TM 9-2616

WAR DEPARTMENT

TECHNICAL MANUAL

INSTRUCTION GUIDE

GENERATING UNIT M5

April 22, 1942

TECHNICAL MANUAL
No. 9–2616

WAR DEPARTMENT,
WASHINGTON, April 22, 1942.

INSTRUCTION GUIDE

GENERATING UNIT M5

SECTION I

GENERAL

1. Purpose.—This manual is published for the information of both using arms and services and ordnance maintenance personnel.

2. Scope.—This manual contains a detailed description of the generating unit M5, and the necessary instructions for its operation and care.

3. References.—See appendix.

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SECTION II

DESCRIPTION

4. General.—*a.* The generating unit M5 (fig. 1) is a portable, self-contained, gasoline-driven, 3-kva, a-c generating unit which supplies 3-phase power at either 125 volts and 60 cycles, or 130 volts and 50 cycles. The generating unit M5 is for use with the remote control system M1 for the 37-mm AA gun carriage M3A1, and the remote control system M5 for the 40-mm AA gun mount M2.

b. It consists principally of a gasoline engine, an a-c generator, two panels carrying the necessary controls and indicators, an outlet receptacle, and the necessary equipment and tools for field maintenance. The generating unit is mounted on skids and is inclosed by a steel housing (7, fig. 1) equipped with hinged hoods and a door which afford access to the interior of the unit and the control panel.

c. Four porter bars are supplied to be inserted through the brackets attached to the housing to facilitate the movement of the unit in the field.

5. Engine.—*a. General.*—The engine is a standard commercial, 4-cylinder, 4-cycle, L-head, water-cooled, 11-horsepower gasoline engine. It is equipped with a starting and ignition system which includes a storage battery, a battery-charging generator, a cut-out, and a starting motor.

b. Ignition system.—The ignition system is of the standard automotive type using an ignition coil and distributor. The ignition switch is mounted with the engine controls on the main switchboard. The distributor is driven by the water pump shaft. The distributor condenser is mounted on the side of the distributor case, and the ignition coil is mounted on top of the engine.

c. Cooling system.—The cooling system is of the forced circulating type consisting of a centrifugal water pump mounted in the front end of the engine, and a copper fin and tube type radiator, designed to give maximum heat radiation and cooled by a 13-inch, 6-blade fan of the pusher type. The fan is driven by a V-belt from the engine crankshaft.

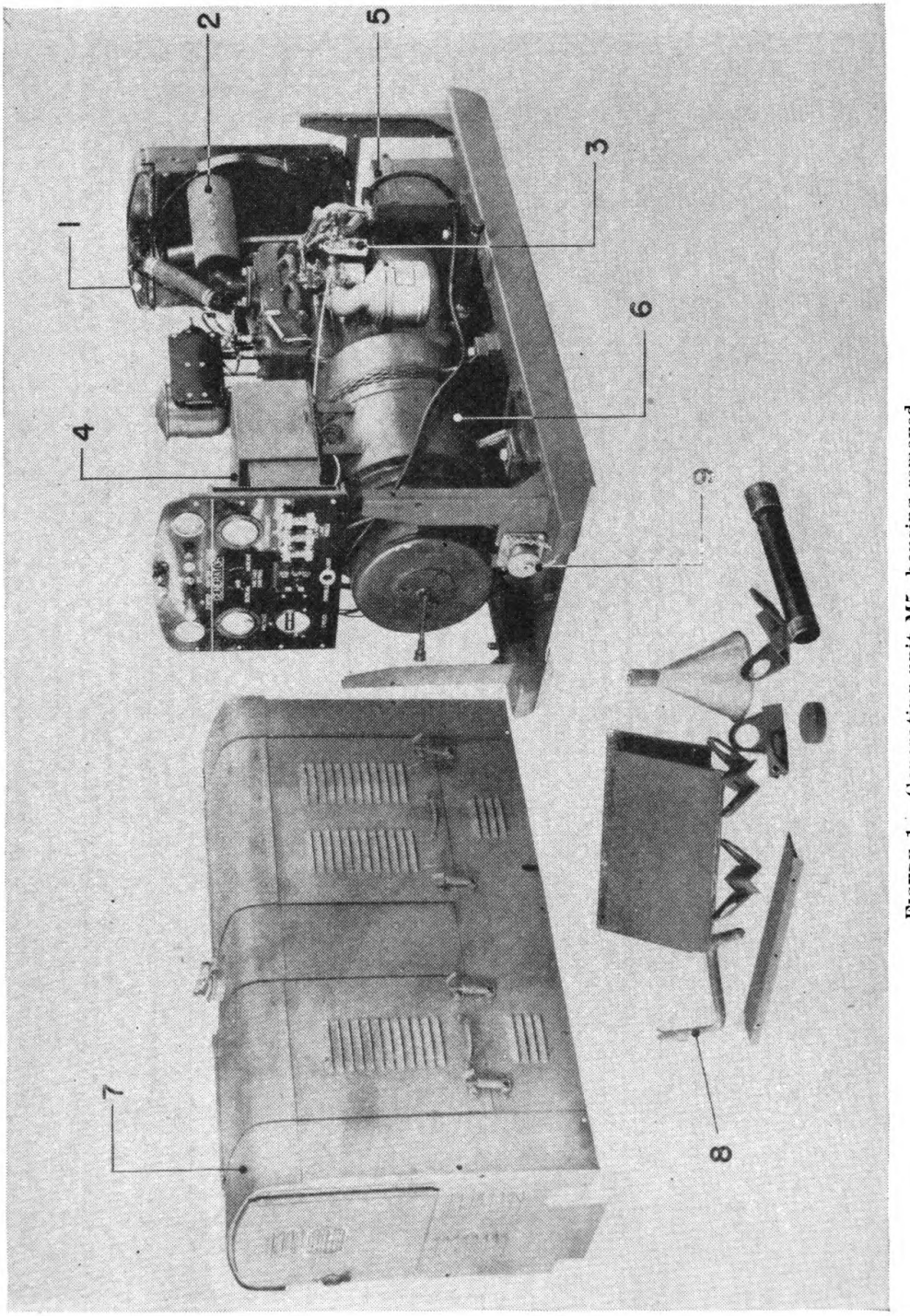


FIGURE 1.—Generating unit M5, housing removed.

1. Radiator.
2. Muffler.
3. Gasoline filter.
4. Tool box.
5. Battery.
6. Generator.
7. Housing.
8. Hand crank.
9. Outlet receptacle.

