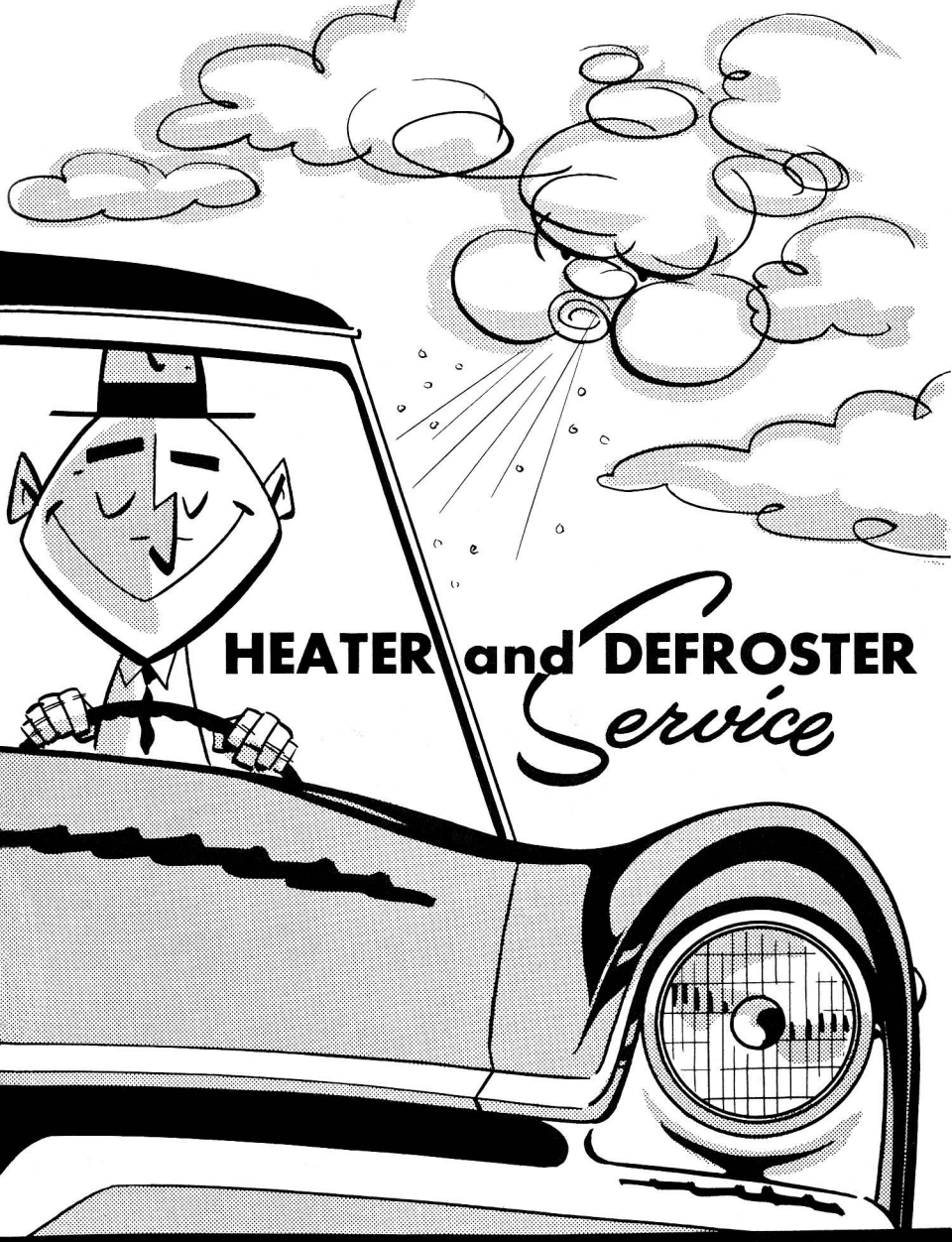
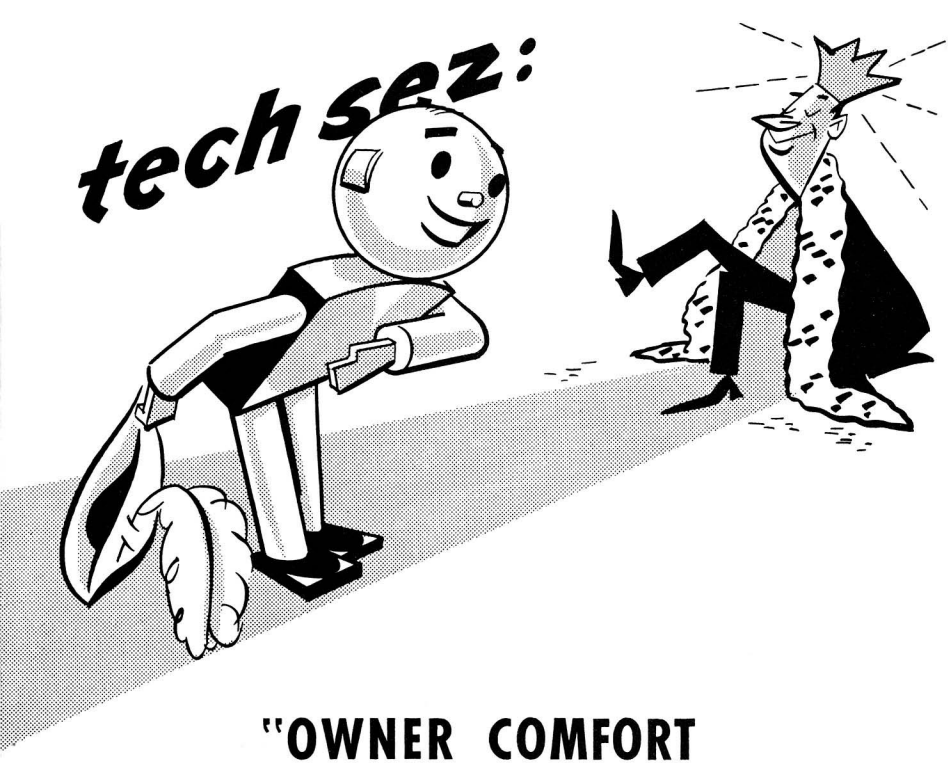


HEATER and DEFROSTER Service

SESSION NO.

SERVICE REFERENCE BOOK 106



"OWNER COMFORT IS STILL THE KING!"

Customers buy cars for a lot of reasons – comfort, convenience, style, performance, economy, safety. But, sooner or later, just about all of them realize that *comfort* is a number-one item in driving satisfaction.

