Dec. 1, 1931. A. H. BATES 1,834,674

HEATER

Filed Oct. 8, 1928

Fig. 1.

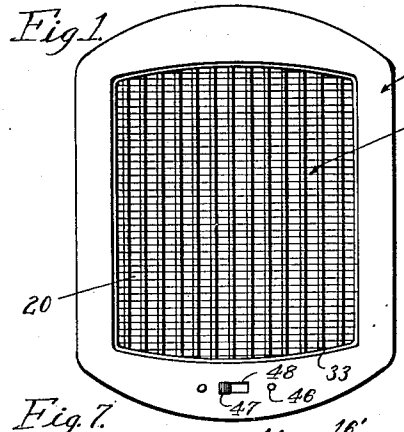


Fig. 2.

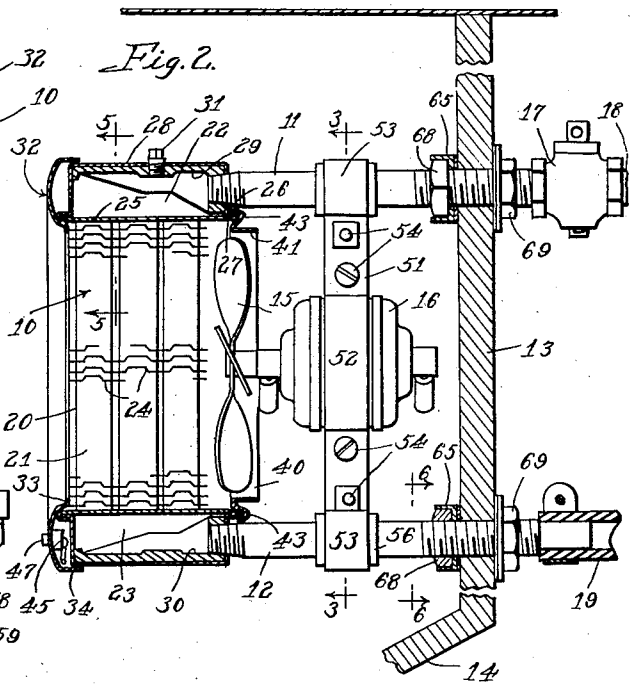


Fig. 7.

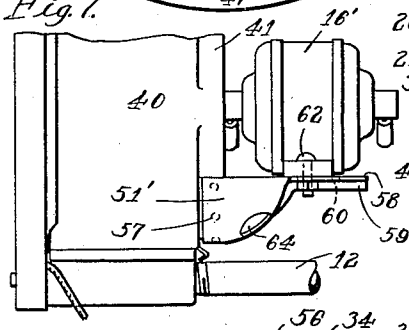


Fig. 3.

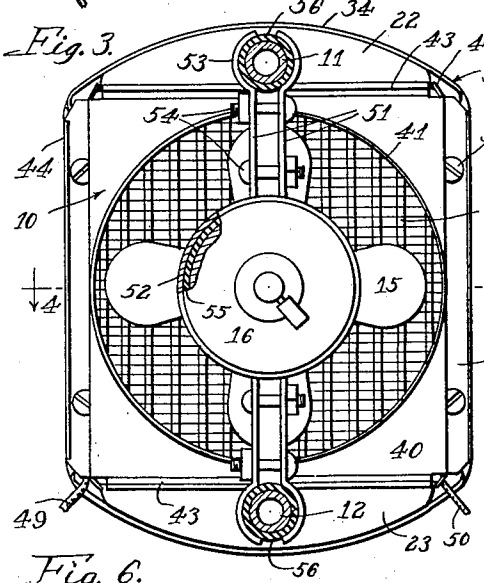


Fig. 5.

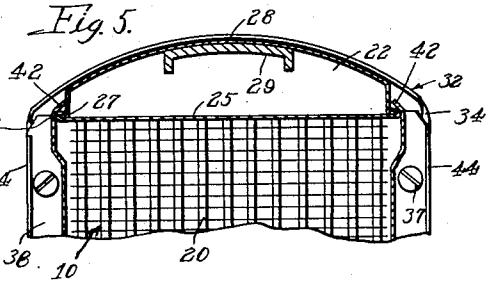


Fig. 4.

