

# Section XVI

## RADIO AND HEATER

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## RADIO

The Electro Touch-Tuner (Model 922) (Fig. 1) and (924) (Fig. 2), have six tubes and two transistors. It includes a variable tone control with manual tuning, push button tuning and automatic search tuning. The Music Master (Model 851) (Fig. 3) has five tubes and one transistor. It includes a variable tone control with manual tuning and push button tuning.

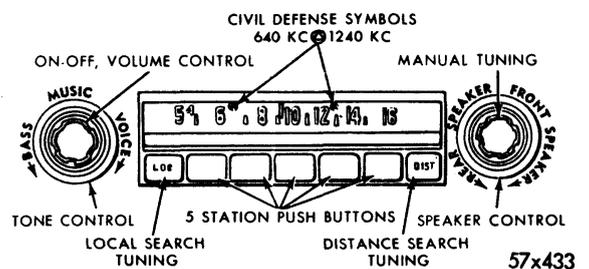


Fig. 2—Operating Controls 924

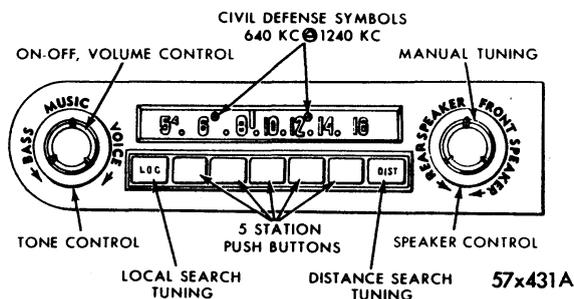


Fig. 1—Operating Controls 922

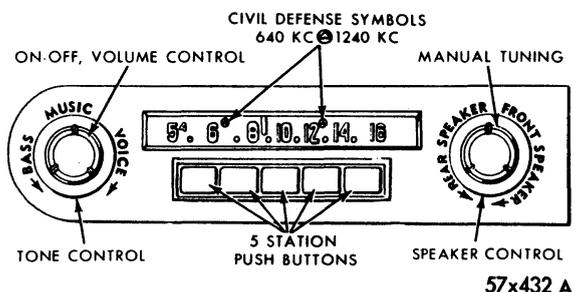


Fig. 3—Operating Controls 851

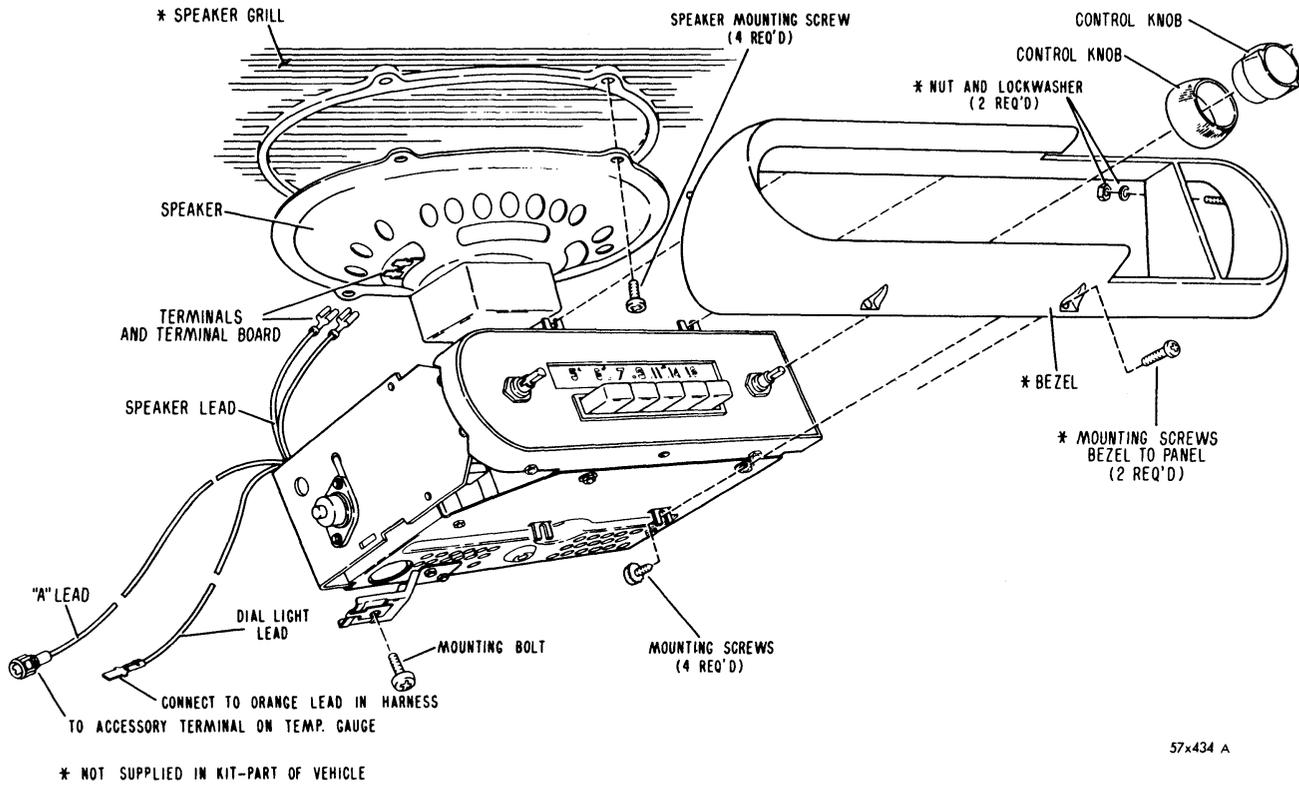


Fig. 4—Radio Model 851

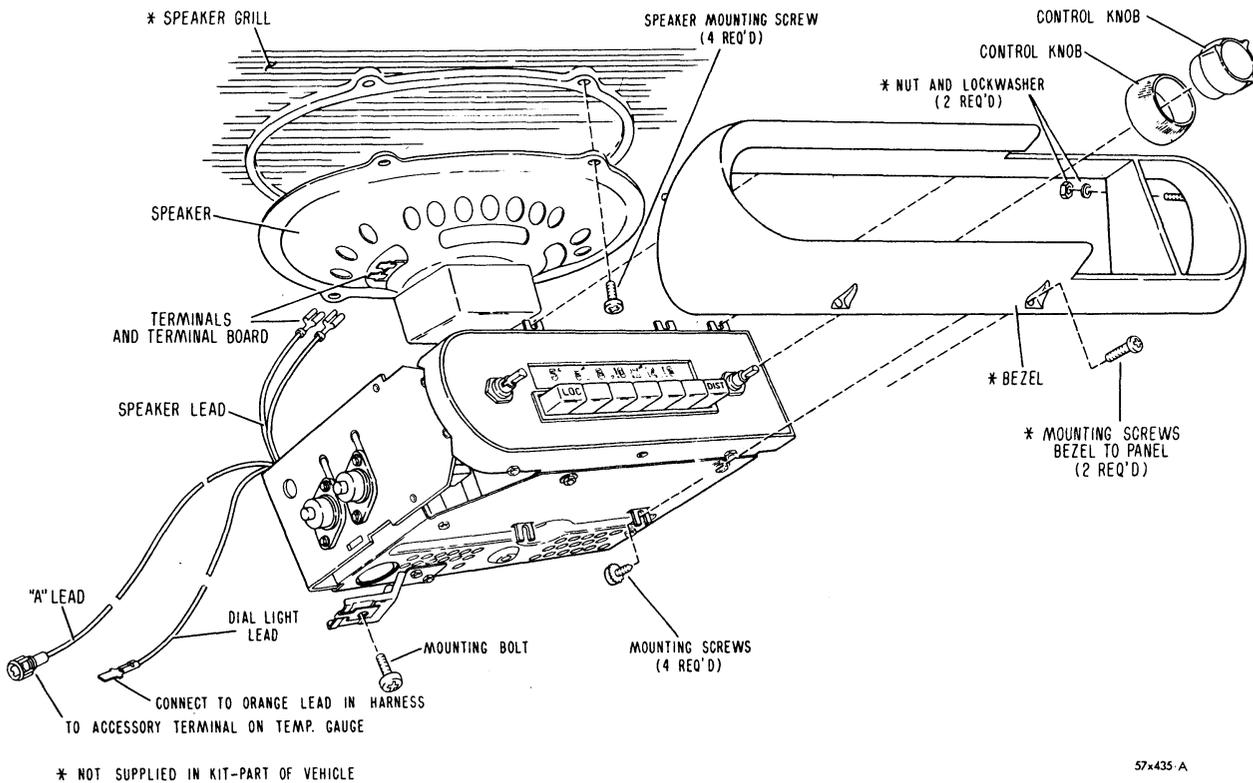


Fig. 5—Radio Model 922

## SERVICE PROCEDURES

### 1. REMOVAL—MODELS LC-1-2-3

Remove speaker grill and speaker. Disconnect "A" lead, pilot light lead, and rear seat speaker plug. Remove mounting screw from lower instrument panel to bracket on radio. Remove nuts from studs on rear of radio and ash receiver housing. Remove two screws from bottom of radio and ash receiver housing. Remove from the front of the instrument panel the radio and ash receiver housing with radio attached. Radio then can be removed from housing.

#### CAUTION

Do not operate radio with speaker detached or damage to transistor will result. If rear seat speaker is disconnected from radio insert jumper wire in rear seat speaker, socket or receiver will not operate. (Fig. 9).

### 2. INSTALLATION (Figs. 4 and 5)

Mount radio to radio and ash receiver housing. Install radio and ash receiver housing in the panel. Attach radio mounting bracket to panel. Connect "A" lead to accessory terminal on the temperature gauge. Connect rear speaker wire plug. Connect pilot lamp lead to orange wire from harness. Plug in antenna lead, as shown in Figure 9. Install speaker to grill panel and connect speaker wires. Then fasten grill panel to dash. Turn on radio to warm up. Adjust antenna compensator.

#### CAUTION

Antenna compensator must be properly adjusted for satisfactory operation of radio.

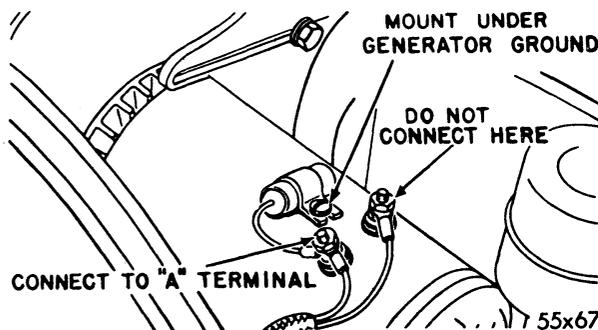


Fig. 6—Generator Condenser

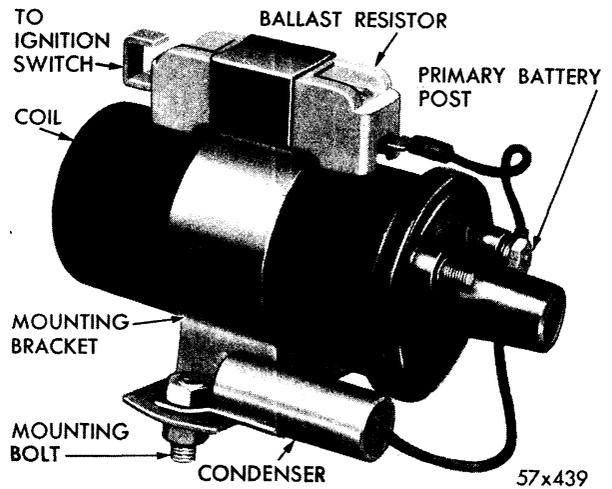


Fig. 7—Coil Condenser

