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TM 9-2920-212-35

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

FIELD AND DEPOT MAINTENANCE MANUAL

MAGNETO, IGNITION, ASSEMBLY

2920–529–8247, 2920–740–3411,
2920–737–2995 AND 2920–753–9854
(BENDIX-SCINTILLA TYPES S4LN–32 AND S6LN–32)

END ITEM APPLICATION

ENGINE, GASOLINE:
4–CYLINDER, CONTINENTAL MODEL AOI–268–3A AND –3B (TM 9–7605–1)
6–CYLINDER, CONTINENTAL MODEL AOI–402–5 (TM 9–2805–210)
6–CYLINDER, CONTINENTAL MODEL AOS–895–3 (TM 9–1730A)
6–CYLINDER, CONTINENTAL MODEL AO–895–4 (TM 9–1755BB)
6–CYLINDER, CONTINENTAL MODEL AOSI–895–5 (TM 9–1805–212)
12–CYLINDER, CONTINENTAL MODEL AV–1790–5B (TM 9–7009–1)
12–CYLINDER, CONTINENTAL MODEL AVSI–1790–6 (TM 9–2805–206)
12–CYLINDER, CONTINENTAL MODEL AV–1790–7 (TM 9–7009–1)
12–CYLINDER, CONTINENTAL MODEL AV–1790–7B (TM 9–7009–1)
12–CYLINDER, CONTINENTAL MODEL AV–1790–7C (TM 9–7009–1)
12–CYLINDER, CONTINENTAL MODEL AVI–1790–8 (TM 9–2805–206)

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*TM 9–2920–212–35

TECHNICAL MANUAL
No. 9-2920-212-35

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *16 June 1960*

MAGNETO, IGNITION, ASSEMBLY 2920–529–8247, 2920–740–3411, 2920–737–2995, AND 2920–753–9854 (BENDIX-SCINTILLA TYPES S4LN–32 AND S6LN–32)

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*This manual supersedes as much of TM 9–1825E, August 1952 as pertains to types S4LN–32 and S6LN–32 magnetos covered herein.

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. General

a. This technical manual contains instructions for field and depot maintenance of the Bendix-Scintilla type S4LN–32 and S6LN-32 magnetos. It contains descriptions of, and procedures for, removal, disassembly, inspection, repair, rebuild, and assembly of the magnetos.

b. The appendix contains a list of current references including supply manuals, forms, technical manuals, and other available publications applicable to the S4LN–32 and S6LN–32 magnetos.

c. This first edition is published in advance of complete technical review. Any errors or omissions will be forwarded on DA Form 2028 direct to Commanding Officer, Raritan Arsenal, Metuchen, N. J., ATTN: ORDJR-OPRA.

d. The pertinent operation and organizational manuals contain operating and lubricating instructions for types S4LN–32 and S6LN–32 magnetos as well as all maintenance operations allocated to using organizations in performing maintenance work within their scope.

2. Field and Depot Maintenance Allocation

The publication of instructions for complete disassembly and rebuild is not to be construed as authority for the performance by field maintenance units of those functions which are restricted to depot shops and arsenals. In general, the prescribed maintenance responsibilities will be reflected in the allocation of maintenance parts listed in the appropriate columns of the current ORD 8 supply manual pertaining to those vehicles incorporating these items. Instructions for depot maintenance are to be used by maintenance companies in the field only when the tactical situation makes the repair functions imperative. Supply of parts listed in the depot guide column of ORD 8 supply manuals will be made to field maintenance only when the emergency nature of the maintenance to be performed has been certified by a responsible officer of the requisition organization and upon express authorization by the chief of the service concerned.

3. Forms, Records, and Reports

a. General. Responsibility for the proper execution of forms, records, and reports rests upon the officers of all units maintaining this equipment. However, the value of accurate records must be fully appreciated by all persons responsible for their compilation, maintenance, and use. Records, reports, and authorized forms are normally utilized to indicate the type, quantity, and condition of material to be inspected, to be repaired, or to be used in repair. Properly executed forms convey authorization and serve as records for repair or replacement of material in the hands of troops and for delivery of material requiring further repair to ordnance shops in arsenals, depots, etc. The forms, records, and reports establish the work required, the progress of work within the shops, and the status of the material upon completion of its repair.

b. Authorized Forms. The forms generally applicable to units maintaining this equipment are listed in the appendix. For listing of all forms, refer to DA Pam 310–2. For instructions on use of these forms, refer to FM 9–10.

Section II. DESCRIPTION

4. Description

a. The Bendix-Scintilla types S4LN–32 and S6LN–32 magnetos (figs. 1 and 2) are flange mounted, gearless, waterproof, radio shielded units. They are driven at ½-engine crankshaft speed in a counterclockwise direction as viewed from the drive end.

b. Both types are identical dimensionally, have the same working components, and are designed for use on 4, 6, and 12 cylinder engines. These

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magnetos employ a rotating magnet, pivotless-type breaker, molded composition encased coil, steel cam, and molded distributor finger. The magnet shaft carries the magnet, cam, and distributor finger assembly thus eliminating the need for internal gears, consequently simplifying timing and maintenance procedures.

5. Differences Between Types (S6LN-32)

a. Earlier types of the S6LN–32 magnetos used a molded, 1-piece breaker cam and distributor finger, and a steel cam follower (SCI 10–56600–2–4). Later production types (SCI 10–56600–8) used a breaker assembly with a fiber cam follower. Present production types (SCI 10–56600–14) use a steel cam and a molded distributor finger and the fiber cam follower.

b. When repairing the earlier production types (SCI 10–56600–2, –4 or –8) magnetos, the 1-piece molded breaker cam and distributor finger as well as the steel cam follower should be replaced and the magneto reidentified as SCI 10–56600–14.

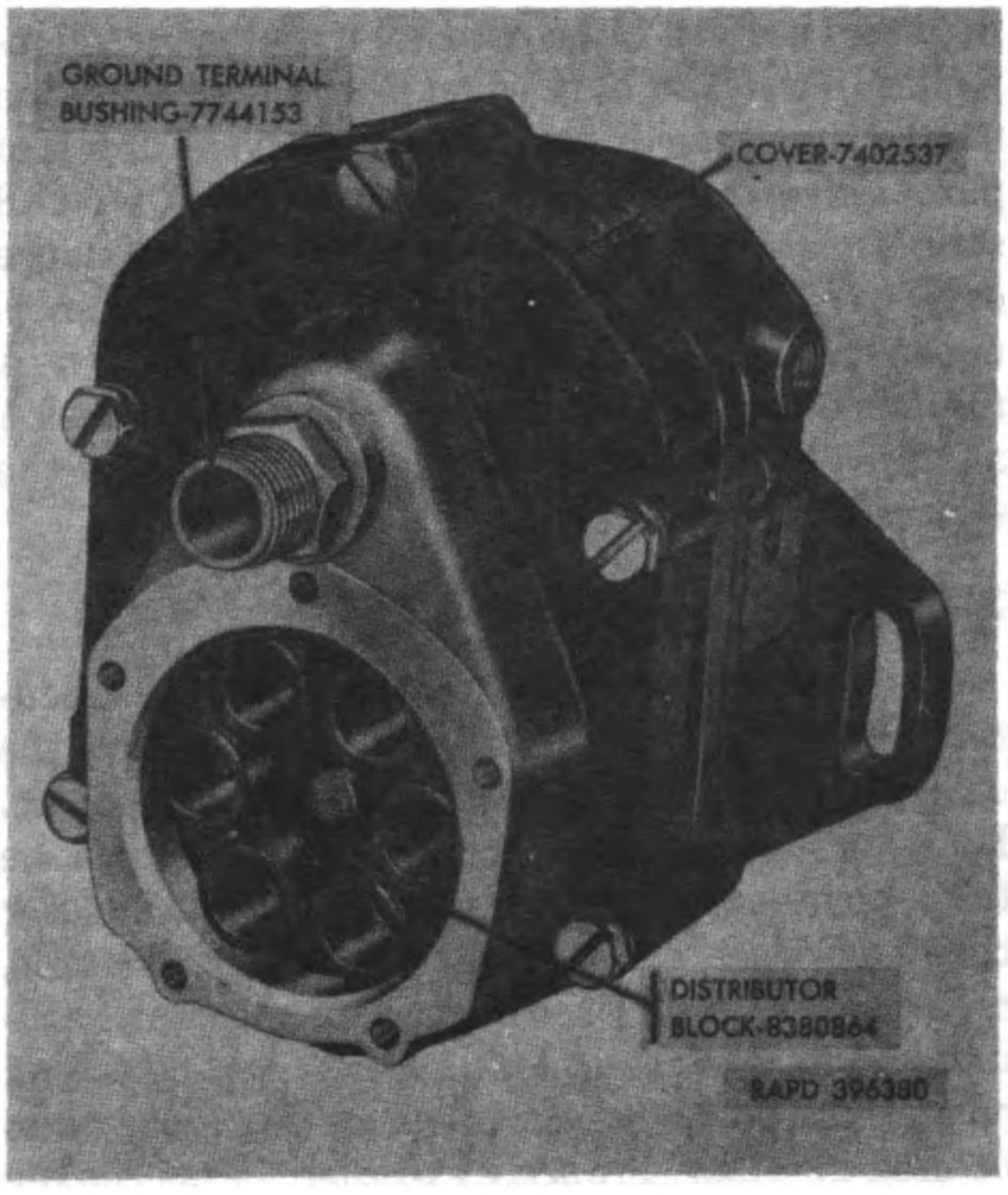

Figure 1. Type S6LN–32 magneto—assembled view.

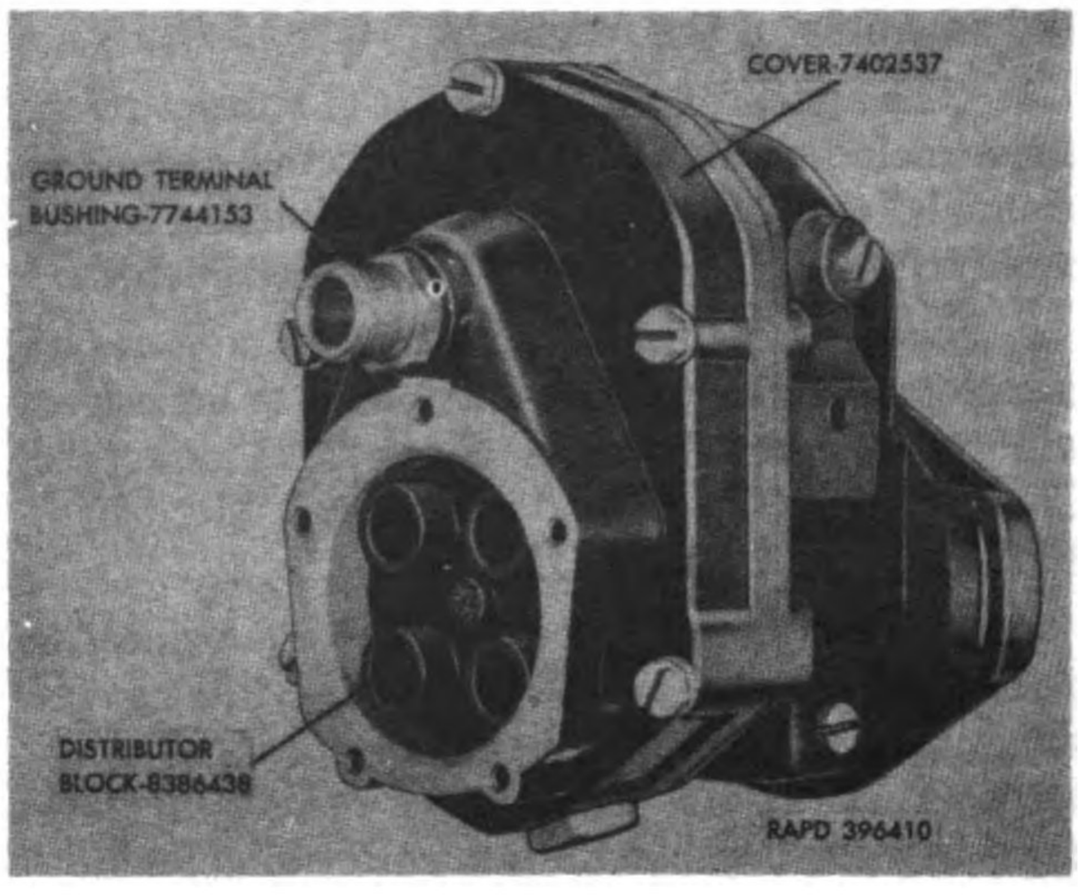

Figure 2. Type S6LN–32 magneto—assembled view.

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CHAPTER 2

PARTS, SPECIAL TOOLS AND EQUIPMENT FOR FIELD AND DEPOT MAINTENANCE

6. General

Tools and equipment, and maintenance parts over and above those available to the using organization are supplied to ordnance field maintenance units and depot shops for maintaining, repairing, and/or rebuilding the material.

7. Repair Parts

Repair parts supplied for Bendix-Scintilla types S4LN–32 and S6LN–32 magnetos are listed in TM 9–2920–212–35P which is the authority for requisitioning replacements.

8. Common Tools

Standard and commonly used tools and equipment having general application to this materiel are listed in ORD 6 SNL J–8, Section 7, ORD 6 SNL J–9, Sections 2 and 3; SM 9–4–4910–J8–12, SM 9–4–4910–J8–13, SM 9–4–4910–J9–22, and SM 9–4–4910–J10–8.

9. Special Tools

The special tools (fig. 3) tabulated in table I are listed in Department of the Army Supply Manual ORD 6 SNL J–16, Section 3 (also refer to TM 9–2920–212–35P). This tabulation contains only those special tools necessary to perform the operations described in this technical manual, is included for information only, and is not to be used as a basis for requisitions.

10. Improvised Tools

The improvised tools (fig. 4) listed in table II and the dimensional detail drawings furnished herein apply only to field and depot shops in order to enable these maintenance organizations to fabricate the tools locally if desired. These tools are of chief value to maintenance organizations engaged in rebuilding a large number of identical components; however, they are not essential for rebuild and are not available for issue. The following data is furnished for information only.

Table I. Special Tools for Field and Depot Maintenance

Item	Identifying Number	References		Use
		Figs.	Pars.	
Bit, screwdriver	GGG–W–6416	3		Magneto coil wedge screws, distributor finger screws, distributor block to cover screws, cam screw (Used w/torque WRENCH GGG–W–686).
Compass	6605–18–C–1598	3	30*d*	Checking magnet polarity.
Extractor	7751050	3	28*c*	Extracting No. 10–32 or ¼–20 (Heli-coil) threaded inserts.
Gage, plug	7950069	3, 15	29*f*	Checking drive shaft bushing (type S6LN–32 only).
Gage, plug	7950467	3, 15	29*f*	Checking drive shaft bushing (type S4LN–32 only).
Inserter	7003241	3	28*d*	Inserting No. 10–32 (Heli-coil) threaded inserts.
Inserter	8390016	3	28*d*	Inserting ¼–20 (Heli-coil) threaded inserts.
Pointer	7079908	3, 23	50	Adjusting magneto "E" gap (used/w PROTRACTOR 7059111 or 7059114).
Protractor	7059114	3, 23	50	Adjusting magneto "E" gap (type S4LN–32 only) (Used w/POINTER 7079908).
Protractor	7059111	3, 23	50	Adjusting magneto "E" gap (type S6LN–32 only) (Used w/POINTER 7079908).
Remover and Replacer	7059093	3, 14	29*h*, 39*b*	Removing bronze-type plain bearing (type S6LN–32 only).
Replacer	7950075	3, 18	40*c*	Replacing oil seal (type S6LN–32 only).
Replacer	7950468	3, 16	31*e*	Replacing distributor block contact springs.
Wrench, spline	7950068	3, 10	45	Holding magneto drive coupling.
Wrench, torque	GGG–W–686	3		Used w/screwdriver BIT 666–W–6416.

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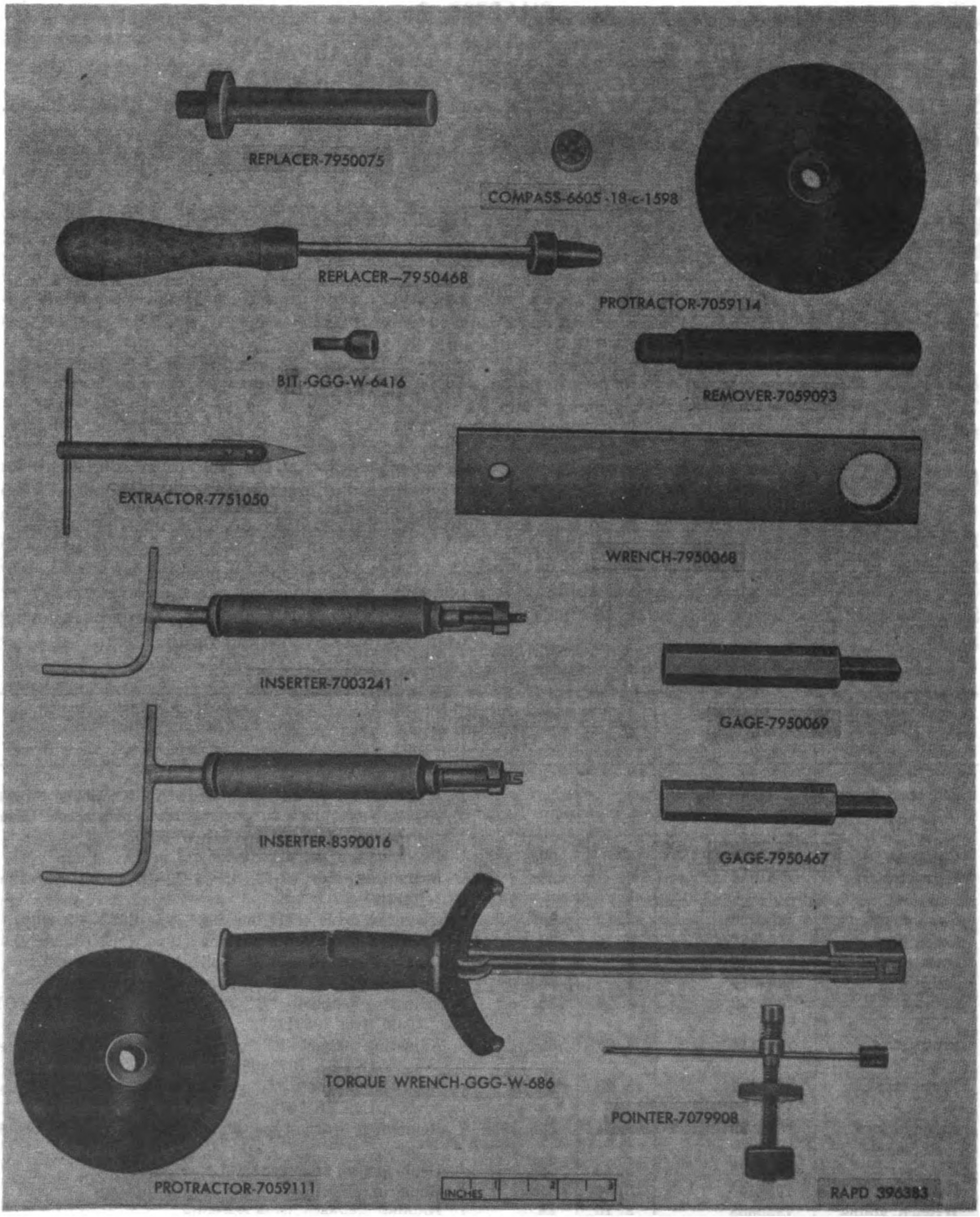

Figure 3. Special tools.

