There are changes in the accessory belt drives specifications, and in addition, the torque method by which belt tensions can be properly tightened has been changed. The power steering pump has a new drive belt and pulley arrangement.

The servicing procedures for the accessory belt drives with one exception of the torque method tightening procedure will remain the same as outlined in the 1960 Chrysler and Imperial Service Manual.

POWER STEERING BELT ADJUSTMENT (Alternate Method)

The belt tension is adjusted using Tool C-3832, when the engine is stopped, by loosening the adjustment bracket to engine mounting bolts, and exerting an outward pull of 50 pounds on a spring scale, at the swivel bolt (Fig. 2). Then tighten the adjustment bracket mounting bolts. At this time the pump mounting bracket is resting against the stop. With the engine running, the pump load reaction will move the pump mounting bracket away from the stop.

TORQUE METHOD

The power steering belts are tightened by using Tool C-3832 and torque wrench Tool C-3005 (Fig. 2). The alternator belts are tensioned by using a special Tool C-3841 and torque wrench Tool C-3005 (Fig. 3). The special tool should be hooked at the heavily-ribbed section of the alternator rectifier end shield. Other belts can also be tightened by this method if the adjusting bracket has a square hole. To tighten belts by the torque method, loosen all mounting bolts and apply the specified torque to the accessory or idler. Tighten all mounting bolts while the torque is applied to the accessory. If it is not possible to use the torque wrench because of clearance, use an extension.

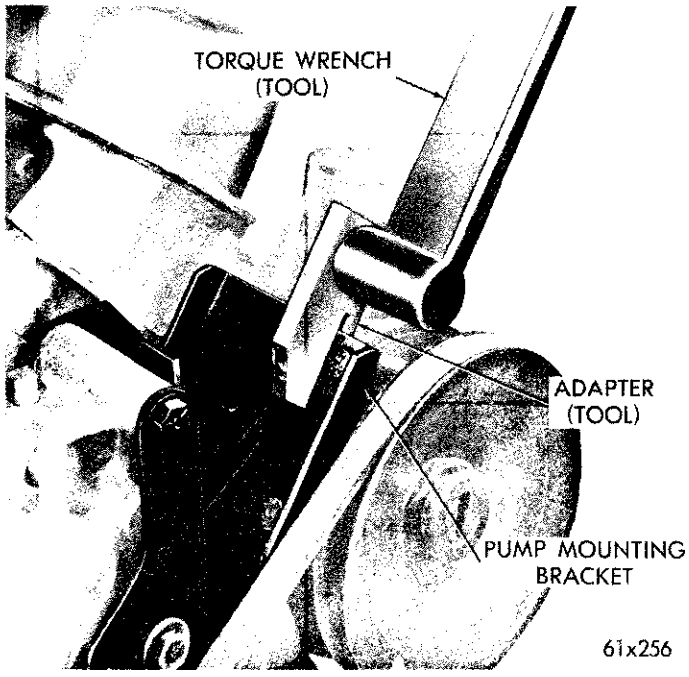

Fig. 2—Power Steering Pump Belt Adjustment

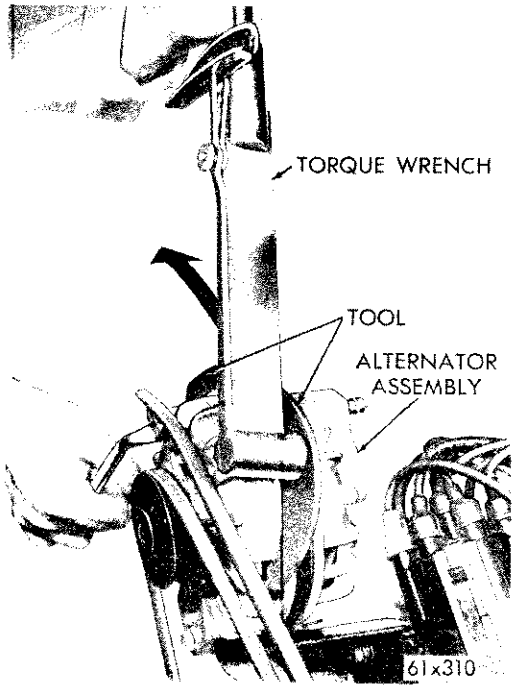

Fig. 3—Alternator Belt Adjustment

GROUP 8
ELECTRICAL AND INSTRUMENTS
DATA AND SPECIFICATIONS

BATTERY

	Standard
Voltage	12 Volts

DATA AND SPECIFICATIONS — Continued

BATTERY

	Standard
Capacity	70 Ampere-Hours
Ground Terminal	Negative
Number of Plates	13
Model	Auto-Lite 12HB-70B Willard MB-27-70

STARTING MOTORS

Starting Model	1889200
Voltage	12
Number of Fields	4
Number of Poles	4
Brushes	4
Spring Tension	32 to 48 Ounces
Drive	Solenoid Shift Overrunning Clutch
End Play	.005″ Minimum
Free-Running Test	
Voltage	11
Amperage Draw	78 Amps Maximum
Minimum Speed rpm	3800 Minimum
Stall Torque Test	
Torque Foot-Pounds	8.5
Voltage	4
Amperage Draw	350
Pinion to Housing Clearance	1/8″ plus or minus 1/32″ between Pinion Stop and End of Pinion.
Solenoid Switch	
Pull-In Coil	20.0 - 22.2 Amps at 6 Volts
Hold-In Coil	11.2 - 12.4 Amps at 6 Volts

ALTERNATOR

	Standard Equipment	Special Equipment Heavy Duty	Special Equipment Air Conditioning
Engine	383 cu. in. or 413 cu. in.	3.83 cu. in. or 413 cu. in.	383 cu. in. or 413 cu. in.
Alternator Number	2095060	2095425	2095100

DATA AND SPECIFICATIONS — Continued

	Standard Equipment	Special Equipment Heavy Duty	Special Equipment Air Conditioning
Rated Output	35 Amperes	40 Amperes	40 Amperes
Voltage	12 Volts	12 Volts	12 Volts
Alternator Pulley Diameter	2.75 in. Single Groove	2.75 in. Single Groove	3.00 in. Twin Groove
Brushes	2	2	2
Condenser Capacity	.5 microfarad (min.)	.5 microfarad (min.)	.5 microfarad (min.)
Field Coil Draw	2.38 amperes minimum to 2.75 amperes maximum at 12 volts, rotating alternator by hand; or 2.97 amperes minimum to 3.43 amperes maximum at 15 volts at 70 degrees Fahrenheit, alternator operating at 750 rpm.		
Current Output (Minimum) at 1250 Engine RPM (Cold)	35 Amperes	40 Amperes	40 Amperes

ALTERNATOR VOLTAGE REGULATOR

Alternator Voltage Regulator Number	2095700
Volts	12
Ground Polarity	Negative
Point Gap	.015 inch plus or minus .001 inch
Air Gap	.048 to .052 inch

Measure gap with gauge back of stop. Contacts close with .052 inch gauge installed. Contacts open with .048 inch gauge installed.

Temperature In Degrees	75°	95°	118°	140°
Minimum Setting	13.7 to	13.6 to	13.5 to	13.4 to
Maximum Setting	14.3	14.2	14.1	14.0

Start and operate the engine at 1250 rpm. Turn on the lights and electrical accessories to create enough electrical load that 15 minutes of operation will stabilize the regulator temperature. Measure the temperature at the regulator by holding a reliable thermometer two (2) inches from the regulator. Turn off the lights and other electrical load. Turn on the instrument panel lights. Read the test voltmeter. With a fully charged battery and 15 amperes flowing in the circuit, the voltmeter reading should be within the specifications shown in the above chart.

DISTRIBUTOR

Chrysler Part Number	2095679
Model	IBP-4005E
Engine Model Usage	361 Cu. In.
Car Model Usage	RC-1 with 2-Barrel Carburetor

DISTRIBUTOR DATA AND SPECIFICATIONS — Continued

Engine Model Usage	383 Cu. In.
Car Model Usage	RC-2 with 2-Barrel Carburetor
Advance – Automatic (Distributor Degrees at Distributor RPM)	0° @ 250 to 450 0° to 2° @ 450 2.5° to 4.5° @ 700 10° to 12° @ 2050
Advance – Vacuum (Distributor Degrees at Inches of Mercury)	0° @ 6″ to 8.1″ 6° to 9° @ 12″ 10.5″ to 13° @ 16″
Breaker Point Gap	.014″ to .019″
Dwell Angle	27° to 32°
Breaker Arm Spring Tension	17 oz. to 21.5 oz.
Timing	10° BTC
Condenser Capacity	.25 to .285 mfd.
Shaft Side Play	.000″ to .003″*
Shaft End Play (After Assembly)	.003″ to .010″
Rotation	Counterclockwise
Spark Plug Type	A-42
Size	14 MM
Gap	.035″
Firing Order	1–8–4–3–6–5–7–2

Coil	Chrysler – Auto-Lite	Chrysler – Essex
	1688212 – 200567	2095223 – 62-160-2
Primary Resistance @ 70° to 80° F.	1.65 to 1.79 ohms	1.41 to 1.55 ohms
Secondary Resistance @ 70° to 80° F.	8000 to 9200 ohms	9200 to 10600 ohms

Ballast Resistor	2095501
Resistance @ 70° to 80° F.	0.6 ohms
Current Draw (Coil and Ballast Resistor in Circuit)	
Engine Stopped	3.0 Amperes
Engine Idling	1.9 Amperes

*When distributor is new or after rebuilding (new bushings and/or shaft installed), service wear tolerance should not exceed .005″.

DISTRIBUTOR

Chrysler Part Number	2095530
Model	Chrysler Built
Engine Model Usage	413 Cu. In.
Car Model Usage	RC-3, RY-1 with 4-Barrel Carburetor

DISTRIBUTOR DATA AND SPECIFICATIONS — Continued

Advance – Automatic (Distributor Degrees at Distributor RPM)	0° @ 310 to 490 0° to 2° @ 490 3.5° to 5.5° @ 800 8.5° to 10.5° @ 2300
Advance – Vacuum (Distributor Degrees at Inches of Mercury)	0° @ 7.4" to 9" 4.5° to 7.8° @ 12" 8.3 ° to 11° @ 15"
Breaker Point Gap	.014" to .019"
Dwell Angle	27° to 32°
Breaker Arm Spring Tension	17 oz. to 21.5 oz.
Timing	10° BTC
Condenser Capacity	.25 to .285 mfd.
Shaft Side Play	.000" to .003"*
Shaft End Play (After Assembly)	.003" to .010"
Rotation	Counterclockwise
Spark Plug Type	A-42
Size	14 MM
Gap	.035"
Firing Order	1–8–4–3–6–5–7–2

	Chrysler – Auto-Lite	Chrysler – Essex
Coil	1688212 – 200567	2095223 – 62-160-2
Primary Resistance @ 70° to 80° F.	1.65 to 1.79 ohms	1.41 to 1.55 ohms
Secondary Resistance @ 70° to 80° F.	8000 to 9200 ohms	9200 to 10600 ohms

Ballast Resistor	2095501
Resistance @ 70° to 80° F.	0.6 oms
Current Draw (Coil and Ballast Resistor in Circuit)	
Engine Stopped	3.0 Amperes
Engine Idling	1.9 Amperes

*When distributor is new or after rebuilding (new bushings and/or shaft installed), service wear tolerance should not exceed .005".

GROUP 8
ELECTRICAL AND INSTRUMENTS

Some of the Electrical Units are the same as those used in the 1960 Chrysler and Imperial Models with the following exceptions:

The Battery has new Data and Specifications.

The Chrysler-built solenoid shift Starting Motor has new service procedures and Data and Specifications.

The Alternator and Voltage Regulator has new service procedures and Specifications.

The service procedures for the RC-1 and RC-2

Auto-Lite Distributor are the same as outlined in the 1960 Chrysler and Imperial Service Manual. There are new service procedures for the Chrysler-built Distributor for Models RC-3 and RY-1. All the specifications have been revised to include both the Chrysler-built and the Auto-Lite Distributors.

The Lighting System has the same service procedures as outlined in the 1960 Chrysler and Imperial Service Manual. There are new service procedures covering the removal and installation of the Instruments, Gauges, Speedometer and Switches. Thermal type gauges testing and service procedures will remain the same as outlined in the 1960 Chrysler and Imperial Service Manual.

The Windshield Wipers, Horns, Electric Window Lifts, Power Seats and the Electric Locking Door Locks remain the same as outlined in the 1960 Chrysler and Imperial Service Manual.

STARTING MOTOR

The Chrysler Corporation built starting motor is a 12-volt, four-coil assembly. The starter drive is an overruning clutch type with a solenoid shift type switch mounted on the starting motor.

The brush holders are riveted to a separate brush plate and are not serviced separately. Brush replacement can be made by removing the commutator bearing end head.

TESTING THE STARTER CURRENT RESISTANCE AND CURRENT DRAW

(1) Test the battery. If it tests 1.210 specific gravity or less, the engine at normal operating temperature, charge the battery.

(2) Test the circuit resistance and the starter current draw.

(3) Disconnect the positive battery lead from the battery terminal post. Connect an 0 to 300 scale ammeter between the disconnected lead and the battery terminal post.

(4) Connect a test voltmeter with a .10 volt scale divisions between the battery positive post and the starter switch terminal at the starter.

(5) Crank the engine and observe the readings on the voltmeter and the ammeter. The voltage should not exceed .12 volt per 100 amperes of current.

The current should not exceed 150 to 250 amperes. A reading of voltage that exceeds .12 volt per 100 amperes indicates there is high resistance caused from loose connections, defective cable, burned switch contacts or, in some instances, a short in starter which causes a voltage leak. A current that is high and is combined with slow cranking speed, indicates that starter should be removed and repaired.

REMOVAL OF STARTING MOTOR

(1) Disconnect the cable at the battery.

(2) Remove the starter cable at the starter.

(3) Disconnect the solenoid lead wire from the solenoid.

(4) Remove the bolts attaching the starting motor to the flywheel housing and remove the starter motor and housing seal.

TESTING THE STARTER MOTOR (BENCH TEST)

Free Running Test

(1) Place starter in a vise and connect a fully-charged, 12-volt battery to the starter.

(2) Connect a test ammeter (100 amperes scale) and carbon pile rheostat in series with the battery positive post and the starter terminal.

(3) Connect the voltmeter (15 volt scale) across starter.

(4) Rotate the carbon pile to full-resistance position.

(5) Connect the battery cable from the battery negative post to the starter frame.

(6) Adjust the rheostat until the battery voltage shown on the voltmeter reads 11 volts.

(7) The current draw should be 78 amperes maximum at 3800 minimum rpm.

Stall Test

(1) Install the starter motor in the test bench.

(2) Follow the instructions of the test equipment manufacturer and check the stall torque of starter against following specifications.

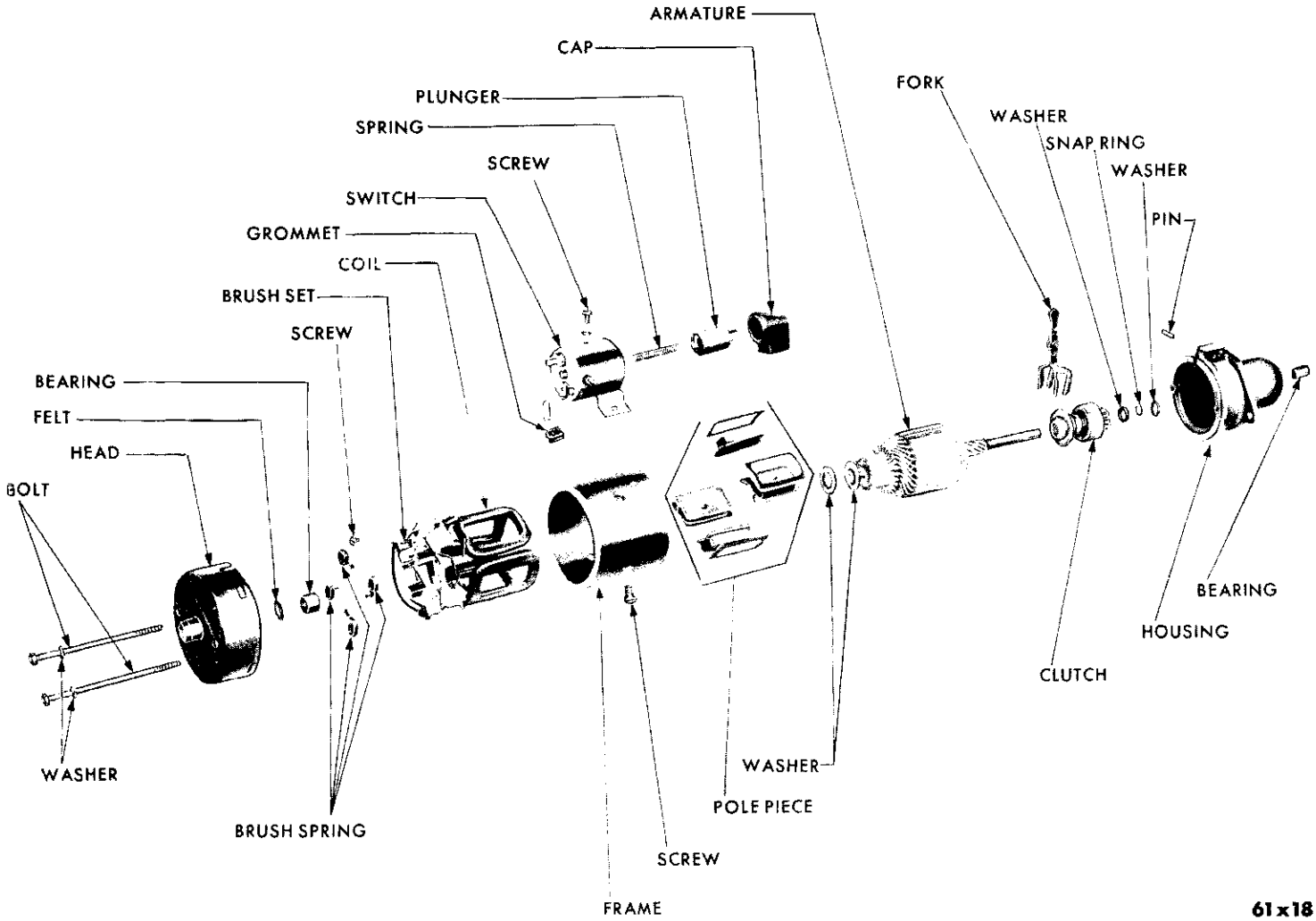

Fig. 1—Starting Motor (Exploded View) (Typical)

(3) With applied battery voltage adjusted to 4 volts, the stall torque should be 8.5 foot-pounds minimum with a current draw of 350 amperes.

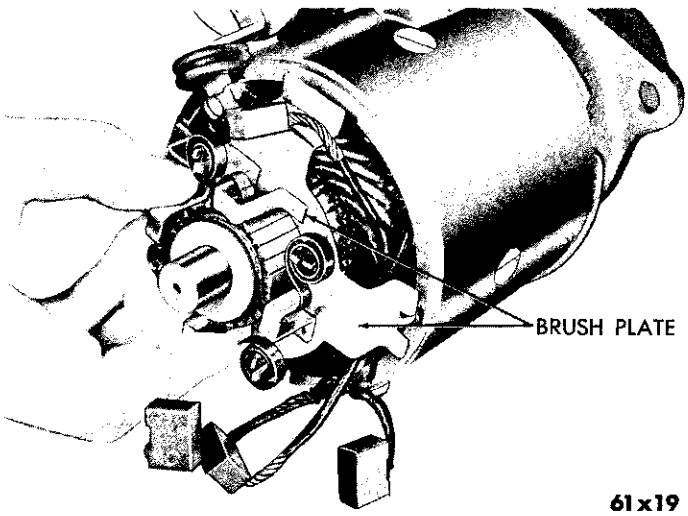

Fig. 2—Removing or Installing Brush Ring

DISASSEMBLING THE STARTER (Fig. 1)

(1) Remove the through bolts and tap the commutator end head from the field frame.