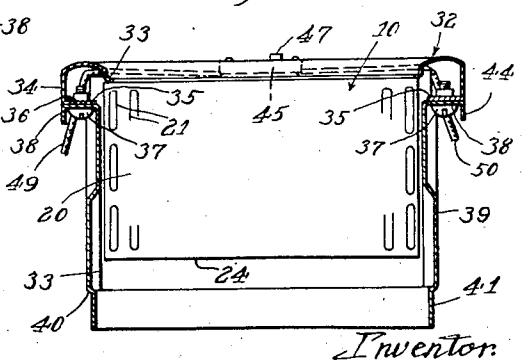
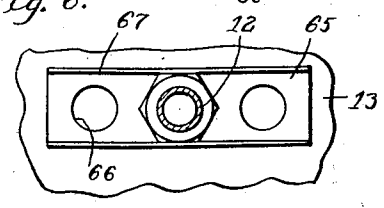


Fig. 6.



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Patented Dec. 1, 1931 1,834,674

UNITED STATES PATENT OFFICE

ALBERT H. BATES, OF ROCKFORD, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO LIBERTY FOUNDRIES COMPANY, OF ROCKFORD, ILLINOIS, A CORPORATION OF ILLINOIS

HEATER

Application filed October 8, 1928. Serial No. 311,032.

This invention relates to a hot water heater especially adapted for use on motor cars, utilizing the hot water from the motor and having a forced draft of air therethrough secured by means of an electric fan.

Heaters of the kind referred to have been provided heretofore, but I am aware that they have embodied various objectionable features in their construction, have not been as easy to install as might be desired, have not been compact enough to suit installation in some makes of cars, and were apt to develop leaks, squeaks and rattles in service owing to their faulty mounting. It is, therefore, the general object of my invention to provide a heater specially constructed, assembled, and mounted, with a view to avoiding the objections just noted.

Briefly stated, the heater of my invention embodies the following features:

(1) The provision of a heater unit wherein the upper and lower tanks of the radiator core are firmly clamped between the front plate and the sheet metal shroud on the back in such a way that there is absolutely no danger of any of these parts getting loose and rattling or squeaking. This construction is furthermore of advantage in that the beads provided on the shroud serve by engagement with flanges on the tanks of the radiator core to accurately locate the shroud with reference to the radiator, so that the fan will be centralized with respect to the shroud. This, of course, greatly facilitates assembling and is a great advantage in the quantity production of heaters.

(2) The provision of simple and improved means for supporting the electric fan motor which not only tends to deaden sound and vibration arising from the operation of the heater, but also permits a certain amount of adjustment of the motor toward or away from the radiator to change the volume of air forced through the radiator and incidentally eliminate any possible whirring sound apt to be produced where the fan is operated in too close proximity to the radiator core.

(3) The provision of reinforcing cleats for use in mounting the heater on the dash, serving to generally stiffen the support, particularly in the case of a sheet metal dash, and to minimize side sway of the heater relative to its mounting. This feature avoids any danger of the heater working loose at its mounting and incidentally minimizes the likelihood of leaks, squeaks and rattles, because of the fact that the heater is maintained absolutely rigid.

The foregoing and other features of the invention are fully illustrated in the accompanying drawings wherein—

Figure 1 is a front view of the heater;

Fig. 2 is a central vertical longitudinal section therethrough showing the same mounted on the dash of an automobile;

Figs. 3, 4, 5 and 6 are sections taken on the lines 3—3, 4—4, 5—5 and 6—6 of Figs. 2 and 3 looking in the directions indicated by the arrows, and

Fig. 7 is a fragmentary side view of a heater of slightly modified construction.

Corresponding reference numerals are applied to similar parts throughout the views.

The heater shown in Figs. 1 to 6, generally speaking, comprises an air heating radiator 10 supported by hot water supply and return pipes 11 and 12 on the dash 13 of an automobile, under the cowl and well above the toe board 14 so as not to reduce foot room. A fan 15 driven by an electric motor 16 serves to insure a forced draft of clean fresh air through the radiator 10 from the back thereof whereby to distribute the heat to all parts of the car. The supply pipe 11 has connection through a stop cock 17 with a pipe 18 tapped into the water jacket of the motor at a point where the water attains the highest temperature and where it also gets hot immediately after the motor has started running, namely, in the head of the motor. The return pipe 12, on the other hand, has connection with a hose 19 tapped into the lower outlet hose connection of the car radiator between the latter and its water pump. From this much general description it will be evident that hot water, or whatever cooling fluid is used, is supplied to the radiator 10 from the motor through the pipe 11 and that it flows downwardly through the radiator and back to the motor through

the return pipe 12. In warm weather the heater may be entirely shut off by simply closing the cock 17 and, if desired, the fan 15 can be turned on in hot weather for the purposes of ventilation.

