

LOW COST AIR CONDITIONING

BY KEN FERMOYLE

THE PROSPERITY of this country is reflected in the comforts we demand; its efficiency is reflected by the way those demands are met—and at increasingly lower prices.

There is no better recent example of this than air conditioning for automobiles. Only a few years ago such a luxury was almost unheard-of; attention was focused on such other accessories as power brakes, automatic transmissions, power steering and a variety of others. Now most of these are commonplace. They don't show up on every car but they're out of the novelty class.

Air conditioning, however, is still something quite new under the automotive sun, though indications are it will become as widely used and demanded as some of these other accessories. In 1953, production of auto air-conditioning units totaled 41,000. Last year the figure jumped to over 67,000. This year estimates are that from 150,000 to 200,000 or more will be sold. The first units were priced so high that they were out of reach of all but the best-heeled auto buyers. Prices are still high compared to other accessories but there are now several units tagged at under \$400.

This isn't cheap, but it's well under prices of original units. Understand, not all air-conditioning systems can be had for under \$400; in fact, most are still priced well above that figure. The significant thing is that prices have tended downward and will, no doubt, continue to do so.

The lowest-priced optional equipment air-conditioning system now being offered is that for American Motors' Rambler at \$345. Highest-priced is the Lincoln unit which goes for nearly \$750.

Between these are a variety of others being sold for a variety of prices. In addition to the systems being sold and installed by manufacturers or their dealers, several units are being built and sold by firms without official factory connections. They offer air-conditioning systems on the same basis that independent accessory manufacturers offer other accessories for a car.

One of the foremost of these independent manufacturers is the Novi Equipment Company, which manufactures a unit for many late model cars. The Novi unit

sells for \$395 installed. The company has systems for late models of Ford, Chevrolet, Buick, Oldsmobile, Lincoln, Mercury and Cadillac. Installations for Plymouth and several others were being studied by Novi engineers at press-time.

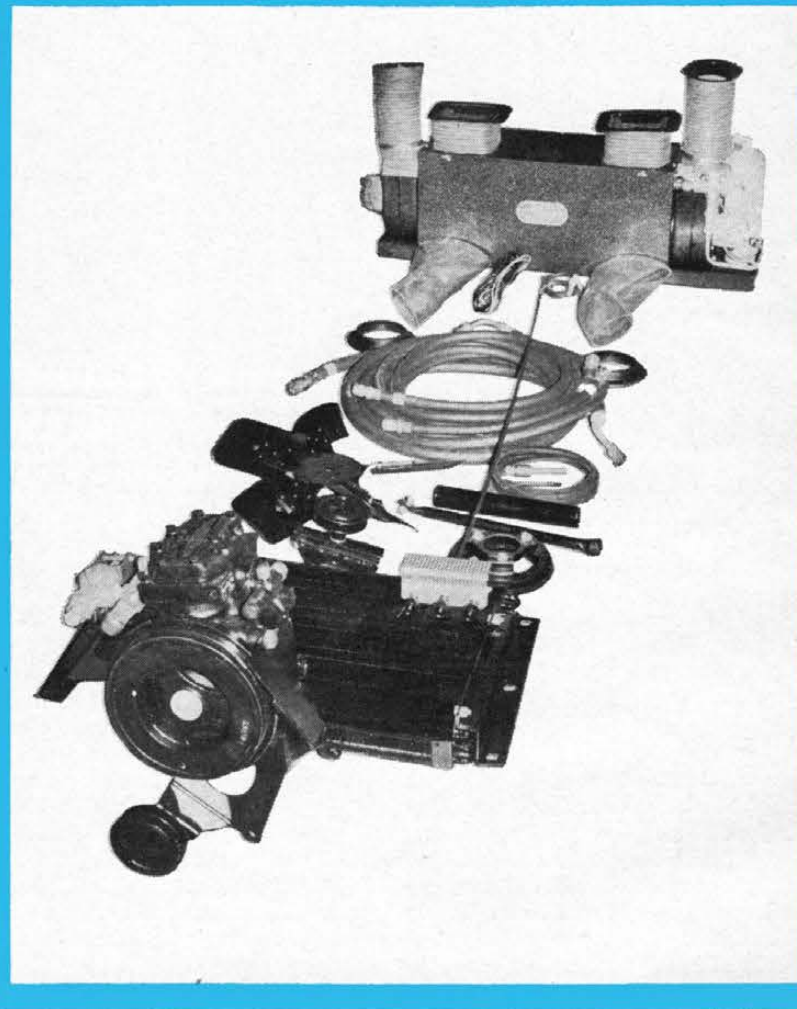
(Incidentally, the Novi firm is headed by Lou Welch, well-known to auto enthusiasts for his sponsorship of the fast but unfortunate Novi cars which have appeared annually at Indianapolis for a number of years.)

