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April 16, 1940. J. M. AUFIERO 2,197,172

AUTOMOBILE HEATER AND WINDSHIELD DEFROSTER

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Fig. 1.

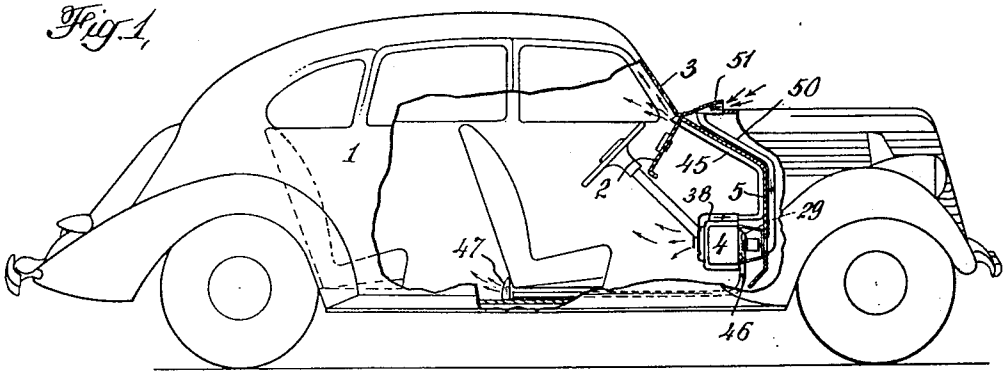
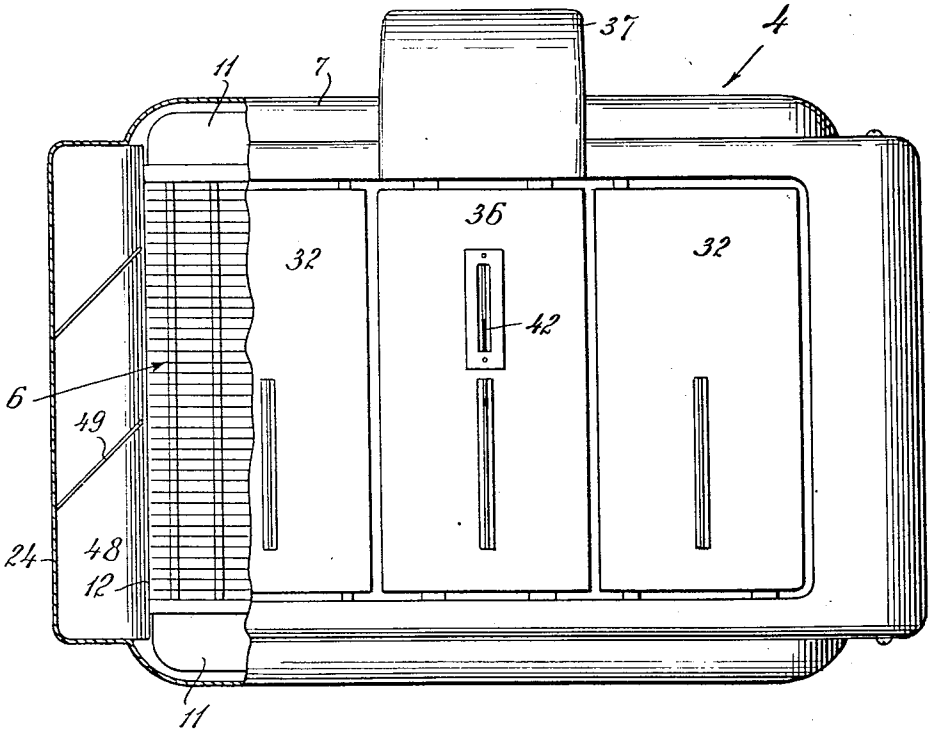


Fig. 2.



