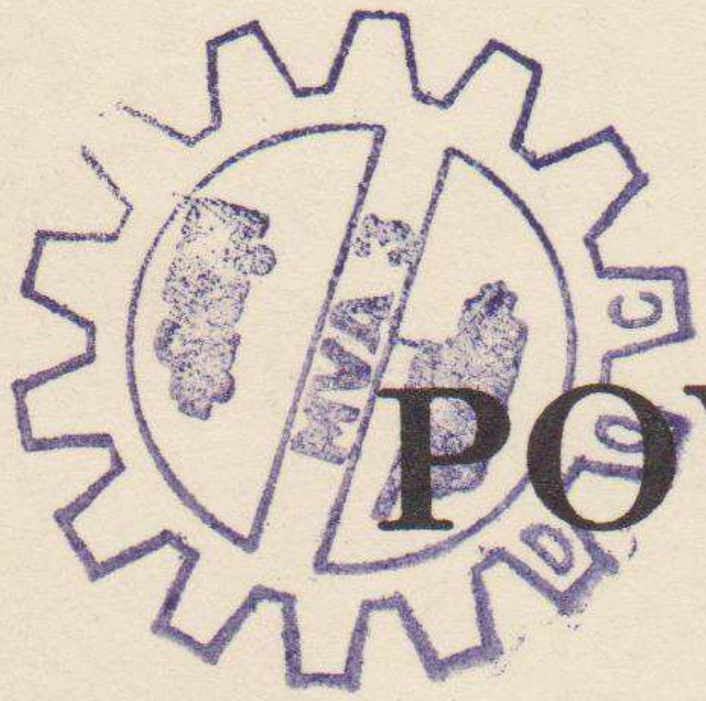
TECHNICAL HANDBOOK

Lorenz 053-593 LE, 1st ed. June 1955

FURNISHED IN LIEU OF TECHNICAL MANUAL

TM 11—900 A



POWER UNIT

PE-75-AF-GY

C. LORENZ AKTIENGESELLSCHAFT - STUTTGART
(GERMANY)

ARMY CONTRACT NO. DA-91-557-EUC-368 AND
DA-91-516-EUC-540

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SAFETY NOTICE

This equipment generates high voltage which is dangerous to life. At all times, be careful to observe every safety regulation. Keep clear of all live parts. Never make or change electrical connections while the unit is in operation.

Do not remove any guards, shields, or screens while the unit is in operation. Keep tools, oil cans, bolts, etc., away from the unit while it is operating. Such items may fall into moving parts or may be drawn into the generator by magnetic attraction. Keep moisture away from the unit and keep the surrounding area dry.

Do not service with gasoline while the unit is running. Avoid filling the fuel tank when a radio transmitter is operating close by.

CONTENTS

		Paragraphs	Page
CHAPTER 1. INTRODUCTION			
Section I.	General	1, 2	1
II.	Description and data	3–9	2
CHAPTER 2. OPERATING INSTRUCTIONS			
Section I.	Service upon receipt of equipment	10–17	9
II.	Controls and instruments	18, 19	13
III.	Operation under usual conditions	20–24	14
IV.	Operation under unusual conditions	25–28	15
CHAPTER 3. ORGANIZATIONAL MAINTENANCE INSTRUCTIONS			
Section I.	Organizational tools and equipment	29–31	17
II.	Lubrication and preservation	32–37	18
III.	Preventive maintenance	38–47	22
IV.	Theory	48, 49	32
V.	Trouble shooting	50, 51	34
CHAPTER 4. FIELD MAINTENANCE INSTRUCTIONS			
Section I.	Prerepair procedures	52, 53	40
II.	Inspecting and stripping	54–56	40
III.	Disassembly	57–60	43
IV.	Reassembly	61–68	54
CHAPTER 5. SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE			
Section I.	Shipment and limited storage	69, 70	67
II.	Demolition to prevent enemy use	71, 72	67
APPENDIX I. REFERENCES			69
II. IDENTIFICATION TABLE OF PARTS			71
INDEX			105

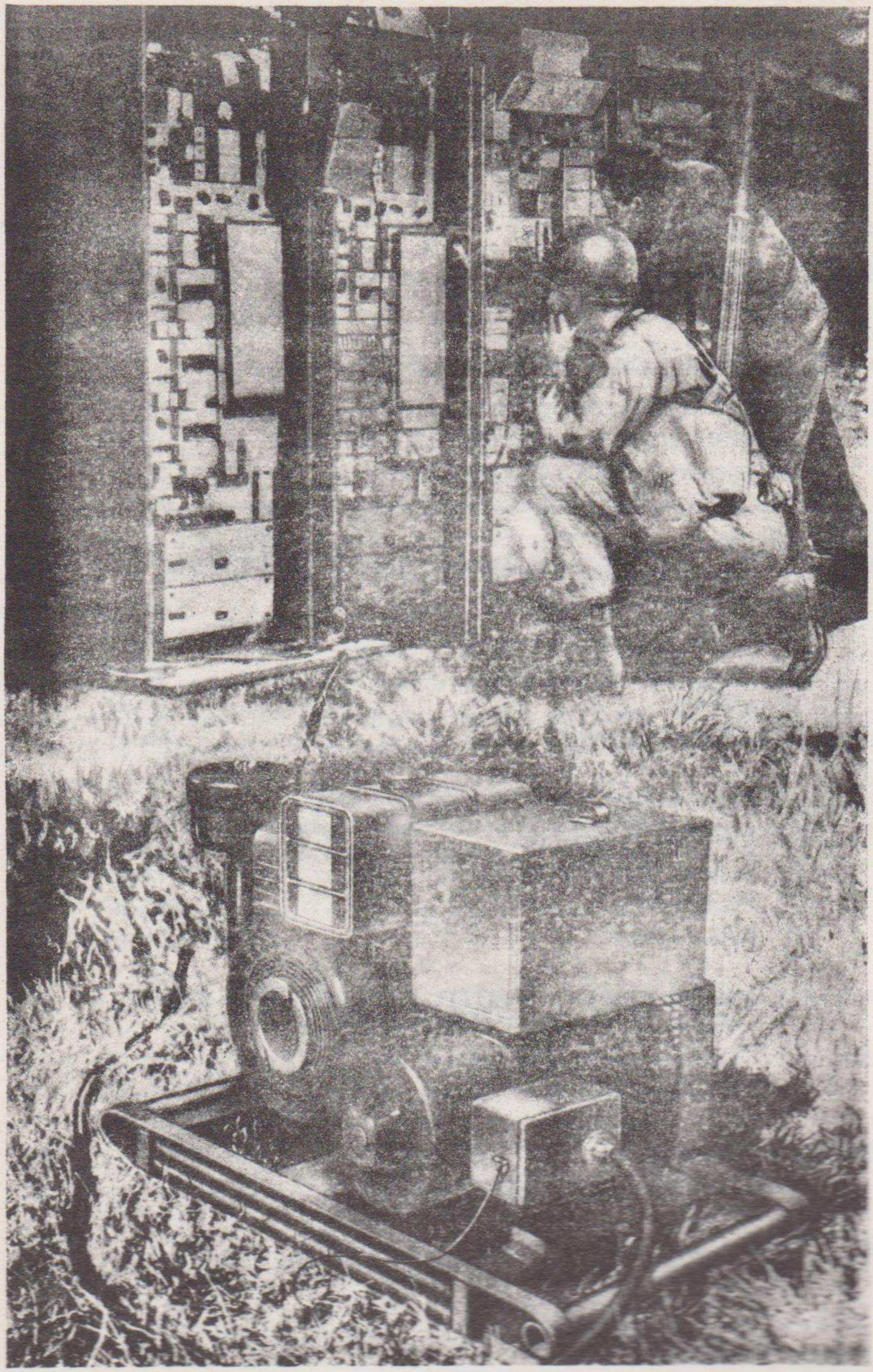


Figure 1. Power Unit in use.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the information and guidance of personnel to whom this equipment is issued. They contain information on the operation, organizational and field maintenance of the equipment, and a discussion of the theory of operation. They apply to Power Unit PE-75-AF-GY only.

b. Appendix I contains a list of current references applicable to the equipment. Appendix II contains an identification table of parts.

2. Forms and Records

a. The following forms will be used for reporting unsatisfactory conditions of Army equipment:

(1) DD Form 6, Report of Damaged or Improper Shipment, will be filled out and forwarded as prescribed in SR 745-45-5 (Army) and AFR 71-4 (Air Force).

(2) DA Form 468, Unsatisfactory Equipment Report, will be filled out and forwarded to the Office of the Chief Signal Officer, as prescribed in SR 700-45-5.

(3) AF Form 54, Unsatisfactory Report, will be filled out and forwarded to Commanding General, Air Matériel Command. Wright-Patterson Air Force Base, Dayton, Ohio, as prescribed in SR 700-45-5 and AFR 65-26.

(4) DA AGO Form 11-260, Operator First Echelon Maintenance Check List for Signal Corps Equipment—Power Units, Reel Units, will be prepared in accordance with instructions on the back of the form. Operations applicable to Power Unit PE-75-AF-GY are listed in paragraph 38*f*(1).

(5) DA AGO Form 11-261, Second and Third Echelon Maintenance Check List for Signal Corps Equipment—Power Units, Reel Units, will be prepared in accordance with instructions on the back of the form. Operations applicable to Power Unit PE-75-AF-GY are listed in paragraph 38*f*(2).

b. The following forms, explained in TM 37-2810, are necessary in connection with the operation and maintenance of Signal Corps internal-combustion-engine-driven equipment:

(1) DA Form 464 (Work Sheet for Preventive Maintenance Service and Technical Inspection of Engineer Equipment).

(2) DA Form 460 (Preventive Maintenance Roster).

c. Use other forms and records as authorized.

Section II. DESCRIPTION AND DATA

3. General Description

a. Power Unit PE-75-AF-GY is a self-contained, compact, portable, gasoline-engine-driven electrical generating set of the manual-starting type. It is designed to deliver 2,500 watts of 60-cycle ac (alternating current) at 120 volts.

b. Power Unit PE-75-AF-GY is driven by Signal Corps Gasoline Engine PD-31/U (Briggs and Stratton model 23BP). This engine is a single-cylinder, four-stroke cycle, air-cooled unit which develops 6.5 hp (horsepower) at 2,800 rpm (revolutions per minute).

c. The electrical generator used in Power Unit PE-75-AF-GY is Signal Corps Alternating Current Generator G-40/U-GY. It is a single-phase, self-excited unit which develops 2,500-watt, 60-cycle, 120-volt ac at 100 percent power factor, when driven at 1,800 rpm. The generator is driven through dual V-belts and appropriate belt pulleys. Generator load connections are made through plug-in receptacles which are mounted in Signal Corps Electrical Noise Suppressor F-155/U-GY.

d. All components of Power Unit PE-75-AF-GY are mounted on a welded-steel skid base. The skid base is provided with tubular end members to permit the insertion of wooden carrying handles. These carrying handles are secured in the side channel members of the skid base when they are not in use. A tool and spare parts box is mounted on top of the generator frame, and a metal guard is provided for the generator drive belts.