Although the refrigeration circuit on all automobile air-conditioning systems is basically the same, there are two different methods of mounting equipment in the car. Most of the earlier systems and

many in current production have part of the system in the front part of the car, part goes in the trunk. In some systems, all components are installed in the front portion of the car.

Before going into this, however, here is a brief explanation of how air-conditioning systems work:

A refrigerant—Freon 12 is universally used because it evaporates rapidly and completely at normal temperatures—enters a radiator-like container called an evaporator. The refrigerant is in a liquid state on entering the evaporator but due to decreased pressure and increased surface area it immediately evaporates. This draws heat from the air surrounding the



evaporator and this air is used to cool the passenger compartment.

Other vital links in the system include the compressor and condenser and the blower and duct system. The compressor pumps the refrigerant thru the refrigeration system and compresses the Freon after it leaves the evaporator so it may be condensed back to a liquid. The condenser is another radiator-like unit which is normally placed ahead of the car radiator. By passing the hot Freon gas under pressure into the condenser and subjecting it to a stream of cooler air, this heat is removed and the gas is changed back to a liquid. It's then ready to start its journey back to the evaporator and go thru the whole cycle again. The blower drives the cool air into the passenger compartment thru various types of duct-work, depending on what type of system is involved.

There are other steps and components involved in most auto air-conditioning systems but these are the basic and most important. There are detail differences between the various systems but they all work in the way outlined above.

As stated, the condenser is placed ahead of the radiator; the compressor, since it is driven directly off the engine in all current systems, is mounted in the engine compartment. In most systems, such as Lincoln, Novi, Cadillac, etc., the evaporator and blower assembly is in the trunk. In others, American Motors cars, Ford and Pontiac, for example, these components are mounted under the hood or under the dash in the passenger compartment. Each method has merit and a lot of supporters. For compactness, simplicity and economy, however, many experts feel the latter is preferable and will be used ultimately by all manufacturers.

The compressor, as mentioned, is driven by the engine; usually a belt is used to connect it to a pulley on the crankshaft. In most systems the compressor is operating all the time this belt is hooked up and the only way to shut it off is to remove the belt. In other units, notably American Motors' system, some sort of clutch arrangement is used so the com-

pressor is driven only when the unit is in use. Both methods have their backers.

Those who favor constant running claim this prevents interior parts and seals from drying up and causing leaks by keeping lubricants flowing. Opponents point out that extra fuel is used up in driving the compressor; some of the engine's power is used to run the compressor and this cuts performance, they say also. (Limited tests have shown that an air-conditioning system cuts gas mileage by as much as two mpg.)

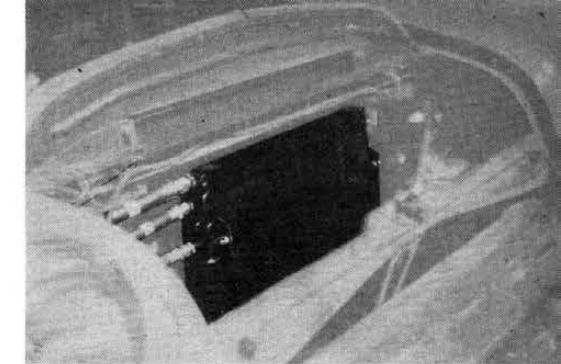
Many people wonder what service and maintenance problems are involved in automobile air conditioning. Actually, the only moving parts in these systems are the compressor and blower assembly. These components, then, are the ones which can be expected eventually to show wear; various systems have different methods of providing necessary lubrication to these parts.

The only problem you may have with the remainder of the system would be leakage, or perhaps minor difficulties with valves or controls. Air-conditioning men advise that it's a good idea to check all connections in the system regularly, or have it done, to insure that no leaks will develop.

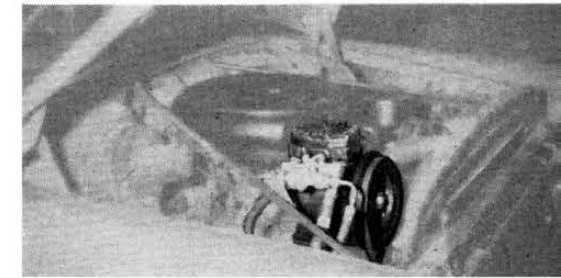
Remember that an auto air-conditioning system is basically the same as your home refrigerator and everyone knows what reliability it provides with little or no attention. Since an automobile unit is subjected to motion in the car and since power to operate it is supplied by the car's engine, which runs at varied speeds, this type of unit may require a little more attention and service than a home unit. Experts claim that buyers of air-conditioned cars should have no difficulty in this respect, however.