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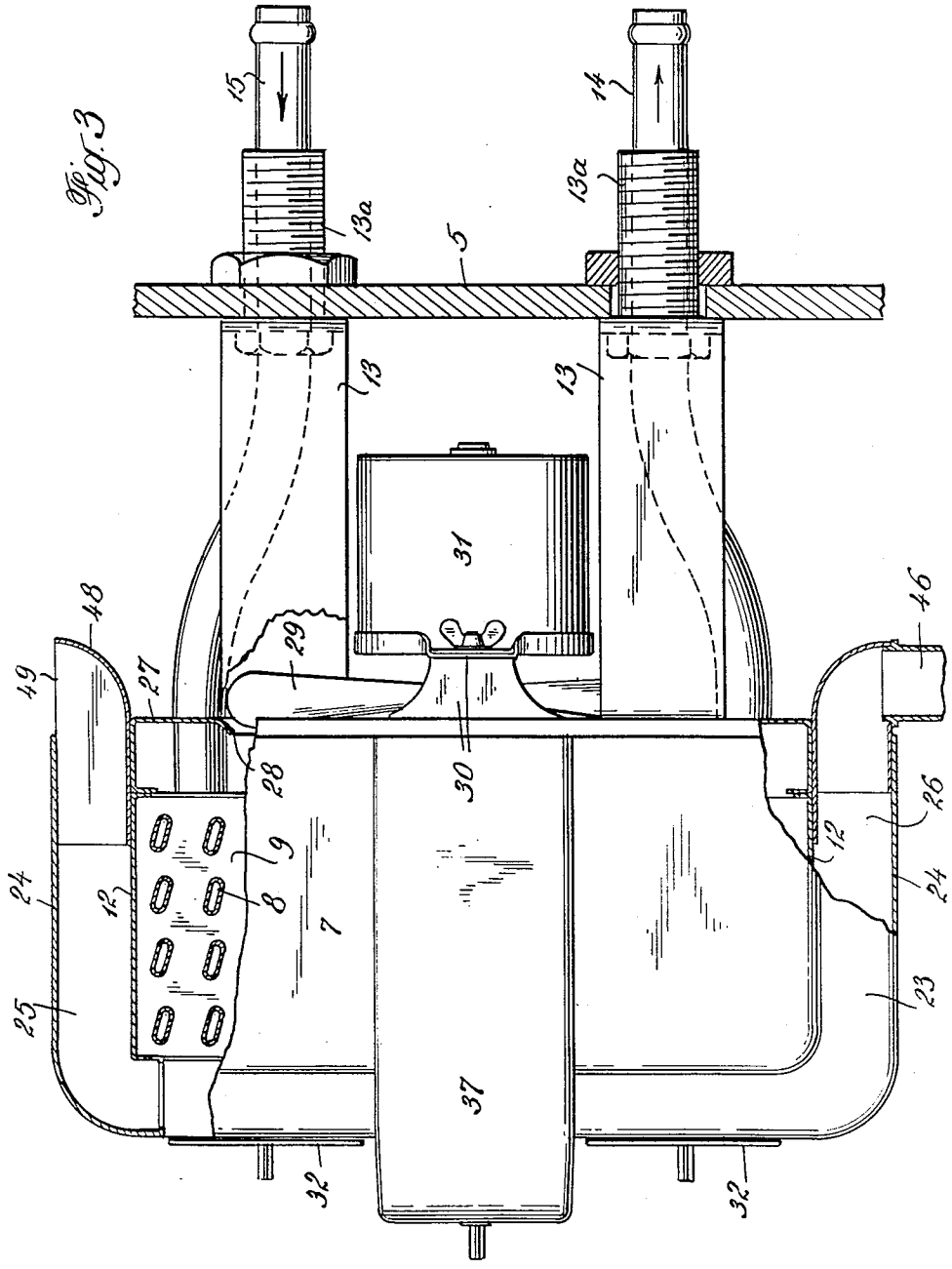
BY Pennie Davis Marvin & Edmonds
his ATTORNEYS.

