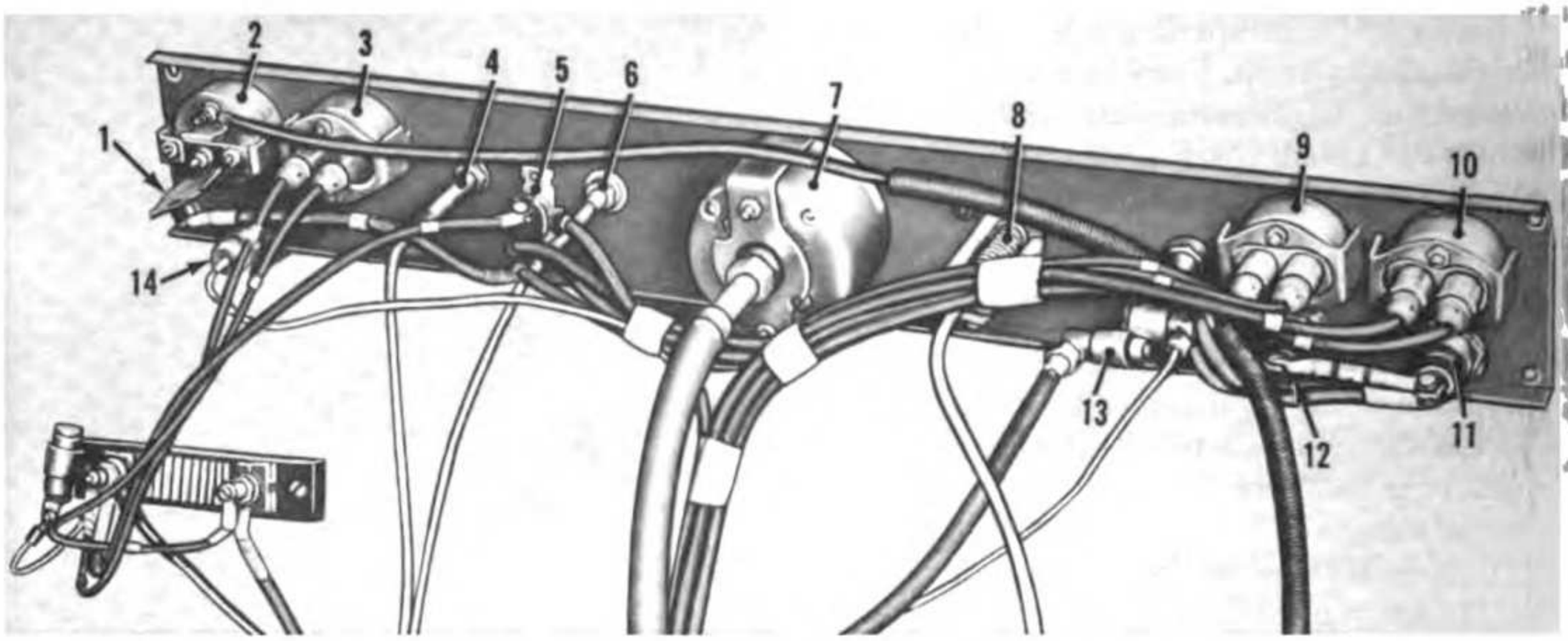
a. Removal

(1) *Disconnect gage wiring.*

Note. Label all electrical wiring before removal in order to facilitate installation.

(*a*) *Disconnect wiring to coolant-temperature gage.* Disconnect two bell-type connectors at rear of coolant-temperature gage (10, fig. 178).

(*b*) *Disconnect wiring to oil-pressure gage.* Disconnect two bell-type connectors at rear of oil-pressure gage (9).



1 Resistor
2 Fuel gage
3 Ammeter
4 Throttle control
5 Battery-disconnect switch
6 Choke control
7 Tachometer and hour-meter
8 Radiator shutter manual control
9 Oil-pressure gage
10 Coolant-temperature gage
11 Overheat warning light
12 Low-oil-pressure warning light
13 Primer pump
14 Magneto switch

Figure 178. Control panel disconnect points.

(*c*) *Disconnect wiring to ammeter.* Disconnect two bell-type connectors at rear of ammeter (3).

(*d*) *Disconnect wiring to fuel gage.* Remove hex nut and lockwasher securing fuel-gage-sending-unit cable to top terminal of fuel gage (2) and remove cable. Remove screw, lockwasher, and plain washer securing battery-switch cable to resistor (1).

(2) *Disconnect tachometer and hour-meter cable.* Loosen retaining nut and remove tachometer and hour-meter cable from rear of tachometer and hour-meter (7).

(3) *Disconnect switch wiring.*

(*a*) *Disconnect wiring to battery-disconnect switch.* Remove screw and lockwasher securing shunt cable to upper terminal of battery-disconnect switch (5) and remove cable. Remove screw and lockwasher securing oil-pressure-warning-light cable and overspeed-relay cable to lower terminal, and remove cables.

(*b*) *Disconnect wiring to magneto switch.* Loosen ferrule nut at rear of magneto switch (14) and pull magneto ground cable partially out of switch shield. Remove screw and lockwasher securing ground cable to switch terminal and remove cable with ferrule nut and ferrule.

(4) *Disconnect radiator-shutter control cable.* Loosen two setscrews securing radiator-shutter-manual-control cable to radiator-shutter control (8). Remove cable.

(5) *Disconnect choke control cable.* Loosen screws securing choke control (6) to choke-valve lever on carburetor and remove choke cable from carburetor.

(6) *Disconnect throttle control cable.* Loosen screws securing throttle control (4) to throttle lever and to cable bracket on carburetor. Remove throttle cable from carburetor.

(7) *Disconnect primer-pump fuel lines.* Loosen retaining nuts securing inlet and outlet fuel lines to rear of primer pump (13) and remove fuel lines.

(8) *Disconnect wiring to warning lights.* Remove screw and lockwasher securing overheat-warning-light-sending-unit cable to lower terminal of overheat-warning light (11). Remove screw and lockwasher securing inter-warning light cable to upper terminal. Remove screw and lockwasher securing low-oil-pressure-warning-light-sending-unit cable to lower terminal of low-oil-pressure warning light (12). Re-

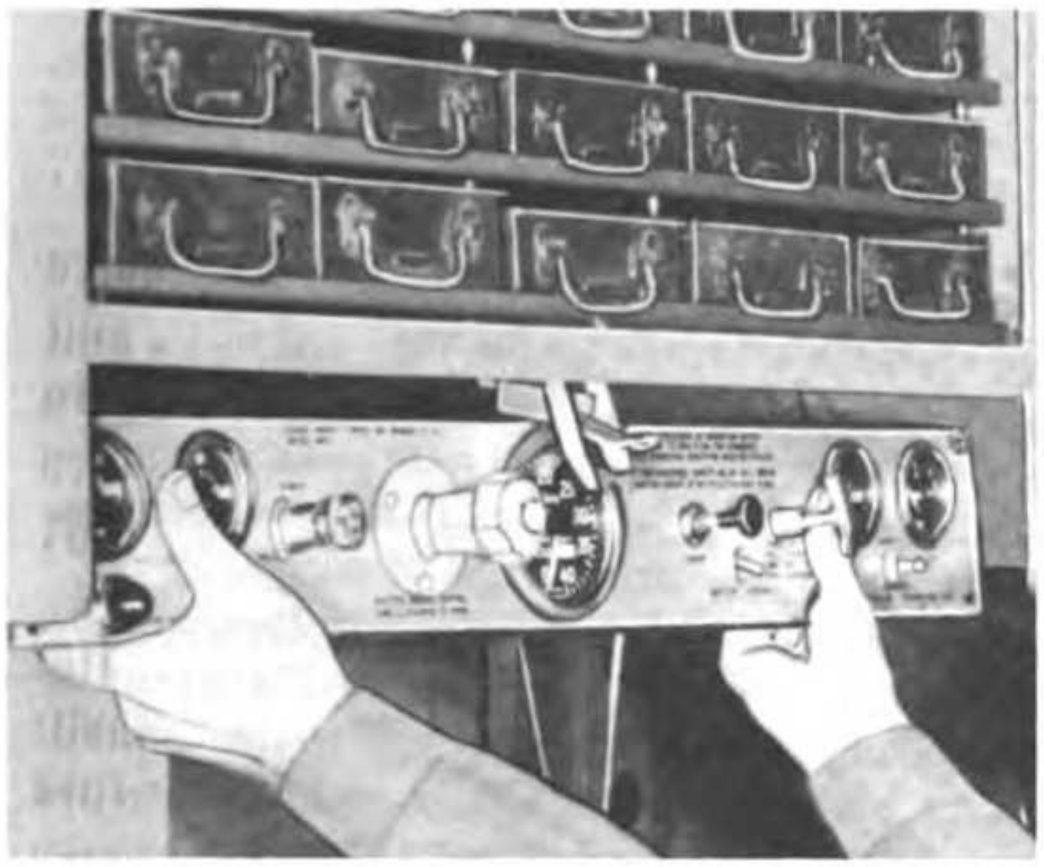


Figure 179. Removing control panel.

move screw and lockwasher securing battery-disconnect switch and interwarning light cables to upper terminal. Remove warning light cables.

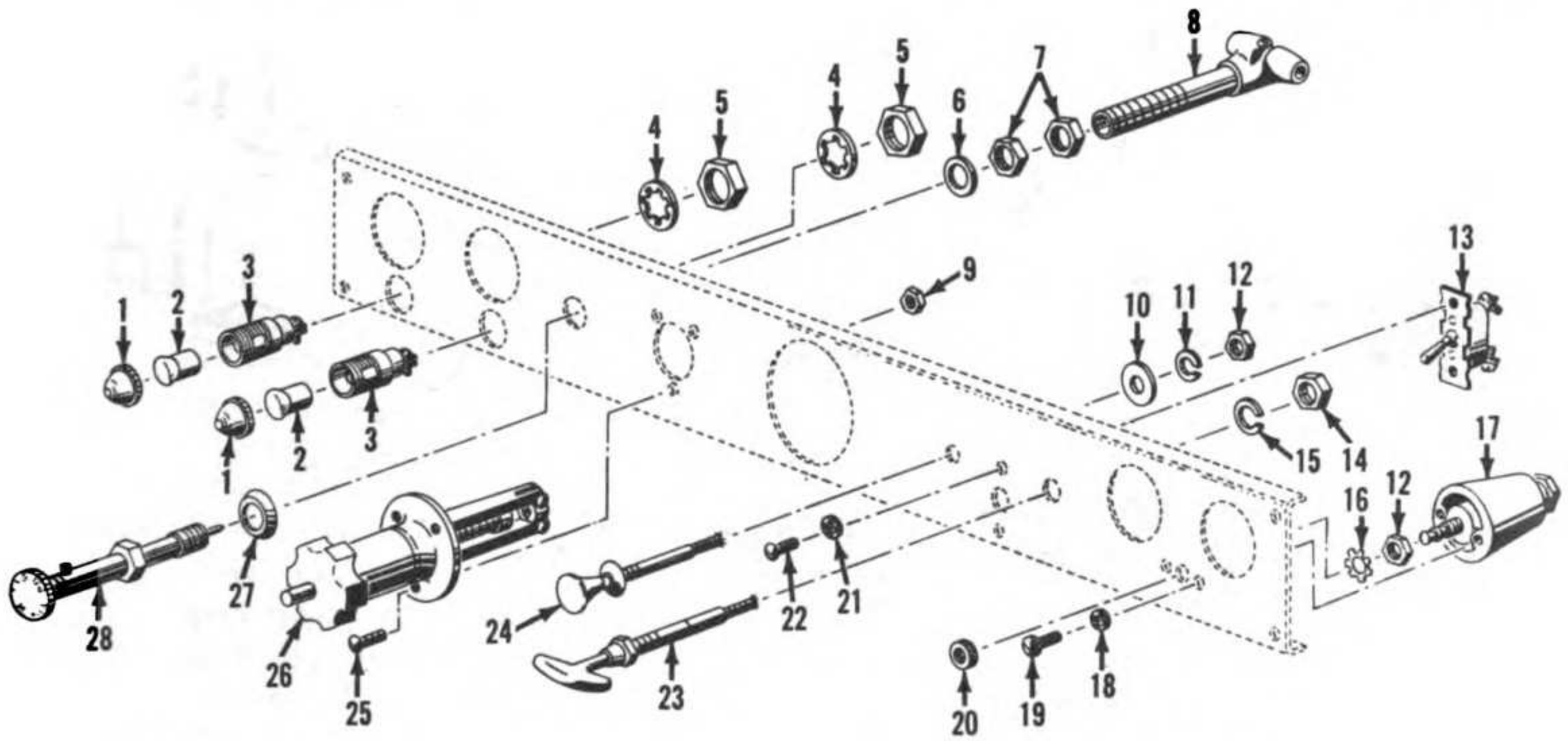
(9) *Remove control panel.* Remove two nuts, washers, and screws securing each end of control panel on mounting brackets and remove control panel from mobile shop (fig. 179).

b. Disassembly.

(1) *Remove warning lights.* Remove nut (5, fig. 180) and lockwasher (4) securing each warning-light socket (3) in control panel. Remove warning lights from front of panel. Back off red globe (1) from socket (3) and remove bulb (2).

(2) *Remove primer pump assembly.* Loosen two nuts (7) securing primer-pump assembly (8) on primer piston assembly (28) and remove cylinder assembly and brass washer (6) from rear of control panel. Remove piston assembly and special washer (27) from front of control panel.

(3) *Remove radiator shutter manual control.* Remove three nuts (9) from rear of con-



1 Red globe (2 rqr)
2 Bulb (2 rqr)
3 Socket (2 rqr)
4 Lockwasher, thin, 1 inch int tooth (2 rqr)
5 Nut, Collar, 1–28 (2 rqr)
6 Washer, brass, $\frac{5}{8}$ ID x 1 OD x $\frac{1}{22}$ thk
7 Nut, hex, brass, $\frac{5}{8}$–32 NC (2 rqr)
8 Primer cylinder assembly
9 Nut, hex, 10–32 NF (3 rqr)
10 Washer, plain, $\frac{3}{8}$ inch std
11 Lockwasher, $\frac{3}{8}$ inch std
12 Nut, hex, $\frac{3}{8}$–24 NF (2 rqr)
13 Battery-disconnect switch
14 Nut, hex (part of throttle control)
15 Lockwasher, $\frac{7}{16}$ inch std
16 Lockwasher, $\frac{3}{8}$ inch ext tooth
17 Magneto switch
18 Lockwasher, No. 10 int tooth (2 rqr)
19 Screw, mach, 10–24 NC x $\frac{3}{8}$ (2 rqr)
20 Nut, knurled, $\frac{3}{8}$ inch
21 Lockwasher, No. 6 int tooth (2 rqr)
22 Screw, mach, 6–32 NC x $\frac{3}{8}$ (2 rqr)
23 Throttle control
24 Choke control
25 Screw, mach, 10–24 NC x $\frac{1}{2}$ (3 rqr)
26 Radiator shutter manual control
27 Special washer
28 Primer piston assembly

Figure 180. Control panel controls and lights, exploded view.

trol panel and remove three screws (25) and radiator shutter manual control (26) from front of control panel.

(4) *Remove choke control.* Loosen nut (12), lockwasher (11), and plain washer (10) securing choke control (24) in control panel. Pull choke control from front of control panel and remove nut, lockwasher, and plain washer from rear of panel.

(5) *Remove throttle control.* Loosen nut (14) and lockwasher (15) securing throttle control (23) in control panel. Pull throttle control from front of control panel and remove nut and lockwasher from rear of panel.

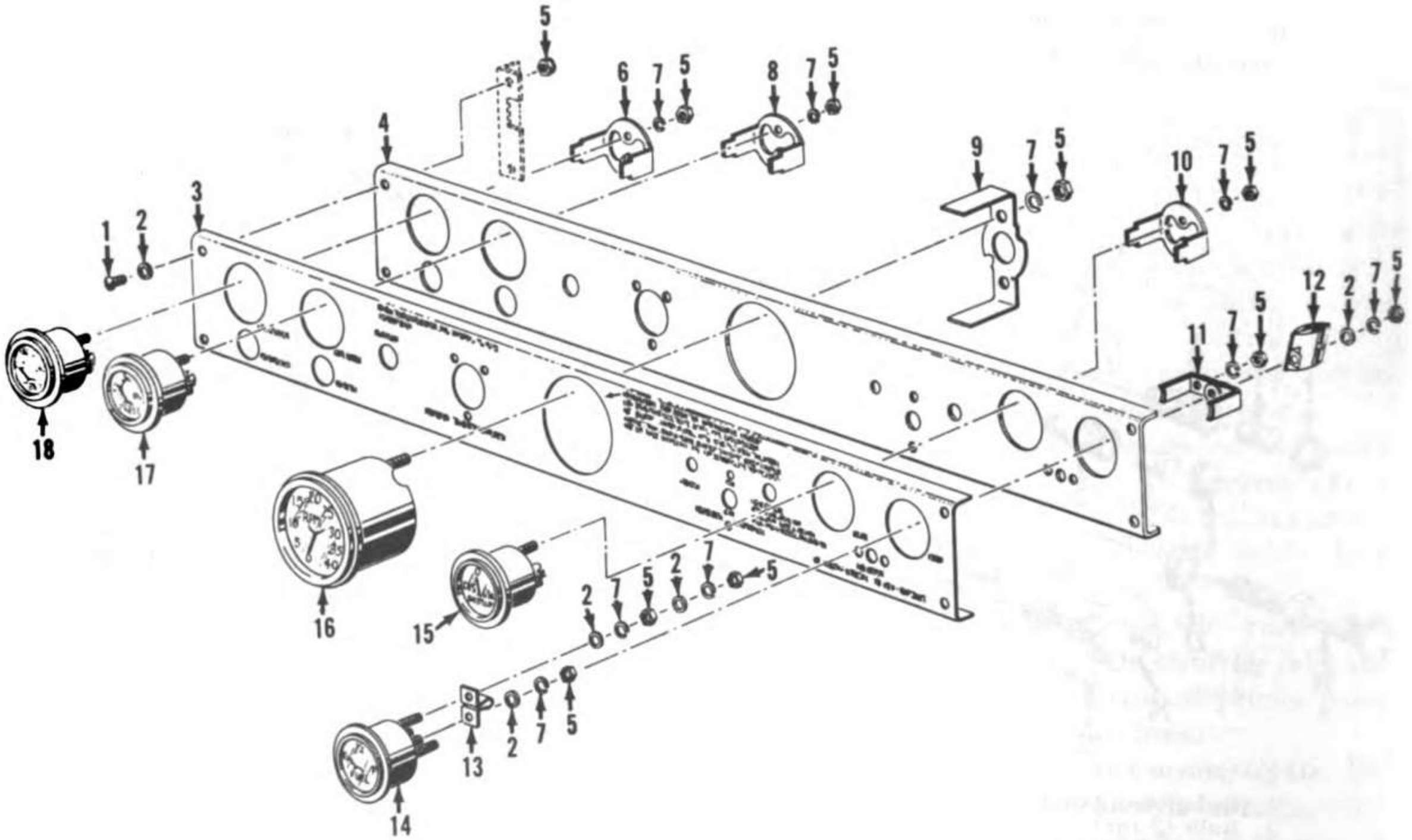
(6) *Remove battery-disconnect switch.* Remove two screws (22) and lockwashers (21) securing battery-disconnect switch (13) in control panel. Remove switch from rear of panel.

(7) *Remove magneto switch.* Remove knurled nut (20), two screws (19), and lockwashers (18) securing magneto switch (17) in control panel. Remove switch, nut (12), and lockwasher (16) from rear of control panel.

(8) *Remove coolant-temperature gage.* Remove two nuts (5, fig. 181) and lockwashers (7) securing coolant-temperature gage (18) in control panel (4). Remove bracket (6) from rear of panel and remove gage from front of panel.

(9) *Remove oil-pressure gage.* Remove two nuts (5) and lockwashers (7) securing oil-pressure gage (17) in control panel. Remove bracket (8) from rear of panel and remove gage from front of panel.

(10) *Remove fuel gage.* Remove three nuts (5), three lockwashers (7), and plain washer (2) securing fuel gage (14) in



1 Screw, mach, 10–32 NF x ⅜ (4 rqr)
2 Washer, No. 10 (4 rqr)
3 Control panel decal
4 Control panel
5 Nut, hex, 10–32 NF (7 rqr)
6 Bracket
7 Lockwasher, No. 10 std (10 rqr)
8 Bracket
9 Bracket
10 Bracket
11 Bracket
12 Resistor
13 Terminal insulator
14 Fuel gage
15 Battery ammeter
16 Tachometer and hour-meter
17 Oil-pressure gage
18 Coolant-temperature gage

Figure 181. Control panel instruments, exploded view.

control panel. Remove resistor (12) and bracket (11) from rear of panel and remove gage with terminal insulator (13) from front of panel. Remove screws (5), lockwashers (7), and plain washers (2) securing terminal insulator on fuel gage. Remove insulator.

(11) *Remove ammeter.* Remove two nuts (5) and lockwashers (7) securing battery-ammeter (15) in control panel. Remove bracket (10) from rear of panel and remove ammeter from front of panel.

(12) *Remove tachometer and hour-meter.* Remove two nuts (5) and lockwashers (7) securing tachometer and hour-meter (16) in control panel. Remove bracket (9) from rear of panel and remove tachometer from front of panel. Remove decal (3) from control panel (4).

c. Cleaning and Inspection

(1) *Cleaning.* Remove grease from instruments with soft fiber brush and an approved cleaning solvent. Polish all electrical terminals and connections to remove corrosion and to restore a good conducting surface. Clean all parts with a clean cloth dampened in an approved cleaning solvent.

Caution: Do not immerse instruments in cleaning solvent.

(2) *Inspection.*

(*a*) *Instruments.* Inspect instruments for cracked or broken glass. Inspect mounting studs for corrosion, stripped or crossed threads. Replace damaged instruments.

(*b*) *Control cables.* Inspect cables for sharp bends, kinks, and breaks. Inspect cable housings for burs, nicks, and other physical damage that will prevent ease of cable operation.

(*c*) *Primer pump.* Inspect primer pump for presence of foreign material and ease of operation.

(*d*) *Warning lights.* Test bulbs and sockets for open circuit. Replace burned out bulbs and defective sockets.

(*e*) *Resistor.* Test value of resistor with a dc ohmmeter. The resistor should be capable of cutting down 24 volts to 6 volts.

(*f*) *Fuel-gage terminal insulator.* Replace torn insulator.

(*g*) *Switches.* Inspect switches for corrosion, excessive wear, or burning of the contacts. Replace defective switches.

d. Reassembly.

(1) *Install tachometer and hour-meter.* Aline decal (3, fig. 181) on control panel (4). Insert tachometer and hour-meter (16) through control panel. Aline bracket (9) over rear of tachometer and secure, using two lockwashers (7) and two nuts (5).

(2) *Install ammeter.* Insert battery-ammeter (15) through control panel. Aline bracket (10) on rear of ammeter and secure, using two lockwashers (7) and two nuts (5).

(3) *Install fuel gage.* Aline terminal insulator (13) on rear of fuel gage (14) and secure, using plain washers (2), lockwashers (7), and nuts (5). Insert fuel gage through control panel, aline bracket (11) over rear of fuel gage and secure, using two lockwashers (7) and two nuts (5). Install resistor (12) on center stud of fuel gage and secure with plain washer (2), lockwasher (7), and nut (5).

(4) *Install coolant-temperature gage.* Insert coolant-temperature gage (18) through control panel. Aline bracket (6) over rear of gage and secure, using two lockwashers (7) and two nuts (5).

(5) *Install oil-pressure gage.* Insert oil-pressure gage (17) through control panel. Aline bracket (8) over rear of gage and secure, using two lockwashers (7) and two nuts (5).

(6) *Install magneto switch.* Install nut (12, fig. 180) and lockwasher (16) on magneto switch (17), tighten nut on shaft. Insert switch through control panel from rear. Aline mounting holes and secure, using two lockwashers (18), two screws (19), and knurled nut (20).

(7) *Install battery-disconnect switch.* Insert battery-disconnect switch (13) in control panel from the rear. Aline mounting holes and secure, using two lockwashers (21) and two screws (22).

(8) *Install throttle control.* Insert throttle control (23) through front of control panel. Assemble lockwasher (15) and nut (14) over cable and tighten securely against rear of control panel.

(9) *Install choke control.* Insert choke control (24) through front of control panel. Assemble plain washer (10), lockwasher (11), and nut (12) over cable and tighten securely against rear of control panel.

(10) *Install radiator shutter manual control.* Insert radiator shutter manual control (26) through front of control panel. Aline mounting holes and secure, using three screws (25) and three nuts (9).

(11) *Install primer pump assembly.* Assemble special washer (27) on primer piston assembly (28) and insert piston assembly through front of control panel. Screw two nuts (7) on primer cylinder assembly (8) and install brass washer (6) on cylinder assembly. Screw cylinder assembly into piston assembly at rear of control panel. Tighten jamnuts securely against rear of control panel.

(12) *Install warning lights.* Install bulb (2) into socket (3) and screw red globe (1) over bulb and on socket. Insert two warning light assemblies through front of control panel and secure, using lockwasher (4) and nut (5).

e. Installation.

(1) *Mount control panel.* Aline control panel assembly on mounting brackets in mobile shop and secure, using two screws (1, fig. 181) washers (2), and nuts (5) at each end of control panel.

(2) *Connect wiring to warning lights.* Connect battery-disconnect switch and inter-warning light cables to upper terminal of low-oil-pressure warning light (12, fig. 178) and secure with lockwasher and screw. Connect low-oil-pressure-warning-light-sending-unit cable to lower terminal and secure with lockwasher and screw. Connect opposite end of inter-warning light cable to upper terminal of overheat-warning light (11) and secure with lockwasher and screw. Connect overheat-warning-light-sending-unit cable to lower terminal and secure with lockwasher and screw.

(3) *Connect primer-pump fuel lines.* Connect inlet and outlet fuel lines to their respective fittings at rear of primer pump (13) and tighten retaining nuts.

(4) *Connect throttle control cable.* Hold throttle lever on carburetor against throttle stop screw; pass throttle control cable under clamp on cable bracket and through hole in throttle lever. Tighten screws securing cable to throttle lever and to cable bracket. Pull throttle control (4) out and observe cable and throttle lever action.

(5) *Connect choke control cable.* Hold choke valve lever on carburetor in the open position; pass choke control cable under clamp on choke valve lever and through hole in lever. Tighten cable retaining screws.

(6) *Connect radiator shutter manual control cable.* Insert end of cable into radiator shutter manual control (8) and tighten two setscrews.

(7) *Connect wiring to magneto switch.* Insert magneto ground cable with ferrule and ferrule nut into magneto switch (14). Connect cable to switch terminal and secure with lockwasher and screw. Tighten ferrule nut in magneto-switch shield.

(8) *Connect wiring to battery-disconnect switch.* Connect overspeed relay cable and oil-pressure-warning-light cable to lower terminal of battery-disconnect switch (5) and secure with lockwasher and screw. Connect shunt cable to upper terminal of battery-disconnect switch and secure with lockwasher and screw.

(9) *Connect tachometer and hour-meter cable.* Insert cable into rear of tachometer and hour-meter (7) and tighten retaining nut.

(10) *Connect wiring to gages.*

(*a*) *Connect wiring to fuel gage.* Connect battery-switch cable to resistor (1) and secure with plain washer, lockwasher, and screw. Connect fuel-gage-sending-unit cable to top terminal of fuel gage (2) and secure with lockwasher and screw.

(*b*) *Connect wiring to ammeter.* Connect two bell-type connectors in receptacles at rear of ammeter (3) and lock.

(*c*) *Connect wiring to oil-pressure gage.* Connect two bell-type connectors in receptacles at rear of oil-pressure gage (9) and lock.

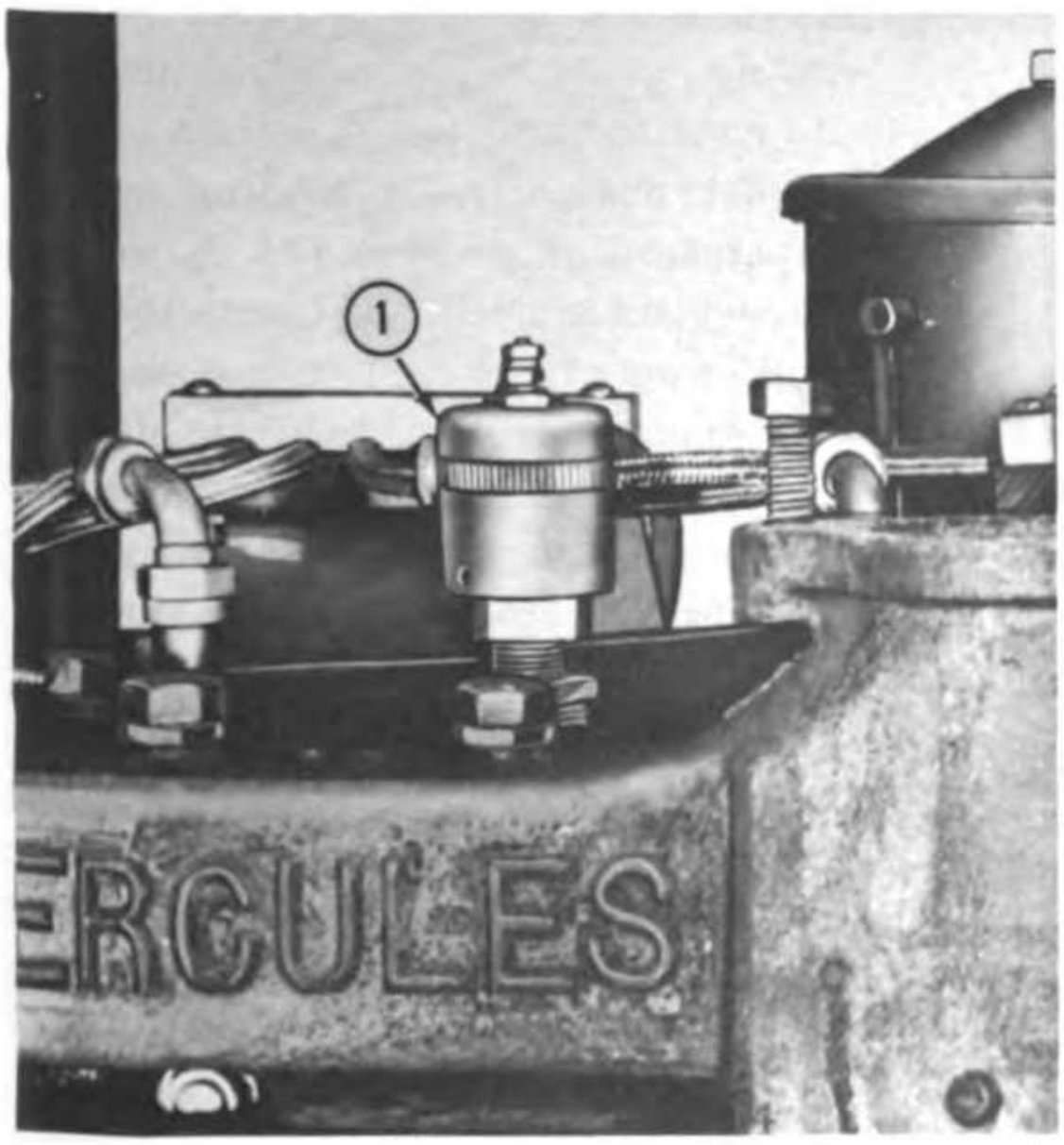
(*d*) *Connect wiring to coolant-temperature gage.* Connect two bell-type connectors in receptacles at rear of coolant-temperature gage (10) and lock.

(11) *Check instruments and controls.* Start engine (par. 41) and operate at idling speed. Check instruments for normal readings and proper operation of all controls. Check primer pump connections for fuel leaks.

179. Sending Units

a. Removal.

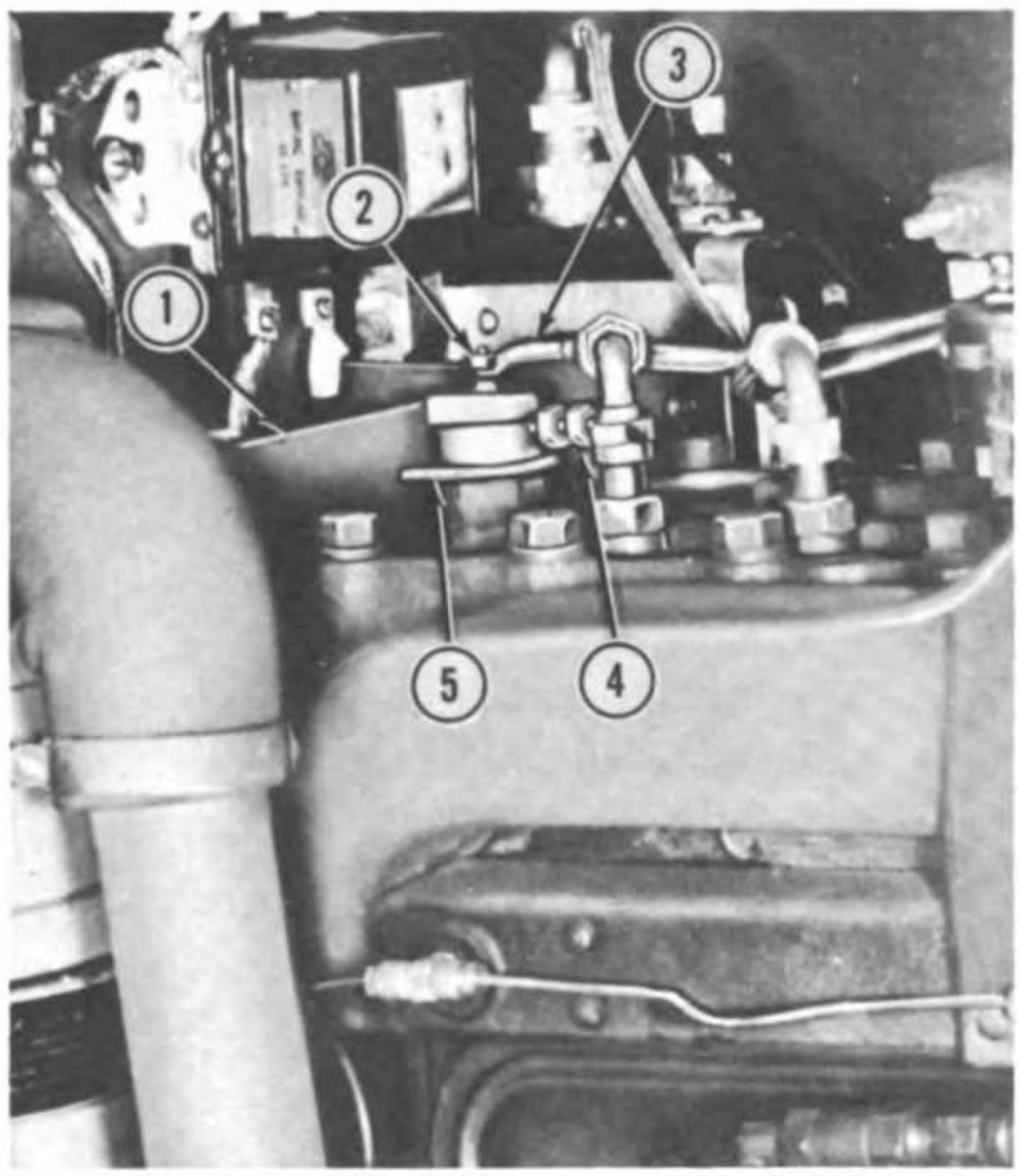
(1) *Removal of overheat-warning-light sending unit.* Remove nut securing sending unit-to-overheat warning light cable to top of overheat-warning light sending unit (1, fig. 182) and lay aside cable. Turn overheat-warning-light sending unit counterclockwise and remove from top of cylinder head.



1 Overheat warning light sending unit

Figure 182. Overheat warning light sending unit installed.

(2) *Removal of low-oil-pressure-warning-light sending unit.* Remove terminal nut (2, fig. 183) securing sending unit to warning light cable (3) to top of sending unit and lay aside cable. Loosen oil line retaining nut (4) and disconnect oil line from side of sending unit. Remove two nuts and clamp (5) securing sending unit to mounting bracket (1) and remove sending unit.

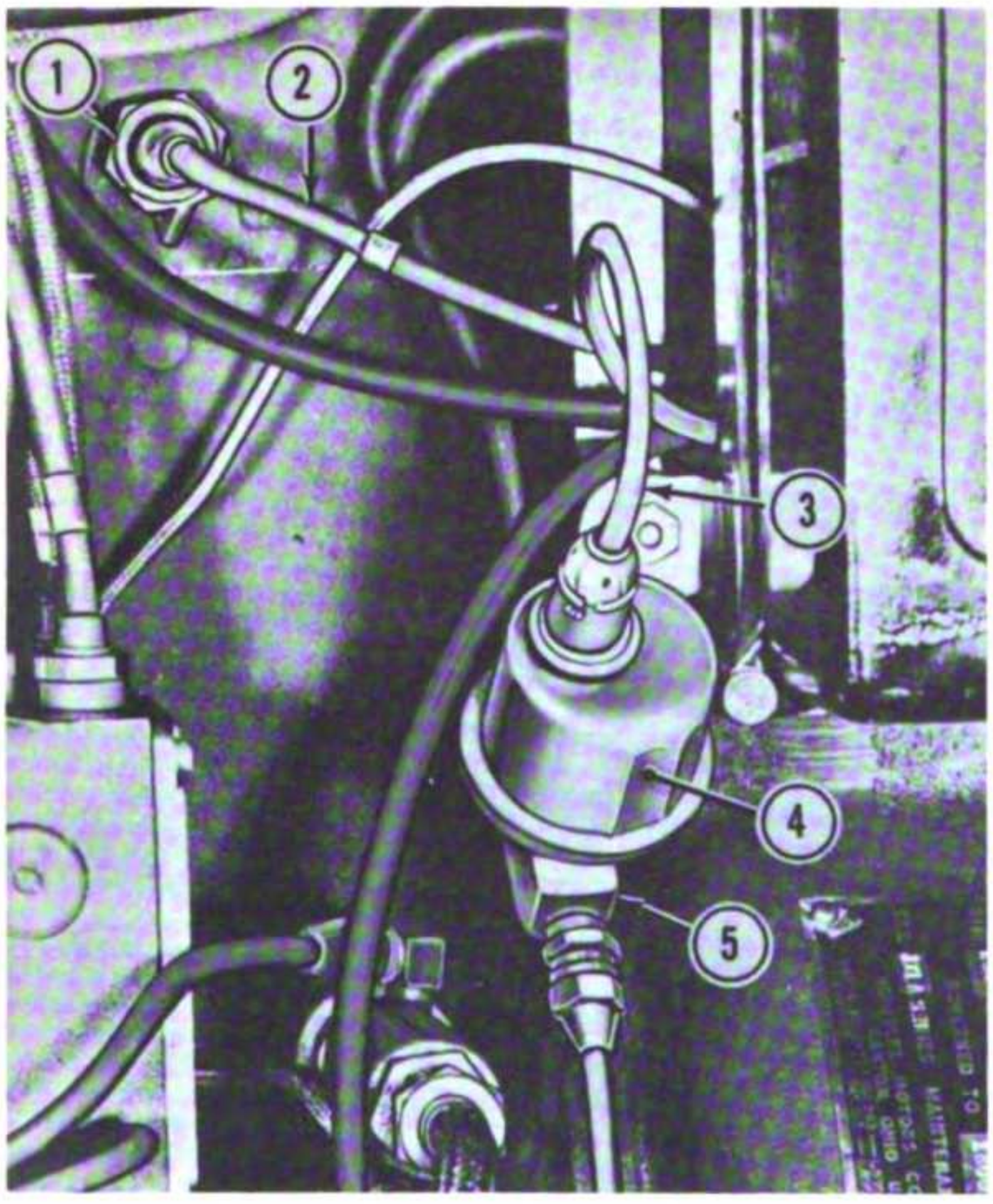


1 Mounting bracket
2 Terminal nut
3 Sending unit-to-warning light cable
4 Oil line retaining nut
5 Clamp

Figure 183. Low-oil-pressure warning light sending unit installed.

(3) *Removal of coolant-temperature-gage sending unit.* Disconnect bell-type connector from top of coolant-temperature-gage sending unit (1, fig. 184) and lay aside sending unit-to-temperature gage cable (2). Unscrew coolant-temperature-gage sending unit from side of cylinder head.

(4) *Removal of oil-pressure-gage sending unit.* Disconnect bell-type connector from top of oil-pressure-gage sending unit (4) and lay aside sending unit-to-oil-



1 Coolant-temperature-gage sending unit
2 Sending unit-to-temperature gage cable
3 Sending unit-to-oil pressure-gage cable
4 Oil pressure gage sending unit
5 Tee

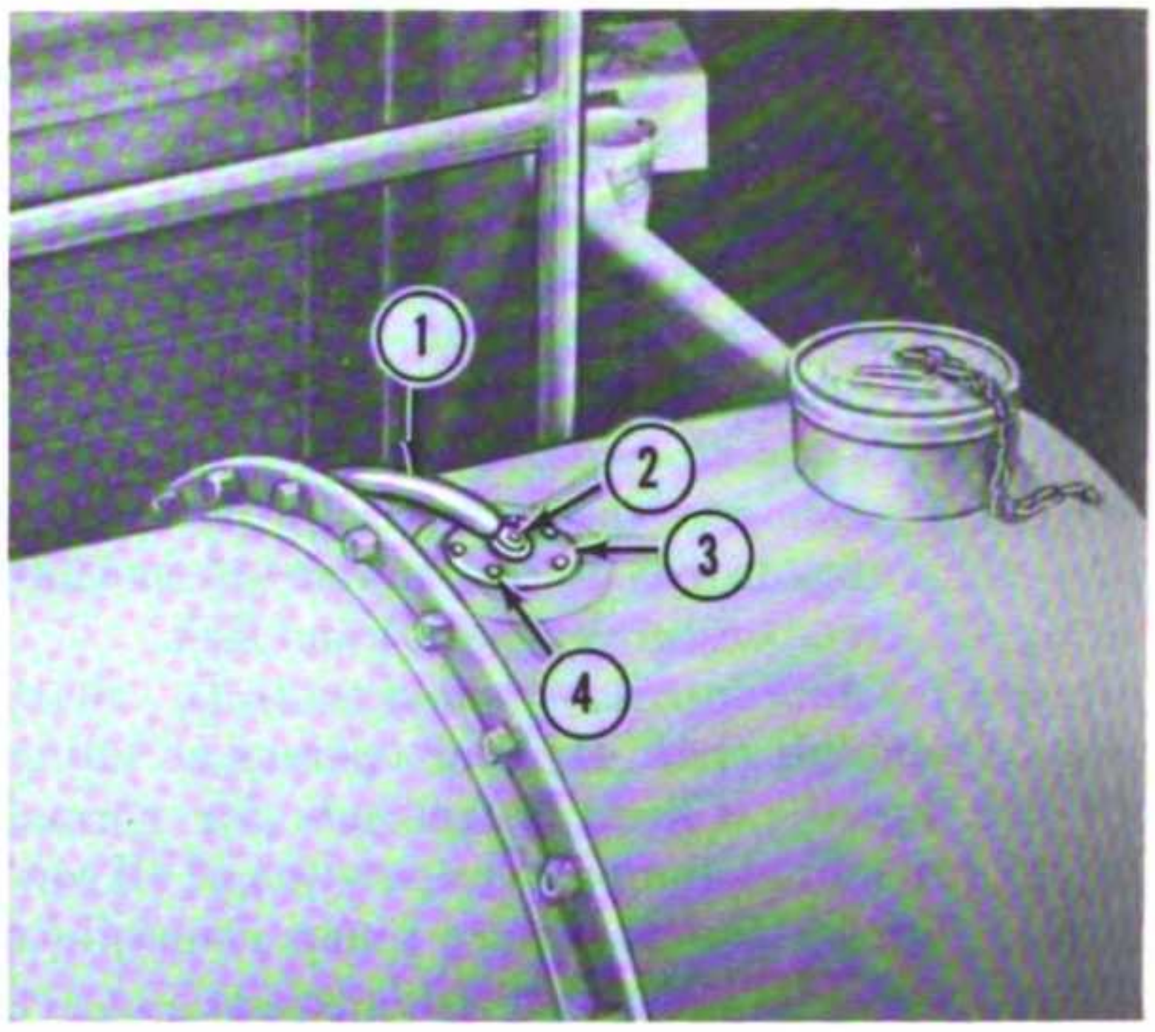
Figure 184. Coolant-temperature gage and oil pressure gage sending units installed.

pressure-gage cable (3). Unscrew oil-pressure-gage sending unit from tee (5).

(5) *Removal of fuel-gage sending unit.* Remove cable screw (2, fig. 185) securing sending unit-to-fuel gage cable (1) to fuel-gage sending unit (3) and lay aside cable. Remove four screws (4) and lockwashers securing sending unit in fuel tank. Remove sending unit and gasket from fuel tank.

b. Installation.

(1) *Installation of fuel-gage sending unit.* Aline gasket on fuel tank. Insert fuel-gage sending unit (3, fig. 185) into fuel tank opening and aline mounting flange on gasket. Install and tighten four lockwashers and screws (4). Secure sending unit-to-fuel gage cable (1) with cable screw (2).



1 Sending unit-to-fuel gage cable
2 Cable screw
3 Sending unit
4 Sending unit screws (4 rqr)

Figure 185. Fuel gage sending unit installed.

(2) *Installation of oil-pressure-gage sending unit.* Screw oil-pressure-gage sending unit (4, fig. 184) into tee (5). Insert sending unit-to-oil pressure gage cable (3) in sending unit and connect bell-type connector.

(3) *Installation of coolant-temperature-gage sending unit.* Screw coolant-temperature-gage sending unit (1) into side of cylinder head. Insert sending unit-to-temperature gage cable (2) in sending unit and connect bell-type connector.

(4) *Installation of low-oil-pressure-warning-light sending unit.* Aline low-oil-pressure-warning-light sending unit on mounting bracket (1, fig. 183) and secure, using clamp (5) and two nuts. Attach oil line to side of sending unit and tighten oil line retaining nut (4). Connect sending unit-to-warning light cable (3) to top of sending unit and secure with terminal nut (2).

(5) *Installation of overheat-warning-light sending unit.* Screw overheat-warning-light sending unit (1, fig. 182) into top of cylinder head. Connect sending unit-to-overheat warning light cable to top of sending unit and secure with a nut.

Section XVI. ENGINE OIL FILTER

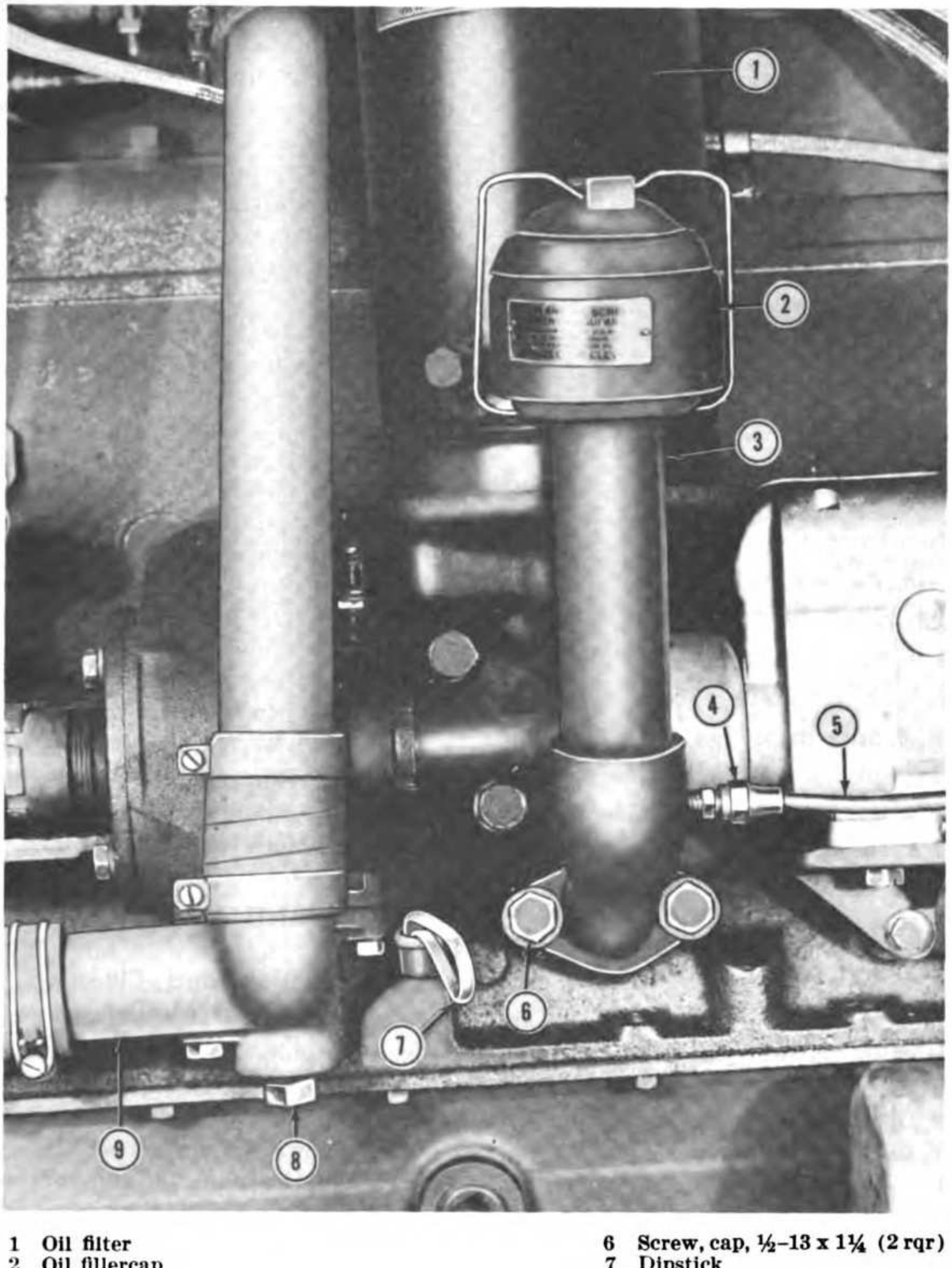
180. Description

The by-pass type oil filter (1, fig. 186) is mounted on the left side of the engine on a cast base that has passages for engine oil and coolant. The filter element is serviced as outlined in paragraph 77*g*.

181. Removal of Oil Filter and Base

a. Loosen retaining nut (4) and disconnect oil line (5) from side of oil filler pipe (3).

b. Remove two cap screws (6) and lockwashers securing oil filler pipe to engine and remove oil filler pipe with oil fillercap (2).

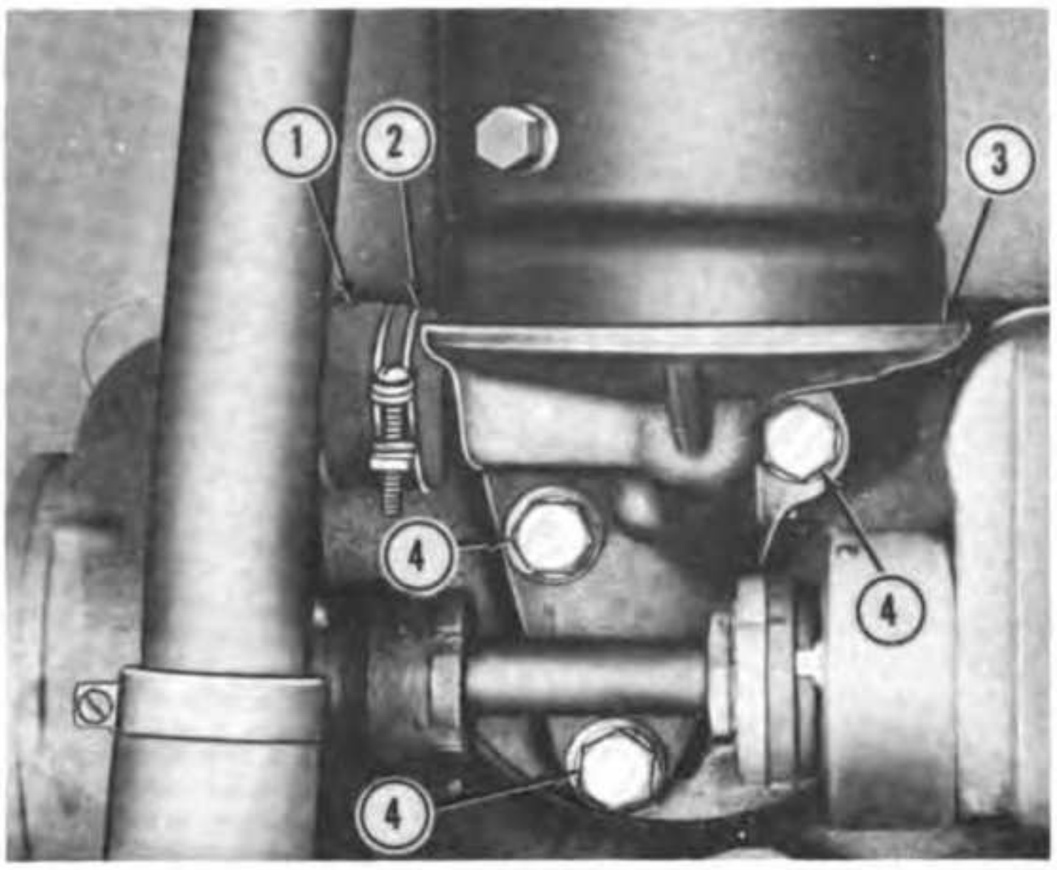


1 Oil filter
2 Oil fillercap
3 Oil filler pipe
4 Retaining nut
5 Oil line
6 Screw, cap, ½–13 x 1¼ (2 rqr)
7 Dipstick
8 Drain plug
9 Water pump adapter

Figure 186. Oil filter installed.

c. Remove drain plug (8) at bottom of water pump adapter (9) and drain cooling system.

d. Loosen hose clamps (2, fig. 187) securing hose (1) between water pump and base (3).



1 Hose, 1¾ x 1¾ lg
2 Clamp, hose, wire, 1¾ ID (2 rqr)
3 Base
4 Screw, cap, ½–13 x 1¼ (4 rqr)

Figure 187. Oil filter disconnect points.

e. Remove four cap screws (4) and lockwashers securing base and oil filter to engine. Remove base with oil filter. Remove and discard flange gasket.

182. Cleaning and Inspection of Oil Filter and Base

a. Cleaning. Remove oil filter element (par. 77*g*). Unscrew threaded long pipe securing oil filter body to base and remove oil filter body. Clean oil filter body with an approved cleaning solvent. Dry with compressed air. Make certain oil passages in base are clear of all foreign material.

b. Inspection. Inspect base and oil filter body for cracks and other physical damage. Replace all defective parts.

183. Installation of Oil Filter and Base

a. Assemble oil filter body on base and screw threaded long pipe through bottom of oil filter body into base. Install oil filter element (par. 77*g*).

b. Spread an approved gasket compound on a new flange gasket and aline gasket on engine mounting surface. Make certain gasket does not cover oil passages and is correctly positioned over dowel.

c. Aline base (3, fig. 187) with oil filter on gasket and slip coolant inlet into hose (1). Secure base to engine, using four lockwashers and cap screws (4). Tighten hose clamps (2).

d. Aline oil filler pipe (3, fig. 186) on engine and secure, using two lockwashers and cap screws (6).

e. Connect oil line (5) to side of oil filler pipe and tighten retaining nut.

f. Install drain plug (8) in bottom of water pump adapter (9) and fill cooling system.

g. Start engine (par. 41) and allow oil filter to fill. Stop engine (par. 48) and add oil (See LO 5–9128–1) to full mark on dipstick (7).

Note. **Check for oil leaks when operating engine.**

Caution: Stop engine immediately if low-oil-pressure warning light (par. 18*m*) goes on. Correct cause before restarting engine.

Section XVII. ENGINE EXHAUST PIPE AND MUFFLER

184. Description

The engine exhaust pipe and muffler are mounted vertically between the engine exhaust manifold and the top panel of the engine enclosure. The upper end of the exhaust muffler projects through an opening in the top panel and is fitted with a hinged raincap. During engine operation, exhaust pressure opens the raincap permitting exhaust gases to escape. The exhaust muffler permits the exhaust gases to escape with a minimum of noise and also minimizes exhaust back pressure.

185. Inspection and Cleaning of Exhaust Pipe and Muffler

a. Inspection. Inspect exhaust pipe and muffler for cracks, holes, excessive burning, and corrosion. Carefully examine nuts, screws, and muffler clamps for good condition. Replace all defective parts (pars. 186 and 187).

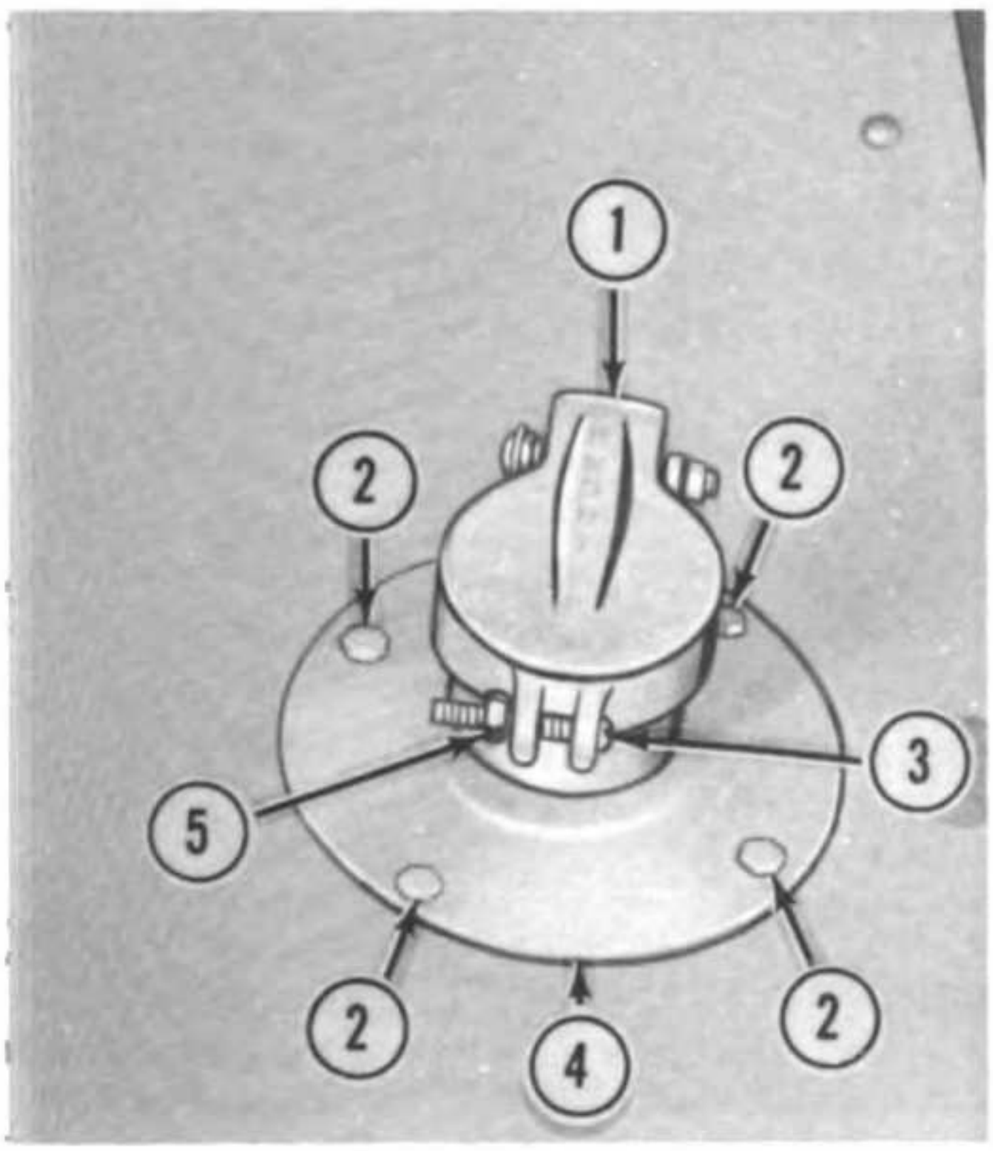
b. Cleaning. When exhaust pipe and muffler are cold, wipe excess water, dirt, grease, carbon, and rust from exterior of exhaust pipe and muffler. Carbon deposits and accumulated rust inside the exhaust pipe and muffler reduce engine efficiency

and cause overheating. After exhaust pipe and muffler are removed (par. 186), tap exhaust pipe and muffler to remove carbon deposits and rust.

Caution: Do not tap exhaust pipe and muffler when installed. Carbon deposits and rust will fall into the exhaust manifold and cause damage to the engine.

186. Removal of Exhaust Pipe and Muffler

a. Loosen nut (5, fig. 188) and stove bolt (3) securing exhaust raincap (1) on end of exhaust muffler and remove raincap.



1 Exhaust raincap
2 Screw, cap, ¼ x 1 NC (4 rqr)
3 Bolt, stove, ¼ x 1½ lg
4 Plate
5 Nut, hex, ¼ inch NC

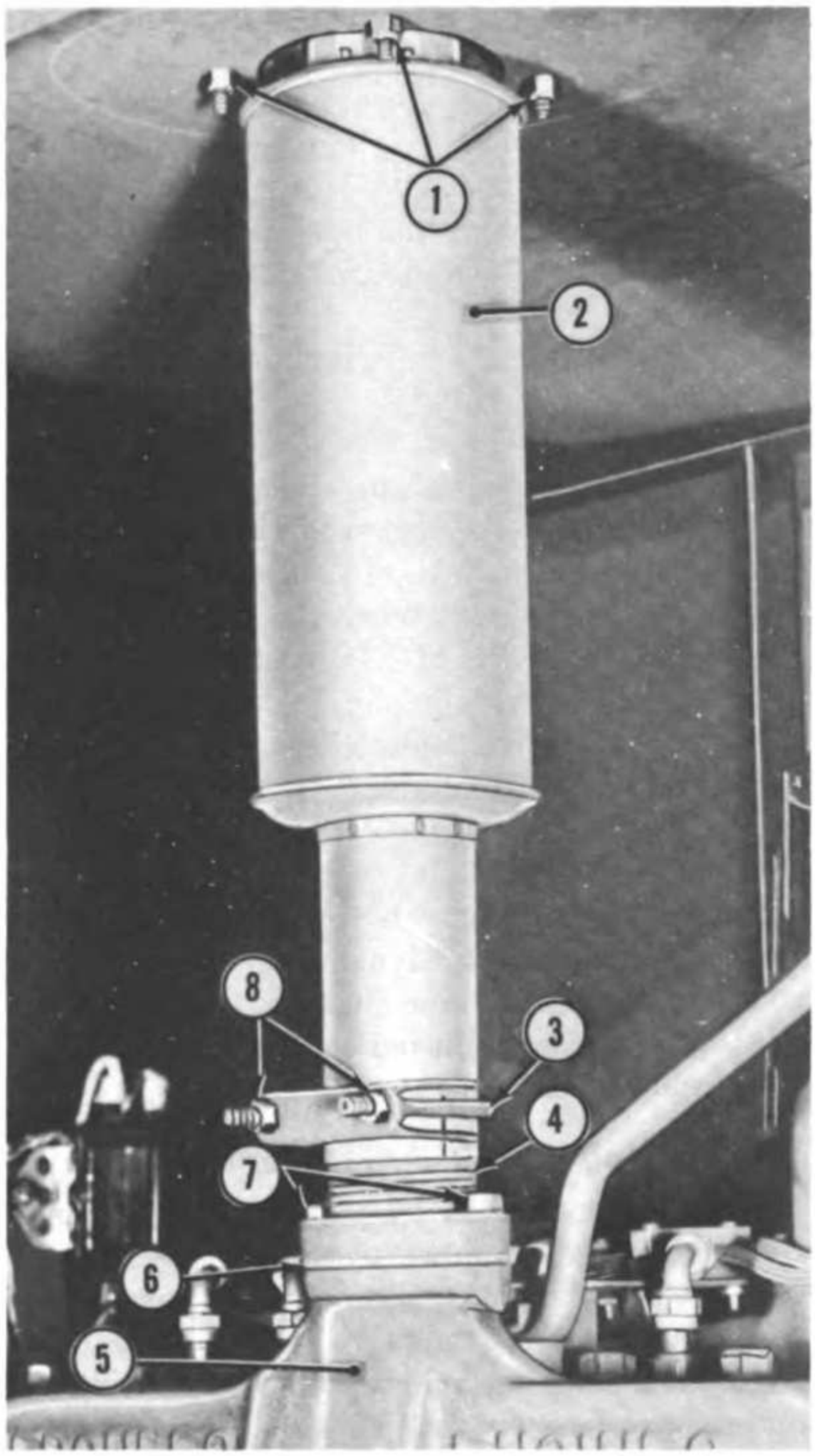
Figure 188. Exhaust raincap installed on engine enclosure.

b. From within engine enclosure, remove four stopnuts (1, fig. 189) securing plate (4, fig. 188) in top panel of engine enclosure and remove four screws (2) and plate from top of engine enclosure.

c. Loosen hex nuts (8, fig. 189) and slide clamp (3) upward on sleeve of exhaust muffler (2).

d. Remove two cap screws (7) and lockwashers securing exhaust pipe (4) to exhaust manifold (5) and push exhaust pipe upward into exhaust muffler sleeve.

e. Swing bottom of exhaust muffler away from exhaust manifold and remove exhaust pipe and muffler from engine. Pull exhaust pipe out of exhaust muffler sleeve. Remove and discard exhaust flange gasket (6).



1 Stopnuts (4 rqr)
2 Exhaust muffler
3 Clamp
4 Exhaust pipe
5 Exhaust manifold
6 Exhaust flange gasket
7 Screw, cap, 7/16 NC x ½ (2 rqr)
8 Nut, hex, 7/16 NC (2 rqr)

Figure 189. Engine exhaust pipe and muffler installed.

187. Installation of Exhaust Pipe and Muffler

a. Install exhaust pipe into long sleeve of exhaust muffler. Insert short sleeve of muffler into opening in top panel of engine enclosure. Aline exhaust muffler (2) vertically between top panel and exhaust manifold (5). Install new exhaust flange gasket (6) on exhaust manifold and lower exhaust pipe (4) on gasket. Install and tighten

two lockwashers and cap screws (7), securing exhaust pipe to exhaust manifold.

b. Slide clamp (3) down, covering slot in exhaust muffler sleeve and tighten two hex nuts (8).

c. Aline plate (4, fig. 188) over top of exhaust muffler and aline mounting holes with holes in top panel of engine enclosure. Install four screws (2) through plate and through top panel. Install and tighten four stopnuts (1, fig. 189) from within engine enclosure.

d. Install raincap (1, fig. 188) over end of exhaust muffler and tighten stove bolt (3) and nut (5).

Section XVIII. ENGINE CLUTCH ASSEMBLY

188. Description

The dry-type clutch contains one three-piece driven disk operating between two drive plates. Lugs on the driven disk are always engaged in the engine flywheel ring. When the clutch is in the CLUTCH DISENGAGED position, the drive plates do not drive the clutch shaft but remain stationary. When the clutch is in the CLUTCH ENGAGED position, the drive plates lock the driven disk and the drive plate keyed to the clutch shaft drives the clutch assembly. The engine clutch (2, fig. 10) controls transmission of power from the engine to the dynamotor-welder and air compressor. The engine clutch is completely enclosed, but can be adjusted through the handhole in the clutch bell housing.

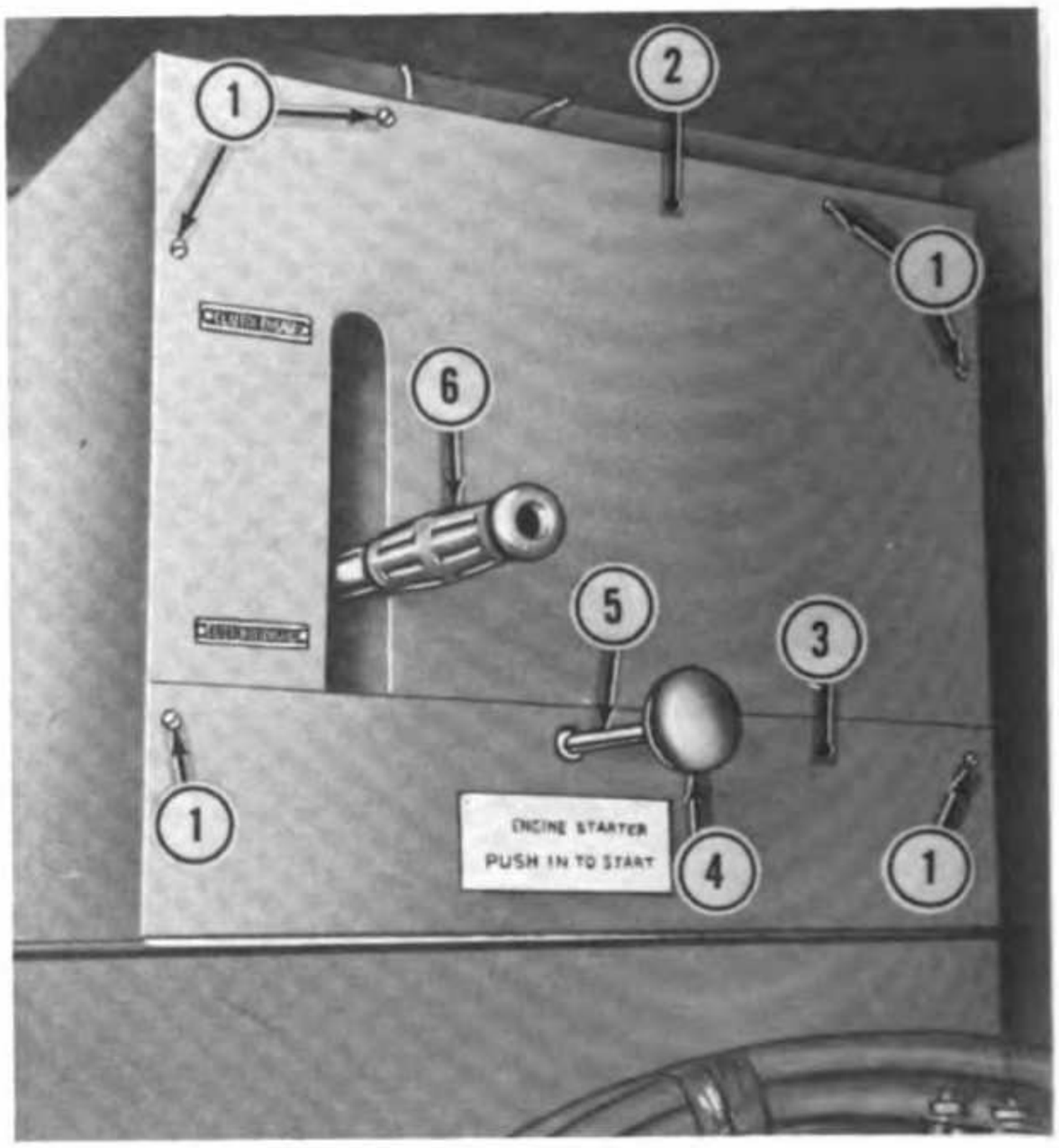
189. Engine Clutch Adjustment

a. Disengage clutch by pushing engine clutch control (1, fig. 42) down to the CLUTCH DISENGAGED position. Stop engine (par. 48).

b. Remove four screws (1, fig. 190) securing engine clutch upper access plate (2) to bulkhead and remove access plate. Unscrew starting motor control knob (4) from starting motor control rod (5); remove two screws (1) securing engine clutch lower access plate (3) to bulkhead and slide access plate off control rod.

c. Remove two screws securing handhole cover plate on clutch bell housing and remove handhole cover plate.

d. Rotate clutch assembly by hand until yoke lockpin (3, fig. 191) can be reached through handhole. Pull lockpin out and rotate yoke (2) clockwise to take up clutch wear. Turn yoke up snug; then test adjustment by moving engine clutch control. When clutch adjustment is correct, it will require firm hand pressure to pull the engine clutch control up and snap the clutch into its engaged position. Clutch adjustment is too tight if the engine clutch control will not snap in, and too loose if the engine clutch control eases in without



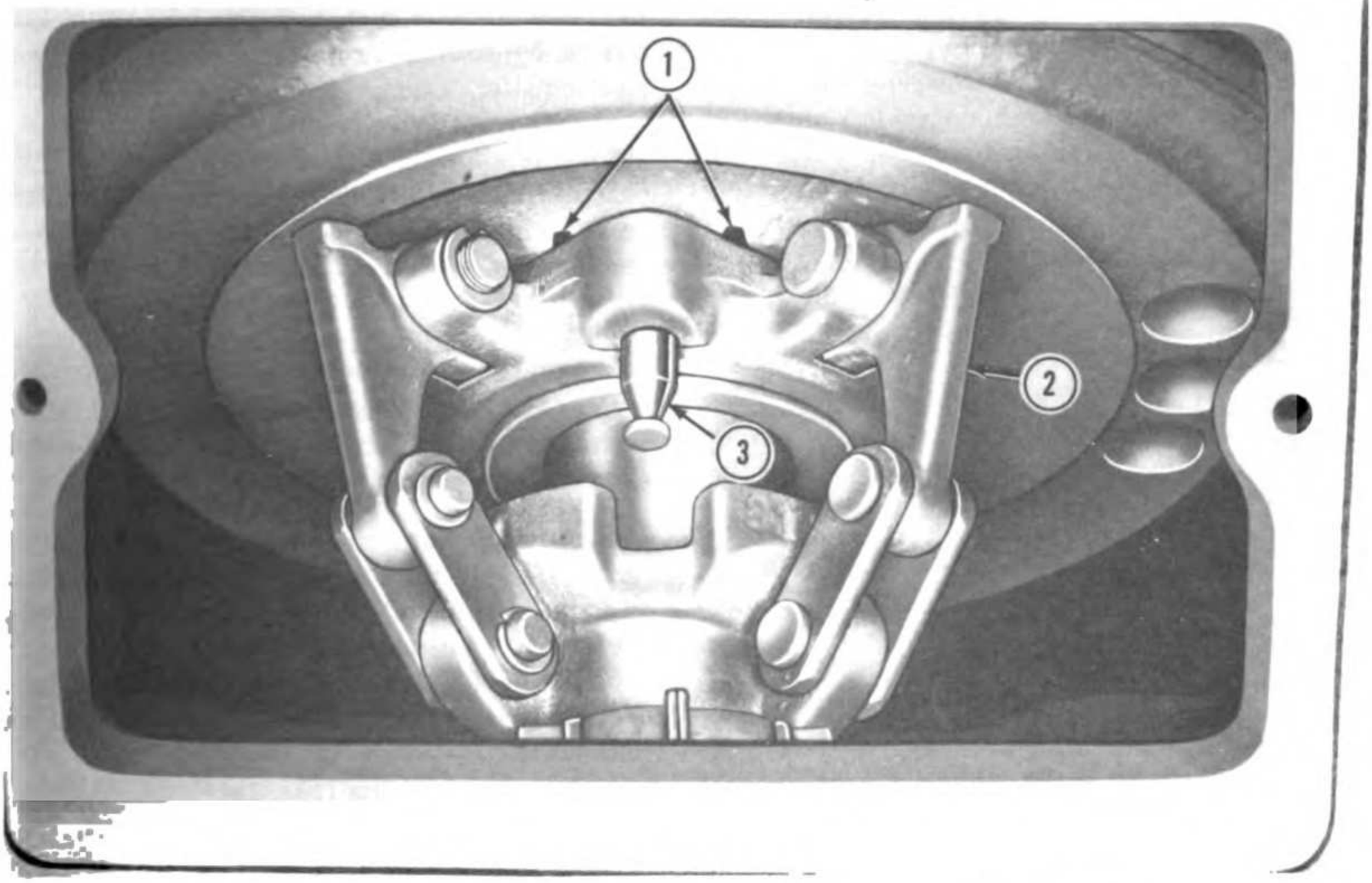
1 Screw, sheet metal, No. 10 x ½ lg (6 rqr)
2 Engine clutch upper access plate
3 Engine clutch lower access plate
4 Starting motor control rod knob
5 Starting motor control rod
6 Engine clutch control

Figure 190. Engine clutch access plates installed.

resistance. Turn the yoke as necessary to make final adjustment. Insert lockpin through yoke and into a notch in the pressure plate (1).

Note. Adjustments made to take up clutch wear seldom require more than one notch adjustment.

e. Test clutch adjustment by starting engine (par. 41) and start dynamotor-welder (par. 42). If engine clutch slips under a normal load, remove lockpin (3) and rotate yoke clockwise until the lockpin can be inserted in the next pressure plate notch (1). If clutch grabs as it is being engaged, remove lockpin and rotate yoke counterclockwise until the lockpin can be inserted in the next pressure plate notch.



1 Pressure plate notches 2 Yoke 3 Lockpin

Figure 191. Engine clutch adjustment lockpin and yoke.

f. Stop dynamotor-welder (par. 42) and stop engine (par. 48).

g. Lubricate engine clutch assembly as specified in LO 5–9128–1.

h. Aline handhole cover plate on clutch bell housing and secure, using two cap screws.

i. Assemble engine-clutch lower access plate (3, fig. 190) over starting-motor control rod (5) and aline access plate on bulkhead. Secure access plate to bulkhead with two screws (1). Screw starting-motor control knob (4) on starting-motor control rod. Aline engine-clutch upper access plate (2) over engine-clutch control (6) and secure to bulkhead, using four screws (1).

Section XIX. DRIVE BELTS

190. Description

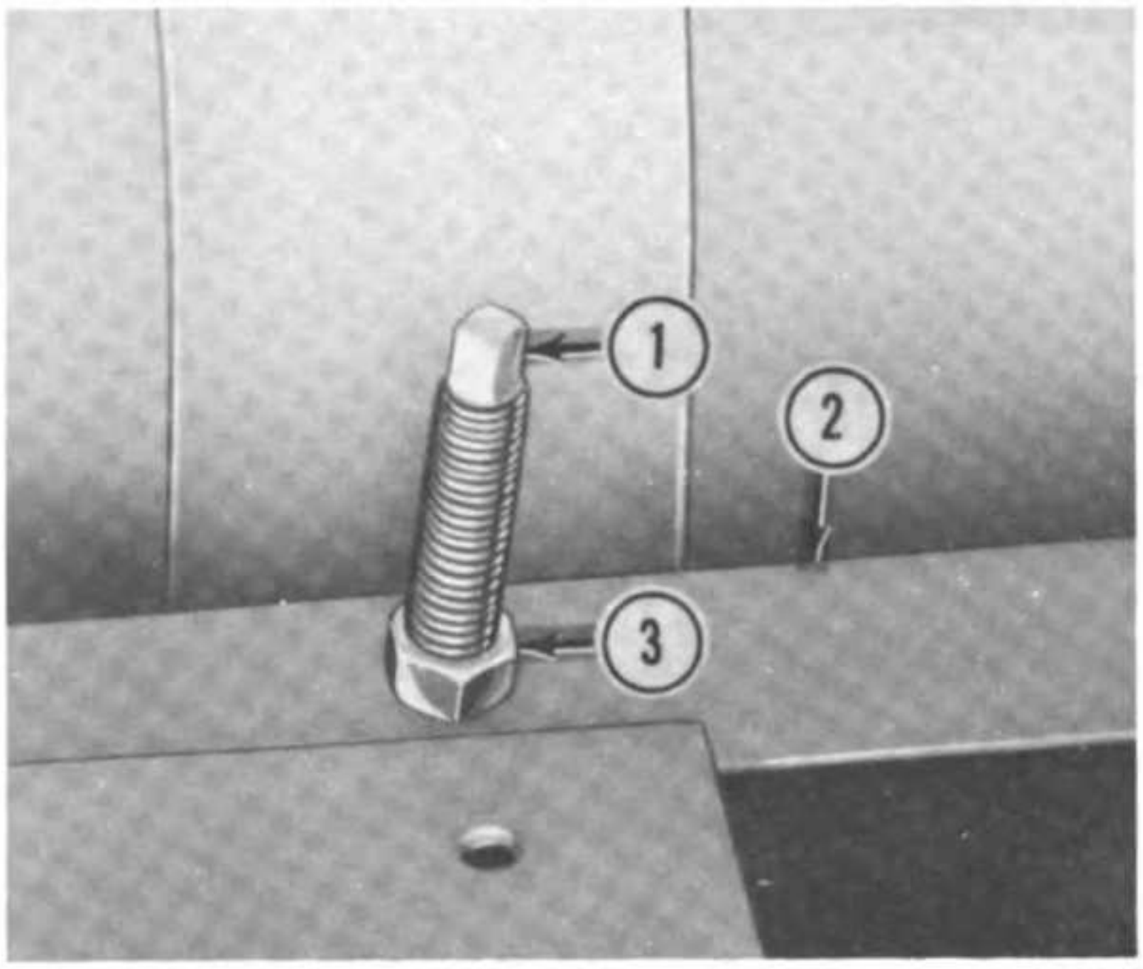
The engine drives the dynamotor-welder through six V-type belts (3, fig. 10) that are installed on two pulleys. One pulley is mounted on the engine-clutch shaft and the other pulley is mounted on the dynamotor-welder shaft.

191. Drive Belts Adjustment

a. Remove engine-clutch upper access plate (par. 189*b*) to gain access to the drive belts.

b. To increase tension on drive belts, loosen locknut (3, fig. 192) and rotate stabilizer bar (1) clockwise. This will increase tension on the belt tension spring in the dynamotor-welder cradle assembly (2). Tighten locknut after one inch of finger deflection is obtained on the belts at a point midway between the pulleys. To decrease tension on drive belts, loosen locknut and rotate stabilizer bar counterclockwise. This will decrease tension on the belt tension spring in the dynamotor-welder cradle assembly. Tighten locknut after adjustment is made.

c. Install engine-clutch upper access plate (par. 189*i*).



1 Stabilizer bar
2 Dynamotor-welder cradle-assembly
3 Locknut, stabilizer bar

Figure 192. Drive belts adjusting points.

192. Removal of Drive Belts

a. Remove engine clutch access plates (par. 189*b*).

b. Provide slack in drive belts by loosening locknut (3, fig. 192) and rotating stabilizer (1) counterclockwise.

c. Lift front drive belt off engine pulley (1, fig. 193) and allow belt to drop on starting motor control rod (3). Remove remaining five belts from engine pulley and allow them to drop on starting motor control rod as shown in figure 193.

Note. Opposite end of starting motor control rod is secured to the starting motor lever with a clevis pin and is easily raised and lowered.

d. Raise starting motor control rod and remove six drive belts (2) from rod and out of mobile shop. Lower control rod.

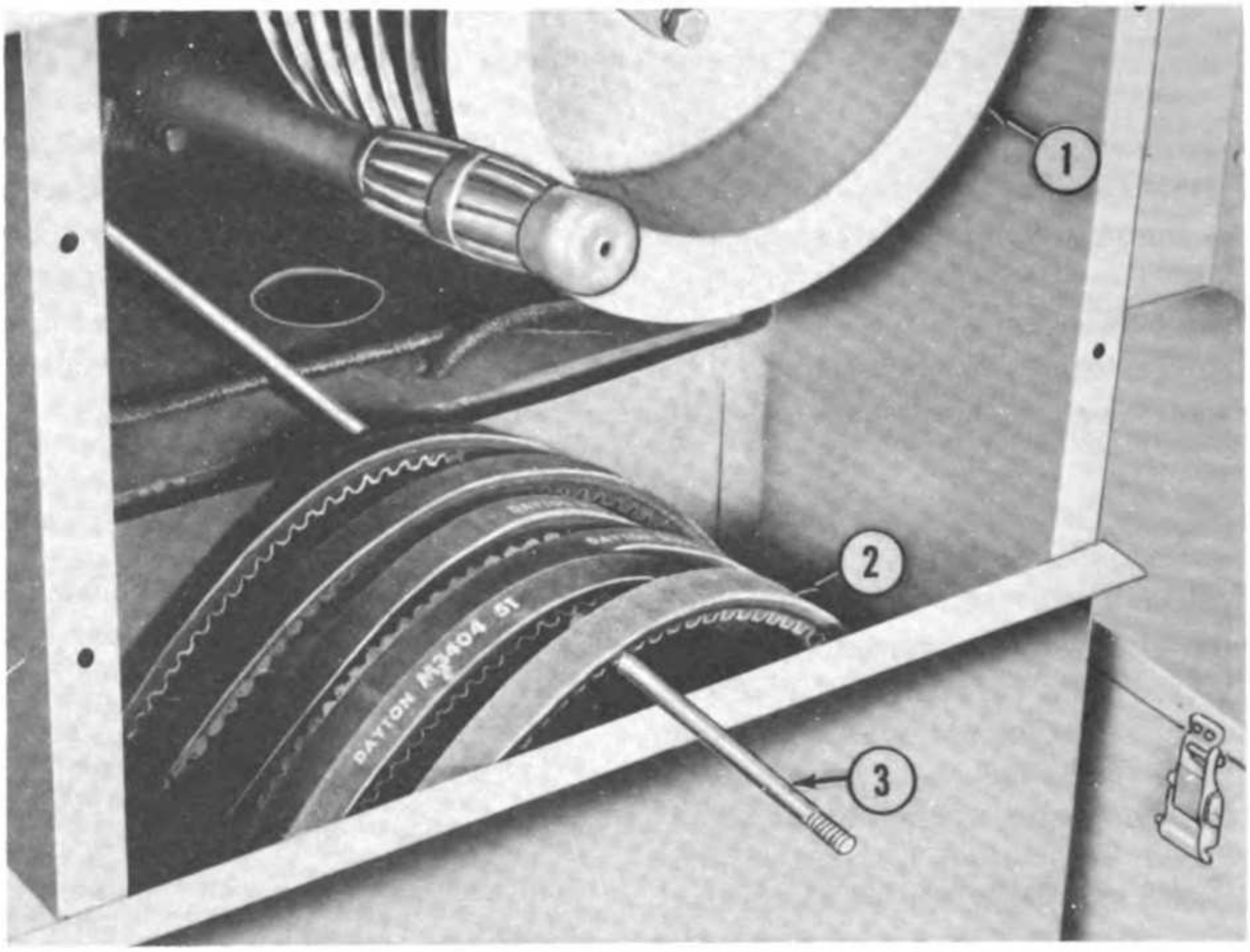
193. Installation of Drive Belts

a. Raise starting motor control rod (3) and slip six drive belts (2) on control rod, allowing the belts to hang as shown in figure 193.

b. Assemble each drive belt, one at a time, around dynamotor-welder pulley, and over engine pulley (1).

c. Adjust drive belts (par. 191).

d. Install engine-clutch access plates (par. 189*i*).



1 Engine pulley 2 Drive belts (6 rqr) 3 Starting motor control rod

Figure 193. Drive belts removed from engine pulley.

