Sept. 20, 1949. L. H. PLUM 2,482,595

RADIATOR CONSTRUCTION

Filed Dec. 29, 1945

Fig. 1

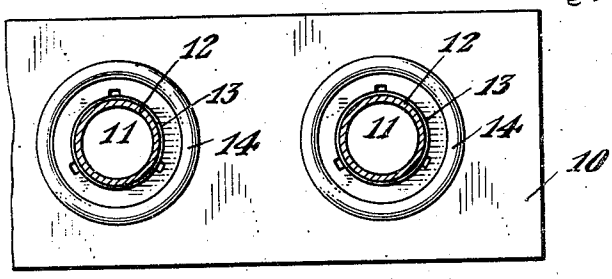


Fig. 2

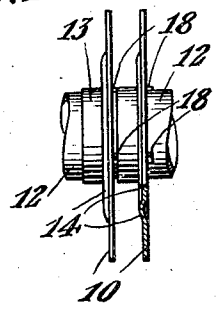


Fig. 3

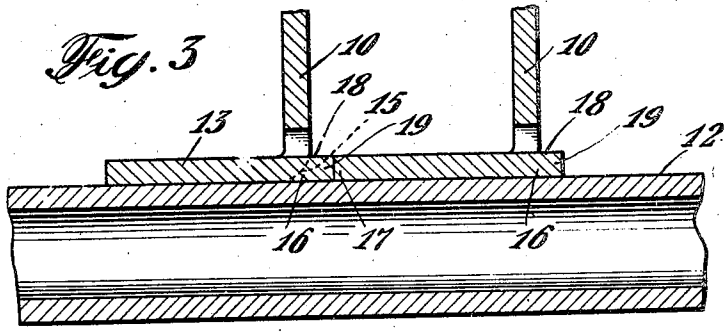


Fig. 4

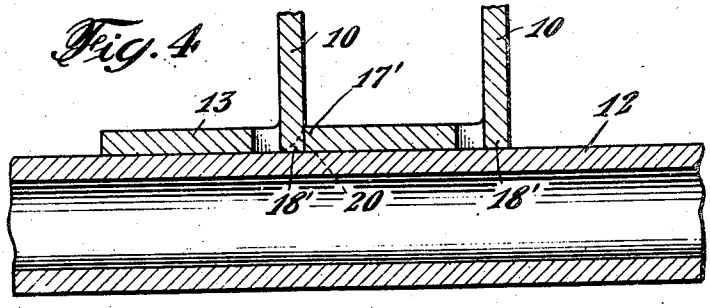
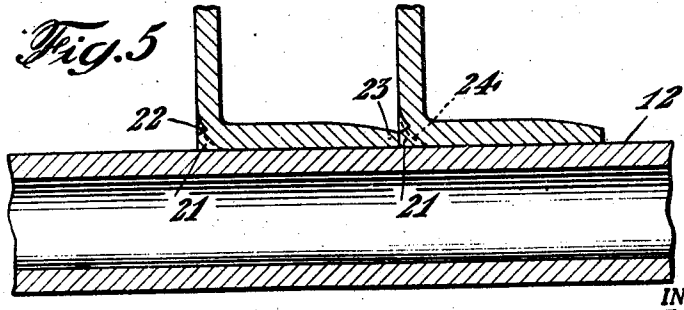


Fig. 5



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RADIATOR CONSTRUCTION

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3 Claims. (Cl. 257—262.16)

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This invention relates to heat exchanging apparatus such as radiator constructions wherein heating fluid conduits are provided, having a multiplicity of spaced apart radiating fins.