The radiator 10 may have a core of any suitable or preferred construction but is herein illustrated as having a turbotube core 20 consisting of two or three rows of vertical flat tubes 21 connected at their upper and lower ends respectively to tanks 22 and 23 and provided with transverse radiating fins 24. The upper and lower tanks each have a flat inner wall 25 constituting a header plate having its edges swedged inwardly, as shown at 26, over flanges 27 bent outwardly on the edges of the front, back and side walls of a drawn piece 28 forming the rest of the tank. The parts 26 and 27 are pressed firmly together and form a continuous circumferential rim on each of the tanks, said rims being utilized in the assembling of the heater unit in a manner hereinafter to appear. The pressing of the parts together gives such a good bond that the tanks are rendered water-tight by this operation alone. However, the joints are subsequently soldered to positively insure that the radiator will remain water-tight. The construction described, it will be seen, is such that there is no mechanical strain on the soldered joints tending to open them. Cast brackets 29 and 30 are riveted or otherwise suitably secured within the upper and lower tanks 22 and 23 respectively and have the supply and return pipes 11 and 12 threading therein for connection with said tanks. This makes a very firm and rigid construction and minimizes the danger of water leakage due to joints loosening. A plug 31 is provided for the upper tank 22 and likewise threads into the bracket 29. This plug is removed only when the system is being filled with water and serves to allow the air to escape.

A front plate 32, formed in one piece from sheet metal and suitable nickel-plated for enhanced appearance, constitutes a marginal ornamental frame for the front of the radiator 10. It has a narrow, flat, inner rim 33 arranged to bear against the front of the radiator core 20 and an outer rim 34 rearwardly directed and fitting about the outside of the radiator over the upper and lower tanks 22 and 23, as best appears in Fig. 2. At each side of the radiator the front plate has the edge of the rim 34 bent inwardly to form a flange 35 (see Fig. 4) for fastening the front plate to the radiator. The flange 35 has a number of flanged holes struck therein as shown at 36, these holes being tapped for reception of screws 37. The screws 37 are passed through holes in an outturned flange 38 provided on the forward edges of the side walls 39 of a sheet metal shroud 40 enclosing the back and sides of the radiator core 20 between the upper and lower tanks 22 and 23. The shroud 40 is formed from a single piece of sheet metal by drawing and has a circular flange 41 formed on the back thereof defining an air intake opening in which the fan 15, previously referred to, is arranged to operate. The upper and lower edges of the side walls 39 of the shroud 40 have inturned flanges 42 to fit over the rims of the upper and lower tanks 22 and 23 of the radiator and in a similar manner the back wall has its upper and lower edges beaded, as appears at 43, to fit over the rims of said upper and lower tanks. With this sort of construction, I have found that if the side walls 39 are made slightly too short for a true fit of the shroud and front plate on the radiator, the screws 37 fastening the flanges 35 and 38 together will stretch the front plate and shroud into snug contact with the radiator wherever these parts bear against the same. The front plate and shroud are thus made drum-tight and there is never the slightest danger of any part of the radiator unit itself becoming loose and giving rise to rattles and squeaks in the operation of the car. The edges of the flanges 38 are bent rearwardly as appears at 44 to give the flanges added stiffness and prevent bending of the flanges at the screws when the screws are tightened. If the flanges were allowed to bend at the screws, it would obviously prevent the tight drawing together of the front plate and shroud. It should be evident from the foregoing that the bearing of the shroud on the rims of the upper and lower tanks of the radiator serves to accurately locate the shroud with reference to the radiator, which of course, is important in assembling, especially in quantity production, inasmuch as it is necessary to have the fan as nearly central in the circle defined by the flange 41 as possible or else there might be danger of interference of the flange 41 with the fan, especially if the workmen assembling the heater happen to be a little careless.

A switch 45 for controlling the motor 16 may be mounted in the hollow of the front plate 32, preferably between the front plate and the lower tank 23 as shown in Fig. 2, rivets 46 or other suitable means being provided to fasten the casing of the switch to the front plate. The switch shown is of the sliding contact type most commonly used in automobile lighting systems because of its suitability to low voltage conditions, and has its lever 47 projecting through a small slot 48 provided therefor in the front plate 32. One wire 49 (see Fig. 4) is led from the switch 45 to the ammeter or source of current, and another wire 50 is led from the switch to the motor 16, the other lead from the motor being grounded in the usual way. The space between the corners of the front plate and the shroud 40 permits easy extension of the wires 49 and 50 from the radiator for the connections just described. It will be evident

that with the switch assembled as a part of the heater there is a saving in time in installation of the heater in the car, there being no necessity for mounting a separate switch on the instrument board, as would otherwise be the case. The heater unit is, in other words, self-contained. At the same time it is just as handy to operate the switch on the heater as it would be if the same were mounted on the instrument board, and there is less danger of the driver confusing one switch for another. Furthermore, the switch is practically entirely concealed and, therefore, does not detract from the appearance of the heater.