### 3. REMOVAL—MODELS LY-1

Disconnect antenna, pilot lamp lead from orange wire on harness. Remove speaker grill and speaker, disconnect two wire lead from speaker. Disconnect "A" lead from accessory terminal on temperature gauge. Remove rear seat speaker wire plug. Remove mounting nut from lower instrument panel to bracket on radio. Remove radio control knobs. Remove radio from underneath instrument panel.

### 4. INSTALLATION

Mount radio to panel. Install control knobs. Attach radio mounting bracket and nut to panel.

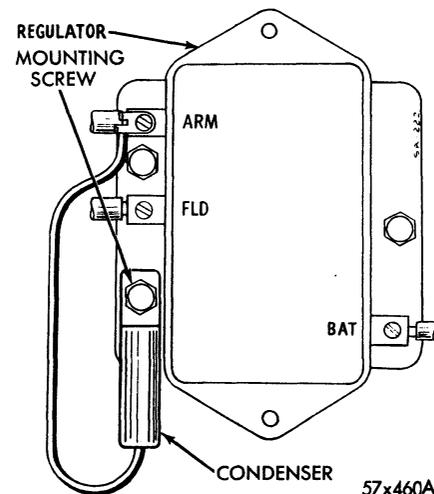


Fig. 8—Voltage Regulator Condenser

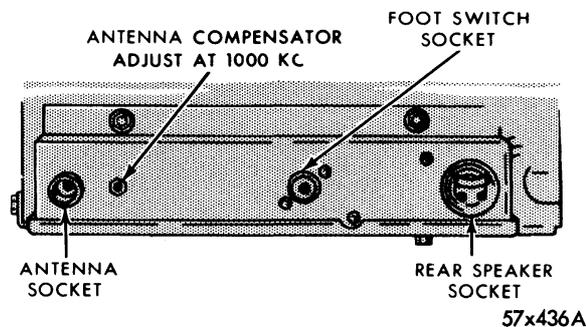


Fig. 9—Antenna Compensator Adjustment

Connect "A" lead to accessory terminal on the temperature gauge. Connect rear seat speaker wire plug. Connect pilot lamp lead to orange wire from harness. Plug in antenna lead, as shown in Figure 9. Install speaker to grill panel. Connect speaker wires and fasten grill panel to dash.

#### 5. INTERFERENCE

Install suppression equipment for elimination of interference and tire static (Fig. 6, 7 and 8).

#### CAUTION

Antenna compensator must be properly adjusted for satisfactory operation of radio (Fig. 9).

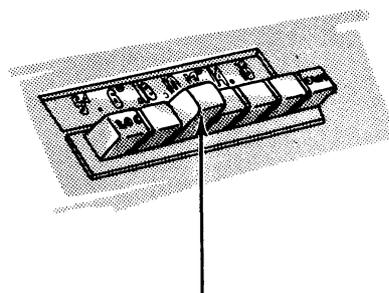
#### 6. ANTENNA COMPENSATOR

Extend antenna fully, tune radio manually to a weak station, 1,000 KC., turn antenna compensator, (Fig. 9) for maximum volume.

**NOTE:** It is important when adjusting the compensator that antenna is fully extended and compensator be trimmed at 1,000 KC.

#### 7. PUSH BUTTON ADJUSTMENT— MODELS 922, 924 and 851 (Fig. 10)

Extend antenna fully and turn radio on for



PUSH BUTTON PULLED OUT FOR STATION SET UP  
57x437

Fig. 10—Push Button Adjustment

fifteen minutes. Unlock push buttons by pulling them out. Manually tune in desired station and relock push buttons. Repeat operation on other push buttons.

#### 8. LOCAL AND DISTANT PUSH BUTTONS

Local push button fill tune only strong stations. Distant push button will tune all stations within range of radio.

**NOTE:** Do not set end push buttons.

In order to obtain the best performance from search tuning, antenna should be extended.

#### 9. FOOT SWITCH SEARCH TUNER

The foot switch search tuner, on Models 922 and 924, is located on the left forward end of the floor boards. By depressing with the foot, it will select a station on the radio.