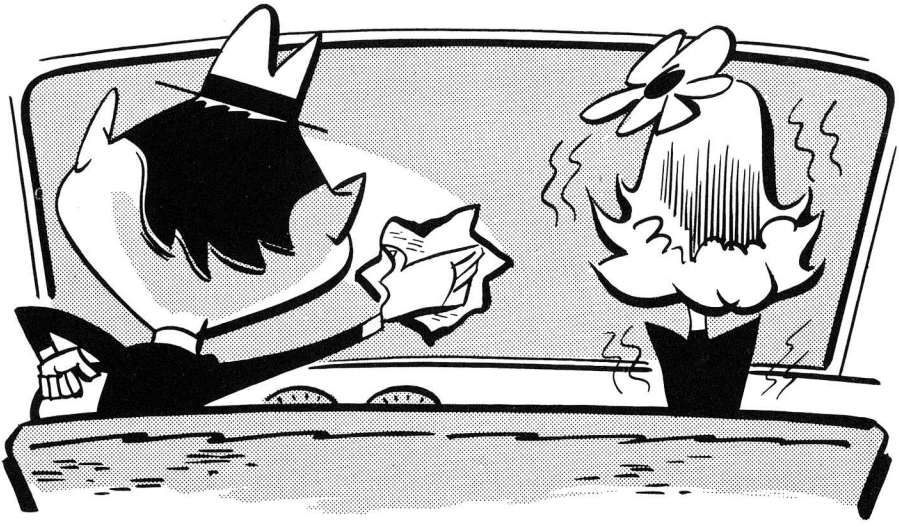
Anything that contributes to comfort, therefore, is mighty important to owners and to us. And that's why this reference book spells out service details on how to keep the heater on the ball. Nobody enjoys driving in the winter if the car's too cold.

And as far as the defroster's concerned . . . it's got to work right or the car won't be safe to drive. You can't get good visibility without good defrosting action. So, this book also tells you how defrosting can be improved whenever necessary.

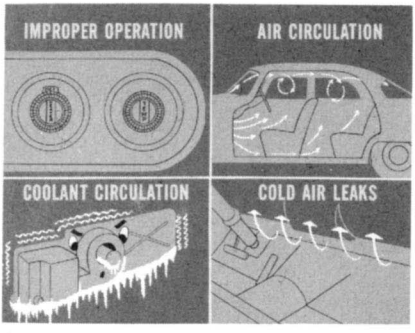
For your convenience, here's an index to service tips you can use on heaters and defrosters:

HEATER AND DEFROSTER CONDITIONS

Occasionally, a very damp or cold day might cause a windshield to steam up. If the owner has difficulty getting the defroster to work, or the heater fails to operate the way he believes it should, chances are he'll drop in to see you.



In any event, no technician ever needs to bite his nails or stew about heater and defroster service. It's fairly simple to take care of, and the conditions are easy to diagnose and correct. As a matter of fact, most cases of unsatisfactory operation can usually be traced to only *four main conditions.*



For example, there's *improper operation* of the controls on the part of the owner. Next, the *air circulation* might not be right. Third, *coolant temperature* and coolant circulation might be a little off base. And, fourth—you might have to track down *cold-air leaks* or drafts.

Ordinarily, you won't find all these conditions present in any one car. However, you should be familiar with each one in case you ever have to check over a heater and defroster completely. Take the matter of control know-how, for instance.

How to Operate the Heater. Surprising as it sounds, a lot of owners don't know how to operate the controls to get the most out of the heater and defroster. In fact, you can often tell by the way an owner describes a heater condition whether or not he's operating the heater correctly.

Right there, then, is a good clue. It pays to let the owner talk. Let him describe, in his own words, the condition he wants to have corrected. That way, you'll get a better idea of what's wrong. Frequently, it can save you a lot of unnecessary work.

Now, as a reminder, remember that the heaters in our cars are designed to provide a wide range of temperature control and fresh-air volume. There are two fresh-air doors that you can open by means of conveniently located foot pedals.

As far as control settings go, here's a table that all owners are instructed to follow:

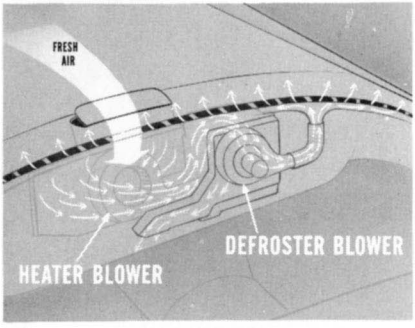
HOW TO SET YOUR CONDITIONAIRE SYSTEM

	Cowl Vent	Ventilator Doors	Temperature Control	Heater Blower	Defroster Blower (Custom Only)
WINTER.....	Open*	Closed*	As Required*	Full on**	As Required
WINTER— Severe Defrosting Conditions..	Open	Closed	Warmest	Full on	Full on
SUMMER—Dry.....	Open	Open	Coolest	Off	Off
SUMMER—Rain.....	Open	Closed	Coolest	Full on	As Required

*Place the temperature control in the warmest position during warm-up and then regulate to give the desired temperature after the car has warmed up. In extreme cold weather, the cowl vent can be closed and ventilator doors opened, to recirculate the air within the car.

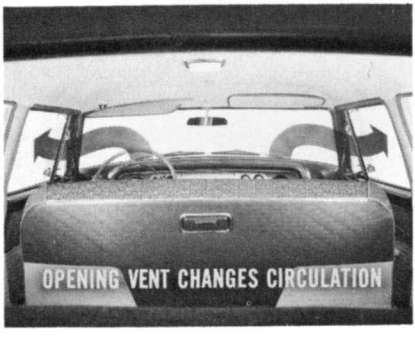
**It is very important that an adequate supply of outside air be drawn in to prevent windows fogging. In slow city driving, the heater blower should be on full. For highway driving, it usually can be turned to low or off. If windows begin to fog, turn the blower on full.

Points on Defroster Operation. Keep in mind that you get the best defrosting action when both the heater blower *and* the defroster blower are turned on. In case you thought the heater blower would take away some of the air from the defroster blower, well – it doesn't.



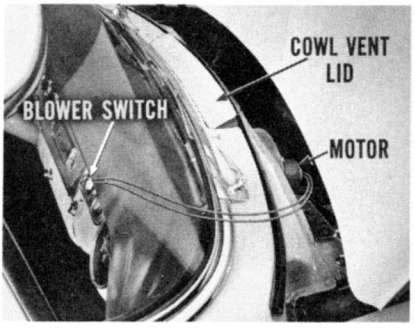
It used to at one time, but not with the type of heaters we're using now. Actually, the heater blower sort of rams the air at the defroster blower, and increases its output. This, incidentally, is a good point to explain to an owner who says his defroster isn't working well.

