

C O N T E N T S

SUBJECT	PAGE
GENERAL INFORMATION	5
COMPRESSION	5
IGNITION	6
Spark Plugs	6
Distributor	6
Ignition Coil	8
Ignition Timing	9
VALVE ADJUSTMENT	10
CARBURETION	10
Fuel Pump and Filter	10
Carburetor	10
Combustion Analysis	10
ROAD TEST	11

GENERAL INFORMATION

Present day engines require periodic checking and adjustment to maintain peak performance and assure economical operation. This engine "tune-up" procedure should be performed seasonally, in the spring and fall, and more often if required due to operating conditions. Checking compression, inspecting and adjusting ignition and inspecting and adjusting carburetion are the necessary steps for a systematic tune-up procedure and should be performed in the sequence listed in this Section.

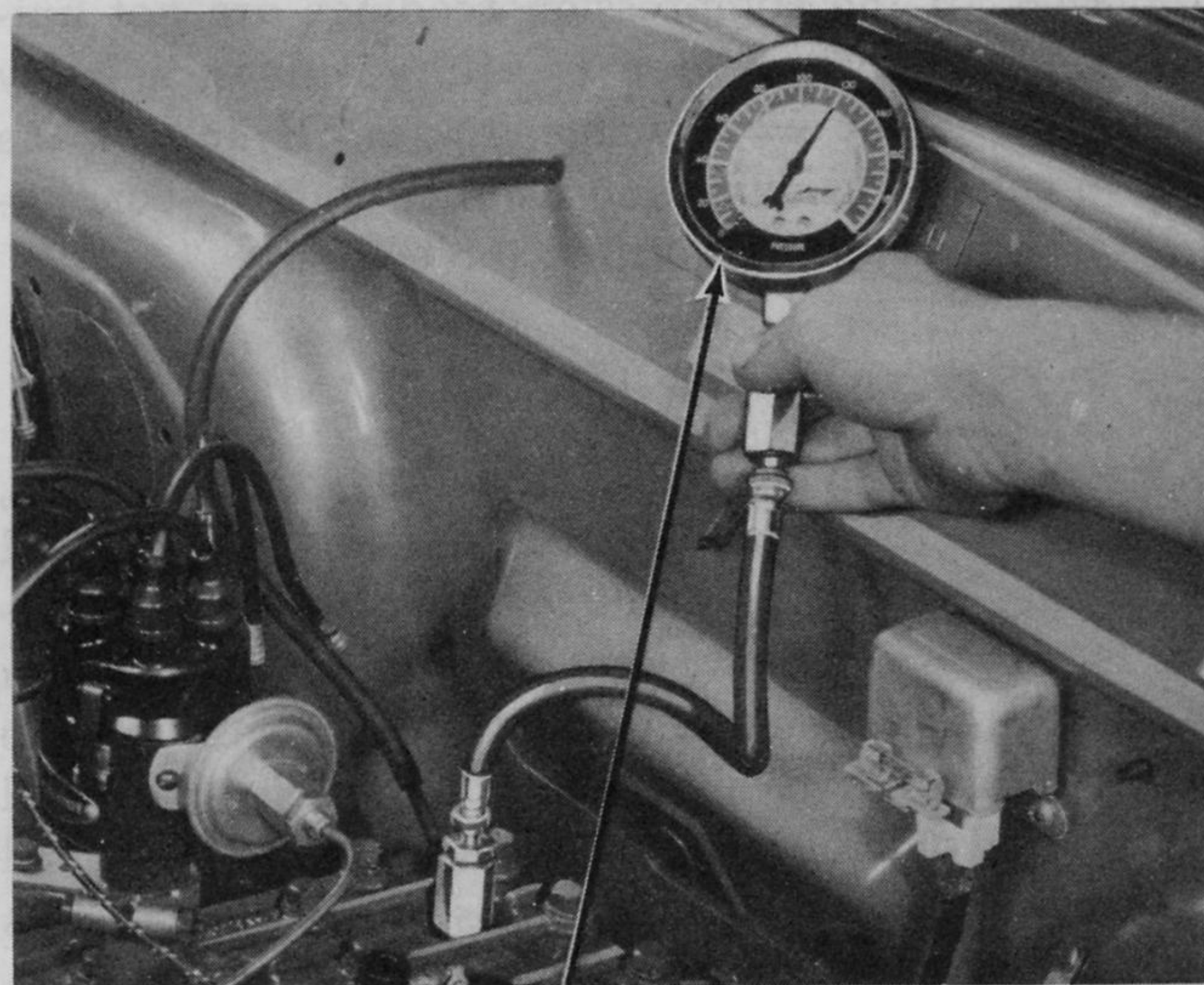
COMPRESSION

Uniform compression in all cylinders will result in uniform power, and a smooth-running and efficient engine. **Specified** uniform compression indicates that pistons, rings, valves, and gaskets are in good condition.

Cylinder compression at **cranking speed** of the Kaiser Supersonic engine is 120 to 130 pounds.

a. COMPRESSION TEST. The compression test must be conducted at the **normal operating temperature** of the engine, using standard testing equipment. The following steps constitute the compression test procedure:

1. Disconnect the vacuum spark advance connection at the distributor.
2. Remove the distributor cap and spark plug wires.



Compression Gauge—W-189

SP-1286

Fig. 5—Checking Cylinder Compression

3. Remove the distributor to provide access to No. 5 spark plug.
4. Loosen the spark plugs and blow out the spark plug wells.
5. Remove the spark plugs and gaskets.
6. Tighten the cylinder head bolts and manifold nuts to 30-35 ft. lbs. torque.
7. Insert the Cylinder Compression Gauge W-189 in No. 1 spark plug hole (Fig. 5).
8. Set the throttle in the full open position.

KAISER-FRAZER SHOP MANUAL

9. Using the engine starter, crank the engine five or six complete revolutions.

10. Note the compression reading on the test gauge.

11. Repeat the foregoing operations for each cylinder.

The maximum allowable variation between cylinders is 10 pounds. If the compression readings are uniform on all six cylinders, but higher than normal, it is probably due to an excessive amount of carbon in the cylinder head and on top of the pistons. If the compression readings are uniform on all six cylinders, but considerably lower than normal, pour a teaspoonful of engine oil in each spark plug opening. Again check the compression of all six cylinders.

