WAR DEPARTMENT

# TECHNICAL MANUAL

# POWER UNIT PE-49-F

June 2, 1943

TECHNICAL MANUAL
No. 11-920

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# POWER UNIT PE-49-F



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THIS TECHNICAL MANUAL, PUBLISHED BY CONTINENTAL ELECTRIC COMPANY, INC., ORDER Nos. 13831-PH-43, 20864-PH-43, 24952-PH-43, 26213-PH-43, 31285-PH-43 AND 1206-PH-44, IS FURNISHED FOR THE INFORMATION AND GUIDANCE OF ALL CONCERNED.

# ILLUSTRATIONS



## DESTRUCTION OF ABANDONED MATERIEL IN THE COMBAT ZONE

**IN CASE IT SHOULD BECOME NECESSARY TO PREVENT THE CAPTURE OF THIS EQUIPMENT, OR WHEN ORDERED TO DO SO, destroy it so that no part of it can be salvaged, recognized, or used by the enemy. Burn all papers and books.**

**BY:**

1. **Explosives when provided.**
2. **Hammers, axes, sledges, or whatever heavy objects are readily available.**
3. **Burning with gasoline, oil, paper, or wood.**
4. **Grenades and shots from available arms.**

PROCEDURE:

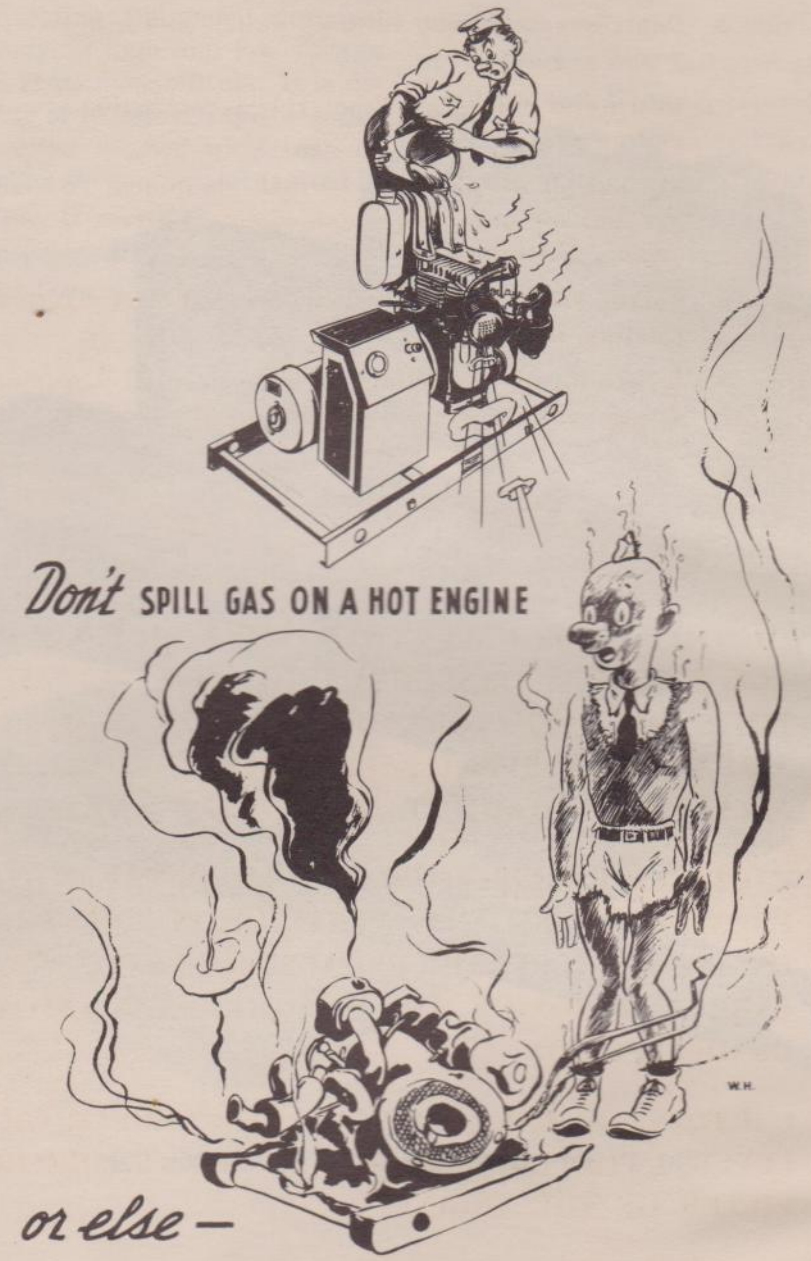
1. Obliterate all identifying marks. Destroy nameplates and circuit labels.
2. Demolish all panels, castings, switch and instrument board.
3. Destroy all controls, switches, relays, connecting means and meters.
4. Rip out all wirings and electrical equipment. Smash gas and oil lines and water cooling systems in gas-engine, generator, etc.
5. Smash every electrical or mechanical part whether rotating, moving, or fixed.
6. Where possible and time permits, bury all debris or dispose of it in streams or other bodies of water.

*CAUTION:* THIS UNIT GENERATES A HIGH VOLTAGE WHICH IS DANGEROUS TO LIFE. AT ALL TIMES THE OPERATORS MUST BE VERY CAREFUL AND OBSERVE EVERY SAFETY REGULATION. IF NECESSARY TO ADJUST *DON'T TAKE CHANCES.*

*CAUTION:* PROPER CARE SHOULD BE TAKEN TO PROVIDE SUFFICIENT VENTILATION OF THE ENGINE EXHAUST. THE EXHAUST GASES CONTAIN CARBON MONOXIDE WHICH IS ODORLESS AND A DEADLY POISON.

*CAUTION:* ALWAYS MAINTAIN THE PROPER OIL LEVELS IN THE CRANKCASE AND CARBURETOR AIR FILTER OF THE ENGINE.

