April 21, 1936. W. R. FOX 2,037,857

AUTOMOBILE HEATER

Filed Jan. 24, 1935 2 Sheets-Sheet 1

Fig. 1.

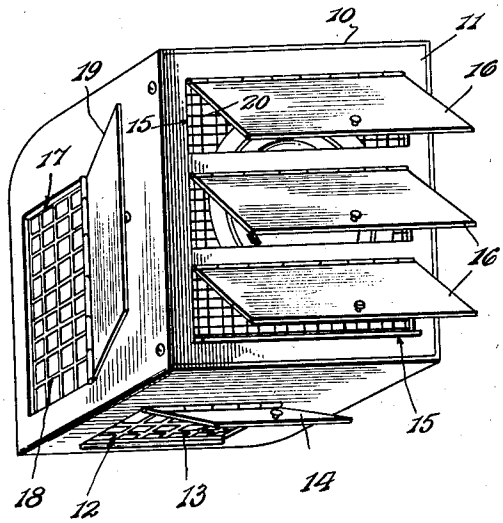



Fig. 4.

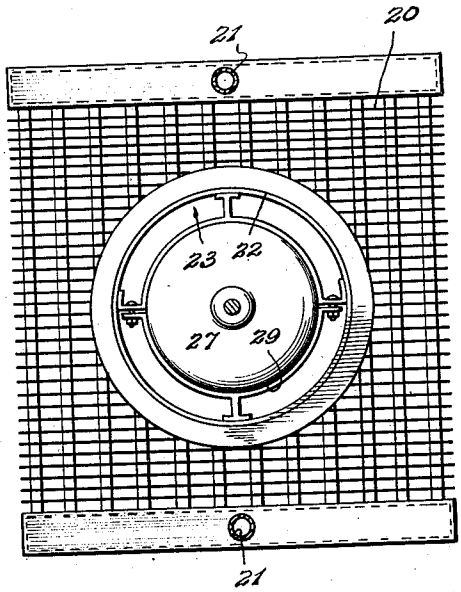
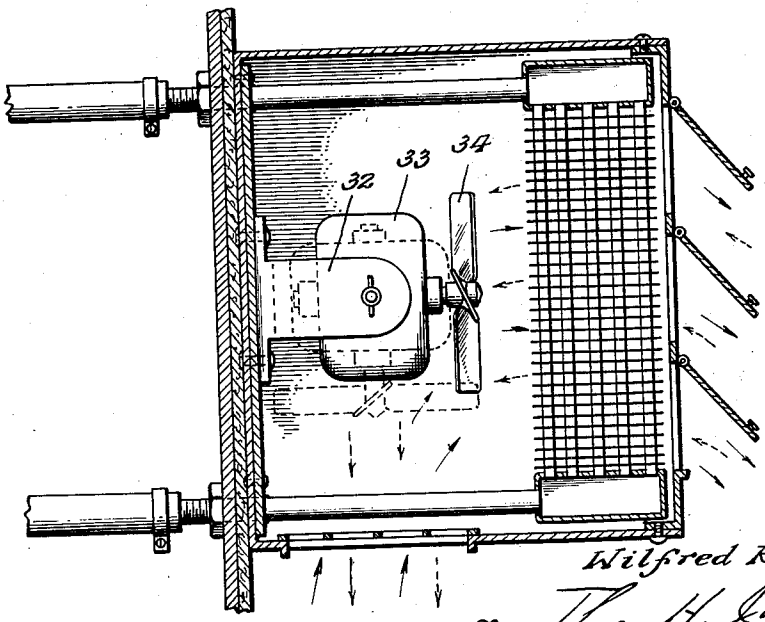



Fig. 5.




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Filed Jan. 24, 1935 2 Sheets-Sheet 2

Fig. 2.

