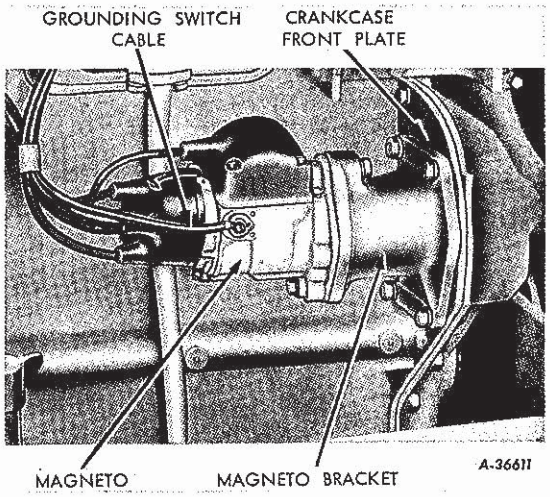
H-4 MAGNETO

1. DESCRIPTION

The International model H-4 magneto is flange mounted to a bracket on the right side of the engine.

The magneto is driven from a shaft and gear supported in a bracket which attaches to the right rear side of the crankcase front plate. (See Illusts. 1 and 2.) The magneto is driven by two lugs which engage in slots of the magneto drive shaft. The magneto is grounded out during diesel operation by an automatic grounding switch in the intake manifold that shorts the primary circuit. The magneto features a completely enclosed breaker chamber, a starting impulse coupling and an Alnico rotor magnet that should never require remagnetizing.



Illust. 1 - Magneto Installed on Engine.

The magneto requires care in handling. The following instructions must be adhered to closely. The magneto is driven through the impulse coupling which has a 150 rpm missing speed. Throw-out speed is 240 to 330 rpm. Illustration 3 shows the complete magneto assembly.

2. REMOVAL

Remove the grounding switch cable from the side of the magneto. (See Illust. 1.) Pull four spark plug cables from the distributor cap. Remove the screws holding the magneto bracket to the crankcase front plate and remove the magneto and bracket as a unit.

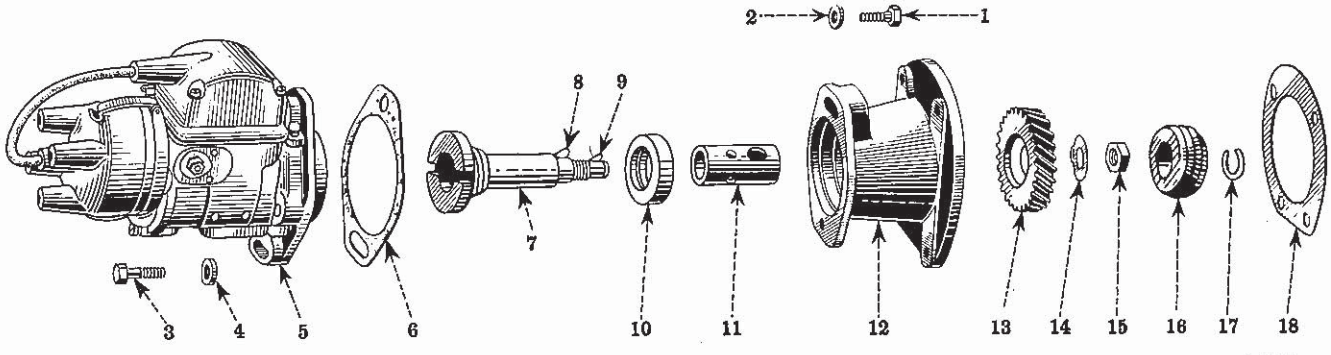
3. DISASSEMBLY

Remove the magneto (5, Illust. 2) and gasket (6) from the bracket (12). Some engines are equipped with a service meter drive gear. On these units the drive gear (16) and retainer (17) will have to be removed. Bend the nut lock (14) back and remove the nut (15) and lock. Press the shaft (7) out of the gear (13) or pull the gear from the shaft. Remove the keys (8 and 9) from the shaft. The shaft can now be removed. The bushing (11) and seal (10) (if so equipped) should not be removed unless it is necessary to replace them, in which case they can be pressed out.

4. INSPECTION AND REPAIR (See Illust. 2.)

Wash all parts except the magneto in dry-cleaning solvent and dry with compressed air.

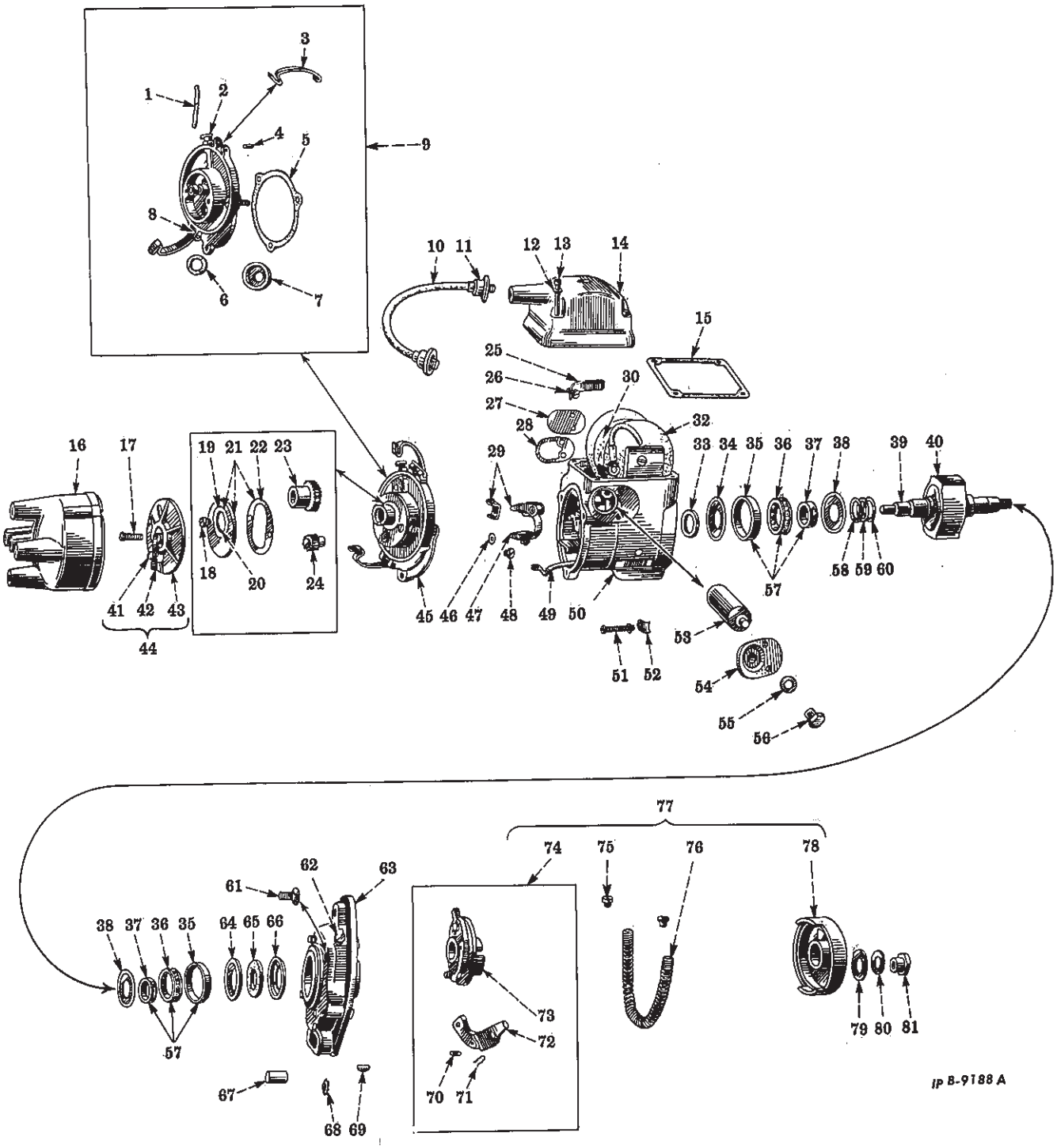
(Continued on page 3.)



Illust. 2 - Magneto Mounting Bracket Components.

1. Cap screw.
2. Washer.
3. Cap screw.
4. Washer.
5. Magneto.
6. Gasket.
7. Shaft.
8. Key.
9. Key.
10. Seal.
11. Bushing.
12. Bracket.
13. Gear.
14. Lock nut.
15. Hex jam nut.
16. Gear.
17. Gear retainer.
18. Gasket.

H-4 MAGNETO



Illust. 3 - Exploded View of Magneto (H-4).