*CAUTION:* STOP THE UNIT BEFORE REMOVING THE GASOLINE TANK FILLER CAP. AVOID SPILLING GASOLINE ON A HOT ENGINE.


Don't SPILL GAS ON A HOT ENGINE
or else —

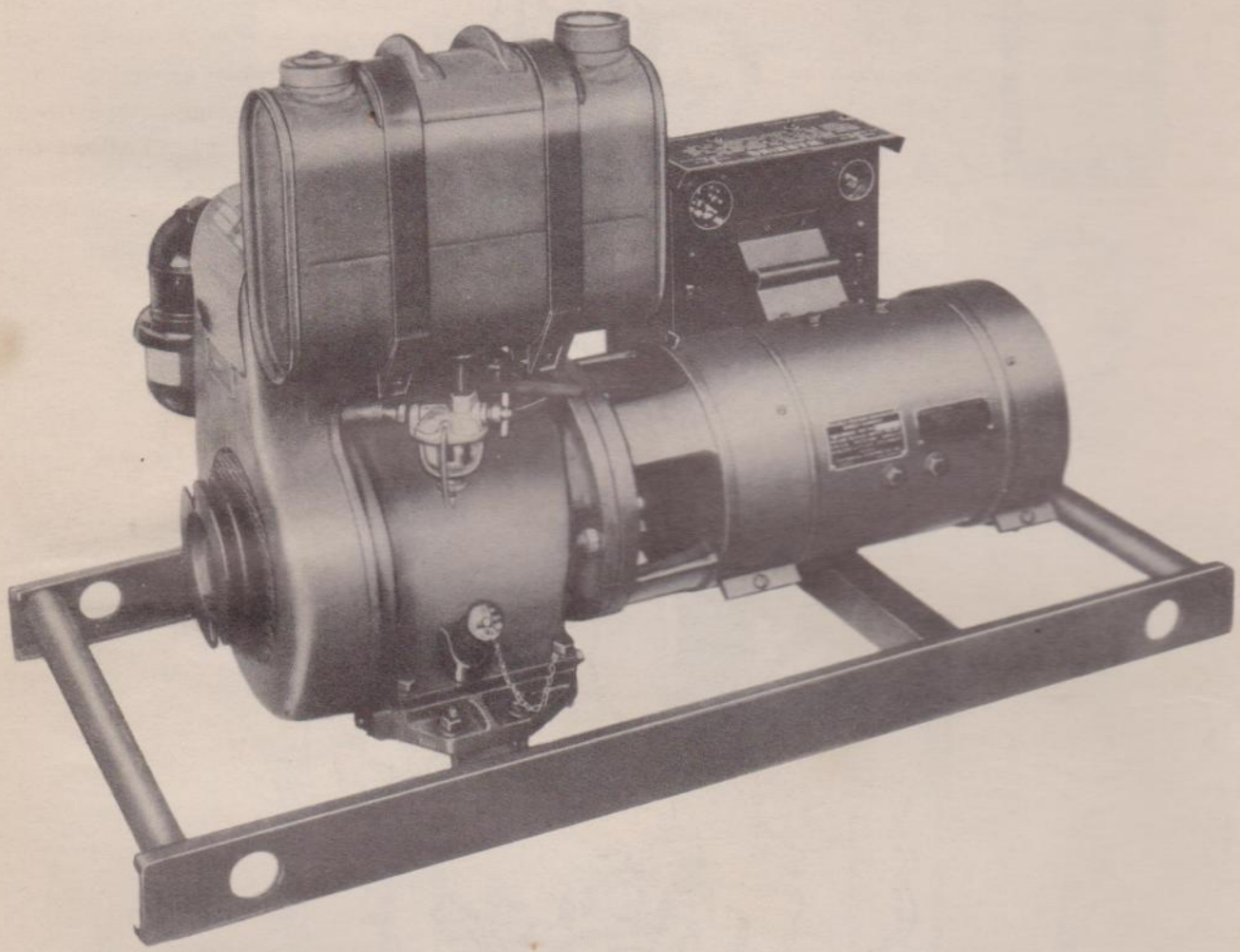


FIG. 1 POWER UNIT PE-49-F READY FOR USE

# SECTION I
# DESCRIPTION

## 1. GENERAL:

*a.* Power Unit PE-49-F is a compact, self-contained, portable generating equipment designed for continuously supplying high and low voltage requirements of field radio transmitters. It is designed for the charging of 12 volt storage batteries by the constant potential method which can be done separately or when the power unit is used in connection with a radio transmitter.

*b.* The Power Unit PE-49-F consists of a double voltage direct current Generator GN-39-F driven by a gasoline Engine GE-9-F. The engine and the generator are rigidly connected by means of a union bracket and fastened at three points to a skid-base with bolts. A control box is mounted on the side of the generator frame. A wooden hood protects the power unit in transit as well as when not in use and provides a storage compartment for the spare parts and tools. Fig. 1 shows the Power Unit PE-49-F ready for use.