4. Purpose and Use

Power Unit PE-75-AF-GY is intended as a source of a-c power for the operation of various Signal Corps telephone, radio, public address, and meteorological equipments. It may be used, also, for any purpose which requires a-c power within the rated electrical output of the equipment.

5. Other Models

There have been seventeen models of Power Unit PE-75-( ) prior to Power Unit PE-75-AF-GY. Power Units PE-75-A and PE-75-B are obsolete. All other prior models of Power Units PE-75-( ) are covered in TM 11-900. Before requisitioning parts for any model, consult the latest issue of the applicable Signal Supply Catalog.

6. Major Parts and Assemblies

a. Gasoline Engine PD-31/U (fig. 4). Gasoline Engine PD-31/U is a single-cylinder, four-stroke cycle, L-head, air-cooled gasoline engine. It has a 3-inch bore, a 3¼-inch stroke, and develops 6.5 hp at 2,800 rpm. This

Note. Basic nomenclature followed by ( ) is used to indicate all models of the equipment, regardless of past or present procurement.

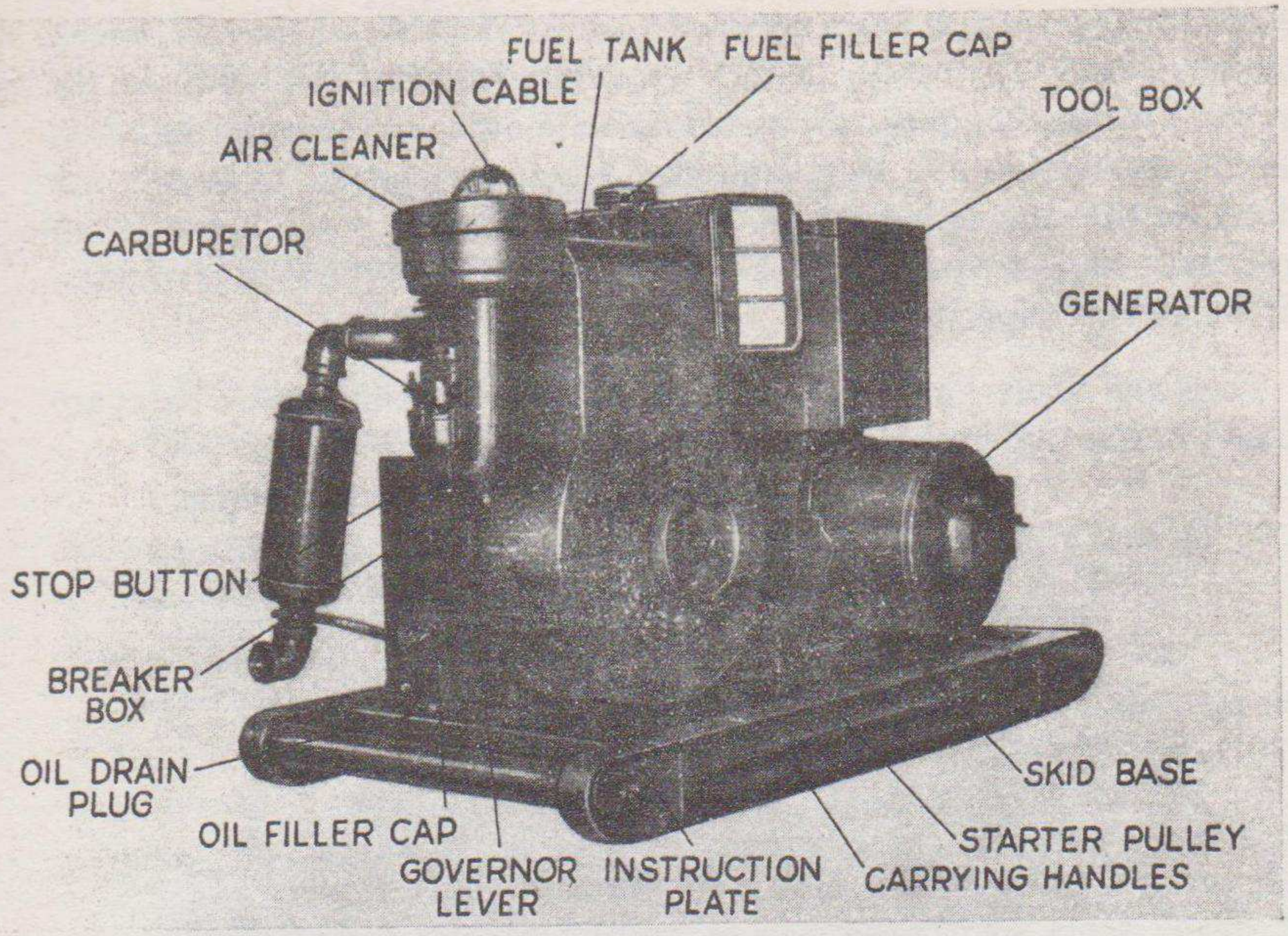


Figure 2. Power Unit PE–75–AF–GY, engine end.

engine is supplied with ball bearings at both the flywheel end and the power take-off end of the crankshaft. Ignition is provided by a magneto ignition system which consists of a generating unit within the flywheel and a breaker mechanism mounted in a separate housing on the side of the crankcase. A diaphragm-type fuel pump and a three-way fuel valve are provided to permit drawing fuel either from the fuel tank mounted on the power unit or from a remote source. The governor consists of a flyball-type governor and an automatic device for advancing and retarding the ignition spark. A rotor cap is supplied for rotating the exhaust valve and thus reducing burning of the exhaust valve and seat. The engine is lubricated entirely by splash system.

b. Alternating Current Generator G-40/U-GY (fig. 5). The main electrical component of Power Unit PE-75-AF-GY is Signal Corps Generator G-40/U-GY. These generators are supplied by C. LORENZ AG., Germany. They are 100 percent interchangeable with generators manufactured previously by Leland or Kurz-Root. They are self-excited, self-regulated, single-phase, compound wound, and are of two-wire, semi-inclosed, drip-proof construction. They are designed to generate 120-volt, 60-cycle ac when driven at a speed of 1,800 rpm. They are rated at 2,500 watts 100 percent power factor. Compound armature windings deliver 36 volts of dc (direct current) to a commutator and 120 volts ac to the slip rings. The stator field windings are excited by dc which is picked up from the commutator by the d-c brushes. The generator of Power Unit PE-75-AF-GY is driven through a double-groove pulley which is attached to one end of the armature shaft.

c. Electrical Noise Suppressor F-155/U-GY. This suppressor consists of a pressed steel box which has a removable cover. Two lock-type receptacles are mounted on the cover to permit connecting the electrical load to the generator. Two binding posts are mounted on one side of the suppressor box to permit connecting the electrical load when no plug-in terminals are provided on the connecting cables. Mounted inside the box are two 57-μh (microhenry) radio-frequency choke coils and 2 two-section .5-μf (microfarad) per section capacitors.

d. Tools and Spare Parts. The following tools and running spare parts are contained in the tool box of Power Unit PE-75-AF-GY:

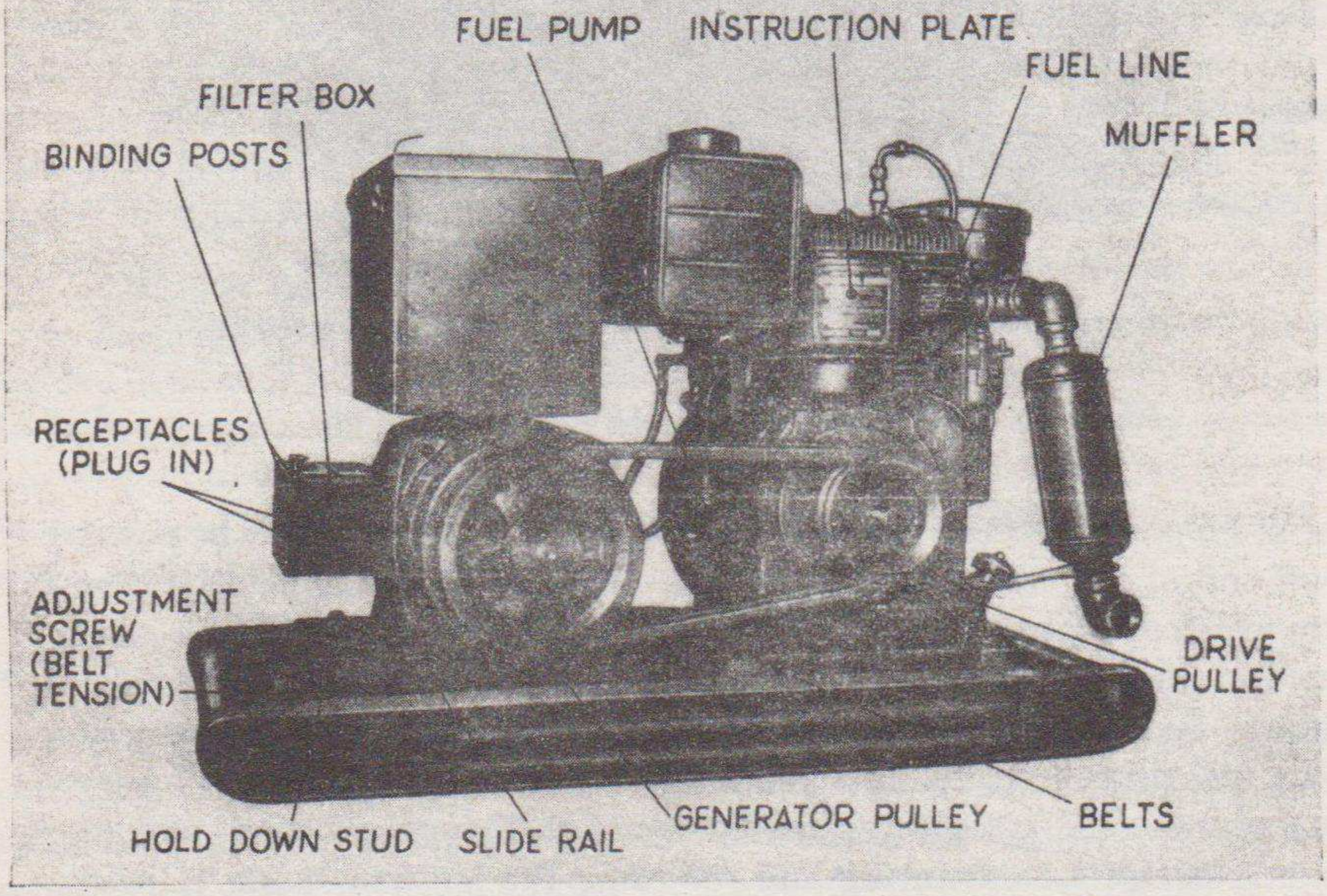


Figure 3. Power Unit PE–75–AF–GY, generator end, belt guard removed.

