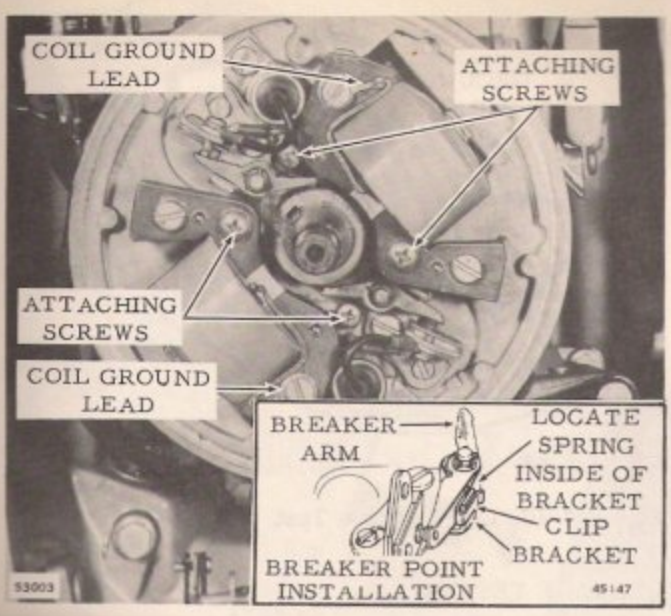

Figure 4-6. Magneto Attaching Screws

CLEANING, INSPECTION, AND REPAIR

ARMATURE PLATE

Clean and inspect bushing (Figure 4-7) for evidence of wear. If worn, a slight lip will appear on upper end of bushing bore. Excessive wear will affect breaker point adjustment. Replace armature plate if worn.

SPARK PLUGS

Inspect plugs for cracked porcelain and worn electrodes. Clean the electrodes with a point file. Adjust gap to the specified .030 inch. In re-gapping, adjust only the ground side electrode, as attempting to bend the center electrode will crack the insulator. See Figure 4-8.

Poor motor performance and premature spark plug failure may result from improper spark plug installation.

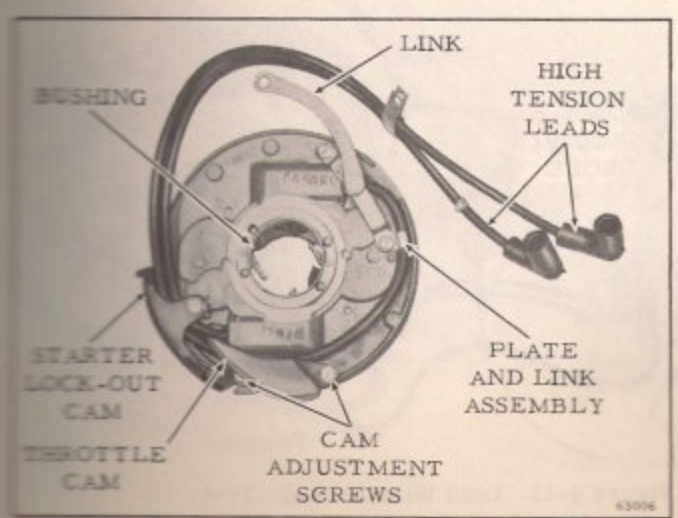

Figure 4-7. Bottom of Armature Plate

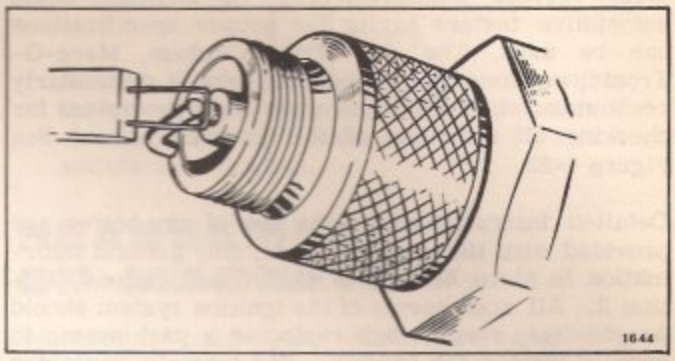

Figure 4-8. Checking Spark Plug Gap

Before installing the plug, be sure the plug seat in the cylinder head is clean and free from obstructions. Install a new spark plug gasket, screw the plug in by hand, then tighten to the specified 17-1/2 to 20-1/2 foot-pounds.