If the compression is higher, it indicates that the pistons or rings are worn or broken and should be replaced. If the compression readings are not uniform, it is probably due to faulty valves, a leaky head gasket, or worn valve guides. If any of the above conditions exist, the trouble must be corrected before attempting to tune the engine.

IGNITION

Proper ignition requires that all wires, circuits, and pertinent electrical units be clean and in good operating condition. Included in the engine tune-up is an inspection of components of the ignition system affecting engine performance. These are the spark plugs, coil, distributor, condenser, and all cables and wiring of the ignition system. Detailed inspection and repair operations of the components of the ignition system other than those covered in the following paragraphs will be found in Section 15, "Electrical," in this manual. The following steps must be covered:

a. SPARK PLUGS. The spark plugs must be thoroughly inspected, cleaned and the electrode gaps reset before installation in the engine. Proceed as follows:

1. Inspect the spark plugs for cracked or chipped porcelain and burned or pitted electrodes. Replace the plug if any of these conditions are evident.

2. Clean the spark plugs and reset the electrode gap to .032 inch by **bending the outer electrode.**

3. Install the spark plugs in the engine, using new

spark plug gaskets. Specified torque for the spark plugs is 30 ft. lbs.

b. DISTRIBUTOR. The distributor acts as a rotating switch in the ignition system, distributing the electrical impulses at the proper time and in proper order to the spark plugs. The distributor should be tested and adjusted on a Distributor Tester to assure efficient engine operation under actual running conditions. Every tune-up job must include a complete distributor test. The testing should be done in accordance with the testing equipment manufacturer's instructions and recommendations, giving the necessary attention to the following items:

1. Distributor Cap. Replace the distributor cap if it is cracked, has carbon tracks, or if the metal inserts are excessively burned. If the cap is in serviceable condition, clean it thoroughly with carbon tetrachloride inside and out, particularly the inserts and the spark plug wire sockets. Make certain that the carbon brush is free in its recess in the center of the cap.

2. Wiring and Terminals. Inspect the primary and secondary wiring insulation and terminals. If the insulation is cracked or worn, or the terminals are cracked or corroded, replace the defective parts.

3. Distributor Rotor. Replace the rotor if it is cracked, if the insulation has a carbon track, or if the metal sector is excessively burned. If the rotor is in serviceable condition, clean it with carbon tetrachloride.

4. Distributor Cam and Bearings. Make a quick check for cam play that might result from worn distributor shaft and bearings. Apply pressure against the cam in first one direction and then the other with the thumb and fingers. If there is excessive play, replace or rebuild the distributor. Paragraph 6, (a), in this Section explains a method of checking this play in the Distributor Tester and how to measure the amount of bearing play with a dial gauge is described in Section 15 "Electrical."

5. Distributor Points. Inspect, clean, and adjust the distributor breaker points. If the points are burned or pitted replace them. If they show a grayish color and only slight pitting, do not replace them.

If the points are to be spaced with the distributor installed on the engine, adjust the breaker point