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Table II. Improvised Tools for Field and Depot Maintenance

Item	References		Use
	Figs.	Pars.	
Remover and replacer	4, 13	29	Removing ball bearing (type S6LN–32)
Remover and replacer	4, 13	29	Removing ball bearing (type S4LN–32)

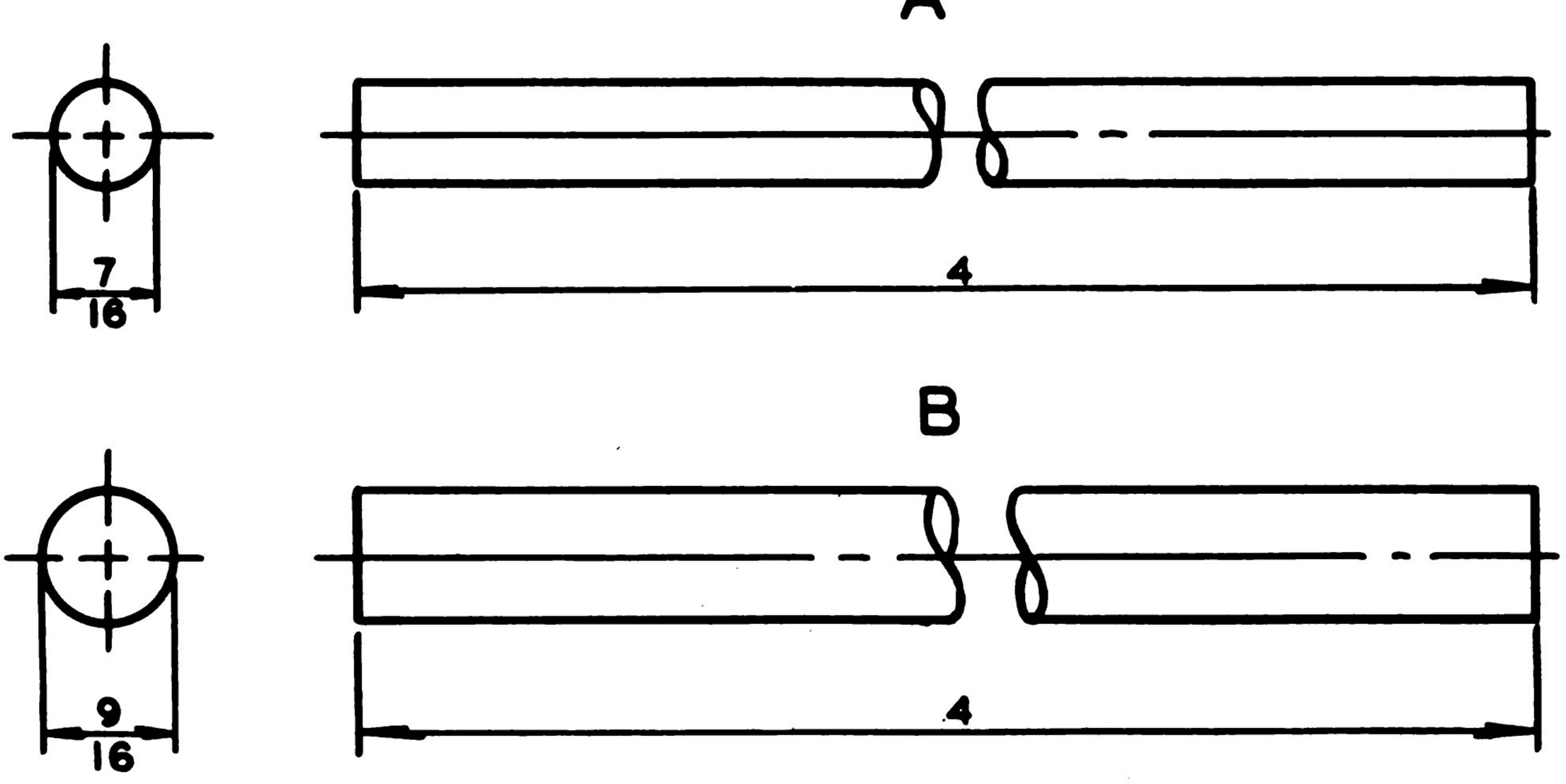

Figure 4. Improvised tools.

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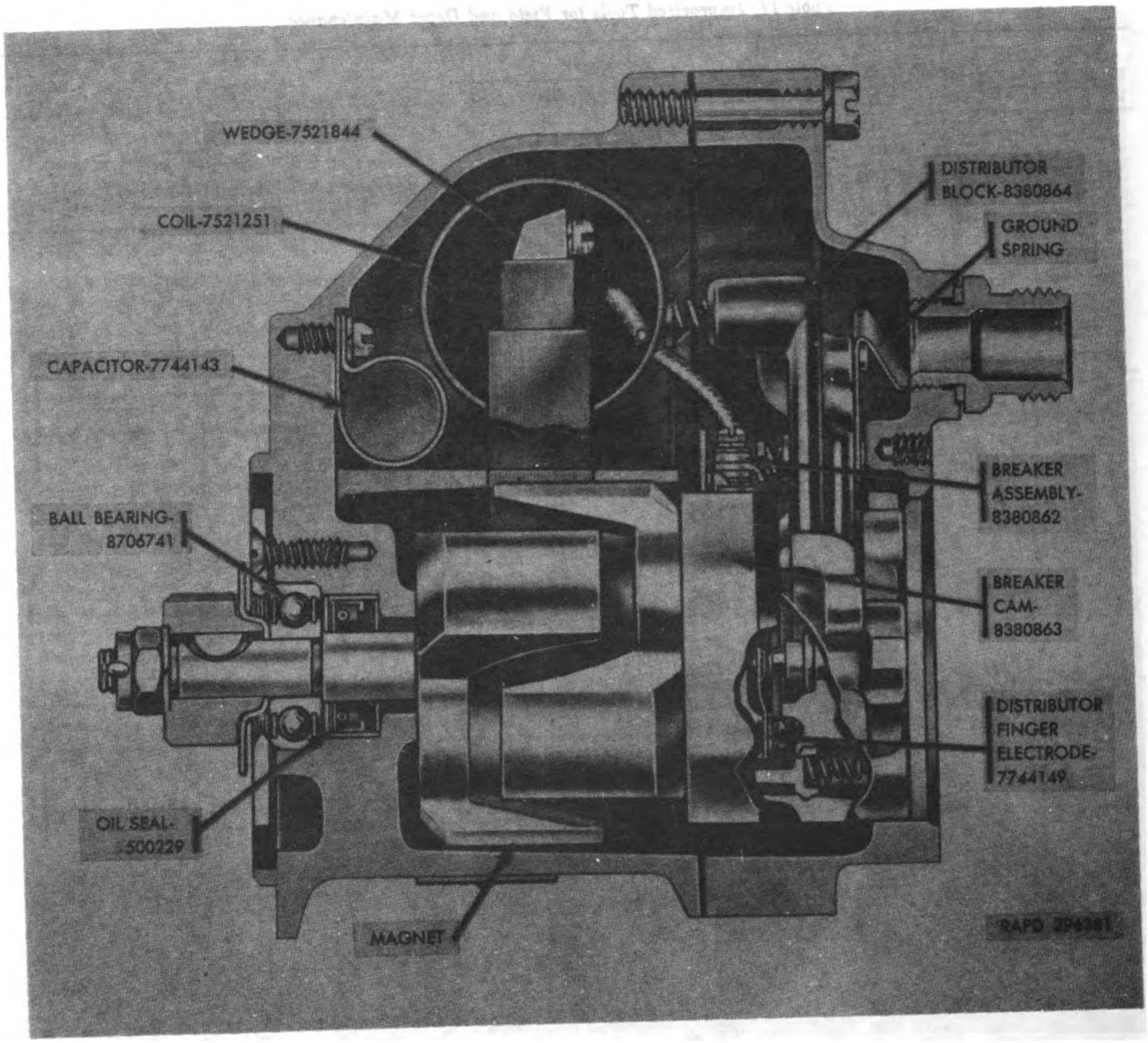

Figure 5. Type S6LN-32 magneto—cutaway view.

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CHAPTER 3
BASIC PRINCIPLES OF OPERATION

11. Principles of Operation

a. Mechanical Action. The rotating magnet turns on a single row ball bearing and a bronze bearing in the drive end of the magneto (fig. 5). Rotation of the magnet causes the cam to operate the breaker assembly which alternately opens and closes the contact points which are part of the breaker assembly. The cam is lubricated by a felt follower, also part of the breaker assembly. The distributor rotor, which is driven by the magnet shaft is in constant contact with a brush and spring assembly in the distributor block.

b. Electrical Operation. Operation of the magneto (fig. 6) depends upon the principle of flux reversal. The rotating magnet rotates in close relation to a pair of laminated iron pole shoes cast in the housing. The laminated core of the magneto coil contacts the upper ends of the pole shoes and is held in place by two securing wedges. In this way, a complete path is provided for the lines of magnetic flux, out of a north pole of the magnet, through one pole shoe, through the coil core, and back to a south pole through the other pole shoe. Consequently, as the magnet is rotated one complete revolution, the direction of flux lines through the pole shoes and coil core is reversed once for each pole of the magnet. The flux reversals in the magnetic circuit induce a current in the primary winding of the coil when the breaker points are closed. The flow of current in the primary winding is accompanied by the build up of a magnetic field around the primary circuit. When the breaker points, which are actuated by the cam, are opened, the energy in the magnetic field of the primary circuit is suddenly released, thereby inducing high voltage in the secondary winding. The high tension current of the secondary circuit travels from the high tension contact of the coil to the high tension spring of the distributor block and through an internal insert to the center electrode of the block. The current is picked up by the spring on the distributor finger and conducted to the distributor finger electrode (fig. 5) from where it is delivered to the distributor block electrodes at the proper intervals. High tension cables carry the current to the spark plugs in the engine cylinders where the discharge or spark for ignition purposes occurs.

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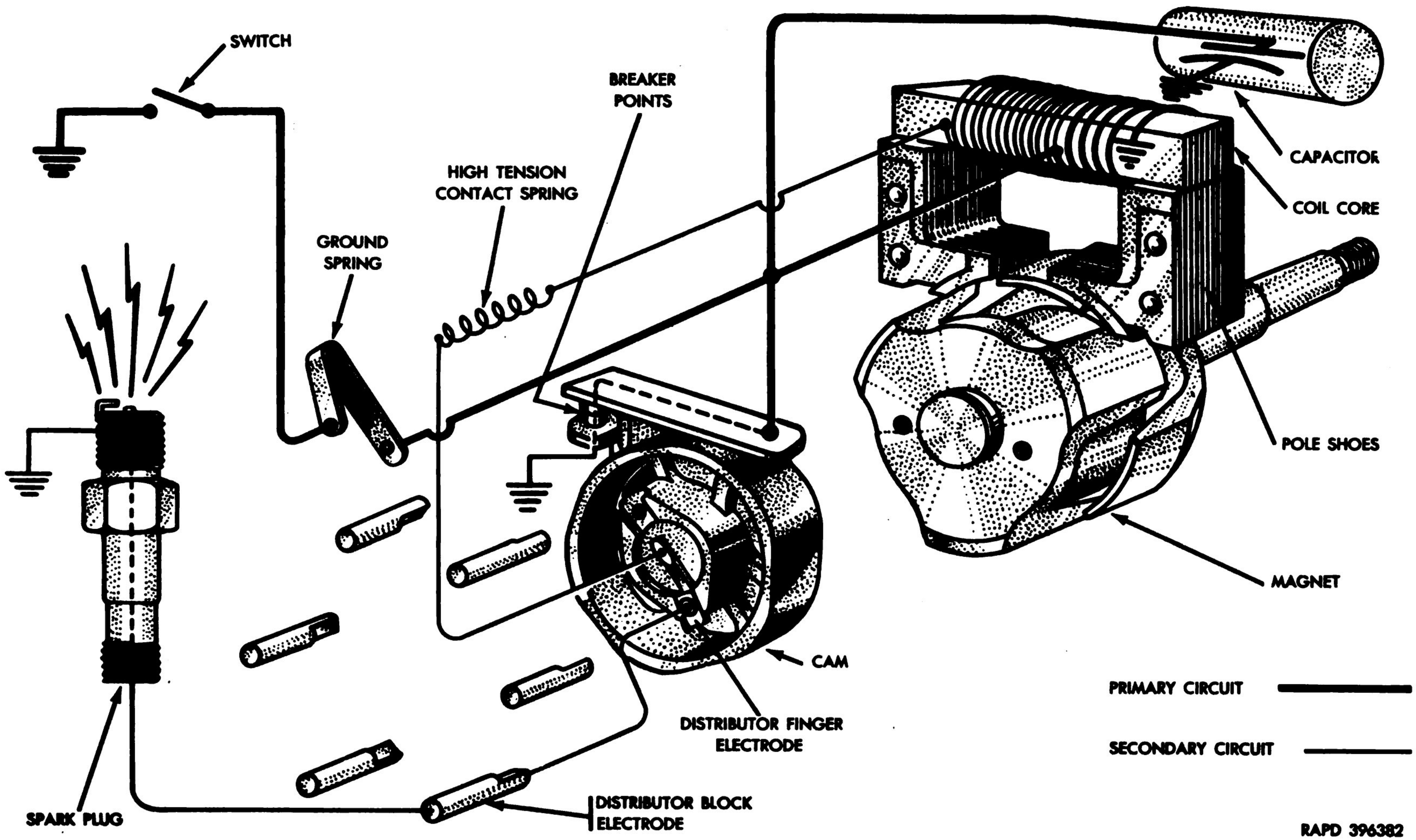

Figure 6. Magneto electrical system—schematic diagram.

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CHAPTER 4

TROUBLESHOOTING PROCEDURES

Section I. GENERAL

12. Purpose

NOTE: Information in this chapter is for use of ordnance maintenance personnel in conjunction with and as a supplement to the troubleshooting section in the pertinent operation technical manual. It provides continuation of instructions where a remedy in the operation technical manual refers to ordnance maintenance personnel for corrective action.

Operation of a deadlined vehicle without a preliminary examination can cause further damage to a disabled component and possible injury to personnel. By careful inspection and troubleshooting, such damage and injury can be avoided and, in addition, the causes of faulty operation of a vehicle or component can often be determined without extensive disassembly.

13. General Instructions

This chapter contains inspection and troubleshooting procedures to be performed while a disabled component is still mounted in the vehicle and after it has been removed.

a. The inspections made while the component is mounted in the vehicle are for the most part visual and are to be performed before attempting to operate the vehicle. The object of these inspections is to determine the condition of the component, and if found defective, to take precautions to prevent any further damage to it.

b. The troubleshooting performed while the component is mounted in the vehicle is that which is beyond the normal scope of the using organization. Check the troubleshooting section of the pertinent vehicle organizational maintenance manual, then proceed as outlined herein.

c. Inspection after the component is removed from the vehicle is performed to verify the diagnosis made when the component was in the vehicle, to uncover further defects, or to determine malfunctions if the component above is received by the Ordnance establishment. This inspection is particularly important in the last case because it is often the only means of determining the malfunction without completely disassembling the component.

d. Troubleshooting a disabled component after it has been removed from the vehicle consists of subjecting it to tests on a test stand with a speed range of from 50 to 2,500 rpm and having a standard 5-mm, 3-point spark gap panel (magneto and distributor tester 17–T–5545 or equal). This chapter also discusses those symptoms which can be diagnosed by using the testing equipment and interprets the results in terms of probably causes.

Section II. TROUBLESHOOTING

14. Procedures

a. Always perform a preliminary check while the magneto is installed in vehicle. Make sure the trouble is in the magneto, since ignition troubles may be caused by faulty spark plugs, defective switch cable or switch, damaged or incorrect wiring, and incorrect timing of magneto to engine. If the trouble is traced to the magneto, check for loose, incorrect, or damaged cable and a cracked radio shield cover or housing assembly.

b. After the component has been removed from the vehicle, or if it has been received already removed, further inspection is necessary (paragraph 18).

c. The major troubleshooting procedures performed on a magneto after removal from the vehicle are made on a tester. However, the magneto should be inspected before the test run to eliminate the possibility of further damage. Turn the shaft of the rotating magnet to make sure it is not binding and there are no obstructions to prevent the shaft from turning freely. If difficulty is encountered, remove the cover and visually inspect the interior of the housing assembly for metal chips or loose parts that may be lodged between the poles of the magnet and pole shoes. Also inspect the cam, distributor finger, and distributor block to see that there is no interference at these

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points. If the shaft rotates freely, the magneto should be subjected to the tests described in *e* below.

d. This paragraph discusses those symptoms which can be diagnosed by operating the magneto on a tester (magneto and distributor tester 17–T–5545 or equal) which has a speed range of from 50 to 2,500 rpm and adequate mounting facilities. The gap panel must have standard 5-mm, 3-point spark gaps. Refer to paragraph 55 for instructions for mounting magneto on test stand.

e. The following is the test for mechanical performance. Run the magneto in normal direction of rotation for a few minutes at various speeds to observe the mechanical performance. If any indications of irregular mechanical operation are detected, disassemble and inspect the unit for cracked, broken or loose parts or for a worn bearing. If erratic sparking is noted, or no sparking occurs, refer to table III.

Table III. Troubleshooting

Malfunction	Probable causes	Corrective action
1. Erratic sparking	*a.* Dirt or moisture in magneto	*a.* Remove cover and inspect inside of magneto for dirt or moisture. Wipe all dirty or moist surfaces with a clean dry cloth.
	b. Broken or loose cables	*b.* Examine coil and capacitor cables and terminals for looseness or cracks. If the capacitor and primary cable terminals are grounding out on the breaker assembly or the housing, loosen the primary contact terminal screw and move the cable terminals until they cannot ground out.
	c. Fouled or worn contact points	*c.* If contact points are dirty, clean with a small brush dipped in dry-cleaning solvent or mineral spirits paint thinner. NOTE: Care must be taken to avoid getting dry-cleaning solvent or mineral spirits paint thinner on the cam follower felt, as this would wash away the lubricant. After cleaning, dry the breaker assembly with compressed air to evaporate the dry-cleaning solvent or mineral spirits paint thinner. CAUTION: Do not hold air-hose nozzle too close to cam follower felt as the felt may become damaged. If points are badly pitted, replace the complete breaker assembly (par. 46).
	d. Worn contact spring	*d.* Check the breaker spring tension (fig. 17) with spring scale gage. The tension should be between 12 and 24 ounces at the instant the points open. If not, replace breaker assembly (par. 46).
	e. Worn electrodes	*e.* Inspect the distributor finger electrode (fig. 23). If the electrode is worn to less than 0.313 inch (par. 56), install new electrode (par. 47).
	f. Carbon tracking	*f.* Inspect distributor block for carbon tracks. Scrape off any tracks that are found, clean the parts (par. 27) and wax-treat (par. 31*d*).

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Table III. Troubleshooting—Continued

Malfunction	Probable causes	Corrective action
1. Erratic sparking—Continued	*g.* Defective capacitor	*g.* Check the capacitor with a capacitor tester. The capacitance should be at least 0.20 microfarad. If not, replace the capacitor assembly (par. 42).
	h. Magneto out of time internally	*h.* Check the internal timing of the magneto (par. 49) to be sure the finger and magnet timing marks are properly alined. Also be sure the distributor finger electrode (figs. 23 and 24) is in the proper slot for the rotation required. Check the point (par. 48), opening. If the points will not open the proper distance, inspect the cam for grooves. If they are found, install new cam.
2. No sparking	*a.* Fouled or worn contact	*a.* Refer to 1*c* above.
	b. Defective capacitor	*b.* Refer to 1*g* above.
	c. Shorted primary circuit	*c.* Be sure the ground spring on the distributor block (fig. 2) is not contacting the housing when the ground terminal insulating sleeve is installed (par. 55*b*(1)). Inspect the capacitor and primary cables to be sure they are not grounded on the breaker assembly support. Check for defective insulation on cables. Replace the coil (par. 48) if the cables are cracked or broken.
	d. Worn electrodes	*d.* Refer to 1*e* above.
	e. Carbon tracking	*e.* Refer to 1*f* above.
	f. Defective coil	*f.* Check resistance of the coil and the output of the primary winding (par. 35*b*). Replace the coil if defective (par. 48).
	g. Improperly charged magnet	*g.* If, after replacing the coil, the output is still low, recharge the magnet (par. 30*d*). If this does not produce the desired output, install new magnet (par. 44).

