Nov. 8, 1938. M. J. MARTY 2,135,827

AUTOMOBILE HEATER

Filed March 19, 1937 2 Sheets-Sheet 1

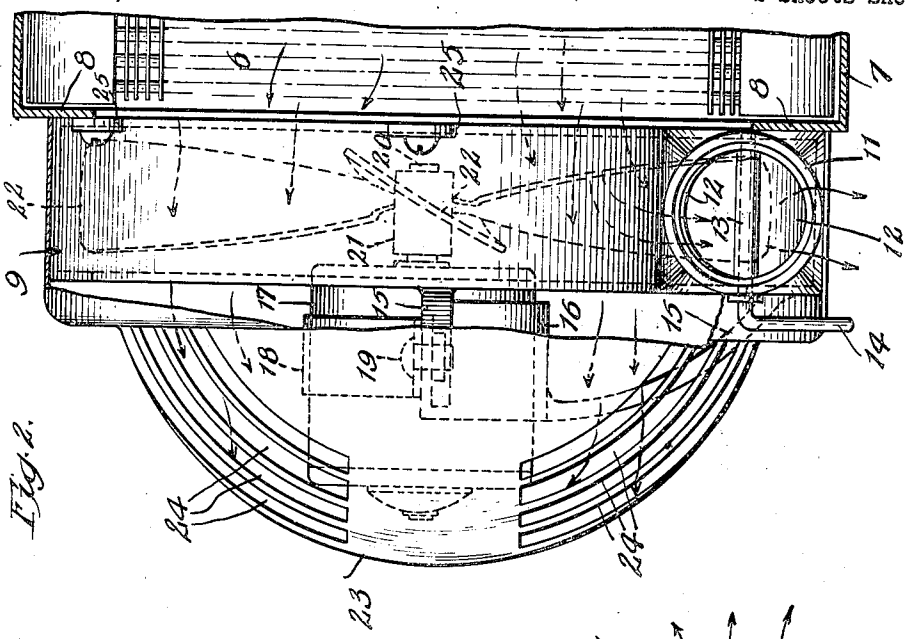

Fig. 2.

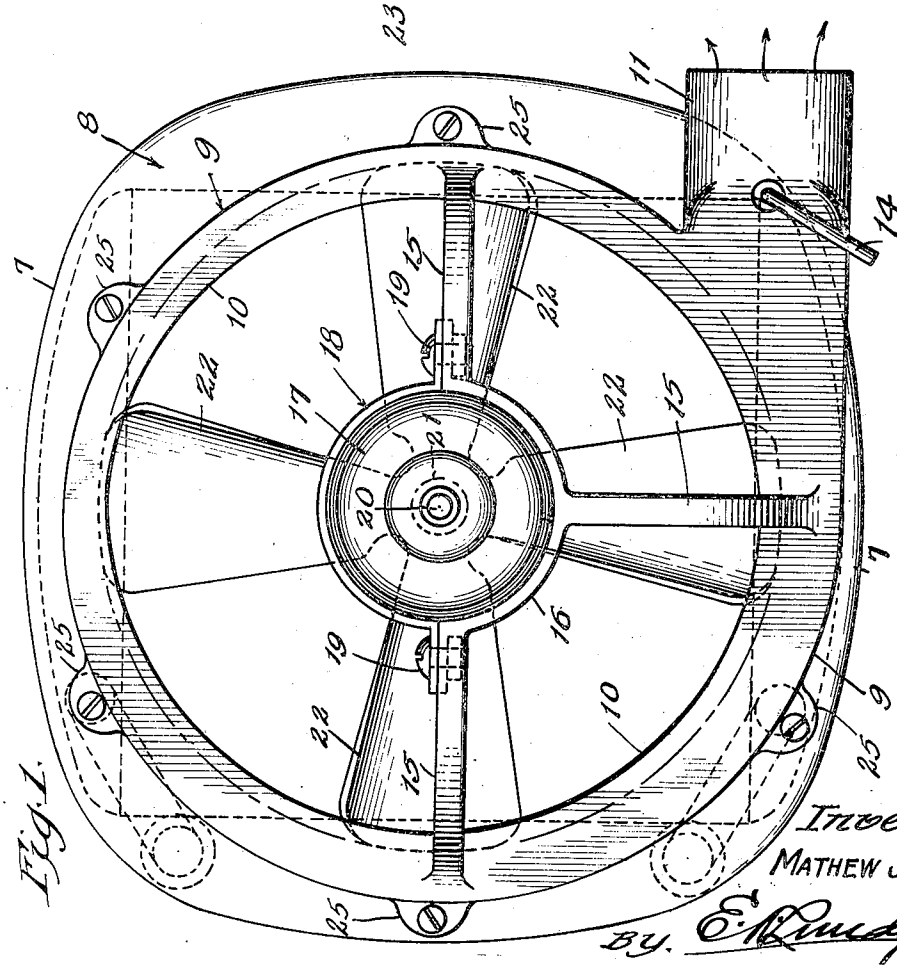

Fig. 1.

