Colt Industries

Fairbanks Morse

Engine Accessories Operation

BELOIT, WISCONSIN 53511

SERVICE INSTRUCTION
45V112 72
Solid State Magneto

After testing of the magneto indicates service is required, or if the magneto is in for overhaul, proceed as follows:

1. *End Cap and Cover Removal*
   - A. Remove the two (2) screws which hold the End Cap cover to the end cap.
   - B. Remove cover and gasket. Inspect for cracks. Note condition of carbon brush. It should depress and spring back.
   - C. Use two screwdrivers to pry distributor rotor gently from shaft. Remove the shaft felt from the end cap.

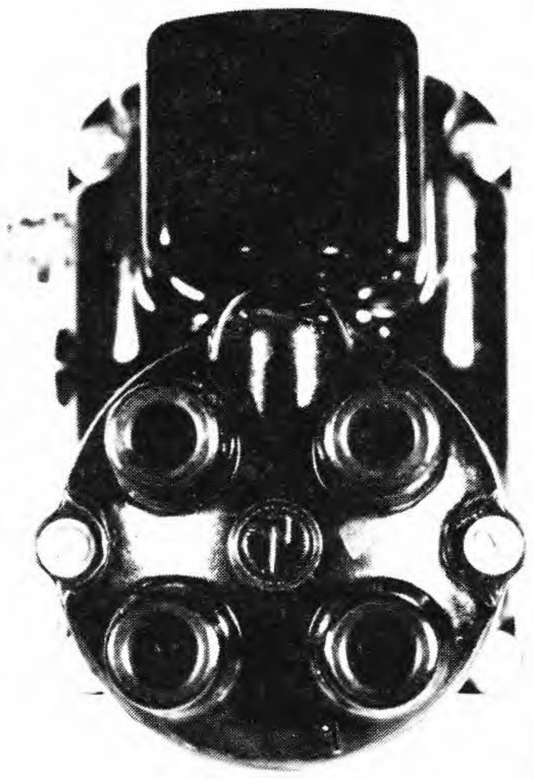


Figure 1

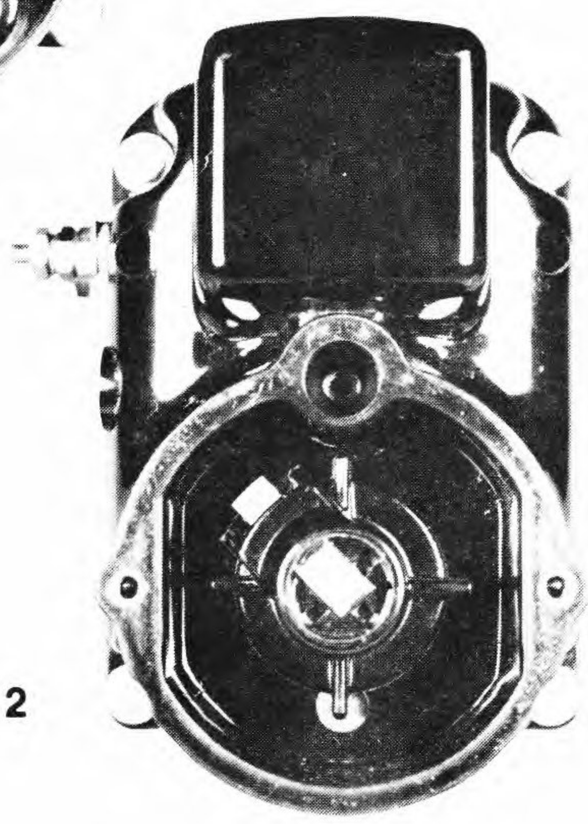


Figure 2



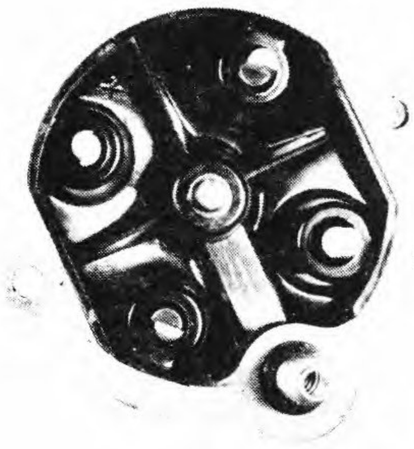


Figure 3

- D. Remove the four (4) screws which hold the end cap to the magneto housing.
- E. Carefully lift end cap from housing. Note position of all wires.