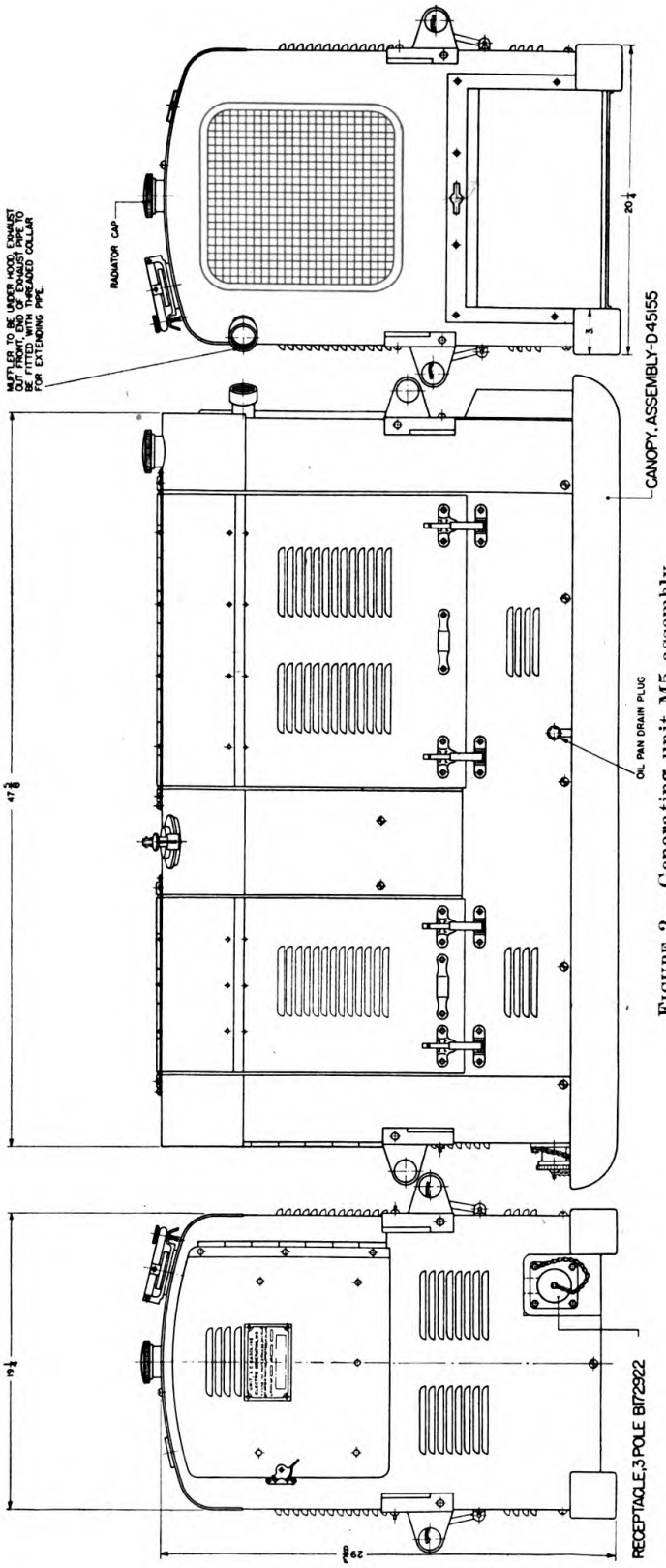


FIGURE 2.—Generating unit M5 assembly.

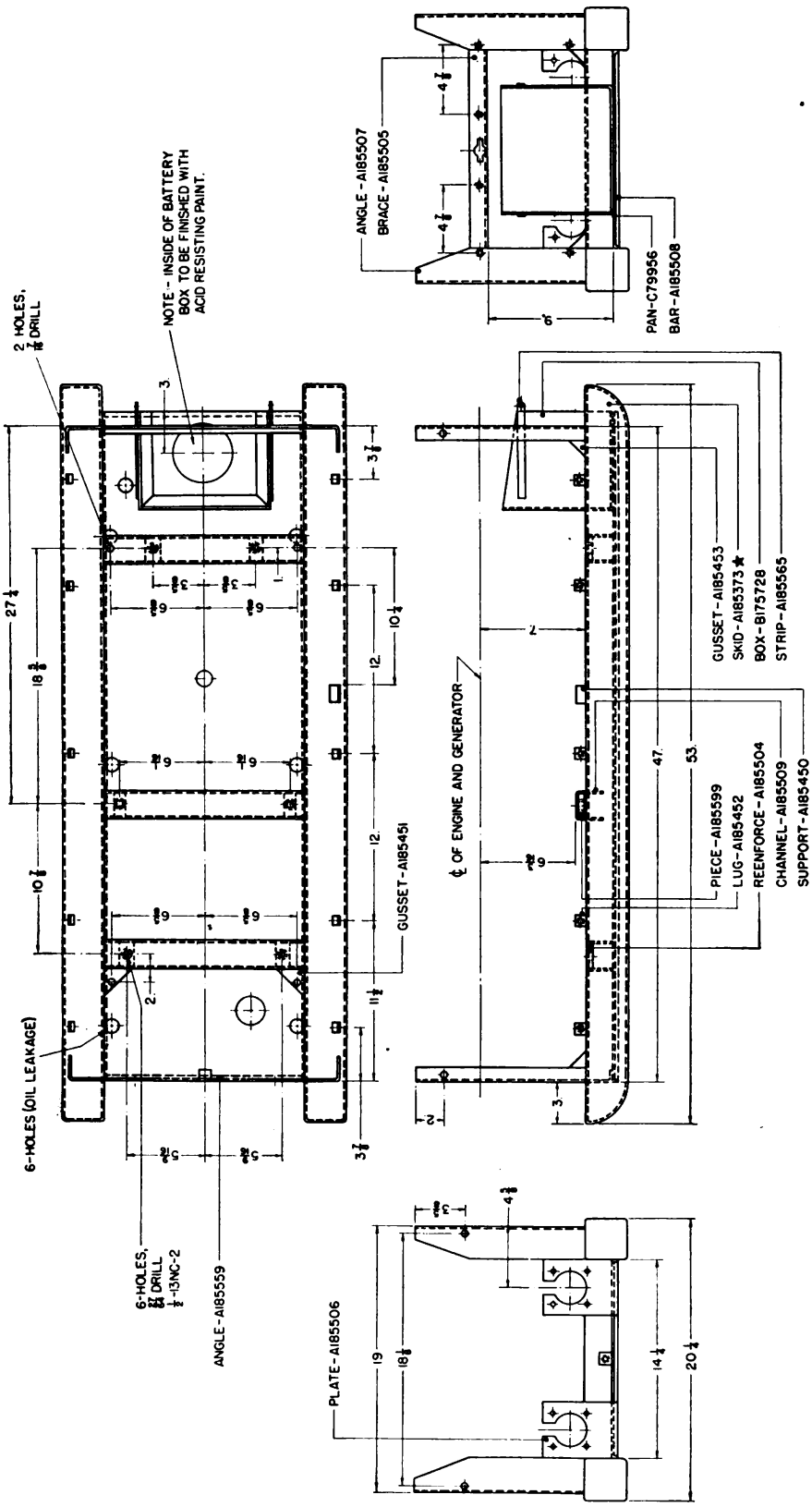


FIGURE 3.—Skid assembly.

d. Lubricating system.—Lubrication is provided by a gear pump mounted in an oil pan. It furnishes positive pressure oiling to all main and connecting-rod bearings. All other bearing surfaces are splash lubricated. The oil is kept clean by an oil filter mounted on top of the engine.

e. Accessories.—Other equipment includes air, oil, and gasoline filters which provide maximum engine protection under all adverse operating conditions.

6. Generator.—*a.* The main generator (6, fig. 1) is a 3-kva, 3-phase a-c, separate inbuilt exciter of the revolving field type. It is designed to generate 60 cycles, 125 volts when driven at 1,200 rpm, or 50 cycles, 130 volts when driven at 1,000 rpm. The d-c generator for separate excitation is mounted on the same shaft with the main generator rotor between the generator bearings. Voltage is controlled by a hand-operated rheostat on the control panel.

b. The exciter field is built in the front bearing bracket of the main generator. The brush holders for the exciter commutator and the collector rings which supply current to the revolving field of the main generator are of the radial box type with adjustable spring tension. They require very little attention but are readily accessible upon removal of the front generator cover.

c. The armature shaft is mounted in two oversize ball bearings with sufficient movement of bearings allowed for thermal expansion of shaft. Screw type grease cups are provided to lubricate these bearings. A large-diameter fan is provided for cooling the generator by propelling cool air past the windings.

d. The generator is designed to give the best possible regulation and overload capacity. It is so constructed that it will not be harmed if operated as long as 2 hours at 25 percent overload. It is designed for trouble-proof operation in all weather conditions from the Tropics to the Arctic and for coastal or inland operation.

7. Panels.—The control equipment necessary for the operation and control of the generating unit M5 is mounted on two panels, the instrument panel and the subpanel. To facilitate its use, this equipment is indicated by lettering engraved on these panels.

a. Instrument panel.—The instrument panel (figs. 4 and 5), located inside the generator end of the housing and accessible through a vertically hinged door, carries the controls and indicators for the engine and the a-c generator. The instrument panel is divided by two closely spaced, horizontally engraved lines. The equipment pertinent to the engine is mounted above these lines, and the equipment pertinent to the generator is mounted below these lines.