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Fig. 3



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AUTOMOBILE HEATER AND WINDSHIELD DEFROSTER

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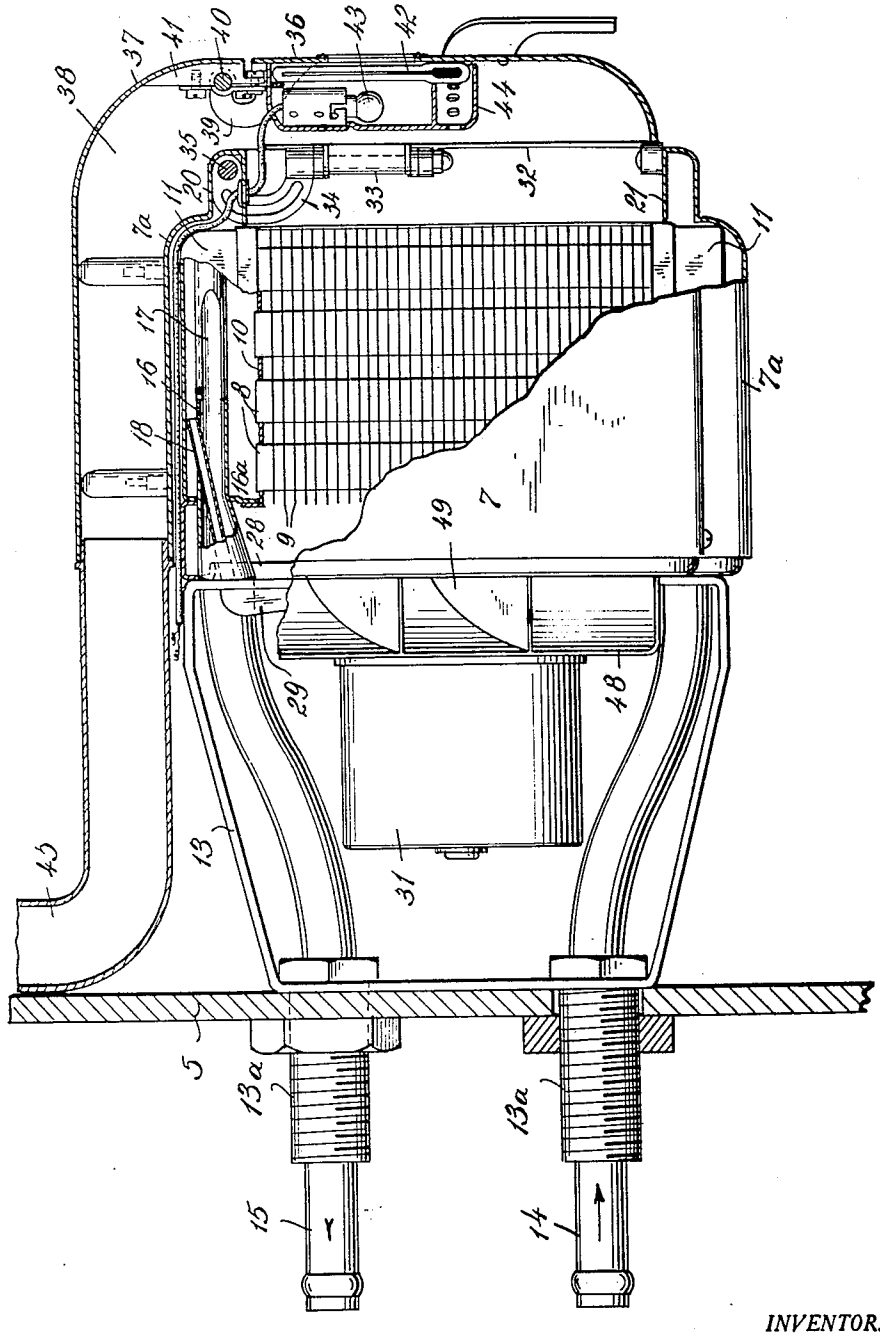


Fig. 4.