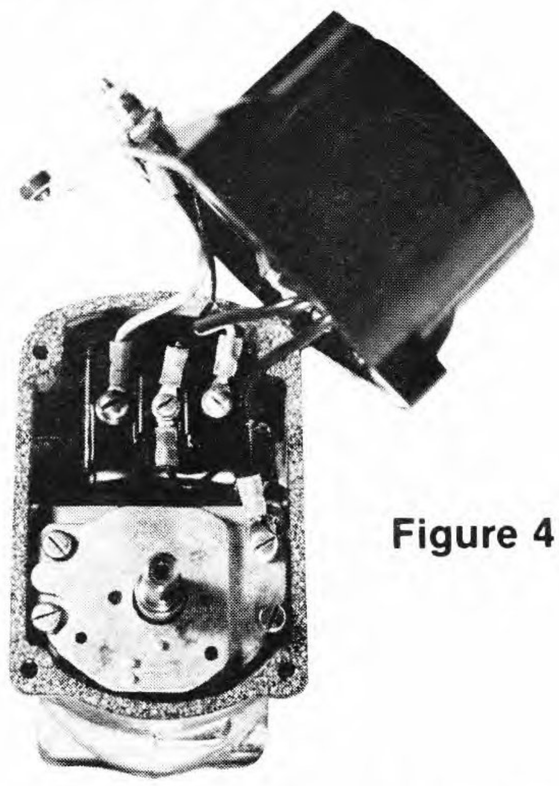


Figure 4

2. *Removal of Electronic Components*
   - A. Remove two black ground wires from bearing support screw.
   - B. Loosen two screws on top of housing.
   - C. Rotate magnetic rotor until flux lock is broken.
   - D. Coil, together with speed limiter and transformer in end cap, can now be removed from the magneto.

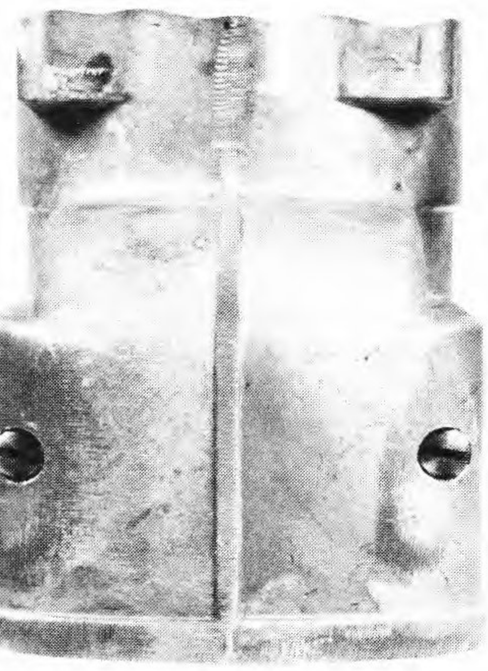
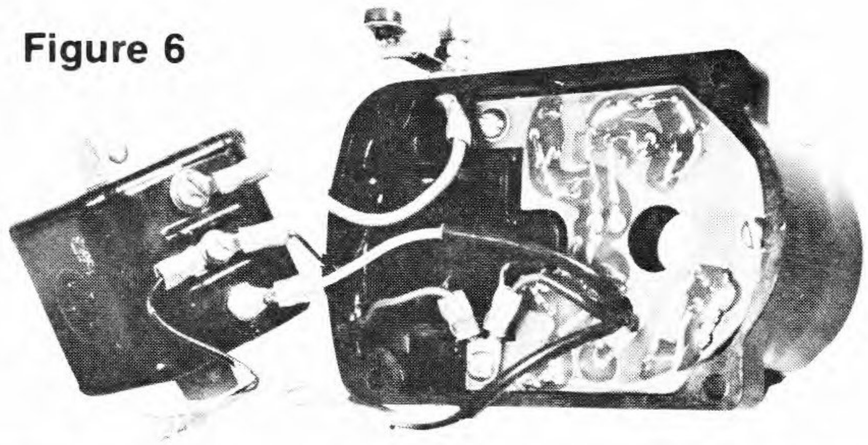


Figure 5

Figure 6



3. *Removal of Bearing Support Assembly*
   A. Remove the screws which hold the bearing support to magneto housing.
   B. Carefully remove bearing support from housing.
   C. Note the bearing inside the bearing support. Visually inspect the bearing for signs of failure. Removal of bearing is not recommended unless bearing failure is definitely suspected.