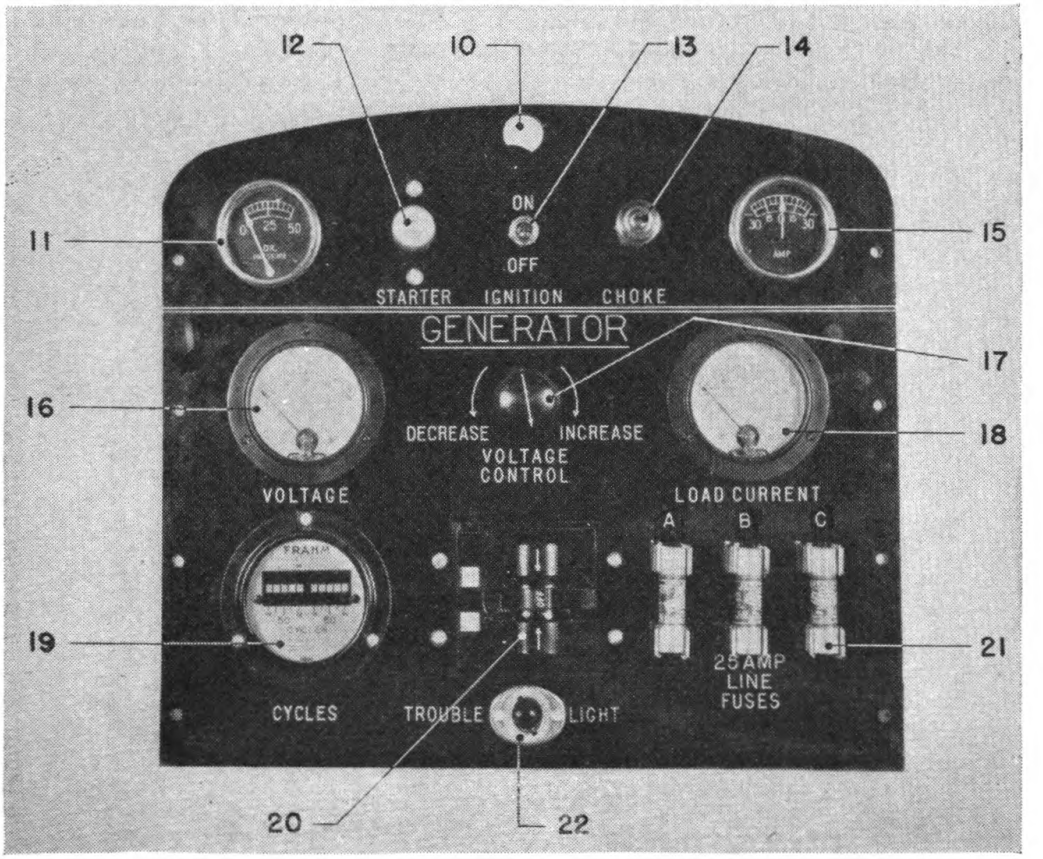
(1) The engine controls and indicators are:

(*a*) Ammeter which indicates the charging or discharging rate of the storage battery.

(*b*) Oil pressure gage for a continuous check of the engine lubrication.

(*c*) Starting switch (button).

(*d*) Ignition switch.



10. Dash lamp.
11. Oil pressure gage.
12. Starter button.
13. Ignition switch.
14. Choke control.
15. Charging ammeter.
16. Voltmeter.
17. Field rheostat.
18. Load ammeter.
19. Frequency meter.
20. Main switch (circuit-breaker).
21. Fuses (25-ampere).
22. Receptacle.

① Front view.

FIGURE 4.—Instrument panel.

(*e*) Manual choke control.

(2) The generator controls and indicators are:

(*a*) A-c voltmeter which indicates the output or line voltage.

(*b*) A-c ammeter which indicates the load or line current.

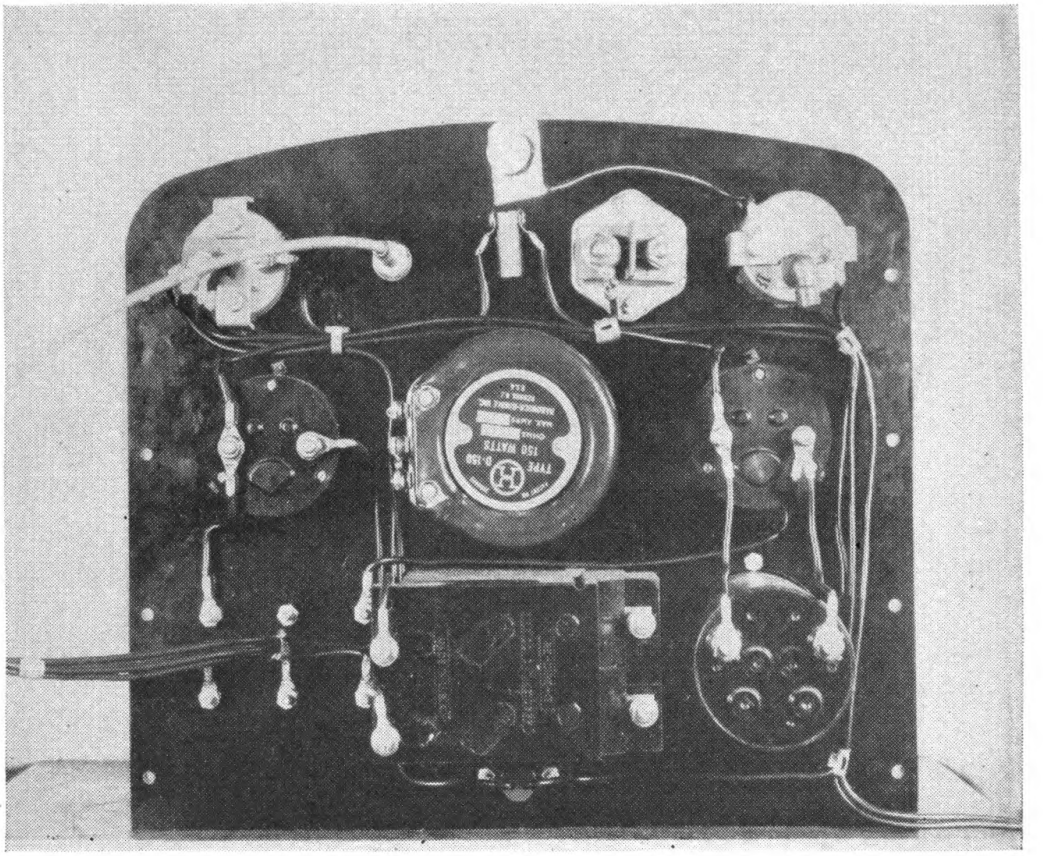
(*c*) Frequency meter, vibrating-reed type, which continuously registers the a-c output frequency.

(*d*) Main switch, double-pole circuit-breaker type, for connecting and disconnecting the load (opens circuit if trouble develops).

(*e*) Field rheostat, hand-operated rotary type, for regulating output voltage.

(*f*) Three line fuses, mounted in clips, for short-circuit protection to the generator.

(3) The instrument panel also carries a dash light, located at the top of the panel, with a self-contained switch, and a socket, located at the bottom of the panel, for attaching the extension cord and trouble



② Rear view.
FIGURE 4.—Instrument panel—Continued.

lamp. The power for these lights is supplied from the battery circuit.

b. Subpanel.—(1) The subpanel (fig. 6) is a terminal board, carrying the links necessary to connect its terminals. It is located inside the housing in a compartment of the tool box near the point where the leads emerge from the a-c generator.

(2) The terminals of the subpanel are conveniently arranged to facilitate the repositioning of the connecting links when changing the frequency of the generator. A cover, horizontally hinged at the top of the subpanel, is provided. Instructions for repositioning the