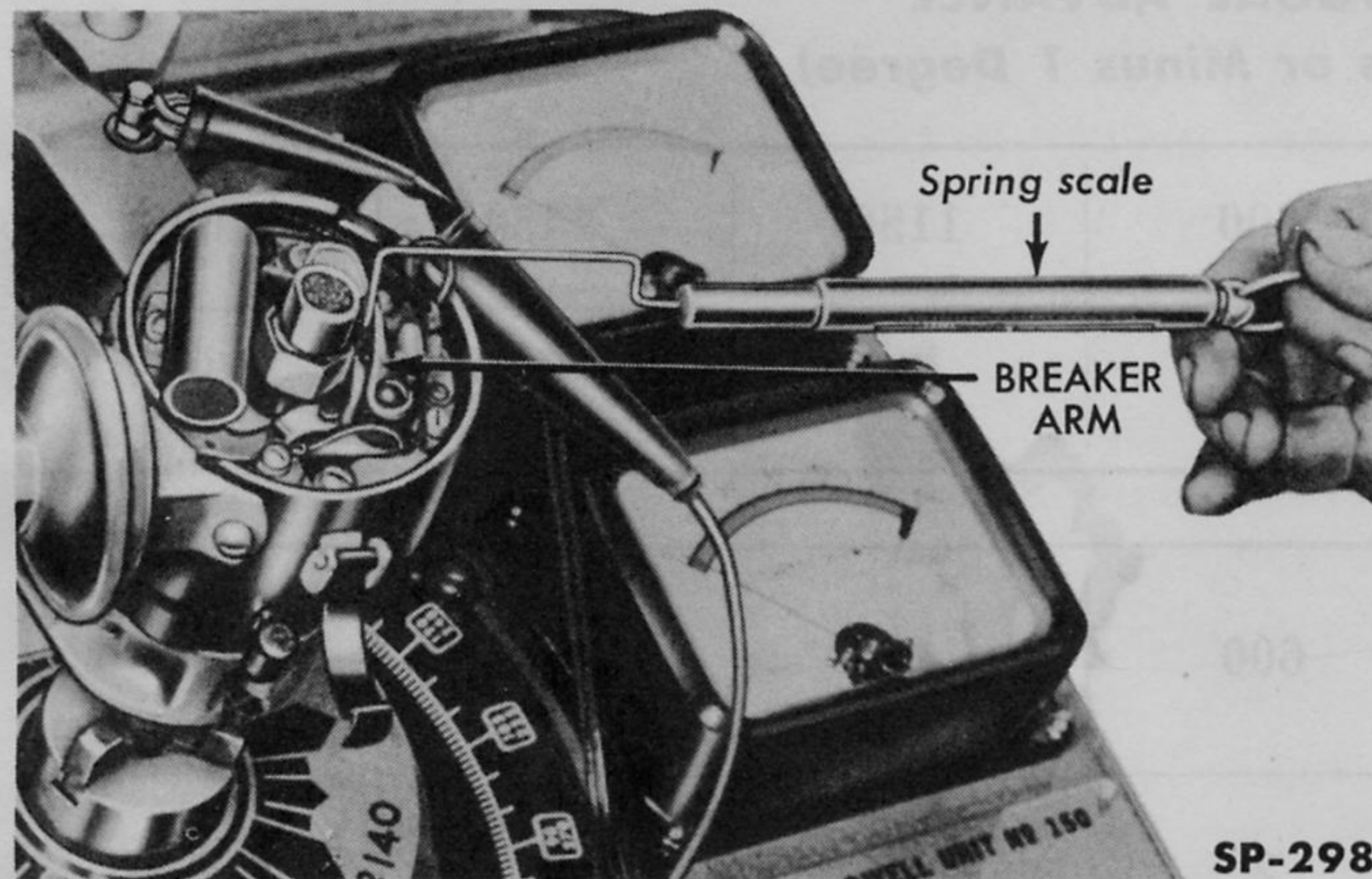


Fig. 6—Checking Breaker Arm Spring Tension

gap to .020 inch on Auto-Lite distributors and .022 inch on Delco-Remy distributors with the breaker arm rubbing block on a high point of the cam. The points should be in proper alignment and new points should make contact near the center.

Check the breaker arm spring tension, in line with the points, with a spring scale calibrated in ounces. The tension must be between 17 and 20 ounces (Fig. 6).

To correct the tension, adjust the spring or replace the points. Adjustment for increasing or decreasing spring tension is provided by a slot in the end of the spring where it is held by the breaker plate clip and screw. Too low a tension will cause missing, particularly at high speed. Too high a tension will shorten life of the breaker arm rubbing block.

6. Distributor Performance Tests. Install the distributor in a Distributor Tester as shown in Figs. 7 and 8.

(a) Cam and Bearing Play. Drive the distributor at low speed. With a wood dowel, or piece of plastic or brass rod, in the end of the cam, as shown in Fig. 7, apply pressure alternately toward and away from the breaker arm rubbing block. If checking the distributor used on Kaiser models apply pressure directly to the side of the cam due to the slot at the upper end of the cam which might interfere with the wood dowel. Play resulting from shaft and bearing wear will change both the spark position indication on the degree ring and the dwell angle. Instructions for bearing replacement are provided in Section 15, "Electrical."

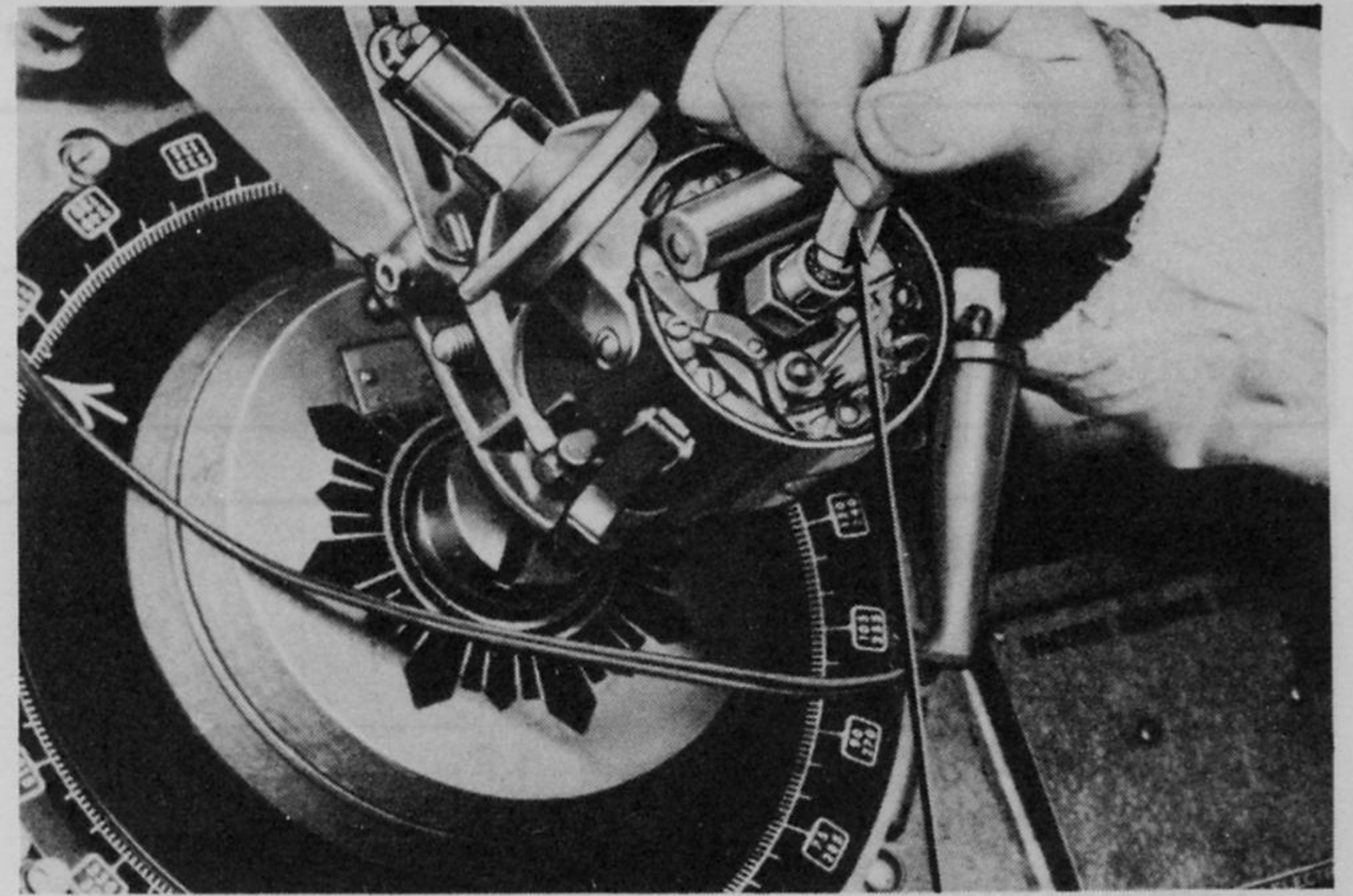


Fig. 7—Checking Distributor Shaft and Bearing Wear

(b) Centrifugal Spark Advance. Make a quick check of the centrifugal (governor) advance mechanism. Turn the rotor and cam with the fingers to extend the governor weights. When the rotor is released the spring should return the cam to the retarded position. Following the Distributor Tester manufacturer's instructions, check the centrifugal advance (Fig. 8) at specified distributor speeds shown in the following table or in curves in Section 15, "Electrical." Instructions for replacing springs and adjusting the centrifugal advance are given in Section 15.

