Nov. 1, 1932. T. E. MURRAY 1,885,536

RADIATOR

Filed Feb. 4, 1930

Fig. 1.

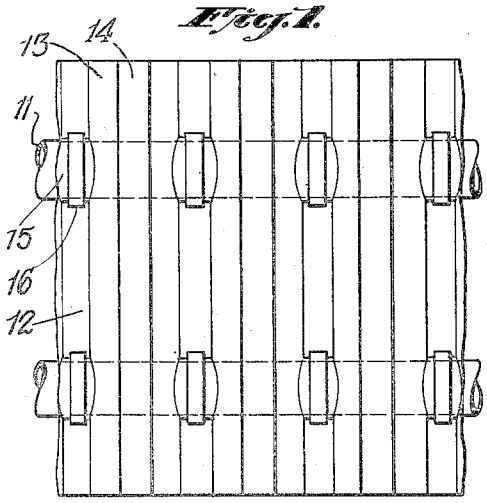


Fig. 2.

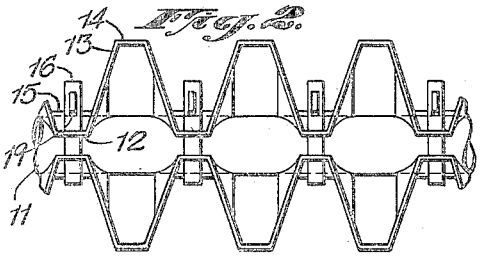


Fig. 3.

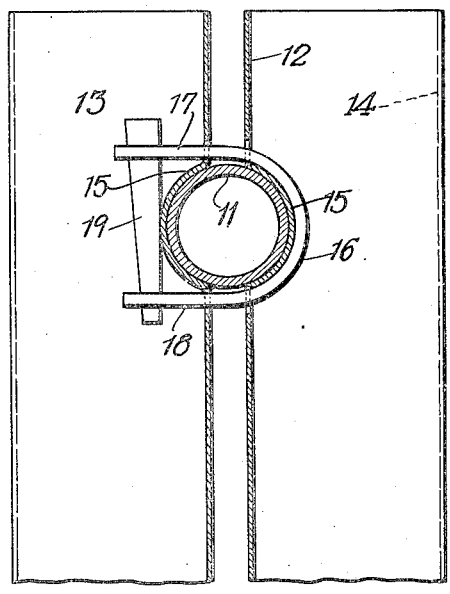


Fig. 4.

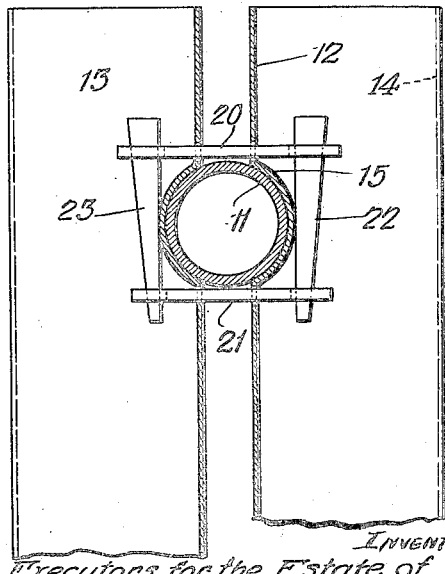
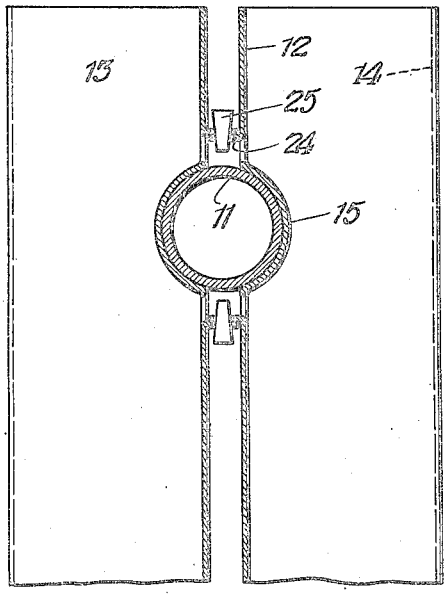


Fig. 5.