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Fig. 5

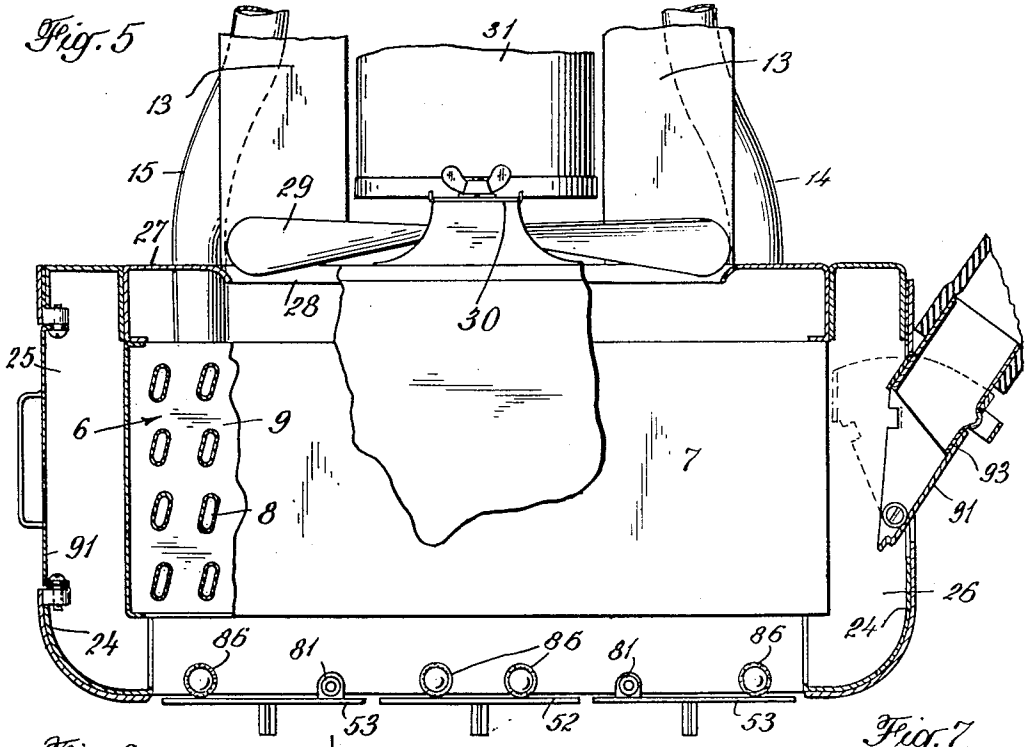


Fig. 6

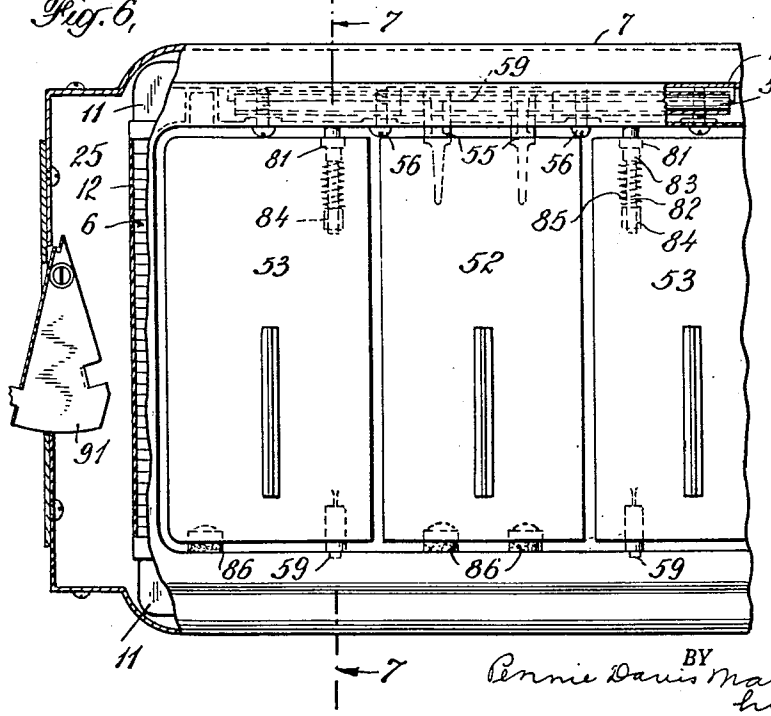
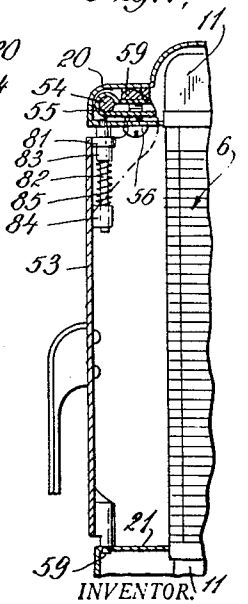


Fig. 7



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UNITED STATES PATENT OFFICE

2,197,172

AUTOMOBILE HEATER AND WINDSHIELD DEFROSTER

John M. Auflero, Brooklyn, N. Y.