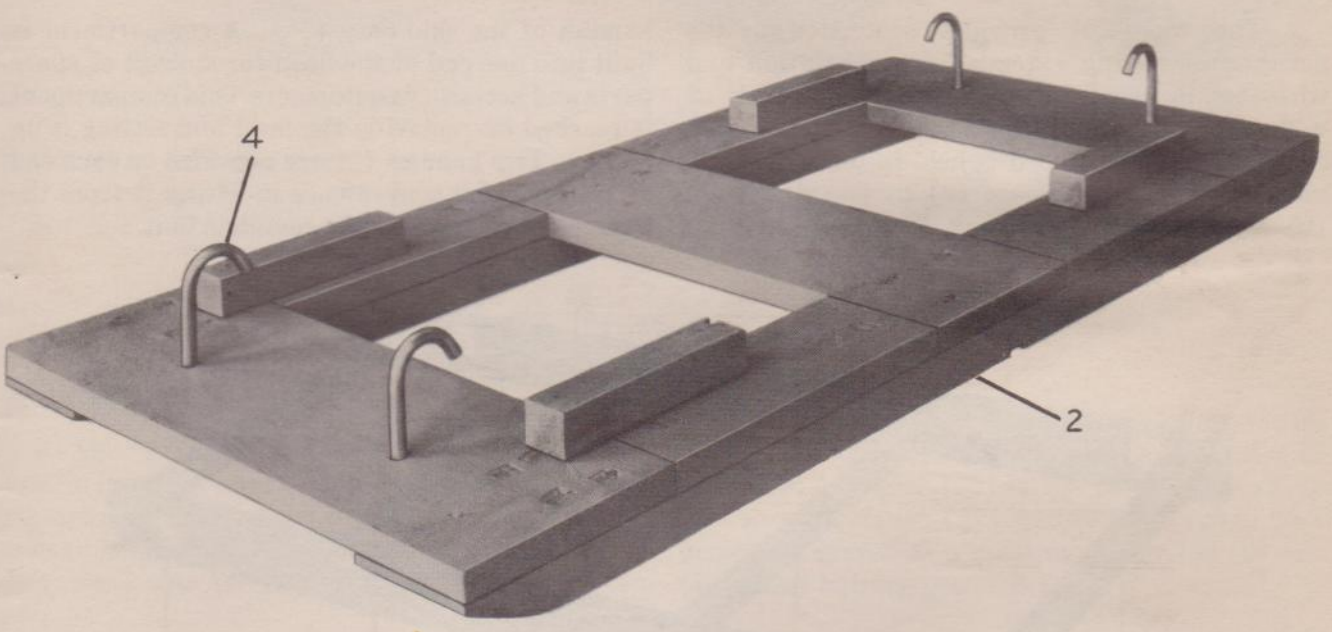



FIG. 2 HOOD BASE WITH "J" BOLTS

## 2. HOOD BASE:

*a.* The hood base (2) provides a sturdy support for the entire unit and hood (3) during transportation by train or truck and permits skidding the power unit over rough terrain in the field. It is constructed of wood securely held together by resin-coated clinched nails. Four "J" bolts (4) hold the power unit to the hood base. If extended maneuvers involve manual transportation of the Power Unit PE-49-F, the hood base can be readily removed to facilitate handling and reduce the weight of the unit to the minimum. The base is removed by loosening the nuts on the four "J" bolts (4) so that these bolts will swing clear of the carrying handles on the skid-base.

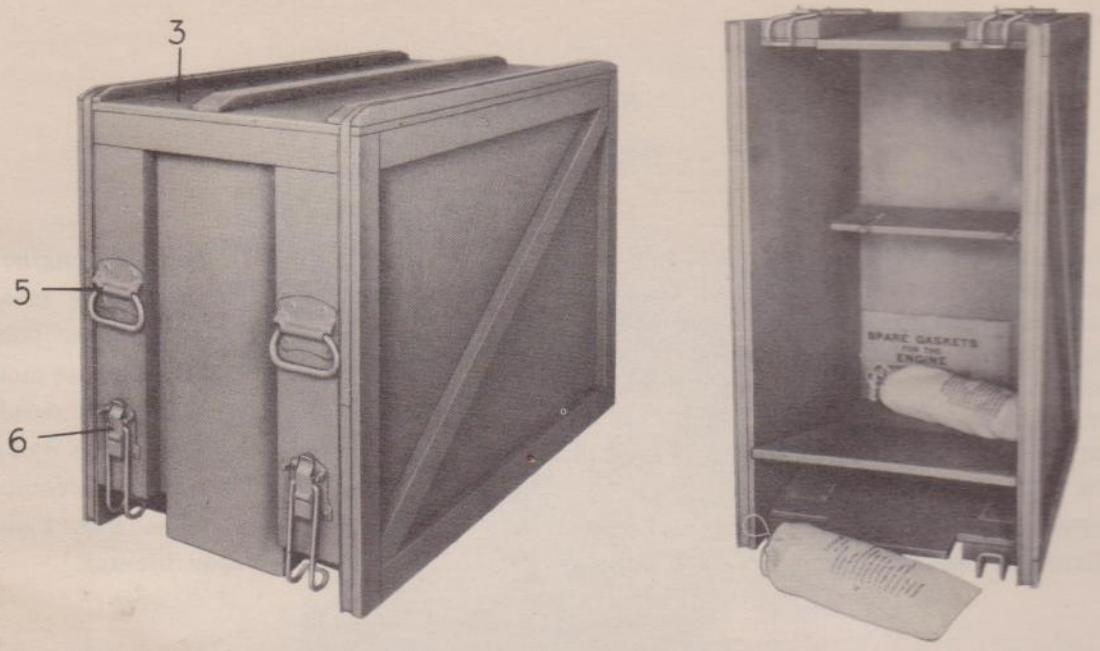



FIG. 3 HOOD—EXTERIOR AND INTERIOR SHOWING COMPARTMENT WITH DOOR OPEN

**3. HOOD:**

*a.* The hood (3) provides protection to the power unit during extended transportation and when not in use. The construction is entirely of wood securely fastened together with resin-coated clinched nails. The hood is held in place over the unit and on the hood base (2) by two drawbolts (6) at each end which hook under the carrying handles of the skid-base (20). A compartment is built into one end of the hood for storage of spare parts and accessory equipment. This compartment is reached by removing the hood and setting it up on end. Two handles (5) are provided on each end of the hood for convenience in lifting it from the base and for handling the complete unit.