(1) *Tools.*

1 gage, thickness
1 pliers, combination, 6 ½-inch
1 screw driver, 9-inch
2 rope, starting
1 wrench, adjustable, 8-inch
1 wrench, box and open-end, $^{3}/_{8}$-inch opening each end
1 wrench, box and open-end, $^{7}/_{16}$-inch opening each end
1 wrench, box and open-end, $^{1}/_{2}$-inch opening each end
1 wrench, box and open-end, $^{9}/_{16}$-inch opening each end
1 wrench, hexagonal, L-shaped, $^{5}/_{32}$-inch (Allen wrench)

1 burnisher, contact
1 hose, auxiliary fuel line
2 sheets, abrasive, No. 240 AOP
1 wrench, spark plug $^{13}/_{16}$-inch, hexagonal

(2) *Running spare parts.*
1 bowl, fuel cleaner
2 gasket, air cleaner mounting
2 gasket, carburetor
2 gasket, air cleaner cover assembly
4 gasket, fuel filter bowl
2 plug spark
1 capacitor, .2-μf

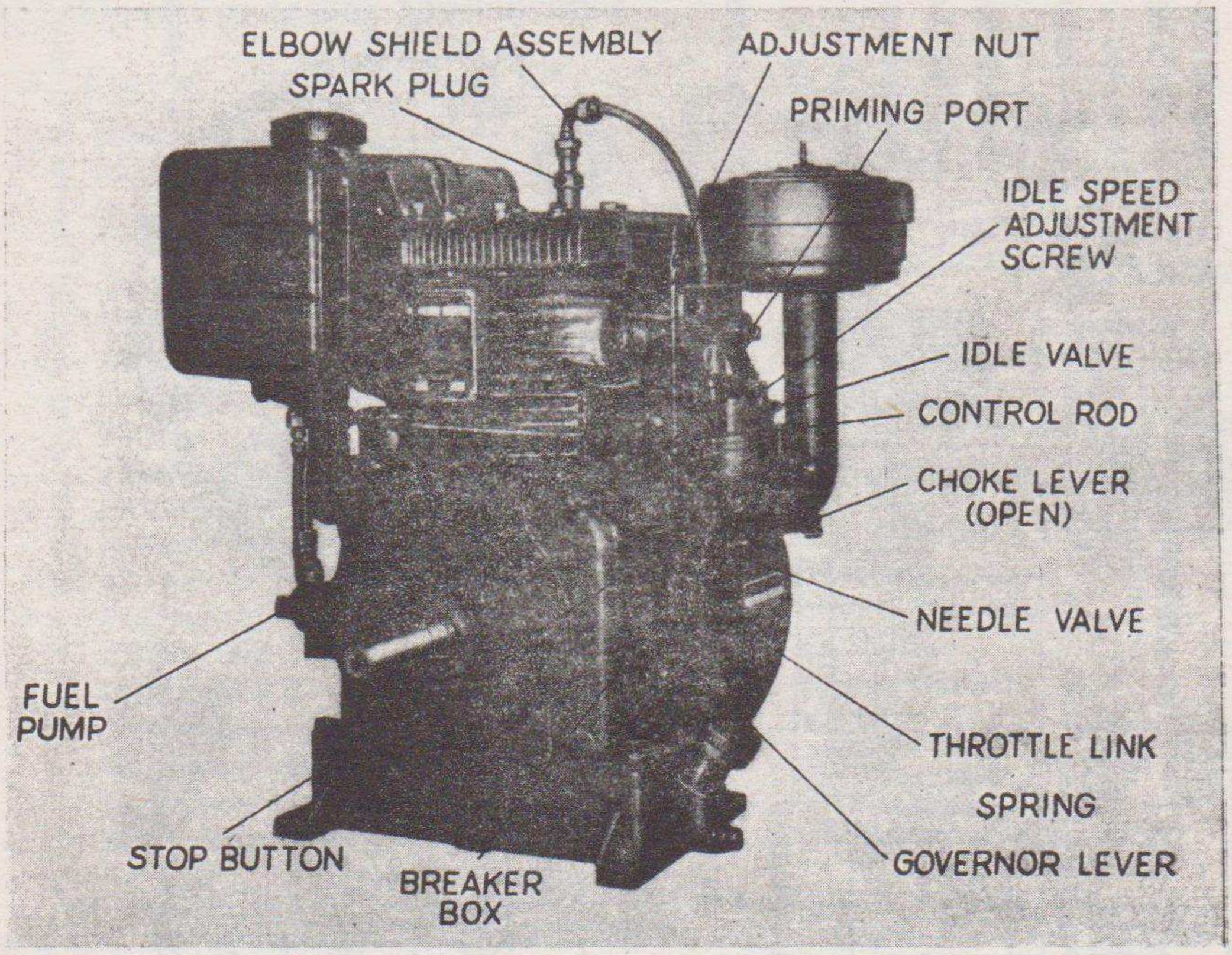


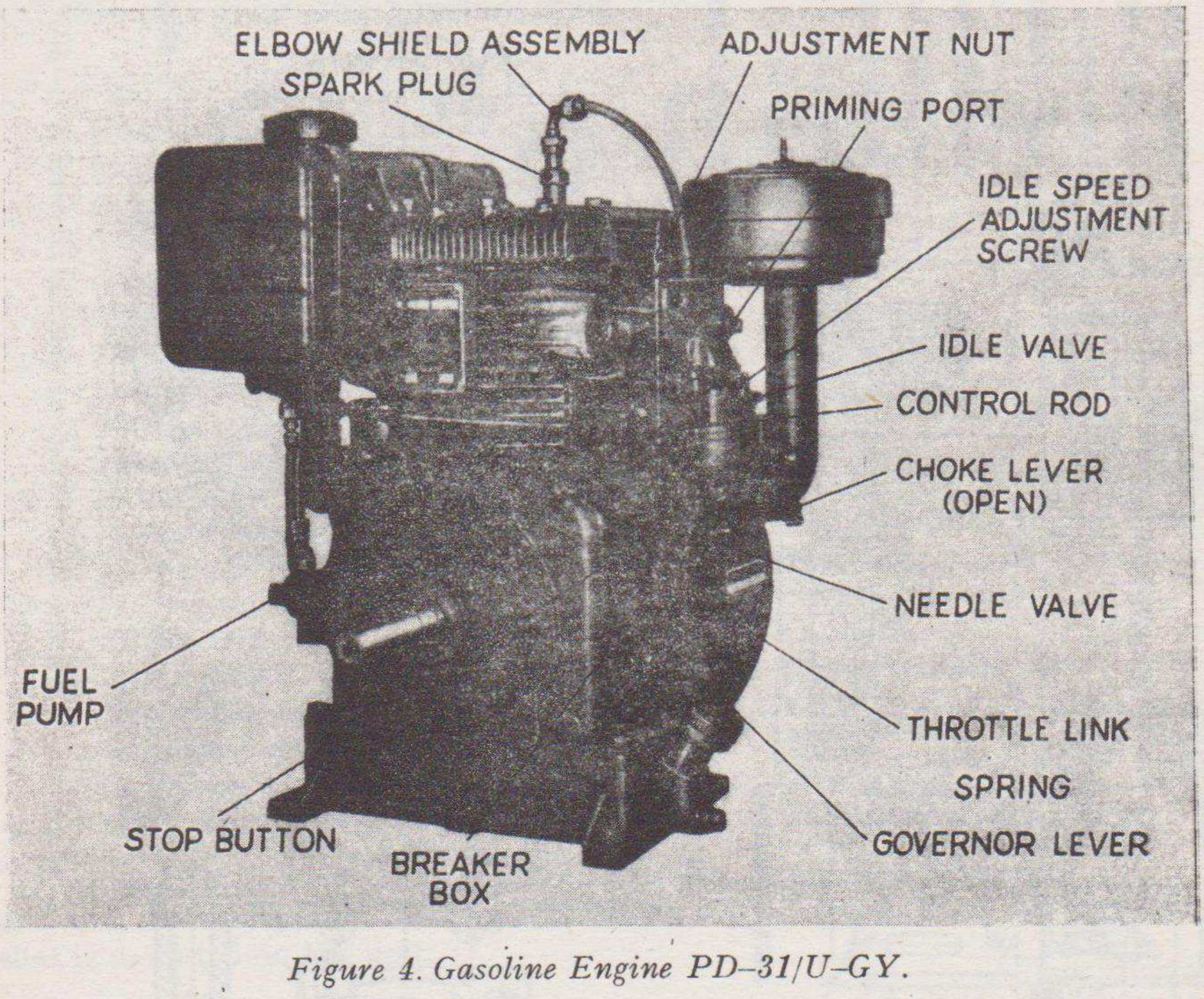
Figure 4. Gasoline Engine PD–31/U–GY.