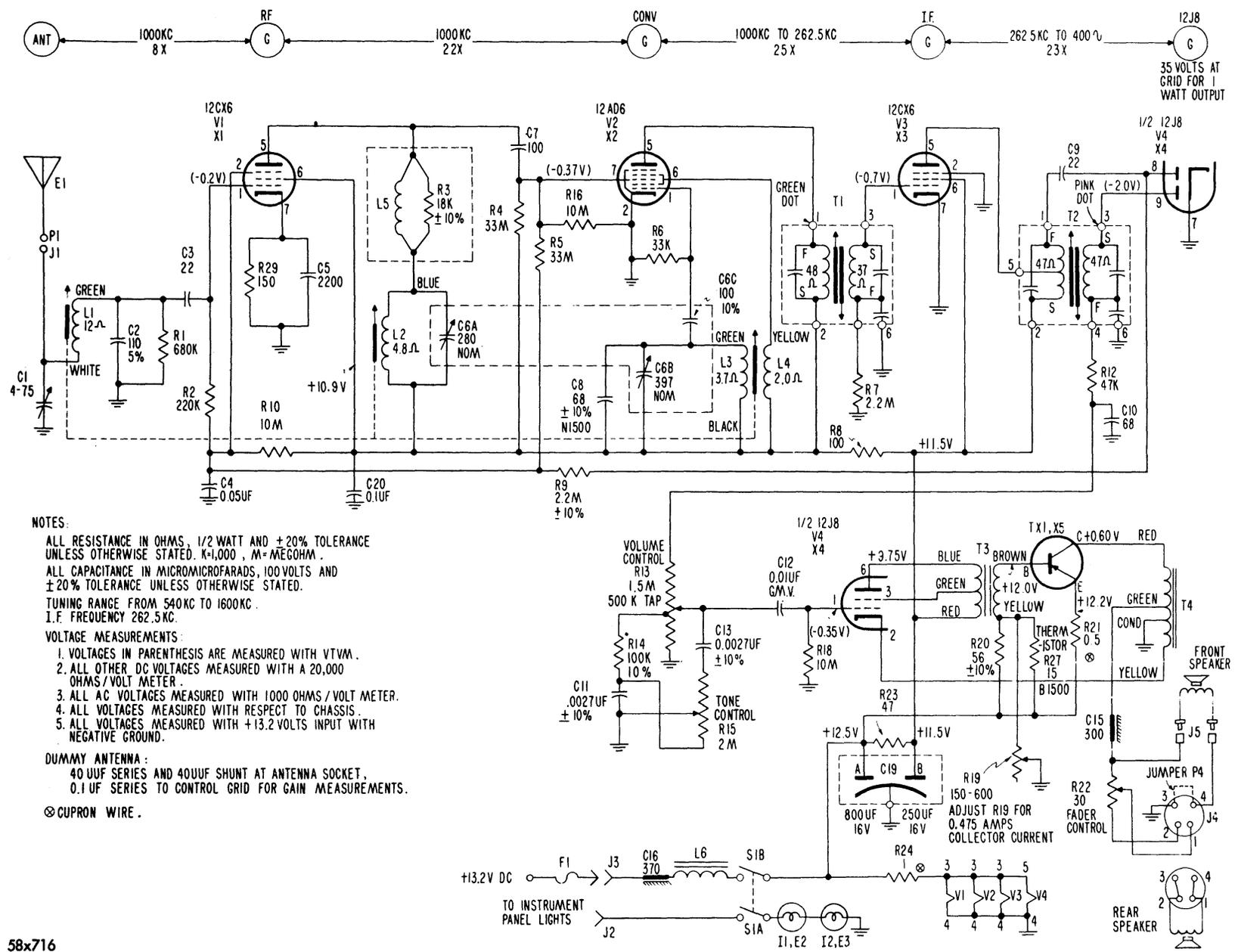
The foot switch activates the touch-tuner mechanism in the same manner as the search-tuning buttons (LOC and DIST) except that the search sensitivity of the touch-tuner buttons was last depressed. Therefore, the foot switch will cause the search-tuner to operate at a sensitivity determined by which of the two search-tuning buttons was last depressed.

## RADIO SERVICE DIAGNOSIS

#### CAUTION

If the radio is to be operated outside the car, it is imperative that the negative side of the

power source be connected to the radio housing and the positive side to the "A" lead. If connected otherwise permanent damage to radio components will result.



**NOTES:**

ALL RESISTANCE IN OHMS, 1/2 WATT AND ±20% TOLERANCE UNLESS OTHERWISE STATED. K=1,000, M=MEG OHM.

ALL CAPACITANCE IN MICROMICROFARADS, 100 VOLTS AND ±20% TOLERANCE UNLESS OTHERWISE STATED.

TUNING RANGE FROM 540KC TO 1600KC.

I.F. FREQUENCY 262.5KC.

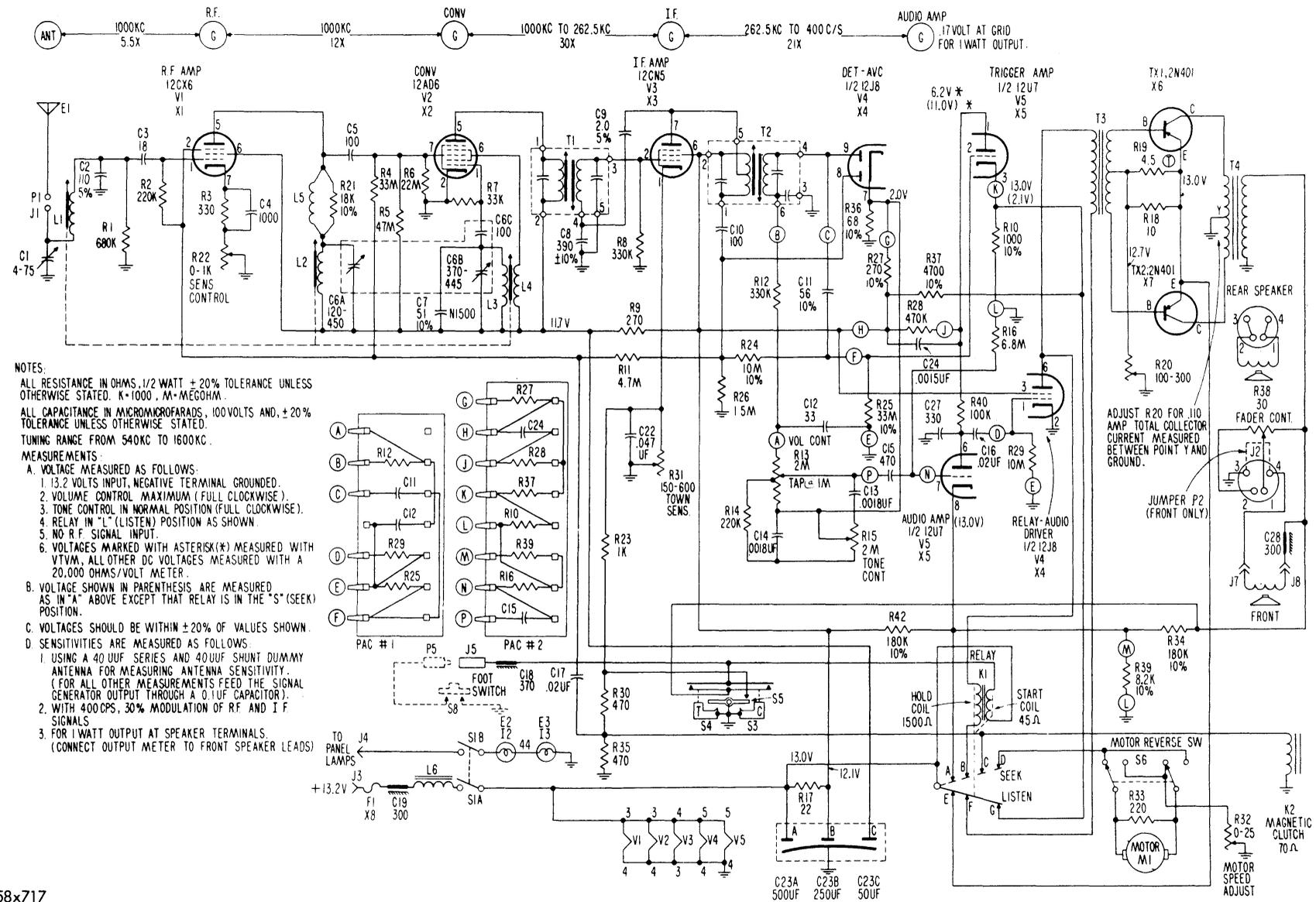
**VOLTAGE MEASUREMENTS:**

1. VOLTAGES IN PARENTHESIS ARE MEASURED WITH VTVM.
2. ALL OTHER DC VOLTAGES MEASURED WITH A 20,000 OHMS/VOLT METER.
3. ALL AC VOLTAGES MEASURED WITH 1000 OHMS/VOLT METER.
4. ALL VOLTAGES MEASURED WITH RESPECT TO CHASSIS.
5. ALL VOLTAGES MEASURED WITH +13.2 VOLTS INPUT WITH NEGATIVE GROUND.