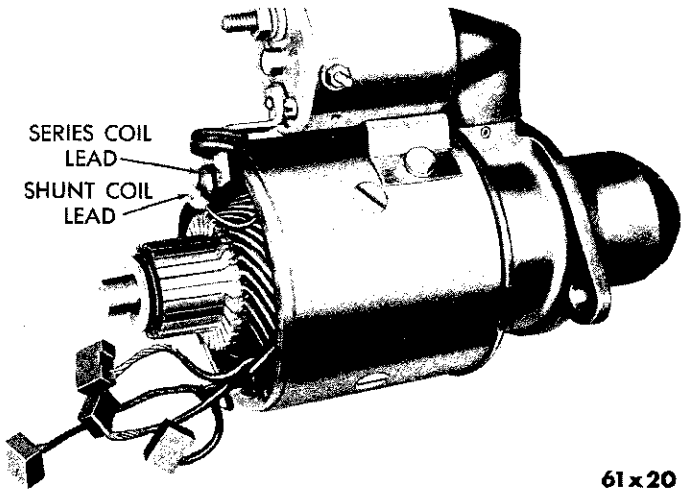

Fig. 3—Field Coil Leads Disconnected from Solenoid Connector

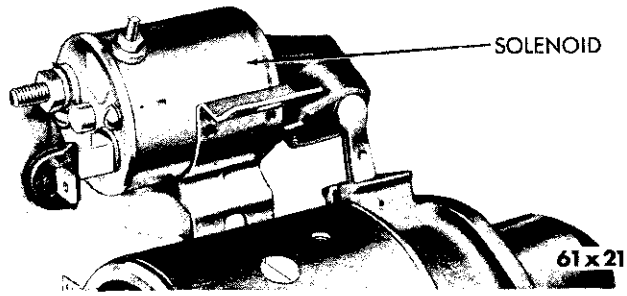

Fig. 4—Removing or Installing Starter Solenoid

(2) Remove the thrust washers from the armature shaft.

(3) Lift the brush holder springs and remove the brushes from the brush holders.

(4) Remove the brush plate (Fig. 2).

(5) Disconnect the field coil leads at the solenoid connector (Fig. 3).

(6) Remove the solenoid attaching screws and remove the solenoid and boot assembly (Fig. 4).

(7) Drive out the overrunning clutch shift fork pivot pin (Fig. 5).

(8) Remove the drive end pinion housing and spacer washer.

(9) Note position of shifter fork on the starter drive and remove the shifter fork (Fig. 6).

(10) Slide the overrunning clutch pinion gear toward commutator end of armature, drive the stop retainer toward the clutch pinion gear to expose the snap ring and remove the snap ring.

(11) Slide the overrunning clutch drive from the armature shaft.

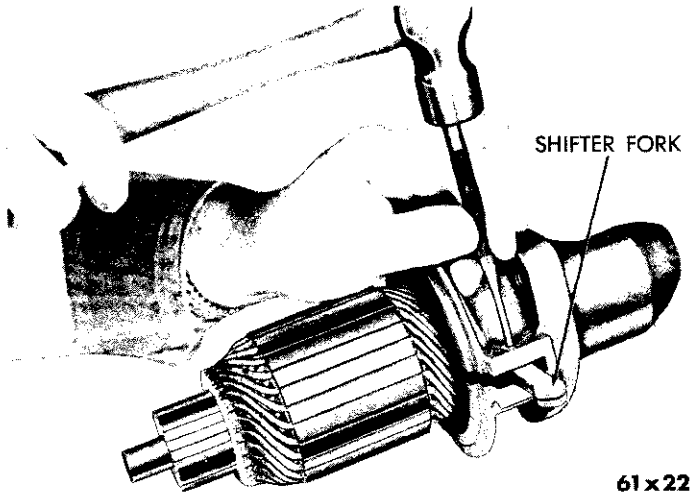

Fig. 5—Removing or Installing Shifter Fork Pivot Pin

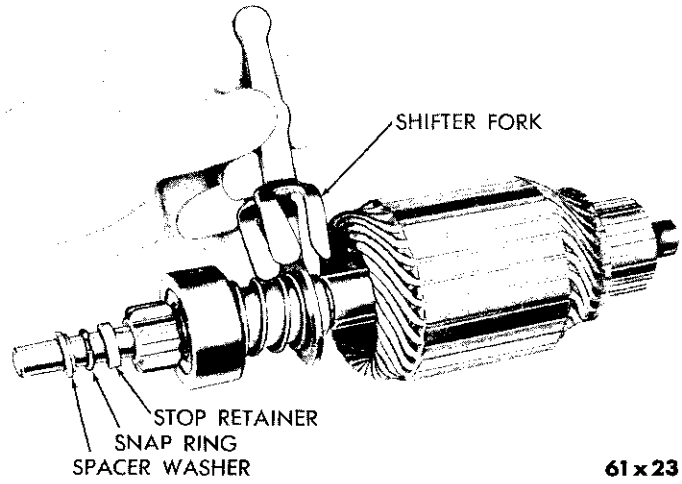

Fig. 6—Removing or Installing Shifter Fork

(12) If necessary to replace field coils, remove the ground brushes terminal attaching screw and raise the brushes with terminal and shunt wire up and away from field frame (Fig. 7). Remove the pole shoe screws with special pole shoe impact screwdriver, Tool C-3475.

CLEANING THE STARTER PARTS

(1) Do not immerse parts in cleaning solvent. Immersing field frame and coil assembly and/or armature will damage insulation. Wipe these parts with cloth **only.**

(2) Do not immerse drive unit in cleaning solvent. The drive clutch is pre-lubricated at factory and solvent will wash lubrication from clutch.

(3) The drive unit may be cleaned with brush moistened with cleaning solvent and wiped dry with cloth.

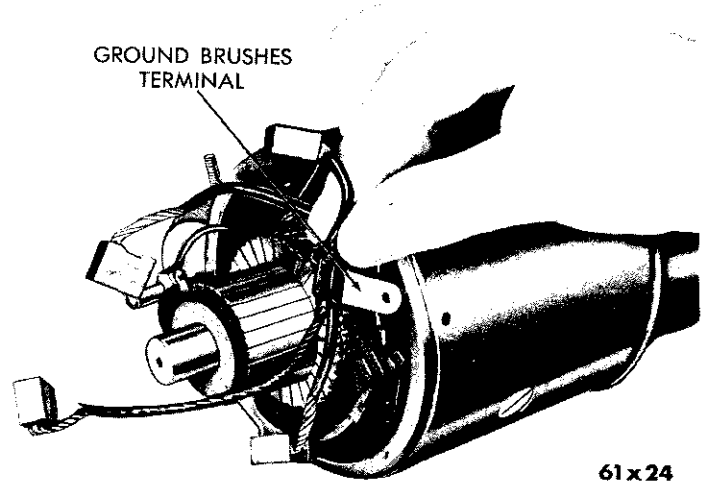

Fig. 7—Removing or Installing Ground Brushes Terminal

BRUSHES AND SPRINGS — REPLACEMENT

(1) The brushes that are worn more than ½ the length of the new brush, or are oil-soaked, should be replaced. The brushes and springs can be replaced after removing the commutator end head and the brush plate.

(2) Lift the brushes, disengage the brushes from the brush holders and remove the brush plate.

(3) Disconnect the field lead wires at solenoid connector (Fig. 3).

(4) Remove the screw attaching the ground brush terminal to the field frame and raise the brushes and terminal up and away from the field frame (Fig. 7).

NOTE: The leads are not equal in length. Check the brush leads before cutting to insure the proper length at installation.

(5) Clip the brush leads at the ground terminal and at the field coils.

(6) Open the brush lead retaining clips to remove the old brush leads.

(7) When resoldering the brush leads, make a strong, low resistance connection using a high temperature solder and resin flux. Do not use acid. **Do not** break the shunt wire when removing and installing the ground brushes.

(8) Brush springs can be removed by spreading the retainers and disengaging the springs from the retainer legs.

(9) Measure the brush spring tension with a spring scale hooked under the spring near the end. Pull the scale on a line parallel to the edge of the brush and take a reading just as the spring end leaves the brush. Spring tension should be 32 to 48 ounces. Replace the springs that do not meet specifications.

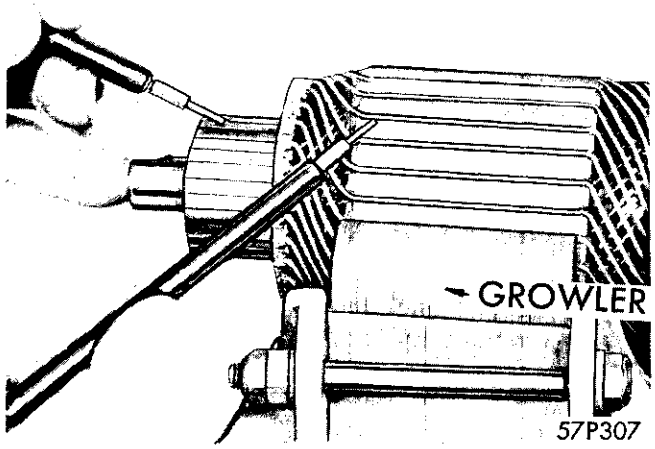

Fig. 8—Testing Armature for Short

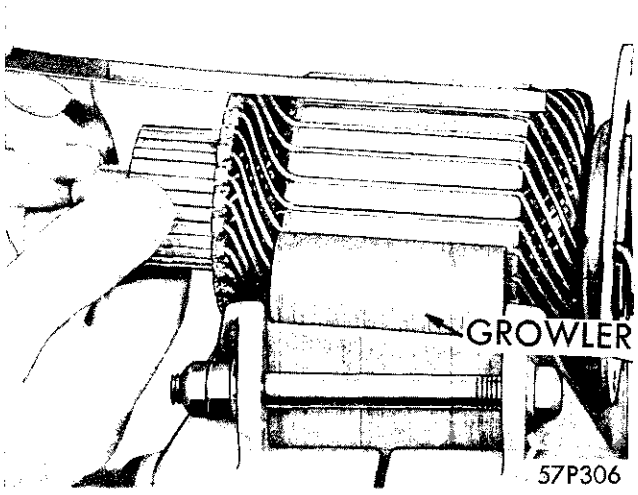

Fig. 9—Testing Armature for Ground

TESTING THE ARMATURE

Testing the Armature for Short Circuit

Place the armature in the growler (Fig. 8) and hold a thin steel blade parallel to core and just above it, while slowly rotating the armature in the growler. A shorted armature will cause the blade to vibrate and be attracted to the core. Replace a shorted armature.

Testing Armature for Ground

Touch armature shaft and end of a commutator bar with a pair of test lamp test prods (Fig. 9). If the lamp lights, it indicates a grounded armature. Replace the grounded armature.

Testing Commutator Run-Out, Refacing and Undercutting

Place the armature in a pair of "V" blocks and check the run-out with a dial indicator. Test both the shaft and the commutator. A bent shaft requires replacement of armature. When the commutator run-out exceeds .003 inch, the commutator should be refaced. Remove only sufficient metal to provide a smooth, even surface.

TESTING THE FIELD COILS FOR GROUND

(1) Remove the through bolts and remove the commutator end frame.

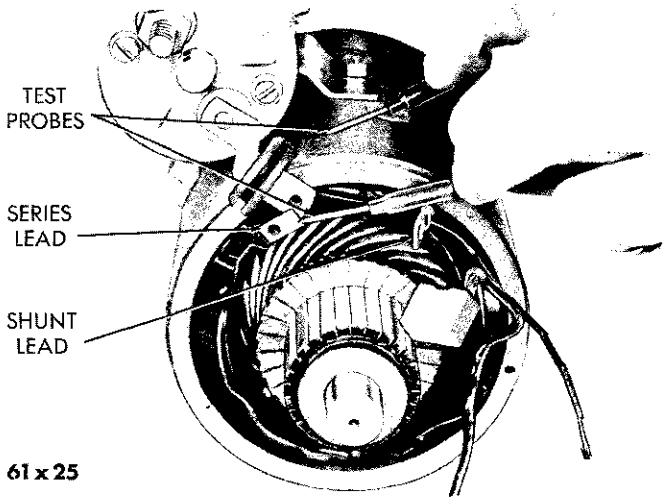

Fig. 10—Testing Series Field Coil for Ground

(2) Remove the brushes from the brush holders and remove the brush ring (Fig. 2).

(3) Disconnect the field lead wires at the solenoid connector and separate the field leads to make sure they do not touch the solenoid connector (Fig. 3).

(4) Remove the ground brushes attaching screw and raise the brushes with terminal and shunt wire up and away from field frame (Fig. 7).

(5) Touch one probe of test lamp to series field coil lead and the other probe to the field frame (Fig. 10). The lamp should not light.

(6) Touch one probe to the shunt field coil lead and the other probe to the field frame (Fig. 11).

If the lamp lights in either test (5) or (6), the field coils are grounded. If the field coils are grounded, test each coil separately after unsoldering the connector wires. Replace the grounded field coils.

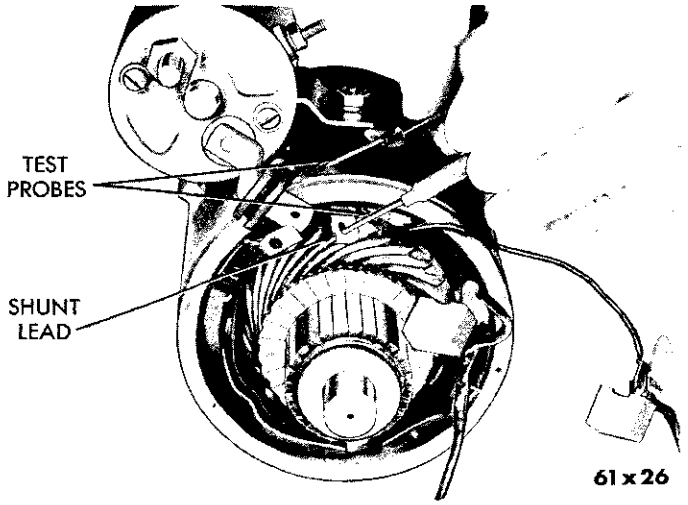

Fig. 11—Testing Shunt Field Coil for Ground

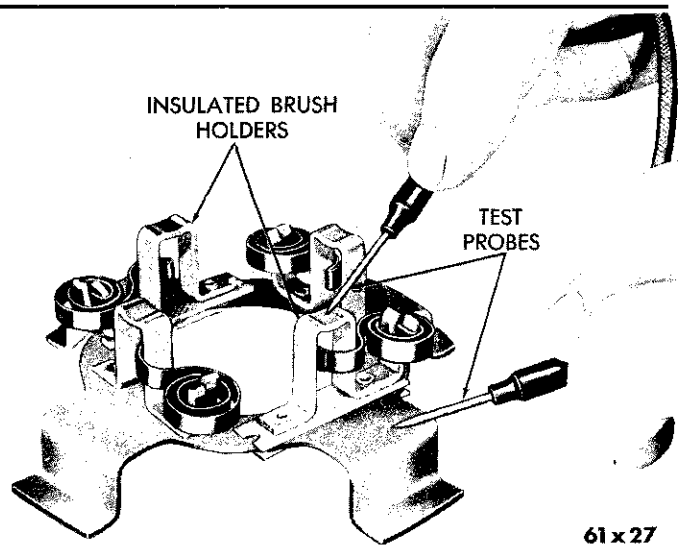

Fig. 12—Testing Insulated Brush Holders for Ground

(7) Touch each of the brush holders with one test probe, while holding the other test probe against the brush ring. Two brush holders that are 180 degrees apart should cause the test lamp to light as they are intentionally grounded. The other two brush holders (Fig. 12) should not cause the lamp to light when tested, as they are insulated. If the insulated brush holders cause the lamp to light when tested, it indicates that the brush holders on the brush ring are grounded. Replace the brush ring assembly if the brush holders are grounded.

REPLACING THE FIELD COILS

A pole shoe impact screwdriver Tool C-3475 should be used to remove and install the field coils to prevent damage to the pole shoe screws and for proper tightening. The pole shoes that are loose and not properly seated may cause the armature core to rub the pole shoes. This will decrease the starter efficiency and damage the armature core.

SERVICING THE BRUSHES

Inspect the armature shaft bearing surfaces and bushings for wear by placing the core in a vise equipped with soft jaws. Do not squeeze tightly. Try commutator end frame, the drive end frame, and armature support bushings for wear by placing them on shafts and checking for side play. Replace the commutator end frame and bushing assembly if the bushing is worn, also, replace drive end bushing if it is worn. The bushing should be well soaked in SAE 30W engine oil before it is installed.

SERVICING THE DRIVE UNIT

Place the drive unit on the shaft and, while holding

armature, rotate pinion. The drive pinion should rotate smoothly in one direction (not necessarily easily), but should not rotate in opposite direction. If the drive unit does not function properly, or the pinion is worn or burred, replace the drive unit.

ASSEMBLING THE STARTER (Refer to Fig. 1)

(1) Lubricate the armature shaft and splines with SAE 10W oil or 30W rust preventive oil.

(2) Install the starter drive, stop collar (retainer), the lock ring and the spacer washer.

(3) Install the shifter fork over the starter drive spring retainer washer with the narrow leg of fork toward commutator (Fig. 6). This is important, if fork is not properly positioned, the starter gear travel will be restricted causing a lockup in the clutch mechanism.

(4) Install the drive end (pinion) housing on the armature shaft, indexing the shifting fork with the slot in the drive end of the housing.

(5) Install the shifter fork pivot pin (Fig. 5).

(6) Install the armature with the clutch drive, shifter fork, and pinion housing; slide armature into field frame until the pinion housing indexes with the slot in the field frame.

(7) Install the solenoid and boot assembly (Fig. 4). Tighten bolts 60 to 70 inch-pounds torque.

(8) Install the ground brushes (Fig. 7).

(9) Connect the field coil leads at the solenoid connector (Fig. 3).

(10) Install the brush holder ring (Fig. 2) indexing tang of ring in hole of the field frame.

(11) Position the brushes in brush holders. Be sure the field coil lead wires are properly enclosed behind the brush holder ring and that they do not interfere with the brush operation.

(12) Install thrust washers on commutator end of armature shaft to obtain .010 inch minimum end play.

(13) Install the commutator end head.

(14) Install through bolts and tighten 40 to 50 inch-pounds torque.

ADJUSTING STARTER DRIVE GEAR (PINION) CLEARANCE

(1) Place the starter assembly in a vise equipped with soft jaws and tighten vise sufficiently to hold starter.

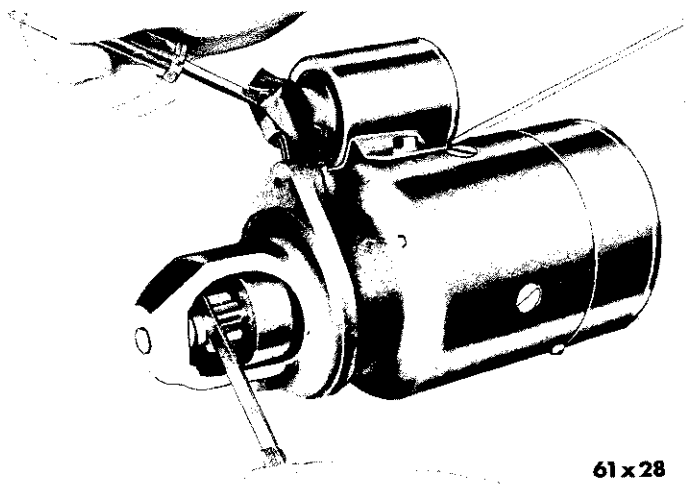

Fig. 13—Checking Starter Drive Pinion Clearance

NOTE: Place a wedge or screwdriver between the bottom of the solenoid and the starter frame to eliminate all deflection in the solenoid when making the pinion clearance check.

(2) Push in on solenoid plunger link (Fig. 13) (NOT THE FORK LEVER) until plunger bottoms.