Figure 7

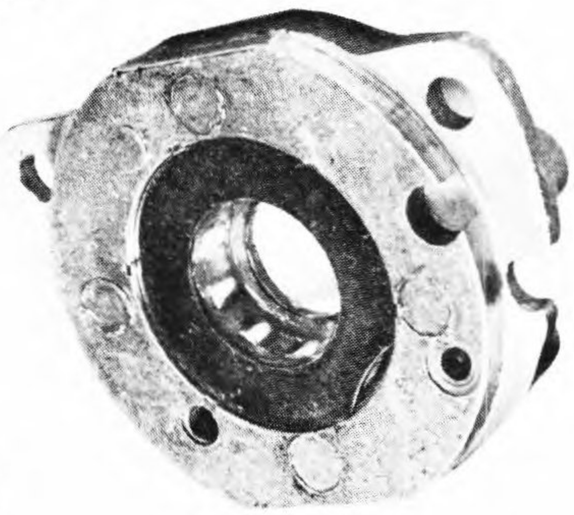


Figure 8

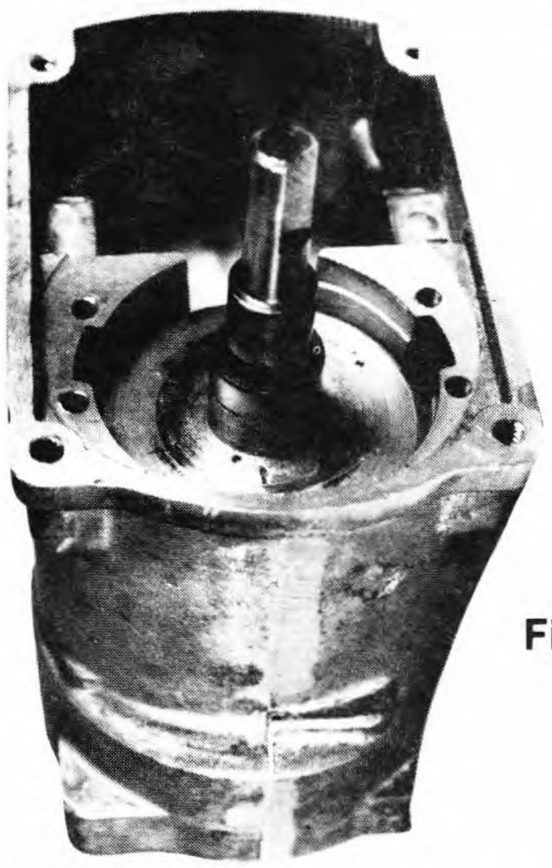


Figure 9

4. *Removal of Drive Assembly and Impulse Coupling*
   A. Remove the four bolts holding drive shaft assembly to magneto housing.
   B. Remove the drive assembly. Note how the impulse coupling lugs fit into the slots of the drive shaft feet.

Figure 10



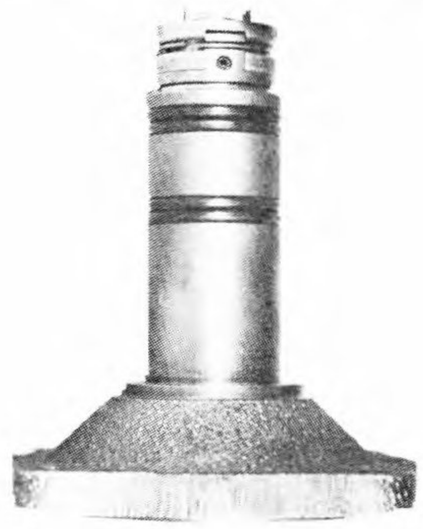


Figure 11

   C. Using a pin punch, force roll pin through the drive shaft. The drive shaft can now be removed from the rest of the assembly.
   D. Remove the retaining ring from the drive coupling.
   E. Remove the four (4) O-rings from the drive shaft housing.



