

July 21, 1959

M. BENISCH

2,895,310

MOTOR-VEHICLE AIR-CONDITIONING SYSTEM

Filed Dec. 31, 1954

2 Sheets-Sheet 1

Fig. 1

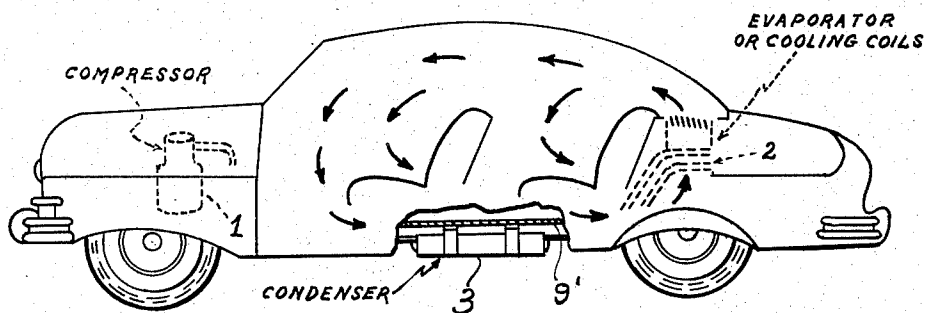


Fig. 2

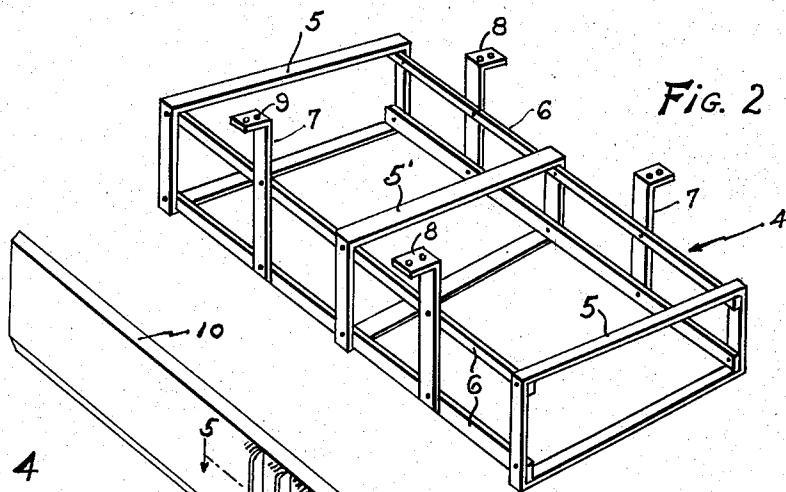


Fig. 4

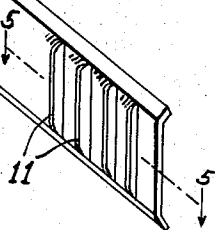


Fig. 3

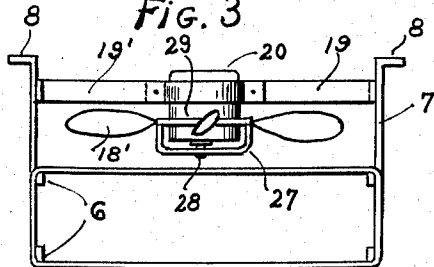
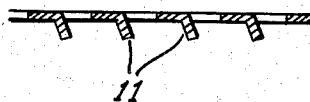