**DUMMY ANTENNA:**  
40 UF SERIES AND 40UF SHUNT AT ANTENNA SOCKET,  
0.1 UF SERIES TO CONTROL GRID FOR GAIN MEASUREMENTS.

☉ CUPRON WIRE.

Fig. 11—Schematic Radio Model 851



- NOTES:
- ALL RESISTANCE IN OHMS, 1/2 WATT + 20% TOLERANCE UNLESS OTHERWISE STATED. K=1000, M=MEGOHM.
  - ALL CAPACITANCE IN MICROMICROFARADS, 100VOLTS AND, ± 20% TOLERANCE UNLESS OTHERWISE STATED.
  - TUNING RANGE FROM 540KC TO 1600KC.
- MEASUREMENTS:
- A. VOLTAGE MEASURED AS FOLLOWS:
    - 13.2 VOLTS INPUT, NEGATIVE TERMINAL GROUND.
    - VOLUME CONTROL MAXIMUM (FULL CLOCKWISE).
    - TONE CONTROL IN NORMAL POSITION (FULL CLOCKWISE).
    - RELAY IN "L" (LISTEN) POSITION AS SHOWN.
    - NO R.F. SIGNAL INPUT.
    - VOLTAGES MARKED WITH ASTERISK (\*) MEASURED WITH VTVM, ALL OTHER DC VOLTAGES MEASURED WITH A 20,000 OHMS/VOLT METER.
  - B. VOLTAGE SHOWN IN PARENTHESIS ARE MEASURED AS IN "A" ABOVE EXCEPT THAT RELAY IS IN THE "S" (SEEK) POSITION.
  - C. VOLTAGES SHOULD BE WITHIN ± 20% OF VALUES SHOWN.
  - D. SENSITIVITIES ARE MEASURED AS FOLLOWS:
    - USING A 40 UUF SERIES AND 40UUF SHUNT DUMMY ANTENNA FOR MEASURING ANTENNA SENSITIVITY. (FOR ALL OTHER MEASUREMENTS FEED THE SIGNAL GENERATOR OUTPUT THROUGH A 0.1 UF CAPACITOR).
    - WITH 400CPS, 30% MODULATION OF RF AND I F SIGNALS.
    - FOR 1 WATT OUTPUT AT SPEAKER TERMINALS. (CONNECT OUTPUT METER TO FRONT SPEAKER LEADS)

Fig. 12—Schematic Radio Model 922

58x717

Do not operate the radio without the front seat speaker connected and either the rear seat speaker or a jumper wire connected to the rear seat speaker socket; otherwise the receiver will not operate and damage to components may result.

#### 10. RADIO IS INOPERATIVE OR DEAD

Turn on the radio. Check to see if the tubes light up. If the tubes are not lighted, disconnect the "A" lead cable and check the fuse located in the receptacle. If the fuse is not blown, follow procedures outlined in Paragraph B below.

a. **Fuse is Blown**—If the fuse is blown, install a new fuse and check to see if the tubes are lighted. Ignore the pilot light as it is fed by a separate lead. If the tubes do not light up, make certain that voltage is available at the "A" lead and if it is, or if the new fuse blows, remove the receiver for major repair.

b. **Fuse is not Blown**—Check for voltage at the "A" lead with a voltmeter. If 12 volts are available and the tubes are not lighted, remove the receiver for a major repair. If the tubes are lighted, connect the test antenna to the receiver and hold it so that it protrudes out of and away from the car. If the receiver operates, install a new antenna and lead-in. Make certain that the old antenna connector was clean and made a good connection before discarding it.

If the antenna is not at fault, disconnect the speaker and plug in the test speaker. If the receiver operates, replace the old speaker. If the speaker is not at fault, remove the receiver and substitute the test tubes for those in the receiver, one at a time, allowing enough time for each tube to heat up before going on to the next. If the receiver is still inoperative, it must be removed for a major repair.

**NOTE:** It will seldom be necessary to replace a transistor power output stage. Replacement and testing of transistors should be left to a competent radio service man. After performing all of the preceding checks, be sure to remove all parts marked for use in testing.

#### 11. RADIO RECEPTION IS WEAK

When reception is limited to a few strong local stations, adjust the antenna trimmer to align the receiver to the antenna with antenna fully

extended. If the reception is not improved, proceed with the following steps. Substitute a test antenna, remove the receiver and substitute test tubes as outlined in Paragraph 10(b).

#### 12. RADIO RECEPTION IS NOISY OR ERRATIC

The cause of noisy or erratic reception can be isolated by finding out when the noise occurs. If it occurs while the vehicle is at a standstill with the engine not running, the trouble lies in the radio receiver. If the noise occurs only while the vehicle is standing with the motor running, it is probably caused by ignition or electrical units on the vehicle. If the noise occurs only while the vehicle is in motion, it is probably caused by wheel and tire static, or by intermittent shorting of the antenna. Power lines, electric road signs, etc., are another source of noise.

#### 13. RADIO IS NOISY WITH CAR STANDING STILL—ENGINE NOT RUNNING

Tune in a local station, and jar the side of the receiver case with the hand. Make sure that the connector plugs are firmly seated. If the connectors are secure and the noisy reception continues as the receiver is jarred, remove the receiver and proceed with the following steps.

Tap the tubes gently with the finger tips, while holding the tubes in the socket to eliminate disturbing the tube contacts. If the receiver becomes noisy as any particular tube is tapped, replace the defective tube. If none of the tubes are noisy, a major repair is indicated.

#### 14. RADIO IS NOISY WITH CAR STANDING STILL—ENGINE RUNNING

Close and securely latch hood before checking for noise. Start engine, turn on radio and tune to a spot between stations. Engine noise will usually appear in radio as a clicking sound that varies in frequency with speed of engine.

If noise is present, check voltage regulator, ignition coil, and generator capacitors for clean, tight connections; also check that antenna lead-in cable shield makes good around contact at receiver receptacle and that antenna mounting nut is tight. Check the receiver mounting for good ground contact both at the support bracket mounting and where the receiver contacts the instrument panel.