(c) Breaker Point Resistance and Dwell Angle. Make distributor resistance and dwell angle (often called "cam angle") tests with a Distributor Tester

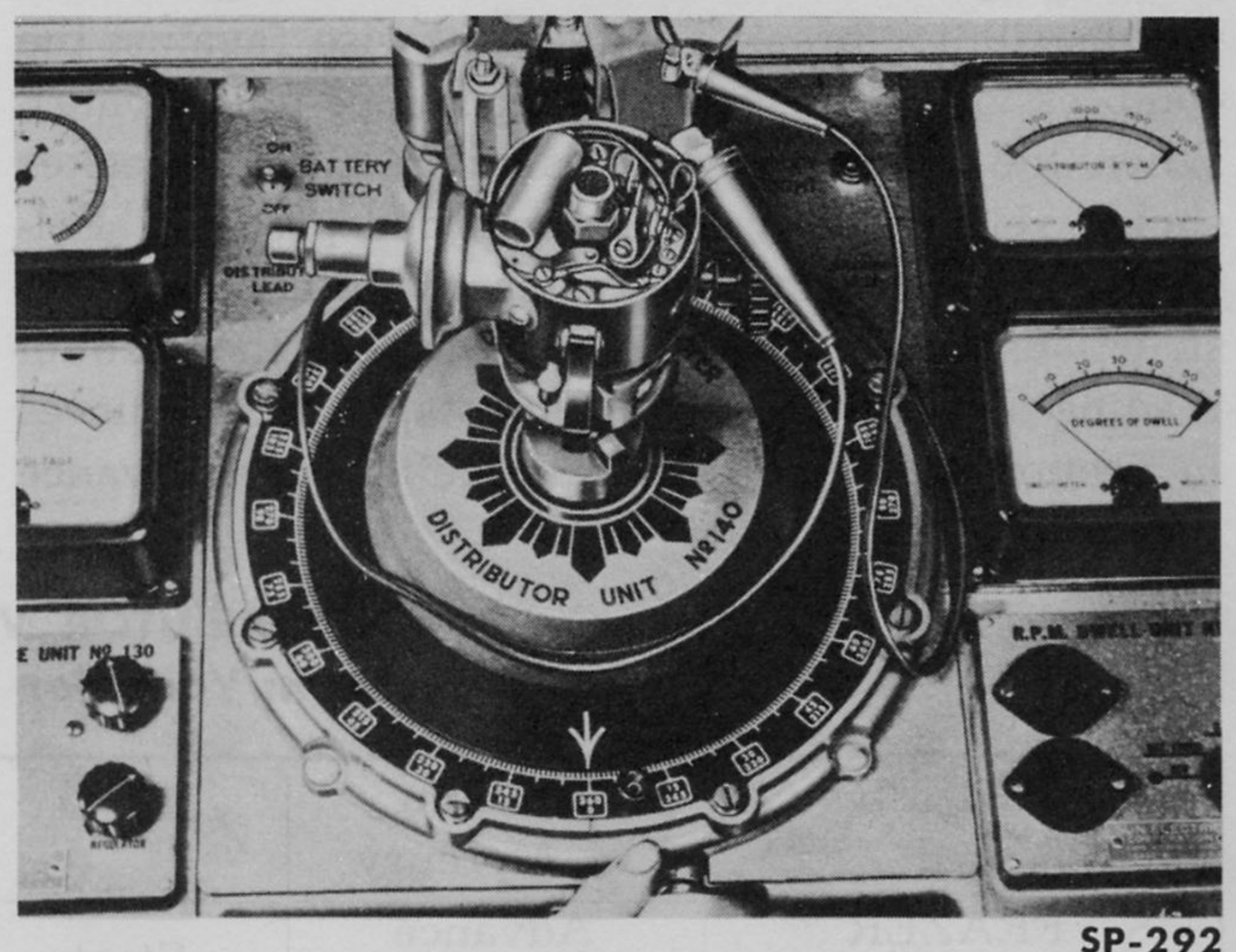


Fig. 8—Checking Centrifugal Spark Advance

KAISER-FRAZER SHOP MANUAL

DISTRIBUTOR CENTRIFUGAL ADVANCE (Maximum Variation Plus or Minus 1 Degree)

KAISER MODELS (with Delco- Remy distributor)	Distributor RPM	325	600	1150	1450	1600
	Distributor Degrees	Start	2	6	8	9

KAISER and FRAZER MODELS (with Auto- Lite distributor)	Distributor RPM	325	600	1140	1480	1680
	Distributor Degrees	Start	2	6	8	9

in accordance with the manufacturer's instructions. The distributor resistance should be checked to detect any high resistance within the distributor low-tension circuit. Excessive resistance can be caused by bad breaker points or poor contacts in the primary circuit.

The dwell angle test will determine the breaker cam angle during which the breaker points are in contact. With the tester in operation, adjust the breaker point gap to obtain a dwell angle of 38 degrees on Auto-Lite distributors and 37 degrees on Delco-Remy distributors. (Distributor shaft and bushing wear may cause the dwell angle indicator pointer to fluctuate at low test stand speed).

(d) Vacuum Advance. Make a quick check of the vacuum advance unit for free movement. By pushing against the condenser with the fingers, turn the distributor breaker plate clockwise (against the compression of the centrifugal advance unit spring). When the finger pressure is released the breaker should return freely to the retarded position. Following the Distributor Tester manufacturer's instructions, check the vacuum advance at the vacuum reading shown in the following table, or in curves in Section 15, "Electrical." If the vacuum advance

does not conform to the specifications, make the adjustments detailed in Section 15.