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H-4 MAGNETO

Index to Reference Numbers in Illust. 3.

1. Oil well felt.
2. Oiler.
3. Distributor cap spring.
4. Locating pin.
5. Body gasket.
6. Felt seal retainer.
7. Felt seal.
8. Cap spring pin.
9. Distributor body.
10. "Coil to Distributor" cable.
11. Cable nipple.
12. Coil cover mounting washer.
13. Screw.
14. Coil cover.
15. Coil cover gasket.
16. Distributor cap.
17. Distributor brush.
18. Screw.
19. Gear cover felt seal retainer.
20. Gear cover felt seal.
21. Distributor gear cover.
22. Distributor gear cover gasket.
23. Distributor gear.
24. Rotor pinion.
25. Secondary leadout strap.
26. Screw.
27. Condenser hole cover.
28. Hole cover gasket.
29. Breaker arm and stationary point.
30. Coil core.
32. Coil end insulator.
33. Bearing felt.
34. Inner bearing felt retainer.
35. Bearing outer race.
36. Bearing retainer.
37. Bearing inner race.
38. Oil flinger.
39. Breaker cam.
40. Rotor, assembly.
41. Distributor rotor nut.
42. Distributor arm.
43. Distributor rotor.
44. Distributor rotor, assembly.
45. Distributor.
46. Terminal washer.
47. Spring anchor.
48. Screw.
49. Primary leadout cable.
50. Frame, assembly.
51. Screw.
52. Condenser clip.
53. Condenser.
54. Terminal insulator.
55. Lock washer.
56. Short circuiting terminal.
57. Rotor shaft ball bearing.
58. Rotor shim, light.
59. Rotor shim, medium.
60. Rotor shim, heavy.
61. Screw.
62. Impulse coupling oiler.
63. Mounting flange.
64. Oil retainer washer.
65. Oil seal.
66. Oil retainer washer.
67. Impulse coupling stop pin.
68. Lock washer.
69. Woodruff key.
70. Pawl pin washer.
71. Pawl pin snap ring.
72. Pawl.
73. Magneto member.
74. Magneto member w/pawls.
75. Spring end button.
76. Coupling spring.
77. Rotating unit.
78. Drive member.
79. Lock washer.
80. Lock washer.
81. Impulse coupling nut.

4. INSPECTION AND REPAIR - Continued (Refer to Illust. 2.)

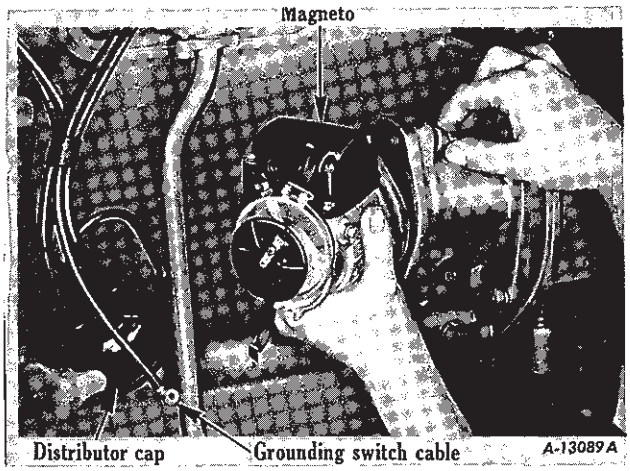
Inspect all parts for wear and damage; replace parts as necessary. The new shaft diameter is .9995 to 1.0005 inches; the bushing diameter is 1.0015 to 1.0030 inches. This gives a running clearance of .001 to .0035 inch. When pressing in a new bushing, the 9/16 inch holes must be toward the front end of bracket and arranged vertically to coincide with similar openings in the bracket. The four 3/16 inch holes are then toward the magneto end of bracket. The end of the bushing must be flush with the front face of the bracket. Be careful when reaming the bushing to have the bore square with the mounting face within .002 inch or the gear will run-out, causing a noisy timing gear train.

5. REASSEMBLY OF MOUNTING BRACKET

Press in a new oil seal (10, Illust. 2) (if so equipped) with the lip facing the front of the bracket. Lubricate the magneto shaft with engine oil and place it in the bracket (12). Install the key (8) in the shaft. Press the gear (13) on the shaft with the flat side facing the bracket. Secure the gear with nut lock (14) and nut (15). Install the key (9), drive gear (16) and retainer (17) (if so equipped). The end clearance of the shaft must be .003 to .013 inch.

CAUTION: The gear must run true with the front face of the bracket.

H-4 MAGNETO



Illust. 4 - Removing the Magneto.

6. INSTALLING AND TIMING THE MAGNETO TO THE ENGINE

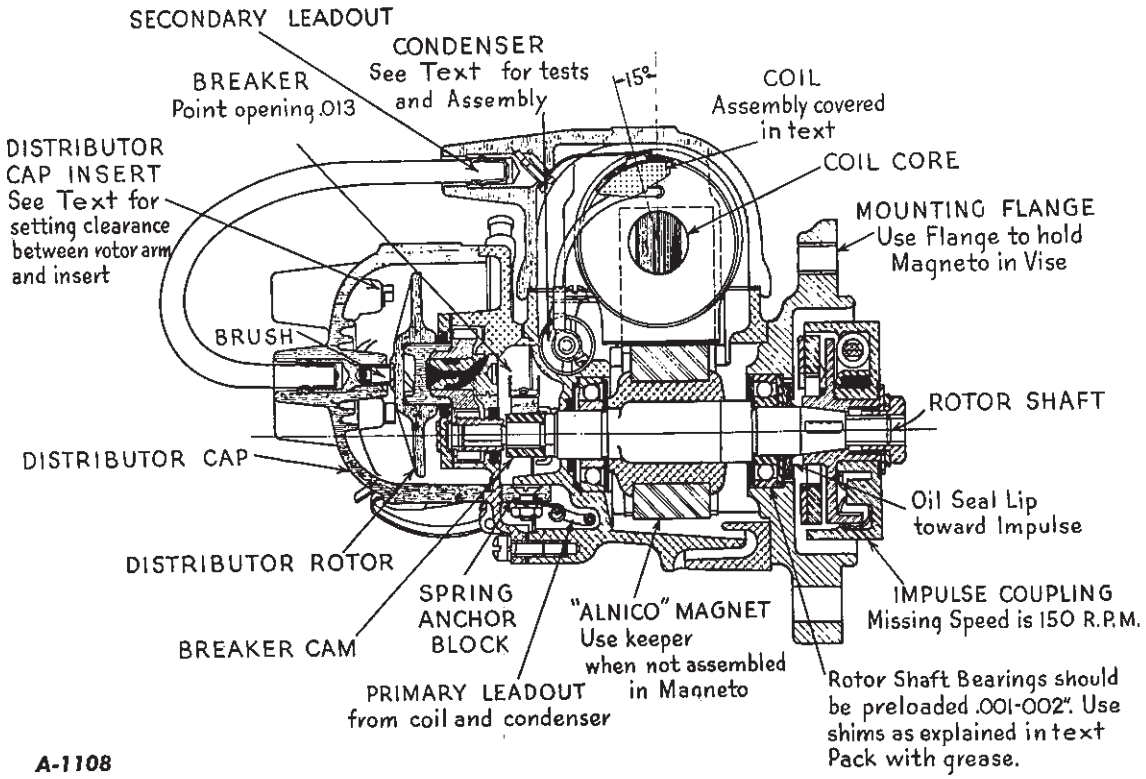
1. Shellac a new gasket to the bracket. Attach the bracket to the crankcase front plate, so the punch mark on the magneto gear tooth lines up with the chamfered tooth on the camshaft gear. Install the magneto.

2. Attach a jumper wire between the magneto terminal and the coil cover mounting bolt. This will ground the magneto and prevent accidental starting.

3. Crank the engine until the No. 1 piston (next to the radiator) is on top dead center of the compression stroke. The compression stroke can be determined by removing the No. 1 spark plug, placing your thumb over the opening and cranking the engine until an outward pressure is felt. Continue cranking slowly until the timing mark is in line with the pointer. The intake and exhaust valves are now both closed.

4. Remove the distributor cap and turn the magneto coupling in a counterclockwise direction (as viewed from the coupling end) until the metal strip on the distributor rotor points to the No. 1 terminal on the distributor cap. Install the distributor cap.

5. Assemble the magneto on the engine, being sure that the lugs on the impulse coupling engage in the slots on the magneto drive gear coupling. Assemble the magneto so the top is as close to the crankcase as possible.



Illust. 5 - Cross Section of Magneto.