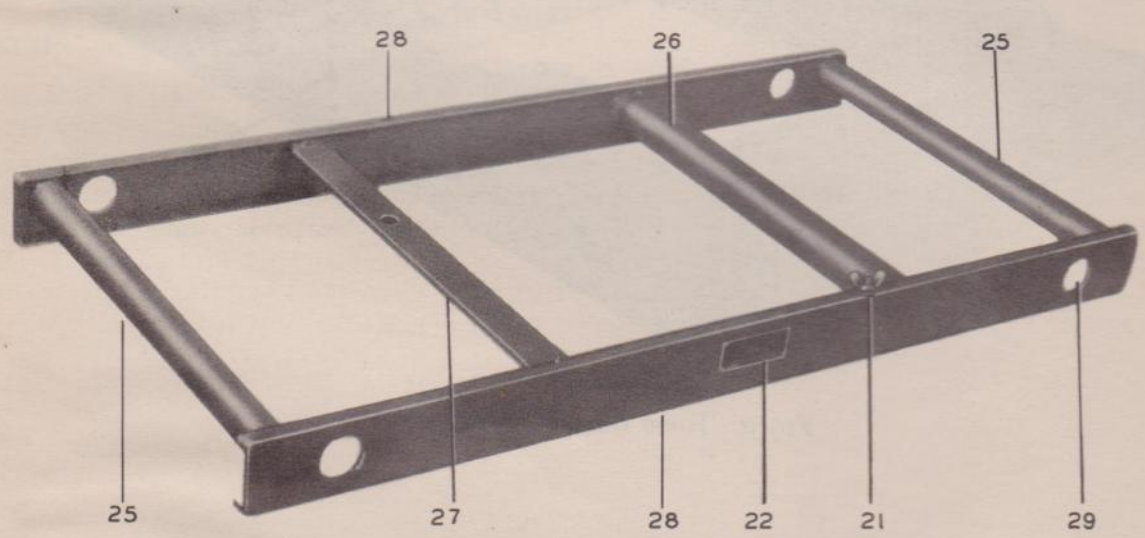



FIG. 4 SKID-BASE

**4. SKID-BASE:**

*a.* The skid-base (20) is the main support of the engine (100) and the generator (30). The two parallel sides (28) are standard steel channels. The carrying handles (25) at each end are seamless steel tubing. A length of standard pipe (26) supports the engine at two points and a similar length of angle iron (27) supports the generator at one point. All the tubing, pipe, and angle iron are continuously welded to the side channels, resulting in a rigid, lightweight unit. Four holes (29) are provided in the sides to accommodate one inch pipe to facilitate carrying in the field.

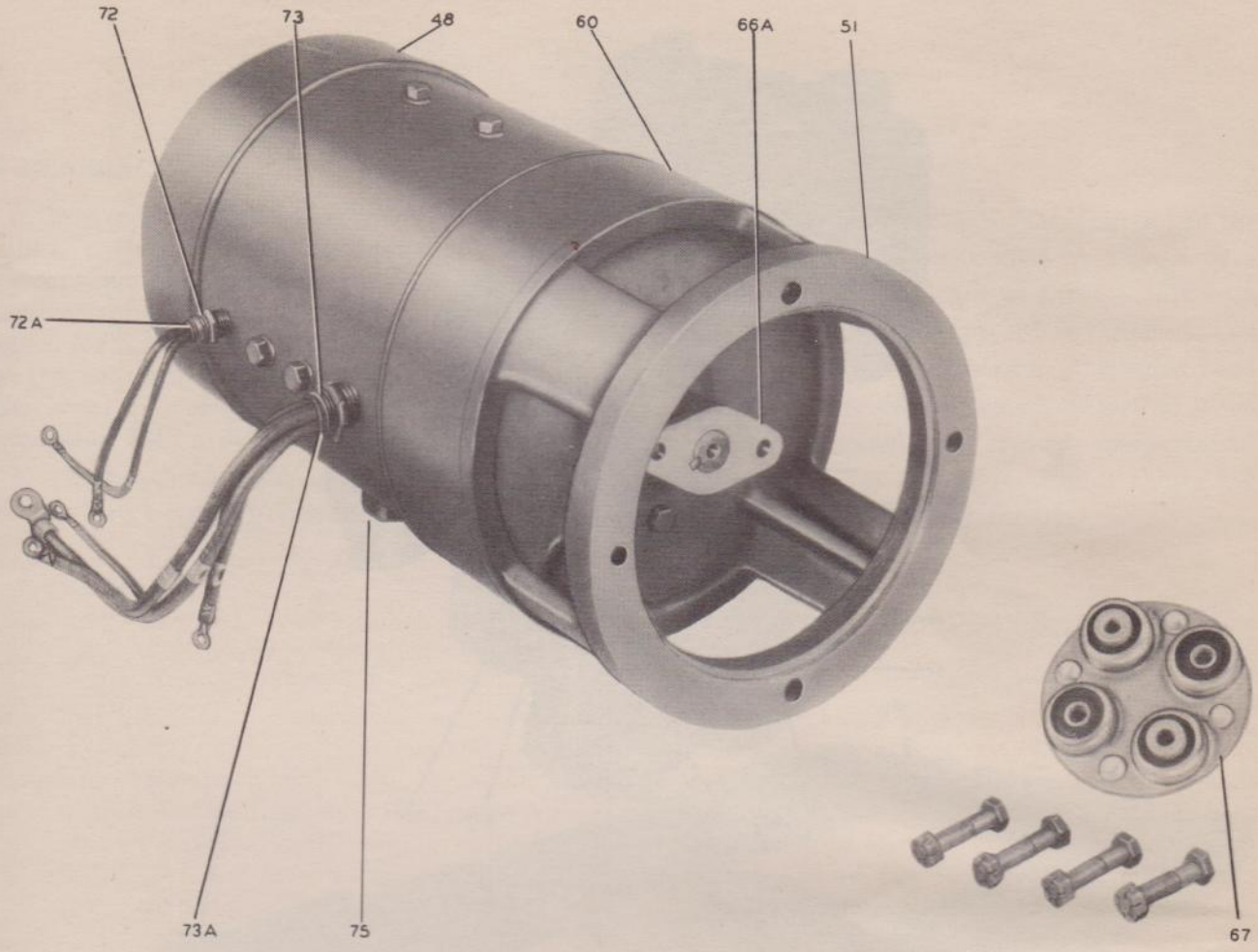



FIG. 5 GENERATOR GN-39-F

**5. GENERATOR:**

*a.* The Generator GN-39-F (30) is a dual voltage, drip-proof, semi-enclosed, direct current unit receiving its power from the engine (100) through a flexible coupling (65). Permanent and accurate alignment with the engine is provided by a union ring (51) rabbetted flange which is bolted to the engine crankcase flange (112). The generator is supported by a boss (75) at one point on the angle iron cross member (27) of the base (20). The generator serves as a starting motor for the engine when battery power is applied.