Figure 12

   F. Remove retaining nut and washer from impulse coupling.
   G. Using a suitable puller, remove the impulse coupling. When removing the coupling, care must be taken to remove both sections together.



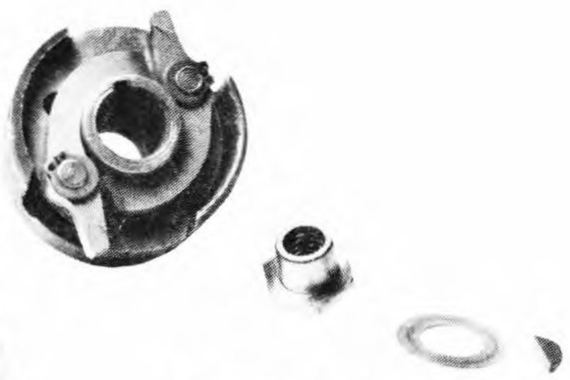


Figure 14

Figure 13

H. To disassemble impulse coupling, use magnetic rotor shaft as a tool to unwind the impulse coupling. It will be necessary to remove magnetic rotor as in (5C) below before proceeding. Note that the spring unwinds one (1) revolution. Use this count to rewind the spring when reassembly occurs.

5. *Removal of Magnetic Rotor and Drive End Bearing*
   A. Remove the oil seal.

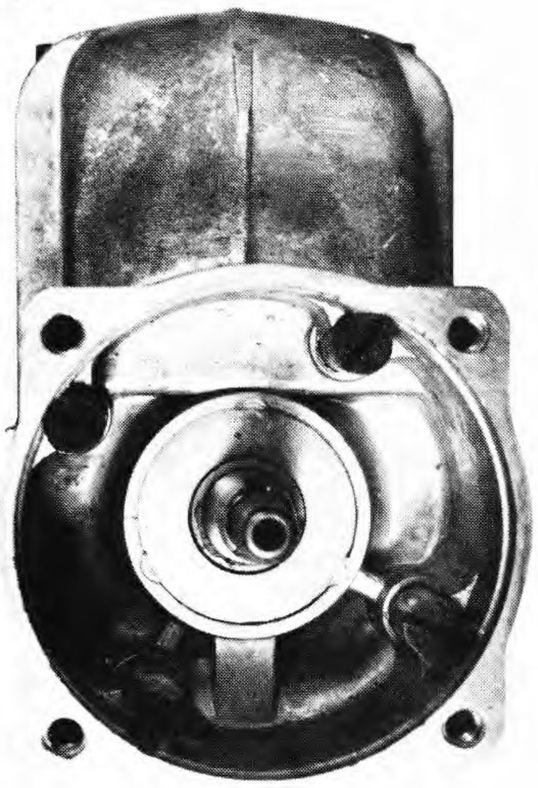


Figure 15

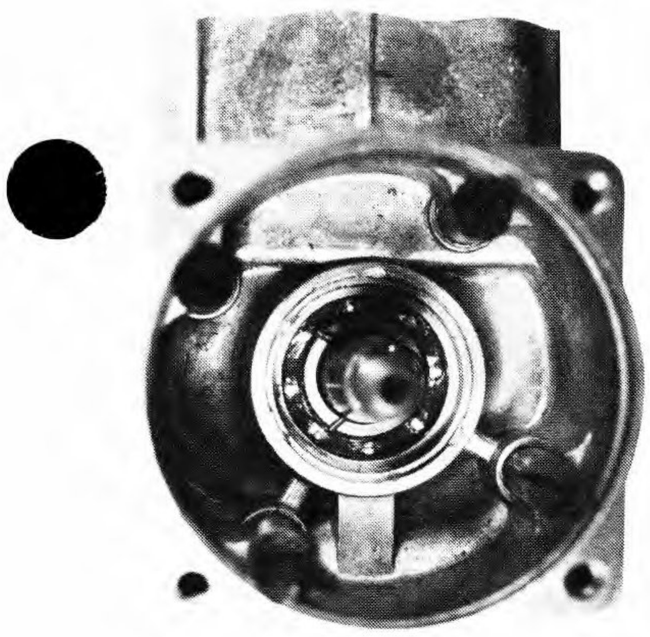


Figure 16

   B. Remove magnetic rotor shaft snap ring.
   C. Press magnetic rotor out of housing.
   D. If drive end bearing is to be removed, use snap ring tool to remove retaining ring.

