Sept. 16, 1930. T. E. MURRAY 1,776,080

RADIATOR

Filed July 11, 1925

Fig. 1.

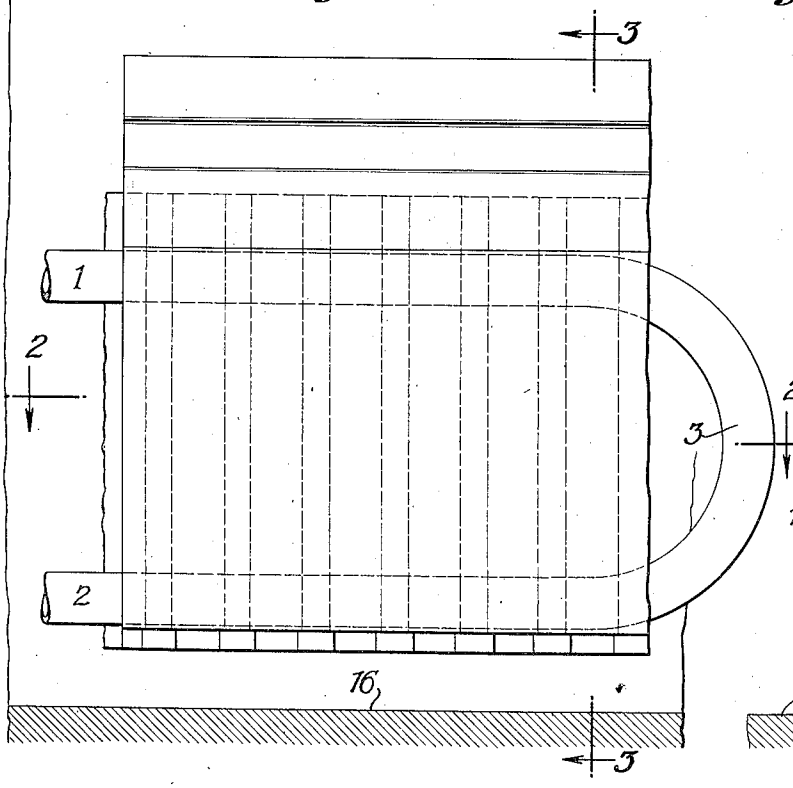


Fig. 3.

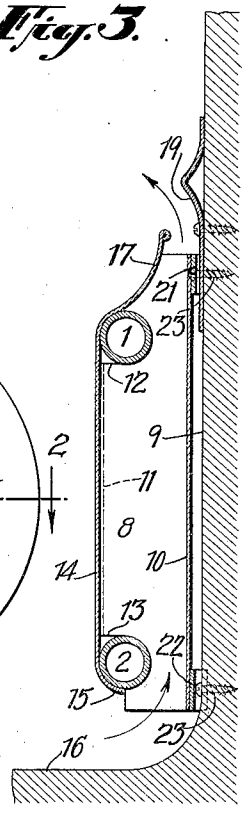


Fig. 2.

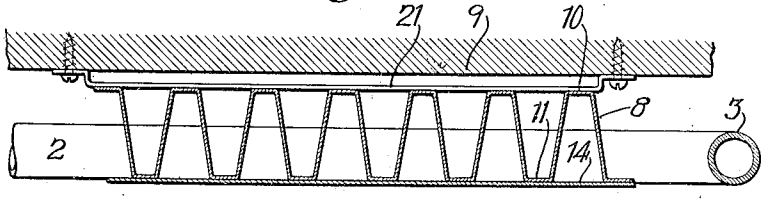


Fig. 5.

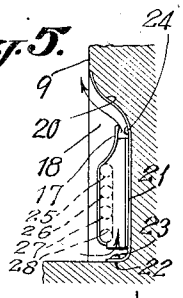
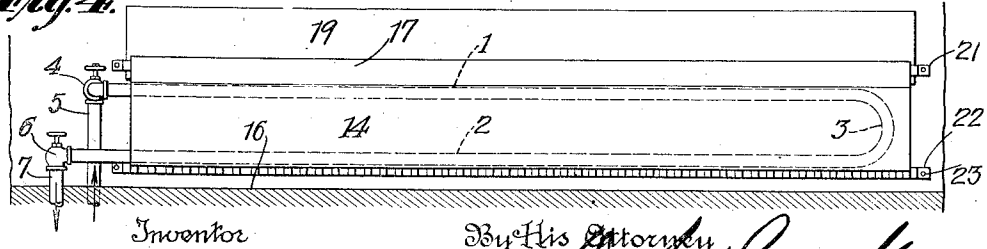


Fig. 4.