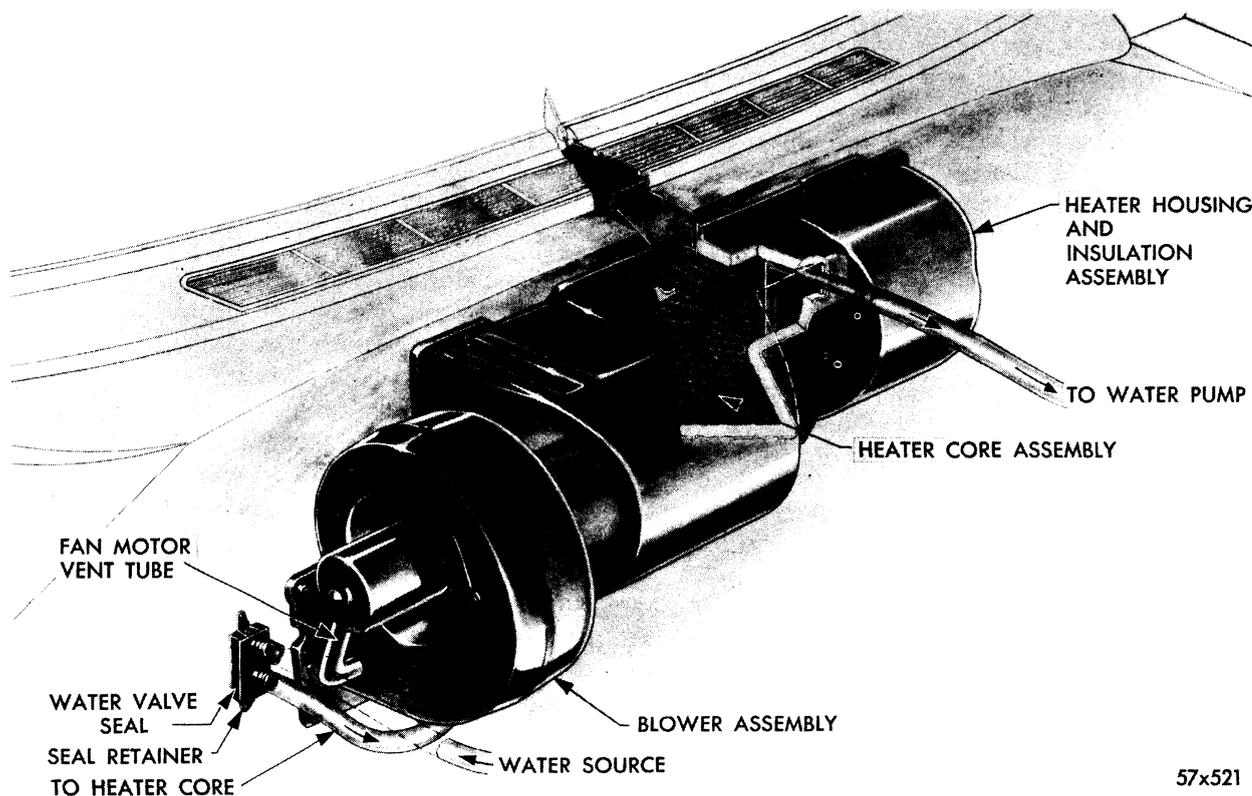


Fig. 13—Heater Installation (Engine Side)

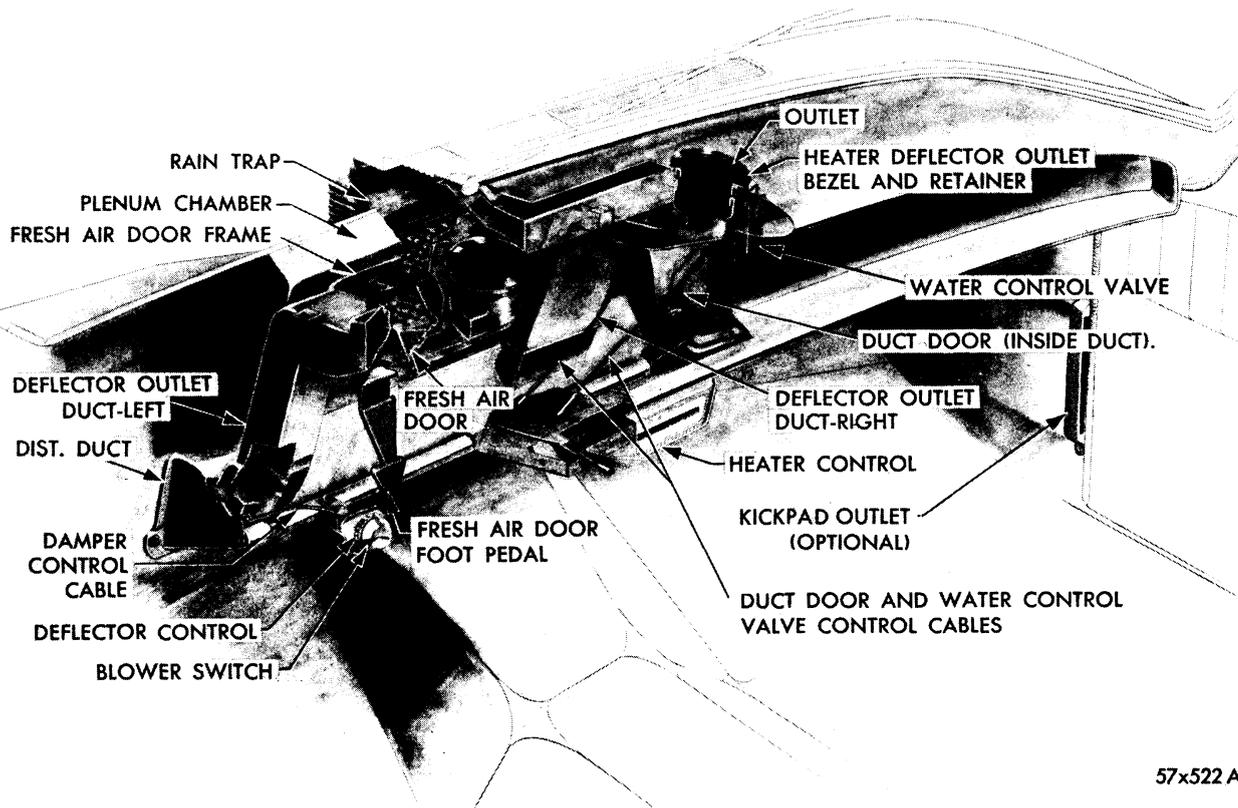


Fig. 14—Heater Installation (Driver Side)

If noise is still present, substitute the good suppression test parts one at a time.

#### 15. RADIO IS NOISY WITH CAR IN MOTION

Turn on radio and check for engine noise as described in Paragraph 14 above. If engine noise is present, correct as outlined.

Retract the antenna and flex it slightly to let it vibrate. Move and twist the lead-in slightly. If noise occurs when this is done, replace the antenna.

#### 16. RADIO IS NOISY WHEN CAR EQUIPMENT IS OPERATED

When excessive loud "clicks" and "pops" are heard in the radio due to the operation of directional signals, brake lights, power seats or power windows, all ground connections to the radio antenna and lead-in wire should be thoroughly checked. A poor ground connection at any point can produce the above trouble. A limited amount of noise from electrical apparatus may be considered normal.

#### 17. RADIO RECEPTION IS DISTORTED OR GARBLED

Distorted or garbled sound may be caused by the voice coil rubbing on the center pole piece of the speaker magnet, by a torn speaker cone, by foreign material coming in contact with the

cone, or by a defective tube in the receiver. The voice coil may be thrown out of alignment by a twisting or bending of the speaker frame if the speaker unit is improperly mounted in the speaker grille. To determine if the speaker is at fault, substitute the test speaker, tighten the attaching nuts finger tight only. If the reception is not corrected, substitute tubes as outlined in Paragraph 10(b) above.

#### 18. RADIO TOUCH-TUNER MECHANISM RUNS CONTINUOUSLY

When checking the operation of the touch-tuner, first make certain that the manual portion of the receiver will tune in distant stations, that the antenna is fully extended, and that the antenna trimmer is adjusted. It may also be necessary to move the vehicle to a location where normal station signal strength is available (out of and away from steel reinforced buildings).

If the touch-tuner mechanism starts and runs continuously without the "LOC" and "DIST" buttons having been operated, remove the receiver for a major repair.

If the touch-tuner mechanism runs continuously after the "LOC" button is operated, depress the "DIST" button momentarily. If the tuner still runs continuously when the "DIST" button is operated, the receiver must be removed for a major repair.

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## HOT WATER HEATER

The Chrysler MOPAR All Weather Comfort System supplies fresh air through cowl vent for ventilating, heating and defrosting (Figs. 13 and 14).

For summer operation there is one fresh air door provided, which directs fresh air from cowl vent opening to bottom of driver compartment. Two drain tubes are provided in bottom of air duct below ventilator door in case water does come in through vent.