Another point you might wonder about is opening the front-door vent wings to help the defroster do its job. That may help when the car is cold. But, after the engine warms up, and the heater begins to put out some heat, opening the vent wings changes the air circulation. In this way it's more apt to *hinder,* rather than help the defrosting action. Not only that, opening the vent wings will often cool off passengers in the rear seat, instead of providing them with some heat.

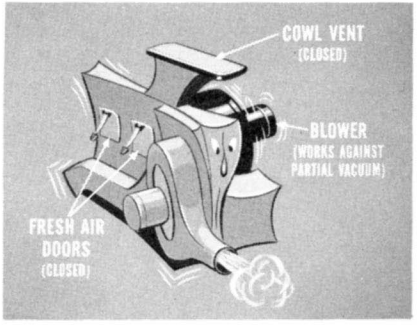


AIR CIRCULATION

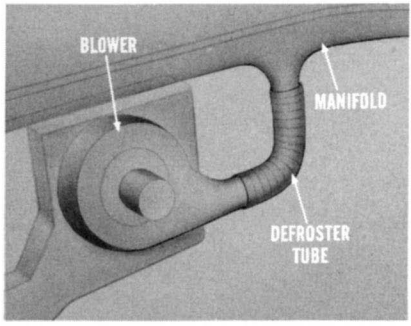
Air circulation inside the car is mighty important to proper heater and defroster operation. The blower, for instance, should work in *both high* and *low* positions. If blower speeds seem slow, check the blower-switch-to-motor circuit for electrical troubles. Also, remember to keep the cowl vent lid open whenever you do check blower speeds.



If the cowl vent lid and fresh-air doors are *closed,* the blower works against a *partial vacuum* without moving any air. There's no air circulation with the cowl vent lid closed.



After checking the heater blower in high and low positions, check the *defroster blower* in both *high and low positions.* Again . . . keep the cowl vent lid open. If the defroster blower speed is slow, check the circuit.



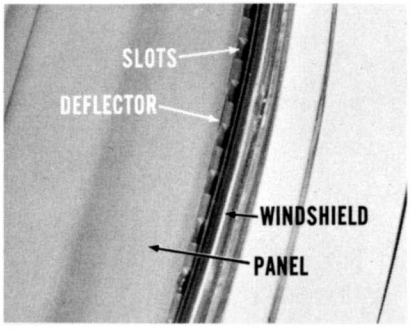
And even if the motor speeds are okay, you might find a defroster still doesn't deliver enough heated air to the windshield. In this case, look for *leaks*. Check defroster tube connections to the blower and to the defroster manifold. Make sure the manifold seams don't leak.

Speaking of leaks, even a tiny one in the heater core can cause heavy windshield fogging. And, if a *glycol* antifreeze is used, an oily film will form on the glass.

You can check for a condition of that type by turning heater controls off. Close the cowl vent lid. Wipe the windshield dry and clear. Park outside where the glass will get cold. Let the engine idle so the coolant will stay warm.

After about five minutes, open the cowl vent lid, turn on the heater and defroster blowers. Turn the temperature control on high. If the windshield fogs up quickly, you've got a core leak to correct.

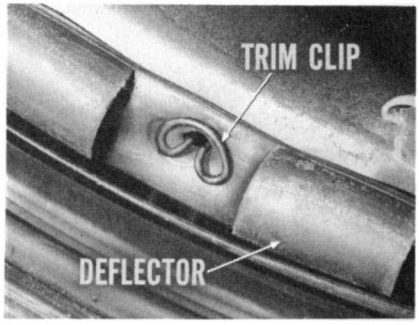
Another item that can affect defrosting is the position of the deflector. That's the rubber strip that distributes the defroster air across the windshield. It's between the windshield and front edge of the instrument panel. It won't direct air through the slots unless the panel is properly positioned so the deflector fits tightly between the windshield and the instrument panel.



A deflector that has dropped out of place, partially restricts air flow along parts of the glass, causing an uneven defrosting pattern. Besides that, if there are gaps between the deflector and panel, defroster air escapes. Heated air isn't directed against the windshield.

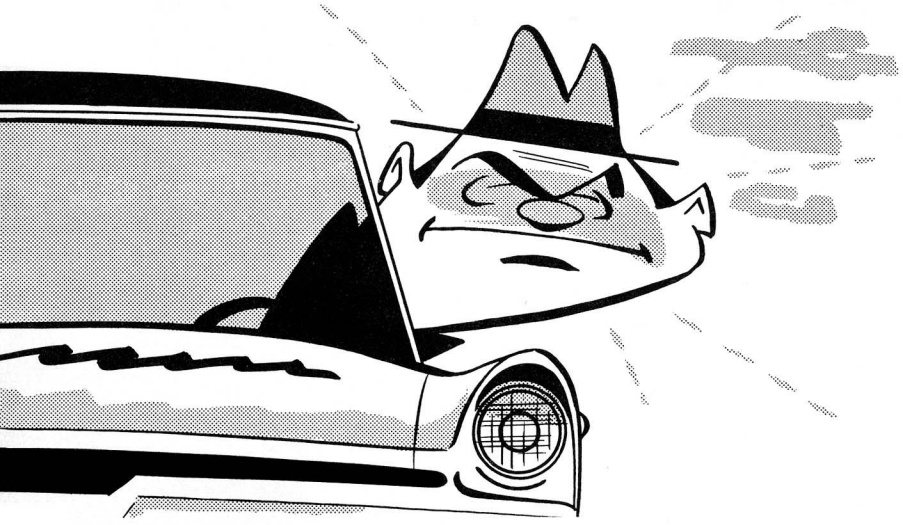
You can correct a deflector condition by loosening the panel attaching bolts. Push the panel forward so it contacts the rubber deflector along its entire length. Then retighten the bolts.

Sometimes a deflector gets out of place when the windshield glass is replaced. Occasionally, on some of the '55 models, the deflector attaching nibs may be broken off. If that ever happens, remove the windshield and loosen the instrument panel so you can position the deflector properly. You can use trim clips to replace any broken nibs, to help retain the deflector.



Defroster Deflector—1955 and 1956 Dodge—These models use a special metal deflector to direct defroster air over the windshield. This deflector must also contact the weatherstrip tightly along its entire length. If the deflector is warped, you can bend it back into place easily without removing it from the car. Just remove the windshield side and lower garnish moldings. Then, to move the deflector *toward* the weatherstrip, bend the attaching tabs *forward* until the deflector contacts the windshield weatherstrip.