The motor 16 with its fan 15 is supported as a unit by the radiator. The preferred mounting involves the use of sheet metal brackets 51 extending from pipe 11 to pipe 12, substantially semi-circular portions 52 intermediate the ends of said brackets being arranged to clamp the housing of the motor therebetween, and substantially semi-circular end portions 53 being arranged to clamp the pipes 11 and 12 therebetween when the bolts 54 are tightened. Cushioning material, such as rubber or the like, is interposed between the motor housing and its clamping portions 52, as shown at 55, and similar cushioning material is provided at 56 around the pipes 11 and 12. This minimizes the transmission of any sound or vibration from the motor to the pipes and thence to the radiator or dash and the heater unit is, as a result, rendered smooth and quiet in operation. The motor is obviously held rigidly by means of the brackets 51 and, since it is a simple matter to get the pipes 11 and 12 properly spaced, there is no difficulty about centering the fan 15 properly with respect to the opening defined by the circular flange 41. Aside from that advantage, this method of assembling the motor on the heater gives the further advantage that the motor can be adjusted toward or away from the radiator core to get the fan positioned precisely as desired with respect to the back of the radiator core. Thus, supposing the volume of air forced through the radiator is too high for normal conditions; in such cases the backing away of the motor a certain amount will usually be found to cut down the volume of air appreciably so that the desired operating characteristics can be obtained. Furthermore, there is sometimes a noticeable whirring noise produced if the fan is operated in too close proximity with the radiator core and that can also be remedied by backing the motor away from the radiator slightly to obtain the proper spaced relation between the fan and the radiator where the operation of the fan will be practically noiseless.

Referring for a moment to Fig. 7 showing a modified construction, substantially all of the advantages of the motor mounting just described may be obtained by the provision of a bracket 51′ mounted directly on the shroud 40 and serving to support the motor 16′. This bracket is formed from a single piece of sheet metal to a half-bowl shape to fit around the circular flange 41 and permit wiring of the bracket thereto, as indicated at 57. The bracket 51′ has a shelf 58 formed by a rearwardly directed flange, which flange is formed with one or more ribs 59 merging with the main body portion of the bracket and serving to give the desired strength and rigidity. Elongated slots 60, formed in the shelf 58 receiving the bolts 62, permit the fastening of the motor to the bracket while allowing for a certain amount of fore and aft adjustment. Here again, cushioning material is suitably provided to minimize the transmission of sound and vibration from the motor to the bracket and tend toward quiet operation. Obviously, this construction affords substantially all of the advantages of the construction just described, and offers the additional advantages of lower cost, ease in assembling and less weight. If desired, the bracket 51′ may be provided with air holes 64 to minimize the obstruction to the flow of air into the radiator core. While the bracket 51′ as shown here, is mounted on the lower part of the shroud 40 with the motor 16′ resting thereon, it should be apparent that this bracket might be fastened on either side or on the top of the shroud with the motor fastened thereto in the same way.

The mounting of the heater unit on the dash 13 by means of the pipes 11 and 12, which are usually disposed so that one is directly above the other, makes the heater rigid enough in a vertical plane so that there is no likelihood of its having any up and down sway, but there is obviously very little support for the unit against side sway unless some reinforcement is provided to guard against it. I, therefore, prefer to provide a transversely disposed cleat 65 in connection with the fastening of each of the pipes 11 and 12 to the dash 13. The cleats are suitably formed from channel stock or sheet metal bent to channel form to afford the desired stiffness with very little weight involved. Each cleat has at least three holes 66 provided therein between the flanges 67, one hole being provided at the middle of the cleat and the other two holes being preferably provided in different spaced relation to the ends of the cleat. If there is nothing to interfere, the cleat is preferably used with the pipe passing through the middle hole, but if something adjacent the point where the pipe is passed through the dash happens to interfere with the use of the cleat in that way, the pipe can be passed through either end hole, if not enough space is available to allow use of the hole farther removed from the end of the cleat, then the hole nearer the end of the cleat is used. In any event the cleat is ar-

ranged by bearing against the dash at either side of the pipe to distribute the support over that amount of area and thus reinforce the mounting proportionately. If there is anything to interfere with placing of the cleat in a horizontal position, in which position it furnishes the most lateral support, the cleat can be placed at whatever angle will suit the conditions, the aim being, of course, to place the cleats so that they will furnish the maximum lateral support. As shown in Fig. 2, the nuts 68 on the inside of the dash threading on the pipes 11 and 12, are arranged to fit between the flanges 67 of the cleats. The nuts 69 threading on the pipes on the outside of the dash are, therefore, the ones to be tightened to remove any play in the mounting. The use of the cleats as dash reinforcements is found to be of particular advantage in the mounting of the heater units on sheet metal dashes, in which case there is even greater need for adequate lateral support for the heaters than where they are mounted on wooden dashes.