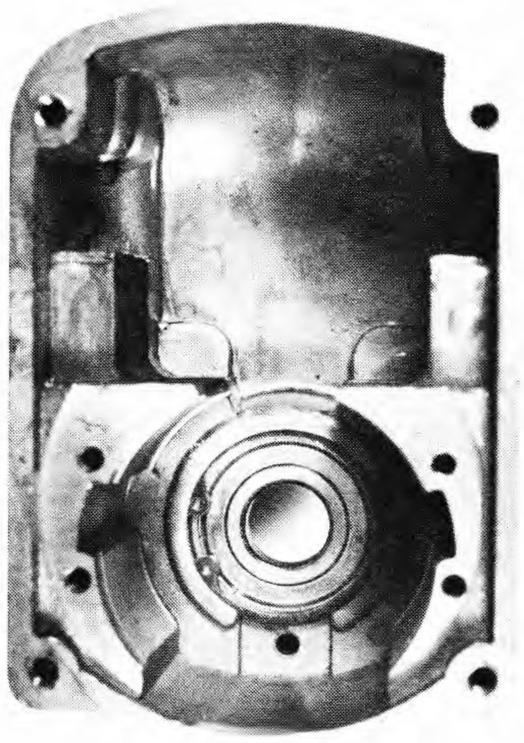


Figure 17

   E. Press the drive end bearing assembly out from the outside of the housing.
   F. Clean and inspect all parts.

6. *Test Procedures for Transformer in End Cap, Speed Limiter and Generator Coil*
   A. Prior to the check of electronic components, the unit should be inspected for physical defects such as cracked bakelite, broken or frayed insulation, pinched or broken wires, faulty contacts, and/or loose mounting screws. Any of these defects can negatively affect performance.
   B. Transformer Secondary Resistance Test
      1. Disconnect brown and black primary wires leading from inside of end cap. Note the two wires leading into the end cap.

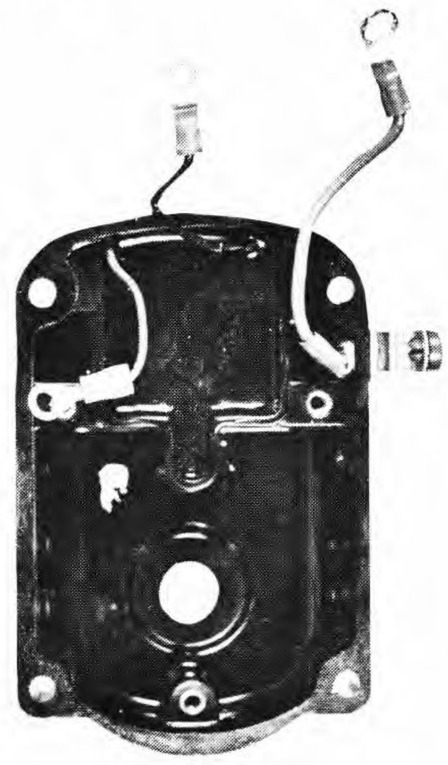


Figure 18

      2. Set ohmmeter in X1000 position.
      3. Calibrate ohmmeter by connecting red and black test probes and using calibration knob to zero ohmmeter.
      4. Continuity-test transformer in end cap by connecting black test probe to either primary wire (brown or black) and using red probe to contact insert in high voltage tower. Transformer resistance should read 1800-2200 ohms. Any transformer which does not meet these specifications is defective. Do not attempt to remove transformer from capsule in end cap.
      5. Before proceeding to next test, reattach black primary wire to generator coil. Leave brown wire open for use in speed limiter test.
   C. Speed Limiter Test
      Early cutout, late cutout and erratic spark may indicate a defective speed limiter.