Application June 15, 1936, Serial No. 85,250

4 Claims. (Cl. 257—137)

This invention relates to car heaters for automobiles, particularly to that type of car heater wherein the hot water of the engine radiator is circulated through a radiator section mounted in the car body and the air within the car is circulated by means of a fan mounted in the heater casing adjacent the radiator. Such heaters are widely used at the present time and the object of the present invention is to provide a heater of this type having improved means for regulating the temperature and the circulation of heated air throughout the car, and the intake of fresh air into the car.

A further object of the invention is to provide a heater of this type with means whereby a portion of the heated air discharged from the heater may be utilized for defrosting the windshield.

A further object of the invention is to provide a heater of this type which is quiet and efficient in operation; which is of small size in proportion to its capacity; and which adds to rather than detracts from the appearance of the car.

A further object of the invention is to provide a heater of this type of simple, rugged construction and low manufacturing cost, which will, barring accident and abuse, outlast the average car.

In the accompanying drawings I have illustrated my improved car heater in its preferred form together with certain modifications thereof, but it is to be understood that the invention is not limited to these specific structures except insofar as such limitations are embodied in the appended claims.

In the drawings

Figure 1 is a side elevation of an automobile with a portion of the body broken away to show the installation of my improved heater therein;

Fig. 2 is a front view of the heater—that is, the face of the heater as observed by the occupants of the car—with a portion thereof broken away;

Fig. 3 is a plan view of the heater shown in Fig. 2;

Fig. 4 is a side elevation of the heater shown in Fig. 3 with certain portions shown in vertical section;

Fig. 5 is a plan view partly in horizontal section showing certain modifications in the casing of the heater for regulating the distribution of heated air;

Fig. 6 is a front elevation of a modified form of heater shown in Fig. 5; and

Fig. 7 is a detail sectional view on line 7—7 of Fig. 6.

Referring to the drawings, particularly Figs. 1 to 4 thereof, 1 indicates the body of an automobile having the usual instrument board 2 and windshield 3. The heater is indicated generally by reference numeral 4 and is supported beneath the instrument board on the partition 5 between the body and the engine compartment.

The heater comprises a radiator 6 of the usual fin-and-tube construction, said radiator being enclosed in a sheet metal casing 7 from which it is preferably removable as a unit. The radiator proper comprises radiator tubes 8, fins 9 and upper and lower tube sheets 10. The tube sheets are covered with sheet metal caps 11 brazed or otherwise attached to the outwardly extending flanges of the tube sheets (see Fig. 5), the caps and tube sheets forming the intake and delivery compartments of the radiator.

The bank of radiator tubes is closed at each end with sheet metal plates 12, leaving the front and back side walls open for the circulation of air through the radiator between the fin plates. Attached to the back wall of the casing 7 are two supporting brackets 13 by means of which the heater is attached to the car. Each of these brackets comprises a metal strap bent to generally rectangular form and having in its portion parallel with the rear wall of the casing two holes in which screw-threaded sleeves 13a are mounted, the sleeves serving the dual purpose of clamping screws for clamping the heater against the partition 5 and supports for the intake pipe 14 and delivery pipe 15 which are connected in the usual manner with the water circulating system of the car.

The intake pipe 14 is brazed, welded or otherwise secured in any other desired manner to the adjacent wall of the cap 11 forming the intake compartment of the radiator. The delivery pipe is formed with a reduced extension 16 which projects into the radiator through the side wall of the cap 11 and extends across the cap above the open ends of the tubes. This reduced extension 16 is cut away on one side as indicated at 17 to provide an opening through which the water is drawn into the delivery pipe. Mounted in the delivery pipe 15 is an air-eliminator comprising a small tube 18 projecting through the side wall of the extension 16 at such an angle as to extend centrally of the adjacent enlarged portion of the pipe 15. This small tube opens at the outer end into the space at the top of the radiator above the intake opening 16a and

operates to insure the withdrawal of air out of the radiator back into the circulating system of the engine where it will normally escape from the surface of the water in the top of the main engine radiator.