7. Performance Characteristics

a. Power Unit PE-75-AF-GY is rated at 2.5 kw (kilowatts) under full load. As the load increases, the voltage output drops and the frequency, in cycles per second, decreases slightly. These power units are adjusted to hold the output to a variation of not more than 2 cycles, from no load to full load, and to maintain the output frequency within a range of 58 to 62 cycles. The engine speed is held between 2,950 rpm at no load and 2,750 rpm at full

1 burnisher, contact
1 hose, auxiliary fuel line
2 sheets, abrasive, No. 240 AOP
1 wrench, spark plug $^{13}/_{16}$-inch, hexagonal

(2) *Running spare parts.*
1 bowl, fuel cleaner
2 gasket, air cleaner mounting
2 gasket, carburetor
2 gasket, air cleaner cover assembly
4 gasket, fuel filter bowl
2 plug spark
1 capacitor, .2-μf



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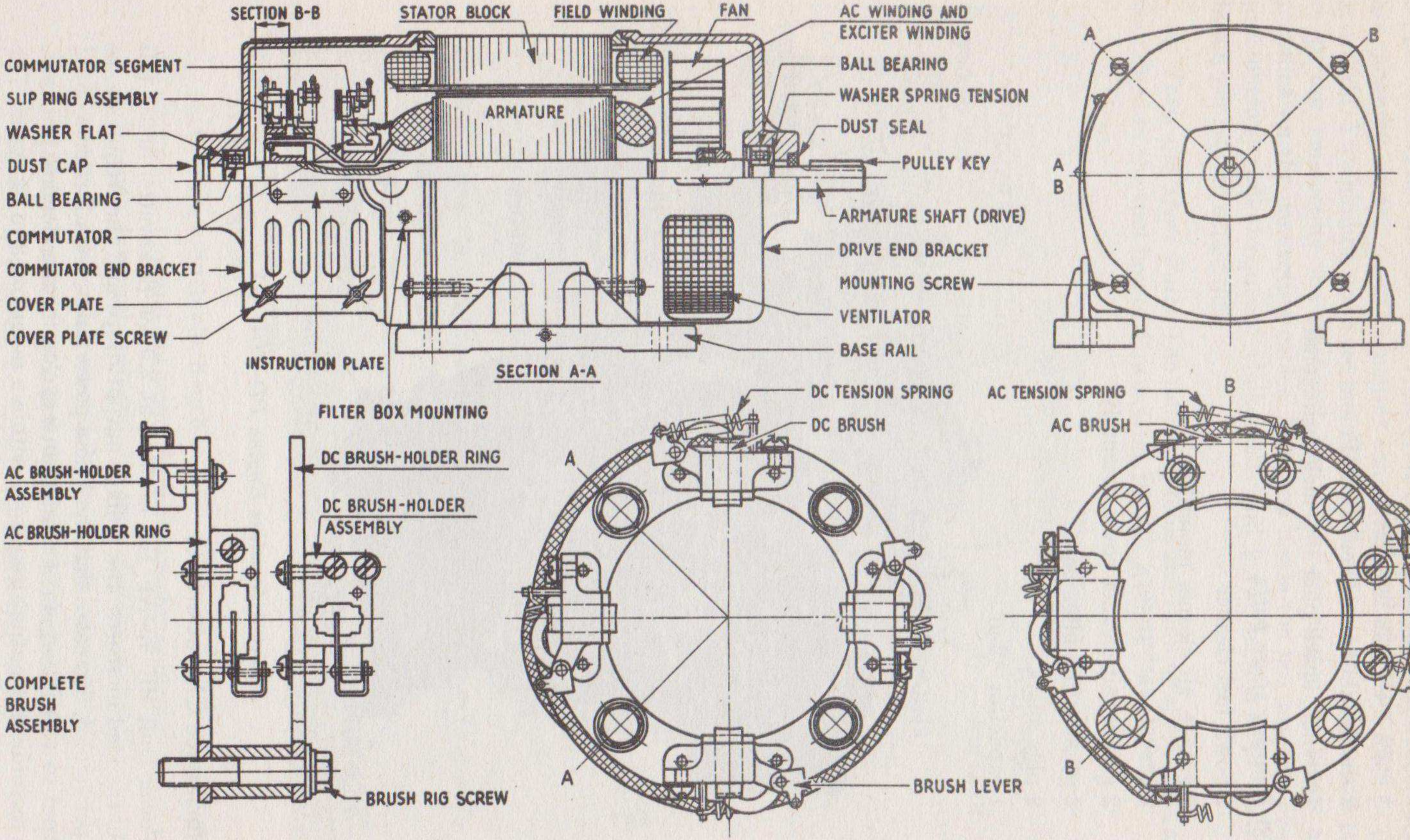

Figure 5. Alternating current Generator G–40/U–GY.

load. A variation of 50 rpm in engine speed will result in a change of 1¼ cycles in the a-c output.

b. The chart that follows shows typical performance under various load conditions.

Approximate load	Amperes	Volts	Watts	Cycles	Exciter volts
60 w	0.45	130	58.5	60.3	40.2
120 w	0.9	130	117	60.3	40.2
¼ load	6	126	756	60	40
½ load	11	124	1,364	60	39.7
¾ load	17	120	2,040	59.7	39.5
Full load	22	116	2,552	59.5	38.5
Maximum load	28	110	3,080	58.3	36.2

8. Table of Condensed Specifications

a. Engine.

Make	Briggs and Stratton.
Model	Sig C PD–31/U.
Cycle	4-stroke.
Type cylinder head	L.
Number of cylinders	1.
Bore (inches)	3.
Stroke (inches)	3¼.
Compression ratio	5.4 to 1.
Engine speed	2,200 to 3,200 rpm.
Type of cooling	Air.
Horsepower	6.5 at 2,800 rpm.
Piston rings	2 compression, 1 oil control.
Piston pin	Floating; slip fit.
Lubrication	Splash (no pump).
Air cleaner	Oil bath.
Spark plug	Champion XEJ–8.
Fuel tank capacity	6 qt.
Crankcase oil capacity	5 pt.
Governor	Mechanical.
Main bearings	Ball (both ends).

Note. Power Unit PE–75–AF–GY is supplied with a fuel pump and a three-way fuel valve to permit drawing fuel from a supply source other than the tank that is mounted on the unit.

b. Generator.

Make	C. Lorenz AG., Germany.
Model	Sig C G–40/U–GY.
Rating	2.5 kw; 120 v.
Power factor	100 percent.
Excitation	Self-excited.
Speed	1,800 rpm.
Brushes	Carbon with pigtail.
Bearings	Ball (both ends).

9. Weights and Dimensions

The following table contains the weights and dimensions of Power Unit PE-75-AF-GY and its major components:

Item	Length (in.)	Width (in.)	Height (in.)	Weight (lb)
Power Unit PE–75–AF–GY, consisting of	36	19	$24^{1}/_{2}$	298
Engine w/accessories	$19^{7}/_{8}$	$15^{5}/_{8}$	$21^{1}/_{2}$	100
Generator w/pulley and suppressor	$17^{1}/_{8}$	10	$9^{9}/_{32}$	120
Suppressor	$7^{7}/_{8}$	5	$4^{1}/_{8}$ deep.	6

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

10. Siting

Install Power Unit PE-75-AF-GY in a clean, dry, level area. When installed within a building or shelter, make ample provision for ventilation and a free circulation of air around the unit. Allow at least 2-feet clearance on all sides of the unit. When the unit is installed out of doors, place it on grass or soft ground rather than a hard surface. Hard surfaces will permit the unit to creep. If the unit must be installed on a hard surface, take appropriate measures to prevent creeping. Avoid placing the unit in low areas which may become flooded in the event of heavy rain.

11. Preparation of Foundation

Power Unit PE-75-AF-GY is assembled on a skid base and normally will not require any special foundation. However, if it is necessary to operate the equipment in a marshy location, place it on planks or packing cases.

12. Uncrating, Unpacking, and Checking

a. Uncrating and Unpacking. Power Unit PE-75-AF-GY, when packed for oversea shipment, is protected by a moisture-vaporproof barrier within the crate. This moisture-vaporproof barrier is not used when packed for domestic shipment. Do not uncrate the equipment until it is needed. Unpack the equipment as follows:

(1) Remove the packing list before removing the crate.

(2) Cut the metal straps at a point near the bottom of the crate.

(3) Remove the nails that hold the crate to the wooden base and lift the crate from the unit.

(4) Remove the inner protective covering and remove the unit from the base of the packing case.

b. Checking. Carefully check the equipment against the packing list and inspect the unit for any damage that may have occurred in transit. See that all tools and spare parts are in accordance with current parts lists. If there is any evidence of rough handling, other indication of possible damage to the equipment, other unsatisfactory condition, or if the contents of the packing crate do not check with the packing lists, fill out and forward DD Form 6.

Note. Spare parts are individually processed and packaged to protect them against moisture. Do not open packages until the parts are needed.

13. Setting Up Equipment

a. Thoroughly clean all parts of the air cleaner and see that it is installed properly on the engine. Make sure that all connections are tight.

b. Place the unit in the position previously selected. It is recommended that the unit be located as near to the center of the electrical load as possible. This will reduce line losses and improve voltage control at the remote ends of the lines.

c. If the unit is installed within a building or shelter, anchor the skid base to the floor or foundation. Remove the exhaust muffler and attach a short length of flexible exhaust line to the engine exhaust outlet. Extend the exhaust line to the outside of the building or shelter and attach the muffler to the outdoor end of the exhaust line. It is recommended that pipe having an inside diameter of not less than 1½ inches be used and that its length does not exceed 10 feet. Make certain that all connections and joints in the exhaust line are gastight.

d. If fuel is to be drawn from a remote supply tank, it is recommended that the tank be located outside the building or shelter and as far from the unit as the length of the remote fuel supply line will permit. Connect one end of the remote fuel supply line to the three-way fuel valve on the unit and connect the other end to the fuel supply tank (fig. 7).

e. Make sure that there is ample clearance all around the unit to permit servicing and that there are no obstructions to a free circulation of air for cooling and ventilation.

14. Removal of Corrosion Preventives

Remove the crankcase drain plug, below the oil-filler cap, and drain any oil that may be present in the engine crankcase. Carefully inspect the equipment for any seals or blind gaskets and remove them. Make sure that the crankcase breather, carburetor air intake, and exhaust outlet are not obstructed. Blow through the vent in the fuel tank cap to make sure that it is clear. Do not attempt to operate the equipment until after it has been lubricated in accordance with the lubrication order and the instructions in paragraph 16.

15. Connections and Interconnections

Power Unit PE-75-AF-GY is provided with two twist-lock receptacles which are mounted to the cover of the suppressor unit. Two binding posts, mounted on one side of the suppressor box, also are provided. If the using equipment has connecting power cables with plugs attached, insert the plugs into the power output receptacles. If there are no plugs attached to the power cables, connect the load to the two binding posts on the side of the suppressor unit. Make sure that the unit is grounded to a good earth ground.