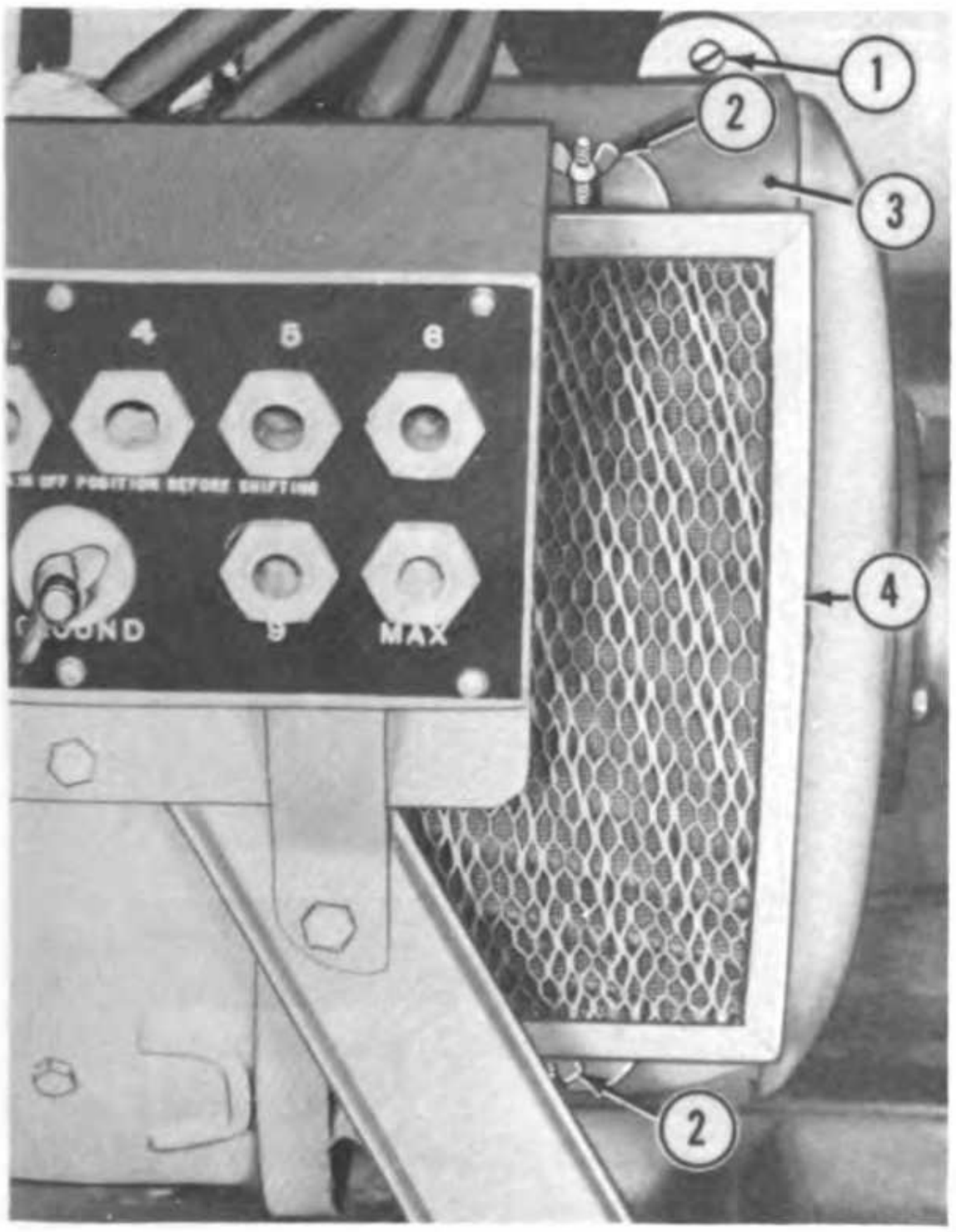
Section XX. DYNAMOTOR-WELDER AND ELECTRIC-CONTROL SYSTEM

194. Description

The dynamotor-welder and electric-control system supplies and controls electrical energy for the 208-volt circuit (fig. 92), the 110-volt circuit (fig. 89), and for welding operation. The dynamotor-welder is driven by the engine (par. 42*a*) or from an external power source (par. 42*b*). The electric-control cubicle controls the input and output of the dynamotor-welder, and also provides the operator with controls to adjust current and voltage for welding operations (par. 47). Four impingement-type air filters are mounted on the dynamotor-welder cover bands, two on each cover band, to filter air drawn into each end of the dynamotor-welder for cooling purposes.

195. Dynamotor-Welder Air Filters

a. Removal. Remove two wingnuts (2, fig. 194) securing air filter (4) on band (3) and remove air filter. Remove remaining air filter from dc end and two air filters from band on ac end.



1 Band screw (2 rqr)
2 Wingnut (2 rqr)
3 Band
4 Air filter

Figure 194. Dynamotor-welder band and air filter installed, dc end.

b. Cleaning and Inspection.

(1) *Cleaning.* Clean air filters with a stiff bristle brush dampened in approved cleaning solvent. Dry with compressed air.

(2) *Inspection.* Inspect air filters for bent or damaged screen mesh and for cracked or damaged frames.

c. Installation. Aline air filter (4) on band (3) and secure with two wingnuts (2). Install remaining three air filters in the same manner.

196. Dynamotor-Welder DC Brushes

a. Servicing.

(1) *Remove band.* Remove two nuts and two band screws (1, fig. 194) securing band (3) around dynamotor-welder; spread and remove band with attached air filters (4).

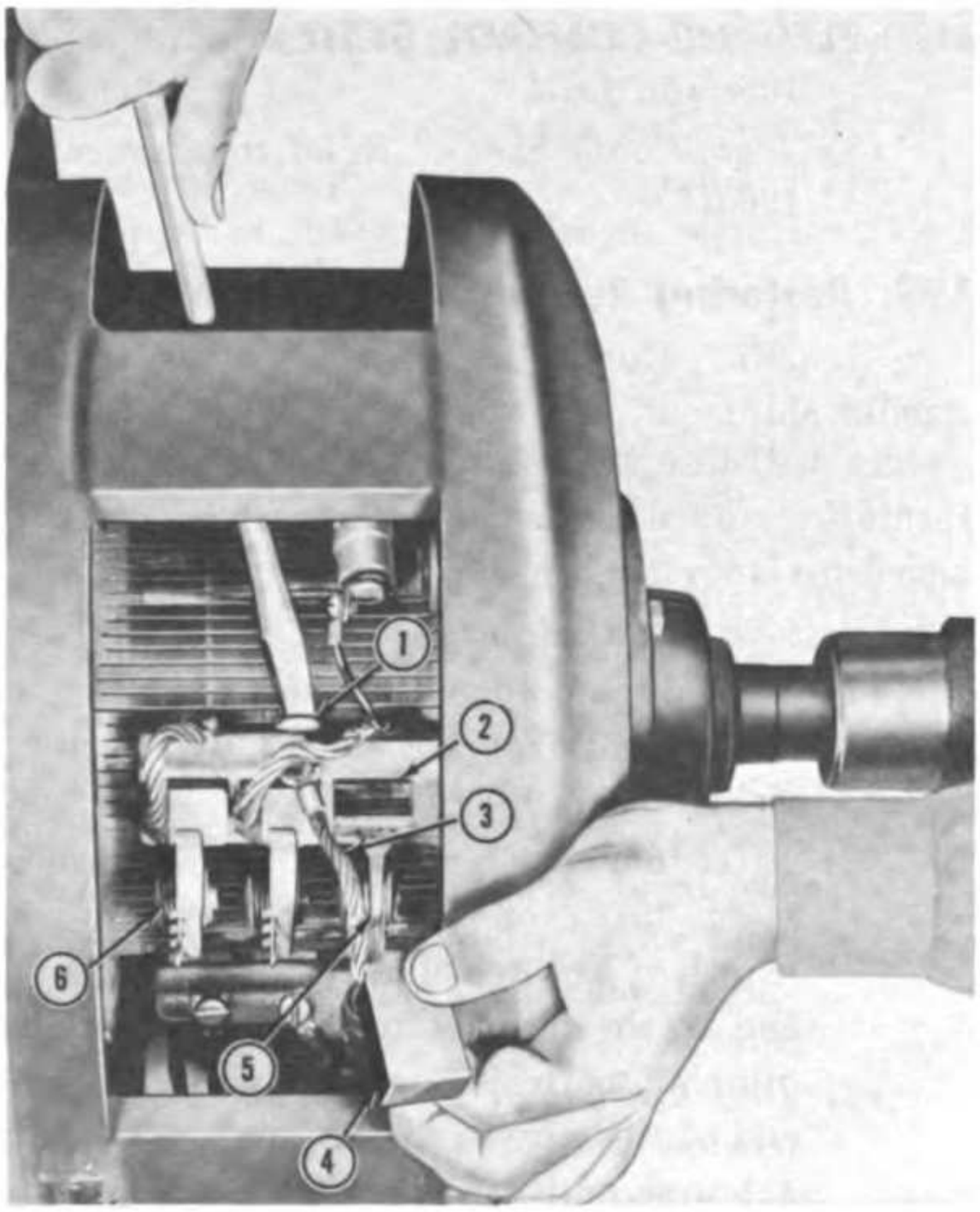
(2) *Pull brush out of brush holder.* Lift tension arm (5, fig. 195) off top of brush (4) and pull brush out of brush holder (2).

Note. There are 12 brushes installed in groups of three.

(3) *Inspect.* Inspect brush for cracks, excessive wear, and loose or frayed brush leads (3). Replace brush if wear is more than one-half original length.

(4) *Check brush spring tension.* Install brush back into brush holder and check brush spring tension. Attach a small spring scale to the tension arm and pull on scale. A two-pound pull should lift the tension arm off the brush. If tension arm lifts before two pounds are indicated on the scale, disconnect scale and move brush spring (6) back on tension arm one notch. Recheck brush spring tension. If brush spring is too weak and the last notch in the tension arm is used, notify the proper authority. Check all 12 brush springs in this manner.

(5) *Install band.* Make certain all brushes are installed in their holders and the tension arms are pressing the brushes against the commutator. Assemble band (3, fig. 194) with air filters around dynamotor-welder and secure ends of band together with two band screws (1) and two nuts.



1 Screw
2 Brush holder
3 Brush lead
4 Brush
5 Tension arm
6 Brush spring

Figure 195. Removing dynamotor-welder dc brush.

b. Removal.

(1) *Remove band.* Refer to *a*(1) above.

(2) *Pull brush out of brush holder.* Refer to *a*(2) above.

(3) *Remove brushes.* Remove screw (1, fig. 195) securing brush lead (3) to brush holder (2) and remove brush (4). Remove remaining 11 brushes in the same manner.

c. Installation.

(1) *Insert brush.* Lift tension arm (5) and insert brush (4) into brush holder (2). Lower tension arm on brush.

(2) *Secure brush.* Connect brush lead to brush holder and secure with screw. Install all 12 brushes in the same manner.

(3) *Seat brushes.* Seat brushes to contour of commutator by placing a strip of No. 00 sandpaper between brushes and commutator with the grit side of sandpaper against the brushes. Draw sandpaper back and forth until brushes conform to contour of commutator. At least 90 percent of brush contact area should be seated. Use compressed air to carefully remove loose particles from commutator.

Caution: Do not use emery cloth for seating brushes; emery particles will cause short circuits in the commutator.

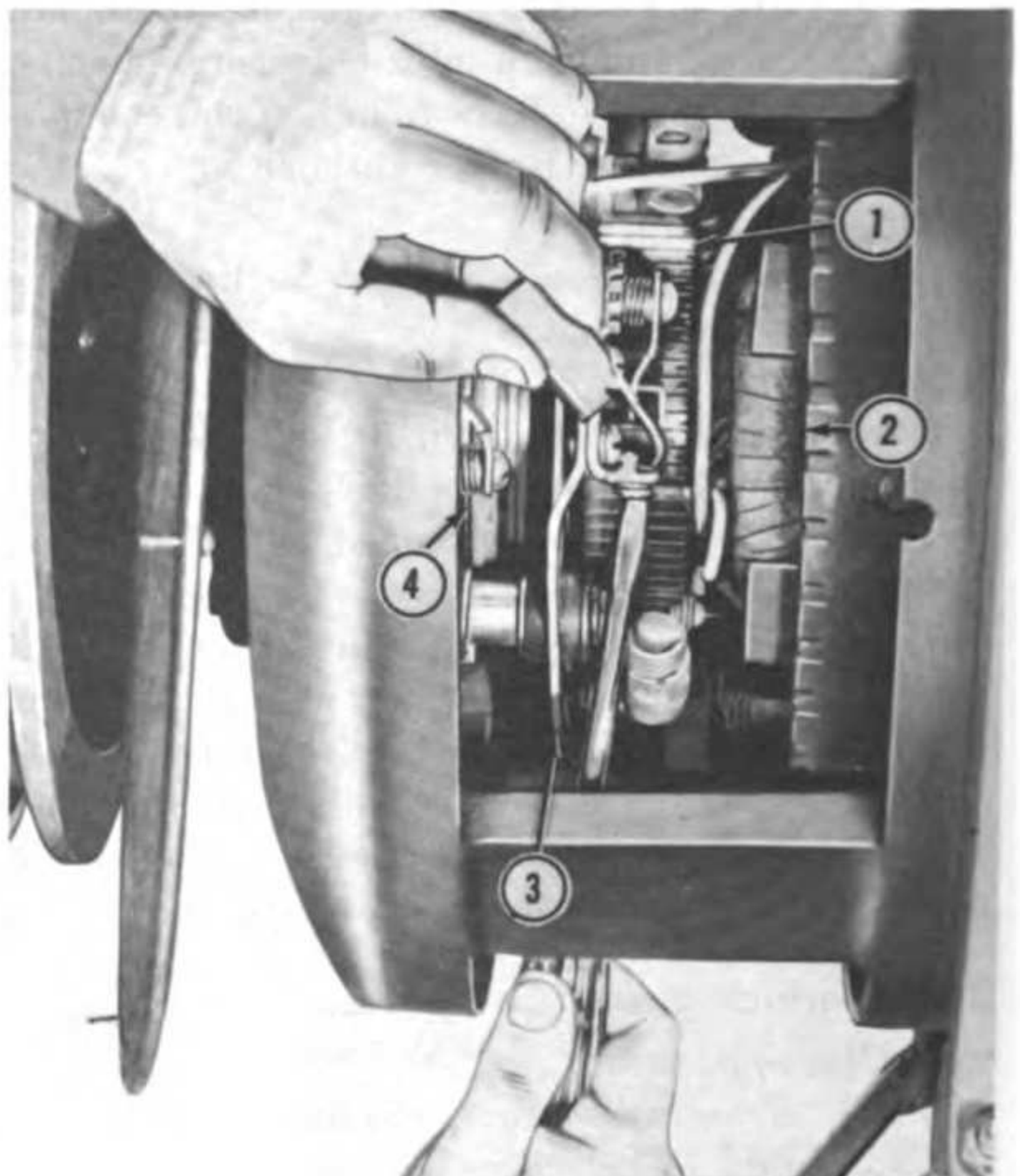
(4) *Install band.* Refer to *a*(5) above.

197. Dynamotor-Welder AC Brushes

a. General. The dynamotor-welder ac brushes consist of four slipring commutator brushes; two inner exciter ring, and two outer exciter ring commutator brushes. All eight brushes are mounted in one exciter and slipring brush holder assembly.

b. Servicing. Inspect and check brush spring tension as outlined for dc brushes in paragraph 196*a*(4).

c. Removal. Remove four brushes off slipring commutator (2, fig. 196). Remove four brushes from exciter ring commutator (1) (two brushes from inner exciter ring (3) and two brushes from outer exciter ring (4)). Follow similar procedure for removing dc brushes outlined in paragraph 196*b*.



1 Exciter ring commutator
2 Slipring commutator
3 Inner exciter ring
4 Outer exciter ring

Figure 196. Removing dynamotor-welder ac brush.

d. Installation. Install four brushes in slipring brush holders, two brushes in inner exciter ring brush holders, and two brushes in outer exciter ring brush holders, following procedure outlined in paragraph 196*c*.

Note. Slipring and exciter brushes are of different sizes and cannot be interchanged.

198. Dynamotor-Welder Commutators

a. Cleaning.

(1) *Remove both bands.* Refer to paragraph 196*a*(1).

(2) *Remove all brushes.* Refer to paragraphs 196*b*, and 197*c*.

(3) *Clean.* Clean commutators with a cloth saturated with an approved cleaning solvent. Remove all grease, oil, carbon deposits and foreign material from all commutators. If commutators are dull, forcibly apply a piece of heavy canvas on the commutator. This will result in a burnishing action which will effectively clean and brighten the commutator.

b. Inspection.

(1) *Inspect.* Inspect commutators for loose bars, flat spots, roughness, out-of-round, scores, and high mica between segments. Report all defects found in the commutators to the proper authority.

(2) *Install all brushes.* Refer to paragraphs 196*c* and 197*d*.

(3) *Install both bands.* Refer to paragraph 196*a*(5).

199. Restoring Residual Magnetism

a. General. During long periods of storage or during shipment, the exciter in the dynamotor-welder will lose its residual magnetism with the result that no voltage is generated even though the armature is rotating in the proper direction.

b. Restore Residual Magnetism.

(1) With dynamotor-welder stopped, remove cover band from ac end of dynamotor-welder (par. 196*a*(1)).

(2) Lift four exciter commutator brushes (par. 197*a*) off commutator. Using a length of No. 10 insulated wire; touch one end to the positive terminal of the mobile shop batteries and touch the opposite end of the wire to the exciter brushes for a few seconds. This sets up a magnetic field which leaves enough residual magnetism to cause the exciter to build up by itself when the exciter brushes are again lowered to the commutator.

(3) Install cover band (par. 196*a*(5)).

Section XXI. AIR COMPRESSOR

200. Description

The air compressor (6, fig. 10) is driven by the dynamotor-welder through a drive shaft (8). An air tank (5), welded in the roof of the mobile shop, stores and distributes air under pressure to pneumatic tools through piping and hose couplings. The compressor clutch (7) must be placed in the CLUTCH ENGAGED position before the air compressor will operate. Flexible air lines are installed between the air compressor and air tank, and between the air tank and hose reel.

201. Servicing Air Compressor

a. Cleaning.

(1) *Remove guard.* Remove two screws and lockwashers securing guard on shroud and remove guard.

(2) *Clean shrouds.* Remove all foreign material from shrouds and exterior of air compressor.

(3) *Install guard.* Aline guard on shroud and secure, using two lockwashers and screws.

(4) *Clean compressor clutch and air lines.* Using compressed air, blow dust, dirt, and all foreign material from compressor clutch housing, flexible air lines, piping, and air tank.

b. Inspection.

(1) *Compressor clutch.* Inspect compressor clutch housing, clutch control lever, drive shaft, and mounting flange for cracks, breaks, and other physical damage. Inspect for signs of oil leaks. Inspect mounting for tightness. Report to the proper authority if parts are damaged or if leaks are found.

(2) *Air compressor.* Inspect shrouds, cylinder heads, filters, and compressor block for physical damage and for signs of air

or oil leaks. Report all deficiencies to the proper authority.

(3) *Air tank and lines.* Inspect air tank and all lines for physical damage and for signs of air leaks. Check all hose and pipe connections for tightness. Make certain air tank draincock operates freely, and in the closed position, completely shuts off the escape of air.

202. Servicing Air Compressor Discharge Valves

a. General. Remove and inspect air compressor discharge valves every month or after 240 hours of operation. Carbon will form on valves and valve seats which will prevent the valves from seating, causing a loss of pressure and operating efficiency of the air compressor.

b. Removal.

(1) Loosen setscrew locknut (5, fig. 197) and back out setscrew (4) one turn.

(2) Remove three valve cap nuts (7) securing valve cap (6) to cylinder head (2) and remove valve cap and valve cap gasket (8).

(3) Pull the cage and discharge valve assembly (1) out of cylinder head. Remove valve seat gasket (9) from cylinder head.

(4) Remove remaining three cage and discharge valve assemblies from the air compressor.

c. Cleaning and Inspection. Clean the cage and discharge valve assembly and valve seat with an approved cleaning solvent. Replace deteriorated or damaged gaskets. Replace excessively burned or damaged valve assembly. Make certain valve disk moves freely by pushing it off its seat with a screwdriver or nail.

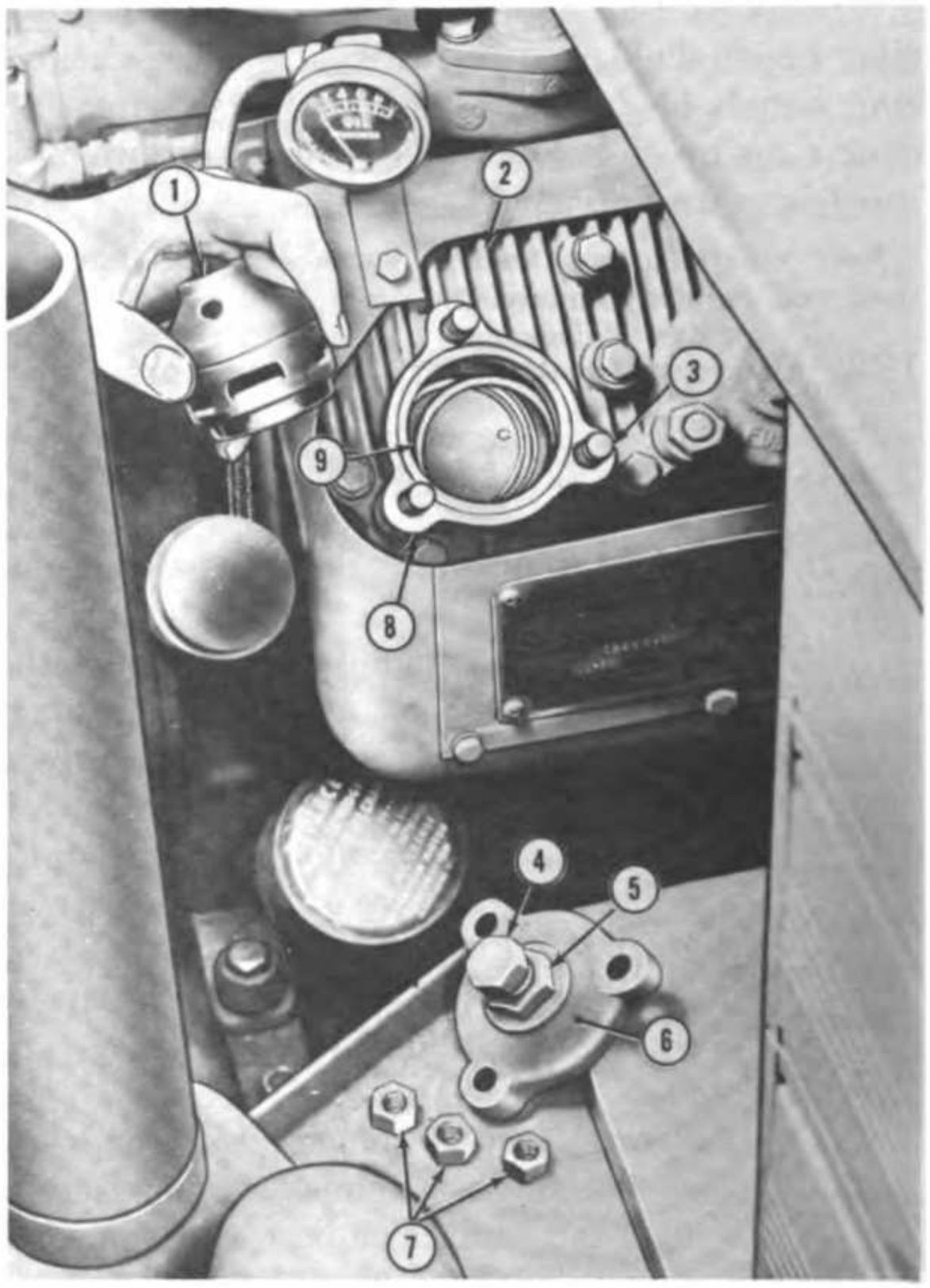
d. Installation.

(1) Install valve seat gasket (9) and the cage and discharge valve assembly (1) in cylinder head (2).

(2) Aline valve cap gasket (8) and valve cap (6) on cylinder head studs (3). Install and tighten three valve cap nuts (7).

Caution: Tighten nuts alternately to avoid leaks and to prevent valve cap distortion.

(3) Screw setscrew (4) down and tighten setscrew locknut (5).



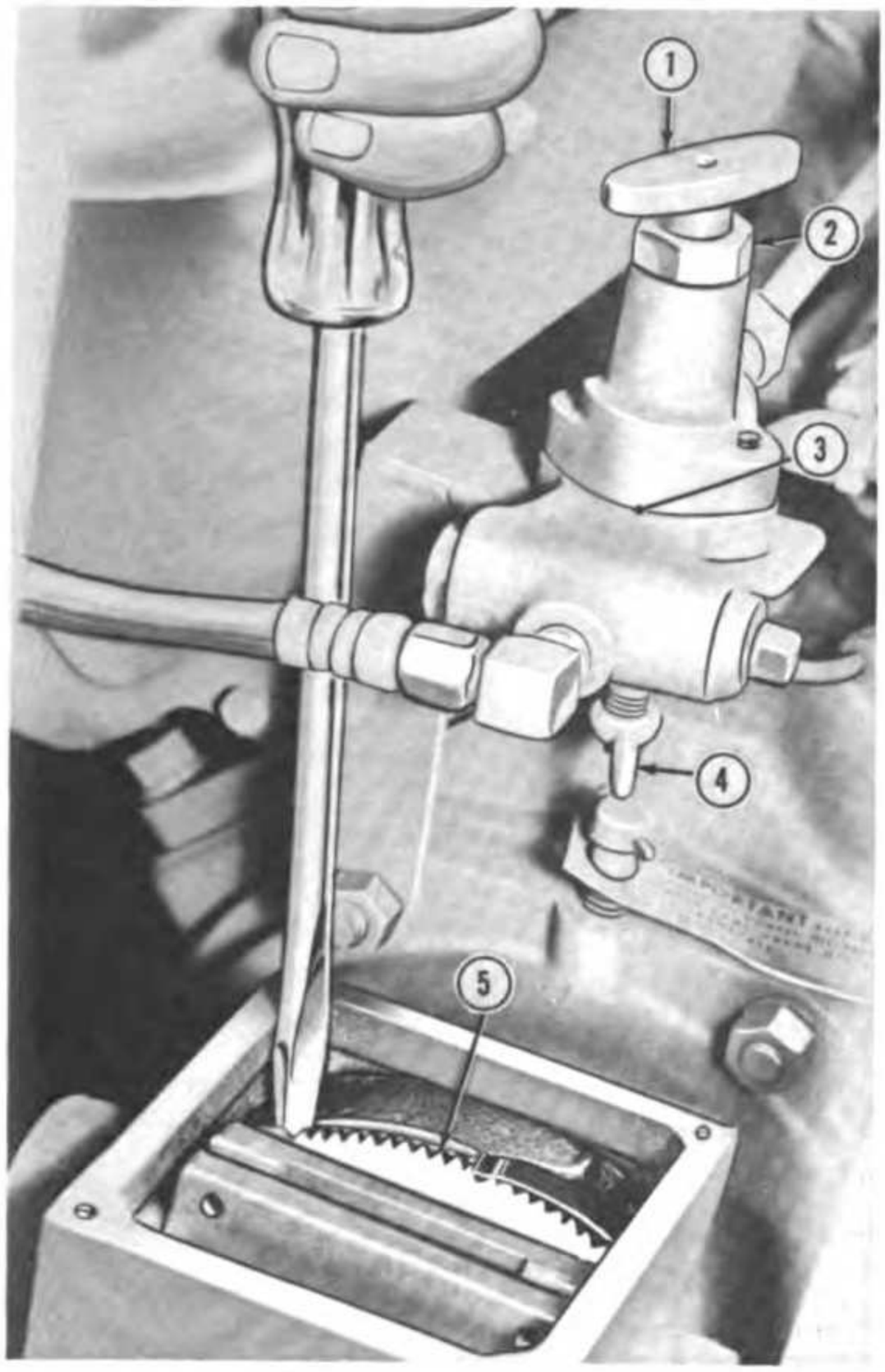
1 Cage and discharge valve assembly
2 Cylinder head
3 Cylinder head studs
4 Setscrew
5 Setscrew locknut
6 Valve cap
7 Valve cap nuts (3 rqr)
8 Valve cap gasket
9 Valve seat gasket

Figure 197. Removing cage and discharge valve assembly.

203. Compressor Clutch Adjustment

a. Remove four cap screws securing access cover on compressor clutch housing and remove access cover.

b. Using a screwdriver, rotate adjusting ring (5, fig. 198) clockwise, one tooth at a time. After rotating adjusting ring, move clutch control lever (1, fig. 42) to the CLUTCH ENGAGED position. Clutch rollers should snap over center after applying firm pressure on the clutch control lever. If the clutch is difficult to engage or engages too easily, continue to rotate adjusting ring clockwise or counterclockwise, depending on the condition, until proper adjustment is made.



1 Tension screw
2 Locknut
3 Pilot valve
4 Thumbscrew
5 Adjusting ring

Figure 198. Adjusting compressor clutch and pilot valve adjusting points.

c. Aline access cover on clutch housing and secure, using four cap screws.

204. Pilot Valve Adjustment

a. General. The pilot valve (3, fig. 198) controls the unloading and loading of the air compressor and is adjustable so that unloading pressure can be set to suit operating conditions.

b. Adjust Pilot Valve.

(1) Start air compressor (par. 53*a*).

(2) If air compressor was started with pressure in the air tank, load the air compressor manually by turning the thumbscrew (4) counterclockwise. If air compressor was started with no pressure in the air tank, close the draincock at the bottom of the air tank.

(3) If air pressure indicated on the air-pressure gage (2, fig. 45) is not 100 psi (normal unloading pressure) after air compressor is loaded, adjust the pilot valve as follows:

Note. **Air compressor will load after the air pressure has dropped 10 pounds below the normal unloading pressure (100 psi).**

(*a*) Loosen locknut (2, fig. 198) and turn tension screw (1) clockwise to increase unloading pressure and counterclockwise to decrease unloading pressure.

(*b*) Tighten locknut when air-pressure gage indicates 100 psi.

(4) Stop air compressor (par. 53*b*).

205. Air Compressor and Air Tank Lines

a. Removal.

(1) *Open draincock.* Open draincock at bottom of the air tank.

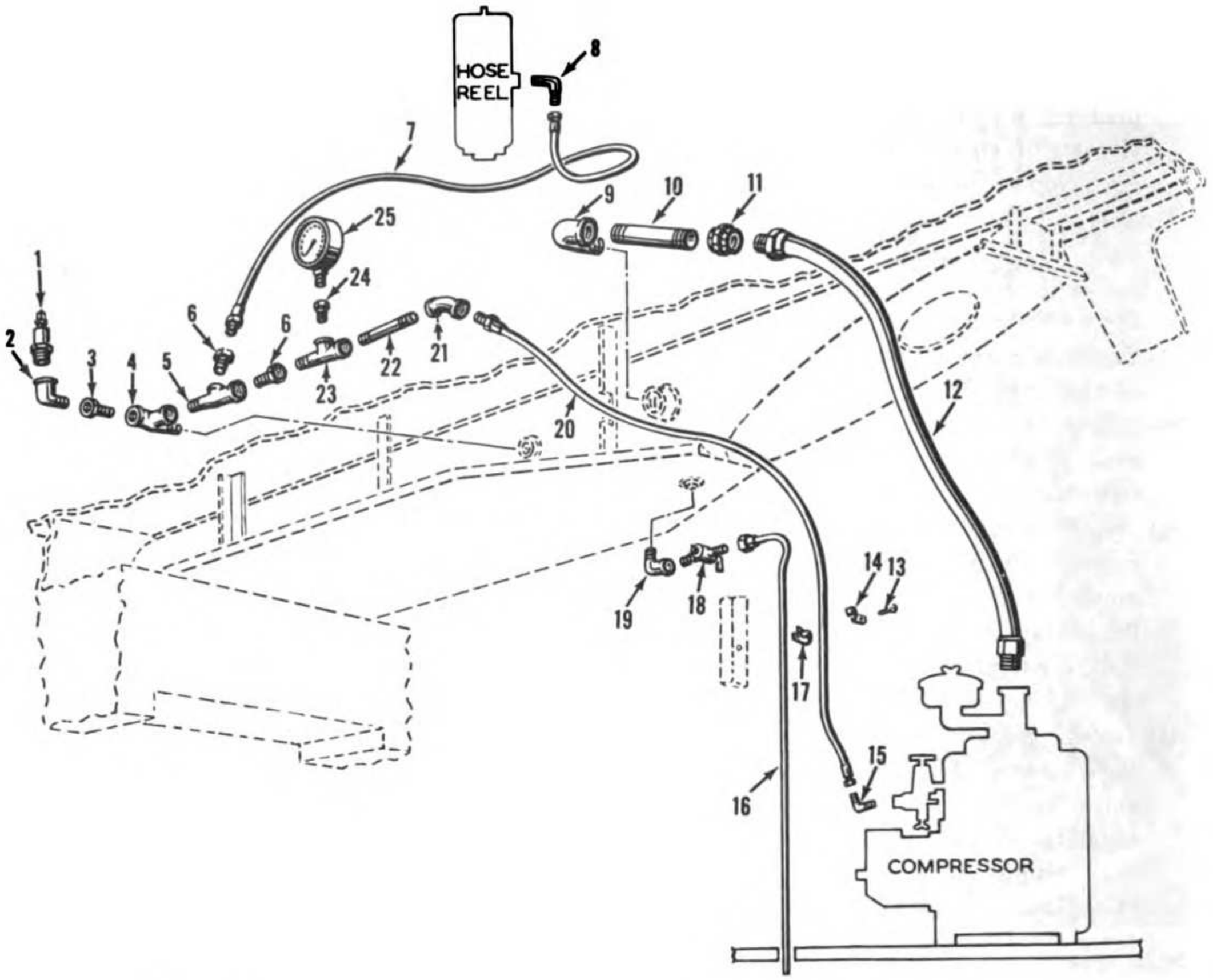
(2) *Remove safety valve and fittings.* Unscrew safety valve (1, fig. 199) from ell (2). Remove ell from reducing bushing (3) and reducing bushing from tee (4) in side of air tank.

(3) *Remove hose-reel flexible hose and fittings.* Loosen retaining nuts securing hose-reel flexible hose (7) between the hose reel and reducing bushing (6) and remove flexible hose. Remove elbow (8) from side of hose reel and remove bushing from tee (5).

(4) *Remove air-pressure gage and fitting.* Unscrew air-pressure gage (25) out of reducing bushing (24) and remove reducing bushing from tee (23).

(5) *Remove pilot-valve flexible hose and fittings.* Loosen retaining nuts securing pilot-valve flexible hose (20) between ell (15) on pilot valve and ell (21). Remove screw (13) and clamp (14) securing flexible hose to bulkhead and remove flexible hose. Remove ell from pilot valve. Remove ell (21), nipple (22), tee (23), reducing bushing (6), and tee (5) from tee (4) and remove tee from side of air tank.

(6) *Remove air-tank flexible hose and fittings.* Loosen retaining nuts securing air-tank flexible hose (12) between air compressor and union (11) and remove flexible hose. Remove nipple (10) from



1 Safety valve
2 Ell, street, ½ PT
3 Bushing, reducing, ¾ PT to ½ PT
4 Tee, service, ¾ PT (Air tank)
5 Tee, service, ¾ PT
6 Bushing, reducing, ¾ PT to ⅜ PT (2 rqr)
7 Hose-reel flexible hose
8 Elbow, male, ⅜ x ⅜ PT
9 Ell, street, 1½ PT
10 Nipple, 1½ PT x 6 lg
11 Union, 1½ PT
12 Air-tank flexible hose
13 Screw, metal, No. 7
14 Clamp
15 Ell, male, ¼ x ¼ PT
16 Drain line, copper, w/fitting, ⅜ x 64 lg
17 Clamp, pipe, ¼
18 Draincock
19 Ell, street, ¼ PT
20 Pilot-valve flexible hose
21 Ell, 45°, ⅜ PT
22 Nipple, ⅜ PT x 3 lg
23 Tee, service, ⅜ PT
24 Bushing, reducing, ⅜ PT to ¼ PT
25 Air-pressure gage

Figure 199. Air compressor and air tank lines, exploded view.

ell (9) and remove ell from side of air tank.

(7) *Remove draincock and fittings.* Loosen retaining nut securing drain line (16) to draincock (18) and remove drain line. Remove clamp (17) from drain line. Unscrew draincock from ell (19) and remove ell from bottom of air tank.

b. Cleaning and Inspection.

(1) *Cleaning.* Clean all fittings, hoses, safety valve, air-pressure gage, and draincock with an approved cleaning solvent. Allow parts to dry.

(2) *Inspection.* Inspect flexible hoses for cuts, excessive wear, and signs of leakage. Unwind hose from hose reel; inspect for

cuts, excessive wear, and signs of leakage. Rewind hose and check for ease of operation. Inspect safety valve and draincock for ease of operation. Inspect all parts for corrosion and physical damage. Replace all defective parts.

c. Installation.

Note. Apply a small amount of approved pipe sealing compound to all male threads before installation.

(1) *Install draincock and fittings.* Screw ell (19) into bottom of air tank and install draincock (18) into ell. Connect drain line (16) to draincock and tighten retaining nut.

(2) *Install air-tank flexible hose and fittings.* Screw ell (9) in side of air tank and screw nipple (10) in ell. Connect air-tank flexible hose (12) to air compressor. Install union (11) on nipple and connect opposite end of flexible hose to union.

(3) *Install pilot-valve flexible hose and fittings.* Install ell (15) in side of pilot valve. Install tee (4) in side of air tank; install tee (5), reducing bushing (6), tee (23), nipple (22), and ell (21). Connect pilot-valve flexible hose (20) between ell (15) and ell (21) in pilot valve and tighten retaining nuts. Secure drain line (16) and pilot-valve flexible hose to bulkhead, using two clamps (14 and 17) and screw (13).

(4) *Install air-pressure gage and fittings.* Install reducing bushing (24) in tee (23) and screw air-pressure gage (25) in reducing bushing.

(5) *Install hose-reel flexible hose and fittings.* Install elbow (8) in side of hose reel. Install reducing bushing (6) in top of tee (5). Connect hose-reel flexible hose (7) between fittings and tighten retaining nuts.

(6) *Install safety valve and fittings.* Install reducing bushing (3) in tee (4) and install ell (2) in reducing bushing. Screw safety valve (1) in ell.

(7) *Close draincock.* Close draincock before starting air compressor (par. 53*a*).

206. Air Tank Supply Lines

a. Removal.

(1) *Remove three-way air distributor.* Unscrew three-way air distributor assembly (10, fig. 200) from ell (1).

(2) *Disassemble three-way air distributor assembly.* Remove three hose couplings (8) from two street ells (6) and cross (11). Unscrew street ells from cross and remove cross from connector (12). Remove hose coupling (8) from service tee (9).

(3) *Remove pipes and fittings.* Remove ell (1) from end of pipe (2) and remove opposite end of pipe from ell (1). Remove ell and remove pipe (3) from air-tank outlet assembly (4).

(4) *Remove and disassemble air-tank outlet assembly.* Remove air-tank outlet assembly from side of air tank. Remove hose coupling (8) from side of service tee (9). Remove ell (1), nipple (5), street ell (6), union (7), and nipple (5) from top of service tee.

b. Cleaning and Inspection. Perform all applicable cleaning and inspection instructions outlined in paragraph 205*b*. Inspect pipes for corrosion and physical damage. Replace all defective parts.

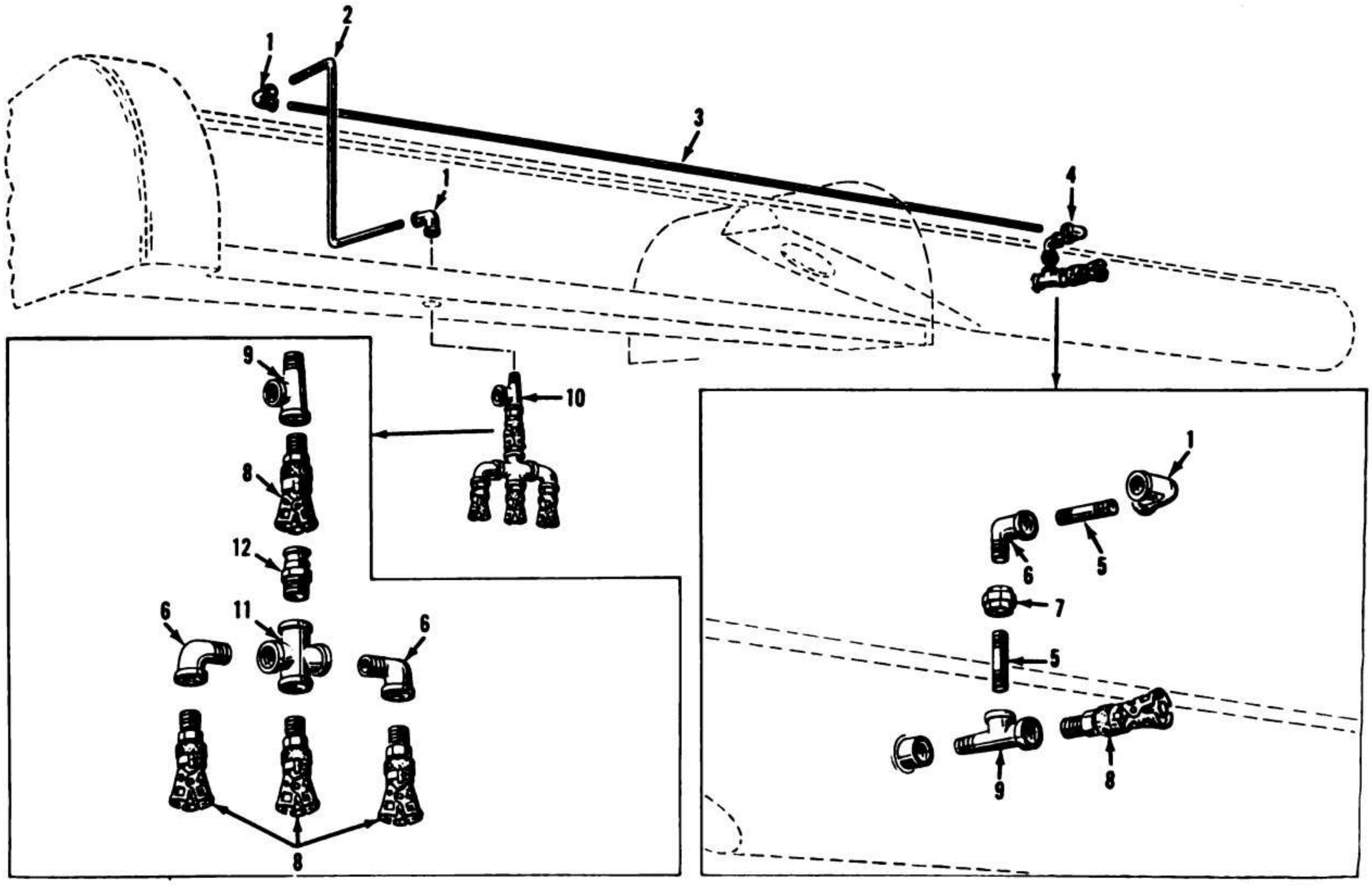
c. Installation.

(1) *Assemble and install air-tank assembly.* Install nipple (5), union (7), street ell (6), nipple (5), and ell (1) in top of service tee (9), in the order named. Install hose coupling (8) in side of service tee (9). Screw air-tank outlet assembly (4) into side of air tank.

(2) *Install pipes and fittings.* Install pipe (3) in air-tank outlet assembly. Screw ell (1) on opposite end of pipe (3) and screw pipe (2) in other side of ell. Install ell (1) on opposite end of pipe (2).

(3) *Assemble three-way air distributor assembly.* Screw hose coupling (8) into service tee (9). Install connector (12) in hose coupling and screw cross (11) on connector. Install street ells (6) on each side of cross. Screw a hose coupling (8) into street ell and a hose coupling into bottom of cross.

(4) *Install three-way air distributor assembly.* Screw three-way air distributor assembly (10) into side of air tank.



1 Ell, ¾ ID (3 rqr)
2 Pipe, ¾ ID x 44 lg
3 Pipe, ¾ ID x 104 lg
4 Air tank outlet assembly
5 Nipple, ¾ ID x 2 lg (2 rqr)
6 Ell, street, ¾ ID (3 rqr)
7 Union, ¾ ID
8 Hose, coupling (QAW), female, ¾ MPT (5 rqr)
9 Tee, service, ¾ ID (2 rqr)
10 Three-way air distributor assembly
11 Cross, ¾ ID
12 Connector (QAW), male

Figure 200. Air tank supply lines, exploded view.

Section XXII. SHOP EQUIPMENT

207. Description

The shop equipment covered by this section is the lathe and lathe drive, bench grinder, bandsaw, honing machine, valve refacer, hydraulic press (100-ton), and the cylinder boring bar.

208. Lathe and Lathe Drive

a. General. The service operations which can be performed by organizational maintenance personnel are the cleaning and inspection of the lathe, replacement of the lathe drive and lathe drive belt. Report all defects in the lathe to the proper authority.

b. Cleaning and Inspection of Lathe.

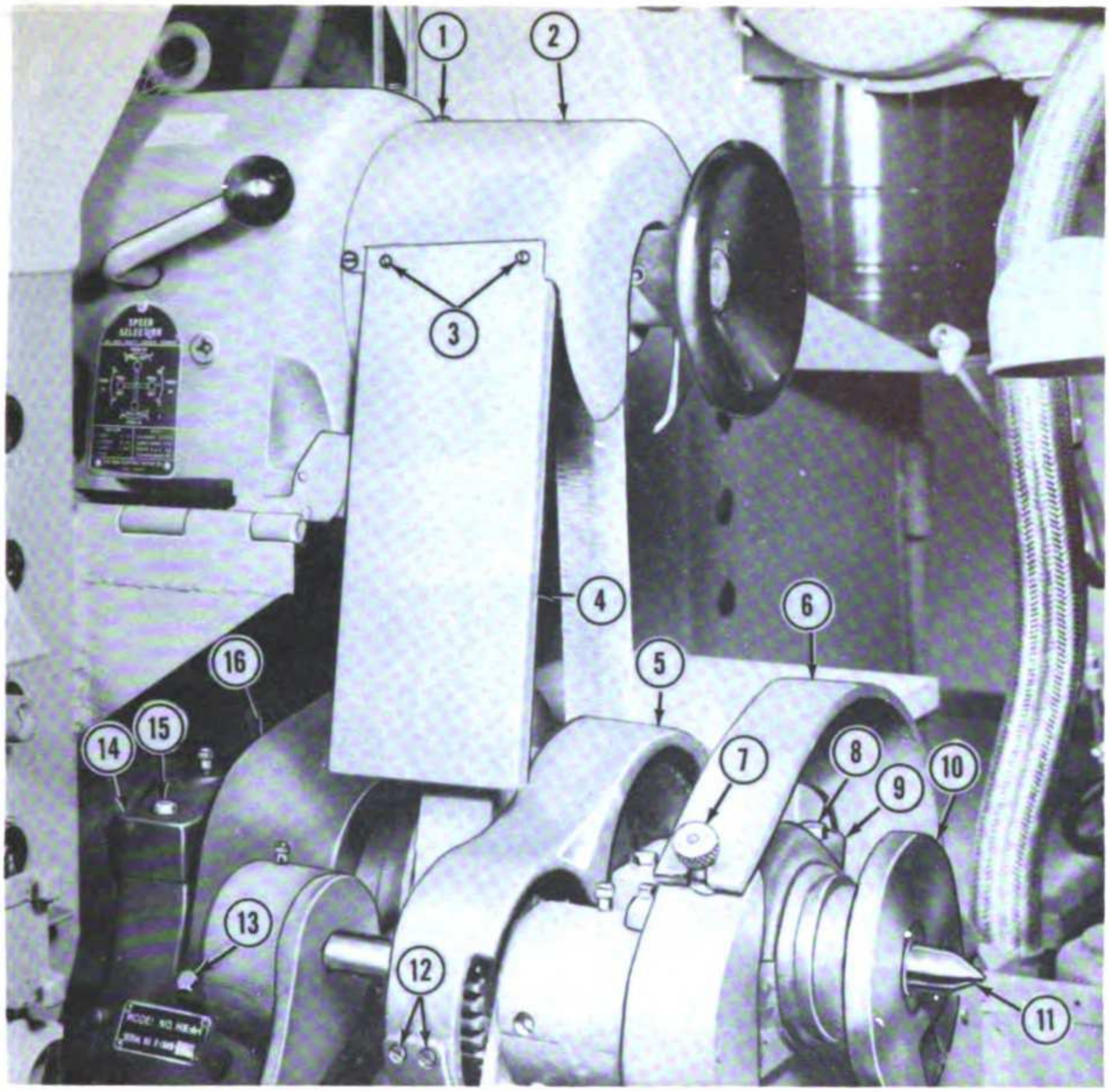
(1) *Cleaning.* Clean all parts of the lathe with a lint-free cloth dampened with an approved cleaning solvent. Remove corrosion, if any, from machined surfaces with an approved rust remover. After cleaning, apply a thin film of light oil on machined surfaces.

(2) *Inspection.* Inspect all parts of the lathe for damage and loose parts. Inspect all wiring for frayed or cut insulation and check connections for tightness.

c. Removal of Lathe Drive.

(1) Remove three spindle guard screws (1, fig. 201) securing spindle guard (2) to lathe drive housing and remove spindle guard with attached belt guard (4) or the belt guard may be removed separately by removing two belt guard screws (3).

(2) Loosen turnbuckle (2, fig. 101) to provide slack in lathe drive belt (11) and slip drive belt off drive spindle.



1 Spindle guard screw (3 rqr)
2 Spindle guard
3 Belt guard screw (2 rqr)
4 Belt guard
5 Center gear guard
6 Right gear guard
7 Thumbscrew
8 Bearing cap screw (4 rqr)
9 Right bearing cap
10 Faceplate
11 Headstock center
12 Center guard screw (4 rqr)
13 Left guard screw (4 rqr)
14 Left bearing cap
15 Bearing cap screw (2 rqr)
16 Left gear guard

Figure 201. Lathe drive installcd, left rear view.

(3) Hook 1-ton hoist to trolley ring, and attach lifting hook to eyebolt (3) on top of lathe drive housing. Take up slack in hoist chain.

(4) Loosen retaining nut securing motor cable (4) to receptacle (5) at side of lathe drive housing and lay aside cable.

(5) Remove nut (10) and cap screw (9) securing turnbuckle to mounting bracket (6) and disconnect turnbuckle.

(6) Remove four nuts (8), lockwashers, and cap screws securing lathe drive on mounting bracket; operate 1-ton hoist (1, fig. 202) and lift lathe drive off mounting bracket (3). Lower lathe drive to floor of mobile shop. Remove 1-ton hoist from eyebolt (2).

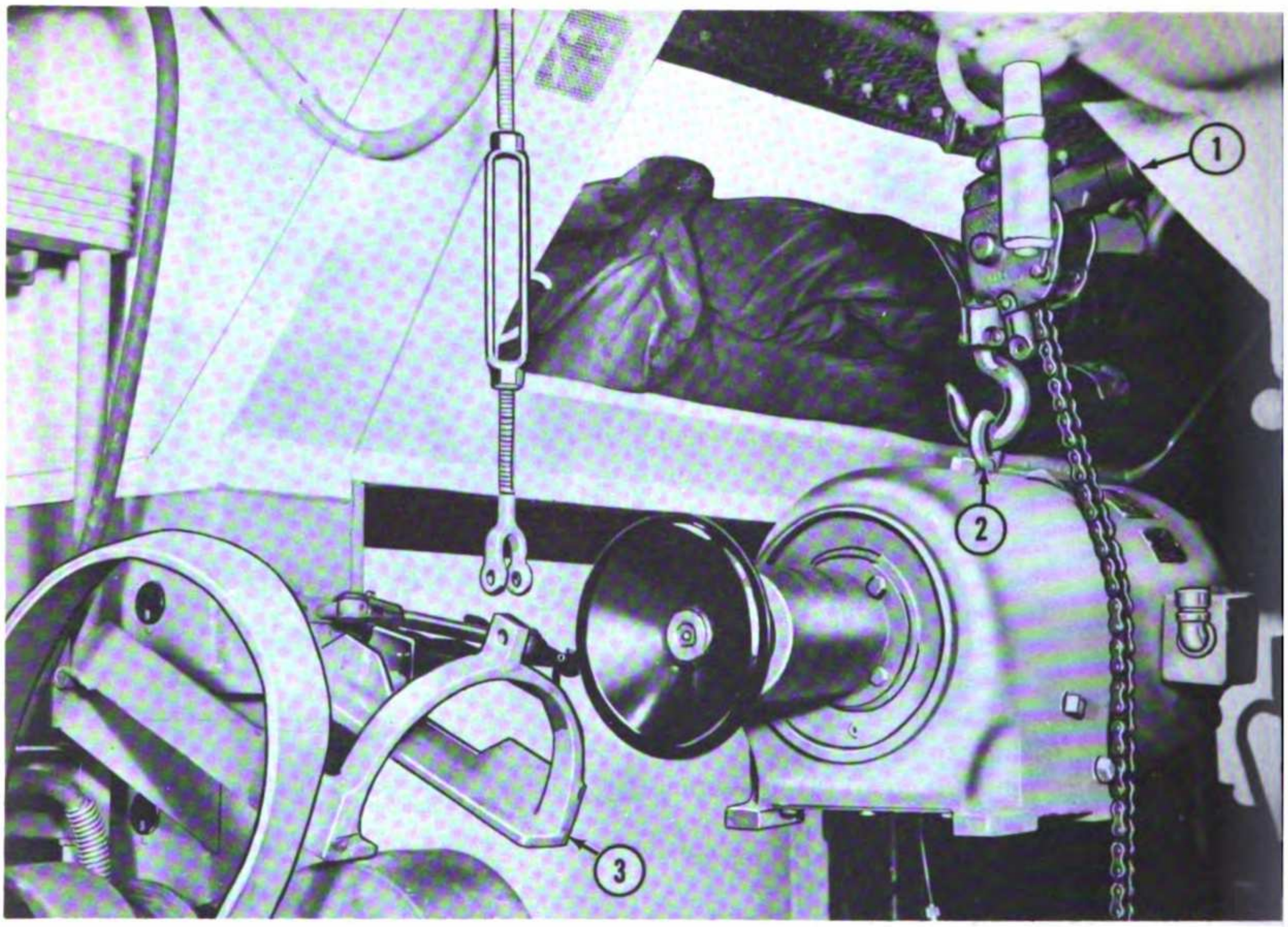
d. Installation of Lathe Drive.

(1) Hook 1-ton hoist (1) to trolley ring and attach lifting hook to eyebolt (2) on top of lathe drive housing. Operate hoist and lift lathe drive into place on mounting bracket (3).

(2) Install four cap screws, lockwashers, and nuts (8, fig. 101) to secure lathe drive on mounting bracket (6).

(3) Aline turnbuckle (2) on mounting bracket and secure, using cap screw (9) and nut (10).

(4) Slip lathe drive belt (11) spindle and



1 1-ton hoist 2 Eyebolt 3 Mounting bracket

Figure 202. Lathe drive removed.

tighten turnbuckle until one-half inch belt deflection is obtained at a point midway between the lathe drive spindle and the lathe spindle. Remove lifting hook from eyebolt and remove 1-ton hoist from trolley ring and store (app. II).

(5) Aline spindle guard (2, fig. 201) with attached belt guard (4) over drive belt and over spindle. Secure to lathe drive housing, using three spindle guard screws (1).

(6) Connect motor cable (4, fig. 101) to receptacle (5), at side of lathe drive housing, and tighten retaining nut.

e. Replacement of Lathe Drive Belt.

(1) *Removal.*

(*a*) Lift hotplate (7) off cabinet and store in a safe place.

(*b*) Remove spindle guard with attached belt guard (*c*(1) above).

(*c*) Remove four left guard screws (13, fig. 201) securing left gear guard (16) over lathe and remove left gear guard.

(*d*) Remove four center guard screws (12) securing center gear guard (5) over lathe and remove center gear guard.

(*e*) Loosen thumbscrew (7) and swing right gear guard (6) back.

(*f*) Remove four bearing cap screws (8) securing right bearing cap (9) on right end of headstock spindle and remove right bearing cap. Remove two bearing cap screws (15) securing left bearing cap (14) on left end of headstock spindle and remove left bearing cap.

(*g*) Remove three nuts (1, fig. 203) securing tumbler and change gear guard (2) to lathe headstock and remove guard.

(*h*) Unscrew faceplate (10, fig. 201) from headstock spindle.

(*i*) From gear train end of headstock, insert a bar through the headstock spin-

dle and push headstock center (11) out of opposite end of headstock spindle. With one man at each end of bar, lift headstock spindle (fig. 204) high enough to remove lathe drive belt from under headstock spindle, lower headstock spindle until ready to install new belt.

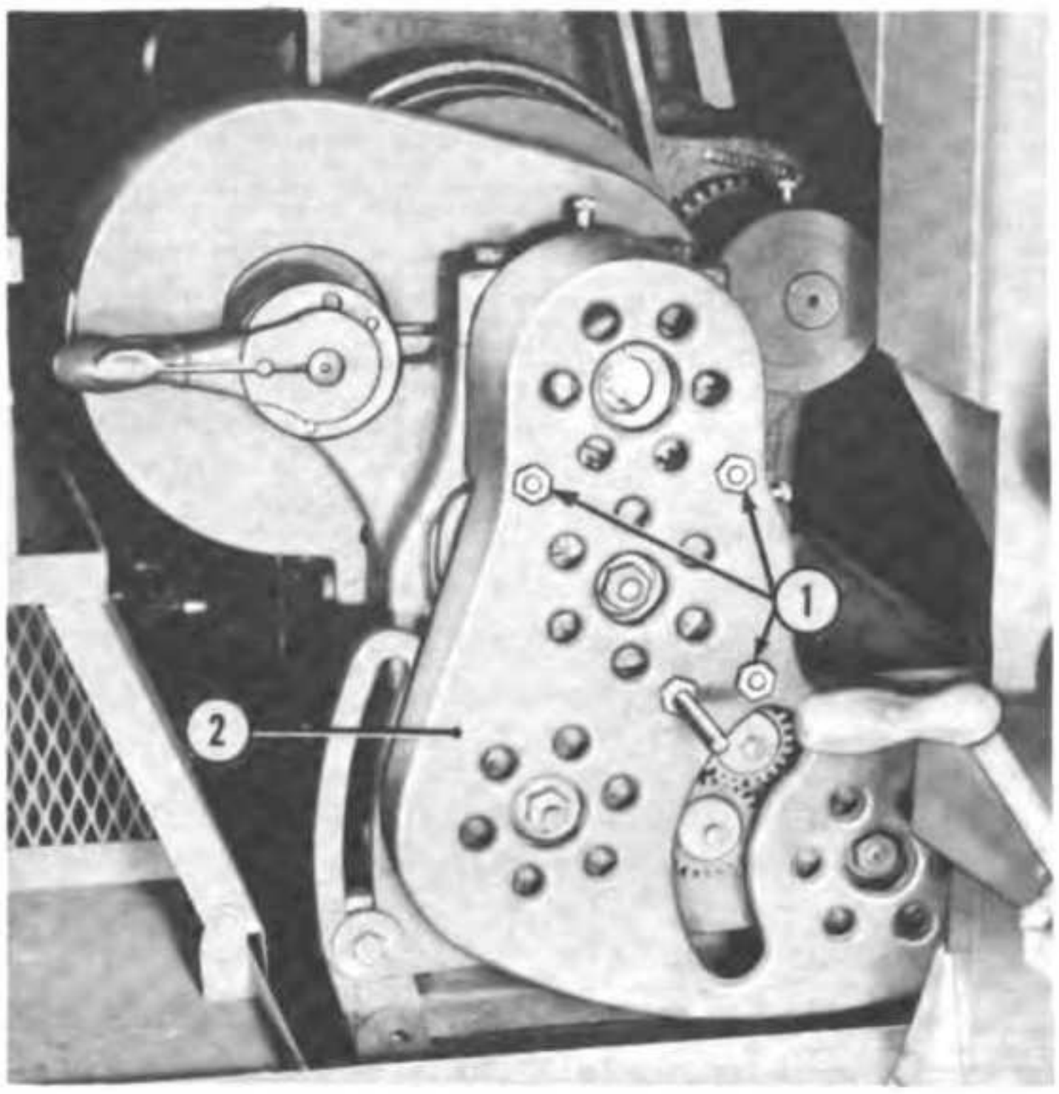
(2) *Installation.*

(*a*) With a bar inserted through the headstock spindle ((1)(*i*) above), raise headstock spindle and slip a new lathe drive belt under headstock spindle and over lathe drive spindle. Lower headstock spindle and remove bar.

(*b*) Aline left bearing cap (14, fig. 201) over left end of headstock spindle and secure to housing, using two bearing cap screws (15). Aline right bearing cap (9) over right end of headstock spindle and secure to housing, using four bearing cap screws (8).

(*c*) Swing right gear guard (6) in position and tighten thumbscrew (7).

(*d*) Aline center rear guard (5) over lathe and secure, using four center guard screws (12).



1 Nut, hex, ⅜–16 (3 rqr)
2 Tumbler and change gear guard

Figure 203. Lathe tumbler and change rear guard installed.

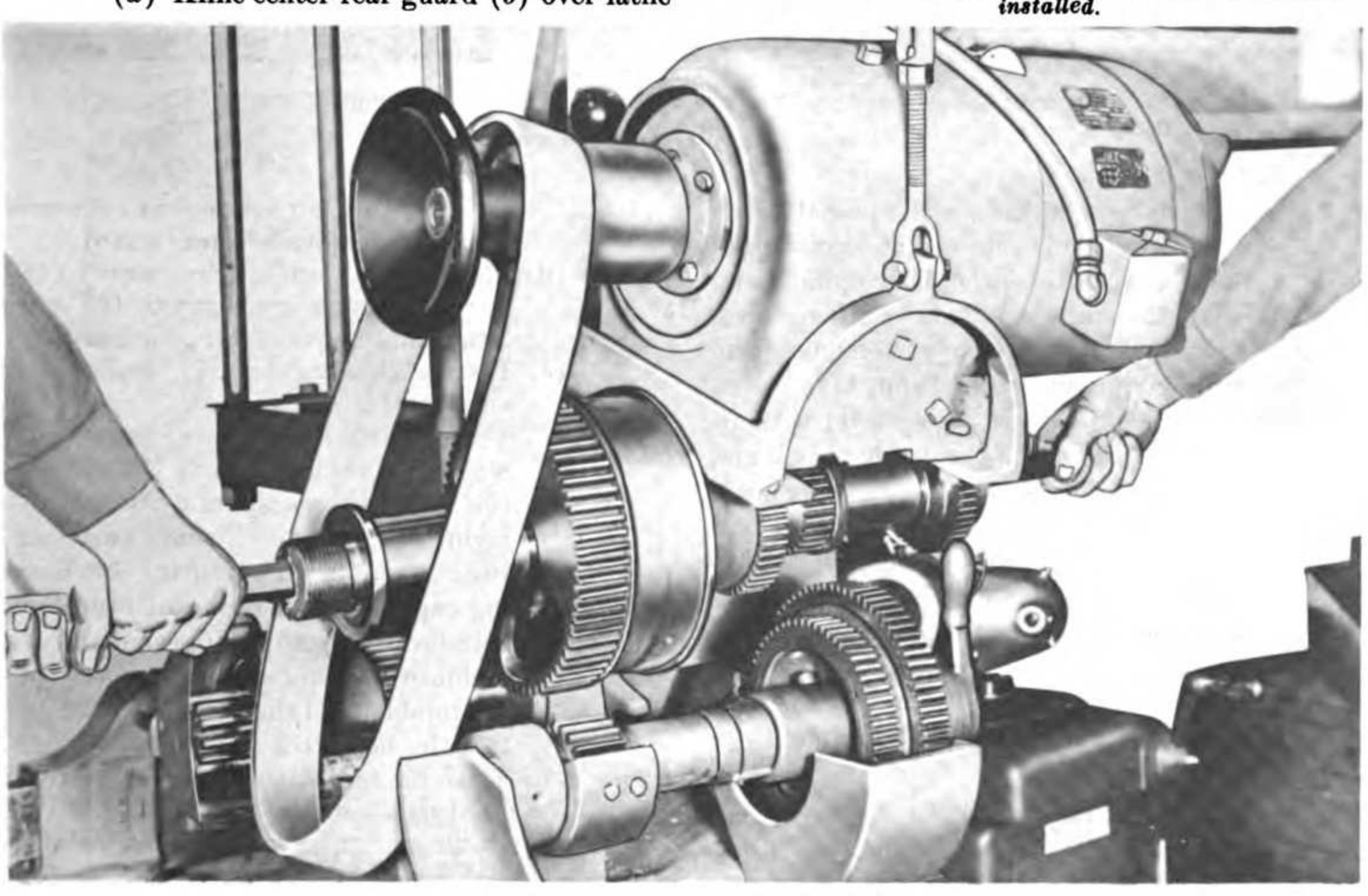


Figure 204. Raising headstock spindle.

(*e*) Aline left gear guard (16) over lathe and secure, using four left guard screws (13).

(*f*) Install spindle guard with attached belt guard (*d*(5) above).

(*g*) Aline the tumbler and change gear guard (2, fig. 203) over gear train and secure to housing, using three nuts (1).

(*h*) Adjust turnbuckle (2, fig. 101) until one-half inch belt deflection is obtained at a point midway between the lathe-drive spindle and the lathe spindle.

(*i*) Screw faceplate (10, fig. 201) on right end of headstock spindle and install headstock center (11) in headstock spindle.

(*j*) Place hotplate (7, fig. 101) in position on cabinet.

209. Bench Grinder

a. General. The service operations which can be performed by organizational maintenance personnel are the cleaning, inspection, and replacement of the bench grinder.

b. Cleaning. Clean all dust and dirt from grinding wheels, eyeshields, dust chutes, and motor with compressed air. Clean all parts with an approved cleaning solvent and dry with compressed air. Apply a thin film of light oil on machined surfaces.

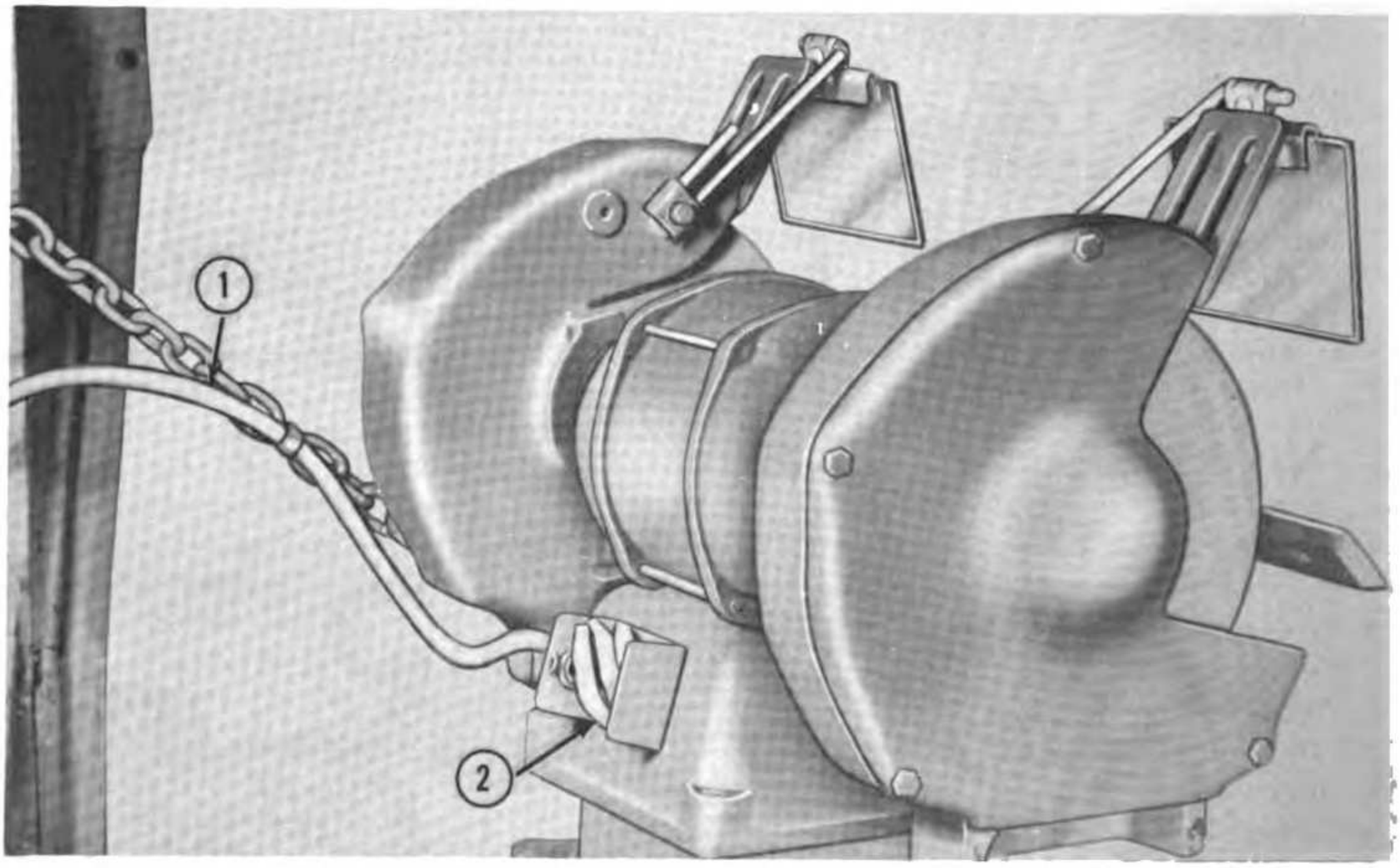
c. Inspection. Inspect grinding wheels for excessive wear, cracks, and chipped grinding surfaces. Replace damaged or excessively worn grinding wheels. Replace cracked eyeshields. Replace damaged dust chutes. Report motor defects to the proper authority.

d. Removal.

(1) Place start-stop switch (11, fig. 43) in the STOP position.

(2) Remove two screws securing cover on wiring box and remove cover. Remove tape connecting power cables to motor leads and disconnect cables. Loosen cable connector and pull power cable (1, fig. 205) out of side of wiring box (2).

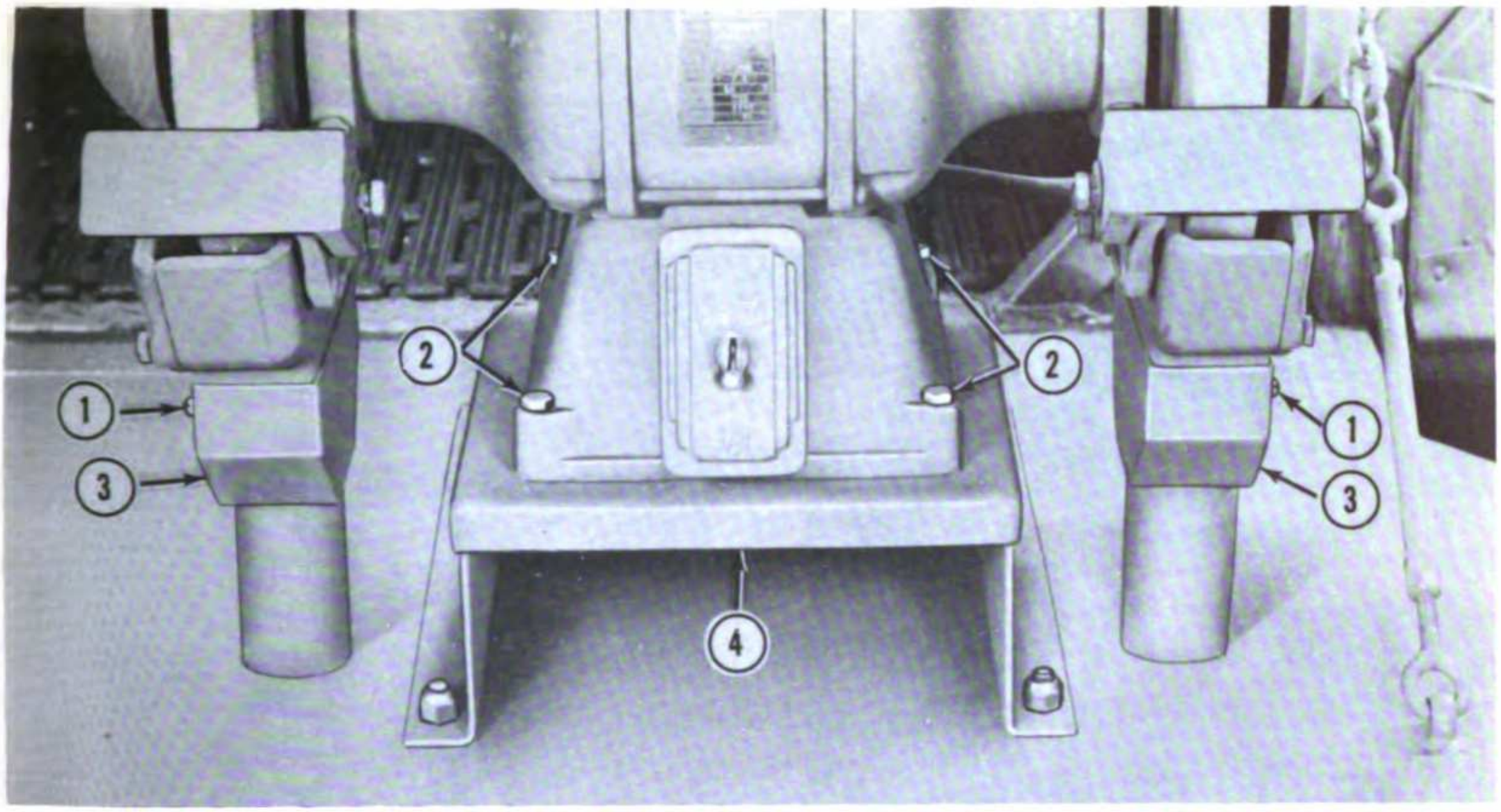
Note. Tag all wiring to facilitate installations.



1 Power cable

2 Wiring box

Figure 205. Bench grinder installed, rear view.



1 Screw, dust chute
2 Mounting nut
3 Dust chute
4 Mounting bracket

Figure 206. Bench grinder disconnect points.

(3) Remove two screws (1, fig. 206) securing each dust chute (3) to side of bench grinder and remove dust chutes.

(4) Remove four mounting nuts (2) securing bench grinder on mounting bracket (4) and lift bench grinder off mounting studs.

e. Installation.

(1) Lower bench grinder on mounting studs and secure to mounting bracket (4), using four mounting nuts (2).

(2) Aline a dust chute (3) on each side of bench grinder and secure, using two screws (1).

(3) Insert power cable (1, fig. 205) through side of wiring box (2) and connect power cable to motor leads. Tape connections and remove tags.

210. Bandsaw

a. General. The service operations which can be performed by organizational maintenance personnel are cleaning, inspection, and replacement of bandsaw.

b. Cleaning. Clean all parts of bandsaw with an approved cleaning solvent and dry with compressed air. Make certain all metal filings are removed from table.

c. Inspection. Inspect blade for dulled or broken teeth. Replace defective blade. Check table spring for loss of tension. Inspect drive belt for wear and damage. Replace defective drive belt. Check bandsaw for proper operation (par. 59). Inspect all parts for damage. Report all motor defects to the proper authority.

d. Removal.

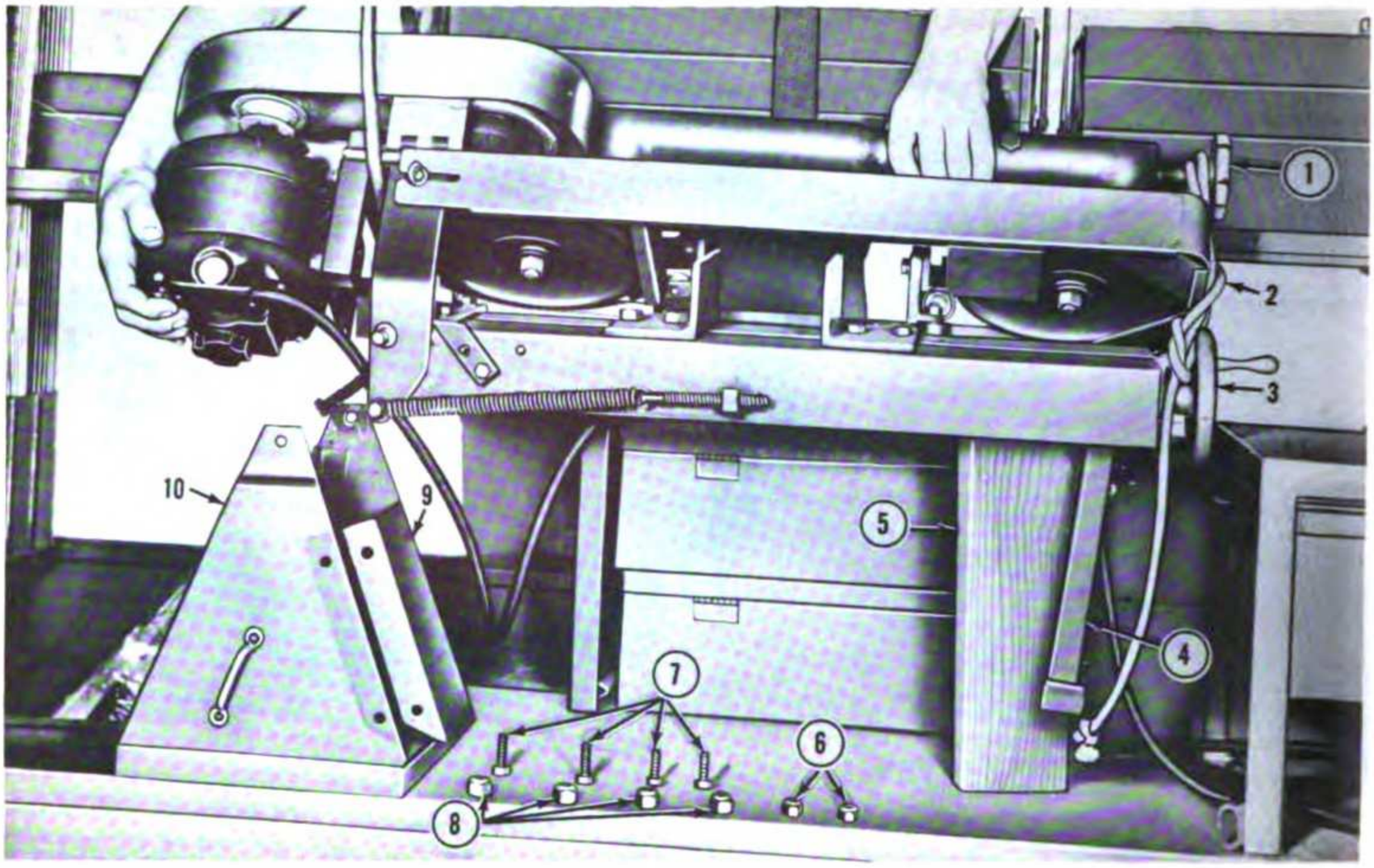
(1) Pull cable plug (2, fig. 109) out of mobile shop outlet.

(2) Push bandsaw down so that blade tension handwheel (1, fig. 207) and vise adjusting wheel (3) can be tied together with rope (2).

(3) Attach rope to motor. Hook 1-ton hoist to trolley ring and attach rope to lifting hook; take up slack. Place short wheel chock (5) under table for support.

(4) Remove four nuts (8), cap screws (7) securing cross member (9) to mounting support (10) and remove cross member.

(5) Remove two mounting nuts (6) securing bandsaw to mounting bracket; spread mounting bracket and hoist bandsaw clear of mounting bracket and remove bandsaw through rear of mobile shop.



1 Blade tension handwheel
2 Rope
3 Vise adjusting handwheel
4 Support bar
5 Short wheel chock
6 Mounting nuts (2 rqr)
7 Cross member cap screws (4 rqr)
8 Cross member nuts (4 rqr)
9 Cross member
10 Mounting support

Figure 207. Removing bandsaw.

e. Installation.

(1) Using 1-ton hoist on trolley ring, lift bandsaw and move bandsaw into position over mounting support (10). Place short wheel chock (5) under adjusting wheel end of bandsaw for support.

(2) Aline motor end of bandsaw between mounting support and secure, using two mounting nuts (6).

(3) Aline cross member (9) on mounting support and secure, using four cap screws (7) and nuts (8).

(4) Remove lifting hook from rope around motor and remove rope. Untie rope (2) and allow bandsaw to open.

(5) Remove short wheel chock from under table and allow support bar (4) to rest on floor of mobile shop. Remove 1-ton hoist from trolley ring. Store short wheel chock and 1-ton hoist.

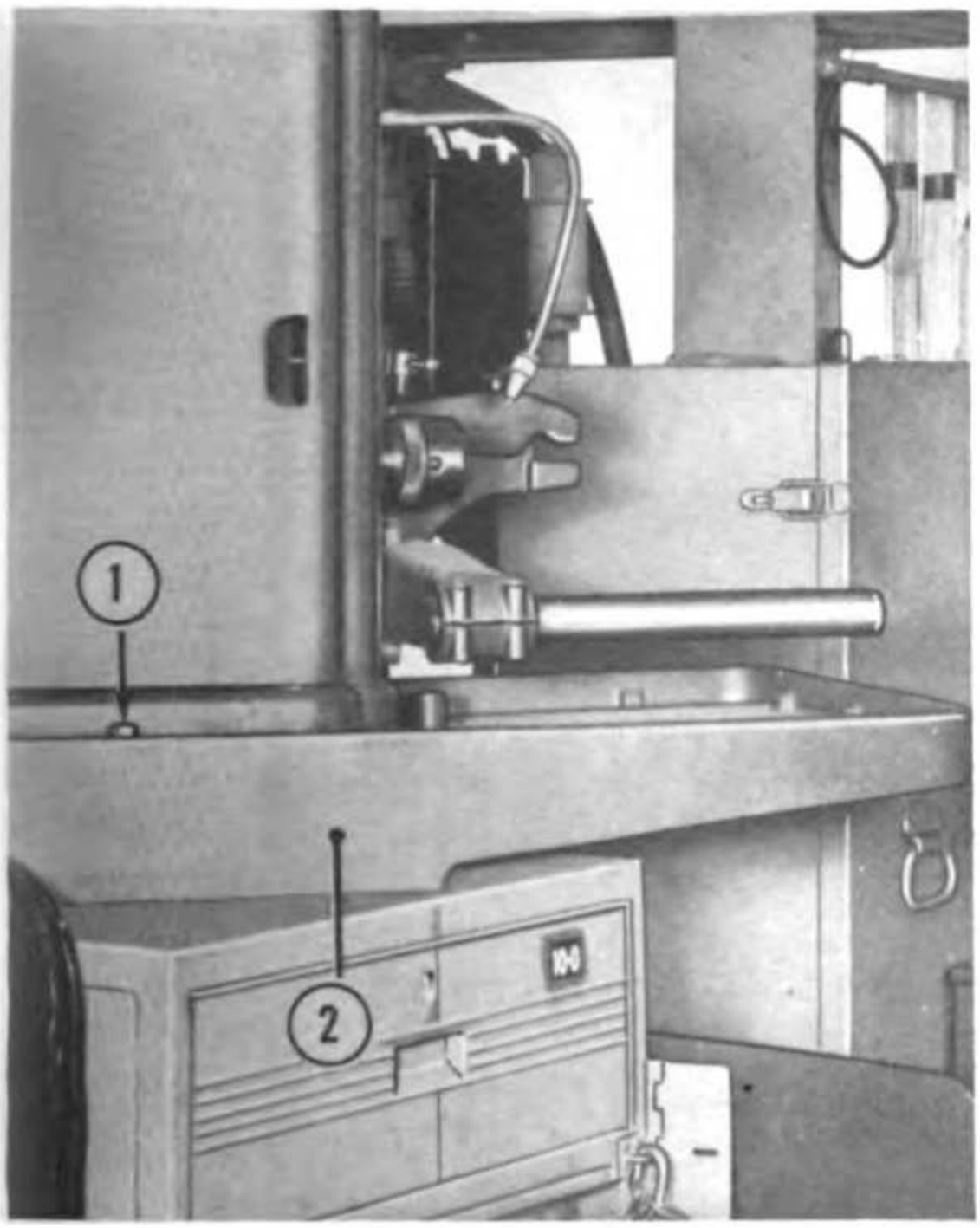
211. Honing Machine

a. General. The service operations which can be performed by organizational maintenance personnel are cleaning, inspection, and replacement of the honing machine (fig. 56).

b. Cleaning. Clean all parts of honing machine with an approved cleaning solvent. Open side doors and apply a thin film of light oil on machined surfaces after cleaning.

c. Inspection. Inspect V-belts for excessive wear and damage. Inspect coolant hoses for leaks and damage. Inspect controls for ease of operation (par. 60).

d. Removal. Pull cable connector plug from mobile shop outlet. Drain coolant from honing machine. Open the link connecting the foot pedal chain to the clutch control lever and pull the chain down through table. Remove a stopnut and mounting bolt (1, fig. 208) securing each side of honing machine on base (2) and lift machine out of mobile shop.



1 Mounting bolt (2 rqr) 2 Base

Figure 208. Honing machine installed, side view.

e. Installation. Place honing machine on base (2); aline mounting holes and secure, using bolt (1) and a stopnut on each side of machine. Pass foot pedal chain up through table and connect to clutch control lever. Fill honing machine with coolant.

212. Hydraulic Press, 100-Ton

a. General. The service operations which can be performed by organizational maintenance personnel are cleaning, inspection, replacement of pump and ram (par. 67*b*), and replacement of hydraulic press as a unit.

b. Cleaning. Clean all parts of hydraulic press with an approved cleaning solvent. Apply a thin film of light oil to machined surface of ram.

c. Inspection. Inspect pump and hydraulic hoses for signs of leaks. Inspect oil-pressure gage for cracks. Check all hose connections, mounting bolts, and frame bolts for tightness. Check hydraulic press for ease of operation (par. 67).

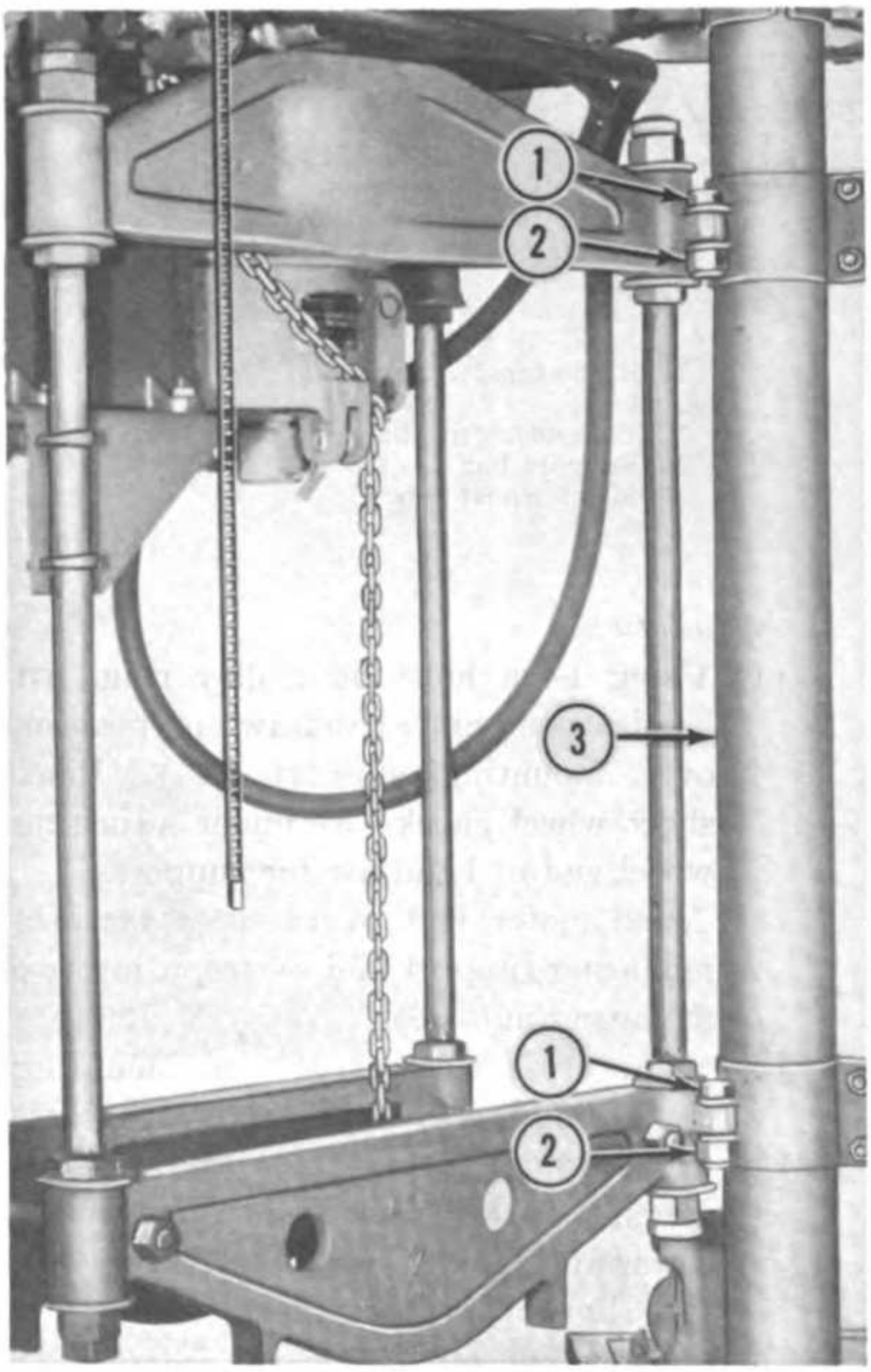
d. Removal.

(1) *Open rear panel assembly.* Refer to paragraph 39*c*.

(2) *Release press.* Loosen retaining sleeve (1, fig. 116) securing the left front leg of press frame and swing hydraulic press toward center of mobile shop.

(3) *Attach sling and hoist.* Wrap chain sling around top of press frame. Hook 1-ton hoist to trolley ring and attach lifting hook to chain sling. Take up slack.

(4) *Remove press.* Remove two stopnuts (2, fig. 209) and two bolts (1) securing hydraulic press to left rear trailer-supporting jack cylinder (3) and swing hydraulic press away from cylinder as shown in figure 210. Slide hydraulic press to end of hoist rail and lower to ground. Remove 1-ton hoist and chain sling.