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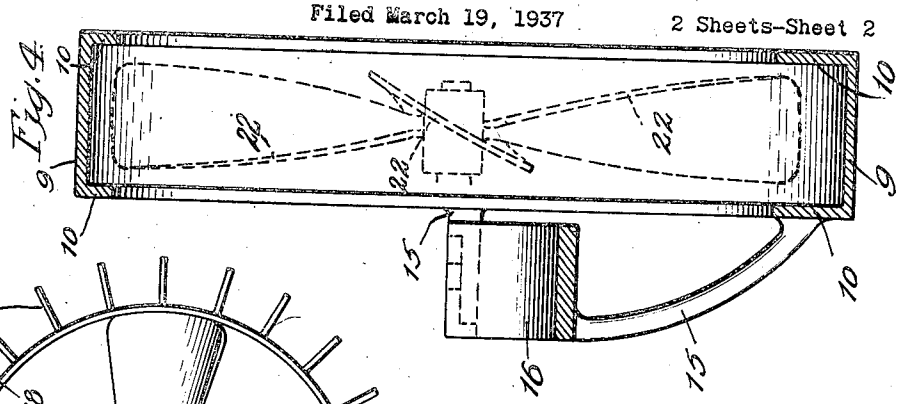

Fig. 4.

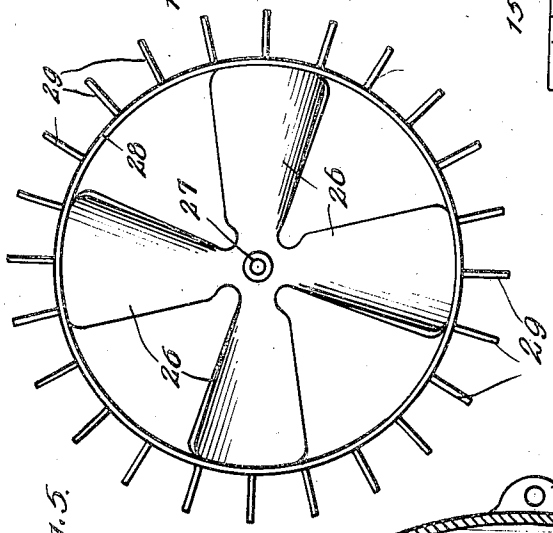

Fig. 5.