If threads are stripped in cylinder head, Heli-Coil inserts are available. Caution should be taken when installing the Heli-Coil inserts. Tools for inserts are available from your parts distributor.

CLEANING BREAKER POINTS

a. After extensive service, the breaker points may become worn, dirty, or out of adjustment. Inspect the breaker assemblies for corrosion or unusual wear. Questionable breaker points should be replaced. Check action of the spring and free movement of the breaker arm. DO NOT change breaker arm spring tension.

b. Dirt, foreign particles, and oil are very detrimental to contact performance. The oils and acids from a person's hand, even though clean, can affect contact resistance. Oil deposits on the points will cause them to burn out after a very short period of operation. If points need cleaning, use alcohol or trichlorethylene. NEVER FILE POINTS --- replace them.

c. To remove any traces of dirt from contacts, insert a strip of bias tape and work it up and down between the points. Repeat entire cleaning procedure for second set of points.

d. Check points for good electrical contact, using ignition analyzer as described under "Breaker Point Testing." Check and adjust breaker point setting as necessary as described under "Breaker Point Adjustment."

TESTING COILS, CONDENSERS, AND BREAKER POINTS

TEST EQUIPMENT

To determine accurately the condition of components of the ignition system, an ignition analyzer should be used. Without the use of test equipment, coils, condensers, or point assemblies may be replaced needlessly.

A wide variety of ignition analyzers is available from various manufacturers. In addition, some automotive testers having the proper specifications can be used. The use of the Graham, Merc-O-Tronic, or Stevens ignition analyzers is particularly recommended, since these units have provisions for checking all functions of the ignition system. See Figure 4-23.

Detailed instructions for the use of any tester are provided with the unit; therefore, only general information is given here. See Coil Specifications, Section 2. All components of the ignition system should be checked, even though replacing a part seems to have corrected the trouble. For example, replacing points may have increased spark, but a further improvement might be realized if a condenser is found to be weak and is replaced.

COIL TESTING

The coil is tested under conditions of actual operation, as the ignition analyzer provides an interrupted primary current and measures the induced secondary voltage. If the coil is in good condition and is suitable for use, the meter will so indicate.

The coil must be removed from the armature plate for this test. Connect the test leads from the ignition analyzer to the coil, making sure that the black lead is connected to the ground lead of the coil, the red lead to the coil breaker point lead, and the high tension lead to the coil secondary. With the coil index adjusted as specified, note the meter reading. See Figure 4-9.

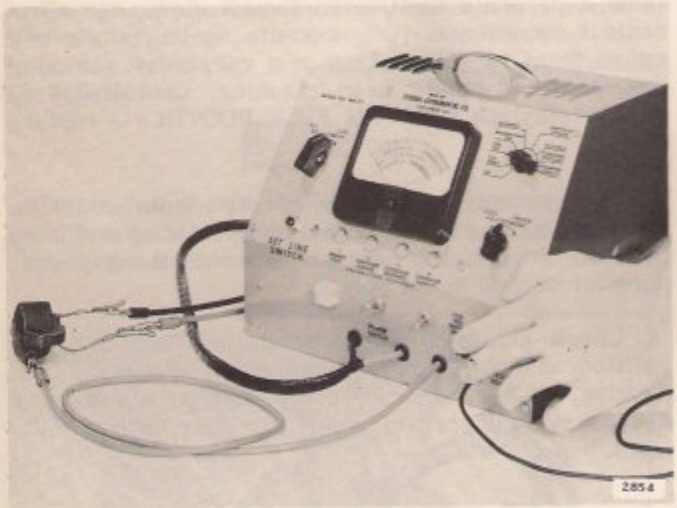

Figure 4-9. Coil Test

A low reading on the tester indicates a weak coil which must be replaced. No attempt should be made to improve this spark by increasing primary current; the coil is defective if it cannot be made to give a good reading on the specified primary current. A completely dead coil is indicated if there is no reading.

