June 19, 1934. H. JAFFE 1,963,906

RADIATOR CONSTRUCTION

Filed June 15, 1932

Fig. 1

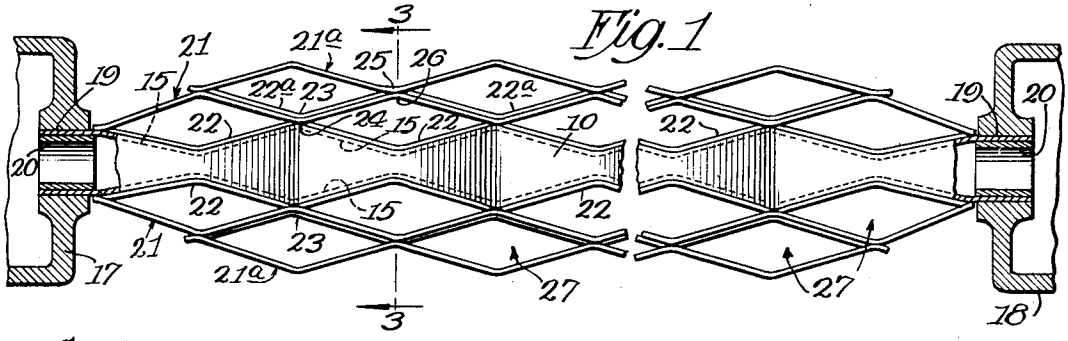


Fig. 2

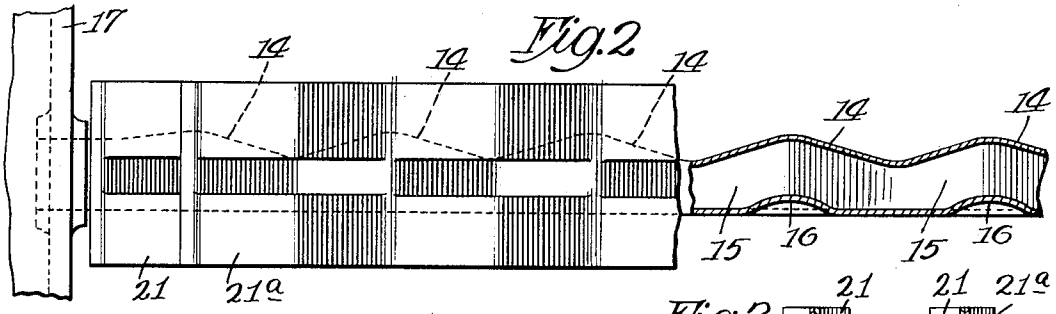


Fig. 3

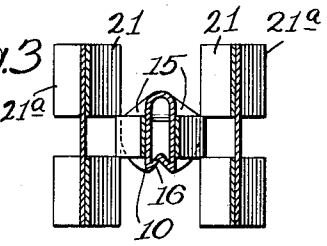


Fig. 4

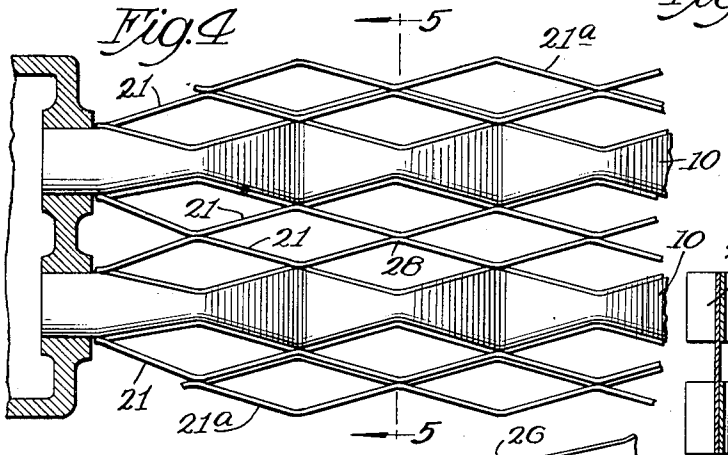


Fig. 5

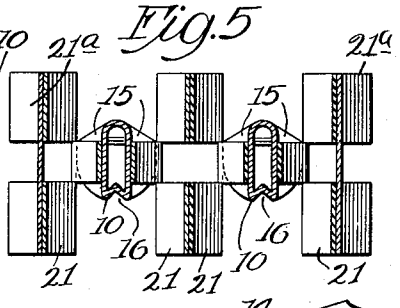


Fig. 6

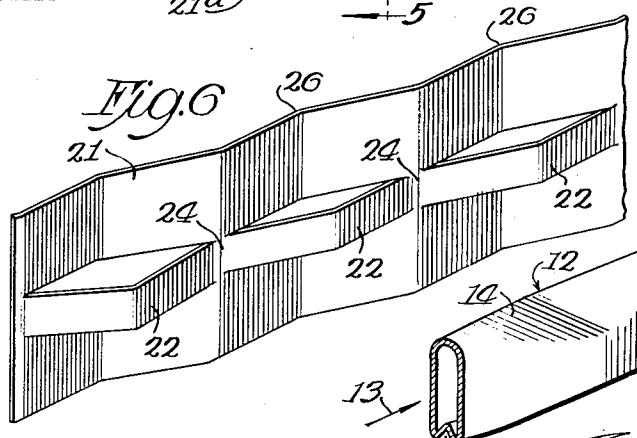
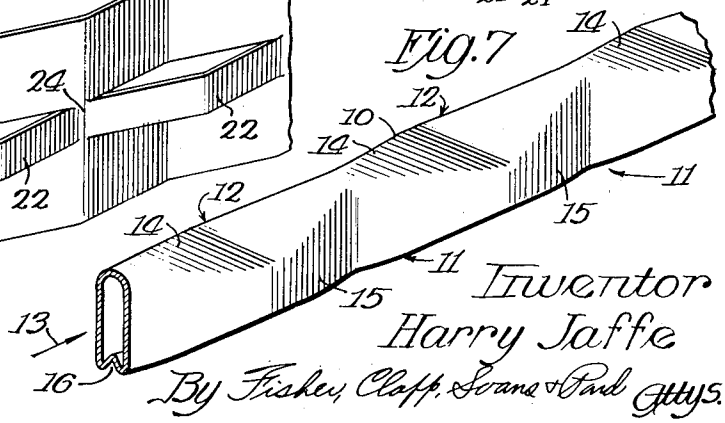


Fig. 7



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RADIATOR CONSTRUCTION

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8 Claims. (Cl. 257—124)

This invention relates to an improved construction of a radiator, for example, a heat radiator such as is used in concealed radiator installations in present day building construction. In other words, radiators of the type herein disclosed are mounted within an air passageway or flue built into a wall or the like of a building.

The main objects of the invention are to provide a radiator which is particularly adapted to he above mentioned purpose, although not limited thereto, and which will be of materially greater efficiency than radiator structures of the conventional type heretofore used; to provide a more efficient radiator which will be lighter in weight and which will embody a smaller amount of material and which will be smaller in size than radiators of the prior art having the same heat radiating capacity, and, in general, it is the object of this invention to provide an improved radiator.

Other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawing in which a radiator embodying a selected form of the invention is illustrated.

In the drawing—

Fig. 1 is a plan.

Fig. 2 is a side elevation, a portion thereof being shown in section.

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

Fig. 4 is a plan corresponding to Fig. 1, but showing a multi-tube radiator unit.

Fig. 5 is a section on the line 5—5 of Fig. 4, and Figs. 6 and 7 are perspectives of the fin and conduit or tube elements respectively of the improved radiator.

Referring now to the drawing, and more particularly to Figs. 1, 2, 3, 6 and 7, the improved radiator embodies a tube 10 which may be of suitable metal, but preferably a copper tube. As clearly shown in Fig. 7, the tube has longitudinally spaced, oppositely disposed pairs of side portions pressed inwardly as indicated at 11, and top portions of the tube intermediate the respective inwardly pressed pairs are pressed inwardly as indicated at 12.