1 Bolt, ¾ NC x 2¾ (2 rqr)
2 Stopnut, elastic, ¾ inch NC (2 rqr)
3 Trailer-supporting jack cylinder

Figure 209. Hydraulic press, 100-ton, hinged mounting.

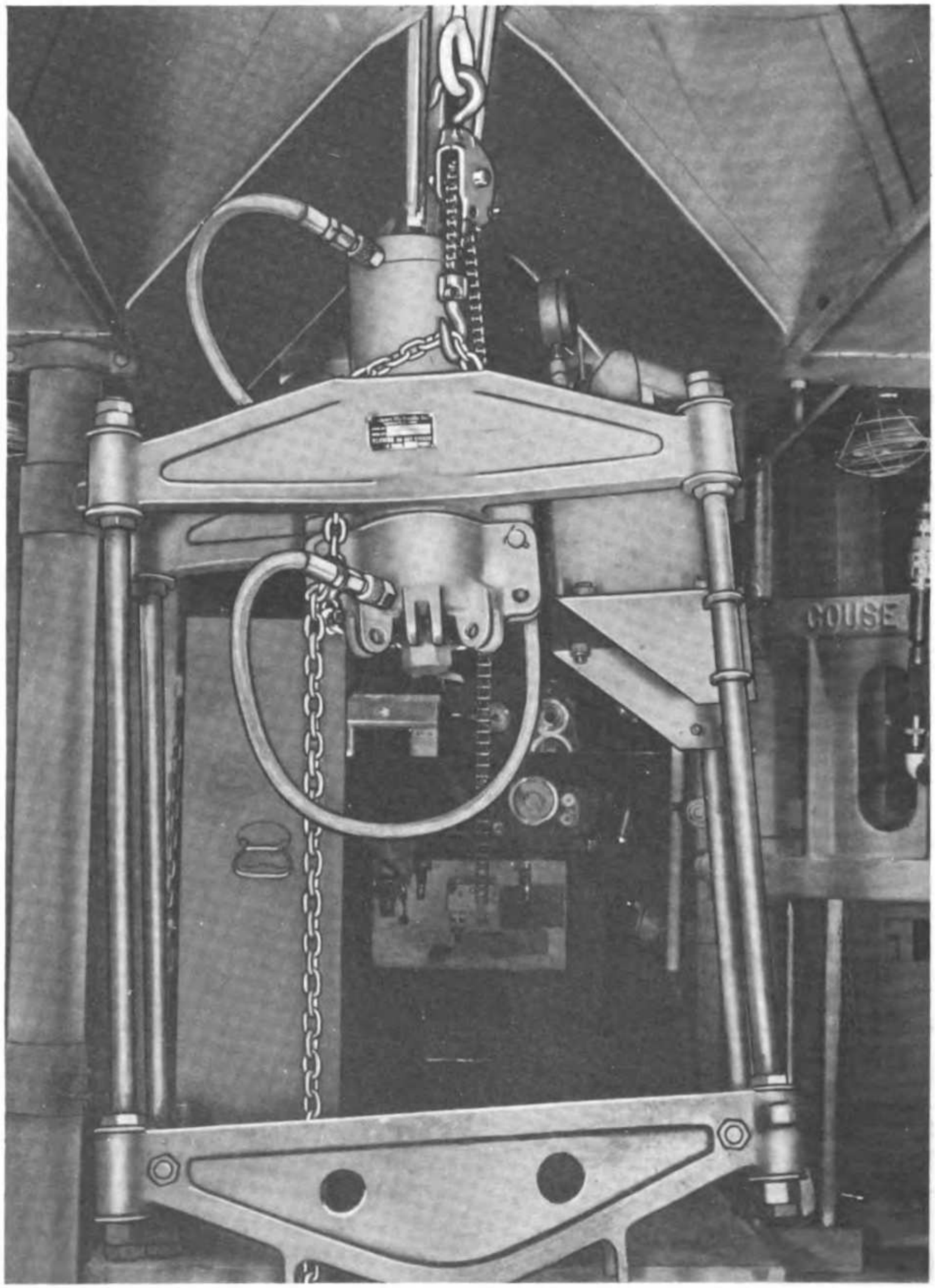


Figure 210. Removing 100-ton hydraulic press.

e. Installation.

(1) *Attach sling and hoist.* Wrap chain sling around top of press frame. Hook 1-ton hoist to trolley ring and attach lifting hook to chain sling. Take up slack.

(2) *Install press.* Lift and slide hydraulic press into mobile shop. Aline mounting hinges with hinges on left rear trailer-supporting jack cylinder (3, fig. 209); install and tighten two bolts (1) and stopnuts (2). Remove 1-ton hoist and chain sling and store (app. II).

(3) *Secure press.* Swing hydraulic press to stored position and turn retaining sleeve until it engages the left front leg of the press frame as shown in figure 116.

(4) *Close rear panel assembly.* Refer to paragraph 50*a*.

213. Valve Refacer

a. General. The service operations which may be performed by organizational maintenance personnel are cleaning, inspection, and replacement of the valve refacer.

b. Cleaning. Clean all parts of valve refacer with an approved cleaning solvent. Apply a thin film of light oil to all machined surfaces.

c. Inspection. Inspect all moving parts for ease of operation (par. 61). See if dial markings are legible. Inspect grinding wheel for looseness, excessive wear, and damage. Replace defective grinding wheel. Check motor brushes for wear and proper spring tension. Inspect coolant hoses for signs of leaks and tightness of connections.

d. Removal.

(1) Pull cable connector plug out of mobile shop outlet.

(2) Remove cap screw (2, fig. 211) and lockwasher (1) securing each corner of the valve refacer on bench (3) and remove from mobile shop.

e. Installation. Place valve refacer on bench (3); aline mounting holes and secure, using a lockwasher (1) and cap screw (2) in each corner.

214. Cylinder Boring Bar

a. General. The service operations which can be performed by organizational maintenance personnel are cleaning, inspection, and replacement of the cylinder boring bar.

b. Removal.

(1) Attach chain to handle on top of cylinder-boring-bar box (1, fig. 212). Hook 1-ton hoist to trolley ring and attach lifting hook to chain. Take up slack.

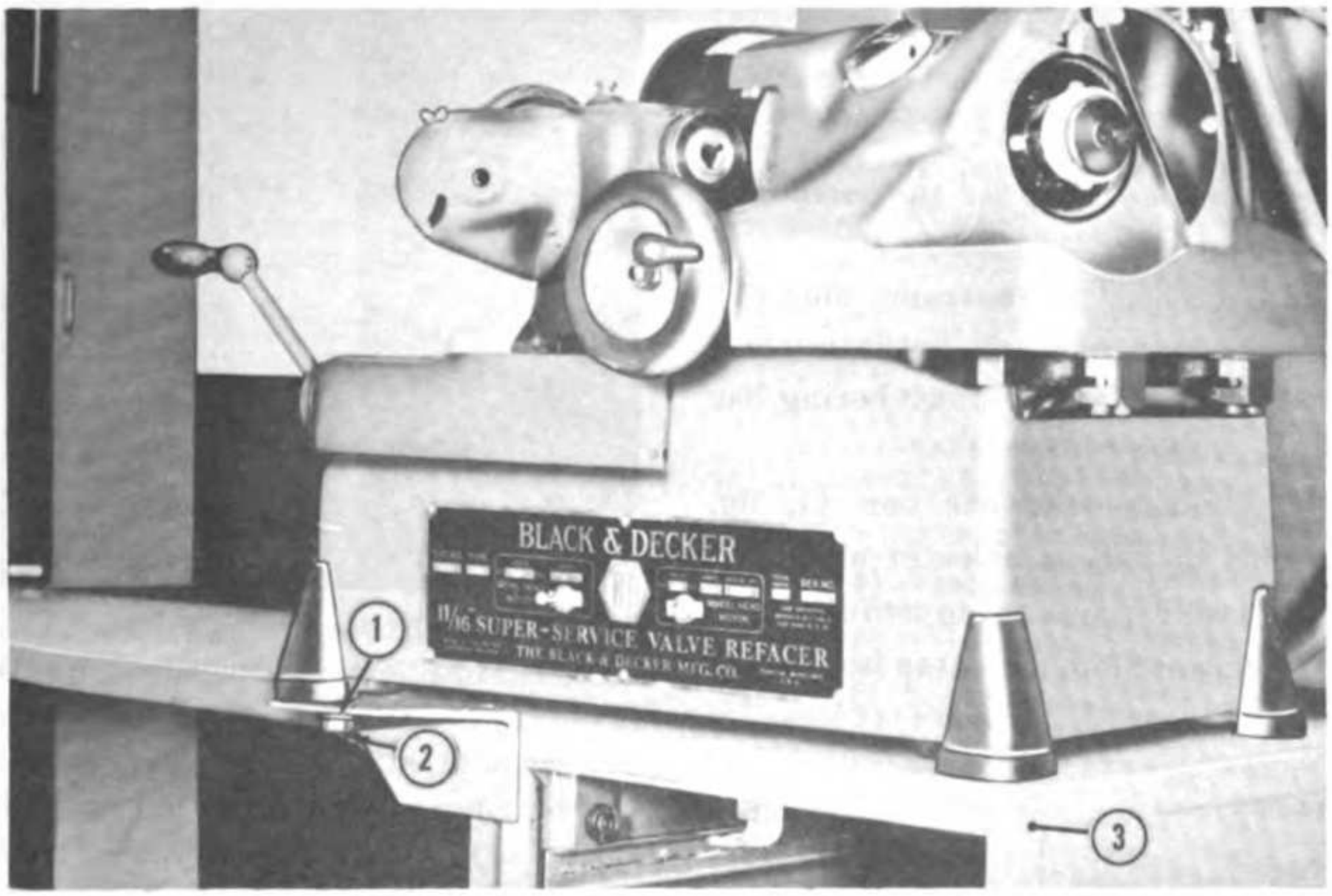
(2) Remove two stop nuts (2) securing cylinder-boring-bar box to mounting panel (3) and swing box away from mounting panel and out of mobile shop (fig. 213) through rear door.

c. Cleaning. Clean box and cylinder boring bar with an approved cleaning solvent and dry with compressed air.

d. Inspection. Inspect cylinder boring bar and accessories for damage. Report all defects to the proper authority. Inspect wiring for cut or frayed insulation. Inspect coolant hose for signs of leaks and tightness of connections.

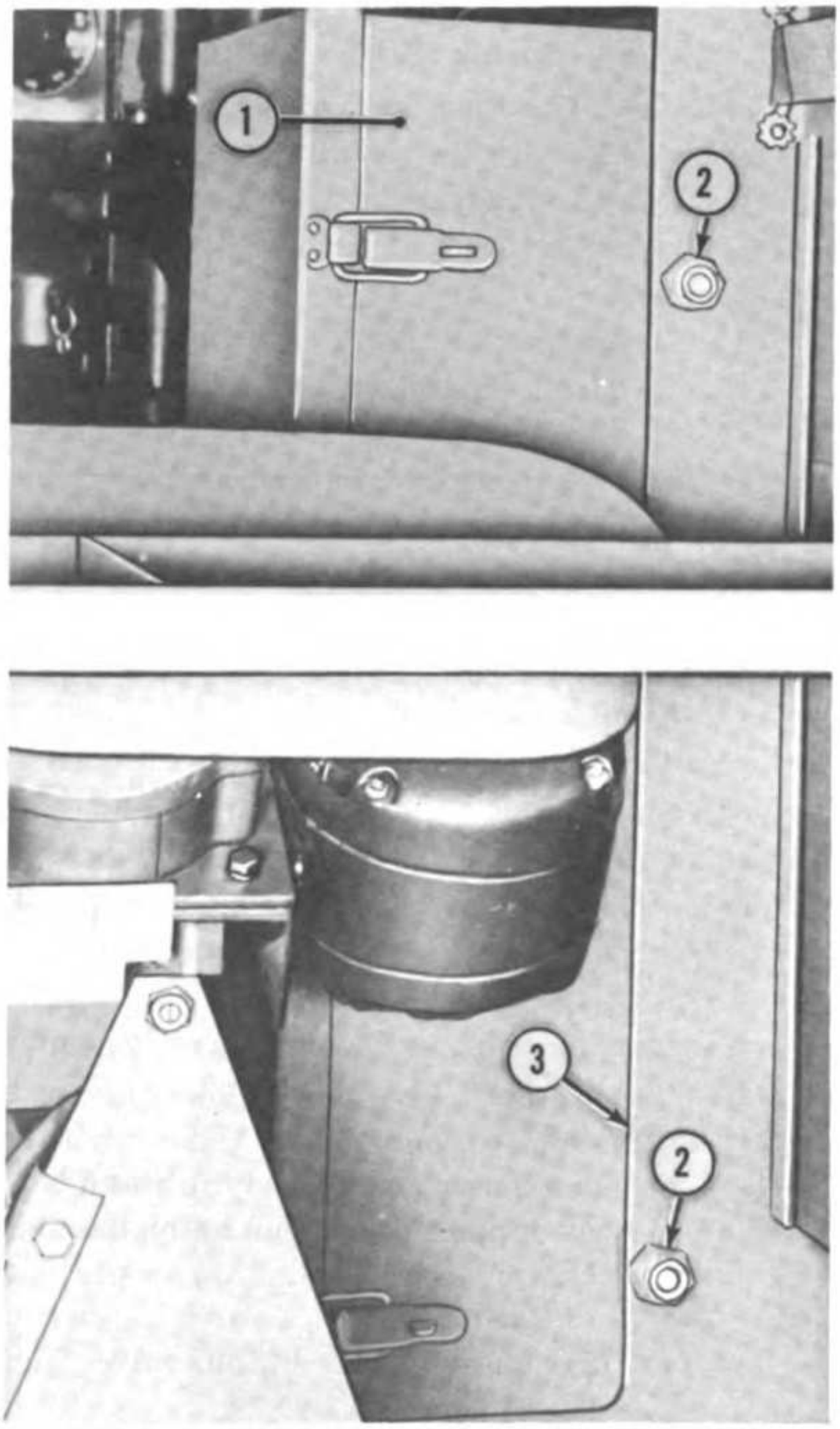
e. Installation.

(1) Fasten cover on box securely. Stand box on end and attach chain (3) to top handle.



1 Lockwasher, ⅜ std (4 rqr) 2 Screw, cap, ⅜ x 1 NC (rqr) 3 Bench

Figure 211. Valve refacer installed.

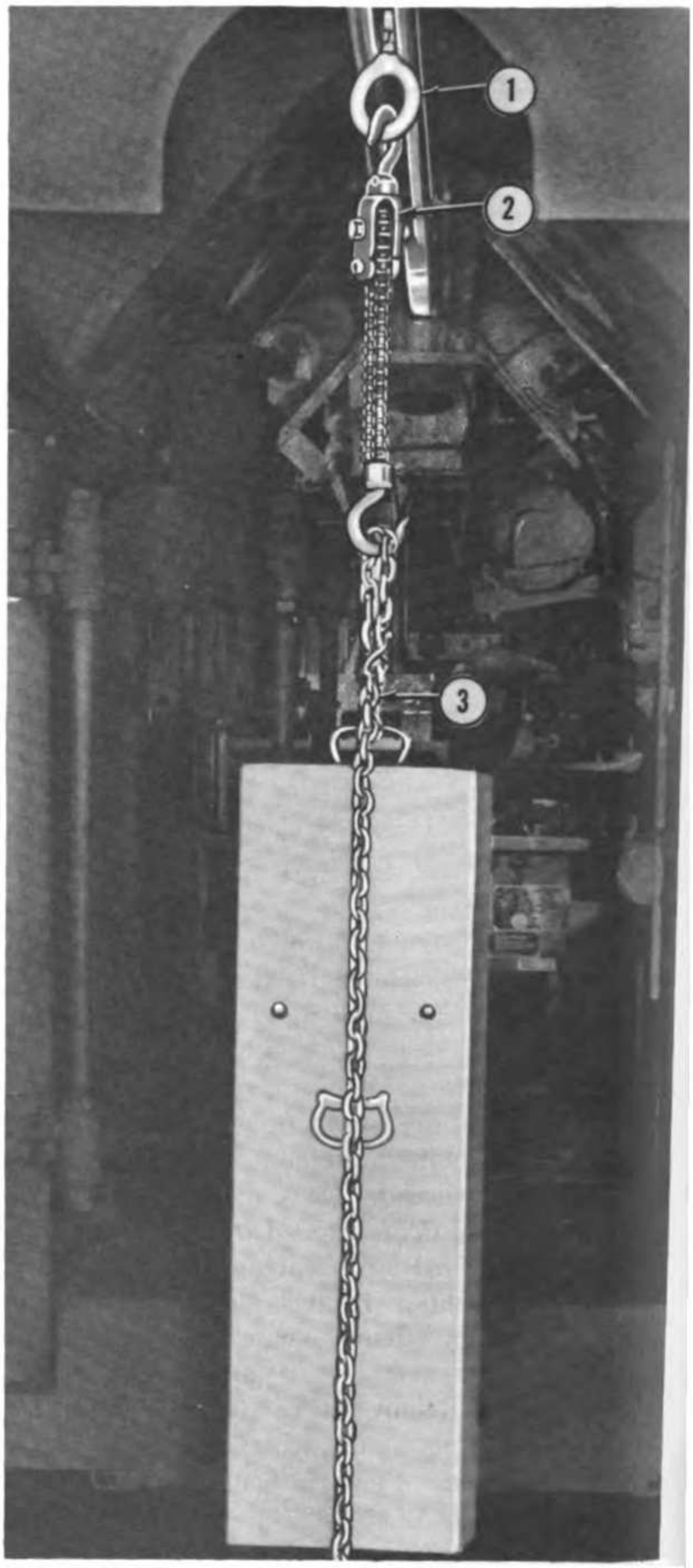


1 Cylinder boring bar box
2 Stopnuts
3 Mounting panel

Figure 212. Cylinder boring bar and box installed.

Attach 1-ton hoist (2) to trolley ring (1) and hook chain of 1-ton hoist to chain (3). Lift and slide cylinder boring bar into mobile shop.

(2) Aline cylinder-boring-bar box (1, fig. 212) with mounting holes in mounting panel (3) and secure, using two stopnuts (2). Remove chain and 1-ton hoist.



1 Trolley ring
2 1-ton hoist
3 Chain

Figure 213. Removing cylinder boring bar and box.

CHAPTER 4

SHIPMENT, LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

215. Limited Storage

a. Inspection. Refer to organizational preventive maintenance services (par. 79).

b. Cleaning and Painting.

(1) Wash down the mobile shop, using mild detergent.

(2) Inspect all painted surfaces of the mobile shop and shop equipment for corrosion and wear.

(3) Clean, prime, and repaint all surfaces as required. Use methods and materials consistent with good shop practice and as required by applicable current specifications. Refer to paragraph 78 and TM 9–2851 for additional painting instructions.

Caution: Use approved masking to prevent overspray, or accidental painting of machined surfaces, bearing surfaces, screw threads, glass, nameplates, rubber, plastic, or fabric. Do not paint lubrication fittings, bearings, breather caps, and vents. Protect electrical parts including wiring, switches, sockets, and similar items from paint and metal filings. Remove all excess paint from surrounding surfaces before it dries.

c. Lubrication. Perform complete lubrication service. Refer to LO 5–9128–1, LO 5–9128–2, and LO 5–9128–3.

d. Protection in storage. Store the mobile shop in a storage building if available. Take all precautions necessary to protect the equipment against the effects of weather and temperature conditions expected during the storage period. Make certain the equipment is protected from dirt, dust, and moisture. Check to see that the electrical equipment and wiring are protected from fungus growth if the mobile shop is to be stored in tropical or semi-tropical regions.

(1) *Shop body.*

(*a*) Place the mobile shop under canvas with the rear of the mobile shop facing into the wind if inside storage facilities are not available.

(*b*) Place wheel chocks at front and rear of semitrailer wheels.

(*c*) Secure all mobile shop tie-down cables.

(*d*) Coat exposed surfaces of hydraulic jacks with grease or approved rust-preventive compound. Make sure that jack safeties are securely in place.

(*e*) Lock hydraulic system by closing all GREEN valves (6, fig. 31) to prevent leakage through check valve in pumps.

(*f*) Close engine fuel shutoff valve (fig. 41).

(*g*) Lock all padlocks on storage bins and lifting sides after completing steps outlined below.

(2) *Engine.*

(*a*) Fill fuel system (par. 162*b*).

(*b*) If temperature is expected to fall below 32° F. during storage period, drain cooling system (par. 158*b*(1)), and fill cooling system (par. 158*d*(5)) with required antifreeze solution.

(*c*) Place clutch control lever (1, fig. 42) in the CLUTCH DISENGAGED position.

(*d*) Place battery-disconnect switch (10, fig. 40) in the OFF position.

(*e*) Remove all battery cables and coat battery posts and cable terminals with lubricant. Service as recommended in paragraph 171*a*.

(*f*) Make sure that raincaps, on top of engine enclosure, are securely in place.

(3) *Dynamotor-welder and electric-control system.*

(*a*) Place all circuit breakers and equipment operating switches in OFF position.

(*b*) Open front panel of electric-control cubicle (fig. 43) and clean all circuit components, using soft brush moistened with approved cleaning solvent.

(*c*) Wipe all exposed electric cables with clean dry cloth.

(*d*) Check all power cables and plugs for cuts in the insulation, frayed leads, or other defects. Repair or replace as required.

(*e*) Replace all defective fuses.

(*f*) Check electric system fungus-proofing.

(4) *Air compressor.*

(*a*) Place air compressor clutch control lever (1, fig. 44) in the DISENGAGED position.

(*b*) Open draincock (18, fig. 199) and drain moisture from air tank.

Note. Make sure draincock is left in open position. This will prevent condensation of moisture in the air tank during the storage period.

(5) *Shop equipment.*

(*a*) Clean all metal chips and filings from the lathe, milling-and-grinding attachment, drills, and other items of shop equipment.

(*b*) Lubricate all shop equipment using the proper grade and type of lubricants. Refer to LO 5–9128–2 and LO 5–9128–3. Make sure the trolley and chain hoist are properly greased.

(*c*) Wipe the lathe bed and all bare metal surfaces with lightly oiled rag or cotton waste.

(*d*) Make sure all drive belts are clean and free of grease. Dress with proper solvent.

(*e*) Clean all heater exhaust ports.

(*f*) Hang small bags of corrosion-preventive compound (VPI crystals) on all large items of shop equipment. Sprinkle VPI in all storage compartments and drawers.

(6) *Toolkits and toolsets.*

(*a*) Check all toolkits and toolsets for good condition and completeness (app. II).

(*b*) Thoroughly clean and oil all tools. Sharpen all cutting tools as required. Repair or replace all defective tools such as those with loose handles, poor or defective working surfaces, or other defects which impair their function.

(*c*) Place all tools in their proper storage places.

(*d*) Hang small bags of corrosion-preventive compound (VPI crystals) in all tool storage drawers and compartments. Sprinkle VPI crystals on tools. Padlock all storage compartments so equipped.

(*e*) At least once every ten days, start and operate the engine until normal operating temperatures are reached and all bearings and gears have been lubricated. Check engine gages and instruments for proper readings. Stop engine and check for leaking coolant and lubricants.

(*f*) Inspect entire unit for any unusual condition such as damage, rusting and pilferage.

(*g*) Correct, or report to proper authority, all deficiencies found.

216. Domestic Shipment

a. General. Perform limited storage services (par. 215) before shipment of mobile shop.

b. Loading for Shipment by Rail.

(1) Use lifting slings (1, fig. 23) and a crane or suitable lifting apparatus capable of handling 12 tons and lift mobile shop on flatcar. Secure mobile shop on flatcar as shown in figure 22.

(2) If no lifting apparatus is available, load mobile shop on flatcar, using a prime mover. Connect prime mover to mobile shop (par. 51). Construct suitable ramp (1, fig. 25) in front of flatcar. Back mobile shop up ramp and on flatcar. Disconnect prime mover from mobile shop (par. 38) and drive prime mover off ramp. Secure mobile shop on flatcar as shown in figure 22.

c. Loading for Shipment by Air.

Note. **Refer to figure 21 for overall dimensions of mobile shop to make certain aircraft is large enough to receive mobile shop.**

(1) Remove wheels and axle assembly (par. 147).

(2) Roll mobile shop into "flying boxcar" on rollers and secure mobile shop in aircraft with suitable tie-downs. Roll wheels and axle assembly into aircraft and under gooseneck of semitrailer. Secure wheels and axle assembly in aircraft with suitable tie-downs.

Section II. DEMOLITION TO PREVENT ENEMY USE

217. General

When capture or abandonment of the mobile shop to the enemy is imminent, the responsible unit commander makes the decision either to destroy the unit or to render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all mobile shops and all corresponding repair parts.

218. Preferred Demolition Methods

Explosives and mechanical means, either alone or in combination, are the most effective methods to employ. Listed below are the vital parts in order of priority of demolition for each preferred method. In each case, completion of the first two steps will render the unit inoperative. Completion of the additional steps will further destroy the unit.

a. Demolition by Explosives. Place as many of the following charges (fig. 214) as the situation permits and detonate them simultaneously with detonating cord and a suitable detonator:

(1) A 2-pound charge over each set of wheels, and over the axle.
(2) A 2-pound charge under the engine.
(3) A 1-pound charge inside the electric-control cubicle.
(4) A 2-pound charge under each end of the dynamotor-welder.
(5) A 1-pound charge under the front of the air compressor.
(6) A 1-pound charge in the center of the air compressor.
(7) A 2-pound charge in the lathe bed.
(8) A 1-pound charge under the lathe drive.

Note. **The above charges are the minimum requirements for this method.**

(9) A ½-pound charge on the fan.
(10) A ½-pound charge in the fan shroud.
(11) A ½-pound charge above the carburetor.
(12) A 1-pound charge on the generator.
(13) A 1-pound charge on the water pump.
(14) A 1-pound charge under the starting motor.
(15) A 2-pound charge under the lathe tailstock.
(16) A 1-pound charge on the radial drill arm.
(17) A 1-pound charge under the hydraulic press, 100-ton.

b. Demolition by Mechanical Means. Use sledge hammers, crowbars, picks, axes, or any other heavy tools which may be available, together with the tools normally included with the mobile shop, to destroy the following:

(1) Engine and accessories.
(2) Dynamotor-welder.
(3) Electric-control cubicle.
(4) Air compressor.
(5) Air tank.
(6) Lathe and other major items of shop equipment.

Note. **The above steps are the minimum requirements for this method.**

(7) All parts of the shop equipment such as lathe lead screw or accessories which can be damaged by this method.
(8) Small electric-, pneumatic-, or hydraulic-powered tools.
(9) Accessories and handtools.

219. Other Demolition Methods

If the situation prohibits employing either of the preferred methods, use the following, either singly or in combinations:

a. Demolition by Weapons Fire. Fire on the mobile shop with the heaviest weapons available.

b. Demolition by Scattering and Concealment. Remove all easily accessible vital parts such as engine accessories, electric-control-system parts, air valves, lathe accessories, toolkits, and tool sets, and scatter them through dense foliage, bury them

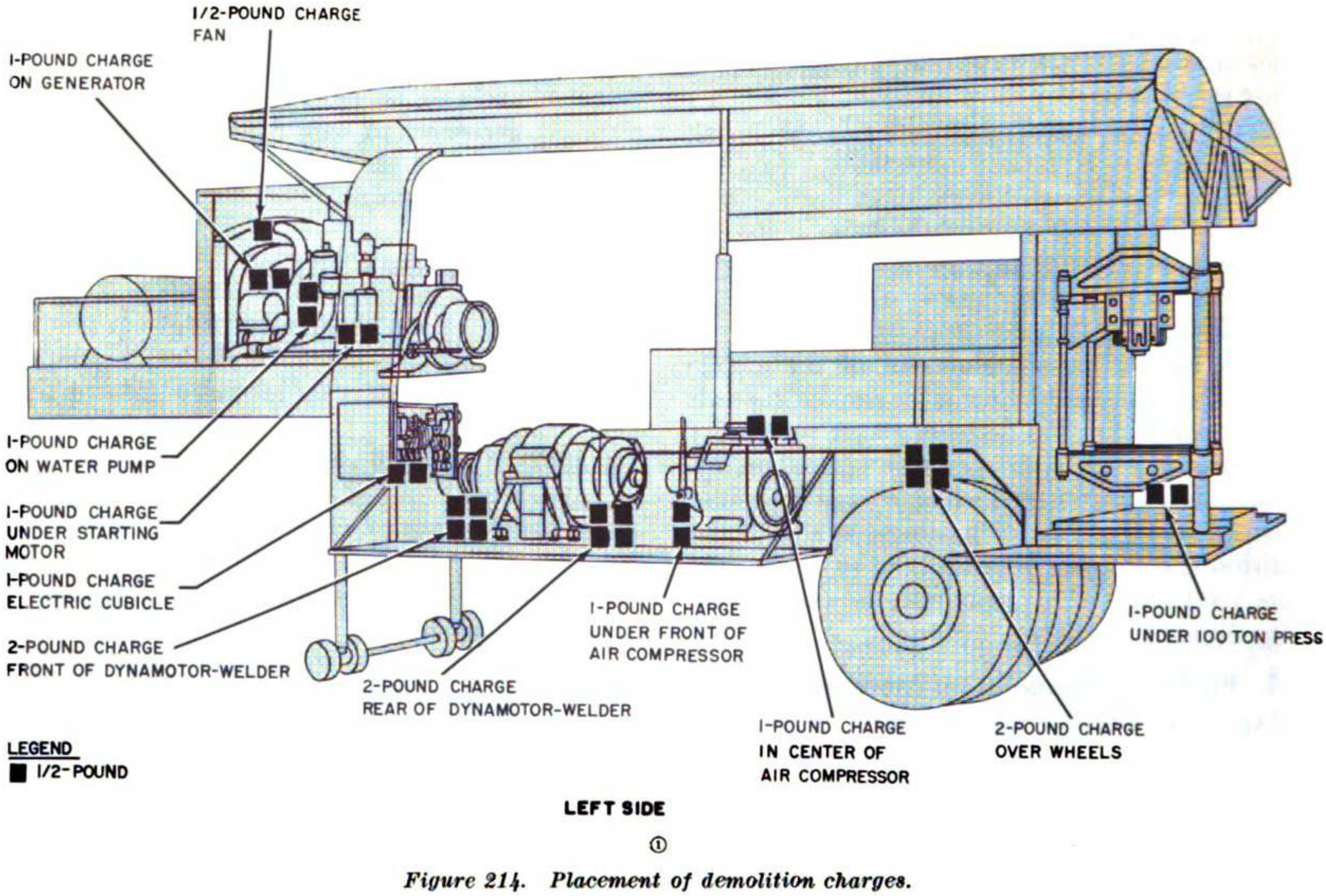


Figure 214. Placement of demolition charges.

in dirt or sand, or throw them in a lake, stream, well, or other body of water.

c. Demolition by Burning. Pack rags, clothing, or canvas under and around the major power supply components. Saturate this packing with gasoline, oil, or diesel fuel, and ignite.

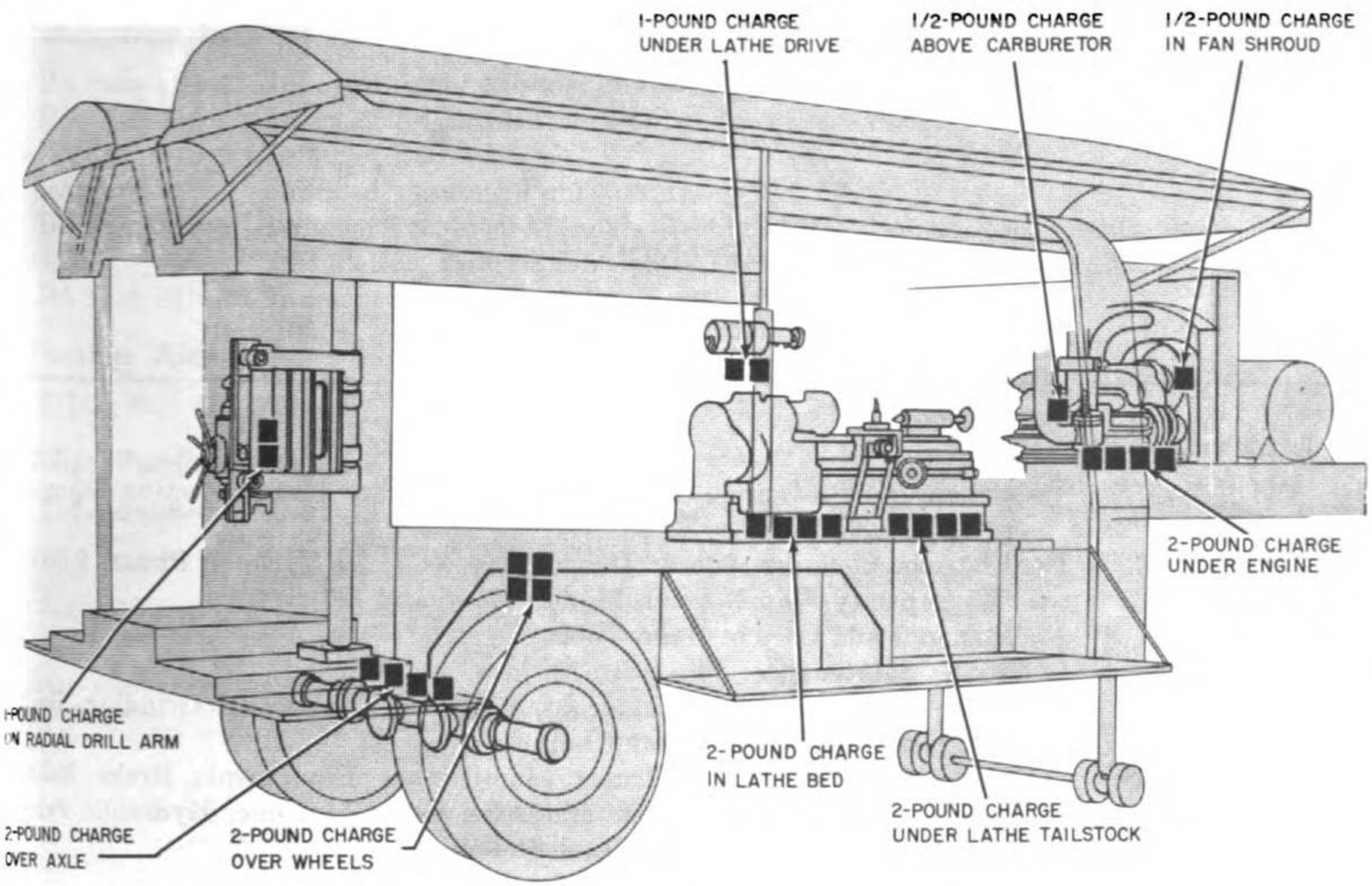
d. Demolition by Submersion. Totally submerge the mobile shop in a body of water to provide some water damage and concealment. Salt water will do the greater damage to metal parts.

e. Demolition by Misuse. Perform the steps listed below to make the unit inoperative:

(1) Drain lubricant and coolant from the engine. Drain lubricant from air compressor and compressor clutch. Start engine (par. 41); start air compressor (par. 53) and operate at full throttle.
(2) Start shop equipment electric motors and jam mechanism so that motors will burn out.
(3) Use gas welding torch and apply flame to dynamotor-welder armature.
(4) Use gas welding torch and burn brake camshafts and radius rods in half.
(5) Cut all accessible cables and air, fuel, hydraulic, coolant, and lubrication lines.

220. Training

All operators should receive thorough training in the destruction of the mobile shop. Simulated destruction, using all the methods listed above, should be included in the operator training program. It must be emphasized in training that demolition operations are usually necessitated by critical situations, when the time available for destruction is limited. For this reason, it is necessary that operators be thoroughly familar with all methods of destruction and be able to carry out demolition instructions without reference to this or any other manual.



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③

Figure 214—**Continued.**

APPENDIX I

REFERENCES

1. Accessory Equipment

TM 5–687	Inspection and Preventive Maintenance Services for Fire-Protection Equipment and Appliances.
TB 5–4164–1	Bar, Boring, Cylinder, Motor Driven, 110 Volt, 60 Cycle, 1 Phase, 2.6000 to 5.343 Capacity, Van Norman Models 777–S and 777–S–4.
TM 9–867	Maintenance and Care of Hand Tools.
TM 9–1799	Ordnance Maintenance: Fire Extinguishers.
TM 9–1834A	Ordnance Maintenance: Vehicular Maintenance Equipment; Grinding, Boring, Valve Reseating Machines, and Lathes.
TM 9–1834B	Ordnance Maintenance: Vehicular Maintenance Equipment; Brake Relining Machines, Frame Straightener and Axle Aliner Machine, Hydraulic Presses, Connecting Rod Aliner, and Clutch Rebuilder.
TM 9–8662	Fuel-Burning Heaters for Winterization Equipment.
TM 9–9107–2	Valve Refacer, Wet Type, ¼ to ⅝ Inch Capacity, Universal-Current, 110-Volt (Black & Decker Model 550–P) (40–V–505).
TM 10–450	Sheetmetal Work; Body, Fender, and Radiator Repairs.

2. Dictionaries of Terms and Abbreviations

SR 320–5–1	Dictionary of United States Army Terms.
SR 320–50–1	Authorized Abbreviations.

3. Lubrication and Painting

LO 5–9128–1	Shop, Mobile, General Purpose Repair, Set No. 1, Heavy, 12-Ton Semitrailer Mounted, Couse Model MED.
LO 5–9128–2	Shop, Mobile, General Purpose Repair, Set No. 1, Heavy, 12-Ton Semitrailer Mounted, Couse Model MED.
LO 5–9128–3	Shop, Mobile, General Purpose Repair, Set No. 1, Heavy, 12-Ton Semitrailer Mounted, Couse Model MED.
TM 9–2851	Painting Instructions for Field Use.

4. Preparation for Export Shipment

TB 5–9711–1	Preparation of Corps of Engineers Equipment for Oversea Shipment.
TB 5–9713–1	Preparation for Export, Spare Parts for Corps of Engineers Equipment.

5. Preventive Maintenance

TB 5–9128–1	Preventive Maintenance Services: Shop, Mobile, General Purpose Repair, Set No. 1 Heavy, 12-Ton Semitrailer Mounted Couse Model Med.
TM 5–505	Maintenance of Engineer Equipment.

6. Publication Indexes

DA Pam 108–1	Index of Army Motion Pictures, Television Recordings, and Filmstrips.
DA Pam 310–1	Index of Administrative Publications.
DA Pam 310–2	Index of Blank Forms.
DA Pam 310–3	Index of Training Publications.
DA Pam 310–4	Index of Technical Manuals, Technical Regulations, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
DA Pam 310–25	Index of Supply Manuals—Corps of Engineers.

7. Training Aids

FM 21–8	Military Training Aids.

8. Allied Publications

TM 5–9128–2	Shop, Mobile, General Purpose Repair, Set No. 1, Heavy, 12-Ton Semitrailer Mounted, Couse Model MED.

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APPENDIX II

SHOP LOAD

1. Scope and Illustrations

Appendix II contains complete illustrations and two separate listings of all shop equipment and tools. The illustrations and listings of appendix II are referenced to the shop load location key (fig. 215). Appendix II is divided into three paragraphs. This paragraph consists of illustrations of the complete shop load arranged according to the proper location and storage position for each item. Paragraph 2 below, lists all shop equipment and tools and is referenced to the illustrations in this paragraph. Paragraph 3 below lists all shop equipment and tools in strict alphabetical order and is referenced to locations and illustrations of the shop load.

Tool sets containing similar items, with the exception of size or capacity (for example, wrench sets, drill sets, and similar items), are listed as a one-line entry under paragraphs 2 and 3 below.

Standard items of equipment such as the bushing hone, brake relining machine, and similar items with associated accessories, are listed as a one-line entry in paragraph 3 below, and also are listed in detail (accessories listed under main item) in paragraph 2 below.

In certain cases where a functionally related group of small tools is packed in a set (for example, ¼-inch socket-wrench set, tap-and-die set, and similar items) these tools are listed as a one-line entry in paragraphs 2 and 3 below.

Quantities are indicated in the description, and are considered as a unit of one unless otherwise noted.

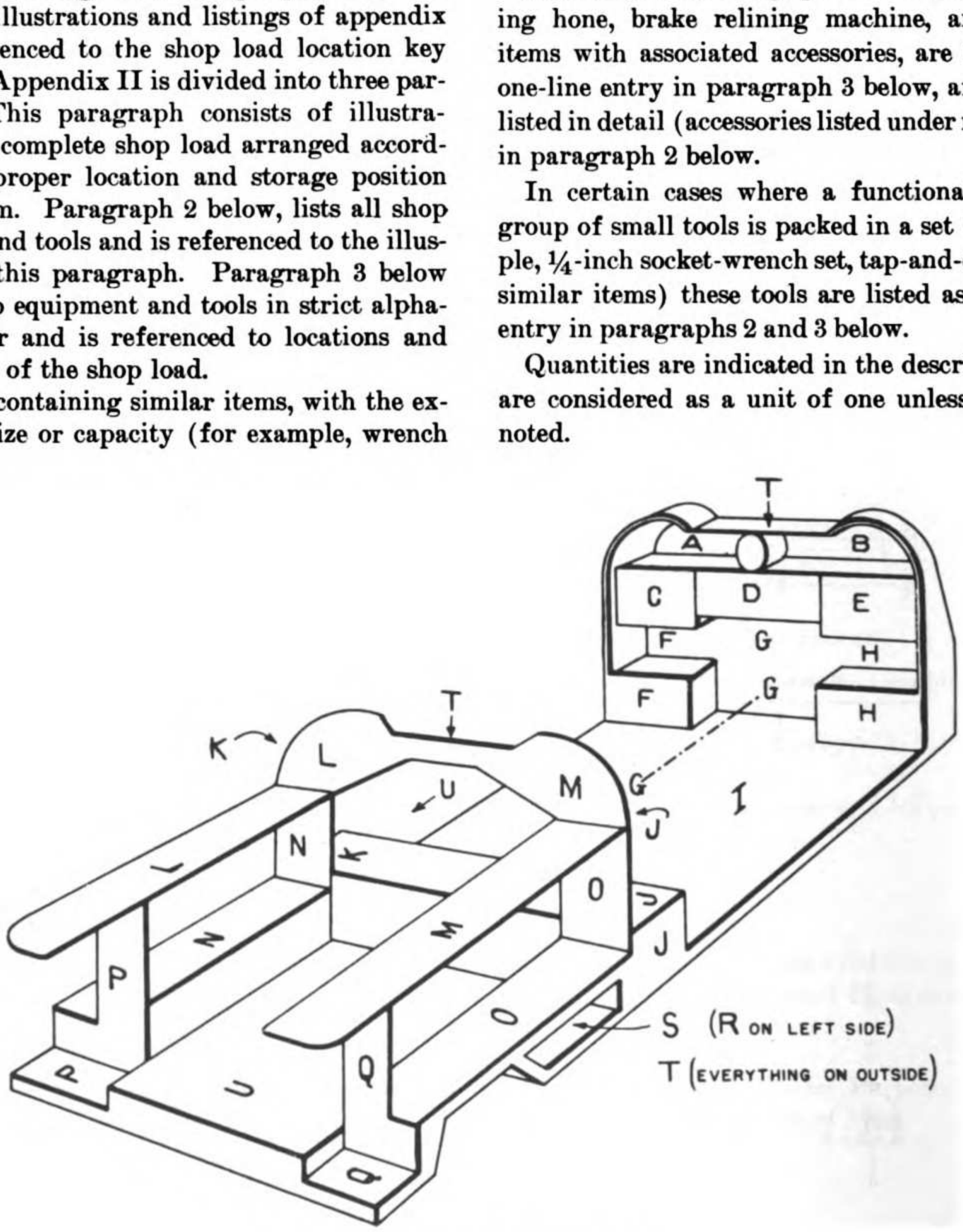
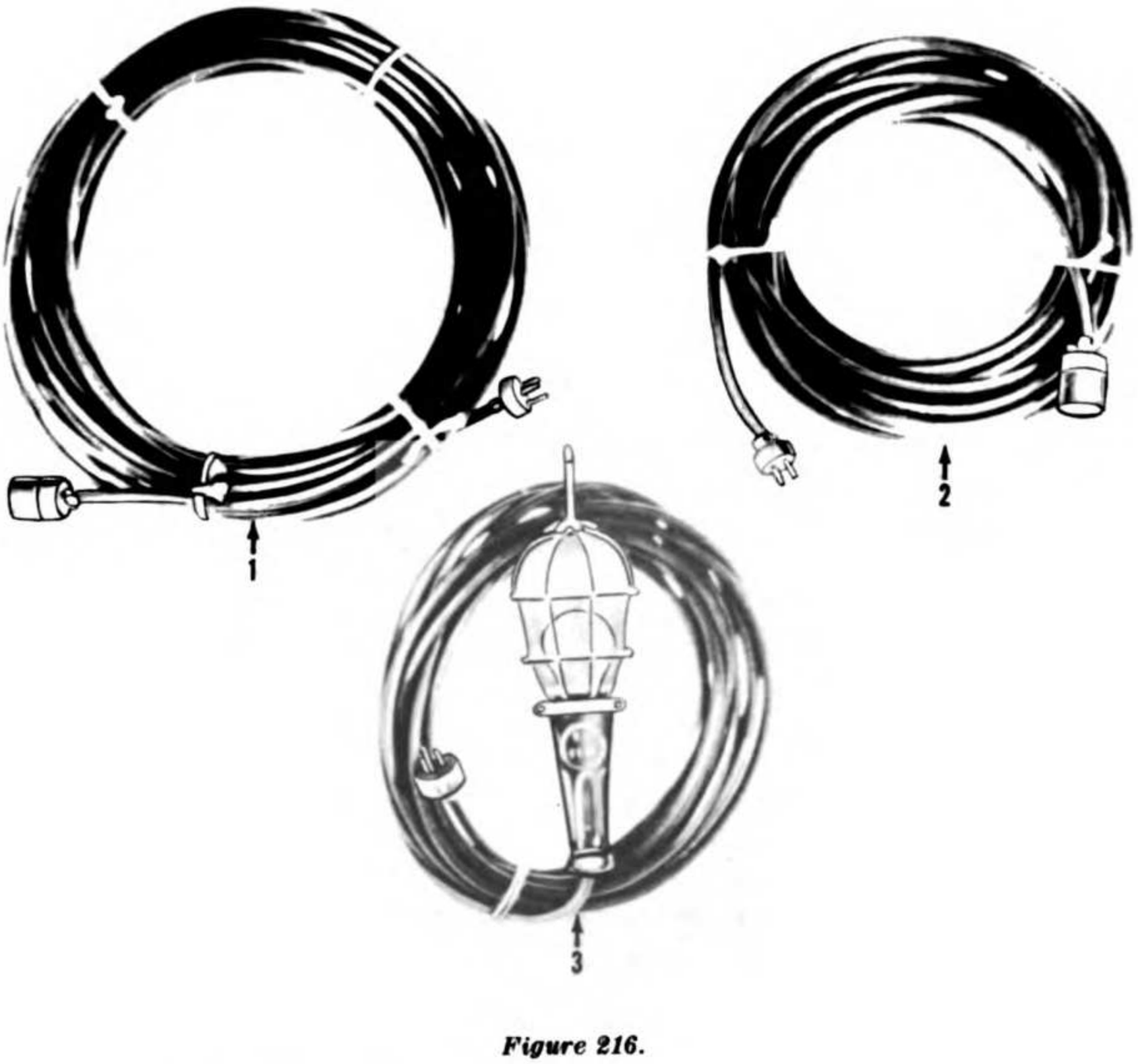


Figure 215. Shop load location key.



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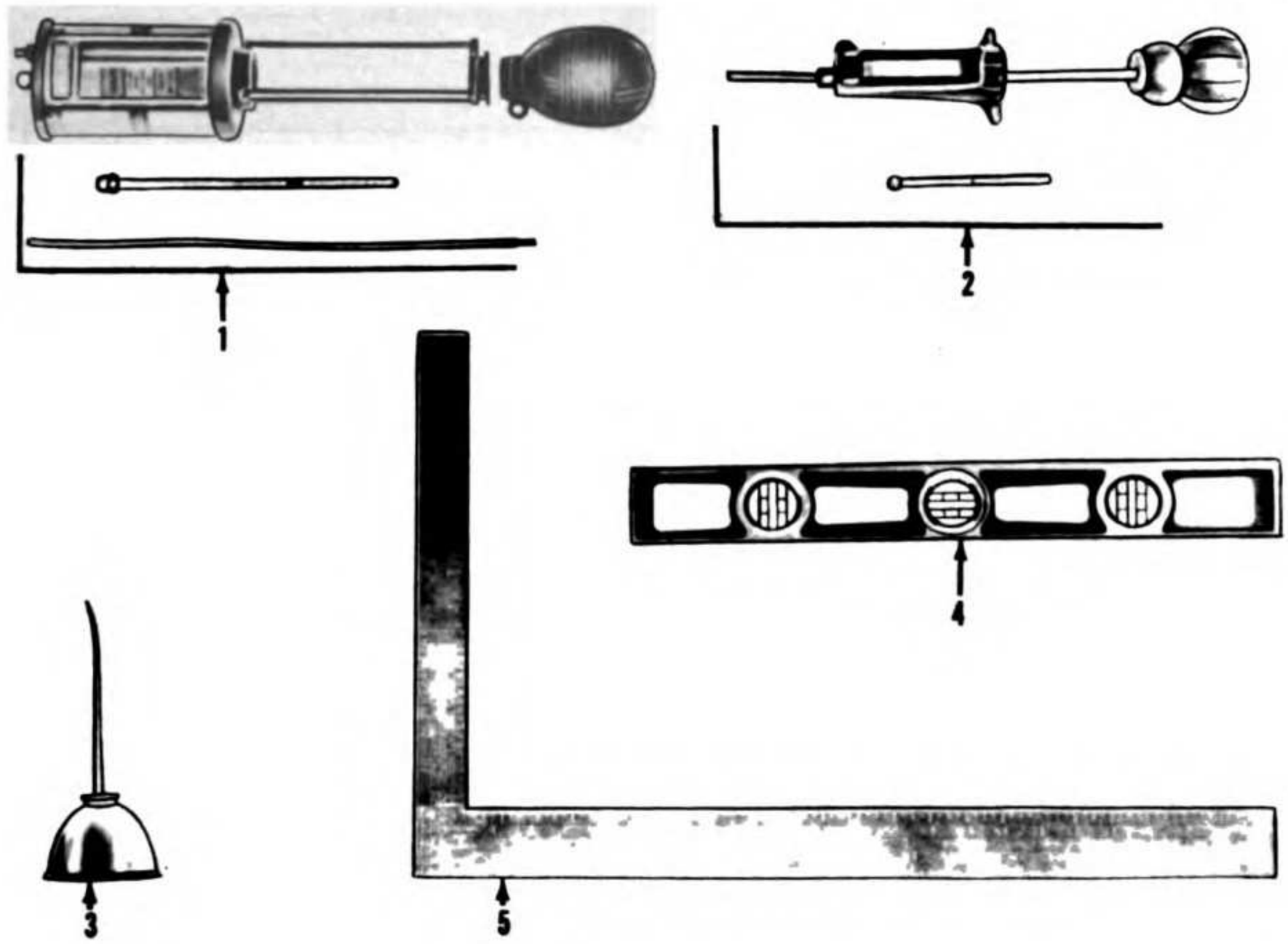

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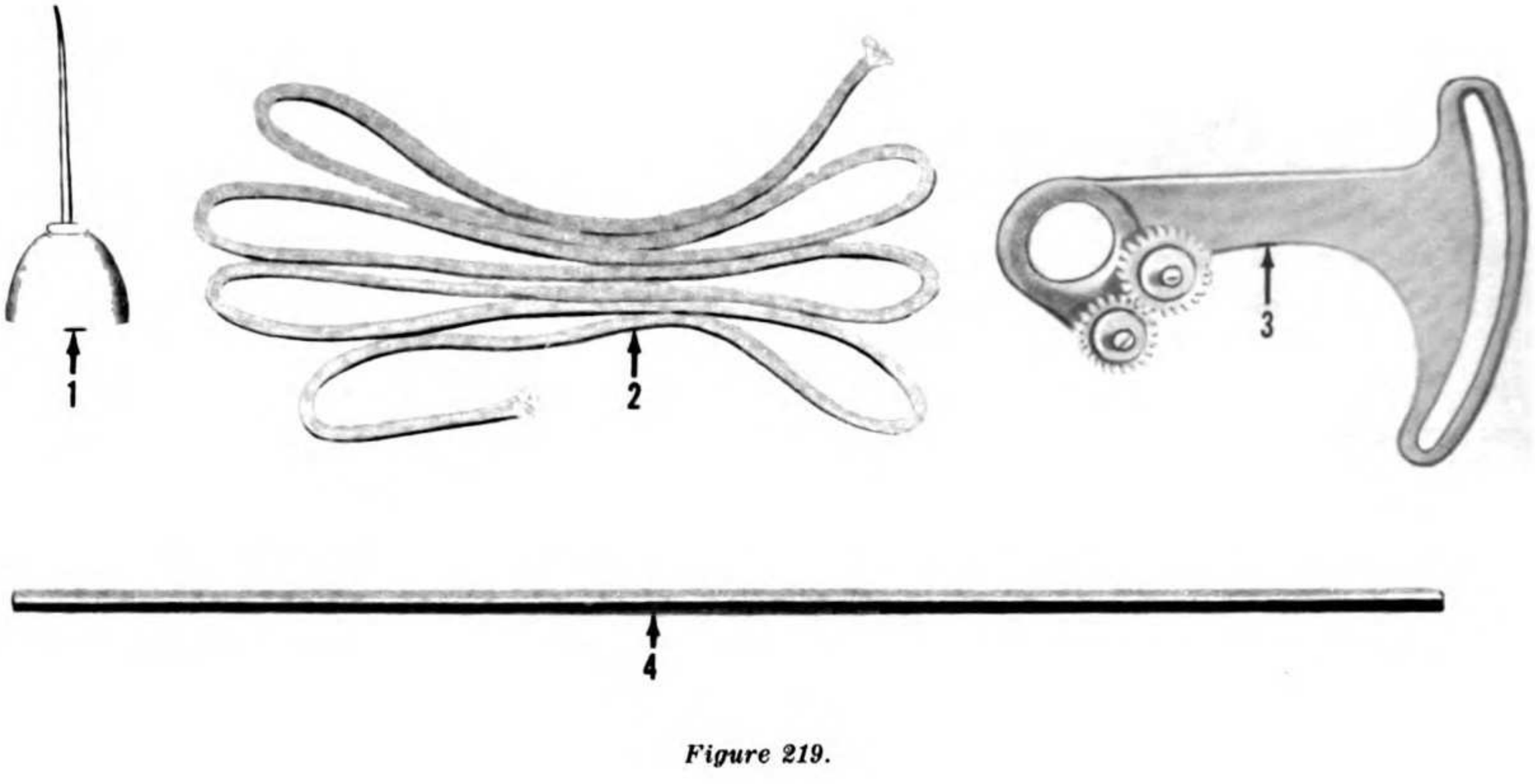

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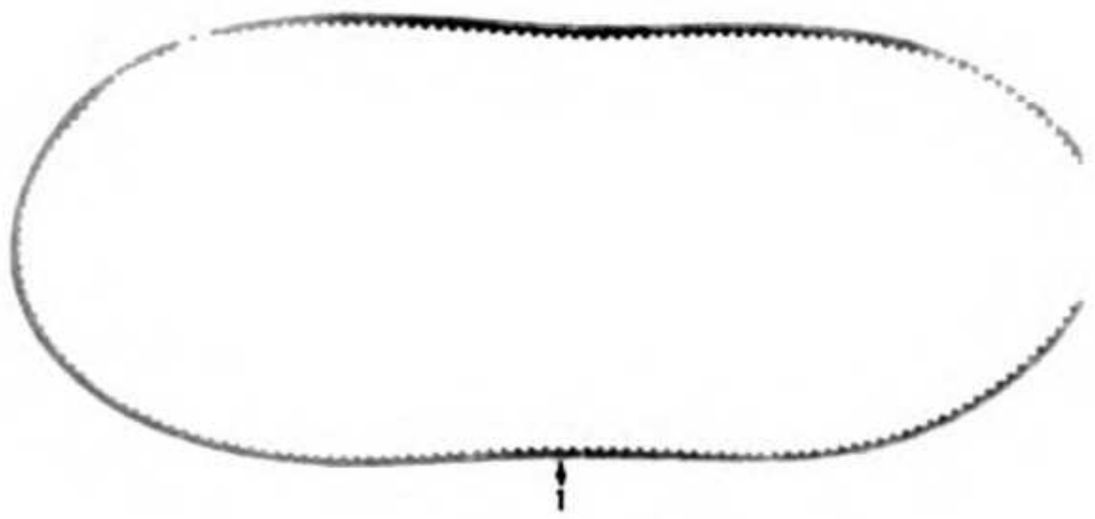

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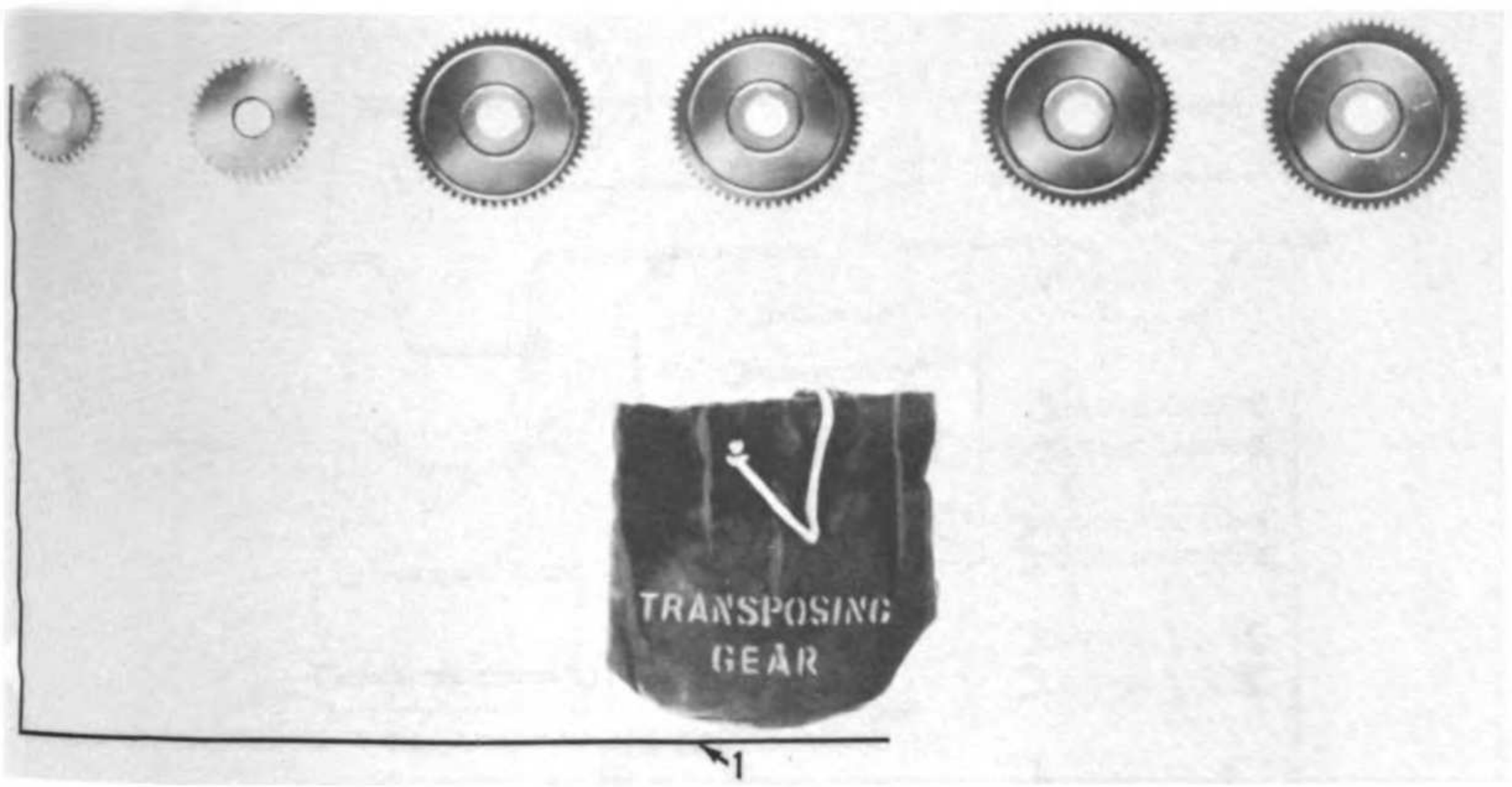

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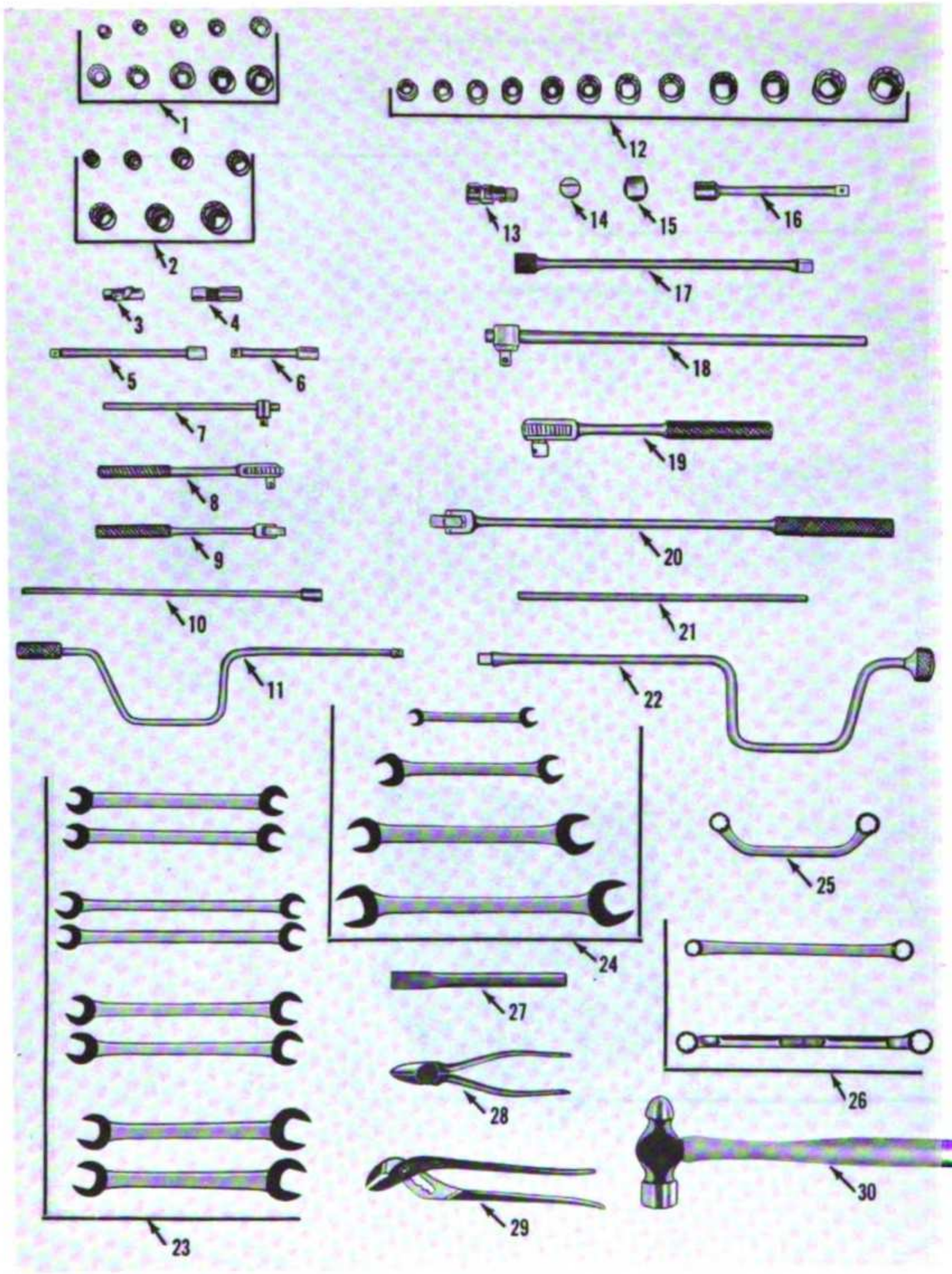

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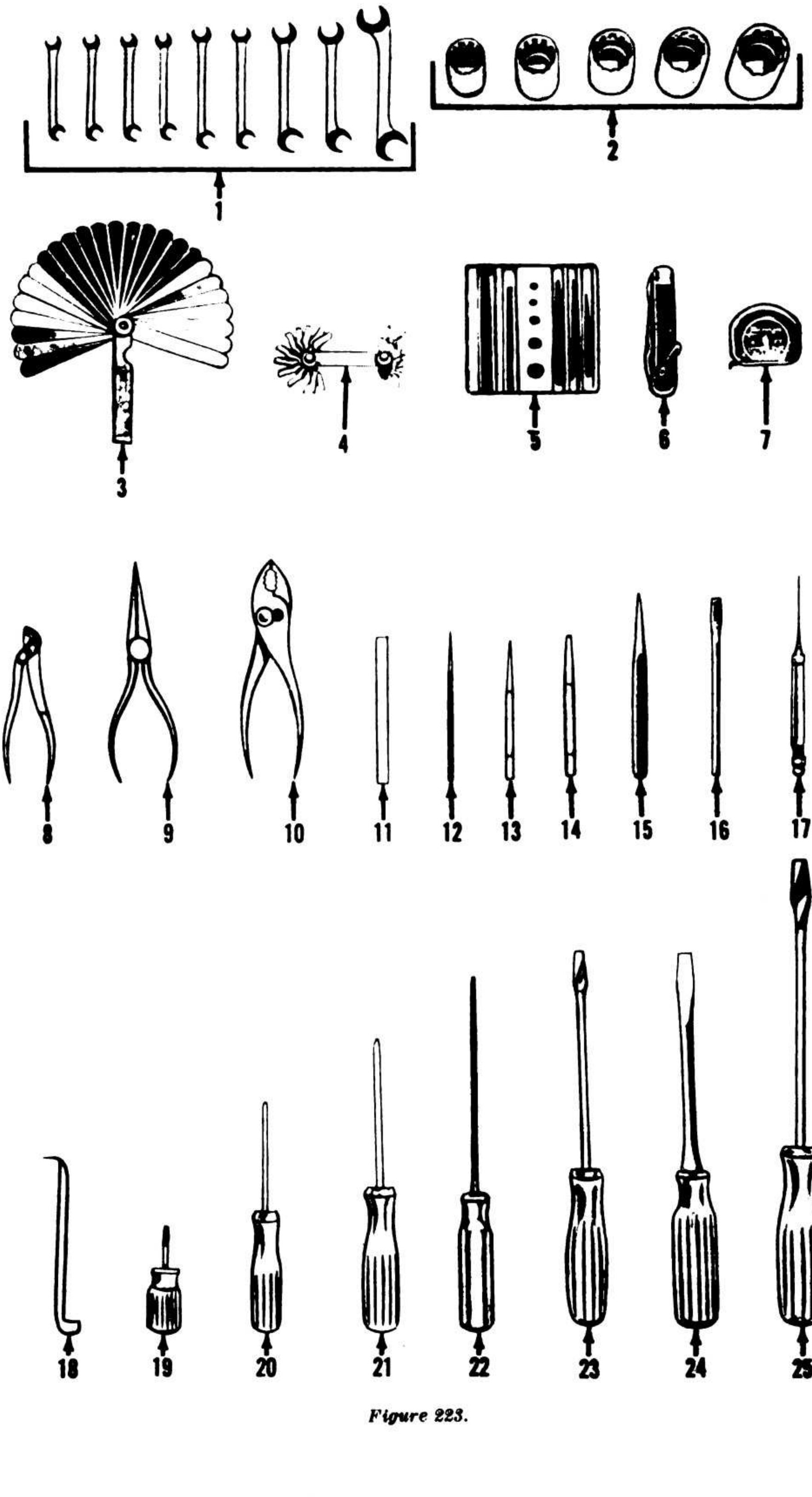

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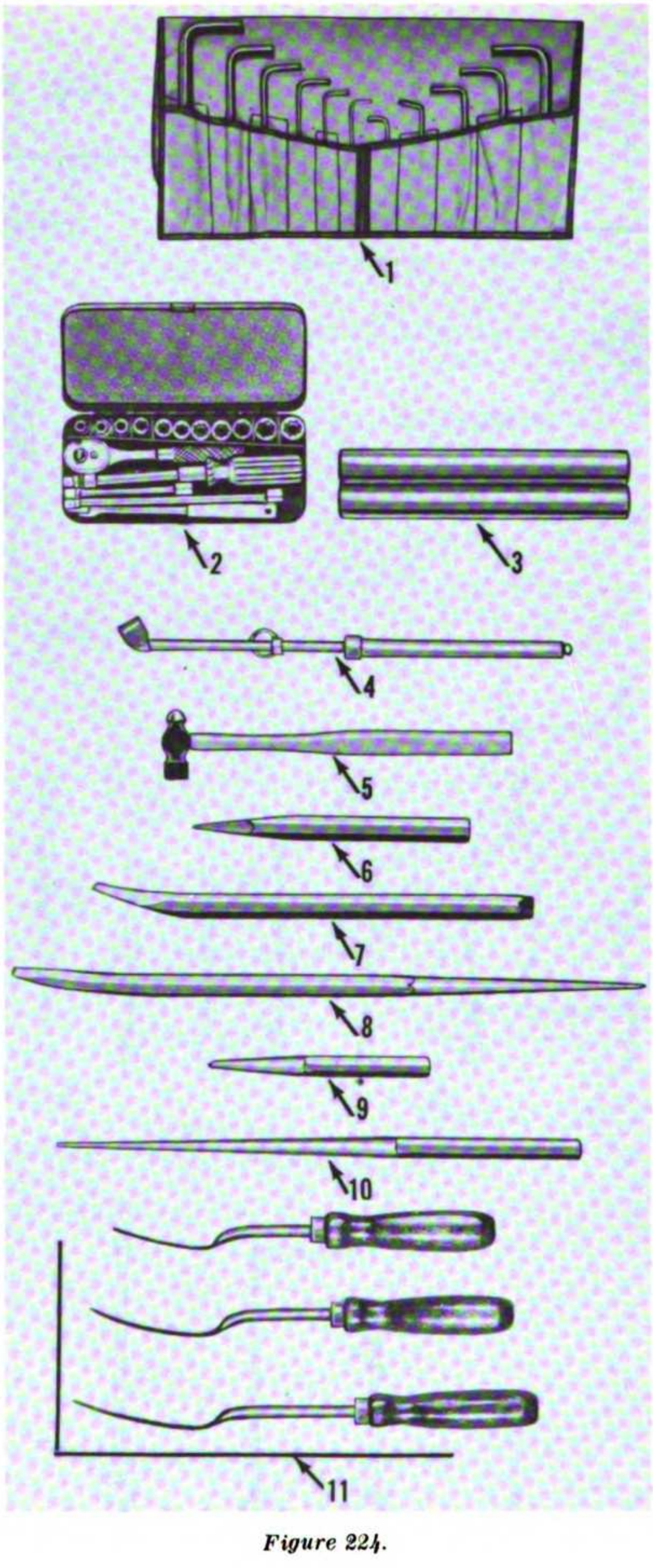

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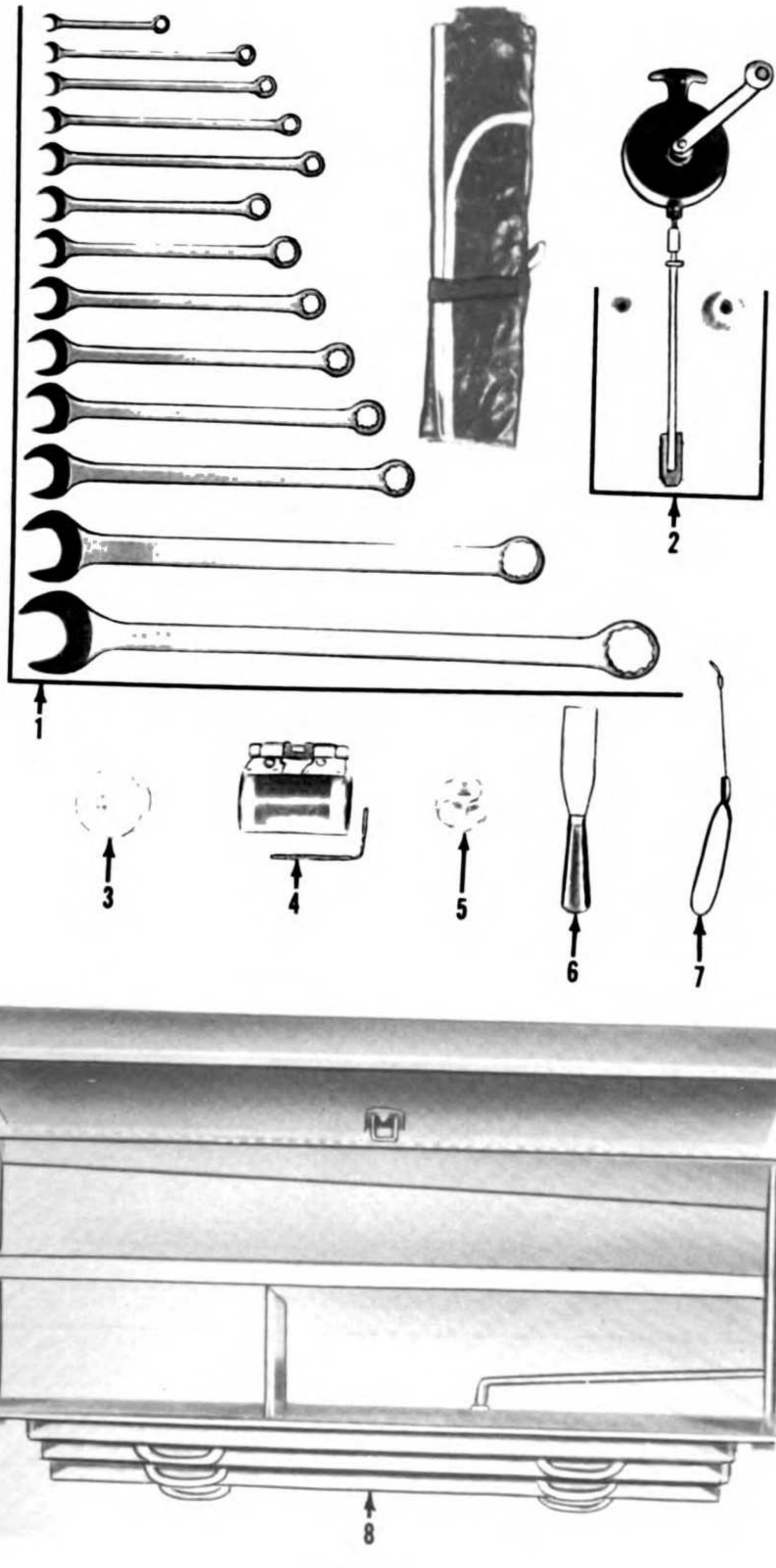

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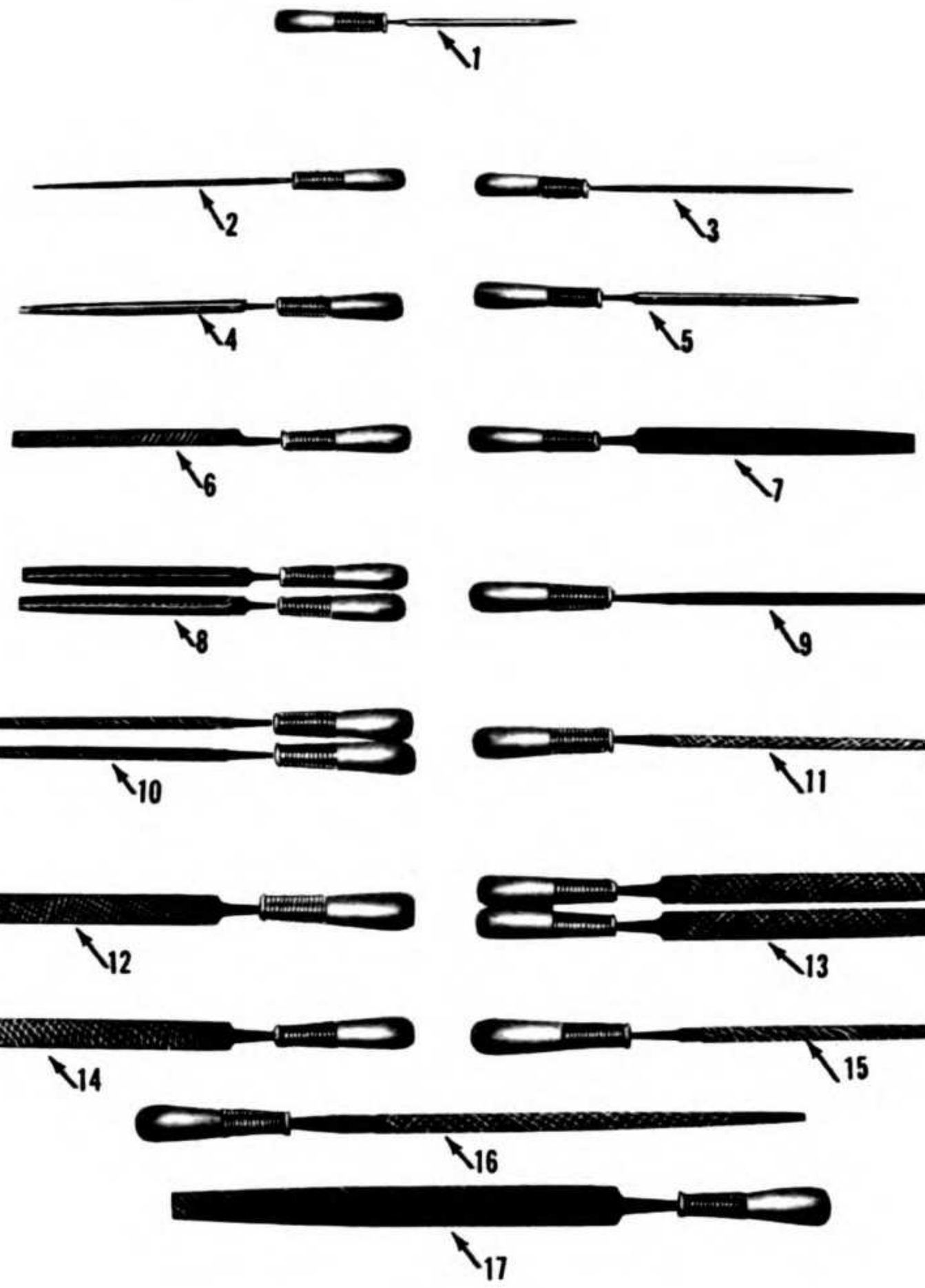

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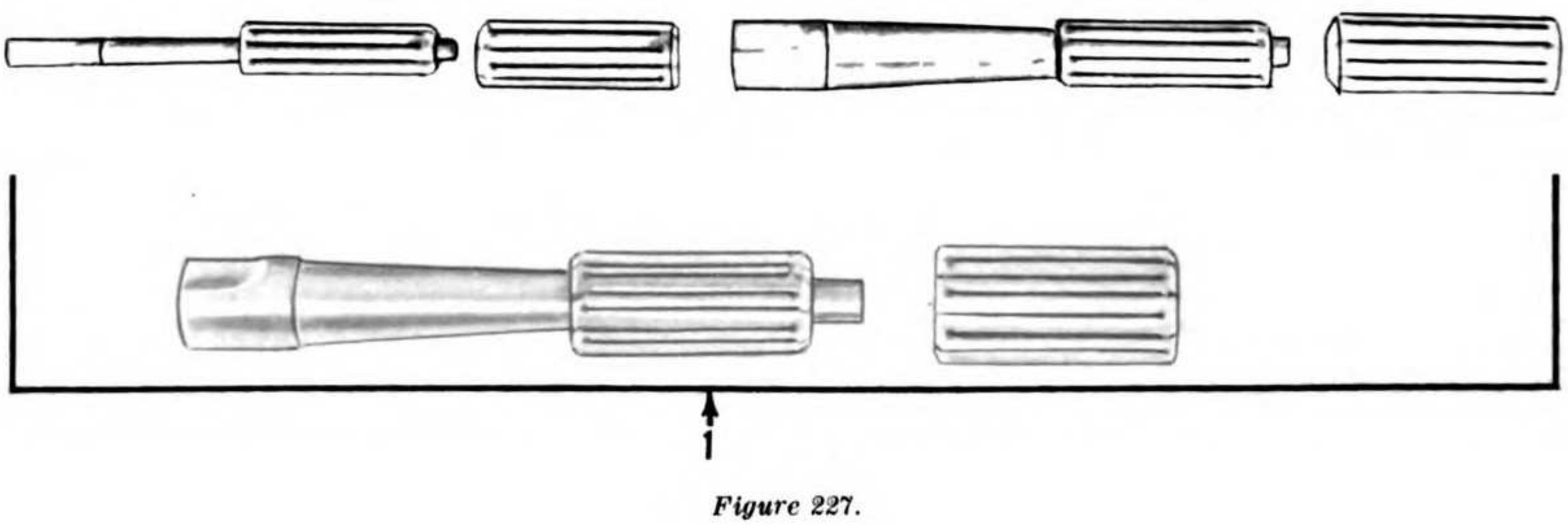

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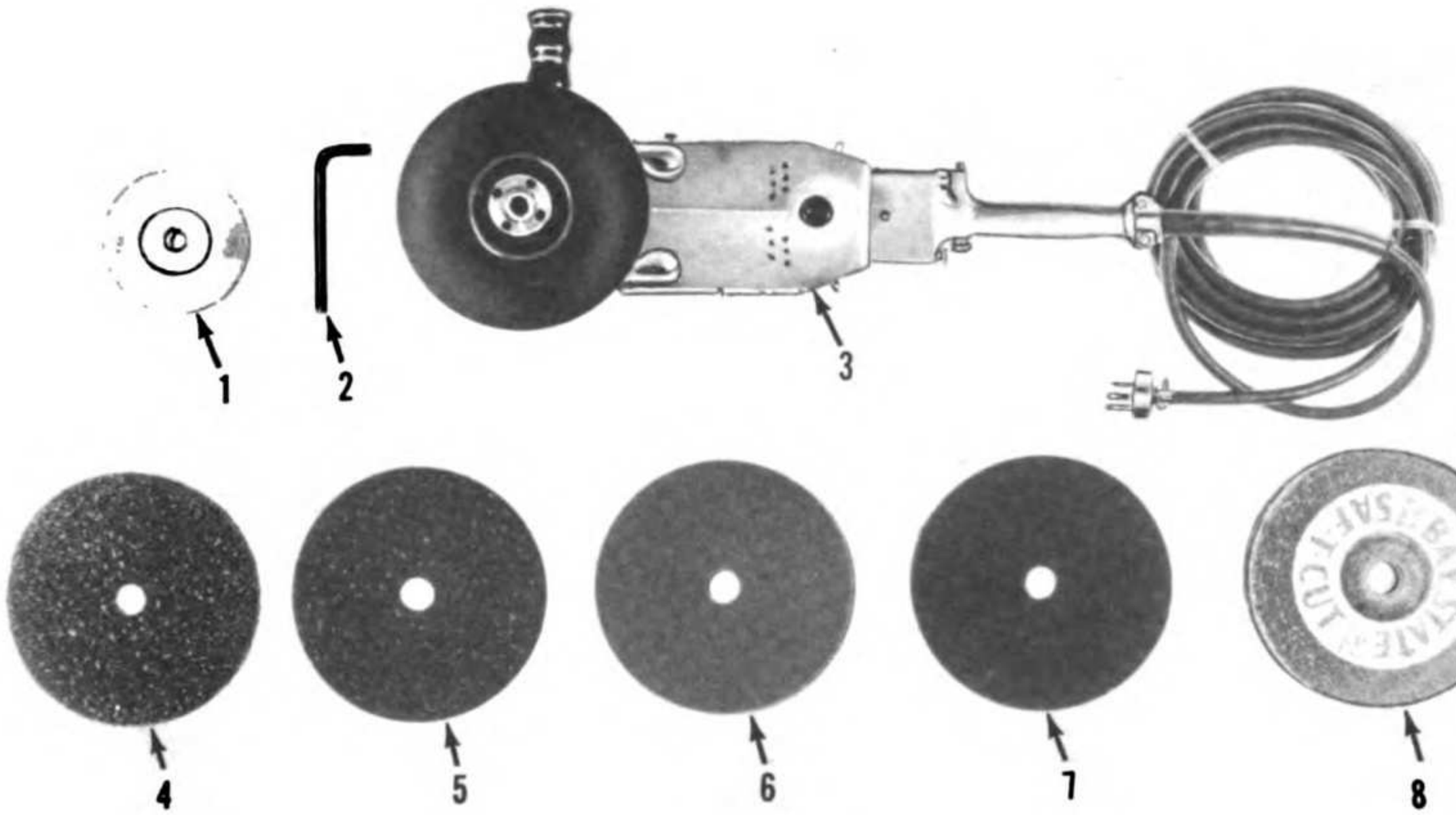

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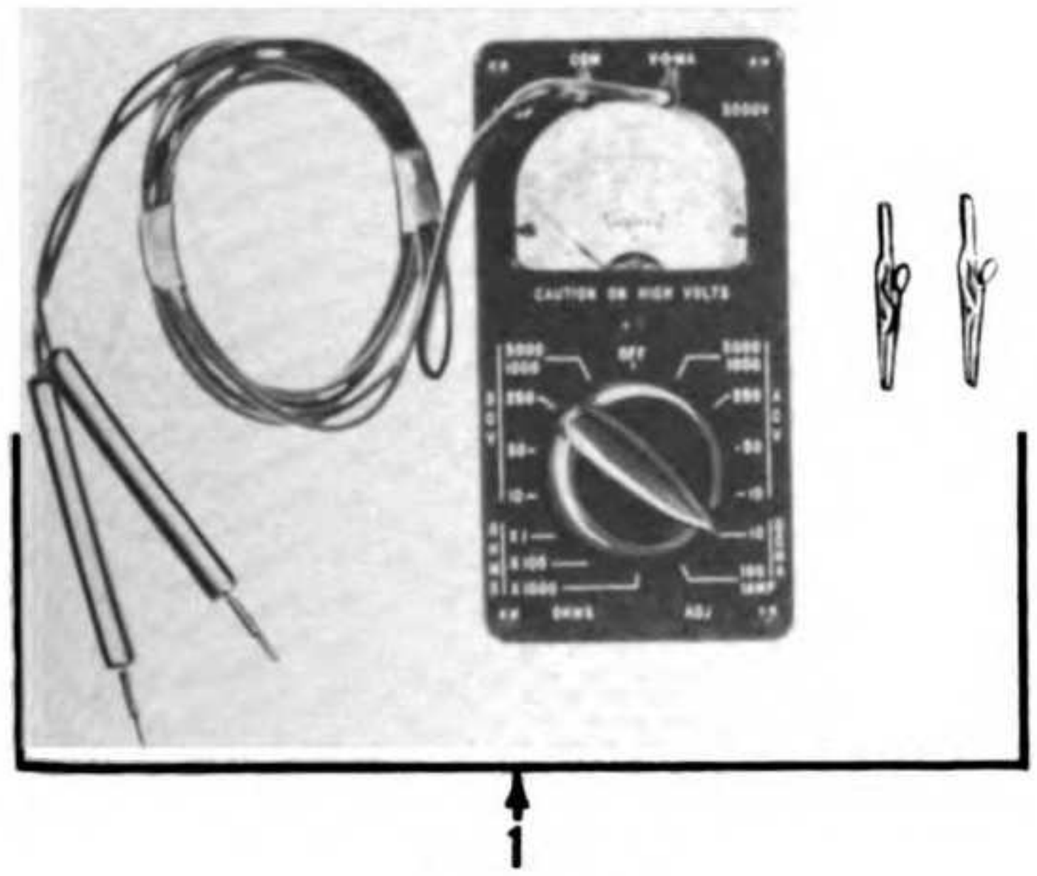