Using a good transformer in end cap, prepare to test the limiter.

1. Disconnect all three (3) wires leading from speed limiter. While testing, secure the three (3) wires to speed limiter screw opposite the shutdown switch. Replace the yellow wire with the brown wire from the transformer and secure to coil. This procedure removes the speed limiter from the magneto circuit and keeps the wires out of the way while testing the unit.
2. Check to see that all other wires are firmly in place.
3. Install end cap, distributor rotor, cover and gaskets.
4. Mount magneto on test stand and run at operating speed. If the symptoms listed after "C" continue, the speed limiter may be eliminated as a source of the problem. If the symptoms cease, the speed limiter is defective.
5. Replace the speed limiter if it is determined to be defective. Return all wires to their correct terminals for operation.

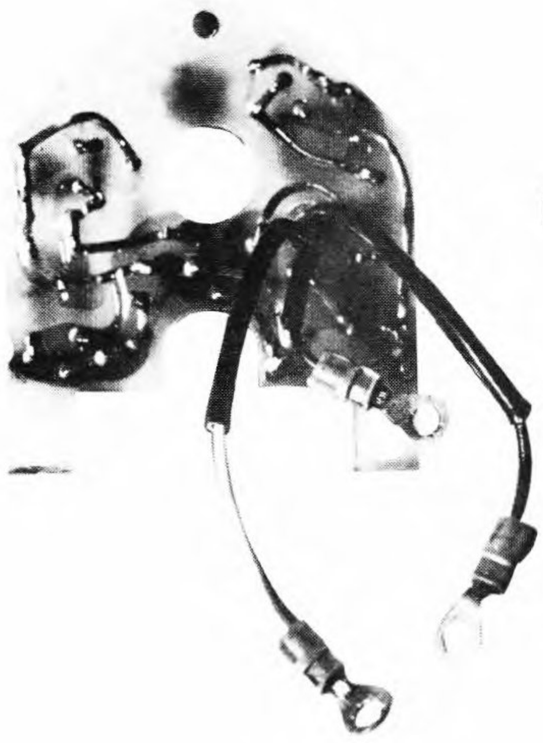


Figure 19

Generator Coil

The generator coil contains electronic circuitry. Do not attempt to test it on a conventional coil tester. A defective coil can be determined in the field only through elimination of the other electronic components as possible sources of poor performance. If the wiring, connections, transformer in end cap and speed limiter are eliminated as sources of the malfunction, the coil may be determined to be defective. In this case it must be replaced.

1. Before disconnecting coil wires, make a diagram for use in reassembling wires.

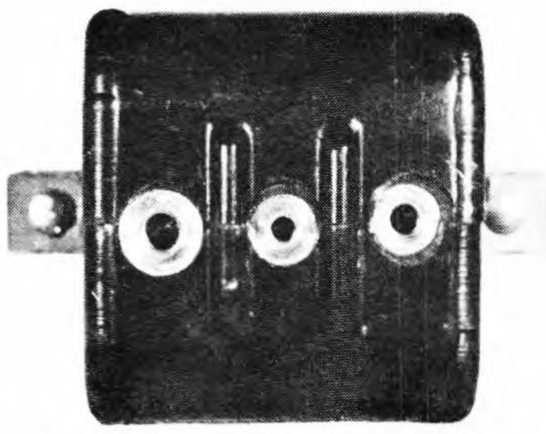


Figure 20

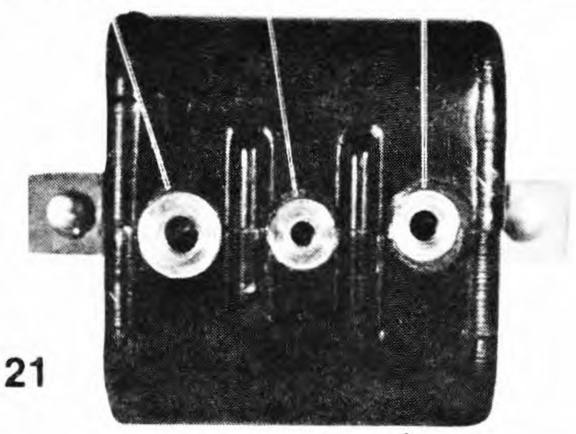


Figure 21

2. Disconnect the four coil wires (one red, one yellow, two black).
3. Replace with a new GV2477C coil if the coil is defective.