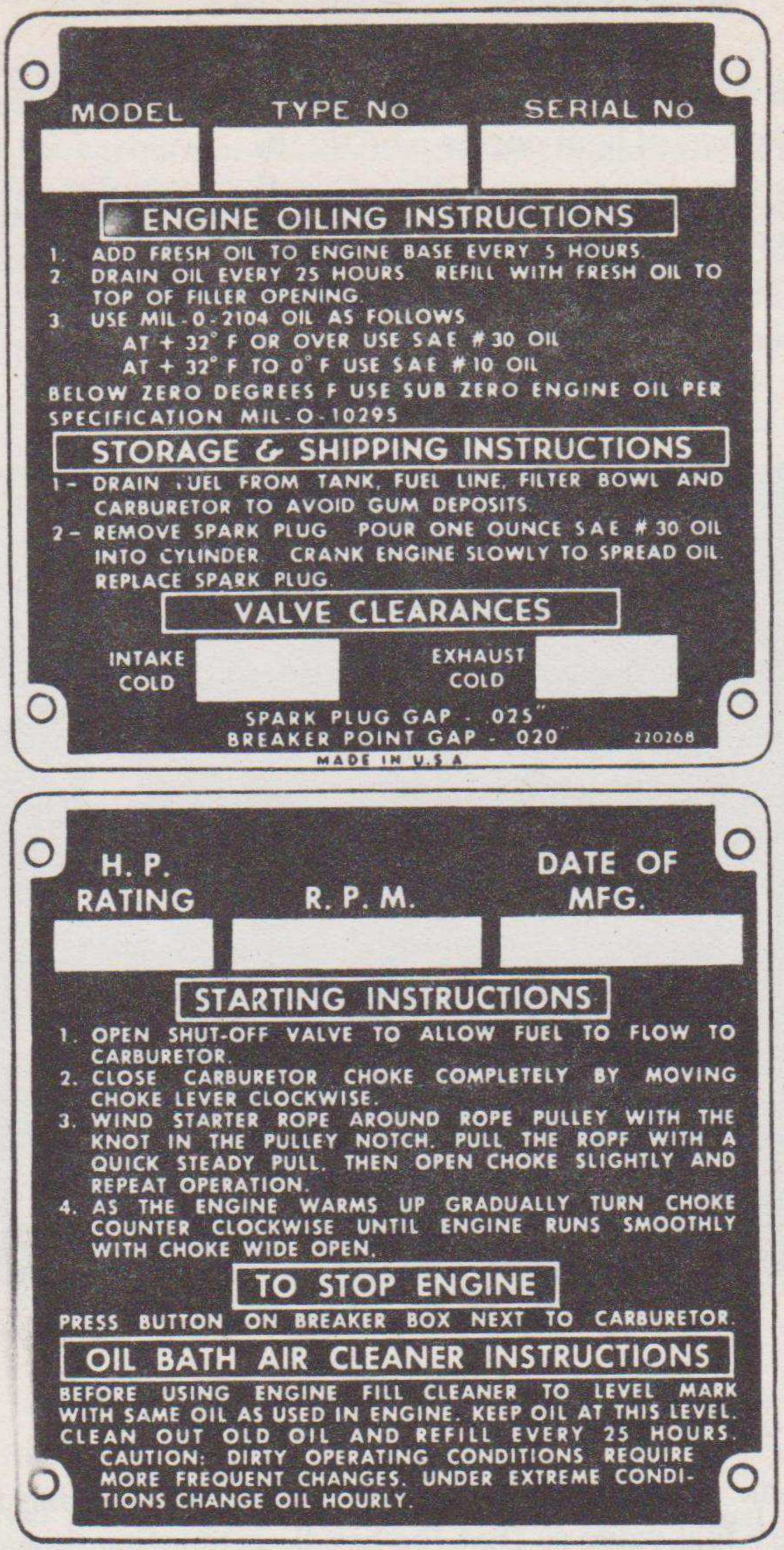

Figure 6. Power Unit PE–75–AF–GY, engine instruction plate.

16. Initial Lubrication

a. Remove the red CAUTION tag from the crankcase filler and stow it in the tool box for future use. See that the crankcase drain plug is installed securely.

b. Remove the crankcase filler cap and put the required amount (5 pints) of Oil, engine (OE) into the crankcase. See the lubrication order for the

equipment for the correct grade of oil to use. Replace the cap on the filler opening.

c. Wipe off all control linkage and lubricate all bearing surfaces and ball joints with 1 or 2 drops of light engine oil (OE 10).

d. Remove the cover from the air cleaner and fill the oil reservoir with the same grade of engine oil (OE) as used in the engine crankcase. Do not fill the reservoir above the indication mark on the inside of the bowl. If the unit is being operated in extremely low temperature, do not put any oil in the air cleaner, but operate it in a dry condition.

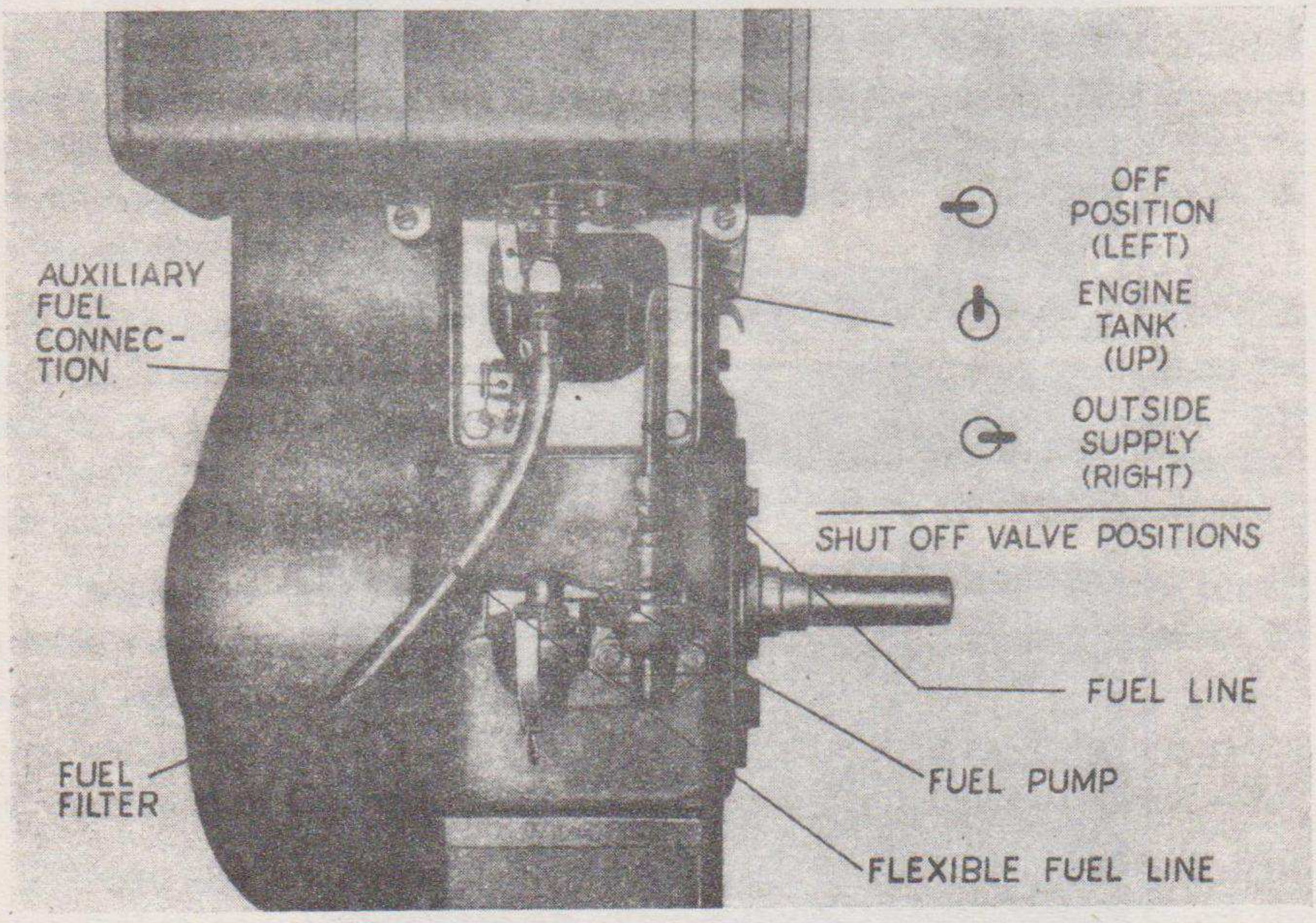

Figure 7. Power Unit PE–75–AF–GY, fuel supply assembly.

17. Preparation of Fuel System

Fill the fuel tank and inspect all connections in the fuel line for leaks. Turn the three-way fuel valve so that the handle is pointing upward. Have some one hold a finger on the stop button on the breaker box and crank the engine several times while the stop button is being pressed. If the fuel pump is functioning properly, the glass sediment bowl, which is part of the fuel filter, will fill with fuel. Shut off the fuel supply by turning the three-way valve (fig. 7) so that the handle is pointing to the left. If fuel is to be drawn from a remote source, remove the cap from the auxiliary fuel connection elbow and connect the remote fuel line to the elbow. If a remote fuel supply is not to be used, make sure that the cap is securely in place on the auxiliary fuel connection elbow. Check the carburetor and all connections to see that there are no leaks. Try all control linkage to see that it moves freely.

18. Manual Controls

Except for the carburetor choke (located on the carburetor air intake) and the stop button (located on the side of the magneto breaker box), there are no manual controls on Power Unit PE-75-AF-GY. When starting the equipment, set the choke control so that the lever is pointing downward.

Figure 8. Power Unit PE–75–AF–GY, lubrication.

Raise this lever gradually as the engine warms up. It must be raised fully when the engine has reached operating temperature. When it is desired to stop the unit, press the stop button (fig. 2) and hold it in until the engine has stopped completely.

19. Automatic Controls and Instruments

The only automatic control on Power Unit PE-75-AF-GY is the combination governor and automatic spark control. The governor normally is adjusted at the factory and no further adjustment should be necessary. There are no meters or instruments on Power Unit PE-75-AF-GY.