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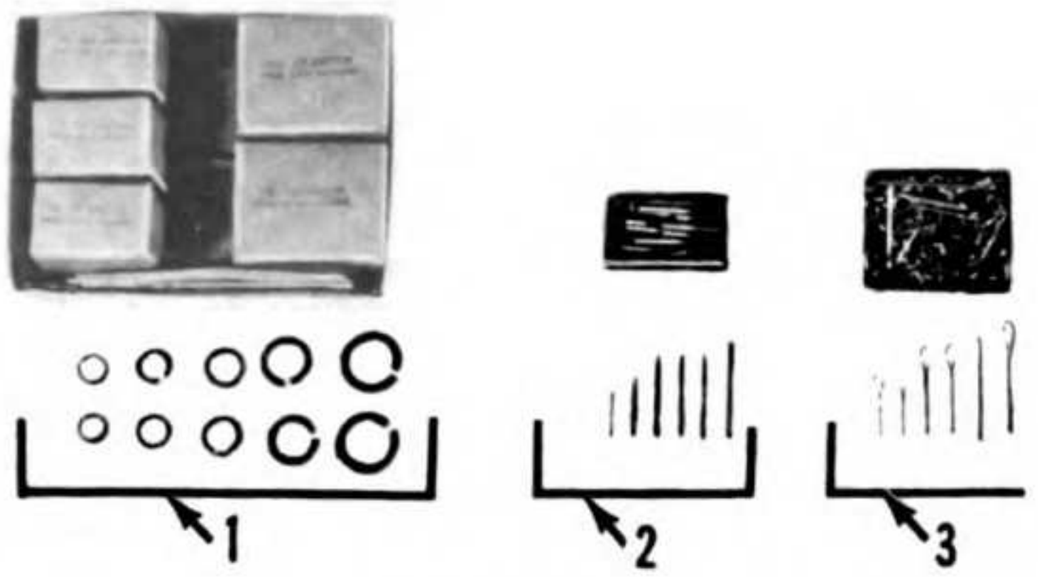

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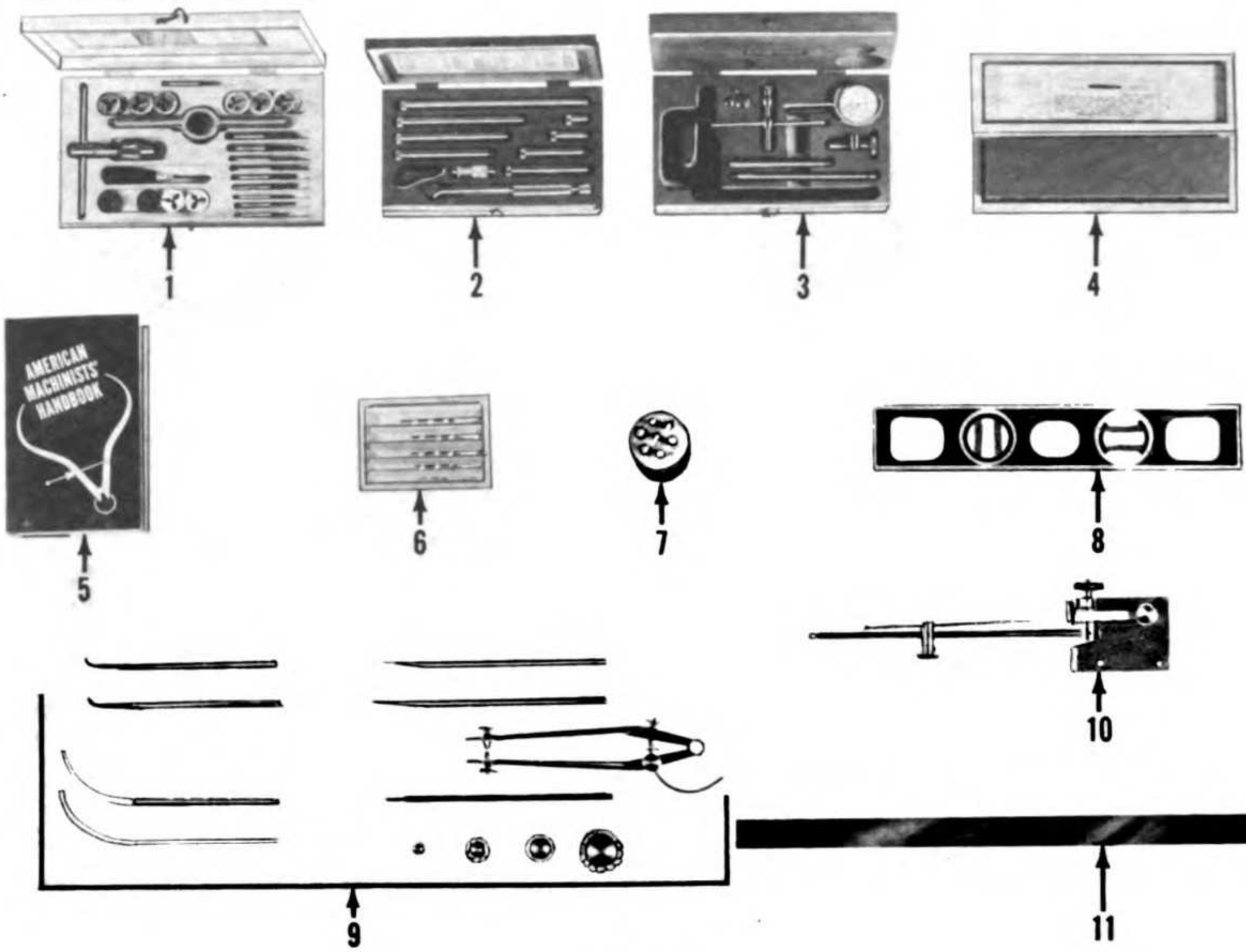

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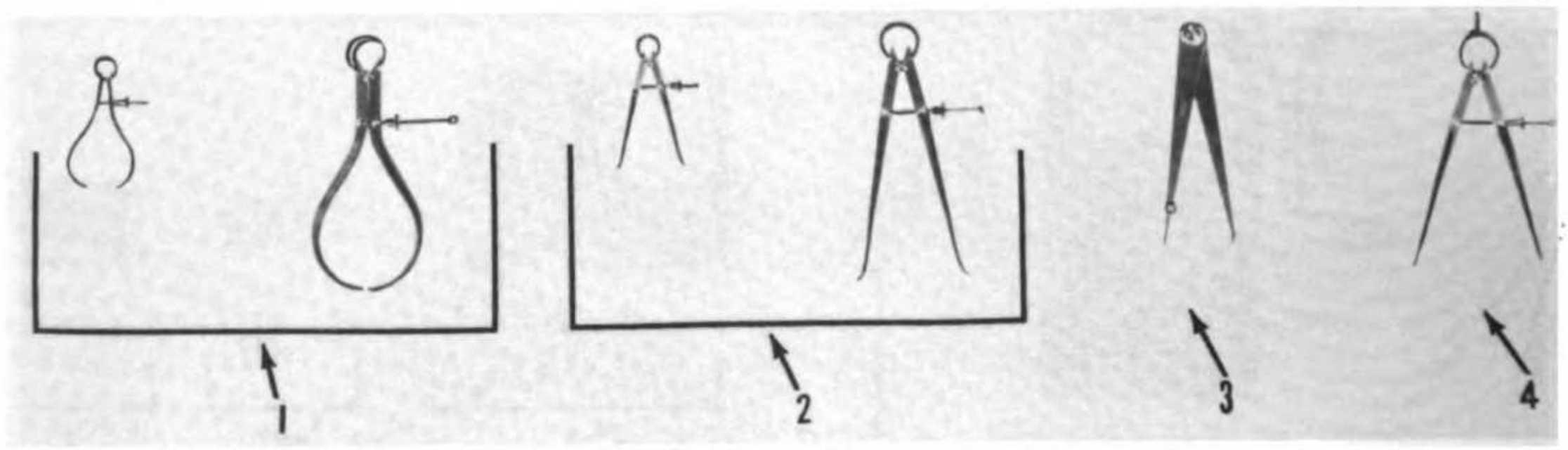

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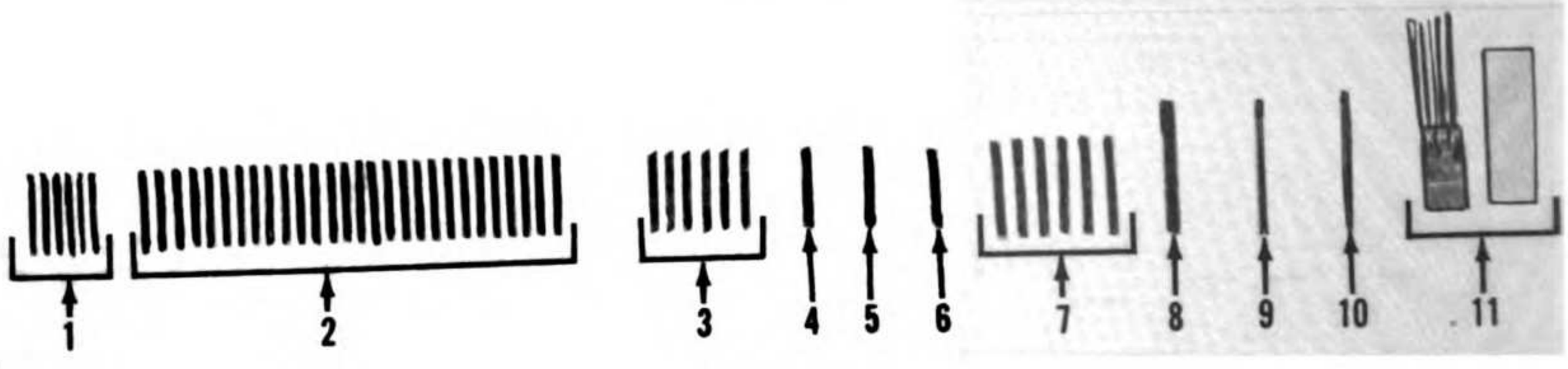

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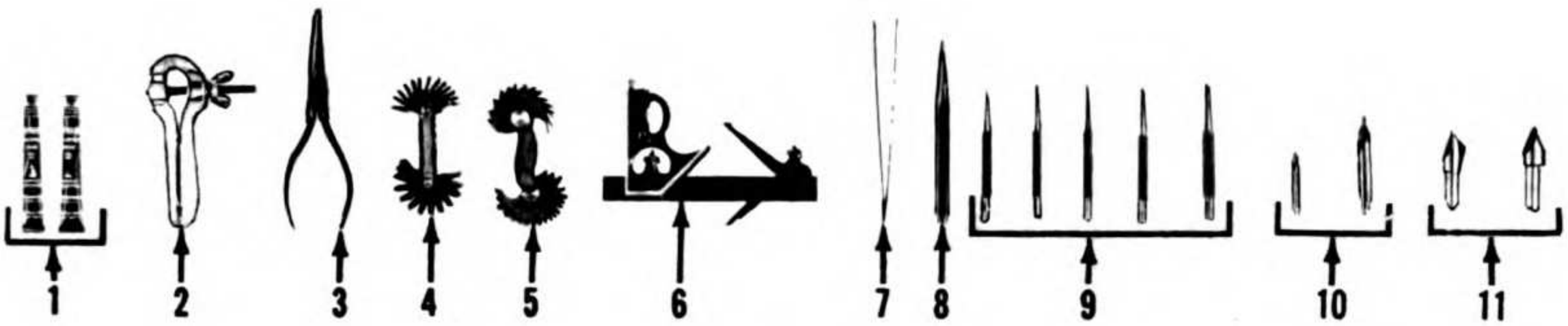

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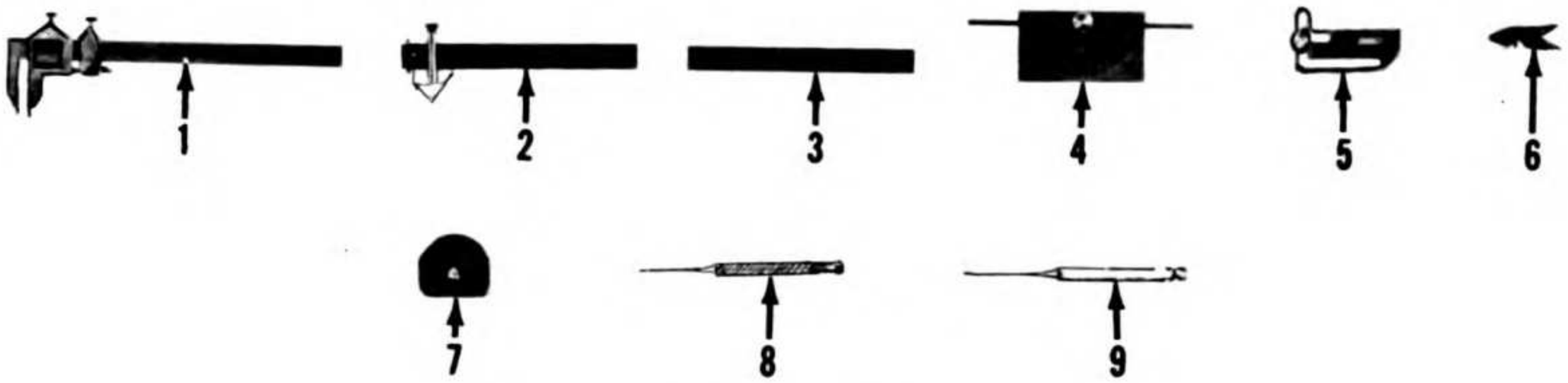

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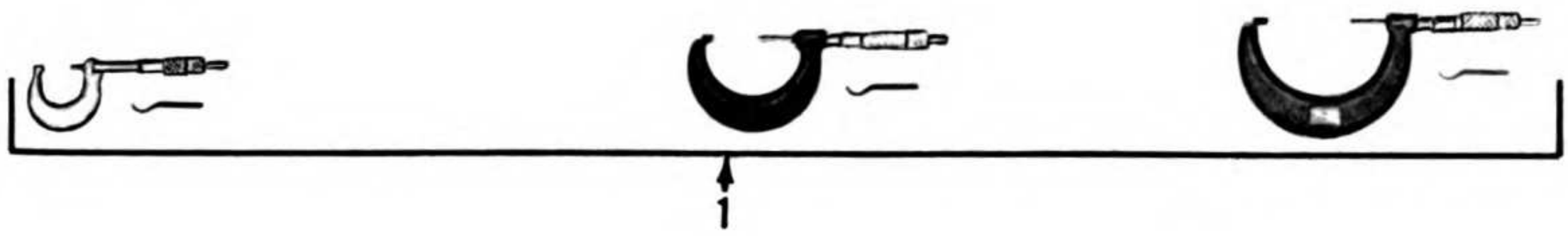

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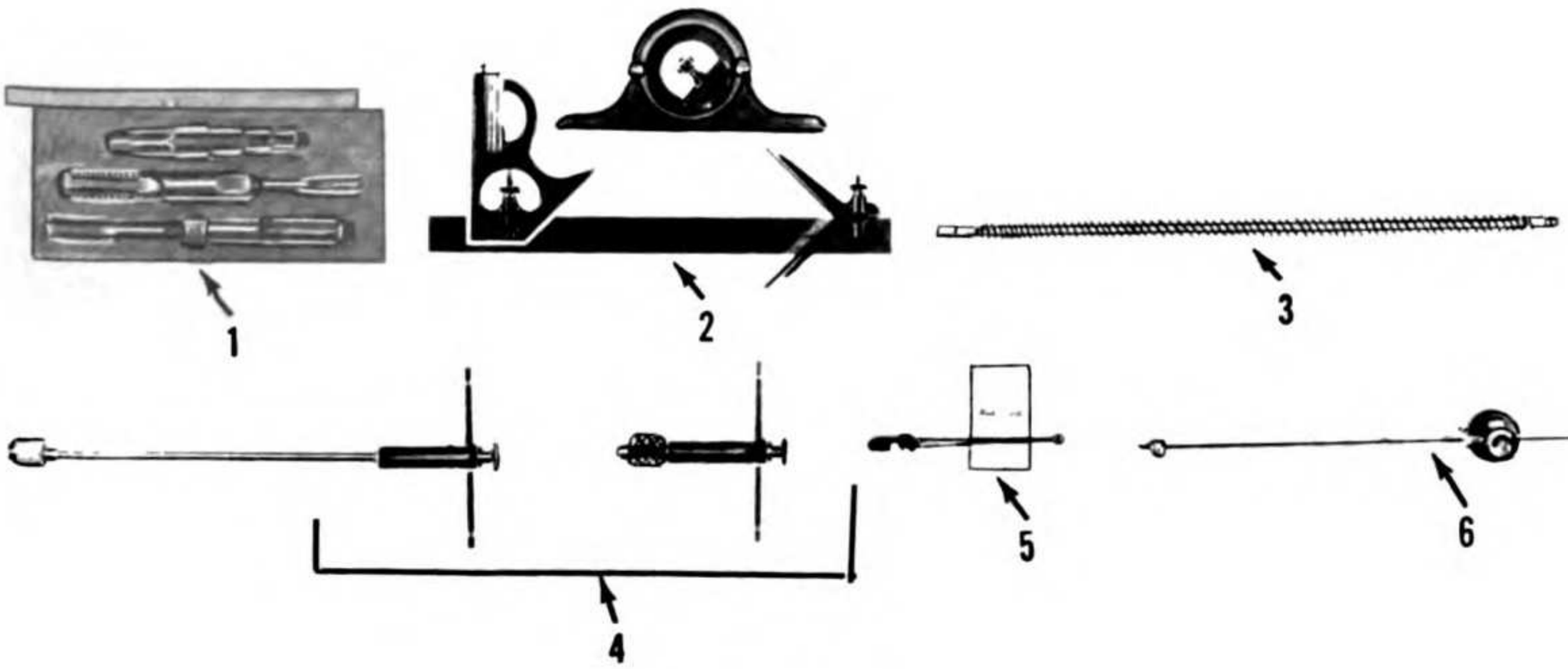

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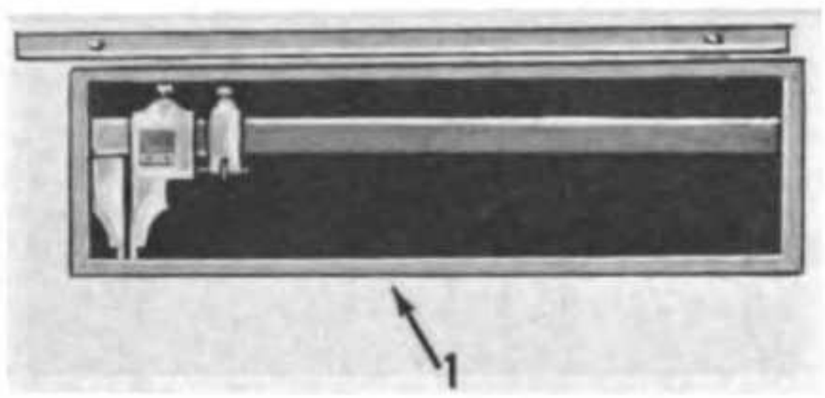

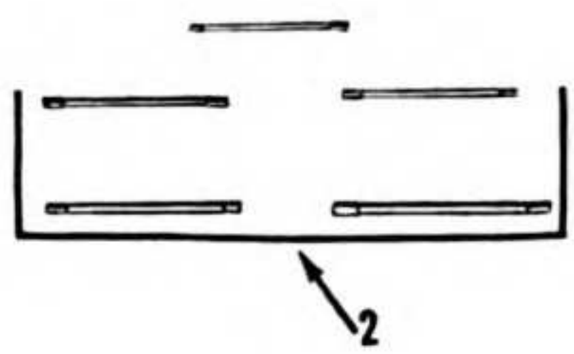

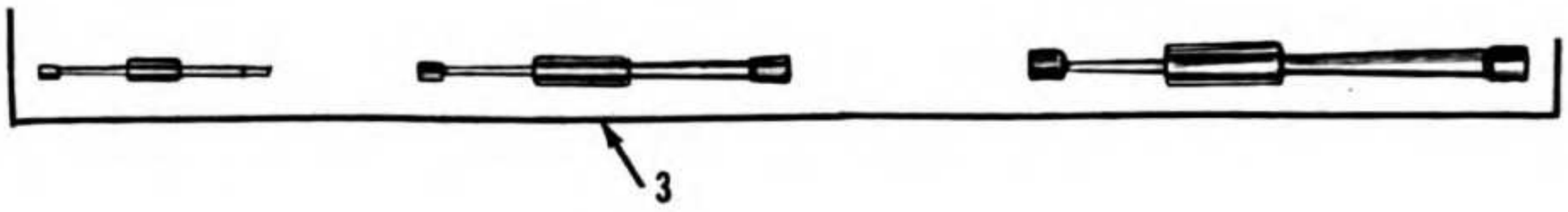

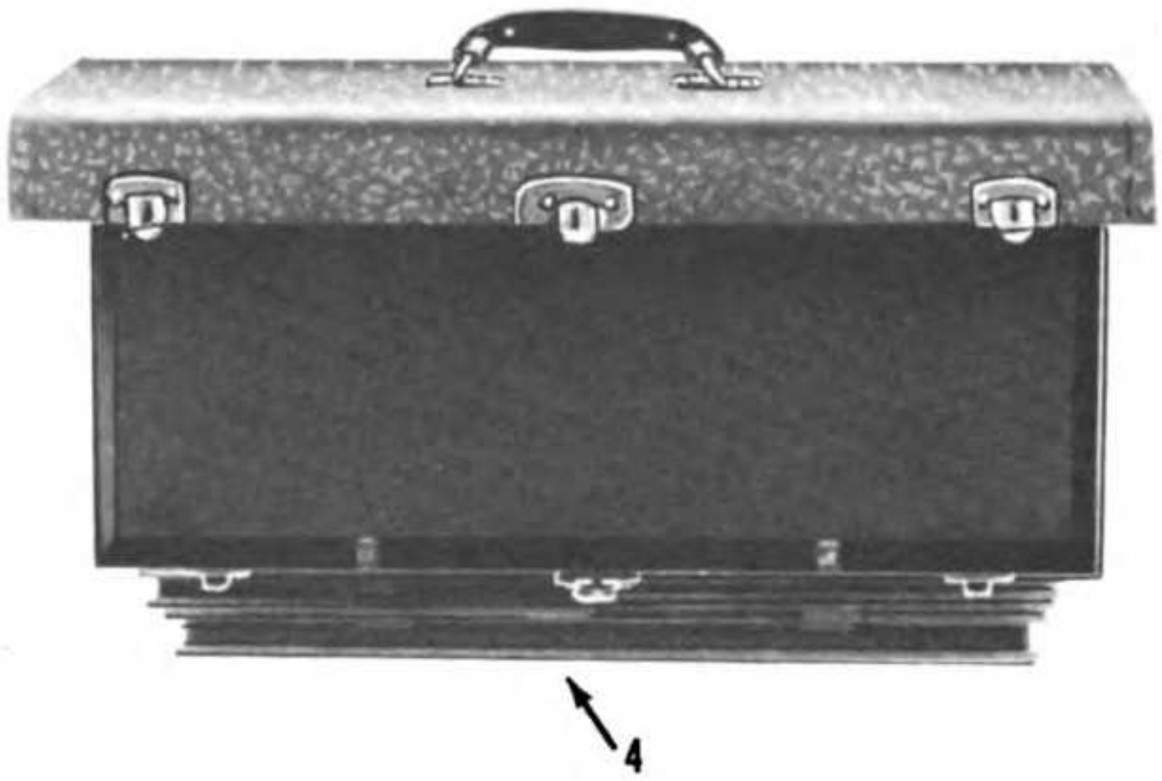

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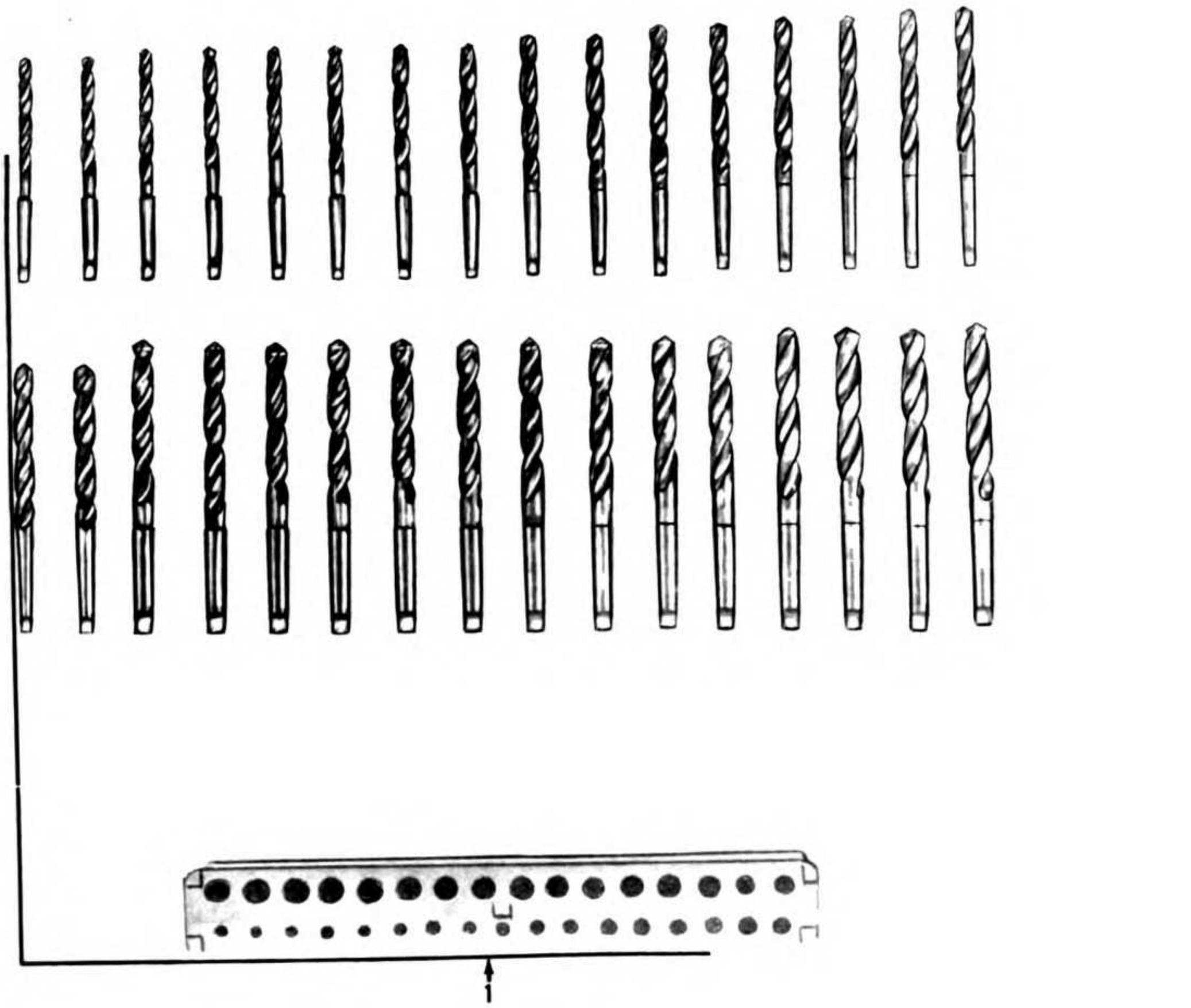

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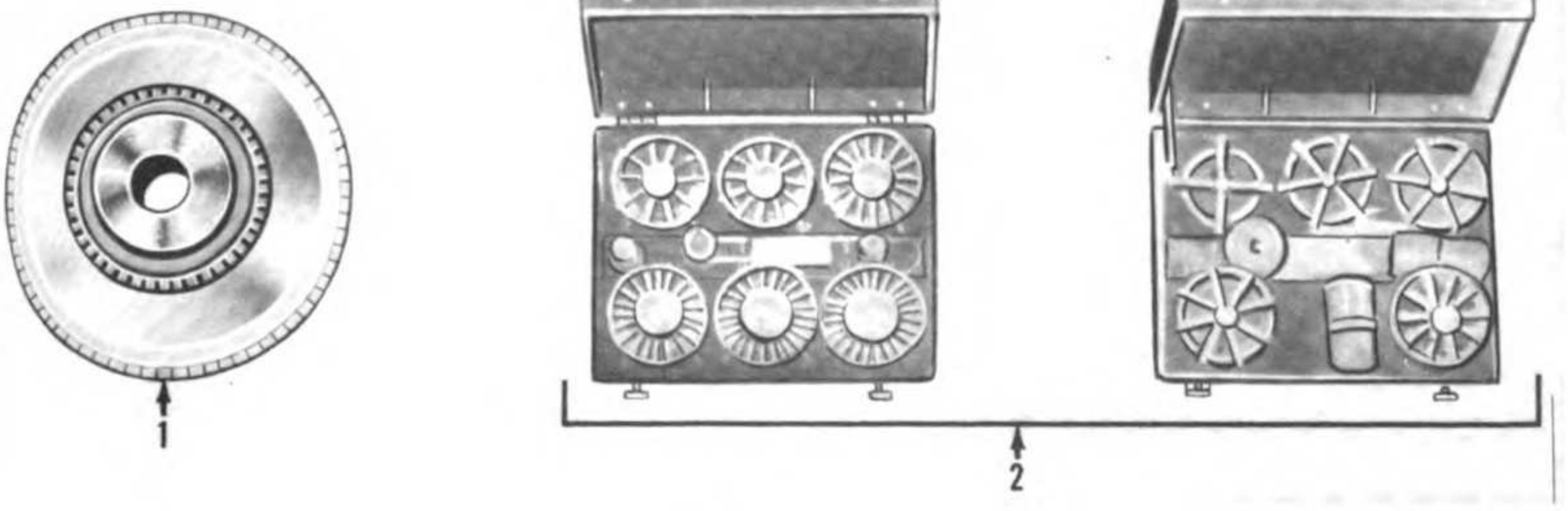

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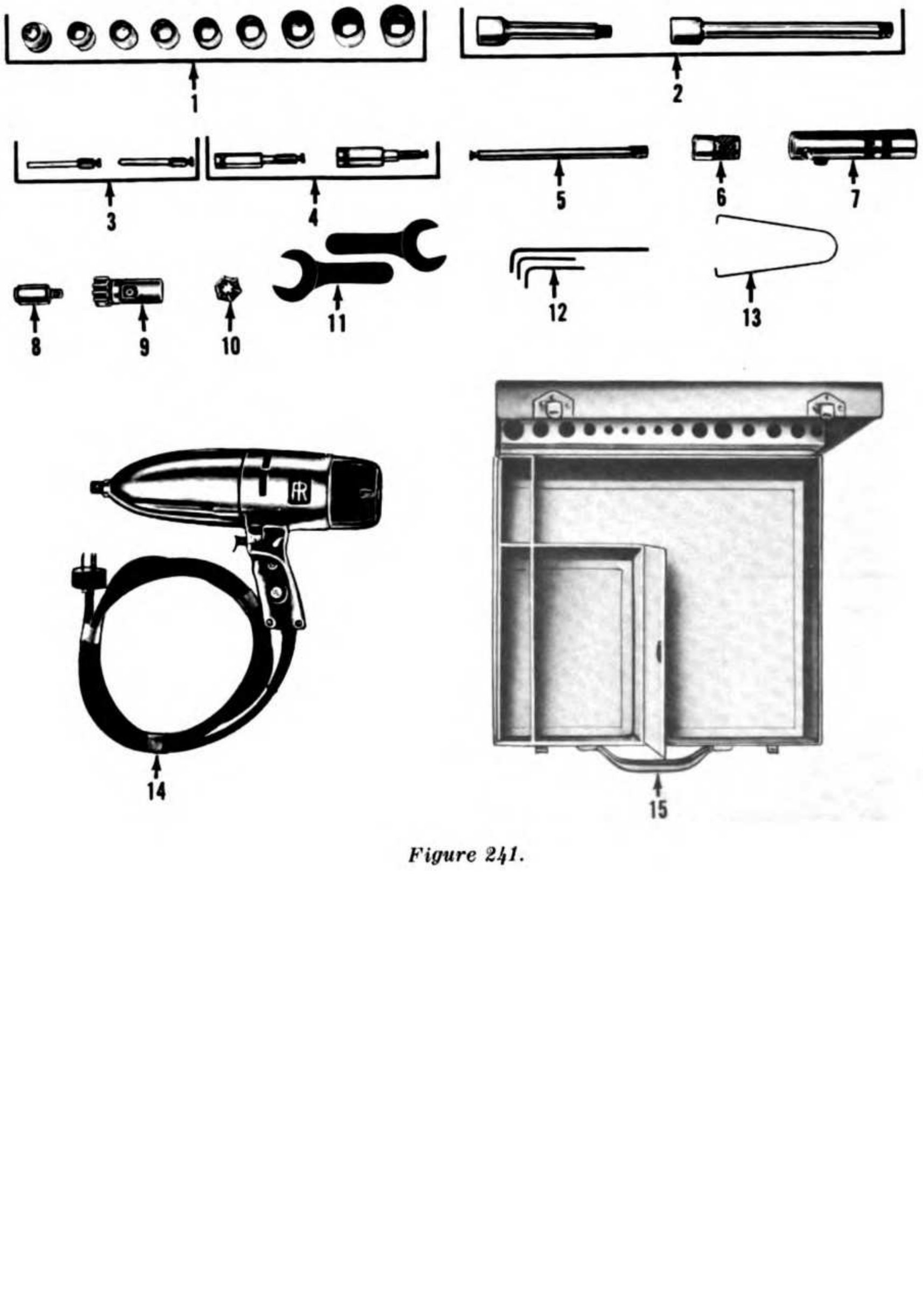

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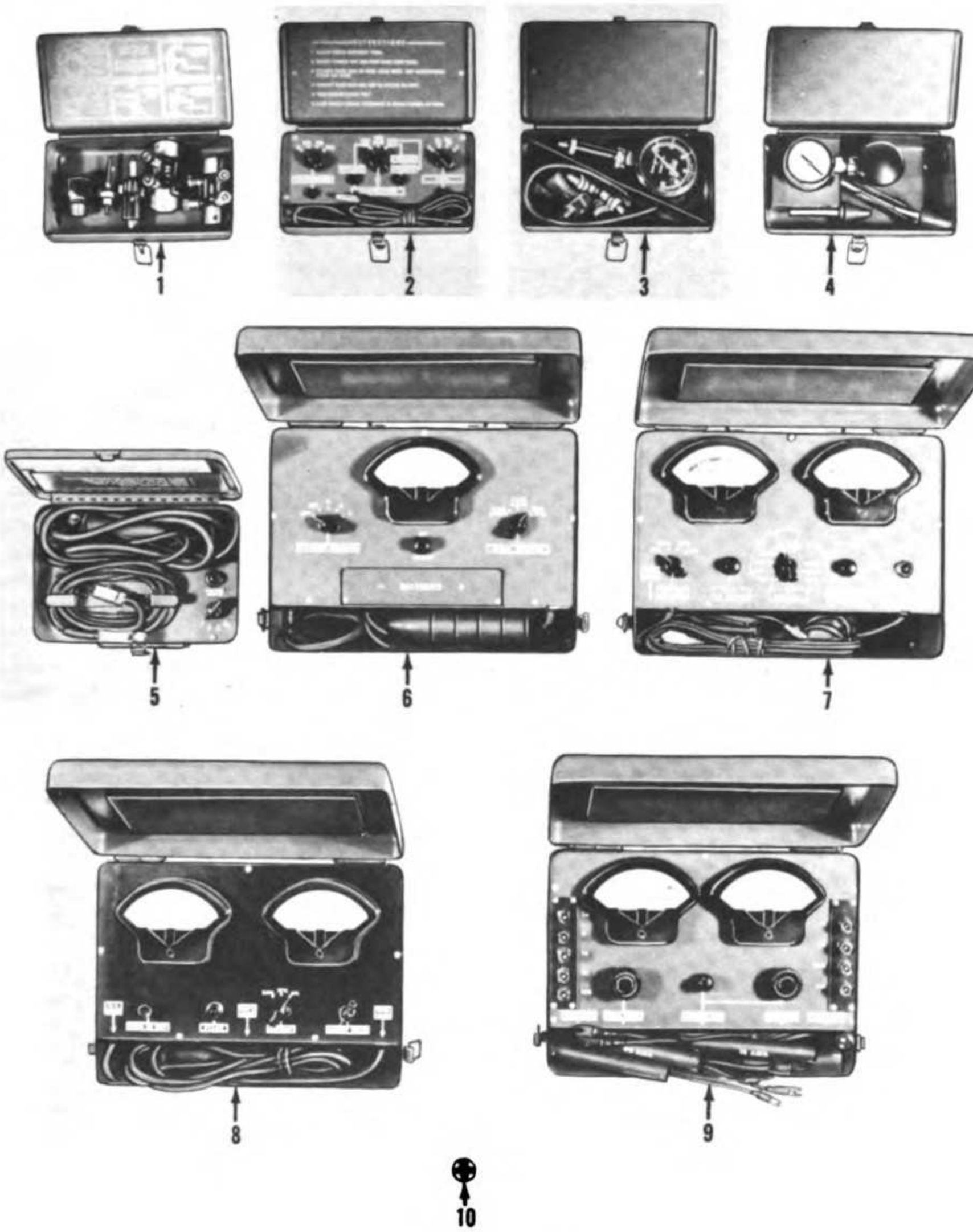

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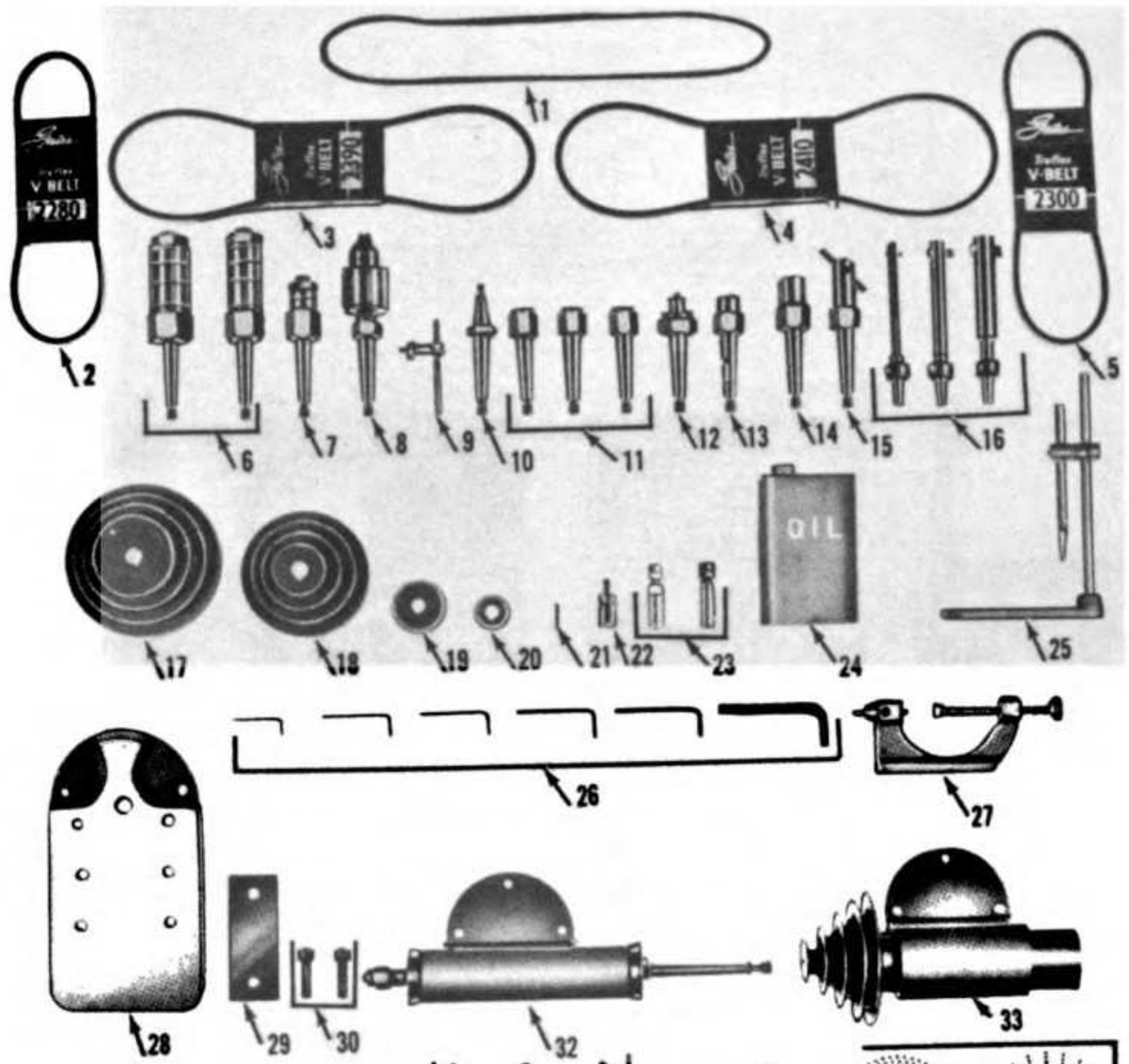

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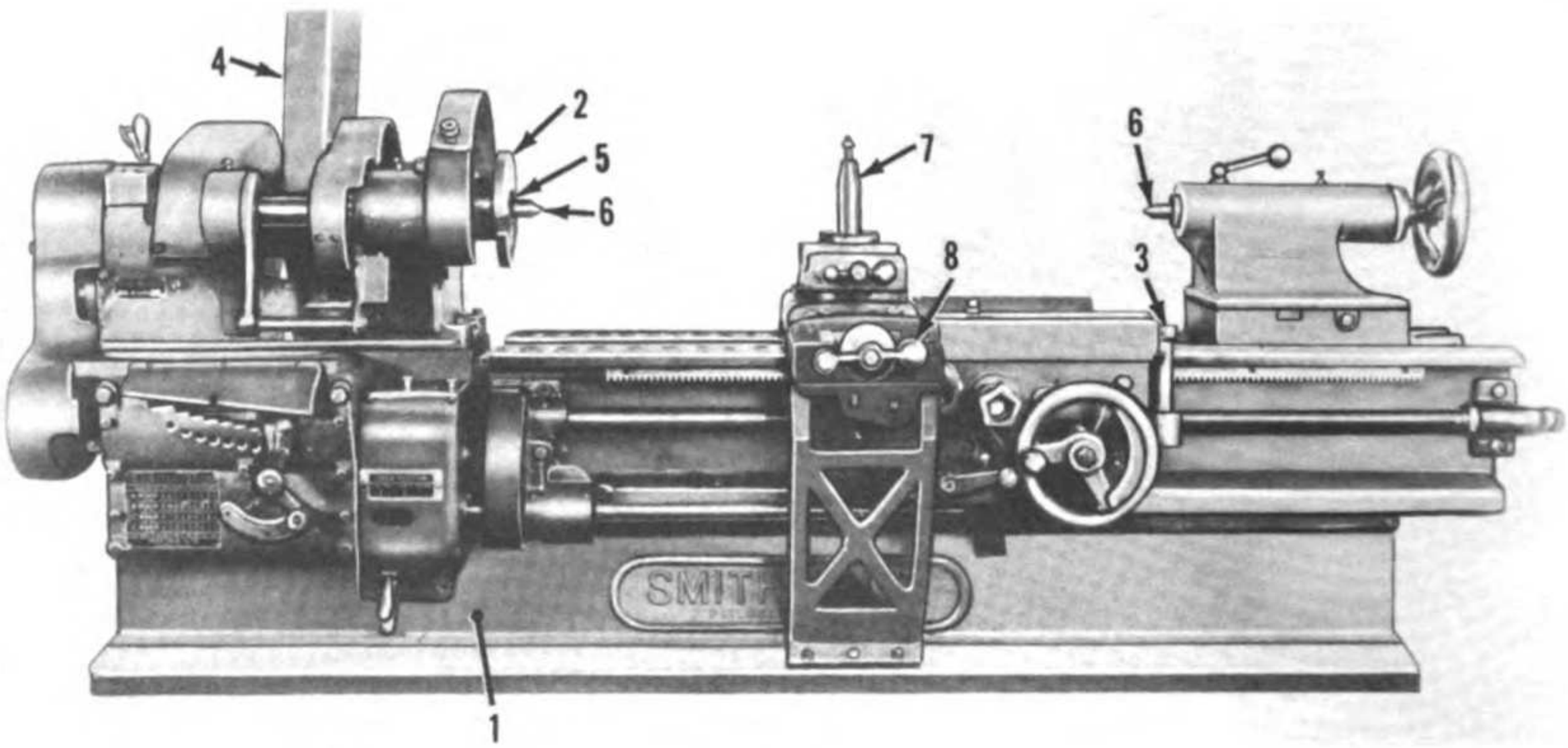

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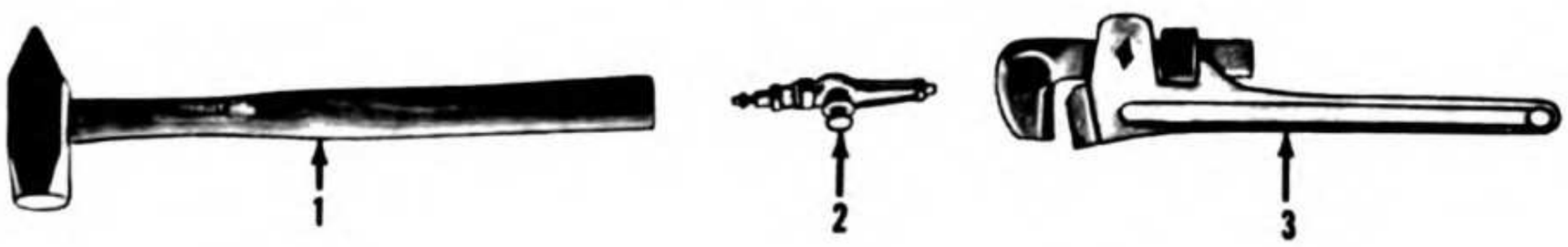

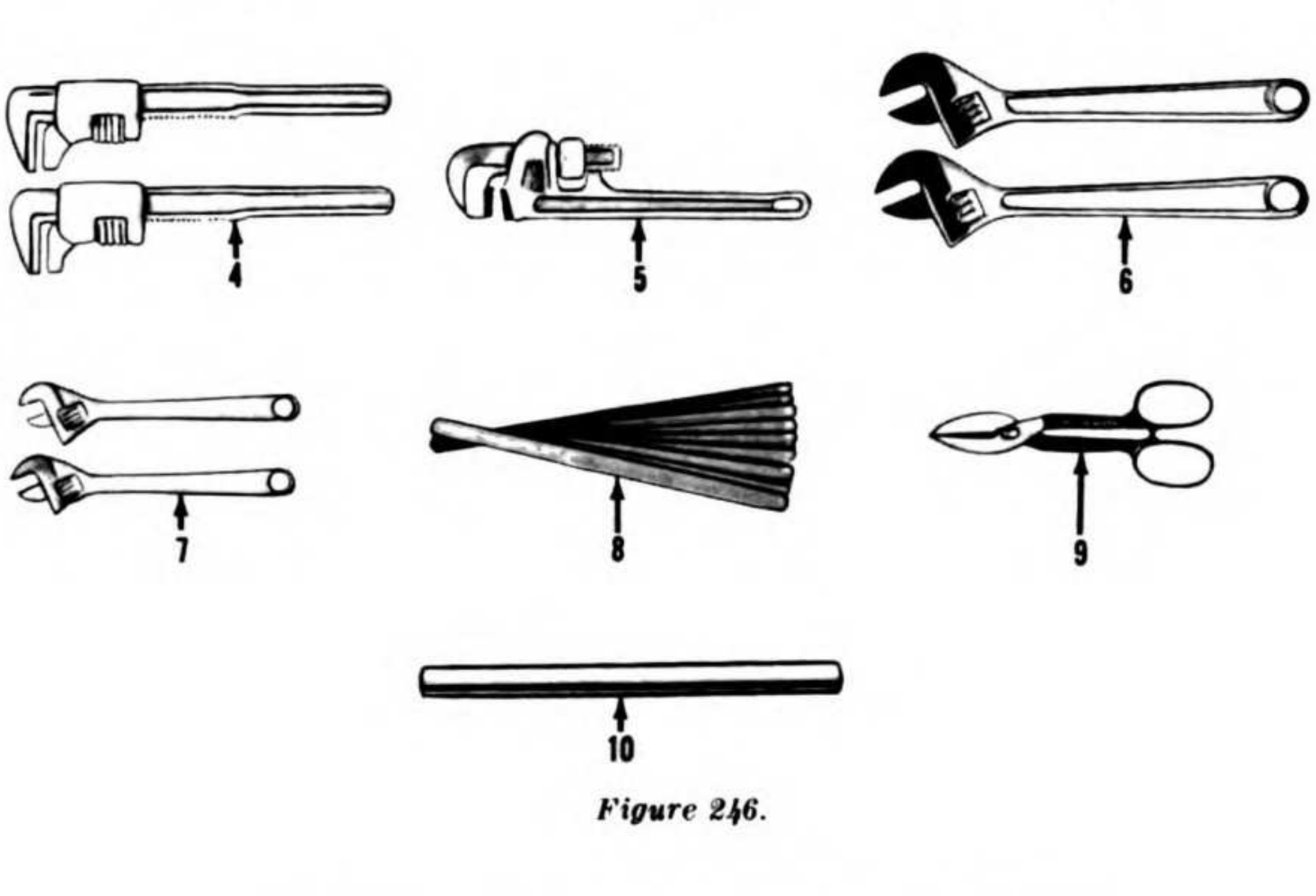

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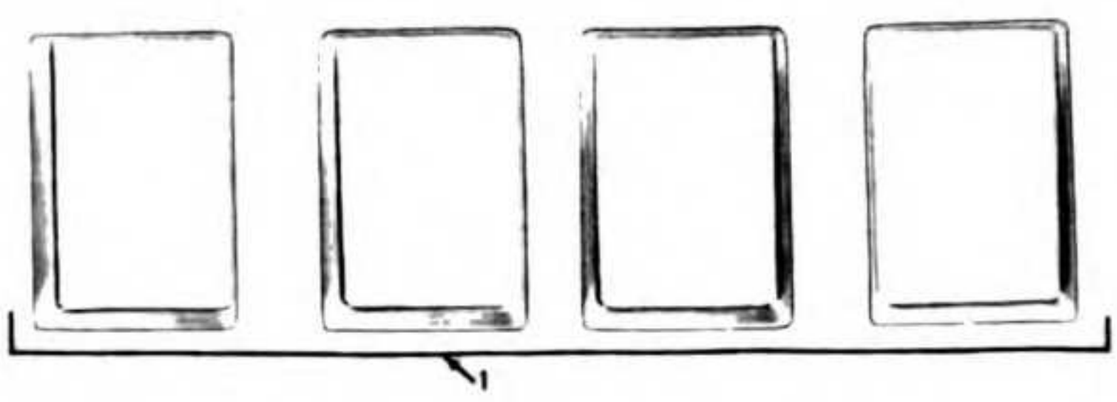

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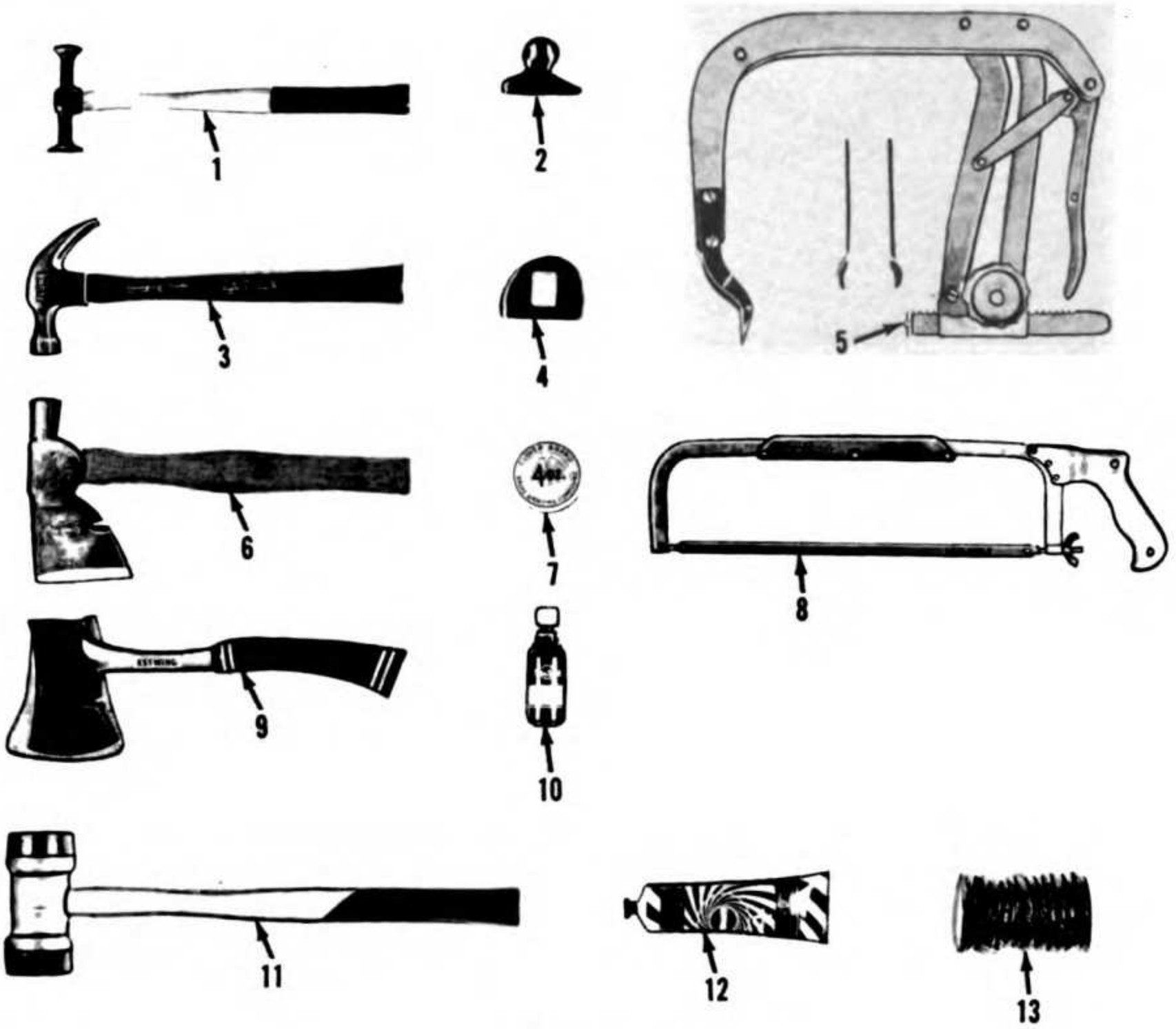

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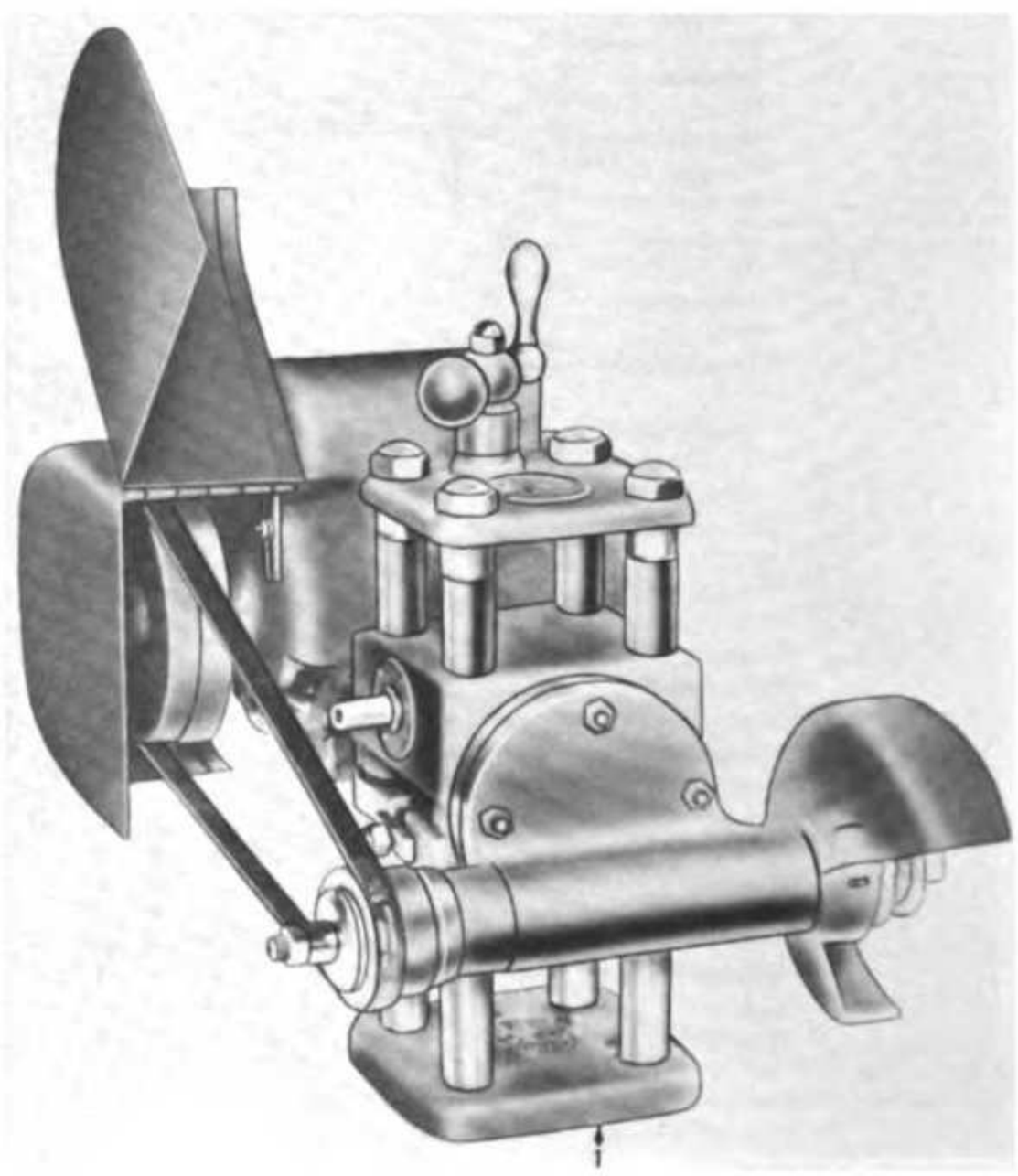

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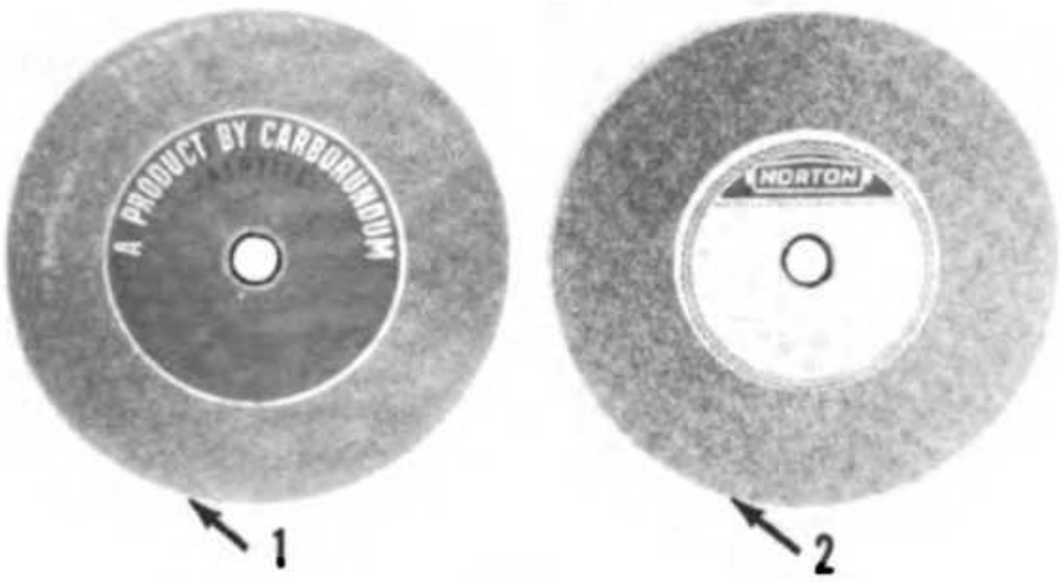

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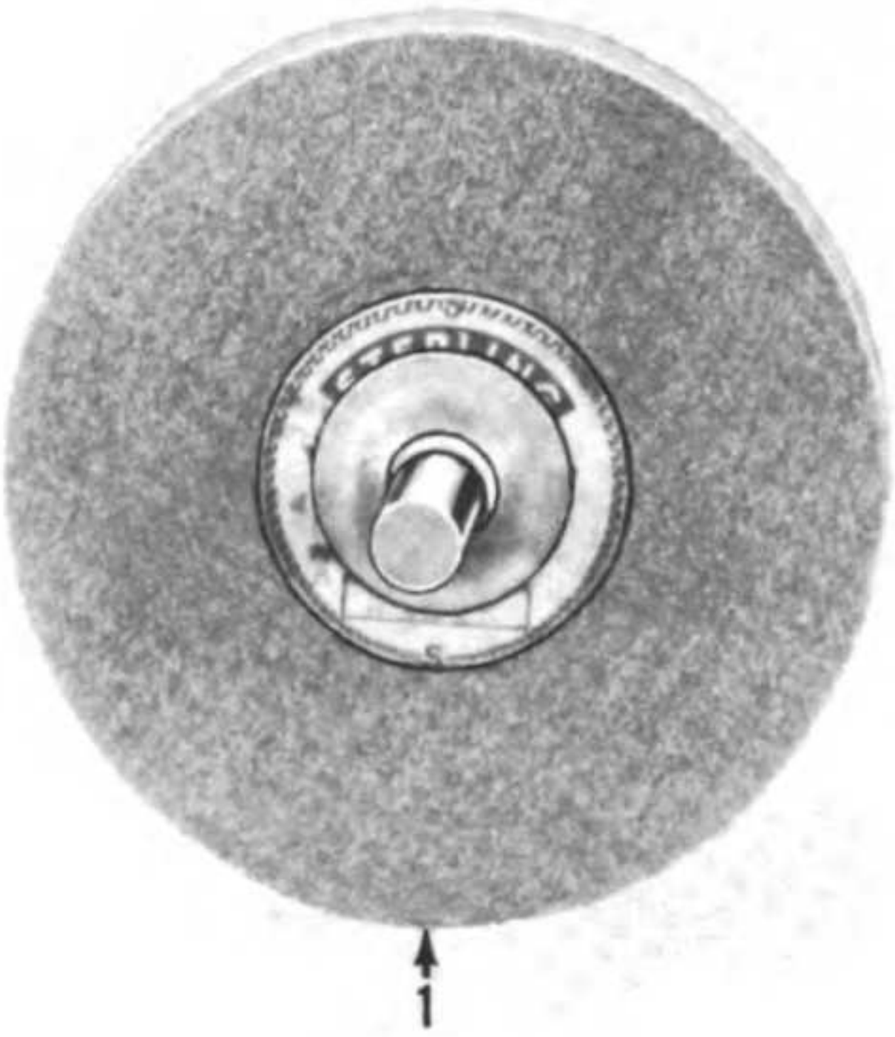

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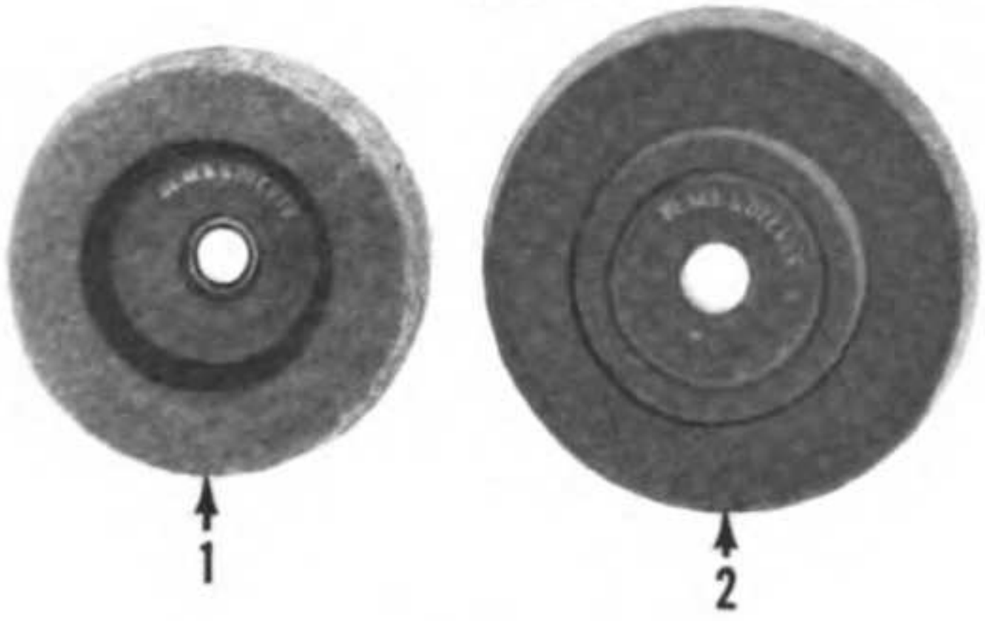

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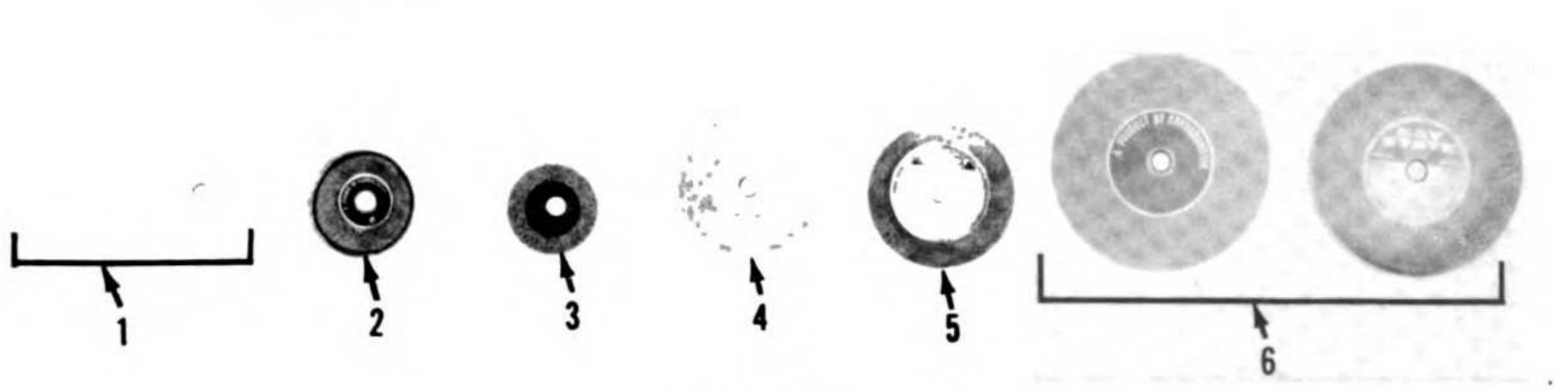

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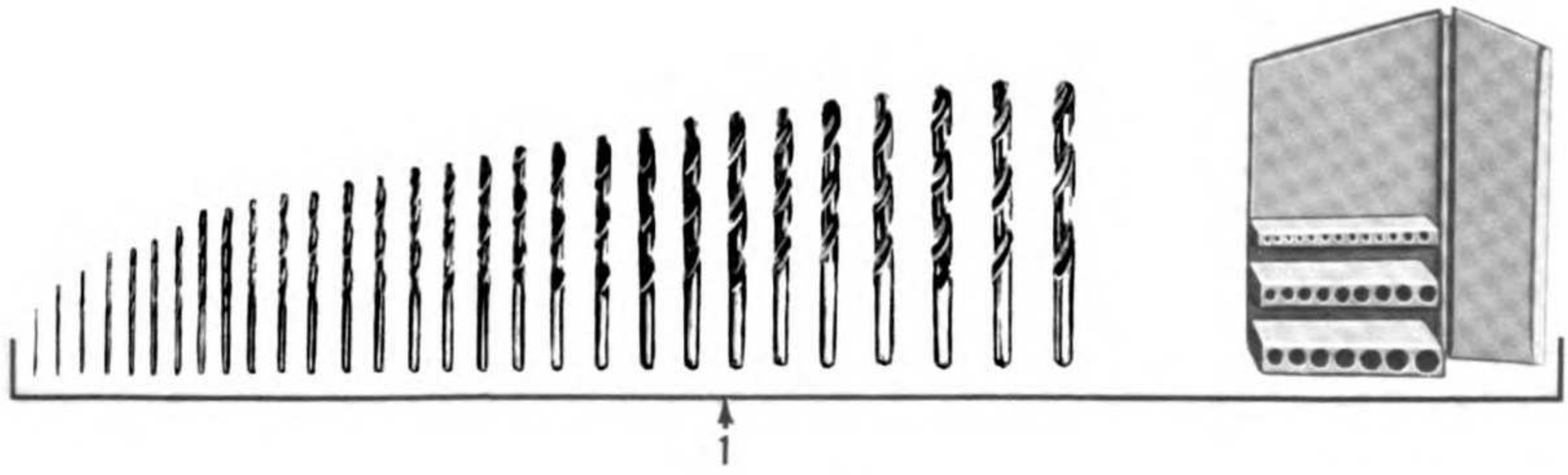

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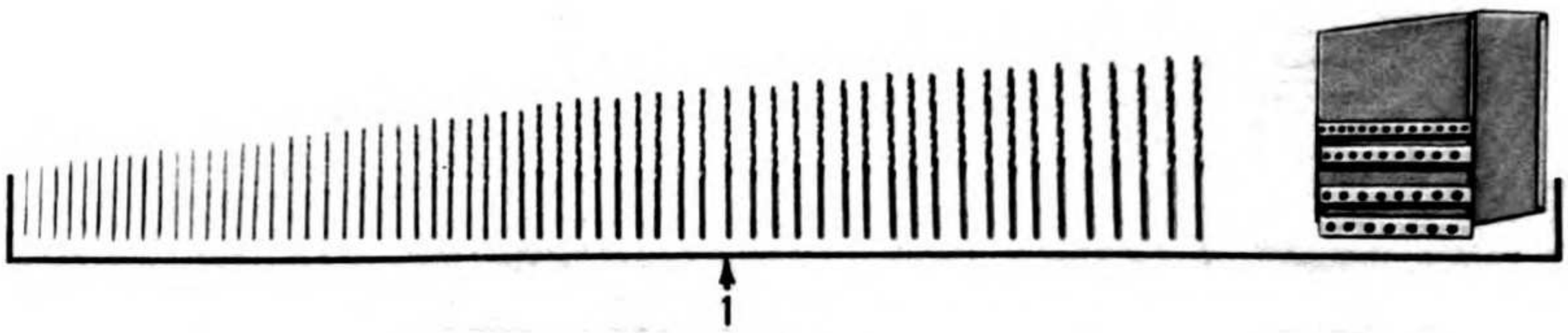

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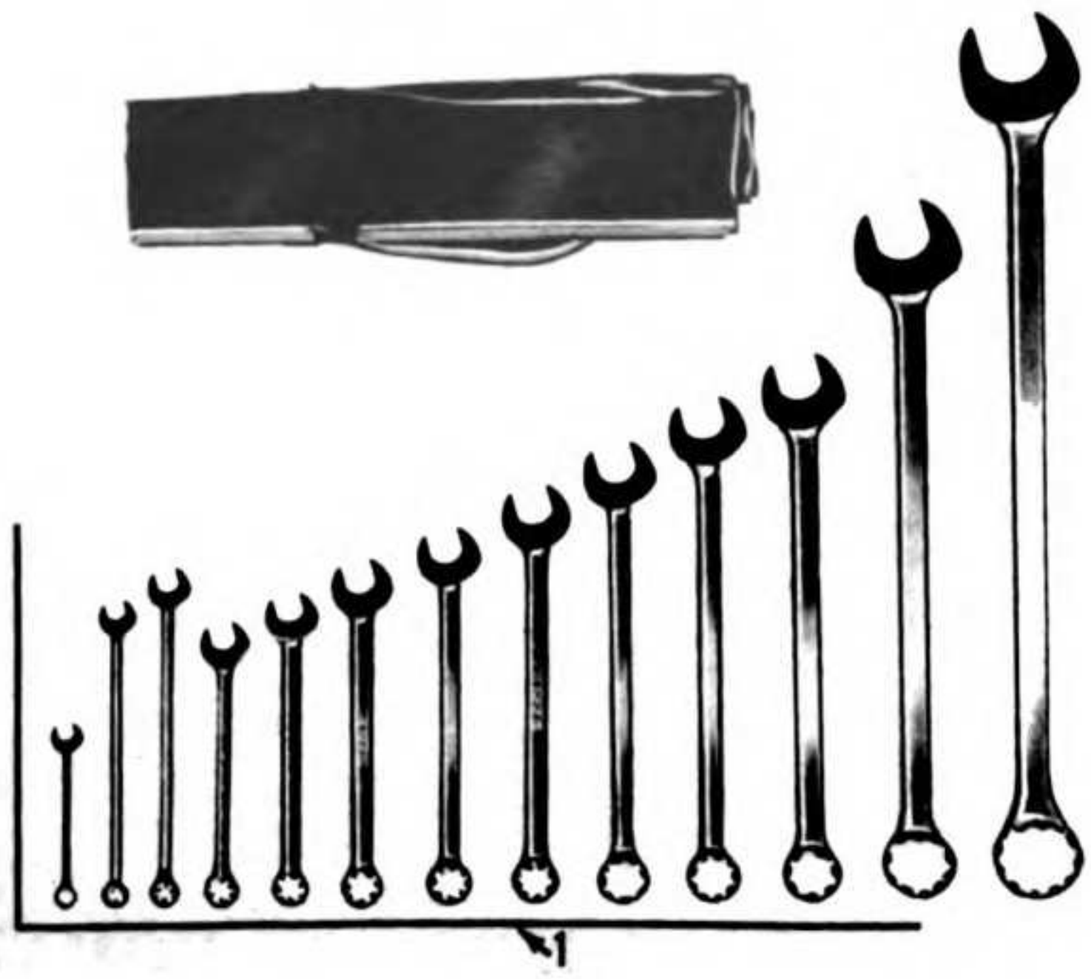

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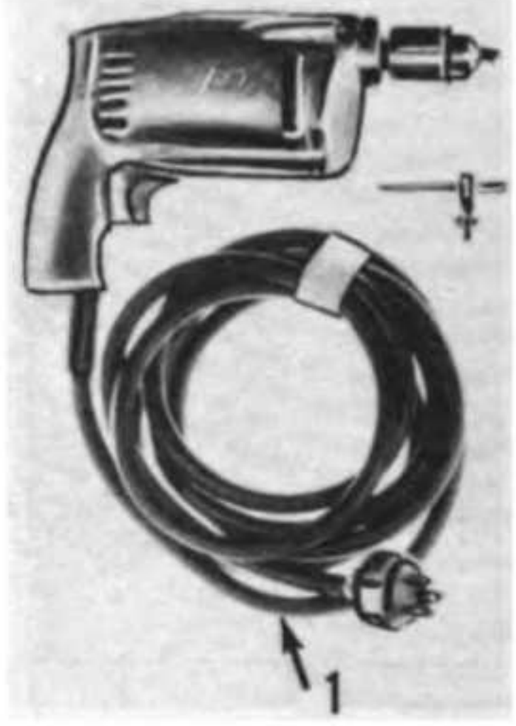

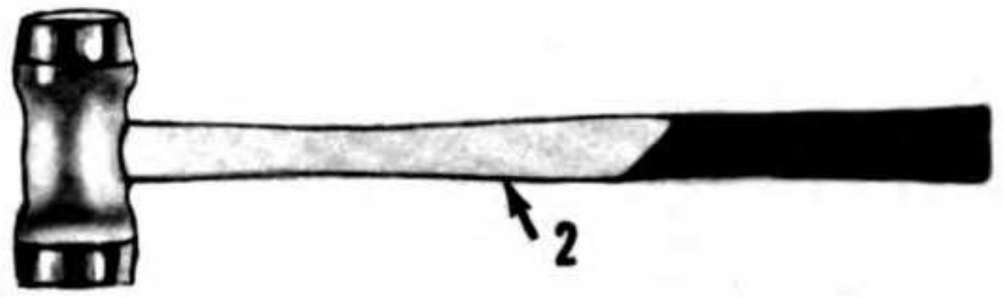

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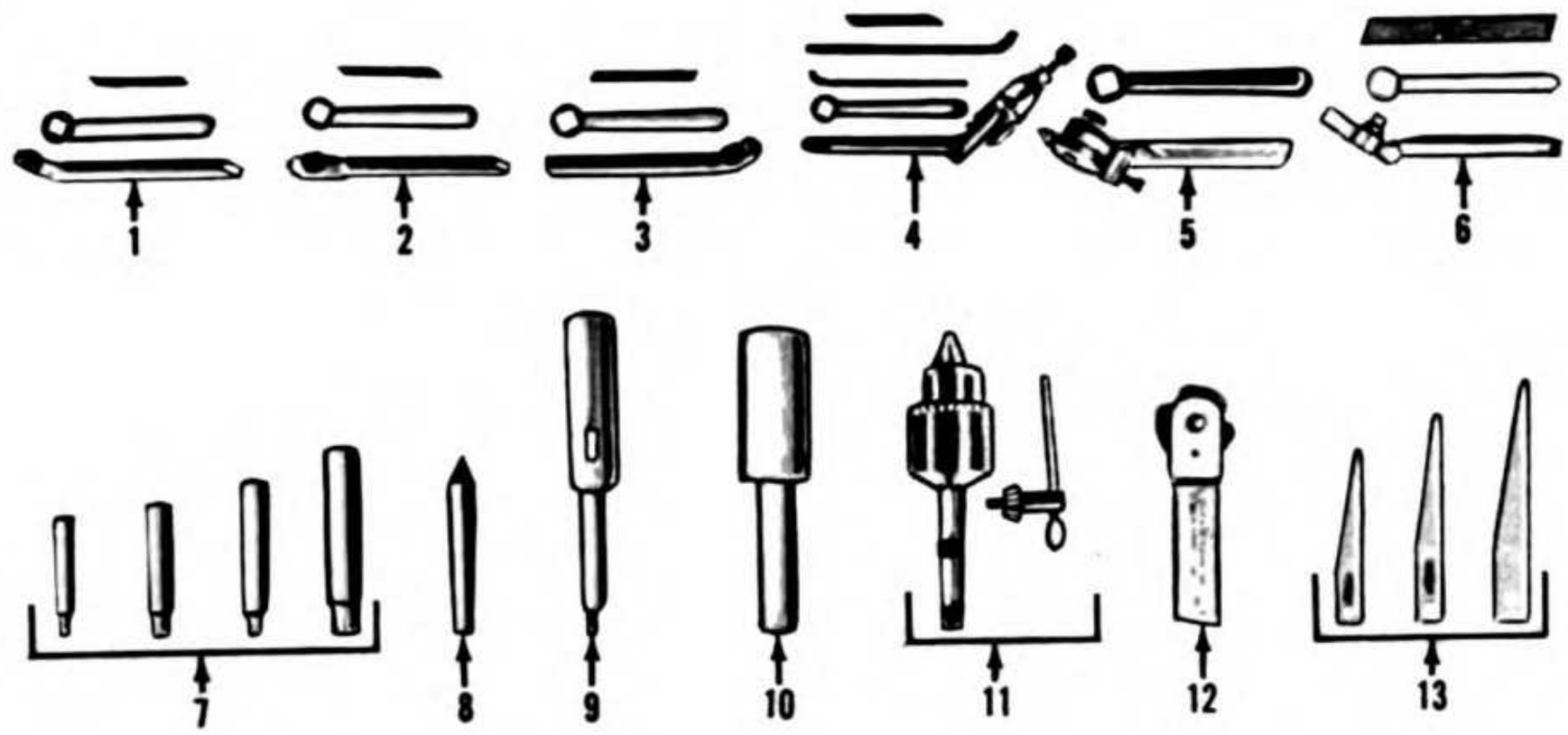
Figure 259.