Directly above the defroster blower is an unrestricted opening about 5″ long between the deflector and weatherstrip. Bend the top edge of the deflector at this point until it's about ⅛″ away from the weatherstrip.



If the two defroster air slots at each end of the upper cowl bar are open, cover them with a length of 2″ adhesive tape of good quality. Also, inspect the ends of the deflector at each side of the windshield. If there are openings between the deflector and weatherstrip at these points, seal them in with body sealer.

Finally, install the windshield lower and side garnish moldings. The lower garnish must fit *behind* the deflector. If it is installed over the deflector, the metal deflector will be pulled away from the windshield weatherstrip or the deflector openings will be covered.

Defroster Deflector—1955 and 1956 De Soto. To service the special metal deflector on these models, you'll have to remove the upper instrument panel. Remove all inside garnish moldings at the windshield. Disconnect the electric clock if the car is so equipped. Remove the screws attaching the upper to the lower instrument panel. The screws are usually hidden, as they're under the panel upper molding.

Pull the upper instrument panel back until the clips, located under the panel front edge, have pulled out from under the deflector. Then, lift out the upper instrument panel.

Remove both right and left end sections of the deflector. To remove the defroster attaching clips, pry apart the lugs and lift them out. Use a 2″ adhesive tape to cover the end slot on the left side of the upper cowl bar and 1½ slots at the end of the right side. If the deflector doesn't contact the weatherstrip, use a blunt drift and tap it lightly with a hammer to move it forward.

Right above the defroster blower, the deflector should bend forward to within ⅛″ of the weatherstrip so there's an unrestricted opening about 5″ long. Finally, install the upper instrument panel and the moldings and the garnish moldings.

Defroster Deflector—1955 and 1956 Chrysler. This deflector is similar to that on De Soto models, but removal procedure differs on both early and late 1955 and 1956 Chrysler cars.

Upper Instrument Panel Removal—Late 1955 and all 1956 Chrysler Models. Remove the side garnish moldings. Remove the cross-head screw at each end of the instrument upper panel. Heads of these screws will pull through the panel trim and padding, but can be located by inserting a short screwdriver in the trim hole—midway between the two garnish molding attaching screws.

Raise the rear edge of the upper instrument panel slightly, then pull the panel back until the clips at the front edge of the panel disengage from the deflector. Lift out the upper instrument panel. Seal the end slots as you did on the De Soto and make sure there's the same 5″ unrestricted opening above the defroster blower. Reinstall the panel as you did on the De Soto.

Upper Instrument Panel Removal—Early 1955 Chrysler Models. On these models, too little clearance between the instrument panel ends and "A" posts prevented removing the panel from inside. Peel back the panel padding and cover at each end. Then, trim off enough metal from the end of the panel to permit removal. Later, you can install the late 1955-type garnish moldings to cover the trimmed section.

NOTE: On all Chryslers, make sure the instrument-panel crash pad is securely cemented to the panel along the entire length of the forward edge. If this covering is loose, it can obstruct defroster air flow and cause poor defrosting.

COOLANT TEMPERATURE AND CIRCULATION

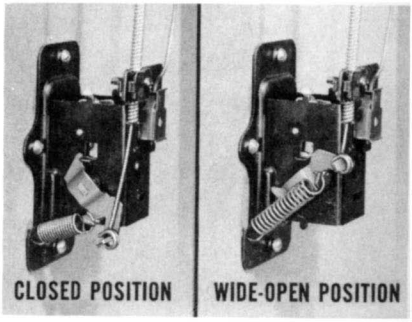
Here's a quick way to check coolant temperature. Just warm up the engine until the thermostat opens. If you can hold your hand on the top tank of the radiator, the coolant isn't getting hot enough. So, you'd better test the thermostat.

Checking circulation can be done easily and quickly, too. Just feel the two hoses at the heater core. If one is hot and the other is cold, there's poor circulation. In a case like this, you'd first check for kinked hoses that are cutting off circulation. Next, you'd check the operation of the temperature control valve. Maybe it doesn't open

fully. In addition, don't forget that there just might be an air lock in the heater core. Also, the water pump might not be doing its job.

CHECKING THE TEMPERATURE CONTROL VALVE

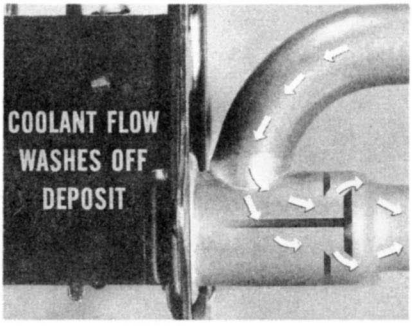
To check this control valve, first see if the control cable moves the valve lever from closed to wide-open position. If not, adjust travel of the control cable.



Usually, the thermostat part of the temperature control valve does not cause any reduction in heating. But, it's so easy to check, you might as well check it next.

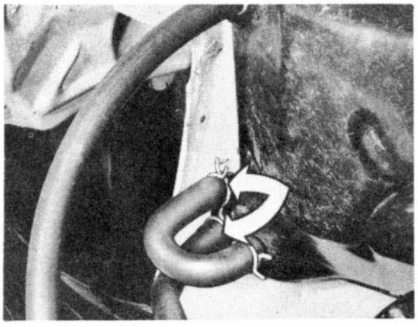
All you have to do is turn the temperature control on "high", which fully opens the control valve. Use your thumb and try to move the spring-loaded lever, at the top of the assembly *forward about ¼".* If it *does move forward,* and snaps back when you release it, it's probably okay. If it doesn't, then it's binding somewhere, and you'll have to free it up.

Every now and then you might hear of a case where the heater doesn't shut off. Naturally, if that happens during the summer, an owner won't be happy. Usually, the cause is dirt or scale particles sticking under the valve and preventing it from seating tightly.



Cleaning away the dirt or particles, however, is really simple. Just turn the temperature control on "high". Then, race the engine several times to speed up coolant flow through the valve. That washes off the deposit—and swish! The valve will then seat tightly.

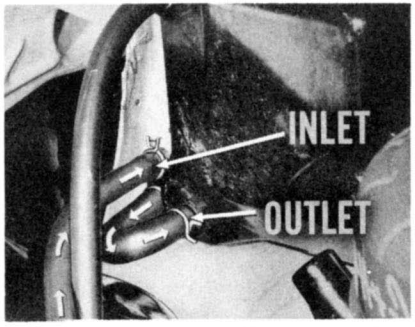
"Buzz" in Heater at High Speed. An owner might report that he hears a "buzz" from the heater when he is driving at speeds of 55 m.p.h. and above.