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CHAPTER 5

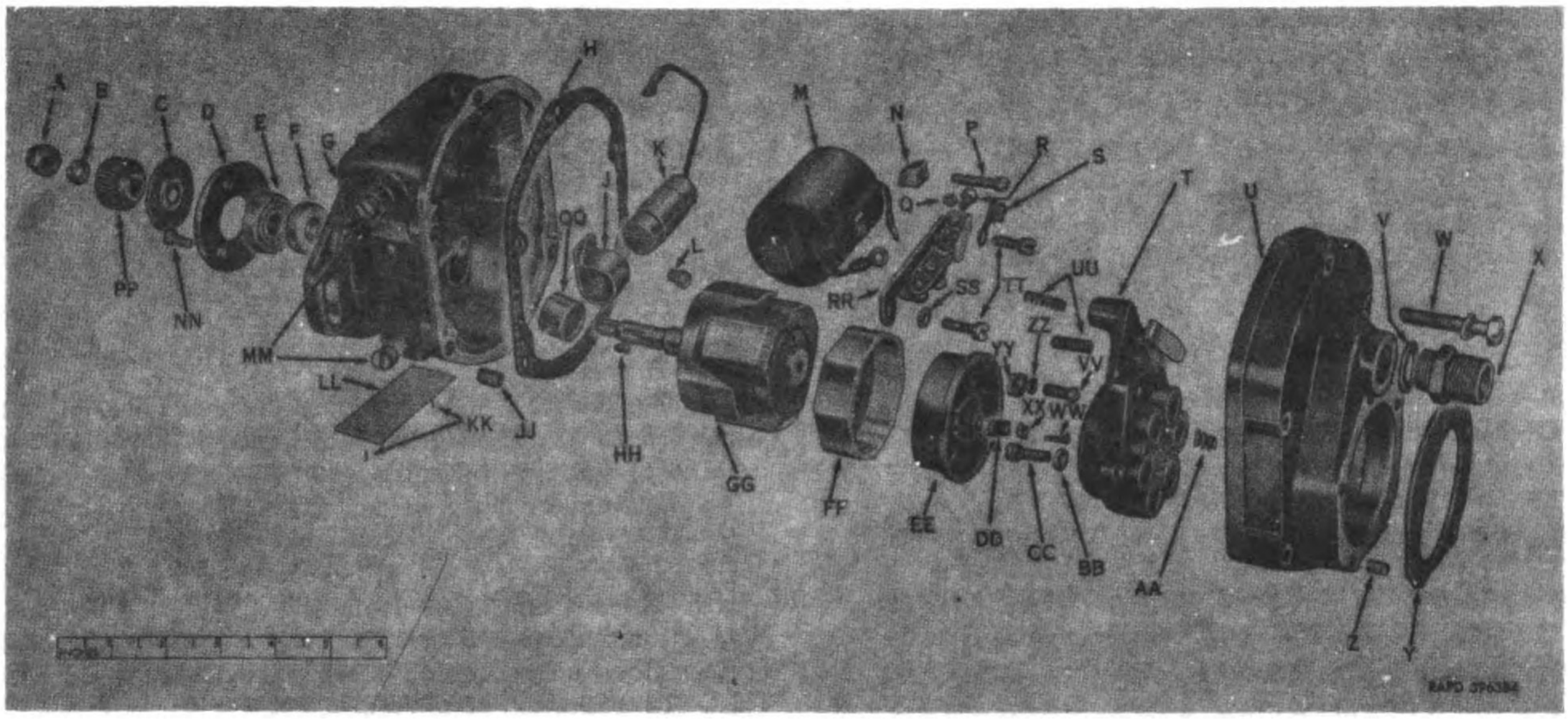
REPAIR AND REBUILD

Section I. DISASSEMBLY

NOTE: The key letters shown below in parenthesis refer to figures 7 and 8 except where otherwise indicated.

15. General

During the procedures described in this section, place all disassembled components of the magneto upon a clean piece of cloth or paper. Cover all parts with cloth or paper to prevent the accumulation of dust, dirt, or metal chips.



A—⅝-24 Hexagon castellated nut 125020
B—⅝ Bolt size lockwasher 7023711
C—Oil slinger 7744151
D—Ball bearing retainer 7744154
E—Ball bearing 700030
F—Oil seal 500229
G—Magneto housing assembly 77820-10-56613Y (used w/magneto 7539854 and 7403411).
77820-10-88651 (used w/magneto 5298247)
H—Cover assembly gasket 7744849
J—Capacitor mounting clamp 7402511
K—Capacitor 7744143
L—No. 10 x ⅝ fillister-head screw 77820-10-85937-5
M—Coil assembly 7521251
N—Coil clamping wedge 7521844
P—No. 8 x 1 fillister-head screw 131987
Q—No. 8 lockwasher 7376293
R—No. 8-32 x ¼ machine screw 131954
S—Electrical terminal cup 77820-10-58938
T—Distributor block assembly 77820-10-87638Y
U—Cover assembly 7402537 (used w/magneto 7539854 and 7403411).
77820-10-88652 (used w/magneto 5298247)
V—Ground terminal bushing plain washer 7744773
W—¼-20 Hexagon-head slotted screw 77820-10-51663
X—Ground terminal bushing 7744153
Y—Cable outlet plate gasket 7402535
Z—No. 10-32 Helicoil insert 77820-10-77870-10
AA—Helical compression spring 7744157
BB—No. 0.196 x 0.328 x 0.025 plain washer 77820-10-7611
CC—No. 8-32 fillister head machine screw 131954
DD—Distributor finger contact spring 7744148
EE—Distributor finger 7417583
FF—Breaker cam 7417581
GG—Rotating magnet assembly 77820-10-56629
HH—Drive coupling woodruff key 7744772
JJ—Cover screw Helicoil insert 77820-10-77820-25
KK—Identification plate drive screw 77820-10-90501-4
LL—Identification plate 77820-2-7822L
MM—Ventilating hole plug 7347779
NN—No. 10-32 fillister head screw 133634
PP—Magneto drive coupling 7744155
QQ—Bushing-type bronze bearing 7744153
RR—Breaker assembly 7416699
SS—No. 0.173 x 0.312 x 0.031 plain washer 77820-10-7611
TT—No. 8-32 fillister head screw 7417580
UU—High tension contact spring 7744157
VV—No. 8-32 fillister head screw 7417580
WW—No. 0.112 x 0.375 self-tapping screw 7744769
XX—Distributor finger electrode 7744149
YY—Plain washer, special 179860
ZZ—No. 8 lockwasher 7417582

Figure 7. Type S6LN-32 magneto—exploded view.

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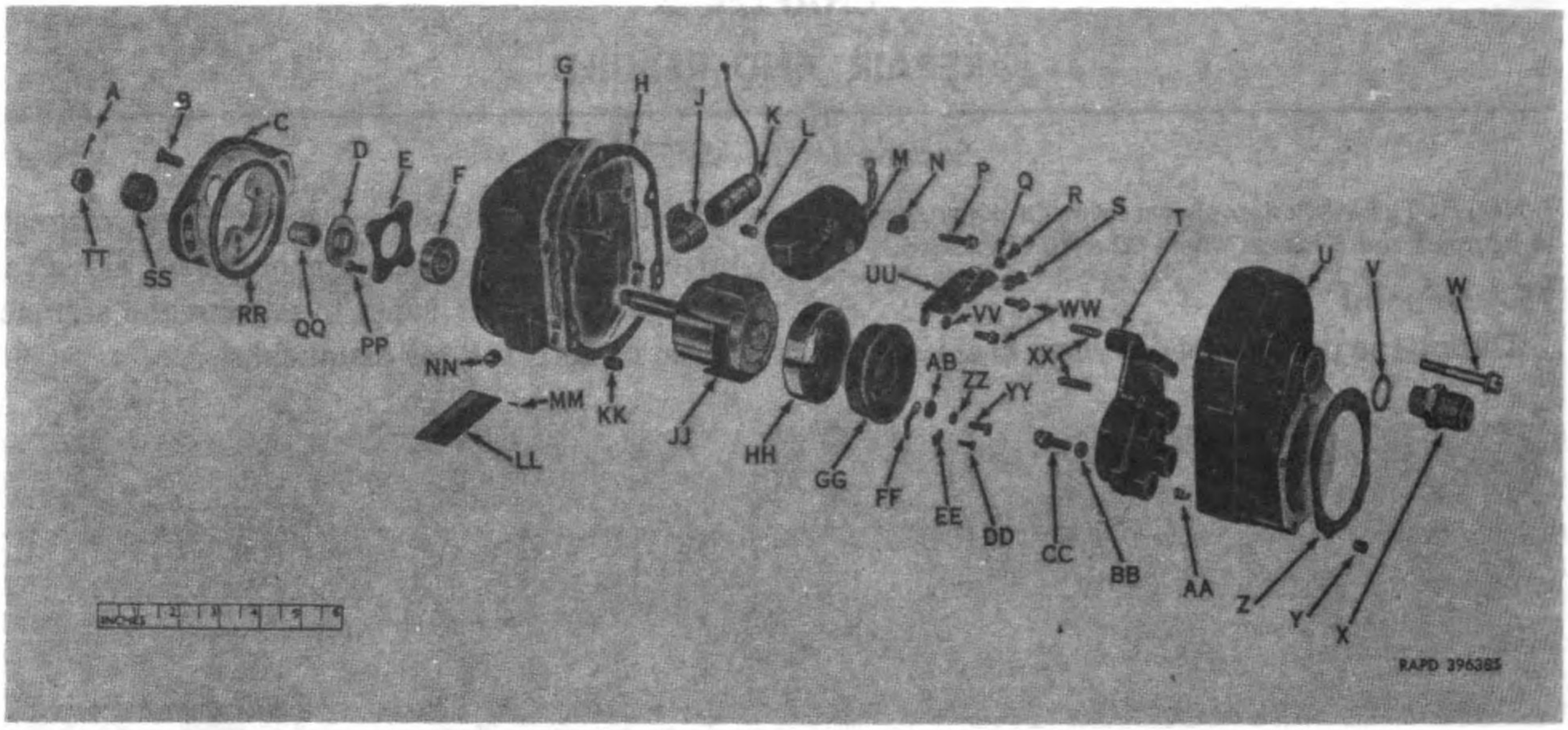

A—Cotter pin 188736
B—¼-28 countersunk head screw 77820-10-56655
C—Magneto mounting flange 77820-10-54691W
D—Oil slinger 77820-10-56675
E—Ball bearing retainer 77820-10-56657
F—Ball bearing 710255
G—Magneto housing assembly 77820-10-54680
H—Cover assembly gasket 7744849
J—Capacitor mounting clamp 7402511
K—Capacitor 7744143
L—No. 10 x ⅝ fillister head screw 77820-10-35937-5
M—Coil assembly 7521251
N—Coil clamping wedge 7521844
P—No. 8-32 fillister head screw 77820-10-35936-16
Q—No. 8 lockwasher 7376293
R—No. 8-32 machine screw 131966
S—Electrical terminal clip 77820-10-58938
T—Distributor block assembly 77820-10-37508Y
U—Cover assembly 7402537
V—Ground terminal bushing plain washer 7744773
W—¼-20 hexagon head slotted screw 7744847
X—Ground terminal bushing 7744153
Y—No. 10-32 Helicoil insert 77820-10-77870-10
Z—Cable outlet plate gasket 7402535
AA—Helical compression spring 7744157
BB—No. 0.196 x 0.328 x 0.025 plain washer 77820-10-7611
CC—No. 8-32 fillister head machine screw 131954
DD—0.112 x ⅜ self-tapping screw 7744769
EE—Distributor finger electrode 7744149
FF—Distributor finger contact spring 7744148
GG—Distributor finger 77820-10-58926
HH—Breaker cam 77820-10-58925
JJ—Rotating magnet assembly 77820-10-56629
KK—Cover screw Helicoil insert 77820-10-77870-25
LL—Identification plate 77820-2-782Z
MM—Identification plate drive screw 77820-10-90501-4
NN—Ventilating hole plug 7347779
PP—No. 10-32 fillister head screw 133634
QQ—Bushing bearing 77820-10-58994
RR—Mounting adapter gasket 7416335
SS—Magneto drive coupling 77820-10-56688
TT—⅜-16 Castellated hexagon nut 77820-10-4092
UU—Breaker assembly 7744846
VV—No. 8 lockwasher 77820-10-7611
WW—No. 10-32 fillister head machine screw 132119
XX—Distributor block contact spring 7744157
YY—No. 8-32 fillister head screw 77820-10-56171
ZZ—No. 8 lockwasher 7744776
AB—Kidney-type special washer 7744770

Figure 8. Type S4LN-32 magneto—exploded view.

CAUTION: Special care must be exercised when handling the magneto to see no chips of metal are attracted to and held onto the magnet by the strong magnetic field. Chips may very easily lodge between the pole pieces and be thrown out into the interior of the magneto when the unit is assembled and operating.

NOTE: The following instructions refer to both magneto types. Variations in procedure will be indicated with a suitable reference to magneto type and its exploded view.

16. Remove Cover

Loosen the five hexagon-head slotted screws (W) which secure the cover (U) to the housing assembly (G) and pull cover assembly from the housing. Remove and discard cover gasket (H). If cover assembly contains cam oiler and washer, remove them. Do not attempt to disassemble the cam oiler.

NOTE: Current production magnetos with the steel breaker cam, do not have the cam oiler.

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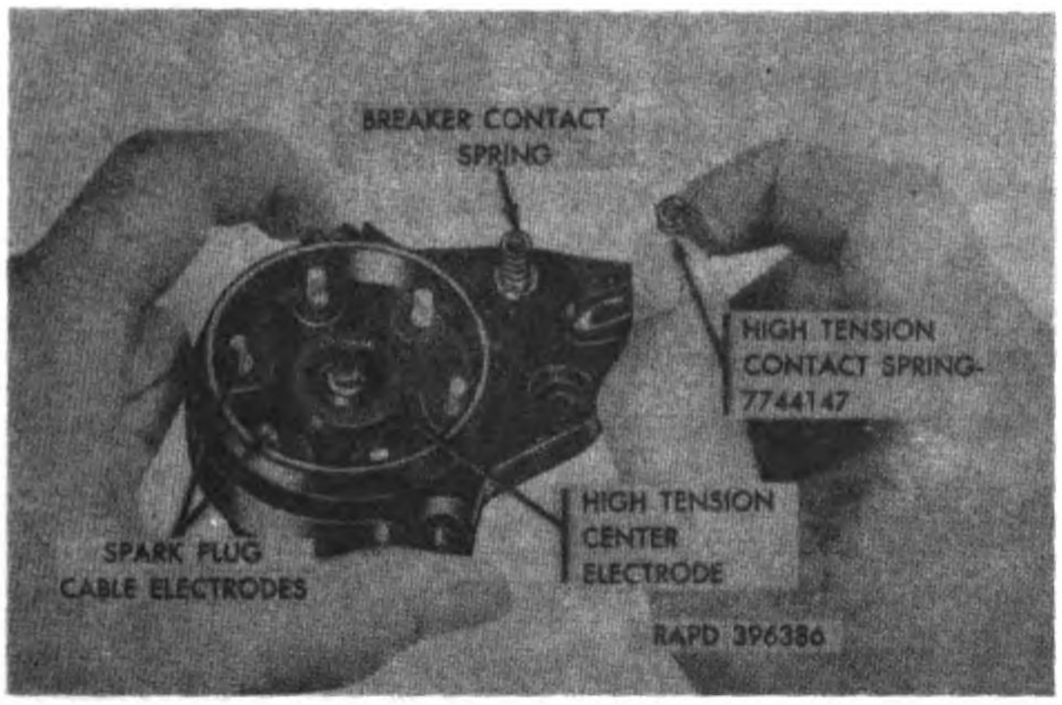

Figure 9. Removing high-tension contact spring.

17. Remove Distributor Block

Remove the three screws (CC) and plain washers (BB) which secure the distributor block (T) to cover assembly (U). Lift out distributor block. Carefully pull out the high tension and breaker contact springs (UU fig. 7; XX fig. 8) with the fingers as shown in figure 9. Do not remove the high tension cable contact springs (AA) unless they are worn, broken, or distorted.

18. Remove Cam and Distributor Finger

Remove screws (VV, fig. 7; YY, fig. 8), lockwashers (ZZ figs. 7 and 8), and special washers (YY fig. 7; AB fig. 8) and pull breaker cam (FF fig. 7; HH, fig. 8) and distributor finger (EE fig. 7; GG, fig. 8) from magnet assembly (GG fig. 7; JJ fig. 8). Separate breaker cam and distributor finger. Remove screw (WW, fig 7; DD, fig. 8), electrode (XX, fig. 7; EE, fig. 8), and contact spring (DD, fig. 7; WW, fig. 8).

19. Remove Breaker Assembly

Remove breaker assembly machine screw (R, figs. 7 and 8) and lockwasher (Q, figs. 7 and 8) and lift off capacitor and coil primary cables. Remove breaker assembly (RR, fig. 7; UU, fig. 8) securing screws (TT, fig. 7; WW, fig. 8) plain washers (SS, fig. 7; VV, fig. 8) and lift off breaker assembly.

20. Remove Coil

Remove fillister-head screws (P) and wedges (N). If wedges will not lift out of position, tap the rim of the housing above the wedge gently with soft-faced mallet. Left out coil (M).

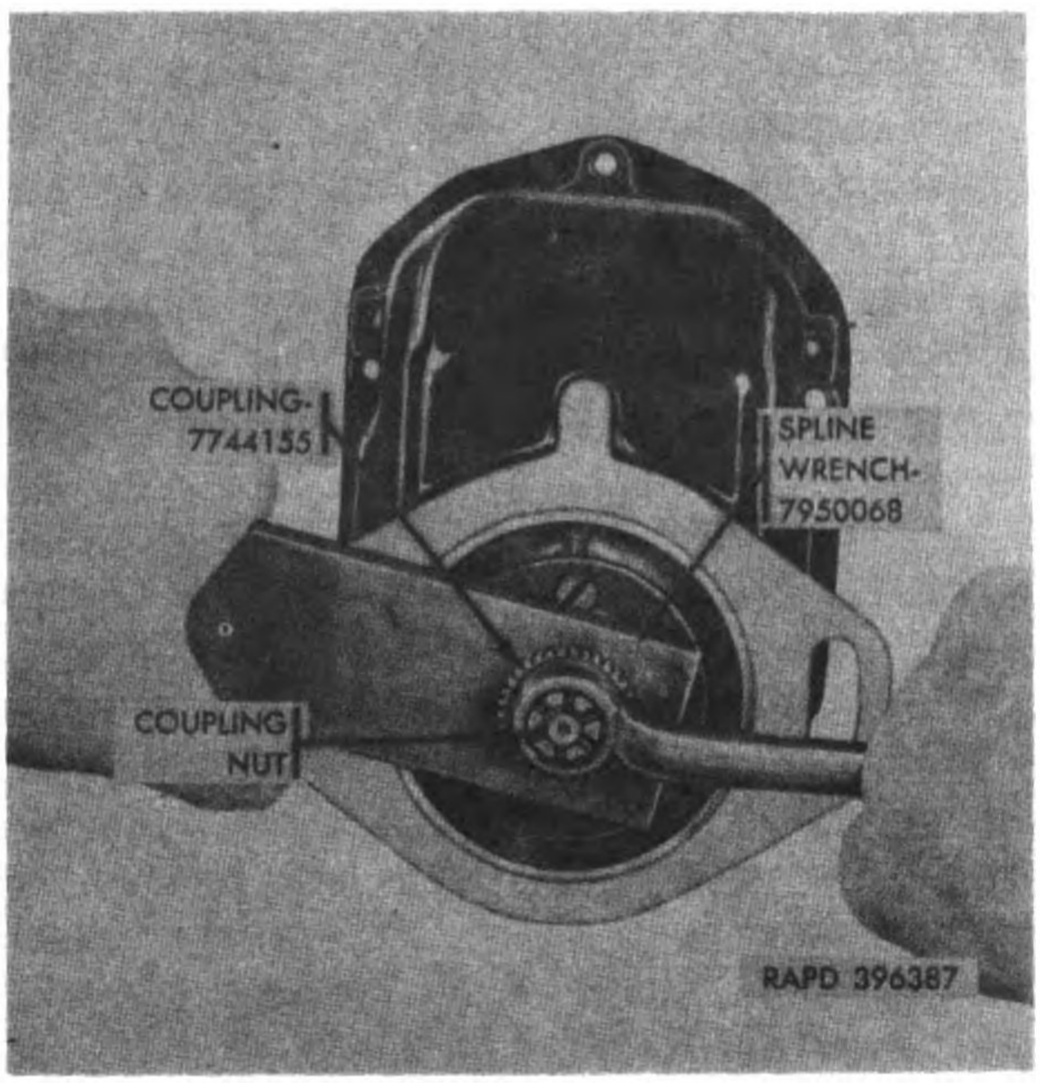

Figure 10. Removing coupling nut—types S4LN-32 and S6LN-32.