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UNITED STATES PATENT OFFICE

THOMAS E. MURRAY, DECEASED, LATE OF BROOKLYN, NEW YORK, BY JOHN F. MURRAY, JOSEPH B. MURRAY, AND THOMAS E. MURRAY, JR., EXECUTORS, ALL OF BROOKLYN, NEW YORK, ASSIGNORS, BY MESNE ASSIGNMENTS, TO AMERICAN RADIATOR & STANDARD SANITARY CORPORATION, A CORPORATION OF DELAWARE

RADIATOR

Application filed February 4, 1930. Serial No. 425,753.

In a previous Patent No. 1,744,078 and certain pending applications there are described certain radiators of the convection type comprising horizontal tubes or similar narrow elongated heating elements to which is applied an extended area structure composed of corrugated sheets or the like forming transverse plates or fins between which are vertical passages for heating the air and inducing a strong upward draft and circulation of the heated air throughout the room to be warmed.

In such radiators the manner of securing the extended area structure to the heating element is important. The contact should be intimate and of substantial extent to secure good conductivity and should be durable under the strains set up by alternate heating and cooling, and should be as economical as possible. The present invention aims to secure these advantages in radiators of this and similar types.

The accompanying drawing illustrates embodiments of the invention.

Fig. 1 is a front elevation and Fig. 2 a plan of the central part of a radiator;

Figs. 3, 4 and 5 are vertical sections through points at which the parts are secured together.

The heating element is a tube 11 for steam or other heating medium extending horizontally in two sections in vertical alignment with each other. It is preferably of copper.

The radiator may be used for cooling the air by circulating cold brine, for example, through the tube, in which case the air circulation would be downward.

Applied to opposite sides of the tube are corrugated sheets forming inner longitudinal plates 12, outer longitudinal plates 13 and transverse plates or fins 14. The inner plates 12 are bent outward to form recessed portions 15 which embrace the tube so as to provide a considerable contact area. The opposite plates 12 are spaced apart slightly above and below the tube. This is essential in Fig. 5 in order to leave room for the fastening devices, but is not essential in other figures.

Referring first to Figs. 1 and 2, immediately above and below each section of the tube the plates 12 are apertured to receive certain devices for securing the sheets to the tube. A strap 16, preferably of stiff steel closely embraces the recessed portion 15 of one of the plates 12 and has transverse portions 17 and 18 passing through the openings in the plates 12 to a point laterally beyond the tube. The parts 17 and 18 have holes through them in a vertical direction. A wedge 19 passed through such holes bears against the plate and can be forced down sufficiently to draw the opposite recessed portions 15 of the plates 12 into close contact with the tube.

The tubing is preferably of thin copper. The corrugated sheets may be of copper, aluminum, steel or other metal. They also are preferably extremely thin, the corrugated shape serving to stiffen them.

For some installations it is sufficient to have a corrugated sheet at only one side, using a straight flat sheet or merely a series of plates 12 at the opposite side to form anchorages for the securing devices.

Radiators of generally similar design have been built also with separate transverse plates or fins like 14 but free at their outer edges and with flanges like the plates 12 engaging the heating element. The method of fastening above described may be applied to the flanges of such separate fins as well as to the plates 12 forming parts of the continuous corrugated sheets illustrated.

Instead of using a single wedge at one side, two wedges may be used, as in Fig. 4. Straight bars 20, 21 are passed through openings in the plates 12. Wedges 22 and 23 at opposite sides engage the portions 15 of the plates and react against each other to press the plates firmly into close contact with the tube.