Generally, the cause of the "buzz" *lies in reversed hose connections* at the temperature control valve. This causes the coolant to flow through in the wrong direction.

To check for a case like that, just turn the temperature control to "full *on*" or "full *off*" position. If the noise stops with the control turned to either extreme position, the hoses are probably reversed.

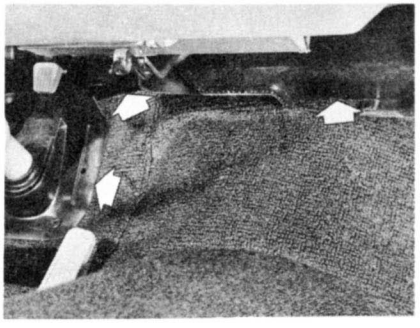
Getting the hoses hooked up right is easy. Just remember that hot water flowing *from the engine* should go to the *upper* pipe of the temperature control valve. This is the pipe curved like an elbow, and is the control-valve *inlet*. Once you get that right, you can't miss. The hose from the lower pipe (a straight section) is the *outlet,* and goes to the *bottom* of the heater core.



One exception to the hose locations, by the way, is found on the Imperial. On Imperial models, the valve is upside down. In other words, the elbow-shaped pipe is the *lower* one. However, that is still the *inlet* connection. So connect the hoses accordingly.

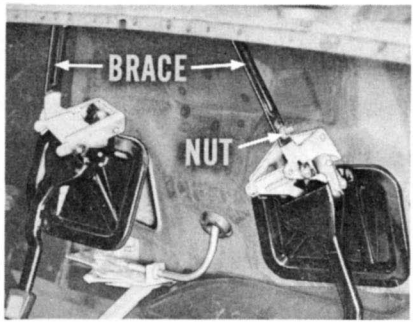
Checking for Cold-Air Leaks. Cold-air leaks don't show up often. When they do, though, heating the car would be like trying to warm it up with all the windows open.

So, it pays to check for leaks at the cowl panel, at the base of the steering column, and in the front compartment floor. Check the covering on the floor to be sure it's in place. Doors, and windows, too, should close tight and make a good seal.

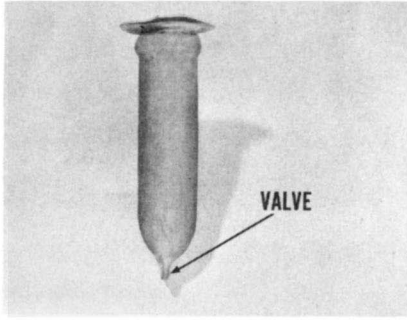


Another area to inspect closely is around both fresh-air doors. Take a shipping tag and close the door on it to see if it closes up snugly enough. If the seal grips the tag firmly, the seal's in good shape.

How to Adjust Fresh-Air Doors. Now, if the fresh-air doors are not closing or sealing properly, adjust them. Here's the way to do it. First, open the fresh air door and loosen the retaining nuts that hold the bracket to the cowl panel. Next, loosen the hinge strap brace nut so you can adjust the length of the strap bracket. Push down on the hinge bracket with the door closed, and tighten the strap brace nut. Open the door and tighten the bracket retaining nuts.



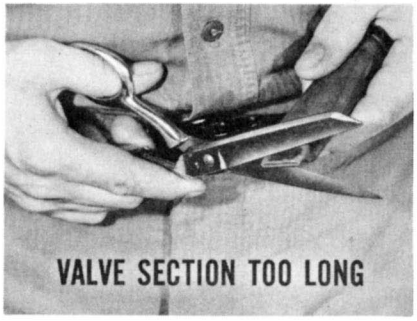
Once you have the doors adjusted, check them again with the shipping tag, to make sure they seal tightly, and lock in place when closed.



Water Leaks at Fresh-Air Doors. Occasionally, rain that enters the cowl ventilator might collect in the heater housing instead of draining as it should. This can happen if the valve in the rubber drain hose doesn't open properly. This valve is designed to open from the weight of the water that collects in the hose. If this valve

didn't open at all, the water level might get high enough and leak out the fresh-air doors in the cowl panel. Or, it might even get past the grommet around the cowl vent operating rod.

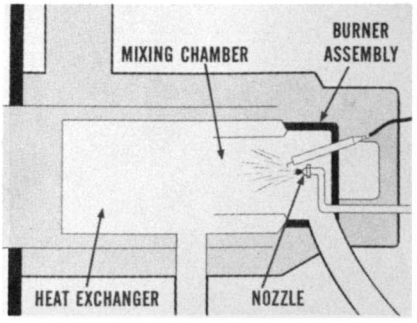
To correct a condition of this kind, you'll have to get the valve working again, if it happens to be stuck. Sometimes you can do that by just squeezing it from the bottom. And, if the valve section is too long and the valve tends to stick closed, use scissors to cut off about half the section. Usually, once you get the valve open and working, it won't stick closed again.

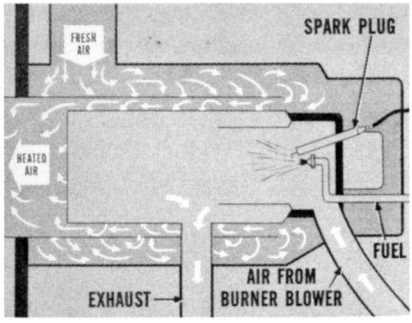


INSTANT-HEAT GASOLINE HEATER

This new type of gasoline heater uses the same controls, and defroster and heater blowers that hot water heaters use. All that differs is the method of producing the heat.

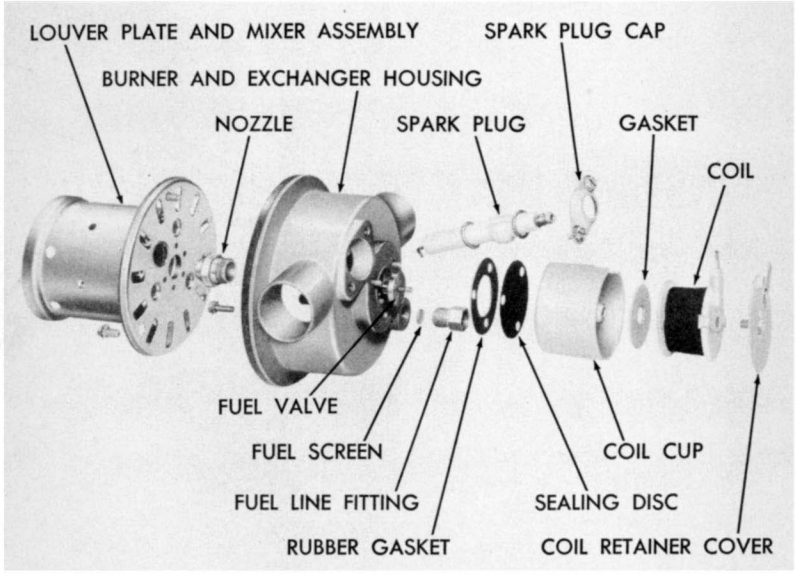
When you look at this new heater, one section at a time, it becomes fairly easy to understand. There's a heat exchanger, and a burner assembly. The burner assembly has a nozzle that atomizes the fuel in a mixing chamber.