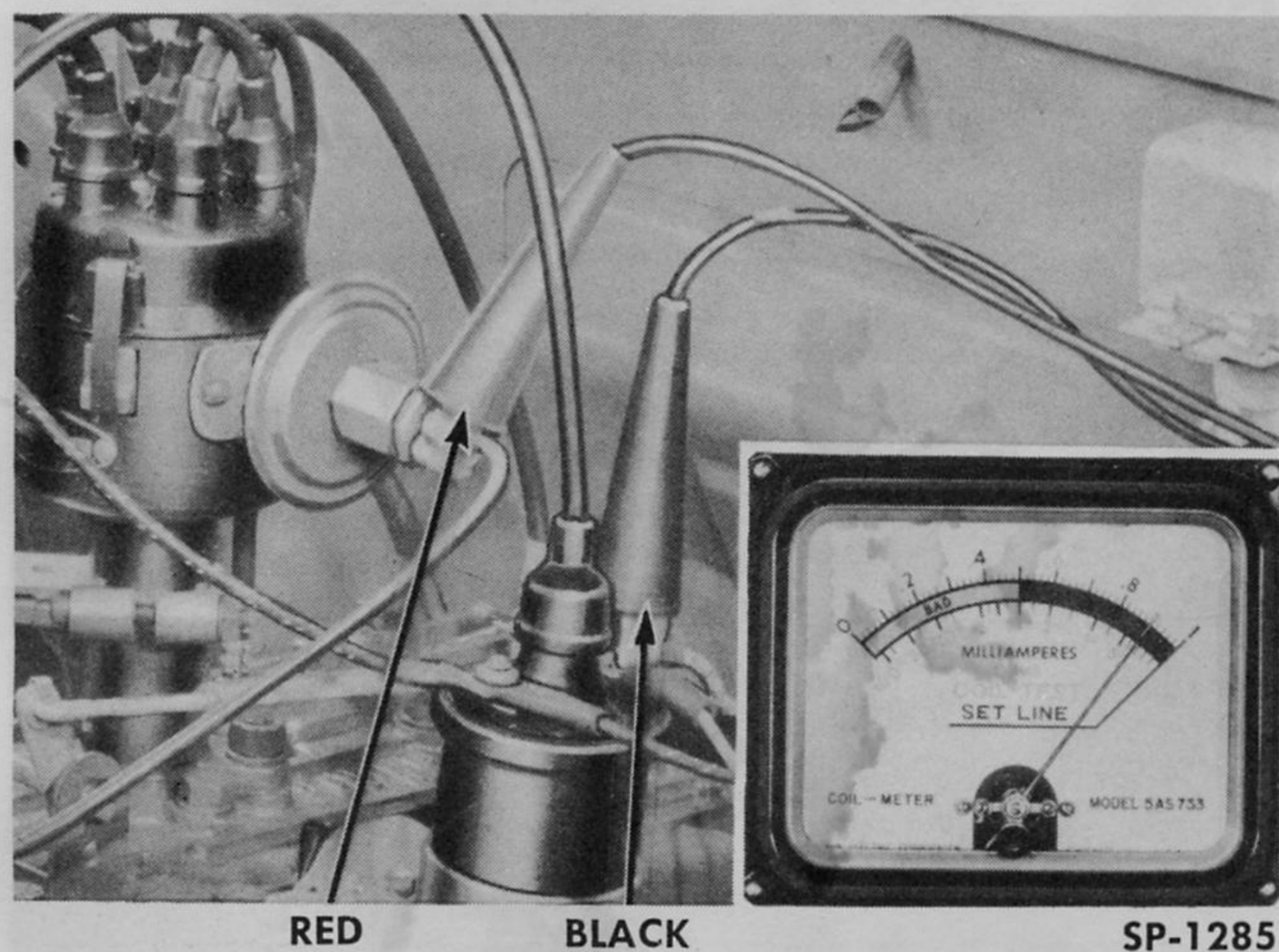
(e) Condenser. Inspect the condenser and check its performance according to the instructions of the Distributor Tester manufacturer. Replace the condenser if its performance is not satisfactory. The distributor specifications call for a condenser capacity of .20 to .25 microfarads and insulation resistance of 500,000 ohms.

c. IGNITION COIL. Clean the coil thoroughly and check the cables and the tightness of the terminals. Check the high-tension cable socket. Look for any crack in the insulation or any carbon track. Most ignition coil troubles are caused by loose connections, moisture, or dirty condition. If there is reason to suspect internal coil trouble, make a current draw test or make coil bench tests according to the instructions of the test equipment manufacturer (Fig. 9). For further information regarding coil tests see Section 15, "Electrical."

To check the current draw detach one primary cable from the coil and insert a low-reading ammeter between the cable terminal and the coil terminal. The current draw (cold), with the breaker

DISTRIBUTOR VACUUM ADVANCE (Maximum Variation Plus or Minus 1 Degree)

KAISER and FRAZER MODELS	Vacuum In. Mercury	10	11	13	14	15
	Advance Dist. Degrees	Start	1	3	4	5



RED BLACK SP-1285
Fig. 9—Coil Performance Test

points in contact, should be 4.8 amperes at 6.3 volts. A coil with internal failure in either the primary or secondary winding is not repairable. Install a new coil.

d. IGNITION TIMING. Install the distributor and connect the electrical cables. If the position of the distributor main drive shaft has been affected by the distributor removal at the start of the tune-up procedure, it must be repositioned. The shaft must be installed and positioned with the offset (narrow) side toward the manifold side of the engine when the "No. 1" piston is on the compression stroke and the timing pointer aligns with the zero calibration of the vibration damper.

The manual timing of the distributor and engine is accomplished with a timing light. Proceed as follows:

1. Adjust the carburetor for the slowest possible low idling speed. This can be determined by use of the tachometer in the standard test equipment.

2. Attach the terminal of the small red cable of the Ignition Timing Light C-693 to the battery positive terminal (or to convenient ground), the terminal of the small black cable to the battery negative terminal (or to the hot terminal of the starter solenoid switch), and the heavy cable terminal to the No. 1 spark plug (Fig. 10).