H-4 MAGNETO

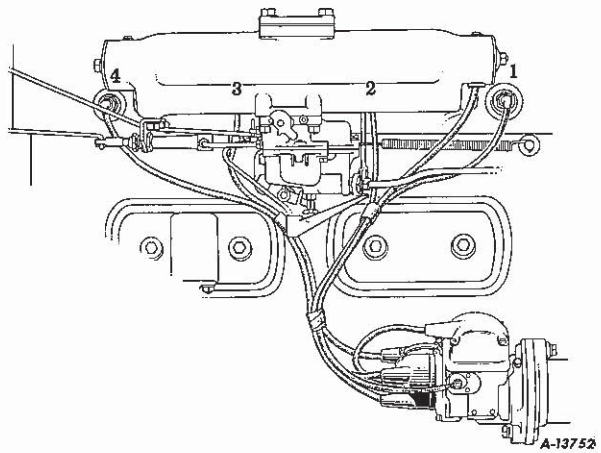
6. Insert the magneto mounting bolts loosely in the magneto flange, just enough to hold the magneto in place. Then crank the engine one complete revolution to the next top dead center. Now, pull the upper part of the magneto away from the engine until the impulse coupling just trips.

7. Tighten the mounting bolts firmly. Attach the spark plug cables to the engine and to the magneto. Start by connecting the No. 1 cylinder spark plug to the socket marked "1" on the distributor cap; connect the next socket with the No. 3 cylinder, the next socket with the No. 4 cylinder and the last with No. 2 cylinder.

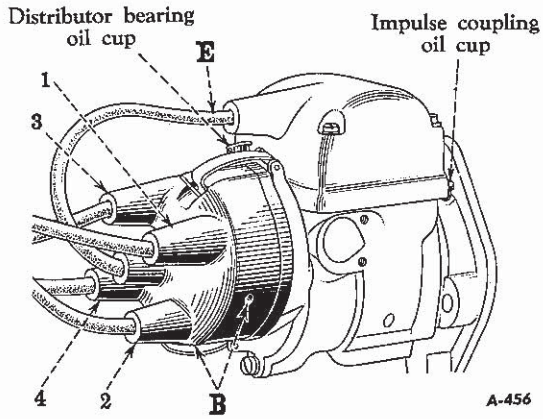
8. Remove the jumper wire from the magneto terminal, connect the grounding switch cable to the terminal and reconnect the jumper wire.

9. To check the timing, crank the engine slowly until the top dead center of the No. 1 cylinder is reached, at which time the impulse coupling should just trip. The magneto is now correctly wired and timed.

10. Remove the jumper wire from the coil cover mounting bolt to the magneto terminal.



Illust. 6 - Wiring Chart for Magneto. The Engine Firing Order Is 1, 3, 4, 2.



Illust. 7 - Counterclockwise Rotation (Viewed from the Distributor End.)

DISTRIBUTOR CAP

7. REMOVAL

Remove the secondary leadout wire (E, Illust. 7) from the coil cover. To remove the distributor cap, push the distributor cap springs (3, Illust. 3) out of the cap recesses and pull off the cap.

8. INSPECTION AND REPAIR

The carbon brush in the central socket contacts the monel metal strip of the distributor rotor (Illust. 5). The brush and spring can be pulled out of the socket, if replacement is necessary. If the four inserts are badly worn, replace the cap. All the grease must be removed from the monel metal strip on the distributor rotor to assure good contact. The distributor cap must be free of dust or dirt, inside and out, before assembling to the magneto. The two ventilating holes (B, Illust. 7) must be open at all times.

Check thoroughly for cracks in the bakelite distributor cap around the spark plug cables and coil-to-distributor cable sockets. Very small cracks will allow a spark to go through the cap and partially short-out the engine. For adjustment of the rotor arm with respect to the inserts, refer to Illust. 9 and par. 10,11 and 12.

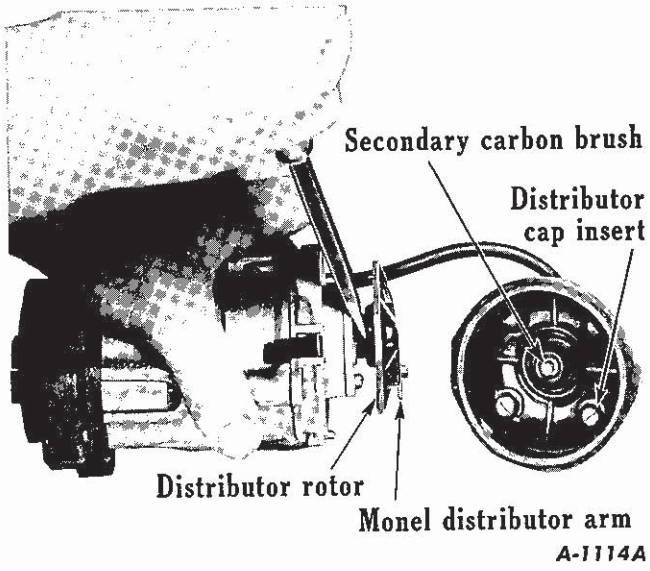
9. INSTALLATION

The cap fits only one way; the ventilating holes are always on the bottom side. Snap the body springs into the distributor cap recesses and install the secondary wire.

DISTRIBUTOR ROTOR

10. REMOVAL

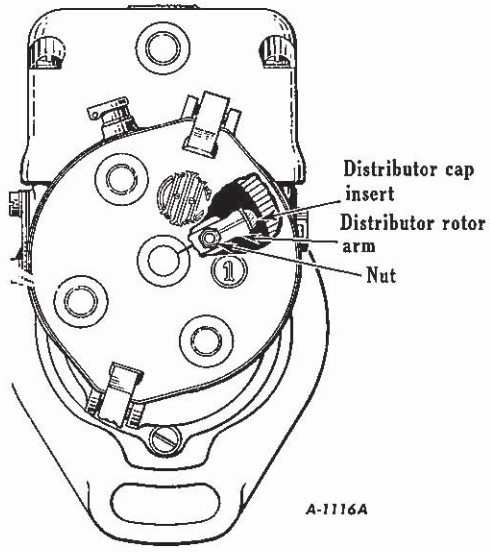
Remove the distributor cap. Apply the end of a screwdriver against the hub of the rotor and pry off the rotor as shown in Illust. 8. The bakelite rotor is fragile; handle it with care.



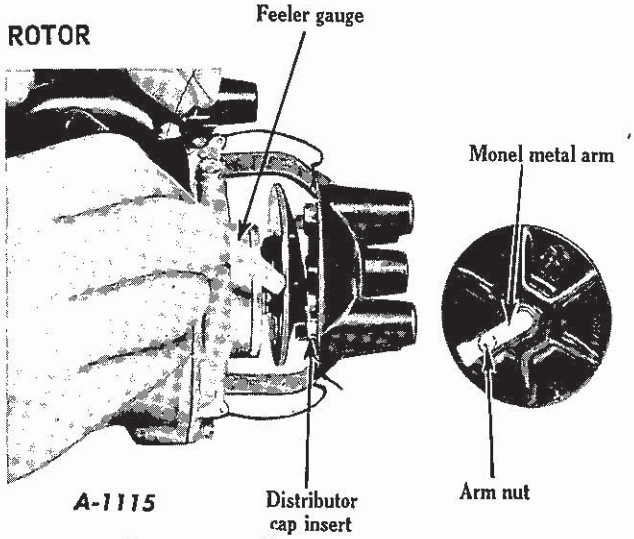
Illust. 8 - Method of Removing Distributor Rotor from its Spindle.

11. ADJUSTMENT

The monel metal arm on the distributor rotor is adjustable and renewable. It is removed by running out the arm nut. The arm must operate as close to the insert in the distributor cap as possible without rubbing (Illust. 10). To adjust the distributor arm correctly, take a cap from stock and cut it away as shown in Illust. 10. Then, using a feeler gauge, check the distance between the distributor arm and the insert in the distributor cap.



Illust. 9. Adjusting Rotor Arm.

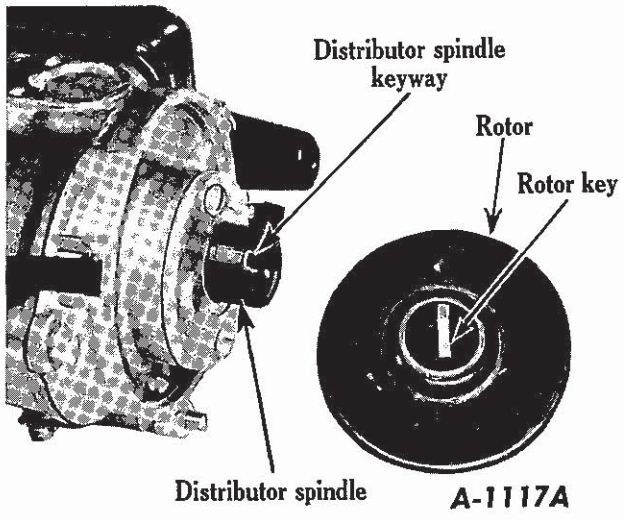


Illust. 10 - Inspecting Rotor Clearance.