Fig. 5



INVENTOR
MORTIMER BENISCH
BY *David J. Bonetti*
his ATTORNEY

July 21, 1959

M. BENISCH

2,895,310

MOTOR-VEHICLE AIR-CONDITIONING SYSTEM

Filed Dec. 31, 1954

2 Sheets-Sheet 2

Fig. 6

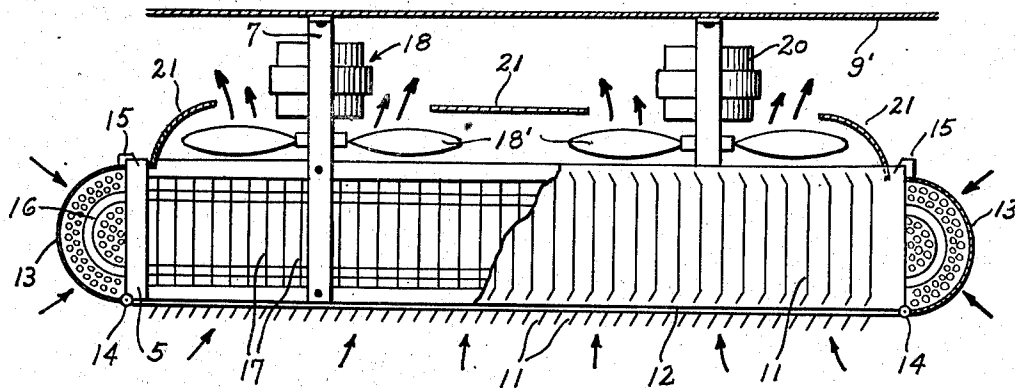


Fig. 7

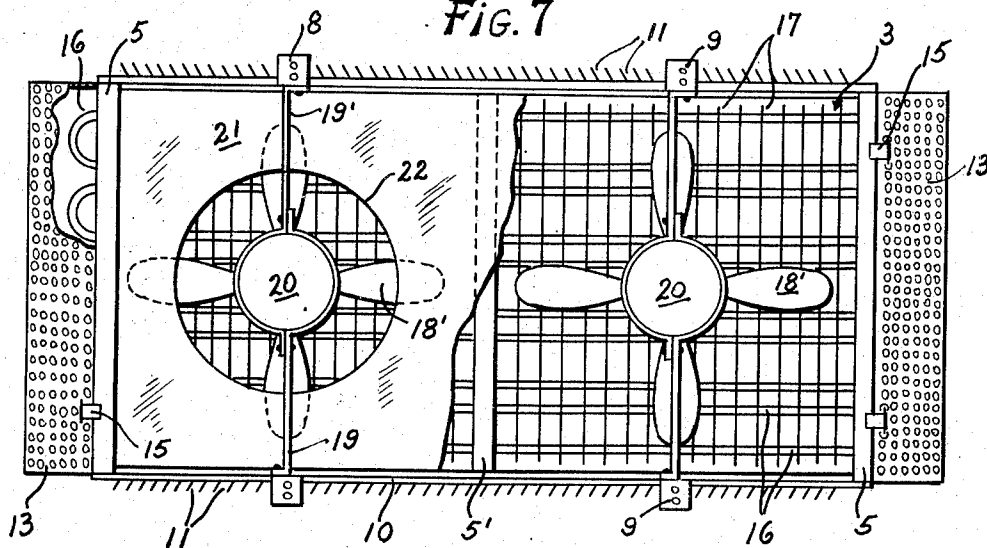


Fig. 8

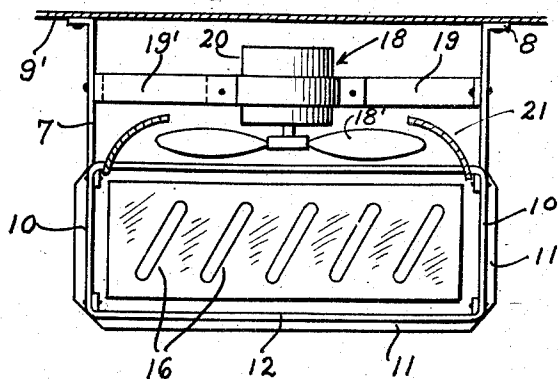
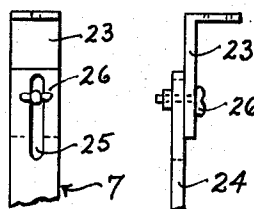


Fig. 9a

Fig. 9b



INVENTOR

MORTIMER BENISCH

BY

David S. Bonett
his ATTORNEY

1

2,895,310

MOTOR-VEHICLE AIR-CONDITIONING SYSTEM

Mortimer Benisch, Tucson, Ariz.

Application December 31, 1954, Serial No. 479,047

2 Claims. (Cl. 62—239)

The present invention relates to a motor-vehicle air-conditioning system, and more particularly to the novel installation of one of the components of such system, to wit: the condenser.

It has been my experience with presently known air-conditioning systems that they are inefficient, require a large amount of power for their operation, and interfere with the performance of the motor. In present systems, the condenser is disposed in front of the radiator, in back of the grill, where it obstructs the flow of air to the radiator causing inefficient cooling of the circulating water for the motor. Furthermore, the condenser which gives off a large amount of heat, due to the compressed refrigerant flowing through the coils thereof, tends to overheat the motor cooling system.