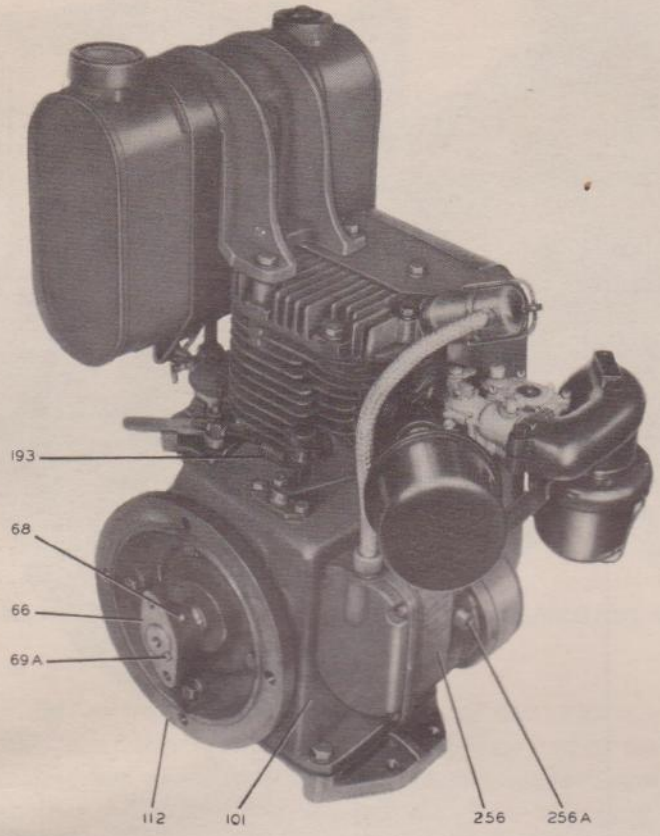



FIG. 6 ENGINE GE-9-F

**6. ENGINE:**

*a.* The Engine GE-9-F (100) is the source of power for the unit and is a single cylinder, four cycle, air-cooled, gasoline engine with impulse-coupled magneto (256) ignition. A flange (112) is provided on the engine crankcase (101) to which the generator (30) is mounted. The engine is fastened and located on the skid base (20) at two points through two "U" bolts (24). The engine drives the generator through a flexible coupling (65).