The arm can be adjusted slightly to gain the desired clearance. To adjust the rotor arm, loosen the nut (Illust. 9) and move the arm to the point where the outside end just clears the vertical portion of the distributor cap inserts.

12. INSTALLATION

When installing the rotor, be sure that the rotor key on the inside of the rotor coincides with the slot on the end of the distributor spindle (Illust. 11). To assist in lining up the key with the slot, use as a guide the rib which is



Illust. 11 - Distributor Rotor Removed.

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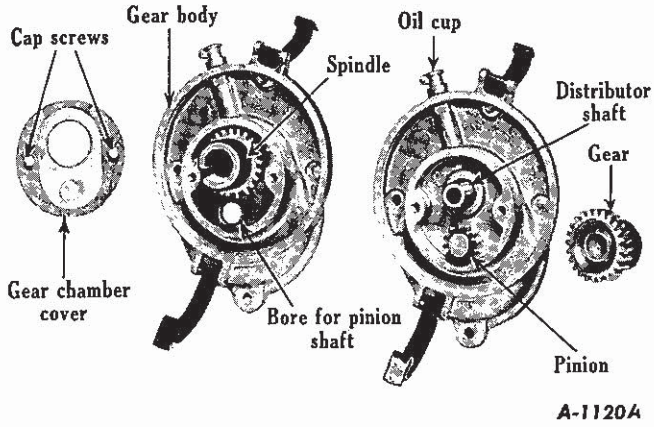
DISTRIBUTOR ROTOR

opposite the monel metal arm on the opposite side of the rotor; the rib being in line with the key. Be sure that the rotor is pressed on as far as it will go, as there is a possibility of entrapped air preventing the rotor from being pushed all the way down on the hub of the distributor gear. The rotor must have a heavy hand-press fit on the distributor spindle. Install the distributor cap and the secondary cable.

DISTRIBUTOR GEARS

13. DESCRIPTION

The distributor gears are contained in a chamber which is a part of the distributor body (Illust. 2). This chamber is partially filled with magneto grease and sealed with felt washers around the hub of the gear.



Illust. 12 - Distributor Gear Assembly.

14. REMOVAL

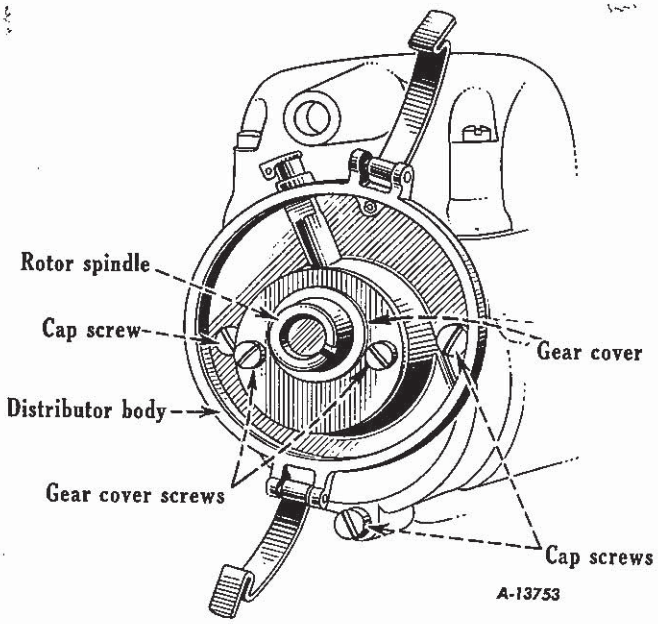
Remove the three cap screws (Illust. 13) from the body and remove the body with gasket.

15. DISASSEMBLY

By removing the two cap screws, the cover and gasket can be removed (Illust. 12). Then the distributor and distributor spindles can be lifted out. The felt oil seal may be replaced by driving out the old retainer.

16. INSPECTION AND REPAIR

Before replacing the retainer and felt, clean out the hole with a metal cutting tool such as a bearing scraping tool. Replace the felt and retainer and lock the new retainer in place by very lightly crimping over the edge of the body with a center punch. The thrust surface of the retainer should be flat. Do not soak the new seal in oil. After assembly, coat it lightly with magneto grease.



Illust. 13 - Magneto with Distributor and Rotor Removed.

17. REASSEMBLY AND TIMING

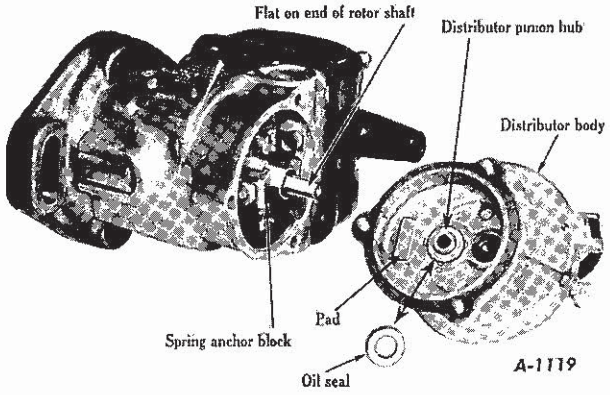
Secure the gear body, with the gasket, to the magneto frame. The body and gasket fit in one position only. Install the distributor gear spindle on the shaft. It must turn freely on the shaft. Install the distributor pinion and check the backlash with the gear. A slight movement should be felt (approx. .002 to .004 inch). Turn the rotor shaft to make the flat spot on the pinion hub line up with the flat spot on the rotor. Take off the distributor spindle and fill the bore with magneto grease. Press the distributor gear spindle onto the shaft. As the teeth of the spindle gear come into contact with the teeth of the pinion, line up the distributor spindle gear with the pinion, so the marked tooth on the pinion is in line with the "L" mark on the spindle gear (Illust. 15). The "L" mark is for counter-clockwise magneto (this model), and the "R" mark is for a clockwise magneto.

(Continued on next page.)

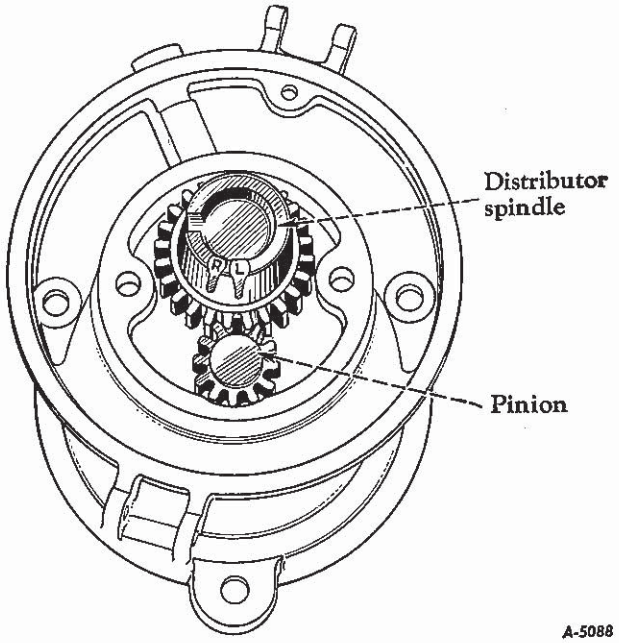
DISTRIBUTOR GEARS

17. REASSEMBLY AND TIMING - Continued

Partially fill the remaining chamber space with magneto grease. Install the cover, with the gasket, and secure with two screws. Install the distributor rotor as directed in par. 13, and secure the distributor cap.



Illust. 14 - Magneto with Distributor Body Removed.



Illust. 15 - Timing Marks on Distributor.

BREAKER MECHANISM

18. DESCRIPTION

The entire breaker mechanism of the magneto is in its own separate compartment, thoroughly sealed against dirt and moisture. This makes it possible to thoroughly grease the mechanism without the possibility of grit working into the lubricant and causing an abrasive action on working parts.

19. REMOVAL (Refer to Illust. 16.)

Remove the distributor cap, distributor rotor and the distributor body. Now the breaker arm assembly and spring anchor block can readily be inspected and removed for any modification that may be required. The spring anchor block can be removed by unscrewing the nut that secures it to the breaker arm and primary lead-out wire spring anchor terminal. The stationary point can be removed by removing one screw.