It is therefore an important object of my invention to locate the condenser underneath the vehicle where it will not interfere with the cooling system of the motor.

It is a further object of my invention to provide a framework which is adjustably suspended from the underside of the floorboard or chassis of the vehicle and which is provided with a compartment for housing the condenser, the compartment having side and bottom walls which are provided with louvers for forcing the flow of a cooling medium through the condenser.

Another object of the invention is to provide fan means above the condenser for exhausting the cooling medium forced through the condenser by way of the louvers in the walls of the framework.

I achieve the foregoing and such other objects as may hereinafter appear in the manner illustrated in the accompanying drawings in which:

Fig. 1 shows in diagrammatic fashion the installation of the air-conditioning system in a motor-vehicle according to the present invention,

Fig. 2 is a perspective view of the framework for housing the condenser underneath the vehicle,

Fig. 3 is end view of the framework, showing the location of one of the exhaust fans,

Fig. 4 is a perspective view of one of the louvered side members for the framework shown in Fig. 2,

Fig. 5 is an enlarged sectional view taken along the line 5—5 of Fig. 4,

Fig. 6 is side elevational view, partly broken away, of the condenser installation,

Figs. 7 and 8 are plan and end views, respectively, of Fig. 6, and

Figs. 9a and 9b are enlarged front and side views, respectively of the frame supporting arms showing the means for adjusting the clearance between the condenser and the ground underneath the motor vehicle.

Referring now more specifically to the drawings, there is shown in Fig. 1 a diagrammatic representation of a motor-vehicle air-conditioning system of the compressor-condenser-evaporator type. While I have shown the compressor 1 disposed underneath the hood of the vehicle and the evaporator 2 in the luggage compartment, it is not intended that I be limited to such locations. For

2

example, the compressor may also be located in the luggage compartment, and in some installations may even be disposed underneath the vehicle, in much the same fashion as the condenser, a description of which now follows.

The condenser 3 is housed in a rectangular-shaped framework indicated generally at 4 which comprises a pair of end rectangular-shaped members 5, 5 and a similarly shaped intermediate member 5'. Riveted on or otherwise suitably affixed to each of the members 5, 5 and 5' at the corners thereof are the longitudinal members 6. Affixed to a pair of longitudinal members 6 at each side of the framework, at points intermediate an end member 5 and the center member 5', are supporting arms 7 which are provided each at the upper end thereof with a lateral portion 8 having one or more holes 9 which are adapted to receive screws or bolts whereby the frame may be attached to or suspended from the floorboard or chassis 9' of the vehicle. The members constituting the framework just described may be made of iron stock having a thickness of about $\frac{3}{16}$ " and about $1\frac{1}{4}$ " wide. As to the framework itself, I have found that one having the dimensions 28" long, 10" wide and 3" high is satisfactory for accommodating suitable condensers which may be used in installations according to the present invention.

Suitably attached to the frame 4 at each side thereof is a plate 10 (Fig. 4) which is provided with vertically disposed louvers 11 distributed along its entire length, but shown only partly so in Fig. 4. A similar louvered plate 12 (Fig. 6) is affixed to the bottom of the frame. The louvers in the bottom and side members face in the same direction, towards the front of the vehicle, so that during motion of the vehicle the louvers will direct or scoop the air from the area surrounding the frame into the compartment enclosed by the two sides plates 10 and bottom plate 12.

A perforated hood 13 is provided at each end of the frame, being suitably pivoted at 14 and provided with latch means as at 15 for holding the hood in closed position.

The area of the framework 4 enclosed by the side plates 10, bottom plate 12 and the end hoods 13 constitutes in effect a compartment for housing the condenser which may be fixed in position therein by suitable means not shown.

The pivoted hoods 13 provide convenient means for slipping the condenser into the compartment in initial installations, or for removal of the condenser for effecting repairs thereof.

The condenser 3 is of conventional construction consisting of a plurality of coils 16 running lengthwise of the frame and a plurality of transverse fins 17 which support the condenser coils in suitable spaced apertures formed therein.