3. With the engine running at lowest possible smooth idle speed (should be below 450 RPM) loosen the distributor advance arm bolt that extends down through the arm into the distributor mounting

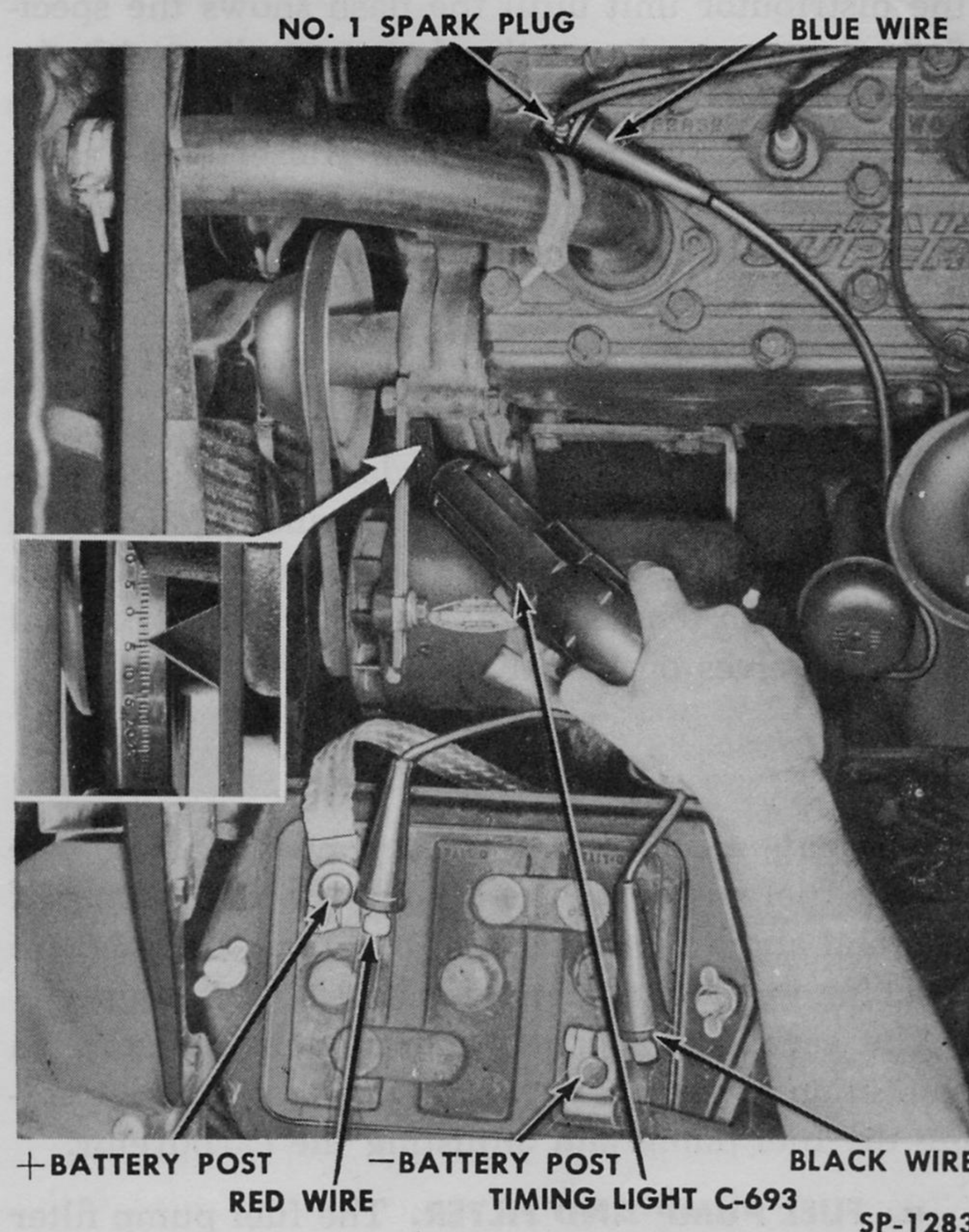
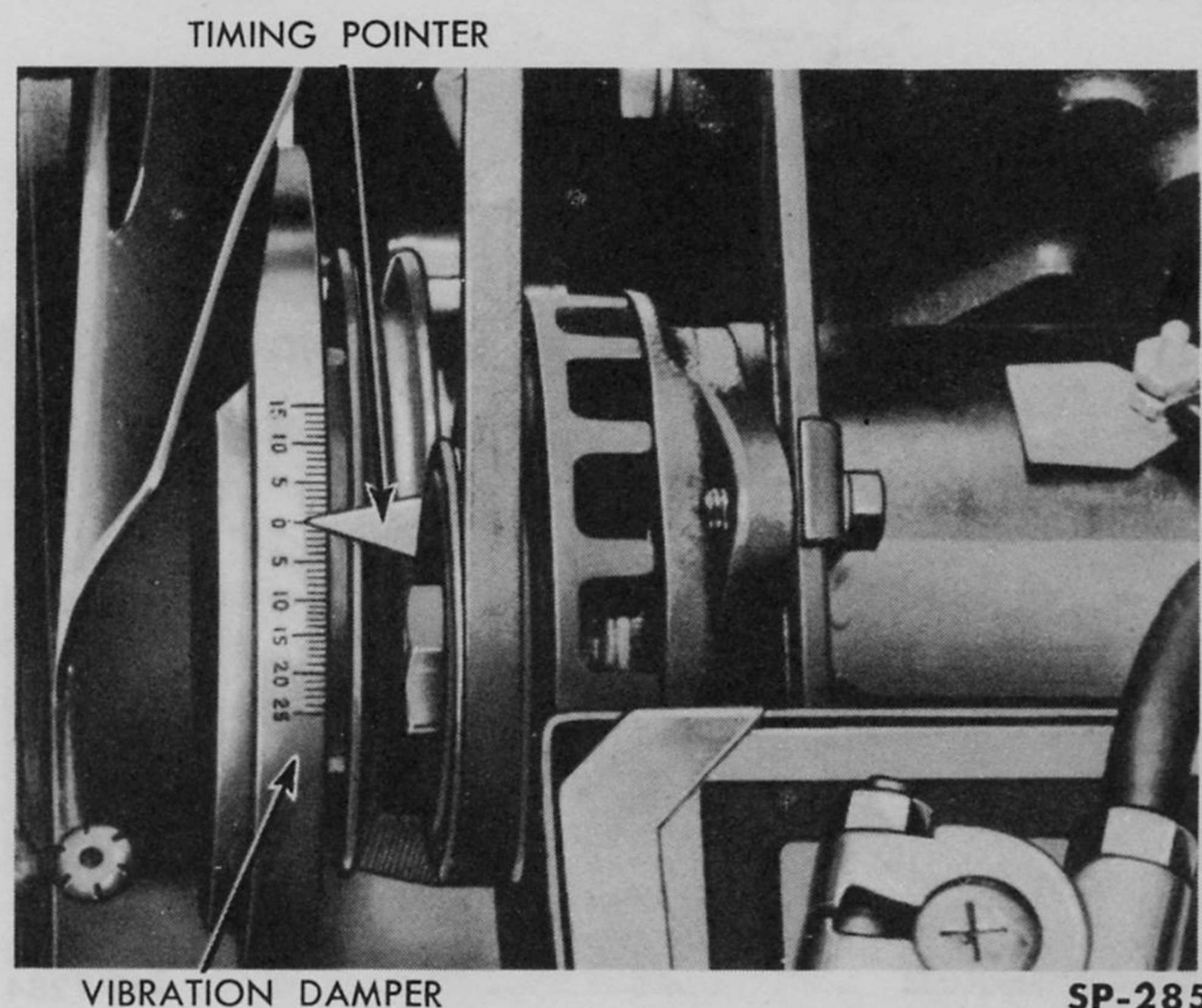