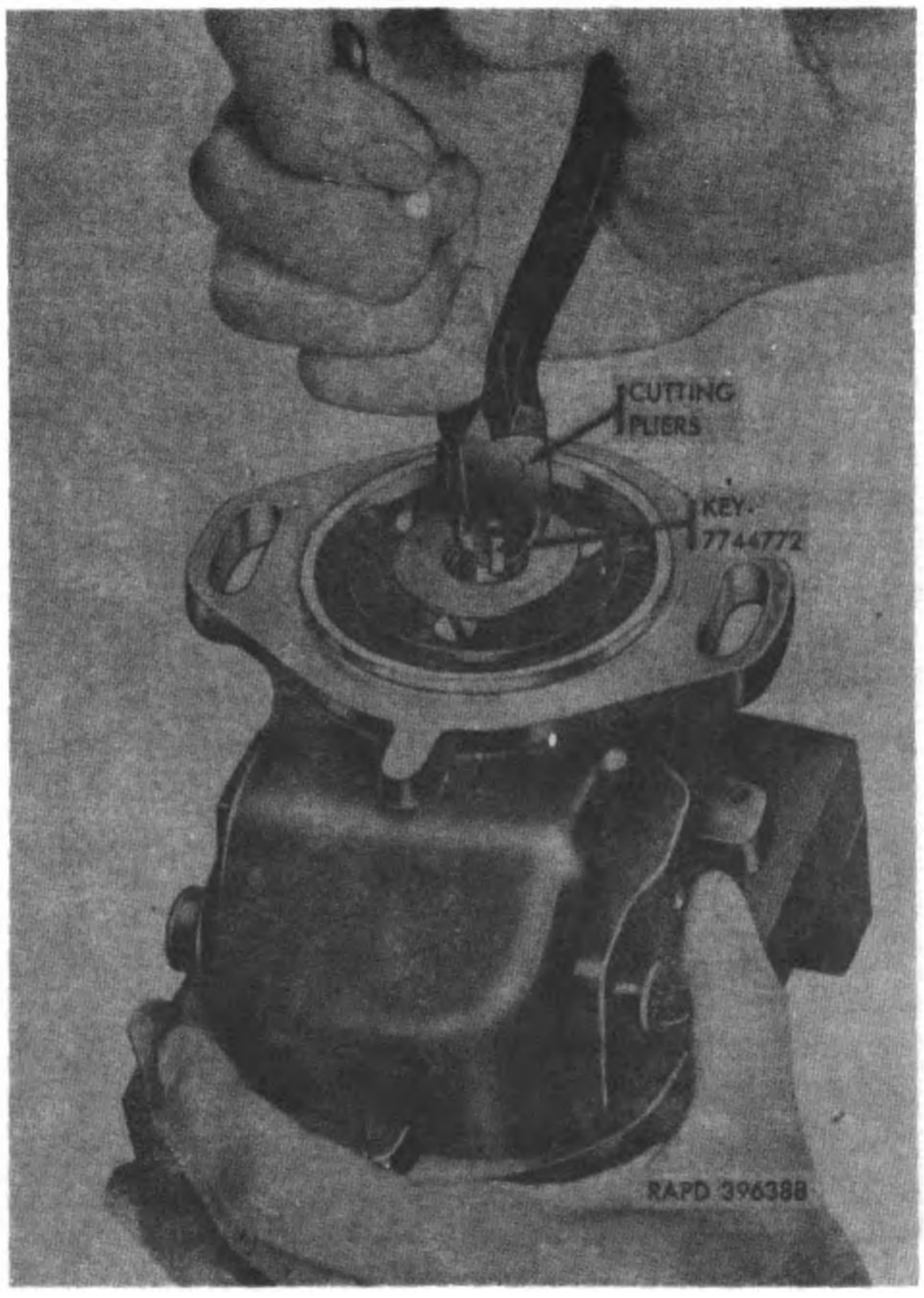

Figure 11. Removing woodruff key—type S6LN-32.

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21. Remove Drive Coupling and Oil Slinger

a. Type S6LN-32 (fig. 7).

(1) Hold the drive coupling (PP) with spline wrench 7950068 (fig. 10) and remove nut (A) with 9/16-inch wrench. Remove lockwasher (B) and drive coupling (PP).

(2) Using diagonal cutting pliers (fig. 11), remove key (HH) and lift off oil slinger (C).

b. Type S4LN-32 (fig. 8).

(1) Remove cotter pin (A). Hold drive coupling (SS) as shown in figure 10, and remove nut (TT). Lift off coupling (SS), bushing (QQ), and oil slinger (D).

(2) Remove screws (B), flange (C), and gasket (RR). Discard gasket.

22. Remove Magnet

a. Type S6LN-32.

(1) Support the magneto housing assembly (G, fig. 7) in an arbor press on two wooden blocks (fig. 12).

(2) Place a protective pad over the drive end of the magnet shaft and press the magnet (GG, fig. 7) out of the housing.

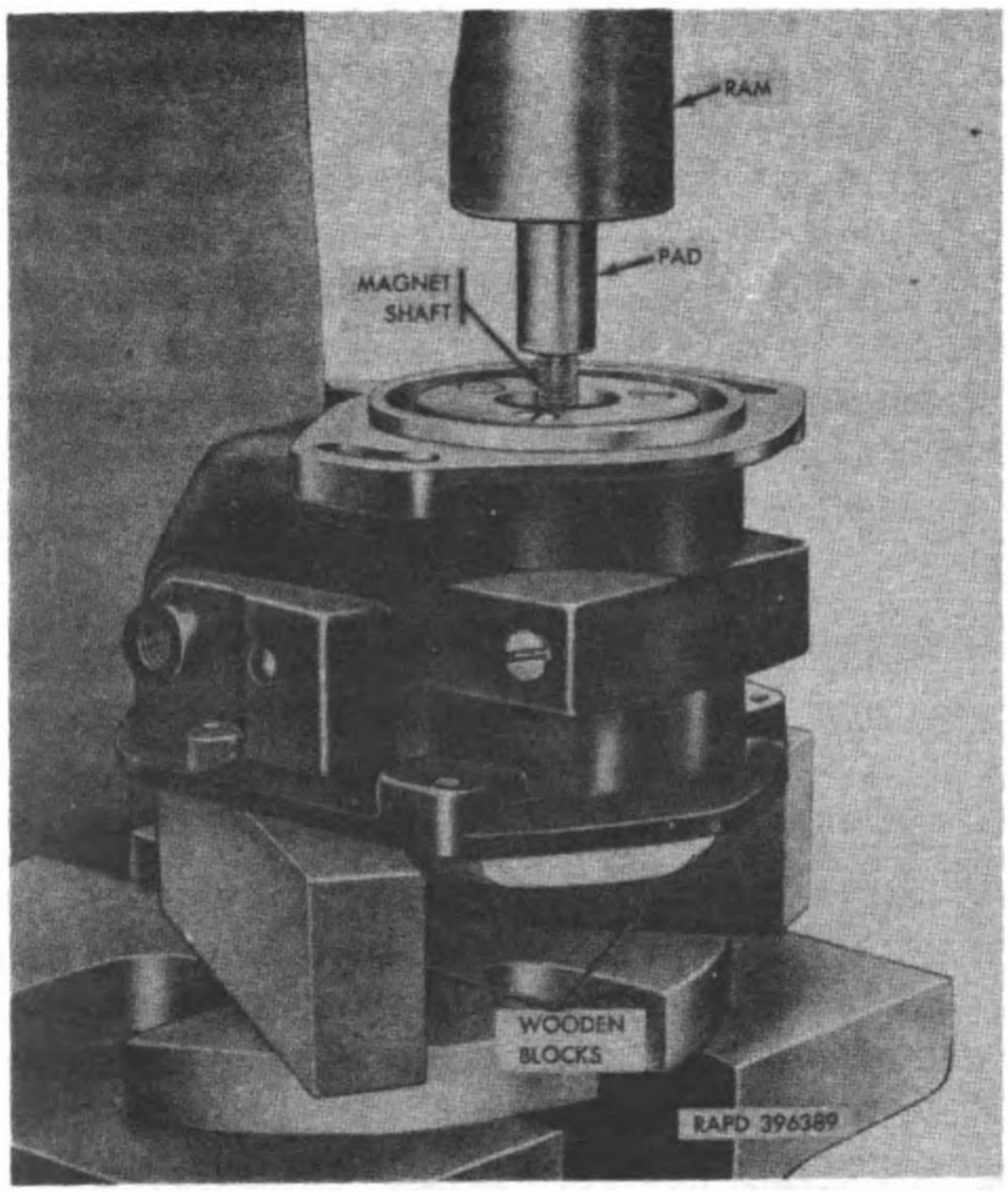

Figure 12. Pressing magnet from housing—types S4LN-32 and S6LN-32.

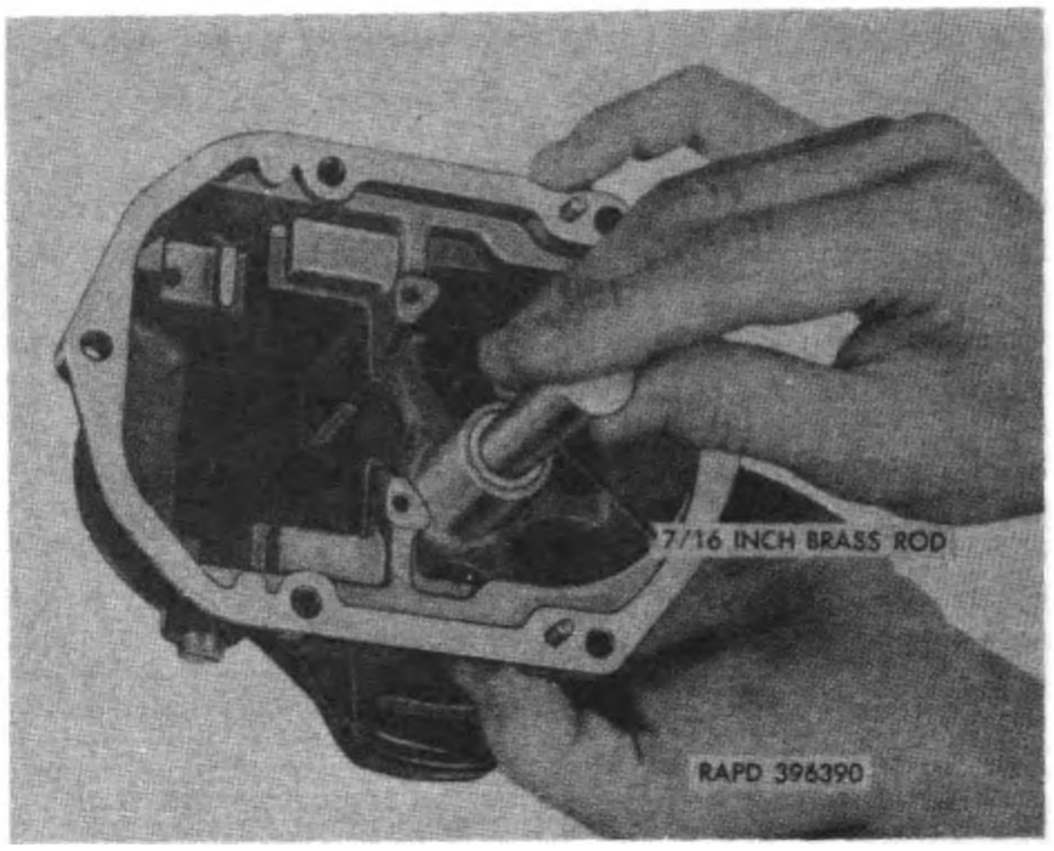

Figure 13. Pushing out ball bearing using improvised remover.

b. Type S4LN-32.

(1) Support the magneto housing assembly (G, fig. 8) on two wooden blocks (fig. 12) in an arbor press.

(2) Place a protective pad over the drive end of the magnet shaft and press the magnet (JJ, fig. 8) out of the housing.

23. Remove Ball Bearing

a. Type S6LN-32.

(1) Remove screws (NN, fig. 7) and lift off ball bearing retainer (D, fig. 7).

(2) Using improvised ball bearing removing tool (A, fig. 4), push ball bearing (E, fig. 7) from magneto housing as shown in figure 13.

b. Type S4LN-32.

(1) Remove screws (PP, fig. 8) and lift off ball bearing retainer (E, fig. 8).

(2) Using improvised ball bearing removing tool (B, fig. 4), push ball bearing (F, fig. 8) from magneto housing as shown in figure 13.

CAUTION: When removing the ball bearing from type S6LN-32 magnetos, it is important that the end of the tool be seated on the inner race of the bearing and not on the leather sealing member of the oil seal. If pressure was supplied to the sealing member of the oil seal, it would damage it and necessitate replacement.

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Do not remove the oil seal (par. 25) unless it is defective.

24. Remove Capacitor

Remove screw (L, figs. 7 and 8) and lift out capacitor (K, figs. 7 and 8). Slide capacitor out of clamp (J figs. 7 and 8).

25. Remove Oil Seal

If inspection (par. 29e(5)) reveals the oil seal (F, fig. 7) to be faulty or if the bronze-type bearing (par. 26) is removed, drive the oil seal out of the housing (G, fig. 7) with a slender punch.

NOTE: The oil seal cannot be removed without damage.

26. Remove Bushing-Type Bearing

If inspection (par. 29) reveals the bushing-type bearing (QQ, figs. 7 and 8) should be replaced, support the housing (G, figs. 7 and 8) in an arbor press and press the bearing from the housing using remover and replacer 7059093 (fig. 14).

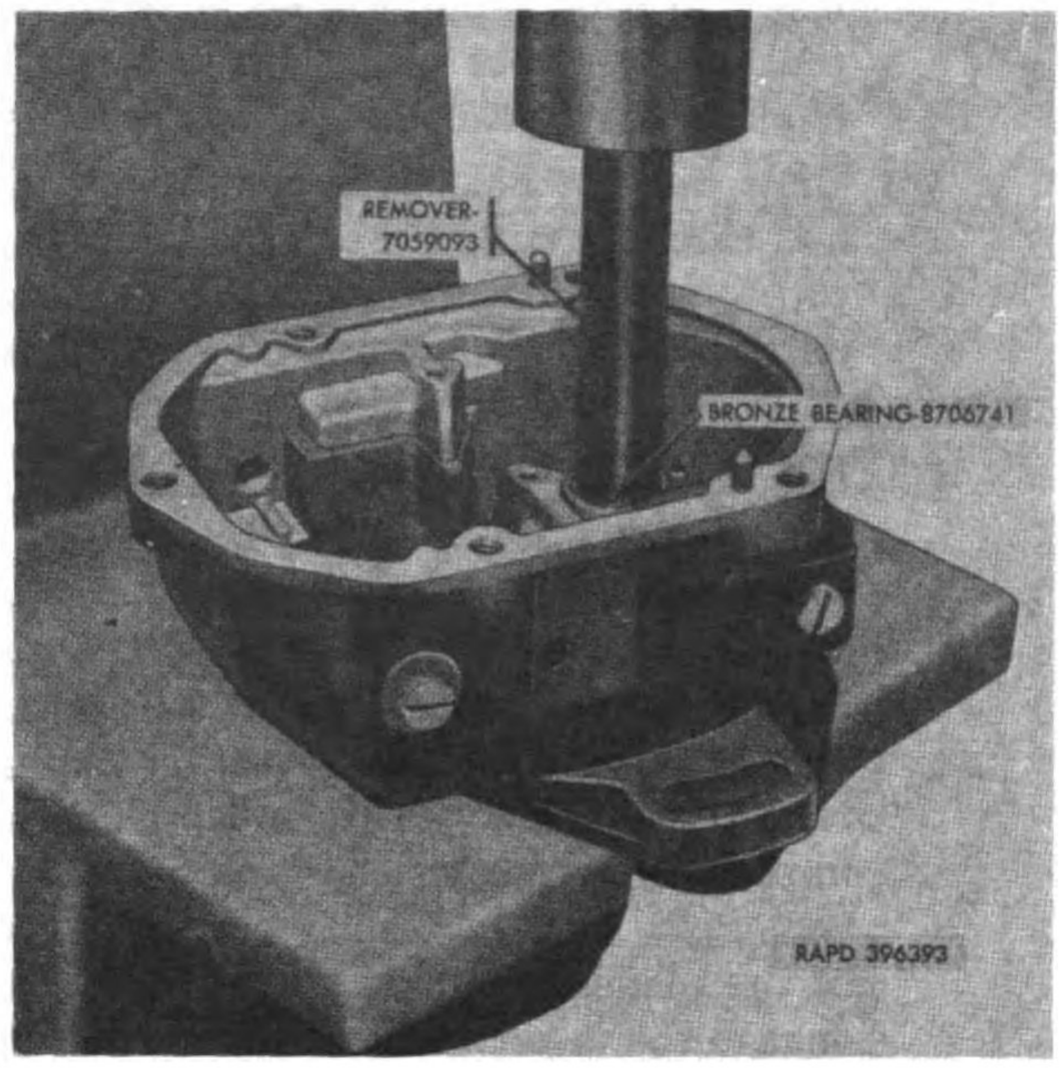

Figure 14. Pressing bushing-type bearing from housing.

Section II. CLEANING

27. Cleaning

a. After completely disassembling the magneto assembly, clean all metal parts such as the housing, cover, magnet, contact springs, coil core wedges, drive coupling, oil slinger, screws and washers with dry-cleaning solvent or mineral spirits paint thinner. Dry with compressed air cr clean cloth.

b. To clean the breaker assembly, use a small brush dipped in dry-cleaning solvent or mineral spirits paint thinner and scrub the cam follower gently. Hold the contact points apart slightly while scrubbing to remove all particles of dirt and old lubricant. After cleaning, dry the felt thoroughly with compressed air.

CAUTION: Avoid holding the air hose nozzle too close to the felt to prevent damaging the felt.

c. Immerse the distributor block and cam and finger in acetone and scrub lightly with a small brush. Dry with compressed air.

d. Wipe the coil, capacitor, and ball bearing with a clean cloth to remove all old oil and dirt particles. Refer to TM 37–265 for additional data covering bearing maintenance.