The air eliminator operates on the Venturi principle. Any air entrained in the water circulating through the radiator will tend to collect at the top and the suction produced by the flow of water through the discharge pipe 16 around the small tube 18 which projects into the tube 15 in the direction of the flow of water, will cause the air through the tube 18 to be drawn into the stream of water passing through the pipe 15 and thus back into the engine radiator.

For distributing the air in different directions through the car, as may be desirable depending upon the number of persons in the car, the front of the casing 7 is preferably provided with three separate doors any one or more of which may be opened, as desired. The middle door is preferably hinged at the top so that when it is opened it will deflect the air downwardly toward the floor adjacent the feet of the occupant of the seat next to the driver's seat. The side doors are hinged to turn on vertical axes and preferably have their pivots at the sides adjacent the middle so that the doors, when open, will deflect the heated air laterally away from the heater in either direction, as desired.

The casing 7 consists of a sheet metal main portion 7a having top, bottom and side walls, but open at the front and back for the circulation of air across the radiator tubes. The top and bottom walls of the casing are shaped to receive the caps 11 of the radiator, which is inserted into the casing from the rear. At their front edges the top and bottom walls are provided with forwardly projecting flanges 20 and 21 of U-shaped cross section, formed by bending the projecting edges of the metal back in horizontal planes approximately coincident with the tube sheets 10, as shown in Fig. 4. At each end the top wall of the casing is bent downwardly to fit over the top cap 11 of the radiator and then outwardly as shown at 23 in Fig. 3. The bottom wall of the casing is similarly shaped with respect to the bottom cap 11 of the radiator so that the end walls 24 of the casing are spaced away from the end plates 12 of the radiator to form ducts 25 and 26 at the ends of the casing communicating with the space at the front of the casing between the doors and the front of the radiator.

The rear of the casing 7 consists of a removable sheet metal plate 27 having forwardly projecting marginal flanges fitting within the top and bottom walls of the casing and forming at each end a continuation of the adjacent end wall of the radiator. The back piece 27 is formed with a central opening 28 co-extensive with the fan 29 and with brackets 30 for supporting the fan motor 31.

The side doors 32 are supported on hinges 33 depending from brackets 34 whose upper ends are shaped to project into the U-shaped flange at the top of the front opening of the casing. The brackets 34 are maintained in properly spaced relation by a transverse pin 35 and are held in place by the adjacent edge of the cap 11 which engages the back edges of the bracket when the radiator is assembled in the casing.

The middle door 36 is preferably supported by a cap piece 37 attached to the top wall of the casing, as shown in Fig. 4, and forming with the wall a rearwardly extending duct 38. The door 36 is of U-shaped cross section so as to form, when the door is closed, a continuation of the duct across the face of the radiator from top to bottom. The door is suspended by brackets 39 from a pivot rod 40 turning in journal blocks 41 attached to the inner face of the downwardly turned end of the cap piece 37. A thermometer 42 may be mounted on the back of the middle door 36 in position to be read through a slot in the door. A lamp 43 is also provided to illuminate the thermometer, the lamp and thermometer being mounted in a box 44 detachably connected in suitable manner to the back of the door.

The heated air delivered to the ducts 25, 26 and 38 may be distributed in various ways throughout the car. For example, as shown in Fig. 1, the duct 38 is provided with an extension 45 leading to a point adjacent the windshield in front of the driver, so that, when the middle door is closed a blast of hot air will be discharged against the windshield and serve to melt any ice or frost which may be deposited on the outer face of the windshield. The duct 26 is similarly provided with an extension 46 leading across the bottom of the car and under the front seat to a register 47 in front of the back seat of the car, while the duct 25 is provided with a deflector 48 having downwardly inclined vanes 49 for directing the hot air toward the driver's feet.

For admitting fresh air to the heater there is provided a duct 50 leading from an opening in the partition 5 back of fan 29 to a position under a damper 51 hinged at its rear edge in the cowl in front of the windshield. When the damper is raised the forward motion of the car will cause air to be scooped into the duct 50 and discharge against the suction side of the fan. The quantity of fresh air may be regulated by varying the extent to which the damper is opened.