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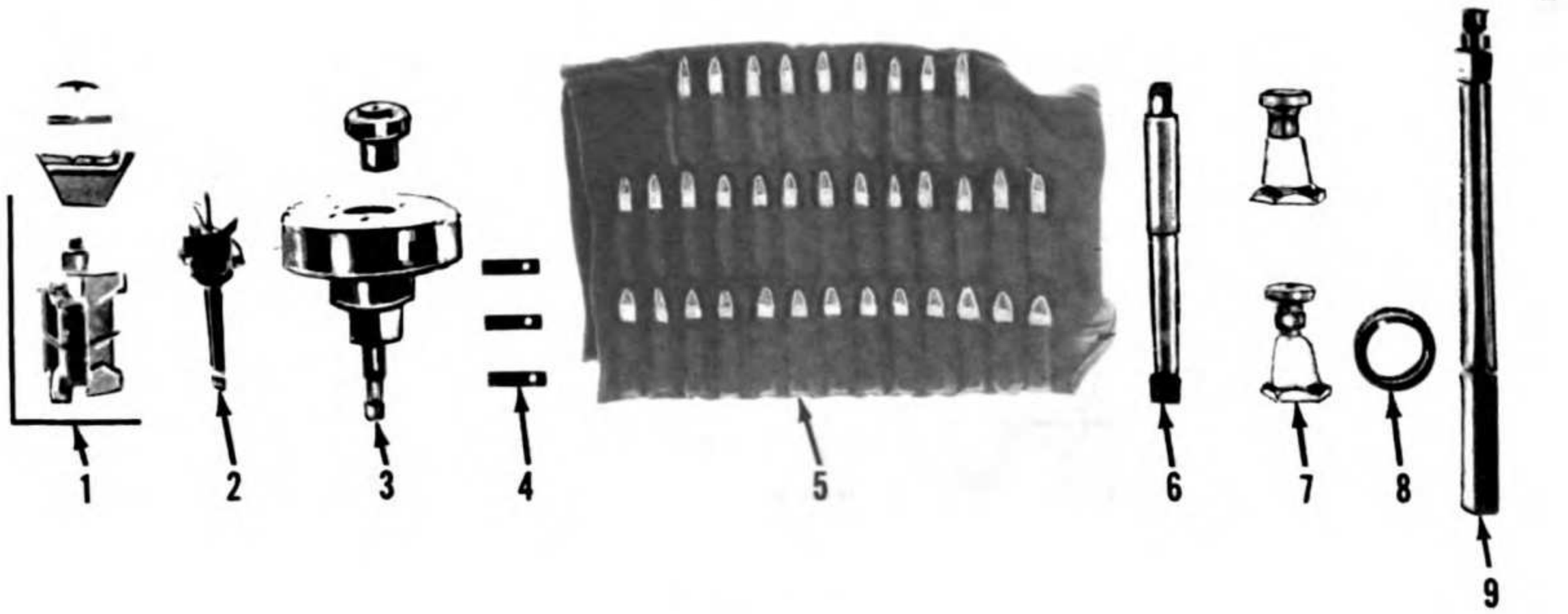

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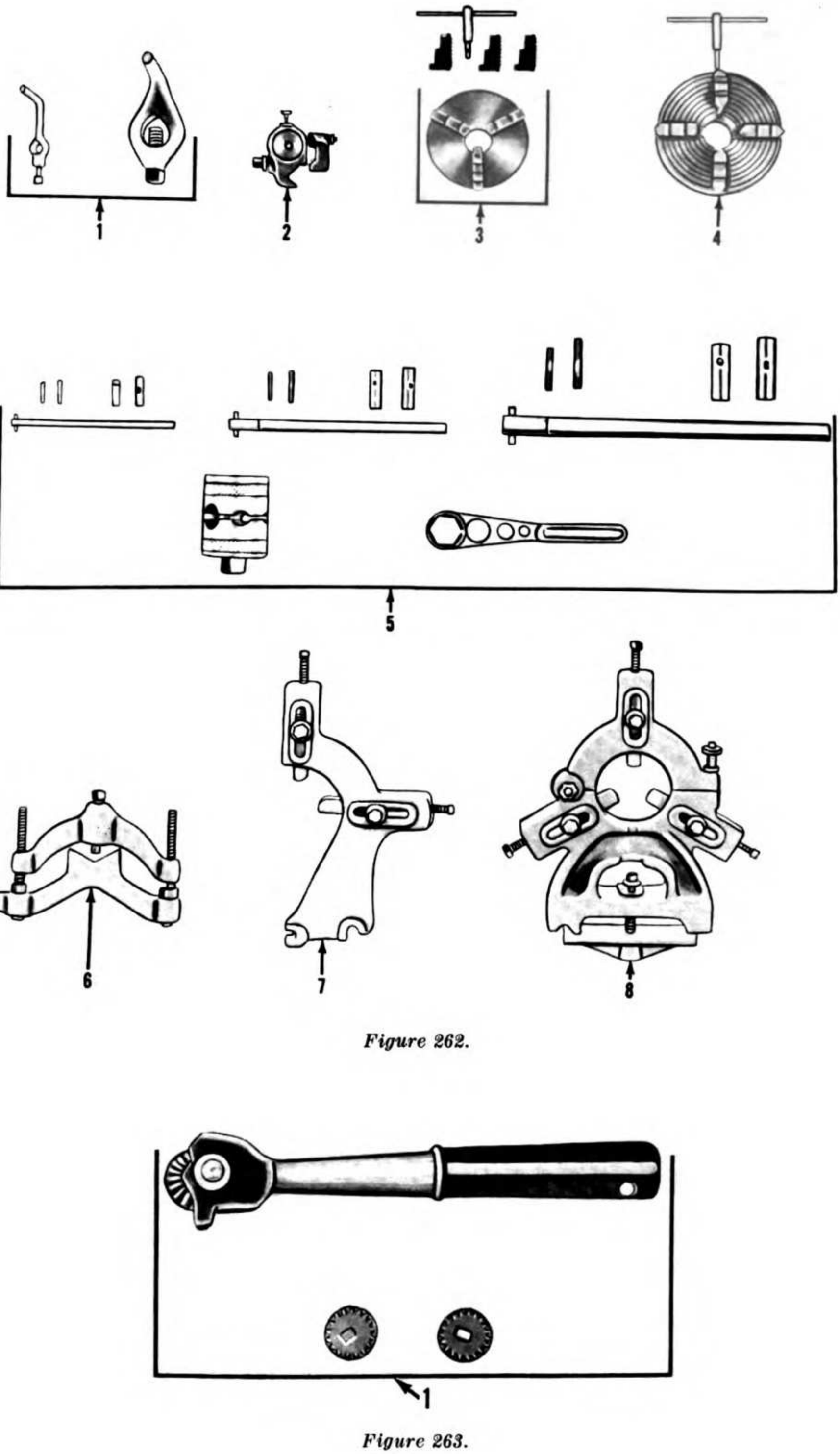

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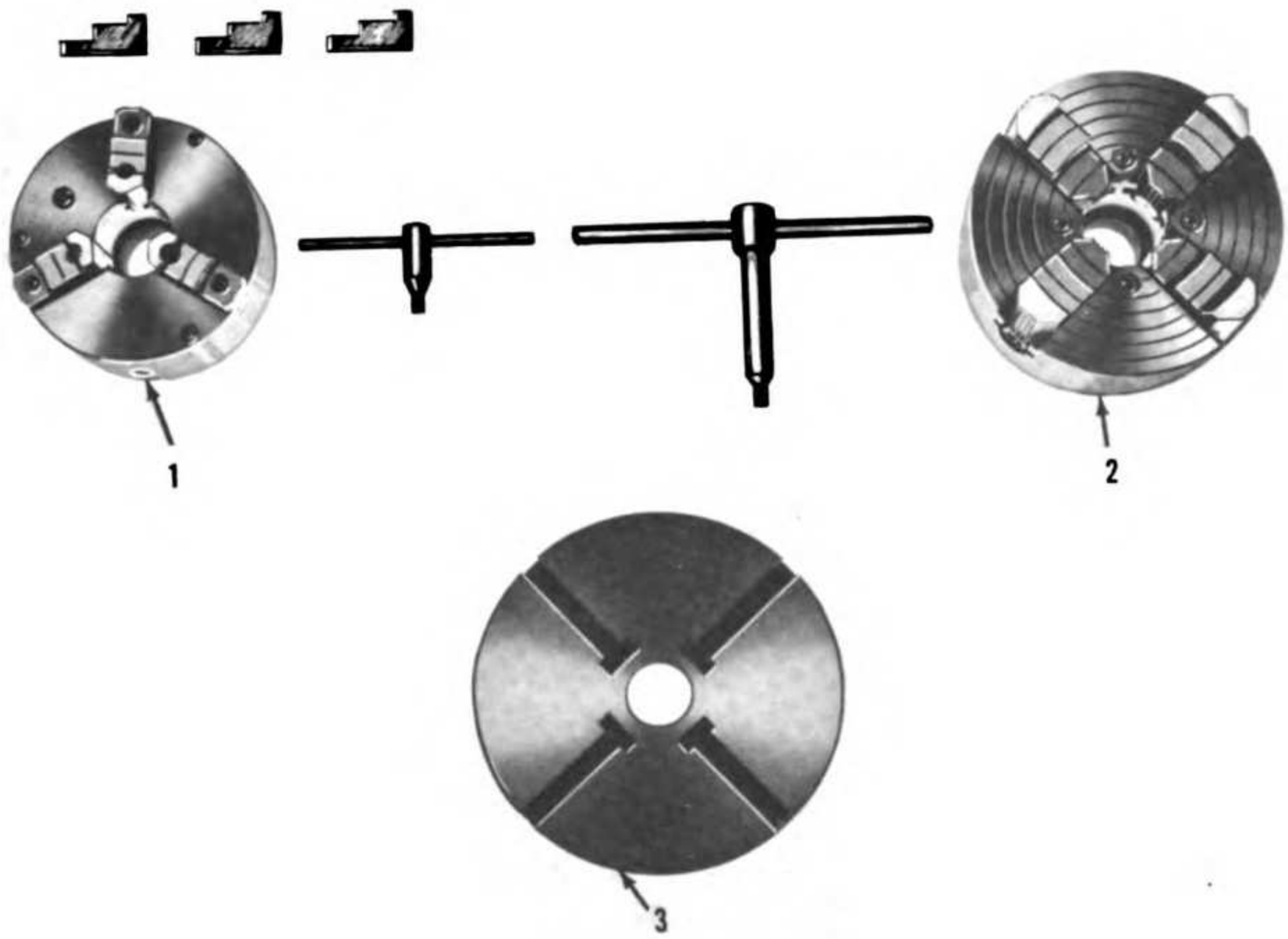

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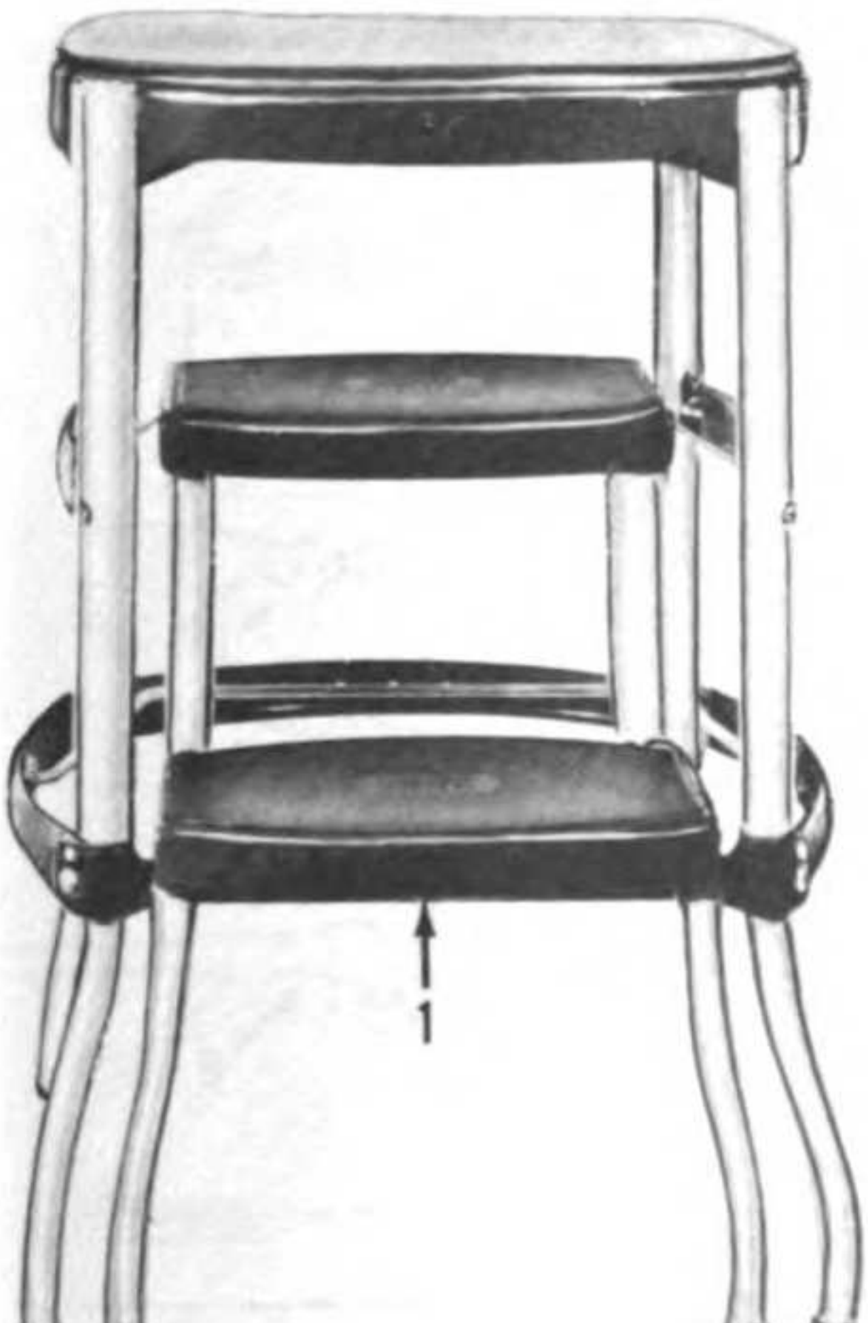

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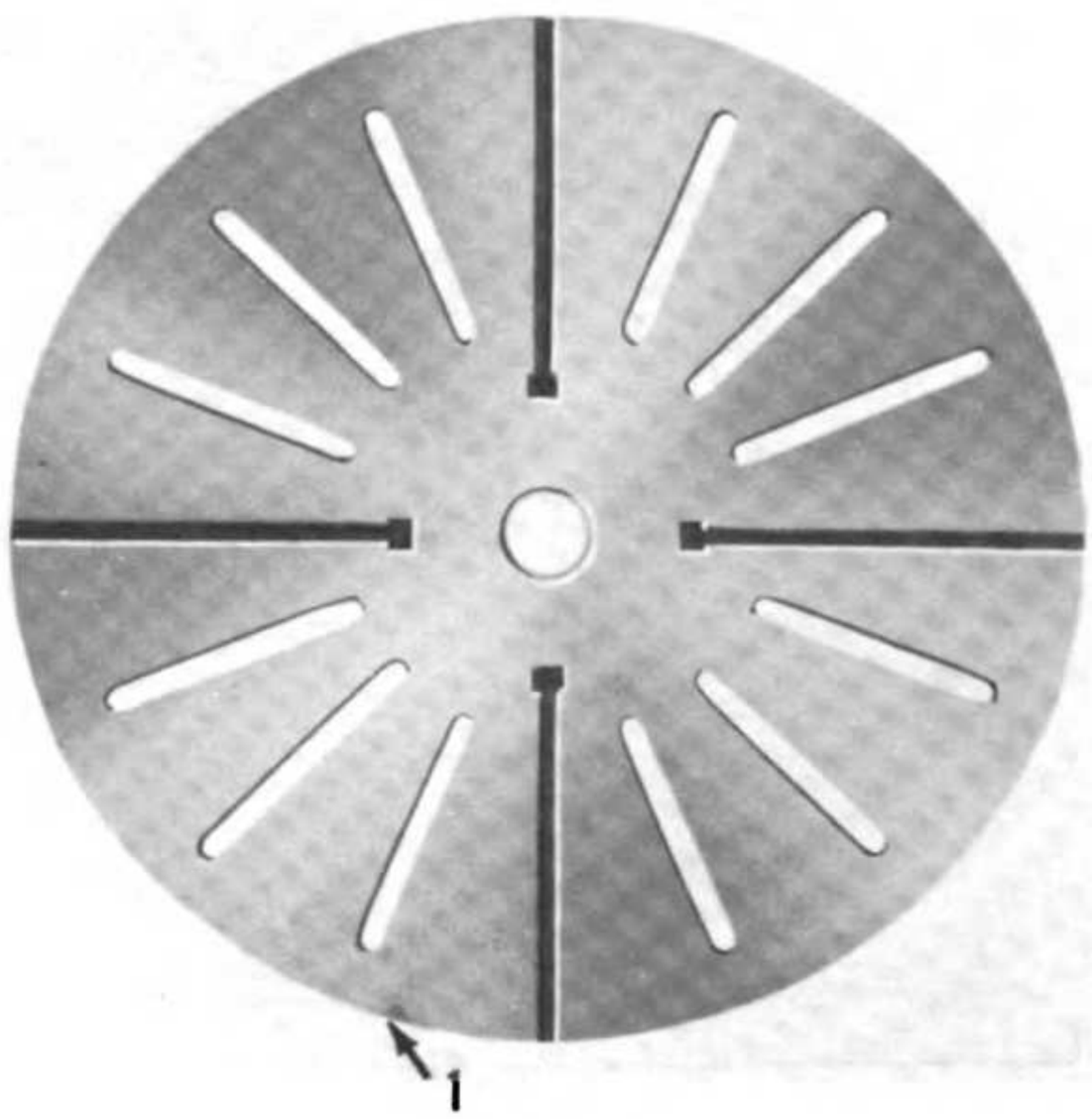

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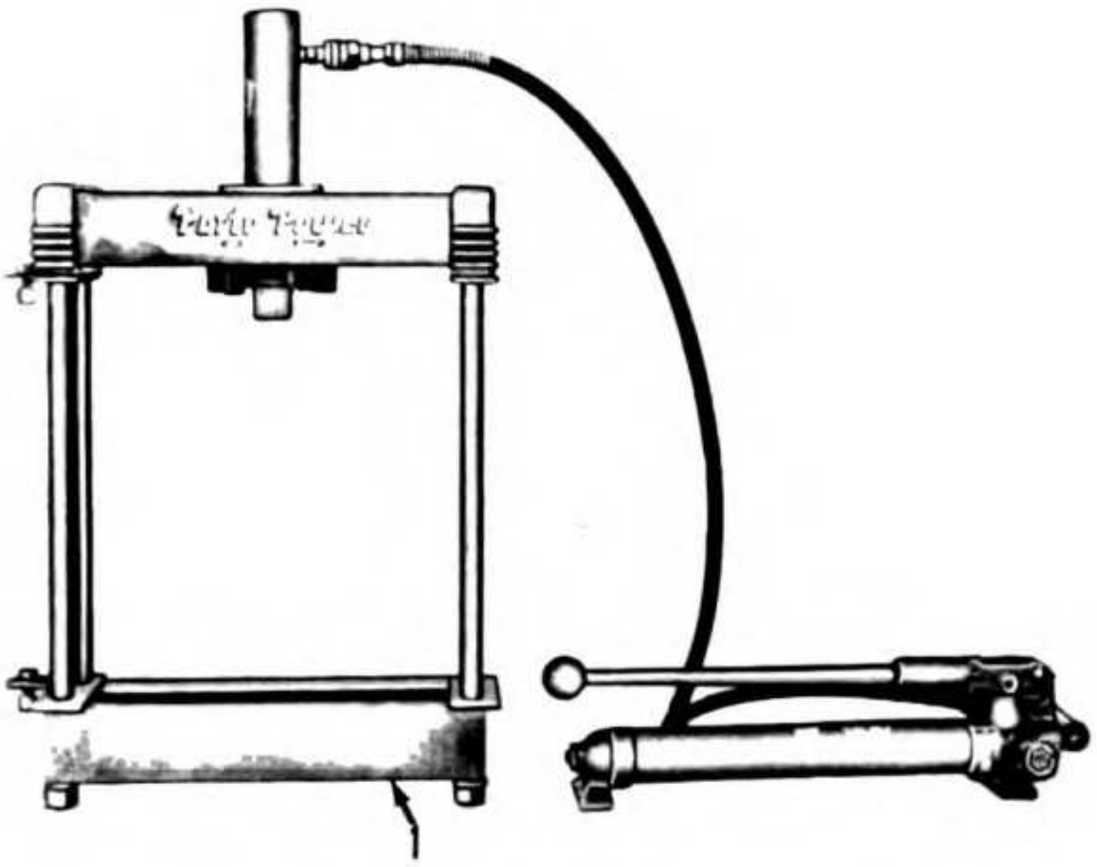

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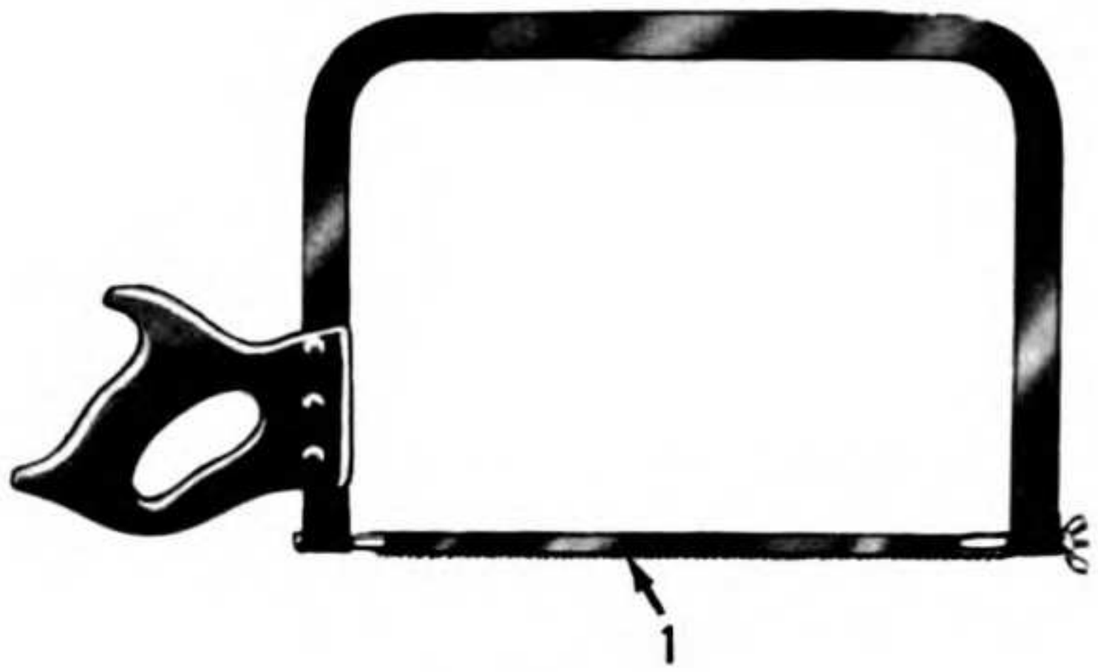

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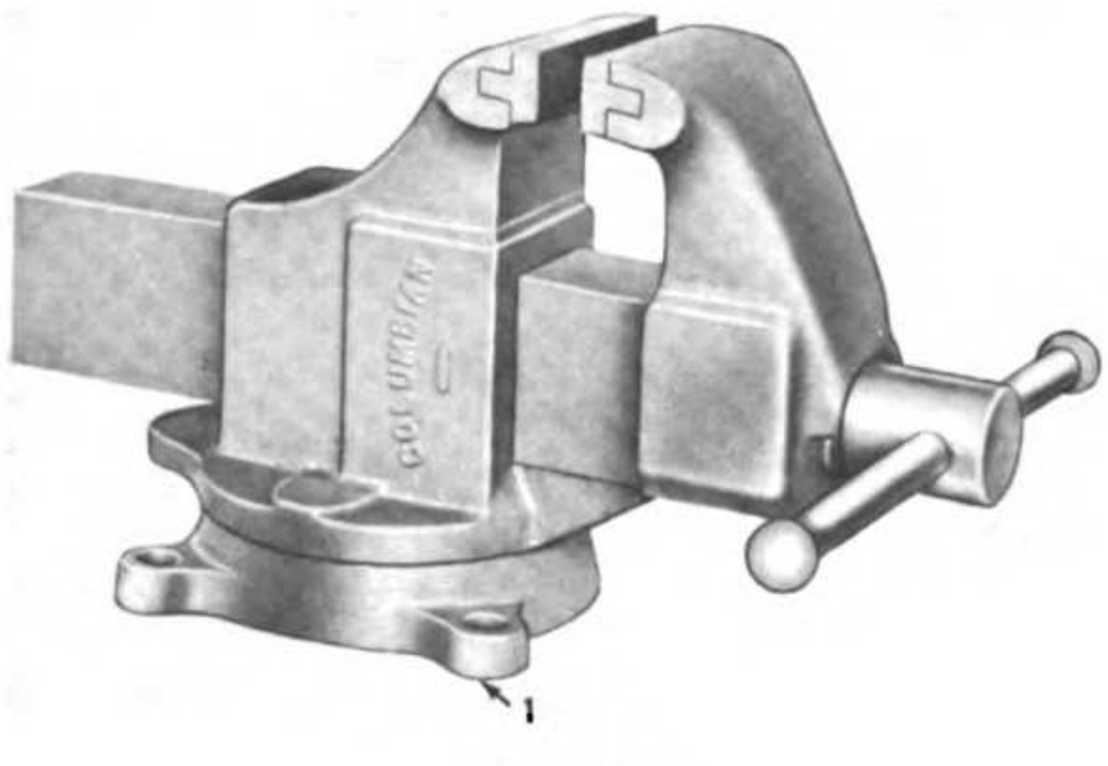

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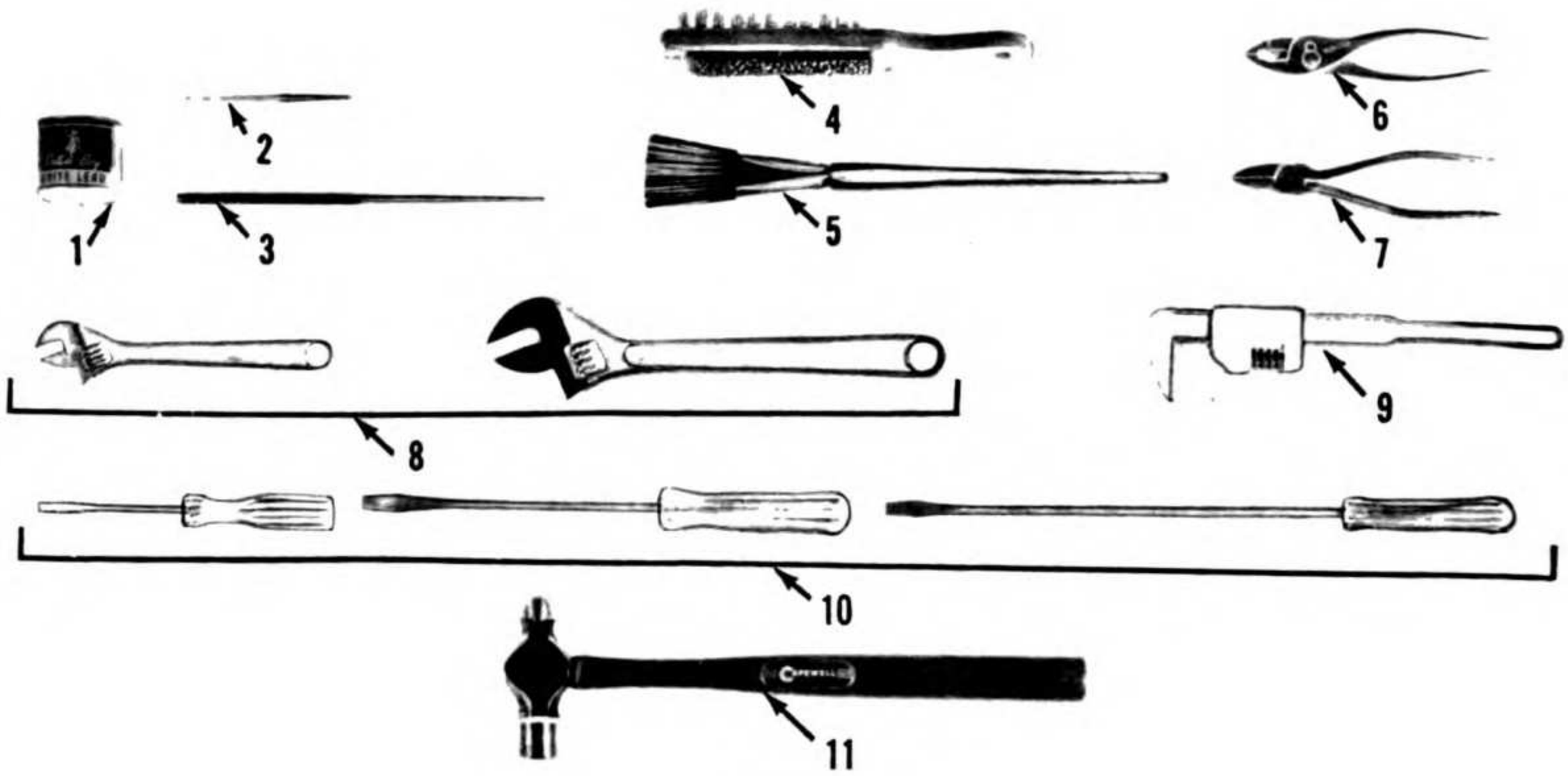

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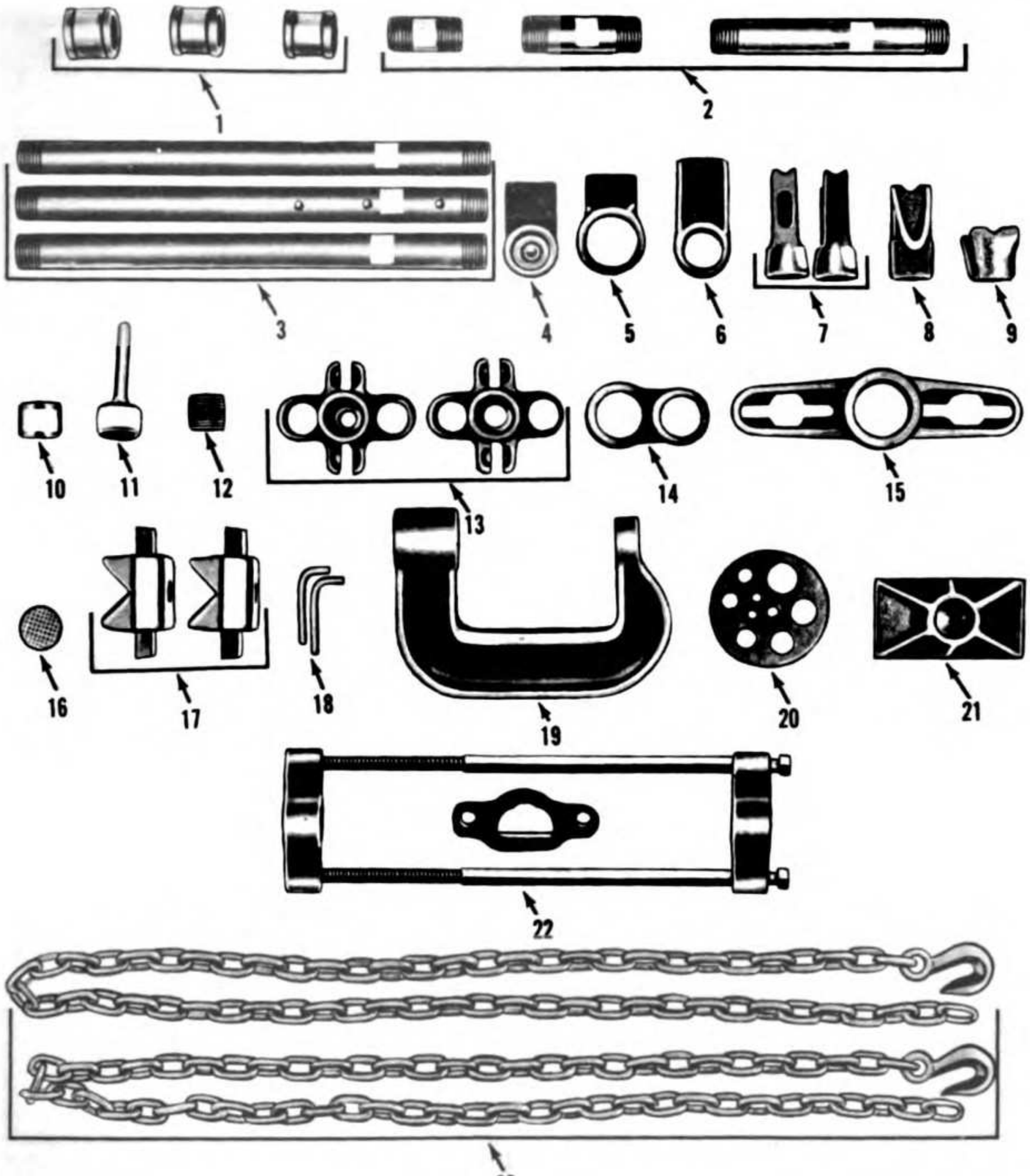

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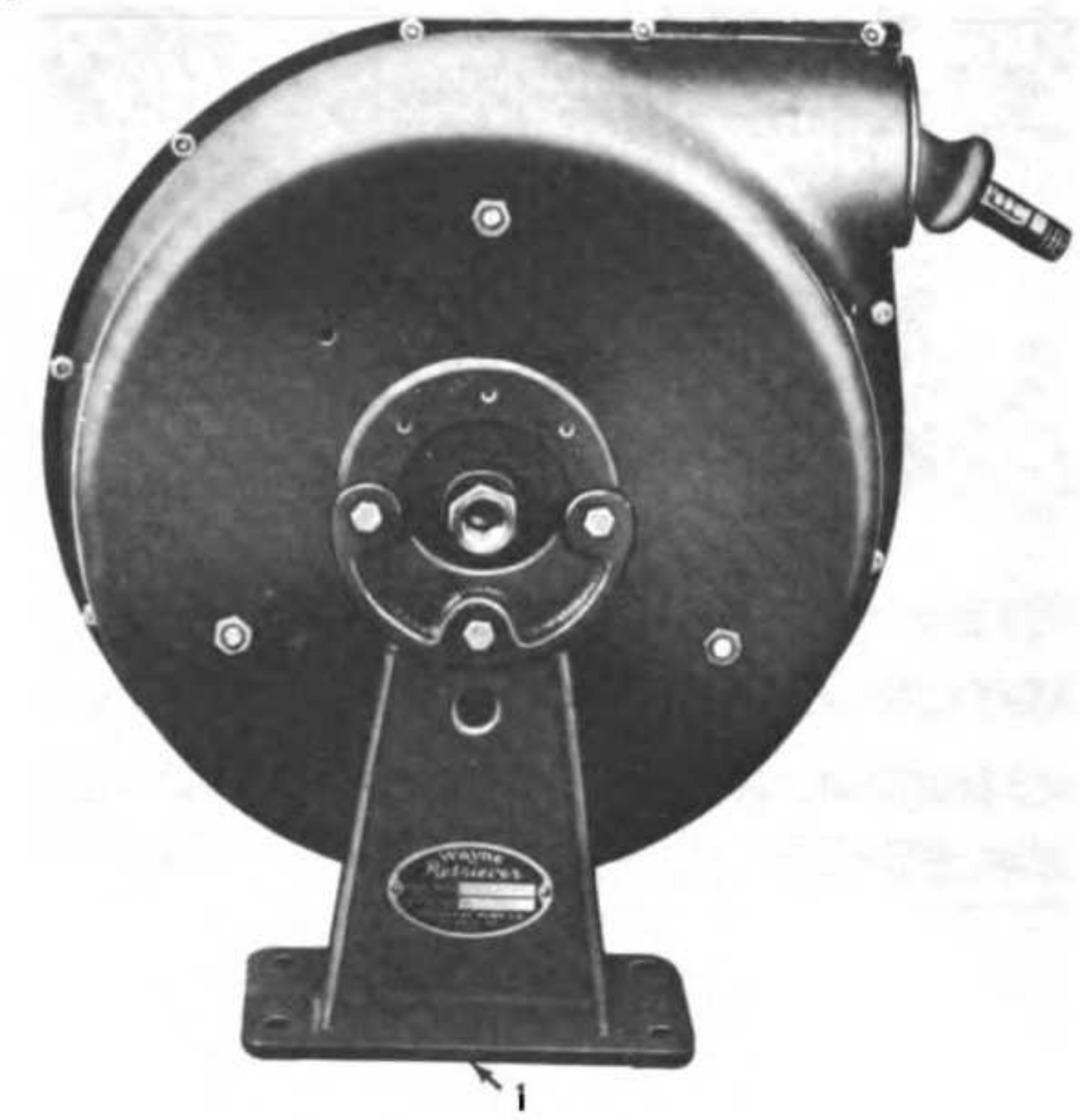
Figure 272.



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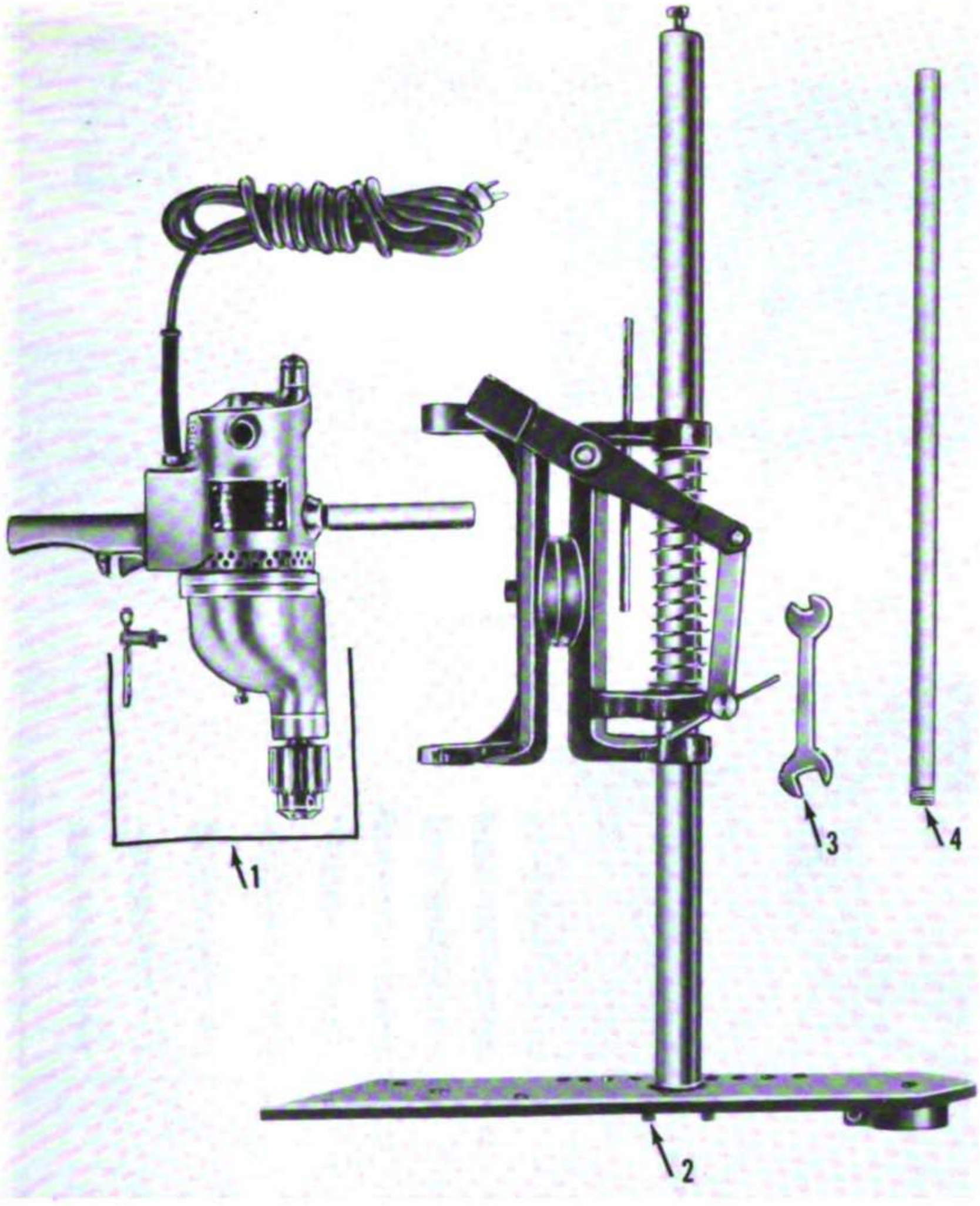

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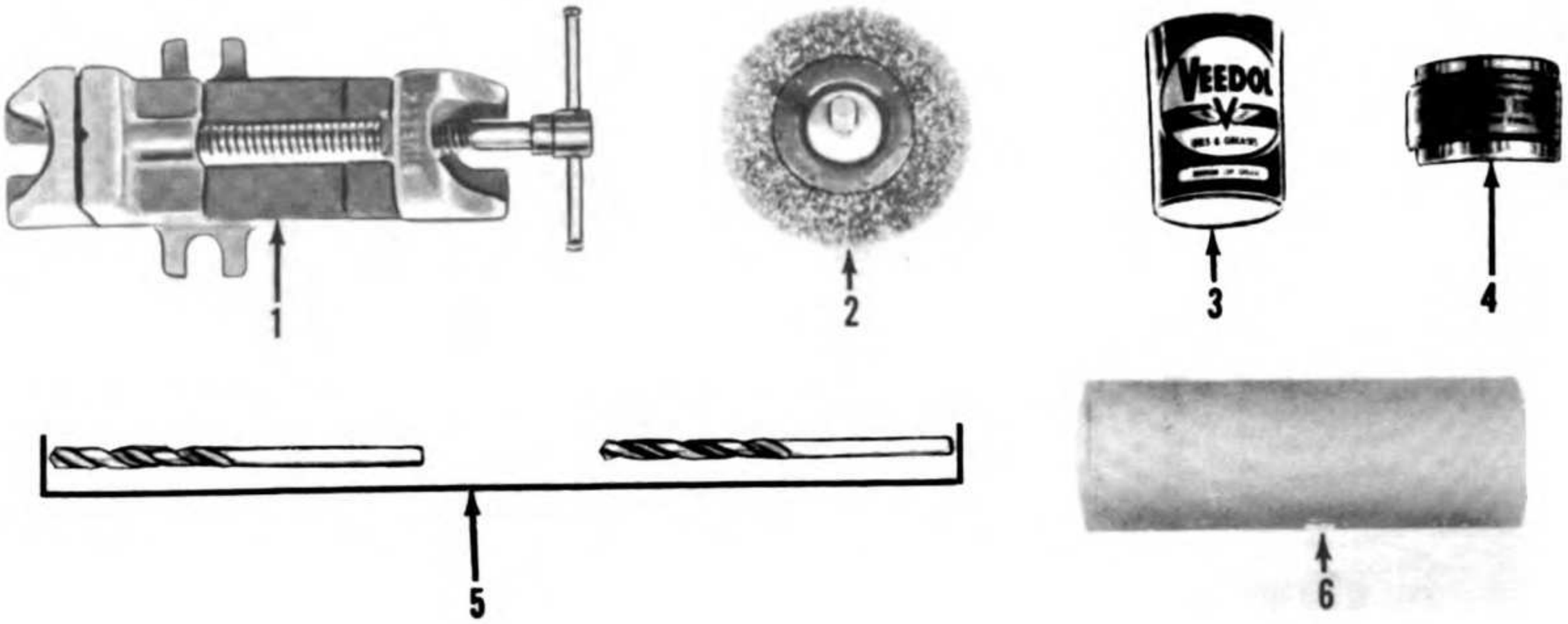

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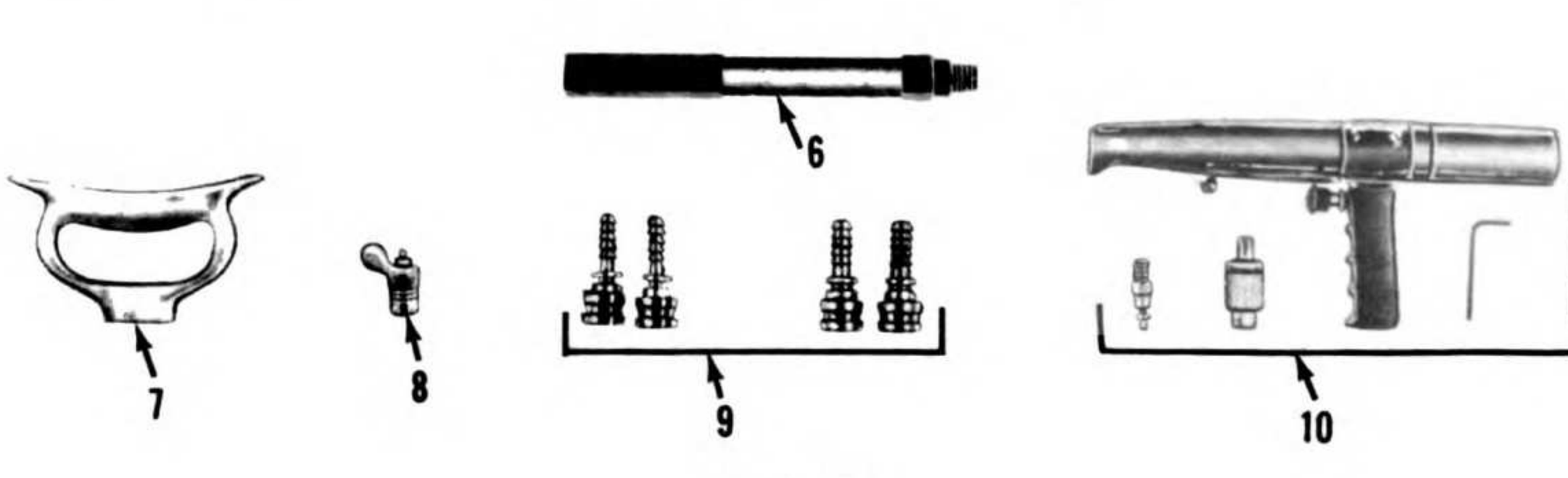

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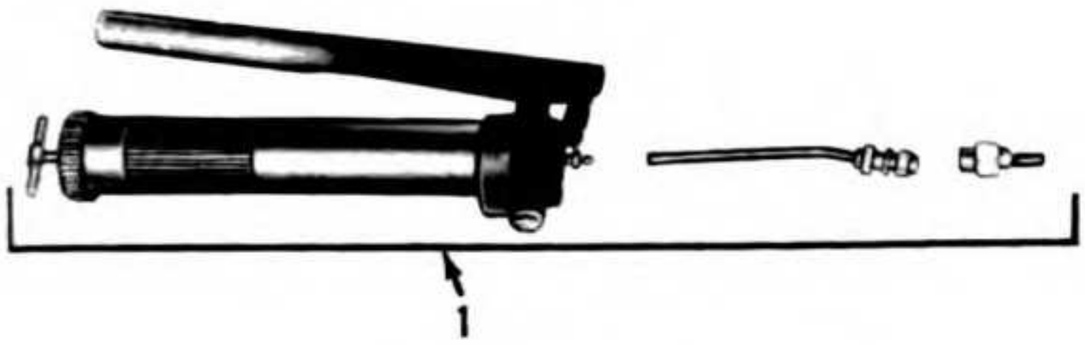

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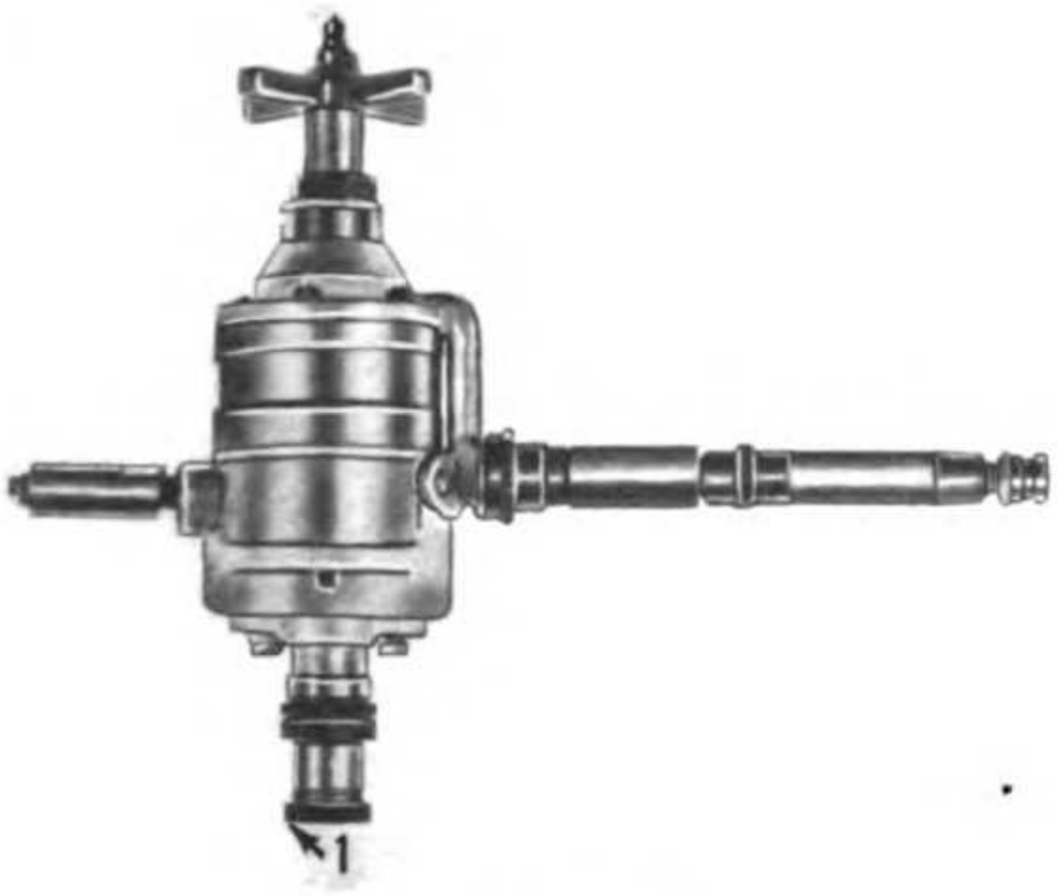

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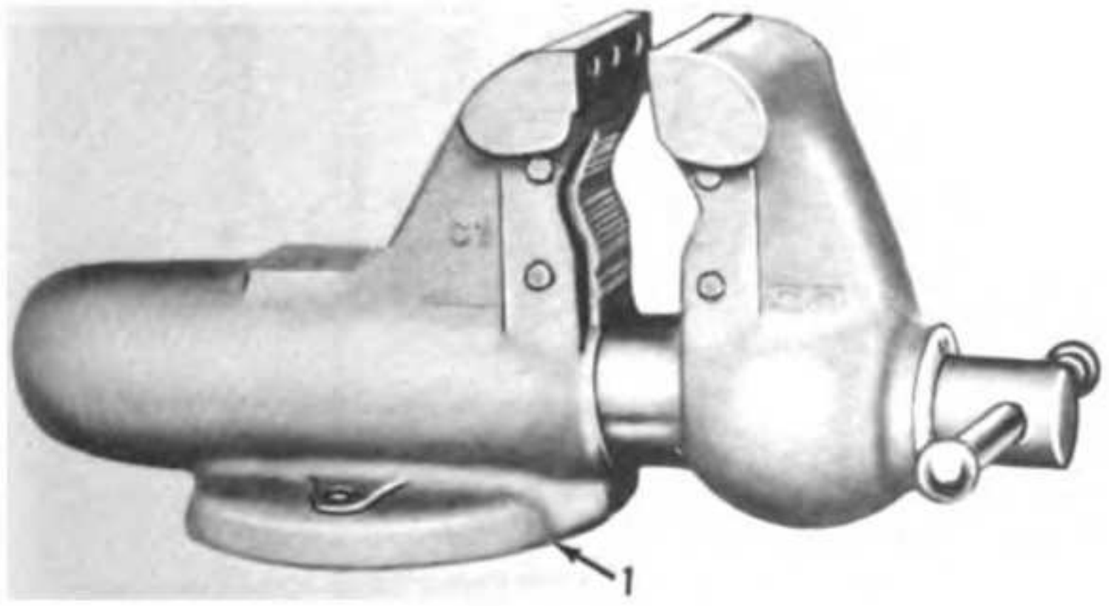

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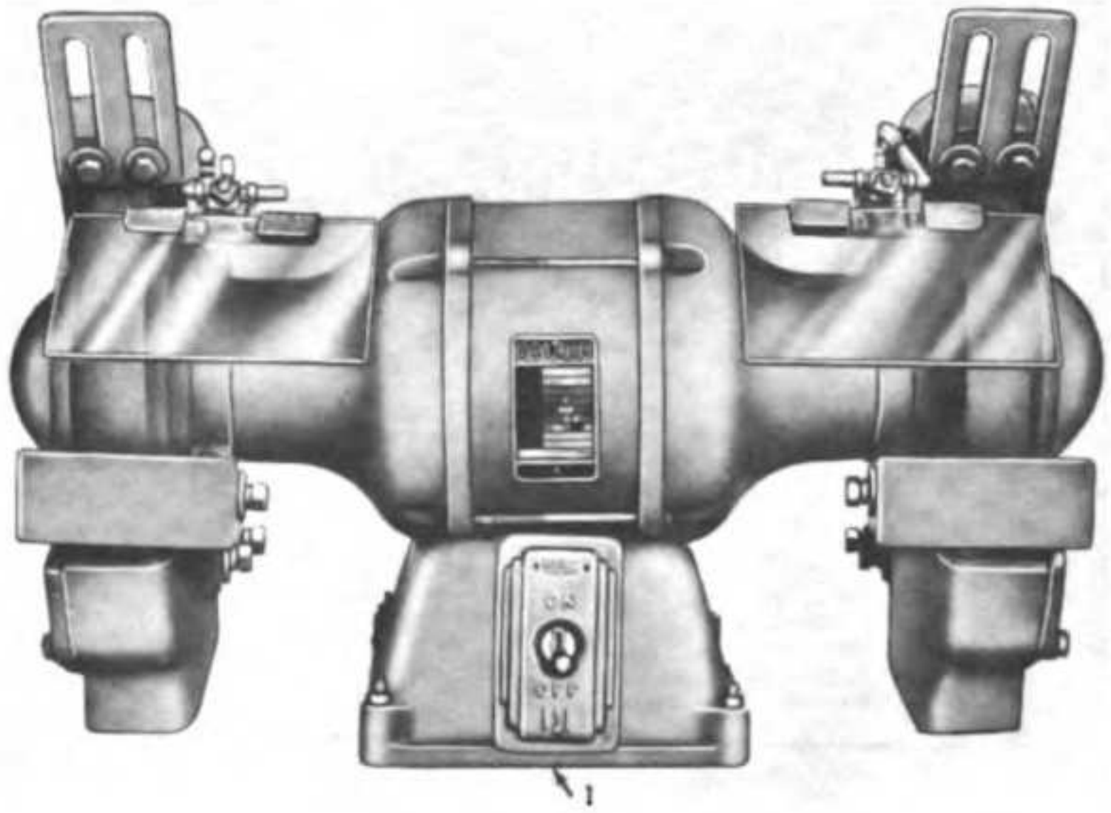

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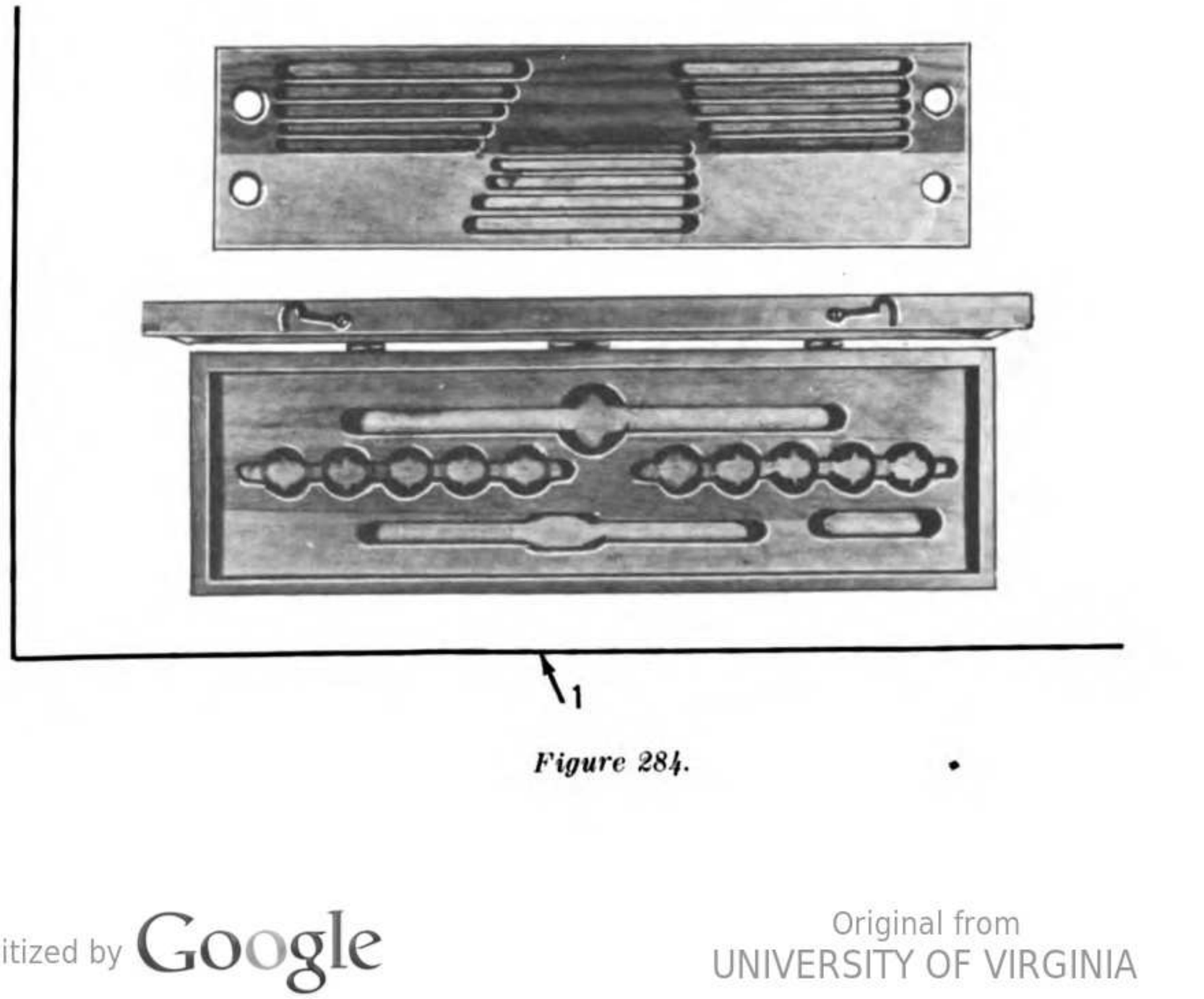

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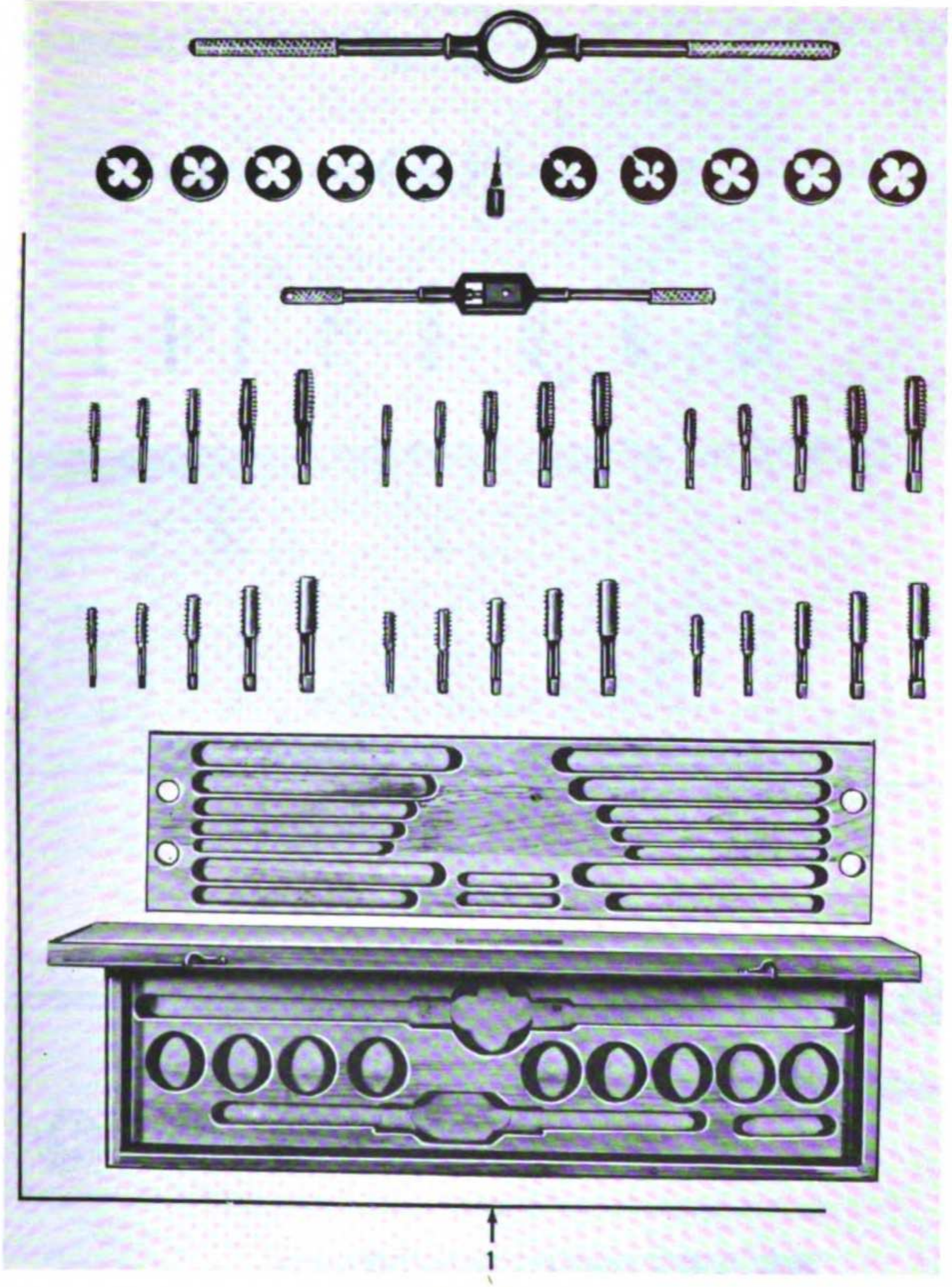

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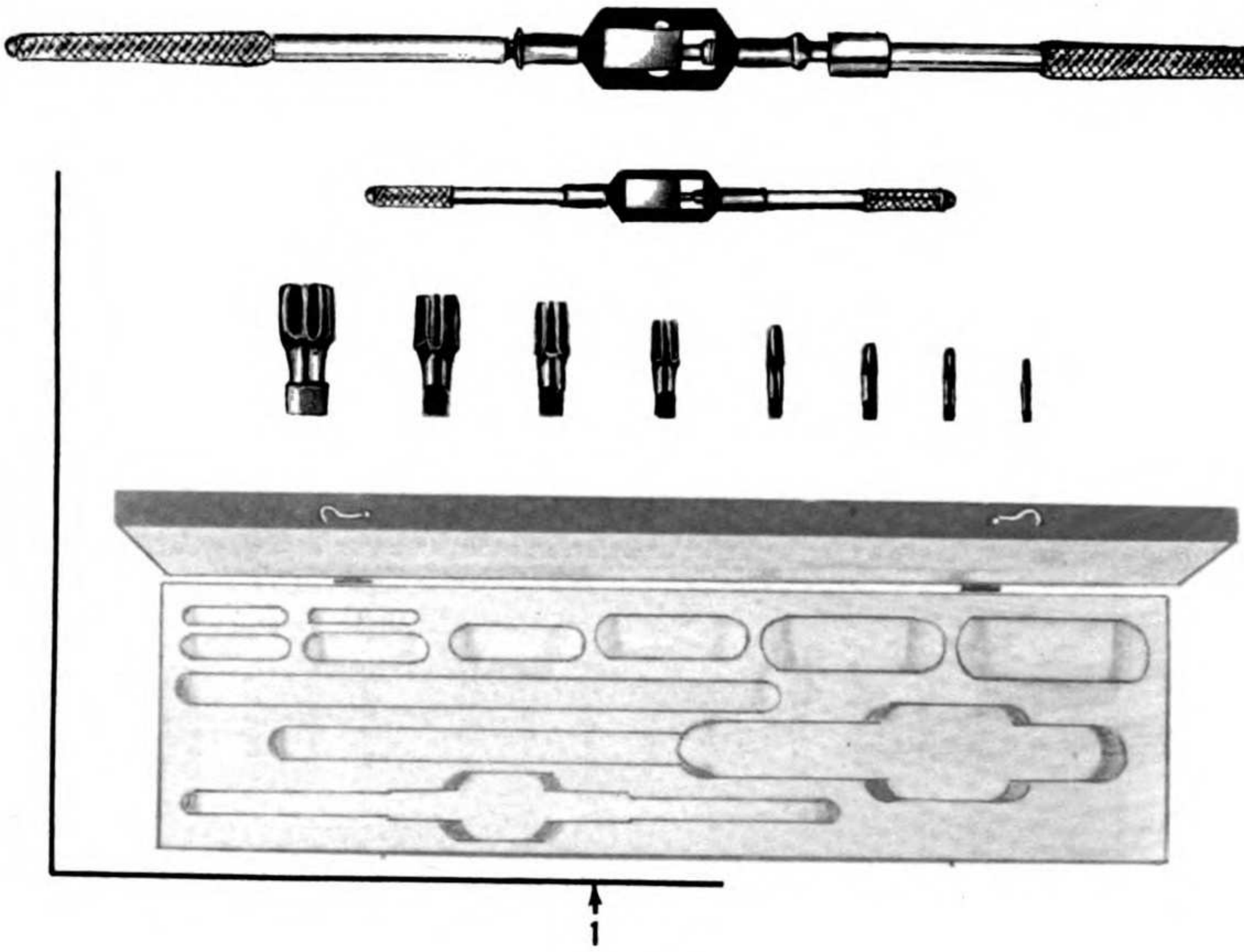

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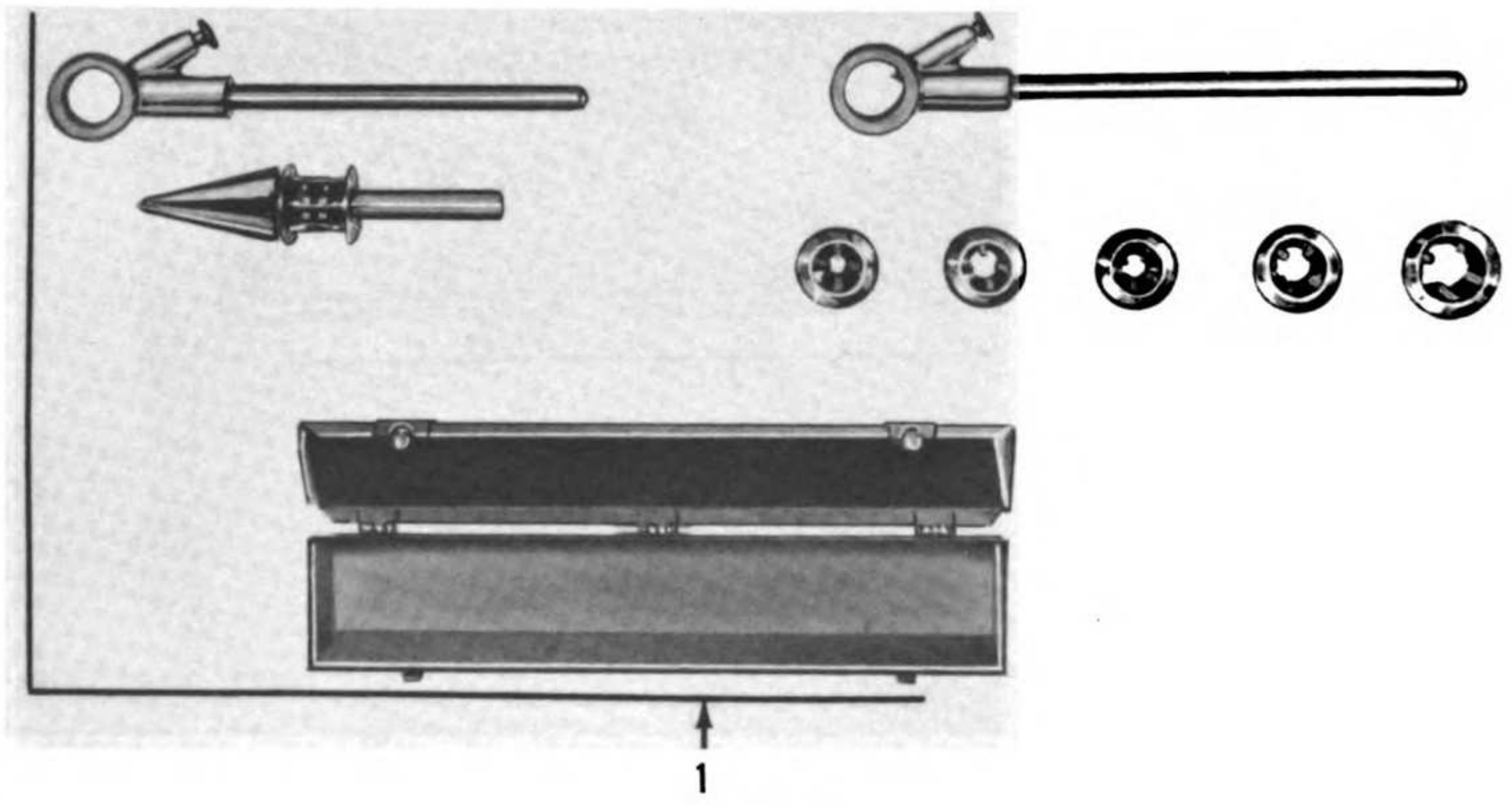

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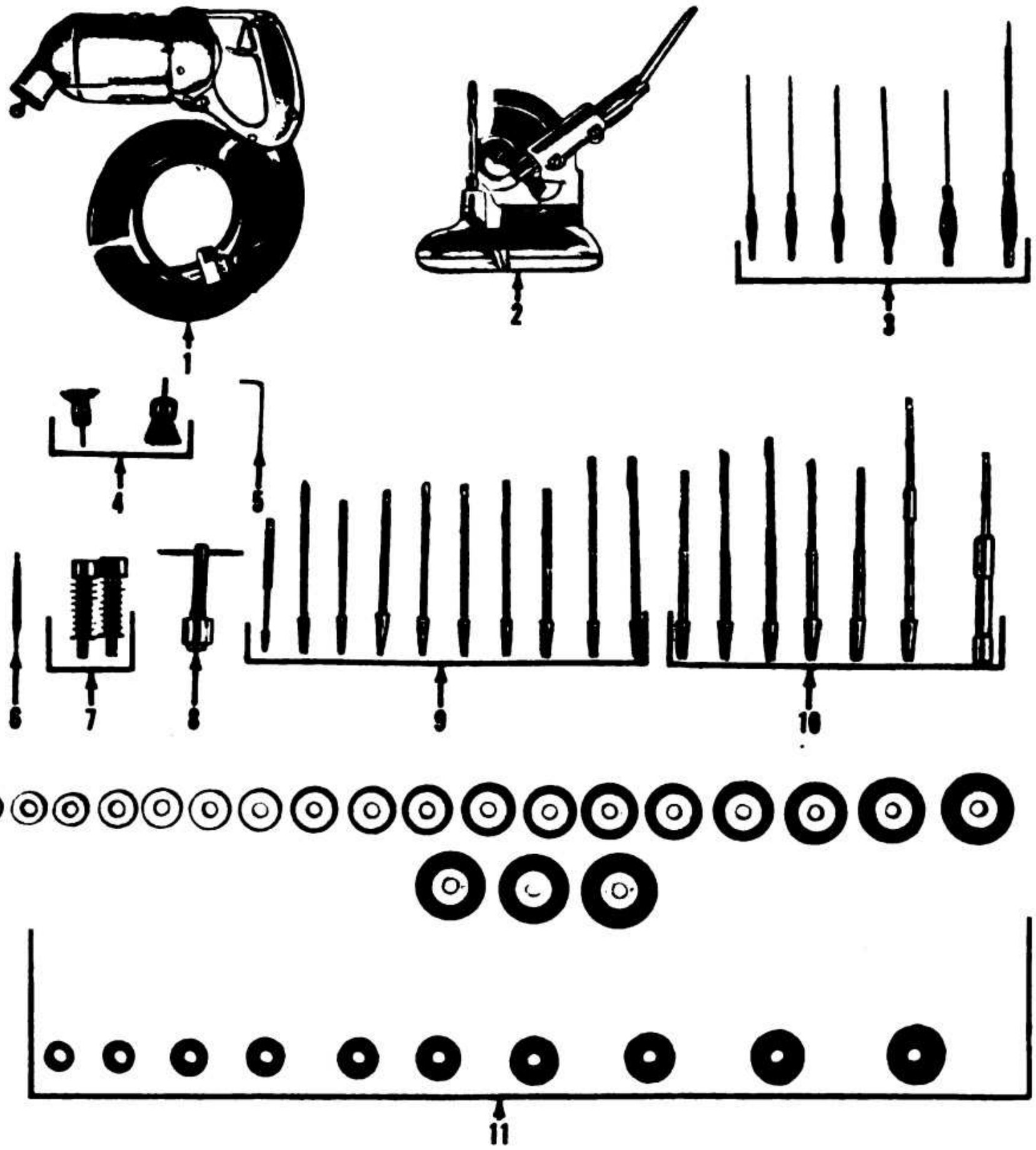

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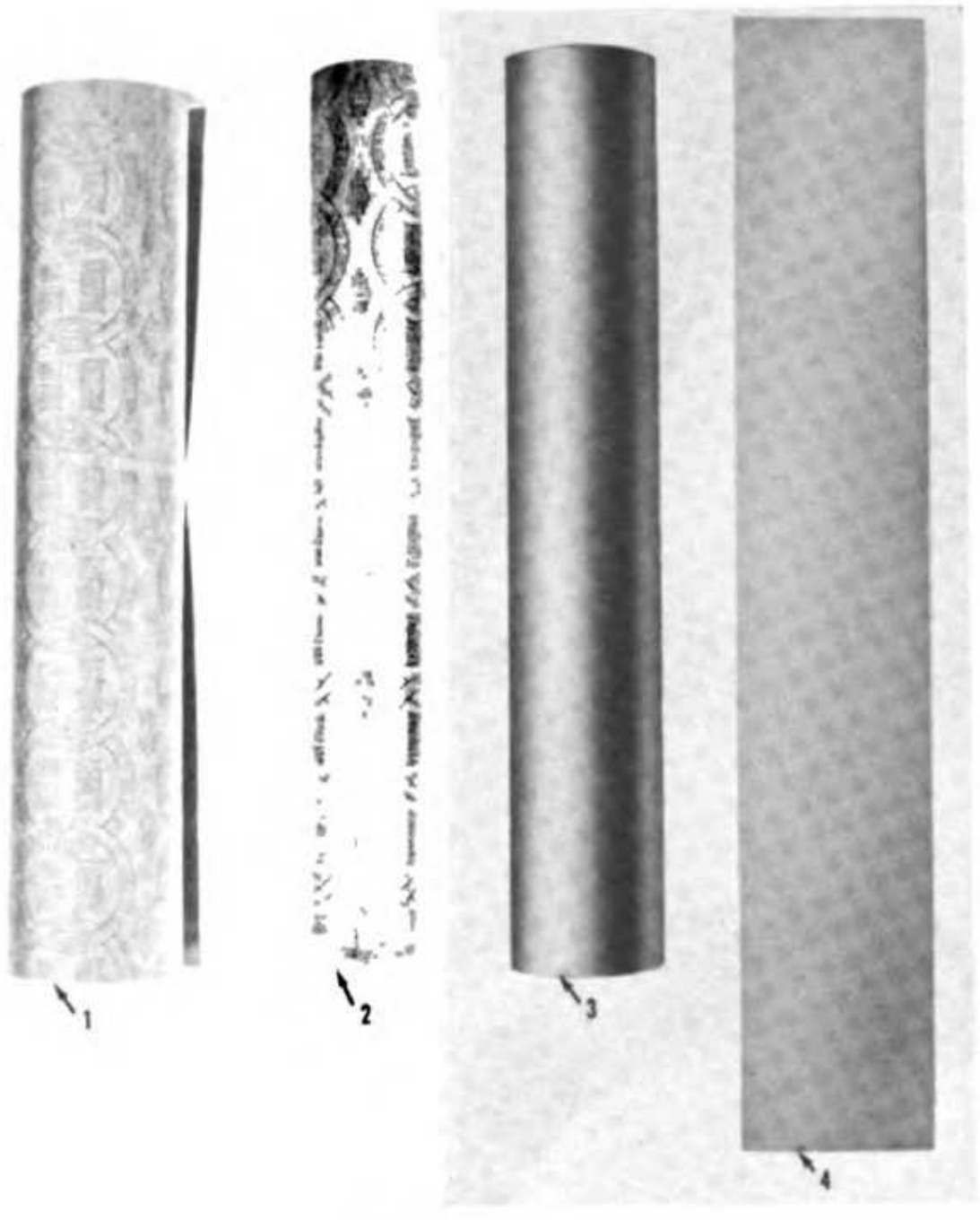

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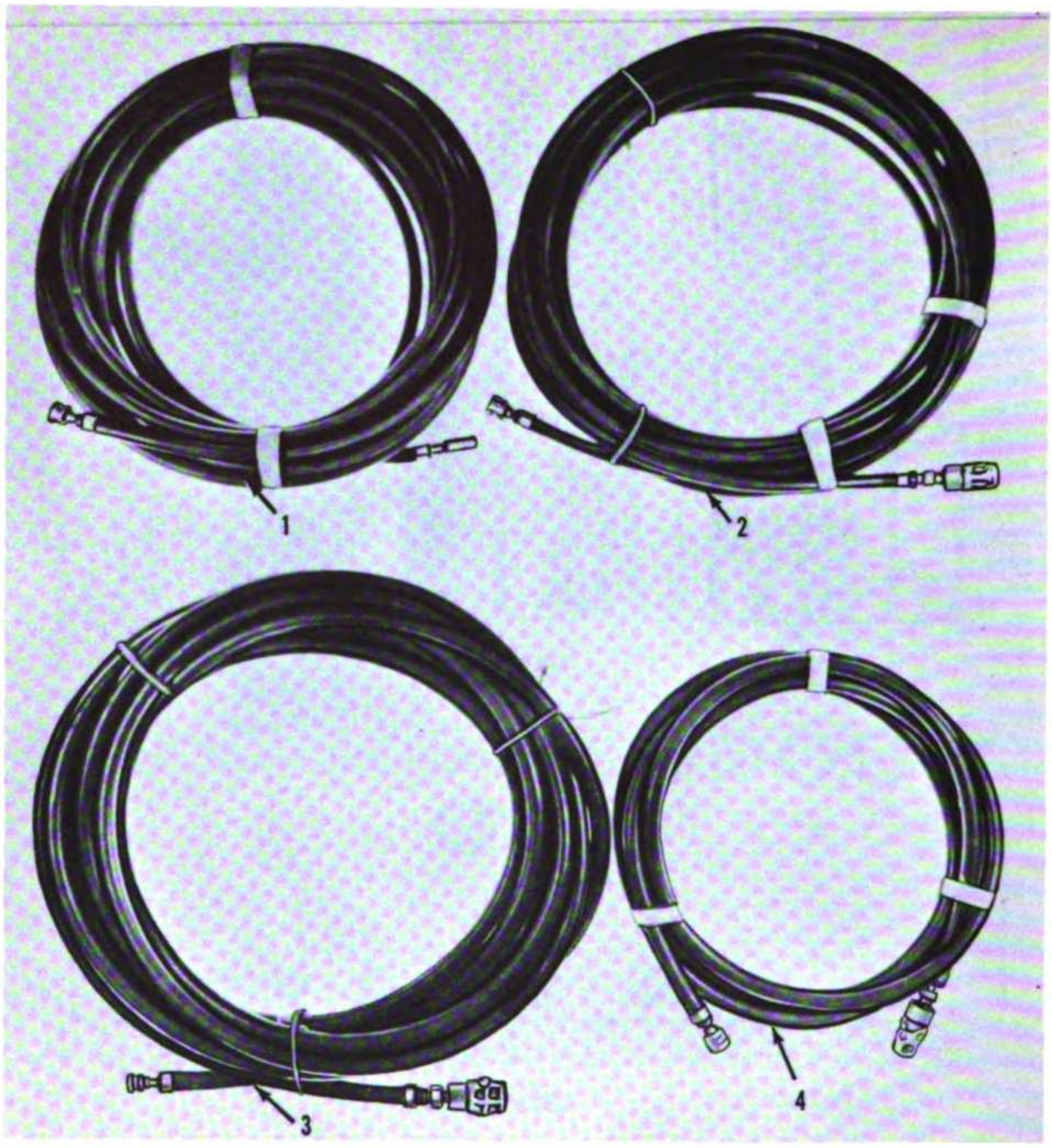

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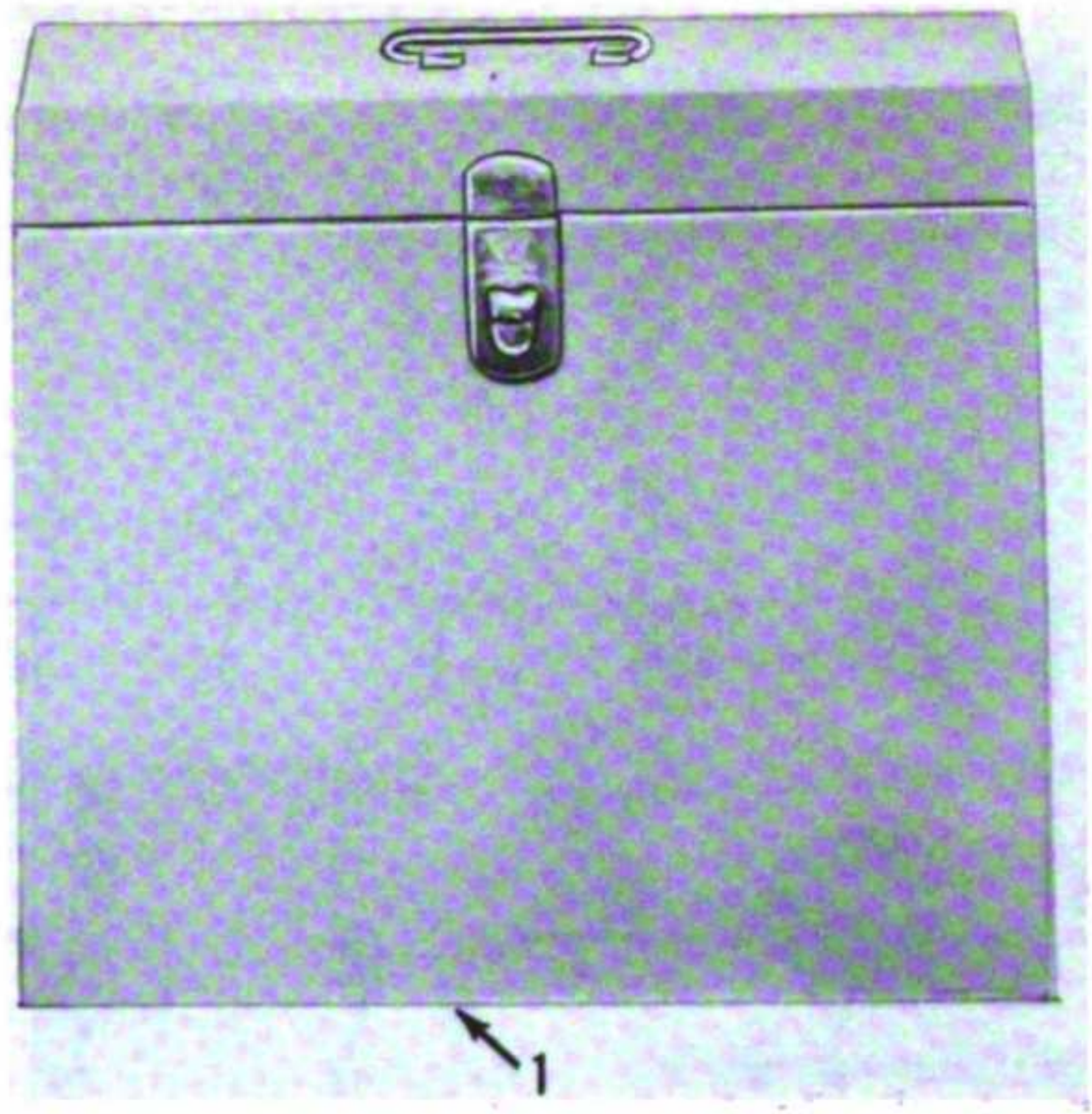

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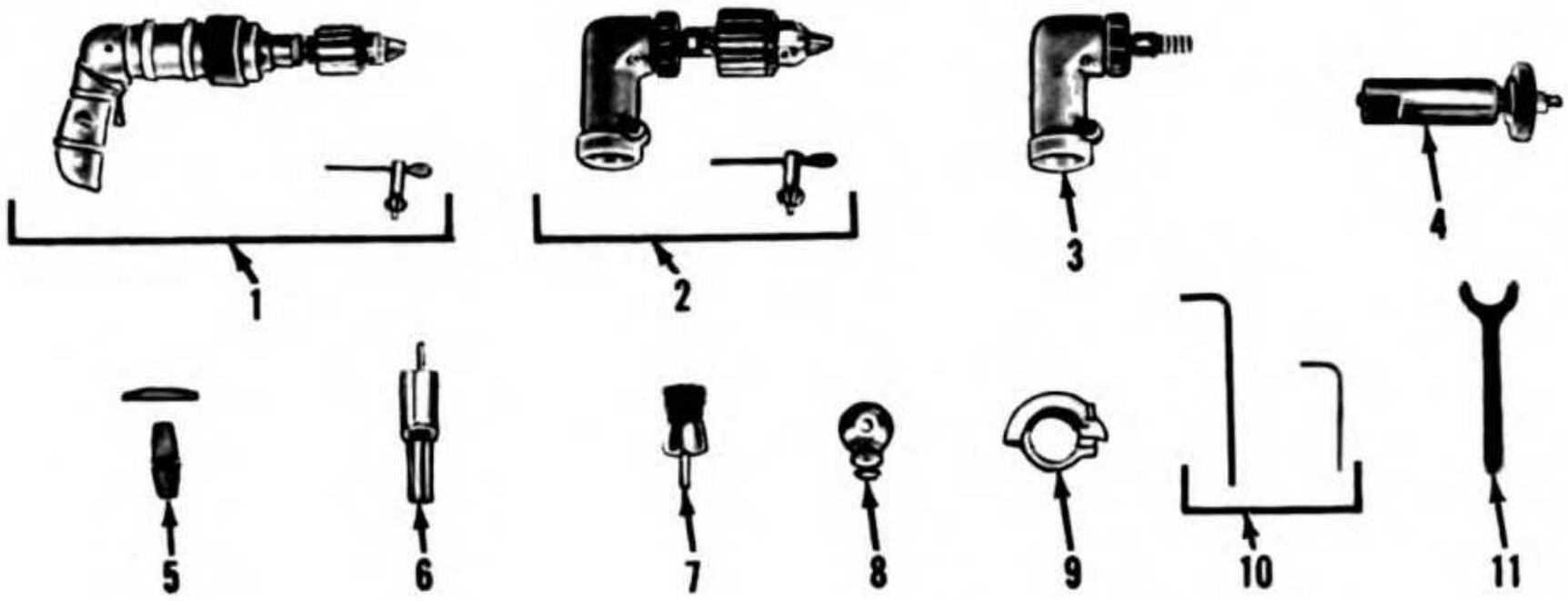

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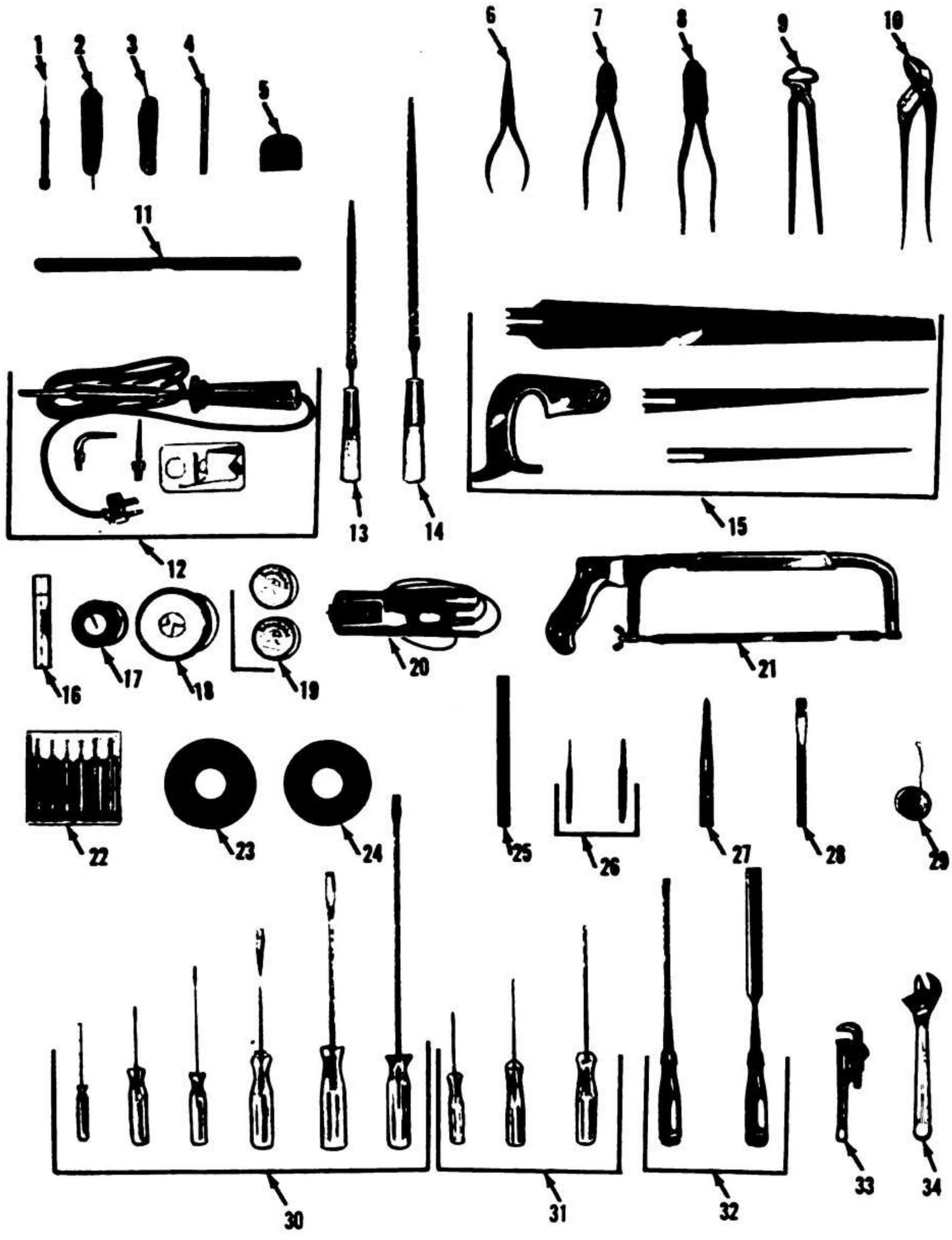

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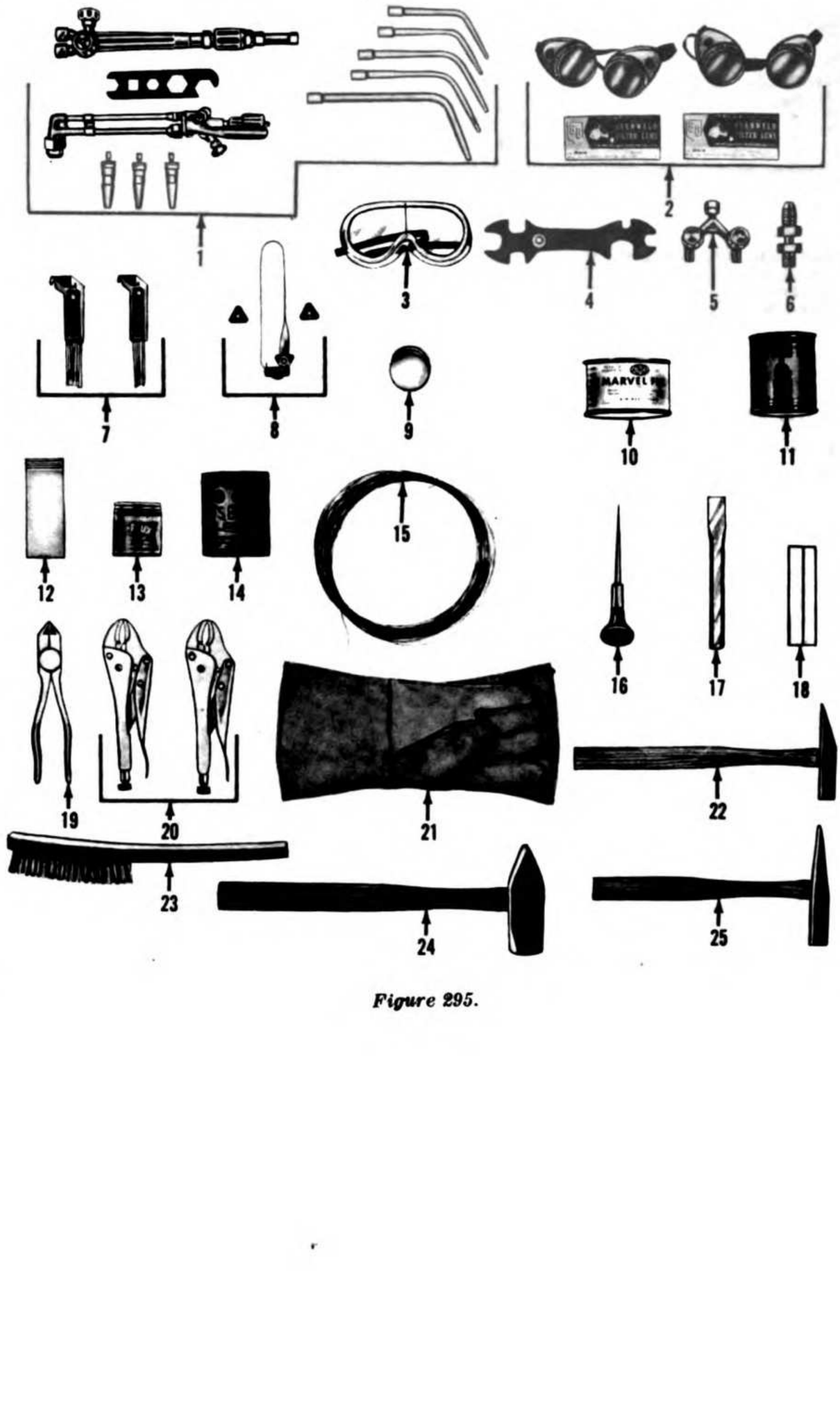

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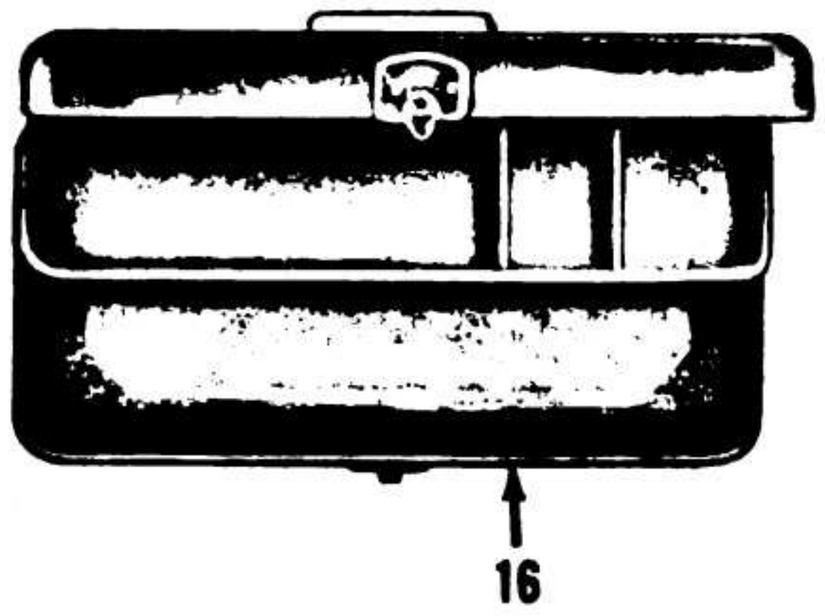