Section III. OPERATION UNDER USUAL CONDITIONS

20. Preliminary Procedure

a. Before attempting to operate the unit, crank it a few times, with the stop button depressed, to make sure that all parts move freely. Follow all applicable instructions in paragraphs 10 through 17 and see that the equipment is thoroughly clean.

b. See that the fuel tank is full and that the filler cap is securely in place. Check all fuel connections and the fuel line to see that there are no leaks. If fuel is to be drawn from a remote supply tank, see that connections are

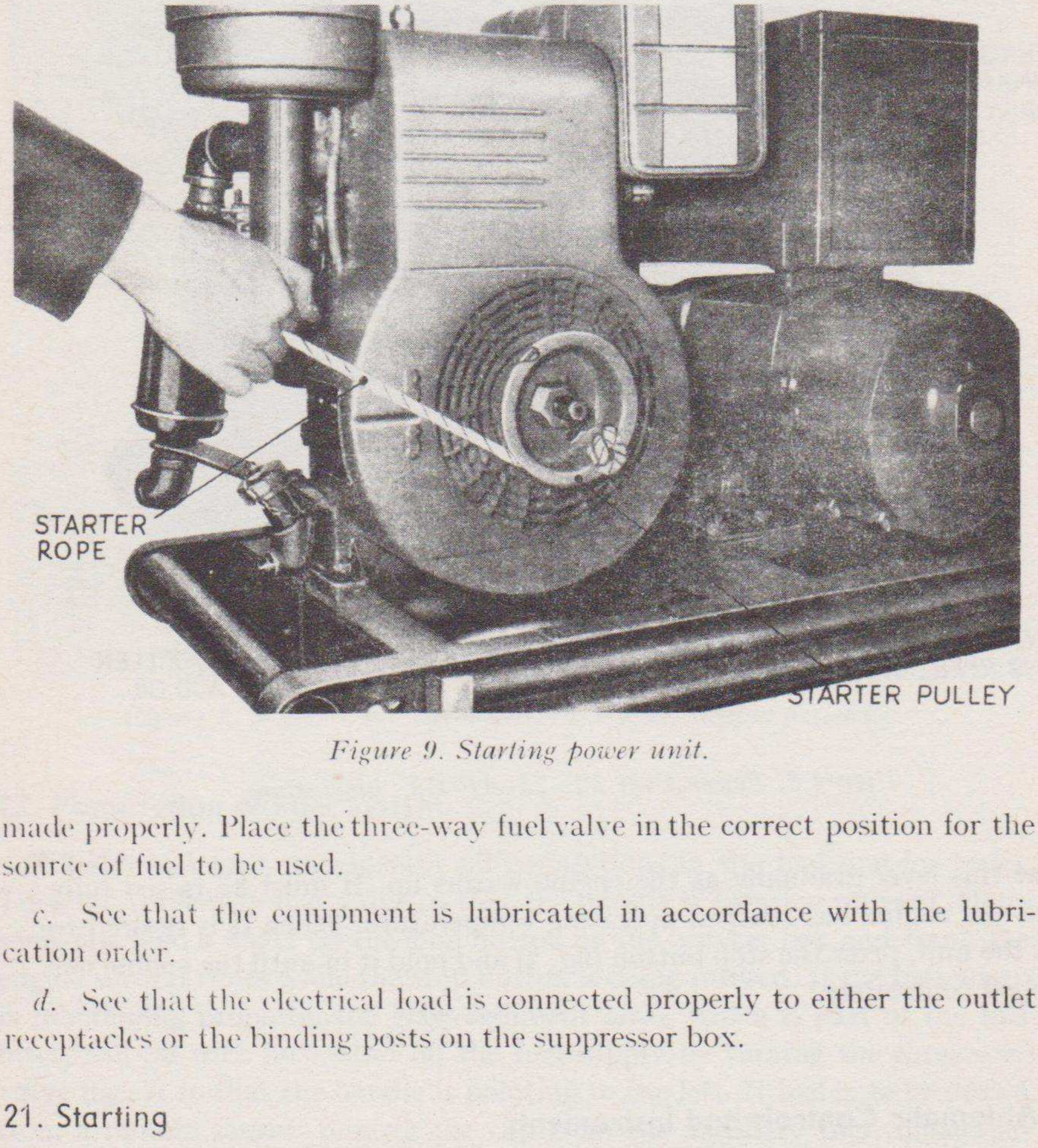

Figure 9. Starting power unit.

made properly. Place the three-way fuel valve in the correct position for the source of fuel to be used.

c. See that the equipment is lubricated in accordance with the lubrication order.

d. See that the electrical load is connected properly to either the outlet receptacles or the binding posts on the suppressor box.

21. Starting

a. Place the starting rope in the starting pulley with the knot on the outside of the pulley. Wind the rope clockwise around the pulley (fig. 9).

b. See that the glass sediment bowl of the fuel filter is filled, and set the carburetor choke in closed position.

c. Give the starting rope a quick hard pull; the unit should start. If the unit fails to start after the second or third trial, refer to the trouble chart in paragraph 51 for the possible cause.

22. Precautions After Starting

a. As the engine warms up, gradually open the carburetor choke valve. The choke should be open fully when the engine has reached operating temperature.

b. If it is necessary to keep the choke partially closed after the engine has reached operating temperature, it is an indication that the carburetor setting is too lean. Readjust the carburetor by turning the needle valve counterclockwise until the engine will run smoothly with the choke fully open.

c. While the unit is running, keep alert for any unusual noise, exhaust smoke, or evidence of overheating.

23. Operating Procedure

Power Unit PE-75-AF-GY requires very little attention while it is in operation. Be alert for any unusual conditions; listen for rattles, knocks, squeaks, or hums that may indicate trouble. Watch for indications of excessive exhaust smoke, overheated parts, uneven operation, and missing. Stop the unit every 4 hours and inspect the crankcase oil level. While the equipment is at halt, give it a quick general inspection and make any adjustments for which the need might have been indicated while the unit was in operation. Check the fuel supply and make certain that it is ample for not less than 4 hours of operation.

24. Stopping

To stop Power Unit PE-75-AF-GY, press the stop button (fig. 2) and hold it in until the engine has come to a complete stop. This button is located on the face of the breaker box which is mounted on the carburetor side of the engine.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

25. General

When Power Unit PE-75-AF-GY is operated under extreme climatic conditions, special precautions are necessary to prevent poor performance or total operational failure. Most Signal Corps equipment can be used under extreme climatic conditions provided difficulties common to the climatic conditions are anticipated and precautions taken to prevent them.

26. Operation in Arctic Climates

a. Fuel and Lubricants. Store all fuel and lubricants in tightly closed containers at all times. Keep the containers as full as possible to avoid air spaces. Condensation occurs in air spaces which causes water to be deposited at the bottom of the fuel can or oil can. Keep snow, ice, and water away from fuel and lubricant containers and keep lubrication points free from snow and ice. Follow the cold weather instructions in the lubrication order for the equipment.

b. General Precautions. Whenever possible, store the unit in a heated inclosure when not in use. If this is not possible, wrap the unit in blankets or other protective covering to retain as much heat as possible. When operating the equipment, place it in the lee of a building, hill, snowbank, or any other structure or natural formation that will protect it from cold winds. Follow applicable instructions in TB SIG 66.

27. Operation in Desert Climates

When operating the power unit under extremely dusty or sandy conditions, service the oil-bath air cleaner and crankcase breather more frequently than under normal operating conditions. Protect the equipment as much as possible from sand and dust. Keep all moving parts clean and well-lubricated. When operating outdoors, it is good practice to spread waste oil over the area immediately surrounding the power unit. If the installation is indoors, sweep out the area surrounding the unit at frequent intervals. Follow applicable instructions in TB SIG 75.

28. Operation in Tropical Climates

When the equipment is being operated under conditions of extreme heat and high humidity, take special precautions to see that the flow of air around the unit is unobstructed. Keep the equipment free from moisture, keep all air passages clean, and protect the equipment as much as possible from the direct rays of the sun. Follow applicable instructions in TB SIG 72 and TB SIG 13.

CHAPTER 3

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. ORGANIZATIONAL TOOLS AND EQUIPMENT

29. Catalog Reference

All tools, parts, and equipment supplied with Power Unit PE-75-AF-GY are listed in paragraph 6*d*. See the Department of the Army Supply Catalog SIG 7 & 8-PE-75 for maintenance parts and stock numbers.

30. Use and Care of Tools

a. Use of Tools.

(1) *General.* The proper use of tools is very important. Improper use will damage the tools and the equipment and may result in personal injury.

(2) *Wrenches.* When tightening a nut, bolt, or cap screw, be sure to use the correct wrench for the job. Do not use a wrench that is worn slightly or oversize. This will result in rounding the nut, bolt head, or screw head, and may cause damage to the equipment and personal injury if the wrench should slip. Never use pliers for tightening or loosening nuts, bolts, or cap screws. Always use the correct size open-end wrench, box wrench, or socket wrench. When tightening cylinder-head fastenings, use a torsion wrench, if one is available. Never use a pipe or other means to increase the leverage. This will bend or break the wrench and may strip the threads of the fastening.

(3) *Screw drivers.* When loosening or tightening a fastening which has a slotted head, use a screw driver with a blade that fits the slot in the head of the fastening. Do not use a wrench or pliers on the shank of the screw driver to increase leverage. Be sure to keep the blade of the screw driver square in the slot of the fastening. Never use a screw driver as a pry bar or chisel.

(4) *Other tools.* Specific tools are made for specific purposes. Make sure to use the right tool for the job and that it is of the correct size for the work to be done.

b. Care of tools. The condition in which a mechanic keeps his tool equipment is a good indication of his ability. Do not abuse tools by using them for work for which they were never intended. Keep tool equipment properly stowed and protected from dirt and dampness at all times when not in use. After using a tool, clean it thoroughly and replace it in its proper place in the toolbox. Keep all tools free from rust and keep adjustable tools, such as pliers and adjustable wrenches, lubricated. Keep the tool box clean and free from all foreign matter and debris. After cleaning tools and before putting them away, wipe them with a clean cloth moistened with oil to

protect them against rust. For more complete details on the care and use of tools, refer to TM 11-453.

31. Improvised Tools

A tool for undercutting the mica insulation between the copper bars of the commutator may be made from an old hack saw blade (fig. 10). Snap the blade off so that one piece is approximately 4½ inches long. Obtain a wooden block about ¾ inch square and 3 inches long. Cut a slot, the thickness of the hack saw blade, into one end of the block to a depth of about 1 inch. Place the rounded end of the hack saw blade in the slot, and drill a hole in the wooden handle so that a rivet may be passed through both the handle and the hole in the saw blade. Rivet the handle in place and bind the end into which the hack saw blade has been inserted with friction tape. Now grind the hack saw blade to the same thickness as the mica strips between the commutator bars.