Another question often asked about automobile air conditioning is: "Is it safe?" The answer is a definite yes. Freon 12, the refrigerant used in all systems, is nonexplosive, nonflammable, noncorrosive and has practically no odor. The only thing you have to be careful about is handling it while in liquid form; it evaporates so quickly at normal tem-

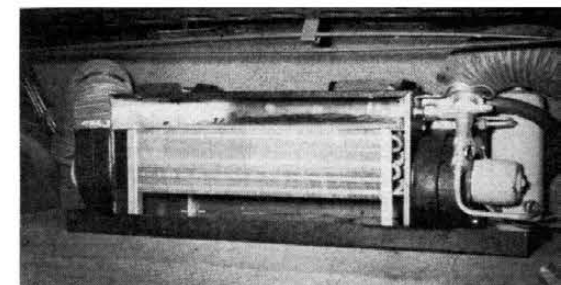
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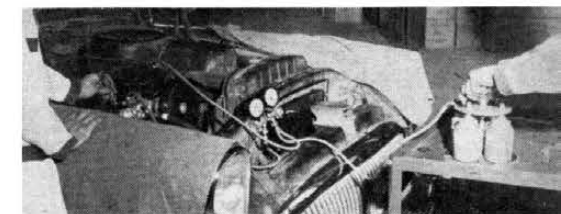
Condenser, as in most all air conditioning systems, is set up in conventional position in front of the stock radiator.



Shading highlights location of the compressor. The installation used as an illustration here is on a 1954 Buick V-8.

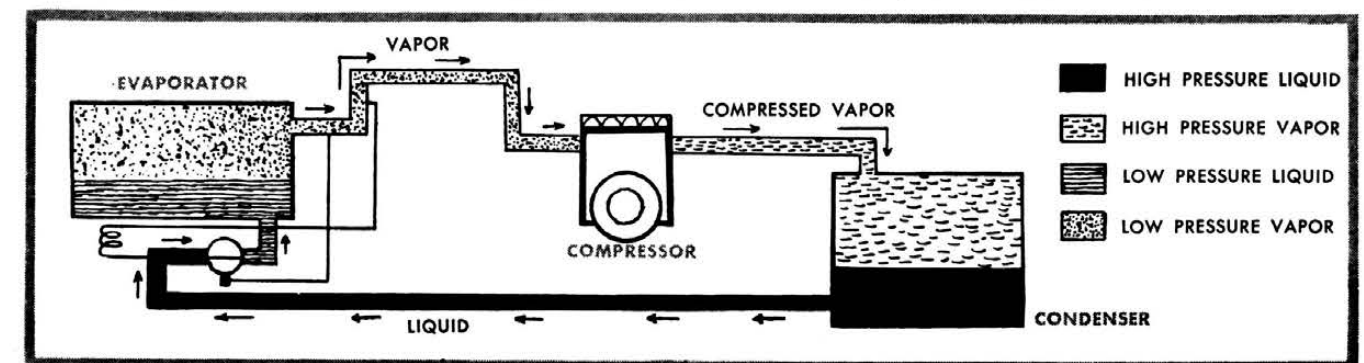


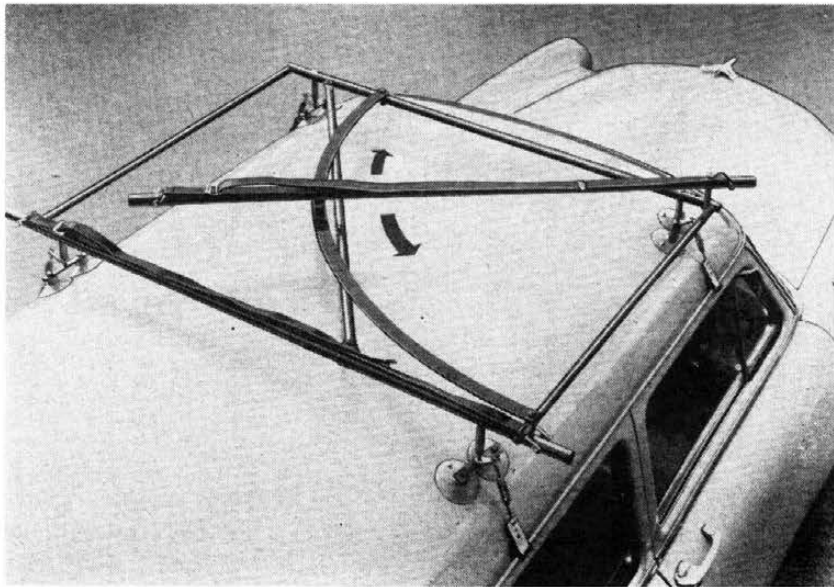
Evaporator and blower assembly are stowed on shelf in rear trunk. In this picture, the cover has been removed.