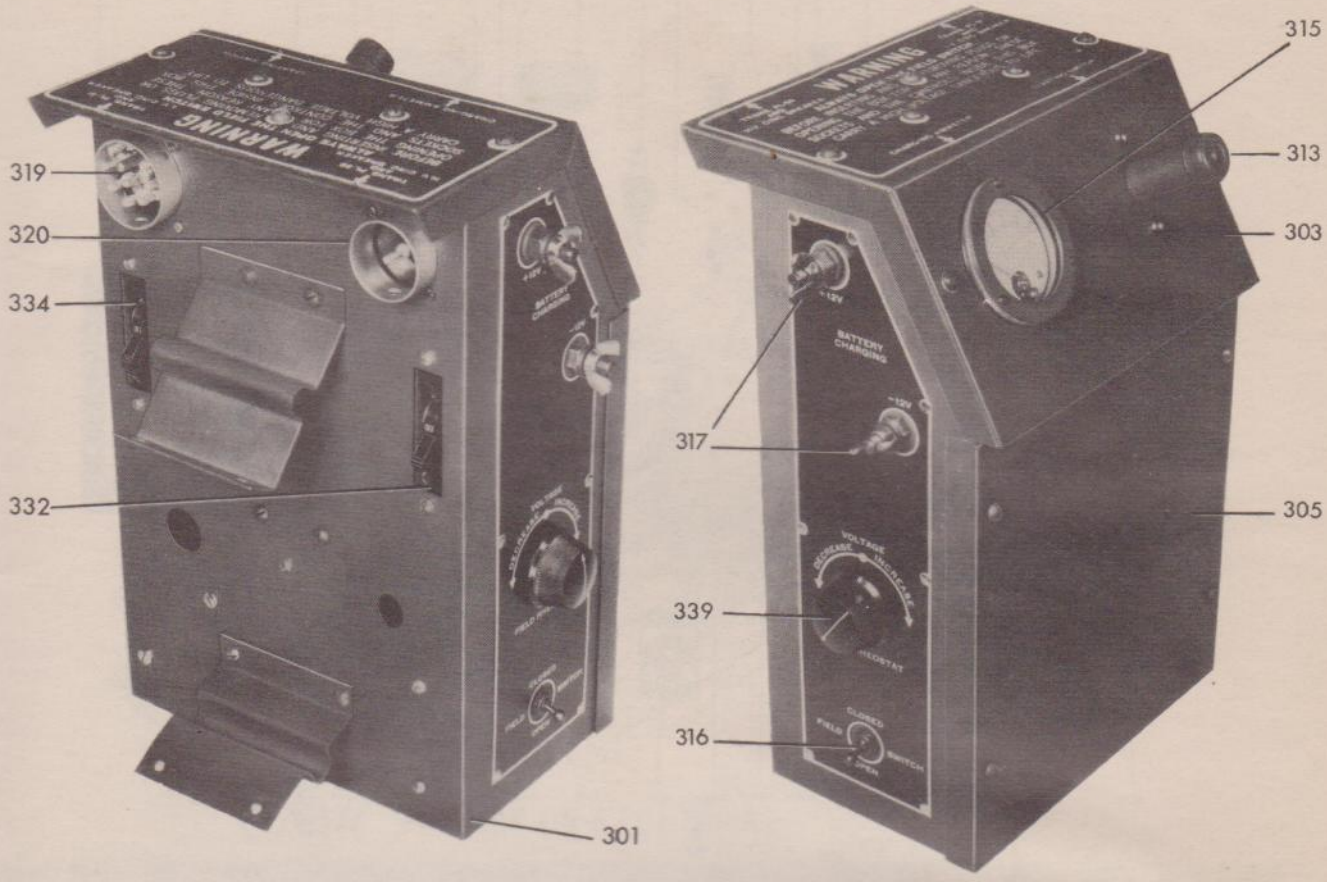



FIG. 7 CONTROL BOX

**7. CONTROL BOX:**

*a.* The box (301) proper is constructed of sheet steel spot welded together. The front cover (305) is readily removable to permit access to the control devices. Gaskets (302) and a drip-proof top (303) make this box (300) a weatherproof housing for the controls. A starting switch (313), and ammeter (315) are located at the top of the box. A field switch (316), two battery charging binding posts (317), and a field rheostat (339), are located on the outside of one end. A complete circuit label (308) of the control, filter and generator circuit is located on the inside of the front cover. The control equipment comprises essentially a reverse current battery cutout (340), a switching relay (338), resistors, capacitors and high and low voltage circuit breakers. The generator leads are brought in through the back of the box.

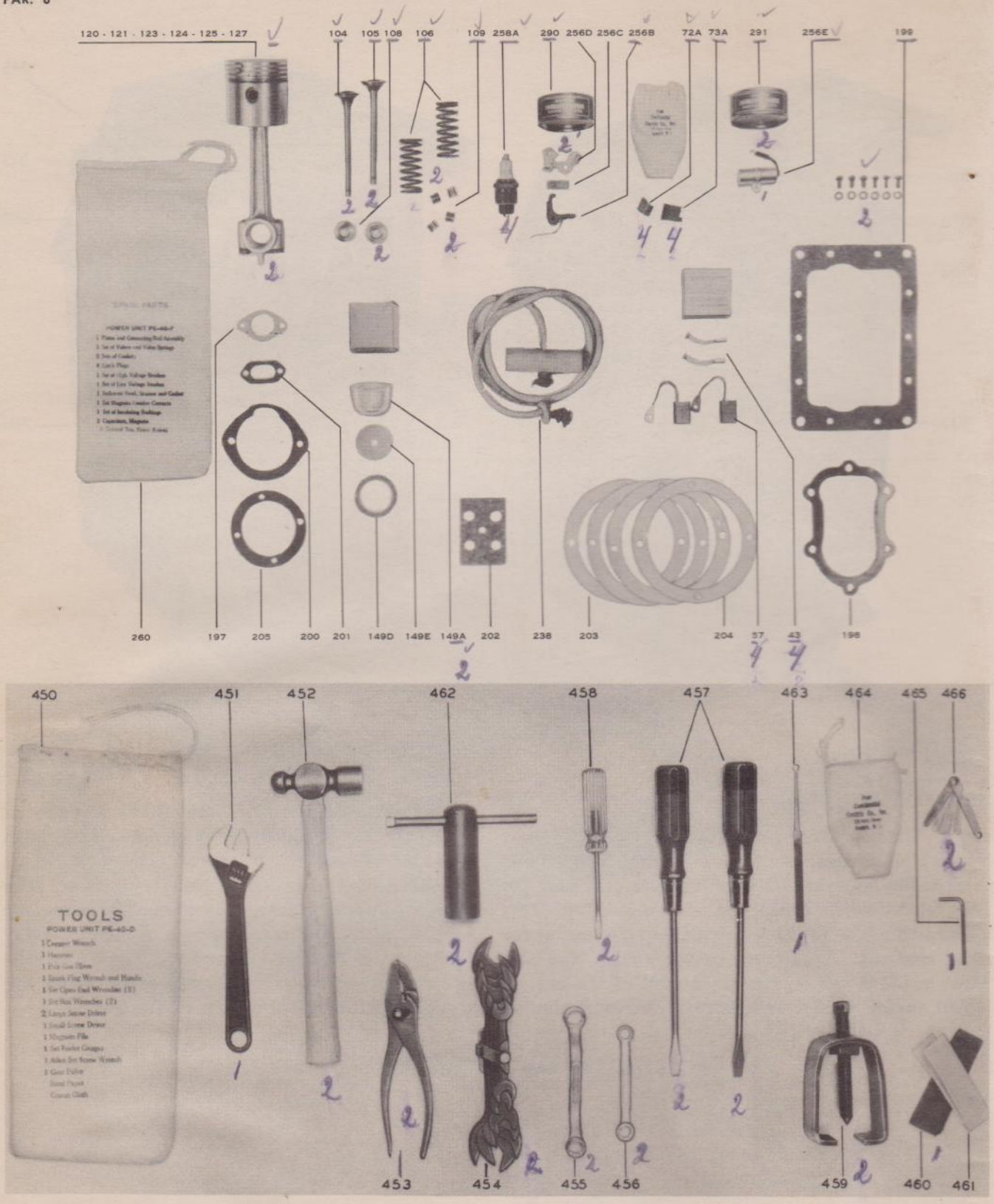



FIG. 8 SPARE PARTS AND TOOLS

## 8. SPARE PARTS AND TOOLS:

*a.* Important replacement parts for the Engine GE-9-F (100) and Generator GN-39-F (30) together with a set of tools for maintenance and adjustments comprise the spare parts and tools.