Fig. 10—Timing Distributor and Engine

adapter; move the arm to center the slot with respect to the bolt.

4. Then loosen the bolt that extends upward through the 45 degree slot in the advance arm into the distributor housing (base). Advance or retard



SP-285
Fig. 11—Vibration Damper Calibration and Pointer

KAISER-FRAZER SHOP MANUAL

the distributor unit until the flash shows the specified advance marks on the damper in line with the pointer (Fig. 11). The proper timing is 4 degrees before top dead center for both Kaiser and Frazer models. After the desired setting has been obtained tighten the bolt, re-check the timing, and remove the Timing Light C-693.

VALVE ADJUSTMENT

Adjust the valves in accordance with the procedure outlined in Section 1B, "Engine Repair." The tappet clearance should be adjusted to .014 inch cold (at room temperature) for both the intake and exhaust valves on both Kaiser and Frazer.

CARBURETION

Efficient carburetion is dependent upon the proper fuel supply to the carburetor, the mixing of fuel and air in the carburetor and upon the mixture reaching the combustion chambers of the engine.

The carburetion check and tune-up includes an inspection of the fuel system, cleaning and inspecting the fuel pump and adjusting the carburetor.

a. FUEL PUMP AND FILTER. The fuel pump filter bowl must be cleaned and the pump action checked to assure efficient operation. Proceed as follows:

1. Remove the filter bowl and screen, and clean them thoroughly. Install the bowl and screen using a new bowl gasket.
2. Test the fuel pump pressure using Fuel Pump

