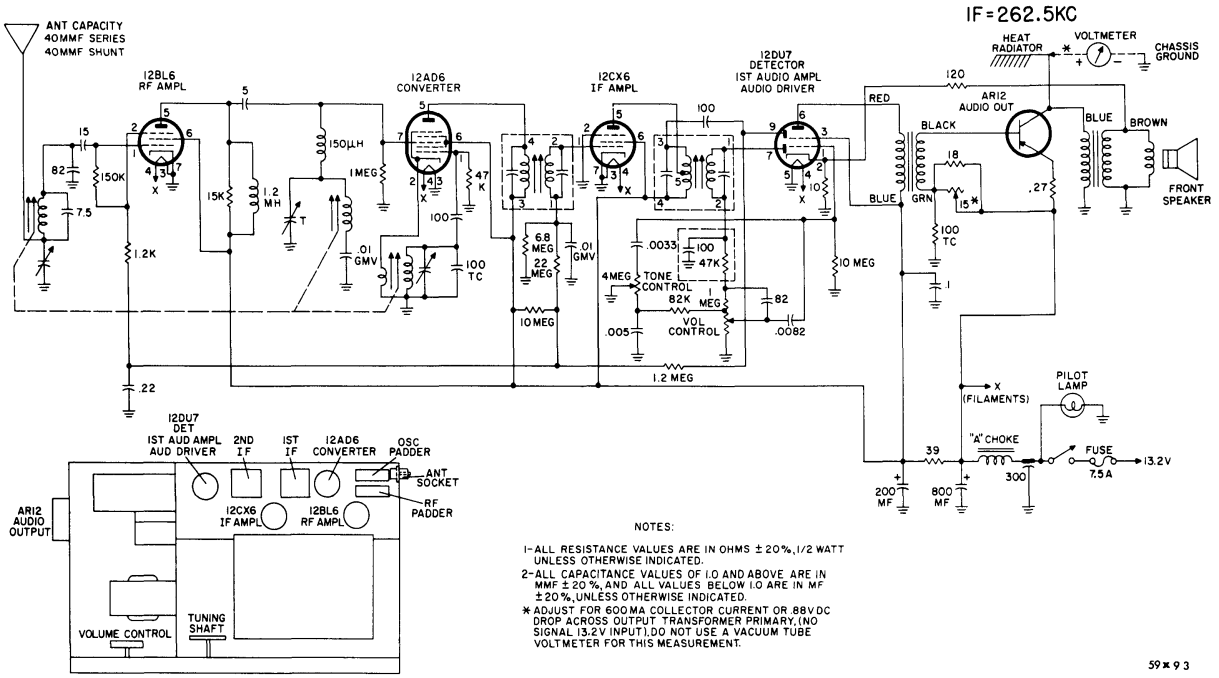

Figure 1—Radio circuit diagram model 855

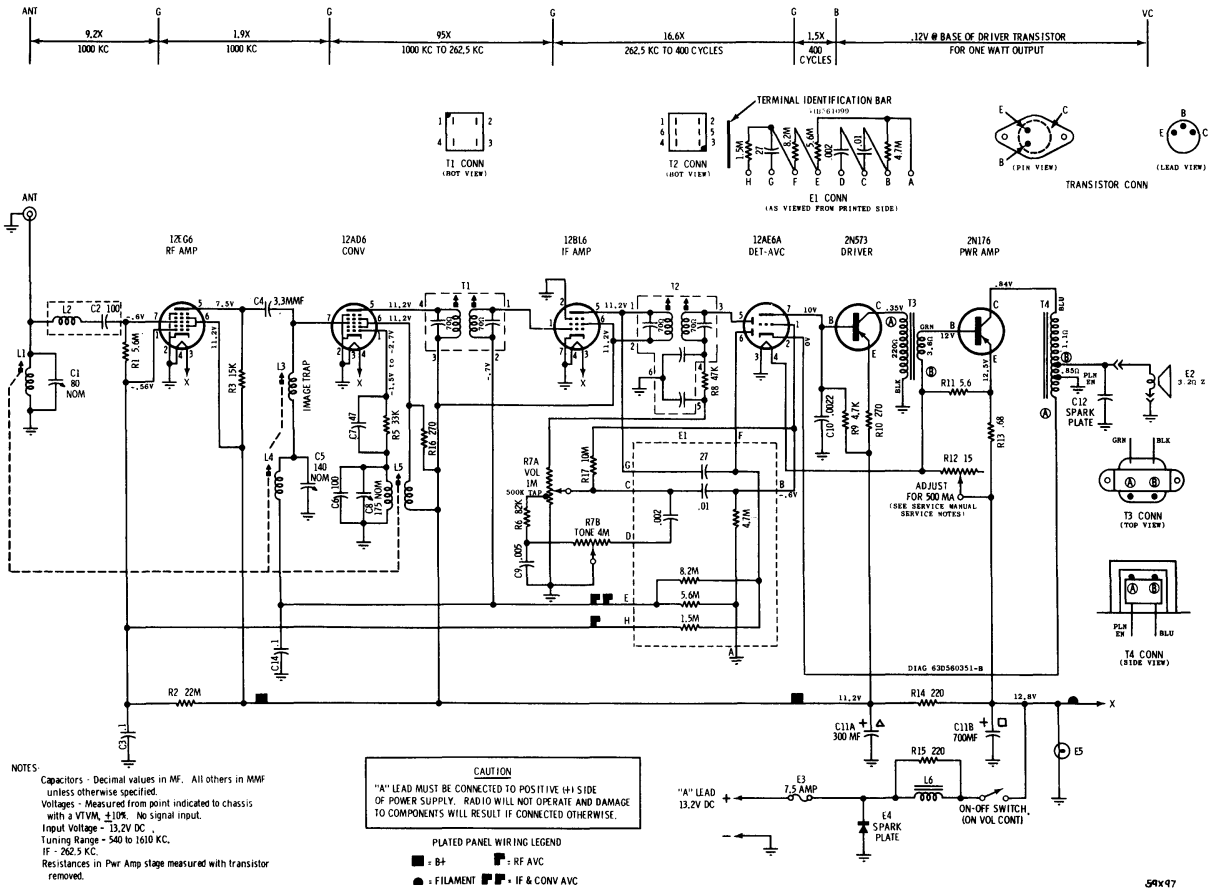

Figure 2—Radio circuit diagram model 860

SECTION II—RADIO—HOT WATER HEATER—INSTANT GAS HEATER

1. RADIO

Models 855 and 860 are transistor powered radios. The output tubes, rectifier tube, the vibrator and the power supply transformer have all been eliminated by the use of the transistor. There is only one transistor in each receiver, the balance of the circuit functions being performed by tubes operating directly from the car battery.