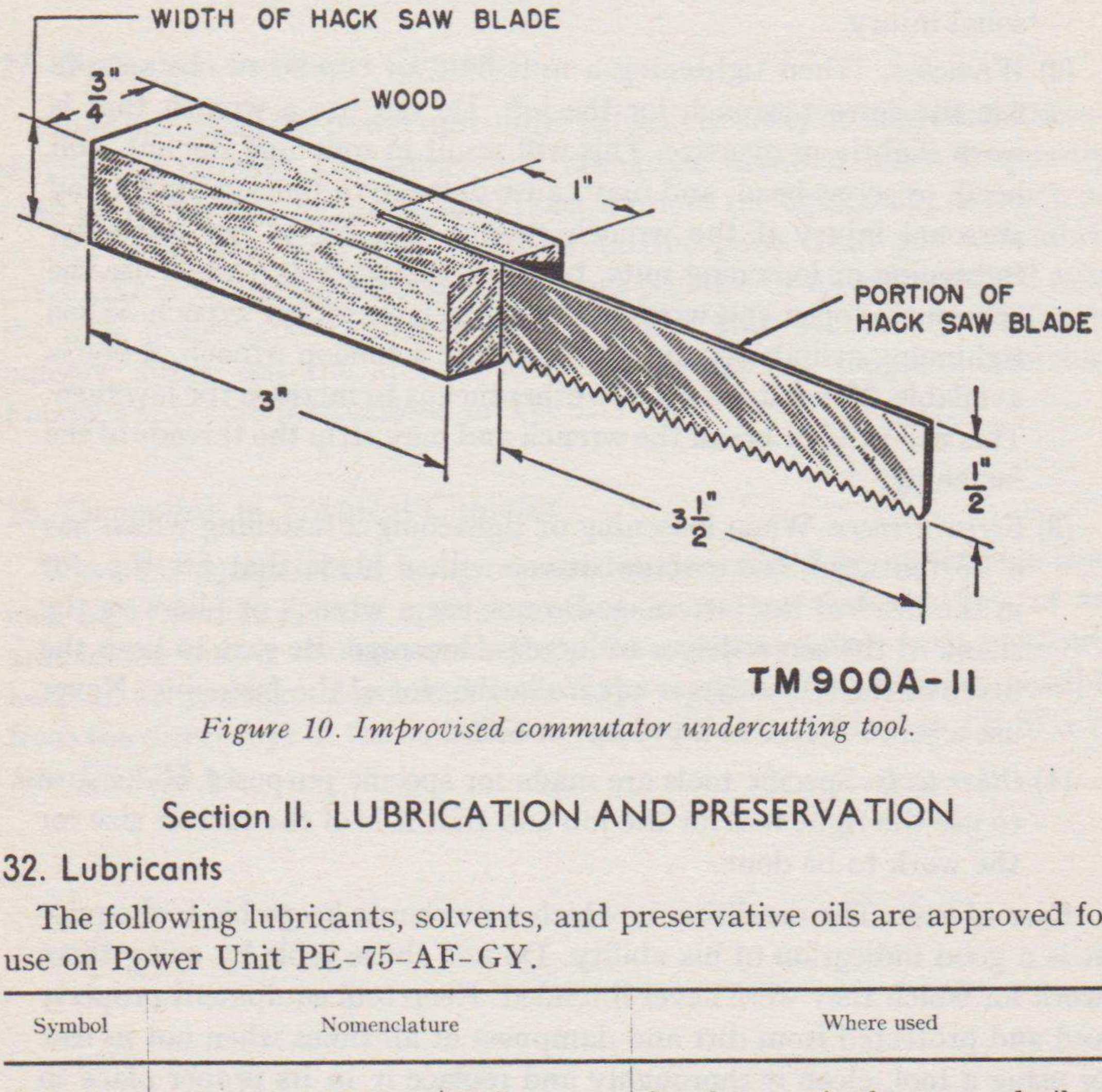

Figure 10. Improvised commutator undercutting tool.

Section II. LUBRICATION AND PRESERVATION

32. Lubricants

The following lubricants, solvents, and preservative oils are approved for use on Power Unit PE-75-AF-GY.

Symbol	Nomenclature	Where used
OE 30	Oil, engine (above +32°)	Crankcase, air cleaner, and oilcan points.
OE 10	Oil, engine (+32° to 0°)	Do.
OES	Oil, engine, subzero (below 0°) ..	Do.
SD	Solvent, dry-cleaning.....	All cleaning except electric wires.

33. Lubricating Periods

Lubrication instructions frequently are given in periods of days, weeks, months, half-years, and years. A daily period of operation consists of any consecutive 8-hour period or any number of periods of operation that total 8 hours. A weekly period of operation is any number of operating periods that total 64 hours. A monthly period of operation is any number of operating periods that total 256 hours. A half-yearly period of operation is any number of operating periods that total 1,024 hours. A yearly period of operation is any number of operating periods that total 2,048 hours.

34. Lubrication Requiring Disassembly

No parts of Power Unit PE-75-AF-GY require disassembly for lubrication. The generator bearings on Power Unit PE-75-AF-GY are factory-lubricated and do not require field lubrication. If a bearing becomes overheated and loses its lubricant or the bearing becomes otherwise unsatisfactory, replace it.

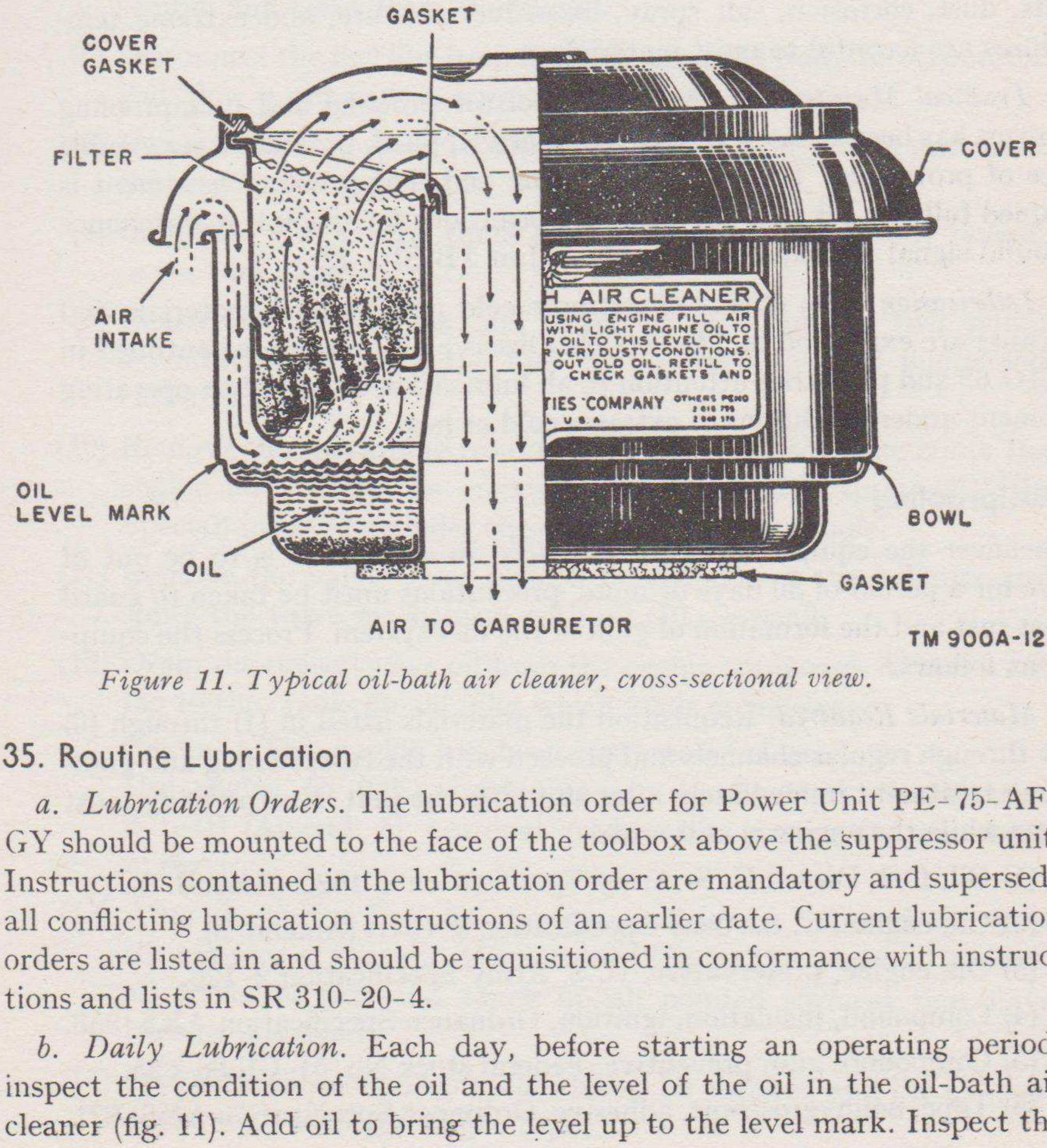

Figure 11. Typical oil-bath air cleaner, cross-sectional view.

35. Routine Lubrication

a. Lubrication Orders. The lubrication order for Power Unit PE-75-AF-GY should be mounted to the face of the toolbox above the suppressor unit. Instructions contained in the lubrication order are mandatory and supersede all conflicting lubrication instructions of an earlier date. Current lubrication orders are listed in and should be requisitioned in conformance with instructions and lists in SR 310-20-4.

b. Daily Lubrication. Each day, before starting an operating period, inspect the condition of the oil and the level of the oil in the oil-bath air cleaner (fig. 11). Add oil to bring the level up to the level mark. Inspect the

level of the engine oil in the engine crankcase and add oil to bring it up to the correct level. Stop the unit after every 4 hours of operation and recheck the oil in the crankcase. Use only the grade of oil specified in the lubrication order for the equipment.

c. Weekly Lubrication. At the end of every 64 hours of operation, lubricate the throttle and governor linkage. Remove the crankcase drain plug; drain the crankcase and refill it with the grade of oil specified in the lubrication order; replace the drain plug securely.

d. Monthly Lubrication. At the end of every 256 hours of operation, remove and disassemble the crankcase breather. Wash all parts thoroughly in Solvent, dry-cleaning (SD), saturate the element with engine oil (OE), and reassemble and reinstall it.

36. Weatherproofing

a. General. Signal Corps equipment, when operated under severe climatic conditions, requires special treatment and maintenance. Fungus growth, insects, dust, corrosion, salt spray, excessive moisture, and extreme temperatures are harmful to most materials.

b. Tropical Maintenance. A special moistureproofing and fungiproofing treatment has been devised which, if properly applied, provides a reasonable degree of protection. The moistureproofing and fungiproofing treatment is explained fully in TB SIG 13. Special precautions for tropical maintenance of ground signal equipment are explained in TB SIG 72.

c. Lubrication. The effects of extreme cold and heat on materials and lubricants are explained in TB SIG 69. Observe all precautions outlined in TB SIG 69 and pay strict attention to all lubrication orders when operating equipment under conditions of extreme cold or heat.

37. Rustproofing

Whenever the equipment is to be placed in storage or is to be out of service for a period of 30 days or more, precautions must be taken to guard against rust and the formation of gum in the fuel system. Process the equipment as follows:

a. Materials Required. Requisition the materials listed in (1) through (6) below through regular channels and proceed with the rustproofing and gumproofing treatment immediately after stopping the unit. Rustproofing must be done while the engine is still warm.

(1) Oil, fuel, Diesel, U. S. Army Specification 2-102C (Amend. 3).

(2) Oil, engine, U. S. Army Specification 2-104B (Amend. 5).

(3) Oil, engine, preservative, U. S. Army Specification 2-126.

(4) Compound, insulation, ignition, Ordnance Specification AXS-858.

(5) Compound, gum preventive, Federal stock No. 51-C1586-225.

