No. 108,001. PATENTED OCT. 4, 1870.

E. BOURNE.

RADIATOR.

Fig. 1.

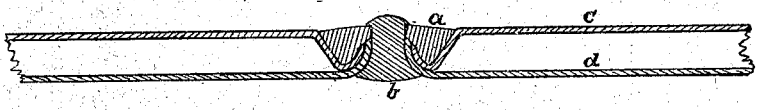


Fig. 2.

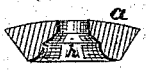


Fig. 3.

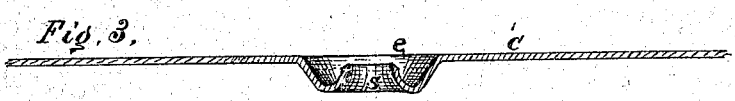
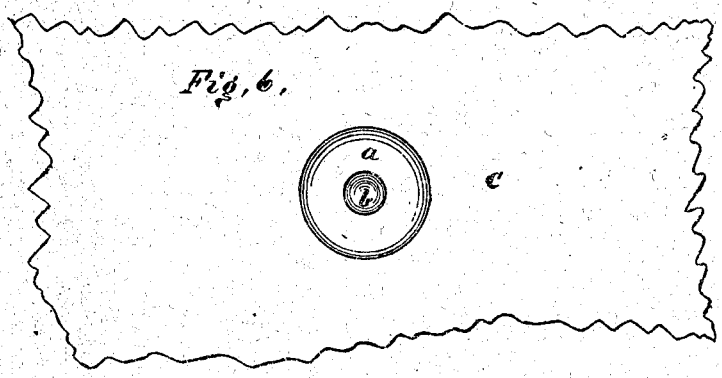


Fig. 4.

Fig. 5.

Fig. 6.



Witnesses

Josiah W. Ellis

Andrew Humbert

Inventor.

Edward Bourne

United States Patent Office.

EDWARD BOURNE, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 108,001, dated October 4, 1870.

IMPROVEMENT IN RADIATORS.

The Schedule referred to in these Letters Patent and making part of the same.

I, EDWARD BOURNE, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain Improvements in Radiators, of which the following is a specification.

Nature and Objects of the Invention.

This invention relates to an improvement in that class of radiators formed of two thin metallic sheets, fastened at various points of their surface, by rivets passing through both.

The invention I have made consists in so shaping the sheets, at their point of contact around the rivets, as that that portion of each sheet will be transverse, or nearly so, to the plane of its surface, forming in each a deep conical hole, that, when brought together, the cone formed in one sheet will enter and rest within the conical portion of the other sheet, which, on being clamped between the inside of a washer and a tapering rivet, a greater amount of bearing will be given at this point, making the sheets doubly stiff and secure against leakage, while the construction and arrangement of the parts are such that the rivet and washer may be easily got at and readily removed, for repair or otherwise, without danger of changing or affecting the shape or relative position of the sheets.

Description of the Accompanying Drawing.

Figure 1 represents a sectional view of two thin metallic sheets, held together by a rivet and washer, at their point of union, in accordance with my plan.

Figure 2, section of the washer.

Figure 3, section of the upper sheet.

Figure 4, section of the lower sheet.

Figure 5 represents the rivet.

Figure 6, top view of the parts.

General Description.

I take two thin metallic sheets, and punch as many corresponding holes therein as may be found necessary, each hole a little less in diameter than the rivets to be used.

One of these sheets *c* is then submitted to the action of a pair of dies, so constructed and operated as to make around each of its several holes a deep annular depression, *e*, leaving the center, or that part immediately around each hole, standing upward, giving it the shape of a hollow cone, *s*, and by which operation the hole is enlarged and brought to the proper size and form.

The other sheet, *d*, is then, in like manner, submitted to the action of a pair of dies, so constructed as to simply raise the metal around each of its several holes into the shape of a hollow cone, *f*, the outside diameter of which corresponds with the inside of those, *s*, in the first-described sheet *c*, so that, when the two sheets are placed together, the cones *f* in the second sheet will enter those in the first sheet, as seen in the drawing, fig. 1.

The rivet *b* is then introduced, and a washer, *a*, of the exact shape of the annular depression *e*, is placed therein, which, on the burring of the rivet, clamps the conical portion of the sheets together, making a joint around each rivet superior to any heretofore in use for this purpose.

Although I have stated that the cones *f* in the second sheet are struck up by a pair of dies, still, if the sheet is thin enough, this striking up is not necessary, as the tapering head of the rivet will accomplish that object by drawing the thin metal sheet immediately around it into that form, by the process of hammering.

I claim—

1. So shaping the sheets, at their point of contact around the rivets, as that the cones *f*, formed in the one sheet, *d*, will enter and rest within the conical portions *s* of the other sheet, *c*, and clamping the said parts together by means of washers *a* and rivets *b*, substantially in the manner shown and set forth.

2. The annular depression *e*, with its corresponding-shaped washer *a*, in combination with the cones *s* and *f*, arranged and clamped together by the rivet *b*, substantially in the manner shown and set forth.

EDWARD BOURNE.

Witnesses:—

JOSIAH W. ELLS,

ANDREW HUMBERT.