(3) Measure the clearance between the end of pinion and pin stop with plunger seated and pinion pushed toward commutator end. The clearance should be ⅛ inch. Adjust for proper clearance by loosening solenoid attaching screws and move solenoid fore and aft as required.

(4) Test starter operation under a free running test (Paragraph "Testing the Starter Motor (Bench Test)").

INSTALLING THE STARTER

(1) Before installing the starter, be sure starter and flywheel housing mounting surfaces are free of dirt and oil. These surfaces must be clean to make good electrical contact.

(2) Install the starter to flywheel housing seal.

(3) Install the starter from beneath the engine.

(4) Tighten the attaching bolts securely.

(5) Attach the wires to the solenoid switch or the starter terminal.

(6) Install the battery cable and test operation of the starter for proper engine cranking.

STARTING MOTOR
SERVICE DIAGNOSIS

Condition	Possible Cause	Remedies
STARTER FAILS TO OPERATE	(a) Weak battery or dead cell in battery.	(a) Test specific gravity and check for dead cell. Replace or recharge battery, as required.
	(b) Ignition switch defective.	(b) Replace switch.
	(c) Loose or corroded battery cable terminals.	(c) Clean terminals and clamps, replace if necessary. Apply a light film of vasoline to terminals. Tighten clamps securely.
	(d) Open circuit, wire between ignition—starter switch and ignition terminal on starter relay.	(d) Inspect and test all wiring.
	(e) Defective drive unit.	(e) Replace drive unit.
	(f) Defective solenoid or solenoid switch.	(f) Test and replace.
	(g) Defective starting motor.	(g) Test and repair.
	(h) Armature shaft sheared.	(h) Test and repair.
STARTER FAILS AND LIGHTS DIM	(a) Weak battery or dead cell in battery.	(a) Test specific gravity and check for dead cell. Replace or recharge battery, as required.
	(b) Loose or corroded battery cable terminals.	(b) Clean terminals and clamps, replace if necessary. Apply a light film of vasoline to terminals. Tighten clamps securely.
	(c) Internal ground in windings.	(c) Test and repair starter.
	(d) Grounded starter fields.	(d) Test and repair starter.
	(e) Armature rubbing on pole shoes.	(e) Test and repair starter.
STARTER TURNS, BUT PINION DOES NOT ENGAGE	(a) Starter clutch slipping.	(a) Replace drive unit.
	(b) Wrong starter pinion clearance.	(b) Adjust pinion clearance.
	(c) Broken teeth on flywheel drive gear.	(c) Replace flywheel ring gear.
	(d) Armature shaft rusted, dirty or dry, due to lack of lubrication.	(d) Clean, test and lubricate.
STARTER RELAY DOES NOT CLOSE	(a) Battery discharged.	(a) Recharge or replace battery.
	(b) Defective wiring.	(b) Check open circuit, wire between the starter relay ground terminal post and neutral starter switch (auto-

STARTING MOTOR SERVICE DIAGNOSIS — Continued

Condition	Possible Cause	Remedies
		matic transmission only). Also check open circuit, wire between ignition-starter switch and ignition terminal and starter relay.
	(c) Neutral starter switch on automatic transmission faulty.	(c) Replace switch.
	(d) Check starter relay.	(d) Test and replace if necessary.
	(e) Check ignition-starter switch.	(e) Replace ignition-starter switch.
RELAY OPERATES BUT SOLENOID DOES NOT	(a) Faulty wiring, open circuit wire between starter-relay and solenoid terminal and solenoid actuating terminal post.	(a) Test for open circuit wire between the starter-relay solenoid terminal and solenoid actuating terminal post.
	(b) Faulty solenoid switch or connections.	(b) Test for loose terminal connections on terminal buss bar between solenoid and starter field.
	(c) Solenoid switch contacts corroded.	(c) Test and replace solenoid.
	(d) Broken lead or loose soldered connection inside solenoid switch cover.	(d) Replace solenoid.
SOLENOID PLUNGER VIBRATES BACK AND FORTH WHEN SWITCH IS ENGAGED	(a) Battery low.	(a) Test specific gravity of battery. Replace or recharge battery.
	(b) Faulty wiring.	(b) Test for loose connections at relay, ignition-starter switch and solenoid. Repair as necessary.
	(c) Lead or connections broken inside solenoid switch cover or open hold-in winding.	(c) Test and replace solenoid.
	(d) Solenoid defective.	(d) Test and replace solenoid.
	(e) Check condition of moisture on solenoid contacts (cold weather conditions).	(e) Test and clean contacts.
STARTER OPERATES BUT WILL NOT DISENGAGE WHEN IGNITION STARTER IS RELEASED	(a) Broken solenoid plunger spring or spring out of position.	(a) Test and repair.
	(b) Defective ignition-starter switch.	(b) Replace switch.
	(c) Defective solenoid.	(c) Replace solenoid.
	(d) Pinion clearance improperly adjusted.	(d) Adjust pinion clearance.
	(e) Solenoid plunger stuck in solenoid.	(e) Remove plunger, wipe clean of all dirt, place a thin film of Lubriplate on plunger, wipe off excess.

STARTING MOTOR SERVICE DIAGNOSIS — Continued

Condition	Possible Cause	Remedies
	(f) Insufficient clearance between winding leads and main contractor in solenoid.	(f) Test and repair.
	(g) Defective relay.	(g) Replace relay.

ALTERNATOR

CONSTRUCTION AND OPERATION

The alternator (Fig. 14) is fundamentally an alternating current generator, with six (6) built-in silicon rectifiers, that convert the alternating current into direct current, which is available at the "output" "BAT" terminal. A voltage regulator (Fig. 15) is used in the field circuit to limit the output voltage.

The main components of the alternator are the rotor, the stator, the rectifiers, the two end shields and the drive pulley. See Figure 16.

ROTOR

The rotor (Fig. 17) consists of circular field coils, encased by two end pole pieces, each having six protruding fingers spaced 60 degrees apart. In assembly, the six protruding fingers (of each end pole piece) are alternately spaced providing twelve poles. Since the end pole pieces have different polarity, this in effect provides a (12) twelve-pole rotating electro magnet.

The ends of the field coil winding are connected to the slip rings at the rear end of the rotor. The field coil is externally excited by means of battery current. The battery current is supplied to the field coil winding through the ignition switch, fuse, the regulator, the brushes and the slip rings.

STATOR

The stator (Fig. 18) consists of an internally-slotted laminated stationary armature having three separate sets of windings. One end of each of the windings is connected to a common "Y" connection. The other end of each winding is connected in parallel to one "positive" case rectifier, and to one "negative" case rectifier.

RECTIFIERS

In order to convert the induced alternating current in the stator windings into useable direct current,

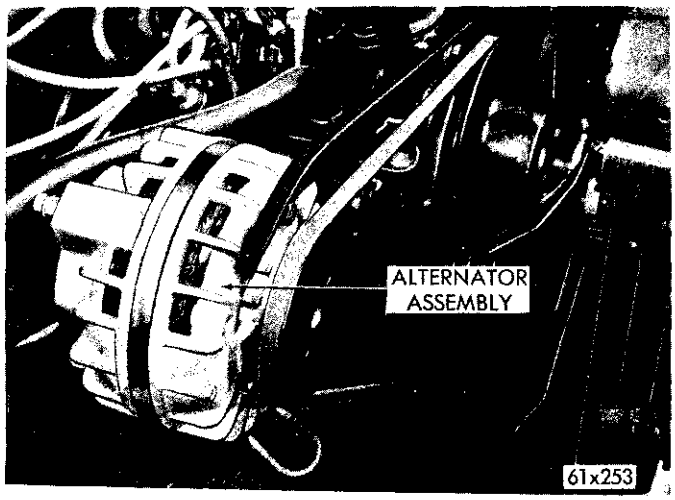

Fig. 14—Alternator Installed

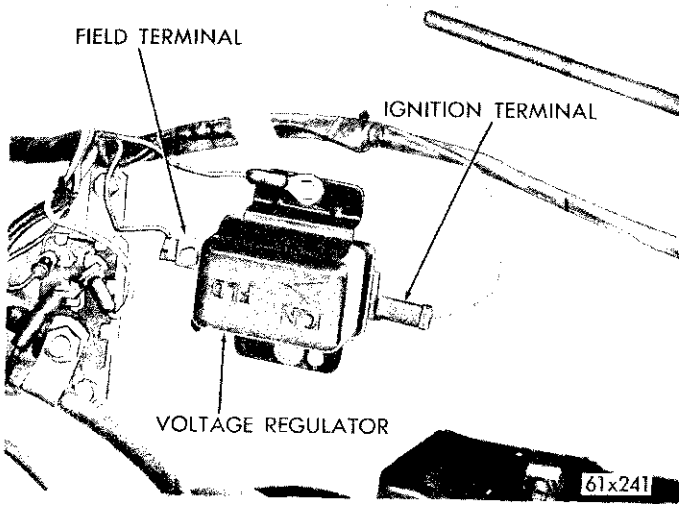

Fig. 15—Voltage Regulator Installed

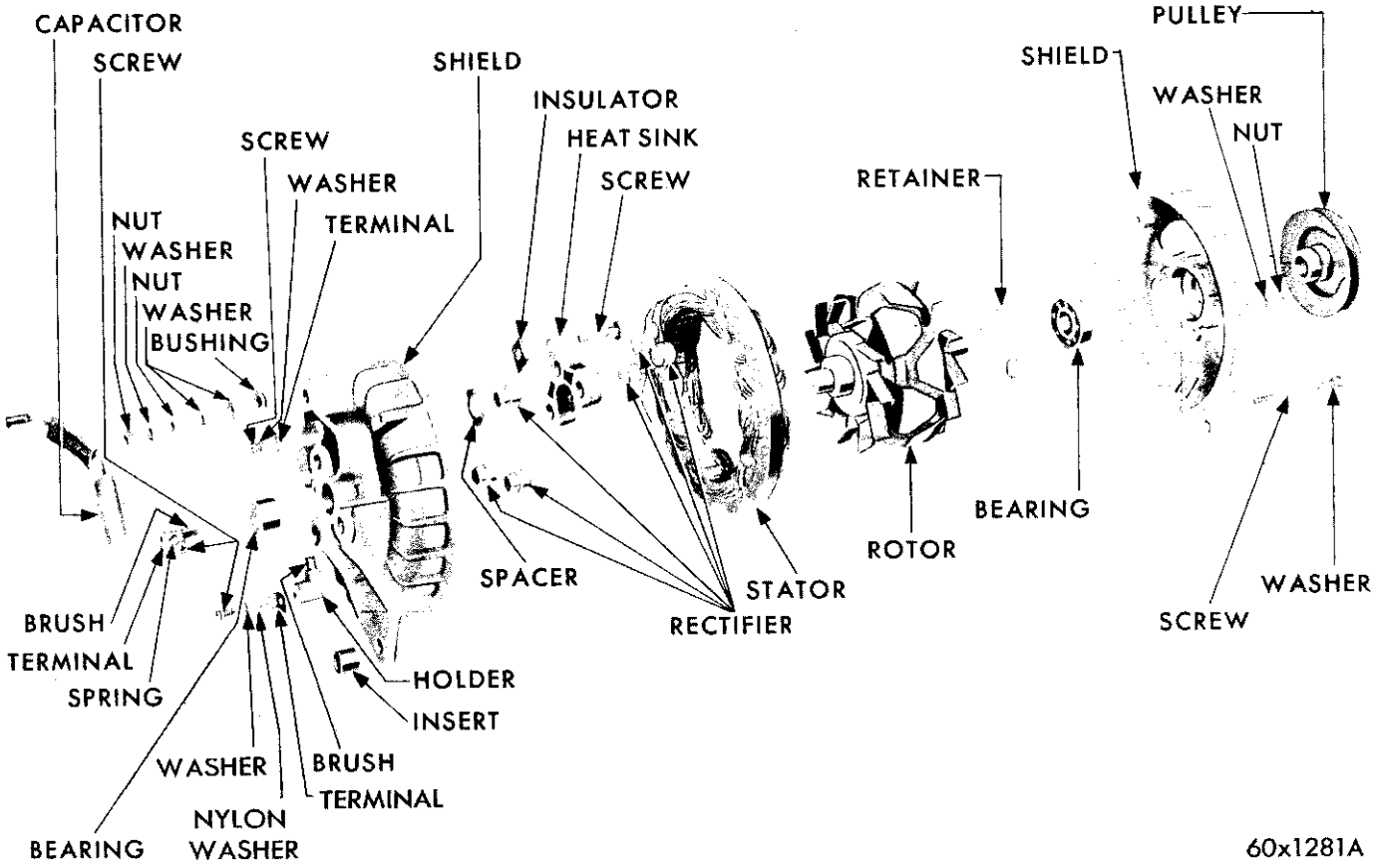

Fig. 16—Alternator (Exploded View)

six (6) silicon (diode) rectifiers are used (Figs. 19 and 20). Three of the rectifiers have positive polarity cases, and are pressed into an insulated die cast aluminum holder called a "heat sink." The heat sink is electrically insulated and is large enough to absorb the heat from the positive case rectifiers. The heat sink contains the "output" "BAT" terminal. Three of the rectifiers have "negative" polarity cases, and are pressed into the rear die cast aluminum end shield, providing a ground in the circuit.

The silicon rectifiers have a very high resistance to current flow in one direction, and very low resistance in the opposite direction. One end of each of the three stator windings is connected in parallel to

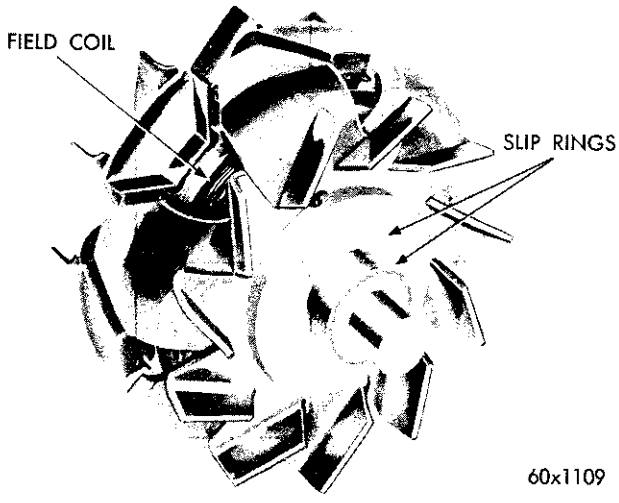

Fig. 17—Alternator Rotor Assembly

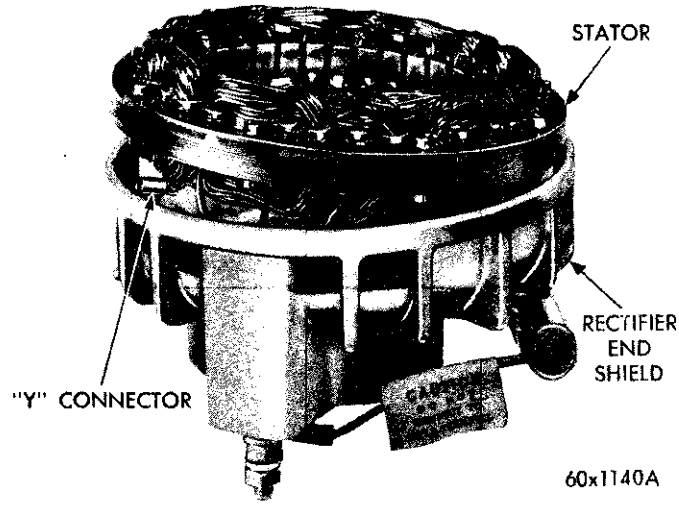

Fig. 18—Separating Stator and End Shield to Expose "Y" Connector

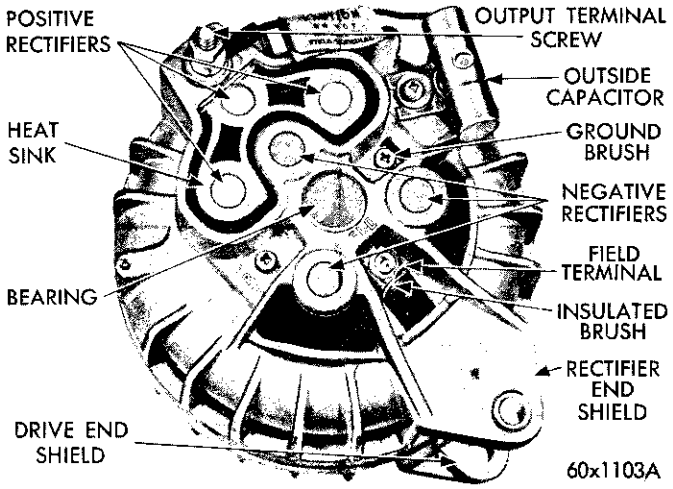

Fig. 19—Alternator Assembly

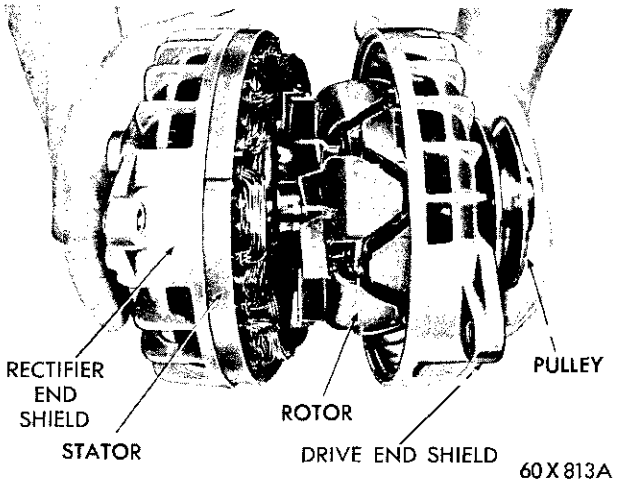

Fig. 21—Separating Drive End and Rectifier Shields

one positive case rectifier, and to one negative case rectifier. The other end of the three stator windings is connected together in a "Y" connection. The rectifiers permit the induced alternating current of the three stator windings to flow in **only one** direction to the "output" "BAT" terminal. In effect this provides "direct current" at the output "BAT" terminal.

Since the rectifiers will permit the current to flow only in one direction, through the output terminal to the battery, and their high resistance in the opposite direction prevents the flow of battery current to the alternator, their use eliminates the need of a circuit breaker (cut-out relay). For this reason the battery must **always** be connected with the **negative** terminal to the **ground.**

END HOUSINGS

The two die cast aluminum end shields (Fig. 21) support and contain the internal parts. The housings are vented at both ends and around the circumference. Two centrifugal fans on the rotor shaft force cool air through the alternator. The rotor shaft is supported on the front end by a pre-lubricated ball bearing (Fig. 22). The rear end of the rotor shaft is supported by a pre-lubricated roller bearing (Fig. 20).

PULLEY

A single-sheave pulley, pressed on the front end of the rotor shaft, drives the rotor. A two-sheave pulley is used on air conditioning equipped cars. A single-sheave pulley is used on standard production cars. The crankshaft pulley has a larger diameter on air conditioning equipped cars.