Section III. INSPECTION AND REPAIR

28. Radio Shield Cover (U)

a. Inspect the radio shield cover for cracks. Replace the cover if any are evident.

b. Inspect all machined surfaces for grooves, nicks, or burs. Minor grooves, nicks, or burs may be removed with fine file or stone. If filing or stoning fails to correct the condition, the cover must be replaced.

c. Check all tapped holes for worn, stripped, or mutilated threads. Damaged threads may be repaired by installing helicoil inserts as described below. If helicoil inserts (Z, fig. 7; Y fig. 8) have been installed during previous overhauls, they are considered to be in good condition if screws can be installed by hand with no apparent binding and if insert remains properly seated when screws are removed. Damaged inserts are replaced as follows:

(1) Insert blade of extractor 7751050 into the center of the insert, turn the tool and insert counterclockwise, and back the insert from the hole. In some cases, it may be necessary to tap the head of the tool lightly to gain a purchase on the

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insert to back it out. Do not attempt to pull the insert out with pliers as this will damage the threads of the tapped hole.

(2) Blow out the hole with compressed air and carefully run-in the helicoil finishing top to assure clean threads. Again blow out the hole to remove any metal chips.

d. Install new inserts as follows:

(1) Use inserting tool 8390016 for installing ¼–20 inserts and inserting tool 7003241 for installing No. 10–32 inserts. Withdraw the mandrel of the inserting tool beyond the recessed section of the sleeve, then slip the helicoil insert into the recess, tang forward, and advance the mandrel until its slot engages the tang of the insert. Press forward slightly on the handle of the mandrel and turn it clockwise to engage the insert in the threaded end of the sleeve. Hold the sleeve and continue turning the handle of the mandrel until the tang of the insert is just clear of the sleeve.

(2) Start the insert into the tapped hole by turning the entire inserting tool over the hole until the first coil of the insert engages the first thread of the hole. Hold the sleeve stationary and turn the insert in with the mandrel by rotating the handle clockwise until the last coil of the insert has entered about one half turn into the top thread of the hole. With the insert fully seated, rotate the handle of the mandrel sharply one half turn counterclockwise to break off the tang and imbed the end of the coil into the wall of the hole.

29. Housing Assembly

a. Check the housing assembly (G, figs. 7 and 8) for cracks, damaged or worn threads, nicks or burs, or mounting and mating surfaces.

b. Inspect the pole shoe laminations for any damage.

c. Nicks or burs, if not of extreme nature, may be removed with fine file or stone. Cracks or damaged pole shoe laminations are cause for replacement of the housing assembly.

d. Inspect the helicoil inserts, if previously installed as in 28*c* above. Repair damaged threads by installing helicoil inserts as described in paragraph 28*c*(1).

e. If, during disassembly, there was evidence of oil inside the housing assembly, or the leather sealing member of the oil seal (F, fig. 7) is stiff and hard, drive the oil seal out with a slender punch. Install new oil seal during assembly procedures (par. 40).

f. Coat the inner surface of the bushing-type bearing (QQ, figs. 7 and 8) with SAE 30 engine oil. Also coat the magnet (GG, fig. 7; JJ fig. 8) with SAE 30 engine oil and insert the magnet shaft into the bearing and check for side play. If any side play is evident, check the inside diameter of the bearing using gage 7950069 or 7950467. First wipe the oil from the inside of the bearing then insert the "NO GO" end of the gage (fig. 15) into the bearing at several points. If the gage will go into the bearing at any point, the bearing is worn beyond acceptable limits specified in repair and rebuild standards (par. 56).

g. If the bushing meets requirements of *f* above, then check it further for proper lubrication. Heat the housing at 300°F for no longer than 5 minutes. If oil is now visible on the bushing, it requires no further lubrication. If no oil appears, the bushing should be impregnated as follows:

(1) Place a cork tightly into the end of the bearing inside the housing. Fill the bearing with SAE 30 engine oil.

CAUTION: If the oil seal is still in the housing, it must be coated with oil to protect it from the heat of the oven.

(2) Place the housing in an oven at 200°F for 45 minutes.

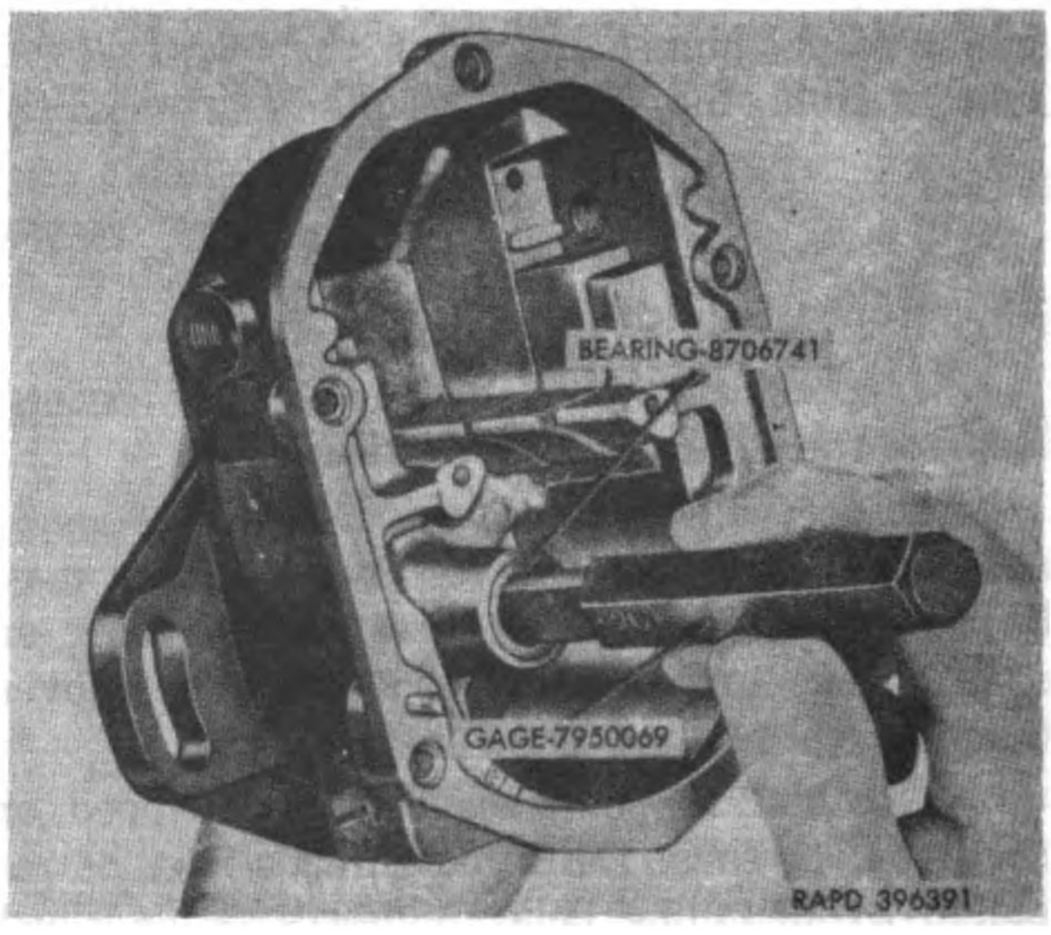

Figure 15. Checking bushing-type bearing.

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(3) After the 45 minutes has elapsed, remove the housing from the oven and let it cool to room temperature.

(4) Remove the cork and drain out any excess oil. Also wipe the housing clean of any oil that may have spilled on it.

h. Bushings worn beyond limits (par. 56) should be replaced as follows:

(1) Support the housing in an arbor press and press out the bushing with remover and replacer 7059093 (fig. 14).

NOTE: Before removing the bushing, it is necessary to first remove oil seal (F, fig. 7) and ball bearing (E, fig. 7).

(2) Press new bearing (QQ, figs. 7 and 8) into the housing (G, figs. 7 and 8), making sure the bearing is started squarely into the housing before pressing it into place. Use remover and replacer 7059093 (fig. 14) to press the bearing into the housing.

30. Magnet (GG, fig. 7; JJ, fig. 8)

a. Inspect the magnet for and remove any metal chips or other foreign material that may have adhered to it.

b. Check the pole pieces and shaft for scoring or other damage. Replace the magnet if there is any apparent damage.

c. Measure the shaft of the magnet at the points indicated in figure 27, for the values listed in repair and rebuild standards (par. 56).

d. If magnet is otherwise satisfactory, it should be recharged before being assembled into the housing assembly.

(1) Place the magnet in a magnet charger with an adapter set designed to fit this magnet.

(2) Close the charger switch for a period of 1-second and then open switch. Repeat this operation 3 times to properly charge the magnet.

(3) Remove magnet from charger. Lay the magnet on a clean cloth away from any metal or foreign objects which might adhere to it. Using compass 6605–18–C–1598, check to see if the magnet is properly charged. If the magnet pole containing the timing mark repels the north-seeking end of the compass needle, then the magnet has been properly charged.

(4) Wrap magnet in a clean cloth until ready to assemble into the housing.

31. Distributor Block (T)

a. Check the surfaces of the distributor block for cracks or carbon tracking. Using a knife or similar tool, carefully scrape off all carbon tracks.

b. Inspect the electrodes for excessive wear or erosion; the carbon contact button for wear or cracks and the ground spring for looseness. Replace the distributor block if any of the above are evident.

c. Inspect the high tension cable contact springs (AA figs. 7 and 8). If springs are worn, broken, or otherwise distorted, pull them from the distributor block recesses with needle nosed pliers. Using replacer 7950468 (fig. 16), install new springs. Place the spring, large end first, into the tapered end of the tool. Seat the guide in the cavity of the distributor block and push the spring into place with the plunger.

d. Wax-treat the distributor block as follows:

(1) Place the distributor block in an oven heated to 130° to 150°F for about half of an hour to evaporate all traces of the cleaning solvent and to thoroughly warm the part.

(2) Blend a mixture of 40 percent moisture and fungus-resistant insulating wax and 60 percent carbon tetrachloride. Melt the wax in a suitable container (at 170°F) and slowly stir in the carbon tetrachloride.

(3) Remove the distributor block from the oven and using small brush, apply light even coating of wax over the entire surface of the dielectric material.

(4) Again place the distributor block in an oven set at 160° to 170°F for 2 hours to evaporate the solvents in the wax.

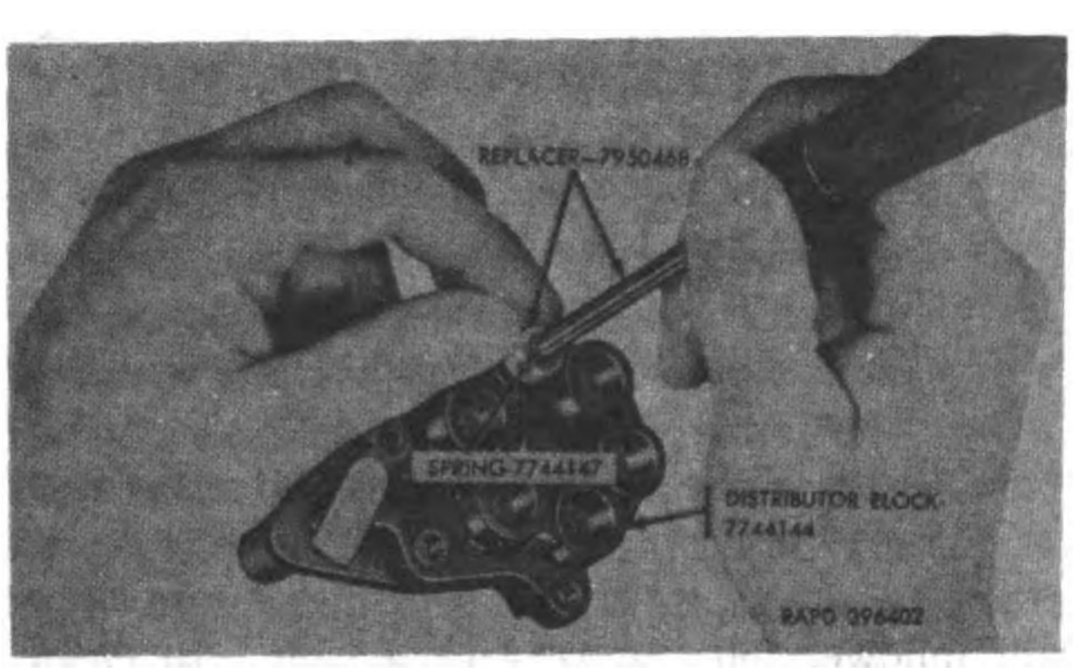

Figure 16. Replacing high tension springs.

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Remove from oven and drain the wax compound out of all cavities.

(5) Wipe the wax from the ends of the springs with a soft cloth. Also wipe the wax from the carbon brush, the electrodes, and the ground spring.

(6) Wrap the distributor block in a clean cloth to protect until ready to assemble into the cover assembly.

32. Cam (FF, fig. 7; HH, fig. 8)

a. Inspect the cam for any grooves or irregularities on the lobe surfaces.

b. Replace the cam if there is any damage.

33. Distributor Finger

a. Inspect the distributor finger (EE, fig 7; GG, fig. 8) for cracks or excess wear. Replace the distributor finger if there is any apparent damage or wear.

b. Measure the electrode (XX, fig. 7; EE, fig. 8) for the limits specified in repair and rebuild standards (par. 56). If it is worn beyond limits, replace.

c. Inspect spring (DD, fig. 7; FF, fig. 8) for distortion or erosion and replace it if damaged in any way.

34. Breaker Assembly

a. Inspect the surfaces of the contact points for wear. Points in good condition will have a gray frosted appearance. If any well defined mounds or pits are found on the points, replace the complete breaker assembly (RR, fig. 7; UU, fig. 8).

NOTE: Do not attempt to redress the points or disassemble the breaker assembly.

b. Check the tension of the breaker spring (fig. 17) with a spring scale gage. Place the end of the scale hook under the end of the spring adjacent to the contact point. The tension should be between 12 and 24 ounces at the instant the points open. Replace the breaker assembly if spring tension is out of limits.

c. Check the cam follower felt to make sure it is securely fastened to the spring. Replace the breaker assembly if the felt is loose.

d. Breaker assemblies which are otherwise satisfactory must have the cam follower felt lubricated. Using SAE 50 engine oil, saturate the cam follower felt. Squeeze excess oil into clean cloth, then scrape the felt with the thumb. If oil appears on the thumb nail, the felt is properly lubricated.

e. Wipe off all oil from the metal parts of the breaker assembly. Exercise particular care to see no oil is left on the point surfaces.

35. Coil (M, figs. 7 and 8)

a. Inspect the coil terminals to see that they are securely fastened to the cables and the cables are not frayed or broken. Also check the coil core laminations for any damage or separations. The coil must be replaced if any of the above conditions are apparent.

b. Measure the resistance of the coil winding by connecting 1-ohmmeter lead to the high tension spring contact and the other to the primary cable terminal of the coil. The resistance must be from 8,000 to 11,000 ohms. Check continuity of the primary winding by connecting 1-ohmmeter lead to the primary cable terminal and the other to the ground cable terminal. A reading of less than 1 ohm is satisfactory. Replace the coil if it does not meet these requirements.

36. Capacitor (K, figs. 7 and 8)

a. Inspect the terminal to see that it is securely fastened to the cable and that the cable is not broken or cracked. Also check the capacitor housing and mounting clamp (J, figs. 7 and 8) for any damage. Replace the capacitor and/or mounting clamp if any of the above is apparent.

b. Measure the capacitance of the capacitor. It must be between 0.20 and 0.28 uf. Replace the capacitor if not to these requirements.

37. Ball Bearing (E, fig. 7; F, fig. 8)

a. Check the ball bearing for roughness or sticking by holding the inner race with the fingers

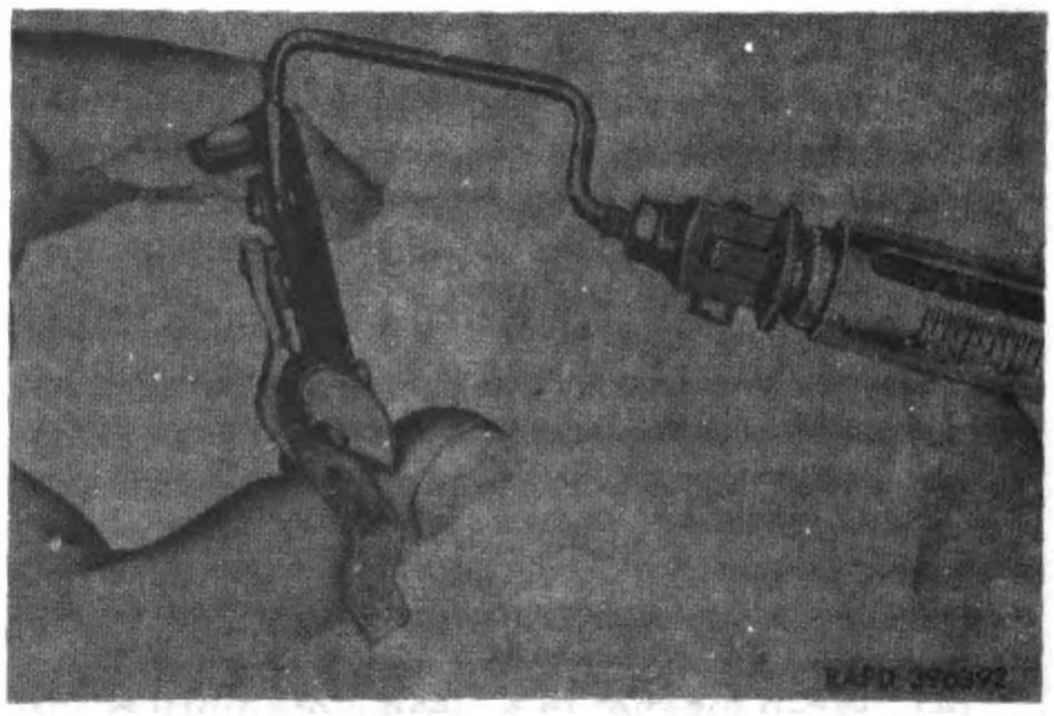

Figure 17. Measuring breaker spring tension.

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and turn the outer race. Replace the bearing if roughness or sticking is evident.

b. Refer to TM 37-265 for additional data covering bearing maintenance.

38. Inspect All Remaining Parts

a. *S6LN-32* (fig. 7).

(1) Inspect the nut (A), washer (B), coupling (PP), oil slinger (C), bearing retainer (D), plugs (MM), wedges (N), clip (S), washer (V), ground terminal bushing (X), and all securing screws and washers.

(2) Replace any or all of the items above if there is any apparent damage.

b. *S4LN-32* (fig. 8).

(1) Inspect the nut (TT), coupling (SS), flange (C), bushing (QQ), oil slinger (D), bearing retainer (E), plugs (NN), wedges (N), terminal (S), washer (V), ground terminal bushing (X), and all securing screws and washers.

(2) Replace any or all of the above if there is any apparent damage.

Section IV. ASSEMBLY

39. Install Bushing-Type Bearing

a. If bushing-type bearing (QQ, figs. 7 and 8) was removed, replace.

b. Support the housing (G, figs. 7 and 8) in an arbor press. Start the bearing into the housing, making sure it is square and then press it into the housing with remover and replacer 7059093.

40. Install Oil Seal

a. If oil seal (F, fig. 7) was removed, replace.

NOTE: No attempt should be made to install the old oil seal.

b. Coat the recess in housing (G, figs. 7 and 8) which accommodates the oil with ball and roller bearing grease. Also apply liberal coating of SAE 30 engine oil to the oil seal.

c. Support housing in an arbor press. Place the oil seal in the housing with the sealing member toward the drive end of the magneto and press into place with replacer 7950075 (fig. 18).

41. Install Ball Bearing

a. Coat the ball bearing (E, fig. 7; F, fig. 8) with general purpose grease.

b. Push the ball bearing into the housing recess with the fingers, making sure it is started squarely into the recess before seating.