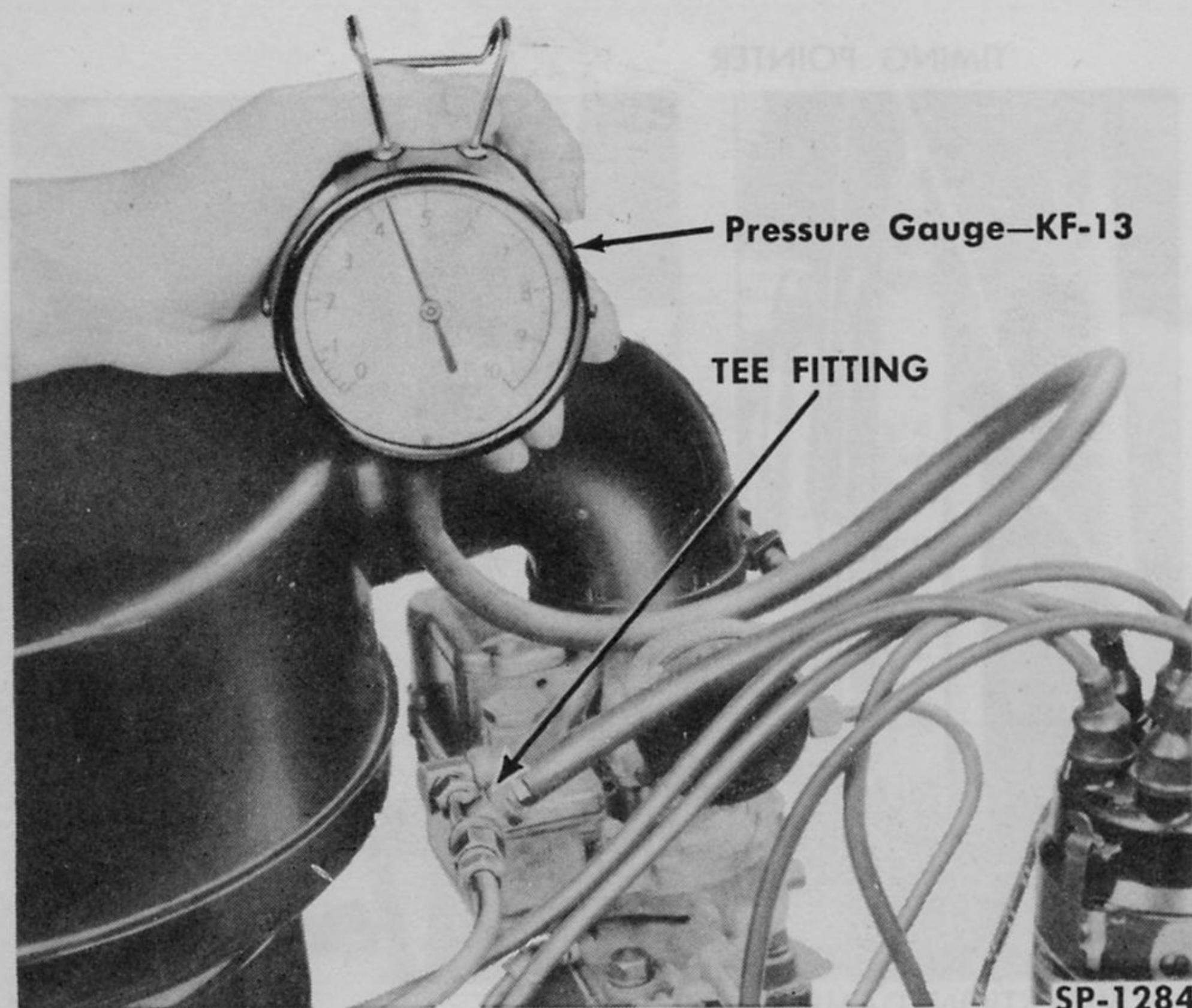
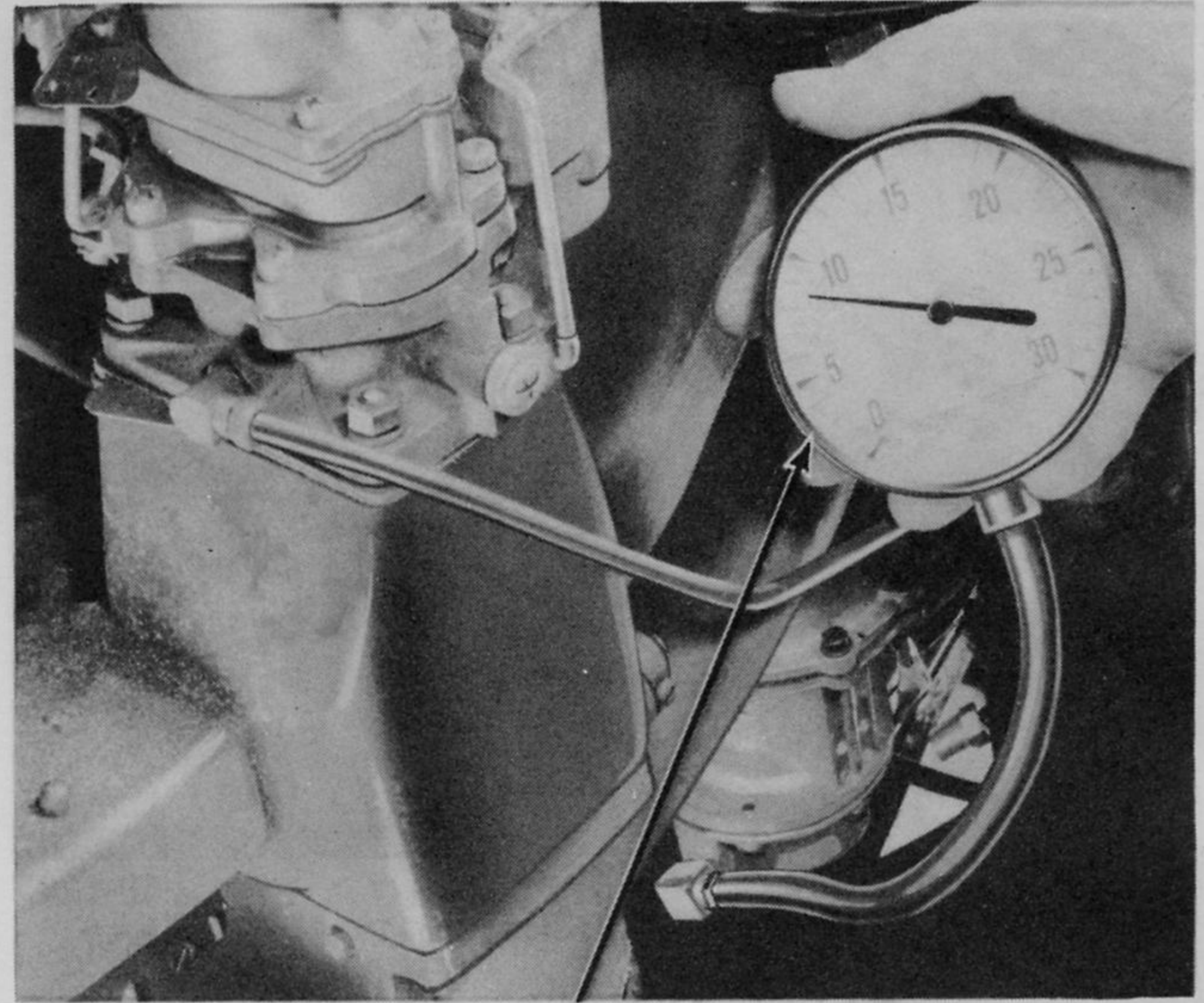


Fig. 12—Testing Fuel Pump Pressure



Vacuum Gauge—C-425 SP-1288
Fig. 13—Testing Fuel Pump Vacuum

Checking Gauge KF-13 (Fig. 12). With the engine operating at a fast idle, at normal operating temperature, the pressure should be 3½ to 4½ pounds. Insufficient fuel pump pressure can result from leaks, split seams, kinks and obstructions in the fuel lines as well as a defective pump. High fuel pressure may be corrected by adding gaskets between the pump body and engine block as detailed in Section 2, "Fuel" in this manual. In the case of low pressure due to a defective fuel pump, the pump must be removed and reconditioned, or replaced.

3. Test the fuel pump action using a Vacuum Gauge C-425 (Fig. 13). Disconnect the fuel pump "inlet" and "outlet" lines and connect a vacuum gauge to the inlet side of the fuel pump. Crank the engine and observe the reading on the gauge. If the reading is less than 6 inches of vacuum, the pump must be removed and reconditioned or replaced.

b. CARBURETOR. The carburetor should be removed from the engine and thoroughly cleaned and inspected. Refer to Section 2, "Fuel," for detailed instructions. After necessary corrections and adjustments are made, install the carburetor. Start the engine and when normal operating temperature is reached, adjust the idle fuel mixture. Clean and service the air cleaner as detailed in Section 2, "Fuel."

c. COMBUSTION ANALYSIS. Using a suitable analyzer, check the combustion efficiency in accord-

ance with the following specifications, with the air cleaner installed.

	<u>IDLE</u>	<u>2000 RPM</u>
Air Fuel Ratio.....	11.5 to 1	14 to 1
Combustion Efficiency ----	70% + 5%	85% + 5%

ROAD TEST

After the operations detailed in this Section have been performed and all necessary shop checks have been made, it is advisable to road test the vehicle, to assure satisfactory performance under actual driving conditions.

SERVICE BULLETIN REFERENCE