Figure 4-10. Coil Leakage Test

LEAKAGE TESTING

Check for leakage from the coil and high tension lead (caused by moisture, cracks in the coil housing, or carbon paths) by running the test probe over the outside of the coil and the high tension lead. Replace any coil which shows any leakage. See Figures 4-10 and 4-11.

SAFETY WARNING

Perform all tests on the coil on a wooden or insulated bench top to prevent leakage or shock hazards.

CONDENSER TESTING

The ignition analyzer provides three tests of condenser condition: condenser leakage, condenser resistance, and condenser capacity.

Refer to Section 2 of this manual for condenser specifications. The condenser may be tested while mounted on the armature plate by disconnecting the lead from the breaker assembly. Connect one test lead to the breaker plate (or the condenser mounting clip if test is made off the plate) and connect second

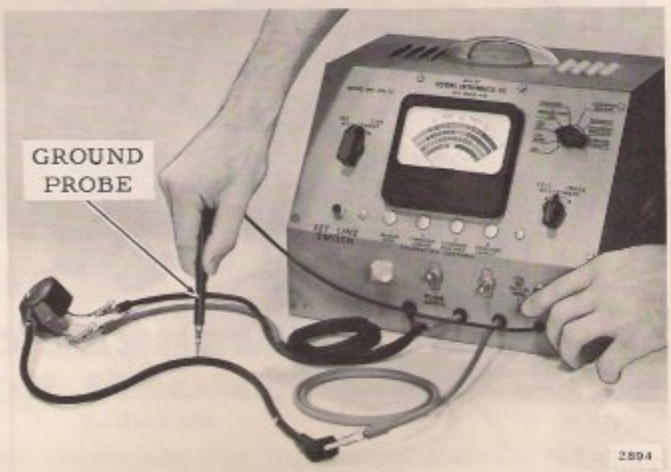

Figure 4-11. Lead Wire Leakage Test

test lead to condenser lead. The condenser should be replaced if it fails to meet any of the three tests. See Figure 4-12.

SAFETY WARNING

High voltage is applied to the condenser in the leakage test. Handle leads carefully and turn selector switch to "Discharge" before disconnecting leads from condenser.

Figure 4-12. Condenser Test

BREAKER POINT TESTING

It is possible to check the electrical condition of the points with the ignition analyzer. Connect one test lead to the breaker arm, and connect the second test lead to the breaker assembly screw terminal.

If the points are good, meter reading will be in the green area on the "Breaker Test" scale. If reading is in red area, do not immediately reject the points, but check the test lead connections to make sure that they are tight. A secure contact is necessary because of the current used in this test. See Figure 4-13.

Figure 4-13. Breaker Point Test

NOTE

NEVER FILE POINTS to bring reading within the green ("good") area. Reject the points if cleaning with trichlorethylene does not give a satisfactory reading.

REASSEMBLY OF MAGNETO

Reassemble components which were removed from the magneto armature plate, following the reverse order of disassembly and paying particular attention to the following:

a. Refer to Figures 4-6, 4-7 and 4-16 for correct reassembly. Correct locating of the coil and lamination assemblies is governed by machined mounting surfaces on the armature plate. Coil lamination heels should be flush with machined surfaces. See Figure 4-14.

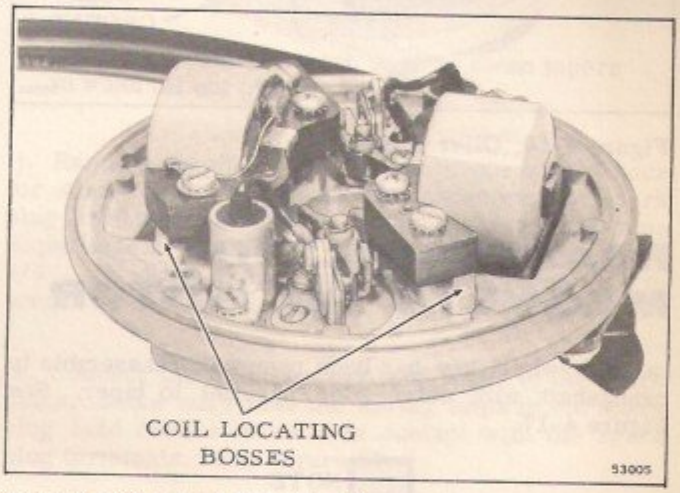

Figure 4-14. Coil Locating Bosses

Alignment of the magneto coils will be simplified with the use of a coil locating ring (Special Tool #317001) machined to fit over the four bosses. See Figure 4-15.