The transistor is able to deliver comparatively large amounts of power to the speaker with only the 12 volts of the battery applied to its circuit. The service life of the radio is materially improved by the use of the transistor. The transistor itself, when properly protected, electrically and thermally has an almost indefinite service life.

REMOVAL OF RADIO CHASSIS

Disconnect radio antenna lead-in wire at radio and disconnect the battery lead wire at the fuse holder, also disconnect the speaker leads. Remove the manual tuning knob, on-off control knob and the mounting nuts, Figure 3. Remove the mounting screw and washer located behind the ash tray. Loosen the attaching nut on the radio mounting bracket at the instrument panel. Remove the radio from the rear of the instrument panel.

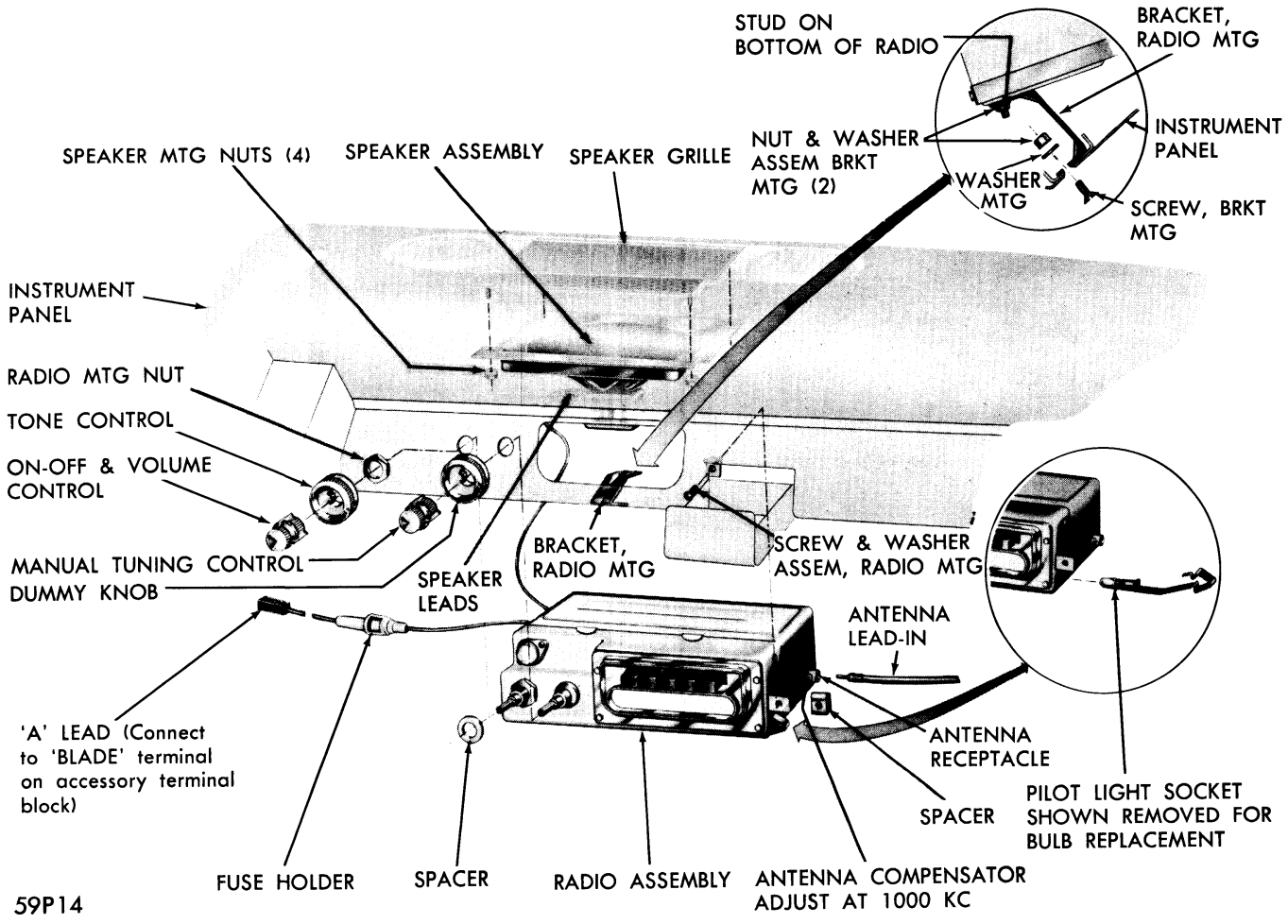

Figure 3—Radio removal and installation

2. HOT WATER HEATER

The 1959 heaters are equipped with push button control for "OFF," "DEFROST" (DEF), "VENT" (V), "HIGH" (HI) and "LOW" (LO) blower speed positions, Figure 4.

The fresh air enters the cowl air intake through the grille and open "FRESH AIR DOOR." It then passes through the heater core and into the blower. Leaving the blower the fresh air enters the distribution duct through the open shut-off door.

The distribution of the fresh air to the instrument panel outlet grilles and to the floor level outlets is directed by the damper. The proper positioning of the doors and the damper are controlled through three vacuum actuators.

The temperature control lever operates the water valve through a bowden cable. It is important that the bowden cable is adjusted to provide full open and close position of the water valve. This can be done by removing the outlet hose from the core tube when the temperature control lever is in the "OFF" position. The radiator cap should be removed to relieve the pressure. With the engine running there should be no flow of water from the tube. A flow of water is an indication of an improperly adjusted cable or an inoperative valve.