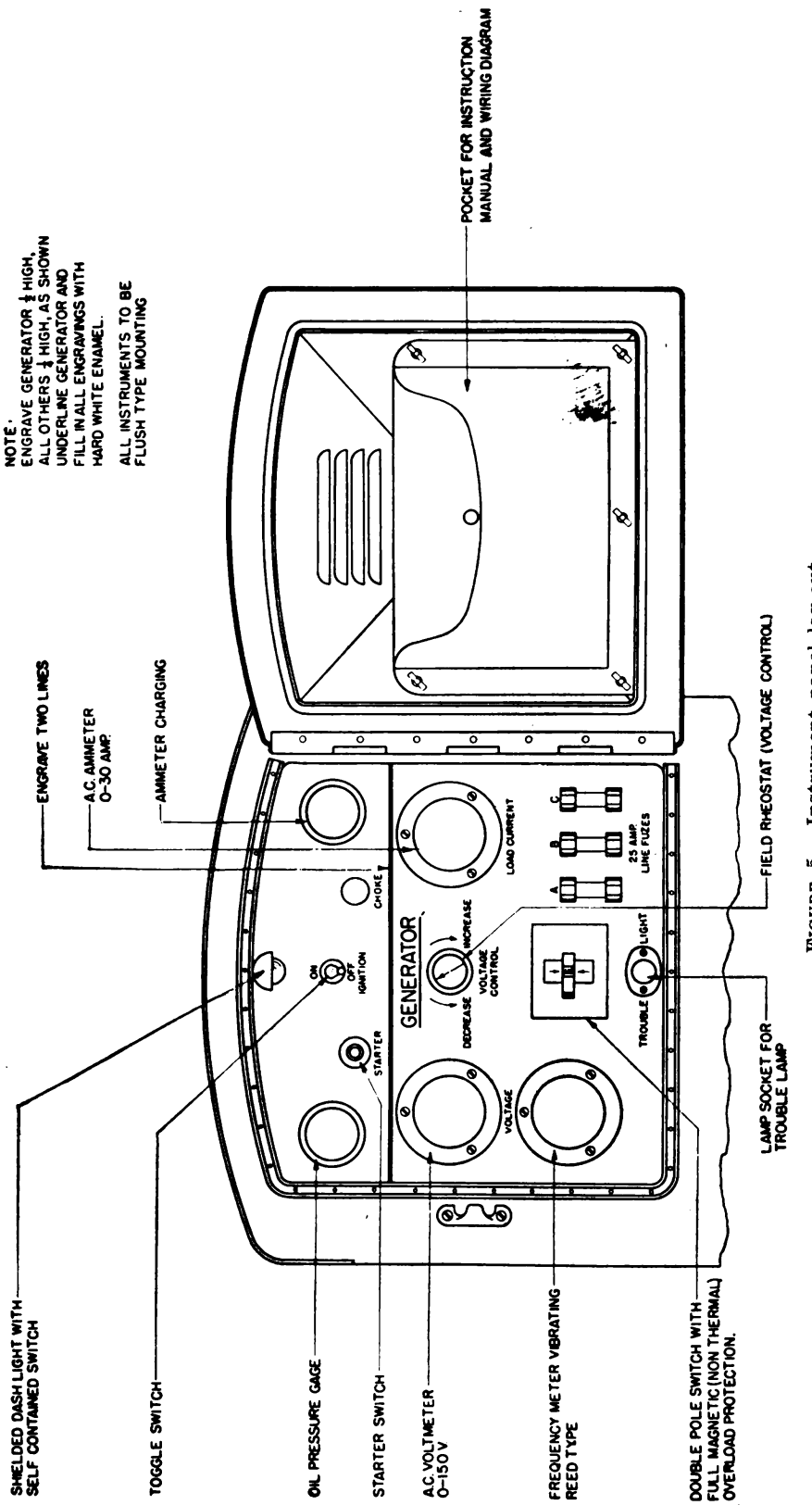


FIGURE 5.—Instrument panel lay-out.

connecting links are located on a metal plate attached to this cover. (See fig. 7.)

8. Outlet.—A three-pole receptacle (9, fig. 1) is used for connecting in the load and is located at the panel end of the housing near the right-hand skid. A removable, screw-on type cover is provided with the receptacle and is attached to it by a safety chain.

9. Equipment.—The generating unit is supplied with the following equipment to facilitate handling and field maintenance:

a. Four porter bars, two long and two short, packed in a separate case, to be inserted through the brackets provided to facilitate handling the unit.

b. Starting hand crank (8, fig. 1) fastened inside the housing for emergency use.

c. Copper funnel, located inside the housing at the back of the engine compartment, to facilitate filling the gasoline tank.

d. Tool box (4, fig. 1) mounted above the main generator, which contains the following parts:

(1) Adjustable 6-inch wrench.
(2) Socket type spark plug wrench.
(3) Ten-inch screw driver.
(4) Pair of slip-joint pliers.
(5) Set of open-end wrenches contained in a cloth tool roll.
(6) Trouble light with an extension cord and plug.
(7) Assortment of bolts, screws, and spare parts for any minor repairs that may be necessary.

SECTION III

OPERATION

10. Preparation for use.—*a.* The crankcase should be filled to its capacity of 4 quarts with oil of the proper viscosity. The oil level of the crankcase is indicated on a bayonet type gage stick at the rear of the engine. (See fig. 8.)

b. The gasoline tank, located in the housing, should be filled to its capacity of 5 gallons; a copper funnel and a strainer pad will facilitate the filling. The safety cap on the gasoline filler should be locked down and the shut-off valve at the bottom of the tank opened after filling.

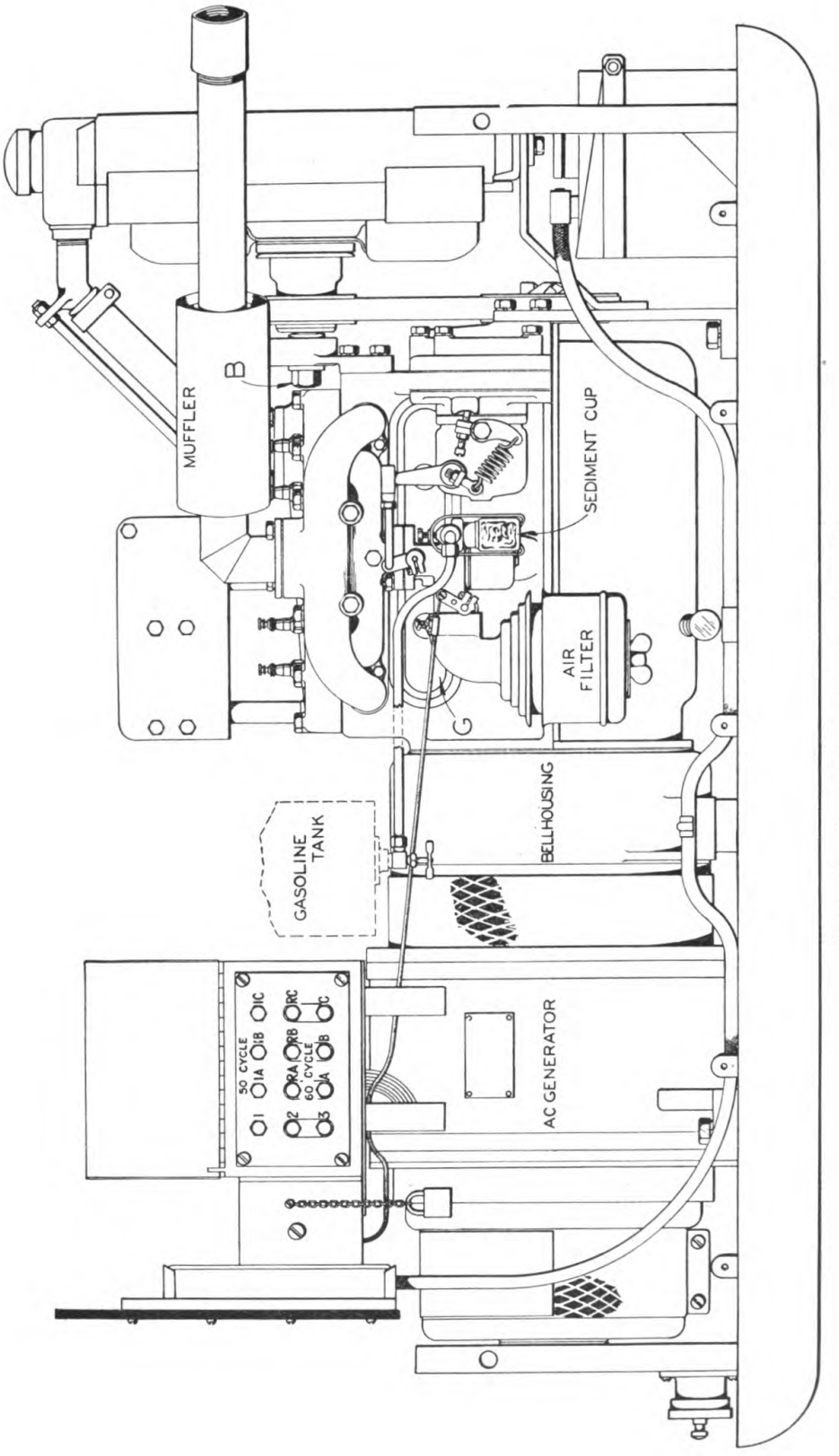


FIGURE 6.—Generating unit M5—side view.

A gage on the top of the tank indicates the amount of gasoline in the tank.

c. The drain cock below the water pump should be closed and the radiator filled with water to its capacity of 5 quarts. If freezing weather is anticipated, an antifreeze solution should be used.

d. (1) The storage battery (5, fig. 1), located under the radiator at the front end of the engine, should be checked and, if necessary, distilled water added until it covers the top of the plates.