A pair of air-exhaust fans 18, 18 are disposed above the condenser with the fan blades 18' directly over the condenser for exhausting the air drawn through the condenser by way of the louvered plates 10, 12 and the end hoods 13. The fans may be supported from the supporting arms 7 by means of the straps 19, 19' encircling the fan motors 20, as shown. Although I have shown the use of motor driven fans, it will be understood that a flexible drive may be employed if so desired.

In order to protect the fan blades and to increase the suction created by the fans, I provide a shroud or hood 21 of light metal, such as aluminum or the like, disposed above the condenser as shown in Fig. 6. Suitable openings 22 are provided in the shroud above the fan blades through which the exhausted air is forced. The several arrows shown in Figs. 6 and 8 represent the direction of air flow from the area surrounding the condenser, through

the various louvres, the condenser itself, and through the apertures 22 of the protective shroud 21.

In order to enable proper installation in all makes of cars, where for example the floorboard may not be level, I provide means for adjusting the length of each supporting arm 7, such means comprising a sliding connection between the parts 23 and 24 shown in Figs. 9a and 9b with an elongated slot 25 in one of them and fastening means 26, which may take the form of a nut and bolt, for maintaining the length of the arm in adjusted position.

In those installations where the clearance between the floorboard or chassis of the car is sufficient, the fan means and its manner of support may be as shown in Figs. 6 and 8. However, in those cases where the clearance is limited and critical, a construction shown in Fig. 3 may be employed. In this instance, a cup-shaped spider 27 is affixed to the motor-shaft 28, and the fan blades 18' (four in number, but only two being shown) are attached to the upper ring member 29 which forms a part of the spider 27. By means of this construction the space required between the upper surface of the condenser and the floorboard for accommodating the motor and fan blades may be reduced considerably.

It will be clear from the above description that I have provided a more efficient air-conditioning system for vehicles. By placing the condenser under the car, I avoid completely the overheating problem of the motor. By thus increasing the efficiency of the condenser, the compressor could be made smaller, thereby lowering the cost of the units, and requiring less motive power to operate the compressor. Also, due to the efficiency of the frame assembly, there would be no need to run the fans when the car is running at constant speed. In other words, the fans would be used mostly for city driving, thereby removing any additional strain on the battery.

While I have illustrated and described a preferred form of construction, I do not wish to limit myself to the precise details of structure shown, but desire to avail myself of such variations and modifications as may come within the scope of the appended claims.

What I claim as new is:

1. In a motor-vehicle air-conditioning system of the compressor-condenser-evaporator type, a rectangular-shaped condenser, a framework constituting a housing

for the condenser, means for suspending the framework underneath the vehicle from the floorboard or chassis thereof, closure members for the sides and bottom of the framework provided with louvres which face in the same direction towards the front end of the vehicle, fan means carried by the framework above the condenser for drawing air from the area external to the condenser through the louvres of the closure members and through the condenser for cooling the same, and a shroud or hood disposed over the condenser for protecting the fan means and increasing the air exhaust, the framework suspending means being provided with positive adjusting means to thereby adjustably position the condenser with respect to the floorboard or chassis of the vehicle.

2. In a motor-vehicle air-conditioning system of the compressor-condenser-evaporator type, a rectangular-shaped condenser, a framework constituting a housing for the condenser, means for suspending the framework underneath the vehicle from the floorboard or chassis thereof, closure members for the sides and bottom of the framework provided with louvres which face in the same direction towards the front end of the vehicle, a perforated closure member at each end of the framework, at least one of said end closure members being hinged to permit ready access to the condenser within the framework for servicing thereof, fan means carried by the framework above the condenser for drawing air from the area external to the condenser through the louvres of the closure members and through the condenser for cooling the same, and a shroud or hood disposed over the condenser for protecting the fan means and increasing the air exhaust.

References Cited in the file of this patent

UNITED STATES PATENTS

591,316	Woods	Oct. 5, 1897
2,078,343	Replogle	Apr. 27, 1937
2,443,472	Mayo et al.	June 15, 1948
2,475,841	Jones	July 12, 1949
2,525,869	Corhanidis	Oct. 17, 1950
2,541,921	Henny	Feb. 13, 1951
2,576,549	Wagner et al.	Nov. 27, 1951
2,672,029	Saunders	Mar. 16, 1954