The chart indicates the automatic positions of the doors, damper and the functioning of the blower motor with the various switches depressed. No two button positions provide the same operation.

	Fresh Air Door	Shut Off Door	Defroster Control Door	Blower Speed
Off	closed	closed	up	off
Lo	closed	open	up	slow
Hi	closed	open	up	fast
Defrost	closed	open	down	fast
Vent	open	open	down	off

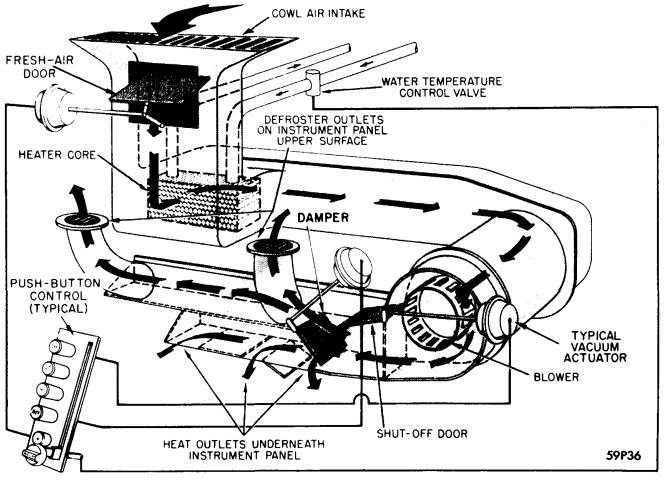

Figure 4—Push button heater air flow

"OFF" POSITION

When the "OFF" button is depressed, the fresh air door is closed, the shut off door is closed and the damper is up.

"DEFROST" POSITION

In the defrost position the fresh air door is closed to the car interior but the fresh air can pass through the heater core and be drawn in and through the blower by the blower fan. The shut off door is "OPEN" and the damper is down, Figure 5.

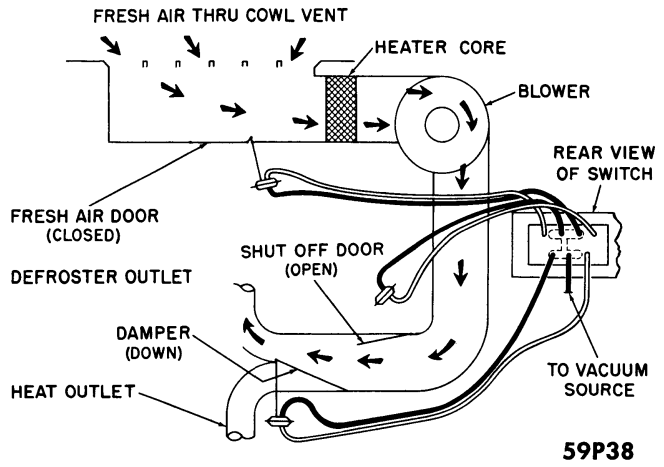

Figure 5—Defrost position

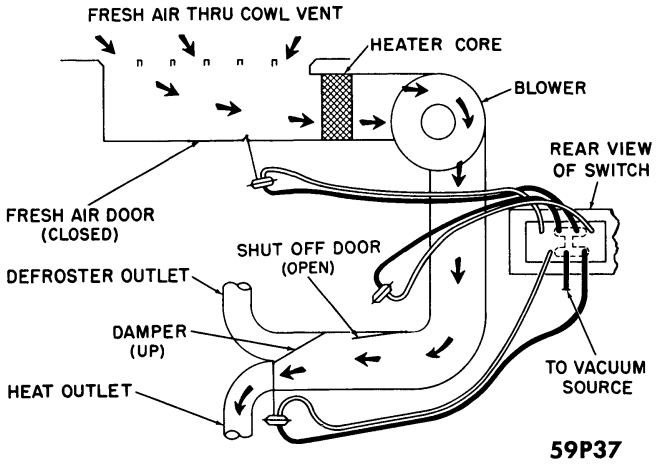

Figure 6—High and low position

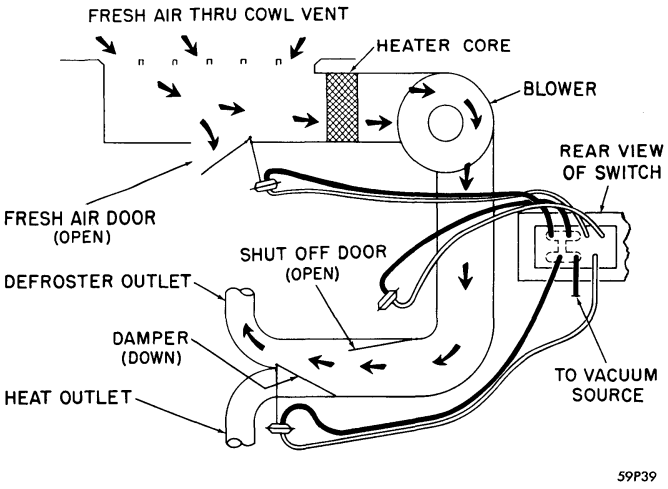

Figure 7—Vent position

The supply of fresh heated air will be directed up and out through the instrument panel outlet grilles. In this position, the hoses to the shut off door and the damper are reversed from what they are for the "OFF" position.

"HI" AND "LO" POSITIONS

In the "HI" and "LO" positions the "FRESH AIR DOOR" is closed. The "SHUT OFF" door is open and the "DAMPER" is in the "UP" position. The difference between these two control buttons positions is in the blower motor speed only, Figure 6.

"VENT" POSITION

The vent position is to supply fresh warm air to the car interior, the blower motor being "OFF," Figure 7.

The "SHUT OFF" door is "OPEN" allowing part of the incoming fresh air to be directed "UP" past the damper which is in the "DOWN" position. This provides some air through the defroster or instrument panel air outlet grilles.