It is believed the foregoing description conveys a clear understanding of my invention and of its various objects and advantages. While reference has been made in the foregoing description to various specific details of construction, it should be understood that changes might be made without seriously departing from the spirit and scope of the invention. For that reason, the appended claims have been drawn with a view to covering all legitimate modifications and adaptations.

I claim:

1. A radiator unit comprising a radiator core, having upper and lower tanks or headers communicating therewith, a front frame plate for said radiator covering the fronts of the tanks and defining the margins of the core, said plate projecting beyond the opposite sides of the core, a shroud fitting closely about and enclosing the back and sides of the core between the tanks, but open at the back to permit the passage of air through the core, and means for fastening the shroud to the projecting portions of the front frame plate at opposite sides of the core.

2. A radiator unit as set forth in claim 1 wherein the tanks have outwardly projecting rims thereon, and wherein the shroud has the edges conformed to fit said rims whereby to make good connections and also insure accurate positioning of the parts, the edges of said shroud being arranged to be clamped onto said rims in the fastening of the shroud to the front frame plate.

3. A radiator unit as set forth in claim 1 wherein the front frame plate has an inner rim portion for abutment with the front of the radiator to position the plate, the said rim being arranged to be clamped onto the radiator front in the fastening of said plate onto the shroud.

4. A radiator unit as set forth in claim 1 wherein the front frame plate has a rim portion fitting over the radiator and serving to position the plate thereon, and wherein the upper and lower tanks have outwardly projecting rim portions thereon adjacent the edges of the shroud, the shroud having the edges thereof conformed to fit on said rims whereby accurately to position the shroud with reference to the radiator.

5. A radiator unit comprising a radiator core having upper and lower tanks or headers communicating therewith, a front frame plate covering the fronts of the tanks and defining the margins of the core, having an outer rim fitting over the radiator and serving to position the plate with reference thereto, a shroud enclosing the back and sides of the core between the tanks, but open at the back to permit the passage of air through the core, said upper and lower tanks having outwardly projecting rims on the back and sides, and said shroud having the upper and lower edges thereof conformed to fit on said rims whereby to position the shroud properly with reference to the radiator, the sides of said shroud having flanges on the forward edges thereof, and the front frame plate having flanges on the edges of the rim thereof arranged to cooperate therewith, and means for fastening said flanges together.

6. A radiator unit as set forth in claim 5 wherein the means serving to fasten the said flanges together is arranged when tightened to draw the flanges toward one another whereby to cause the frame plate and the shroud to clamp onto the radiator.

7. A radiator unit as set forth in claim 5 wherein the means serving to fasten the said flanges together is arranged when tightened to draw the flanges toward one another whereby to cause the frame plate and the shroud to clamp onto the radiator, the outer edges of the flanges on the sides of the shroud being bent rearwardly to reinforce and stiffen the same against buckling or bending under the tightening of the fastening means.

8. A radiator unit comprising a radiator core having upper and lower tanks or headers communicating therewith, the said tanks having outwardly projecting rims defining the edges of the header plates, a front frame plate covering the fronts of said tanks having an inner rim fitting over the rims on the fronts of said tanks and defining the margins of the core, and an outer rim extending rearwardly and fitting over the outside of the tanks, the latter rim having inturned flanges at either side of the core, a shroud enclosing the back and sides of the core between the upper and lower tanks, said shroud having the upper and lower edges thereof conformed to fit onto the rim of the tanks at the back and sides thereof, and having the back open to permit the passage of air through the core,

the forward edges of the sides of said shroud being provided with outturned flanges for cooperation with the inturned flanges of the front frame plate, said flanges being normally spaced with reference to one another before they are fastened together, and means for fastening said flanges together whereby the front frame plate and shroud are both stretched into snug contact with the radiator, the front frame plate bearing against the radiator about its inner rim and the shroud bearing against the radiator about its upper and lower edges.

9. A radiator heater unit comprising, in combination, a radiator comprising a core and upper and lower tanks or headers communicating therewith, said tanks having outwardly projecting rims thereon, a shroud enclosing the back and sides of the core between said tanks, the back of said shroud having an opening therein adapted to permit the passage of air through said core, said shroud having the upper and lower edges thereof conformed to fit onto said rims whereby accurately to position said shroud with reference to the radiator, means for fastening the shroud to the radiator, said radiator being adapted to have communication with a source of supply of heating fluid, a motor having a fan arranged to be operated to induce a draft of air through the radiator core, and means for supporting the motor so that the fan is disposed substantially centrally in the opening in the back of said shroud.