NOTE

Do not connect breaker point leads until after breaker point adjustments.

Figure 4-15. Coil Locating Ring

b. Make sure that a new oiler wick is installed under the forward coil. See Figure 4-16.

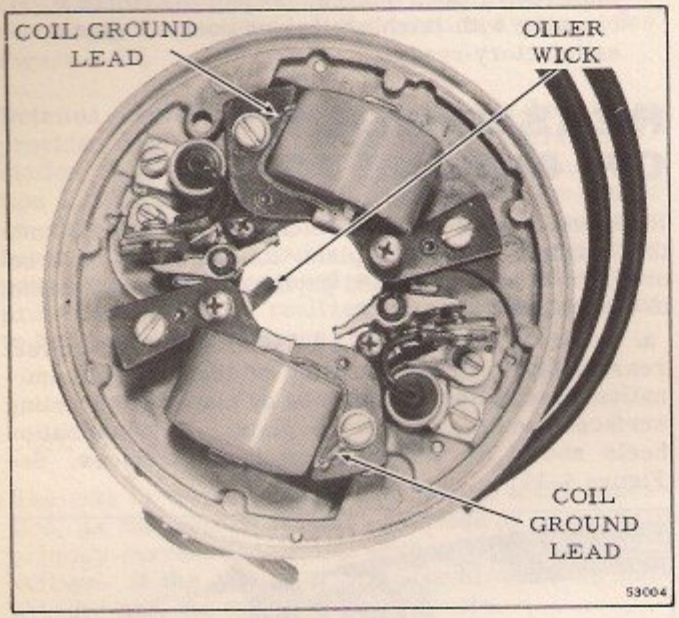

Figure 4-16. Oiler Wick

REASSEMBLY OF MAGNETO TO MOTOR

a. If flywheel key has been removed, reassemble to crankshaft with outer edge parallel to taper. See Figure 4-17.

NOTE

Be sure that the single upset mark on the side of the key is facing down. See Figure 4-17. Incorrect installation of the key will affect cam position and ignition timing.

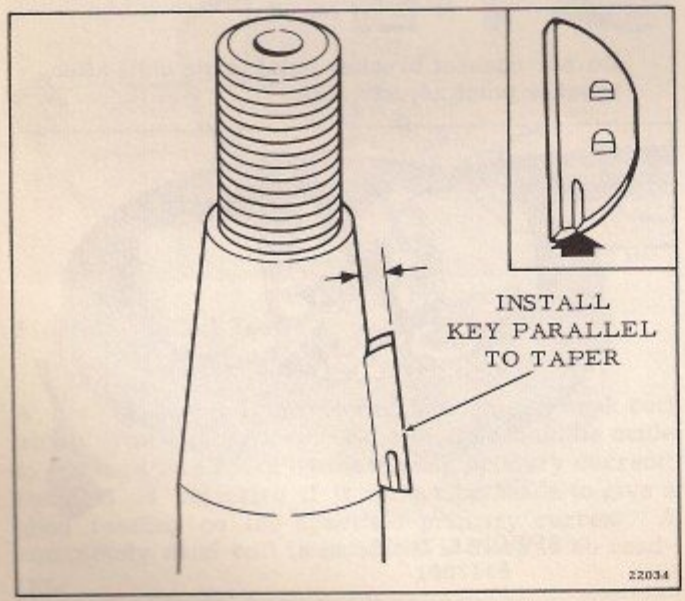

Figure 4-17. Flywheel Key Position Parallel to Taper

b. Install cam, making certain that side marked "TOP" is up. See Figure 4-16.

c. Apply a coat of OMC Sea-Lube* Moly Lube to the magneto support retaining ring, and bushing in armature plate. Attach to power head. Make certain retaining ring is installed with tapered side down. Align screw holes of the magneto support ring to correspond to the position of the magneto. See Figure 4-18. DO NOT add oil or grease to the oiler wick on the magneto.