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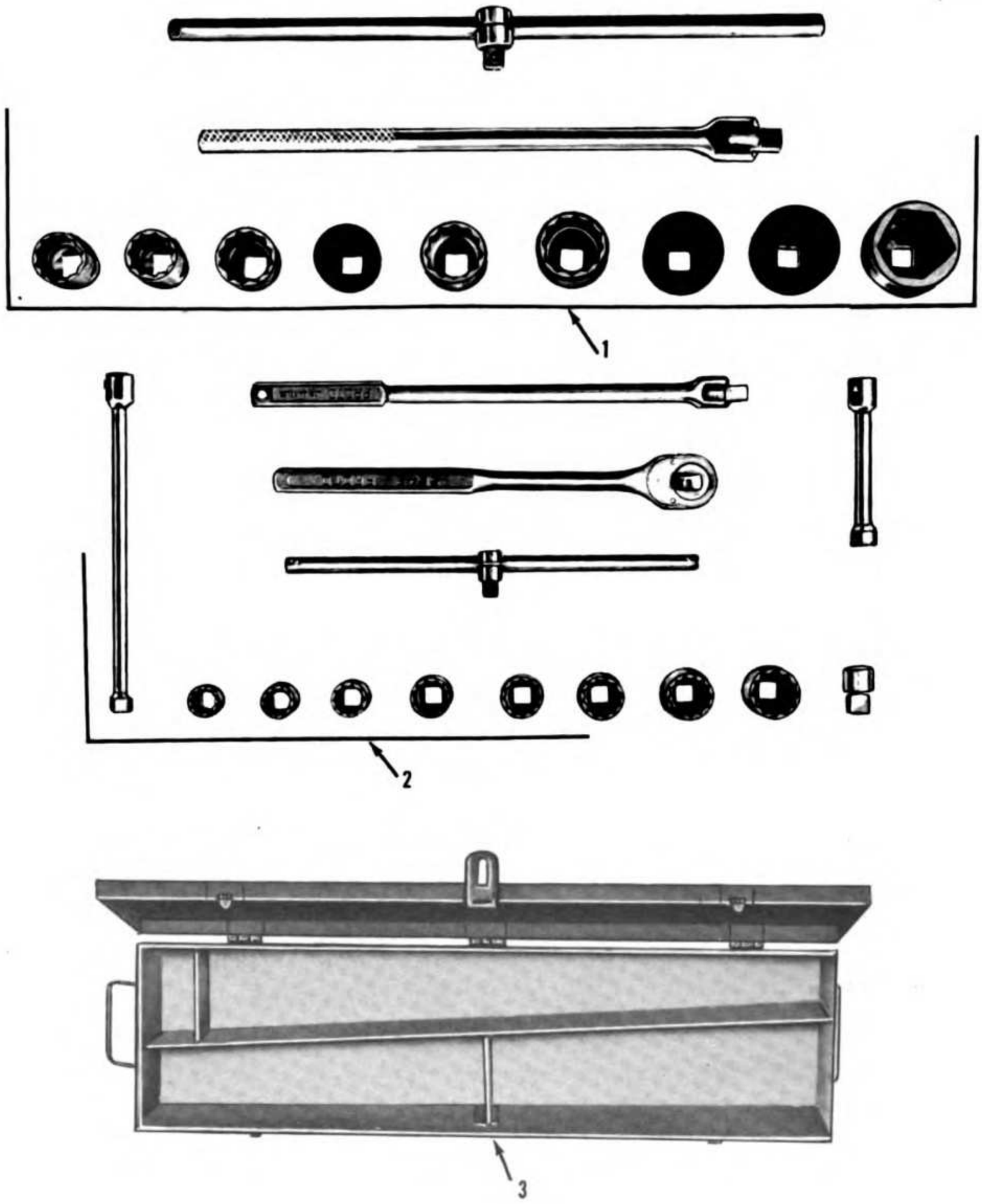

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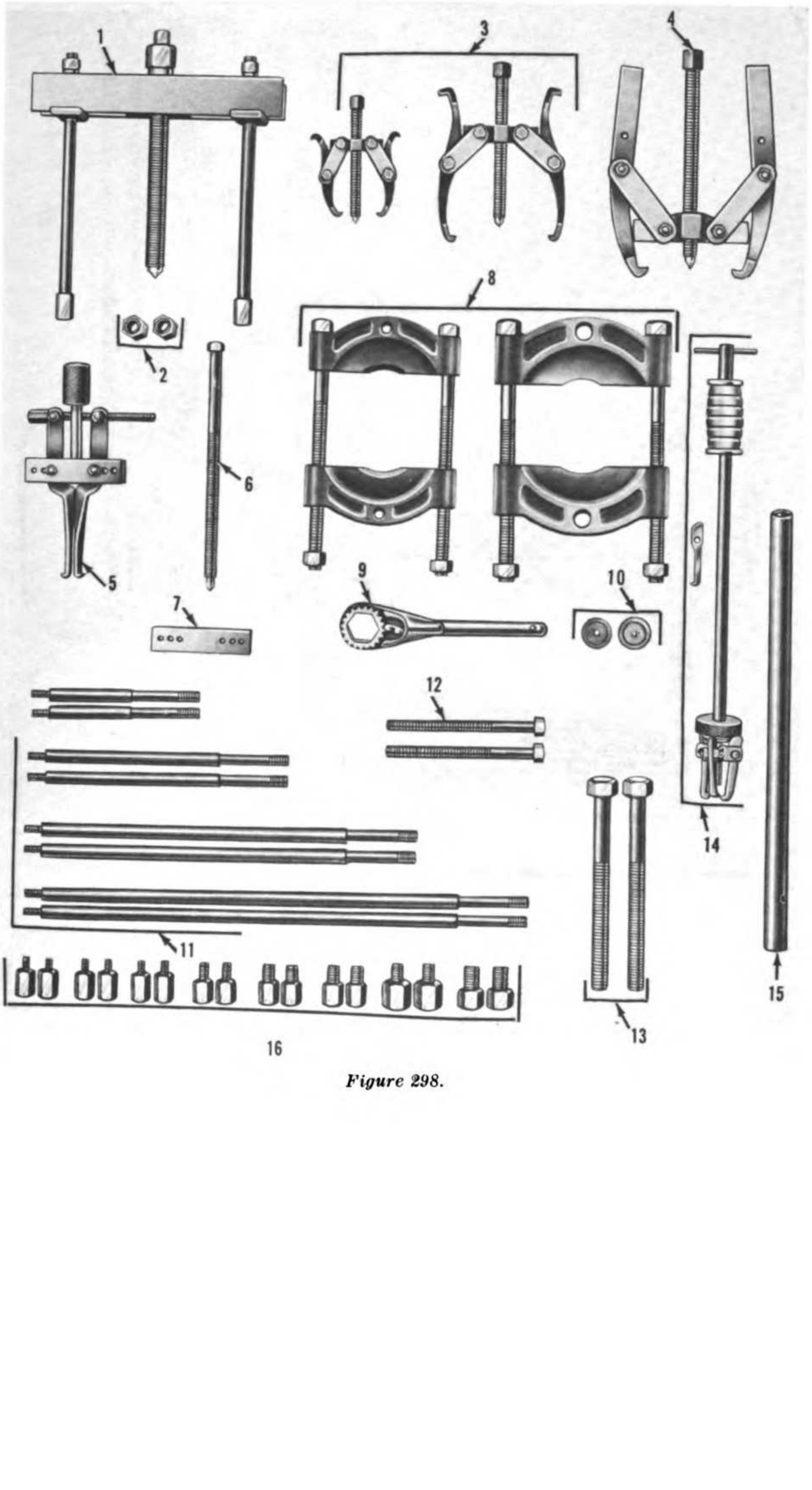

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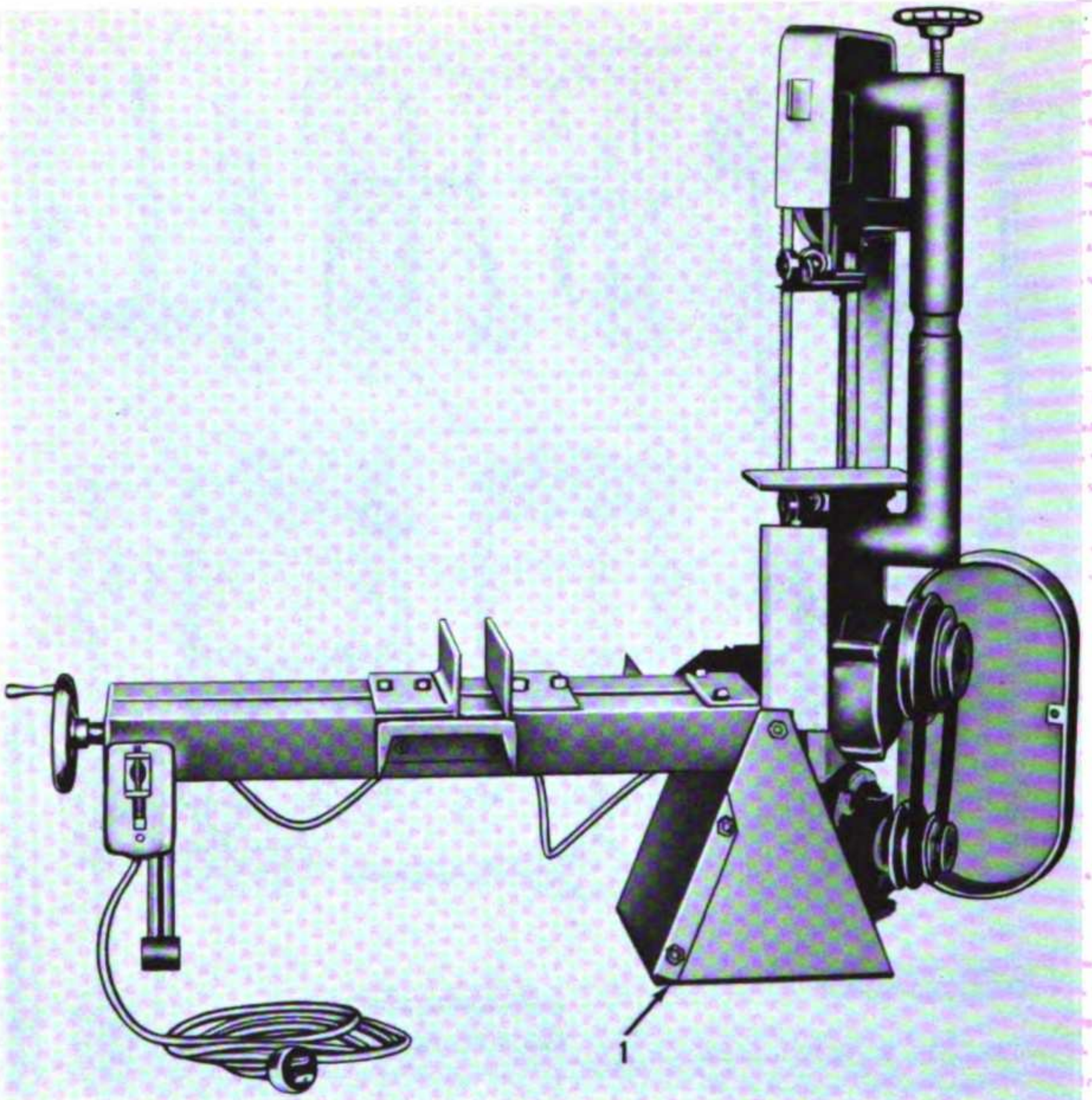

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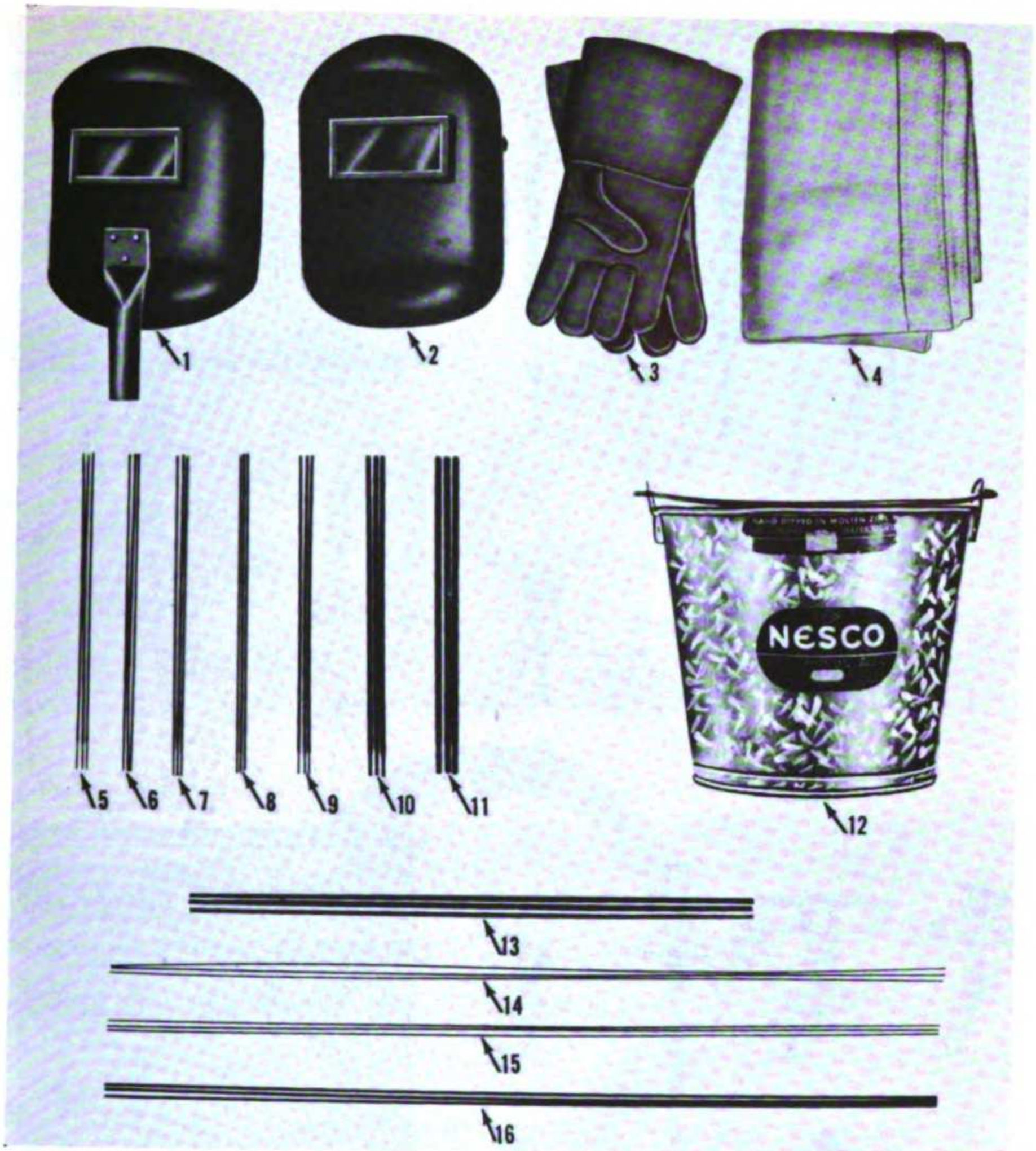

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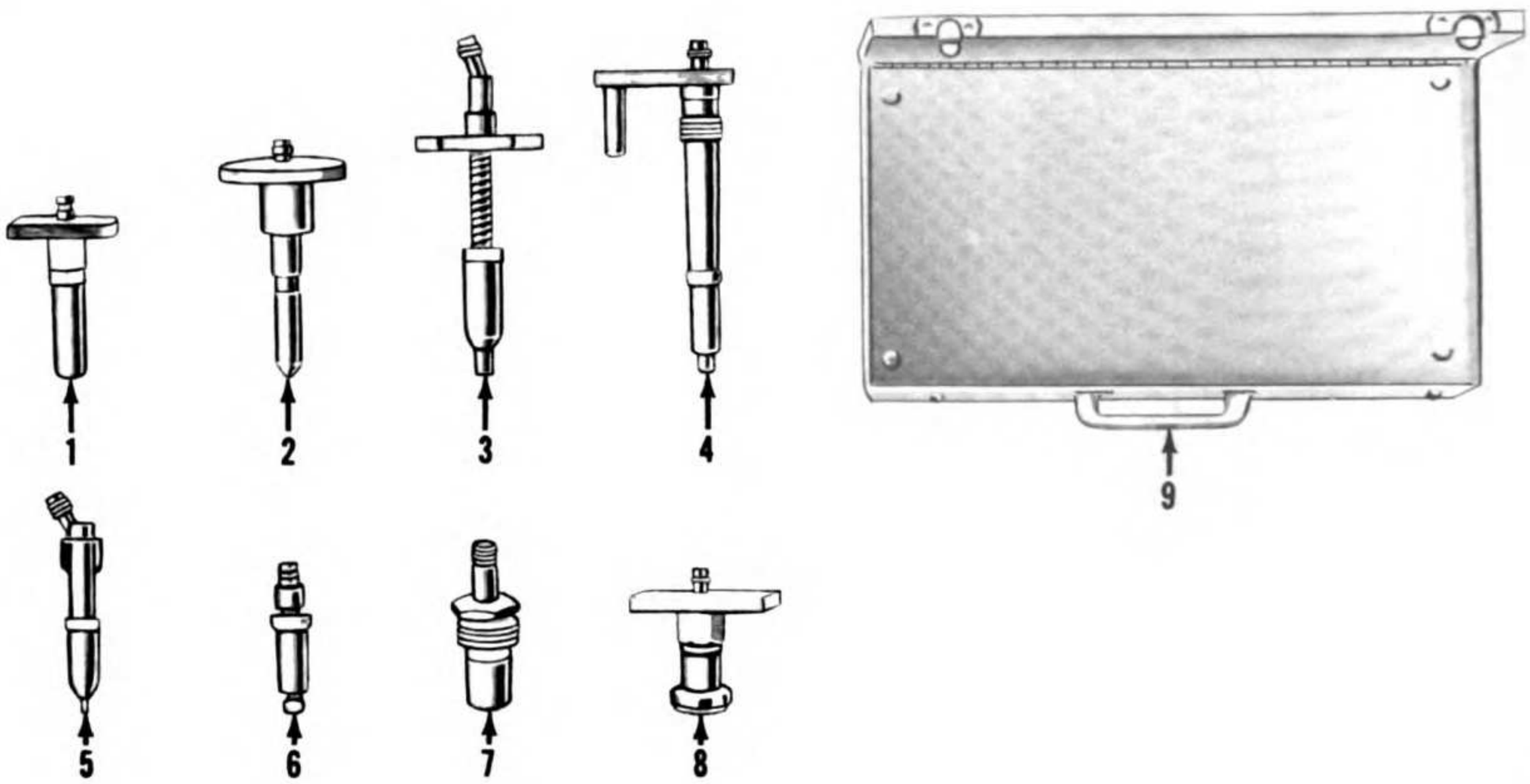

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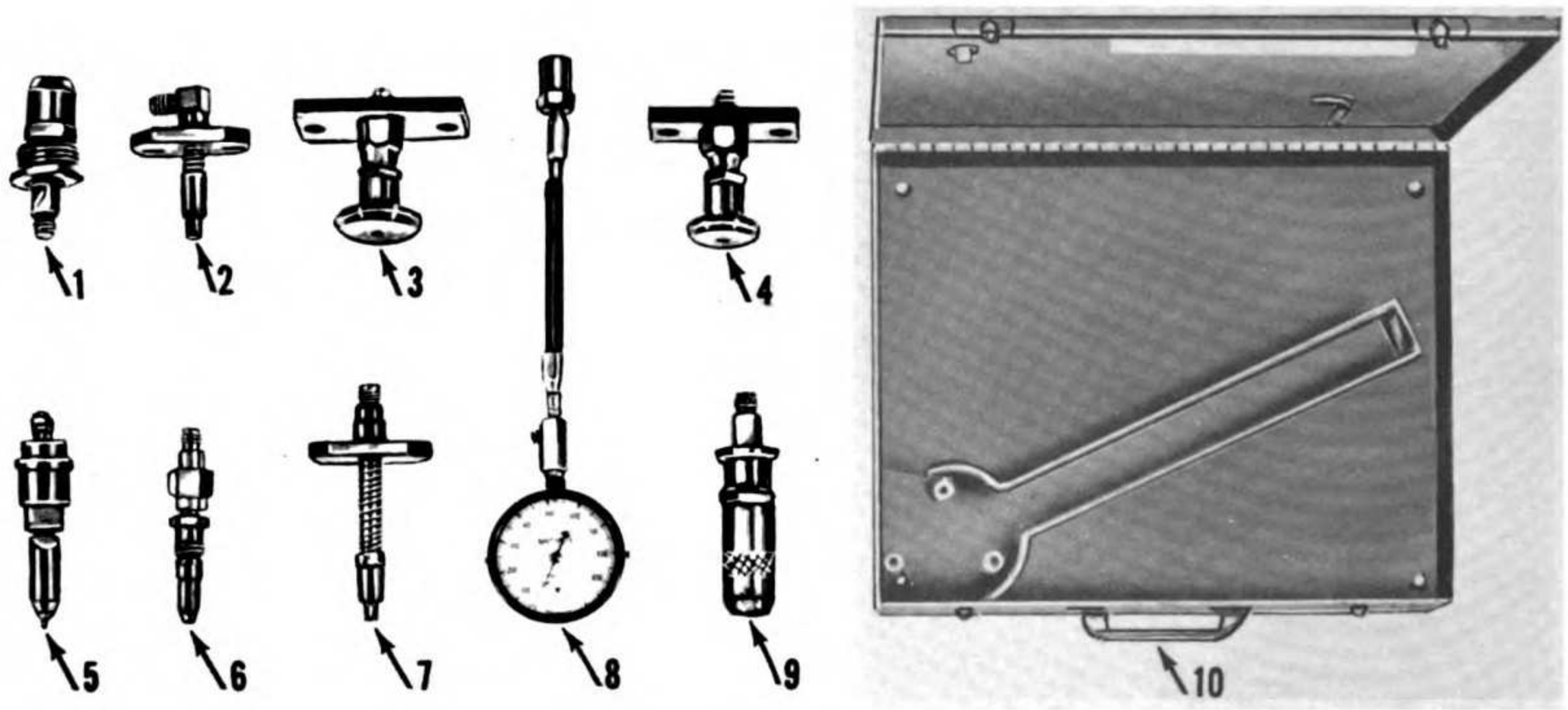

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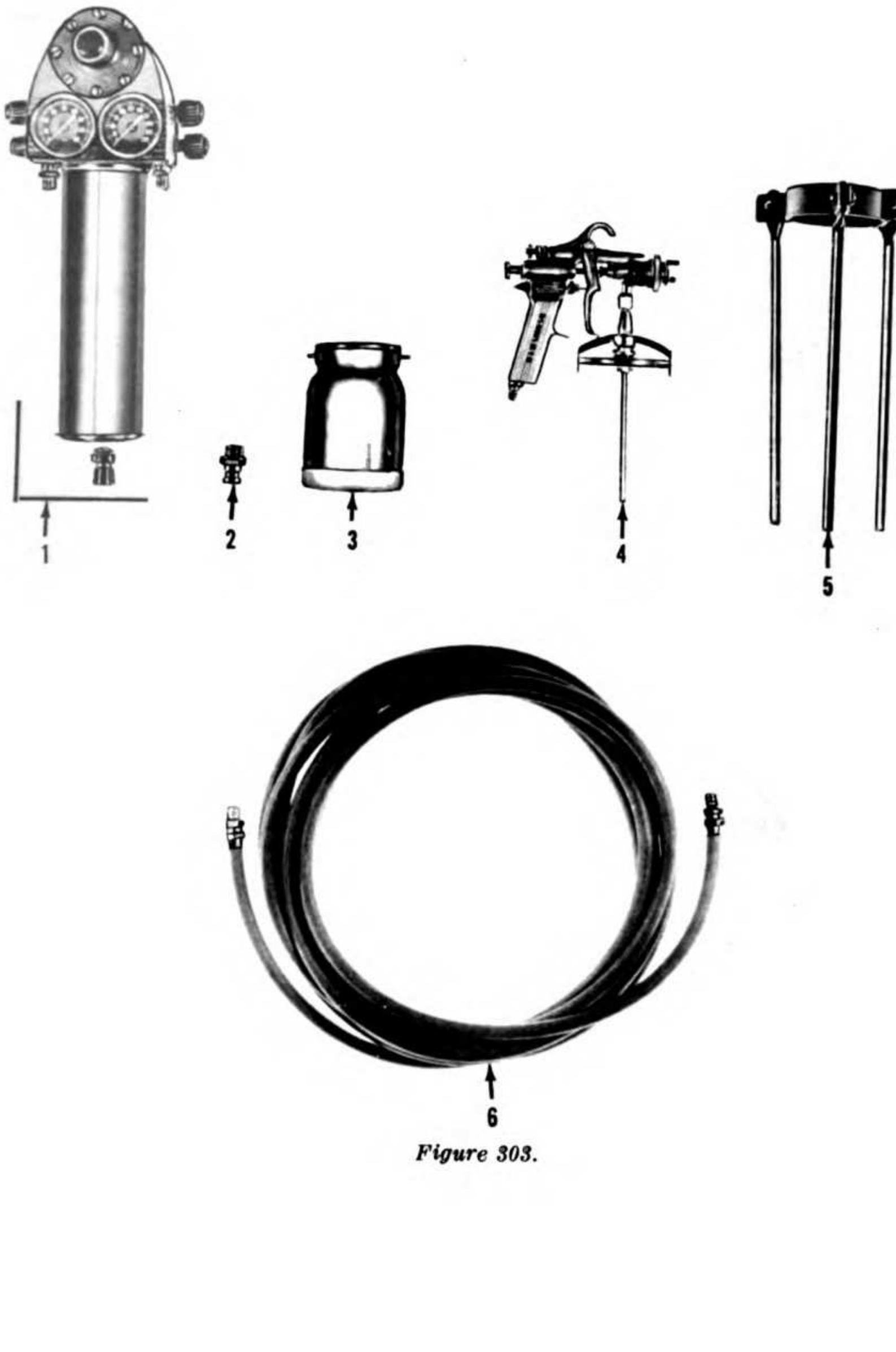

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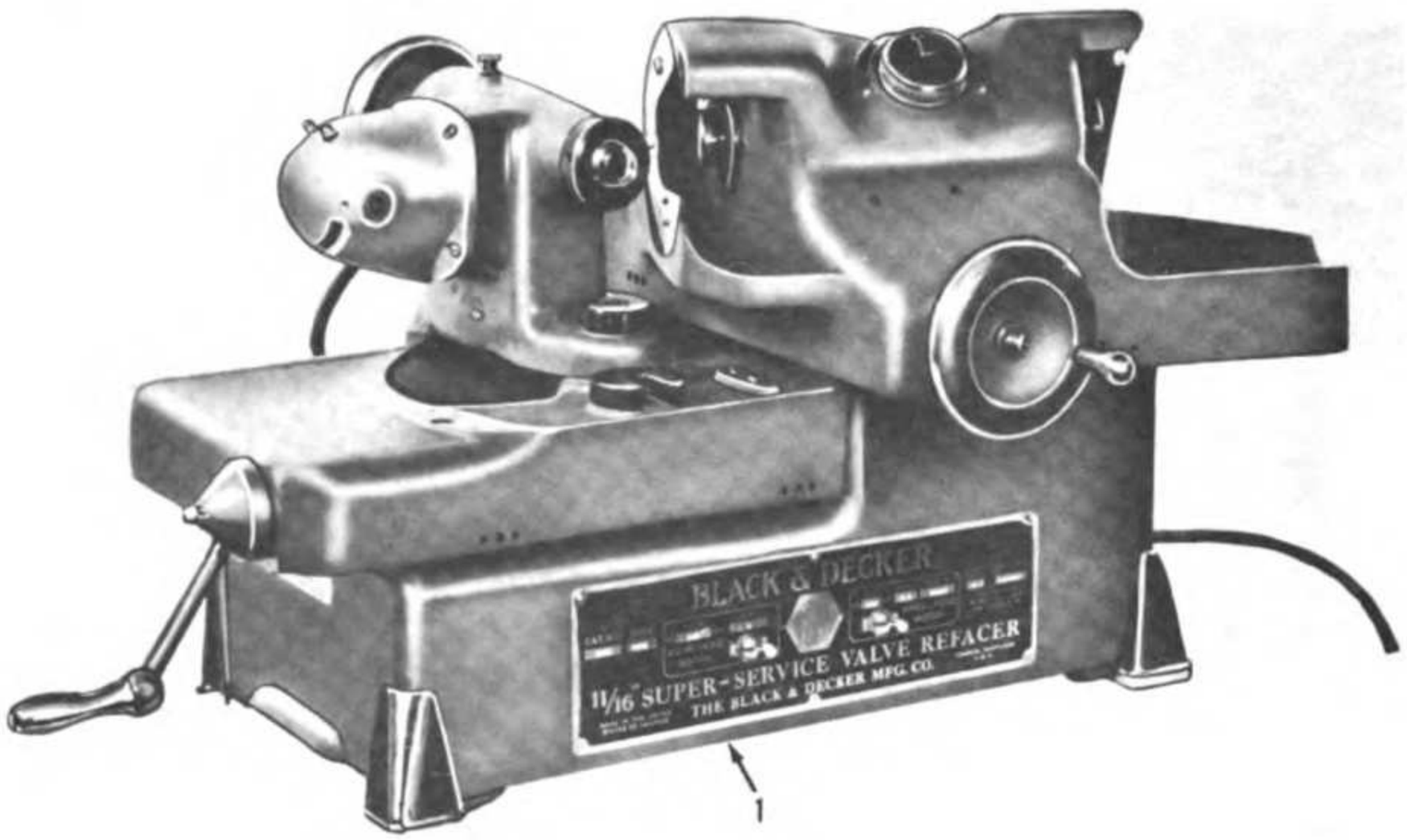

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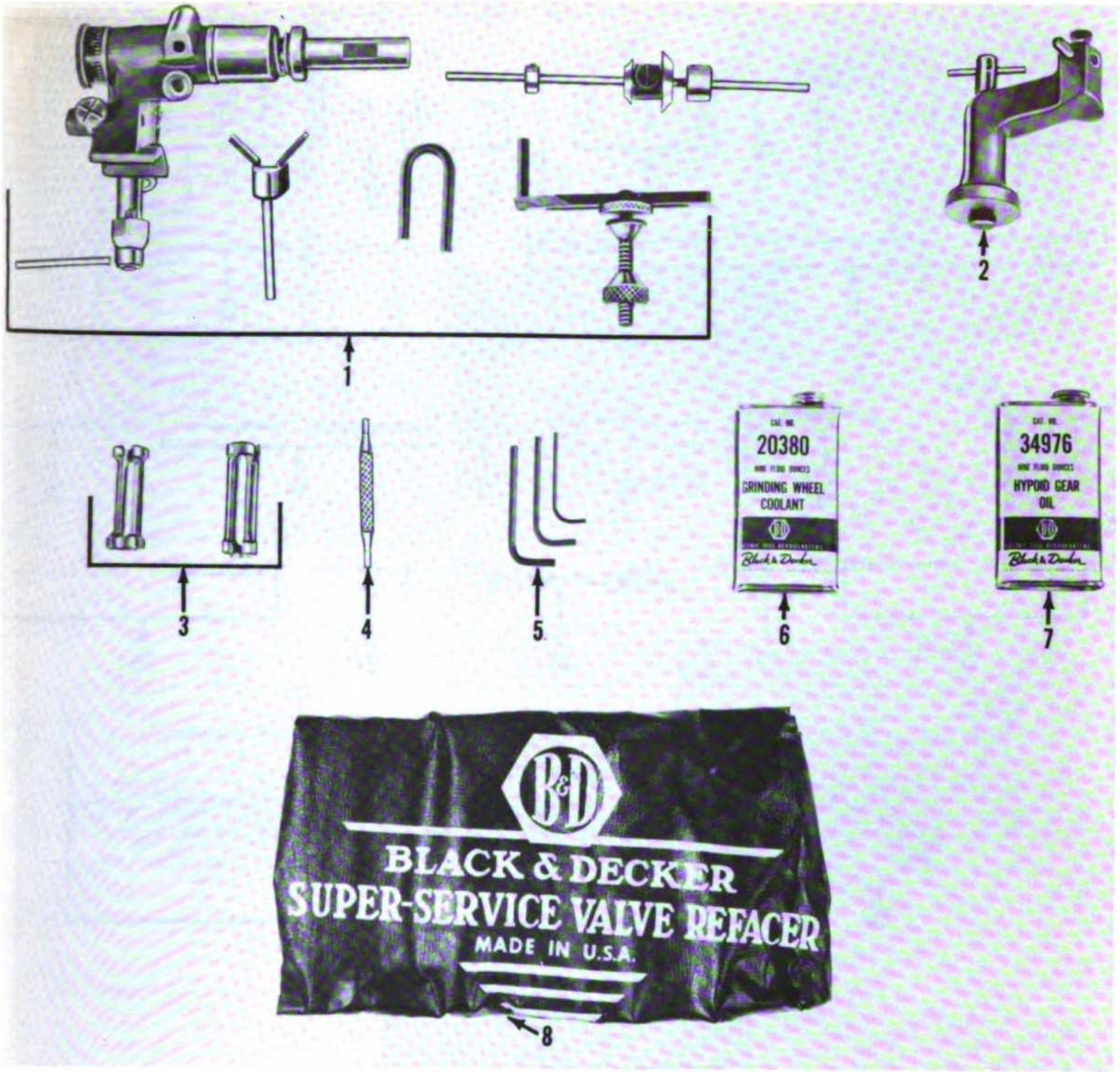

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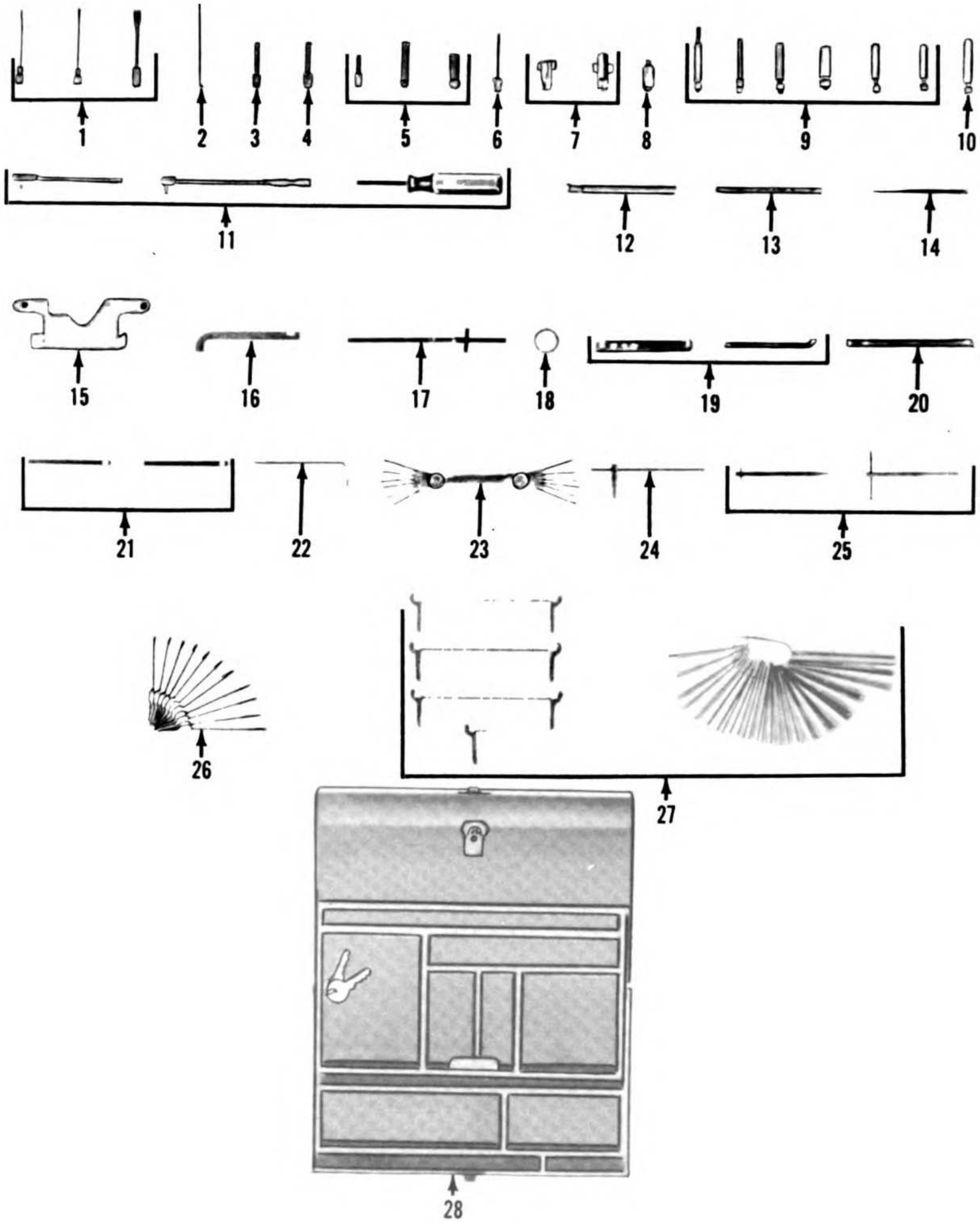

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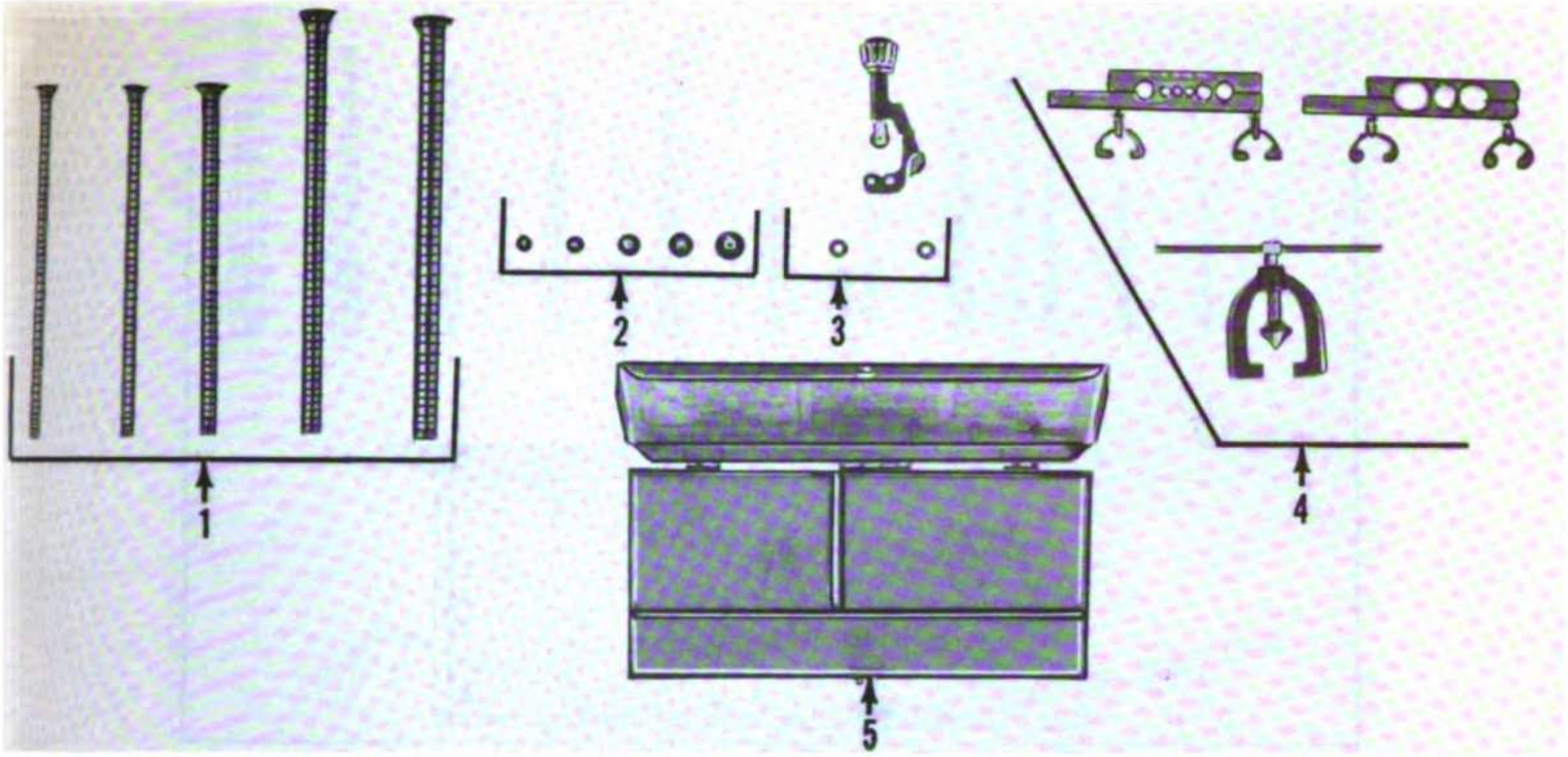

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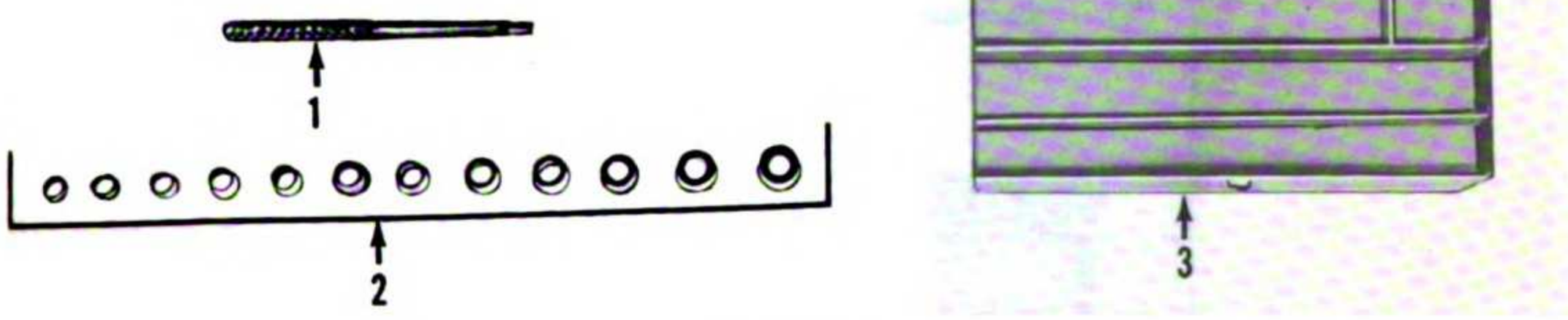

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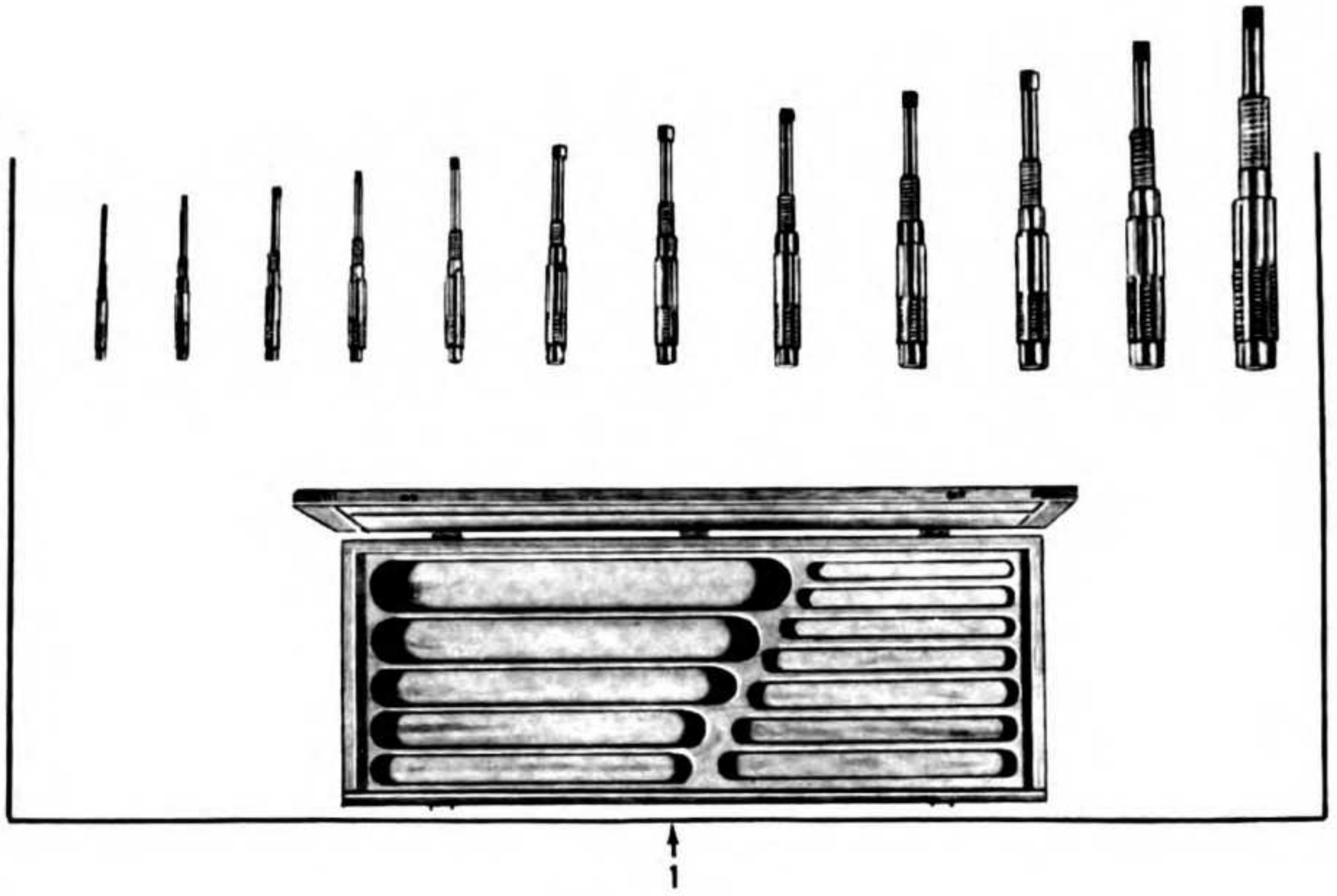

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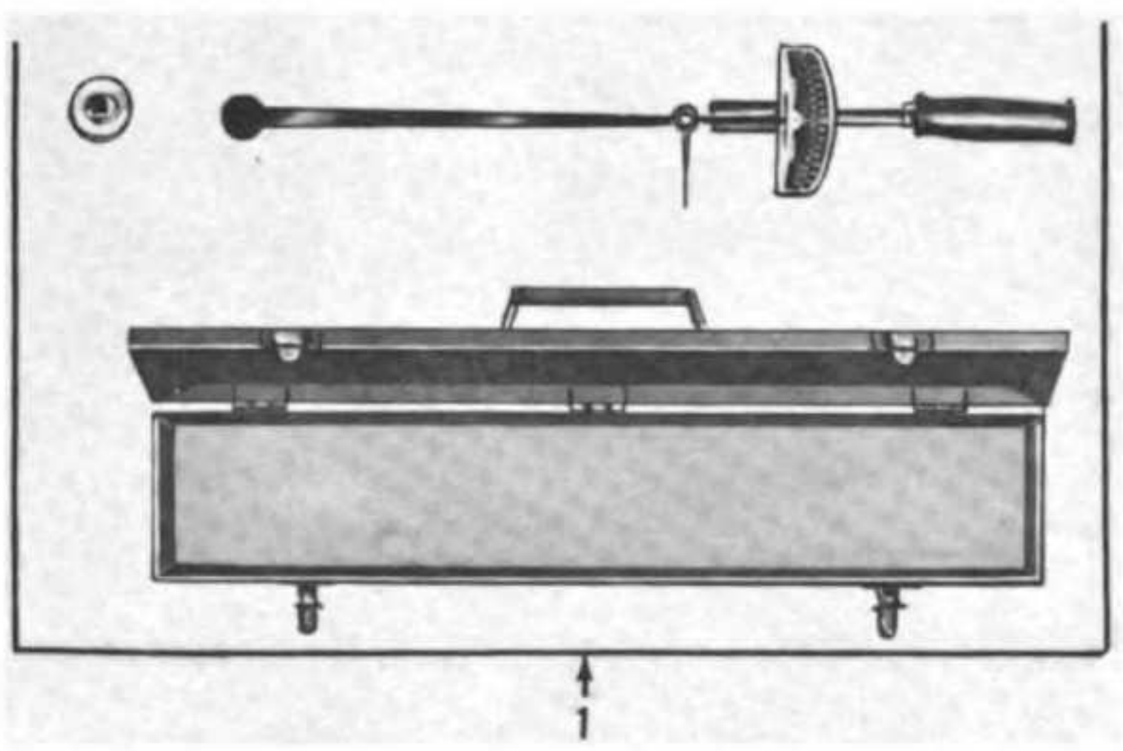

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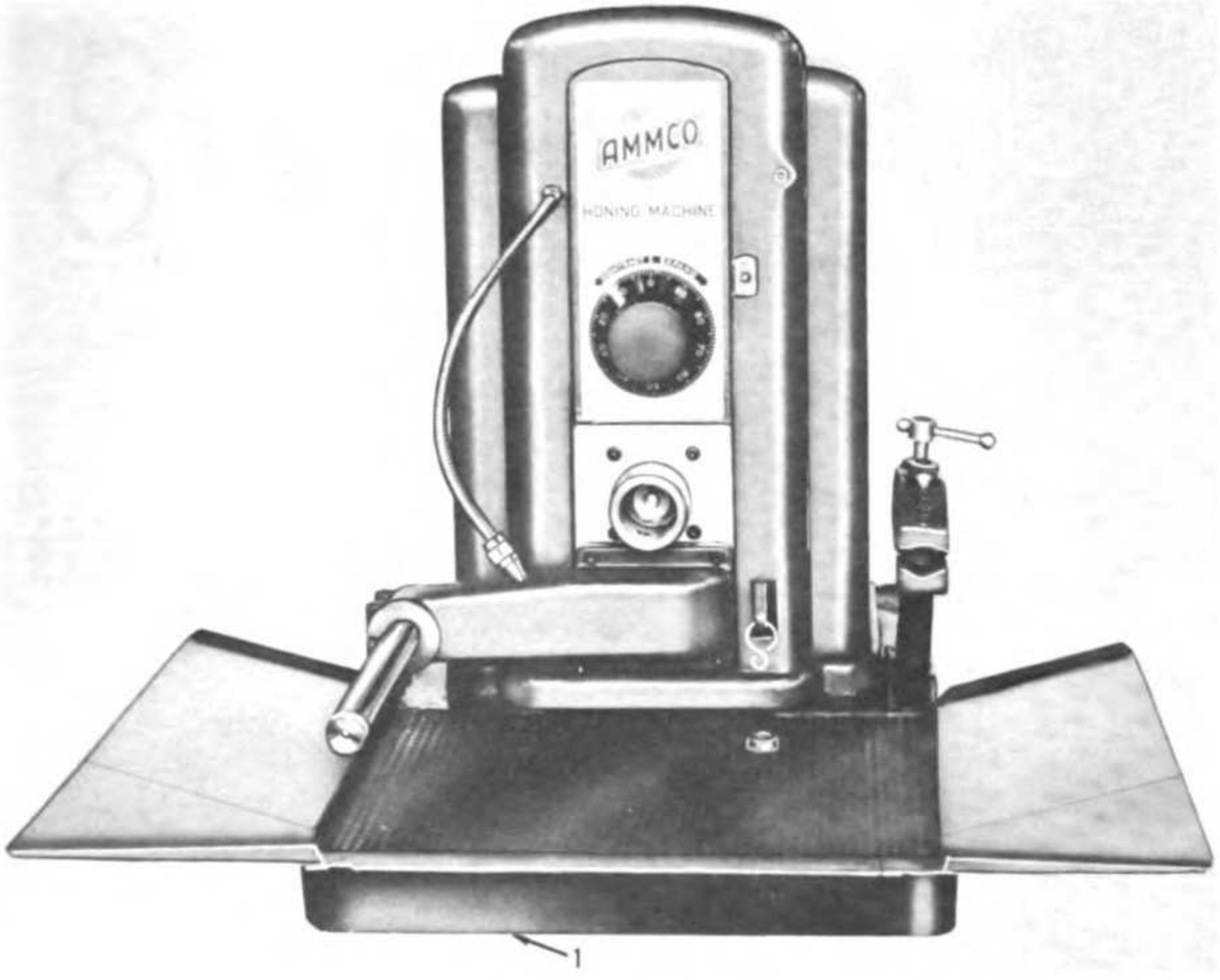

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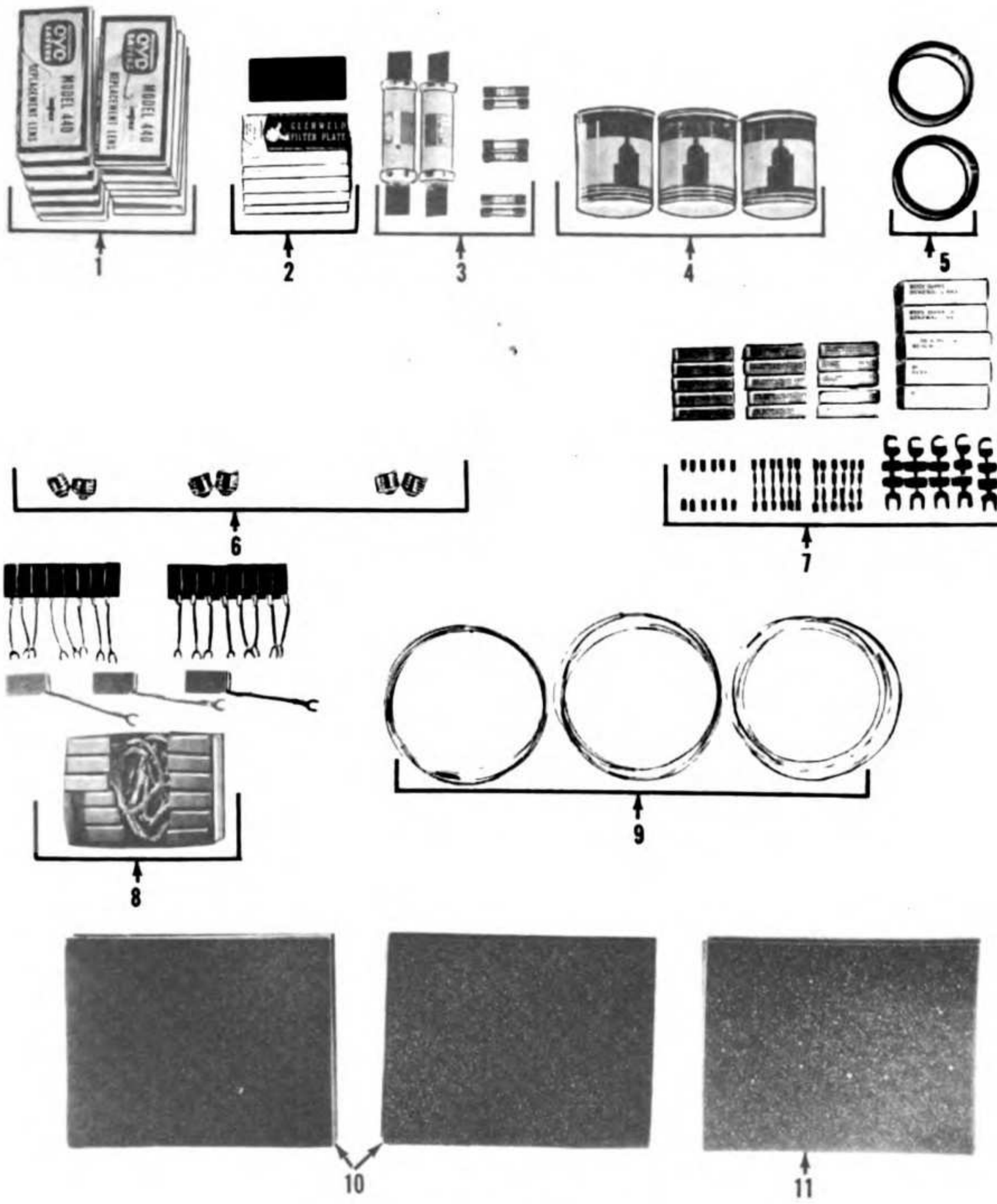

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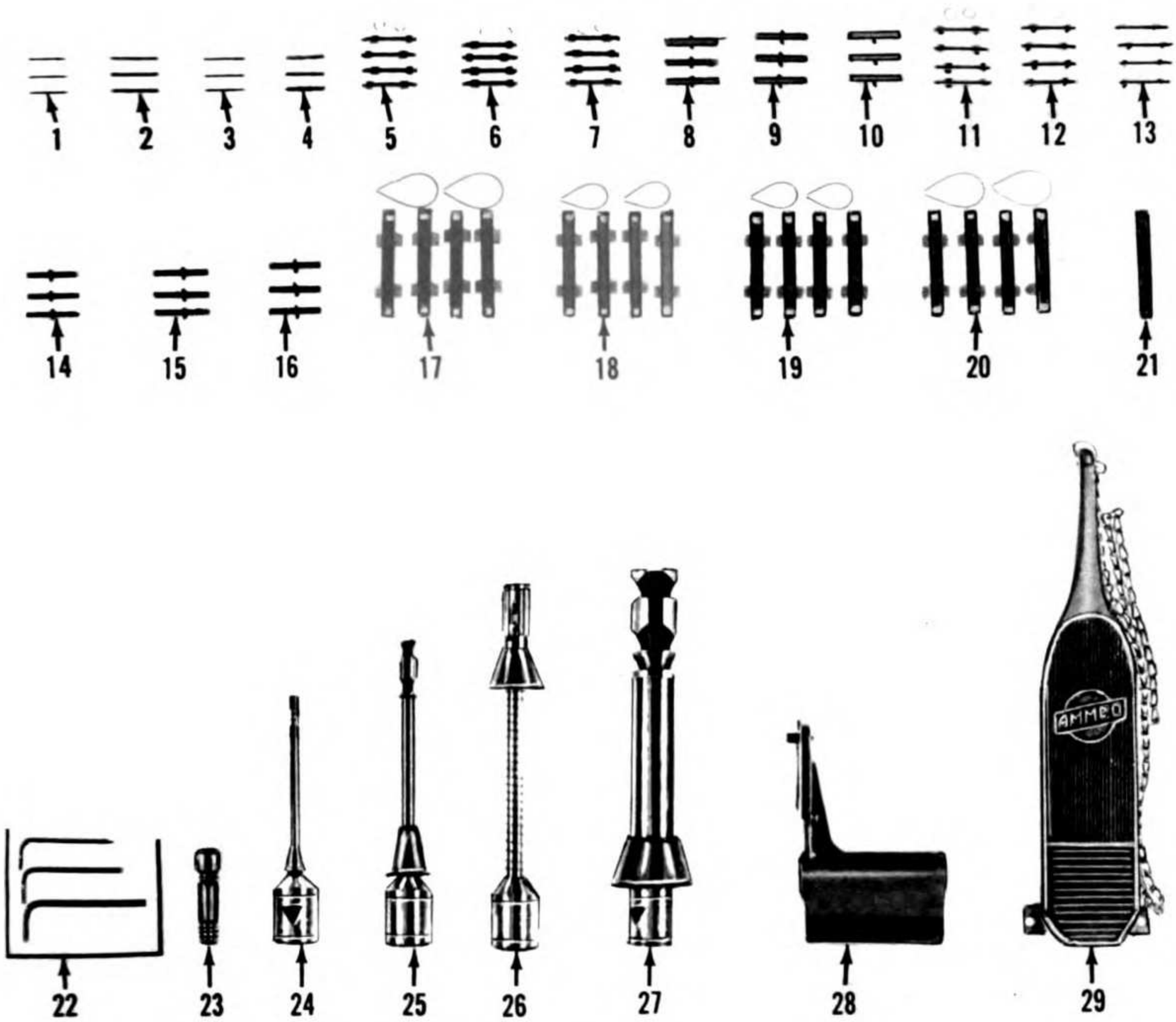

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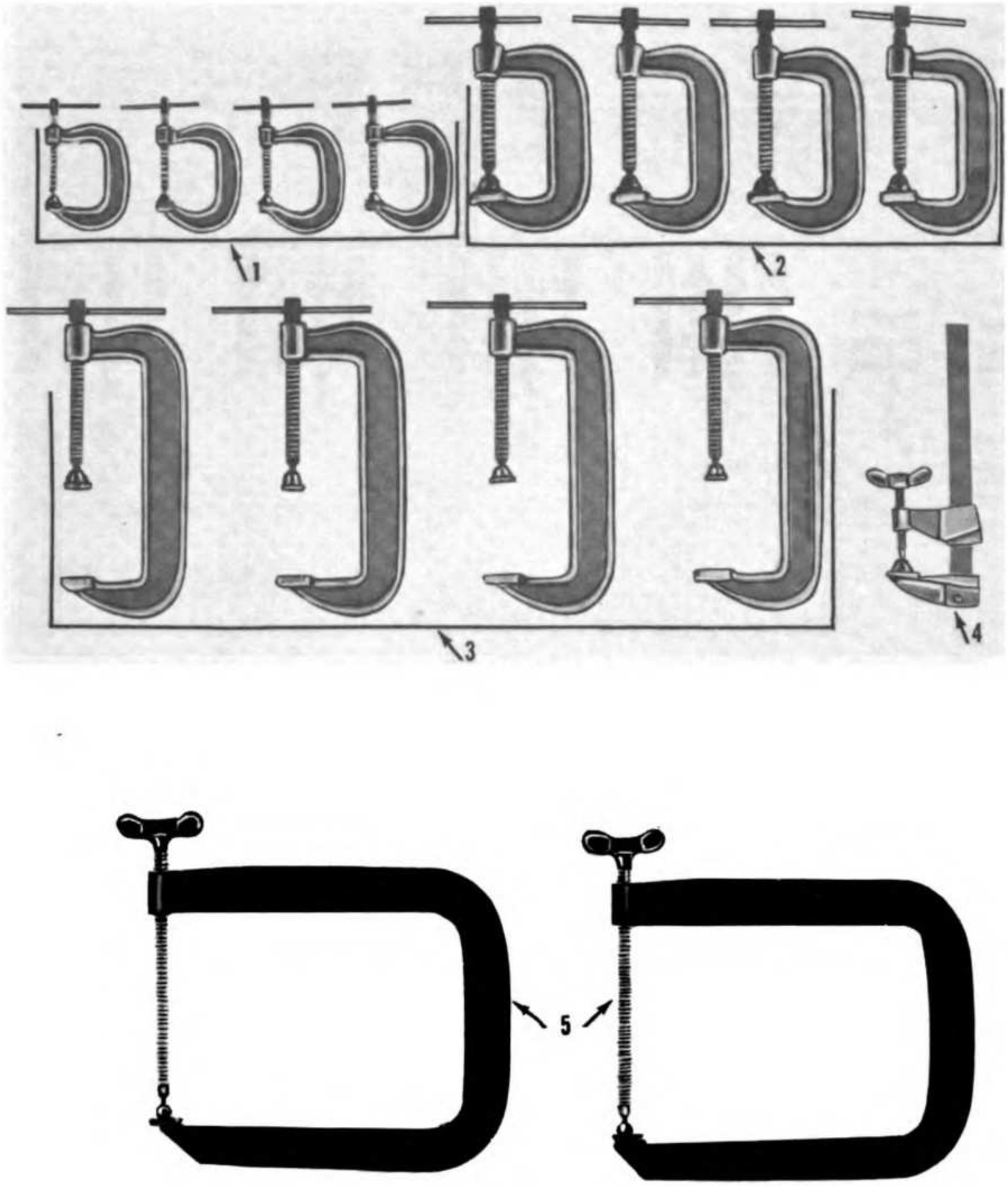

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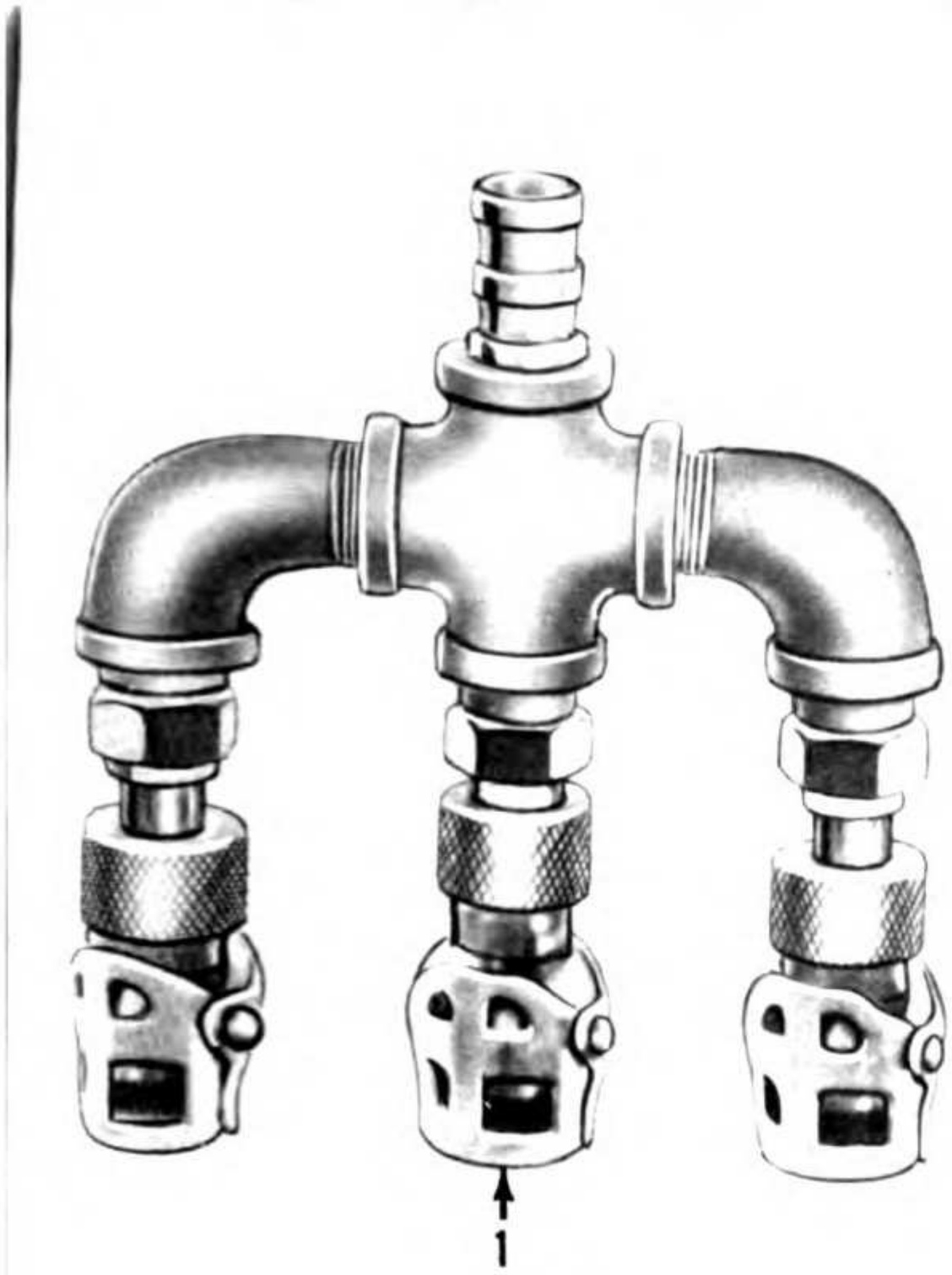

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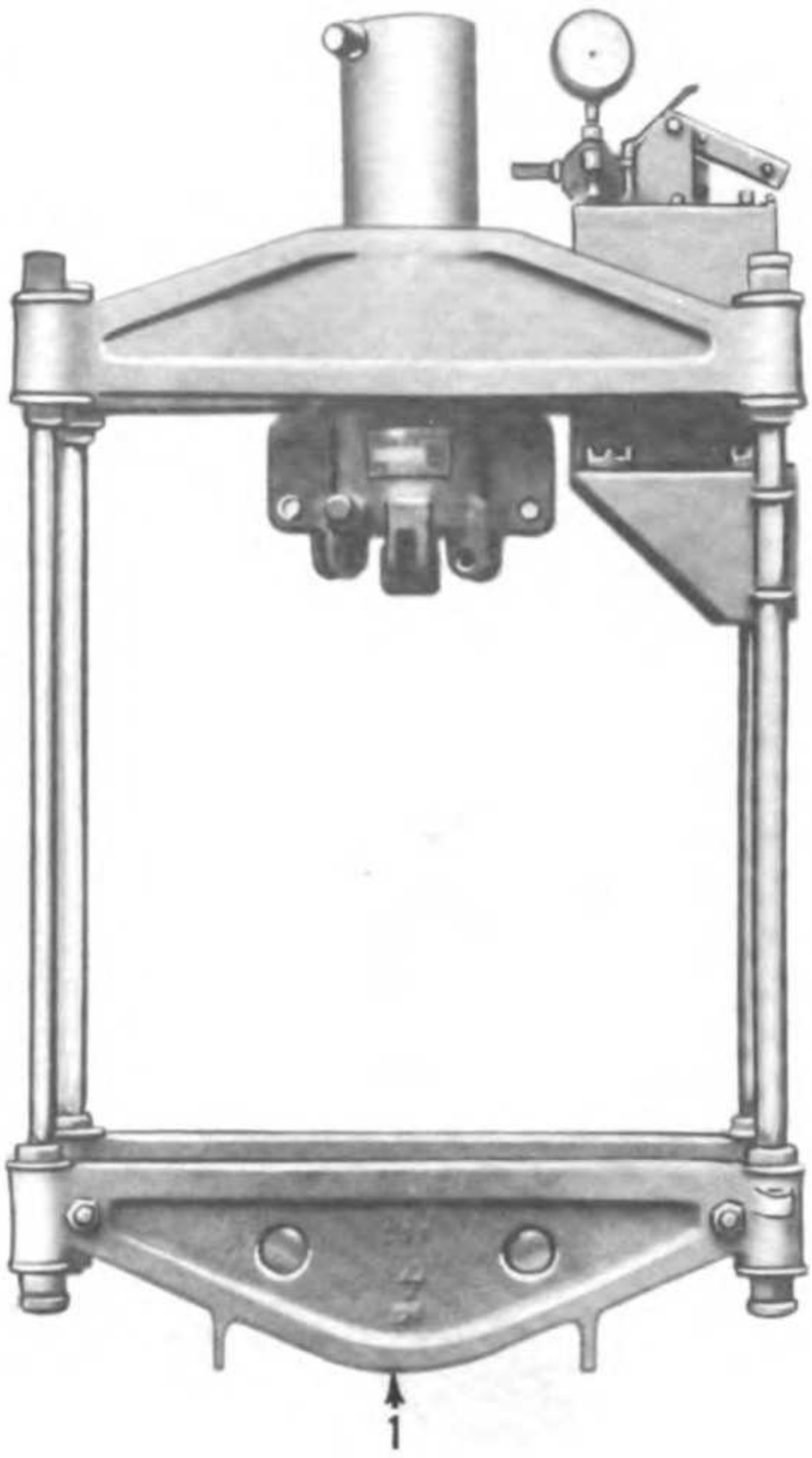

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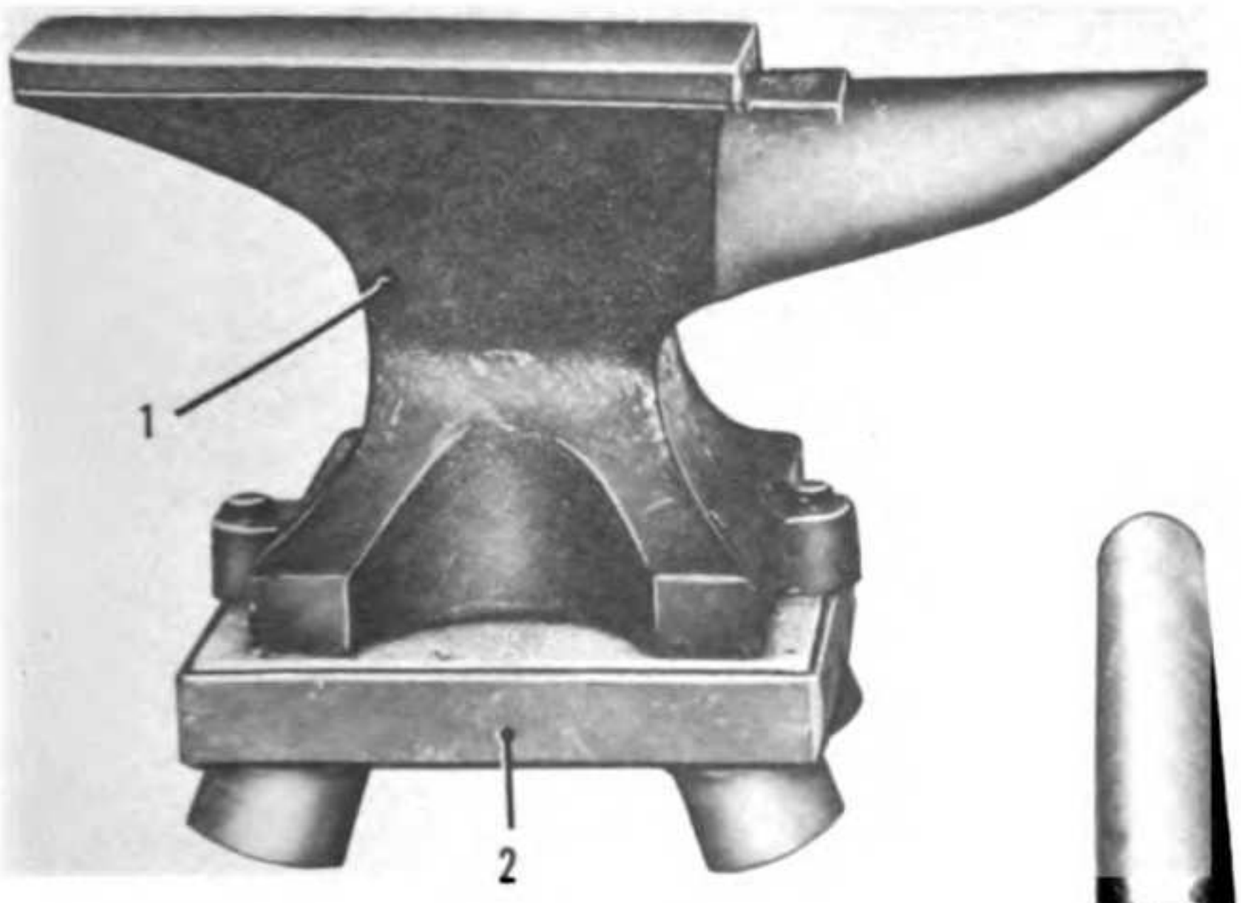

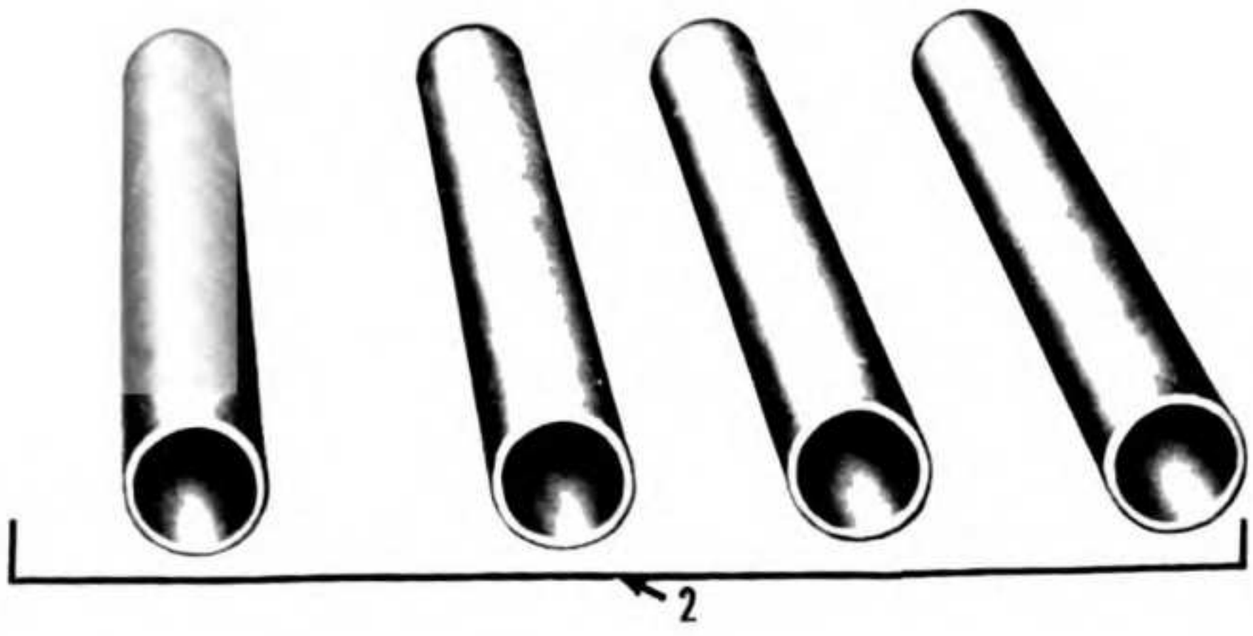

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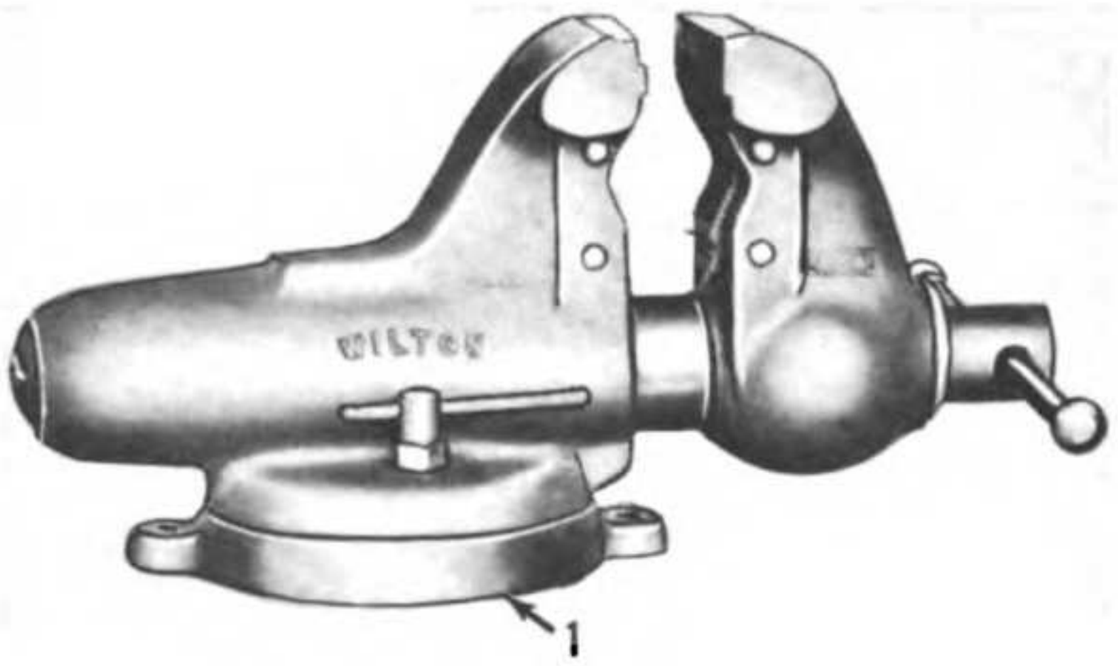

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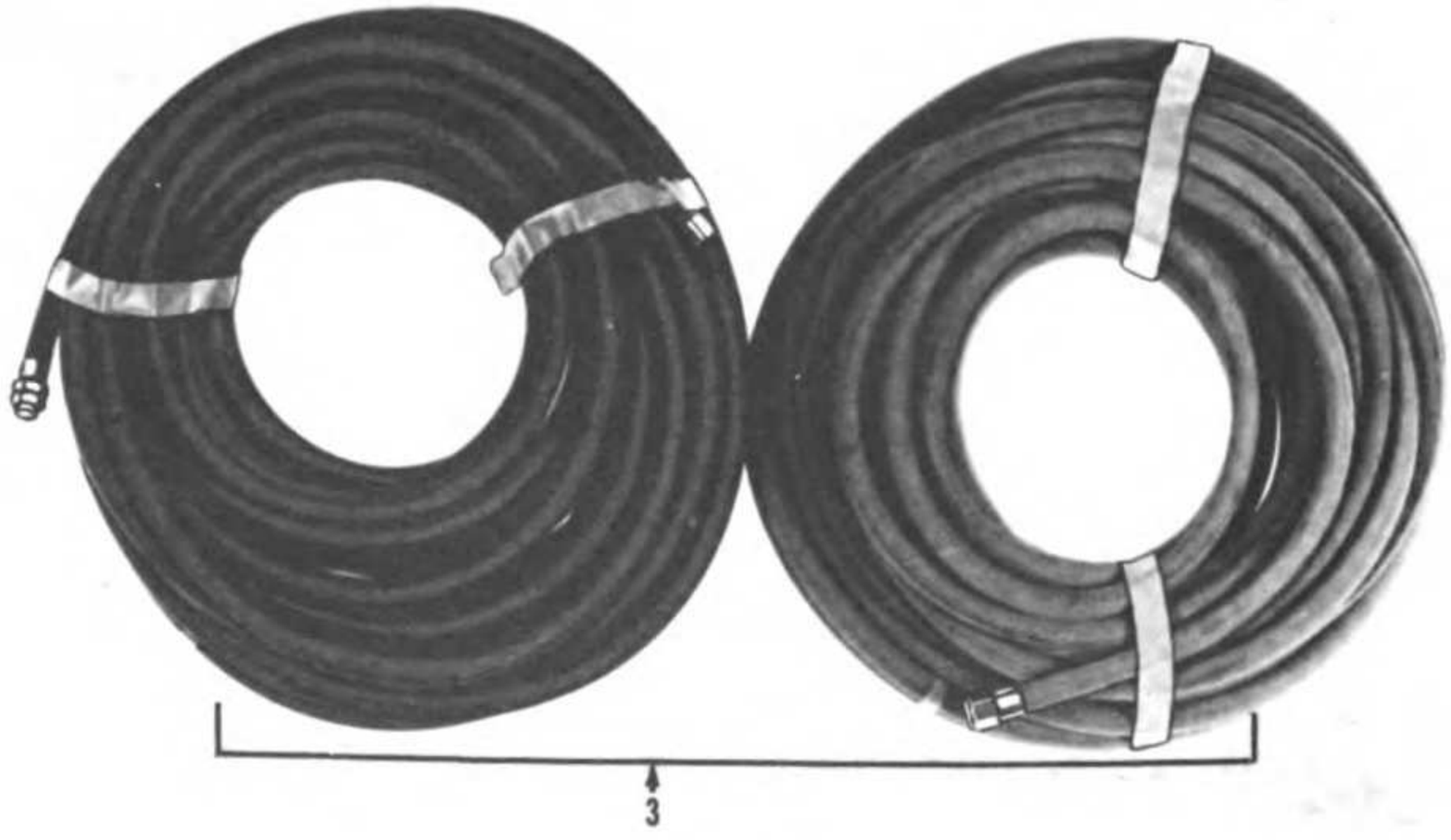

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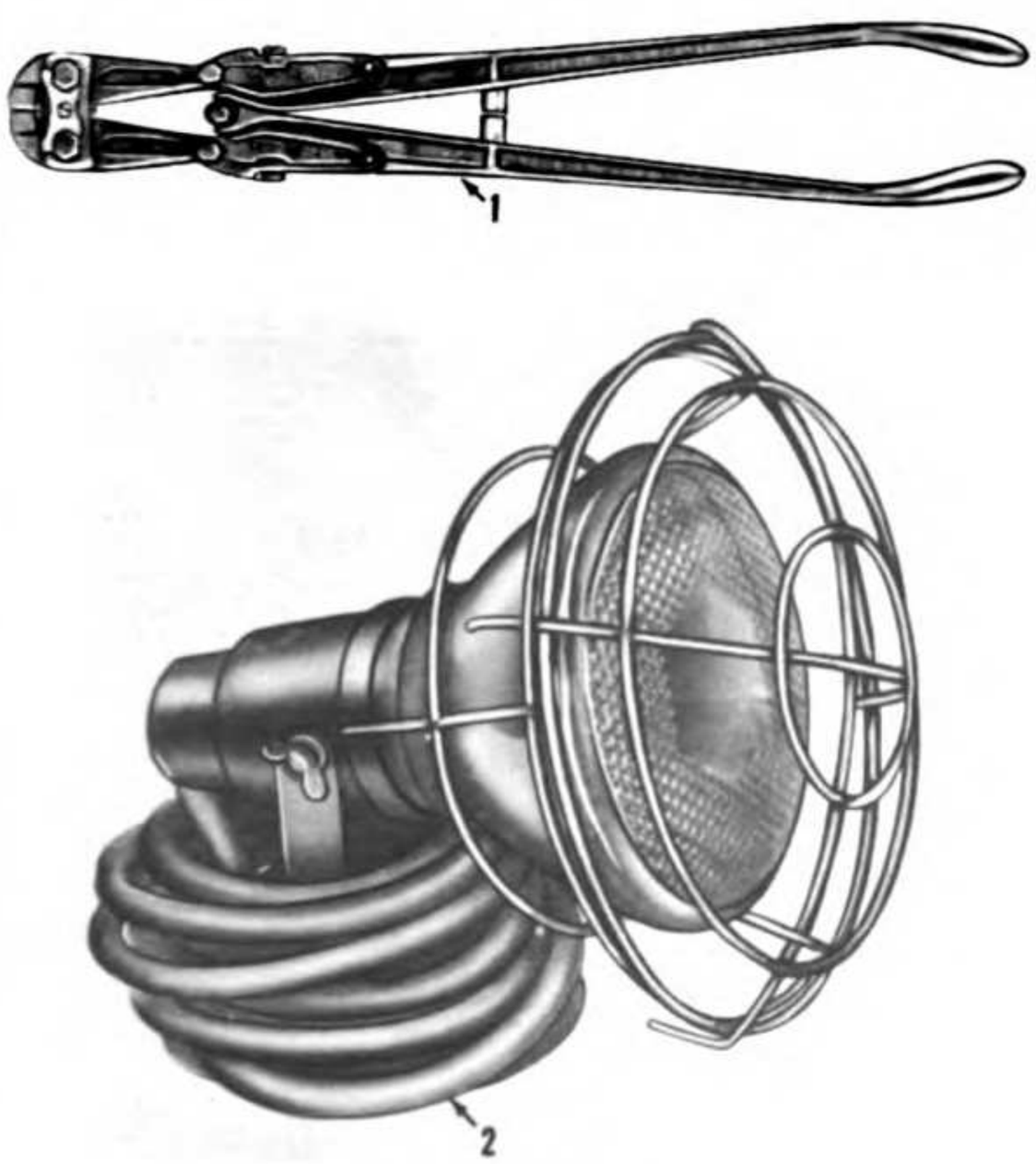


Figure 320.

Figure 321.