CONTROL SWITCH

The control switch is a combination vacuum and electrical switch. The vacuum source is supplied to the switch from the engine intake manifold. Depressing the control buttons causes a sliding valve to either open a passage to vacuum pressure or to vent the opposite side of a diaphragm that is subjected to vacuum, to atmospheric pressure.

VACUUM ACTUATORS

The vacuum actuators have two sealed chambers separated from each other by a rubber diaphragm. Outlet tubes connect to the chambers. The hoses are attached to the actuator tubes and their opposite ends to tubes on the switch.

No adjustment to the rods connecting the actuator to the doors and damper is required. Sufficient overtravel is provided to assure full closing and opening. See last section of Manual for wiring diagrams.

3. INSTANT GAS HEATER

OPERATION

The heater assembly consists of a cylindrical steel heater exchanger with a burner assembly mounted at one end. The burner is equipped with a nozzle to atomize the fuel, a mixer can to mix the atomized fuel with combustion air, and a spark plug to ignite the mixture. A solenoid operated on-off valve to control flow of the fuel, Figure 8.

The heat exchanger and burner assembly is enclosed in a case. The heater case surrounds the heater exchanger and provides a channel through which the fresh air flows into the distribution chamber. Fresh air is drawn from the fresh air intake and through the heater into the car by a blower which is mounted on the firewall. A short rubber duct connects the inlet of the blower to the heater case.

An overheat switch is mounted inside the heater case. This switch contains a bimetal element which will open the electrical circuit to the solenoid fuel valve and shut the burner off in the event the temperature should rise above a safe maximum. This switch will automatically reset itself when the burner cools.

BURNER BLOWER ASSEMBLY

REMOVAL—Remove the combustion air hose, disconnect blower ground wire and the blower feed wire from the connector. Disconnect wire at breaker point. Loosen but do not remove, the mounting bracket clamp. The blower assembly can then be removed by unhooking the clamps from the mounting bracket, Figure 9.