20. INSPECTION AND REPAIR (Refer to Illust. 17 and 18)

If the rubbing block is worn, install a new breaker arm. Examine the inside of the breaker housing for oil or grease. If oil has been leaking into the breaker housing, the grease being used in the distributor gear case is too thin. Another possible cause is that excessive lubricant is being injected into the distributor gear oil cup or that the felt oil seal is not functioning properly.

21. REASSEMBLY (Refer to Illust. 16 and 17.)

Before reassembling, thoroughly clean all parts to remove grease and oil. Apply a light coating of magneto grease to the breaker cam to prevent rusting. Reinstall the fixed breaker point, leaving the terminal screw slightly loose until the point opening has been adjusted. Secure the anchor block and primary spring terminal to the breaker arm and to the magneto. Do not flatten the spring terminal and be careful that it does not touch any part of the magneto frame. When reinstalling the anchor block, do not push it tight against the magneto body frame, but allow it to stick out far enough so it is pushed into place by the distributor pad on the distributor body (Illust. 19). Install the gear body, with gasket, and secure it with screws (par. 18). Install the distributor rotor and distributor cap.

22. BREAKER ARM CAM (Refer to Illust. 18.)

The breaker arm cam will last indefinitely if it is properly lubricated. If the cam becomes worn, it can be replaced. The cam is a press fit on the shaft and fits only one way.

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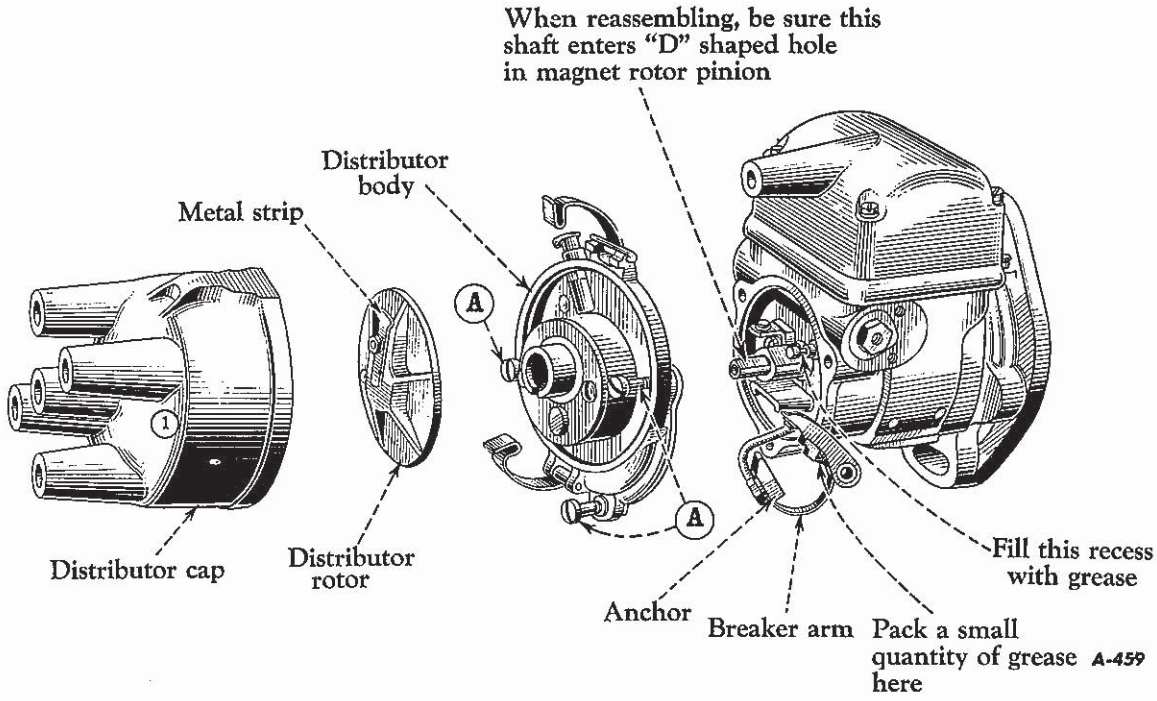
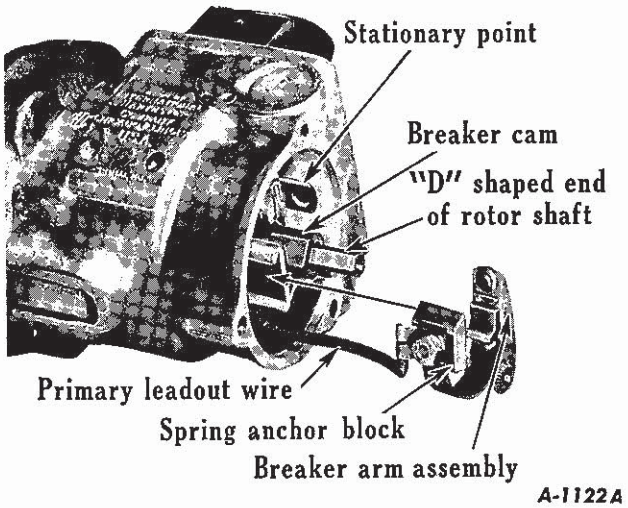
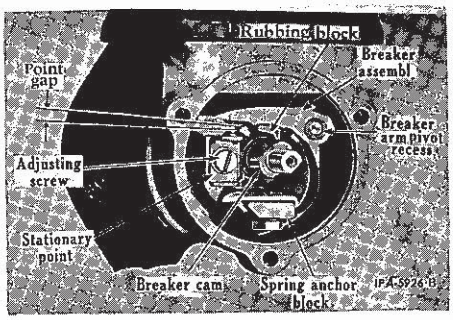
BREAKER MECHANISM



Illust. 16 - Magneto Parts Removed to Gain Access to Breaker Point Chamber.



Illust. 17 - Magneto Breaker Arm Removed.



Illust. 18 - End View of Breaker Mechanism.

CONDENSER

24. **REMOVAL** (See Illusts. 19 and 20.)

To remove the condenser with the coil in place, bend the condenser terminal lock from the flat on the condenser terminal screw. The screw can then be removed with the lock and outer bakelite washer.

(Continued on next page.)

CONDENSER

23. REMOVAL - Continued

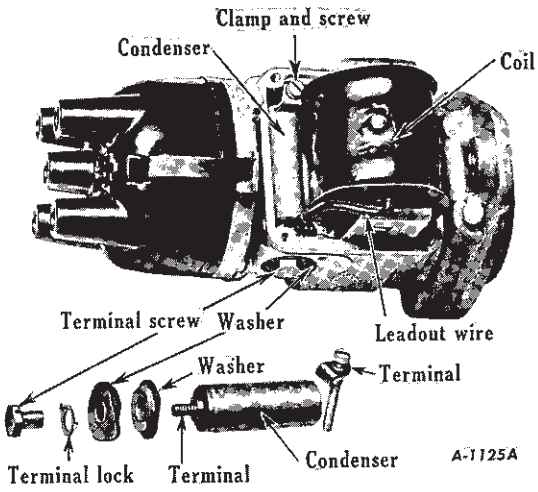
Remove the coil cover, the condenser hole cover plate and the clip and screw. Push the condenser back into the frame and remove the inner washer and two primary wires from the condenser terminal. Push the condenser out through the hole in the side of the magneto.

24. INSPECTION (TEST)

Test the condenser, if it does not show to be in good condition; it must be replaced.

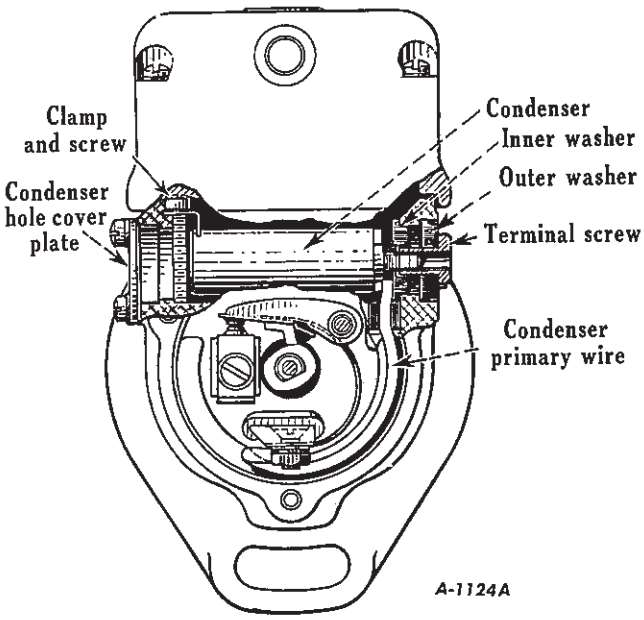
25. INSTALLATION (Refer to Illust. 19.)