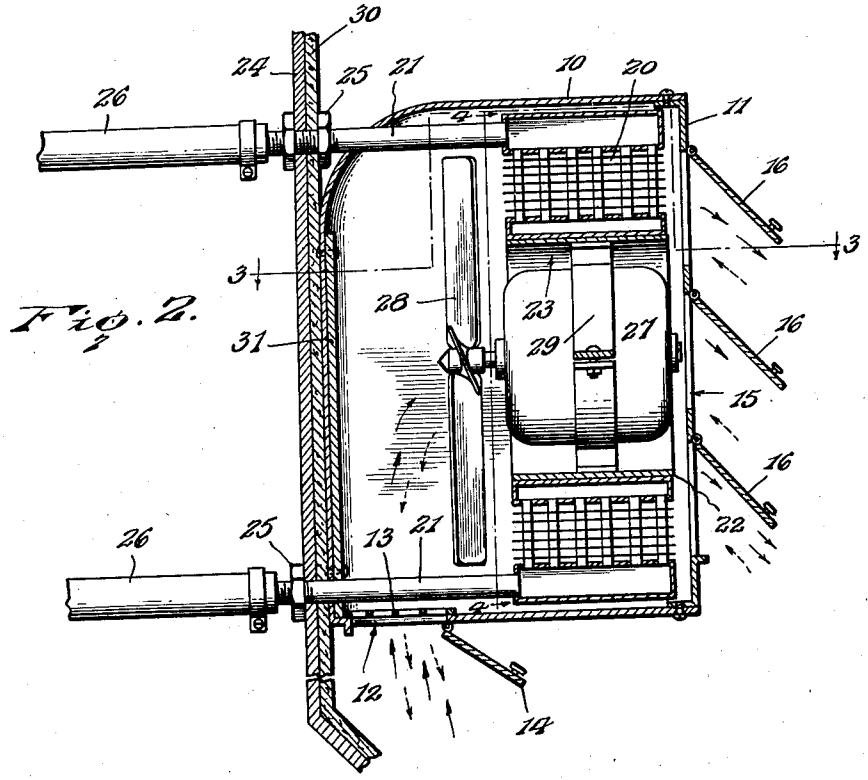
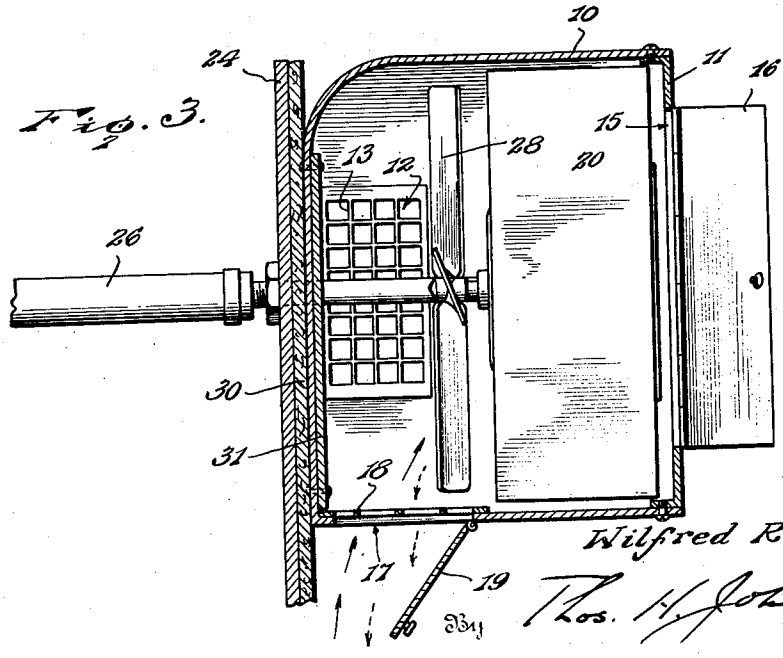



Fig. 3.




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## AUTOMOBILE HEATER

Wilfred R. Fox, Flint, Mich.

Application January 24, 1935, Serial No. 3,330

3 Claims. (Cl. 98—40)

This invention relates to an improved automobile heater of the type embodying a motor driven fan for setting up air currents through the heater and seeks, as one of its principal objects, to provide a heater wherein the flow of heated air currents may be interchangeably directed to preselected locations.

Another salient object of the invention in this connection is to provide a heater wherein the motor will be reversible so that the direction of flow of heated air currents may be reversed at will simply by reversing the direction of rotation of the motor fan.

Another object of the invention is to provide a heater wherein the heated air currents may be caused to flow rearwardly within the vehicle for warming the hands and upper part of the body of the driver or other occupant of the vehicle and wherein, when so desired, the heated air currents may be caused to flow downwardly within the vehicle for warming the feet while also, when preferred, the heated air currents may be caused to flow laterally within the vehicle to afford general heating of the interior of the vehicle.

And the invention seeks, as a still further object, to provide a heater which will be compact, which may be readily installed and which, by providing control over the direction of flow of the heated air currents will afford a maximum of comfort.

Other and incidental objects of the invention not specifically mentioned in the foregoing will appear during the course of the following description and in the drawings, forming part of my application.

Figure 1 is a perspective view of my improved heater, particularly showing the arrangement of the doors of the heater casing.

Figure 2 is a vertical sectional view taken medially through the heater, this view particularly showing the fan employed.

Figure 3 is a horizontal sectional view on the line 3—3 of Figure 2 looking in the direction indicated by the arrows.

Figure 4 is a vertical transverse sectional view on the line 4—4 of Figure 2 looking in the direction indicated by the arrows.

Figure 5 is a vertical sectional view showing a slight variation of the invention.