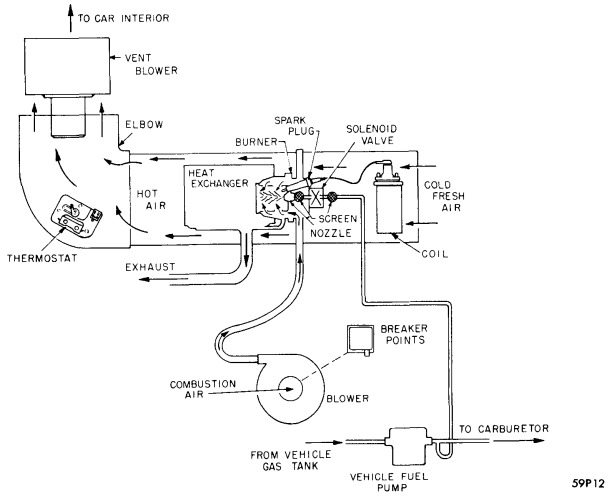

Figure 8—Overall flow system

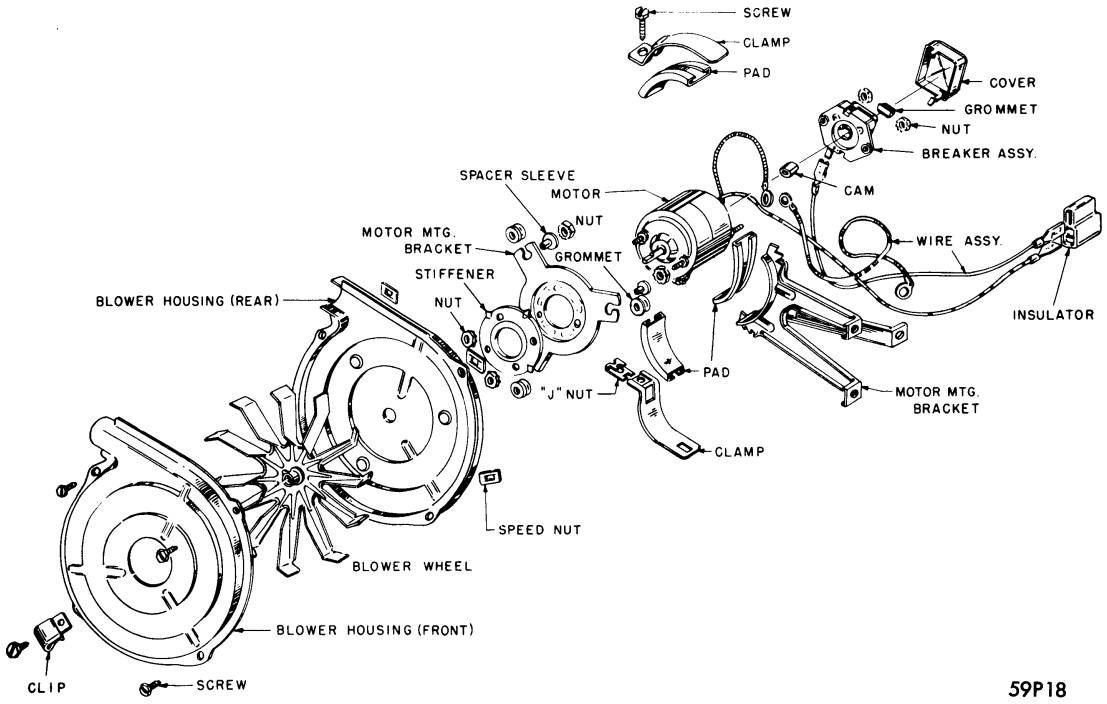

Figure 9—Burner blower—disassembled view

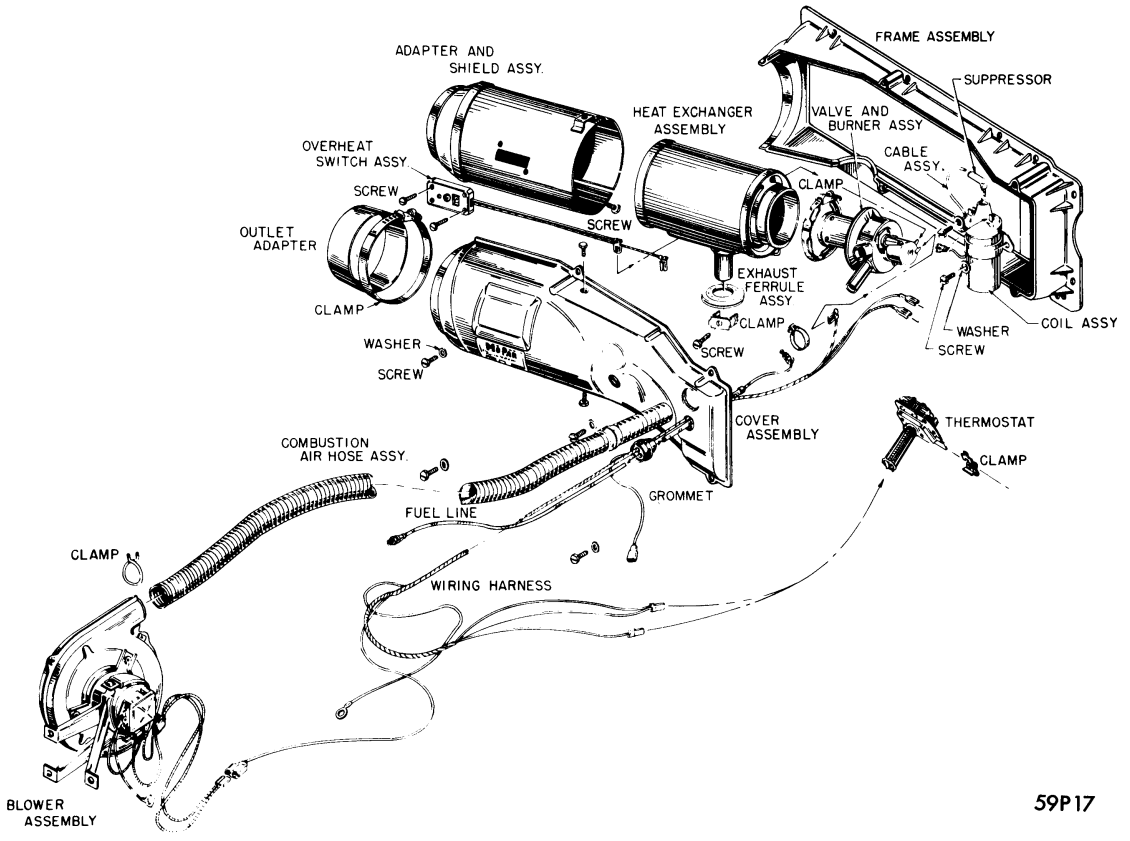

Figure 10—Heater disassembled view

INSTALLATION—Check the blower fan for proper clearance and freedom of movement during installation. When tightening the nuts attaching the inner fan housing to the motor mounting bracket, install the fan on the motor shaft and tighten nuts so the rubber grommets will be compressed evenly, but not too tightly.

BREAKER POINT ASSEMBLY

To replace the breaker points, remove the cover; use care not to lose the small insulating grommet. Remove the nuts from the two studs on the motor, remove the ground wires from the stud, lift off the breaker point assembly. Remove the cam from the end of the motor shaft by holding the blower fan and turning the cam clockwise. Always install a new cam with breaker points.

After installing new cam, align the three studs on the back of the breaker points casting with the three eyelets in the end of the motor housing. Fit the new breaker points over the motor studs. Replace the ground wires on the stud and tighten the mounting nuts securely.

Turn the fan until the points open to their widest gap and check opening with a .018 in. feeler gauge. Turn the adjusting screw to obtain the proper gap, then seal the screw to the mounting bracket by soldering securely with 50-50 solder and flux (not acid). Replace the cover and insulating grommet and reinstall the blower assembly on the motor mounting bracket.

HEATER ASSEMBLY

REMOVAL—Disconnect the combustion air hose at the burner blower assembly, Figure 10. Remove the exhaust tube clamp and disconnect the heater exhaust tube. Remove the outlet adaptors which attach the cover of the heater case to the frame. The cover can now be removed with all the heater components and with the blower hose attached.

INSTALLATION—Fasten the heater cover and burner assembly to the heater frame. Connect the heater outlet adapter to the heater cover. Fasten the exhaust tube to the bottom of the heater cover. Connect the combustion air hose to the inlet pipe of the burner assembly.

BURNER ASSEMBLY

REMOVAL—Disconnect the white and black wires from the terminals of the solenoid fuel valve and pull the ignition cable off the spark plug. Disconnect the fuel line from the fitting on the burner casting. The fuel line should not be removed from the grommet in the cover unless it requires replacement. Remove the burner blower hose.

Loosen the clamp attaching the burner assembly to the heat exchanger and break the seal formed by the gasket. The burner assembly can then be removed with the rubber vent tube attached.

INSPECTION BEFORE DISASSEMBLY

The nozzle and mixer assembly should be checked before disassembly since the condition of these parts will give an indication of the cause of unsatisfactory operation. The nozzle and inside of mixer can around the nozzle will normally be covered with a medium layer of black carbon and the nozzle should have a small gray opening at the hole. The outer end of mixer will usually be burned to a gray or reddish color and some scaling or loose particles are usually present. These will do no harm.

Indications of improper operation are an uneven build-up of black carbon, or an excessively burned or eroded spot on the mixer. The openings around nozzle must not be clogged with carbon since this will prevent entry of proper amount of combustion air. If these symptoms are present, the condition will not be remedied by cleaning, since it is caused by a one-sided spray from nozzle or by dripping or leakage around the nozzle seat.

The spark plug electrodes will operate properly with a considerable accumulation of carbon and lead, but must not be shorted out. If the electrodes are burned, this indicates an improperly directed spray and nozzle, or nozzle seat is at fault.