(2) The batteries are generally shipped dry and the electrolyte has to be put in after receival. The small rubber stoppers in the vent holes of the battery caps should be removed and the terminals coated with petrolatum or light grease to protect them from acid fumes. After the initial preparation, acid should never be added to the battery.

11. Starting.—*a.* The engine may be started after the preliminary servicing described above has been completed. The same procedure is followed as that of starting an automobile engine.

(1) Pull out the choke button if the engine is cold.

(2) Snap on the ignition switch.

(3) Push the starter button.

b. As soon as the engine starts, the manual choke control should be pushed in until it is only about one-fourth out. As the engine warms up, the choke should be gradually returned to its normal or "all in" position. If the engine has been shut down recently and is still warm, it will not be necessary to use the choke.

c. The hand crank may be used if the current of the starting battery is too weak to provide the proper voltage for ignition and also crank the engine.

d. If the engine fails to start in 15 to 20 seconds of cranking, or if it should suddenly stop, the operator should shut off the switches and look for the cause. The following procedure should be used:

(1) *Check for fuel reaching engine cylinders.*—(*a*) Uncouple the fuel line at the gasoline filter (fig. 6) and open the gas cock above it to see if the gasoline flows freely to the filter. If this is free, uncouple the gasoline filter from the carburetor and connect the filter to the gasoline line again to see if the gasoline flows freely through the filter element to the carburetor.

(*b*) Should the gasoline fail to pass through the filter, take off the glass bowl and clean it with gasoline. Clean the filter element also. This element is made up of a number of very thin disks held together by a nut on the bottom and should be handled carefully. If compressed air or a tire pump is at hand, the filter element should be

blown out before replacing the bowl. These operations assure gasoline getting to the carburetor.

(*c*) After the above operations, the engine should be cranked from 10 to 15 seconds with the choke out and then a spark plug removed. The spark plug should be wet or damp with gasoline if the carburetor is clear and free. This completes the test to see that fuel reaches the engine cylinders.

(2) *Check for ignition faults.*—For a quick check of the ignition system, remove a spark plug wire and hold it close to the engine block while the engine is being cranked (either with the starter or with the hand crank) with the ignition switch on. There should be a strong blue spark at least $\frac{3}{16}$ inch long. If there is no spark or if the spark is very weak, the following checks should be made:

(*a*) Check all the wiring connections at the battery terminals, battery ground, starter switch, ignition switch, battery ignition ammeter, coil terminals, and primary lead to the distributor.

(*b*) If there is still no spark, remove the distributor cap and inspect for any cracks. Failure to start due to a cracked distributor, manifold cracks or air leaks, defective condenser, etc., are very rare.

(*c*) Inspect the breaker points to see if they are smooth, have a flat contact with each other, and are adjusted for the maximum gap. If these points are rough, they should be smoothed with an ignition file or an oilstone before adjusting; if they show excessive wear, they should be replaced from the spare sets found in the tool box.

(3) *Low battery charge.*—If the starter is very sluggish and its operation dims the instrument panel light, the battery charge is low and there may not be the proper voltage for ignition. In this event, the engine must be cranked with the hand crank. Upon starting, the battery-charging generator will bring the battery up to full charge very rapidly.

(4) *Flooding.*—If it is suspected that failure to start or to run is due to flooding, push in the choke and crank the engine from 10 to 15 seconds with the starter.

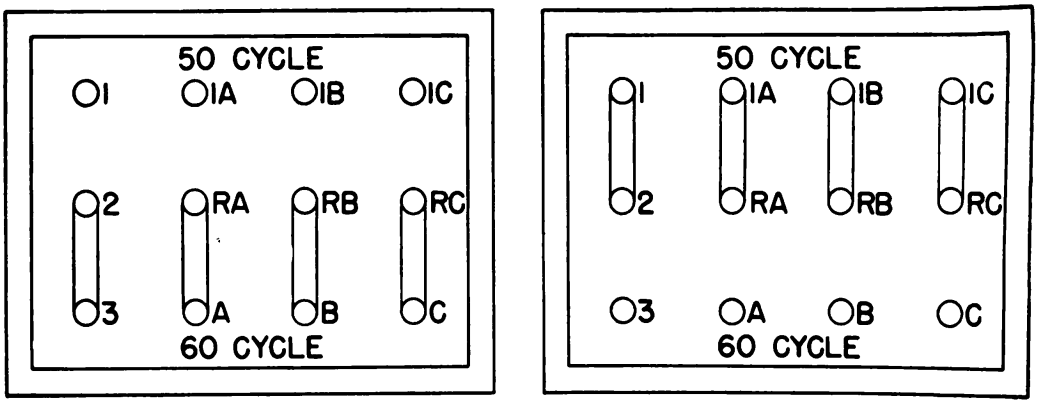
12. Changing frequency.—Two changes are necessary to convert the generating unit from 60-cycle operation to 50-cycle operation, or vice versa.

a. Repositioning links connecting terminals on subpanels.—The links connecting the terminals on the subpanel must be repositioned in accordance with the instructions on the metal plate (fig. 7) inside the cover of the subpanel. This not only reconnects the windings of the a-c generator, but utilizes or shorts out a resistor in the exciter

field. Before operating the generating unit, these connections should be checked to see that they are tight and correctly made.

b. Changing engine speed.—(1) The speed of the engine must be changed to conform to the speed necessary to give the frequency desired. The speed of the engine is controlled by a mechanical governor, gear driven from the timing train in front of the engine. This governor is of the fly-ball type, operating in oil, and is easily adjusted for either 50-cycle or 60-cycle generator operation.

(2) The engine should run at 1,200 rpm for 60-cycle generator operation and 1,000 rpm for 50-cycle generator operation. The engine speed is checked by the frequency meter on the instrument panel.



① 60-cycle, 3-phase. ② 50-cycle, 3-phase.

FIGURE 7.—Instruction chart for changing links.

13. Operating under load.—*a.* After the engine has been started and is operating satisfactorily, the load should be thrown across the generator by throwing the main switch to "on." As this switch is a circuit-breaker, it will automatically disconnect the generator from the load, should any trouble develop. It resets immediately when thrown to the "on" position again and throws out if the trouble has not yet been cleared. The trouble, generally a short circuit, should be cleared before further use.

b. To guard against the breaker sticking or failing to throw out for any reason, there are three fuses (fig. 4), one in each line, which will save the generator from a continuous overload.

c. The voltmeter is connected in the circuit ahead of the main switch and will read the line voltage at all times except when the fuses are out. If the machine is running and the voltmeter does not register, check the fuses before proceeding further. The frequency meter, wired in the circuit with the voltmeter, will read the frequency

continuously. Normally there is from one to three cycles change in frequency as the load is varied.

d. The ammeter is placed in one phase (one line) of the load circuit and gives a direct indication of the load if the load is properly balanced between phases. Since some of the load may be single-phase, it is advisable to check each phase occasionally with a portable ammeter and, if necessary, reconnect the load so that it is more nearly balanced.

e. Normal full load or rating for a balanced load is 13.9 amperes and 125 volts on 60-cycle operation or 13.3 amperes and 130 volts on 50-cycle operation. The generator will not be harmed, though, even if it is operated for as much as 2 hours at 25 percent overload or at 25 percent more current in either case.

f. The field rheostat is connected in the exciter field circuit. It varies the voltage of the exciter, which in turn varies the excitation of the a-c generator and controls the voltage of the entire unit. It is normally advisable to adjust the voltage to the rated or desired value after the machine reaches a steady operating condition at its normal load. If this adjustment is made in the first few minutes of operation it may be necessary to increase the rheostat setting slightly to compensate for the normal rise in temperature as the machine approaches a steady operating temperature.

g. As an initial setting the no-load voltage (switch open) may be set to approximately 140 volts on 60 cycles, or 150 volts on 50 cycles and a final adjustment made after the load has been applied.