For winter operation, close fresh air door and turn blower on. The fresh air flows downward through heater case, heat exchanger blow-

er, duct door and distributor duct. Temperature control is provided by a lever on instrument panel which opens the duct door on the right side of car to admit air to the distributor duct and also opens the heater water control valve. As the lever is moved toward warmer the water valve is opened further. The heater water valve will then maintain this temperature automatically.

Defrosting is provided by heated air flowing from distributor duct to defroster outlet on the top of instrument panel. The damper in the distributor duct divides the heater air to defroster outlet or floor as desired.

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**19. REMOVING AND INSTALLING CORE**

(Fig. 13)

Drain cooling system, remove hoses from engine side of firewall, remove heater housing (engine side) and remove core from housing. When installing housing and core be sure to draw bolts up evenly—alternate from top to bottom, working from center out. Fill cooling system, check for leaks with heater controls set at warmest position. Check blower and defroster for proper operation.

**NOTE:** In event an "air lock" condition occurs, remove heater outlet hose and turn temperature control to warmest position. Run engine until trapped air is forced out.

**20. BLOWER MOTOR  
(REMOVAL AND INSTALLATION)**

**NOTE:** Lack of air when blower is turned on can be caused by either blower not working or

duct door not open.

Disconnect three electrical lead wires to blower motor. Remove mounting screws. Disengage rubber boot from heater housing. Remove blower motor mounting plate from blower housing and remove motor assembly.

When installing fan, adjust to 1/2 inch clearance between fan wheel and mounting plate.

**21. REAR WINDOW DEFROSTER**

The rear window defroster (optional on all Models) is located on and under the rear shelf panel of the car, and consists of a blower, flexible hose and nozzle. A switch, located on the instrument panel, controls the blower for defrosting the rear window. There is no connection with the heater in the car, with the rear window defroster, so that when air is drawn through the blower from inside the car, it is recirculated on the rear window glass.

## INSTANT HEAT CONDITIONAIRE MODEL 803 HEATER

The heater assembly consists of a cylindrical stainless steel heat 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 is also mounted on the burner casting to control flow of the fuel.

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 cowl vent and forced through the heater into the car by a blower which is mounted on the firewall. A short rubber duct connects the outlet 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 electric circuit to the solenoid fuel valve and shut the heater off in the event the temperature should rise above a safe maximum. This switch will automatically

reset itself when the heater cools.

**22. BURNER BLOWER ASSEMBLY**

(Figs. 15 and 16)

**a. Removal**

Remove the combustion air hose, disconnect

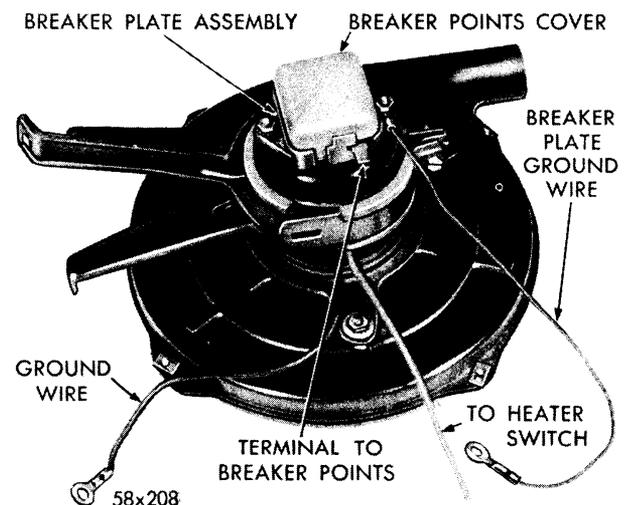


Fig. 15—Burner Blower Assembly

blower ground wire and the blower hot lead 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 (Fig. 15).

**b. Installation**

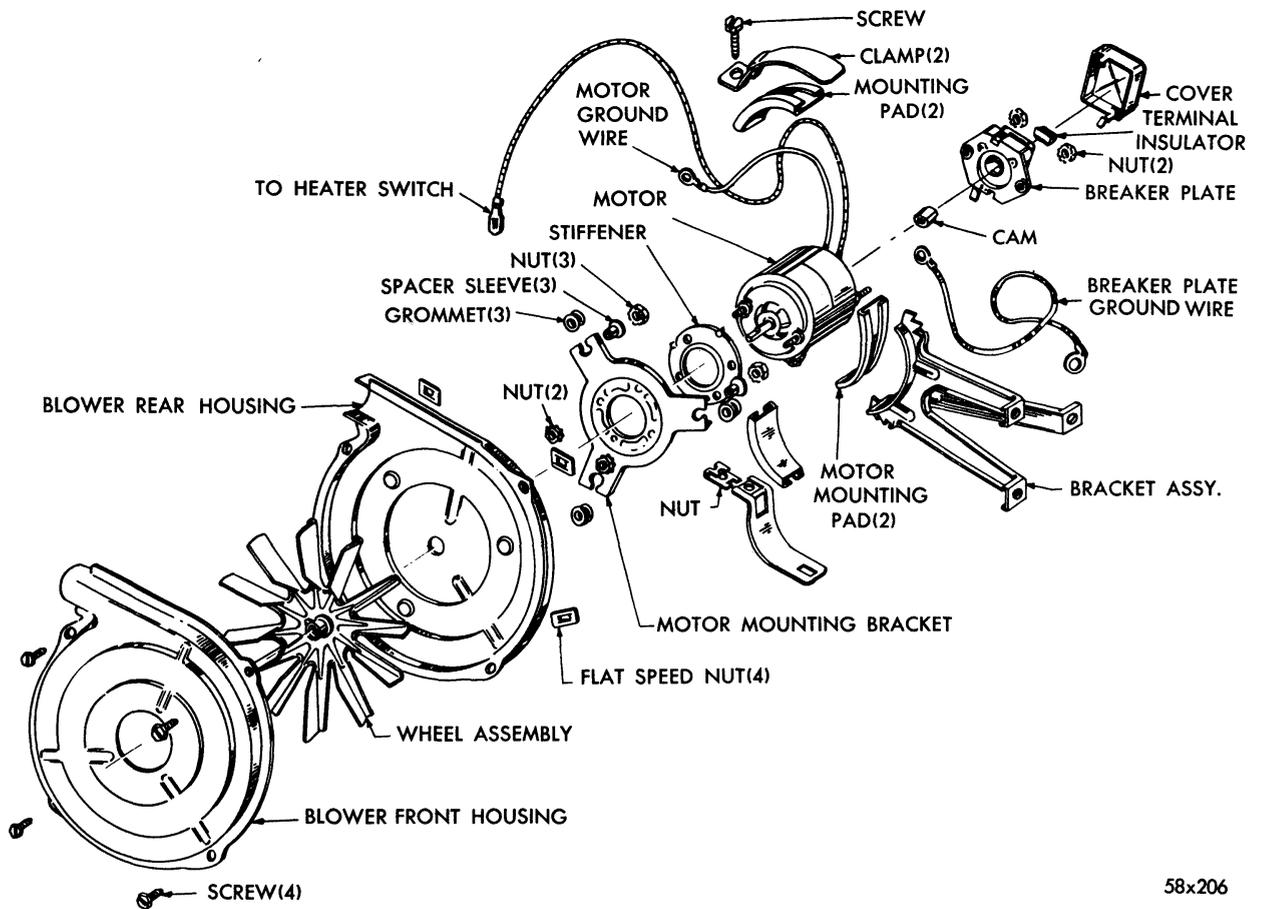
Check the blower fan for clearance and freedom of movement. When tightening the nuts attaching the inner fan housing to the motor mounting bracket, try the fan on the motor shaft and tighten nuts so the rubber grommets will be compressed evenly but not too tightly.

**c. Breaker Point Assembly**

To replace the breaker points, remove the cover, being careful not to lose the small insulating grommet. Remove the nuts from the two studs on the motor, remove the two ground

wires from the stud, and lift off the entire breaker points assembly. Remove the cam from the end of the motor shaft by holding the blower fan and turning the cam clockwise (this is a left-hand thread). Always install a new cam with new breaker points.