Install the inner bakelite washer. Line up the terminals of the primary wires and insert the condenser.



Illust. 19 - Magneto with Coil Cover Removed.

Install the outer washer and secure the condenser in position with a nut lock and terminal screw. When tightening the condenser terminal screw, there is a possibility of breaking the bakelite washer or the condenser terminal. Do not apply too much pressure to the wrench when tightening the screw. Secure the condenser clamp and screw. Attach the condenser hole cover plate and gasket with cap screws and washers. Install the coil cover and gasket and secure with four cap screws.



Illust. 20 - Cross Section View of Condenser Assembly.

PRIMARY WIRE

26. GENERAL (Refer to Illust. 21.)

The primary wire connecting the breaker arm assembly to the condenser terminal must be a tight fit in the rubber grommet and the grommet must be a tight fit in the magneto frame. To remove the primary wire, the spring anchor terminal must first be unsoldered (assuming the coil cover, distributor cap, rotor and body are removed). Then pull the terminal wire out from the top of the magneto. In reassembling the primary wires, reverse the above procedure. The primary wires to both the coil and condenser must be pulled tight when the condenser is assembled.

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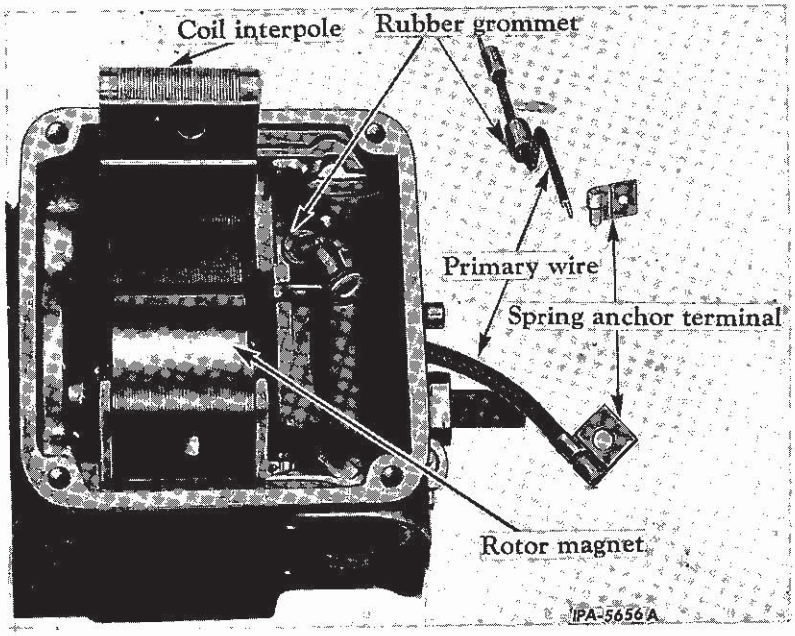
PRIMARY WIRE



Illust. 21 - Location and Assembly of Primary Wire.

COIL AND COIL COVER

27. REMOVAL

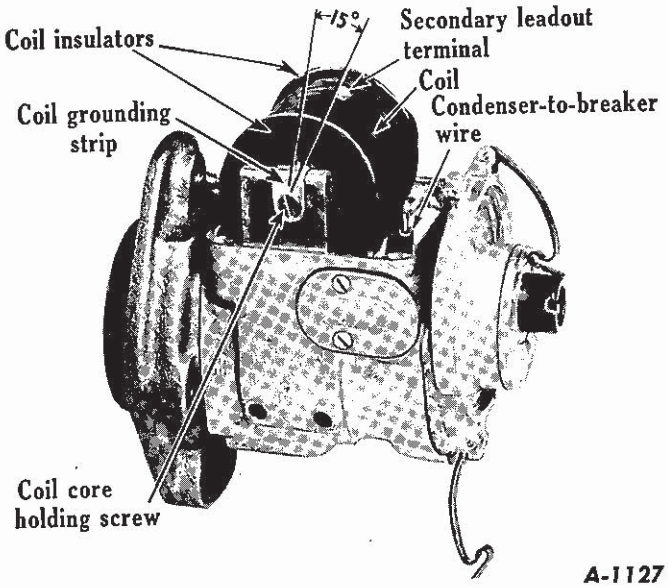
Remove the coil cover and gasket. The screws will be retained in the cover, if they are unscrewed only from the frame. Remove the primary wire from the condenser terminal. The magneto with the cover removed and the coil grounding strip attached under the coil core holding screw is shown in Illust. 19. Remove the two screws from each end of the core. Then remove the coil.

CAUTION: Before lifting the coil out, turn the magnet to the neutral position or so the pole of the magnet bridges the air gap between the end of the coil pole pieces.

28. INSPECTION AND REPAIR
(Refer to Illust. 22 and 23.)

Inspect the end insulators of the coil. If they are damaged, they must be replaced. Test the length of the coil core mounting screws by bottoming the screws lightly in the coil core, and pressing the assembly into position as shown in Illust. 23. The mounting screws are 5/8 inch long. If either screw head does not fall back of the face of the pole piece by 1/32 inch as shown, it must be removed and enough cut off the threaded end to make it fit properly. When the coil core is in place, the screws will

(Continued on next page.)



Illust. 22 - Coil Mounted on Magneto.

COIL AND COIL COVER

28. INSPECTION AND REPAIR - Continued

then tighten up in the countersunk hole of the pole piece before the screws bottom in the coil core.

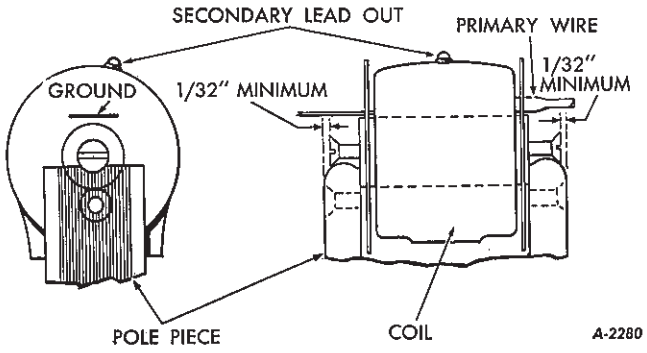
CAUTION: Do not file or otherwise deface the ends of the coil core or the face of the pole pieces, as this will impair the magnetic circuit and the efficiency of the magneto.

Test the coil, if it does not show to be in good condition, it must be replaced.

29. INSTALLATION
(Refer to Illust. 22.)

Press the coil in place; the secondary leadout terminal should be at an angle of 15 degrees with the center line of the coil. The reason for so positioning the coil terminal is to secure a good contact with the secondary terminal outlet in the coil cover. Position the grounding strip and secure the coil core holding screws tightly in position.

Install the condenser (par. 26). Before installing the coil cover, be sure that the contact points are clean and that the secondary leadout in the coil cover bears firmly against the secondary leadout terminal. Install the coil cover, with gasket, and secure it to the magneto frame with four screws.



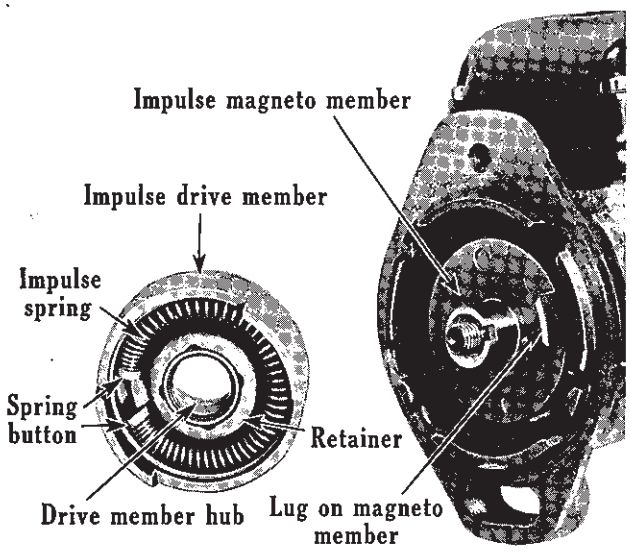
Illust. 23 - Assemble Coil Core Mounting Screws to Coil Core So They Do Not Bottom in Core when Assembled in the Magneto.