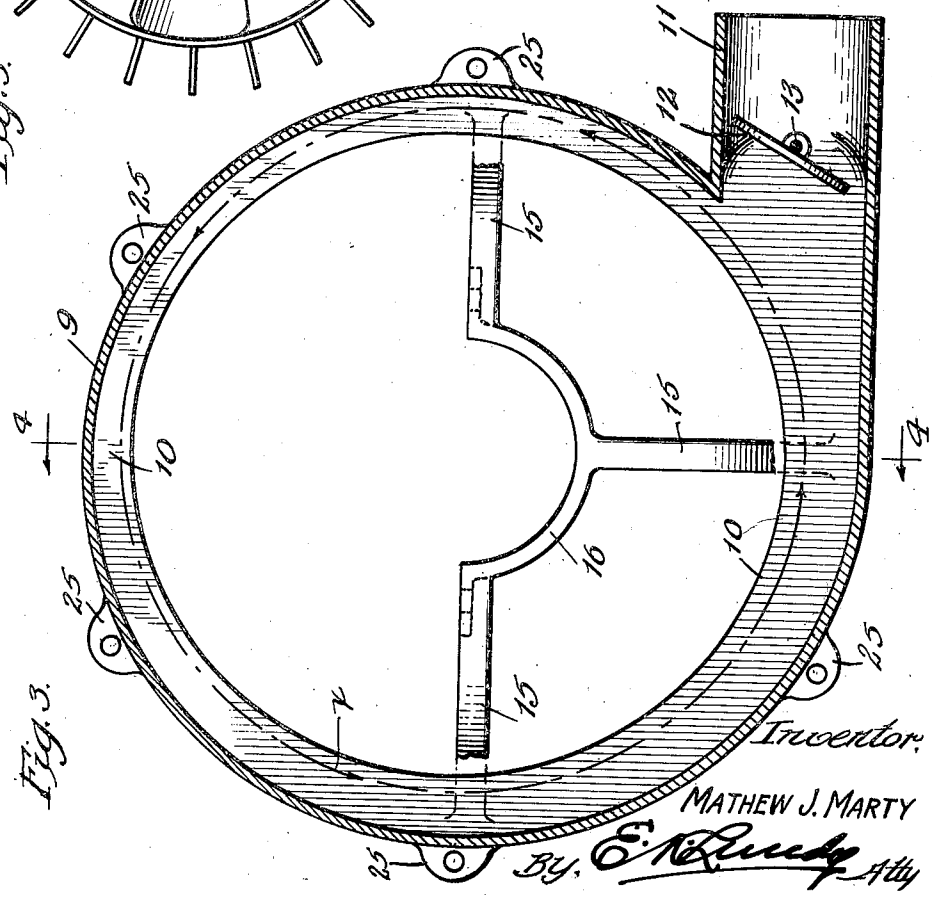

Fig. 3.

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UNITED STATES PATENT OFFICE

2,135,827

AUTOMOBILE HEATER

Mathew J. Marty, Chicago, Ill.

Application March 19, 1937, Serial No. 131,905

5 Claims. (Cl. 230—119)

My invention relates to heaters for warming the interiors of vehicles having closed bodies, and it has special reference to the type of heater wherein hot fluid from the engine cooling system is circulated in a small radiator and a current of air is forced through such radiator for distribution within the vehicle body.

The aim of the present invention is to distribute the heated air in a plurality of directions outward from the casing in which the heat unit is housed so that these separate currents of air may be utilized for different purposes. For example, one current of air is discharged through the front of the housing for warming the vehicle interior, while another current of air, which is discharged preferably in a tangent direction, may be utilized for the purpose of defrosting the windshield of the vehicle. If desired, however, the second current of air, instead of being used to defrost, may be directed toward the feet of the person sitting to one side of the heater rather than the person who may be seated directly in front of the heater.

In connection with this present invention the main current of heated air is discharged, preferably straight out or axially from the pan or blower and the other current of air is discharged tangent to the fan or blower. In order to do this the fan is positioned so that it rotates within an annular fan-chamber of preferably channeled shape in cross-section. This fan-chamber has a discharge nozzle extending tangent to the channel, and the fan is preferably disposed slightly eccentric within the chamber so that the outer edges of the blades are spaced farther from the cylindrical wall of the chamber as they approach the nozzle than at other locations remote to the nozzle which thus permits the pressure to be built-up at the proper place for discharge through the nozzle.

Some of the objects and advantages of the present structure are that it is novel in construction; it is made of sturdy parts to withstand hard usage; it is dependable in operation; it is easy to adjust and operate; and it is economical to manufacture so that it may be sold to the user for a reasonable retail price. Further objects and advantages will be obvious to persons skilled in the art after the device is understood from the following description taken in connection with the accompanying drawings that form a part herein.

In the drawings:

Fig. 1 is a vertical elevation of the improved heater with a portion of the adjacent wall removed for clearness.

Fig. 2 is a view looking at the side of the heater with portions broken away and in section.

Fig. 3 is a view in detail of the fan chamber removed from the housing and shown in transverse vertical section.

Fig. 4 is a vertical axial section taken on line 4—4 of Fig. 3.

Fig. 5 is a view on a smaller scale showing a modified form of fan.

The drawings are to be understood as being somewhat schematic, and they are for the purpose of disclosing a typical or preferred form in which this invention may be made, and in these drawings like reference characters are used to designate like parts wherever such parts appear in the different views.

The heater unit is preferably of the usual "tube and fin" type having headers or chambers at the ends of the tubes, one of which headers receives the heated fluid from the engine cooling system and the other header returns the fluid to the cooling system after passage through the tubes. The before-mentioned structure is usually designated as the core or unit and has been identified herein as a whole by the numeral 6. There is a housing that partially surrounds this core 6 and is anchored in some suitable manner to the dash board of the vehicle and the pipes to and from the headers project through the dash board. A somewhat cylindrical wall 7 of this housing is shown at the right in Fig. 2 and there is an inner annular flange 8 that extends inwardly alongside the adjacent walls of the headers, and there is a similar flange at the opposite side of the core 6 so that the latter is enclosed by the housing and openings of substantial dimensions are provided at the front and rear of the structure for passage of air through the core. In the usual practice, a fan or the like is mounted at the rear of the core and housing to drive air through the core to heat such air by intimate contact with the tubes of the core. In my improved structure I prefer to have the fan as disposed in front of the core where it will draw or suck the air through the latter. However, it will be understood the fan may be disposed in either of the positions mentioned depending upon the use to which the apparatus is put.