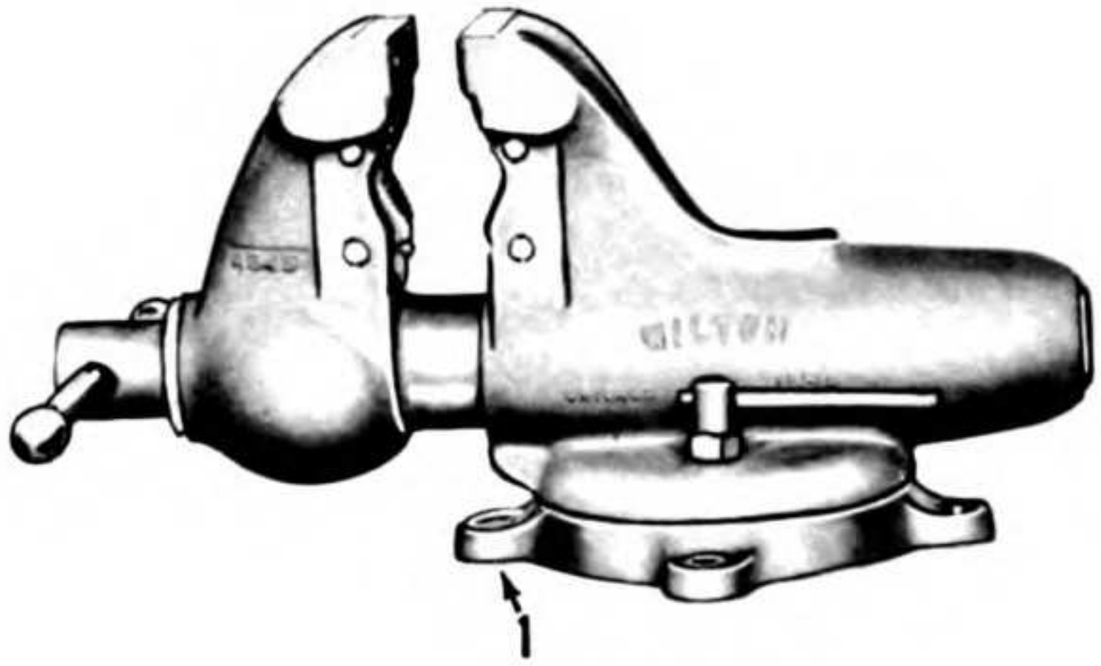
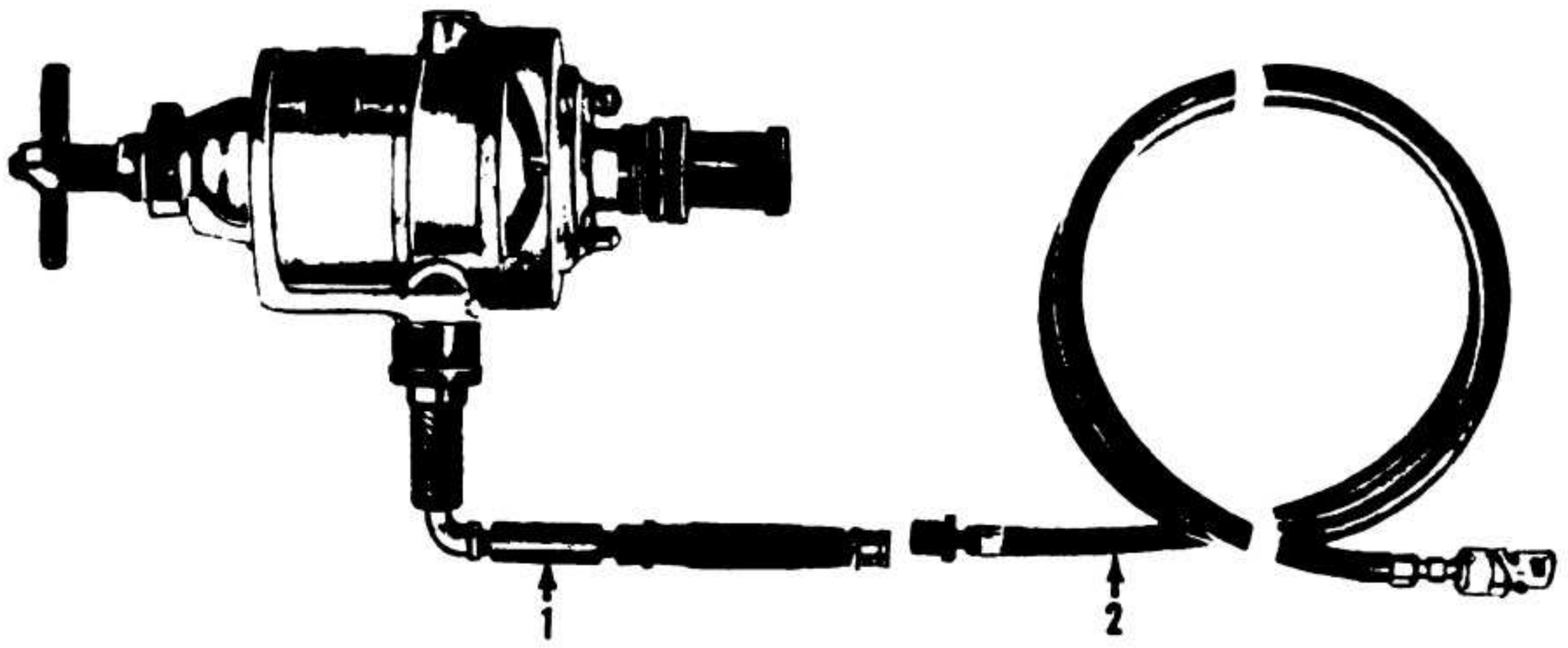


Figure 322.



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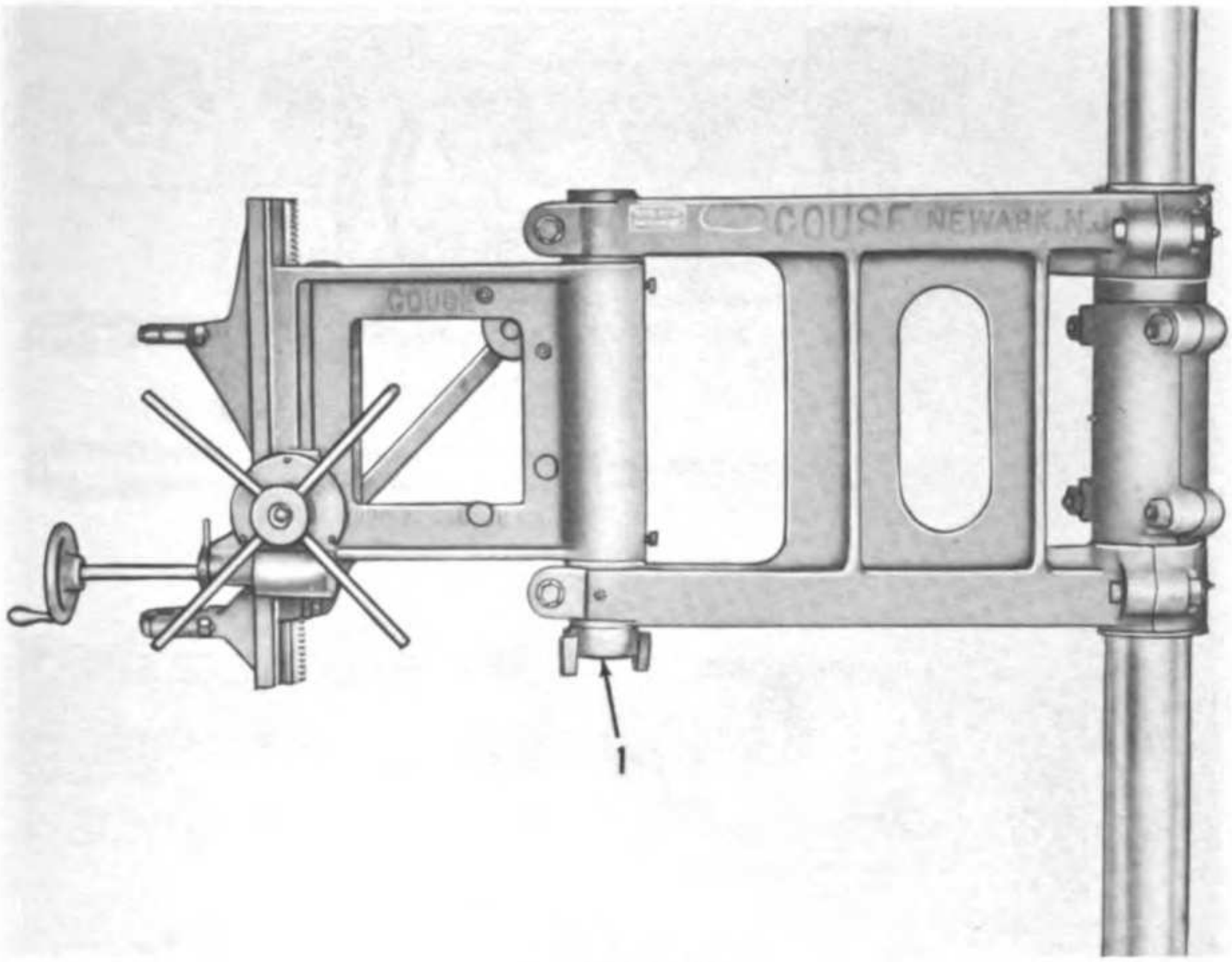

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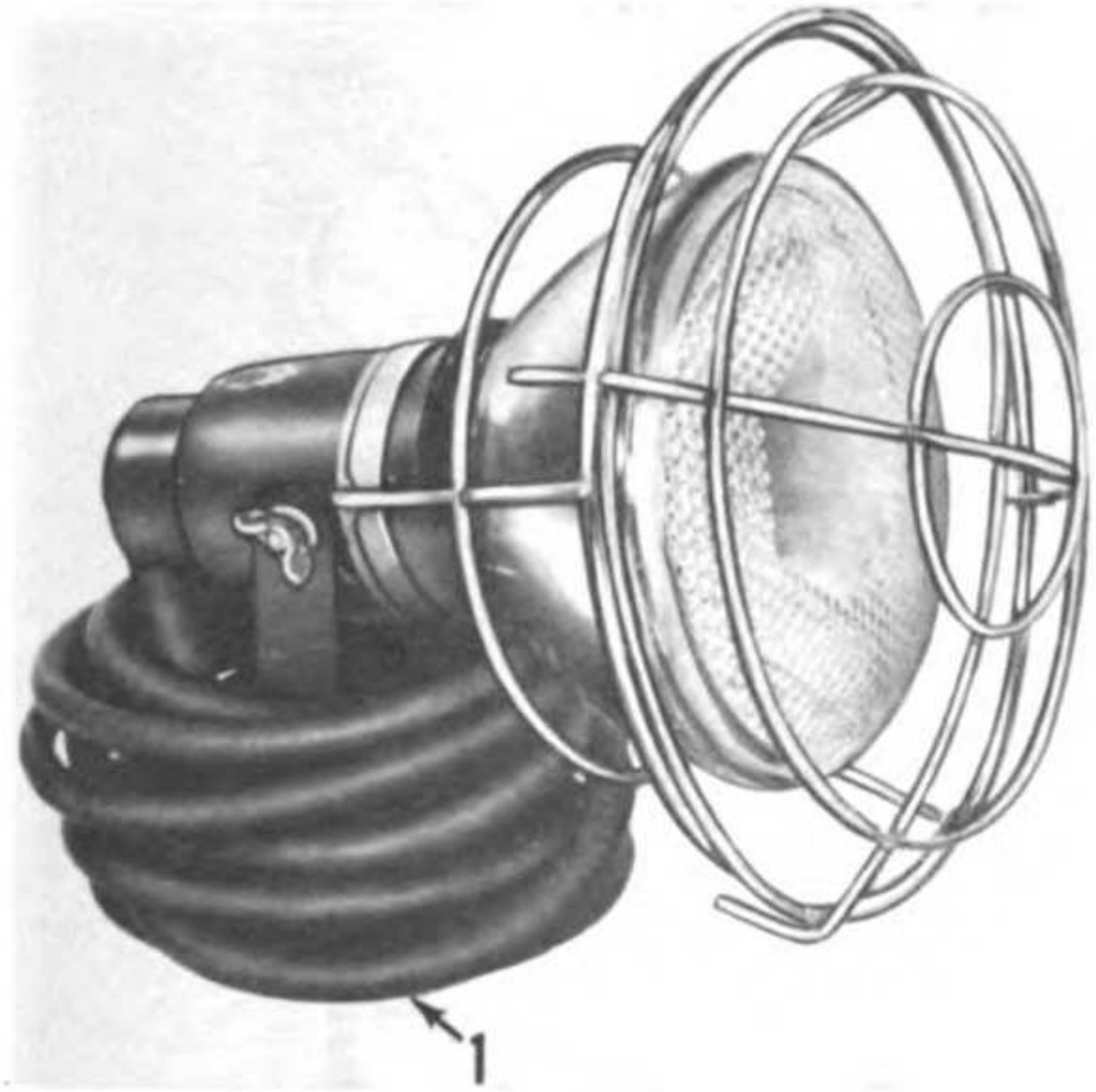

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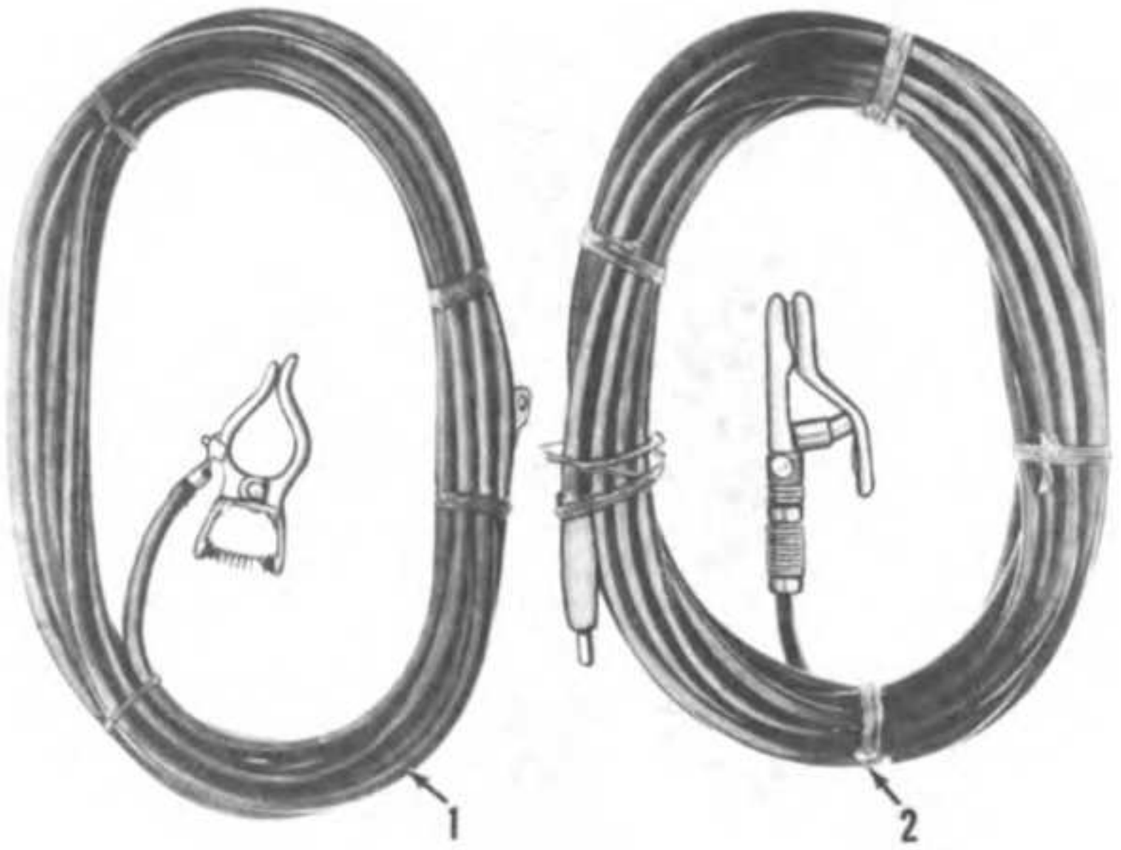

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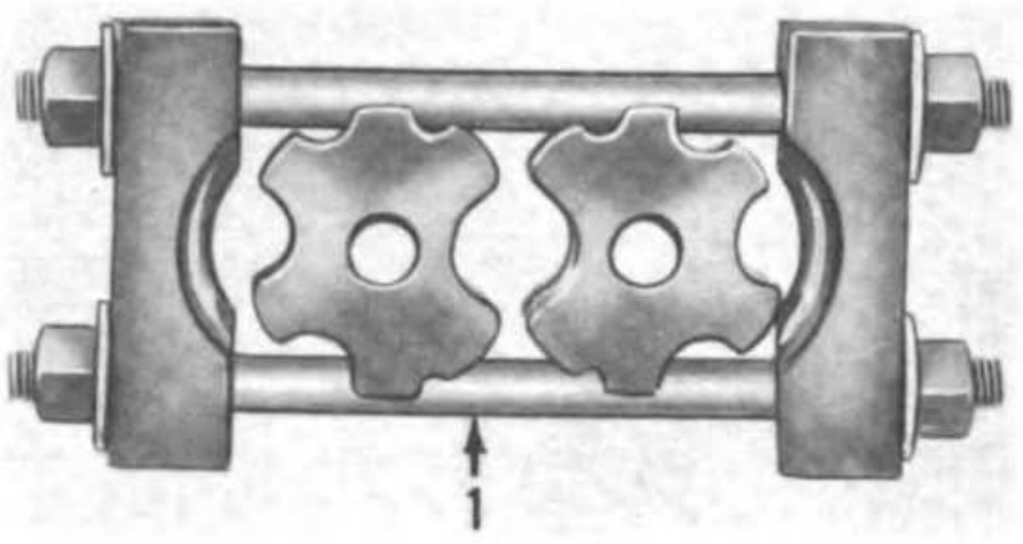

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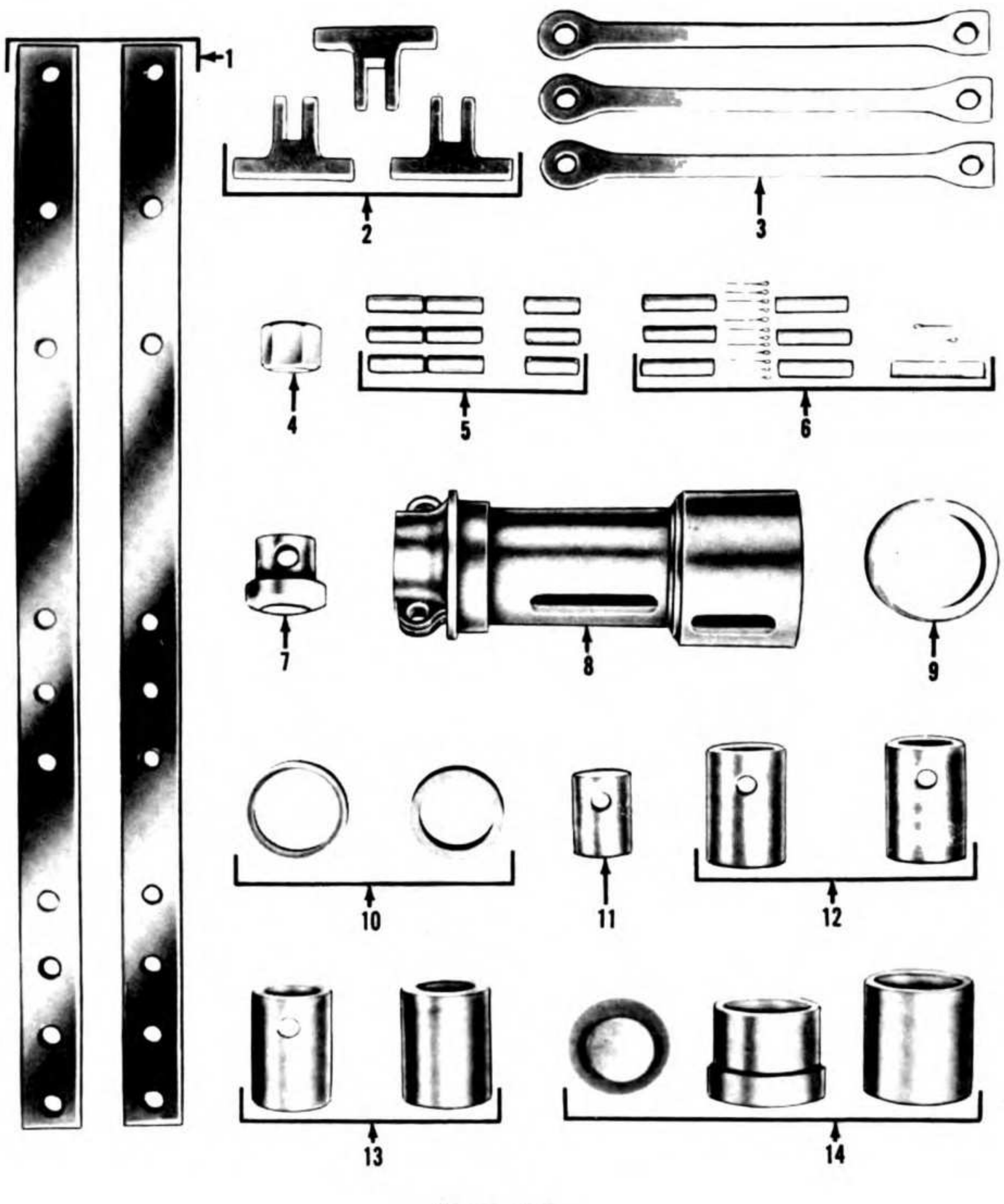

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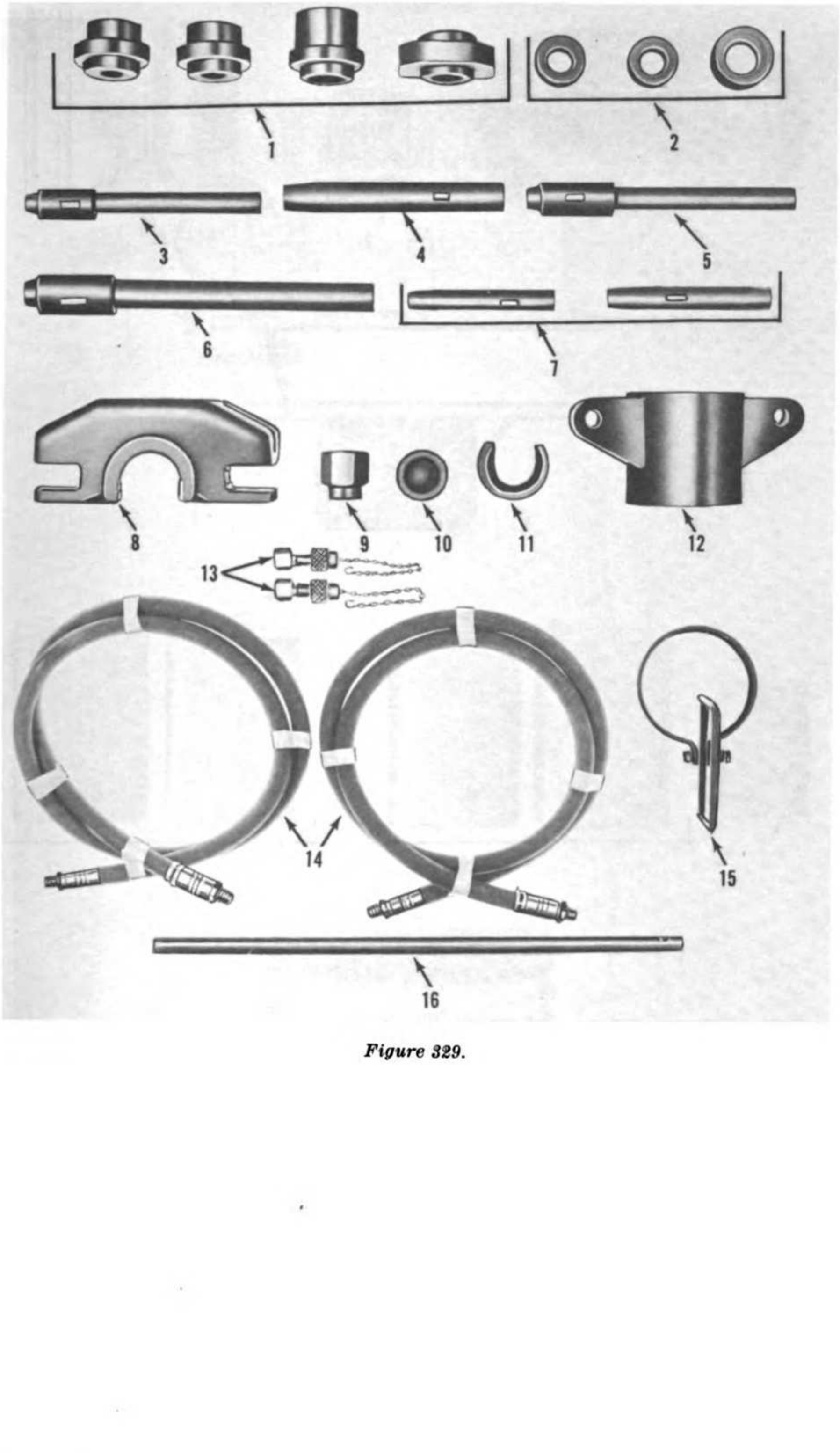

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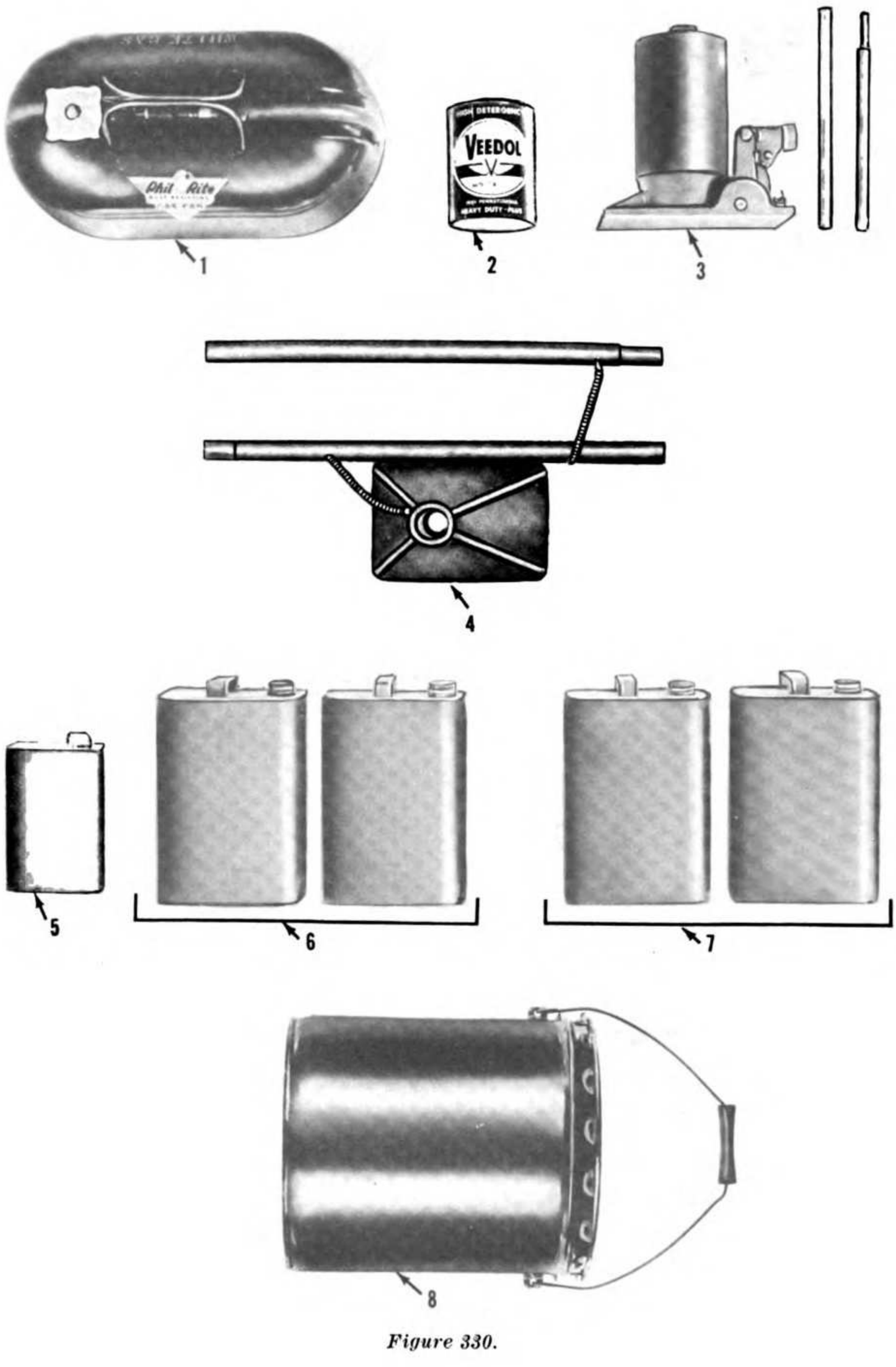

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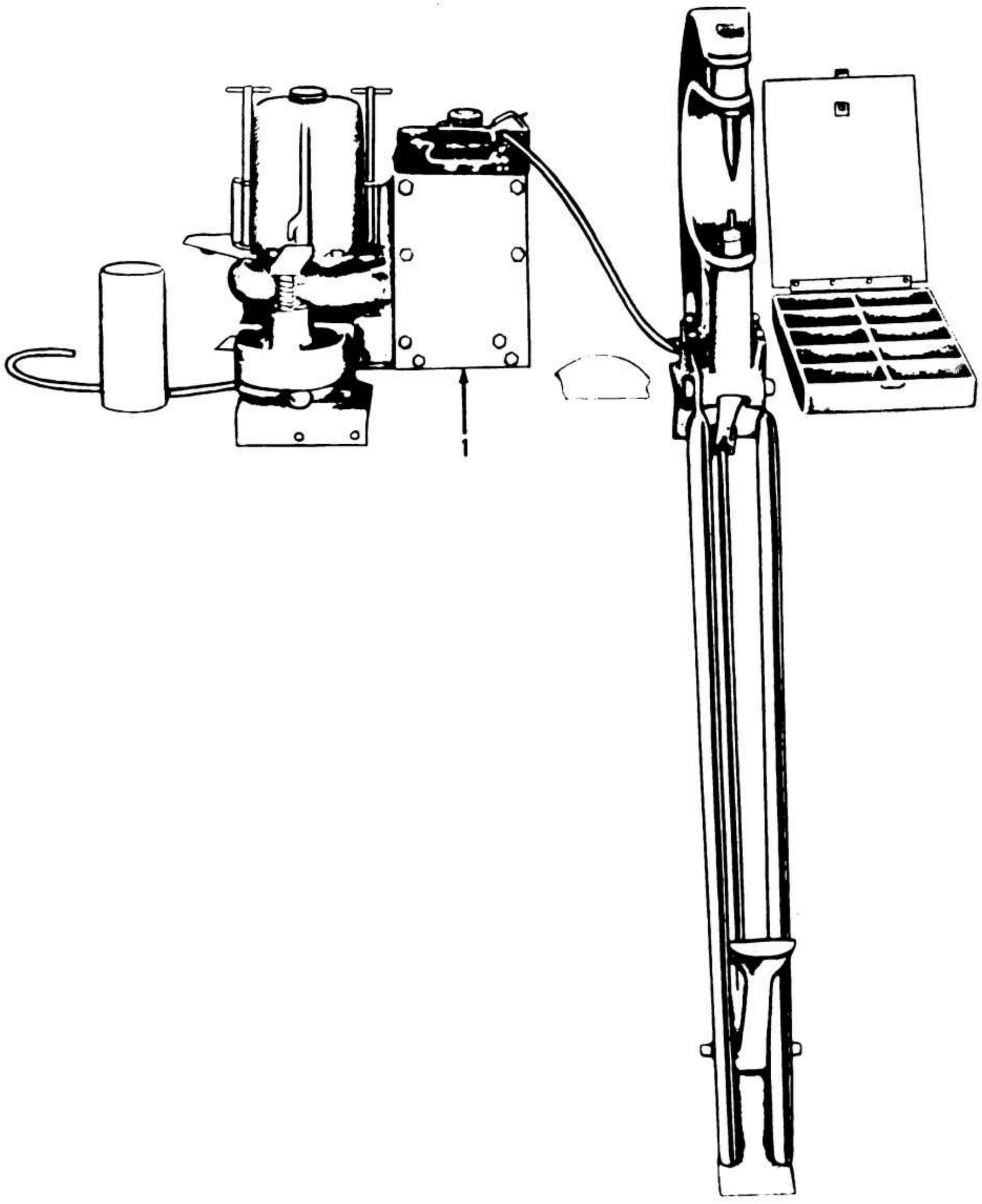

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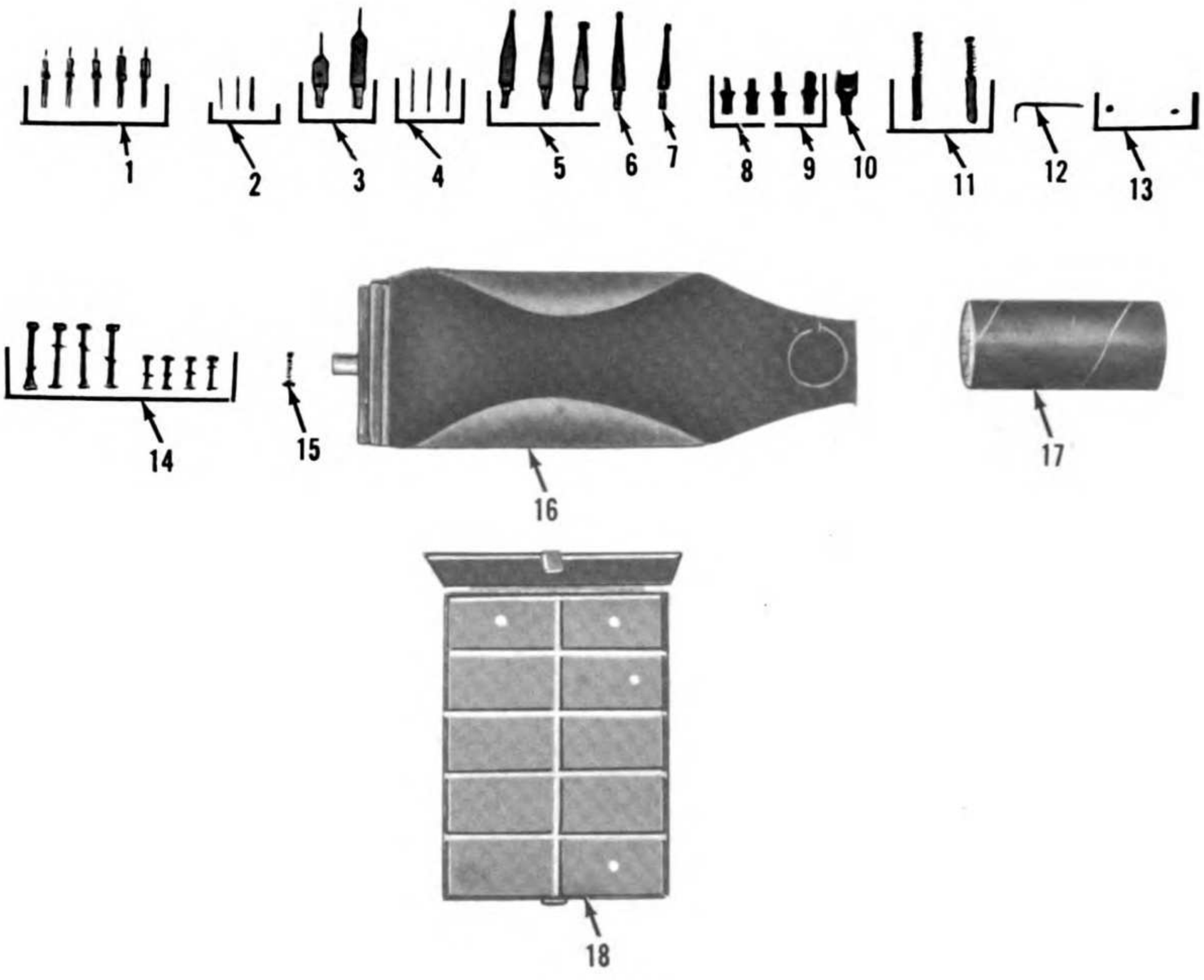

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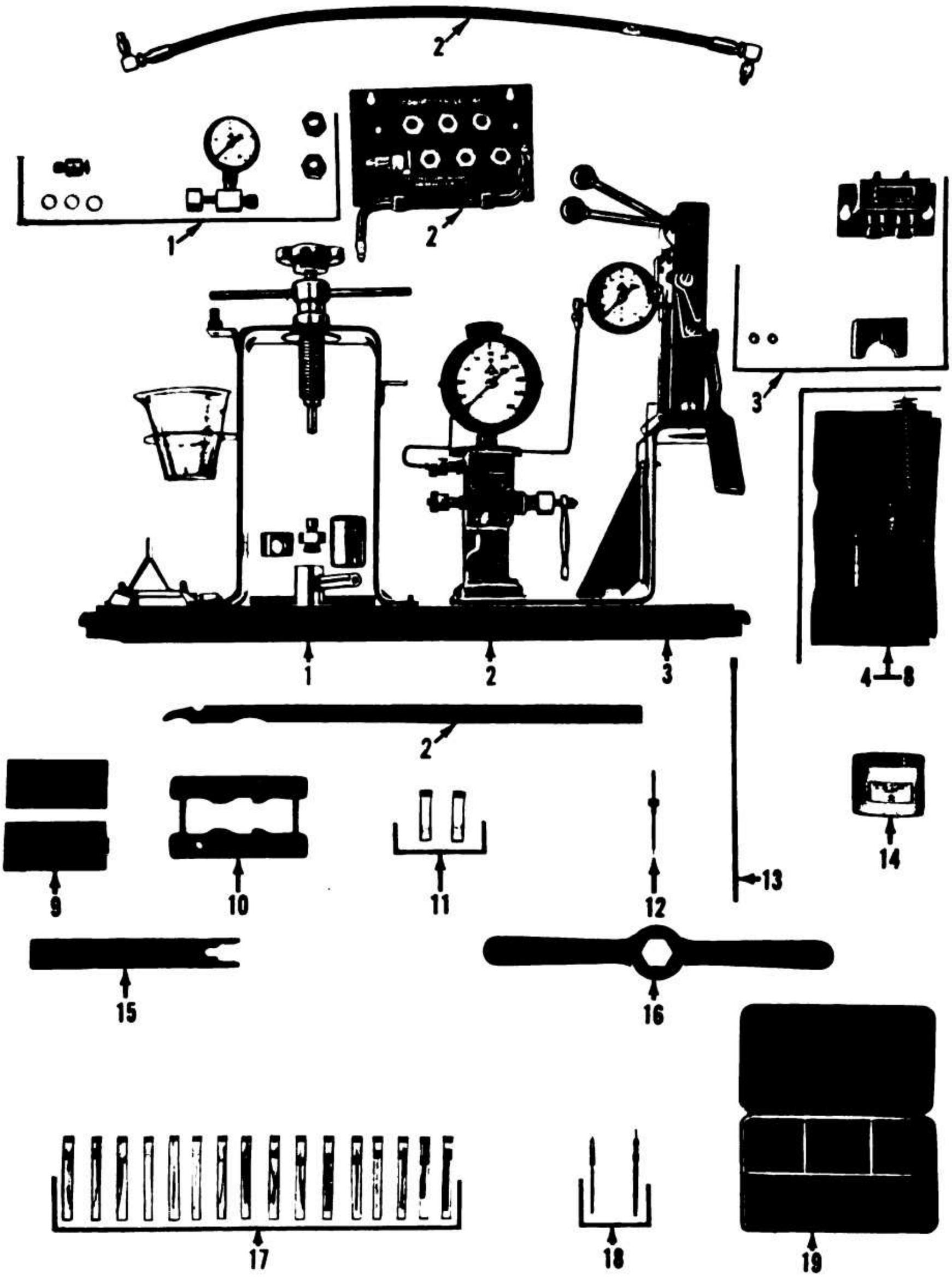
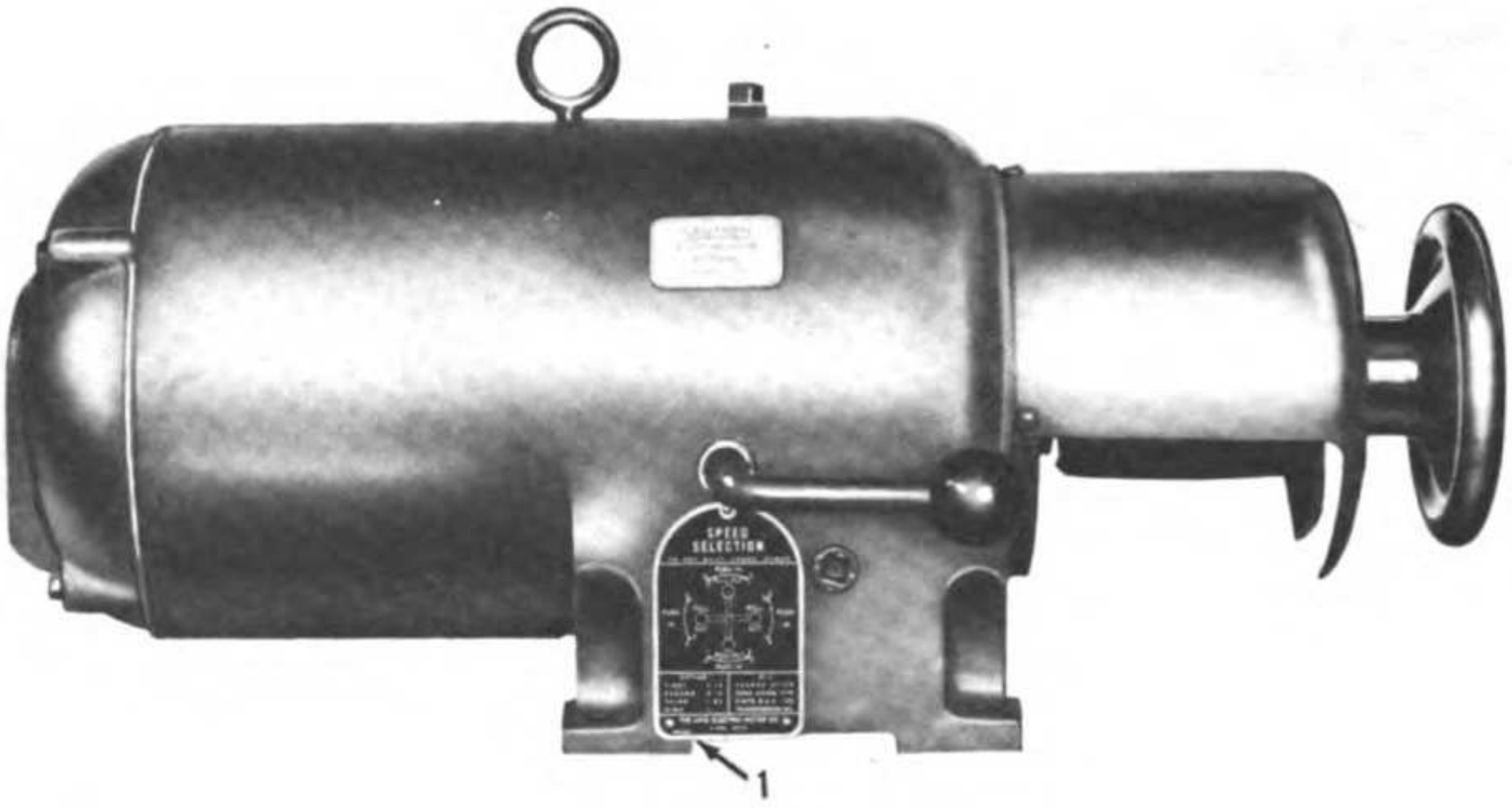


Figure 333.



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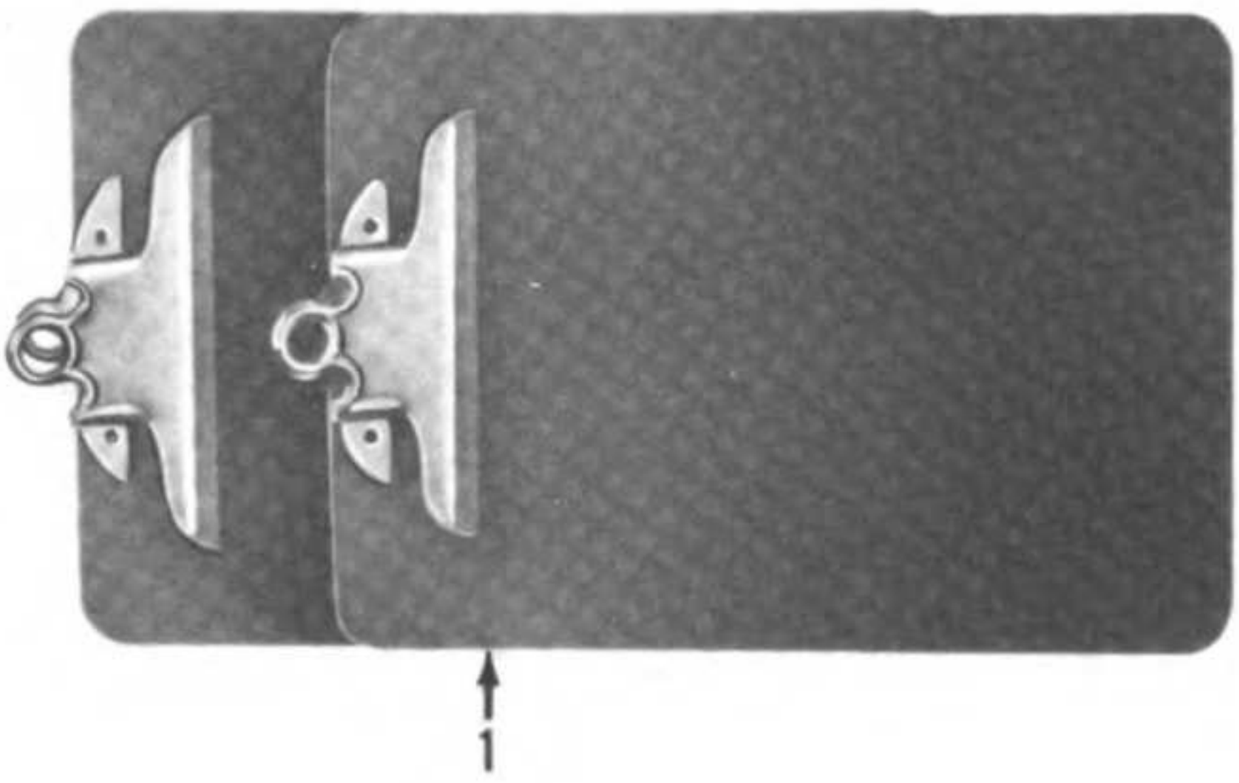

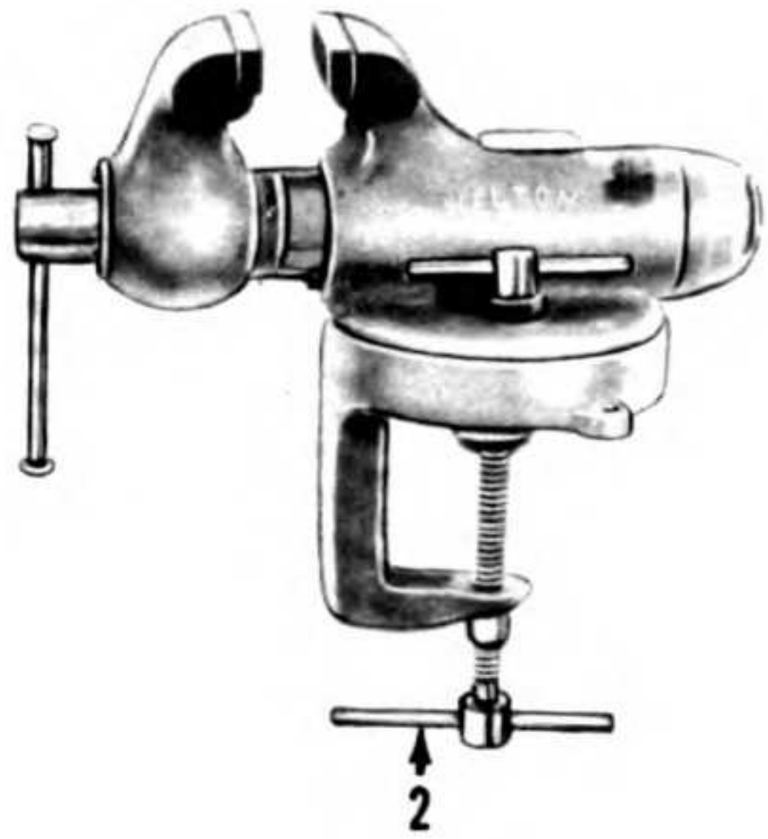

Figure 335.

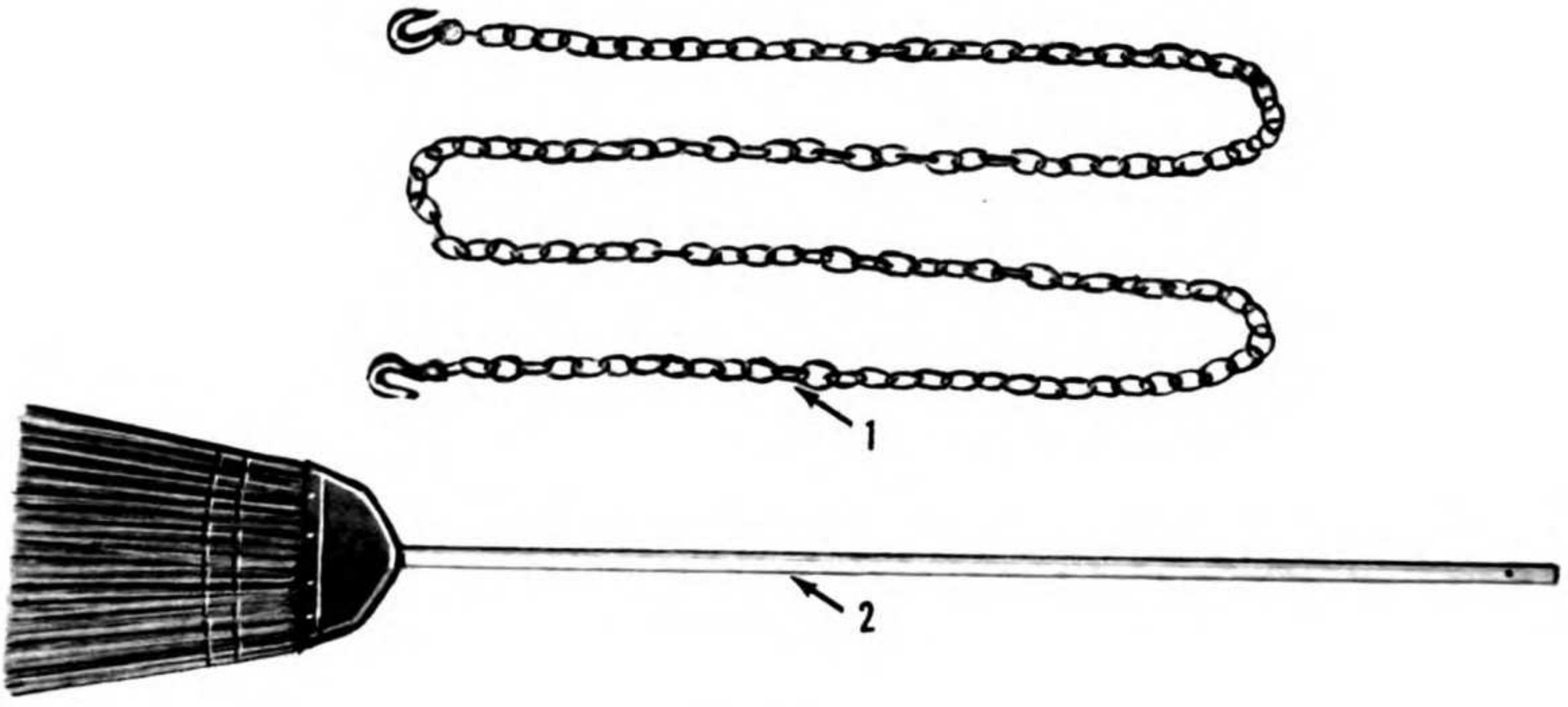

Figure 336.

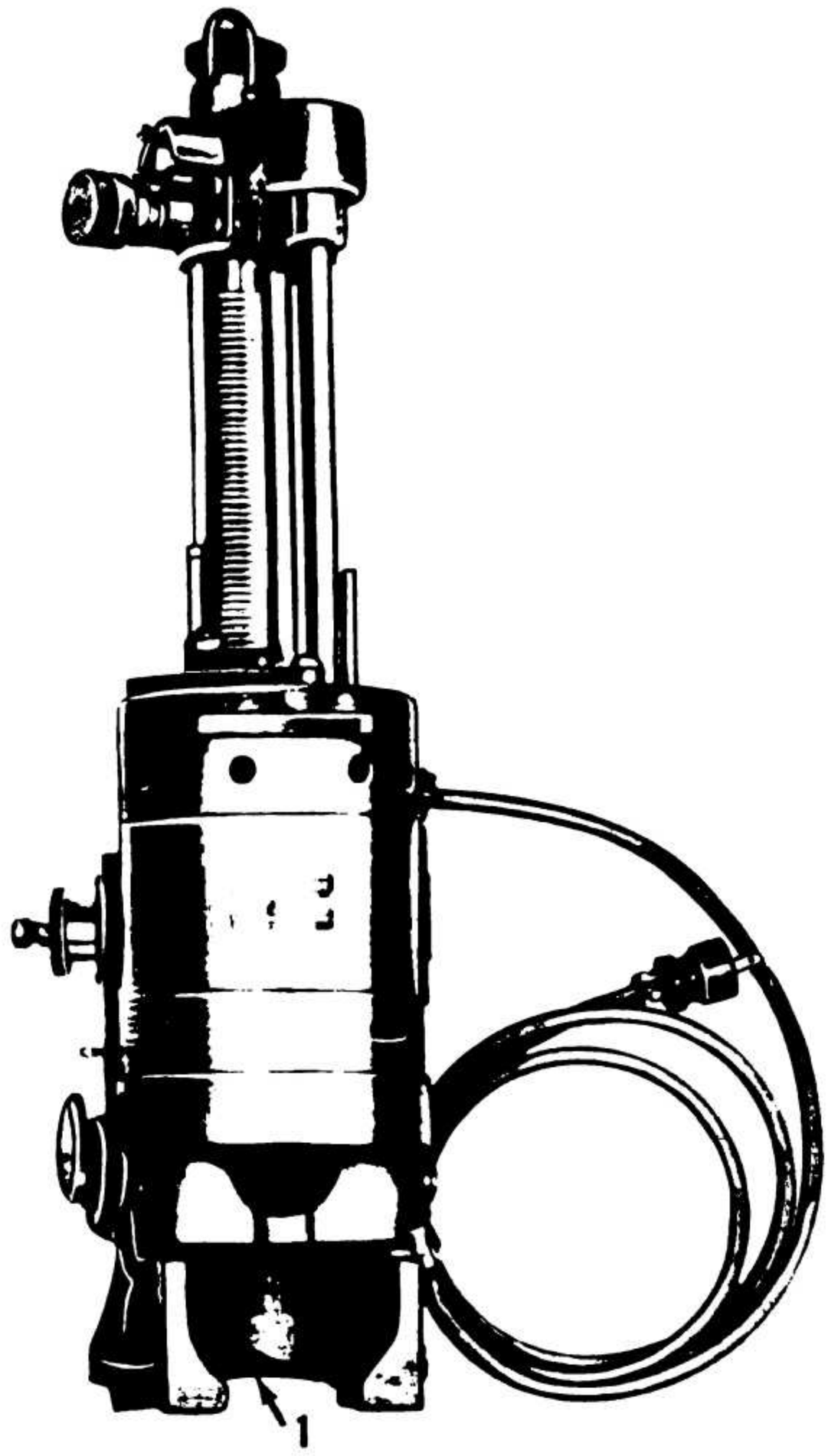

Figure 337.

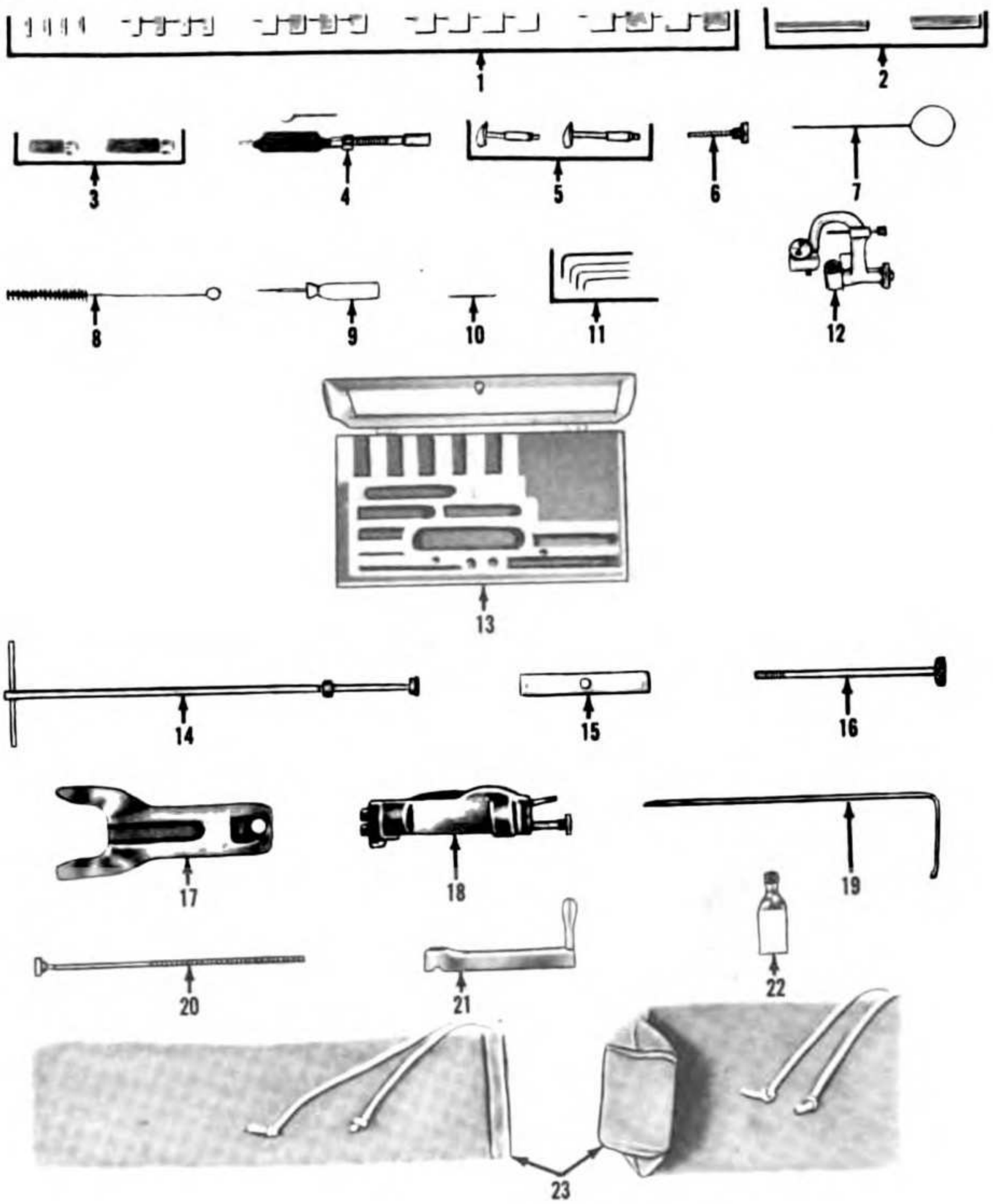

Figure 338.

Fig. No.	Index No.	Description	Shop location
		MISCELLANEOUS	
216	1	Extension, cord, 50-feet, set of two	1–A
	2	Cable, emergency, 50 feet	1–A
	3	Lamp, electric, trouble, 110 volts, 50 watts, 35-foot cord, set of two	1–A
217	1	Hydrometer, antifreeze	2–A
	2	Hydrometer, storage battery, 1.130 to 1.310 specific gravity range	2–A
	3	Oiler, ½ pint capacity	2–A
	4	Level and plumb, carpenter's metal, 18 inches	2–A
	5	Square, carpenter's, steel, 16 x 24 inch blade	2–A
		SPRAY GUN ACCESSORIES	
218	1	Needle, fluid FF	3–A
	2	Needle, fluid D	3–A
	3	Tip, fluid FF	3–A
	4	Tip, fluid D	3–A
	5	Cap, air, No. 30	3–A
	6	Cap, air, No. 306	3–A
		MISCELLANEOUS	
		Lamp, adjustable arm (not illustrated)	4–A
		LATHE ACCESSORIES	
219	1	Oiler, ½ pint capacity	1–B
	2	Rope, braided, ½ inch, 10 feet long	1–B
	3	Gears, transposing	1–B
	4	Bar, knockout, steel, ⅞ x 36 inches	1–B
		AIR TANK	
		Tank, air, built into body (not illustracted)	2–B
		BLOWER	
		Blower, ventilating (not illustrated)	3–B
		MISCELLANEOUS	
		Lamp, adjustable arm (not illustrated)	4–B
220	1	Belt, V-type, set of six, size C	4–B
		LATHE ACCESSORIES	
221	1	Gears, transposing, metric thread cutting, set of six with canvas bag, 29, 37, 55, 56, 57 and 58 teeth	5–B

Fig. No.	Index No.	Description	Shop location
		MASTER MECHANICS KIT	
222	1	Wrench, socket only, ⅜ inch square drive, 12 point opening, set of ten, 5/16 to 13/16 inch	1–C
	2	Wrench, socket only, ⅜ inch square drive, 12 point opening, deep, set of seven, ½ to ⅞ inch	1–C
	3	Joint, socket wrench, ⅜ inch square drive	1–C
	4	Socket, screwdriver, pilot, ⅜ inch square drive, ½ inch blade	1–C
	5	Bar, socket wrench, extension, ⅜ inch square drive, 6 inches long	1–C
	6	Bar, socket wrench, extension, ⅜ inch square drive, 3 inches long	1–C
	7	Handle, sliding T, ⅜ inch square drive, 8 inches long	1–C
	8	Ratchet, reversible, ⅜ inch square drive, 6 inches long	1–C
	9	Handle, hinged, ⅜ inch square drive, approx. 10 inches long	1–C
	10	Bar, socket wrench, extension, ⅜ inch square drive, 11 inches long	1–C
	11	Speeder, crank type, ⅜ inch square drive, 16 inches long	1–C
	12	Wrench, socket only, ½ inch square drive, 12 point opening, set of twelve, 7/16 to 1 inch	1–C
	13	Joint, socket wrench, ½ inch square drive	1–C
	14	Bit, socket wrench, drag link, ½ inch square drive, ¾ inch blade	1–C
	15	Adapter, socket wrench, square drive, male end ¾ inch, female end ½ inch	1–C
	16	Bar, socket wrench, extension, ½ inch square drive, approx. 5 inches long	1–C
	17	Bar, socket wrench, extension, ½ inch square drive, approx. 10 inches long	1–C
	18	Handle, socket wrench, sliding T, ½ inch square drive, approx. 14 inches long	1–C
	19	Handle, socket wrench, ratchet, reversible, ½ inch square drive, approx. 10½ inches long	1–C
	20	Handle, socket wrench, hinged, ½ inch square drive, approx. 16 inches long	1–C
	21	Bar, cross, socket wrench, 11½ inches long, ⅜ inch stock	1–C
	22	Handle, socket wrench, speeder, brace type, ½ inch square drive, approx. 18 inches long	1–C

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		MASTER MECHANICS KIT—Con.	
222	23	Wrench, tappet, 15 degree, double head, open end, set of eight, two each of the following sizes: 7/16 x 1/2 inch, and 3/4 x 7/8 inch	1-C
	24	Wrench, engineer, 15 degree, double head, set of four, open end, spear head, 3/8 x 7/16 inch, 19/32 x 41/16 inch, 3/4 x 7/8 inch, and 15/16 x 1 inch	1-C
	25	Wrench, box, 12 point, half-moon pattern, 9/16 x 5/8 inch	1-C
	26	Wrench, box, 12 point, double offset pattern, set of two, 1/2 x 9/16 inch and 5/8 x 3/4 inch	1-C
	27	Chisel, machinist's, 3/4 inch bit, 5/8 inch hex., length 7 inches	1-C
	28	Pliers, diagonal cutting, 7 inch	1-C
	29	Pliers, water pump, 10 inch	1-C
	30	Hammer, machinist's, ball peen, 1 1/2 pound	1-C
223	1	Wrench, ignition, midget, 15 and 60 degree, set of nine, 13/64 x 15/64 inch, 7/32 x 1/4 inch, 15/64 x 13/64 inch, 1/4 x 7/32 inch, 9/32 x 5/16 inch, 5/16 x 9/32 inch, 11/32 x 3/8 inch, 3/8 x 11/32 inch, and 7/16 x 12 inch	1-C
	2	Wrench, socket only, 1/2 inch square drive, 12 point opening, extra deep, set of five, 13/16 to 1 1/8 inch	1-C
	3	Gage, thickness, U. S., 25 leaves, 3 5/8 inches long, .0015 to .035	1-C
	4	Gage, screw pitch, metric thread, 28 pitches, 0.25 to 2.50 inclusive	1-C
	5	Extractor, screw, set of 5 items, 3/16 to 3/4 inch	1-C
	6	Knife, electricians	1-C
	7	Rule, tape, steel, English, 72 inches, 16th and 32d graduations	1-C
	8	Pliers, ignition, 4 1/2 inch	1-C
	9	Pliers, flat, narrow nose, 6 inch	1-C
	10	Pliers, combination, slip joint, 6 inch	1-C
	11	Dresser, contact point, flexible abrasive stone	1-C
	12	Punch, pin, starter, 1/16 inch point, 4 inches long	1-C
	13	Punch, drive pin, single, 1/8 x 4 inches	1-C
	14	Punch, drive pin, single 1/4 x 4 inches	1-C
	15	Punch, prick, 3/8 x 5 1/2 inches	1-C
	16	Chisel, machinists, hand, 3.8 inch bit, 5/16 inch hex, 5 1/2 inches long	1-C
	17	Scriber, pocket, 2 7/8 inch blade	1-C
	18	Screwdriver, offset, 4 inches long, 1/4 inch tip	1-C
	19	Screwdriver, close quarter, 1 inch blade, 7/32 inch tip	1-C
223	20	Screwdriver, recessed screw, Phillips, 3 inch blade, No. 1 point	1-C
	21	Screwdriver, recessed screw, Phillips, 4 inch blade, No. 2 point	1-C
	22	Screwdriver, spark testing, 6 inch blade, 3/16 inch tip	1-C
	23	Screwdriver, common, 6 inch blade, 5/16 inch tip	1-C
	24	Screwdriver, common, 6 inch blade, 3/8 inch tip	1-C
	25	Screwdriver, common, 8 inch blade, 7/16 inch tip	1-C
224	1	Wrenches, Allen, setscrew, short arm series, set of eleven with canvas roll, .050 inch to 3/8 inch	1-C
	2	Wrench, socket, set, 1/4 inch square drive, seventeen items, metal box, two extension bars, hinged handle, ratchet handle, spinner handle, eight sockets 6 point opening 3/16 to 7/16 inch, three sockets 8 point opening 1/4 to 3/8 inch	1-C
	3	Drift, fiber rod, 1 inch diameter, 8 inches long, set of two	1-C
	4	Gage, tire pressure, 10 to 160 pounds	1-C
	5	Hammer, machinist, ball peen, 2 ounce	1-C
	6	Chisel, machinist, hand 7/8 inch bit, 3/4 inch hex, 8 inches long	1-C
	7	Chisel, rivet buster, hand, 3/8 inch bit, 3/4 inch diameter, 12 inches long	1-C
	8	Bar, pry, 18 inch	1-C
	9	Punch, center, octagon, single, 5/8 x 6 inches	1-C
	10	Punch, taper, 9/16 x 14 inches	1-C
	11	Scraper, bearing, hollow ground, set of three, 3, 3 1/2, and 4 inch blade	1-C
225	1	Wrench, set, box and open end, 12 point box, 15 degree both ends, set of thirteen wrenches and leatherette roll, 3/8 x 3/8, 7/16 x 7/16, 1/2 x 1/2, 9/16 x 9/16, 5/8 x 5/8, 11/16 x 11/16, 3/4 x 3/4, 13/16 x 13/16, 7/8 x 7/8, 15/16 x 15/16, 1 x 1, 1 1/4 x 1 1/4 and 1 1/2 x 1 1/2 inches	1-C
	2	Grinder, valve and valve seat, hand-operated, grinder type w/suction cup	1-C
	3	Compound, valve grinding, coarse and fine, 4 oz. two compartment can	1-C
	4	Compressor, piston ring, hand-type w/ratchet, 3 1/2 to 7 inch	1-C
	5	Puller, stud, 1/4 to 3/4 inch	1-C
	6	Knife, putty, 1 1/4 x 3 1/2 inch blade	1-C

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		MASTER MECHANICS KIT—Con.	
225	7	Scraper, carbon, flexible, 9 inches long	1–C
	8	Chest, tool, master mechanic's, steel, 24 x 11⅝ x 9⅝ inches	1–C
		FILE SET	
226	1	File, American Standard, saw, slim taper, single cut, 6 inch	2–C
	2	File, American Standard, single cut, smooth, 8 inch	2–C
	3	File, American Standard, round, double cut, bastard, 8 inch	2–C
	4	File, American Standard, saw, slim, taper, single cut, 8 inch	2–C
	5	File, American Standard, saw, slim taper, 8 inch	2–C
	6	File, American Standard, saw, cross-cut, 8 inch	2–C
	7	File, American Standard, lathe, flat, smooth, 10 inch	2–C
	8	File, American Standard, half round, double cut, 2d cut, 8 inch, set of two	2–C
	9	File, American Standard, single cut, smooth, 12 inch	2–C
	10	File, American Standard, square, bastard, 12 inch, set of two	2–C
	11	File, American Standard, round, double cut, bastard, 12 inch	2–C
	12	File, American Standard, flat, single cut, bastard, 12 inch	2–C
	13	File, American Standard, half round, double cut, 2d cut, 12 inch, set of two	2–C
	14	File, American Standard, lathe, flat, 12 inch	2–C
	15	File, American Standard, round, double cut, bastard, 14 inch	2–C
	16	File, American Standard, round double cut, bastard, 16 inch	2–C
	17	File, American Standard, flat, single cut, bastard, 16 inch	2–C
		LATHE ACCESSORIES	
227	1	Mandrel, lathe, expanding, set of three, 1½ to 2 inch, 2 to 2¾ inch and 2¾ to 3¾ inch	3–C
		ELECTRIC SANDER KIT	
228	1	Adapter, abrasive wheel	4–C
	2	Wrench, Allen, ⅜ inch	4–C
	3	Sander, electric, portable disk type, 7 inch diameter	4–C
	4	Disk, aluminum oxide, 7 inch diameter, ⅞ inch hole, No. 16 grit, set of four	4–C
	5	Disk, aluminum oxide, 7 inch diameter, ⅞ inch hole, No. 24 grit, set of four	4–C
	6	Disk, aluminum oxide, 7 inch diameter, ⅞ inch hole, No. 40 grit, set of four	4–C
	7	Disk, aluminum oxide, 7 inch diameter, ⅞ inch hole, No. 80 grit, set of four	4–C
	8	Wheel, abrasive, 7 inch diameter x ¼ inch thickness x ⅞ inch hole, No. 24 grit	4–C
		VOLT-OHMMETER TESTER	
229	1	Tester, volt-ohmmeter for ac and dc current	5–C
230	1	Washer, lock, assorted, No. 4 to ⅞ inch, box of 1,000	1–D
	2	Pin, taper, assorted, 00000 to No. 6 inclusive, box of 100	1–D
	3	Pin, cotter, assorted box of 400, 1/16 x ⅛ x 2 inches	1–D
		MACHINIST'S PRECISION TOOL KIT	
231	1	Threading set: Bolt and Screw, 24 items:	1–E
		Box, wood.	
		Die, threading, NC., 13/16" O. D.:	
		Gage — *Threads*: 4 — 40; 6 — 32; 8 — 32; 10 — 24; 12 — 24	
		Die, threaded, NF., 13/16" O. D.:	
		4 — 48; 6 — 40; 8 — 36; 10 — 32; 12 — 28	
		Screwdriver	
		Stock, type 0, No. 1	
		Tap, hand, NC, taper:	
		4 — 40; 6 — 32; 8 — 32; 10 — 24; 12 — 24	

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
231		MACHINIST'S PRECISION TOOL KIT—Continued	
		Tap, hand, NF, taper:	
		Gage *Threads*	
		4 48	
		6 40	
		8 36	
		10 32	
		12 28	
		Wrench, tap, 1/16 to 1/4 inch.	
	2	Caliper, micrometer, inside, 1½ to 12 inches	1–E
	3	Indicator, dial, adjustable type, universal, range 0.20 inch	1–E
	4	Stone, sharpening, mounted, one side coarse, other side fine	1–E
	5	Book, reference, "American Machinists' Handbook"	1–E
	6	Reamer, carbon steel, straight shank, square end, taper pin, spiral flute, set of five, and wood box, Nos. 000000, 00000, 0000, 000, and 00	1–E
	7	Reamer, taperpin, carbon steel, straight shank, square end, spiral flutes, in set consisting of Nos. 00 to 5	1–E
	8	Level and plumb, carpenters, metal, nonadjustable, 12 inch	1–E
	9	Caliper and divider, maximum capacity 40 inches, w/ball point attachment w/4 ball points and holder	1–E
	10	Gage, surface, universal, 3 inch base, 9 inch spindle	1–E
	11	Blade, combination square, 18 inch	1–E
232	1	Caliper, spring, outside, set of 2, 3 inch and 6 inch	1–E
	2	Caliper, spring, inside, set of 2, 3 inch and 6 inch	1–E
	3	Caliper, hermaphrodite, adjustable point, 6 inch	1–E
	4	Divider, spring, 6 inch	1–E
233	1	Bit, tool, ¼ inch square, H. S. steel, set of 6	1–E
	2	Bit, tool, 5/16 inch square, H. S. steel, set of 28	1–E
	3	Bit, tool, 5/16 inch square, H. S. steel, ground, set of 6	1–E
	4	Bit, tool, ⅜ inch carbide, left, ⅜ x ⅜ x 2½ inches	1–E
	5	Bit, tool, ⅜ inch carbide, nose, ⅜ x ⅜ x 2½ inches	1–E
	6	Bit, tool, ⅜ inch carbide, right, ⅜ x ⅜ x 2½ inches	1–E
233	7	Bit, tool, ⅜ inch square, H. S. steel, set of 6	1–E
	8	Bit, tool, ½ inch square, H. S. steel	1–E
	9	Stone, sharpening, medium grit, ⅜ inch triangular x 4 inches long	1–E
	10	Dresser, contact point, flexible, abrasive stone	1–E
	11	File, swiss pattern, needle, in set, No. 2 cut, 5½ inch, 12 files, barrette, crossing, equaling, flat, half round, joint, knife marking, round, slitting, square and 3 square	1–E
234	1	Pigment, in oil, blue, prussion, non-drying, 2 ounce tube	1–E
	2	Vise, hand, hinged jaw, 1½ inch jaw x 1 inch opening	1–E
	3	Pliers, chain, round nose, without cutter, 6 inch	1–E
	4	Gage, screw pitch, metric thread, 28 pitches, 0.25 to 2.50 inclusive	1–E
	5	Gage, screw pitch, V-thread, 30 pitches, 4 to 42 inclusive	1–E
	6	Square, machinist's combination with center head, 6 inch blade	1–E
	7	Tweezers, type No. 6	1–E
	8	Punch, prick, ⅜ inch	1–E
	9	Punch, drive pin, single, set of 5, 3/32 x 4, 1/8 x 4, 5/32 x 4, 3/16 x 4, and ¼ x 4	1–E
	10	Countersink and drill combined, high speed steel, single, set of 2, 3/32 x 3/10 x 2⅛ inches, and 7/32 x ½ x 3 inches	1–E
	11	Reamer, high speed steel, straight shank, center, fluted type, set of 2, 82 degrees x ¼ inch and 60 degrees x ¼ inch	1–E
235	1	Caliper, vernier, inside and outside, 6 inch	1–E
	2	Gage, drill point, w/6 inch hook rule	1–E
	3	Rule, steel, spring tempered, English, 6 inches, 16ths, 32nds, 54ths and and 100ths graduations	1–E
	4	Protractor and depth gage	1–E
	5	Bevel, universal	1–E
	6	Gage, center, U. S. Standard, 60 degree	1–E
	7	Rule, tape, 78¾ inches, 2 meter, 16ths and MM graduation	1–E
	8	Scriber, pocket, 2⅞ inch blade	1–E
	9	Scriber, pocket, 1⅞ inch blade	1–E
236	1	Caliper, micrometer, outside, single, set of 3, 0 to 1 inch, 1 to 2 inches, 2 to 3 inches	1–E

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		MACHINIST'S PRECISION TOOL KIT—Continued	
237	1	Taps, sparkplug, set of four, 10-MM x 1.00, 14-MM x 1.25, 18-MM x 1.50 and ⅞ inch x 18 N. S. T. S., with counterbore for 14-MM, 18-MM and ⅞ inch taps and wood case	1–E
	2	Square, machinist's combination with center head and bevel protractor, 12 inch blade	1–E
	3	Retriever, alnico magnet type, with handle and flexible extension	1–E
	4	Wrench, tap, ratchet, set of 2	1–E
	5	Cutter, glass, turret head	1–E
	6	Cutter, glass, circle sweep type, w/2 extra wheels, 2 to 24 inch diameter capacity	1–E
238	1	Caliper, vernier, precision, 300m to 12 inches, outside and inside, English and metric	1–E
	2	Mandrels, set of 5, solid, sizes: ¼, 5/16, ⅜, 7/16 and ½ inch	1–E
	3	Mandrels, set of three, expanding, ½ to 11/16, 11/16 to 1, and 1 to 1 5/16 inches	1–E
	4	Box, tool, metal, w/7 drawers top compartment, 20 x 8½ x 13 inches	1–E
		DRILL SET	
239	1	Drill, set of 32 and stand, twist, high speed steel, taper shank, 23/64 to 1-inch	2–E
		LATHE ACCESSORIES	
240	1	Chuck, collet, spindle nose type	3–E
	2	Collet, for spindle nose collet chuck, set of 11, 1/16 to 1 ⅜ inches	3–E
		IMPACT WRENCH SET	
241	1	Socket, hex, 5/16 inch, set of 9, 5/16 to 1 1/16 inch	1–F
	2	Extension, set of 2, 4 inch and 9 inch	1–F
	3	Bit, Phillips No. 3, set of 2, No. 3 and 4	1–F
	4	Bit, screwdriver, set of 2	1–F
	5	Driver, socket	1–F
	6	Chuck, quick-change, ⅜ inch square drive	1–F
	7	Remover, stud	1–F
	8	Adapter, socket	1–F
	9	Chuck, Jacobs No. 99 with No. 103—⅜ inch collet	1–F
		IMPACT WRENCH SET—Con.	
241	10	Collet, No. 103—½ inch collet interchangeable with No. 103—⅜ inch collet for No. 99 chuck	1–F
	11	Wrench, open end, 1 5/16 inches, set of two	1–F
	12	Wrench, Allen, set of three	1–F
	13	Puller, spring	1–F
	14	Wrench, impact, electric	1–F
	15	Case, carrying, steel	1–F
		ELECTRICAL CONTROL CUBICLE	
		Cubicle, electrical control (not illustrated)	2–F
		HEATER	
		Heater, 20,000 BTU (not illustrated)	3–F
		ENGINE ANALYZER KIT	
242	1	Set, adapter, for waterproof system	1–G
	2	Tester, gasoline, temperature and pressure gage, 6, 12, and 24 volts	1–G
	3	Gage, vacuum and fuel pump	1–G
	4	Tester, compression, w/ adapters	1–G
	5	Light, timing, power type	1–G
	6	Tester, dwell-tachometer	1–G
	7	Tester, coil and condenser	1–G
	8	Tester, high tension harness	1–G
	9	Tester, volt-amp	1–G
	10	Lamp, for timing light, extra	1–G
		Case, carrying (not illustrated)	1–G
		MILLING ATTACHMENT ACCESSORIES	
243	1	Belt, flat, 5/16 x 38 inch	2–G
	2	Belt, V-type	2–G
	3	Belt, V-type	2–G
	4	Belt, V-type	2–G
	5	Belt, V-type	2–G
	6	Arbor, milling attachment, lathe, side mill, with spacing collars, set of 2, 1¼ and 1 inch	2–G
	7	Arbor, milling attachment, lathe, side mill, ⅞ inch	2–G
	8	Arbor, milling attachment, lathe, with 0 to ½ inch drill chuck	2–G
	9	Key, drill chuck	2–G
	10	Arbor, milling attachment, lathe, angle mill, threaded ⅜ inch, 24 NF RH	2–G

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		MILLING ATTACHMENT ACCESSORIES—Continued	
243	11	Arbor, milling attachment, lathe, end mill, with set screw, set of 3, for ⅛ inch, ½ inch and ⅝ inch straight shank	2–G
	12	Arbor, milling attachment, lathe, shell end mill, ¼ inch	2–G
	13	Adapter, milling attachment, lathe, No. 2 Morse taper	2–G
	14	Adapter, milling attachment, lathe, No. 7 Brown and Sharpe taper	2–G
	15	Arbor, milling attachment, lathe, fly cutter, with 5/16 x 5/16 inch HS steel cutter bit, adj	2–G
	16	Holder, tool, for slotting head, set of 3, ½ x 4 inch w/¼ inch square tool, ¾ x 4 inch, w/⅜ inch square tool, and 1 x 4 inch w/½ inch square tool	2–G
	17	Pulley, V-belt, large	2–G
	18	Pulley, V-belt, small	2–G
	19	Pulley, flat belt, 2 inch diameter and 2¼ inch diameter	2–G
	20	Pulley, flat belt, 1¼ inch diameter and 1½ inch diameter	2–G
	21	Key, pulley shaft	2–G
	22	Lock screw, pulley	2–G
	23	Collet, milling attachment, lathe, for mounted wheels, set of 2, ⅛ and 3/16 inch	2–G
	24	Oil, lubricating, 1 pint can	2–G
	25	Gage, grinding, tooth stop rest type, for fluted tools and cutters	2–G
	26	Wrench, Allen, set of 6, 1/16 to ⅜ inch	2–G
	27	Dresser, abrasive wheel, diamond type, with holder, for milling attachment, lathe	2–G
	28	Base, adapter, milling attachment, lathe, universal, size 2	2–G
	29	Adapter, milling attachment, lathe, tool post T-slot mounting, size 2	2–G
	30	Bolt, for basic unit and base or T-slot adapter, set of 2	2–G
	31	Bolt, T-slot, set of 3	2–G
	32	Head, internal grinding, milling attachment, lathe	2–G
	33	Head, milling and drilling, end, high speed, milling attachment, lathe, size 2	2–G
	34	Attachment, slotting, milling machine, swivel base, 4 inch stroke	2–G
	35	Arbor, slotting attachment drive	2–G
	36	Head, 90° universal, milling attachment, lathe	2–G
	37	Head, dividing, milling attachment, lathe	2–G
	38	Plate, set of 3, index Nos. 1, 2 and 3	2–C
		Box, metal, for milling attachment accessories. (box not shown in illustration)	2–C
		LATHE	
244	1	Lathe, engine, extension gap, triple back geared, 14 inches and 28 inches	3–G
	2	Face plate, 6 inch diameter	3–G
	3	Indicator, thread dial, on lathe carriage	3–G
	4	Belt, lathe, 2-ply leather, 2 inches wide x 77 inches nominal length	3–G
	5	Sleeve, head stock spindle, No. 3 Morse taper hole	3–G
	6	Center, lathe, No. 3 Morse taper, set of two	3–G
	7	Tool post, assembly	3–G
	8	Stop, adjustable thread cutting	3–G
		LATHE ACCESSORIES	
		Base, for lathe (not illustrated)	3–G
245	1	Cover, canvas for lathe	3–G
		DYNAMOTOR-WELDER	
		Dynamotor-welder, front part functions as a 12 kw. 3-phase generator, the rear part is a 300 amp, 40-volt dc arc welder (not illustrated)	4–G
		DYNAMOTOR-WELDER ACCESSORIES	
		Filter, dust, set of four each (not illustrated)	4–G
		Pulley, V-belt, 11 inch PD, 6 groove (not illustrated)	4–G
		Panel, for welding jacks (not illustrated).	
		AIR COMPRESSOR	
		Compressor, air, 50 cfm at 1,800 rpm (not illustrated)	5–G
		Clutch, Rockford (not illustrated)	5–G
		MISCELLANEOUS	
		Pipe, flexible, from air tank to compressor (not illustrated)	5–G

Fig. No.	Index No.	Description	Shop location
		MISCELLANEOUS—Continued	
245		Shaft, jack, for compressor, with four U-bolts (not illustrated)	5–G
		MISCELLANEOUS	
246	1	Hammer, blacksmith's, cross peen, 2-pounds	6–G
	2	Blowgun, ⅜ inch brass w/valve and Eastman male ¼ inch Snap-Tite coupler	6–G
	3	Wrench, pipe, adjustable, 14 inches long	6–G
	4	Wrench, adjustable, automobile, 3 inch opening x 11 inch long, set of two	6–G
	5	Wrench, pipe, adjustable, heavy duty, 10 inches long	6–G
	6	Wrench, adjustable, crescent type, single head, open end, heavy duty, 1 5/16 inch opening x 12 inches long, set of two	6–G
	7	Wrench, adjustable, crescent type, single head, open end, heavy duty, 1 5/16 inch opening x 8 inches long, set of two	6–G
	8	Blade, hacksaw, hand, 10 inches, 24 teeth, set of twelve	6–G
	9	Shears, tinners, snip, straight cut, 2 inch cut, 8 inches long	6–G
	10	Brass, commercial, bar, composition B, size 1 inch, length 1 foot	6–G
		MISCELLANEOUS	
247	1	Trays, parts, set of four	7–G
		MISCELLANEOUS	
248	1	Hammer, ding, handles, 13-ounce	8–G
	2	Block, sheet metal worker's dolly, general purpose type	8–G
	3	Hammer, carpenter's nail, curved claw, bell face, handled, 1-pound	8–G
	4	Block, sheet metal worker's dolly, heel type	8–G
	5	Lifter and compressor, valve and valve spring, C-shape type, with offset and straight jaws	8–G
	6	Hatchet, half, handled, 3½ inches	8–G
	7	Compound, valve grinding, coarse and fine, 4-ounce two compartment can	8–G
	8	Frame, hacksaw, adjustable, 8 to 12 inches, pistol grip	8–G
	9	Hatchet, axe pattern, handled, with beveled slot, steel handle and sheath, 3⅜ inches	8–G
	10	Shellac, gasket, liquid, 2-ounce bottle	8–G
	11	Hammer, plastic face, replaceable tips, handled, 3-pound, 2-inch diameter face	8–G
	12	Gasket paste, slow drying, pliable, 11-ounce tube	8–G
	13	Packing, water pump, metallic, graphite twisted, ⅛ inch, 1-pound roll	8–G
		HOTPLATE	
249	1	Hotplate, electric	9–G
		MISCELLANEOUS	
		Pulley, V-belt 11 inches PD, 6 groove, mounted on industrial engine unit. (Not illustrated)	10–G
		Belt, V-type, set of six each, size C. (Not illustrated)	10–G
		MISCELLANEOUS	
		Gage, fuel (not illustrated)	11–G
		MILLING ATTACHMENT	
250	1	Milling attachment, lathe, size 2, motor driven, ½ hp, 115–230 volt, 60 cycle, 1 phase	1–H
	2	Head, external grinding, milling attachment, lathe, size 2	1–H
	3	Pulley, flat belt, 2½ x 2¾ inch	1–H
	4	Belt, flat, 9/16 x 40 inch	1–H
	5	Pulley, flat belt, 5¾ x 6 inch	1–H
	6	Guard, belt	1–H
		GRINDER ACCESSORIES	
251	1	Wheel, abrasive, straight, fine, 10 x 1¼ x ⅞ inch, 46 grain	2–H
	2	Wheel, abrasive, straight, coarse, 10 x 1¼ x ⅞ inch, 24 grain	2–H
		WODACK DRILL ACCESSORIES	
252	1	Wheel, grinding, 6 x ¾ x ½ inch, with arbor	2–H