OPERATION

With the ignition switch turned "ON" and the en-

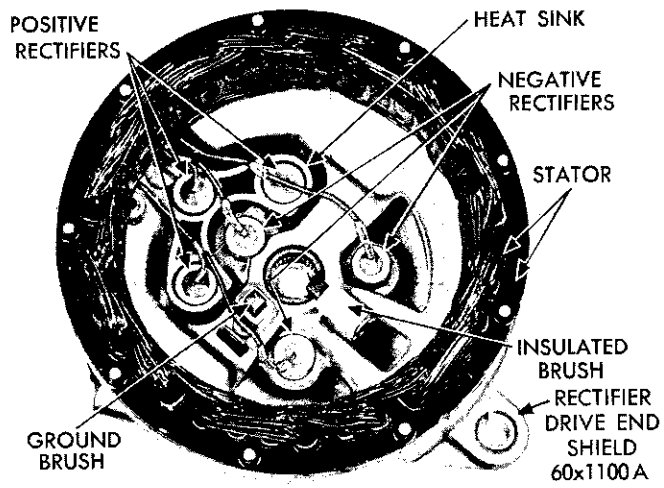

Fig. 20—Stator and Rectifier End Shield Assembly

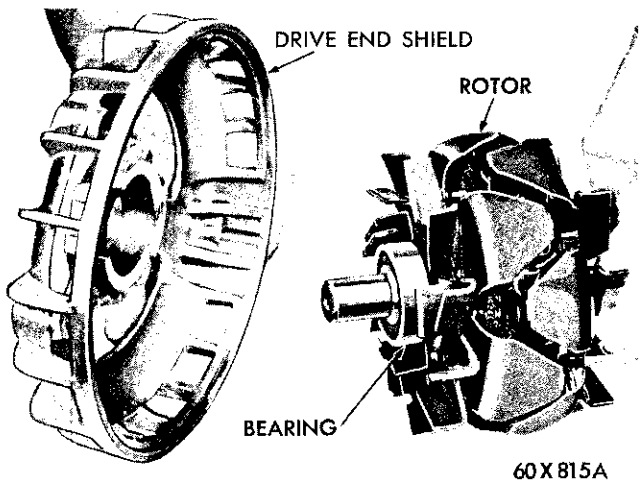

Fig. 22—Separating Rotor from Drive End Shield

gine running, the flow of current through the rotor field coil winding energizes a twelve-pole rotating electro magnet. The rotation of the rotor will cause the stator windings to cut the magnetic lines of force of the rotor. This induces an alternating current voltage in the stator windings. The silicon rectifiers convert the alternating current to (D.C.) direct current at the output terminal, to carry the electrical load and charge the battery. The silicon rectifiers prevent the battery from discharging through the alternator. Hence, no circuit breaker (cutout relay) is required as in a D.C. regulator.

As the rotor speed increases, the induced voltage in the stator windings increases causing more current to flow to satisfy the load requirements. However, there is another factor, commonly known as "inductive reactance" which has an important bearing on current control.

"Inductive reactance" is a **counter-voltage** (voltage of opposite polarity) which is also induced in the stator windings. This voltage tends to oppose the "induced" voltage in the stator windings. As the rotor speed increases, the **counter-voltage** also increases. This factor has been taken into consideration by Chrysler Corporation Engineers, and they designed the Chrysler Corporation Alternator to take advantage of this factor. By designing the correct size and shape of the rotor and stator armature, the selection of the correct size and number of windings, the correct air gap between the rotor poles and stator, and other design features, the Chrysler Corporation Alternator permits "inductive reactance" to limit output current, therefore, no current regulator is needed.

VOLTAGE REGULATOR

The only function of the regulator is to limit the direct current voltage output. The voltage regulator acomplishes this by controlling the flow of current in the rotor field coil, and in effect controls the strength of the rotor magnetic field.

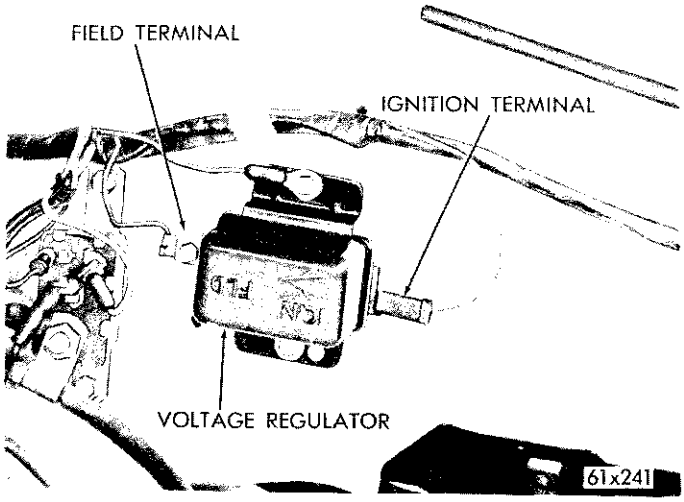

Fig. 23—Voltage Regulator Terminal Connections

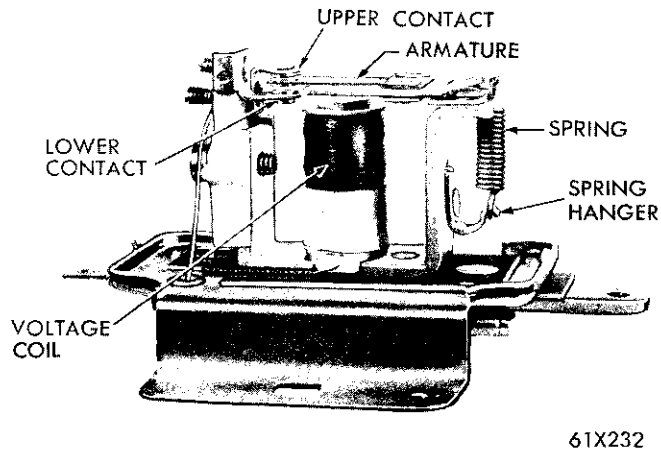

Fig. 24—Voltage Regulator (Cover Removed)

The voltage regulator (Fig. 23) is connected in the field circuit between the battery and the field terminal of the alternator. One terminal of the regulator is marked "IGN" and the other is marked "FLD." The "IGN" terminal of the regulator is connected to the coil side of the ignition switch so that the field circuit is completed **only** when the ignition switch is turned "ON."

The voltage regulator (Fig. 24) has two sets of contacts using a common single armature. The upper and lower stationary contact brackets are mounted on a molded plastic bracket which is attached to the regulator frame by two screws. The upper contact bracket is connected to the "IGN" terminal by a

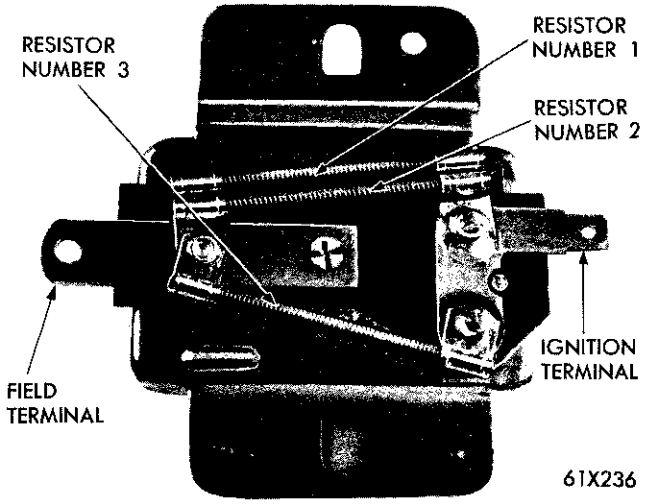

Fig. 25—Voltage Regulator Resistance Units

fusible wire. The lower contact bracket is connected to ground by a fusible wire. The armature is connected to the insulated "FLD" terminal.

Three resistance units are used (Fig. 25). Resistor number "one" and number "two" are connected between the "IGN" and "FLD" terminals, in parallel with the upper set of contacts. Resistor number "three" is connected between the "FLD" terminal and ground. Its function is to reduce arcing at the regulator contacts.

A voltage coil, consisting of many turns of fine wire, is connected in series between the "IGN" terminal of the regulator and "ground." Thus, when the ignition switch is turned "ON," battery voltage applied to the windings energizes the coil and the magnetic force of the coil tends to attract the regulator armature.

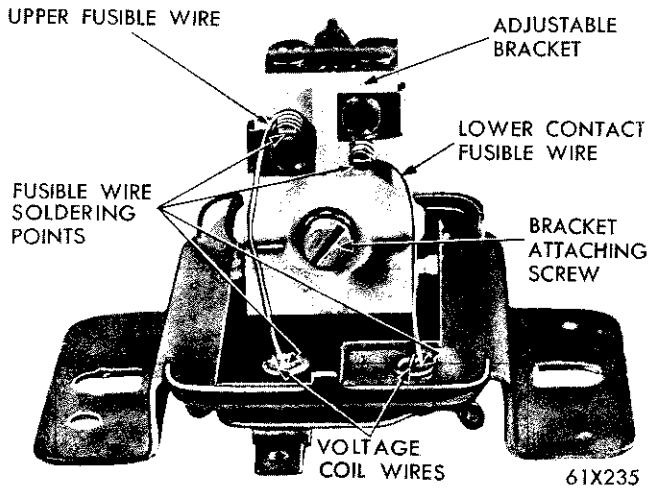

Fig. 26—Voltage Regulator Fusible Wires

REGULATOR OPERATION

(1) When the battery line voltage is relatively low, the current flow through the voltage coil will be low. The magnetic force (or pull) of the voltage coil will not be great enough to overcome the regulator armature spring tension, which is holding the armature contact against the upper stationary contact (Fig. 26).

Battery line voltage applied to the "IGN" terminal causes current to flow through the regulator upper contacts, through the "FLD" terminal of the regulator and to the "insulated" brush and rotor slip ring. The rotor field coil circuit is completed to "ground" through the other rotor slip ring and the "ground" brush. Inasmuch as the upper contacts are "closed," the field circuit resistance is relatively low, and maximum current will flow through the rotor field coil. The rotor field strength will be high, and the alternator output will be at its maximum for any given rotor speed.

(2) As the battery line voltage increases the magnetic pull of the voltage coil overcomes the armature spring tension, and "opens" the upper contacts. The armature contacts at this time do not touch either the upper or lower stationary contacts. Field current now flows through the regulator "IGN" terminal, through resistance number one and number two, through the "FLD" terminal, and through the rotor field to ground.

The two resistors, in series with the field circuit, reduce field current and rotor field strength, with a corresponding reduction in alternator output voltage. This momentarily reduces battery line voltage applied to the regulator voltage coil. The regulator armature spring tension overcomes the magnetic pull of the voltage coil, closing the upper contacts.

When the electrical load requirements are relatively high, the regulator armature oscillates, opening and closing the upper contacts. This alternately "puts in" and "takes out" resistance in the field circuit, and in effect limits the alternator output voltage.

(3) When the electrical load requirements are low and the engine speed is high, the alternator output voltage tends to increase. The battery line voltage (now slightly increased) causes the regulator voltage coil magnetic force to pull the armature contact against the regulator lower stationary contact.

Field current flow is now through the regulator "IGN" terminal, resistors number one and number two, to the regulator "FLD" terminal. Since the regulator armature is connected to the "FLD" terminal and the lower contacts are closed, the field current will now flow to ground through the regulator lower stationary contact, by-passing the alternator field coil. This is because the resistance to ground is less than the alternator rotor field coil resistance.

(4) By-passing the alternator field coil will cause the alternator output voltage and the battery line voltage to drop. This reduction in voltage will reduce the magnetic pull of the regulator voltage coil, to the extent that it cannot hold the armature contact against the stationary lower contact.

The armature moves into a "no contact" position between the upper and lower stationary contacts. This momentarily allows the field current to flow through resistors number one and number two, and through the rotor field coil to ground. At high engine

speed and low electrical load operation, the armature oscillates between the "no contact" position, and contact with the low stationary contact, to limit the battery line voltage.

TESTING THE ALTERNATOR SYSTEM (On Vehicle)

Charging Circuit Resistance Test with Voltmeter and Ammeter Test Unit (Fig. 27)

Test the condition of the battery and state of charge. With the battery in good condition and fully charged, proceed with the tests as follows:

(1) Disconnect the lead at the alternator "BAT" terminal. Connect a 0-50 ampere scale D.C. ammeter in series between the "BAT" terminal and "BAT" lead which was disconnected from the terminal.

(2) Connect the positive lead of a test D.C. voltmeter to the "BAT" lead, and connect the negative voltmeter lead to the battery positive (+) terminal.

(3) Start and operate the engine at a speed to obtain 10 amperes flowing in the circuit. Observe the voltmeter reading. The voltmeter reading should not exceed .2 volt. If a higher voltage drop is indicated, inspect, clean and tighten all the connections in the charging circuit. A voltage drop test may be performed at each connection to locate the connection with excessive resistance.

(4) Disconnect the test instruments. Connect the "BAT" lead to the alternator "BAT" terminal and tighten securely.

Current Output Test (Fig. 28)

(1) Disconnect the battery ground cable.

(2) Disconnect the "BAT" lead at the alternator output "BAT" terminal.

(3) Connect a 0-50 ampere scale D.C. ammeter in series between the alternator "BAT" terminal and the disconnected "BAT" lead.

(4) Connect the "positive" lead of a test voltmeter to the output "BAT" lead. Connect the "negative" lead of the test voltmeter to ground.

(5) Disconnect the field "FLD" lead at the alternator and at the regulator.

(6) Connect a "jumper" lead from the alternator field "FLD" terminal to the alternator output "BAT" terminal. Be sure the ammeter lead is satisfactorily connected to the output "BAT" terminal.

(7) Connect the engine tachometer. Connect the battery ground cable.

(8) Connect a battery-starter tester (equipped with a variable carbon pile) to the battery terminals.

(9) Start and operate the engine at 1250 rpm.

(10) Adjust the "carbon pile" to obtain a reading of 15 volts on the test voltmeter.

(11) Observe the reading on the test ammeter.

The current output should be within the limits shown in the chart below:

Engine Speed	Voltage	Current Output
1250 RPM	@ 15 Volts	35 Amperes Minimum – Cars Without Air Conditioning
1250 RPM	@ 15 Volts	40 Amperes Minimum – Cars With Air Conditioning

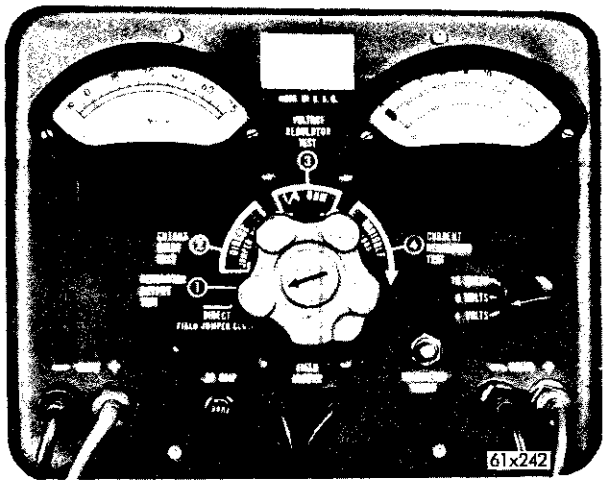

Fig. 27—Voltmeter and Ammeter Test Unit

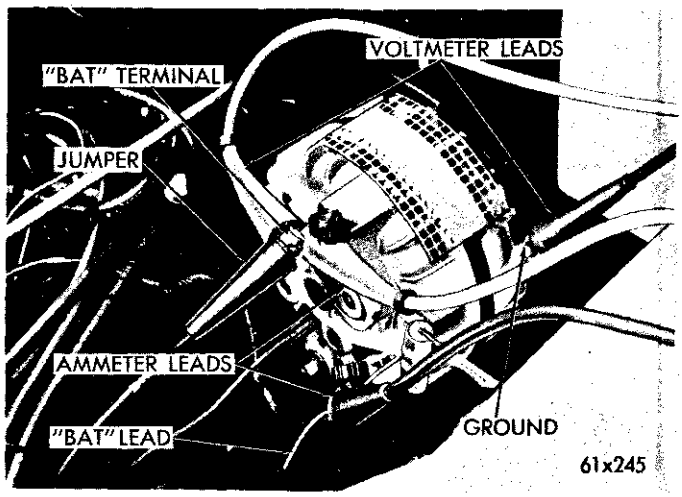

Fig. 28—Current Output Test

If the output is slightly less (3 or 4 amperes) than that specified above, it may be an indication of possible "open" rectifier or other alternator internal problem. If the output is considerably lower than that specified above, it may be an indication of a possible "shorted" rectifier or other alternator internal problem. In either case the alternator should be removed and tested on the bench before disassembly.

Before the alternator is removed and while the ammeter is connected in the circuit it is possible to test the rotor field current draw. Stop the engine. Note the reverse current reading on the ammeter, and the battery voltage reading on the voltmeter. The rotor field coil draw should be 2.38 amperes to 2.75 amperes at 12 volts. If the test ammeter does not have a reverse current scale, reverse the test ammeter leads at the output "BAT" terminal and at the output "BAT" lead. Be sure the jumper is connected to the output "BAT" terminal and field "FLD" terminal on the alternator.

A low rotor field coil draw is an indication of high resistance in the field coil circuit, may be brushes, slip rings or field coil connections. A higher rotor field coil draw indicates a possible shorted coil.

Voltage Regulator Test (On the Car)—Engine at Normal Operating Temperature

(1) If the alternator current output tested satisfactorily, leave the test ammeter and test voltmeter connected as before; however, remove the "jumper" lead from the alternator "field" terminal and "output" terminal. Connect the vehicle field lead at the alternator field "FLD" terminal and the regulator field "FLD" terminal.

(2) Start and operate the engine at 1250 rpm. Turn on the lights and electrical accessories to create enough electrical load, that 15 minutes of operation will stabilize the regulator temperature. Measure the temperature at the regulator by holding a reliable thermometer two (2) inches from the regulator. Turn off the lights and other electrical load. Turn on the instrument panel lights. Read the test voltmeter. With a fully charged battery and 15 amperes flowing in the circuit, the voltmeter reading should be within the specifications shown in the chart below.

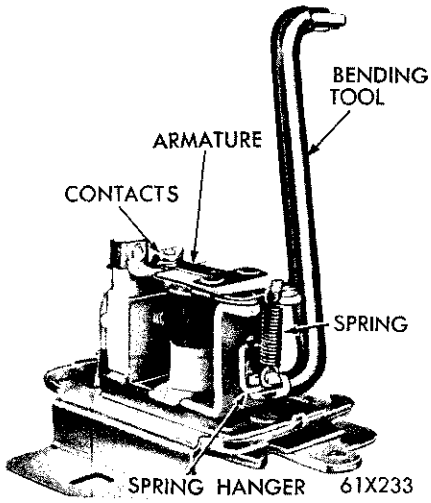

Fig. 29—Adjusting Spring Tension

NOTE: No current reading on test ammeter would indicate a blown fuse wire inside the voltage regulator between the upper stationary contact and the "IGN" terminal.

NOTE: There will be a slightly higher voltage at higher engine speeds, however, this increased voltage must not exceed the voltage specified by more than .7 volt at any temperature range. If the voltage reading is considerably less than the values shown in the chart, test the battery specific gravity to be sure battery is fully charged.

Some test equipment include a "¼ ohm fixed resistance" that may be placed in the charging circuit, which in effect will simulate a fully charged battery. Be sure to follow the test equipment manufacturer's recommendations for the use of the ¼ ohm "fixed" resistor when testing the Chrysler Corporation built alternator.

(3) If the regulator setting is outside the limits shown on the chart, the regulator must be removed to remove the cover. To adjust the voltage setting, bend the regulator lower spring hanger **down** to **increase** voltage setting, or **up** to **decrease** voltage setting. Use an insulated tool to bend the spring hanger. (See Fig. 29.) The regulator must be installed, correctly connected, and retested after each adjustment of the lower spring hanger.

NOTE: If repeated readjustment is required, it is permissible to use a jumper wire to ground the reg-

REGULATOR OPERATING VOLTAGE

Temperature (Degrees)	70° F.	95° F.	118° F.	140° F.
Setting (Volts)	13.7 - 14.3	13.6 - 14.2	13.5 - 14-1	13.4 - 14.0

ulator base to the fender splash shield for testing, in lieu of reinstalling the regulator each time. However, it is important that the regulator cover be replaced, the regulator connections correctly connected, and the regulator satisfactorily insulated by the fender cover to prevent grounding the regulator terminals or resistances. When testing, the regulator must be at the same attitude (or angle) as when installed on the car.

(4) If the alternator and regulator tested satisfactorily, turn the ignition switch "OFF." Disconnect the battery ground cable. Disconnect the test instruments. Correctly connect the leads at the alternator and the regulator. Connect the battery ground cable.

CAUTION

Be sure the negative post of the battery is always connected to ground. Incorrect battery polarity may damage the alternator rectifiers. Do not ground the alternator field circuit, as this may damage the regulator.