In Figs. 5, 6 and 7 I have shown a modified casing construction. As here shown the middle door 52 and the side doors 53 are all mounted in the same plane and the supplemental duct 38 for directing hot air against the windshield is dispensed with.

The middle door 52 is suspended from a rod 54 supported in the U-shaped flange 20 at the front edge of the top wall of the casing by means of sheet metal clips 55 which embrace the rod and are supported by screws 56 set in the inner face of the flange and threaded into a bar 59 welded or otherwise secured within the hollow flange 20. The middle door 52 is provided at its upper edge with two brackets which are fixed to the rod 54 so that the rod turns in the clips 55 which may be clamped about the rods by means of the screw 56 tight enough to hold the door in either open or closed position.

The side doors 53 are also provided with friction hinges as shown in Figs. 6 and 7. The bottom hinge consists merely of a pin 59' projecting into a hole in the projecting flange 21 of the casing 7, the pin being formed on the end of the bracket and welded or otherwise attached to the inner face of the door.

At its upper edge each door 53 is provided with an eye 81 in which the hinge pin 82 is slidingly mounted. The pin 82 is shouldered as shown at 83 and at its lower end is mounted in an eye 84 welded or otherwise secured to the back of the door. Between the shoulder and the eye 84 is a spring 85 which presses the pin 82 upwardly to thereby hold the pin in the hole in which it turns and also insure sufficient friction between the

pin and the casing to hold the doors against rattling in either open or closed position. Rubber-covered stop pins 86 are set in the bottom flange 21 to maintain the doors in line and flush with the wall of the casing when they are closed.

In addition to the doors for regulating the circulation of the air I provide chambers or ducts 25, 26 at each end of the casing into which a portion of the heated air will be deflected, particularly when one or more of the front doors are closed, preferably provided with a hinged door 91 formed of sheet metal of the shape shown in Figs. 5 and 6, adapted when closed to form a continuation of the outside wall of the casing, and when open to direct the heated air in any desired direction away from the casing, depending upon the position of the hinge. For example, the door 91 in the duct 25 is hinged at the top to direct the heat downwardly. Either of doors 91 may if desired be shaped to receive a hose coupling such as shown at 93 in the door of the duct 26 whereby hot air may be conveyed to the windshield, to the rear compartment of the car, or elsewhere as desired.

From the foregoing, it will be understood that among others, the several objects of the invention, as specifically aforenoted, are achieved. Obviously, numerous changes in construction and rearrangements of the parts might be resorted to without departing from the spirit of the invention, as defined by the claims.

I claim:

1. In a heater of the class described a radiator comprising upper and lower water compartments, a discharge pipe leading from said upper compartment and means for eliminating air from said radiator comprising a small tube supported axially of said discharge pipe and with an intake opening closely adjacent the upper wall of said compartment.

2. A heater including, in combination, a heat transfer core, heads connected to said core, intake and outlet pipes connected one to each of said heads for circulating liquid through said core, and a tube having one of its ends extending into that head with which such outlet pipe is connected and adjacent the upper end of said head, the opposite end of said tube extending into said outlet pipe and in a direction parallel to the direction of the flow of liquid therethrough.

3. A heater including, in combination, a heat transfer core, air impelling means disposed adjacent thereto and to cause a flow of air through said core and in heat exchange relationship therewith, a casing enclosing said core, duct portions forming a part of said casing, the bodies of such ducts extending transversely of said core and adjacent the side edges thereof, said casing in line with said air impelling means being provided with an opening, and a panel movably secured to said casing and shiftable to a position to obstruct said opening and to provide in conjunction with said casing continuations of the duct portions thereof.

4. A heater including, in combination, a heat transfer core, air impelling means disposed adjacent thereto and to cause a flow of air through said core and in heat exchange relationship therewith, a casing enclosing said core, duct portions forming a part of said casing, the bodies of such ducts extending transversely of said core and adjacent the side edges thereof, said casing in line with said air impelling means being provided with an opening, the discharge ends of said duct portions being separated from each other and adapted to be coupled to separate conduits, and a plurality of panels associated with said casing and movable to positions spaced from the core face to obstruct air flow through said casing opening and to form continuations of said duct portions.

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