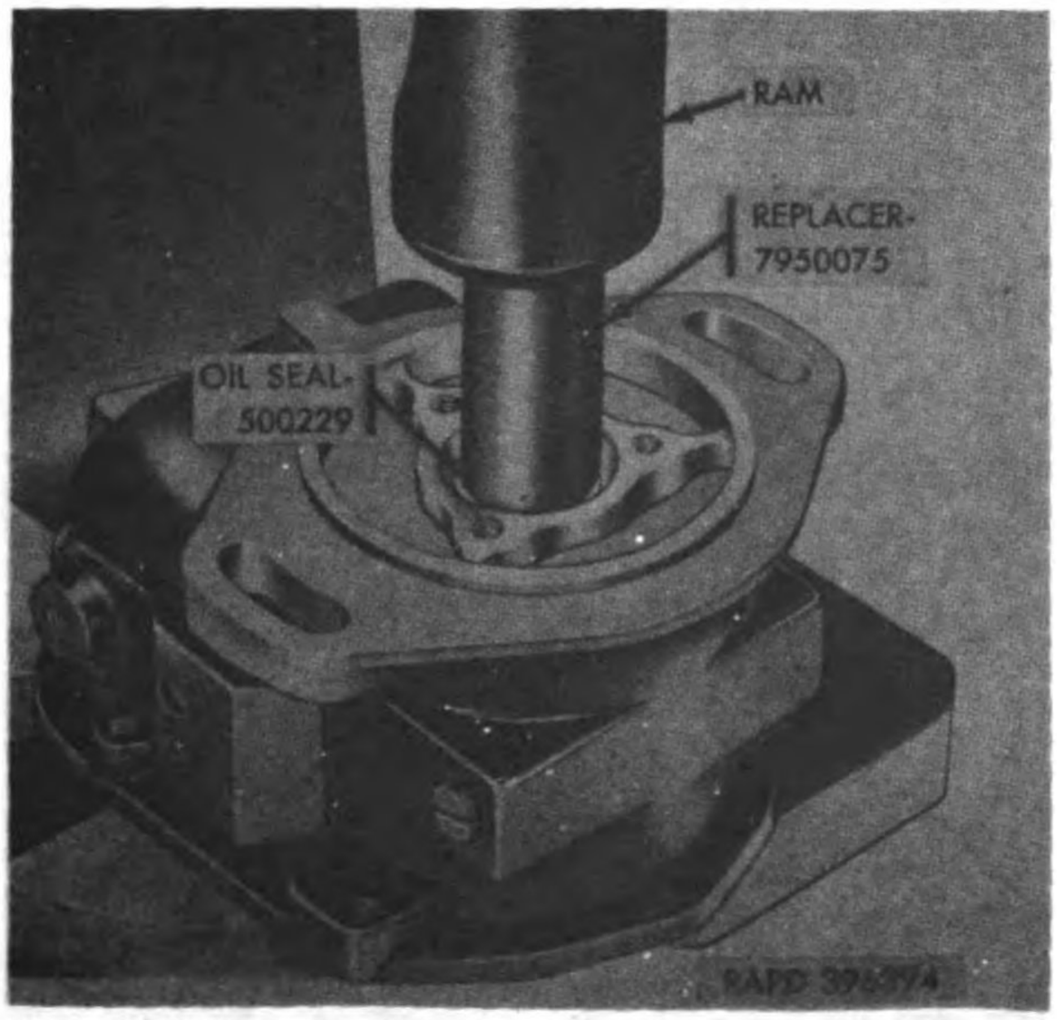

Figure 18. Installing oil seal.

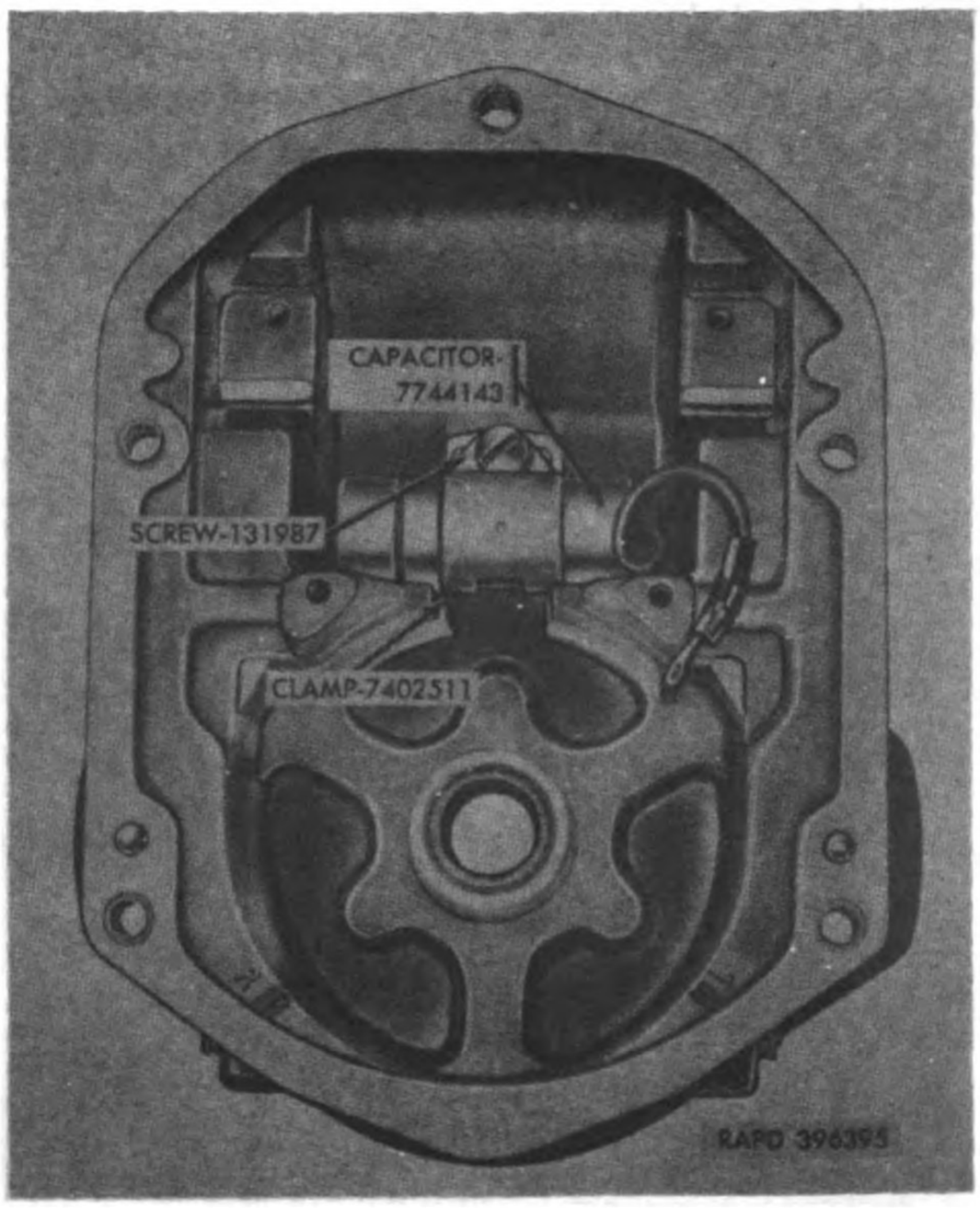

Figure 19. Correct position of capacitor.

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42. Install Capacitor

a. Position capacitor (K, figs. 7 and 8) in mounting clamp (J, figs. 7 and 8) and install capacitor and mounting clamp (fig. 19) in housing (G, figs. 7 and 8).

b. Secure bracket to housing with No. 10 fillister-head screw (L, figs. 7 and 8).

43. Install Coil

a. Position coil (M, figs. 7 and 8) in housing (G, figs. 7 and 8) with the rounded end of the high tension contact (fig. 20) pointing towards the bushing-type bearing (QQ, figs. 7 and 8). Bring the capacitor cable out between the coil and bushing-type bearing.

b. Make sure the coil is seated squarely on the housing pole shoes and secure with wedges (N) and fillister-head screws (P).

NOTE: Be sure the wedges are placed in position so the slanted surface of the wedge contacts the internal surface of the housing.

44. Install Magnet

a. Coat bronze bearing (QQ, figs. 7 and 8) and magnet shaft (GG, fig. 7; JJ, fig. 8) with SAE 30 engine oil. Also apply light film of SAE 30 engine oil to magnet pole pieces and laminated pole shoes of the housing.

b. Support housing (G, figs. 7 and 8) in an arbor press and press the magnet into the housing (fig. 21).

45. Install Oil Slinger and Drive Coupling

a. *Type S6LN-32* (fig. 7).

(1) Place the oil slinger (C) down on the magnet shaft so the well fits into the ball bearing retainer hole and insert the Woodruff key (HH).

(2) Aline the keyway of drive coupling (PP) with the Woodruff key and slide the coupling onto the shaft. Secure with lockwasher (B) and hexagon nut (A). Hold the drive coupling with spline wrench 7950068 (fig. 10) and tighten nut.

b. *Type S4LN-32* (fig. 8).

(1) Place the oil slinger (D) on the shaft so the well fits into the ball bearing retainer hole and slide the plain bushing bearing (QQ) down over the shaft.

(2) Place gasket (RR) on housing and secure flange (C) with screws (B).

(3) Assemble drive coupling (SS) on shaft and secure with nut (TT). Hold drive coupling (SS) with spline wrench 7950068 (fig. 10) and tighten nut to 25 to 35 pound-inch. Lock nut with cotter pin (A).

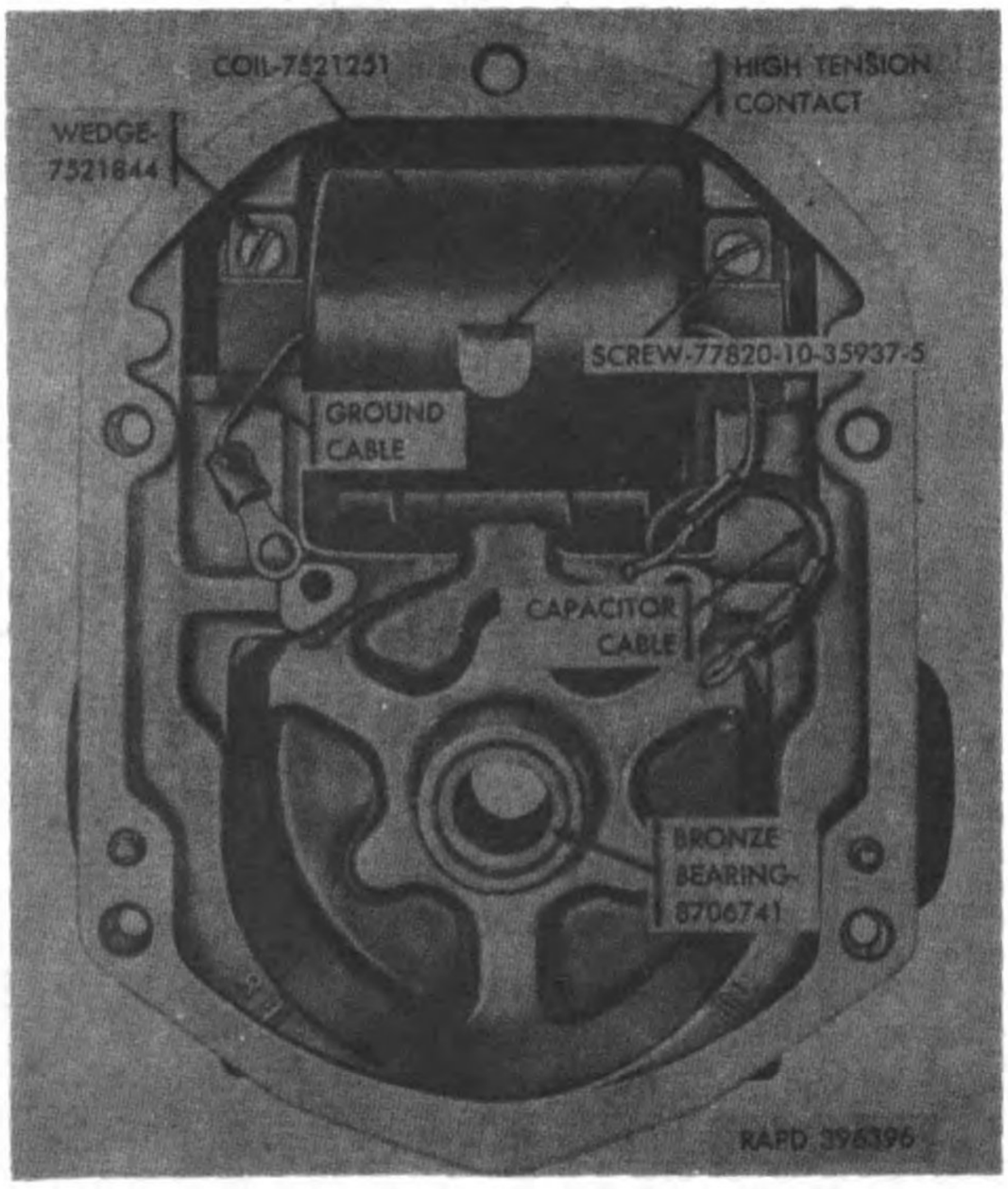

Figure 20. Correct position of coil.

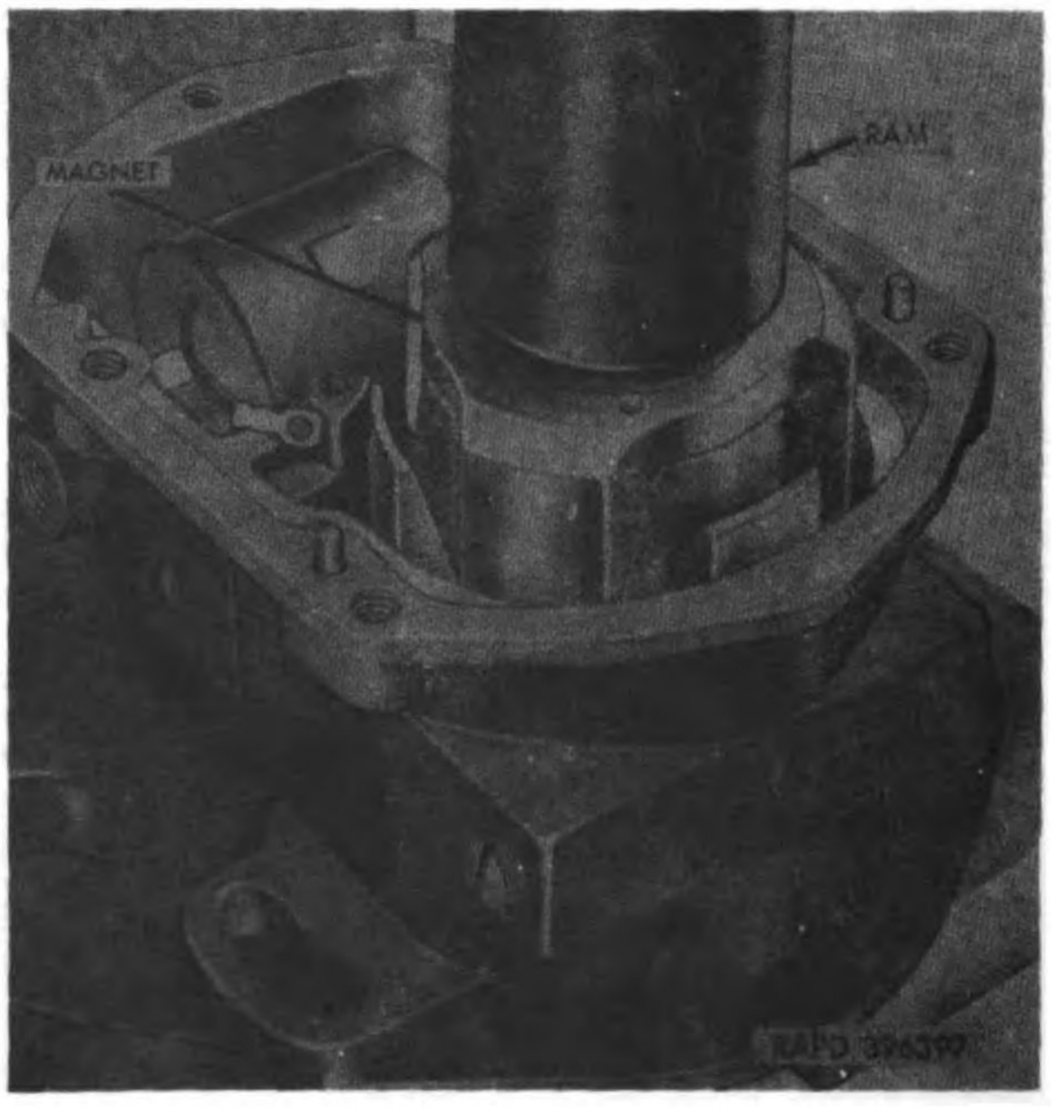

Figure 21. Pressing magnet into housing.

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46. Install Breaker Assembly

a. Position the breaker assembly (RR, fig. 7; UU, fig. 8) in the housing and secure slotted end of the breaker assembly (fig. 22) and coil ground cable in place with screw (TT, fig. 7; WW, fig. 8) and plain washer (SS, fig. 7; VV, fig. 8).

b. Secure the opposite end of the breaker assembly with screw (TT, fig. 7; WW, fig. 8).

c. Fold the cam follower felt and bend clip (S, fig. 7) to hold the felt.

d. Connect the capacitor and cojl primary cables to the breaker assembly with screw (R, figs, 7 and 8) and lockwasher (Q, figs. 7 and 8). Make sure the capacitor terminal is nearest the screw head.

CAUTION: Care must be exercised to prevent the above terminals from contacting the breaker support as this will short circuit the primary winding.

47. Assemble Distributor Finger

a. Type S6LN–32 (fig. 7).

(1) If electrode (XX) and spring (DD) were removed, install new ones in the distributor finger (fig. 23) slot with the arrow pointing in a clockwise direction.

(2) Place the electrode so the curved end faces toward the rim of the finger and

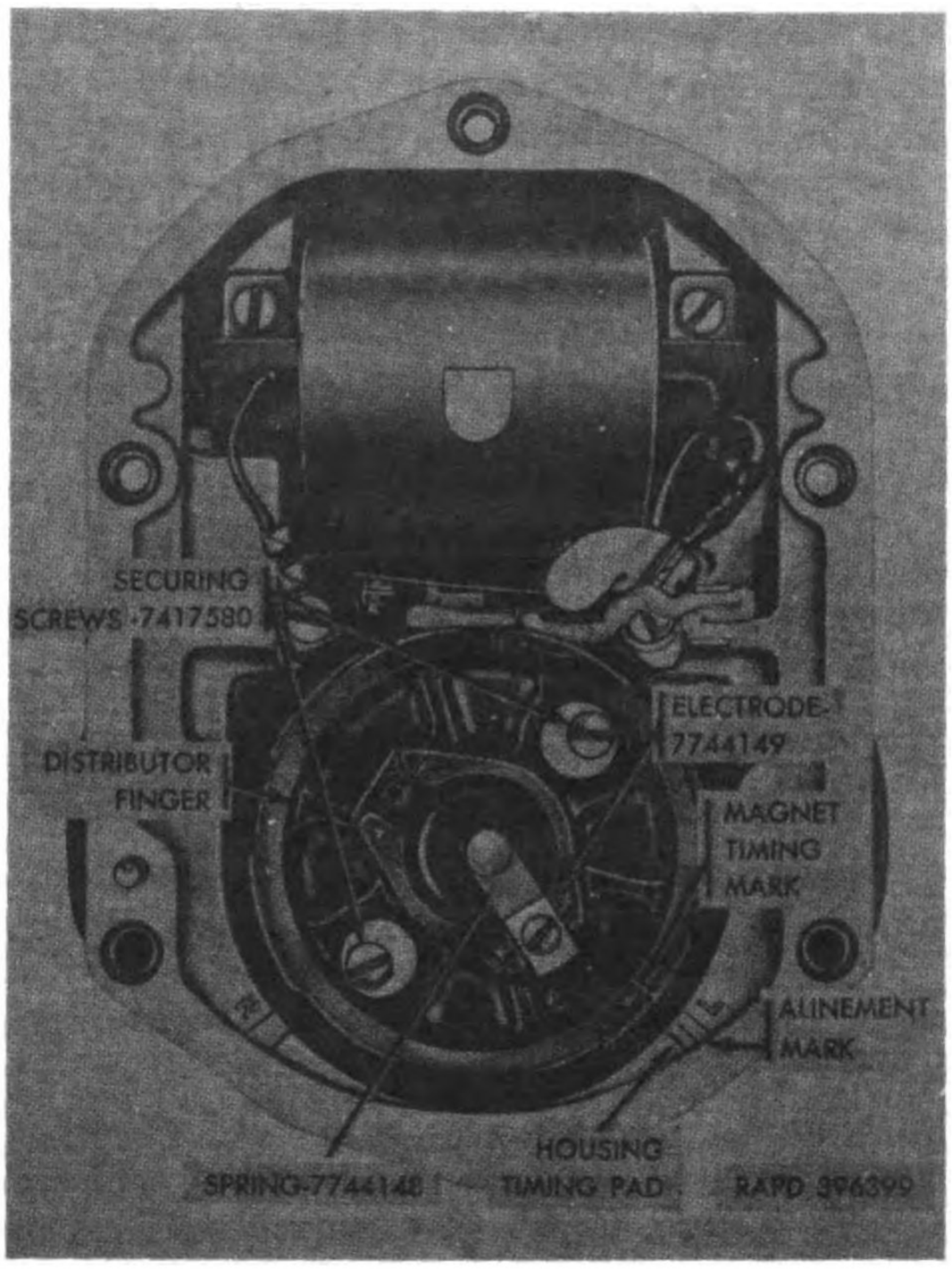

Figure 23. Correct position of distributor finger—type S6LN–32.