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By His Attorney
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UNITED STATES PATENT OFFICE

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RADIATOR

Application filed July 11, 1925. Serial No. 42,903.

My invention aims to provide a radiator of small thickness and height adapted to be placed on the base of a wall or in similar situations where economy in the said dimensions is desirable and where, generally, space of considerable length is available. The accompanying drawings illustrate an embodiment of the invention.

Fig. 1 is a front elevation of a portion of a radiator;

Figs. 2 and 3 are sections of the same on the correspondingly numbered lines;

Fig. 4 is an elevation of the complete radiator;

Fig. 5 is an end view illustrating a modification.

Referring to the embodiment of the invention illustrated, the vessel for the steam or other heating medium comprises a pipe arranged in two substantially parallel lengths 1 and 2 connected by a bend 3. They are approximately horizontal, or they may be slightly inclined to facilitate drainage and circulation. The end of the upper length 1 is connected through admission valve 4 to a pipe 5, and the end of the length 2 is connected through an outlet valve 6 to a pipe 7. The two lengths of pipe are arranged in the same vertical plane and as close together as the total height of the available space requires.

A radiating structure is arranged in contact with the pipe, of a total width which is comparatively small and of a height to extend slightly above and below the pipe. Preferably, but not necessarily, the pipe is arranged on the outer side of the radiating structure so as to be as far from the wall as possible. The radiating structure comprises a series of vertical plates 8 at an angle to the face of the wall 9 connected in succession at alternate edges by inner plates 10 and outer plates 11 parallel to the face of the wall producing a series of corrugations in a horizontal direction. The plates 8, 10 and 11 may be made of a continuous sheet corrugated to the shape required, or of several such sheets united at the edges. The outer vertical face of this corrugated structure is formed with notches 12 and 13 (Fig. 3) to receive the pipes 1 and 2 so that these shall be flush with the outer face of the radiating structure.

A cover plate 14 is mounted on the front of the radiating structure and the pipes. It serves to conceal the radiator, to provide additional radiating surface, and to assist in forming flues which produce a good circulation of air. It may be welded, soldered or otherwise attached to the corrugated structure and to the pipes 1 and 2. At its lower end 15, it covers the pipe 2 and leaves the corrugated structure projecting somewhat lower to facilitate the entrance of cooled air from the floor 16 as indicated by the arrow. At its upper end, it has a curved flange portion 17 which is bent inward and extends up in front of the corrugated structure, holding the air currents in the latter so that they pass out in the direction of the arrow. The spaces enclosed between the plates 8 and 10 and the front plate 14 form flues closed in horizontal section. Similarly, the adjoining spaces between plates 8 and 11 and the face 9 of the wall form approximately closed vertical flues. Thus the cooled air from the floor is heated and rises through these flues and is exposed therein to a very considerable radiating surface and for a long enough time to be heated very efficiently. The plates may be made of copper which is a rapid conductor of heat and is most efficient in heating the air passing over it. Though this is a comparatively expensive metal, the plates may be made very much thinner than steel or iron plates, the structure being so well braced by its shape as to have all the requisite strength. The pipe also may be of copper or brass for greater efficiency; or the pipe, and also the radiating structure, may be of iron or steel. The complete radiator including the pipes and the flues formed by the radiating structure, is a unitary transportable structure, as distinguished from radiators made of parts which are separately built into the wall of a room.

A radiator of this type may be made of small height, say six or eight inches and elongated sufficiently to secure the desired effect. Such a radiator, although the heat units transmitted to a given column of air

are less than if the same column traversed a radiator of the usual considerable height, will make up the required number of heat units by its length and at the same time will maintain a better circulation of air in the room because the total cross-section of the columns of ascending air will be greater than the same cross section for the ordinary radiator. Also, it takes up a minimum of space. It may, for example be less than two inches in thickness. And where the structure of the wall permits it can be set partly or wholly in a recess in the bottom of the wall as indicated at 18 in Fig. 5.

To protect the wall against the hot air emerging from the radiator and to deflect it out into the room a forwardly curved shield 19, Fig. 3 (or 20, Fig. 5) may be fastened to the wall back of the upper part of the radiator and projecting above it and outward into the room.

The radiator may be mounted in various ways. There is usually a curve or molding in the corner at the bottom of the wall which might interfere with the placing of the radiator close against the wall if it were carried on the usual supporting feet. I prefer to fasten it to the vertical face of the wall, so that it can more easily be brought close up against the wall. For this purpose, I may use strips 21 and 22 fastened to the top and bottom of the inner face of the radiator and fastened at their ends to the wall by means of screws 23 or other fastening devices according to the character of the wall.

