June 7, 1932. T. E. MURRAY 1,861,448

RADIATOR

Filed Feb. 4, 1930

Fig. 1.

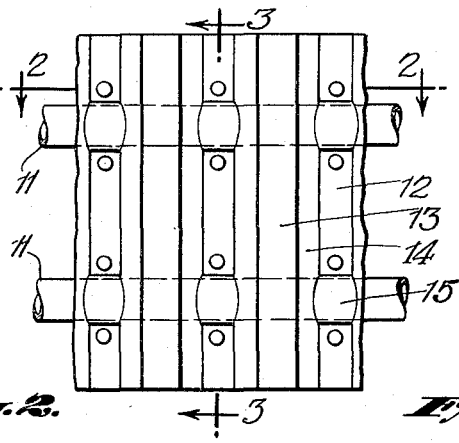


Fig. 2.

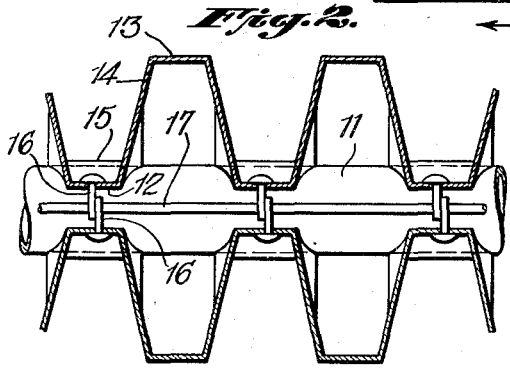


Fig. 4.

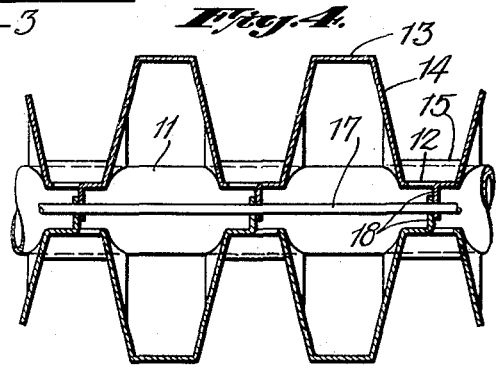


Fig. 3.

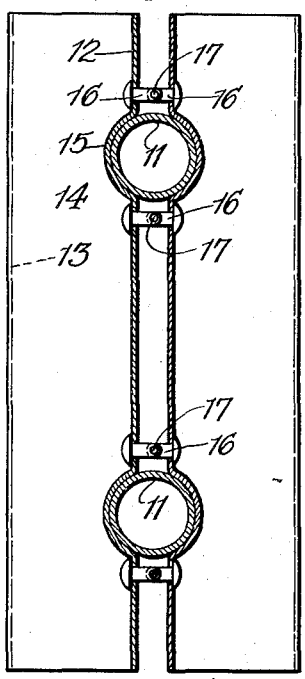
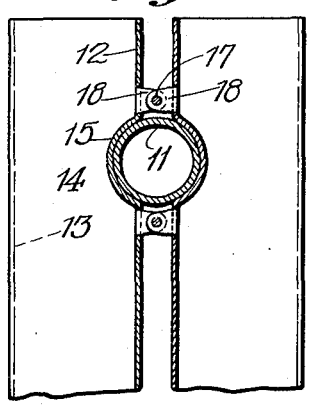


Fig. 5.



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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. 425,752.

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.

The accompanying drawing illustrates embodiments of the invention.

Fig. 1 is a front elevation of the central part of a radiator; and Figs. 2 and 3 are sections thereof on the correspondingly numbered lines;

Figs. 4 and 5 are sections similar to Figs. 2 and 3 illustrating a modification.

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 to leave room for the fastening devices.

Immediately above and below the tube the plates 12 are apertured to receive the shanks of headed pins 16. The ends of the pins are flattened and apertured. When the plates are pressed into close contact with the tube the ends of the opposite pins overlap bringing their apertures in line with each other. The parts being clamped together firmly in this position, a rod 17 is passed lengthwise through the holes in the overlapping pins and thus the parts are locked together.

The rods may be in short sections, but preferably they are made in one length extending through all the joints in a line. This simplifies the operation of locking the pins together and also stiffens the radiator against lateral bending; a stiff rod of steel being preferred for this reason. The corrugated sheets may be of copper, aluminum, steel or other metal. They are preferably extremely thin, and the stiffening effect of the rod 17 makes it possible to use sheets (and tubes) of the thinnest gauge.

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 heads of the pins.

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 separate pins for this purpose, the plates 12 may be punched and bent to form integral ears 18 extending inward and overlapping. The overlapping portions are punched to provide holes which register when the sheets are pressed into close engagement with the tube, and through which a fastening or locking rod 17 is passed, as explained in connection with Fig. 2. The same modifications described in connection with Figs. 1, 2 and 3 may be applied to the construction of 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.

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 opposite portions embracing the heating element and devices projecting inwardly from said opposite portions and secured together at points between said portions and beyond the heating element for holding said structure in close engagement with the heating element.

2. A radiator including a heating element, an extended area structure comprising opposite portions embracing the heating element, and pins engaging the said opposite portions and secured together between such portions.

3. A radiator including a heating element, an extended area structure comprising opposite portions embracing the heating element, and pins engaging the said opposite portions and secured together between such portions by longitudinal rods engaging the ends of said pins.

4. A radiator including a heating element, an extended area structure in parts at opposite sides respectively of the heating element and fastening devices within the space between the opposite parts and outside of the heating element for securing said parts in position.

5. A radiator including a heating element, an extended area structure in corrugated sheets at opposite sides respectively of the heating element, with the inner portions of the corrugations engaging the heating element with a heat-conducting engagement, and fastening devices within the space between the inner portions of the opposite sheets and outside of the heating element for securing said sheets in position.

In witness whereof, we have hereunto signed our names.

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Executors of Thomas E. Murray, Deceased.