Nov. 8, 1932. L. D. HARNETT ET AL 1,887,093

RADIATOR

Filed Nov. 2, 1931

Fig. 1.

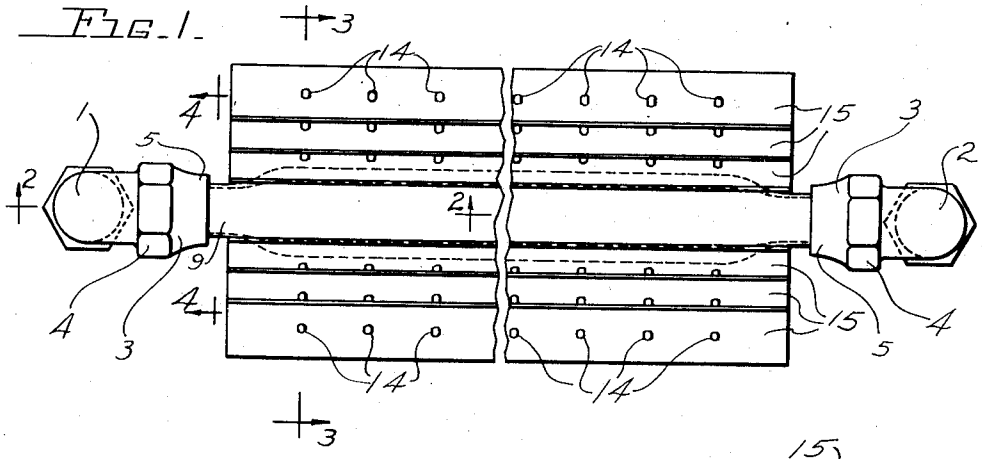


Fig. 2.

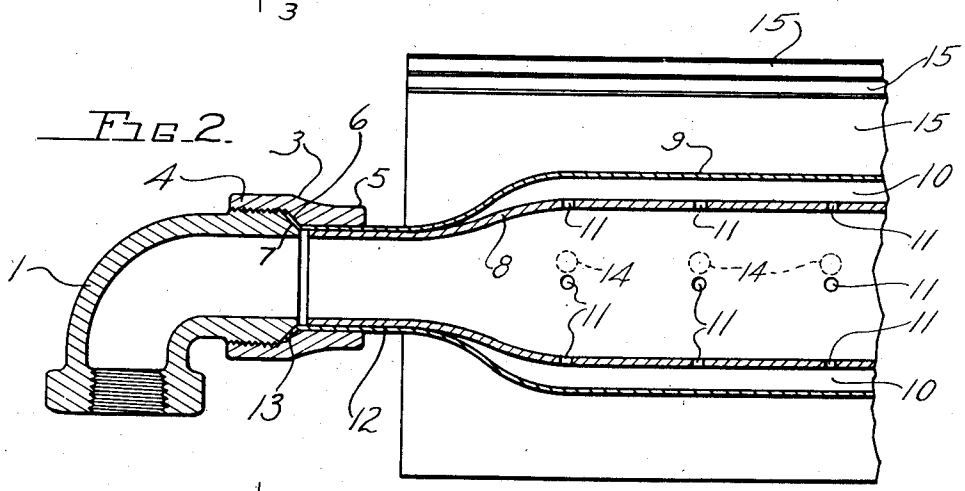


Fig. 3.

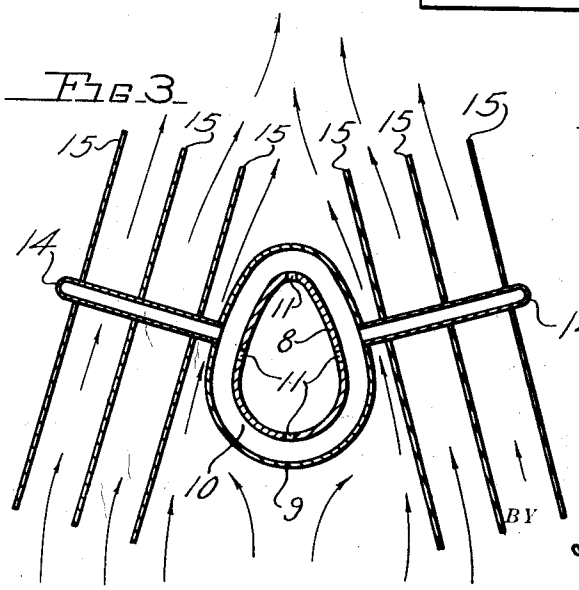
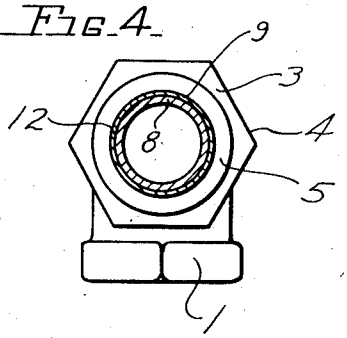


Fig. 4.