In Fig. 5 there is illustrated another method of mounting the radiator. It is shown in connection with the radiator set in a recess, but may be used also for the outside type like Fig. 3. The shield 20 is extended either in a continuous plate or with openings to lighten it down the back of the radiator proper to form a protecting sheet 21 and is provided at the bottom with flanges or feet 22 through which screws 23 may be passed to fasten the radiator directly on the floor. An additional set of screws 24 may be provided at the upper portion of the plate 21 and shielded somewhat from sight by the front plate 17, fastening the radiator back against the wall. The vessel for the heating medium may be a single length of pipe or may be more than two lengths. For example, in Fig. 5, I have shown the pipe in four lengths 25, 26, 27 and 28. The diameters of the pipes may be varied inversely with the number of horizontal lengths used. And vessels of other shapes than the bent pipes described may be used. Also other elongated heating elements of small cross-section may be used instead of the pipes.

The radiator may be equally used for cooling air by circulating cold brine or the like through the pipes so that the latter become a heating element only in the negative sense, that is, they extract heat from the radiating structure and induce a flow of the cool air downward through the flues similar to the upward circulation of air induced by the passage of steam through the pipes.

Various modifications of the structure illustrated and described may be made by those skilled in the art without departing from the invention as defined in the following claims.

What I claim is:

1. A radiator comprising a vessel for the heating medium and separate parts applied to the outside of said vessel and constituting a radiating structure including vertical plates extending rearwardly from said vessel but not beyond the forward face thereof, so that the radiator may be placed against a vertical wall with the vessel remote from such wall.

2. The radiator of claim 1 having in addition a cover plate at the front forming with parts of the radiating structure closed vertical flues.

3. An elongated radiator of small height and thickness comprising a long heating element of small cross-section extending horizontally and radiating plates separate from and applied to the outside of said heating element and shaped to form vertical flues for inducing a rapid draft of the heated air, said parts constituting a unitary transportable structure, and means carried by said plates for fastening the radiator against the base of a wall and a rear plate carried by said radiating plates to protect the wall from the heated air.

4. An elongated radiator of small height and thickness comprising lengths of pipe extending horizontally adjacent to each other and in the same vertical plane and radiating plates separate from and applied to the outside of the said pipes, the pipes being applied at one side of the plates and the plates being shaped to form vertical flues for inducing a rapid draft of the heated air, said parts constituting a unitary transportable structure.

5. A radiator comprising an elongated heating element and a corrugated plate separate from and applied to the outside of the heating element the ridges of said plate extending transversely to the length of the heating element and the ridges being cut away along one face of the plate to form notches which fit the heating element.

6. An elongated radiator of small height and thickness adapted to be placed at the base of a wall for heating and circulating the air of a room, comprising a long heating element of small cross section extending horizontally and radiating plates separate from and applied to the outside of said heating element with an intimate heat conducting contact and shaped to form vertical flues, said plates having a height which is much

greater than that of the heating element so as to induce a strong draft and circulation of the air in the room.

7. A base board radiator of small height and thickness comprising in combination with a wall of a room to be heated a plate spaced a slight distance from the base of the wall with air passages at the top and bottom thereof, a heating element in the space between the wall and the plate and a separate radiating structure applied to the outside of the heating element with an intimate heat conducting contact and comprising thin sheet metal fins extending laterally with vertical passages between them in which the air is heated by contact with the fins and an upward draft induced for circulating the heated air.

8. A base board radiator comprising in combination with a wall of a room to be heated a plate spaced about two inches from the face of the wall and about eight inches high and corresponding substantially to the usual base board with air passages at the top and bottom thereof, a heating element in the space between the wall and the plate and a separate radiating structure applied to the outside of the heating element with an intimate heat conducting contact and comprising thin sheet metal fins extending laterally with vertical passages between them in which the air is heated by contact with the fins and an upward draft induced for circulating the heated air, said fins substantially filling the height and width of said space so as to secure the maximum heating and circulating effect.

9. A base board radiator of slight thickness, of a height several times its thickness and of a length several times its height, said radiator comprising in combination with the wall of a room to be heated, a plate spaced from the face of the wall with air passages at the top and bottom thereof, a heating element in the space between the wall and the plate and a separate radiating structure applied to the outside of the heating element with an intimate heat conducting contact and comprising thin sheet metal fins extending laterally with vertical passages between them in which the air is heated by contact with the fins and an upward draft induced for circulating the heated air, said fins substantially filling the height and width of said space so as to secure the maximum heating and circulating effect.

In witness whereof, I have hereunto signed my name.

THOMAS E. MURRAY.