10. A radiator heater unit comprising, in combination, a radiator comprising a core and upper and lower tanks or headers communicating therewith, said tanks having outwardly projecting rims thereon, a shroud enclosing the back and sides of the core between said tanks, the back of said shroud having an opening therein adapted to permit the passage of air through said core, said shroud having the upper and lower edges thereof conformed to fit onto said rims whereby accurately to position said shroud with reference to the radiator, means for fastening the shroud to the radiator, pipes projecting rearwardly from the upper and lower tanks having communication with a source of supply of heating fluid and serving to support said radiator, as, for example, on the dash of an automobile, a motor having a fan operating in the back of said radiator, and means for mounting said motor on one of said pipes so that the fan is disposed substantially centrally in the opening in said shroud.

11. A radiator heater unit comprising, in combination, a radiator comprising a core and upper and lower tanks or headers communicating therewith, said tanks having outwardly projecting rims thereon, a shroud enclosing the back and sides of the core between said tanks, the back of said shroud having a substantially circular opening therein adapted to permit the passage of air through said core and having the upper and lower edges thereof conformed to fit onto said rims whereby accurately to position said shroud with reference to the radiator, means for fastening the shroud to the radiator, pipes projecting rearwardly from the upper and lower tanks and having communication with a source of supply of heating fluid, said pipes being disposed on a substantially diametrical line with reference to the circular opening in the back of said shroud, a motor having a fan operating in the opening in the back of said shroud, and means extending between said pipes substantially diametrically with reference to said circular opening and serving to support said motor with the fan thereof substantially centrally disposed in said opening.

12. A radiator heater unit of the character described, comprising a radiator having the core thereof communicating with upper and lower tanks or headers, supply and return pipes connected with the upper and lower tanks and extending rearwardly therefrom for communication with a source of supply of heating fluid, means for supporting said pipes, as, for example, on the dash of an automobile, an electric motor having a fan on the armature shaft thereof operating in back of the radiator core, and a bracket for supporting the motor with its fan in the position described, comprising two parts embracing the housing of the motor intermediate their ends and embracing the supply and return pipes at their opposite ends, and means for fastening the two parts together.

13. A heater unit as set forth in claim 12 including sound and vibration deadening material interposed between the ends of the bracket parts and the pipes, the bracket parts being arranged to clamp onto said material whereby to avoid metal to metal contact between the bracket and the pipes and prevent the transmission of vibration and sound incident to the operation of the motor to the pipes and thence to the radiator or other parts connected therewith.

14. A radiator heater unit comprising a radiator having the core thereof communicating with upper and lower tanks or headers, upper and lower supply and return pipes connected to said tanks and extending rearwardly therefrom for communication with a source of supply of heating fluid, means furnishing air to be heated to the radiator core, means for fastening the upper and lower supply and return pipes to a heater support, such as the dash of an automobile, the unit being held against up and down movement by reason of the mounting on the upper and lower supply and return pipes, and means provided in connection with the pipes for preventing lateral swinging movement of the unit with said pipes.

15. A heater unit as set forth in claim 13,

wherein the last mentioned means comprises reinforcing cleats arranged to be disposed in horizontal position, or nearly so, and arranged to be caused to bear against the heater support in the fastening of the supply and return pipes thereto.

16. A radiator unit comprising a radiator core, having upper and lower tanks or headers communicating therewith, a shroud fitting closely about and enclosing the back and sides of the core between the tanks and having the top and bottom edges thereof engaging the back and sides of the tanks for support thereon, said shroud having an opening in the back thereof to permit the passage of air through the core, a front frame plate for said radiator covering the fronts of the tanks and defining the margins of the core and projecting beyond the opposite sides of said core, the shroud having the front ends bent outwardly for attachment to the projecting portions of the front frame plate at opposite sides of the core, and means for fastening the last mentioned portions of the shroud and frame plate together.

17. A radiator unit comprising a radiator core, having upper and lower tanks or headers communicating therewith, a shroud fitting closely about and enclosing the back and sides of the core between the tanks and having the top and bottom edges thereof engaging the back and sides of the tanks for support thereon, said shroud having an opening in the back thereof to permit the passage of air through the core, a front frame plate for said radiator covering the fronts of the tanks and defining the margins of the core and projecting beyond the opposite sides of said core, the projecting portions of said frame plate being bent rearwardly and then inwardly to provide inturned flanges for purposes of attachment to the shroud, the shroud having the front ends thereof bent outwardly to provide flanges for attachment to the frame plate, and means for fastening the outturned flanges of the shroud to the inturned flanges of the frame plate.