If it be assumed that steam, hot water, or other heating fluid flows through the tube 10 from left to right in the drawing, i. e. in the direction indicated by the arrow 13, then it will be apparent that the top indentations 12 serve to form baffle members 14, which the heating fluid will impinge against in its passage through the tube. Also, the indented side portions 11 provide side baffles 15 against which the heating fluid will impinge when it passes beyond the respective top baffles 14.

In radiators, it is important to prevent the accumulation of moisture in pockets and hence it is desirable to maintain a substantially straight bottom for the tube or conduit so that the heating fluid may flow freely along the bottom of the tube without collecting in pools. In connection with the indenting of the side portions 11, intermediate bottom portions are pressed inwardly as indicated at 16. Such upwardly pressed bottom portions compensate for the excess of metal in the bottom wall portion of the conduit between the side portions which are pressed towards each other and thereby prevents the formation of pockets in the bottom of the tube. As will be evident from an inspection of Figs. 2, 3, and 7, the bottom of the tube is also maintained substantially straight by the described arrangement, so that heating fluid, for example, hot water, may flow continuously along the bottom of the pipe without collecting in pools.

The upwardly pressed bottom portions 16 are additionally useful in that they serve to deflect the flow of heating fluid upwardly against the respective top baffles 14. In other words, the current of heating fluid is caused to eddy in its flow through the conduit so as to more effectively transmit its heat to the wall of the conduit.

The conduit 10 has its opposite ends connected to suitable headers such as indicated at 17 and 18, and any suitable connection may be utilized. However, I prefer to connect the ends of the conduit to the respective headers by providing suitable apertures 19 in the headers through which the end portions of the tube may be inserted as shown in Fig. 1. Sleeves 20 of suitable metal such as brass are positioned within the inserted ends of the tube and the said sleeve and inserted end portions are then expanded by a suitable expanding tool so as to cause the metal of the tube ends to flow into the pores in the walls of the header openings 19. The sleeve 20 serves to reinforce the expanded end portions of the tube so as to produce a strong and rigid connection between the conduit ends and respective headers.