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		VALVE REFACER—ABRASIVE WHEELS	
253	1	Wheel, grinding, 4 inch, recessed	2-H
	2	Wheel, grinding, 5 inch, standard	2-H
		MILLING ATTACHMENT—ABBRASIVE WHEELS	
254	1	Wheel, abrasive, straight, milling attachment, lathe, set of 2, 1¼ x ⅜ inch, grain 80, and 2½ x ⅜ inch, grain 80	2-H
	2	Wheel, abrasive, cup, flaring, milling attachment, lathe, size 3 x 2¼ x 1⁄ inch, grain 60	2-H
	3	Wheel, abrasive, straight cup, 2½ x 1½ x ½ x ½ inch, grain 60	2-H
	4	Wheel, abrasive, dish, milling attachment, lathe, size 4 x ½ inch, grain 100	2-H
	5	Wheel, abrasive, straight cup, milling attachment, lathe, size 4 x 1½ x ½ x ½ inch, grain 60	2-H
	6	Wheel, abrasive, stright, milling attachment, lathe, set of 2, 6 x ¾ inch, grain 60, and 6 x ¾ inch, grain 46	2-H
		DRILL SET 1⁄16 to ½ INCH	
255	1	Drills, twist, set of 29 and metal box high speed steel, straight shank, fractional sizes, short series, 1⁄16 to ½ inch by 64ths	3-H
		DRILL SET—NOS. 1 to 60	
256	1	Drills, twist, set of 60 and metal box high speed steel, straight shank, wire gage sizes, Nos. 1 to 60	3-H
		WRENCH SET	
257	1	Wrenches, box and open end, 12 point box, 15 degree angle both ends, set of 13 and leatherette roll, ⅜ x ⅜ to 1½ x 1½	3-H
		MISCELLANEOUS	
258	1	Drill, electric, portable, universal motor, 110 volts, ¼ inch drill	3-H
	2	Hammer, plastic face, repaceable tips, handled, 3-pound, 2-inch diameter face	3-H
		MILLING ATTACHMENT ACCESSORIES	
259	1	Cutters, woodruff, keyseat, high speed steel, set of 14 (diameter x thickness) ½ x 1⁄16, ½ x 3⁄32, ½ x ⅛, ⅝ x ⅛, ¾ x ⅛, ¾ x 3⁄32, ⅞ x 3⁄16, 1 x 3⁄32, 1 x ¼, 1 x 5⁄16, 1⅛ x 5⁄16, 1¼ x ¼, 1¼ x 5⁄16, and 1½ x ⅜ inch	4-H
	2	Cutter, milling, end mill, spiral, long, right hand, 3⁄16 inch, w/⅜ inch shank	4-H
	3	Cutter, milling, high speed steel, end mill, spiral, long right hand, set of 3, ¼ inch, w/⅜ inch shank, ⅜ inch, w/⅜ inch shank, and ½ inch, w/½ inch shank	4-H
	4	Cutter, milling, high speed steel, plain, single, diameter 2¼ inch, width of face ½ inch, hole ⅞ inch	4-H
	5	Cutter, milling, high speed steel, staggered tooth, single, diameter 2½ inches, width of face ⅜ inch, hole ⅞ inch	4-H
	6	Cutter, milling, high speed steel, saw, metal slitting, without chip clearance, diameter 3 inches, thickness 3⁄32 inch, hole 1 inch	4-H
	7	Cutter, milling, high speed steel, saw, metal slitting, without chip clearance, diameter 3 inches, thickness ⅛ inch, hole 1 inch	4-H
	8	Cutter, milling, high speed steel, plain, single, diameter 3½ inches, width of face 5⁄16 inch, hole 1 inch	4-H
		LATHE ACCESSORIES	
260	1	Holder, tool, left hand offset, ½ inch x 1⅛ inches x 6 in. with one 5⁄16 inch square HS bit and wrench	4-H
	2	Holder, tool, straight shank, ½ inch x 1⅛ inches x 6 inches, with one 5⁄16 inch square bit HS and wrench	4-H
	3	Holder, tool, righth and offset, ½ inch x 1⅛ inches x 6 inches, with one 5⁄16 inch square HS bit and wrench	4-H
	4	Holder, boring tool, reversible right or left hand, ½ inch x 1 inch shank. One 5⁄16 inch diameter and one 5⁄16 inch diameter forged boring bars. Also one 5⁄16 inch square HS tool bit and one wrench	4-H
	5	Holder, lathe tool, threading, ⅝ x 1⅜ inch shank	4-H

Fig. No.	Index No.	Description	Shop location
		LATHE ACCESSORIES—Continued	
261	6	Holder, tool, cutting off, right hand offset, ⅝ inch x 1⅜ inches for ⅛ inch x ⅞ inch cutter, complete with cutter and wrench	4–H
	7	Sleeve, taper, set of 4, Morse No. 1 to No. 2, No. 1 to No. 3, No. 2 to No. 3 and No. 3 to No. 4	4–H
	8	Center, lathe, Morse taper No. 3, hardened, (extra)	4–H
	9	Socket, fitted, for No. 3 Morse taper shank drills	4–H
	10	Pilot, chuck	4–H
	11	Chuck, Jacobs, ⅛ inch to ⅝ inch capacity, with No. 3 Morse taper arbor and key	4–H
	12	Holder, lathe tool, knurling, revolving head, ⅝ x 1⅜ x 6⅝ inches, with 3 pair knurles	4–H
	13	Drift, drill or center key, plain, in set, No. 1 to No. 3	4–H
	14	Clamp, jaw, face plate, all-purpose, set of four, solid nose, 6-ton down pressure, 3⅝ inches x 1½ inches x ¾ inch	4–H
	15	Wrench, tool post	4–H
	16	Wrench, compound and steady rest, $^{13}/_{32}$ x $^{1}/_{16}$ inch	4–H
	17	Wrench, tailstock	4–H
	18	Spindle, centering, complete with combination center drill and countersink	4–H
	19	Adapter, tailstock one end No. 3 Morse taper, other end a running fit in the accompanying bronze bushing which is threaded 1½ inches–8 to take 5 inch or 6 inch chucks	4–H
	20	Adapter, headstock, one end tapered to fit lathe spindle, other end threaded 1½ inches–8. Center hollow to take centering spindle. With bronze retaining nut	4–H
		MISCELLANEOUS	
261	1	Reamer, cylinder ridge, precision type, $2^{9}/_{16}$ to 4¾ inch range	4–H
	2	Cutter, milling, face, adjustable from 1¼ inch to 2½ inch with ⅜ inch square bits, No. 3 Morse taper shank	4–H
	3	Reamer, cylinder ridge, precision type, range 4⅞ inch to $6^{7}/_{16}$ inch	4–H
	4	Cutter, set of three	4–H
	5	Set, figures and letters, stamping, steel, $^{5}/_{16}$ inch characters, in roll	4–H
	6	Driver, for ¾ inch sockets	4–H
	7	Jack, machinist's, 2-ton capacity, height, 2¾ inch, lift 1 inch, set of two	4–H
	8	Nut, spindle, extra for 1½ inch drill	4–H
	9	Handle, for air drill	4–H
		LATHE ACCESSORIES	
262	1	Dog, lathe, bent tail, set of 2, ½ inch and 1¼ inch maximum capacity	5–H
	2	Stop, micrometer carriage	5–H
	3	Chuck, 5-inch universal 3-jaw	5–H
	4	Chuck, 6-inch independent 4-jaw	5–H
	5	Holder, 3-bar boring tool, with boring bars ½-inch, ¾-inch and 1⅛-inch diameter	5–H
	6	Dog, lathe, reversible, 3-inch to 6-inch capacity	5–H
	7	Rest, follower	5–H
	8	Rest, center	5–H
		MISCELLANEOUS	
263	1	Dresser, emery wheel, 4-cutter type, w/2 extra sets of cutters	5–H
		LATHE ACCESSORIES	
264	1	Chuck, 8 inch universal 3-jaw with inside and outside jaws and key	1–I
	2	Chuck, 10 inch independent 4-jaw with key	1–I
	3	Face plate, 12-inch diameter	1–I
		MISCELLANEOUS	
		Mat, rubber for floor (not illustrated)	2–I
265	1	Stool, step, combination	2–I
		LATHE ACCESSORIES	
266	1	Face plate, 28-inch diameter	3–I
		10-TON HYDRAULIC PRESS	
267	1	Press, hydraulic, portable, 10-ton	1–J
		MISCELLANEOUS	
268	1	Frame, hacksaw, nonadjustable, heavy, deep throat, 12-inch blade	2–J

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		VISE	
269	1	Vise, machinist's, 3½ inch	3–J
		LATHE ACCESSORIES	
270	1	Pigment, paste in oil, white lead, 1-pound can	4–J
	2	Punch, center, octagon, single, ⅜ x 4½ inches	4–J
		Punch, taper, ⅜ x 9½ inches	4–J
	4	Cleaner, file	4–J
	5	Brush, lathe	4–J
	6	Pliers, combination, slip joint, 6 inch	4–J
	7	Pliers, diagonal cutting, 7 inch	4–J
	8	Wrench, adjustable, crescent type, single head, open end, set of two, 15/16 x 8 and 15/16 x 12 inches	4–J
	9	Wrench, adjustable automobile, 3 inch opening x 11 inches long	4–J
	10	Screwdriver, common, plastic handle, set of 3, ¼ x 4, 7/16 x 8 and ⅜ x 12 inches	4–J
	11	Hammer, machinist's, ball peen, handled, 1½-pound	4–J
		10-TON HYDRAULIC PRESS ACCESSORIES	
271	1	Coupling, tube, set of three	6–J
	2	Tube, extension, set of 3, 3-, 5- and 10-inch	6–J
	3	Tube, extension, 20-inch, set of three	6–J
	4	Toe, spreader plunger	6-J
	5	Toe, spreader ram	6–J
	6	Toe, clamp	6–J
	7	Toe, spreader, set of two	6–J
	8	Head, wedge	6–J
	9	Base, V-type	6–J
	10	Head, pusher	6–J
	11	Pin, pusher	6–J
	12	Connector, short	6–J
	13	Plate, chain pull, set of two	6–J
	14	Head, clamp	6–J
	15	Plate, chain pull	6–J
	16	Saddle, serrated	6–J
	17	Block, V-type, set of two	6–J
	18	Pin, lock, set of two	6–J
	19	Clamp, C-type	6–J
	20	Adapter, press plate	6–J
	21	Base, flat	6–J
	22	Remover, king pin	6–J
	23	Chain, set of two	6–J
		MISCELLANEOUS	
272	1	Attachment, tire inflation with chuck, leader hose and gage	1–K
		HOSE REEL	
273	1	Reel, hose, with 25 feet of ⅜ inch air hose	1–K
		WATER CARRIER	
		Carrier, water (not illustrated)	2–K
		WODACK DRILL SET	
274	1	Drill, electric, ⅝ inch, 2-speed, 450 to 2,000 RPM, universal 110-V motor, with ⅝ inch chuck and key	3–K
	2	Stand, drill	3–K
	3	Wrench, open end	3–K
	4	Handle, pipe, 28 inches long	3–K
		MISCELLANEOUS	
275	1	Vise, drill press, flanged type, heavy duty, 3½ inch jaw x 4½ inch opening	4–K
	2	Wheel, wire, 6 inch diameter with ½ inch arbor	4–K
	3	Grease, lubricating, mineral, cup, 1-pound can	4–K
	4	Lubricant, 1-pound can	4–K
	5	Drill, twist, high speed steel, straight shank, fractional size, long series, set of two, ⅝ and 9/16 inch	4–K
	6	Packing, sheet asbestos, metallic-cloth, thickness 1/16 inch. width 10 inches, length 40 inches	4–K
		MISCELLANEOUS	
276	1	Hose, pneumatic, braided, ⅜ inch x 15 feet	6–K
	2	Hammer, pneumatic, chipping, closed handle	6–K
	3	Header, button, rivet, set of 3, ¼, 5/16, and ⅜ inch	6–K
	4	Chisel, set of 7, flat; diamond point round narrow nose, rivet buster, cape, half round, and ripper	6–K
	5	Tool, beading	6–K
	6	Handle, for ¼ inch pneumatic drill	6–K
	7	Handle, for ⅝ inch electric drill	6–K
	8	Adapter, pin-type, Alemite	6–K
	9	Coupling, hose valve, set of 4, two each ⅜ and ½ inch hacksaw, hand, pneumatic, with coupling, speed	6–K
	10	Hacksaw, hand, pneumatic, with coupling, speed regulator, 5/32 inch Allen wrench and 2 blades	6–K

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		PNEUMATIC TOOL KIT—ADDITIONAL	
277	1	Drill, pistol grip, 5/16 inch	6–K
	2	Grinder, button type handle, 2 inch	6–K
		LUBRICATING GUN	
278	1	Gun, lubricating, lever type, hand-operated, Alemite, 16-ounce, with extension and push type adapter	7–K
		PNEUMATIC DRILL	
279	1	Drill, pneumatic, ¼ inch, reversible, piston-type	8–K
		VISE	
280	1	Vise, combination bench and pipe, 4½ inch jaw, (less base)	9–K
		ELECTRIC GRINDER	
281	1	Grinder, electric, bench type, 220 volts, 60-cycle, 3-phase	10–K
		MISCELLANEOUS	
		Mat, rubber (not illustrated)	11–K
		BATTERY CHARGER	
282	1	Charger, battery, dry plate rectifier, fast charge, for 6, 12 and 24-volt lead acid type batteries	1–L
		BATTERY CHARGER—ACCESSORIES	
283	1	Cable, battery connecting	1–L
		TENTING	
		Tenting, canvas (not illustrated)	2–L
		BOLT AND SCREW THREADING KIT	
284	1	Threading set, bolt and screw, NC and NF, carbon steel, right hand, 1½ inch OD adjustable round split dies, ¼ to ½ inch, set of 43 items and wood box	3–L
285	1	Threading set, bolt and screw, NC and NF, carbon steel, right hand, 2½ inch adjustable round split dies, 5/16 to 1 inch, set of 43 items and wood box	4–L
		PIPE TAP SET	
286	1	Tap set, pipe, carbon steel, right hand, set of 10 items and wood box, two adjustable tap wrenches ¼ to ¾ and ¾ to 1¼ inches, and 8 taps ⅛ inch to 1½ inch, 11½ to 27 threads per inch	5–L
		PIPE THREADING SET	
287	1	Threading set, pipe, nonadjustable, with individual heads and renewable dies, ratchet, set of 7 items and metal box, ⅛ to ¾ inch	6–L
		MISCELLANEOUS	
		Cushion units, set of eight (not illustrated)	7–L
288	1	Pot, compound, 10-quart	7–L
		VALVE SEAT GRINDER	
289	1	Grinder, electric valve seat, 110 volts, universal motor	1–M
	2	Stand, dressing No. 20153	1–M
	3	Cleaner, set of 6	1–M
	4	Brush, set of 2	1–M
	5	Wrench, Allen setscrew	1–M
	6	Wrench, pin	1–M
	7	Sleeves, set of two	1–M
	8	Wrench, pilot	1–M
	9	Pilot, special, set of 10	1–M
	10	Pilot, standard, set of 7	1–M
	11	Wheel, abrasive, set of 31	1–M
		Box (not illustrated)	1–M
		TENTING	
		Tenting, canvas (not illustrated)	2–M
		SHEET PACKING	
290	1	Packing, sheet, Vellumoid, thickness (1/16 inch, width 36 inches, length 36 inches, set of two sheets	3–M
	2	Packing, sheet, Vellumoid, thickness 1/32 inch, width 36 inches, length 36 inches, set of two sheets	3–M
	3	Packing, sheet, rubber, cloth inserted, thickness ⅛ inch, width 36 inches, length 36 inches	3–M
	4	Shim stock, steel, laminated, .002 laminations, 0–.016 inch thickness, 8 x 48 inch sheet	3–M

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		PNEUMATIC HOSE	
291	1	Hose, pneumatic, braided, ⅜ inch x 50 feet	4–M
	2	Hose, pneumatic, braided, ⅜ inch x 50 feet	4–M
	3	Hose, pneumatic, braided, ½ inch x 50 feet	4–M
	4	Hose, air, ½ inch x 15 feet long	4–M
		FIRST AID KIT	
		Kit, first aid (not illustrated)	1–N
		CORRESPONDENCE FILE	
292	1	File, correspondence	2–N
		PNEUMATIC TOOLKIT	
293	1	Drill, pistol grip, 5/16 inch	4–N
	2	Attachment, right-angle, low speed, with ½-inch chuck	4–N
	3	Attachment, right-angle, hi-speed	4–N
	4	Attachment, grinding head	4–N
	5	Blades, rotor, set of 12	4–N
	6	Saw, hole, 1 inch	4–N
	7	Brush, wire, end type	4–N
	8	Handle, button type	4–N
	9	Guard, grinder	4–N
	10	Wrench, Allen, set of two	4–N
	11	Wrench, spanner	4–N
	12	Pad, sanding, 7 inch	4–N
	13	Brush, wire, 4 x 1 x ⅝ inch	4–N
	14	Grease, tube	4–N
	15	Wrench, set of two	4–N
	16	Nut, sanding pad	4–N
	17	Hose, ¼ inch x 15 feet long, 2 lengths	4–N
	18	Box, with partition assembly	4–N
	19	Tray, with divider assembly	4–N
		ELECTRICIAN'S TOOLKIT	
294	1	Scriber, pocket, 2⅞ inch blade	5–N
	2	Tweezers, 4½ inch, with case	5–N
	3	Knife, electrician's screwdriver and cutting blade, length closed 3⅝ inches	5–N
	4	Dresser, contact point, flexible abrasive stone	5–N
	5	Rule, tape, steel, inside and outside, depth and height measuring, English, 72 inches, 16th and 32nds graduation	5–N
	6	Pliers, chain, round nose, long, without cutter, 6 inch	5–N
	7	Pliers, diagonal cutting, 7 inch	5–N
	8	Pliers, lineman's side cutting, 8 inch	5–N
	9	Nippers, shoeing, 8 inch	5–N
	10	Pliers, water pump, 10 inch	5–N
	11	Blade, hacksaw, hand, all hard, HS steel, 12 inch, 24 teeth, set of 24	5–N
	12	Iron, soldering, thermostatically controlled, 110 volts, 225 watts, with rest stand and tips Nos. 1, 2, and 3	5–N
	13	File, American Standard, saw, slim taper, 8 inch	5–N
	14	File, American Standard, round, double cut, bastard, 12 inch	5–N
	15	Blade, saw, set of 3 and handle, 12 inch compass, 10 inch keyhole and 18 inch nail cutter	5–N
	16	Compound, antifreeze, for soldering iron tips	5–N
	17	Solder, tin-lead, wire, rosin core, ⅛-inch, 1-pound spool	5–N
	18	Solder, tin-lead, wire, acid core, ⅛-inch, 5 pound spool	5–N
	19	Flux, soldering paste, noncorrosive, two 2-ounce cans	5–N
	20	Tester, voltage, combination ac and dc, range 110 to 540 volts	5–N
	21	Frame, hacksaw, adjustable, pistol grip, 8 to 12 inches	5–N
	22	Screwdriver, jeweler's set of 6	5–N
	23	Tape, insulating, rubber, .027 to .033-inch thick, ¾-inch wide, 30 feet to roll	5–N
	24	Tape, friction, ½-inch wide, ½-pound roll	5–N
	25	Pencil, wood cased, lead, carpenters, set of 2	5–N
	26	Punch, drive pin, single, set of 2, ⅛ x 4 and ¼ x 4 inches	5–N
	27	Punch, center, octagon, single, ⅝ x 6 inches	5–N
	28	Chisel, machinist's, hand, cold, single, ½ inch bit, 7/16 inch hex., 6 inches long	5–N
	29	Adapter, receptacle, 3 pole polarized, plug, 2 pole parallel blade, molded into one piece with ground wire	5–N
	30	Screwdriver, insulated plastic handle, straight tip, set of 6, 1/64 x 3, 3/16 x 3, 3/16 x 5, 5/16 x 6, 7/16 x 8, and ⅜ x 12-inch blade	5–N

Fig. No.	Index No.	Description	Shop location
		ELECTRICIAN'S TOOLKIT—Continued	
294	31	Screwdriver, recessed screw, regular type, Phillips type, plastic handle, single, set of 3, 3 inch blade No. 1 point, 4 inch blade No. 2 point, and 6 inch blade No. 3 point	5–N
	32	Chisel, woodworkers, socket, firmer, handled, set of 2, ⅜ and ¼ inch	5–N
	33	Wrench, pipe, adjustable, heavy duty, 6 inches long	5–N
	34	Wrench, adjustable, crescent type, single head, open end, $1\frac{5}{16}$ inch opening, 8 inches long, heavy duty	5–N
		Chest, steel, electrician's tools (not illustrated)	5–N
		WELDER'S KIT	
295	1	Torch, oxyacetylene cutting and welding, medium duty, with three cutting tips, drill size No. 46, 52, 56 and five welding tips, drill size No. 43, 52, 54, 58 and 64 and wrench with 5 openings	6–N
	2	Goggles, eyecup protective, welders, glare flat lens w/2 extra lenses, shade No. 6, set of two	6–N
	3	Goggles, eyecup, protective, over spectacle type chippers and grinders	6–N
	4	Wrench, torch and regulator, cutting and welding, universal, 5 openings	6–N
	5	Connector, acetylene, two-way	6–N
	6	Adapter, acetylene regulator	6–N
	7	Cleaner set, welding and cutting equipment, set of 21 stainless steel cleaners hinged to metal container, size range 30 thru 75 drill gage	6–N
	8	Ignitor, oxacetylene with 6 spare flints	6–N
	9	Lens, clear welder's goggles, 6 pair	6–N
	10	Flux, welding and brazing, brass, copper, bronze, cast iron and steel, type I, 1-lb. can	6–N
	11	Flux, brazing, 1-lb. can	6–N
	12	Lens, helmet or hand shield, welders, cover, set of 12	6–N
	13	Flux, brazing, paste, silver, 8-ounce jar	6–N
	14	Compound, 1-pound can, hardening, nontoxic	6–N
295	15	Solder, silver, wire, $\frac{1}{32}$ inch diameter, 8-ounce	6–N
	16	AWL, scratch, type V, 6 inch	6–N
	17	Chisel, machinist's hand, cold, single, ⅞ inch bit, ¾ inch hex., 8 inches long	6–N
	18	Crayon, metal worker, soapstone, $\frac{3}{16}$ x ½ x 5 inches, set of 12	6–N
	19	Pliers, lineman's, side cutting, 8 inches long	6–N
	20	Wrench, adjustable, vise grip, 1¼ inch opening, 10 inches long, set of two	6–N
	21	Gloves, welder's, leather, 4 finger and thumb type, large	6–N
	22	Hammer, tinners, setting, handled, 12-ounce	6–N
	23	Brush, wire, scratch, w/wood handle, 3 x 17 rows, 14 inches long	6–N
	24	Hammer, blacksmith's, cross peen, 3-pound	6–N
	25	Hammer, welder's chipper, 16-ounces	6–N
		Case, steel, tool-mechanic (not illustrated)	
		BRAZING AND SOLDERING KIT	
296	1	Stem, fine work, straight	7–N
	2	Stem, fine work, curved	7–N
	3	Stem, light work	7–N
	4	Stem, medium work	7–N
	5	Stem, heavy work	7–N
	6	Stem, paint burner	7–N
	7	Stem, soldering iron	7–N
	8	Head, soldering copper	7–N
	9	Valve, pilot control	7–N
	10	Adapter	7–N
	11	Handle, assembly	7–N
	12	Regulator, 10 pound pressure	7–N
	13	Wrench, double end	7–N
	14	Ignitor, oxacetylene, w/6 flints	7–N
	15	Hose, acetylene, red, 15 foot	7–N
	16	Case, carrying, metal	7–N
		SOCKET WRENCH SET ¾ AND 1 INCH DRIVE	
297	1	Wrench, socket, set, 1 inch square drive, 11 items, sliding-T-handle, hinged handle, 5 regular length 12 point sockets $1\frac{13}{16}$ to 2⅜ inches, 4 regular length 6 point 2⅛ to $2\frac{15}{16}$ inches	8–N

Fig. No.	Index No.	Description	Shop location
		SOCKET WRENCH SET ¾ AND 1 INCH DRIVE—Continued	
297	2	Wrench, socket, set, ¾ inch square drive, 14 items, hinged, ratchet and sliding-T-handle, 2 extension bars, 8 regular length 12 point sockets 1 1/16 to 1¼ inches and 1 male adapter ¾ to 1 inch	8–N
	3	Box, tool, for ¾ and 1 inch drive wrench set	8–N
		OWATONNA TRACTOR MAINTENANCE KIT	
298	1	Puller, push, two leg type	9–N
	2	Adapter, threaded, set of two	9–N
	3	Puller, short arm, reversible arm, set of 2	9–N
	4	Puller, short arm	9–N
	5	Attachment, puller, bearing cup	9–N
	6	Screw, forcing	9–N
	7	Block, slotted	9–N
	8	Attachment, puller, bearing, set of 2	9–N
	9	Wrench, special	9–N
	10	Adapter, step plate, set of 2	9–N
	11	Leg, puller attachment, set of 8, two each 4½ inch, 9½ inch, 16½ inch, and 22½ inch	9–N
	12	Bolt, forcing, set of two	9–N
	13	Bolt, forcing, set of two	9–N
	14	Puller, internal or external booster hammer type	9–N
	15	Handle, tubular	9–N
	16	Adapter, threaded, 8 sets of two	9–N
		Chest, tractor maintenance puller set (not illustrated)	9–N
		BAND SAW	
299	1	Saw, band, metal cutting, motor driven, 110 volts, 60-cycle, single-phase, 3½ inch capacity—16 HP electric motor	10–N
		WELDER'S ACCESSORIES	
300	1	Shield, welder's, hand held, shade No. 10	11–N
	2	Helmet, welder's	11–N
	3	Gloves, welder's, leather, 4 finger and thumb type, large	11–N
	4	Cloth, asbestos, 3 x 6 feet, 1/16 inch thick	11–N
	5	Electrode, welding, stainless steel, 5/32 x 14 inches, in waterproof container, 10-pound bundle	11–N
		WELDER'S ACCESSORIES—Con.	
300	6	Electrode, welding, shield arc alloy, size ⅛ inch, length 14 inches. Used for welding brass, bronze and copper, 5-pound bundle	11–N
	7	Electrode, welding, shield arc alloy, size ⅛ inch, length 14 inches. Welding aluminum in any form, 5-pound bundle	11–N
	8	Electrode, welding, shield arc, steel, mild, size 5/32 inch, length 14 inches. Used for all position general purpose work, 50-pound bundle	11–N
	9	Electrode, welding, shield arc, non-ferrous, in waterproof container, size ⅛ inch, length 14 inches. Used for welding cast iron, machinable, 10-pound bundle	11–N
	10	Electrode, welding, shield arc alloy, size 3/16 inch, length 14 inches. Hard facing, tough abrasion resisting surfaces, 10-pound bundle	11–N
	11	Electrode, welding, shield arc, Stoody tube Borium, ¼ inch, 5-pound bundle	11–N
	12	Bucket, general purpose, iron, galvanized, 14-quart	11–N
	13	Rod, welding, oxyacetylene, cast iron, 3/16 x 24 inches, 10-pound bundle	11–N
	14	Rod, welding, oxyacetylene, manganese bronze, ⅛ x 36 inches, 10-pound bundle	11–N
	15	Rod, welding, oxyacetylene, steel, mild, ⅛ x 36 inches, 10-pound bundle	11–N
	16	Rod, welding, oxyacetylene, steel, mild, 3/16 x 36 inches, 20-pound bundle	11–N
		DIESEL COMPRESSION INDICATOR—ACCESSORIES	
301	1	Adapter, for International Harvester TD–9, TD–14 and TD–18	13–N
	2	Adapter, for Cummins model H, HR, NH, NVH and NVHS engines	13–N
	3	Adapter, for Buda and other engines using American Bosch T-nozzles length 95-mm	13–N
	4	Adapter, for Murphy model ME	13–N
	5	Adapter, for GM model 71 engines	13–N
	6	Adapter, for Wankesha-Hesselman oil engines 130 HS, 140 HK, 140 HS	13–N

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		DIESEL COMPRESSION INDICATOR—ACCESSORIES—Con.	
301	7	Adapter, for Caterpillar screw type nozzles D–2, D–4 and D–6 tractors.	13–N
	8	Adapter, for International Harvester model TD and UD–6A	13–N
	9	Box, metal, carrying	13–N
		DIESEL COMPRESSION INDICATOR KIT	
302	1	Adapter, for Caterpillar screw type nozzle D–8800 engine and D–7 tractor	14–N
	2	Adapter, for Hercules engines	14–N
	3	Adapter, for International Harvester TD–24	14–N
	4	Adapter, for International Harvester TD–9A, TD–14–A, TD–18–A	14–N
	5	Adapter, for GM model 110	14–N
	6	Adapter, for Caterpillar screw type nozzle with throw away capsule D2, D4, D6 tractors	14–N
	7	Adapter, for Hercules, Mack and Wankesha diesel using American Bosch R- and S-nozzles 35-mm. to 95-mm. long	14–N
	8	Indicator, compression, diesel engine, 50 to 1,000 psi range, 3½ inch dial, flexible connections	14–N
	9	Adapter, for Caterpillar clamp type nozzles D–4, D–6, D–7 and D–8 tractors	14–N
	10	Box, metal, carrying	14–N
		SPRAY GUN	
303	1	Transformer, air	1–O
	2	Connector, end, male, pipe, 2100 series	1–O
	3	Attachment, suction feed cup, 1-quart	1–O
	4	Gun, spray	1–O
	5	Stand, air transformer, 3-legged folding type	1–O
	6	Hose, air, 30-foot length, 5/16 x 5/8	1–O
		VALVE REFACER GRINDER	
304	1	Grinder, electric, valve refacer, wet type, two 115-v motors	2–O
		VALVE REFACER ACCESSORIES	
305	1	Attachment, grinding, valve stem, tappet and rocker arm, micrometer feed	3–O
	2	Dresser, wheel, Universal, with diamond and nib	3–O
	3	Collet, set of 2, 3/32 to 5/16 inch and 1/2 to 1 1/16 inch	3–O
	4	Wrench, pin, for workhead	3–O
	5	Wrench, Allen, set of three	3–O
	6	Coolant, grinding wheel, 9-ounce can	3–O
	7	Oil, hypoid, 9-ounce can	3–O
	8	Cover, leatherette, for refacer	3–O
		CARBURETOR SERVICE TOOLKIT	
306	1	Bit, socket wrench, screwdriver, set of 3	4–O
	2	Screwdriver, offset	4–O
	3	Wrench, socket, oval, small	4–O
	4	Wrench, socket, special jet	4–O
	5	Wrench, socket, pronged, set of 3	4–O
	6	Wrench, socket, special jet	4–O
	7	Socket, screwdriver, set of 2	4–O
	8	Socket, inserter, ring, small	4–O
	9	Wrench, socket, deep, set of 6, 3/32, 5/16, 13/32, 1/2, 3/8 and 7/16 inch hexagon	4–O
	10	Wrench, socket, special check valve	4–O
	11	Handle, set of 3, ratchet, hinged and spinner	4–O
	12	Extractor, rivet	4–O
	13	Chisel, cold	4–O
	14	Puller, pin, starter	4–O
	15	Gage, level, float, special 1/16 inch	4–O
	16	Tool, bending	4–O
	17	Gage, depth, 6 inches	4–O
	18	Cylinder, loading pump	4–O
	19	Tool, bending, set of 2	4–O
	20	Wrench, economizer valve	4–O
	21	Gage, feeler, set of 2, .010 and .015 inch	4–O
	22	Puller, ring, retainer	4–O
	23	Gage, fast idle adjustment	4–O
	24	Puller, vent tube, main	4–O
	25	Puller, jet, set of 2, small and large	4–O
	26	Gage, metering rod	4–O
	27	Gage, float level and unloader	4–O
	28	Box, tool, metal	4–O

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		TUBING TOOLKIT	
307	1	Bender, tubing, set of 5, ¼, 5/16, ⅜, ½ and ⅝ inch	5–O
	2	Adapters, double flaring, 1 each of the following sizes: 3/16, ¼, 5/16, ⅜ and ½ inch	5–O
	3	Cutter, tubing, ⅛ to 1 inch, w/2 spare wheels	5–O
	4	Tool, flaring, ⅛ to ¾ inch, consists of 2 flaring bars and 1 yoke	5–O
	5	Box, tool	5–O
		BUSHING EXTRACTOR AND INSERTER KIT	
308	1	Driver, extractor and inserter, bushing	6–O
	2	Adapter, extractor and inserter, bushing, set of 12, (I. D. x O. D.) 9/16 x ⅝, 23/64 x 43/64 ⅝ x ¾, 1 1/16 x 1 3/16, 47/64 x 55/64, ¾ x 1, 51/64 x 59/64, 55/64 x 63/64, 59/64 x 1 3/64, 1 5/16 x 1 1/16, 1 x 1⅛ and 1 1/16 x 1 3/16 inch	6–O
	3	Box, metal, extractor and inserter bushing set, for Snap-On No. A–57F–B or equal	6–O
		REAMER SET	
309	1	Reamer, carbon steel, straight shank, square end, hand adjustable, ground for brass or bronze, set of 12 and wood box, Nos. A to L, size range from 15/32 to 1 25/32 inch	7–O
		TORQUE INDICATING WRENCH	
310	1	Wrench, socket, torque indicating, 150 foot-pound capacity, ½ inch square drive, complete with ratchet adapter and steel box	8–O
		HONING MACHINE	
311	1	Hone, bushing, precision, motor driven, ⅓ HP, 110-volt, 60-cycle, 1-phase, bench type, wet type, range .480 to 3.0 inches	9–O
		MISCELLANEOUS	
312	1	Lens, chippers and grinders, clear, set of 12	10–O
	2	Lens, helmet or hand shield, welders, filter, shade No. 10, set of 12	10–O
312	3	Fuses, 2 each, 150A, 20A, 15A, 10A	10–O
	4	Flux, brazing, three 1-pound cans	10–O
	5	Packing, V-type, two sets of 5 in each set	10–O
	6	Lamps, three sets of 2 each, 60W 115V, 100W 115V, and 300W 115V	10–O
	7	Fuse links, spares, 100 each of 20A, 15A, 10A, and 50 each of 150A	10–O
	8	Brushes, for dynamotor-welder, two sets of 20	10–O
	9	Blades, band saw, set of 12	10–O
	10	Cloth, emery, 9 x 11 inches, 25 sheets, grade 00 and grade 1	10–O
	11	Paper, silicon carbide, sheet 9 x 11 inches, grade 60, two quires	10–O
		HONING MACHINE ACCESSORIES	
313	1	Stone, range .480 to .600 inch	11–O
	2	Stone, range .600 to .720 inch	11–O
	3	Stone, range .480 to .600 inch	11–O
	4	Stone, range .600 to .720 inch	11–O
	5	Stone, range .720 to .855 inch	11–O
	6	Stone, range .855 to .990 inch	11–O
	7	Stone, range .990 to 1.125 inch	11–O
	8	Stone, range 1.125 to 1.437 inch	11–O
	9	Stone, range 1.437 to 1.750 inch	11–O
	10	Stone, range 1.750 to 2.062 inch	11–O
	11	Stone, range .720 to .855 inch	11–O
	12	Stone, range .855 to .990 inch	11–O
	13	Stone, range .990 to 1.125 inch	11–O
	14	Stone, range 1.125 to 1.437 inch	11–O
	15	Stone, range 1.437 to 1.750 inch	11–O
	16	Stone, range 1.750 to 2.062 inch	11–O
	17	Stone, range 2.500 to 3.000 inch	11–O
	18	Stone, range 2.000 to 2.500 inch	11–O
	19	Stone, range 2.000 to 2.500 inch	11–O
	20	Stone, range 2.500 to 3.000 inch	11–O
	21	Stone, dressing stick	11–O
	22	Wrench, Allen, set of 3, 7/32, ¼ and 5/16 inch	11–O
	23	Drain, pipe and cap	11–O
	24	Head, honing, regular type, range .480 to .720 inch	11–O
	25	Head, honing, regular type, range .720 to 1.125 inch	11–O
	26	Head, honing, blind type, range 1.125 to 2.062 inch	11–O
	27	Head, honing, regular type, range 2.0 to 3.0 inch	11–O
	28	Fixture, connecting rod	11–O
	29	Pedal, foot, with chain	11–O

Fig. No.	Index No.	Description	Shop location
		MISCELLANEOUS	
314	1	Clamp, C, light service, 2 inch, set of four	12–O
	2	Clamp, C, medium service, 4 inch, set of four	12–O
	3	Clamp, C, medium service, 8 inch, set of four	12–O
	4	Clamp, screw, quick adjusting, sliding head, 8 inches	12–O
	5	Clamp, deep reach, 8 inches x 12 inches, set of two	12–O
		MISCELLANEOUS	
315	1	Distributor, 3-way air hose, with one male and three female QAW couplings	13–O
		100-TON HYDRAULIC PRESS	
316	1	Press, hydraulic, portable, 100-ton, tractor service	1–P
	2	Ram, hydraulic, 100-ton push, 80-ton pull, 14 inch travel	1–P
	3	Pump, hydraulic, hand, 3-speed	1–P
	4	Gage, hydraulic	1–P
		ANVIL	
317	1	Anvil, blacksmith's, steel, 100-pound	2–P
	2	Stand, anvil, with 4 pipe legs	2–P
		VISE	
318	1	Vise, combination bench and pipe, swivel base, 4½ inch jaw	3–P
		WELDER'S KIT—ACCESSORIES	
319	1	Regulator, 2-stage acetylene, with 400 and 30 pound gages	4–P
	2	Regulator, 2-stage oxygen, with 3,000 and 100 pound gages	4–P
	3	Hose, gas, double combination, braided, 75 feet long	4–P
		MISCELLANEOUS	
320	1	Clipper, bolt, rigid head cutter, angular cut, ½ inch capacity	5–P
	2	Floodlight, with body clamp and base, 150-W, 110-V bulb	5–P
321	1	Bar, crow, pinchpoint, set of 2, 48 inches and 36 inches	1–Q
	2	Sledge, blacksmith's, double face, handled, 8-pound	1–Q
	3	Wrench, pipe, adjustable, heavy duty forged aluminum alloy, with replaceable jaws, 36 inches long	1–Q
	4	Wrench, adjustable, pinned jaw type, single head, open end, extra heavy duty, 1⅜ to 2⅞ inches opening, 24 inch nominal length	1–Q
	5	Ladle, melting, bottom pouring, 6 inch diameter, 2-pint capacity	1–Q
		VISE	
322	1	Vise, combination bench and pipe, swivel base, 4½ inch jaw	2–Q
		RADIAL DRILL—ACCESSORIES	
323	1	Drill, pneumatic, 3 HP piston type, safety reversible handle and throttle with QAW male coupling, free speed 350 RPM, 1½ inch capacity, equipped with No. 4 Morse taper socket	3–Q
	2	Hose, air, ½ inch x 7 feet	3–Q
	3	Wrench, structural, set of 2, 1 inch and 1¼ inch	3–Q
	4	Oiler, steel, round, force feed, ½-pint capacity, 6-inch bent spout	3–Q
	5	Hoist, jack, 1-ton capacity	3–Q
		RADIAL DRILL	
324	1	Arm, radial drill	3–Q
		MISCELLANEOUS	
325	1	Floodlight, with body clamp and base, 150-W, 110-V bulb	4–Q
		MISCELLANEOUS	
		Chocks, wheel (not illustrated)	1–R
		Ring, lifting, for dynamotor-welder (not illustrated)	1–R
326	1	Cable, welding, ground, 40 feet, with ground clamp and dip attached	1–R
	2	Cable, welding, electric arc, 60 feet, with special plug and electrode holder	1–R

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		MISCELLANEOUS	
327	1	Vise, pressure	2–R
		100-TON HYDRAULIC PRESS ACCESSORIES	
328	1	Bar, puller, set of two	3–R
	2	Adapter, set of three	3–R
	3	Arm, set of three	3–R
	4	Cap, ram	3–R
	5	Pin, set of six	3–R
	6	Pin and cotter keys, set of seven	3–R
	7	Plug, shaft driver	3–R
	8	Pusher, sprocket, group	3–R
	9	Adapter, collar	3–R
	10	Adapter, collar, set of two	3–R
	11	Adapter, ram coupling	3–R
	12	Adapter, threaded, set of two, 1⅜—12 and 1½—12	3–R
	13	Adapter, threaded, set of two, 1¾—12 and 2½—12	3–R
	14	Spacer, group	3–R
329	1	Adapter, pin and bushing, set of four	3–R
	2	Collar, bushing assembly, set of three	3–R
	3	Pin, bushing assembly	3–R
	4	Pin, bushing	3–R
	5	Pin, bushing assembly	3–R
	6	Pin, bushing assembly	3–R
	7	Pin, bushing, set of two	3–R
	8	Yoke, track service	3–R
	9	Adapter, ram cap	3–R
	10	Cap, ram recessed	3–R
	11	Adapter, track, service yoke	3–R
	12	Yoke, puller shaft	3–R
	13	Coupler, hydraulic, set of two	3–R
	14	Hose, hydraulic, ½ inch x 8 feet, set of two	3–R
	15	Handle, for ram when out of press frame	3–R
	16	Handle, pump	3–R
		MISCELLANEOUS	
330	1	Can, gasoline, iron, galvanized, 2½ gallons	1–S
	2	Oil, lubricating, engine automotive and diesel, grade SAE 30, 1-quart can	1–S
	3	Jack, automobile and motor truck hydraulic, 12-ton	1–S
	4	Pipe foot, part of 1-ton hoist jack	1–S
	5	Oil, lubricating, preservative, general use, 1-quart can	1–S
	6	Fluid oil, hydraulic, for jacks, two 1-gallon cans	1–S
	7	Oil, cutting, lard, two 1-gallon cans	1–S
	8	Oil, honing, for Ammco honing machine, 5-gallon pail	1–S
		Retractor, jack spring, for servicing the hydraulic jacks built in the corners of the body (not illustrated)	1–S
		BRAKE RELINING MACHINE	
331	1	Machine, brake relining, heavy duty, bench type, 8-inch throat, 115 volt, 60 cycle, single phase, induction motor	2–S
		BRAKE RELINING MACHINE ACCESSORIES	
332	1	Countersink and drill, set of five	3–S
	2	Drill, center, set of three, 5/32, 3/16 and ¼ inch	3–S
	3	Punch, offset knockout, set of two, with 9/64 inch and 3/16 inch insertable point	3–S
	4	Punch, point only, set of three, 9/64, 3/16 and ¼ inch	3–S
	5	Clincher, straight roll, set of three, for 9/64 inch, 3/16 inch and ¼ inch rivets	3–S
	6	Clincher, star, for clutch facings, 9/64 inch	3–S
	7	Clincher, short, for blocks	3–S
	8	Anvil, plain, set of two, for 5/16 inch and ⅜ inch head rivets	3–S
	9	Anvil, long, set of two, for ⅜ inch and ½ inch rivets	3–S
	10	Knockout, rivet	3–S
	11	Holder, rivet tube, set of two, 5/16 inch and ⅜ inch head	3–S
	12	Wrench, Allen	3–S
	13	Screw, Allen, set of two, ¼ x ⅛ and ¼ x ¼ inch	3–S
	14	Bolts, carriage, with nuts and locks, two sets of four, ¼ x 2 and 3/16 x 1 inch	3–S
	15	Bolt, special machine, 5/16 x 1 inch, with nut	3–S
	16	Bag, dust	3–S
	17	Sleeve, grinding	3–S
	18	Box, rivet	3–S
		FIRE EXTINGUISHER	
		Extinguisher, fire, carbon dioxide (not illustrated)	1–T

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		TENTING	
		Frame, pipe, for canvas tenting (not illustrated)	2–T
		MISCELLANEOUS	
		Ladder, step, general purpose (not illustrated)	3–T
		Handles, for hydraulic jacks, built in on truck, set of four (not illustrated)	3–T
		INDUSTRIAL ENGINE	
		Engine, gasoline, industrial type, liquid cooled (not illustrated)	4–T
		Governor, supplied and installed with industrial engine, rated at 1,800 RPM (not illustrated)	4–T
		DIESEL INJECTOR REPAIR KIT	
333	1	Fixture, test, for Cummins engine models A, H, and NH injectors	1–U
	2	Tester, diesel injector, hydraulic hand, complete with 5,000 psi. gage, double outlet block having 14 x 1.5-mm x 60 degrees cone outlet connection	1–U
	3	Fixture, test for GM 71 (and 110) series injectors, with 2,000 psi. gage pumping lever and cam-operated quick-clamp connector with replaceable seals for use with diesel injector tester	1–U
	4	Brush, cleaning, fuel hole	1–U
	5	Brush, cleaning, rack hole	1–U
	6	Hone	1–U
	7	Reamer, spray tip	1–U
	8	Roll, canvas	1–U
	9	Block, lapping, diesel valve, set of two	1–U
	10	Jaws, vise, diesel injector holding	1–U
	11	Drill, twist, cleaning, set of two, 0.0175 and 0.01968 inch	1–U
	12	Gage, diesel timing, 1.460 inch, high output	1–U
	13	Driver, diesel injector repair	1–U
	14	Compound, lapping, No. 600 Alundum, grade A	1–U
	15	Lifter, diesel injector spring	1–U
	16	Wrench, injector nut	1–U
	17	Needle, cleaning, 5 each of 16 following sizes, all 2½ inches long, diameter in inches: 0.006, 0.007, 0.008, 0.009, 0.010, 0.011, 0.012, 0.013, 0.014, 0.016, 0.020, 0.024, 0.033, 0.035, 0.041 and 0.0465	1–U
	18	Vise, pin, set of 2, 0 to 0.40 and 0.030 to 0.062 inch capacity	1–U
	19	Box, metal, for small parts	1–U
		Chest, metal, carrying case (not illustrated)	1–U
		LATHE ACCESSORIES	
334	1	Motor, overhead drive for lathe	2–U
		HEATER	
		Heater, 20,000 BTU. (not illustrated)	3–U
		MISCELLANEOUS	
335	1	Boards, order, set of two	4–U
	2	Vise, clamp type, 2½ inch jaws	4–U
		BLOWER	
		Blower, ventilating, set of two (not illustrated)	5–U
		MISCELLANEOUS	
		Mat, rubber for floor (not illustrated)	6–U
336	1	Sling, chain, 10 foot, ¼ inch, with 2 shackles and 2 hooks	6–U
	2	Broom, fiber	6–U
		Lamp, adjustable arm, set of four (not illustrated)	6–U
		Traveller, rolls in U-track the length of body, built-in (not illustrated)	6–U
		CYLINDER BORING BAR	
337	1	Bar, boring, cylinder, motor driven 110 volt, 60 cycles, 1-phase capacity 2.600 to 5.343 inches, with 15 foot cord	7–U
		CYLINDER BORING BAR ACCESSORIES	
338	1	Shoes, five sets of 4, catspaw Nos. 1, 2, 3, 4 and 5	7–U
	2	Stick, honing, set of 2, 5/16 x 5/16 x 4 and ½ x ½ x 3 inches	7–U
	3	Holder, tool, set of 2, small and large with bit	7–U
	4	Micrometer, special with adjusting wrench	7–U
	5	Hood, chip collector, set of two, small and large	7–U

2. Item Identification and Location—Continued

Fig. No.	Index No.	Description	Shop location
		CYLINDER BORING EAR ACCESSORIES—Continued	
338	6	Screw, special, for 60 HP Ford	7–U
	7	Holder, tool extractor	7–U
	8	Brush, wire handle, 9 inches long	7–U
	9	Screwdriver, common, plastic handle, blade 2 inches long, bit 9/32 inch	7–U
	10	Wrench, pin, for setting tool	7–U
	11	Wrench, Allen, set of four	7–U
	12	Fixture, lapping	7–U
	13	Box, metal, 12 x 7 x 2 inches	7–U
	14	Handle, anchor with nut	7–U
	15	Bridge, clamp	7–U
	16	Key, anchor	7–U
	17	Clamp, anchor	7–U
	18	Anchor, complete	7–U
	19	Holder, anchor	7–U
	20	Screw, anchor, long	7–U
	21	Crank, feed engage	7–U
	22	Oil, lapping	7–U
	23	Bag, canvas, set of 2	7–U

3. Alphabetical Listing of Complete Shop Load

Fig. No.	Index No.	Description	Shop location
295	6	Adapter, acetylene regulator	6–N
276	8	Adapter, pin-type, Alemite	6–K
294	29	Adapter, receptacle, 3 pole polarized plug	5–N
228	1	Adapter, sander to grinder disk	4–C
242	----	Analyzer, engine, set of 11 items	1–G
317	1	Anvil, blacksmith, 100 lb	2–P
324	1	Arm, radial drill, Couse folding-arm type	3–Q
272	1	Attachment, tire inflation with chuck, leader hose and gage, with ¼ inch Eastman Snap-Tite coupler	1–K
295	16	Awl, scratch, 6 in	6–N
337 338	1	Bar, boring cylinder, motor driven 110 volt, 60 cycles, 1-phase, capacity 2.600 to 5.343 inches, with 31 accessories	7–U
		Bar, crow, pinchpoint:	
321	1	36 in	1–Q
321	1	48 in	1–Q
219	4	Bar, knockout, ⅞ x 36 inches	1–B
224	8	Bar, pry, 18 in	1–C
		Base, for lathe (not illustrated)	3–G
220	1	Belts, V-type, size C set of 12 (not illustrated)	4–B 10–G
235	5	Bevel, universal	1–E
		Bit, lathe tool holder:	
233	1	¼ x ¼ in., high speed steel, set of 6	1–E
233	2	5/16 x 5/16 in., high speed steel, set of 28	1–E
233	3	5/16 x 5/16 in., high speed steel, set of 6	1–E
233	4	⅜ x ⅜ x 2½ in., carbide, left	1–E
233	5	⅜ x ⅜ x 2½ in., carbide, nose	1–E
233	6	⅜ x ⅜ x 2½ in., carbide, right	1–E
233	7	⅜ x ⅜ in., high speed steel, set of 6	1–E
233	8	½ x ½ in., high speed steel	1–E
231	11	Blade, combination square, 18 in	1–E
212	9	Blades, band saw, set of 12	10–O
246	8	Blades, hacksaw, 10 in., 24 teeth, set of 12	6–O
294	11	Blades, hacksaw, 12 in., 24 teeth, set of 24	5–N
248	2	Block, sheetmetal worker's dolly, general purpose	8–G
248	4	Block, sheetmetal worker's dolly, heel type	8–G
		Blowers, ventilating, set of 2 (not illustrated)	5–U
		Blower, ventilating (not illustrated)	3–B
246	2	Blowgun, bronze, ⅜ inch	6–G
335	1	Boards, order, set of 2	4–U
231	5	Book, reference, Machinists' Handbook, American	1–E
246	10	Brass, commercial; 1-in. diameter x 1-ft. long	6–G
296	----	Brazing and soldering kit, set of 16 items	7–N
336	2	Broom, fiber	6–U
270	5	Brush, lathe	4–J
295	23	Brush, wire, scratch	6–N
312	8	Brushes, for dynamotor-welder, set of 40	10–O
300	12	Bucket, general purpose, 14 qt	11–N
283	1	Cables, battery connecting, set of 5	1–L
216	2	Cable, emergency, 50 feet	1–A
326	1	Cable, welding, ground, 40 feet	1–R
326	2	Cable, welding, electric arc, 60 feet with special plug and electrode holder	1–R

3. Alphabetical Listing of Complete Shop Load—Continued

Fig. No.	Index No.	Description	Shop location
231	9	Caliper and divider, maximum capacity 40 inches, w/ball point attachment w/4 ball points and holder	1–E
232	3	Caliper, hermaphrodite, adjustable point, 6 in	1–E
231	2	Caliper, micrometer, inside, 1½ to 12 in	1–E
		Caliper, micrometer, outside, single with locknut and ratchet stop:	
236	1	0 to 1 in	1–E
236	1	1 to 2 in	1–E
236	1	2 to 3 in	1–E
		Caliper, spring inside:	
232	2	3 in	1–E
232	2	6 in	1–E
		Caliper, spring outside:	
232	1	6 in	1–E
232	1	Toolmaker's 3 in	1–E
235	1	Caliper, vernier, inside and outside, 6 in	1–E
238	1	Caliper, vernier, inside and outside, 12 in	1–E
330	1	Can, gasoline, iron, 2½ gallon capacity	1–S
		Carrier, water, 4-gallon capacity, (not illustrated)	2–K
282	1	Charger, battery, rectifier, dry plate, fast 115 volt, 60 cycle, single phase, 75 amperes capacity charge	1–L
294	35	Chest, tool, electrician's steel	9–N
238	4	Chest, machinist's precision	1–E
225	8	Chest, tool, master mechanic's steel	1–C
295	26	Chest, welder's, steel	6–N
294	28	Chisel, machinist's, hand cold, single, ½ in. bit, ⅛ in. hex., 6 in. long	5–N
		Chisel, machinist's, hand, cold, single:	
223	16	⅜ in. bit, ⅝ in. hex., 5½ in. long	1–C
222	27	¼ in. bit, ⅝ in. hex., 7 in. long	1–C
224	6	⅜ in. bit, ¾ in. hex., 8 in. long	1–C
295	17	Set of two	6–N
224	7	Chisel, rivet buster, ⅜ in. bit, ¾ in. hex., 12 in. long	1–C
		Chisel, woodworkers, socket, firmer, handled, single:	
294	32	⅜ in	5–N
294	32	¼ in	5–N
		Chocks, wheel, (not illustrated)	1–R
314	1	Clamp, C, light service, 2 in., set of 4	12–O
		Clamp, C medium service:	
314	2	4 in., set of 4	12–O
314	3	8 in., set of 4	12–O
314	5	Clamp, C, deep reach, medium to heavy service, 8 inch opening, 12 inch depth, set of 2	12–O
314	4	Clamp, screw, quick adjusting, sliding head, 8 in	12–O
270	4	Cleaner, file, combination card and brush	4–J
295	7	Cleaner, set, welding and cutting equipment	6–N
320	1	Clipper, bolt, rigid head cutter, angular cut, ½ in. capacity	5–P
300	4	Cloth, asbestos, 3 x 6 feet, 1/16 inch thick	11–N
312	10	Cloth, emery, 9 x 11 inches, grade 00, 25 sheets	10–O
312	10	Cloth, emery, 9 x 11 inches, grade 1, 25 sheets	10–O
294	16	Compound, antifreeze for soldering iron tips	5–N
295	14	Compound, steel hardening nontoxic, 1-lb can	6–N
225	3	Compound, valve grinding, coarse-fine, 4 oz., 2 compartment can, set of 2	8–G
248	7	Compressor, air, 50 cfm at 1,800 rpm—100-pound pressure, (not illustrated)	5–G
225	4	Compressor, piston ring, hand type, 3½ to 7 in. capacity	1–C
295	5	Connector, acetylene, two-way	6–N
		Countersink and drill, combined, high speed steel, single:	
234	10	3/32 x 3/10 x 2⅛ in	1–E
234	10	7/32 x ½ x 3 in	1–E
276	9	Coupling, hose valve, Quick-As-Wink type, straight form male end steel with hose shank, ⅜ inch No. 2000 or equal, set of 2	6–K
276	9	Coupling, hose valve, Quick-As-Wink type, straight form male end steel with hose shank, ½ inch No. 2000 or equal, set of 2	6–K
295	18	Crayon, metal worker's, soapstone, 3/16 x ½ x 5 in., 12 pieces	6–N
		Cubicle, electrical, control (not illustrated)	2–F
		Cushion units, set of 8 (not illustrated)	7–L
237	6	Cutter, glass, circle sweep type, 2 to 24 in. dia. capacity	1–E
237	5	Cutter, glass, turret head	1–E
261	2	Cutter, milling, face adjustable from 1¼" to 2½" with ⅜" square bits, No. 3 Morse taper shank	4–H
		Disk, sander, aluminum, oxide:	
228	4	7 in. dia., ⅞ inch dia. hole, No. 16 grit, set of 4	4–C
228	5	7 in. dia., ⅞ inch dia. hole, No. 24 grit, set of 4	4–C

3. Alphabetical Listing of Complete Shop Load—Continued

Fig. No.	Index No.	Description	Shop location
		Disk, sander, aluminum, oxide—Con.	
228	6	7 in. dia., ⅞ inch dia. hole, No. 40 grit, set of 4	4–C
228	7	7 in. dia., ⅞ inch dia. hole, No. 80 grit, set of 4	4–C
315	1	Distributor, 3 way air hose, with one male and three female QAW couplings	13–O
232	4	Divider, spring, 6 in	1–E
223	11	Dresser, contact point, flexible	1–C
233	10	Abrasive stone, set of 3	1–E
294	3	Cutting blade, length closed 3⅝ in. set of 2	5–N
263	1	Dresser, emery wheel, 4-cutter type, w/2 extra sets of cutters, complete w/wheels and washers	5–H
224	3	Drift, fiber, rod, 1 in. dia., 8 in. long, set of 2	1–C
258	1	Drill, electric, portable universal motor, 110 volts, ¼ in. drill, 0 to ¼ in. chuck, heavy duty, standard speed	3–H
274	----	Drill, electric ⅝ inch capacity	3–K
276	7	with stand, wrench, handle and pipe handle	6–K
279	1	Drill, pneumatic, ¼ inch capacity, reversible, piston type	8–K
276	6	Handle, for ¼ inch pneumatic drill	6–K
323	1	Drill, pneumatic, 1½ inch capacity, reversible, piston type	3–Q
261	8	Nut, spindle, extra for 1½ inch drill	4–H
261	9	Handle, for pneumatic drill	4–H
		Drill, twist, high speed steel, straight shank, fractional size, long series:	
275	5	5/16 in	4–K
275	5	⅝ in	4–K
255	1	Drill, twist, high speed steel, straight shank, fractional sizes, short series, 1/16 to ½ in. by 64ths, set of 30 items	3–H
256	1	Drill, twist, high speed steel, straight shank wire gage sizes, No. 1 to No. 60, set of 61 items	3–H
239	1	Drill, twist, high speed steel, taper shank, Morse, fractional sizes, 3 3/64 in. to 1 in. by 64ths, set of 32 items and stand	2–E
261	6	Driver, for ¼ inch sockets, No. 3 Morse taper	4–H
		Dynamotor-welder, with the following accessories:	
		(Not illustrated)	4–G
		Filter, dust, set of 4 (not illustrated)	4–G
		Panel, for welding jacks (not illustrated)	4–G
		Pulley, V-belt (not illustrated)	4–G

Fig. No.	Index No.	Description	Shop location
		Electrode, welding shield arc, alloy:	
		Size *Length* *Used For* *Qty.*	
300	7	1/8 14 aluminum 5-lb.	11–N
300	6	1/8 14 brass 5-lb.	11–N
300	10	3/16 14 hard facing 10-lb.	11–N
300	5	Electrode, welding shield arc, alloy, 5/32 in., 14 in. long, 10 lbs	11–N
300	9	Electrode, welding, shield arc, 1/8 in., 14 in. long, 10 lbs	11–N
300	8	Electrode, welding, shield arc, steel mild, 5/32 in., 14 in. long, general purpose, 50 lbs	11–N
300	11	Electrode, welding, shield arc Stoody tube Borium, ¼ inch, 5 lbs	11–N
		Engine, gasoline, industrial type, liquid cooled (not illustrated)	4–T
		With governor (not illustrated)	4–T
216	1	Extension, cord, 50-feet, set of two	1–A
		Extinguisher, fire, carbon dioxide, 15 lb. (not illustrated)	1–T
223	5	Extractor, screw, standard length, in set, 3/16 to ¾ in	1–C
308	----	Extractor and inserter set, bushing, 3/16 to 1 7/64 in. I. D., ⅝ to 1 3/16 in. O. D., set of 13 items and metal box	6–O
261	5	Figures and letters, stamping, steel, 3/16 in. characters	4–H
		File, American Standard, double cut:	
		Flat:	
		Bastard:	
226	12	12 in	2–C
226	17	16 in	2–C
		Half round:	
		Second cut:	
226	8	8 in., set of 2	2–C
226	13	12 in., set of 2	2–C
		Round, bastard:	
226	3	8 in	2–C
226	11	12 in., set of 2	2–C
294	14	12 in	5–N
226	15	14 in	2–C
226	16	16 in	2–C
		File, American Standard, lathe, flat:	
226	7	10 in	2–C
226	14	12 in	2–C
		File, American Standard, round, single cut, smooth:	
226	2	8 in	2–C
226	9	12 in	2–C
226	6	File, American Standard, saw, crosscut, 8 in	2–C
226	1	File, American Standard, saw, slim taper, single cut, 6 in	2–C
226	5	File, American Standard, saw, slim	2–C
294	13	taper, 8 in. set of 2	5–N
226	4	File, American Standard, saw, slim taper, single cut, 8 in	2–C

3. Alphabetical Listing of Complete Shop Load—Continued

Fig. No.	Index No.	Description	Shop location
226	10	File, American Standard, square, double cut, bastard, 12 in., set of 2	2–C
292	1	File, correspondence	2–N
233	11	File, Swiss pattern, needle in set, No. 2 cut, 5½ inch, 12 files, barrette, crossing, equaling flat, half round, joint, knife markings, round, slitting, square and 3 square	1–E
325	1	Floodlight, with body clamp and base	4–Q
320	2	150–W 110-V bulb, outdoor use, 12-foot cord, set of 2	5–P
330	6	Fluid, hydraulic, for jacks, two 1-gallon cans	1–S
295	11	Flux, brazing, four 1-lb. cans	6–N
312	4	Flux, brazing, three 1-lb cans	10–O
295	13	Flux, brazing, paste, silver, 8 oz	6–N
294	19	Flux, soldering paste, noncorrosive, two 2-oz. cans	5–N
295	10	Flux, welding and brazing, brass, copper, bronze, cast iron, and steel	6–N
248	8	Frames, hacksaw, adjustable, pistol	8–G
294	21	grip, 8 to 12 in., set of 2	5–N
268	1	Frame, hacksaw, nonadjustable, rail, 12 in	2–J
		Frame, pipe, for canvas tenting, (not illustrated)	2–T
312	3	Fuses, 2 each, 150A, 20A, 15A, 10A	10–O
312	7	Fuse links, spares, 150A	10–O
312	7	Fuse links, spares, 20A, 15A, 10A	10–O
235	6	Gage, center, U. S. Standard, 60 deg	1–E
235	4	Gage, depth, and protractor	1–E
235	2	Gage, drill point, with 6 in. hook rule	1–E
		Gage, fuel, (not illustrated)	11–G
223	4	Gage, screw pitch, metric thread, 28	1–G
234	4	pitches, 0.25 to 2.50 inclusive, set of 2	1–E
234	5	Gage, screw pitch, V-thread, 30 pitches, 4 to 42 inclusive	1–E
231	10	Gage, surface, universal, 3 in. base, 9 in. spindle	1–E
223	3	Gage, thick, U. S., 25 leaves, 3⅝ in. long	1–C
224	4	Gage, tire pressure, 10 to 160 lbs	1–C
248	12	Gasket paste, pliable, 11 oz. tube	8–G
295	21	Gloves, welders, leather 4 finger	6–N
300	3	and thumb type, 2 pair	11–N
295	3	Goggles, eyecup protective, over spectacle type, chipper's and grinder's	6–N
	3	Goggles, eyecup protective, welders	6–N
275	3	Grease, lubricating, mineral, 1 pound can	4–K
281	1	Grinder, electric, bench type, 1 HP, 220 volts, 60 cycles, 3 phase	10–K
253	----	Grinder, electric, valve refacer	2–H
304	1	wet type, 115 volt, universal motor	2–O
305	----	with 11 accessories	3–O
289	G	Grinder, electric, valve seat, 110 volt, universal motor, with 62 accessories	1–H
225	2	Grinder valve and valve seat, hand operated grinder type, with suction cup	1–C
278	1	Gun, lubricating with extension and adaptor	7–K
		Hammer, blacksmiths, cross-peen handled:	
246	1	2 lb	6–G
295	24	3 lb	6–N
248	3	Hammer, carpenters, nail, curved claw, handled, 1 lb	8–G
248	1	Hammer, ding, handled, 13 oz	8–G
		Hammer, machinist's ball peen, handled:	
225	5	2 oz	1–C
222	30	1½ lb., set of 2	1–G
270	11	----------	4–J
248	11	Hammer, plastic faced, 3 lb., set of 2	8–G
258	2	----------	3–N
276	1 to 5	Hammer, pneumatic, chipping, open handle, with 12 accessories	6–K
295	22	Hammer, tinners, setting, handled, 12 oz	6–N
295	25	Hammer, welders chipper, 16 oz	6–N
		Handles, for hydraulic jacks, set of 4, (not illustrated)	3–T
248	9	Hatchet, axe pattern, handled, 3⅜ in.	8–G
248	6	Hatchet, half, handled, 3½ in	8–G
		Heater, 20,000 Btu, set of 2 (not illustrated)	3–F
			3–U
300	2	Helmet, welders	11–N
323	5	Hoist, chain jack, 1 ton, with one	3–Q
330	4	accessory: pipe foot	1–S
311	1	Hone, bushing, precision, motor driven	9–O
313	1–29	⅓ HP, 110 volts, 60 cycles, 1 phase, bench type, wet type, range .480 to 3.0 in., with 29 accessories	11–O
323	2	Hose, air, ½ inch x 7 feet with QAW female coupling one end	3–Q
319	3	Hose, gas, double combination, braided, with couplings, ¼ in. dia., 75 ft. long	4–P
291	1	Hose, pneumatic, braided, ⅜ inch x 50 feet	4–M
291	2	Hose, pneumatic, braided, ⅜ inch x 50 feet	4–M
291	3	Hose, pneumatic, braided, ½ inch x 50 feet	4–M
291	4	Hose, air, ½ inch x 15 feet long	4–M

3. Alphabetical Listing of Complete Shop Load—Continued

Fig. No.	Index No.	Description	Shop location
249	1	Hotplate, electric	9–G
217	1	Hydrometer, antifreeze	2–A
217	2	Hydrometer, storage battery	2–A
295	8	Ignitor, oxyacetylene, with 6 spare flints	6–N
301	----	Indicator, compression, diesel engine,	13–N
302	----	50 to 1000 PSI range, 3½ in., dial, flexible connection complete with 16 accessories and two metal boxes	14–N
231	3	Indicator, dial, adjustable type, universal, range 0.20 in	1–E
294	12	Iron, soldering, electric	5–N
330	3	Jack, automobile and motor truck, hydraulic, 12 ton	1–S
261	7	Jack, machinist's, 2-ton, set of 2	4–H
		Kit, first aid, (not illustrated)	1–N
223	6	Knife, electricians, screwdriver and	1–C
294	3	cutting blade, length closed 3⅝ in., set of 2	5–N
225	6	Knife, putty, 1¼ x 3½ in. blade	1–C
		Ladder, step, metal, 18 in. wide, 66 in. high (not illustrated)	3–T
321	5	Ladle, melting, bottom pouring, 6 in. dia	1–Q
		Lamp, adjustable arm, set of 6, (not illustrated)	6–U
		(not illustrated)	4–A
		(not illustrated)	4–B
216	3	Lamp, electric, trouble, 35-foot cord, set of 2	1–A
312	6	Lamps, three sets of 2 each, 60 W 115 V, 100 W 115 V, and 300 W 115 V	10–O
244	1	Lathe, gap, sliding bed type, motor driven, 2 HP, 208 volt, 60 cycles, 3 phase, 14–28 in. x 72 in. capacity with the following accessories:	3–G
260	20	Adapter, headstocked	4–H
260	19	Adapter, tailstock	4–H
244	4	Belt, leather, flat, 2 ply, 2 x 77 in	3–G
244	6	Center, lathe, No. 3 Morse taper,	3–G
260	8	set of 3	4–H
240	1	Chuck, collet, spindle nose type	3–E
262	4	Chuck, 6 in., independent, 4 jaw	5–H
264	2	Chuck, 10 in., independent, 4 jaw	1–I
262	3	Chuck, 5 in., universal 3 jaw, inside and outside jaws	5–H
264	1	Chuck, 8 in., universal, 3 jaw, inside and outside jaws	1–I
260	11	Chuck, Jacobs, ⅛ to ⅝ inch	4–H
260	14	Clamp, jaw, face plate, set of 4	4–H
240	2	Collets, 1/16 to 1⅜ in., set of 11	3–E
245	1	Cover, lathe, canvas	3–G
262	1	Dog, lathe, bent tail, single screw, ½ in	5–H
262	1	Dog, lathe, bent tail, single screw 1¼ in	5–H
262	6	Dog, lathe, reversible, 3 to 6 in	5–H
260	13	Drift, drill or center key, No. 1 to 3	4–H
244	2	Face plate, 6 in	3–G
264	3	Face plate, 12 in	1–I
266	1	Face plate, 28 in	3–I
219	3	Gears, transposing, metric thread, mounted on quadrant	1–B
221	1	Gears, transposing, metric thread, set of 6	5–B
262	5	Holder, boring, for bars ½, ¾, and 1⅛ in. dia	5–H
260	4	Holder, boring tool, ½ x 1 in. shank, for 5/16 x 5/16 in. bit, reversible	4–H
260	12	Holder, knurling, ⅝ x 1⅜ x 6⅝ in	4–H
260	5	Holder, threading, ⅝ x 1⅜ in	4–H
260	6	Holder, tool, cutting off, right hand offset, ⅝ x 1⅜ inches, for ⅛ x ⅞ inch cutter	4–H
		Holder, turning tool, ½ x 1⅛ in., for 5/16 x 5/16 in. bit:	
260	1	Left hand offset	4–H
260	2	Straight shank	4–H
260	3	Right hand offset	4–H
244	3	Indicator, thread dial	3–C
334	1	Motor, overhead drive	2–U
260	10	Pilot, chuck	4–H
244	7	Post, tool	3–G
262	8	Rest, center	5–H
244	5	Sleeve, headstock spindle, No. 3 Morse taper hole	3–G
260	7	Sleeve, taper, set of 4, Morse No. 1 to 2, No. 1 to 3, No. 2 to 3 and No. 3 to 4	4–H
260	9	Socket, fitted, for No. 3 Morse taper shank drills	4–H
260	18	Spindle, centering	4–H
244	8	Stop, adjustable, thread cutting	3–G
262	2	Stop, micrometer, carriage	5–H
244	7	Tool post assembly	3–G
260	16	Wrench, compound and steady-rest	4–H
260	17	Wrench, tailstock	4–H
260	15	Wrench, tool post	4–H
312	1	Lens, chippers and grinders, clear, set of 12	10–O
295	9	Lens, goggles, welders, cover, 6 pair	6–N
		Lens, helmet or hand shield, welders:	
295	12	Cover, set of 12	6–N
312	2	Filter, shade No. 10, set of 12	10–O

3. Alphabetical Listing of Complete Shop Load—Continued

Fig. No.	Index No.	Description	Shop location
		Level and plumb, carpenters, metal, nonadjustable:	
231	8	12 in	1–E
217	4	18 in	2–A
248	5	Lifter and compressor, valve and valve spring, C-shape type, with offset.	8–G
275	4	Lubricant, 1-pound can	4–K
331	1	Machine, brake relining heavy duty,	
332		bench type, with 33 accessories	2–S
			3–S
		Mandrel, lathe, expanding, ½ to 1 9/16 in., set of 3 items:	
238	3	½ to 1 1/16 in. capacity	1–E
238	3	1 1/16 to 1 in. capacity	1–E
238	3	1 to 1 9/16 in. capacity	1–E
		Mandrel, lathe, 1½ to 3¾ in., capacity set of 3 items:	
227	1	1½ to 2 in. capacity	3–C
227	1	2 to 2¾ in. capacity	3–C
227	1	2¾ to 3¾ in. capacity	3–C
238	2	Mandrels, set of 5, solid, sizes: ½ x 5/16, ⅜, 7/16 and ½ inch	1–E
		Mat, rubber for floor, set of 3	
		(not illustrated)	2–I
		(not illustrated)	11–K
		(not illustrated)	6–U
250		Milling attachment, lathe, size 2	
243		motor driven ½ HP, 115–230 volt,	
259		60 cycle, 1 phase, with 91 acces-	
254		sories	1–H
			2–G
			4–H
			2–H
294	9	Nipper, shoeing, 8 inch	5–N
330	7	Oil, cutting, lard, two 1-gallon cans	1–S
330	7	Oil, honing, 5-gallon pail	1–S
330	2	Oil, lubricating, engine, automotive and diesel, Grade SAE 30, 1 qt.	
		can	1–S
330	5	Oil, lubricating, preservative, general	
		use, 1 qt. can	1–S
323	4	Oiler, steel, round, ½ pt. capacity,	
		set of 3	3–Q
217	3		2–A
219	2		1–B
275	6	Packing, sheet, asbestos, metallic	
		cloth	4–K
		Thickness In. *Width In.* *Length In.*	
		1/16 10 40	
290	3	Packing, sheet, rubber, cloth in-	
		serted	3–M
		Thickness In. *Width In.* *Length In.*	
		⅛ 36 36	
290	1	Packing, sheet, Vellumoid, 2 sheets	3–M
		Thickness In. *Width In.* *Length In.*	
		1/16 36 36	
290	2	Packing, sheet, Vellumoid, 2 sheets	3–M
		Thickness In. *Width In.* *Length In.*	
		1/32 36 36	
312	5	Packing, V-type, set of 10	10–O
248	13	Packing, water pump, metallic, graphite twisted, ⅛ in., 1 lb. roll	8–G
312	11	Paper, silicon carbide, sheet, 9 x 11 in., Grade 60, set of 2 qr	10–O
294	25	Pencil, wood cased, lead, carpenters, set of 2	5–N
234	1	Pigment, in oil, blue, nondrying, 2 oz. tube	1–E
270	1	Pigment, in oil, white lead, basic carbonate, 1-lb. can	4–J
230	3	Pin, cotter, assorted box of 400, 1/16 x ⅛ x 2 inches	1–D
230	2	Pin, taper, steel, assorted, No. 00000 to No. 6 inclusive, box of 100	1–D
		Pipe, flexible, (not illustrated)	5–G
234	3	Pliers, chain, round nose long, with-	
		out cutter, 6 in., set of 2	1–E
294	6		5–N
223	10	Pliers, combination, slip joint, 6 inch	1–C
270	6	Pliers, combination, slip joint, 6 inch	4–J
222	28	Pliers, diagonal cutting, 7 in., set	
		of 3	1–C
270	7		4–J
294	7	Pliers, diagonal cutting, 7 in	5–N
223	9	Pliers, flat, narrow nose, 6 in	1–C
223	8	Pliers, ignition, 4½ in	1–C
294	8	Pliers, linemans, side cutting, 8 in.,	
		set of 2	5–N
295	19		6–N
222	29	Pliers, water pump, 10 in., set of 2	1–C
294	10	Pliers, water pump, 10 in	5–N
288	1	Pot, compound, 10 qt. capacity	7–L
267	1	Press, hydraulic, portable, 10 ton,	
		consisting of 27 items	1–J
271			6–J
316		Press, hydraulic, portable, 100-ton,	
		tractor service, with 44 accessories	1–P
328			3–R
329			3–R
225	5	Puller, stud, ¼ to ¾ in	1–C
		Pulley, V-belt, 11 inch PD, 6 groove,	
		(not illustrated)	10–C
224	9	Punch, center, octagon, single ⅝ x	
		6 in	1–C
294	27		5–N
270	2	Punch, center, octagon, single, ⅜ x	
		4½ in. type II, FS GGG–P–831	4–J
		Punch, drive pin, single:	
223	12	1/16 x 4 in	1–C
234	9	3/32 x 4 in	1–E
223	13	⅛ x 4 in., set of 3	1–C
294	26	½ x 5 in., set of 2	5–N
234	9	5/32 x 4 in	1–E

3. Alphabetical Listing of Complete Shop Load—Continued

Fig. No.	Index No.	Description	Shop location
234	9	3/16 x 4 in	1–E
223	14	1/4 x 4 in	1–C
294	26	1/4 x 4 in., set of 2	5–N
234	8	Punch, prick, 3/8 x 5 in	1–E
223	15	Punch, prick, 3/8 x 5½ in	1–C
		Punch, taper:	
270	3	3/8 x 9½ in	4–J
224	10	5/16 x 14 in	1–C
309	1	Reamer, carbon steel, straight shank, square end, hand adjustable, ground for brass or bronze, size A to L inclusive, set of 13 items	7–O
231	6	Reamer, carbon steel, straight shank, square end, taper pin, spiral flute, set of five, and wood box, Nos. 000000, 00000, 0000, 000 and 00	1–E
231	7	Reamer, carbon steel, straight shank, square end, taper pin, spiral flutes, in set, No. 00 to 5, with case	1–E
261	1	Reamer, cylinder ridge, precision type, 2 5/16 to 4¾ in. range	4–H
261	3 to 4	Reamer, cylinder ridge, precision type, 4⅞ to 6 7/16 in. range, with one accessory	4–H
234	11	Reamer, high speed steel, straight shank, center 60 deg., fluted type, ¾ inch	1–E
234	11	Reamer, high speed steel, straight shank, center, 82 degree, fluted type, ¾ in	1–E
273	1	Reel, hose, spring-windup type, complete with 25 ft. of ⅜ in. braided hose	1–K
319	1	Regulator, 2 stage, acetylene, with 400 and 30 lb. gages	4–P
319	2	Regulator, 2 stage, oxygen, with 3,000 and 100 lb. gages	4–P
		Retractor, jack spring, for servicing the hydraulic jacks built in the corners of the body (not illustrated)	1–S
237	3	Retriever, magnet type	1–E
		Ring, lifting for dynamotor-welder, (not illustrated)	1–R
300	13	Rod, welding, oxyacetylene, cast iron, 1/16 x 24 inch, 10 lbs	11–N
300	14	Rod, welding, oxyacetylene, manganese bronze, ⅛ x 36 in., 10-lbs	11–N
		Rod, welding, oxyacetylene, steel, plain or copper coated:	
300	15	⅛ x 36 in., 10-lbs	11–N
300	16	3/16 x 36 in., 20-lbs	11–N
219	2	Rope, braided, ½ inch, 10 foot length	1–B
235	3	Rule, steel, spring tempered, English, 6 in., 16ths, 32nds, 64ths, and 100th graduations	1–E
235	7	Rule, tape, steel, pull-push, English, 78¾ in. 2 meters long, 16ths in., mm. graduations	1–E
223	7	Rule, tape, steel, pull-push, inside and outside, depth and height measuring, English, 72 inches, 16th and 32nd graduations, set of 2	5–N
228	3	Sander, electric, portable, disk type, 7 in. dia	4–C
299	1	Saw, band, metal cutting, motor driven, 110 volt, 60 cycle, 1 phase, 3½ in	10–N
276	10	Saw, hack, pneumatic, hand, with 4 accessories	6–K
		Saw, hand, nest of saws, consisting of 4 items:	
294	15	Blade, compass, 14 in	5–N
294	15	Blade, keyhole, 10 in	5–N
294	15	Blade, nail cutter, 14 in	5–N
294	15	Handle, saw	5–N
		Scraper, bearing, hollow ground, set of 3 items:	
224	11	3 in. blade, 10 in long	1–C
224	11	3½ in. blade, 11 in. long	1–C
224	11	4 in. blade, 12 in. long	1–C
225	7	Scraper, carbon, flexible, 9 in	1–C
223	19	Screwdriver, close quarter, plastic handle, 7/32 x 1 inch	1–C
223	23	Screwdriver, common, plastic handle, 5/16 x 6 in., set of 2	5–N
		Screwdriver, common, plastic handle:	
223	24	⅜ x 6 inches, heavy duty	1–C
223	25	7/16 x 8 inches, heavy duty, set of 3	1–C
270	10	¼ x 4 inches, set of 3	4–J
294	30	5/16 x 3 inches, set of 6	5–N
270	10	¼ x 4 inches	4–J
270	10	⅜ x 12 inches, set of 2	4–J
294	22	Screwdriver, jewelers, set of 6	5–N
223	18	Screwdriver, offset, single, 4 in. long	1–C
235	9	Screwdriver, pocket, 1⅞ in. blade	1–E
		Screwdriver, recessed screw, Phillips type, plastic handle:	
223	20	3 in. blade, No. 1 point, set of 2	1–C
294	31	3 in. blade, No. 1 point set of 3	5–N
223	21	4 in. blade, No. 2 point, set of 2	1–C
294	31	4 in. blade No. 2 point, set of 3	5–N
294	31	6 in. blade, No. 3 point	5–N
223	22	Screwdriver, spark testing, 5/16 x 6 inches	1–C
294	30	Screwdriver, straight tip, extra light duty, plastic handle, 5/64 x 3 inches	5–N
294	30	Screwdriver, straight tip, light duty, plastic handle, 5/16 x 5 inches	5–N
294	30	Screwdriver, straight tip, plastic handle, 5/16 x 3 inches	5–N

3. Alphabetical Listing of Complete Shop Load—Continued

Fig. No.	Index No.	Description	Shop location
223	17	Scriber, pocket, 2⅞ in. blade	1–C
235	8	set of 3	1–E
294	1	Scriber, pocket, 2⅞ in. blade	5–N
		Shaft, jack, for compressor, (not illustrated)	5–G
246	9	Shears, tinners, snip, straight cut, 2 in. cut, 8 in. long	6–G
248	10	Shellac, gasket, liquid 2-ounce bottle	8–G
300	1	Shield, welders, hand held	11–N
290	4	Shim stock, laminated, 0.002 laminations, 0.016 in. thickness, 8 x 48 in. sheet	3–M
321	2	Sledge, blacksmiths, double face, handled, 8 lb	1–Q
336	1	Sling, chain, 10 foot, ¼ inch, with 2 shackles and 2 hooks, set of 2	6–U
295	15	Solder, silver, wire, 1/32 in. dia., 8-oz. roll	6–N
294	18	Solder, tin-lead, wire, composition SN 40, acid core, ⅛ in., 5 lbs. spool	5–N
294	17	Solder, tin-lead, wire, composition SN 40, rosin core, ⅛ in., 1 lb. spool	5–N
303	----	Sprayer, paint, pneumatic, portable,	
218		without compressor, with 11 accessories	1–O 3–A
217	5	Square, carpenters, steel, 16 x 24 in. blade	2–A
234	6	Square, machinists, combination with center head, 6 in. blade	1–E
237	2	Square, machinists, combination, with center head and bevel protractor, 12 in. blade	1–E
317	2	Stand, anvil, with 4 pipe legs	2–P
231	4	Stone, sharpening, 1 in. thick x 2 in. wide x 8 in. long	1–E
233	9	Stone, sharpening, ⅛ x 4 in. long	1–E
265	1	Stool, step, combination	2–I
		Tank, air, built into body, (not illustrated)	2–B
286	1	Tap, pipe, National taper, carbon steel, right hand, set of 11 items, tap sizes ⅛ to 1½ inch	5–L
237	1	Tap, spark plug, set of 4, 10-mm x 1.00, 14-mm x 1.25, 18-mm x 1.50 and ⅞ inch x 18 N. S. T. S., with counterbore for 14-mm, 18-mm and ⅞ inch taps and wood case	1–E
294	24	Tape, friction, general use, ½ in. wide, ½ lb. roll	5–N
294	23	Tape, insulating, rubber, ¾ in. wide, 30 ft. roll	5–N
		Tenting, canvas, no. 12 duck, fire and waterproof with pipe frame,	
		(not illustrated)	2–L
		(not illustrated)	2–M
		(not illustrated)	2–T
229	1	Tester, volt-ohmmeter for ac and dc current	5–C
294	20	Tester, voltage, combination ac and dc, ac 110 to 550 volt, dc 125 to 600 volt	5–N
284	1	Threading set, bolt and screw, N. C. and N. F., adjustable round split dies, right hand, ¼ to ½ in., consisting of 44 items	3–L
231	1	Threading, bolt and screw, N.C. and N. F., adjustable, round split dies, 24 items, gage No. 4 to No. 12	1–E
285	1	Threading set, bolt and screw, N. C. and N. F., adjustable round split dies, right hand, 5/16 to 1 in. consisting of 44 items	4–L
287	1	Threading set, pipe, National pipe thread, nonadjustable, with individual heads and renewable dies, ratchet, set of 8 items, ⅛ to ¾ inch	6–L
306	----	Tool set, carburetor service, consisting of 43 items	4–O
333	----	Tool set, diesel injector repair, pressure test, hand, hydraulic unit, consisting of 22 items	1–U
241	----	Tool set, impact wrench, with 29 accessories	1–F
293	----	Tool set, pneumatic, combination drill	4–N
277	----	grinder and buffer, consisting of 35 items	6–K
298	----	Tool set, tractor, maintenance, consisting of 45 items	9–N
307	----	Tool set, tubing, consisting of 13 items	5–O
295	1	Torch, oxyacetylene, cutting and welding, with 3 cutting tips, and 5 welding tips and wrench	6–N
		Traveller, rolls in U-track (not illustrated)	6–U
247	1	Tray, metal, parts, set of 4	7–G
234	7	Tweezers, type No. 6	1–E
294	2	Tweezers, 4½ in., with case	5–N
335	2	Vise, clamp type, 2½ inch jaws	4–U
322	1	Vise, combination bench and pipe,	2–Q
318	1	swivel base, 4½ inch jaw, set of 2	P–3
280	1	Vise, combination bench and pipe, 4½ inch jaw (less base)	9–K
275	1	Vise, drill press, flanged type, heavy duty, 3½ in. jaw x 4½ inch opening	4–K
234	2	Vise, hand, hinged jaw, 1½ in. jaw x 1 in. opening	1–E
269	1	Vise, machinist's, 3½ inch	3–J
327	1	Vise, pressure	2–R
230	1	Washer, lock, steel, assorted, No. 4 to ⅞ in., box of 1000	1–D

3. Alphabetical Listing of Complete Shop Load—Continued

Fig. No.	Index No.	Description	Shop location
228	8	Wheel, abrasive, disk type, for edge and face grinding, 7 in. dia. x ¼ in. thick x ⅞ in. bore, set of 6	4–C
		Wheel, abrasive, straight	
		Size — *Grain* — *Grade*	
251	2	10 x 1 — 24 — S	
		¼ x ⅞	2–H
251	1	10 x 1 — 46 — M	2–H
		¼ x ⅞	
252	1	Wheel, grinding, 6 x ¾ x ½ inch	2–H
275	2	Wheel, wire, 6 inch dia. with ½ inch arbor	4–K
246	4	Wrench, adjustable, automobile, type II	6–G
270	9	3 inch opening x 11 inch long, set of 4	4–J
246	7	Wrench, adjustable, crescent type	6–G
270	8	single head, open end, 1⁵⁄₁₆ in.	4–J
294	34	opening, 8 in. length, set of 4	5–N
246	6	Wrench, adjustable, crescent type	6–G
270	8	single head, open end, 1⁵⁄₁₆ in. opening x 12 in. long, set of 3	4–J
321	4	Wrench, adjustable, pinned-jaw type, single head open end, 1⅜ to 2⅞ in. opening 24 in. nominal length	1–Q
295	20	Wrench, adjustable, vise grip, 1¼ in. opening 10 in. long, set of 2	6–N
222	26	Wrench, box, 12 point, double offset pattern, set of two, ½ x ⁹⁄₁₆ and ⅝ x ¾ inch	1–C
222	25	Wrench, box, 12 point, half-moon, ⁹⁄₁₆ to ⅝ in	1–C
225	1	Wrench, box and open end, 12 point box	1–C
257	1	15 deg. angle both ends, ⅜ to 1½ in., in leatherette roll, two sets of 14 items	3–H
222	24	Wrench, engineer, 15 deg., double head open end, spear head, set of 4, ⅜ x ⁷⁄₁₆, ¹³⁄₃₂ x ¹¹⁄₁₆, ¾ x ⅞ and ¹⁵⁄₁₆ x 1 inch	1–C
223	1	Wrench, ignition, midget, 15 and 60 deg. double end, set of 9, ¹³⁄₆₄ x ¹⁵⁄₆₄, ⁷⁄₃₂ x ¼, ¹⁵⁄₆₄ x ¹³⁄₆₄, ¼ x ⁷⁄₃₂, ⁹⁄₃₂ x ⁵⁄₁₆, ⁵⁄₁₆ x ⁹⁄₃₂, ¹¹⁄₃₂ x ⅜, ⅜ x ¹¹⁄₃₂ and ⁷⁄₁₆ x ½	1–C
		Wrench, pipe, adjustable, heavy duty, forged aluminum alloy:	
246	5	10 in. long	6–G
246	3	14 in. long	6–G
321	3	36 in. long	1–Q
294	33	Wrench, pipe, adjustable, 6 in. long	5–N
224	1	Wrench, setscrew, Allen, in set, .050 to ⅜ in., short arm series, 11 in roll	1–C
224	2	Wrench, socket, ¼ in. sq. dr. 6 and 8 point opening, ⁵⁄₁₆ to ⁷⁄₁₆ inch, regular length, set of 17 items	1–C
222	1 to 11	Wrench, socket, ⅜ in. sq. dr. 12 point opening, ⁵⁄₁₆ to ⅞ inch, regular and deep, set of 26 items	1–C
222	12 to 22	Wrench, socket, ½ in. sq. dr., 12 point opening, ⁷⁄₁₆ to 1 inch, regular set of 22 items	1–C
223	2	Wrench, socket, ½ in. sq. dr., 12 point opening, ¹³⁄₁₆ to 1⅛ inch deep, set of 5 items	1–C
297	2 to 3	Wrench, socket, ¾ in. sq. dr., 12 point opening, 1¹⁄₁₆ to 1¾ inch, regular length, set of 14 items and metal chest	8–N
297	1	Wrench, socket, 1 in. sq. dr., 1 ¹³⁄₁₆ to 2 ¹³⁄₁₆ inch, regular length, set of 11 items	8–N

INDEX

[AG 451.3 (27 Sep 55)]

BY ORDER OF THE SECRETARIES OF THE ARMY AND THE AIR FORCE:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

OFFICIAL:
JOHN A. KLEIN,
Major General, United States Army,
The Adjutant General.

N. F. TWINING,
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Units organized under following TOE's:

5–48R, Engr Sup Point Co (2)
5–157R, Engr Fld Maint Co (2)
5–262R, Hq & Hq Co, Engr Maint & Sup Gp (2)
5–267R, Engr Depot Co (2)
5–278 R, Engr Depot Maint Co (2)
5–279R, Engr Parts Depot Co (2)

NG: State AG (6); units—same as Active Army except allowance is one copy to each unit.
USAR: None.
For explanation of abbreviations used, see SR 320–50–1.

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