In carrying the invention into effect I employ a more or less rectangular casing 10 which may be of sheet metal or other approved material and preferably, the front wall 11 of the casing is removable to afford easy access to the interior of the casing. As brought out in Figure 2, the top wall of the casing is curved to gradually merge with the back wall while, as shown in Figure 3, the right side wall of the casing, viewing the heater from the front, is likewise curved to gradually merge into the back wall, these walls being curved to reduce the formation of air pockets within the casing and accelerate the flow of air currents therethrough.

Formed in the bottom wall of the casing near the rear thereof is an opening 12 preferably covered by a grill 13 and controlling the flow of air through said opening is a door 14 hinged to the bottom wall and movable to close said opening. Formed in the front wall 11 of the casing are vertically spaced horizontal openings 15 and hinged to said wall are doors 16 for controlling the flow of air through the openings 15 and movable to close said openings. The left side wall of the casing, viewing the heater from the front thereof is, as particularly seen in Figures 1 and 3 of the drawings, likewise provided near the rear thereof with a vertically extending opening 17 preferably covered by a grill 18 and hinged to said wall is a door 19 for controlling the flow of air currents through the opening 17 and movable to close said opening.

Removably mounted within the casing 10 at the front thereof is a heat exchange unit embodying a radiator 20 and extending rearwardly from the top and bottom tanks of the radiator, as particularly seen in Figure 2, are parallel nipples 21 which project through the back wall of the casing 10 and may be appropriately secured thereto for sustaining the unit within the casing. Centrally, the radiator core is provided with a cylindrical opening therethrough and fitting said opening is a cylindrical shield 22 affording an air passage 23 through the radiator.

In the present instance, I have shown my improved heater mounted against the usual dash 24 of a motor vehicle. As will be observed, the nipples 21 project through the dash and are threaded to accommodate nuts 25 which serve to rigidly secure the heater in position at the inner side of the dash. Detachably secured to the forward ends of the nipples 21 are hose 26 suitably connected into the cooling system of the motor vehicle engine so that the heated liquid in the motor vehicle radiator will enter through the uppermost hose to then flow through the radiator 20 and discharge through the lowermost hose, the circulation of the liquid through the radiator 20 being continuous as long as the engine of the motor vehicle is in operation. As the exact manner in which the hose 26 are connected in the cooling system of the motor vehicle forms no part of the

present invention, these details have not been shown.

Associated with the radiator **20** is an electric fan embodying a motor **27** and connected to the inner end of the armature shaft of the motor are fan blades **28**. As brought out in Figure 4, the motor **27** is mounted axially of the passage **23** afforded by the shield **22** and removably supporting the motor in position is a spider **29**, provision being made, as will be observed, whereby the spider may be tightly clamped about the motor or released to permit removal thereof.

Attention is now particularly directed to the fact that the motor **27** is reversible and any conventional reversible motor may be employed, the circuit connections of the motor, for such reason, not being shown. For a like reason, the means employed, as a suitable switch, for stopping and starting the motor as well as the means employed for effecting the reversal of the motor have not been shown as said means form no part of the invention. These means will be, however, preferably located convenient to the driver so that, at will, the motor may be started and the fan blades caused to turn either clockwise or counter-clockwise selectively while, when it is not desired to use the heater, the motor may be stopped.

The dash **24** of the motor vehicle is shown as being covered at its inner side with the usual facing **30** for excluding heat as well as shutting out the sound of the vehicle motor. This facing is often in the nature of a fibrous padding and in order to obviate the overheating of the facing at the point where the casing **10** rests thereagainst I preferably provide a fireproof shield **31** of asbestos or the like. As particularly brought out in Figures 2 and 3 of the drawings, the shield is positioned opposite the fan blades **28** and may be secured to the back wall of the casing **10** in any suitable manner so that the blast of hot air currents set up by the fan, when rotating in a counter-clockwise direction, will impinge the shield.

Assuming now that the motor **27** is set into operation and the fan blades **28** are caused to turn in a clockwise direction, it will be seen that when the doors **14** and **16** are open and the door **19** closed, cold air will be drawn inwardly through the opening **12** of the casing **10** and forced through the radiator **20** to be heated thereby when the air will be expelled as heated air currents through the opening **15** at the front of the casing. The heated air currents will thus be discharged rearwardly within the vehicle for heating the hands and body of the driver or other occupant of the vehicle and preferably, the doors **16** are mounted to work tight on their hinge pins so that the doors may be adjustably opened for regulating the elevation of the heated air currents issuing from the heater. If so desired, the door **19** may, when the heater is operated as just described, also be opened so that cold air will be drawn in through the opening **17** of the casing **10** as well as through the opening **12** or, if preferred, the door **14** may be closed, when all of the air will be drawn in through the opening **17**.