The fan chamber is in the form of a casting, as shown in Figs. 3 and 4 and consists of a cylindrical wall 9 having inwardly disposed annularly flanges 10, 10. These flanges extend toward each other and they are of gradually increasing width from the top toward the bottom of the fan chamber and the inner edges of these flanges

describe a circle that is eccentric to the periphery of the cylindrical wall 9. At a location tangent to the lower arc of the cylindrical wall there is a discharge nozzle 11 of tubular form through which air may be discharged in a direction transverse to the axis of rotation of the fan. In Fig. 3 the line of travel of the edges of the fan blades is indicated by the dot-dash line x. Discharge of air through the nozzle 11 is controlled by means of a disk-valve 12 mounted upon a rotatable spindle 13 that has transversely disposed bearings in opposite sides of the nozzle, and one end of which projects outside the wall of the nozzle where it is bent to form a lateral operating handle 14.

A spider consisting of a plurality of radially disposed arms 15 extends from the outer flange 10 of the fan chamber, which said arms are bowed slightly as seen in Fig. 4 and have their inner ends joined to a concave seat or saddle 16 in which the fan motor 17 is mounted. The motor is held in this seat by means of a strap 18 that has its ends clamped in position by bolts 19. The shaft 20 of the motor projects into the fan chamber and has the hub 21 of the fan secured to it. The blades 22 of the fan project radially from the hub and their outer edges are disposed slightly inside the edges of the flanges 10 of the fan-chamber. As is clearly shown in the drawings the fan is eccentric to the cylindrical wall 9 of the chamber so as to dispose the blades closer to the top portion of the cylindrical wall 9 than at the opposite portion of said wall. When the fan is rapidly rotated the pressure gradually builds up in the deepest or widest portion space between the peripheral edges of the blades and the cylindrical wall 9 of the fan chamber and this built-up air pressure is discharged through the nozzle 11. The fan blades creat a draft of air in an axial direction and will cause air to flow through the core of the heater in the manner shown by the arrows in Fig. 2. The current of air becomes divided, so that a portion leaves the peripheral portions of the blades to be directed into the channel of the fan-chamber and the remaining portion of the air current is discharged axially through the front of the structure.

The motor, as seen in Fig. 2 extends beyond the fan chamber and a suitable guard or shell 23 houses the motor and is provided with a plurality of apertures through which the air may be discharged. The fan-chamber has a plurality of lateral lugs or ears 25 whereby it may be mounted upon the housing 7 by means of the screws or the like. It will be seen the fan-chamber and fan, together with the motor and its guard shell may be made in the form of a unit which may be assembled as such and then conveniently mounted upon the housing 7 of the heater core.

In Fig. 5 is shown a different type of fan embodying a plurality of blades 26 extending radially from a hub 27 and having their outer edges connected by an annular or circumferential band 28, and a plurality of fins or paddle-wheel blades projecting radially from the band 28. With this form of fan the annular or peripheral current of air is created in the fan-chamber by the paddle-wheel blades 29, while the obliquely disposed blades 26 create the current which moves the air through the heater core and discharges a portion of the heated air through the front of the structure.

The air which is discharged from the nozzle 11 is a portion of the air that passes through the heater core and is therefore of a higher temperature than the air within the vehicle body This tangent current of air may be directed toward the feet of the driver of the vehicle, when the heater is mounted on the right side of the dash board, or such air may be conveyed by a hose to the windshield and discharged thereon for the purpose of defrosting the surface thereof.

It will be obvious that the fan chamber unit, which includes the motor and fan, may be mounted upon the opposite side of the heater core and therefore adjacent the dash board. In this position the air will be driven from the rear through the heater core where it is raised in temperature and from whence it is discharged into the vehicle for warming the latter. However, the air discharged through the nozzle 11 would not be heated air but may nevertheless be used for the purpose of defrosting the windshield.