Unit is being charged with Freon, from the bottles standing on the table. Gages fixed to car show pressure readings.

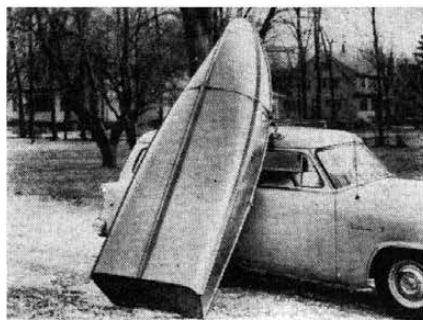
This, roughly, shows how an air conditioning system works, at least as far as layman needs to know. Arrows indicate flow.





Arrows point out direction of travel that loading bar takes as one person hoists boat to be carried to the top of the car. It takes most of the weight in lifting.

New One Man Car-Top Carrier



Steps in loading the boat with a carrier: top, craft is leaned against the traveling bar where it's lashed into place; center, one man lifts and swings boat easily; bottom, rear is then secured to carrier.

PRO-WELD COMPANY, Jackson, Michigan, announces a new car-top boat carrier that can be loaded or unloaded quickly by one person. The carrier features a travelling bar which swings through a 90° arc. To load a boat, ladder or other such cumbersome object, the travelling bar is first put in a position parallel to the side of the car. The boat is then leaned against the bar and strapped down. The loader then lifts the stern and walks around to the back of the car. The travelling bar carries the major portion of the weight as it swings through the quarter circle on a roller which rides a rail. All that remains is to fasten the stern strap tightly and you're ready to go.

The frame of the carrier is of welded all steel tubing construction and is supported on eight off-white suction cups to protect the painted surface. Felt-faced eave clips firmly anchor assembly to the drip moldings. Adjustments are provided so that the unit is easily installed on any auto with drip moldings.

According to the manufacturer, the carrier will handle boats with beams up to 60" and weighing as much as 175 pounds. "Once the load is securely fastened," said Mr. Philip Reynolds, President of the company, "the driver can travel as fast as he would otherwise. The boat or other object is held so rigidly that there is no swaying or vibration. In fact, you would never know it is there." •

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peratures that it will tend to freeze anything it comes in contact with. For this reason extreme care should be taken to prevent any Freon 12, in the liquid state, from getting on the skin or in the eyes.

Freon 12, incidentally, is not especially expensive. It costs from \$4 to \$6 or so for enough to fill a unit, depending on the size of the system and cost of the gas in that locality. It takes from about four to six and one-half pounds of Freon to fill the average system.

What does the future hold for automobile air conditioning? One of the foremost experts in the field, G. T. Etheridge, manager of automotive air conditioning, Kelvinator division of American Motors, discussed this in a recent talk before refrigeration engineers.

"We have the twin problems of lowering the price to the ultimate consumer and the ever-present problem of improving performance," he stated.

Etheridge also points out that equipment will have to be made more compact, controls simplified to eliminate unnecessary components and the cost of wiring and installation. He feels that systems should be set up so they will circulate either cool air in summer or warm air in winter. (The All-Season system used in American Motors products already does this, by the way. This means a big savings because it eliminates the extra expense of a heater.)

Etheridge predicts that "it will be only several years before automobile air-conditioner volume reaches the 1,000,000 per year sales rate." This indicates that he feels many of the problems mentioned above will be at least partially solved in that time and that prices will come down to a level which more buyers can afford. This is good news for car buyers, particularly in very hot climates where air conditioning is a real boon.

The market for automobile air conditioning is there, certainly. A survey covering the desires and habits of passenger car buyers taken last year revealed that 25 per cent of them would like to have air conditioning in their cars. This is only 12 per cent less than the number who want power steering and just slightly less than half the total who want automatic transmissions.

This is significant because the auto industry has always been alert to the desires of its customers and has made great efforts to meet and satisfy them. It is logical to assume that it will do so in the field of air conditioning, also.

Thus, it might not be too long before most of us will be spared the feeling of entering a Turkish bath when we get into our cars on a hot summer day. With the flick of a switch we will be able to reduce the temperature to a comfortable level, just as we now turn on our car heaters in the winter. •