ASSEMBLY

7. *Assembly of Impulse Coupling*

A. Before assembly, clean inside of coupling with degreasing solvent.

B. Spread a small amount of lubricating grease (F.M. Part No. IC9) on the coupling spring assembly before installing.

C. Carefully insert the spring in shell in the direction shown below for clockwise rotation.



Figure 22

D. With one end of the drive spring anchored in the shell, the inside end of the spring should be fitted into the *deep* slot in the hub.

E. Using the magnetic rotor as a tool and firmly gripping the shell, turn the coupling hub one (1) complete turn and push it into its final position inside the shell.

8. *Assembly of Magnetic Rotor and Bearings to Housing*
   A. Replace all seals and gaskets.
   B. Press drive end bearing into place from inside of housing. Using a snap ring tool, install a new retaining snap ring.
   C. Press magnetic rotor into drive end bearing.
   D. Install magneto rotor snap ring on magneto rotor shaft. Make sure snap ring is securely seated in groove.
   E. Lubricate edges of oil seal to prevent damage during installation.
   F. Install a *new* inner washer, oil seal and outer washer. Stake the outer washer in position.

9. *Installation of Impulse Coupling*
   A. Insert Woodruff key in the magneto rotor shaft.
   B. Place the impulse coupling in position and tighten down on the shaft by turning the coupling nut.

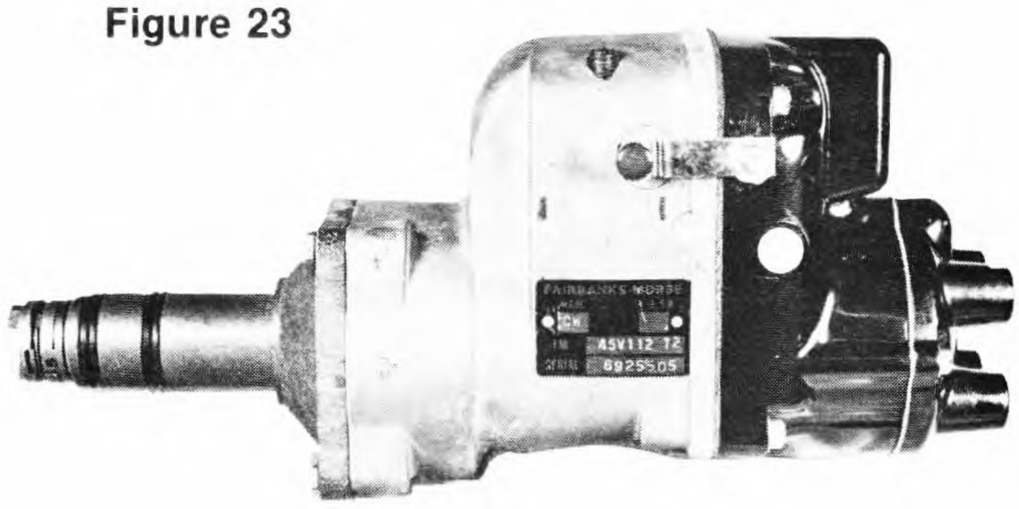
10. *Assembly and Installation of Drive Shaft Assembly*
    A. Mount couplings on end of drive shaft and place metal ring through retaining groove.
    B. Install drive shaft and O-rings in drive shaft housing.
    C. Secure coupling to shaft with roll pin.
    D. Install drive shaft assembly on magneto housing. The slots on the feet of the drive shaft fit the impulse coupling lugs to positively engage the drive shaft. Tighten the four bolts down.

11. *Installation of Electronic Components*
    If the generator coil, speed limiter or transformer in cover have been removed, use the following procedure to reinstall these parts:
    A. Generator Coil
       1. Turn magnetic rotor to break flux lock.
       2. Insert coil in housing. (Raised numbers indicate bottom of coil.) Tighten down set screws on top of magneto.
    B. Speed Limiter Installation
       1. Install speed limiter in cover.
       2. Attach two (2) brown wires (one from transformer, one from speed limiter) to lower right hand speed limiter screw.
    C. Install coil wires. Refer to Chart (Figure #21) for proper location.
    D. Attach black wires from coil and from transformer in end cap to internal ground on bearing support.