(6) Tape, nonhygroscopic, adhesive, Ordnance Specification AXS-871.

b. Procedure.

(1) Drain the engine crankcase and refill it with Oil, lubricating, preservative (PL-Special).

(2) Drain the fuel tank and refill it with fresh fuel to which gum preventive compound has been added, in the proportion of one-quarter container of gum preventive compound to 5 gallons of gasoline.

(3) Place the three-way fuel valve in position to draw fuel from the fuel tank on the unit (fig. 7) (handle pointing upward). Operate the unit on this fuel mixture for 5 minutes. Shut off the fuel supply and permit the unit to come to a stop by pumping the carburetor dry.

(4) Disconnect the lower end of the fuel line from the fuel shut-off valve and drain the fuel tank.

(5) Remove the sediment bowl and screen from the fuel pump assembly and clean them thoroughly.

(6) Disconnect the fuel line from the fuel pump and from the carburetor and blow it out with compressed air.

(7) Remove the high speed jet assembly from the carburetor and drain the carburetor thoroughly.

(8) Crank the unit several times to remove any fuel that may remain in the fuel pump.

(9) Reassemble the screen and sediment bowl to the fuel pump assembly and replace the fuel line between the fuel pump and carburetor.

(10) Remove the spark plug from the engine. Have someone crank the engine and, while the engine is being cranked, spray oil (PL-Special) into the cylinder through the spark plug hole.

(11) Remove the valve cover plate from the side of the cylinder and spray the valve mechanism with oil (PL-Special).

(12) Drain the preservative oil from the engine crankcase. Attach a red tag to the crankcase oil filler which reads as follows:

Caution: This engine has been rustproofed. Date .....
Use engine oil (OE), conforming to U. S. Army Specification 2-104B (Amend. 5), seasonal grade when placing the unit back in service.

(13) After the engine has cooled, remove all grease, oil, and dirt from the exterior of the unit. Use solvent (SD) for this purpose. Remove all traces of rust and touch up all painted surfaces that have become damaged.

(14) Seal all breathers and breather holes, air intakes, and the exhaust outlet with nonhygroscopic tape.

(15) Make sure that all surfaces are dry and spray all unpainted exterior surfaces with insulation compound. Include all wiring and electrical equipment. Spray inside of the cylinder cooling-air shield. Do not get this compound on the interior of the generator. If painted surfaces of the equipment are scratched badly or blistered, follow instructions in paragraph 67.

Section III. PREVENTIVE MAINTENANCE

38. Meaning of Preventive Maintenance

a. Purpose. Preventive maintenance is a systematic series of operations performed periodically to keep equipment operating at top efficiency. The primary purpose of preventive maintenance is to prevent major breakdowns and the consequent need for repair. The primary function of trouble shooting is to locate and correct existing defects.

b. Importance. Preventive maintenance is of utmost importance since the failure or inefficient operation of one piece of equipment may cause the failure of an entire system. It is necessary to inspect the power unit systematically each day that it is operated and at weekly intervals, so that defects may be discovered and corrected before they result in serious damage or failure.

c. Responsibility. Preventive maintenance services are the responsibility of operating organizations. They comprise the scheduled maintenance services performed by the power unit operator and maintenance personnel, respectively. Ordinarily, the power unit operator will replenish the fuel and lubricants. He will perform necessary cleaning operations, tighten loose nuts, bolts, screws, and other fastenings, care for tools and accessories, and make such emergency repairs as are within the scope of his ability, tool equipment, and parts available. He will perform all daily lubrication operations, before operation, at halt (during shut-down periods), and after operation. He will assist the unit mechanic in performing the weekly maintenance on the unit. Maintenance personnel will perform the weekly and monthly maintenance operations with the assistance of the unit operator. The unit mechanic will see that daily lubrication operations have been performed properly by the unit operator. Any maintenance or repair operations beyond the scope of maintenance personnel will be reported to the officer in charge.

d. DA AGO Form 11-260 Services. Refer to the appropriate paragraphs in this manual for detailed instructions for the performance of operations listed on the back of the form. The fact that an operation, instructions for the performance of which appear in this manual, is not listed on DA AGO Form 11-260 does not excuse the operator or the repairman from the performance of such operations.

e. DA AGO Form 11-261 Services. Refer to the appropriate paragraphs in this manual for detailed instructions for the performance of operations

listed on the form. The fact that an operation, instructions for the performance of which appear in this manual, is not listed on DA AGO Form 11-261 does not excuse the operator or the repairman from the performance of such operations.

f. Operations. Items appearing on DA AGO Form 11-260 and DA AGO Form 11-261 that are applicable to Power Unit PE-75-AF-GY are as follows:

(1) *DA AGO Form 11-260 services.*

Item No.	Paragraph reference	Item No.	Paragraph reference
1	39*b*(5) and 42*i*	7	39*b*(2), 41*b*, and 42*b*
2	42*h*	10	47, item 41
3	39*b*(1)	11	47, items 11 and 84
4	39*b*(3) and 41*d*	12	47, item 18
5	42*f*	13	47, item 2
6	39*b*(4) and 41c		

(2) *DA AGO Form 11-261 services.*

Item No.	Paragraph reference	Item No.	Paragraph reference
1	47, item 1	15	47, items 12, 42, and 49
2	42*h*	16	47, items 12, 42, and 49
3	39*b*(1)	18	47, item 46
4	39*b*(3), 41*d*, and 47, items 11 and 44	20	47, item 49
		21	47, items 20 and 39
5	42*f* and 47, item 40	22	47, item 11
6	39*b*(4), 41*c*, and 47, items 20 and 21	24	47, items 40 and 43
		25	47, item 50
7	39*b*(2), 41*b*, and 47, item 2	26	47, item 172
10	47, item 41	27	47, item 13
11	47, items 11 and 84	28	47, item 13
12	47, item 18	29	47, item 20
13	47, item 2	30	68
14	47, item 43	31	47, item 50

39. Daily Maintenance Services

a. Purpose. The before-operation services are intended primarily as a check to see that the power unit has not been damaged, tampered with, or sabotaged since the after-operation services were performed. It is the duty of the operator to determine if the unit is in satisfactory condition to carry out any mission to which it may be assigned.

b. Procedures. The before-operation service consists of performing the operations listed below:

(1) *Tampering and damage.* Inspect the unit for damage that may have resulted from falling debris, shell fire, or sabotage. Be alert for the presence of booby traps. Look for signs of cut drive belts, loosened or clogged breather and air cleaner, and loosened spark plug and ignition wiring.

(2) *Fuel and lubricant.* Check the amount of fuel in the fuel tank. Note any indications of leakage or tampering. Fill the fuel tank, if necessary. If a remote fuel supply is to be used, see that the remote supply tank is full. Check the level of the lubricating oil in the engine crankcase and add oil, if necessary. Inspect the condition of the crankcase oil by noting its color on the depth gage and by rubbing a quantity of the oil between the fingers to detect the presence of sand, grit, or other foreign matter. Remove the air cleaner cover and inspect the level and condition of the oil in the air cleaner. Correct the oil level in the air cleaner, if necessary.

(3) *Leaks.* Inspect the entire fuel system to make sure that all connections are tight and that there are no leaks. Inspect the fuel in the glass sediment bowl of the fuel pump for traces of water or other foreign matter. Inspect the engine crankcase and all gasketed joints for traces of leakage. Trace all leaks to their source and correct or report them.

(4) *Engine warm-up.* Crank the engine and note whether it starts readily. During the warm-up period, be alert for any unusual sounds, sluggish operation, signs of overheating, and excessive exhaust smoke. When operating in low temperatures, follow applicable instructions in paragraph 26.

(5) *Tools and equipment.* See that all tools, running spare parts, and other items of equipment are present and stowed properly. See that two copies of this technical manual and other applicable publications are present and in legible condition. See that two copies of all applicable maintenance forms are present and filled out properly.

40. During Operation

There are no during-operation services necessary for Power Unit PE-75-AF-GY, other than keeping alert for any unusual operating condition. Stop the unit every 4 hours and perform the at-halt service.

41. At-Halt Services

a. The at-halt or at-stop services are regarded as minimum battle services and must be performed every 4 hours of operation.

b. Check the fuel supply to make sure that it is ample for the next period of operation. Refill the fuel tank, if necessary. Replenish the lubricating oil in the engine crankcase.

c. Feel the generator and bearing housings for evidence of excessive heat. If the generator or bearing housings appear excessively hot, report this condition.

d. Make a quick inspection of the entire unit for any evidence of leaks that might have developed during operation. Correct or report any leaks that are found.

e. Inspect the spark plug and spark plug cable to see that the spark plug is tight and that the cable connections are secure.

f. Investigate any deficiencies that were noted during operation. Determine whether they are serious enough to cause damage or failure of the equipment. If so, see that they are corrected before resuming operation.

42. After-Operation Services

a. Purpose. It is the purpose of the after-operation service to correct all deficiencies that were noted during operation, make necessary adjustments and repairs, replenish fuel and lubricant, and to perform any lubrication operations that are required for the period of time that the equipment has been operated. If the after-operation services are performed properly, the unit should be in a ready-to-operate condition.

b. Fuel and Lubricant. Fill the fuel tank. Note whether an unusual amount of fuel has been used during operation. If the equipment appears to be using an excessive amount of fuel, report this condition. Check the level of the engine oil in the engine crankcase and replenish it. If the unit has been operated a sufficient number of hours (64 operating hours) since the crankcase was last drained, drain the crankcase and refill it with fresh engine oil (OE) of the correct seasonal grade.

c. Accessories and Belts. Remove the belt guard and inspect the condition and adjustment of the generator drive belts (fig. 12). Check to see that all accessories are in good condition and that their mounting is secure. See that the cooling-air intake is free from obstructions.

d. Air Cleaner and Breather. Service the air cleaner and the crankcase breather in accordance with the number of hours that the unit has been operated and instructions in the lubrication order for the equipment.

e. Controls and Linkage. Inspect the linkage between the carburetor and governor to see that it is in good condition, not binding, clean, and lubricated properly.

f. Fuel Filter. Look to see if there is any water or other foreign matter in the fuel filter sediment bowl. If there is an excessive amount of foreign matter present, drain the fuel tank and refill it with clean fuel. See that the fuel filter and fuel pump are in good condition and that they do not leak.

g. Wiring and Connections. Inspect the spark plug cable and all other wires to see that they are in good condition and connected securely. Inspect the power output receptacles and binding posts to see that they are in satisfactory condition. Remove all oil, grease, and dirt from the wiring.

h. Clean. Thoroughly clean the entire exterior of the equipment. Use solvent (SD) where necessary, but avoid getting any of the cleaning solvent into the fuel tank, crankcase, air cleaner, breather, and the interior of the generator.