In constructions of the class indicated it is common practice to use radiating fins which comprise thin flexible sheet metal plate-like portions which extend out transversely of the heating fluid conduit or conduits, an aperture and/or apertures being formed therethrough for the conduits, and each aperture being accompanied by an integrally formed flange for embracing the conduit to retain the plate-like portions in position, and also to act as spacing means between adjacent fins. In the usual case, such flanges comprise metal which has been struck out of the apertures, and in forming the flange the sheet metal is somewhat rounded in cross section at the junction of the flange with the plate-like portion. Because of this rounded formation, a narrow annular space or crevice occurs between the external surface of the conduit and the surrounding fin at the region of the line of juncture between the flange and fin. The clearance space within such crevices ordinarily varies considerably because of slight variations in the size and shape of the conduit, particularly if the conduit is expanded to bring the flanged fins into embracing relation therewith. Also, the space within the crevices will vary because of the highly flexible nature of the flanged fins, which may become distorted slightly while being slid into place. Consequently, there will be a tendency for the outer annular edge of the flange on the next adjacent fin to telescope into such crevice with the result that the fins will be irregularly spaced unless some stop means is provided. Also such telescoping may tend to expand portions of some of the fins which embrace the conduit and thereby tend to loosen the same. With constructions wherein the fins are secured to the conduits by expanding the conduits to cause the same to be firmly embraced by the fin flanges, the above noted difficulties may become particularly serious; that is, before the conduit or tube is expanded, the loosely surrounding fin flanges will have a greater tendency to more or less telescope irregularly.

It has heretofore been proposed to bend outwardly the outer annular edges of the fin flanges

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to thereby provide on each, a rim of greater diameter than the abovementioned annular crevice under the next fin, such rim thus acting as stop means for maintaining the desired uniform spacing of the fins. In some cases, however, such constructions have certain disadvantages in that it may be difficult to form such rims uniformly and inexpensively since they have to be shaped of the metal which has been struck out of the fin apertures and greatly expanded. It is desirable to use, for example, very thin sheet aluminum in forming the fins, which adds to the difficulties of forming such spacer rims with the necessary accuracy and rigidity at the outer edges of the flanges.

According to the present invention the above noted difficulties are overcome by providing the stop means in the form of a plurality of detents at spaced points around each conduit aperture on the fin, these detents being struck into the space or crevice beneath the rounded line of juncture between the fin per se and its flange. At these points accurately formed and relatively rigid detents may be easily provided since the metal at these points does not have to be expanded or appreciably stretched for the purpose. Also the stop means formed at this location are relatively more protected against being bent and distorted when the fins are being handled prior to application to the conduits. Furthermore, in this type of construction the struck out detents may be so formed as to not reduce or interfere with the desired gripping areas of the fin flanges on the conduits. In fact such gripping areas may be slightly increased by the detents, rather than being diminished as with prior construction.

Various further and more specific objects, features and advantages will more clearly appear from the detailed description given below taken in connection with the accompanying drawings which form a part of this specification and illustrate merely by way of example, preferred forms of the invention.

In the drawings:

Figure 1 is a face view of one form of fin construction embodying the invention, showing the fin with two apertures and as applied to two heating fluid conduits;

Figure 2 is an edge view showing two of the fins as of Figure 1 applied to a conduit; and

Figures 3, 4 and 5, respectively, are enlarged detail sectional views showing conduits and portions of the fins thereon, formed according to three different embodiments of the invention.

The fin 10 as shown in Figures 1 and 2 is formed with apertures as at 11 for heating fluid conduits 12, each aperture being accompanied by an integral flange 13. If desired one or more corrugations or like formations as at 14 may be provided around each aperture to increase the rigidity of the construction.

As shown in Figure 2, in the bending of the sheet metal to form flanges 13, a somewhat rounded formation occurs as indicated at 15 along the line of juncture of the flange and fin. Consequently, a narrow annular space or crevice occurs as indicated at 16 around the surface of the conduit 12. In the absence of any stop means, the outer edge as at 17 on the flange of the next adjacent fin may tend to telescope into this crevice as above explained. To prevent this, with the form of invention shown in Figures 1–3, inclusive, a plurality of detents, for example, three or more as indicated at 18, may be struck out from the rounded portion of the metal, preferably into a position to contact with the tube 12, and so that the ends of the detents as at 19 will abut the edge 17 of the flange on the next adjacent fin.

With the form of the invention indicated in Figure 4, detents as at 18' may be so struck out of the metal at the rounded portion, that the ends of the detents will abut the outside surface of the tube 12, that is, these detents extend radially of the conduit aperture, and side portions as at 20 thereof will engage the edge 17' of the next adjacent fin.