Or, as in Fig. 5, tabs 24 may be punched out of the plates 12 into position to overlap each other, with vertical holes through which are driven wedges 25 which draw the plates together and clamp the recessed portions 15 thereof in contact with the tube.

It is advantageous to bring the fastening devices closely above and below the tube in order to bring the sheets into close contact with the tube and to hold them so; so as to

prevent such yielding of the sheets when the tube is heated as would occur if the fastenings were at more remote points from the tube.

The same modifications described in connection with Figs. 1, 2 and 3 may be applied to the construction shown in Figs. 4 and 5. The points of attachment are outside of or beyond the tubes, but it is advantageous to bring them close to the tubes in order to hold the sheets in close contact and to prevent such yielding of the sheets when the tubes are heated as would occur if the fastenings were remote from the tubes.

The fastening means described may be supplemented in various ways as, for example, by soldering, brazing or similar operation, either using a film of solder between the tube and the engaging portions of the sheets or dipping the assembled radiator so that the solder is applied only around the edges of the contact areas.

When the radiator is used for cooling air or for analogous interchanging of heat, the tube is still referred to herein as the heating element, though it may be, in fact, transmitting heat to the fluid which circulates within it, instead of in the opposite direction as in the ordinary radiator for heating the air in a room.

In the construction of Figs. 3 and 4 the recesses in the corrugated sheets may be made substantially semi-circular and the plates 12 at opposite sides brought substantially into contact so as to close the spaces above and below the tubes, securing a more compact radiator and a larger contact area between the tubes and the sheets.

Various other modifications may be made by those skilled in the art without departing from the invention as defined in the following claims.

1. A radiator including a heating element, an extended area structure comprising portions embracing the heating element and means for securing the structure to the heating element including transversely extending members and vertically movable wedges engaging said members and holding said structure in close engagement with the heating element.

2. A radiator including a heating element, an extended area structure comprising portions embracing the heating element and means for securing the structure to the heating element including transversely extending members and vertical wedges located outside of said structure and engaging said members and serving to draw and hold the structure in close engagement with the heating element.

3. A radiator including a tubular heating element of circular cross section, an extended area structure comprising recessed portions embracing the heating element and means for securing the structure to the heating element including straps fitting the outside of said recessed portions where they embrace the heating element and means for holding said straps tightly to secure such portions in close and extensive engagement with the heating element.

4. A radiator including a heating element, an extended area structure comprising portions embracing the heating element and means for securing the structure to the heating element including straps fitting the outside of said portions where they embrace the heating element and wedges for drawing said straps tightly to press and hold said portions into extensive and close engagement with the heating element.

5. A radiator including a heating element, an extended area structure comprising portions embracing the heating element and means for securing the structure to the heating element including straps fitting the outside of said portions where they embrace the heating element and means outside of said structure for holding said straps tightly to secure such portions in close and extensive engagement with the heating element.

6. A radiator including a heating element, an extended area structure in parts at opposite sides respectively of said heating element, a strap passing through both said parts and holding them in close engagement with the heating element and means for fastening said strap in place.

7. A radiator including a tubular heating element of circular cross section, an extended area structure having a recessed portion which fits and embraces said tubular heating element, a strap also having a recessed portion which fits and embraces the recessed portion of the said structure and holds it closely around the tubular heating element and means for fastening said strap in place.

8. A radiator including a heating element, an extended area structure in parts at opposite sides respectively of said heating element and vertically movable wedges located between said parts for drawing them and holding them in engagement with the heating element.

9. A radiator including a heating element, an extended area structure in parts at opposite sides respectively of said heating element and wedges located between said parts for drawing them and holding them in engagement with the heating element, said wedges engaging said parts of the extended area structure.

In witness whereof, we have hereunto signed our names.

JOHN F. MURRAY,
JOSEPH B. MURRAY,
THOMAS E. MURRAY, JR.,
Executors for the Estate of Thomas E. Murray, Deceased.