June 7, 1932. T. E. MURRAY 1,861,449

RADIATOR

Filed Feb. 4, 1930

Fig. 1.

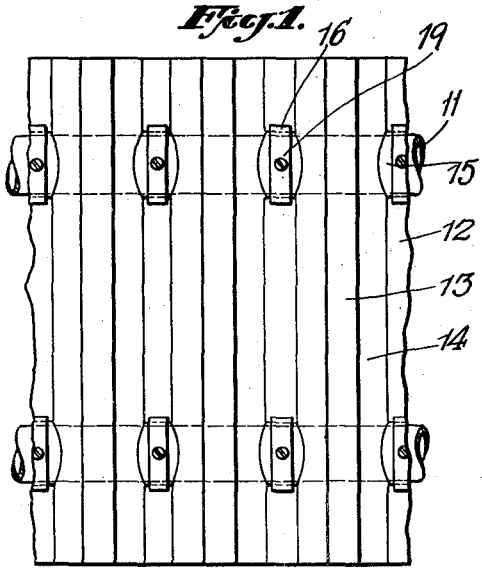


Fig. 3.

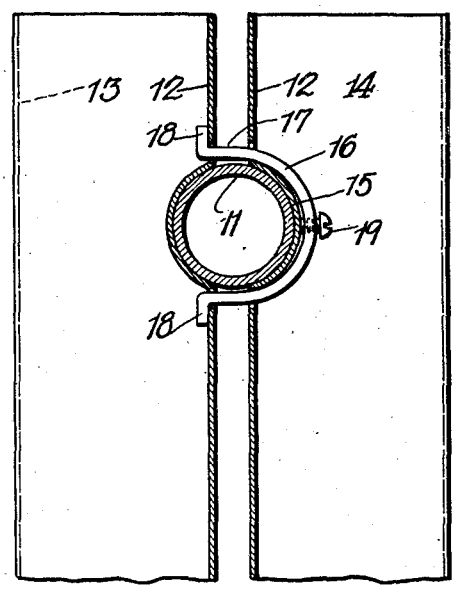


Fig. 2.

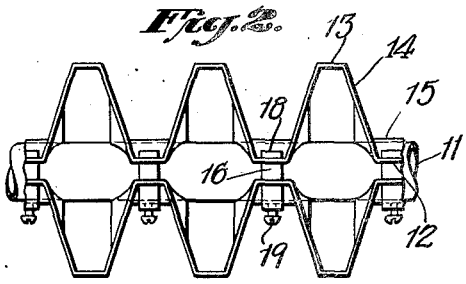
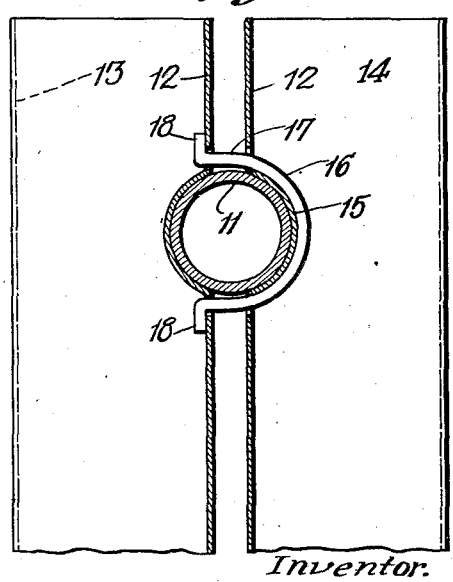


Fig. 4.



Inventor.

Thomas E. Murray, deceased.
John F. Murray.
Joseph B. Murray.
Thomas E. Murray, Jr.
Executors.

By their Attorneys

Usina & Rauber

Patented June 7, 1932 1,861,449

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. 425,754.

In a previous Patent No. 1,744,078 and certain pending applications there are described certain radiators of the convection type comprisng 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 and Fig. 2 is a plan of the central part of a radiator;

Fig. 3 is a vertical transverse section through one of the joints;

Fig. 4 is a similar section of 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, which facilitates the drawing of the recessed portions laterally into close contact with the tube; but said plates may be drawn together above and below the tubes to contact with the latter around practically their entire circumference.

Immediately above and below each tube the plates 12 are apertured to permit the passage of the fastening devices. These comprise straps 16 of comparatively stiff steel which fit and bear against the recessed portions 15 of the sheet at one side of the tube and which have transversely extending portions 17 which pass through the openings in the plates 12 and have their free ends bent up against the sheet at the corresponding side so as to fasten the parts together.

The screw 19 passes through the curved portion of the trap 16 and bears against the recessed portion 15 of the plate. This serves to clamp the ends 17 against the plate 12 and to tighten the connection between the opposite plates.

The screw may be omitted. Fig. 4 shows such a construction. In this case the parts must be clamped closely together before or while the ends 18 are being clinched, so that this clinching operation will ensure a tight connection and an intimate contact of the sheet metal against the tube.

For some installations it is sufficient to have a corrugated sheet at one side only, using a straight flat sheet for a series of plates 12, or other style of anchorage against which to clinch the ends of the straps. Or it is possible to omit one of the sheets, say the right-hand one in Figs. 3 and 4, allowing the clip 16 to engage the tube directly on that side, its ends being clinched as shown in the sheet located at the opposite side.

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.

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.

The opposite corrugated sheets may be brought closer together than they are illustrated and may, in fact, be brought substantially into contact so as to close the space between them, making a more compact radiator and securing a larger contact area between the sheets and the tubes.

The use of straps for holding the sheets closely against the tubes is not claimed broadly in the present application, being covered in another application co-pending herewith.

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 tubular heating element, an extended area structure comprising recessed portions embracing the heating element, recessed straps fitting the outside of said recessed portions at one side of the heating element and connected to the extended area structure at the opposite side at points above and below the heating element to fasten the parts together.

2. A radiator including a heating element, an extended area structure comprising recessed portions embracing the heating element, straps fitting the outside of said recessed portions at one side of the heating element and passing through the extended area structure at the opposite side and bent over against the same to fasten the parts together.

3. A radiator including a tubular heating element, an extended area structure comprising recessed portions embracing the heating element, recessed straps fitting the outside of said recessed portions at one side of the heating element and connected to the extended area structure at the opposite side at points above and below the heating element to fasten the parts together and means for tightening the connection.

4. A radiator including a heating element, an extended area structure comprising recessed portions embracing the heating element, straps fitting the outside of said recessed portions at one side of the heating element and passing through the extended area structure at the opposite side and bent over against the same to fasten the parts together and screws for clamping the bent-over portions in fastening position.

5. A radiator including a heating element, an extended area structure comprising recessed portions embracing the heating element and fastening devices passing from the structure on one side through the structure on the opposite side and bent over into engagement with the latter at points closely above and below the heating element.

6. A radiator including a heating element, an extended area structure in parts at opposite sides respectively of said heating element and a strap passing through one of said parts and connected to the other to hold them in close engagement with the heating element.

7. A radiator including a heating element, an extended area structure a portion of which is in engagement with said heating element and a strap bearing against said engaging portion and connected directly to an opposite part of the structure to hold said engaging portion closely against the heating element.

8. A radiator including a heating element and extended area structure comprising a corrugated sheet the inner portions of which are in engagement with said heating element and straps bearing against the inner portions of the sheet and connected directly to the structure at the opposite side for holding such inner portions of the sheet closely against the heating element.

In witness whereof, we have hereunto signed our names this 24th day of February, 1931.

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