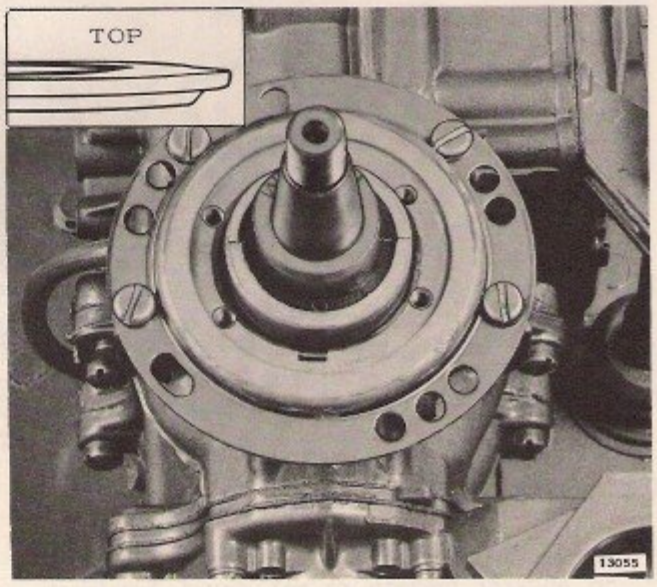

Figure 4-18. Magneto Support Position

d. Place magneto in position over crankshaft, being careful not to damage breaker arms on cam. Do not bend cam follower. Tighten four Phillips head screws.

e. Replace armature link and spring clip.

BREAKER POINT ADJUSTMENT

a. For breaker point adjustment, magneto must be assembled to motor and flywheel must be removed. Place shift lever in forward gear, and turn throttle grip to full advance (Fast).

b. Disconnect all leads from breaker point assemblies. Connect meter or test light between breaker plate and forward breaker point screw terminal. See Figure 4-19.

c. Place timing fixture (Special Tool #383602) on crankshaft. Rotate the crankshaft so that the side of the fixture marked "T" (top) is aligned with the first projection on the armature plate. See Figure 4-19.

NOTE

To avoid water pump impeller damage, rotate the crankshaft in a clockwise direction only.

*Trade Mark

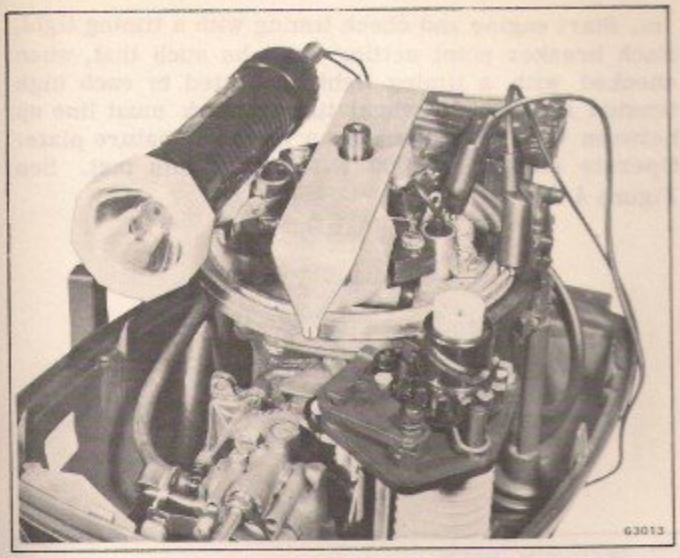

Figure 4-19. Connections for Checking Timing

d. Move the timing fixture clockwise slowly until the exact instant at which the points open is determined, as indicated by the light or meter. The points should break open when the timing fixture is midway between the two projections on the armature plate.

e. If the timing is not correct, rotate the crankshaft clockwise one complete turn and align the timing fixture between the timing marks. Adjust points until the meter or light just indicates an open circuit. See Figure 4-20.