REGULATOR SERVICING

Regulator Mechanical Adjustments

If the regulator cannot be satisfactorily adjusted for voltage control, or if the regulator performance is erratic or malfunctions, it may be necessary to adjust the regulator air gap and contact point gap.

(1) Remove the regulator from the vehicle. Remove the regulator cover.

(2) Insert a .048 inch wire gauge between the regulator armature and the core, next to the stop pin on the spring hanger side. (See Fig. 30.)

(3) Press down on the **armature** (not the contact spring) until it contacts the wire gauge. The upper contacts should just "open."

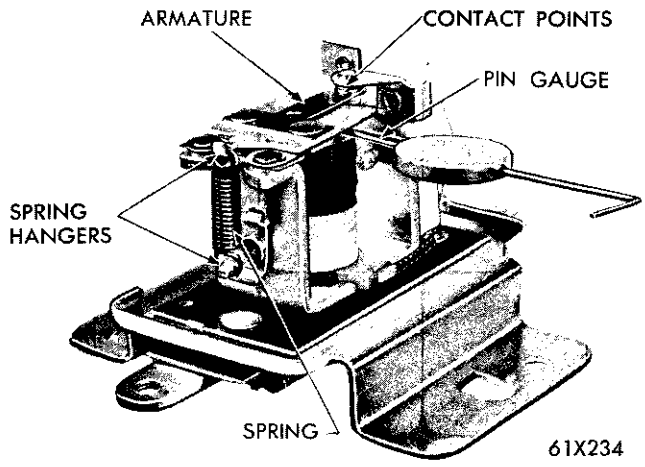

Fig. 30—Checking Air Gap

NOTE: A 12 volt battery and test light connected in series to the "IGN" and "FLD" terminals may be used to accurately determine the contact opening. When the contacts open, the test light will go "dim".

(4) Insert a .052 inch wire gauge between the armature and the core, next to the stop pin on the spring hanger side.

(5) Press down the armature until it contacts the wire gauge. The contacts should remain "closed," and the test light should remain "bright."

(6) If adjustment is required, adjust the air gap by loosening the screw and moving the stationary contact bracket, make sure the air gap is checked with attaching screw fully tightened. Remeasure the air gap as described in steps 2, 3, 4 and 5.

(7) Remove the wire gauge from under the armature. Measure the lower contact gap with a feeler gauge. The lower contact gap should be .015 inch (plus or minus .001"). Adjust the lower contact gap by bending the lower stationary contact bracket.

(8) Install the regulator cover. Install the regulator. The electrical adjustment must be performed on the car after installation of the regulator.

ALTERNATOR SERVICING

Removal

If the alternator performance does not meet current output specification limits, it will have to be removed and disassembled for further test and servicing.

(1) Disconnect the battery ground cable.

(2) Disconnect the alternator output "BAT" and field "FLD" leads and disconnect ground wire.

(3) Remove the alternator from the vehicle.

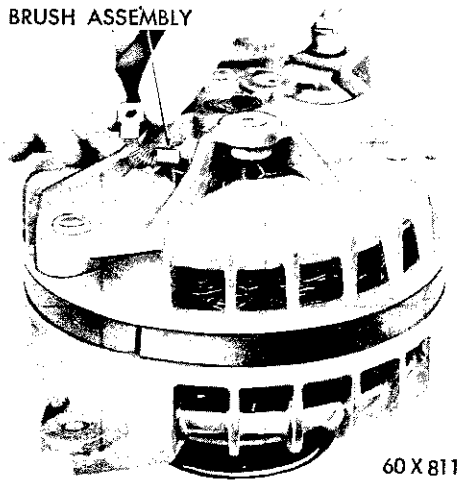

Fig. 31—Removing or Installing Insulated Brush

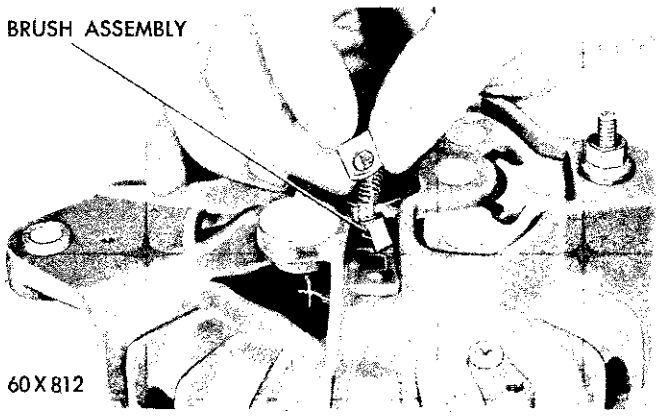

Fig. 32—Removing or Installing Ground Brush

Bench Tests

If the alternator field coil draw has not been tested on the vehicle it may be tested on the test bench.

(1) Connect a source of 12 volt D.C. current and a test ammeter in series to the field "FLD" terminal and to ground.

(2) Slowly rotate the alternator rotor by hand. Observe the ammeter reading. The field coil draw should be 2.38 amperes to 2.75 amperes at 12 volts.

Disassembly

To prevent possible damage to the brush assemblies, they should be removed before proceeding with the disassembly of the alternator. The insulated brush is mounted in a plastic holder that positions the brush vertically against one of the slip rings.

(1) Remove the retaining screw, lockwasher, nylon washer, and field terminal, and carefully lift the plastic holder containing the spring and brush assembly from the end housing (Fig. 31).

(2) The ground brush is positioned horizontally against the remaining slip ring.and is retained in a holder that is integral with the end housing. Remove the retaining screw and lift the clip, spring and brush assembly from the end shield (Fig. 32).

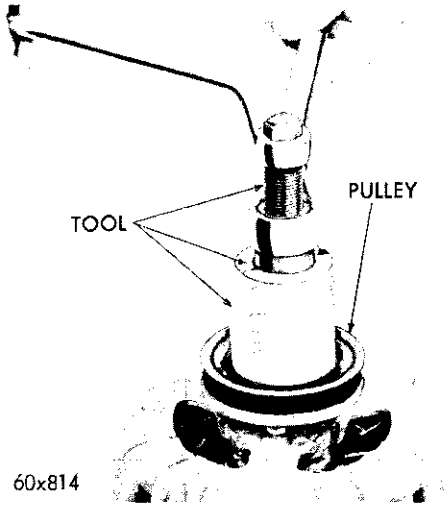

Fig. 33—Alternator Pulley

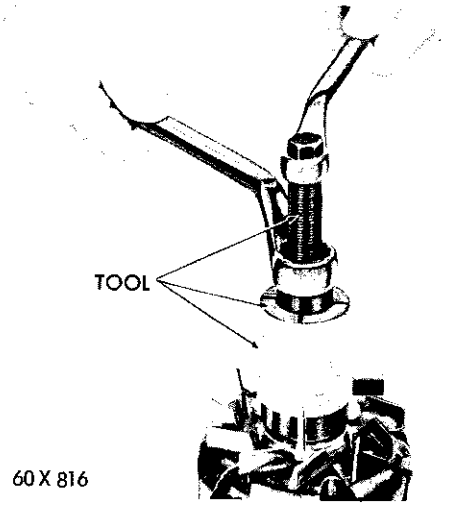

Fig. 34—Removing Bearing from Rotor Shaft

CAUTION

Stator is laminated, do not burr stator or end housing.

(3) Remove the through bolts and pry between the stator and drive end shield with a thin blade screwdriver. Carefully separate the drive end shield, pulley and rotor assembly away from the stator and rectifier shield assembly.

(4) The pulley is an interference fit on the rotor shaft. Remove the pulley with puller Tool C-3615 and special adaptors SP-3002 (Fig. 33).

(5) Remove the three nuts and washers and while supporting the end shield, tap the rotor shaft with a plastic hammer and separate the rotor and end shield.

(6) The drive end ball bearing is an interference fit with the rotor shaft. Remove the bearing with puller Tool C-3615 and adaptors as follows:

(a) Position the center screw of Tool C-3615 on rotor shaft.

(b) Place the thin lower end of the adapters SP-3375 under the bearing equally spaced and the upper end of the adapters around the center screw.

(c) Hold the adapters and center screw in position with the tool sleeve.

CAUTION

Tool sleeve must bottom on bearing, otherwise, adapters may be damaged.

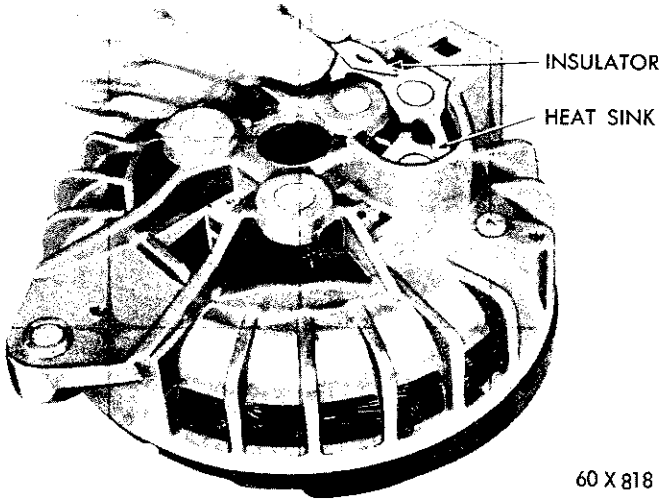

Fig. 35—Removing or Installing Heat Sink Insulator

(d) Turning center screw while holding the outer body of tool (Fig. 34) will withdraw the bearing from the rotor shaft.

NOTE: No further disassembly of the rotor is required, as the balance of the rotor assembly is not serviced separately.

(7) Remove the D.C. output terminal nuts and washers and remove terminal screw and inside capacitor (on units so equipped).

NOTE: The heat sink is also held in place by the terminal screw.

(8) Remove the insulator (Fig. 35).

NOTE: Three rectifiers are pressed into the heat sink and three in the end shield. When removing the rectifiers, it is necessary to support the end shield and/or heat sink to prevent damage to these castings.

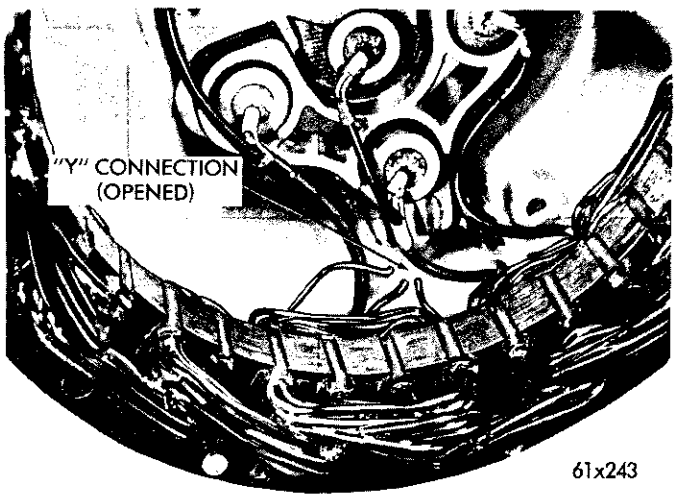

Fig. 36—Separating the Three Stator Leads

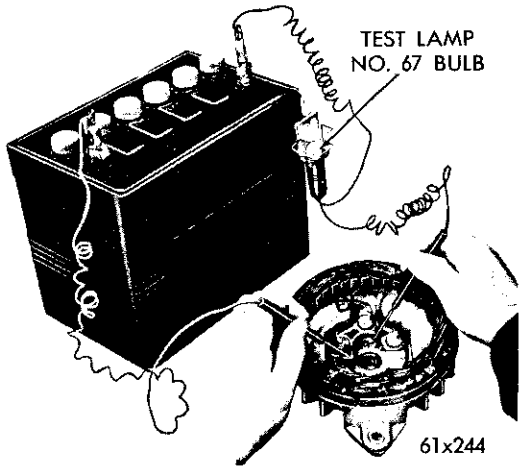

Fig. 37—Testing Rectifiers with Test Lamp

Testing the Rectifiers and Stator

(1) Separate the three (3) stator leads at the "Y" connection. (See Fig. 36.)

(2) Test the rectifiers with a 12 volt battery and a test lamp equipped with a number 67 bulb (4 candle power) as follows:

(a) Connect one side of test lamp to the positive battery post. The other side of the test lamp to a test probe with the other test probe connected to the negative battery post.

(b) Contact the outer case of the rectifier with one probe and the other probe to the wire in the center of the rectifier. (See. Fig. 37.)

(c) Reverse the probes, moving the probe from the rectifier outer case to the rectifier wire, and the probe from the rectifier wire to the rectifier outer case.

If the test lamp "lights" in one direction but does "not light" in the other direction, the rectifier is satisfactory. If lamp lights in "both directions," the rectifier is "shorted." If the test lamp does "not light" in either direction, the rectifier is "open."

NOTE: The usual cause of an open or a blown rectifier is a faulty capacitor or a battery that has been installed in reverse polarity. If the battery is installed properly and the rectifiers are open, test the capacitor capacity.

	Capacity
Internal Capacitor	.158 microfarad (minimum)
External Capacitor	.5 microfarad (minimum)

(3) Disconnect the rectifiers from the stator leads.

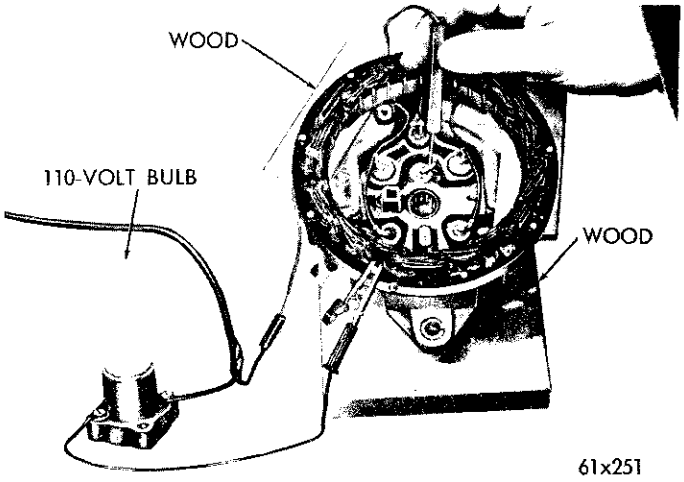

Fig. 38—Testing Stator for Grounds

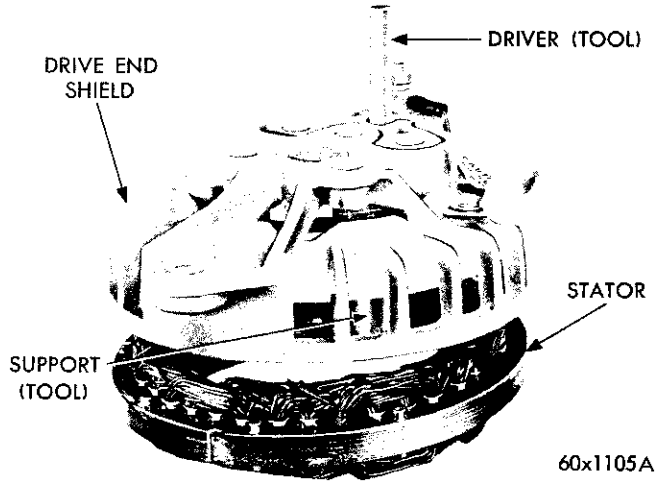

Fig. 40—Removing Rectifier

(4) Inspect the stator connections.

(5) Test the stator for grounds using a 110 volt test lamp (Fig. 38). Use wood slats to insulate the stator from the rectifier shield. Contact one prod of the test lamp to the stator pole frame, and contact the other prod to each of the three stator leads. The test lamp should "not light." If the test lamp lights, the stator windings are "grounded." (See Fig. 38.)

(6) Test the stator windings for continuity, by contacting one prod of the test lamp to **all** three stator leads at the "Y" connection. Contact each of the three stator leads (disconnected from the rectifiers). The test lamp should "light" when the prod contacts each of the three leads. If the test lamp does not light the stator winding is "open." (See Fig. 39.)

(7) Install a new stator if the one tested is "grounded" or "open." If the rectifiers must be replaced, proceed as follows:

(a) Cut rectifier wire at point of crimp.

(b) Support the rectifier shield on Tool C-3771. (See Fig. 40.)

NOTE: This tool is cut-away and slotted to fit over the wires and around the bosses in the shield. Make sure that the bore of the tool completely surrounds the rectifier, then press the rectifier out of the shield using Tool SP-3380 (Fig. 40). The needle roller bearing in the rectifier end shield is a press fit. To protect the end shield it is necessary to support the shield with Tool SP-3383 when pressing the bearing out with Tool C-3770 (Fig. 41).

Assembly

(1) Support the heat sink or rectifier end shield on circular plate Tool SP-3377.

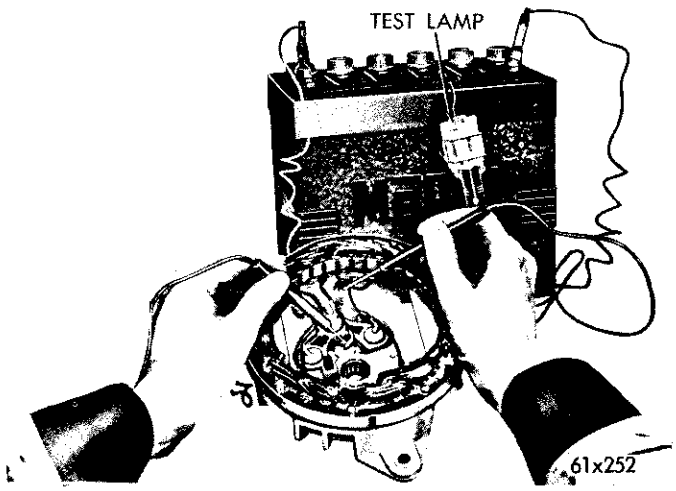

Fig. 39—Testing Stator Windings for Continuity

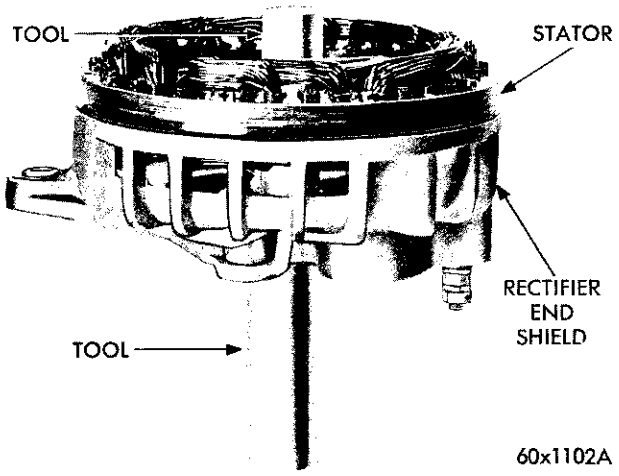

Fig. 41—Removing Rectifier End Shield Bearing

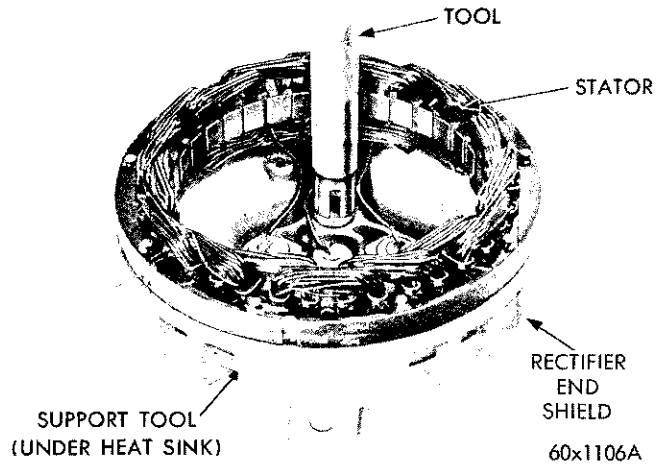

Fig. 42—Installing a Rectifier

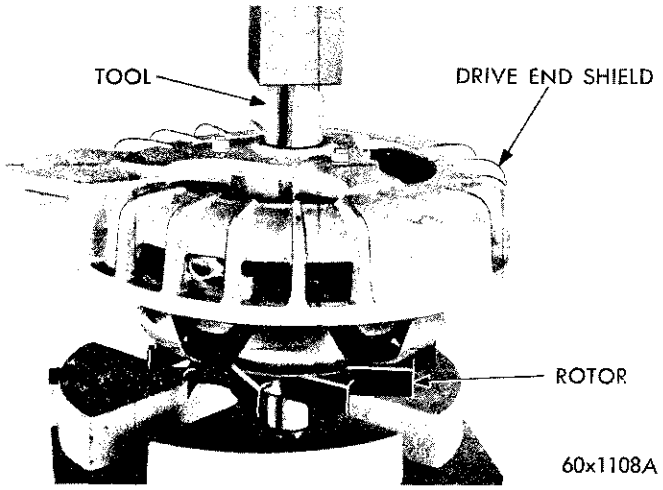

Fig. 44—Installing Drive End to Shield and Bearing

(2) Check the rectifier identification to make sure the correct rectifier is being installed. Refer to the Parts List for rectifier identification.