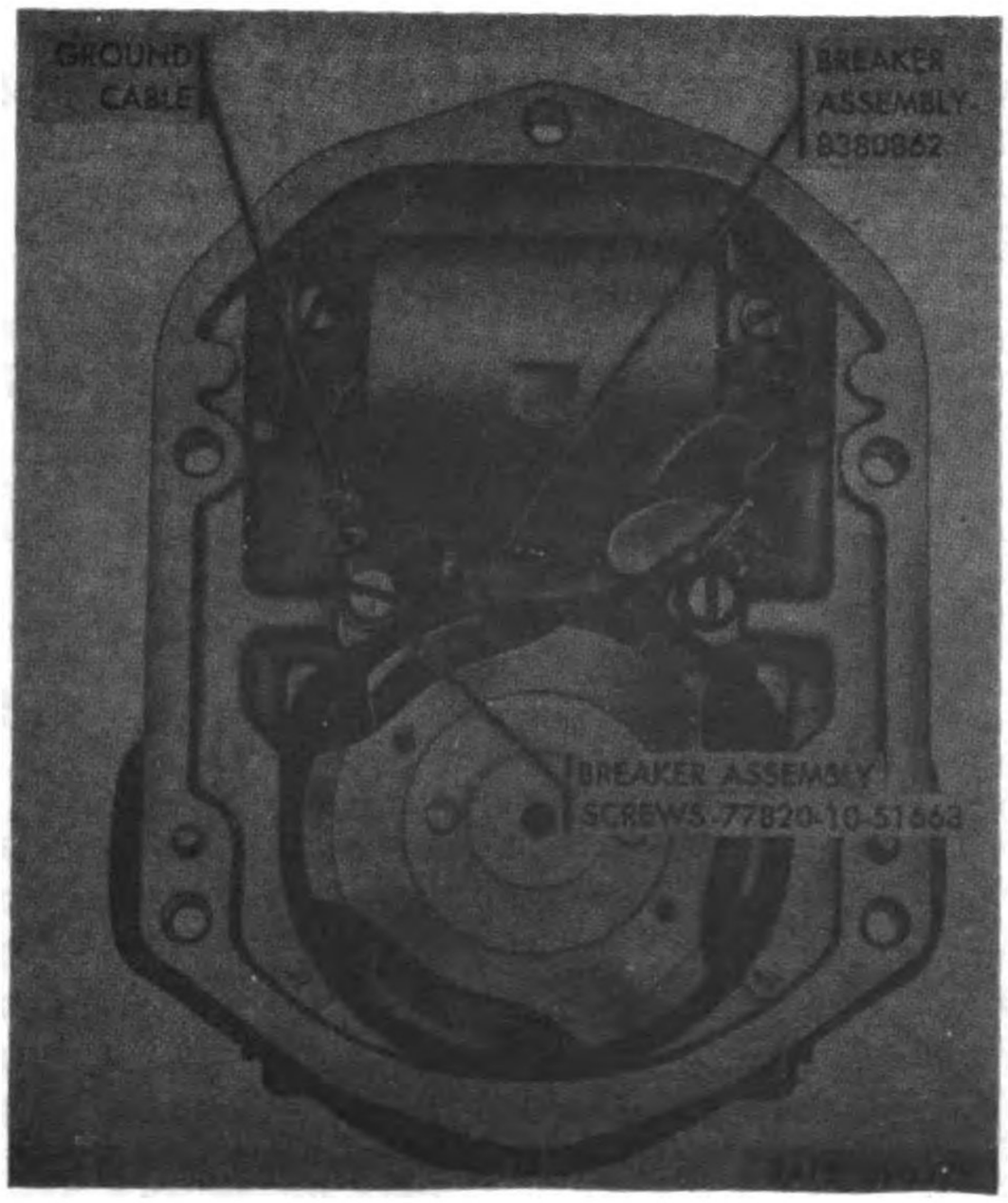

Figure 22. Correct position of breaker assembly.

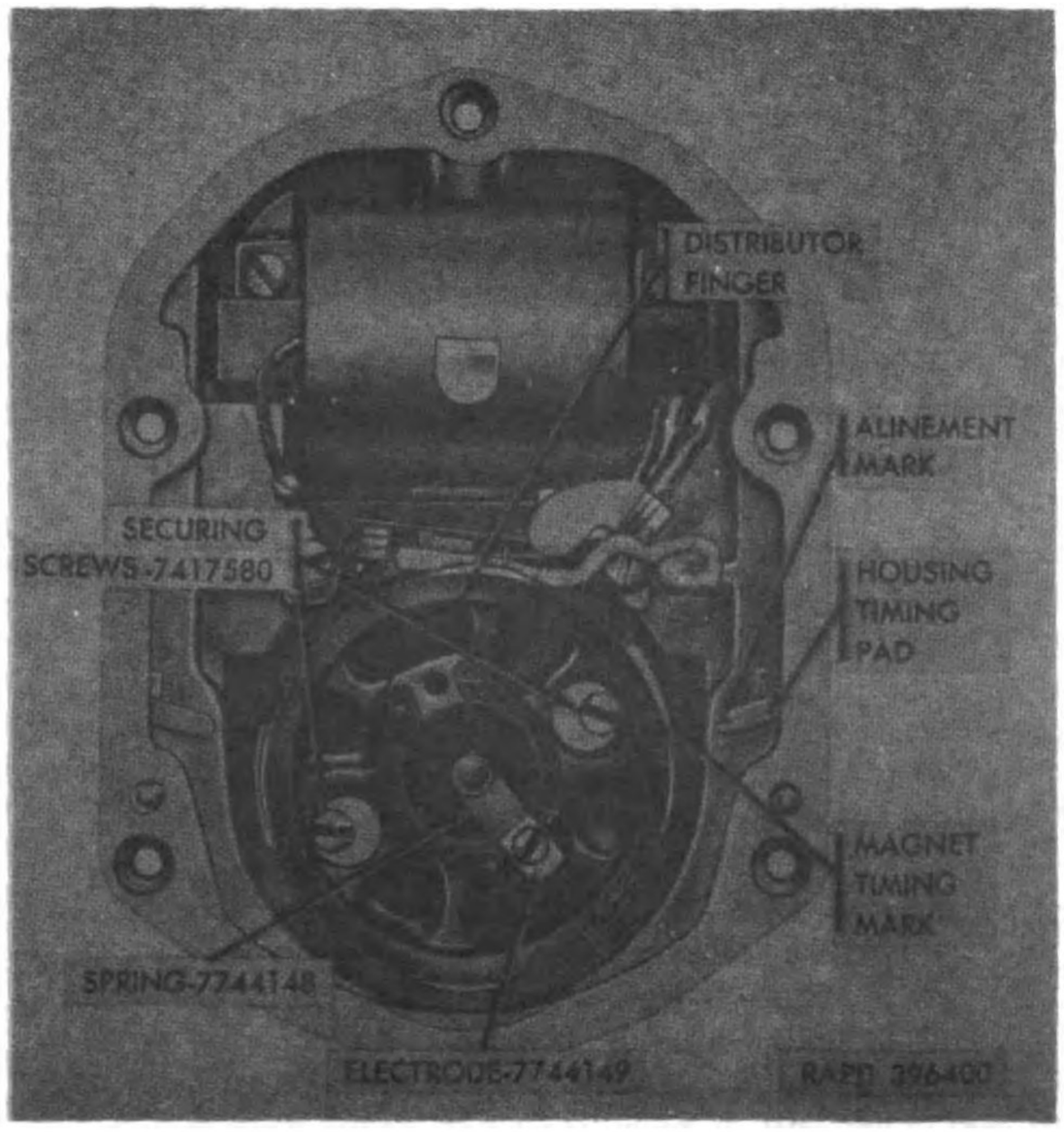

Figure 24. Correct position of distributor finger—type S4LN–32.

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secure the electrode and spring with screw (WW).

b. *Type S4LN–32* (fig. 8).

(1) If electrode (EE) and spring (FF) were removed, install new ones in the distributor finger (fig. 24) slot with the arrow pointing in a counterclockwise direction.

(2) Place the electrode so the curved end faces the rim of the finger and secure the spring and electrode with screw (DD).

48. Install Breaker Cam and Distributor Finger

NOTE: If magnet being repaired contained the earlier type 1-piece distributor finger and cam, it should be modified to incorporate the newer steel cam and molded distributor finger.

a. *Type S6LN–32* (fig. 7).

(1) Place the distributor finger (EE) inside the breaker cam (FF) so the bosses on the back of the finger engage the slots in the cam.

(2) Place the cam and distributor finger on the rotating magnet assembly (GG) so the arrow on the distributor finger is alined with the timing mark on the magnet (fig. 23). Secure the distributor finger and cam to the magnet with two screws (VV), lockwashers (ZZ), and special washers (YY). Torque screws to 12 to 15 pound-inch.

b. *Type S4LN–32* (fig. 8).

(1) Place the distributor finger (GG) inside the breaker cam (HH) so the bosses on the back of the distributor finger engage the slots in the cam.

(2) Place the cam and distributor finger on the magnet (JJ) so the arrow on the distributor finger is alined with the timing mark on the magnet (fig. 24). Secure the distributor finger and cam to the magnet with two screws (YY), lockwashers (ZZ), and special washers (AB). Torque the screws to 12 to 15 pound-inch.

49. Check Magneto Timing

NOTE: If the same magnet and housing are being reused, time the magneto, as described in *a* through *d* below. If a new housing and/or magnet is/are being used, time the magneto (par. 50).

a. Connect a timing light across the breaker assembly points.

b. Turn the magnet in the direction of normal rotation until the timing mark (figs. 23 or 24) is alined with the scribed mark on the housing timing pad (figs. 23 or 24).

c. When the two marks are alined, the contact points should be just opening and the timing light should go out.

d. In the event this does not occur, loosen the breaker assembly securing screws (fig. 22) and adjust the breaker assembly until the contact points are just opening when the timing marks are alined.

50. Timing Magneto-New Housing and/or Magnet

a. Remove the coupling nut, lockwasher, and coupling from the shaft. Place protractor 7059111 (type S6LN–32 magneto) or protractor 7059114 (type S4LN–32 magneto) on the shaft and assemble pointer 7079908 (fig. 25) to the housing.

b. Connect a timing light across the breaker assembly points.

c. Rotate the magnet to neutral position (that position where 1-pole piece of the magnet is centered between the pole shoes of the housing). Turn the magnet, in the normal direction of rotation, 11 degrees + 2 degrees as measured on the protractor. Loosen the two breaker securing screws and shift the breaker assembly until the breaker points are just opening as determined by the timing light. Tighten the breaker assembly securing screws and recheck to see that the 11 degrees + 2 degrees has been properly established.

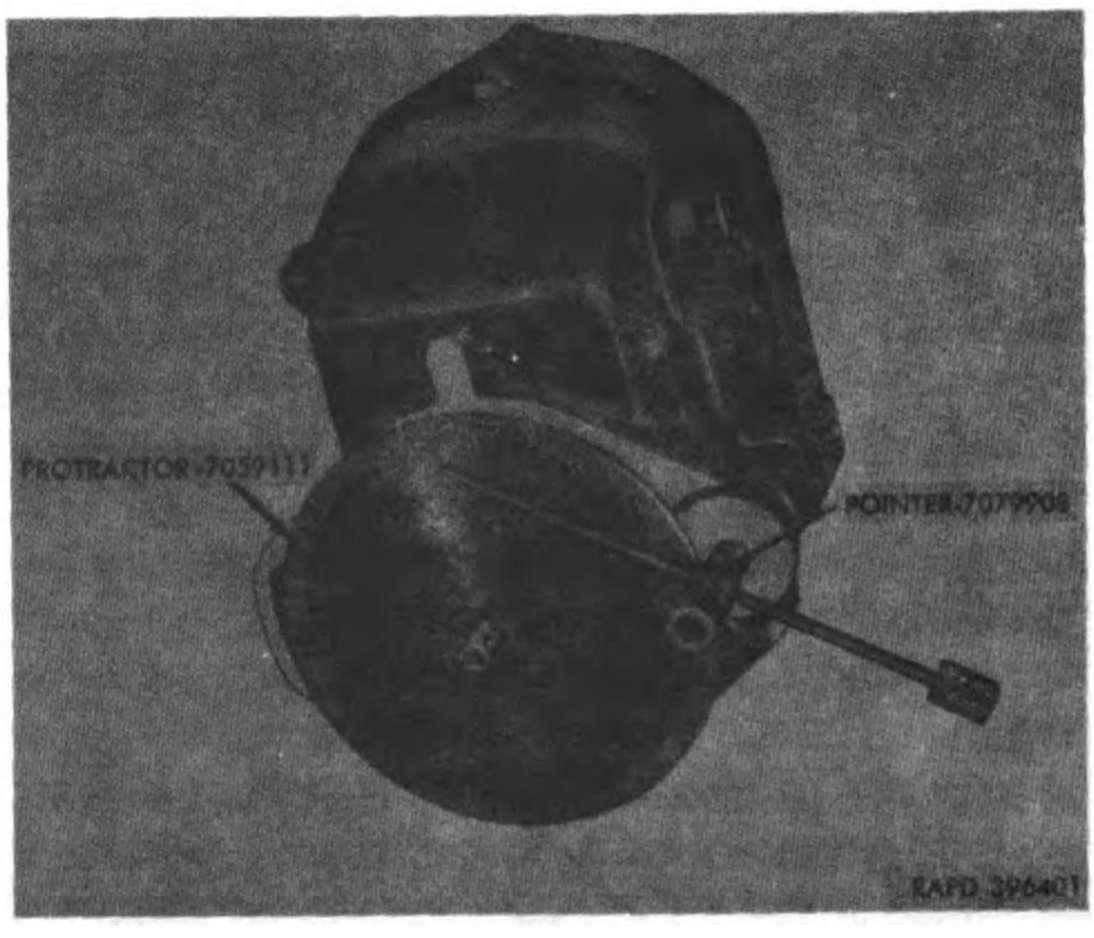

Figure 25. Timing magneto.

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d. When the breaker assembly point opening has been properly set, hold the magnet in position and scribe a mark on the timing pad of the magneto housing. If a new magnet has been installed and the timing marks do not aline, remove the original one from the housing and scribe a new one in its correct position.

51. Install Ground-Terminal Bushing

a. Place new washer (V) on ground terminal bushing (X, figs. 7 and 8). Coat threads of the bushing with plastic-type gasket cement and assemble bushing to the housing.

b. Tighten to a torque of 20 to 22 pound-feet.

52. Test Magnet Strength

a. Mount the magneto, without cover, on a tester (magneto and distributor tester 17–T–5545 or equal) having a speed range of at least 50 to 2,500 rpm. Disconnect the primary coil cable from the breaker assembly. Connect one lead of an ammeter to the housing and the other lead to the primary coil cable.

b. Start the magneto and bring the speed up to 400 rpm. The primary current as read on the ammeter should not be less than 1.5 amperes. If the reading is less than 1.5 amperes, install new coil (par. 43). If this does not correct the reading, recharge the magnet (par. 30*d*).

53. Install Distributor Block (figs. 7 and 8)

a. Position the distributor block (T) in cover (U) (fig. 26).

b. Secure the distributor block and with lockwasher screws (CC) and plain washers (BB). Torque screws to 15 to 20 pound-inch.

NOTE: If cover which was removed from the magneto contained the cam oiler, a new cover without the cam oiler should be used at assembly.

54. Install Cover (figs. 7 and 8)

a. Coat both sides of cover gasket (H) with insulating and sealing compound (electrical connections) and place in position on the housing (G). Set cover (U) in position on housing so the two dowel pins engage the holes in the cover.

NOTE: Use care to prevent the distributor finger contact spring from damaging the high tension center electrode of the distributor block.

b. Secure cover to housing with the five hexagon-head slotted screws (W). Tighten screws to torque of 70 to 80 pound-inch.

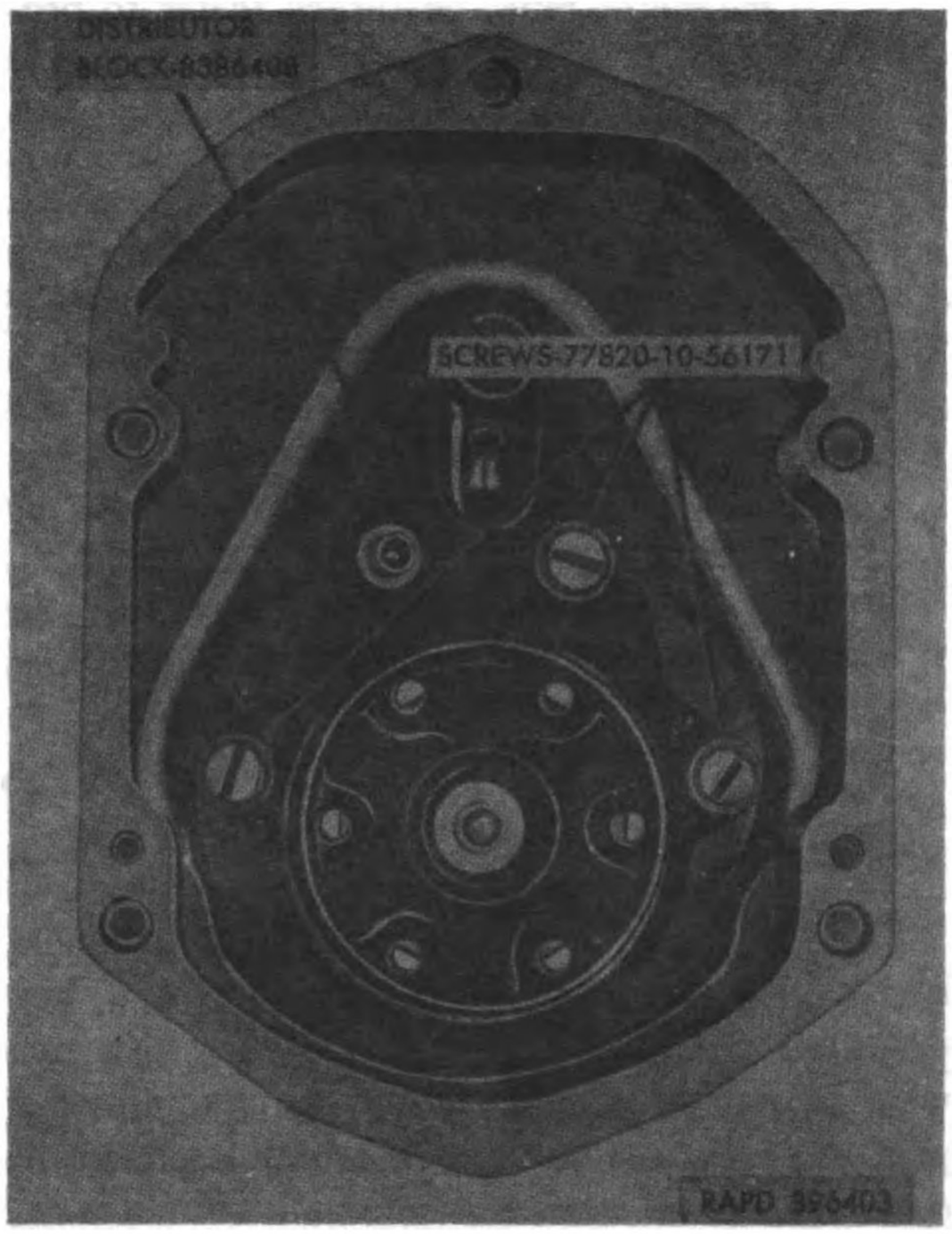

Figure 26. Correct location of distributor block.