18. A radiator unit comprising a radiator core, having upper and lower tanks or headers communicating therewith, a shroud fitting closely about and enclosing the back and sides of the core between the tanks and having the top and bottom edges thereof engaging the back and sides of the tanks for support thereon, said shroud having an opening in the back thereof to permit the passage of air through the core, a front frame plate for said radiator having an outer rim projecting rearwardly for engagement with the top and bottom of the upper and lower tanks for support of said frame plate thereon, said frame plate covering the fronts of the tanks and defining the margins of the core and projecting beyond the opposite sides of said core, the shroud having the front ends bent outwardly for attachment to the projecting portions of the front frame plate at opposite sides of the core, and means for fastening the last mentioned portions of the shroud and frame plate together.

19. A structure as set forth in claim 16 wherein the front frame plate has an inner rim for engagement with the front of the radiator and wherein the means for fastening the shroud to the frame plate is arranged when tightened to draw the said parts toward each other whereby to cause the frame plate to clamp onto the radiator by its inner rim portion and the shroud to clamp onto the upper and lower tanks of the radiator by its upper and lower edges.

20. A radiator heater unit comprising in combination a radiator comprising a core and upper and lower tanks or headers communicating therewith, a shroud fitting closely about and enclosing the back and sides of the core between the tanks, said shroud having a circular opening in the back thereof adapted to permit the passage of air through said core, said shroud having the upper and lower edges thereof engaging the back and sides of the upper and lower tanks for support of the shroud thereon and so as to position said shroud accurately with reference to the radiator, means for fastening the shroud to the radiator, a motor having a fan arranged to be operated to induce a draft of air through the radiator core, pipes projecting rearwardly from the upper and lower tanks in diametrically opposed relation relative to the circular opening in the back of said shroud and adapted to have communication with a source of supply of heating fluid and also adapted to serve to support said radiator, and means for mounting the motor on one of said pipes so that the fan is disposed substantially centrally in the opening in said shroud.

21. A radiator heater unit comprising in combination a radiator comprising a core and upper and lower tanks or headers communicating therewith, a shroud fitting closely about and enclosing the back and sides of the core between the tanks, said shroud having a circular opening in the back thereof adapted to permit the passage of air through said core, said shroud having the upper and lower edges thereof engaging the back and sides of the upper and lower tanks for support of the shroud thereon and so as to position said shroud accurately with reference to the radiator, means for fastening the shroud to the radiator, a motor having a fan arranged to be operated to induce a draft of air through the radiator core, pipes projecting rearwardly from the upper and lower tanks in diametrically opposed relation relative to the circular opening in the back of said shroud and adapted to have communication with a source of supply of heating fluid and also adapted to serve to support said radia-

tor, and a bracket mounted on said pipes and extending substantially diametrically with reference to the opening in the shroud and serving to support the motor with the fan thereof substantially centrally disposed with reference to said opening.

22. A radiator heater unit comprising a radiator having the core thereof communicating with tanks or headers, supply and return pipes connected to said tanks and extending rearwardly therefrom for communication with a source of supply of heating fluid, the radiator core being arranged to have air to be heated passed therethrough, means for fastening the supply and return pipes to a heater support, such as the dash of an automobile, the said pipes affording support for the heater unit in one plane, and means provided in connection with the pipes for preventing side sway of the unit with the pipes in a transverse plane.

23. A heater unit as set forth in claim 22 wherein the last mentioned means comprises reinforcing cleats disposed in a position transverse with reference to the plane of the two pipes and arranged to be caused to bear against the heater support on opposite sides of the pipes in the fastening of said pipes to said support.

24. In a heater unit of the character described, the combination of a radiator comprising a core and upper and lower tanks or headers communicating therewith, the said radiator being adapted to have connection with a source of heating fluid and adapted to have an electric fan force air to be heated through said core, a front frame plate for said radiator covering the fronts of said tanks and defining margins of the core, said plate being constructed to leave a space between the inside thereof and the front of one of said tanks, and a switch for controlling the operation of the electric motor for the heater mounted in said space within said front frame plate and concealed thereby and having a manually operable part thereof projecting through a hole provided therefor in the frame plate for convenient operation from in front of the heater.

25. A radiator heater unit comprising a radiator, a casing for said radiator open in front and having an opening in the back thereof permitting the passage of air through the core of said radiator, said casing having one or more portions thereof formed to fit certain portions of the radiator so as to locate the back opening in a predetermined position, supply and return pipes connected with the opposite ends of said radiator, said pipes being located in a predetermined relation to one another so as to be at diametrically opposite sides of the back opening, said pipes extending rearwardly from the radiator for communication with a source of supply of heating fluid, a motor operating a fan in back of the radiator, and a supporting bracket for said motor mounted on said pipes and extending substantially diametrically with respect to the back opening whereby to hold the fan substantially centrally with respect thereto.