Air and fuel are mixed in the chamber. A spark plug fires the mixture. The heater blower pushes fresh air through a space between the exchanger and a two-piece case, or housing, and on into the car.

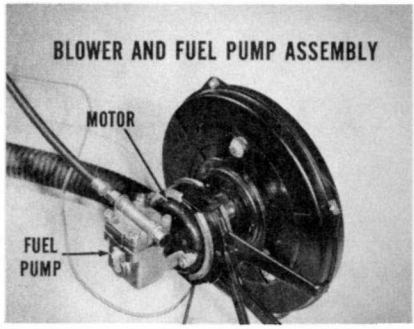
As long as there is the right amount of air, fuel, and a good spark at the plug, the Instant-Heat heater will do a good, fast job.



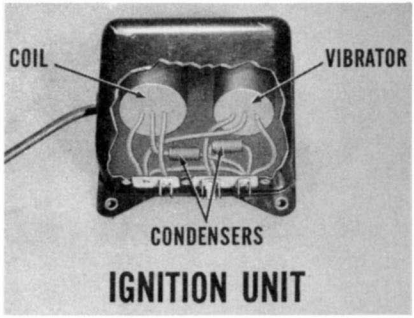
First thing to check is whether or not the rubber connection between the heater blower and heater housing is clamped properly, so it won't leak.

Quite often, when an owner reports not enough heat from the gasoline heater, the trouble's something simple. For example, it might be a blown fuse, a plugged nozzle, a dirty spark plug, or something equally easy to find.

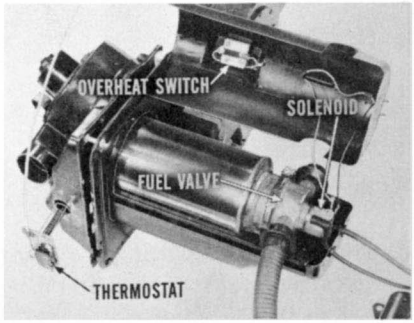
And construction itself is very simple. The blower and fuel pump, for instance, are combined into one assembly, driven by an electric motor.

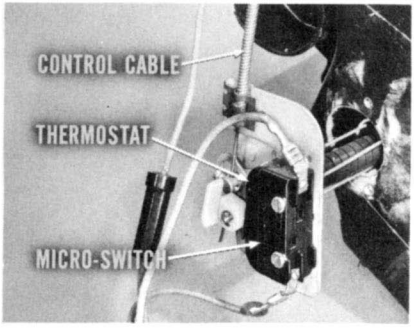


The ignition unit has a coil . . . two condensers . . . and a vibrator. It provides high-tension current for the spark plug. This ignition unit is sealed and should always be serviced as a complete assembly.

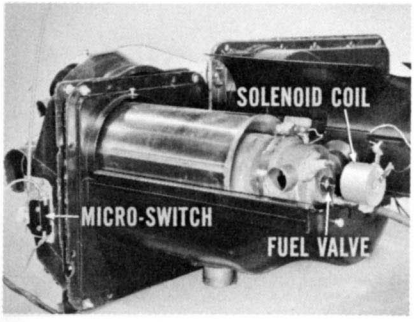


There are also three control units; a heater thermostat . . . an overheat switch . . . and a fuel valve that is operated by a solenoid.

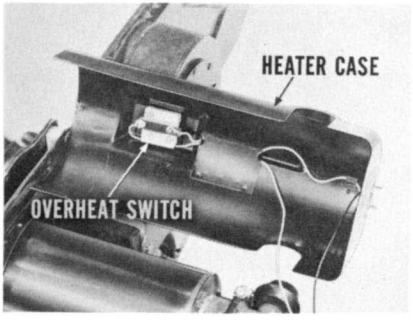




Now, the control cable adjusts the thermostat setting. The thermostat regulates heater output by opening and closing a micro-switch.



The fuel valve regulates fuel flow to the nozzle. It's operated by a solenoid coil. Solenoid action is controlled by the micro-switch in the thermostat.



An overheat switch in the heater case will automatically open the solenoid circuit. This will shut off the fuel if the burner ever overheats.

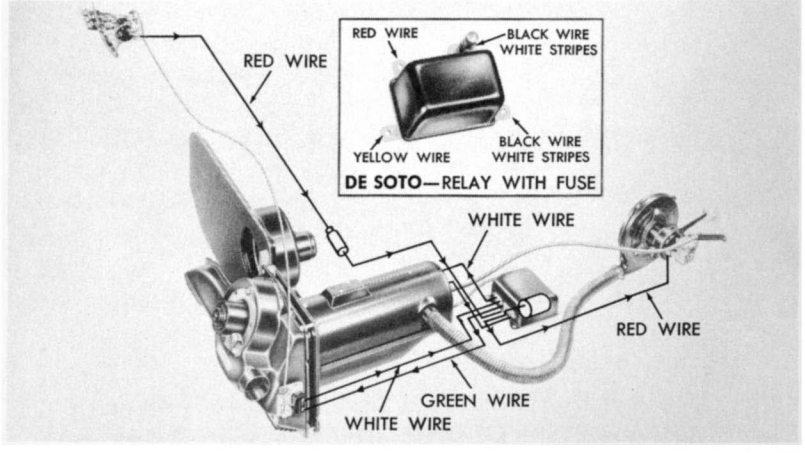
Checking this heater, like any other, will always depend on the owner's report. If he says there's not enough heat to keep him warm, you'll be wise to cover all the bases.

Experience with this new type heater shows that ignition seldom causes any trouble. On the other hand, an electrical check is the easiest one to make.