(3) Start the new rectifier into the casting squarely and press the rectifier into the casting with Tool C-3772 (Fig. 42).

(4) Crimp the new rectifier wire to the wires disconnected at removal.

(5) Support the end shield on Tool SP-3383 so that the notch in support tool will clear the raised section of the heat sink and press the bearing into position with Tool SP-3381 (Fig. 43).

NOTE: New bearings are pre-lubricated, additional lubrication is not required.

(6) Insert the drive end bearing in the drive end shield and install the bearing plate, washers and nuts to hold the bearing in place.

(7) Position the bearing and drive end shield on the rotor shaft and, while supporting the base of the rotor shaft, press the bearing and shield into position on the rotor shaft with arbor press and Tool C-3769 (Fig. 44).

CAUTION

Make sure that the bearing is installed squarely at installation; otherwise, damage to the bearing will result. Press the bearing on the rotor shaft until the bearing contacts the shoulder on the rotor shaft.

(8) Install the pulley on the rotor shaft. The shaft of the rotor must be supported in a manner so that all pressing force is on the pulley hub and rotor shaft (Fig. 45).

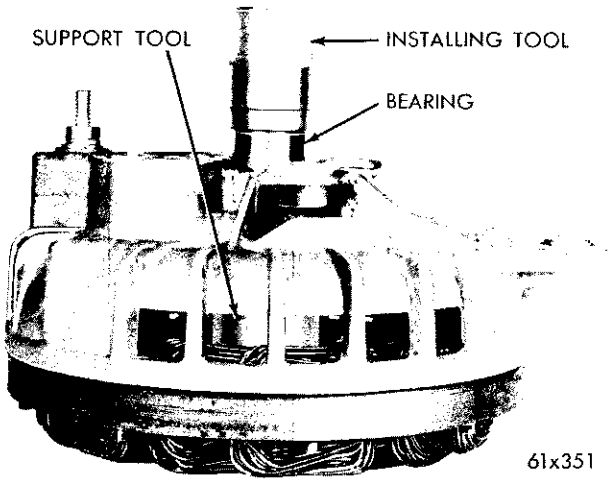

Fig. 43—Installing Rectifier End Shield Bearing

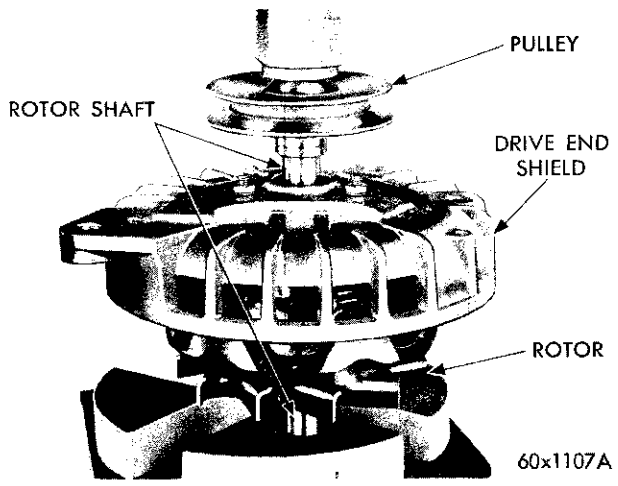

Fig. 45—Installing Alternator Pulley

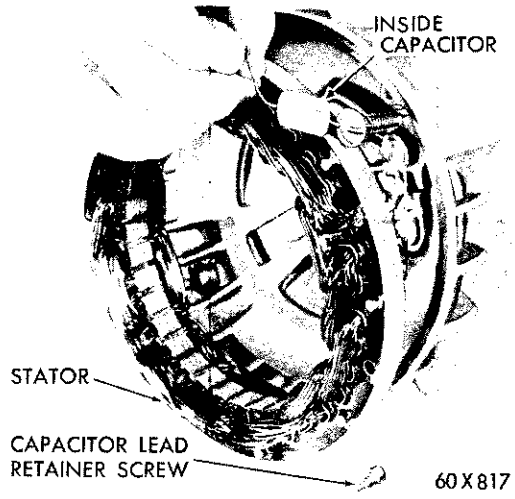

Fig. 46—Installing Inside Capacitor

NOTE: Do not exceed 6800 pounds pressure. Press the pulley on the rotor shaft until the pulley contacts the inner race of the drive and bearing.

(9) Some alternators have the capacitor mounted internally. Make sure the heat sink insulator is in place.

(10) Install the output terminal screw with capacitor attached through the heat sink and end shield (Fig. 46).

(11) Install the insulating washers, lockwashers and lock nuts.

(12) Make sure the heat sink and insulator are in position and tighten the lock nut.

(13) Position the stator on the rectifier end shield. Make sure that all of the rectifier connectors, and stator leads, capacitor lead (internally installed) will not interfere with the rotor fans.

(14) Position the rotor and shield assembly on the rectifier end shield. Align the through bolt holes in the stator, rectifier end shield and drive end shield.

(15) Compress the stator and both end shields by hand and install the through bolts, washers and nuts.

(16) Install the insulated brush, lockwasher, insulating washer, and terminal attaching screw.

(17) Install the ground brush and attaching screw.

(18) Rotate the pulley slowly by hand to be sure that the rotor fans do not hit the rectifiers and stator connectors.

(19) Install the alternator and adjust the drive belt according to the instructions in "ACCESSORY BELT DRIVE" Group 7A of this Supplement.

(20) Connect the output "BAT" and field "FLD" leads and connect the ground wire.

(21) Connect the battery ground cable.

(22) Start and operate the engine, and observe the alternator operation.

(23) Test the current output and regulator voltage setting, if necessary.

ALTERNATOR
SERVICE DIAGNOSIS

Condition	Possible Cause	Correction
Alternator fails to charge. (No output.)	(a) Blown fusible wire in regulator.	(a) Locate and correct cause of the fuse blowing. Install a new fuse wire, soldering both ends securely.
	(b) Alternator drive belt too loose.	(b) Adjust drive belt according to specifications in the 1960 Service Manual.
	(c) Worn brushes and/or slip rings.	(c) Install new brushes and/or rotor.
	(d) Sticking brushes.	(d) Install new brushes.
	(e) Open field circuit.	(e) Test all field circuit connections, and correct as required.
	(f) Open charging circuit.	(f) Inspect all connections in the charging circuit, and correct as required.

ALTERNATOR SERVICE DIAGNOSIS — Continued

Condition	Possible Cause	Correction
Alternator fails to charge. (Continued)	(g) Open circuit in stator windings.	(g) Remove the alternator and disassemble. Test stator windings. Install new stator if necessary.
	(h) Open rectifiers.	(h) Remove the alternator and disassemble. Test the rectifiers. Install new rectifiers if necessary.
Low, unsteady charging rate.	(a) Alternator drive belt loose.	(a) Adjust the alternator drive belt.
	(b) High resistance at battery terminals.	(b) Clean and tighten the battery terminals.
	(c) High resistance in the charging circuit.	(c) Test the charging circuit resistance. Correct as required.
	(d) High resistance in the body to engine ground lead.	(d) Tighten the ground lead connections. Install a new ground lead if necessary.
	(e) Open stator winding.	(e) Remove and disassemble the alternator. Test the stator windings. Install a new stator if necessary.
Low output and a low battery.	(a) High resistance in the charging circuit.	(a) Test the charging circuit resistance and correct as required.
	(b) Low regulator setting.	(b) Adjust the voltage regulator.
	(c) Shorted rectifier. Open rectifier.	(c) Perform current output test. Remove and disassemble the alternator. Test the rectifiers. Install new rectifiers as required.
	(d) Grounded stator windings.	(d) Remove and disassemble the alternator. Test the stator windings. Install a new stator if necessary.
Excessive charging rate to a fully charged battery.	(a) Regulator set too high.	(a) Reset voltage regulator according to specifications.
	(b) Regulator contacts stuck.	(b) Install a new voltage regulator.
	(c) Regulator voltage winding open.	(c) Install a new voltage regulator.
	(d) Regulator base improperly grounded.	(d) Correct the regulator base to ground connection.
Regulator contacts oxidized.	(a) High regulator setting.	(a) Reset the voltage regulator according to specifications.
	(b) Regulator air gap improperly set.	(b) Reset the voltage regulator air gap and lower contact gap.
	(c) Shorted rotor field coil windings.	(c) Test the rotor field coil current draw. If excessive, install a new rotor.
Regulator contacts burned.	(a) High regulator setting.	(a) Reset the voltage regulator according to specifications.

ALTERNATOR SERVICE DIAGNOSIS — Continued

Condition	Possible Cause	Correction
Regulator contacts burned. (Continued)	(b) Shorted rotor field coil windings.	(b) Test the rotor field coil current draw. If excessive, install a new rotor.
Regulator voltage coil windings.	(a) High regulator setting.	(a) Install a new voltage regulator. Test regulator voltage setting and reset if necessary.
Regulator contact points stuck.	(a) Poor ground connection between the alternator and the regulator.	(a) Correct the ground connection. Install a new regulator. Test the regulator setting and reset if necessary.
Noisy alternator.	(a) Alternator mounting loose.	(a) Properly install and tighten the alternator mounting.
	(b) Worn or frayed drive belt.	(b) Install a new drive belt and adjust.
	(c) Worn bearings.	(c) Remove and disassemble the alternator. Install new bearings as required.
	(d) Interference between rotor fan and stator leads or rectifiers.	(d) Remove and disassemble the alternator. Correct the interference as required.
	(e) Rotor or rotor fan damaged.	(e) Remove and disassemble the alternator. Install a new rotor.
	(f) Open or shorted rectifier.	(f) Remove and disassemble the alternator. Test the rectifiers. Install new rectifiers as required.
	(g) Open or shorted winding in the stator.	(g) Remove and disassemble the alternator. Test the stator winding. Install a new stator if necessary.

IGNITION SYSTEM

The ignition system consists of two separate circuits. The battery, ammeter, ignition switch, primary winding of the ignition coil, distributor contacts and condenser, vehicle frame, and the primary wiring make up the voltage primary circuit. The secondary high voltage circuit includes the coil secondary winding, the distributor cap and rotor, the spark plugs, the high tension wiring and the vehicle frame.

SERVICE PROCEDURES

CHECKING THE SECONDARY CIRCUIT

The coil to distributor cap lead wire and the spark plug wires should make good, clean contact in the ignition coil and the distributor cap towers.

The ignition coil tower and the distributor cap should be wiped clean with a cloth moistened in cleaning solvent.

The insulation of the coil lead and spark plug wires will deteriorate with usage. Leakage to ground and between the wires will occur, resulting in hard starting and inefficient engine operation. Old, cracked, or damaged wires should be replaced.

NOTE: The high tension cables have a non-metallic string type conductor for improved radio noise suppression. Care should be taken not to jerk the cables of the spark plugs or out of the distributor cap towers (especially if the engine is hot; otherwise, the cable may pull out of its terminal).

Check cables for excessive resistance or open circuit. Replace the cable if resistance is more than 30,000 ohms. Replace the cable if the terminal has pulled off.

If radio develops excessive noise or if there is a pronounced engine miss, check for defective cables (broken).

The rotor and distributor cap electrodes should be inspected for burning. Replace the rotor if the electrode is burned on the top or worn too short.

DISTRIBUTOR RESISTANCE TEST

This test indicates the resistance of the ignition primary circuit from the distributor side of the coil, through the points and the distributor ground. Excessive resistance in this portion of the ignition system will prevent the coil from producing sufficient output for good over-all ignition. To perform test, proceed as follows:

(1) Turn the Selector Switch to the "CALIBRATE" position and adjust Dwell Calibrator until the Dwell Meter reads on the set line (test leads separated).

(2) Leave selector switch in "CALIBRATE" position, connect tach-dwell red lead to distributor terminal of coil and black lead to a good ground.

(3) Turn the ignition switch "ON." Observe the dwell meter reading. Meter pointer should be well within black bar marked "DISTRIBUTOR RESISTANCE." If the reading is zero or outside of black bar, crank engine with the starter until meter pointer moves as far to right as possible. (This will indicate that breaker points are closed.) A reading now within black indicates a normal distributor primary circuit.

If the reading is outside the black bar, high resistance is present in the distributor primary circuit.

(4) Remove the test lead from the distributor terminal of coil and connect to the following points:

(a) Distributor primary terminal (outside).

(b) Distributor primary terminal (inside).

(c) Breaker point terminal bracket (insulated bracket).

(d) Ground side of contact points.

(e) Distributor housing.

(5) Repeat test at each connection until a noticeable change occurs in the meter reading. If a bad connection or faulty lead is indicated, clean, tighten or replace as necessary and repeat test (4).

If bad points are indicated, remove distributor for complete inspection, service, testing and calibration.

IDLE RPM TEST

The engine idle rpm setting should be tested and recorded as it is when the vehicle is first brought into the shop for testing. This will assist in diagnosing complaints of engine stalling or complaints of creeping and hard shifting on vehicles equipped with automatic transmissions.

(1) Turn the selector switch to the calibrate position and adjust the dwell calibrator until the dwell meter reads on the set line (test leads separated).

(2) Connect the red lead of the test unit to the distributor primary terminal at coil and the black lead to a good ground.

(3) Turn the selector switch to the 8 "LOBE" position.

(4) Turn the tachometer rpm switch to the 1000 rpm position.

(5) With the engine at normal operating temperature (off fast idle), momentarily open the throttle and release to make sure there is no bind in the linkage and that the idle speed screw is against its stop.

(6) Note engine rpm on 1000 rpm scale and adjust the carburetor idle screw to obtain 475-500 engine rpm.

DISTRIBUTOR POINT DWELL

The "degrees of Dwell" of the distributor breaker points are the degrees of rotation through which the breaker points remain closed. This is also commonly referred to as "dwell angle" or "cam angle."

Correct distributor point dwell is essential for good ignition performance and point life.

(1) Connect the tach-dwell red lead to the distributor terminal of the coil and the black lead to a good ground.

(2) Turn the selector switch to the 8 "LOBE" position.

(3) Start the engine and operate at 475 to 500 rpm, engine at normal operating temperature (off fast idle).

(4) Observe dwell meter reading and compare to specifications. If the dwell reading is within specifications, the point gap cam rubbing block and breaker arm are all in satisfactory condition.

If dwell reading is not within specifications, incorrect point gap, defective cam, worn rubbing block or distorted breaker arm is indicated.

DWELL VARIATION

This test indicates the mechanical condition of the distributor. Excessive wear in distributor mechanical

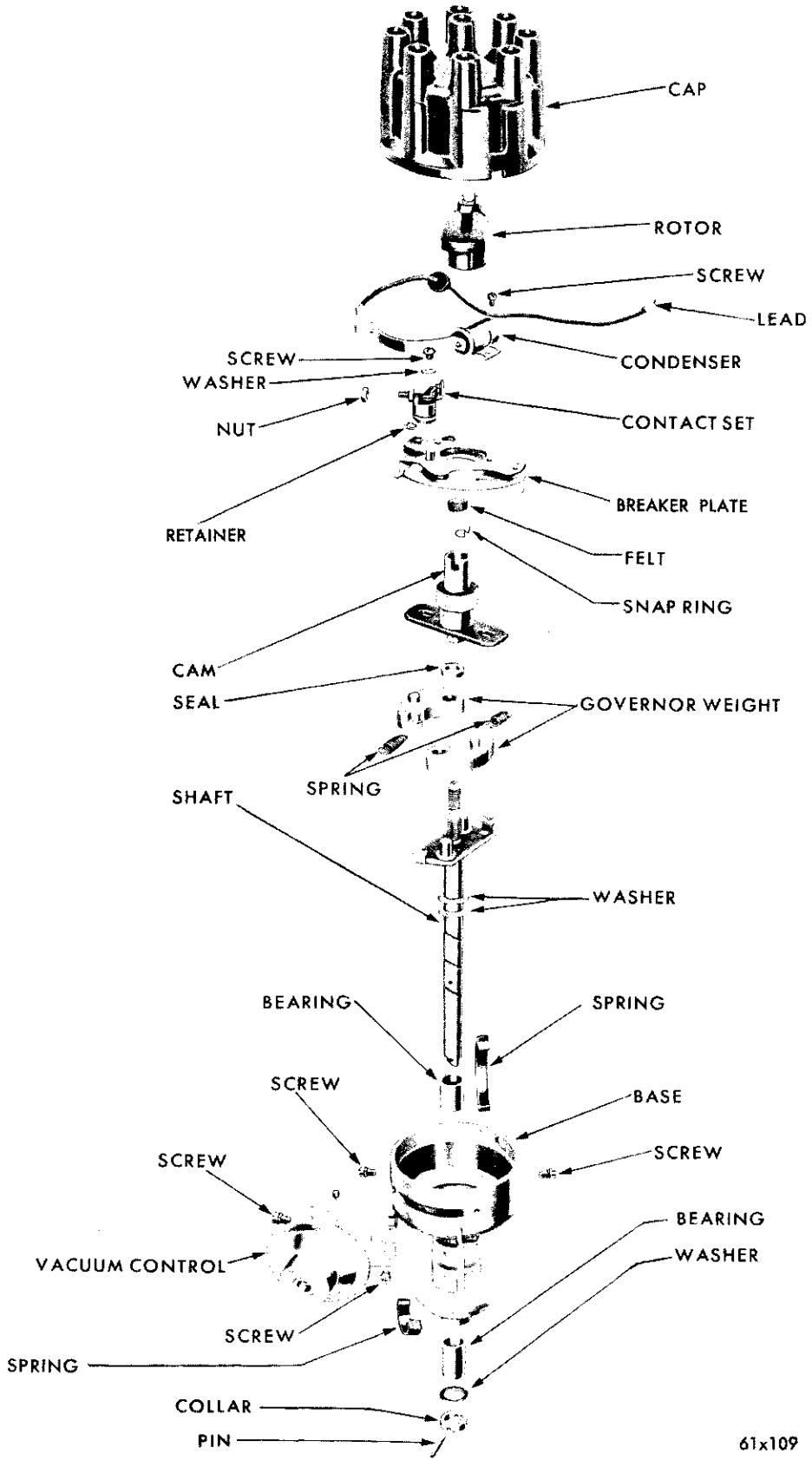

Fig. 47—Distributor (Exploded View) (Typical)

parts cause dwell variations which will affect ignition timing.

(1) With engine at idle speed and distributor vacuum line disconnected and with the test leads connected as in the point dwell test, turn the tachometer rpm switch to the 500 rpm position.

(2) Slowly increase the engine speed to 1500 rpm then slowly reduce to idle speed while observing the dwell meter reading.

If the dwell reading varies more than 2 degrees from initial reading between idle speed and 1500 rpm, probable wear in the distributor shaft, bushings or breaker plate is indicated. Remove distributor for complete inspection and testing on a distributor tester.

NOTE: Dwell variation at speeds above 1500 rpm does not necessarily indicate distributor wear.