## 9. DIMENSIONS AND WEIGHTS:

| Component Part Name | Dimensions — Length | Width | Height | Weight Lbs. |
|---|---|---|---|---|
| Control Box | 9¼" | 7¾" | 12 13/16" | 16 |
| Engine | 12¾" | 16" | 20¼" | 100 |
| Generator | 16¾" | 8" | 8¾" | 80 |
| Hood | 36" | 19⅝" | 25¼" | 50 |
| Hood Base | 37" | 19⅝" | 3¼" | 12 |
| Skid-Base | 36" | 17" | 2½" | 25 |
| Spare Parts and Tools—In two bags | | | | 10 |

## SECTION II

## INSTALLATION AND OPERATION

### 10. INITIAL PROCEDURE:

*a.* Follow closely the procedure outlined below. Adhere to all the instructions and follow them in the order given. Inexperienced personnel should be cautioned against "short cuts." The elimination of any one step in the sequence of operations may be the cause of a serious delay in placing Power Unit PE-49-F in operation.

*b.* The complete Power Unit PE-49-F is enclosed within a rugged, removable hood (3) and a sturdy base (2) which also serves as a support for the skid-base (20) of the unit during transportation. See Figs. 2 and 3.

(1) The hood (3) and hood base (2) are both constructed of well seasoned wood fastened together with resin-coated nails that are clinched to insure a permanent assembly.

*c.* To loosen the hood from base, unlatch the four draw bolts (6) by pulling each thumb latch all the way out and down. Lift the hood clear of the power unit.

*d.* Whenever the Power Unit PE-49-F is to be transported a considerable distance by train or truck, the hood (3) must be in place for protection against bad weather and dirt. Weight of the unit including the hood is 300 pounds.

*e.* After removing the hood, the contents of the storage compartment should be checked. This check must be made before leaving the base. The compartment can be readily reached by setting the hood up on end as shown in Fig. 3. It should contain the following items:

(1) A tool bag with contents as printed on the bag. See Fig. 8.

(2) A spare parts bag with contents as printed on the bag. See Fig. 8.

(3) Three complete sets of engine gaskets packed in a stiff cardboard folder. See Fig. 8. This folder is designed to fit snugly against the back end of the compartment. Keep it there so that the gaskets will not become damaged.

(4) Always keep track of the tools by checking against the list of the tools which is printed on the tool bag. These tools are very complete and very important for maintaining and repairing the power unit. A small wrench which is missing may mean the difference between a properly operating Power Unit PE-49-F and one that will not operate at all. Keep the tool bag in the compartment where it belongs.

*f.* The Power Unit PE-49-F may be operated whether attached to the hood base or not. If at any time, it becomes necessary to remove the hood base from the unit, proceed as follows:

(1) There are four "J" bolts (hooks) (4) which hold the skid-base (20) to the hood base (2). See Figs. 2 and 4. These "J" bolts are fastened to the hood base with nuts which can be reached on the under side of each end of the base.

(2) Select the proper open ended wrench from the tool bag in the hood compartment and loosen each of the four nuts until all the "J" bolts swing clear of the carrying handles (25). See Fig. 4.

(3) With one man at each end, lift the Power Unit PE-49-F by the carrying handles (25) only and move to the desired location. The power unit, without the hood and hood base, weighs 228 pounds.

(4) Make sure that the "J" bolt nuts do not fall off and become lost.

*g.* Keep the hood near the final location of the power unit. The hood must always be in place on the skid-base (20) when the power unit is to be transported any distance.

### 11. INSTALLATION:

*a.* Choose a general location for the Power Unit PE-49-F that will be consistent with the assignment to be carried out and the length of the power cables that connect to the radio set. The power unit will operate in almost any place outdoors and indoors.

*b.* If the power unit is to be located outdoors proceed as follows:

(1) Select a reasonably level spot.

(2) A location on grass or soft ground that will absorb the vibrations from the Engine GE-9-F (100), is preferred over hard ground or concrete.

(3) Avoid low spots which may flood with water from a sudden rain storm.

*c.* If the power unit is to be located indoors proceed as follows:

(1) *CAUTION:* PROPER CARE MUST BE TAKEN TO PROVIDE SUFFICIENT VENTILATION OF THE ENGINE GE-9-F EXHAUST (250). ALL ENGINE EXHAUST GASES CONTAIN CARBON MONOXIDE WHICH IS ODORLESS AND A DEADLY POISON.

(2) If an automobile tire is available, place it under the skid-base (20) to absorb the vibrations from the Engine GE-9-F (100). A mattress or blanket will do almost as well.

(*a*) No harm will result if the Power Unit PE-49-F operates on a hard surface but vibration will cause the unit to "walk away" unless secured in place.

(3) A piece of leader pipe, or any pipe large enough, between the muffler (250) and a window or door will help to conduct the exhaust gases of the Engine GE-9-F away.

*d.* The hood (3) must always be removed when the power unit is to be operated.

*e.* Connect grounding stud (21) to a good "ground." See Fig 9.

**12. PREPARATION FOR USE:**

*a.* First determine that the Power Unit PE-49-F is in good mechanical condition. Proceed as follows: See Figs. 9, 10, 18 and 19.

(1) Make sure that the power unit is free to turn by grasping the starting pulley (239) on the engine (100) by the hand and turning to the right (clockwise facing the pulley). Keep in mind that a four cycle engine turns comparatively easy for about one and one-half revolutions but due to compression in the cylinder is hard to turn for approximately one-half turn. The resistance to turning due to compression is easily distinguished from mechanical obstructions as it is cushioned.

(2) Give the power unit a thorough visual inspection to make sure that no parts are broken, bent, or missing.

(3) Go over all bolts, nuts, and screws, and make sure that they are tight. Pay particular attention to the drain plug (253) and bolts holding the cylinder head (102).