After installing the 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 and fit the new breaker points over the motor studs. Replace the two ground wires on the stud and tighten the mounting nuts securely. Turn the fan until the points open to their widest gap and check width with an .018 feeler gauge. Turn the adjusting screw to obtain the proper gap and then seal the screw to the mounting bracket by soldering securely with 50-50 solder and resin flux (not acid). Replace the cover and insulating grommet and reinstall the blower assembly on the motor mounting bracket.



58x206

Fig. 16—Burner Blower—Disassembled View

**23. HEATER ASSEMBLY (Fig. 17)****a. Removal**

Disconnect the combustion air hose at the burner blower assembly. Remove the exhaust tube clamp and disconnect the heater exhaust tube. Remove the outlet adaptor clamp at the outlet of the heater. Remove the 4 screws which attach the cover of the heater case to the frame. The cover can now be removed with all the heater components attached.

**b. 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 on center of heater cover.

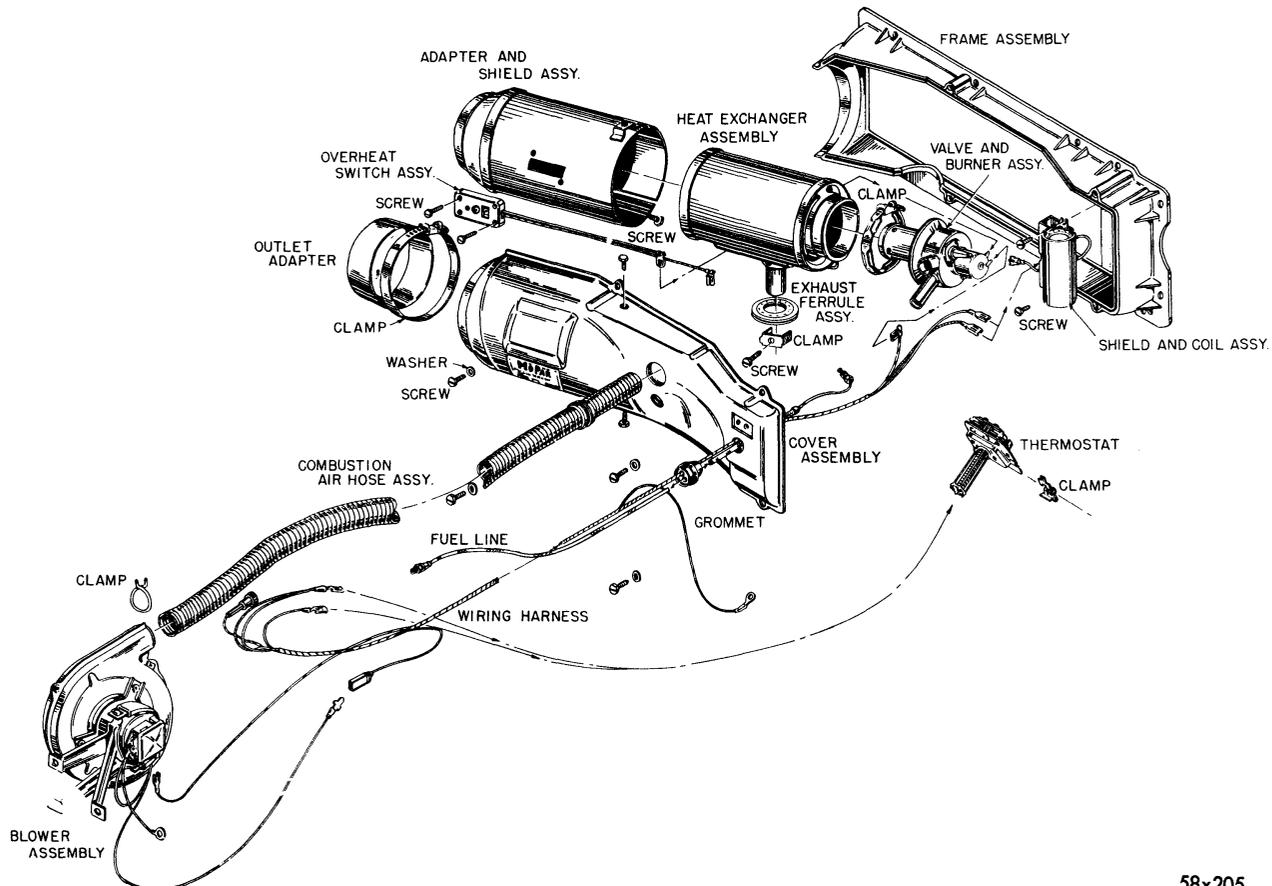
**24. BURNER ASSEMBLY (Fig. 18)****a. Removal of Burner Assembly**

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.

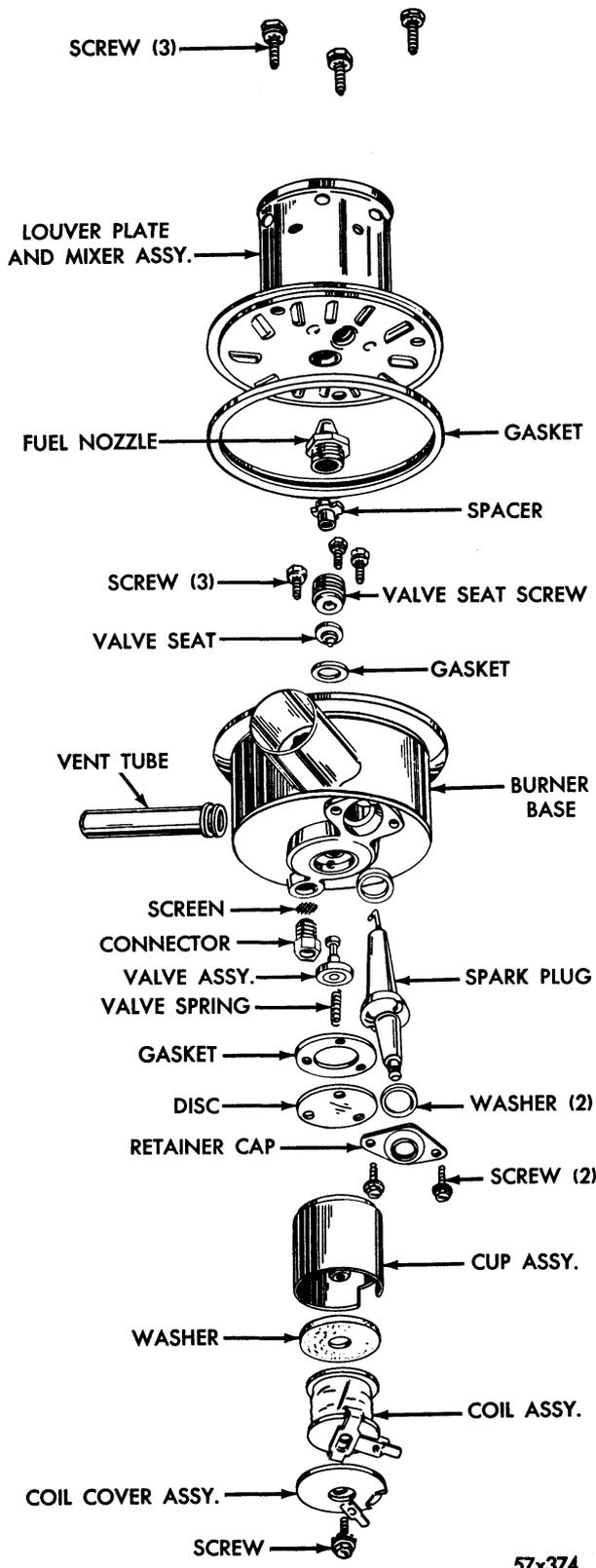
**b. Inspection (Before Disassembly)**

The nozzle and mixer assembly should receive special inspection 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 orifice. The



58x205

**Fig. 17—Heater—Disassembled View**



57x374

Fig. 18—Burner—Disassembled View

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, install a new nozzle.