NOTE

If new breaker point assemblies were installed, allow for seating of the breaker arm by adjusting breakers so that points will break open at first mark.

f. Recheck timing as described above.

g. If timing light or meter is not available, use a feeler gage to adjust breaker points. Point gap should be set to .020 inch (new points - .022 inch) with the breaker arm rubbing block on the high lobe of the cam (full open).

h. Rotate crankshaft through 180° clockwise, and repeat entire procedure for second set of points.

i. Check crankshaft and flywheel tapers for any traces of oil. This assembly must be perfectly dry - swab tapered surfaces with solvent and blow dry with compressed air. Inspect both tapers for burrs or nicks.

NOTE

DO NOT permit solvent used to clean tapers to wash oil out of oiler wick.

j. Replace flywheel but do not torque nut. Check for spark on each cylinder by connecting the spark plug high tension leads to a spark checker (Stevens Experimental Co. Part #S-21 or S-13), gap set to 1/4". If spark jumps gap, tighten flywheel nut to torque specified in Section 2.

k. Connect the high tension lead wires to the spark plugs. Make sure that the spring clips in the spark plug lead covers make firm contact with the spark plug terminals. See Figure 21.

l. Check throttle cam adjustment as described on page 3-8.

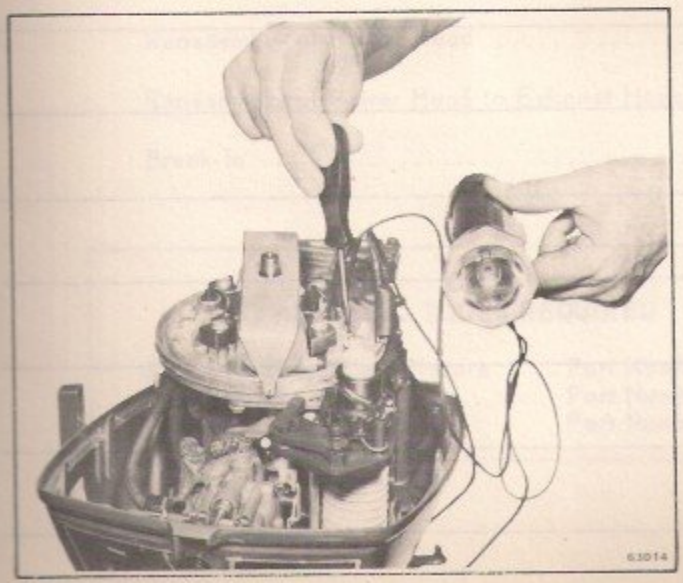

Figure 4-20. Adjusting Breaker Points

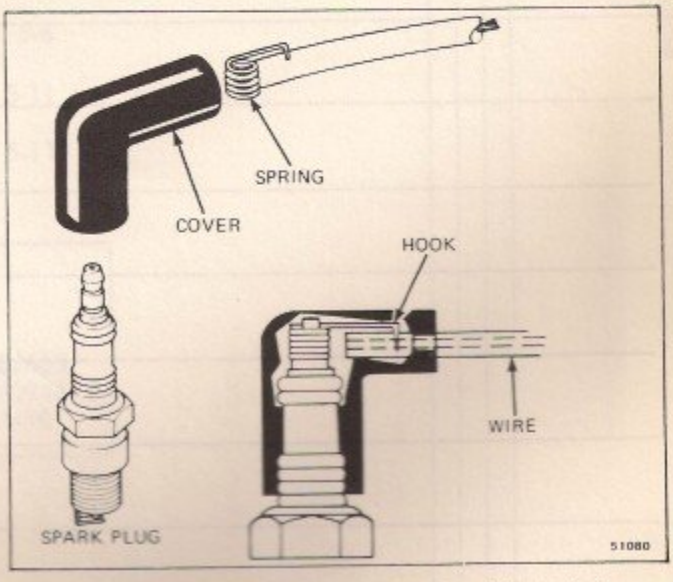

Figure 4-21. Correct Spark Plug Lead Installation

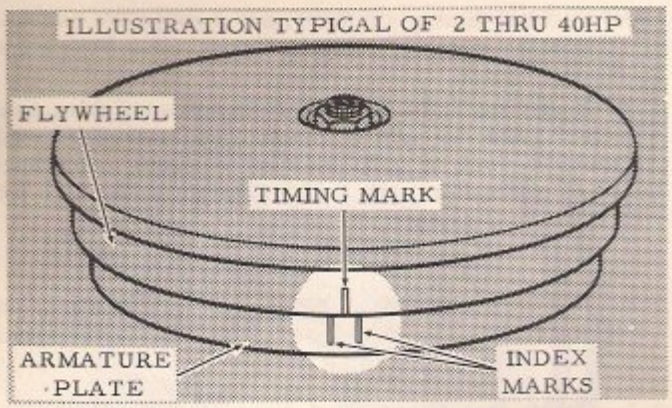

Figure 4-22. Checking Timing with Engine Running

m. Start engine and check timing with a timing light. Each breaker point setting must be such that, when checked with a timing light connected to each high tension lead, the flywheel timing mark must line up between the two index marks on the armature plate. Operate engine at 1000 R.P.M. for this test. See Figure 4-22.

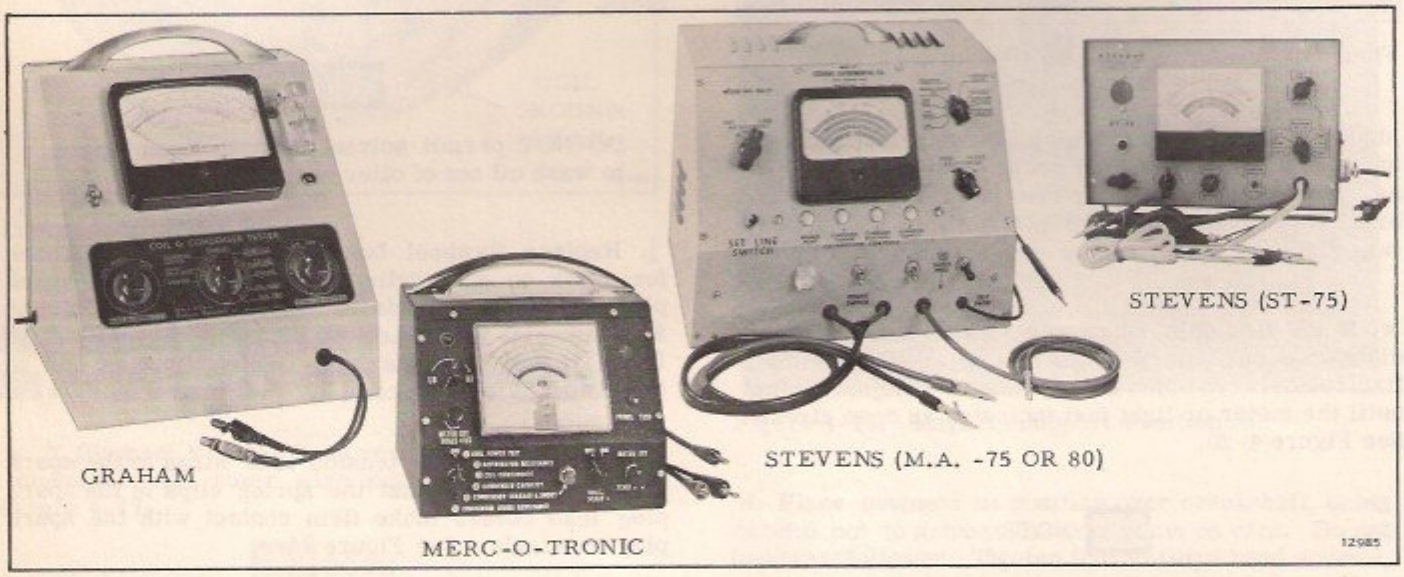

Figure 4-23. Ignition Analyzers

NOTES