DISASSEMBLY

Remove the two screws from the plug retainer cap and remove the spark plug and gaskets. Unscrew the fuel inlet fitting and remove the screen from the casting. Remove the cover of the solenoid and lift out the solenoid coil and sponge rubber gasket, Figure 11.

Remove the mixer and louver plate assembly by removing the three screws which attach it to the burner casting. Unscrew the nozzle, using a 5/8-in. socket or box wrench. The spacer, or filler plug, directly behind the nozzle may now be lifted out.

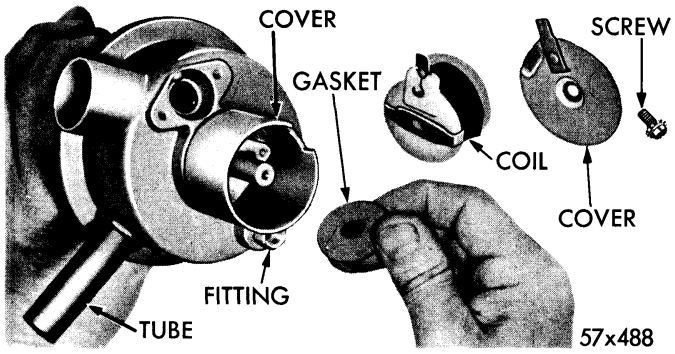

Figure 11—Removing or installing coil and gasket

Remove the valve seat retaining screw in the bottom of the nozzle opening, using an allen wrench (¼-in. across flats) and turn the casting over. The valve seat and gasket will drop out.

Remove the three screws which attach the solenoid cup and remove the cup, sealing disc and gasket. Invert the casting, and the valve spring and plunger will drop out, Figure 12.

ASSEMBLY OF BURNER

If fuel line inlet screen was removed from the burner casting, install a new screen. Install the fuel inlet fitting. Install the valve seat gasket, the valve seat and the valve seat retainer in the order named, making sure the pointed side of the valve seat is toward the solenoid end of the casting. Tighten the retainer firmly but do not use force. Install a new spacer and nozzle. Tighten securely, insert the valve plunger in the other end of the casting, Figure 13, and check for free movement. Place the spring, gasket, sealing disc and solenoid cup on the casting and reinstall the three screws from the burner side of casting. Tighten evenly to insure a good seal.

Insert coil retainer gasket in bottom of coil retainer. Insert the coil assembly so that the terminal fits down into the cut-out portion of the cup, and the ground terminal is directly over the screw hole at the top. Install the cover on the retainer and tighten screw securely. Position the gasket over the louver plate.

> **NOTE**
>
> ***The step on the inside portion of the gasket must contact the outer flange of the louver and the tapered portion of the gasket must face the mixer.***

Position the louver plate and mixer assembly with gasket over the nozzle. Align the three screw holes and spark plug holes with their respective holes in the burner casting. Install the three lockwasher screws in the louver plate and tighten finger-tight. Tighten screws to apply even pressure to the nozzle.

Install the spark plug gaskets on the spark plug (concave side of gaskets against the ball portion). Carefully insert the spark plug through the opening in the housing and through the louver plate. Make certain that the guide slot of the spark plug is in line with the guide on the casting. Tighten spark plug cap attaching screws evenly and securely. Using an .085 in. feeler gauge, adjust the spark plug gap by bending the ground electrode. Do not bend spark plug electrode. Fit the rubber vent tube into the opening in the burner casting.

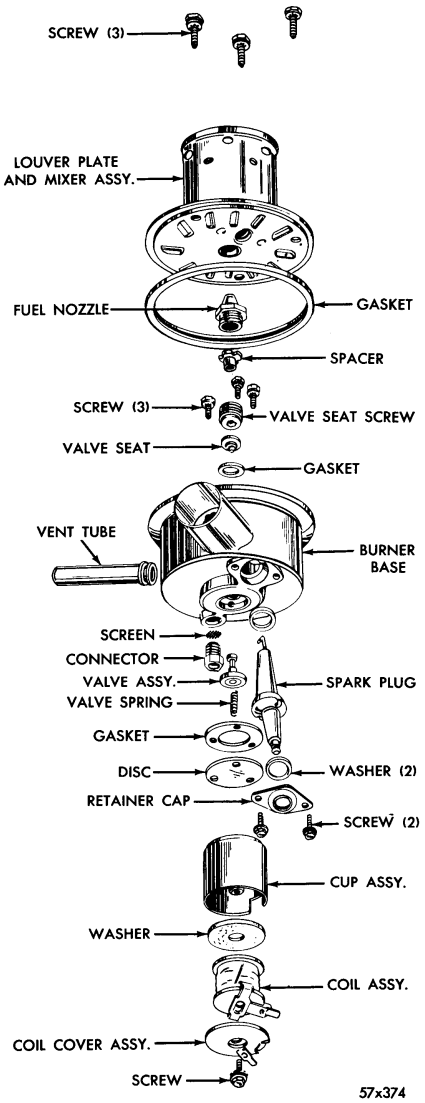

Figure 12—Burner disassembled view

HEAT EXCHANGER AND OVERHEAT SWITCH

Do not remove the heat exchanger unless it is defective and needs to be replaced or the overheat switch requires service. The heat exchanger has no operating parts and should only require replacement after prolonged use. If replacement should become necessary, it can be removed as follows: Remove the two screws that hold the shield to the cover. The heat exchanger and shield assembly can not be moved from the cover. Remove the metal screw that fastens the shield together and open up the shield wide enough to remove the heat exchanger from the shield.

The overheat switch is mounted on the outside of the heat shield. Inspect the heat exchanger for evidence of leakage, dents, loose seams and interior condition. The inside of the heat exchanger will normally contain a deposit of lead and other products of combustion but this should not be regarded as a defect unless the coating is sufficient to cause a noticeable increase

in the warm-up period of the heater. When such is the case, the heater can be restored to its original efficiency by installing a new heat exchanger.

It is not recommended that any attempt be made to weld or otherwise repair the heat exchanger. Clean as much of the deposits from inside the exchanger as possible and blow it out with compressed air. Replace the entire unit if it appears unserviceable after cleaning.