26. A radiator heater unit comprising a radiator, a casing for said radiator open in front and having an opening in the back thereof for the passage of air through the core of said radiator, supply and return pipes connected with the opposite ends of the radiator at diametrically opposite sides of the back opening and extending rearwardly from the radiator for communication with a source of supply of heating fluid, a motor operating a fan in back of the radiator, and a supporting bracket for said motor mounted on said pipes and extending substantially diametrically with respect to the back opening whereby to hold the fan substantially centrally with respect thereto, said supporting bracket being connected to the pipes in such a way that the same may be shifted thereon to adjust the fan in the shroud opening to different spaced relation to the back of the radiator core substantially as and for the purposes described.

27. A radiator heater unit comprising a radiator, a casing for said radiator open in front and having an opening in the back thereof for the passage of air through the core of said radiator, supply and return pipes connected with the opposite ends of the radiator at diametrically opposite sides of the back opening and extending rearwardly from the radiator for communication with a source of supply of heating fluid, a motor operating a fan in back of the radiator, and a supporting bracket for said motor mounted on said pipes and extending substantially diametrically with respect to the back opening whereby to hold the fan substantially centrally with respect thereto, said supporting bracket being arranged to clamp onto said pipes, and cushioning material interposed between the pipes and the bracket so that there is no metal to metal contact and sound and vibration incident to the operation of the motor cannot be transmitted to the pipes and thence to the radiator and parts associated therewith.

28. A radiator heater unit comprising in combination a radiator comprising a core and upper and lower tanks or headers communicating therewith, a shroud fitting closely about and enclosing the back and sides of the core between the tanks, said shroud having a circular opening in the back thereof adapted to permit the passage of air through said core, said shroud having the upper and lower edges thereof engaging the upper and lower tanks for support of the shroud thereon and so as to position said shroud accurately with reference to the radi-

ator, means for fastening the shroud to the radiator, a motor having a fan arranged to be operated to induce a draft of air through the radiator core, and means for supporting the motor so that the fan is disposed substantially centrally in the opening in the back of said shroud.

29. A heater unit as set forth in claim 28 wherein the last mentioned means supports the motor so that the same may be shifted to adjust the fan in the shroud opening to different spaced relation to the back of the radiator core.

30. In a heater having intake and discharge conduits, a motor, a mounting for the motor including oppositely disposed clamping members having their end portions curved to substantially fit the peripheries of said conduits, the intermediate portions of said clamping members also being curved and shaped to substantially fit the periphery of the motor housing, and bolts in said clamping members whereby they may be actuated to clampingly engage said conduits and said motor to firmly secure the motor in position upon the heater, said clamping members permitting adjustment of the motor with respect to the heater body.

31. In a heater having intake and discharge conduits, a motor, a mounting for the motor including oppositely disposed clamping members of yieldable material having their end portions curved to substantially fit the peripheries of said conduits, and the intermediate portions of said clamping members being curved to substantially fit the motor housing, and the curved portions of each clamping member being connected by elongated aligned strap portions having apertures therein adapted to receive suitable clamping bolts whereby said clamping members may be operated to secure the motor in position upon the heater between said conduits.

32. In a heater, the combination of a heating unit, an electric motor having a fan on the armature shaft thereof operating behind the heating unit, tubular supporting members extending from the opposite ends of the heating unit rearwardly adapted to support the heater, and a mounting for the motor including opposed clamping members having intermediate portions embracing the housing of the motor and end portions embracing the aforesaid supporting members, and means for fastening the clamping members together.

33. In a heater, the combination of a heating unit, an electric motor having a fan on the armature shaft thereof operating behind the heating unit, pipes extending from the opposite ends of the heating unit rearwardly for the delivery of heating medium to and from the heating unit, and a mounting for the motor including opposed clamping members having intermediate portions embracing the housing of the motor and end portions embracing the aforesaid pipes, and means for fastening the clamping members together.

In witness of the foregoing I affix my signature.

ALBERT H. BATES.

CERTIFICATE OF CORRECTION.

Patent No. 1,834,674. Granted December 1, 1931, to

ALBERT H. BATES.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, after line 48, insert the following paragraph:

> (3) The provision of a switch for controlling the electric fan motor which is mounted on the inside of the front plate with its lever extending through a slot therein for operation from the front of the heater. This makes an attractive appearing assembly and renders the heater unit self-contained so that the job of mounting a switch on the instrument board of the car is dispensed with.

same page, line 49, for the numeral "(3)" read (4); and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of February, A. D. 1932.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)