As is well known, currents of heated air blown rearwardly within a vehicle as just described quite often become annoying and cause discomfort. Under such conditions, the motor **27** is reversed so that the fan blades **28** are caused to rotate in a counter-clockwise direction. Cold air will then be drawn in through the openings **15** of the casing **10** to flow through the radiator **20** and, when the door **14** is opened and the door **19** closed, discharged as heated air currents downwardly within the vehicle. Thus, after the hands and body of the driver or other occupant of the vehicle have been warmed, the downwardly discharging heated air currents will serve to warm the feet. Should however, the downwardly discharging heated air currents become annoying or cause discomfort, the door **14** may be closed and the door **19** opened when, as will be perceived, heated air currents will be discharged laterally through the opening **17** of the casing **10**. The legs of the driver may thus be warmed while also a general heating of the interior of the vehicle may be accomplished.

I thus provide a heater wherein each of the openings **12**, **15** and **17** in the heater casing constitutes a combined inlet and outlet for the ingress of cold air or egress of heated air. Furthermore, the direction of flow of the air currents may be manually selected through the instrumentality of the reversible motor while also, the location of discharge of the heated air currents may be manually selected through the instrumentality of the doors of the casing. In this connection it is to be observed that the shield **22** will prevent overheating of the motor **27** by the radiator **20** while currents of cold air will be caused to flow through the passage **23** around the motor for cooling the motor regardless of whether the motor is operated in one direction or the other. The heater shown is intended to be mounted at the right of the driver and for such reason, the opening **17** and door **19** are provided at the left side of the casing **10**. In any instance where the steering gear of a motor vehicle is on the right, as in vehicles of foreign make, the opening **17** and door **19** will be provided at the right side of the casing.

It is to be understood that the invention is not confined to a heater wherein the heat exchange unit is in the form of a radiator as specifically shown in the drawings as the invention is equally applicable wherein the exchange unit is heated by steam or is heated by the exhaust gases from the motor vehicle engine. I do not, therefore, wish to be limited in this respect. Furthermore, the location of discharge of the heated air currents from the heater casing may be selectively controlled without the use of doors and in Figure 5 of the drawings I have shown a variation of the invention in this respect. Secured to the back wall of the casing are horizontally aligned brackets **32** and pivoted between said brackets is a fan embodying a motor **33** and fan blades **34**, the motor **33** being reversible like the motor **27**. The motor **33** is thus mounted to swing about a horizontal axis and, as will be observed, the door **14** is eliminated as is also the door **19**. Furthermore, the center opening in the radiator core to accommodate the motor is also eliminated but otherwise, this variation of the invention is substantially identical with the preferred construction.

As will be perceived, when the motor **33** is in the position shown in full lines and the fan blades **34** are turned in a clockwise direction, cold air will be drawn in at the bottom and side of the casing to flow through the radiator and discharged as heated air currents rearwardly at the front of the casing. Upon the reversal of the motor **33** so that the fan blades **34** are turned in a counter-clockwise direction, cold air will be drawn in at the front of the casing and discharged as heated air currents at the bottom and side of the casing. Assuming, however, that the motor is swung downwardly to the position shown by dotted lines, air currents will, when the motor is turned in a

clockwise direction be drawn in at the front of the casing and discharged downwardly as heated air currents at the bottom of the casing while, when the fan blades 34 are turned in a counter-clockwise direction, cold air will be drawn in at the bottom of the casing and discharged as heated air currents at the front of the casing. The location of the discharge of the heated air currents may thus be selected by swinging the fan and any approved means may be provided for adjustably rocking the fan and securing said fan in adjusted position.

Having thus described the invention, I claim:

1. A motor vehicle heater including a casing having front, side and bottom walls, a heat exchange unit mounted within the casing, a fan for setting up currents of air contacting said unit for heating said currents and reversible for reversing the direction of flow of said currents, said walls being formed with openings each providing a combined inlet and outlet for the passage of air currents, and doors adapted to close said openings and operable to control the discharge of heated air currents therethrough selectively.

2. In a motor vehicle heater, the combination of a heat exchange unit, means for setting up currents of air in contact with said unit for heating said currents and operable for changing the direction of flow of the air currents, and means for causing said currents to be discharged at different locations selectively when the currents are flowing in one direction and operable to cause the intake of currents at said locations selectively when the currents are flowing in another direction.

3. In a motor vehicle heater, the combination of a heat exchange unit, means for setting up currents of air in contact with said unit for heating said currents and operable for changing the direction of flow of the air currents, and doors for causing said currents to be discharged at different locations selectively when the currents are flowing in one direction and operable to cause the intake of currents at said locations selectively when the currents are flowing in another direction.

WILFRED R. FOX.