The structure disclosed herein is of course susceptible of various arrangements other than those herein specifically disclosed. I believe I am the first to utilize a fan-chamber upon one of the faces of a heater unit for building up a current of air-pressure adjacent the peripheral path of movement of the fan blades and discharging the annular current tangent to the rotational axis of the fan. It is obvious this fan-chamber need not be of a circular outline as shown but it may be an ovoid or it may have rectangular portions as desired or convenient. Furthermore, I am not aware of the use of an eccentrically disposed fan in a fan-chamber or the prior use of a fan-chamber in which walls are provided that are gradually increased in dimensions similar to the flanges 10 of my present structure regardless of whether the axis of the fan is eccentric to the center of the chamber. Hence it is to be understood that I make broad claim to the above-named features of construction, and limited interpretations are not to be placed upon the language of the claims appended hereto.

What is claimed is:—

1. A fan unit for automobile heaters comprising a casing embodying a substantially cylindrical wall and having a tangentially arranged discharge port; a saddle associated with the wall of said casing; a motor mounted in said saddle; a multi-blade fan operatively connected with said motor and rotatable in said casing, the axis of said cylindrical casing wall being eccentric with respect to the axis of rotation of said fan, said cylindrical casing wall terminating at each side of said fan in spaced annular flanges projecting inwardly from the edges of said wall, said flanges forming with said wall a shallow chamber into which the tips of the fan blades extend, said flanges defining relatively wide circular openings in opposite sides of said casing whereby a portion of the air from the fan is discharged through said tangential discharge port, while the remaining portion of air from the fan is discharged axially through one of said relatively wide openings.

2. A fan unit for automobile heaters comprising a casing embodying a substantially cylindrical wall and having a tangentially arranged discharge port; means associated with the wall of said casing forming a saddle; a motor mounted in said saddle; a fan operatively connected with said motor and rotatable within said casing, the axis of said cylindrical casing wall being out of alignment with the axis of rotation of said fan, said cylindrical casing wall terminating at each side of said fan in spaced annular flanges of gradually increasing width projecting inwardly

from the edges of said wall, said flanges forming with said wall a shallow chamber overtaking the tips of the fan blades, said flanges defining reatively wide circular air inlet and discharge openings in opposite sides of said casing whereby a portion of the air drawn into said fan through said inlet opening is discharged through the tangential discharge port in said casing, the remaining air from the fan being discharged axially through the discharge opening formed by one of the flanges on said casing.

3. A fan unit for automobile heaters comprising a casing embodying a substantially cylindrical wall and having a tangentially arranged discharge port; a fan rotatable in said casing, the axis of said cylindrical casing wall being out of alignment with the axis of rotation of said fan, said cylindrical casing wall terminating at each side of said fan in spaced annular flanges of gradually increasing width projecting inwardly from the edges of said wall, said flanges defining relatively wide air inlet and discharge openings in opposite sides of said casing, said fan and casing being arranged whereby a portion of the air drawn into said fan through one of said air inlet openings is discharged through said tangential discharge port in the wall of said casing while the remaining air discharged by the fan passes axially through said relatively wide openings; a saddle associated with said casing and arranged on the air discharge side of said casing; and a motor carried by said saddle and operatively connected to said fan.

4. A fan unit for automobile heaters comprising a casing embodying a substantially cylindrical wall and having a tangentially arranged discharge port; means associated with the wall of said casing forming a saddle; a motor mounted in said saddle; a fan operatively connected with said motor and rotatable in said casing, the axis of said cylindrical casing wall being eccentric with respect to the axis of rotation of said fan, said cylindrical casing wall terminating at each side of said fan in spaced annular flanges of gradually increasing width projecting inwardly from the edges of said wall, said flanges defining relatively wide air inlet and discharge openings in opposite sides of said casing whereby a portion of the air drawn axially into said fan through the wide inlet opening is discharged through said tangential discharge port in said casing and the remaining portion of air from the fan discharged axially through the other of said relatively wide openings.

5. A fan unit for automobile heaters comprising a casing embodying a substantially cylindrical wall and having a tangentially arranged discharge port; a valve in said port for regulating the air flow therethrough; a saddle associated with said casing; a motor mounted in said saddle; a fan operatively connected with said motor and rotatable in said casing, said cylindrical casing wall terminating at each side of said fan in spaced annular flanges, said flanges defining relatively wide circular air inlet and discharge openings in opposite sides of the casing whereby a portion of the air drawn into said fan through the inlet opening is discharged through the tangential discharge port in said casing, the remaining air from the fan being discharged axially through the discharge opening formed by one of the flanges on said casing.

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