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RADIATOR

Application filed November 2, 1931. Serial No. 572,590.

This invention relates to improvements in radiators, and has for its object to provide a radiator consisting of few parts composed of light sheet metal, and so united that the assembly of parts forming the radiator may be supported entirely by the feed and discharge pipes leading to and from the radiator.

It is also an object of this invention to provide a radiator in which there is means to distribute the heating liquid equally to all parts of the heating surfaces, which surfaces are so arranged that the currents of air passing thereover converge and mix, whereby there is an equal distribution of the heat through all parts of the air contacting with the radiator.

It is also an object of this invention to provide, in connection with a pair of fittings, a pair of pipes, one located within the other but spaced therefrom, with their ends contacting, each end of each of these pipes being connected to a fitting by means of a nipple which serves to support the ends of the pipes and to clamp the ends of the outer pipe on the fittings.

It is also an object of this invention to provide a radiator composed of sheet metal parts, each end of the radiator being supported by a fitting attached to the upper end of a feed or discharge pipe and attached to the radiator by means of a nipple. Headers are entirely eliminated.

These and other advantages will appear from the following description taken in connection with the drawing.

Referring to the drawing:

Figure 1 is a top plan view of a radiator, showing the fitting and the nipple at each end.

Figure 2 is a section on the line 2—2 of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 1.

Figure 4 is a section on the line 4—4 of Figure 1.

The radiator herein described and shown is adapted to be used in connection with air treating and air conditioning apparatus, and is adapted to receive the air from a blower after it has been otherwise conditioned, and heat the air. While this radiator is especially adapted for use in connection with blowers, it may also be used in connection with air currents for heating different parts of the current, and thereafter uniting the parts into a current in which there is a uniform temperature condition. This radiator is adapted to be supported by two pipes, one an inlet and the other an outlet, not shown.

On top of the inlet pipe is an inlet fitting 1 threaded or otherwise attached thereto. To the outlet pipe a similar fitting 2 is threaded. These fittings are similarly constructed and similarly formed, one to receive the heating fluid from a feed pipe, and the other to discharge the heating fluid into a discharge pipe. These fittings are in the form of an elbow. The horizontal part of each fitting has threaded thereon a nipple 3, one end 4 of which is enlarged to receive the threaded end of the fitting, while the other end 5 is reduced to receive one end of heating pipes, later to be described.

Between the enlarged end and the reduced end of the nipple is a tapered shoulder 6, which cooperates with a tapered end 7 of the fitting for gripping one end of a radiator pipe. In the present instance there are two of these radiator pipes, an inner one 8, composed of sheet metal but somewhat thicker than the outer one 9, inclosing the inner one and spaced therefrom to form an annular chamber 10. The ends of each pipe slightly converge to form a restricted inlet or outlet, depending upon which way the heating fluid is flowing through the pipes. The ends of the outer pipe are more restricted than those of the inner pipe and are brought in contact with the ends of the inner pipe so there is formed a substantially closed chamber.

Extending through the wall of the inner pipe is a plurality of holes 11. These pipes, as shown in Figure 3, are ovate in shape. The holes 11 are so arranged that one row of holes is along the small part of the pipe, another row is along each side, while still another row is along the back or broader part of the pipe. By means of these holes the heating fluid may pass from the inside pipe into the

chamber 10, between the two pipes and may also pass back through these holes so that the fluid may be discharged at the outlet fitting. These holes are for the purpose of evenly and equally distributing the heating fluid through the outside pipe, whereby all parts of the surfaces of the outside pipe are equally heated.

The points where each end of one pipe fits with the corresponding end of the other pipe is indicated by the numeral 12, while the outwardly turned flange on the end of each outer pipe is indicated by the numeral 13. These ends are flared out so they will engage the tapered ends of the fittings and be clamped thereon by means of the tapered shoulder 6, as is clearly shown in Figure 2.

Extending from each lateral side of the oval outer pipe 9 is a plurality of elongated cup-shaped projections 14. These projections have connection with the outer pipe so that the heating fluid in the pipe may circulate into these projections, but may not escape because the outer ends thereof are closed. Fitting over the projections, on each side of the pipe, is a plurality of fins 15. The fins on each side of the pipe are parallel with each other.

In order to receive the cup-like projections the fins have holes therein, and are pressed onto the projections and held thereon by means of frictional engagement. While the fins on each side of the pipe are parallel to each other, the fins of one set converge with relation to the fins of the other set so that the air passing through one set of fins will mix and mingle with the air passing through the other set.