*b.* Read the instructions on plate (220A) attached to the air shroud (220) of the Engine GE-9-F (100).

*c.* Check the oil level in the engine crankcase (101) with the bayonet gauge (208). If the oil level is not up to the "full" mark, fill crank case with oil in accordance with instructions on the plate. Make certain that the oil filler cap (208) is closed and locked before starting the engine.

(1) USE ONLY THE GRADE OF OIL SPECIFIED ON THE ENGINE PLATE (220A). NEVER PUT GASOLINE IN CRANK CASE.

*d.* Read the instructions on the carburetor air cleaner bowl (146A). Fill with the same oil as used in the crankcase to the proper level as indicated on the inside of the bowl.

*e.* Determine that there is a supply of gasoline in the tank (251).

(1) NEVER POUR OIL IN THE GAS TANK. THE ENGINE GE-9-F IS A FOUR CYCLE ENGINE AND DOES NOT USE OIL IN THE GASOLINE. ONLY THE CRANKCASE AND AIR CLEANER BOWL SHOULD CONTAIN OIL.

*f.* Make sure that the gasoline shut-off valve (149B) is completely open. Turn to the left (counter-clockwise) to open.

*g.* See that the gasoline strainer bowl (149A) is filled with gasoline. Make sure that no leakage occurs around the bowl. Tighten the knurled screw (149C) if leakage occurs.

*h.* Battery starting.

(1) See that the battery cables are connected to the battery charging terminals (317) on the control box (300) and that the wingnuts on these terminals are tight.

(2) See that the battery cables are connected to the terminals on the battery and that these connections are clean and tight.

(3) Follow the cables from the battery charging terminals on the control box to the battery and make sure that the cable connected to the battery charging terminal marked + is connected to the battery terminal marked +, and that the cable connected to the battery charging terminal marked — is connected to the battery

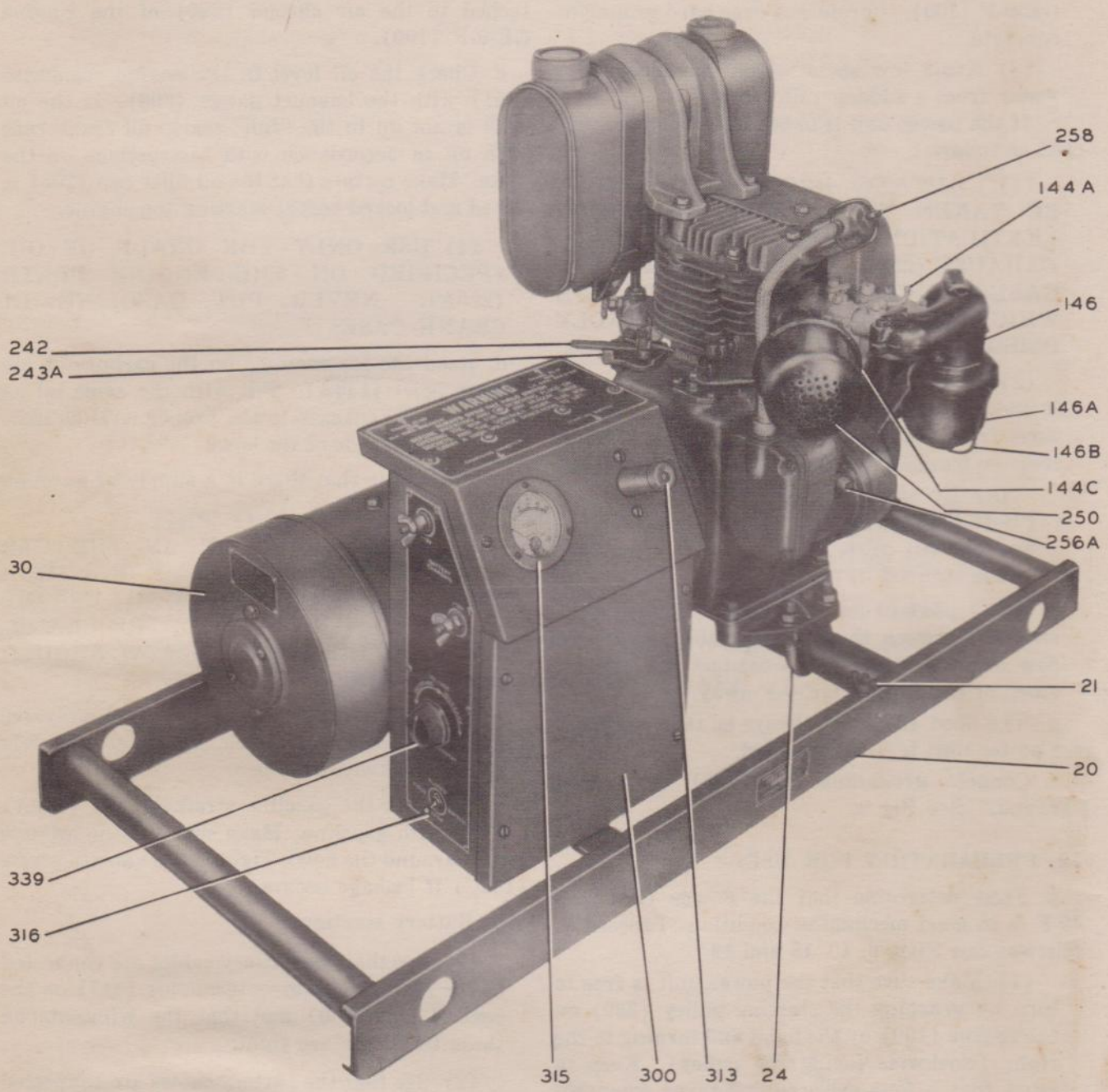



FIG. 9 POWER UNIT PE-49-F—FROM CONTROL BOX SIDE