SECTION IV

CARE AND ADJUSTMENT

14. General care and precautions.—*a.* The generating unit should be kept clean and adequately supplied with water, lubricating oil, and gasoline at all times. Care should be exercised to see that antifreeze is added to the water supply when operating in cold climates and that the proper grade of oil is used for the temperature under which the unit is operating.

b. Exercise care to see that the main switch (circuit-breaker) is always open when connecting or disconnecting the power cable, and before starting the engine.

c. If the unit is used in any building or inclosure, be sure that a hose or pipe is attached to the exhaust pipe (fig. 6) and run through an opening to the outside. Exhaust fumes and gases might prove harmful to the operating personnel.

d. Periodic examinations should be made to see that all electrical connections and leads are in good order and that the electrical indicators and controls are functioning properly. When not in use, see that the receptacle cover is screwed on the outlet receptacle.

e. Do not pour gasoline into the fuel tank while the engine is running, or while the ignition switch is turned on.

f. For cold weather operation or storage, the cooling system is to be protected with a mixture of ethylene glyco in the quantities specified in OFSB 6–G–3.

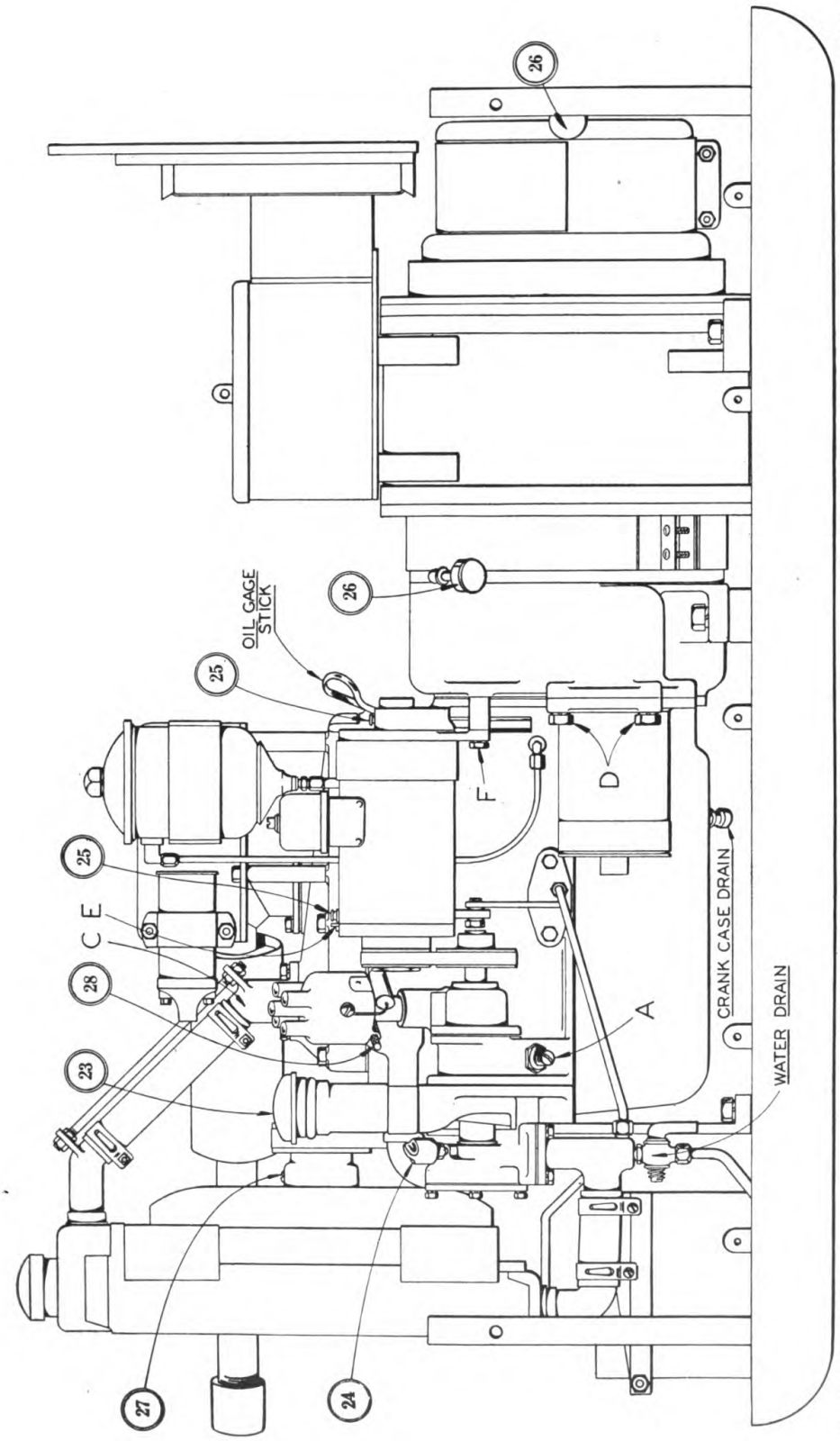
15. Lubrication.—The generating unit M5 should not be lubricated excessively, and the frequency of oiling should be based on the number of hours of operation. Use only specified oils and lubricants. The following points should be checked periodically.

a. Crankcase.—Oil, engine, SAE 30, should be used when the minimum anticipated temperature is not less than plus 10° F., and SAE 10W when the minimum anticipated temperature is not less than minus 10° F. Below minus 10° F., dilute crankcase oil with 10 percent gasoline or kerosene, or 15 percent Diesel fuel. Care must be exercised to maintain the diluent at this ratio, since it will be partially driven off during operation. In case of doubt concerning the quantity of diluent present in the crankcase oil, add an excess of diluent. In extremely low temperatures, if circumstances permit, drain the crankcase while the unit is warm, and heat oil before replacing. Change oil every 50 hours of operation.

b. Water pump.—The grease cup (24, fig. 8) located in the housing of the water pump, should be given one turn every 50 hours of operation. The cup should be refilled when empty. Use waterproof grease No. 4 for lubricating the water pump under all temperature conditions. At low temperatures, lubricate sparingly and only when engine is warm.

c. Battery-charging generator.—A drop of oil should be placed in the cups (25) at each end of the battery-charging generator after every 50 hours of operation.

d. A-c generator.—The grease cups (26, fig. 8) at each end of the a-c generator should be given one turn each after every 50 hours of



23. Oil breather.
24. Grease cup (water pump).
25. Oil cup.
26. Grease cups (a-c generator).
27. Slotted plug.
28. Knurled sleeve.

A, Oil pressure adjusting screw; C, water outlet; D, bolts; E, nut; F, nut.

FIGURE 8.—Generating unit M5—side view.

operation. Refill when necessary. Use grease, special, low temperature, for all temperature ranges.

e. Miscellaneous points.—Use oil, engine, the same as specified for the crankcase, for all miscellaneous points requiring oil. Extreme caution should be exercised at low temperatures to avoid overlubrication. If oil, lubricating, for aircraft instruments and machine guns is available, it is to be used for oiling the miscellaneous points at very low temperatures.

(1) *Cooling fan.*—After every 50 hours of operation, the slotted plug (27) in the fan hub should be unscrewed and the hub filled with oil until it drips from the shaft.

(2) *Distributor.*—A drop of oil should be placed in the knurled sleeve (28) of the oiler on the distributor every few days of operation.

(3) *Governor.*—The governor needs very little attention as it is oiled from the engine lubrication system. However, a drop of oil should be placed on the joints of the connecting links occasionally.

16. Services and inspection.—*a. Battery.*—(1) The battery caps should be removed every few weeks and distilled water added if necessary; if distilled water is not available, clean, filtered rain water or melted snow may be used. *Acid should never be added*, after the initial filling. The level of the liquid in the battery should be one-fourth to one-half inch above the top of the plates.

(2) The terminals should be kept clean and tight and covered with a light coat of petrolatum to help prevent corrosion. For easier access to the battery, the tie rod across the front of the box may be removed and the battery pulled forward.

b. Air cleaner.—(1) The air cleaner (fig. 6) is of the oil bath type and is normally self-cleaning except that the oil in its reservoir should be changed at intervals, according to the amount of dust in the air. The air cleaner should be inspected daily and the oil should be changed at the end of every day's operations if the air is very dusty; otherwise, after every 50 hours of operation. Use the same oil as specified for the crankcase. At temperatures below 0° F., operate the air cleaner without oil.