For radiating the heat transmitted from the heating fluid to the wall of the conduit 10, suitable radiating fins may be provided. In the disclosed structure, fins such as indicated at 21 and which extend longitudinally of the conduit are provided and they are formed of sheet metal which is crimped or bent to the zig-zag form illustrated in Fig. 6. A central strap-like por-

tion 22 of each V-shaped portion of the fin 21 is pressed out of each such V-shaped portion to form, in effect, a longitudinally extending, oppositely arranged, centrally disposed zig-zag strap which will fit the outer side surface portions of the conduit 10. Hence, there is a large area of contact between the radiating fin 21 on each side of the conduit 10 and the respective side walls of the conduit. For further increasing the radiation of heat, an additional fin member 21*a* may be secured to the fin 21 substantially as shown in Fig. 1. The central strap portion 22*a* of the fin 21*a* is united at its vertex 23 to the adjacent ends 24 of the strap portions 22, and the angle portions 25 of the fins 21*a* are united to the angle or vertex portions 26 of the fin 21. As shown in Fig. 1, this arrangement provides a series of passageways 27 through which air may flow and absorb heat given off by the radiating fins.

In making a radiator unit embodying two or more conduits 10 disposed in the same horizontal plane, the radiating fins 21 on the adjacent sides of the conduits 10 are brought into direct contact with each other at their vertices or angle portions as indicated at 28. The auxiliary fin 21*a* is omitted between adjacent conduits.

Obviously, the length of a radiator unit such as described may be made to suit any desired installation and one or any number of units may be arranged in a horizontal plane to provide the desired amount of radiating surface. Also, one or more vertically spaced radiators or banks of radiators of the described construction may be utilized.

In a radiator construction such as shown in Fig. 1, it will be observed that there are but five main elements, not counting the headers, and that four of these elements are of identical construction. The fins 21 and 21*a* on opposite sides of the conduit 10 are of identical construction, but are assembled in staggered relation. Hence, it will be readily understood that a comparatively small amount of equipment is required for manufacturing the described structure and it will be apparent that the equipment necessary is of a simple nature so that the expense involved in manufacturing the improved construction is not great. The radiating fins and the conduit 10 may readily be formed by rolling operations which can be carried on economically and with comparatively inexpensive equipment.

The described radiator construction is particularly advantageous, for the reason that it provides a large area of radiating surface and for the reason that it is such that a very high proportion of heat is transmitted from the heating fluid to the conduit and fins because of the described manner of effecting eddying of the current of heating fluid.

Changes in the described structure may be made without departing from the spirit of the invention, the scope of which should be determined by reference to the following claims, the same being construed as broadly as possible, consistent with the state of the art.

I claim as my invention:

1. A radiator comprising a conduit having its top wall provided with a plurality of longitudinally spaced portions pressed inwardly to form a series of baffles against which heating fluid will impinge in its passage through the conduit, and means integral with the bottom wall of said conduit, located intermediate said baffles, for deflecting the heating fluid toward the baffles.

2. A radiator comprising a conduit having a wall provided with a plurality of longitudinally spaced portions pressed inwardly to form a series of baffles against which heating fluid will impinge in its passage through the conduit, and means integral with the opposite wall and extending inwardly intermediate said baffles, for cooperating with the baffles to form elongated, tortuous passageways of approximately uniform transverse dimension in one direction.

3. In a radiator of the class described, the combination of a conduit and a plurality of heat radiating fins, said fins being bent to substantially zig-zag form, one of said fins being secured at its vertices to said conduit and the other fin being arranged in staggered relation to the first fin and having its vertices secured to adjacent vertices of the first fin.

4. A radiator comprising a conduit having oppositely disposed wall portions pressed inwardly to form baffles against which heating fluid will impinge in its passage through the conduit, a bottom wall portion intermediate said inwardly pressed side portions being pressed inwardly to maintain the bottom of the tube substantially straight.

5. A radiator comprising a conduit having longitudinally spaced, oppositely disposed pairs of side portions pressed inwardly, longitudinally spaced top portions intermediate said pairs of side portions also pressed inwardly, and bottom portions intermediate the sides of said respective pairs pressed upwardly to maintain a substantially straight bottom.

6. A radiator comprising a conduit having longitudinally spaced, oppositely disposed pairs of side portions pressed inwardly, longitudinally spaced top portions intermediate said pairs of side portions also pressed inwardly, bottom portions intermediate the sides of said respective pairs pressed upwardly to maintain a substantially straight bottom, and a heat radiating fin secured to said inwardly pressed side portions.

7. A radiator comprising a conduit having longitudinally spaced, oppositely disposed pairs of side portions pressed inwardly, longitudinally spaced top portions intermediate said pairs of side portions also pressed inwardly, bottom portions intermediate the sides of said respective pairs pressed upwardly to maintain a substantially straight bottom, and a heat radiating fin extending longitudinally of said conduit and having a portion disposed in contact therewith throughout substantially its entire length.

8. A radiator comprising a conduit having a wall portion offset to form baffles in the conduit, and a heat radiating fin extending longitudinally of the conduit and having a portion disposed in contact with said wall portion throughout substantially its entire length, and another portion spaced laterally from said wall portion throughout substantially its entire length.

HARRY JAFFE.