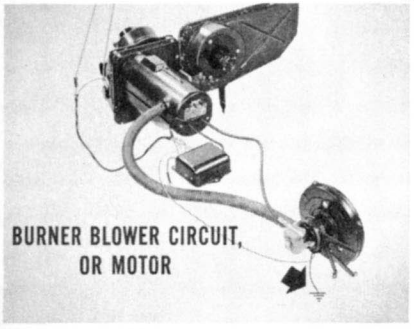
Checking the Electrical Circuits. Look for loose wires, poor grounds, and poor connections first. Every major unit, remember, depends on a good electrical circuit. So, inspect all connections and the fuse, to begin with. What's more, no disassembly is involved.

NOTE: On De Soto cars equipped with this type heater, the electrical system is operated through a special relay. The fuse is located at the "Battery" terminal of this relay. So, on De Sotos, check the following relay wires and connections:

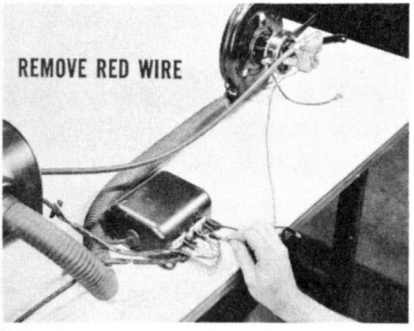
1. BAT—Battery terminal, black wire with white stripe leads to battery.
2. SOL —Solenoid terminal, red wire leads to center terminal of ignition unit.
3. IGN —Ignition terminal, yellow wire leads to the heater switch.
4. TH —Ground terminal, black wire leads to ground.



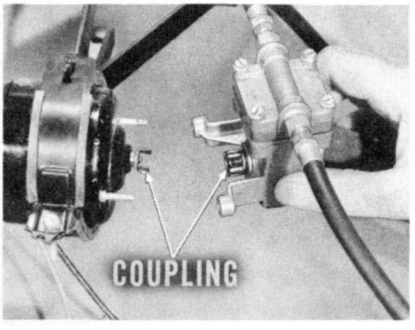
After making preliminary electrical checks, look for combustion air leaks that might upset the fuel-air ratio. For one thing, check hose connections at the blower and the heater housing. Turn the heater blower and ignition switch on. But don't start the engine. Both the heater and burner blowers should operate.



If the heater blower runs, but the burner blower doesn't, the trouble's in the burner blower circuit—or in the motor itself. Make sure there's a good ground connection for the *black* wire leading from the burner blower motor.

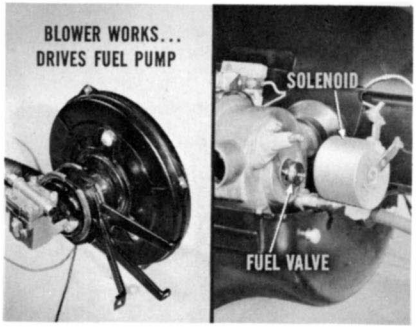


Next, follow the *red* wire back to its connection at the ignition unit. Remove the red wire and hook it to a good *hot* terminal. If the blower operates, you'll find the trouble in the circuit.

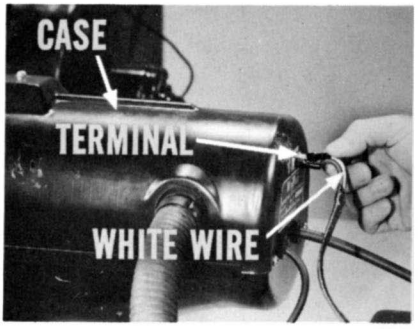


A possible cause of slow blower operation is a *bind* in the fuel pump. So, uncouple the pump. If the blower speeds up, the pump *is* binding.

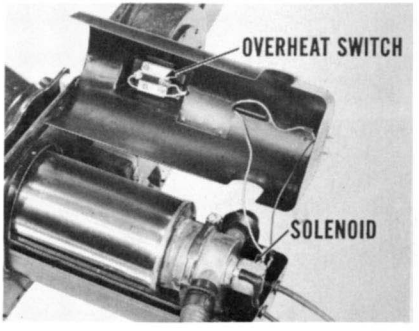
If the blower works and drives the fuel pump, you're all right up to there. But, unless the solenoid fuel valve works, the nozzle won't get enough gas to burn. Here's how you'd go about checking fuel-valve operation.



Remove the *white* wire from its terminal at the front of the heater case. Put the temperature control on "high". Hold your ear close to the case, and touch the wire to its terminal. You should hear the valve "click!" as it opens. *Incidentally, don't let that white wire touch the case, or you'll cause a short!*

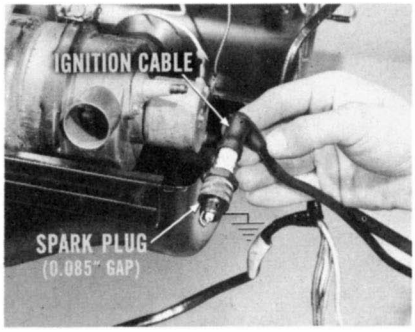


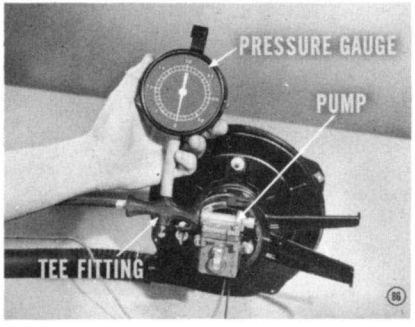
If you do hear the "click", that means that the solenoid coil is okay. If you *don't* hear the "click", check the overheat switch. It's wired *in series* with the solenoid and may need replacement. If the switch, however, is good, the solenoid coil itself may need replacing.



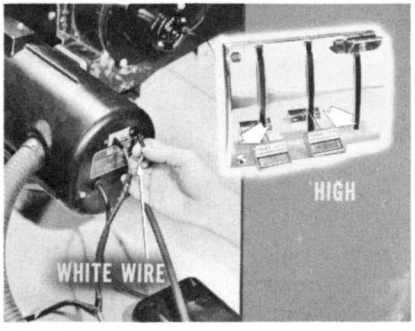
In case both the overheat switch and solenoid coil are okay, then there's either *low fuel pressure,* a *plugged nozzle,* or *poor ignition.*

Ignition is easier to check, so it pays to do it first. Turn the ignition off, and unhook the *red* wire from the terminal at the heater ignition unit to cut off the pump and blower. Lift the heater case cover and pull the ignition cable off the spark plug. Connect the cable to an ordinary spark plug, with the gap set at .085″. Ground the base of the plug, turn on the ignition, the thermostat control, and the burner blower. If the plug produces a continuous, hot spark, the ignition unit is all right.