IMPORTANT

Dwell and gap of the points must both be within their specific tolerance at the same time. If this cannot be accomplished, it is probable that the wrong points are installed or the cam lobes are badly worn.

IGNITION TIMING

To obtain maximum engine performance, the distributor must be correctly positioned to give proper ignition timing.

The ignition timing test will indicate the timing of the spark at the No. 1 piston at idle (only).

(1) Disconnect the vacuum line at the distributor. This will eliminate any chance of vacuum advancing the breaker arm plate. The engine should operate on centrifugal advancce only when checking the ignition timing.

(2) Connect the secondary lead of the Power Timing Light to No. 1 spark plug, red primary lead to the positive terminal of the battery and the black primary lead to the negative battery terminal.

(3) Start the engine and set the idle to 475-500 rpm, engine at normal operating temperature (transmission in neutral).

(4) Using a timing light, observe the position of timing mark on the crankshaft dampener and check against the specifications.

(5) Loosen the distributor clamp screw and rotate the distributor housing so that the specified timing mark and pointer are in alignment. (Moving distributor housing against shaft rotation advances timing and with shaft rotation retards timing).

(6) Tighten the distributor clamp screw after the timing has been set and recheck timing adjustment with a Power Timing Light.

(7) When the spark timing is correct, reconnect the vacuum line to the distributor.

NOTE: As the engine speed is increased, the timing mark should move down on the vibration dampener below the pointer if advance units are functioning.

DISTRIBUTOR REMOVAL

(1) Disconnect the vacuum line at the distributor.

(2) Disconnect the primary lead wire at the coil.

(3) Unfasten the distributor cap retaining clips and lift off the distributor cap.

(4) Scribe a mark on the edge of the distributor housing to indicate No. 1 position of the rotor as reference when reinstalling the distributor.

(5) Remove the distributor hold-down clamp screw and the clamp.

(6) Carefully lift the distributor from the engine.

DISASSEMBLY OF DISTRIBUTORS (Fig. 47)

(1) Remove the distributor rotor.

NOTE: The distributor cap clamp springs are held in place by peening the metal around the openings and should not be removed.

(2) Remove the retainer attaching the vacuum control unit to the breaker plate advance arm.

(3) Remove the two screws and lockwashers attaching the vacuum control unit to the distributor housing and remove the control unit.

(4) Remove primary lead wire and rubber grommet as an assembly.

(5) Remove the two screws and lockwashers attaching the breaker plate to housing and lift out the breaker plate, points and condenser as an assembly.

(6) Remove the oil wick from the distributor cam (Fig. 48). Remove the spring clips from the oil well in cam and remove the cam and yoke assembly and spacer.

(7) Clamp the ribbed section of the distributor housing in a vise equipped with soft jaws and attach the dial indicator to the body of the distributor (Fig. 49) with indicator plunger resting against the distributor cam sleeve.

(8) Hook the spring scale in the bore of the cam

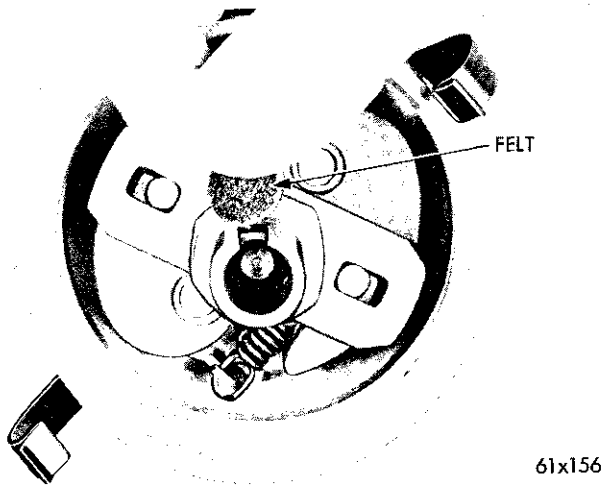

Fig. 48—Removing or Installing Distributor Cam Felt Wick

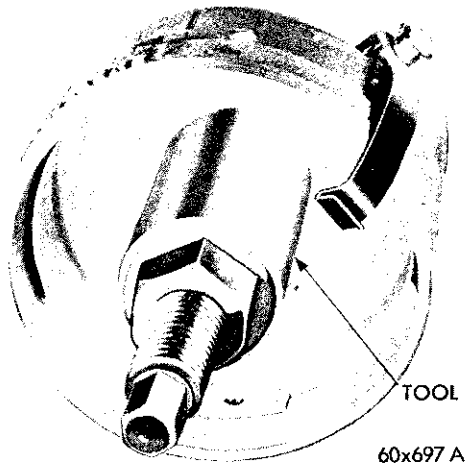

Fig. 50—Removing Distributor Shaft Upper Bushing

sleeve and pull on a line with the plunger of the gauge. Apply a 5-pound pull and read movement of the distributor cam sleeve on the indicator. If the side play exceeds .005 inch, replace bushings and/or distributor shaft as follows:

(a) Remove the distributor drive collar retaining pin and slide collar off the end of the shaft.

(b) Use a fine file to clean the burrs from around the pin hole in the shaft and remove the lower thrust washer.

(c) Push shaft up and remove it through the top of the distributor body. Remove the upper thrust washers.

(d) Remove the shaft oiler and lift out the oiler wick.

(e) Remove upper bushing with Tool C-3744 (Fig. 50) by threading the tap securely into the bushing. Place spacer over the tap. Install tool nut and, while holding the tap, tighten tool nut to remove the bushing. Invert housing and remove the lower bushing in the same manner.

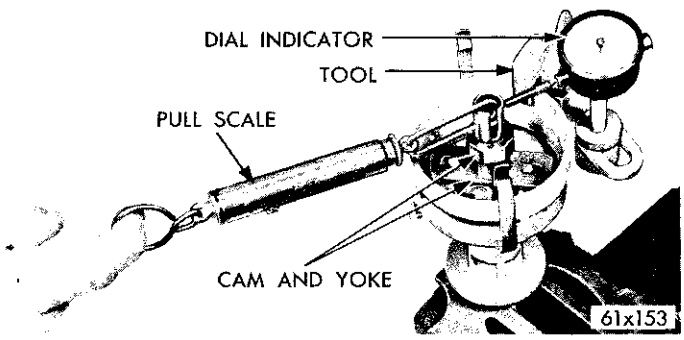

Fig. 49—Checking Distributor Shaft Side Play

(f) Soak the new bushings in light engine oil for approximately 15 minutes.

(g) Position the new upper bushing with slot in bushing **up** and in line with oil hole in housing, then press the bushing into the distributor housing with Tool C-3041 and adapter (Fig. 51). The bushing will measure .094 inch from the top of housing bore for Auto-Lite distributor (IBP-4005E-2095679. For the Chrysler-built distributor, use Tool C-3041 with the flat face of adapter contacting the bushing then press the bushing into the distributor until top of bushing is 1.613 inches from top machined face of distributor housing. Place a straight-edge on machined surface of housing and measure from bottom face of straight-edge to top of bushing. Invert the housing and install the other bushing (Fig. 52) flush with the face of the distributor base.

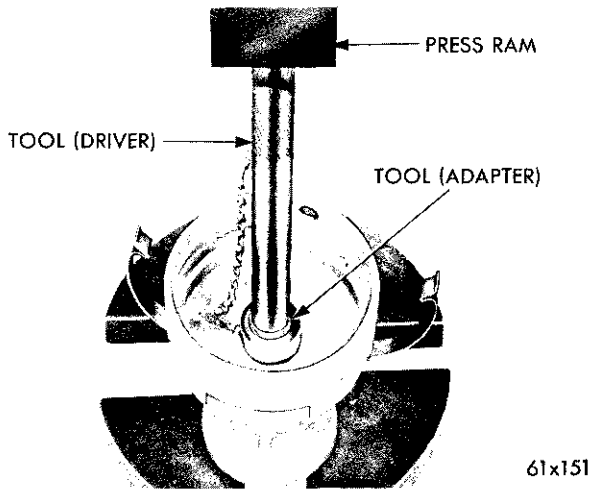

Fig. 51—Installing Distributor Shaft Upper Bushing

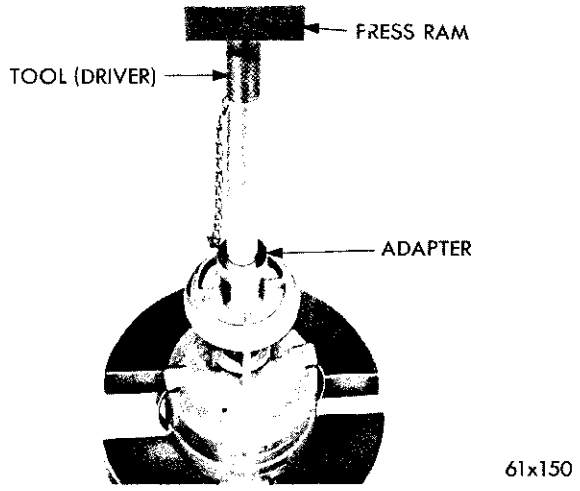

Fig. 52—Installing Distributor Shaft Lower Bushing

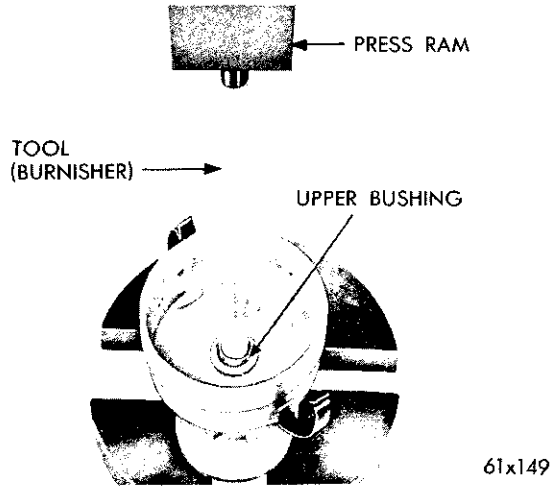

Fig. 53—Burnishing Distributor Housing Bushings

(h) Insert a $^{3}/_{32}$-inch rod through the housing oiler hole to see if the slot in the bushing indexes with the oiler hole in the housing. If the rod cannot be inserted through the housing and the bushing, drill a $^{1}/_{8}$" hole through the upper bushing by drilling through the oil wick hole. Remove burrs caused by the drilling operation.

(i) Install the burnishing tool part of C-3041 tool set and force the burnisher through both the bushings (Fig. 53). The correct bushing diameter is .4995 to .5000 inch.

ASSEMBLING THE DISTRIBUTOR

(1) Check operation of centrifugal weight and check the weight springs for distortion. Lubricate the governor weights.

(2) Inspect all bearing surfaces and pivot pins for roughness, binding or excessive looseness.

(3) Install spacer on the distributor shaft.

(4) Slide the cam and yoke on the distributor shaft, engage the weight lugs with the slots in the yoke. Install the cam retaining spring clip. Be sure it is properly seated in groove of the distributor shaft.

(5) Lubricate and install the two concave upper thrust washers for Auto-Lite distributors or a single flat thrust washer for Chrysler-built distributors. Position the washers on the distributor shaft and slide the shaft into the distributor body. Position the lower thrust washer and drive the collar on the lower end of the shaft and install the retainer pin.

(6) Install the oiler wick and oiler.

(7) Install the breaker plate assembly, align the condenser lead, breaker point spring, primary lead and install the attaching screw.

(8) Install the felt wick in the top of the distributor cam.

(9) Attach the vacuum control unit arm to the breaker plate and install the retainer. Install the vacuum unit attaching washers and screws.

(10) Check the spring tension, and adjust the contact gap.

(11) Lubricate the felt pad in the top of the distributor cam with 3 to 5 drops of light engine oil and install the rotor.

TESTING BREAKER ARM SPRING TENSION

(1) Hook a spring scale Tool MTU-36 on the breaker arm and pull in a straight line at right angles to the point surfaces (Fig. 54). Take a reading as the points start to separate. The spring tension should be 17 to 21.5 ounces. If not, loosen the screw which holds the end of the point spring and slide the end of the spring in or out, as necessary.

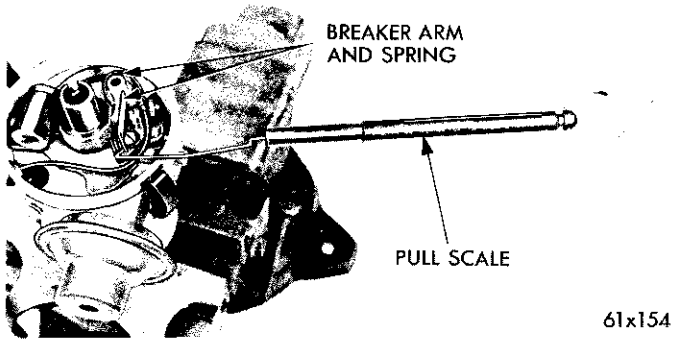

Fig. 54—Testing Breaker Arm Spring Tension

INSTALLING AND ALIGNING CONTACT POINTS

(1) Remove the old contact points and install a new set.

NOTE: Touching the contact point faces with fingers during installation will cause burning of points during operation.

(2) Align the contacts to provide center contact by bending the stationary contact bracket only. Grip bracket next to the contact and bend it away from the breaker arm and then bend it back to vertical and check alignment. It may be necessary to repeat bending process several times to provide perfect alignment which is necessary for efficient ignition and good contact life. **Never bend** movable arm to obtain alignment.

(3) After aligning the points, readjust the point clearance to specifications using a dial indicator (Fig. 55).

(4) Check the dwell angle to show proper degree of closure. See Paragraph, "Distributor Point Dwell." The lock screw should be loosened just enough so that the stationary point can be moved with a slight drag; otherwise, it will be difficult to set the points accurately. After setting the points to correct the clearance, tighten the lock screw.

DISTRIBUTOR LUBRICATION

(1) Add 3 to 5 drops of SAE 10W oil to the oiler on the outside of distributor base.

(2) Lubricate the felt pad under the rotor in the top of the distributor cam with 3 to 5 drops of SAE 10W oil.

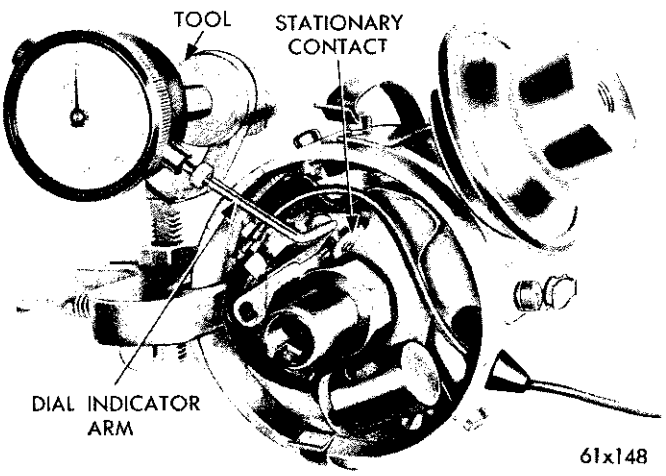

Fig. 55—Checking Point Clearance with Dial Indicator

(3) Wipe old grease from surface of the breaker cam. Apply a light film of new distributor cam grease. **Do not over-lubricate, keep oil and grease away from the breaker points.**

CHECKING DISTRIBUTOR ADVANCE

Automatic Advance Curve

Check the model number on the distributor base and refer to the specifications before making this test.

NOTE: Clamp around the rib section of the distributor housing. The bottom section of the distributor housing is not a machined surface and concentricity would be affected, causing a wobble.

Mount the distributor assembly (less cap) in a reliable stroboscope-type distributor tester and proceed with tests as follows:

(1) Install the vacuum adapter fitting in diaphragm housing and attach the tester vacuum pump hose to fitting.

(2) Turn the Tach-Dwell switch to the 8 "LOBE" position and the Motor Switch to counterclockwise rotation. Refer to "Distributor Advance Specifications" in this Supplement.

(3) Turn the battery switch "ON."

(4) Adjust the tester speed control to operate the distributor at 200 distributor rpm.

(5) Hold the distributor breaker plate in the full retard position and align the "O" distributor tester degree ring with any one of the arrow flashes.

(6) Adjust the tester speed control to operate the distributor at speeds called for under "Specifications" and observe arrow flashes opposite tester degree ring to determine degrees of advance.

(7) If the advance is not according to specifications, corrections can be made by bending the primary and secondary spring tabs to increase or decrease the spring tension. The governor spring tabs can be reached through the access hole at the breaker plate. Rotate the shaft until the proper spring and tab lines up with the access holes. Insert a screwdriver blade through the access hole and bend the spring tab toward the distributor cam to decrease spring tension and advance the spark, or away from the distributor cam to increase the spring tension and retard the spark.

Vacuum Diaphragm Leak Test

With the distributor mounted in distributor tester

and with the vacuum unit attached to the distributor, proceed as follows:

(1) Install the vacuum adjuster fitting in the vacuum unit and turn the distributor tester vacuum pump on.

(2) Place the thumb over the end of the vacuum pump hose and adjust the regulator control knob to give a reading 20 inches with hose closed off to insure tester hose does not leak.

(3) Attach the vacuum pump hose to the adapter fitting on the vacuum unit. The vacuum gauge should hold on maximum vacuum obtainable if no leaks exist.

(4) Observe breaker plate while performing the leak test to check response of breaker plate to vacuum advance. There should be instant response to the pull of the diaphragm, moving the plate without a drag or bind.

(5) If leakage is indicated, tighten vacuum adapter fitting and retest. If leakage is indicated, replace the vacuum unit assembly.

Vacuum Advance Curve

Perform operations 1 through 5 under "Automatic Advance Curve" and proceed as follows:

(1) Turn the tester vacuum pump "ON." Adjust the vacuum pump regulator to vacuum test specifications. See "Specifications" and observe the arrow flashes on the tester degree ring to determine the degrees of advance.

(2) If the vacuum advance is above or below specifications, replace the vacuum advance unit.

INSTALLATION OF DISTRIBUTOR

(1) Position the distributor on engine. Align the rotor with marks previously scribed on the distributor housing.

(2) Engage the tongue of the distributor shaft with the slot in the distributor and the oil pump drive gear.

NOTE: If the engine has been cranked while the distributor is removed, it will be necessary to establish the proper relationship between the distributor shaft and the No. 1 piston position as follows:

(3) Rotate the crankshaft until the number one piston is at top of the compression stroke.

(4) Rotate the rotor to the position of the number one distributor cap terminal.

(5) Lower the distributor into the opening and install the primary terminal lead, distributor cap (make sure all high tension wires "snap" firmly in the cap towers), and distributor hold-down clamp screw. Tighten the screw finger tight.

(6) Connect the secondary lead of a Power Timing Light to the No. 1 spark plug, the red primary lead to the positive terminal of the battery and the black primary lead to the negative battery terminal.

(7) Start the engine. Idle the engine at 475-500 rpm. Rotate the distributor housing so that the specified timing mark and the pointer are in alignment. (Moving the distributor housing against the shaft rotation advances the timing and with the shaft rotation retards the timing.)

(8) At low altitudes, with any good grade of the recommended gasoline, either "regular" or "premium," the engine will give its best performance if timed according to specifications.

When using lower grade fuels, or after carbon has accumulated, objectionable spark ping may occur with the specified timing. In case of this nature, ignition timing should be retarded, but not to exceed 5 degrees of crankshaft rotation later than specified.

At high altitudes or when using higher quality gasoline, for example, "premium" where "regular" is specified or "super premium" where "premium" is specified, there is less tendency for spark ping. In such cases, improved performance may be obtained by advancing the spark not to exceed 5 degrees of crankshaft rotation ahead of specified timing.

Within the foregoing limits, namely, from 5 degrees ahead to 5 degrees later than specified timing, a good rule to follow is to advance the spark until a slight ping is heard when accelerating from 15 mph in direct drive at wide open throttle.

(9) Tighten the distributor clamp screw after the timing has been set and recheck the timing adjustment with a Power Timing Light.

(10) If the timing is correct, reconnect the vacuum line to the distributor and remove the timing light from the engine.