(2) The oil reservoir is in the outside cup and, to be refilled, the thumbscrew on the bottom should be unfastened, the cup dropped down, the old oil emptied, and the reservoir refilled to the bead with specified oil.

c. Gasoline filter.—Dirt or water in the gasoline line will be trapped in the glass bowl of the gasoline filter (fig. 6) and will be plainly visible. The gasoline should be turned off before removing the bowl and care exercised not to damage the gasket. If the metallic filter

element should clog, it should be blown out by means of a tire pump.

d. Battery-charging generator.—The strap on the battery-charging generator that bears the name plate should be removed and the commutator and brushes cleaned. This operation should be performed twice a year.

e. Oil filter.—The oil filter has a replaceable element. Inspect after every 50 hours of operation and replace if the element is plugged with sludge.

f. Fan belt.—The V-type fan belt should be kept in proper adjustment. It does not need to be extremely tight. It is tight enough if it can be deflected about 1 inch when grasped midway between its pulleys. A spare belt is kept in the tool box.

g. Oil pressure.—The oil pressure should be approximately 15 pounds per square inch when the engine is warm and running at 1,200 rpm. At lower speeds the pressure will be less.

h. Thermostat.—The thermostat is mounted in the outlet at the top of the cylinder head. It needs no adjustment and can be replaced quickly if it gets out of order.

i. Starter.—If the starter pinion fails to engage the engine flywheel properly, the entire starter motor unit should be removed. The drive on the end of the armature should be cleaned and lubricated or the spring replaced if found to be broken. The starter motor runs for such short periods that little oiling is necessary.

j. Distributor.—The distributor cap (fig. 8) should be removed occasionally and the breaker points inspected. They should be kept smooth and bright and if they become pitted they should be replaced. The maximum spark gap should be 0.025 inch.

k. Carburetor.—(1) The carburetor has no adjustments for the gas mixture; this was determined and fixed at the factory. The only adjustment is for setting the idling speed at approximately 900 rpm. (See fig. 9.) To make this adjustment, the throttle lever should be held against the idling speed stop, with the engine at full operating temperature, and the idling screw adjusted until the frequency meter reads 48 cycles or slightly less.

(2) If operation of the engine indicates that the gas mixture is wrong, it will be necessary to disassemble the carburetor and thoroughly clean the main gas jet and the float valve. A clogged gas jet or float valve will make the mixture too lean while dirt or a bad seat on the float valve will make the mixture too rich.

l. Spark plugs.—The spark plugs (fig. 6) are of the 14-mm size. The points of the spark plugs should be spaced 0.025 inch apart.

17. Storage.—*a. General.*—When not in use matériel will be stored in closed buildings or covered sheds whenever possible. The matériel will be inspected at the time it is placed in storage and at frequent intervals thereafter. In general, the storage, inspections, and removal from storage will be designated in AR 850–18.

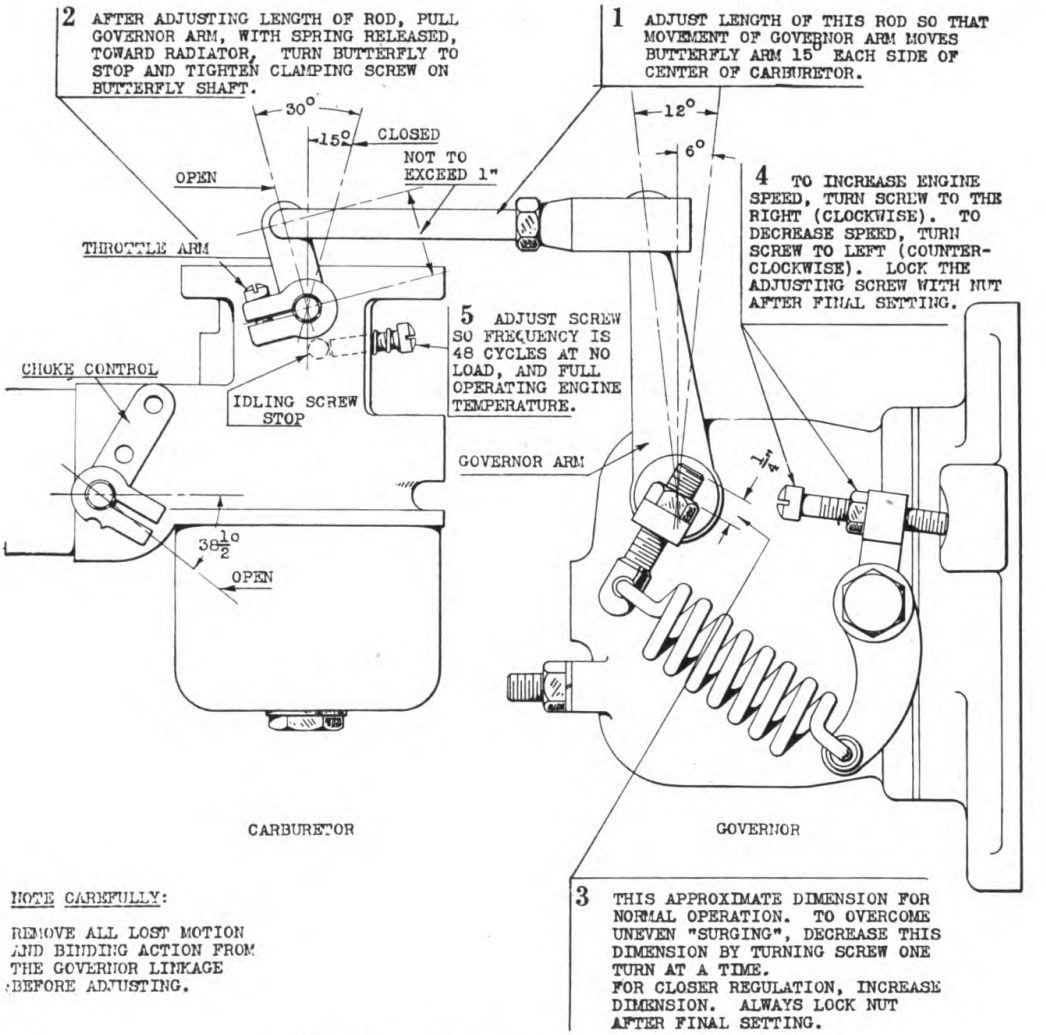


FIGURE 9.—Carburetor and governor.

b. Limited storage.—This applies to matériel out of service for less than 30 days, or matériel that will be kept ready for operation on call. The following operations will be done in placing matériel in storage.

(1) *Batteries.*—The vent will be plugged while cleaning. The case, sides, and top will be washed with a solution made by dissolving 8 ounces of soda ash in a gallon of water. The washing will be followed by flushing with cold water. The terminals and lugs will be

cleaned and then lightly coated with petrolatum. The battery will be checked and the water level maintained so as to completely cover the plates.

(2) The cooling system will be checked and protected with antifreeze if necessary.

(3) The fuel tank will be kept full and the unit kept in readiness for immediate use.

c. Dead storage.—This applies to matériel out of service indefinitely for more than 30 days.

(1) The cooling system will be drained and flushed.

(2) All gasoline will be drained from the fuel tanks.

(3) The valve mechanism, pistons, and cylinders will be coated with a corrosion-preventive compound.

(4) The crankcase will be drained, the plugs and screens cleaned, and then all openings plugged.

(5) The spark plugs will be removed, and the holes oiled and plugged. Serviceable spark plugs will be cleaned, adjusted, and stored.

(6) The battery will be removed and placed in active stock if possible. It should be kept charged at all times.

18. Transportation.—*a.* The unit is mounted on steel skids (fig. 3) and has brackets for the insertion of porter bars fastened at each corner of the housing to facilitate movement of the unit in the field. Four porter bars, two long and two short, are provided and, with the aid of these, six or eight men carry the generating unit for short distances.

b. For transporting over long distances the unit may be loaded onto the carrier truck. When possible, the unit will be operated on the truck, but if the terrain is such that proper location of the truck is impossible, the unit may be removed and emplaced on the ground.