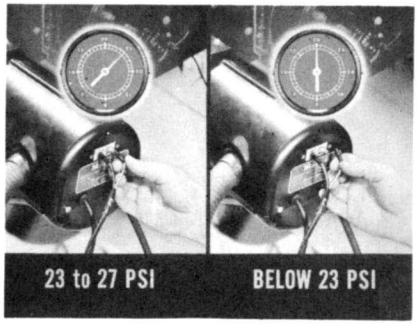


Checking Fuel Pump Pressure. After ignition, check fuel pump pressure. To do this, install a tee fitting and pressure gauge in the fuel line at the outlet side of the pump.



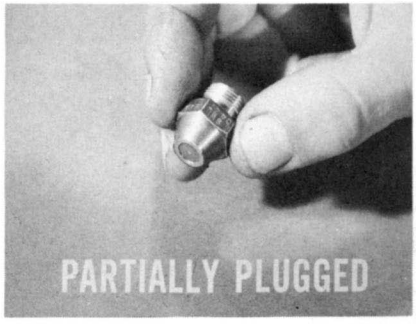
Disconnect the *white* wire from its terminal on the heater case to *close* the fuel valve. Start the engine. Set both temperature and heater controls to "high".

There should be 23 to 27 pounds per square inch pressure. Touch the *white* wire to its terminal to *open* the solenoid fuel valve. Pressure should drop *below* 23 pounds.



That pressure drop tells you that the pump's okay, the fuel line screen is open, and that the solenoid fuel valve is working. If the pump pressure doesn't drop, it means checking for a fuel line restriction, or a faulty solenoid coil.

If pressure drops—but only momentarily—and then builds up again, the nozzle is partially plugged and it should be replaced.

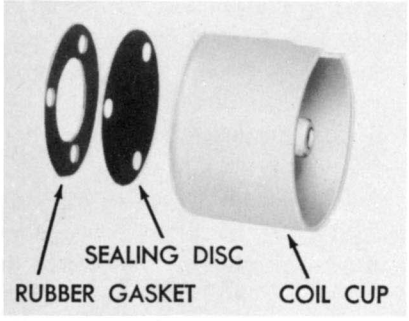


In case you do find low pump pressure, don't replace the pump until you check further. For example, check the pump mounting, its coupling, and check for an obstruction between the blower wheel and housing first. If these points are okay, then you can go ahead and replace the pump.

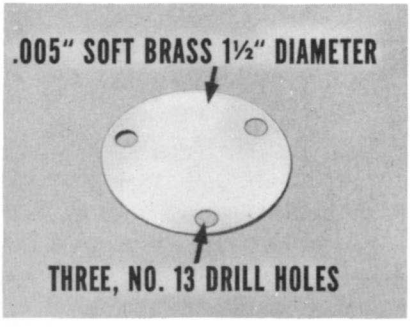
If, with a *new* pump, the pressures are still too low, then the trouble is in the electric motor. This, of course, calls for replacing the motor.

Checking Solenoid Fuel Valve. Now, if the gasoline heater detonates or "pops" shortly after it has been turned off, the most probable cause is a *leaking* solenoid fuel valve. Inspect the valve and seat for any sign of foreign material or damage. Clean the burner base assembly and make sure the valve seat is free from damage.

On current production cars, a sealing disc has been added between the burner base and solenoid cup assembly. If the solenoid cup is ever removed from the burner base, be sure the sealing disc is installed against the cup base. Also, see that the rubber gasket is installed against the burner base. If the sealing disc is installed between the burner base and rubber gasket, it may cause a leak or interfere with proper operation of the solenoid fuel valve.



On early production heaters without this disc, you can easily make one from 0.005″ thick, soft brass shim stock. Just use the rubber gasket as a template and cut a perfect disc 1½″ in diameter. Locate the three attaching screw holes and drill corresponding holes in the disc, using a #13 drill. Remove all burrs and install.



Intermittent Operation. Air bubbles in the fuel supply can sometimes cause intermittent heater operation and low heat output. To correct this, tighten the engine fuel pump cover and rocker arm housing screws. Also, make sure that the heater fuel take-off tee in the outlet of the engine fuel pump points downward. Start the engine and turn the heater on. Next, loosen the heater fuel line at the inlet to the heater fuel pump and bleed all air out of the line. Then, tighten the connection. Check all fittings very carefully for leaks, while the engine is running.

TIPS ON ASSEMBLY

When assembling the louver plate and mixer assembly to the burner and exchanger housing, keep this in mind. Position the clamp assembly so the crimped clamp edges grip both mating flanges all the way around, before you tighten the clamp screw. If the mating edges are not held together securely, an annoying resonant noise may develop in the heater. A loose or improperly positioned clamp will also let "burned gasoline" odors enter the car through the heater outlets.

When you install the white and black leads from the overheat switch to terminals on the solenoid at the end of the burner, connect the white lead to the terminal having a plastic base. Connect the black lead to the other terminal. The white lead is "hot". Reversing these leads will cause a dead short through the overheat switch.

SUMMARY

Remember, owners are intensely interested in a comfortable, cozy car. Nothing pleases them more than good heater and defroster performance. So, whenever a heater comes in for service, give it your very best attention. It's an effective way to keep that customer coming back to you for all of his other service needs.

RECORD YOUR ANSWERS TO THESE QUESTIONS ON QUESTIONNAIRE NO. 106

Once the engine's warm and the heater throws heat, opening vent wings will change air circulation and interfere with good defrosting action.

RIGHT **1** WRONG

Any leak in the heater core has no effect on windshield defrosting.

RIGHT **2** WRONG

Inadequate defrosting can usually be traced to a deflector out of position.

RIGHT **3** WRONG

If one hose at the heater core feels hot while the other feels cold, there's poor coolant circulation.

RIGHT **4** WRONG

Dirt or scale particles which stick under the temperature control valve have no effect on heater operation.

RIGHT **5** WRONG

A "buzz" in the heater at speeds above 55 m.p.h. is usually caused by reversed hose connections at the temperature control valve.

RIGHT **6** WRONG

On all models except the Imperial, hot water flowing from the engine should go to the upper, elbow-shaped pipe of the temperature control valve.

RIGHT **7** WRONG

Difficulty with a gasoline heater is often traced to a blown fuse, plugged nozzle, dirty spark plug, or something equally easy to find.

RIGHT **8** WRONG

The gasoline heater ignition unit, containing a coil, two condensers, and a vibrator, is sealed and serviced as a complete assembly.

RIGHT **9** WRONG

There should be 23 to 27 psi at the fuel pump when testing with both temperature and heater controls set on "high", and the white wire disconnected from the heater case.

RIGHT **10** WRONG

Litho in U.S.A.

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CHRYSLER CORPORATION
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