IMPULSE COUPLING

30. DESCRIPTION

The impulse coupling, inserted between the magneto and the magneto drive, provides easy and positive starting of the engine at low starting speeds. The first purpose of the impulse coupling is to retard the spark at low engine speeds to approximately top dead center of the piston stroke, thereby preventing the engine from backfiring. As the magneto member (Illust. 25) is retarded by the pawls at low speeds, these pawls are stopped by pawl stop pins (Illust. 28). The lug on the magneto member compresses the impulse spring. The lugs on the impulse drive member, which continues to rotate at constant speed, trips the pawls (forces them away from the pawl pin) and the magneto member (keyed to the magneto rotor) is forced to rotate by a compressed spring at a greater speed than that of the drive member. The increased speed of the rotor provides a much hotter spark to the engine than would be provided by a direct drive to the magneto.

As the speed of the engine increases, the weighted ends of the pawls are thrown out by centrifugal force and their short ends no longer engage the pawl stop pins in the mounting flange. The spark is no longer retarded. The missing speed, approximately 150 rpm is the speed at which the impulse coupling no longer continually retards the spark. At this speed



Illust. 24 - Magneto Impulse Coupling Removed.

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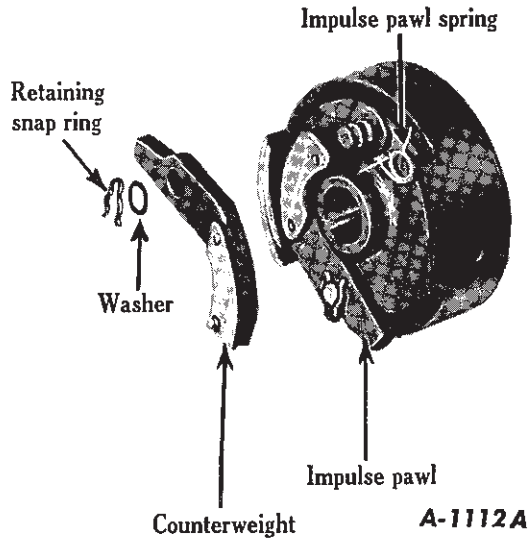
IMPULSE COUPLING

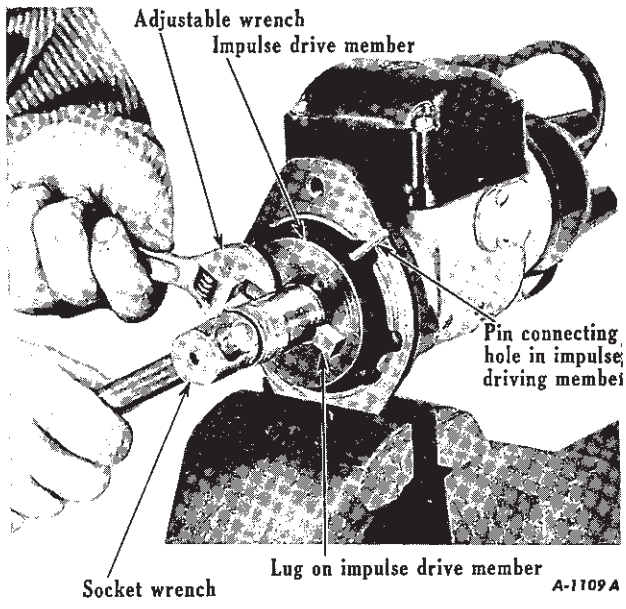


Illust. 25 - Complete Impulse Coupling Showing Rear Side of Magneto Member with Impulse Pawl Removed.

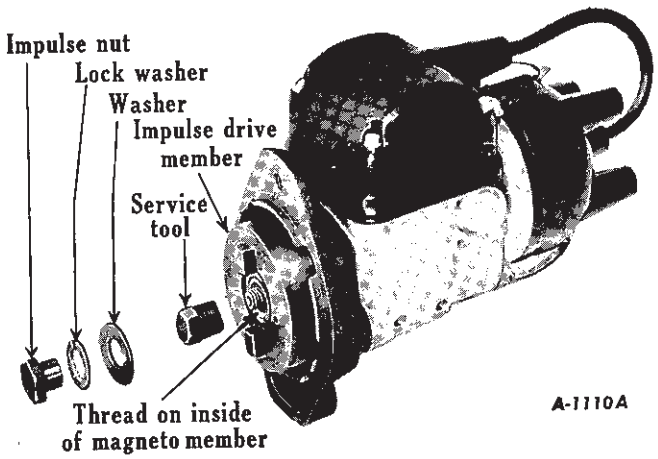
it retards the spark intermittently only. Over the range of the throw-out speed, 240 to 330 rpm, the impulse coupling must cease to function completely, giving the effect of a direct drive.

31. REMOVAL

To remove the impulse coupling, insert a nail or pin through a hole (Illust. 26) in the coupling drive member, locking the two elements together. Apply a socket wrench to the nut and an adjustable wrench to one of the driving lugs to prevent shearing the nail or pin while removing the nut. The impulse coupling can now be removed with a tool (SE-912) (Illust. 27). As the tool is turned in, the inside end contacts the rotor shaft and forces the member off the shaft.



Illust. 26 - Correct Method of Removing Impulse Coupling Nut.



Illust. 27 - Removing Impulse Coupling.

32. DISASSEMBLY AND REASSEMBLY
(Refer to Illust. 24.)

The impulse coupling drive member, with impulse coupling spring, can readily be removed. The impulse coupling spring should seldom be removed from the driving member but, if it is necessary, it can be pried out of place. To install this spring, just compress it sufficiently to fit into the drive member as shown. Before assembling the impulse drive member with the magneto member, soak the wick inside the impulse coupling spring with light oil. Coat the inside drive member hub of the driving member with magneto grease. The lug of the magneto member must be a tight fit between the hardened buttons on each end of the impulse coupling spring. If the buttons become worn or grooved, install new ones.

The impulse pawl can be taken off after removing the retaining snap ring and washer. The impulse pawl spring can then be reinstalled. Use a small amount of grease on the pawl pivot and install the springs, pawls, washers and snap rings. The pawls must move freely on the pivots. When installing

(Continued on next page.)

IMPULSE COUPLING

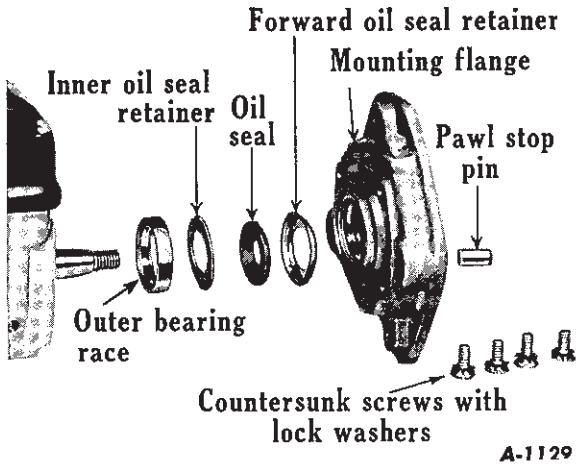
32. DISASSEMBLY AND REASSEMBLY - Continued

the drive member, be sure the lug of the magneto member fits between the spring buttons.

33. INSTALLATION

(Refer to Illust. 28.)

Place a small amount of magneto grease on the pawl pin. Press the assembled impulse coupling on the rotor shaft. Be sure that the keyway in the magneto member engages the key in the magneto rotor shaft. Install the washer and lock washer, which will fit in one position only. Tighten the impulse coupling nut.



Illust. 28 - Magneto with Impulse Coupling.

MOUNTING FLANGE

34. REMOVAL

The mounting flange (Illust. 28) is attached to the magneto bracket and is held to the magneto with four countersunk screws and lock washers.

Remove the impulse coupling (par 32). The flange is freed by taking out the four screws.

35. DISASSEMBLY AND REASSEMBLY

Remove the outer bearing race (Illust. 28). Place the inner retainer in position with the internal taper side of the oil seal facing the bearing race (the bulged side of the oil seal faces the retainer). Then install the inner retainer and press the bearing race in position. Assemble the mounting flange to the magneto body and check the rotor shaft for end play (par. 40).

36. INSTALLATION

After the proper reassembly of the mounting flange has been made as directed in par. 35, install the flange and secure it with screws and lock washers.

ROTOR

37. REMOVAL

To remove the rotor and bearing, it is necessary to remove the impulse coupling (par. 31) and mounting flange (par. 34). Then slide the rotor magnet into a keeper (Illust. 29), as it is being removed from the magneto frame. Always have the rotor in the keeper while it is out of the magneto frame. Be careful that the rotor magnet does not pick up dirt and metal particles.

38. DISASSEMBLY

1. The inner bearing race can be removed readily from the rotor by using puller and adapter shown in Illust. 30. It is necessary to remove the inner bearing race when removing or inserting rotor shims for preloading the rotor bearings.

2. When the bearing inner race has been removed, the inner oil flinger and the rotor shims are free.

39. REASSEMBLY

1. Thoroughly clean the rotor and bearing parts, and reassemble to the rotor approximately the same thickness of shims as taken out.