INSTALLATION OF BURNER ASSEMBLY

Fasten the burner blower hose to the burner. Guide the rubber vent tube through the cover. Position the burner against the heat exchanger, making sure the gasket is seated and in place. Fasten the clamp that secures the burner to the heat exchanger. Connect the spark plug wire and fuel line.

THERMOSTAT

If the thermostat fails to control the duct outlet temperature, it is usually an indication that the cam is loose on the helix shaft or the end of the helix has dropped out of the slot in the control shaft.

To correct this condition, adjust the thermostat as follows: Remove the thermostat cover and blower housing. Disconnect the bowden cable and the two lead wires. Remove the two sheet metal screws and the thermostat.

Inspect the helix to make sure it is crimped tightly in the end of the control shaft. Fit the helix in the slot and crimp the shaft with pliers if necessary. With helix at room temperature, loosen the allen set screw in the plastic cam on the base end of the control shaft, making sure the shaft is completely free to revolve and take its normal position at room temperature (about 75 deg. to 85 deg. F.).

With the plastic cam free on the shaft and the microswitch down, move the control cable linkage as far as it will go to the left and hold in this position. While holding the linkage, turn the plastic cam in a counterclockwise direction until the microswitch just clicks, then tighten the set screw in the cam.

CAUTION

Do not disturb the two screws which attach the microswitch to the thermostat base.

When reinstalling the thermostat, insert the control cable and housing through the retainer clip located on the upper portion of the thermostat mounting plate. Insert the end of the cable through the swivel holes of the thermostat linkage, but do not tighten the screw. Move the temperature control to the extreme low heat position; then move the thermostat control linkage in a downward direction as far as it will go. Tighten swivel screw. When the thermostat cable is properly installed, the temperature control should move the thermostat linkage from one extreme to the other without interference from the cable housing.

4. INSTANT HEATER SERVICE DIAGNOSIS

NO HEAT OR INSUFFICIENT HEAT

Start the engine. Turn heater switch on. The fresh air blower and the burner blower motors should start immediately. Failure of the motors to start may be caused by a defective heater switch, fuse or wiring. Check the ground wires. Check with a test light at the wire connector of the burner blower motor. If the light goes on, replace the burner blower motor. If both blowers run, use a test light to check for current at red terminal (with single wire) of thermostat switch. If test lamp fails to light, check thermostat and wiring. Replace as necessary.

If the test lamp lights at the red terminal of the thermostat, and the white lead from the solenoid valve, touch the white lead to the solenoid valve, touch the white lead to the solenoid valve white terminal, a click should be heard as the fuel control valve opens and closes (with temperature control in HIGH HEAT

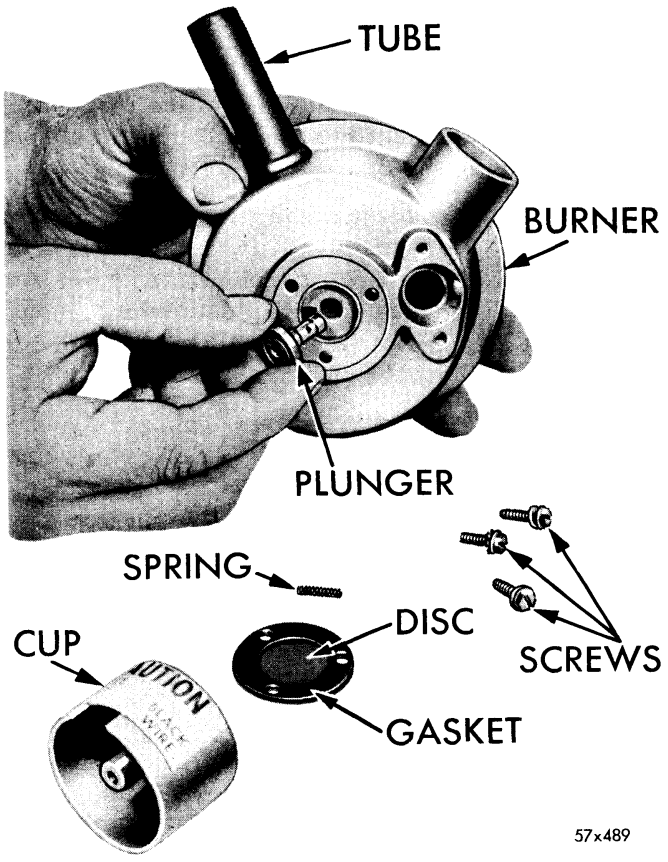

Figure 13—Removing or installing plunger

position). If the valve fails to click, install a jumper wire between the coil red terminal and the white terminal of the solenoid valve. If the valve clicks, replace the overheat switch. If there is no click, check solenoid ground wire. If ground wire is OK, replace solenoid.

If the solenoid valve is operating properly, check the ignition system. Remove the wire from the spark plug and connect it to a test plug. Ground plug to body (can use an automotive type plug with plug gap set at .085 in.). Turn on ignition and heater switches and check the plug for a hot spark. If there is no spark, the coil or breaker points are bad.

If there is a spark at the test plug, it can be assumed that the nozzle is clogged or the spark plug shorted out, and the burner assembly must be removed from the heater.

CAUTION

Be sure the burner is properly grounded and avoid touching any part of the assembly during the following tests.

Remove the burner assembly from the heat exchanger. Pull the fuel line out of the heater case and reconnect it to the burner assembly. Remove the coil from the heater duct and reconnect it to the spark plug. Remove the white wire from the solenoid valve. Ground the assembly to the body of the car and turn the heater switch on. Check for a spark at the spark plug electrodes.

If a hot spark appears at the electrodes of the spark plug, the nozzle is defective. If the spark is being shorted to ground or is completely absent, replace the spark plug. If the plug is shorted out by an accumulation of carbon, the nozzle is probably at fault and the spray pattern should be checked.