12. *Reassembly of External Parts*
    A. Install end cap, new gasket and shaft felt on end cap. Tighten end cap screws evenly.
    B. Install distributor rotor.
    C. Install end cap cover and gasket. Tighten end cap cover screws evenly.

13. *Magneto Test for Proper Operation*
    A. All cylinders must jump 1/4" air gap from pointed electrodes at 200 RPM.
    B. Use the following procedure to adjust the potentiometer:
       1. Remove the white plastic screw from the side of the magneto cover for access to the potentiometer.

Figure 23



2. While running, use a very small screwdriver to regulate speed by adjusting potentiometer to 1900 ±20 RPM for stop firing. Spark should return at 1850 ±20 RPM.
3. After final adjustment, reinstall screw into seal hole.

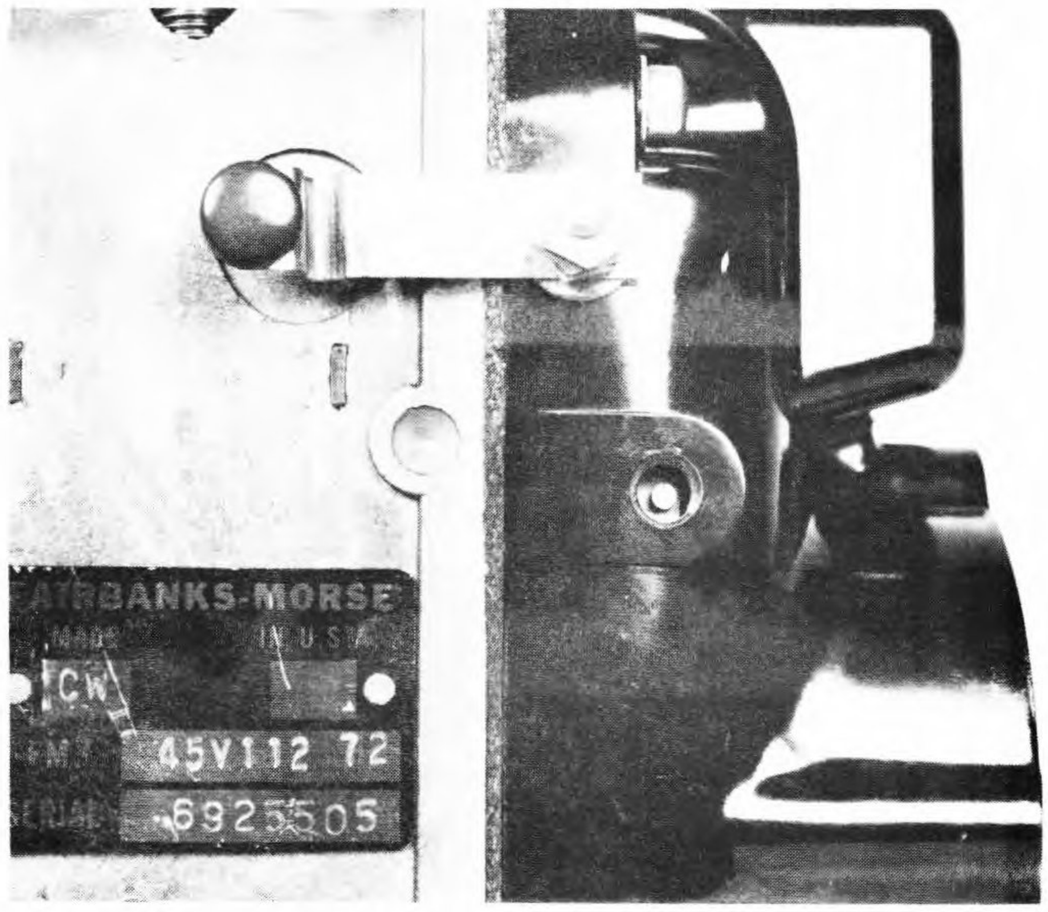


Figure 24