It is also to be observed that the inside fin of each set of fins tends to force the air passing between these fins into intimate and direct contact with the walls of the outer pipe so the air is thoroughly heated as it passes around the pipes. The air passing between any two fins may not be subject to the same temperature condition as the air passing between the fins adjacent the pipe, and for that reason may be differently heated, but since the fins converge the air is brought together at a certain point and thoroughly mixed so that after the air is mixed all parts of it are consistently heated.

The material of which the pipes are made, the fins and other parts may be brass or any other suitable heat-conducting material. The parts are thin and light and are entirely supported by the feed and discharge pipes by means of the nipples and the fittings. No header is required and no additional support other than the feed and discharge pipes.

This radiator may be easily attached to or removed from a support. The fins may be easily removed from the projections and new fins placed thereon. The nipples may be easily removed and replaced by different nipples, and the whole radiator structure, consisting of the pipes and fins, may be easily removed and replaced by new or repaired parts.

A few flat sheets 15 constitute the fins or heat radiating plates, which can be quickly mounted on the projections 14. This eliminates the costly procedure of the prior art of threading small plates on the heat pipes themselves transversely thereof.

It will be understood that we desire to comprehend within our invention such modifications as come within the scope of our claims and our invention.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a radiator, in combination with an inlet and an outlet fitting, a pair of pipes, one within the other and spaced therefrom, the ends of the outer pipe being reduced to contact with the ends of the inner pipe, and a nipple to connect each of the contacting ends of the pipes to one of the fittings and clamp the outer pipe between the nipple and the fitting.

2. In a radiator, in combination with an inlet and an outlet fitting, a pair of pipes, one within the other and spaced therefrom, the ends of the outer pipe being reduced to contact with the ends of the inner pipe and the inner pipe having holes leading into the space between the pipes, and a nipple connecting each of the contacting ends of the pipes to one of the fittings, the nipple and the fitting having inclined surfaces between which the end of the outer pipe is gripped.

3. In a radiator, in combination with an inlet and an outlet fitting, a double-walled connection between the fittings forming an annular chamber, the inner wall having holes leading into the chamber, and cup-shaped members having their open ends extending through the outer wall of the connection.

4. In a radiator, in combination with an inlet and an outlet fitting, a double-walled connection between the fittings forming an annular chamber having communication with the interior of the connection, a plurality of cup-shaped projections on said connection, and heating fins on said projections.

5. In a radiator, in combination with an inlet and an outlet fitting, a double-walled connection between the fittings forming an annular chamber having communication with the interior of the connection, a plurality of cup-shaped projections on said connections, and a plurality of converging fins on the projections.

6. A radiator consisting of a pipe having thereon a plurality of longitudinally arranged heat radiating fins distributed on opposite sides of the pipe.

7. A radiator consisting of a pipe having thereon a plurality of longitudinally ar-

ranged converging fins distributed on opposite sides of the pipe.

8. A radiator consisting of a pipe having thereon a plurality of sets of radiating fins, the fins of one set converging towards the fins of the other set and to a plane passing through the pipe.

9. A radiator consisting of a pipe having thereon a plurality of sets of longitudinally arranged parallel fins, the fins of one set converging towards the fins of the other set and to a plane passing through the pipe.

10. In a radiator, a pipe having a reduced end of different section than the main body of the pipe, said section having a flared end, a second pipe in the first pipe engaging the reduced end, a slidable nipple with an inwardly flared shoulder receiving said flared end and slidably mounted on said reduced section, said nipple being internally threaded beyond the flared end, and an externally threaded fitting having a correspondingly tapered end, whereby said flared end is clamped between the nipple and the fitting when the two are screwed together.

11. In a radiator, a pipe having a plurality of laterally disposed supporting projections, and longitudinally extending plates mounted in spaced relationship on said projections substantially parallel to said pipe.

12. A radiator consisting of a pipe having a plurality of projections thereon and a plurality of sets of parallel, longitudinal fins on the projections, the fins of one set converging towards the fins of the other set and to a plane through the pipe.

13. A radiator consisting of an oval pipe having on each side a plurality of hollow projections, and a plurality of parallel fins on the projections on each side of the pipe, the fins on one side of the pipe converging towards the fins on the other side.

14. In a headerless radiator, a pipe of ovoid section having reduced ends circular in section, a clamping nipple and fitting adapted to clamp a flared end therebetween of said rounded section of the pipe at either end, a perforated distribution pipe within the first-mentioned pipe in spaced relationship therefrom supported in engagement with the circular section end of the first-mentioned pipe, diagonally disposed projections on either side of the first-mentioned pipe, and spaced plates threaded on said projections in longitudinal, parallel relationship with said pipes.

15. In a radiator, a pipe, supporting means on each side thereof, and a heat radiating plate mounted on said supporting means in spaced parallel relationship to each other and to said pipe.

In testimony whereof, we affix our signatures.

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