SPARK PLUGS

Cleaning and Inspection

Remove the spark plugs. Examine the firing ends of the plugs for evidence of oil fouling, gas fouling, burned or overheating conditions. Clean and reset the gaps to .035 inch.

Oil fouling is usually identified by wet, sludgy deposits caused by excessive oil consumption.

Gas fouling is usually identified by dry, black, fluffy deposits caused by incomplete combustion.

Burned or overheated spark plugs are usually identified by a white, burned or blistered insulator nose and badly burned electrodes. Improper fuel, insufficient cooling or improper ignition timing normally are the cause.

Normal conditions are usually identified by white powdery deposits or rusty-brown to grayish-tan powdery deposits.

NOTE: Use new gaskets when installing the spark plugs, tighten plugs to 30 foot-pounds torque.

The high tension cables should be kept clean and checked for cracked insulation and loose terminals.

IGNITION COIL

The ignition coil is designed to operate with an external ballast resistor. When testing the coil for output, include the resistor in tests.

Check the coil for external leaks and arcing. Always make two tests when checking the coil. One when coil is cold, the other after coil has been warmed up.

To check the high tension circuit, pull the secondary cable out of the distributor cap center tower. Hold the end of the cable about ¼ of an inch away from the cylinder head and crank engine with the ignition switch on. If the spark jumps the ¼ inch gap, the coil can be considered satisfactory.

IGNITION SYSTEM

SERVICE DIAGNOSIS

Condition	Possible Cause	Correction
Burned or pitted distributor points.	(a) Dirt or oil on points.	(a) If oil is on contact face, determine cause and correct condition. Clean distributor cam of dirt and grease, apply a light film of distributor cam lubricant Number 1473595 to cam lobes; wipe off excess. Replace point set and adjust as necessary.
	(b) Points misaligned or gap too narrow.	(b) Align and adjust points.
	(c) Defective coil.	(c) Test and replace coil if necessary. Replace and adjust contact points.
	(d) Wrong condenser or defective condenser.	(d) Test condenser and replace if necessary. Replace and adjust points.
	(e) Alternator regulator setting too high.	(e) Test alternator voltage regulator setting, adjust as necessary. Replace and adjust contact points.
	(f) Bushings or distributor shaft worn.	(f) Repair distributor.
	(g) Touching of points with hands during installation.	(g) Replace and adjust contacts.
Ignition coil failure.	(a) Alternator regulator setting too high.	(a) Test alternator setting and adjust as necessary. Inspect condition of distributor contact points.
	(b) Coil damaged by excessive heat from engine.	(b) Replace coil. Inspect condition of distributor contact points.

IGNITION SYSTEM SERVICE DIAGNOSIS — Continued

Condition	Possible Cause	Correction
Ignition coil failure. (Continued)	(c) Coil case or tower cracked.	(c) Replace coil.
	(d) Oil leak at tower.	(d) Replace coil.
	(e) Coil tower carbon-tracked.	(e) Wipe tower clean. Test coil, replace if necessary.
Condenser failure.	(a) Normal fatigue.	(a) Replace condenser. Inspect distributor contact points for pitting.
	(b) Damaged by excessive engine heat or moisture.	(b) Replace condenser. Inspect distributor contact points for pitting.
Fouled spark plugs.	(a) Carburetor mixture over-rich.	(a) Adjust carburetor. Refer to Group 14 "Fuel System."
	(b) Excessive oil consumption.	(b) Oil entering cylinders due to worn rings or worn valve guides. Refer to Group 9 "Engine" for corrective measures.
	(c) Improper plug heat range.	(c) Install correct plugs.
	(d) Improper gap adjustment.	(d) Set spark plug gap to .035 inch.
Burned spark plugs.	(a) Plugs loose or too tight in the cylinder head.	(a) Replace spark plugs: Install new gaskets. Tighten spark plugs to 30 foot-pounds torque.
	(b) Carburetor mixture too lean.	(b) Adjust carburetor. Refer to Group 14 "Fuel System."
	(c) Improper plug heat range.	(c) Install correct plugs.
	(d) Improper ignition timing.	(d) Adjust ignition timing. Refer to Group 8 "Electrical."

INSTRUMENT CLUSTER AND SPEEDOMETER HEAD

REMOVAL (Models RC-1, RC-2, RC-3)

(1) Disconnect the battery ground cable.

(2) Remove the steering wheel as described on Page 6 of the Steering Group 19 of the 1960 Chrysler and Imperial Service Manual.

(3) Remove the steering jacket tube cover from underside of the jacket tube (Fig. 56).

(4) Disconnect all the wires at the terminals before loosening the cluster attaching screw. Disconnect the instrument ground wire.

(5) Remove the screws which attach the instrument cluster bezel to the instrument panel. Remove the bezel (Fig. 57). Disconnect the speedometer cable.

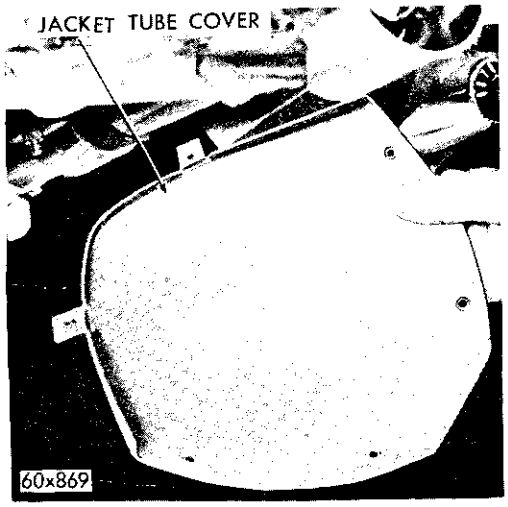

Fig. 56—Removing or Installing the Jacket Tube Cover

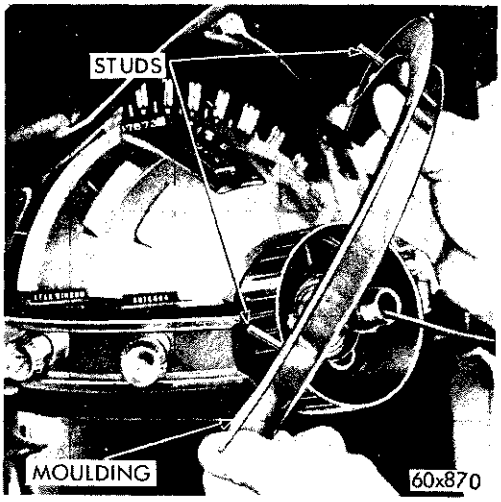

Fig. 57—Removing or Installing the Instrument Cluster Bezel

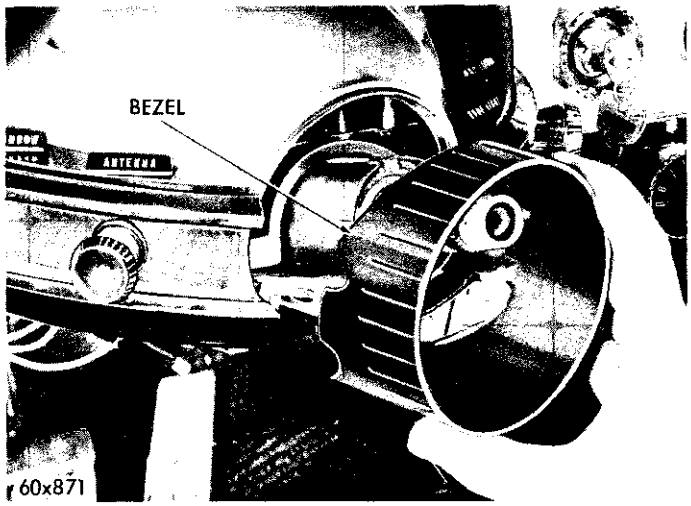

Fig. 58—Removing or Installing Steering Tube Collar

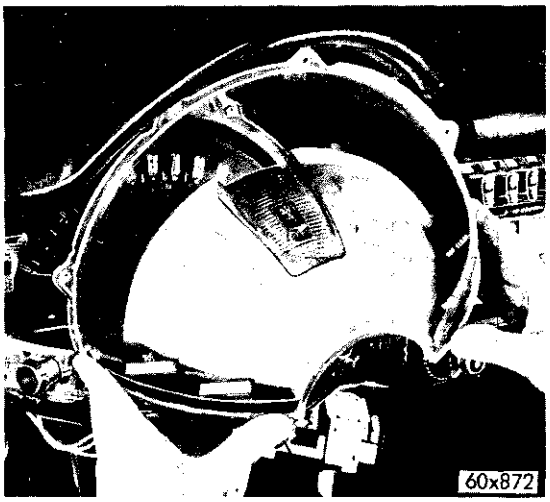

Fig. 59—Removing or Installing the Instrument Cluster and Dome

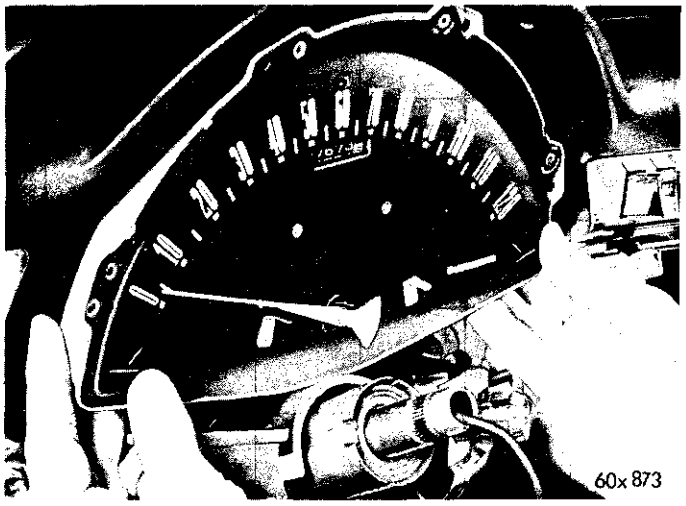

Fig. 60—Removing or Installing the Speedometer Head Assembly

(6) Loosen the two screws (one each side of steering jacket tube) and remove the steering tube collar (Fig. 58).

(7) Remove the two long screws and spacers attaching the dome and cluster assembly to the dome support. These screws are located just behind the steering tube collar attaching screws. (See Fig. 58.)

(8) Remove the four screws attaching the plastic dome to the instrument panel.

(9) Carefully release the base of the dome from the supports at each side and with a pointed instrument, carefully move the dome away from the opening in the instrument panel, so that the top of the dome and cluster can be tipped outward, towards you far enough, in order to reach the parking brake warning lamp socket.

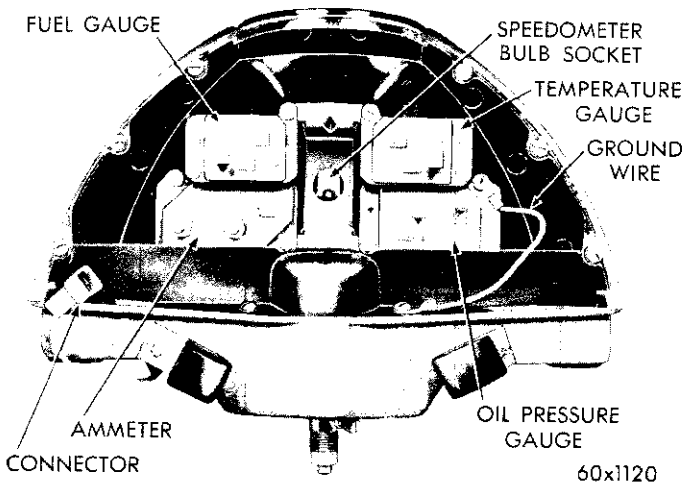

Fig. 61—Instrument Panel Cluster (Back View)

NOTE: In some cases where the dome fits tightly in the support, it may be necessary to remove the six (6) slotted machine screws that attach the cluster to the dome. (See Fig. 61.) Push the cluster up into the dome, and the dome can then be carefully compressed to clear the supports on removal.

(10) Snap out the lamp socket and bulb and remove the dome and cluster assembly from the car, as shown in Figure 59.

(11) Remove the four screws and remove the speedometer head assembly (Fig. 60).

(12) The plastic dome is attached to the cluster by six slotted machine head screws (Fig. 61).

INSTRUMENT CLUSTER AND SPEEDOMETER HEAD INSTALLATION

(1) Install the speedometer head assembly (Fig. 60). Install and tighten the speedometer to panel attaching screws.

(2) Position the instrument cluster in the instrument panel housing and install the parking brake warning lamp in the cluster well socket.

(3) Work the dome and cluster carefully into position, entering the right corner of the dome base into the dome supports. Carefully move the assembly with a slight rocking motion until the dome and cluster assembly is in position on the instrument panel. (Springing down slightly on the dome supports will aid the installation.)

(4) Install the four screws attaching the plastic dome to the instrument panel.

(5) Install the two dome cluster spacers and screws. (Near the steering tube.) (See Fig. 58.)

(6) Install the steering tube collar and tighten the two collar attaching screws (Fig. 58).

(7) Connect all wires disconnected at the time of removal (including ground).

(8) Install the instrument dome bezel (Fig. 57) and the two self-locking nuts. Connect the speedometer cable.

(9) Install the jacket tube over the cover attaching screws (Fig. 56).

(10) Install the steering wheel and steering wheel nut. Tighten to 40 foot-pounds torque. Install the horn blowing components, as described on Page 30 of the Steering Group 19 of the 1960 Chrysler and Imperial Service Manual.

(11) Connect the battery ground cable.

INSTRUMENT REMOVAL

(1) Disconnect the battery ground cable.

(2) Remove the steering jacket tube cover (Fig. 56).

(3) Disconnect the wires at the instrument to be replaced (Fig. 61).

(4) **Oil Pressure Gauge:** When removing the oil pressure gauge, remove the ground wire and the two screws from the speedometer dust shield. Loosen the temperature gauge attaching screws. Remove the oil pressure gauge attaching screws. Carefully remove the oil pressure gauge.

(5) **Ammeter:** When removing the ammeter, remove the two screws from the speedometer dust shield. Loosen the fuel gauge attaching screws. Remove the ammeter attaching screws. Carefully remove the ammeter.

(6) **Fuel Gauge:** When removing the fuel gauge, remove the fuel gauge attaching screws, and carefully remove the fuel gauge.

(7) **Temperature Gauge:** When removing the temperature gauge, remove the temperature gauge attaching screws, and carefully remove the temperature gauge.

INSTRUMENT INSTALLATION

(1) **Temperature Gauge:** Carefully install the temperature gauge into position, and start the attaching screws. Be sure the pointer does not interfere with the cluster dial. Tighten the attaching screws.

(2) **Fuel Gauge:** Carefully install the fuel gauge, and start the attaching screws. Be sure the pointer does not interfere with the cluster dial. Tighten the attaching screws.

(3) **Ammeter:** When installing the ammeter, be sure the fuel gauge screws are loosened, and the screws are removed from the speedometer dust shield, so that the ammeter may be carefully installed. Start the ammeter attaching screws. Be sure the ammeter pointer is not distorted, and does not interfere with the cluster dial. Tighten the ammeter attaching screws. Align the fuel gauge, and tighten the fuel gauge attaching screws. Install the speedometer dust shield attaching screws and ground wire. Tighten the screws.

(4) **Oil Pressure Gauge:** When installing the oil pressure gauge, be sure the temperature gauge screws are loosened, and that the speedometer dust

shield screws are removed. Carefully install the oil pressure gauge. Be sure the oil pressure gauge pointer is not distorted, and does not interfere with the cluster dial. Install the oil pressure gauge attaching screws and ground wire. Tighten the oil pressure gauge attaching screws. Align the temperature gauge and tighten the attaching screws.

Install the speedometer dust shield screws and ground wire, and tighten the screws.

(5) Connect the instrument wires. Connect the instrument panelescent lighting wires. (See Fig. 61.)

(6) Connect the battery ground cable, and test the instrument operation and lighting.

(7) Install the steering jacket tube cover. (See Fig. 56.)

INSTRUMENT CLUSTER AND SPEEDOMETER HEAD REMOVAL (Model RY-1)

(1) Disconnect the battery ground cable.

NOTE: If car is equipped with either heater or air conditioning, or both, it will be necessary to remove the defroster and spot cooler hoses.

(2) Disconnect the speedometer cable at the speedometer head.

(3) Disconnect the odometer reset cable at the instrument panel cluster.

NOTE: To avoid scratching the paint finish on the instrument panel when the instrument cluster is removed, it is recommended that several strips of masking tape be placed on each side of the steering jacket tube.

(4) Remove the five screws securing the instrument cluster to the instrument panel. Carefully remove the instrument cluster (Fig. 62) by tilting the lower end of the cluster outward.

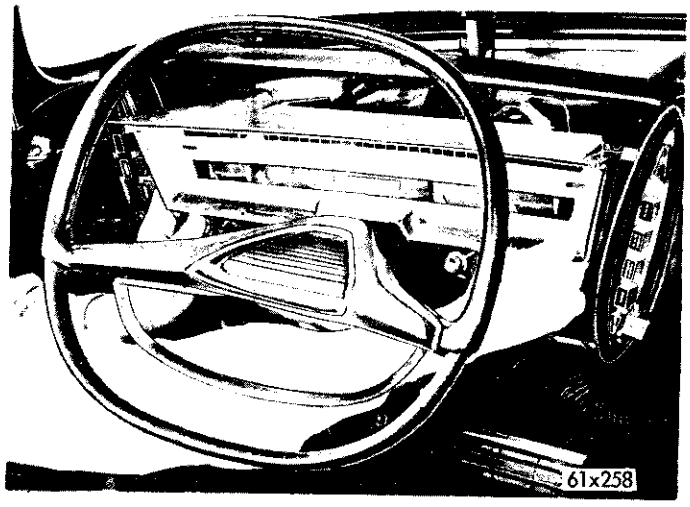

Fig. 62—Removing or Installing Instrument Cluster Panel

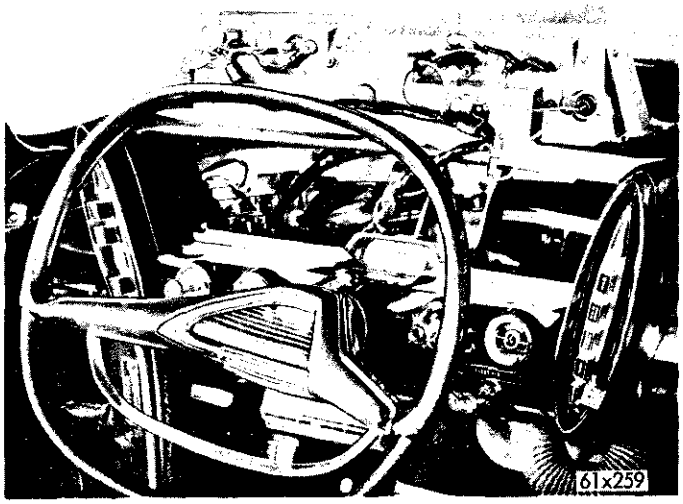

Fig. 63—Disconnect all Electrical Connections

NOTE: For speedometer or complete cluster removal, disconnect all electrical connections, and disengage the wire harness loom from harness clips and remove the cluster to the work bench for further disassembly (Fig. 63).

INSTRUMENT CLUSTER AND SPEEDOMETER HEAD INSTALLATION

(1) Connect all electrical connections that were disconnected at removal, and engage the wire harness loom securely on the wire harness clips.

(2) Carefully install the instrument cluster in position on the instrument panel, and install and tighten the five instrument cluster to instrument panel attaching screws.

(3) Connect the speedometer and odometer cables to the instrument panel cluster. Make sure that the speedometer cable is properly retained in the attaching clips provided and that it is free of any sharp bends.

NOTE: If car is equipped with either heater or air conditioning, or both, connect the defroster and spot cooler hoses.

(4) Connect the battery ground cable.

INSTRUMENT REMOVAL

(1) Disconnect the battery ground cable.

NOTE: The following instruments and switches can be removed and installed from underneath the instrument panel without removing the instrument