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.

**c. Disassembly of Burner Assembly (Fig. 18)**

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. (Fig. 19)

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-inch socket or box wrench. The spacer, or filler plug, directly behind the nozzle will now be lifted out.

Remove the valve seat retaining screw in the bottom of the nozzle opening, using an Allen wrench (1/4-inch 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. (Fig. 18)

**d. Reassembly of Burner**

Refer to Figures 18, 19 and 20, 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 (Fig 20) 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" feeler gauge, adjust the spark plug gap by bending the ground electrode. **Do not bend**

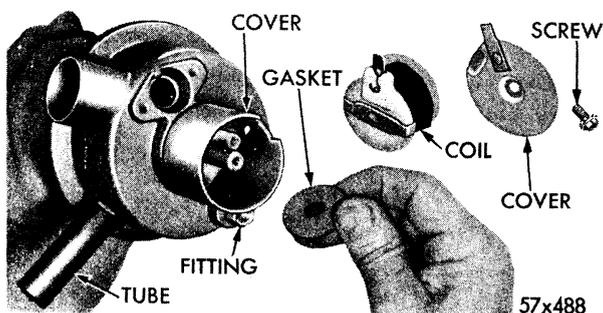


Fig. 19—Removing or Installing Coil and Gasket

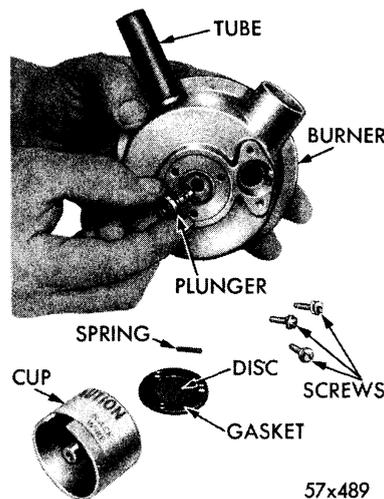


Fig. 20—Removing or Installing Plunger

spark plug electrode. Fit the rubber vent tube into the opening in the burner casting.

#### e. 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 now 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.

**f. 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 attaches the burner to the heat exchanger. Connect the spark plug wire and fuel line.

**25. 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 and 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

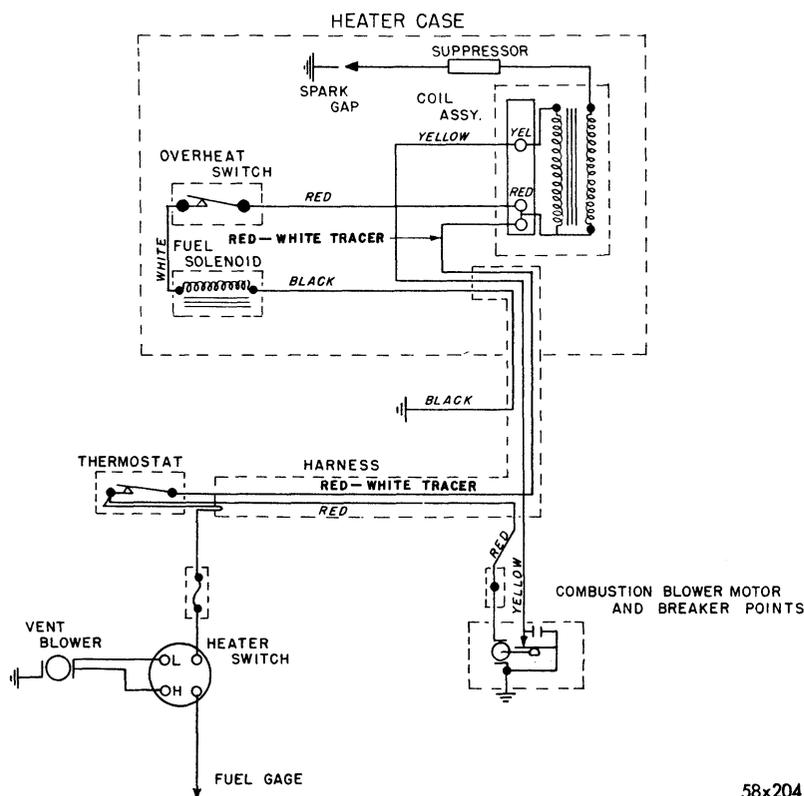
the shaft is completely free to revolve and take its normal position at room temperature (about 75° to 85° F.).

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 counter-clockwise 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 con-



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Fig. 21—Gas Heater Wiring Diagram

trol should move the thermostat linkage from one extreme to the other without interference

from the cable housing. For gas heater wiring diagram refer to Figure 21.

## INSTANT HEAT CONDITIONAIRE SERVICE DIAGNOSIS

### 26. 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, remove the four screws from heater cover and remove cover. Using a test light, check for current at red terminal of ignition coil. If test lamp fails to light, check thermostat and wiring. Replace if necessary.

If the test lamp lights at the red terminal of the coil, remove the white lead from the solenoid valve. Alternately 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 position). If the valve fails to click, install a jumper wire between the coil red 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 units. 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 inches). 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 no 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 if there is no spark, 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 ex-

cessive clogging of the screen in the fuel inlet, clogging of fuel passages within the burner casting, or a defective valve plunger or seat.

### 27. 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".

### 28. HEATER WORKS INTERMITTENTLY

If the heater gets very hot and shuts itself on and off 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.

### 29. HEATER CAUSES ODOR

If the odor is raw gasoline, the fuel connection at the burner casting is leaking 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.

### 30. 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 inches and the electrode should be clean and approximately centered in the insulator of the spark plug. Bend the ground electrode when making adjustment.

### 31. 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 reconnect 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.

## INSTANT HEAT CONDITIONAIRE TROUBLE SHOOTING CHART

### 32. HEATER FAILS TO START WHEN SWITCH IS TURNED ON. COMBUSTION AIR BLOWER DOES NOT RUN.

- a. Burned out fuse.
- b. Loose wire from ignition unit to combustion air blower.
- c. Faulty combustion air blower motor.
- d. Faulty heater switch.

**33. COMBUSTION AIR BLOWER RUNS  
BUT HEATER FAILS TO IGNITE.**

- a. Faulty thermostat or wiring.
- b. Faulty overheat switch.
- c. Faulty coil.
- d. Faulty spark plug.
- e. Open circuit in solenoid valve.
- f. Clogged fuel nozzle.
- g. Comb. air hose disconnected, torn or kinked.
- h. Faulty breaker points or cam.

**34. HEATER IGNITES BUT  
GOES OUT LATER.**

- a. Fresh air blower not running.
- b. Obstruction in fresh air passage.
- c. Duct missing between fresh air blower and heater case.

**35. HEATER BURNS INTERMITTENTLY,  
HEAT OUTPUT IS TOO LOW.**

- a. Thermostat out of adjustment.
- b. Fuel line pinched or clogged.

**36. HEATER BURNS INTERMITTENTLY,  
HEAT OUTPUT IS TOO GREAT.**

- a. Thermostat out of adjustment or shorted out.

**37. HEATER BURNS CONTINUOUSLY,  
HEAT OUTPUT IS TOO LOW.**

- a. Clogged fuel nozzle.
- b. Low fuel pressure.

**38. ODOR OF BURNED GASOLINE IN CAR.**

- a. Leaking connection in exhaust tube.
- b. Broken or loose burner clamp.

**39. EXCESSIVE AMOUNT OF SMOKE  
FROM HEATER EXHAUST WHEN  
HEATER STARTS.**

- a. Leaking shut-off valve.
- b. Insufficient combustion air.
- c. Exhaust system partially obstructed.

**40. POPPING NOISE WHEN HEATER  
STARTS OR CYCLES.**

- a. Leaking solenoid valve.
  - b. Loose, dripping nozzle.
  - c. Nozzle spray directed away from spark plug.
  - d. Intermittent spark caused by too wide gap.
  - e. Insufficient combustion air.
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