Section V. TEST AND ADJUSTMENT

55. Test

a. General. The tests described herein are made after the magneto is completely assembled. If a defective part is found during the test and the part must be replaced, the magneto must be disassembled as far as necessary to replace the faulty part. The magneto must then be completely assembled and installed on the test stand.

b. Operational Test.

(1) *Mount magneto on test stand.* Mount the magneto on a test stand providing a speed range of 50 to 2,500 rpm (magneto and distributor tester 17–T–5545 or equivalent). The gap panel must have standard 5-mm, 3 point spark gaps. Install spark plug cable grommet and retaining plate on S6LN–32 magnetos. Connect the spark plug cables to the test panel spark gaps. Due to the automatic safety ground spring on these magnetos, a ground terminal insulating sleeve and

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coupling nut, as provided on the engine, must be installed in the ground terminal bushing.

(2) *Mechanical performance test.* Run the magneto at various speeds for a few minutes to observe the mechanical performance.

(3) *"Coming-in" speed test.* The "coming-in" speed of a magneto is the lowest speed at which the unit can be turned without missing on any of the spark gaps. The magnetos should spark consistently at 200 rpm with a 5-mm spark gap. If the magnetos must be turned faster to produce constant sparking, recheck the contact point clearance (par. 48). If this is satisfactory, clean the electrode surfaces of the distributor. If the "coming-in" speed is still too high, it may be caused by excessive distributor finger electrode clearance (par. 33*b*). Install a new distributor finger electrode on the finger (par. 47*a* (2)). If this does not lower the "coming-in" speed, recharge or replace the magnet as required (par. 30*d*).

(4) *Ground spring test.* Run the magneto at 1,000 rpm and insert a grounded wire into the ground terminal bushing. Repeat this several times. No sparking should occur when the magneto is short circuited by the grounded wire. If the magneto will not ground out in this manner, install new distributor block (par. 53).

(5) *Magneto run-in test.* Run the magneto at 2,500 rpm for 5 minutes.The sparking should be constant throughout this test.

WARNING: These magnetos are sealed units designed to operate under water, and, as such, they must be suitably ventilated with the forced ventilation provided on the engine. Before starting the engine, be sure the ventilator lines are securely attached to the magneto in the position provided and in accordance with pertinent operator's manual. Note that the threaded outlets for the magneto-ventilation-line connections are tapped ⅛-27NPT to provide sealed threaded joints. Make sure all lines are clear. A plugged up ventilation line may cause excessive drying of the cam follower felt or create a high vacuum in the magneto causing carbon tracking of dielectric parts.

Section VI. REPAIR AND REBUILD STANDARDS

56. General

The repair and rebuild standards included herein give the minimum, maximum, and key clearance of new or rebuilt parts. They also give wear limits which indicate that point to which a part or parts may be worn before replacement, in order to receive maximum service with minimum replacement. Normally, all parts which have not been worn beyond the limits shown in the "Wear limits" column or damaged from corrosion will be approved for service. In the "Sizes and fits of new parts" column, the letter "L" indicates a loose fit (clearance) and the letter "T" indicates a tight fit (interference).

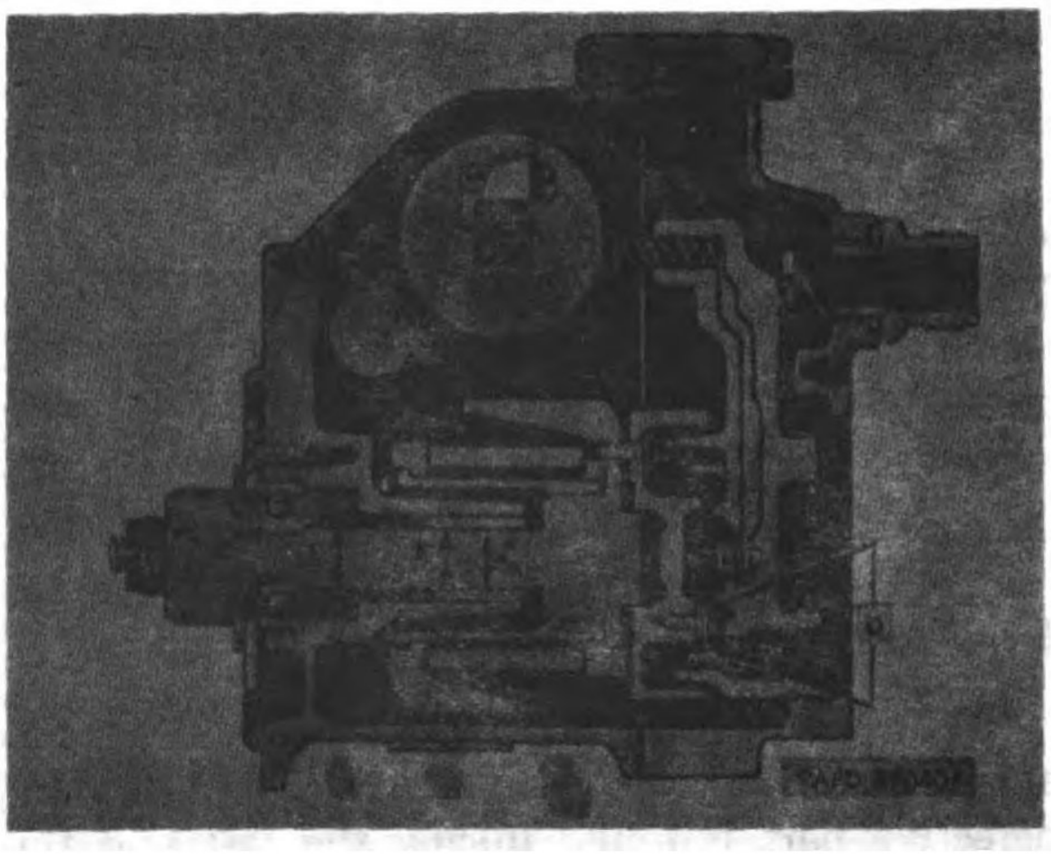

Figure 27. Repair and rebuild standards—points of measurement.

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Fig. No.	Ref. letter	Point of measurement	Sizes and fits of new parts	Field wear limits	Depot wear limits
27	A	Inside diameter of bronze bearing:			
		(type S6LN–32)	0.5150 to 0.5155	0.5162	0.5175
		(type S4LN–32)	0.5925 to 0.5929	0.5936	0.5959
	B	Magnet shaft diameter:			
		(type S6LN–32)	0.5138 to 0.5143	0.5137	0.5118
		(type S4LN–32)	0.5914 to 0.5918	0.5913	0.5912
	A—B	Fit of shaft in bearing		0.002L	0.005L
	C	Magnet shaft diamater inside oil seal:			
		(type S6LN–32)	0.5138 to 0.5143	0.5137	
	D	Length of distributor finger electrode	0.334 to 0.344	—	0.313
	E	Breaker assembly spring tension	12 to 24 ounce		12 to 24 ounce

57. Magneto Torque Wrench Specifications

Fig. No.	Ref. letter	Location	Torque (lb-ft)	Torque (lb-in.)
7	NN	Breaker assembly screws		10–15
8	PP	Breaker assembly screws		10–15
7, 8	P	Coil wedge screws		13–17
7, 8	L	Capacitor screws		25–30
7, 8	CC	Distributor block screws		15–20
7	DD	Distributor finger screws		12–15
8	WW	Distributor finger screws		12–15
7, 8	W	Magneto cover screws		70–80
7, 8	X	Ground terminal bushing	20–22	
7, 8	A, TT	Drive coupling nut	15–20	

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APPENDIX
REFERENCES

1. Publication Indexes

The following indexes should be consulted frequently for latest changes or revisions of references given in this appendix and for new publications relating to materiel covered in this technical manual.

Index of Army Motion Pictures, Film Strips, Slides and Phono-Recordings	DA Pam 108–1
Military Publications;	
Index of Administrative Publications	DA Pam 310–1
Index of Blank Forms	DA Pam 310–2
Index of Graphic Training Aids and Devices	DA Pam 310–5
Index of Supply Manuals—Ordnance Corps	DA Pam 310–29
Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.	DA Pam 310–4
Index of Training Publications	DA Pam 310–3

2. Supply Manuals

The following Department of the Army Supply Manuals pertain to this materiel:

a. Repair and Rebuild.

TOOL KIT: Field Maintenance, Motor Vehicle Assembly Company (5180–754–0703)	ORD 6, SNL, J–8, Sec. 7
SHOP SETS: Headquarters and Service Company Depot Maintenance, Automotive or Armament.	ORD 6, SNL, J–9, Sec. 2
SHOP SETS: Engine Rebuild Company (Automotive), Depot Maintenance	ORD 6, SNL, J–9, Sec. 3
TOOL SET: 4th and 5th echelon (for Magneto Repair; Bosch, Scintilla, and Eiseman Models)	ORD 6, SNL, J–16, Sec. 3
TOOL SETS: Field and Depot Maintenance Tool Kits for engines, Continental Series AO–895 and AV–1790.	SM 9–4–5180–J–16, Sec. 44
SHOP SETS: Field Maintenance, Auto Fuel, and Electrical System	SM 9–4–4910–J8–12
SHOP SETS: Field Maintenance, Automotive	SM 9–4–4910–J8–13
SHOP SET: Depot Maintenance, Engine and Power Train Rebuild Company (Armament)	SM 9–4–4910–J9–22
TOOL KIT: Auto Fuel and Electrical System Repairmen (MOS 634–10) (4910–754–0655)	SM 9–4–4910–J10–8
TOOL KITS: Field and Depot Maintenance for Engine, Continental Series AO-268 and AO-402	SM 9–4–5180–J16–58
Common Hand Tools	ORD 7–8 SNL J–17, Vol. 1 and 2

b. Vehicle.

Carrier, Personnel, Full Tracked, Armored, M75	ORD (*) SNL G–260
Gun, Self-Propelled, Full Tracked, Twin 40–mm, M42, and M42A1	ORD (*) SNL G–253
Gun, Self-Propelled, Full Tracked, 155–mm, M53	ORD (*) SNL G–259
Howitzer, Self-Propelled, Full Tracked, 105–mm, M52, and M52A1	ORD (*) SNL G–258
Howitzer, Self-Propelled, Full Tracked, 155–mm, M44, and M44A1	ORD (*) SNL G–279
Howitzer, Self-Propelled, Full Tracked, 8–Inch, M55	ORD (*) SNL G–259
Tank, Combat, Full Tracked, 76–mm Gun, M41, M41A1, M41A2, and M41A3	ORD (*) SNL G–251
Tank, Combat, Full Tracked, 90–mm Gun, M47	ORD (*) SNL G–262
Tank, Combat, Full Tracked, 90–mm Gun, M48, M48A1, and M48C	ORD (*) SNL G–254
Tank, Combat, Full Tracked, 90–mm Gun, M48A2	ORD (*) SNL G–287
Tank, Combat, Full Tracked, 120–mm Gun, M103, and M103A1	ORD (*) SNL G–256
Tank, Combat, Full Tracked, Flame Thrower, M67	ORD (*) SNL G–254
Tractor, Full Tracked, High Speed, M8A1 and M8A2	ORD (*) SNL G–252
Truck, Gun-Lifting, Heavy, 4 x 4, Front, M249 and Truck Gun-Lifting, Heavy, 4 x 4, Rear, M250	ORD (*) SNL G–268
Vehicle, Tank Recovery, Heavy, M51	ORD (*) SNL G–274

3. Forms

The following forms pertain to this materiel. (Refer to DA Pam 310–2 for index of blank forms.)

DA Form 5–31, Shop, Job Order Register
DA Form 9–1, Materiel Inspection Tag
DA Form 9–79, Parts Requisition
DA Form 9–80, Job Order File

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DA Form 9–81, Exchange Part of Unit Identification Tag
DA Form 460, Preventive Maintenance Roster
DA Form 462, Preventive Maintenance Service and Inspection for Full-Tracked Vehicles
DA Form 468, Unsatisfactory Equipment Report
DA Form 478, Organizational Equipment File
DA Form 811, Work Request and Job Order and Receipt (Set)
DA Form 1546, Request for Issue or Turn-In
DA Form 2028, Recommended Changes to DA Technical Manual Part List or Supply Manual 7, 8, or 9
DD Form 6, Report of Damaged or Improper Shipment

4. Other Publications

The following publications contain information pertinent to major item materiel and associated equipment.

a. General.

Authorized Abbreviations and Brevity Code	AR 320–50
Cleaning and Black Finishing of Ferrous Metals	TM 9–1861
Dictionary of United States Army Terms	AR 320–5
Inspection of Ordnance Materiel in Hands of Troops	TM 9–1100
Military Symbols	FM 21–30
Military Training	FM 21–5
Military Training Aids	FM 21–8
Military Vehicles (Ordnance Corps Responsibility)	TM 9–2800–1
Motor Transportation, Operations	FM 25–10
Motor Vehicles	AR 700–2300–1
Ordnance Maintenance and General Supply in the Field	FM 9–10
Packaging and Packing for Shipment and Storage of Spare Parts for Military Vehicle	MIL–P–11443 (ORD)
Preservation, Methods	MIL–P–116
Principles of Automotive Vehicles	TM 9–8000
Storage Batteries, Lead-Acid Type	TM 9–6140–200–15
Supplies and Equipment: Unsatisfactory Equipment Report	AR 700–38
Techniques of Military Instruction	FM 21–6

b. Operation.

Operation and Organizational Maintenance, Armored Full Tracked Personnel Carrier, M75	TM 9–7418
Operation; 90–mm Full Tracked Self-Propelled Gun, M56	TM 9–2350–213–10
Organizational Maintenance: 90–mm Full Tracked Self-Propelled Gun, M56	TM 9–2350–213–20
Operation and Organizational Maintenance: 8–Inch, Full Tracked, Self–Propelled Howitzer, M55 (T108)	TM 9–7220
Operation and Organizational Maintenance: 105–mm Full Tracked, Self-Propelled Howitzer, M52 (T98E1)	TM 9–7204
Operation and Organizational Maintenance Self-Propelled 155–mm, Howitzer, M44 (T194)	TM 9–7004
155–mm Full Tracked, Self-Propelled Gun, M53 (T97)	TM 9–7212
Operation and Organizational Maintenance: 76–mm Gun, Full Tracked, Tracked Combat Tanks, M41 (T41E1) and M41A1	TM 9–2350–201–12
90–mm Gun, Full Tracked, Combat Tanks M48, M48A1, M48C	TM 9–7012
Operation and Organizational Maintenance: 90–mm Gun, Full Tracked, Combat Tank M48A2	TM 9–7022
Operation and Organizational Maintenance: Tank, Combat, Full Tracked, 120–mm Gun, M103 (T43E1).	TM 9–2350–206–12
Operation and Organizational Maintenance: Truck, Gun-Lifting, Heavy, 4 x 4 Front, M249 and Truck, Gun-Lifting, Heavy, 4 x 4, Rear, M250.	TM 9–8006

c. Maintenance and Repair.

Engine, Gasoline, Horizontally Opposed, Air-Cooled, 4–Cylinder (Continental Model AO–268–8A).	TM 9–7605–1
Engine, Gasoline, Fuel Injected, Horizontally-Opposed, Air-Cooled, 6–Cylinder (Continental Model AOI–402–5).	TM 9–2805–210–35
Engine, Gasoline, Fuel Injected, Supercharged, Horizontally Opposed, Air-Cooled, 6–Cylinder (Continental Model AOSI–895–5).	TM 9–2805–212–35
Engine, Gasoline, Supercharged, Horizontally Opposed, Air-Cooled, 6–Cylinder (Continental Model AOS–895–3).	TM 9–1730A
Engine, Gasoline, Horizontally Opposed, Air-Cooled, 6–Cylinder (Continental Model AO–895–4)	TM 9–1755BB
Engine, Gasoline, "V" type, Fuel Injected, Supercharged and Unsupercharged, Air-Cooled, 12–Cylinder (Continental Models AVI–1790–8 and AVSI–1790–8).	TM 9–2805–206–35
12–Cylinder, Air-Cooled, Engine (Continental Model AV–1790–5A, –5B, and –7)	TM 9–7009–1

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d. Repair and Rebuild.

Expenditure Limits for Repair of Commercial-Type Vehicles	AR 750–2300–6
Expenditure Limits for Repair of Tactical-Type Transport Vehicles	AR 750–2300–7
Instruction Guide: Care and Maintenance of Ball and Roller Bearings	TM 37–265
Lubrication	TM 9–2835
Maintenance and Care of Hand Tools	TM 9–867
Maintenance Responsibilities and Shop Operation	AR 750–5
Materials Used For Cleaning, Preserving, Abrading, and Cementing Ordnance Materiel and Related Materials Including Chemicals, Lubricants, Indicators, and Hydraulic Fluids.	TM 9–1007
Uneconomically Repairable Ordnance Vehicle	AR 755–2300–2
Welding Theory and Application	TM 9–237

e. Vehicular Maintenance.

Painting Instructions for Field Use	TM 9–2851
Tactical Motor Vehicle Preventive Maintenance, Supply, Inspection and Training Procedures	TM 9–2810
Transportation: Preventive Maintenance of Electric Motors and Generators	TM 55–405
Vehicular Maintenance Equipment: Grinding, Boring, Valve Reseating Machines, and Lathes	TM 9–1834A

f. Shipment and Limited Storage.

Instruction Guide: Ordnance Preservation, Packaging, Packing, Storage, and Shipping	TM 9–1005
Packaging and Shipping of Materiel: Preservation, Packaging, and Packing of Military Supplies and Equipment.	TM 38–230
Protection of Ordnance General Supplies in Open Storage	TB ORD 879
Standards for Oversea Shipment and Domestic Issue of Ordnance Materiel Other than Ammunition and Army Aircraft.	TB ORD 885

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By Order of *Wilber M. Brucker*, Secretary of the Army:

L. L. LEMNITZER,
General, United States Army,
Chief of Staff.

Official:

R. V. LEE,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

Tech Stf, DA (1) except
CofOrd (12)
US ARADCOM (2)
US ARADCOM Rgn (2)
Div (2)
Ord Gp (2)
Ord Bn (2) except
TOE: 9–45, 9–375 (None)
Ord Co (2) except
TOE: 9–17, 9–57, 9–229, 9–347, 9–367, 9–376, 9–377 (None)
Units org under fol TOE:
29–55 (2)

NG: State AG (3); Units same as Active Army except allowance is one copy to each unit.
USAR: None.

For explanation of abbreviations used, see AR 320–50.

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