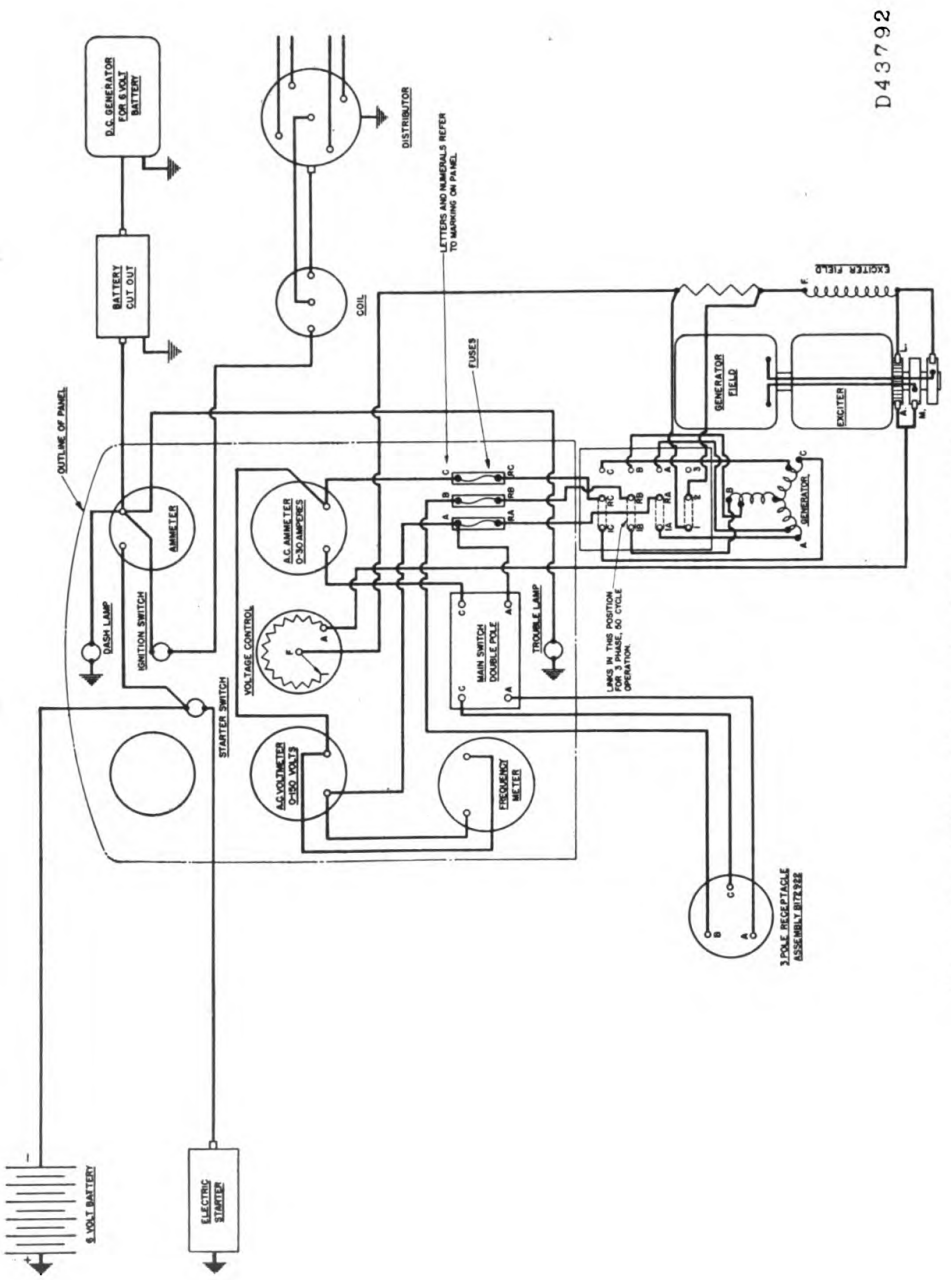


FIGURE 10.—Wiring diagram for 125-volt, 60-cycle operation.

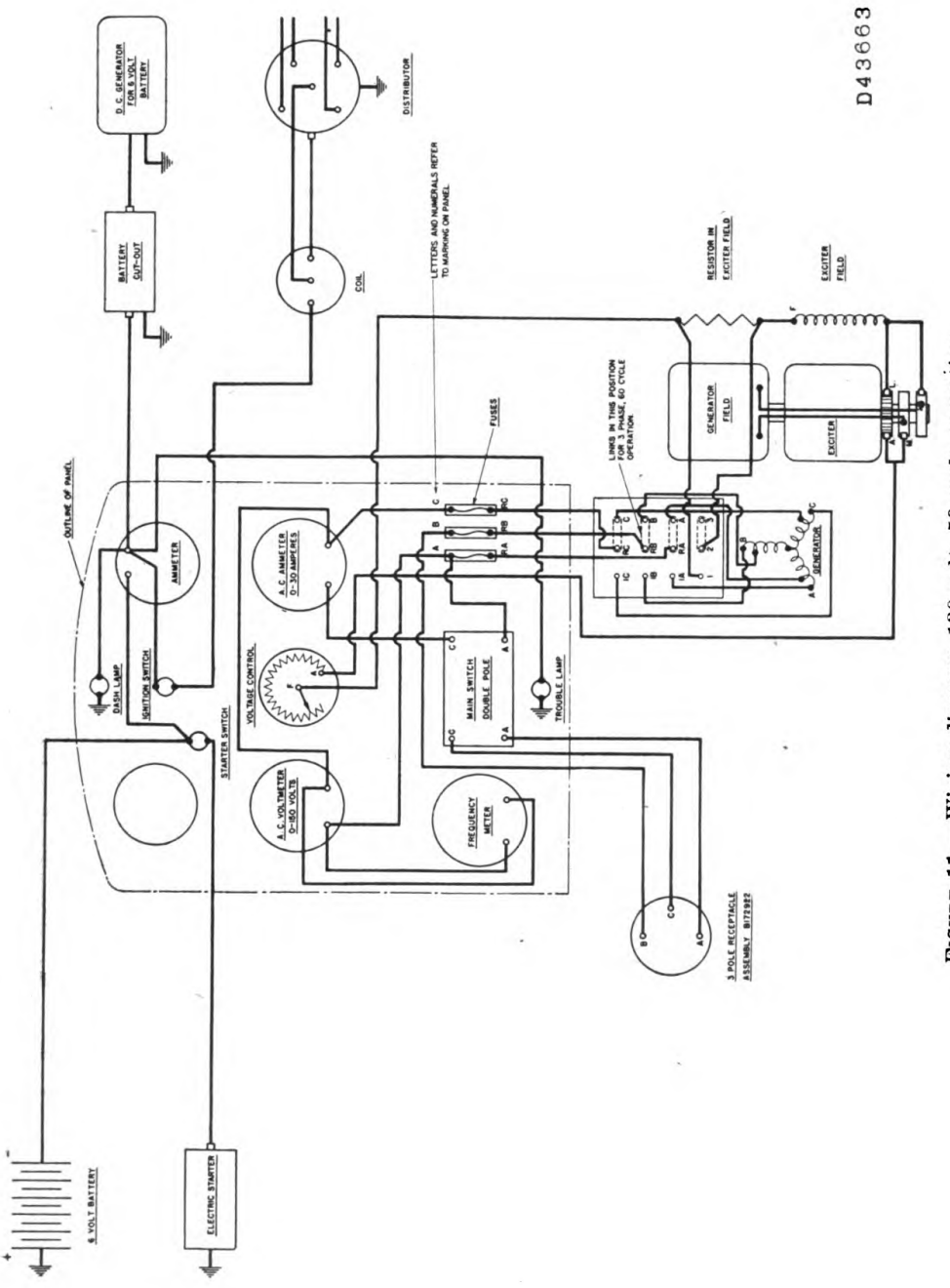


FIGURE 11.—Wiring diagram 130-volt, 50-cycle operation.

INSTRUCTION GUIDE

APPENDIX

LIST OF REFERENCES

1. Standard Nomenclature Lists.

Generating unit M5, ordnance maintenance	SNL F–227
Remote control system M1 and M5	SNL F–208
Cleaning and preserving materials	SNL K–1
Current standard nomenclature lists are as tabulated here. An up-to-date list of SNL's is maintained at the "Ordnance Publications for Supply Index"	(OPSI)

2. Technical Manuals.

Ordnance maintenance, generating unit, M5	TM 9–1616
Ordnance maintenance, remote control system, M1 and M5	TM 9–1643
Ordnance maintenance procedure—matériel inspection and repair	TM 9–1100
Cleaning and preserving materials	TM 9–850

[A. G. 062.11 (12–2–41).]

BY ORDER OF THE SECRETARY OF WAR:

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Chief of Staff.

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The Adjutant General.

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IB 4(3); IR 4(3); IBn 4(3), 9 (1); IC 4(3), 9 (3).
(For explanation of symbols see FM 21–6.)

U. S. GOVERNMENT PRINTING OFFICE: 1942

For sale by the Superintendent of Documents, Washington, D. C.