2. Replace the inner oil flinger (Illust. 32) with the upset portion toward the rotor magnet.

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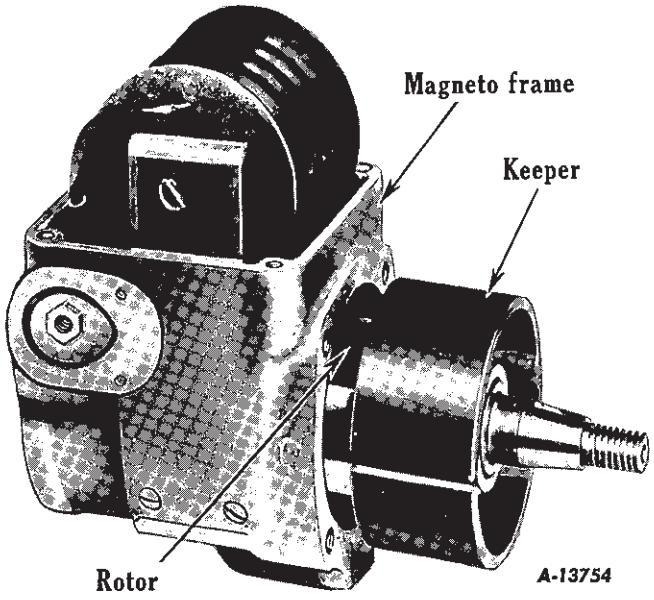
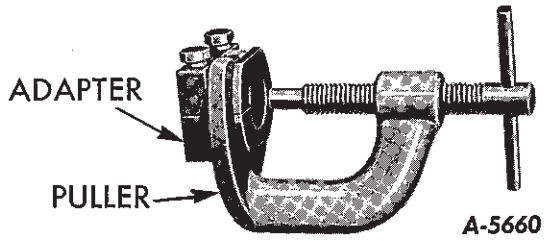
ROTOR



Illust. 29 - Removing Magneto Rotor.

3. Press the bearing inner race firmly into place and install the bearing retainer with balls.

4. The oil seal in the magneto frame and mounting flange can now be installed (par. 35).

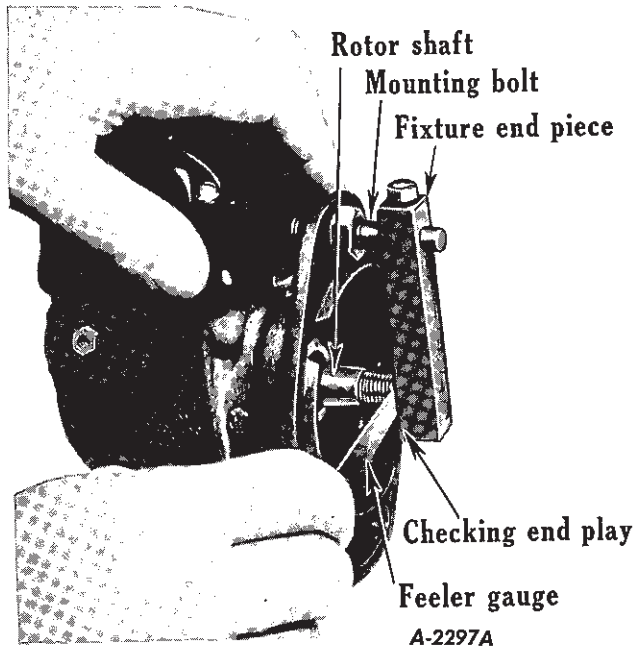


Illust. 30 - Inner Race Puller Tool SE-839.

40. ADJUSTMENT

Thoroughly clean the rotor assembly and bearing races of the old grease and any grit. Lubricating the bearings must not be done until they have been checked for end play.

The old bearings and races must be assembled without disturbing the shims. If an end play check reveals that end play is present, no attempt must be made to preload the old bearings, as this would cause rapid deterioration of the bearings. The recommended procedure, when



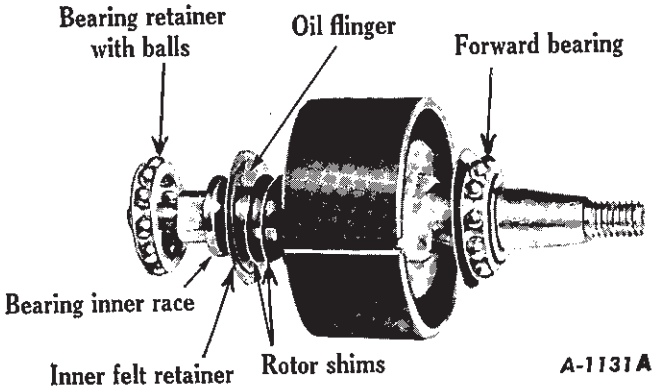
Illust. 31 - Checking Rotor End Play.

end play exists on old bearings, is to replace them.

The distributor body assembly (Illust. 14) must be removed to facilitate correct adjustment of the magneto rotor.

Place sufficient shims (Illust. 32) in back of the new bearing race to allow a small amount

(Continued on next page.)



Illust. 32 - Rotor Shaft with Keeper, Bearings and Shims.

ROTOR

40. ADJUSTMENT - Continued

of end play in the rotor shaft after it is completely assembled. The end play must be checked with no grease on the bearings. Secure the mounting flange in place with the mounting screws (Illust. 28). Then check the end play between the fixture and the end of the rotor shaft with a feeler gauge (Illust. 31).

Take two readings with the feeler gauge; one with the rotor as far one way as it will go and the other with the rotor moved as far in the opposite direction as it will go. The difference in these two readings will be the actual end play. Add .001 inch to the difference between the two readings, which should be the thickness of the additional shims to be added.

Remove the mounting flange, slide the rotor into the keeper, pull the outer race from the shaft and add the required number of shims (Illust. 32) in the proper location. Grease the ball bearings, reassemble the rotor and the mounting flange, and check the rotor for free turning. Be careful not to overfill the bearing retainer with grease; just fill the spaces between the balls in the retainer with magneto grease. The preloading of the bearing must not cause binding of the rotor.

41. INSTALLATION

Install the impulse coupling, distributor body, distributor and distributor cap.

BEARING OUTER RACES AND OIL SEALS

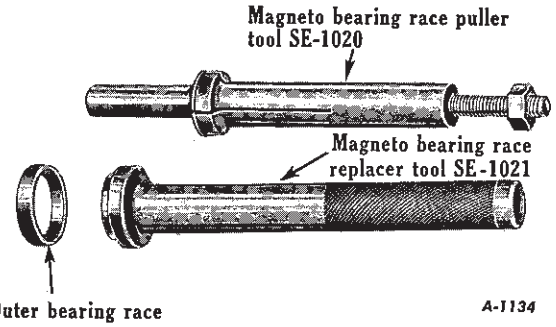
42. REMOVAL

The front bearing outer race and oil seal are assembled in the mounting flange (Illust. 38). They are accessible after removing the impulse coupling and the mounting flange as directed. (Refer to par. 31 and 34.) The purpose of the oil seal is to keep lubricating oil out of the magneto body.

The rear bearing outer race and oil seal are assembled in the main frame. The magneto rotor distributor cap, distributor rotor, and distributor body assembly must be removed in order to remove the rear bearing outer race and oil seal.

43. DISASSEMBLY

The rotor shaft oil seal and the retaining members are held in place by the press fit of the rotor ball bearing outer race (Illust. 28). The rotor bearing races can be removed with a puller (SE-1020) and installed with tool (SE-1021) shown in Illust. 33.



Illust. 33 - Tools Used for Removing and Installing Magneto Outer Bearing Races.

The magneto outer bearing races in both the main frame and the magneto flange can be removed readily. Loosen the expander and insert the tool into the bearing race. Manipulate the split sleeve flange through the bearing race and hold it against the felt retainer. Draw up on the expander by applying a wrench to the flats on the threaded end of the expander, and turn in a counterclockwise direction until a definite pressure is felt. Then tighten the nut and carefully drive the bearing race from place on the shaft.

44. REASSEMBLY AND INSTALLATION

The sequence of assembling the outer bearing race and oil seal is shown in Illust. 28. The internal taper side of the oil seal faces the bearing race and the bulged side of the oil seal faces the oil seal retainer. Careful centering and proper arrangement of the oil seal produces maximum compression and efficiency.

Before installing the outer bearing, be sure the felts and retainers are correctly assembled in place.

Set the bearing race on the end of the tool (Illust. 33). A small amount of clean grease will hold the race on the tool. Carefully line up the tool over the hole and drive the race in place.

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