With the form of the invention shown in Figure 5 detents as at 21 may be struck from the rounded portion of the metal without cutting entirely through the metal. That is, as spaced points around the aperture the metal may be indented as at 22 so as to cause detents 21 to be struck into a position extending along the surface of the tube, and the outer ends of these detents will abut the outer edge as at 23 on the flange of the next adjacent fin. As shown in Figure 5 the outer edge portions of the fin flanges may be gradually tapered so that the metal will be thinner at these portions than at the base of the fins. The edge portions of the fins does not need to be as rigid as the base portions, and this tapered construction makes available the necessary metal for the use of wider flanges if desired, for wider spacing of the fins. The outer ends of the detents 21 may be readily made of a thickness to substantially correspond with the thickness of the flange metal at the edge 23, and accordingly the detents 21 effectively block the edge 23 from entering the crevice under the rounded portion indicated by the dotted line 24.

The construction shown in Figures 1–3, particularly if the detents are relatively rigid, has the advantage that such detents may tend to supplement the gripping action of the flanges on the tube. Also, the form shown in these figures is such that the detents may be conveniently struck out with accuracy by the use of simple forms of dies.

The particular form shown in Figure 4 has the advantage that the detents do not protrude outside the plane of the fins and, therefore, the same are well protected against being bent or distorted during handling of the fins before they are applied to the tube. This advantage is also inherent in the form shown in Figure 5.

Although the invention has been more particularly described in reference to its use on radiator constructions adapted for heating purposes, it will be understood that the constructions herein claimed may be used for other forms of heat exchanging apparatus, including refrigeration or cooling apparatus.

While the invention has been described in detail with respect to particular preferred examples, it will be understood by those skilled in the art after understanding the invention that various changes and modifications may be made without departing from the spirit and scope of the invention, and it is intended therefore in the appended claims to cover all such changes and modifications.

What is claimed as new and desired to be secured by Letters Patent is:

1. A radiating fin construction comprising a plate-like radiating portion adapted to be positioned in a plane extending transversely of a conduit for containing heat exchanging fluid, said portion being formed with an aperture for receiving the conduit passing therethrough, a flange for embracing the conduit and adapted to space the fin with respect to the next fin on the conduit, said flange protruding to one side of said plate-like portion and being integrally formed therewith as a substantially cylindrical area of metal surrounding the region of said aperture, the metal being somewhat rounded in cross-section at the juncture of said flange and plate-like portion, and stop means for preventing the flange on an adjacent fin from tending to enter the space under such rounded portion, said stop means comprising a plurality of detents extending at spaced points around the aperture into such space from, and being integral with, the metal at said rounded portion, all the parts constituting flexible thin sheet metal.

2. A radiating fin construction comprising a plate-like radiating portion adapted to be positioned in a plane extending transversely of a conduit for containing heat exchanging fluid, said portion being formed with an aperture for receiving the conduit passing therethrough, an annular flange for embracing the conduit and adapted to space the fin with respect to the next fin on the conduit, said flange protruding to one side of said plate-like portion and being integrally formed therewith of metal surrounding the region of said aperture, the metal being somewhat rounded in cross-section at the juncture of said flange and plate-like portion whereby an annular crevice will occur around the conduit at such juncture, and stop means for preventing portions on an adjacent fin from tending to telescope into such crevice, said stop means comprising a plurality of detents extending, at spaced points around said aperture, along the conduit surface at such crevice in a direction opposite from said flange and as integral continuations thereof, all the parts constituting flexible thin sheet metal.

3. A radiating fin construction comprising a plate-like radiating portion adapted to be positioned in a plane extending transversely of a conduit for containing heat exchanging fluid, said portion being formed with an aperture for receiving the conduit passing therethrough, an annular flange for embracing the conduit and adapted to space the fin with respect to the next fin on the conduit, said flange protruding to one side of said plate-like portion and being integrally formed

therewith of metal surrounding the region of said aperture, the metal being somewhat rounded in cross-section at the juncture of the flange and plate-like portion, and stop means for preventing the flange on an adjacent fin from tending to enter the space under such rounded portion, said stop means comprising a plurality of detents extending into such space from and being integral with the metal at said rounded portion at spaced points around the aperture, said detents being positioned substantially in the plane of said plate-like portion and being directed substantially radially of the aperture, all the parts constituting flexible thin sheet metal.

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