To examine the spray pattern, connect a jumper wire from the coil red terminal to the white terminal of the solenoid valve. Disconnect the ignition cable from the spark plug. These wiring connections will energize the solenoid directly without going through the overheat switch. After making connection, start the engine and turn the heater switch on (temperature control in high position). The fuel valve will open and the spray from the nozzle can then be examined.

CAUTION

Have a fire extinguisher at hand and avoid any possibility of igniting the spray. NEVER attempt to burn this assembly in the open.

The spray pattern must consist of a fine mist of fuel which is symmetrical in shape and is centered in the mixer assembly. There must be no dripping or leakage around the nozzle seat. If the spray is coarse or uneven, or is directed at an angle in the mixer, the nozzle is defective.

Additional causes of burner failure are: excessive clogging of the screen in the fuel inlet, clogging of fuel passages within the burner casting, or a defective valve plunger or seat.

HEATER GETS TOO HOT

This condition can be caused by a poorly adjusted thermostat or insufficient fresh air. To test the thermostat, connect a test light between the terminal of the thermostat that has ONE red wire running to it and ground. Start the heater with the engine running. After the heater warms up, the test light should go on and off as the thermostat cycles the heater on and off.

If the heater cycles, but the test light remains on, it is an indication that the thermostat contacts are remaining closed and the heater is cycling on the overheat switch. Install a new thermostat. The fresh air supply should be checked before replacing the thermostat since proper thermostat action is dependent upon an adequate supply of fresh air through the heater system. Insufficient air flow can be caused by a defective fresh air blower motor or by an obstruction in the fresh air system. Fresh air door must be closed and temperature control arm moved to a position between "ON" and "WARMEST."

HEATER WORKS INTERMITTENTLY

If the heater gets very hot and shuts itself off and on in an intermittent way, the trouble is probably caused by insufficient fresh air flow. Check the fresh air blower and short coupling duct between the blower and heater.

HEATER CAUSES ODOR

If the odor is raw gasoline, the fuel connection at the burner casting or the solenoid valve is not tight on the casting. A slight odor when a new heater is first turned on should be disregarded. If the odor is burned gasoline, the exhaust tube under the heater is leaking and must be repaired.

TOO MUCH SMOKE FROM HEATER

Excessive smoking and carbon are caused by a slow combustion air motor or a defective nozzle. This condition could also be caused by delayed ignition, resulting from spark plug electrodes which are badly burned, out of adjustment or shorted with carbon. The plug gap should be .085 in. and the electrode should be clean and approximately centered in the insulator of the spark plug. Bend the ground electrode when making adjustment.

HEATER MAKES NOISE WHEN STARTING

If the heater "pops" or "spits" when starting or cycling, a leaking solenoid valve seat or plunger is permitting fuel to flow in the "off" position. Another cause is low fuel pressure from a defective pump, or a combination of low fuel pressure and insufficient combustion air caused by a slow burner motor. Check the fuel pressure first; if the pressure is satisfactory (5 to 7 lbs.) remove the entire burner assembly from the heater. Disconnect the ignition cable and solenoid leads, but re-connect the fuel line. Examine the inside of the mixer can to make sure the nozzle is dry. Turn the heater switch on to start the burner blower. Start the engine which will apply fuel pressure to the solenoid valve. Watch the nozzle carefully for signs of leakage. The slightest amount of leakage through the nozzle will indicate a defective shut-off valve which must be repaired. This condition could also be caused by spark plug electrodes bent out of position, even though adjusted to the proper gap. The center electrode of the plug must be approximately straight to locate the spark gap in the proper position with respect to the spray. Install a new plug and adjust by bending only the ground electrode.

HEATER FAILS TO START WHEN SWITCH IS TURNED ON, COMBUSTION AIR BLOWER DOES NOT RUN

1. Burned out fuse
2. Loose wire from ignition unit to combustion air blower
3. Defective combustion air blower motor
4. Defective heater switch

COMBUSTION AIR BLOWER RUNS BUT HEATER FAILS TO IGNITE

1. Defective thermostat or wiring
2. Defective overheat switch
3. Defective coil
4. Defective spark plug
5. Open circuit in solenoid valve
6. Clogged fuel nozzle
7. Combustion air hose disconnected, torn or kinked
8. Defective breaker points or cam

HEATER IGNITES BUT GOES OUT LATER

1. Fresh air blower not running
2. Obstruction in fresh air passage
3. Duct missing between fresh air blower and heater case

HEATER BURNS INTERMITTENTLY, HEAT OUTPUT IS TOO LOW

1. Thermostat out of adjustment
2. Fuel line pinched or clogged

HEATER BURNS INTERMITTENTLY, HEAT OUTPUT IS TOO GREAT

1. Thermostat out of adjustment or shorted out

HEATER BURNS CONTINUOUSLY, HEAT OUTPUT IS TOO LOW

1. Clogged fuel nozzle
2. Low fuel pressure

ODOR OF BURNED GASOLINE IN CAR

1. Leaking connection in exhaust tube
2. Broken or loose burner clamp.

EXCESSIVE AMOUNT OF SMOKE FROM HEATER EXHAUST WHEN HEATER STARTS

1. Leaking shut-off valve
2. Insufficient combustion air
3. Exhaust system partially obstructed

POPPING NOISE WHEN HEATER STARTS OR CYCLES

1. Leaking solenoid valve
2. Loose, dripping nozzle
3. Nozzle spray directed away from spark plug
4. Intermittent spark caused by too wide gap
5. Insufficient combustion air

See last section of Manual for wiring diagrams.

SECTION III—AIR CONDITIONING

1. GENERAL INFORMATION

The Heater-Air Conditioning on the 1959 Plymouth models is a dual purpose unit combining both heating and cooling for all seasons of the year.

The unit is controlled by vacuum diaphragms which are actuated by push buttons. The heating and cooling cycle is similar to the 1958 models. A water valve and capillary tube is used to control water temperature through a sliding temperature control lever, located to the right of the push buttons.

The new unit incorporates several new features:

1. High air-flow distribution
2. Larger cooling capacity
3. Push button controls
4. Vacuum actuated doors and dampers
5. Larger compressor output capacity