C. SONNEBORN.

METHOD OF MAKING SHEET METAL RADIATORS.

APPLICATION FILED APR. 1, 1914.

1,158,576. Patented Nov. 2, 1915.

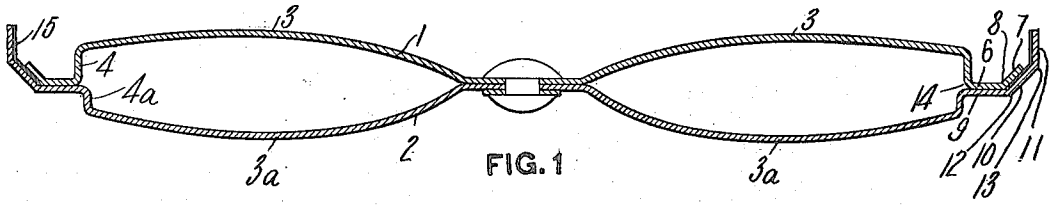


FIG. 1

FIG. 2

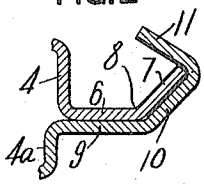


FIG. 3

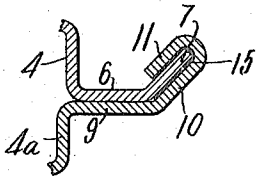


FIG. 4

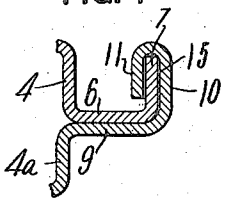


FIG. 5

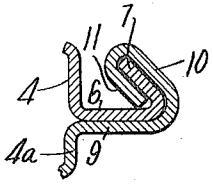


FIG. 6

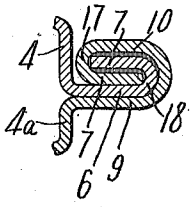
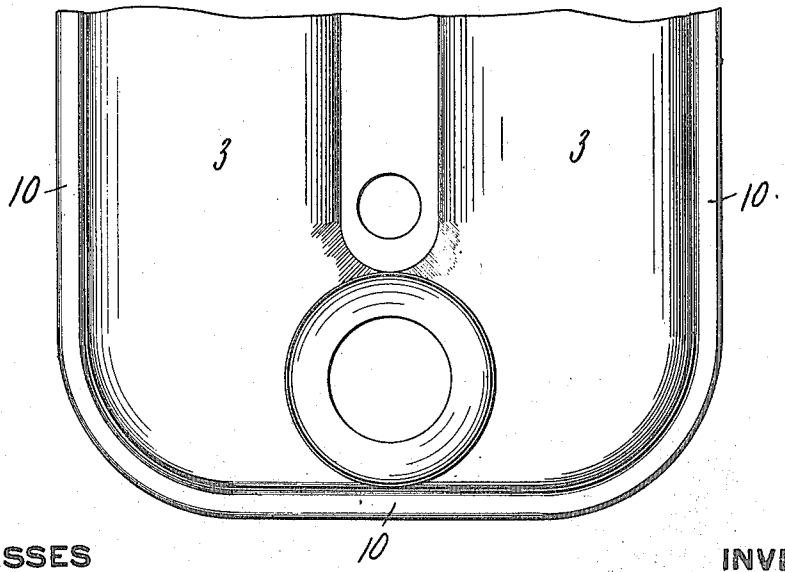


FIG. 7



WITNESSES

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METHOD OF MAKING SHEET-METAL RADIATORS.

1,158,576. Specification of Letters Patent. Patented Nov. 2, 1915.

Application filed April 1, 1914. Serial No. 828,863.

To all whom it may concern:

Be it known that I, CHARLES SONNEBORN, a resident of West Pittsburg, in the county of Lawrence and State of Pennsylvania, have invented a new and useful Improvement in Methods of Making Sheet-Metal Radiators, of which the following is a specification.

This invention relates to a method of making hollow sheet metal seamed articles, and is particularly adapted to the manufacture of sheet metal radiators or similar hollow sheet metal articles formed by joining or seaming together two sections.

The object of the invention is to provide a method whereby a practically perfect, uniform and water and steam-tight joint is formed.

The invention comprises the manipulations hereinafter described and claimed.

In the accompanying drawings Figure 1 is a cross section through two assembled blanks or sections preparatory to seaming them together to form a sheet metal radiator unit; Figs. 2, 3, 4 and 5 are detail views of one edge of the article showing the successive steps of folding to form the seam; Fig. 6 is a detail cross section through the seam of a completely formed radiator unit; and Fig. 7 is a plan view of a portion of said unit.

Each unit of pressed metal radiators is formed from two similar, but not identical sections or "halves," with the edges folded together or "seamed." In the manufacture of sheet metal radiators difficulty has been experienced in forming seams which are sightly, and which are water and steam proof. The present invention is a method for joining together such sections or halves to form a steam and water-tight joint.

In the accompanying drawings the reference numeral 1 indicates one of the sections or halves, which is known in the art and will hereinafter be designated as the smaller half because of its lesser overall dimensions, and 2 represents the other section or half, and known as the larger half because of its larger overall dimensions. The section or half 2 is larger than the section or half 1 entirely around their peripheries, a distance equal to the width of the flange on the half 2 which must be folded over or around the edge of the section 1. These two sections are formed by pressing between suitably shaped dies to substantially the contour shown in Fig. 1, and thereby forming swelled-out side body portions 3 and 3^a, substantially normal or edge body portions 4 and 4^a, and edge projecting portions or flanges which extend entirely around the body portion, that is, at the ends as well as at the sides. After being so embossed the two sections or halves are trimmed, that is, their edges are sheared away so as to leave edge projecting flanges of exactly the proper width entirely around the body portion. These flanges are then pressed between suitably shaped dies which turn the edges of the smaller half 1 so as to leave the substantially horizontal or flat flange portion 6 with the extreme edge portion 7 bent at an angle thereto, preferably an angle of about 45 degrees, the portions 6 and 7 making a sharp "break" on the line 8. The edge portions of the larger half are bent to leave a substantially flat portion 9 of materially greater width than the corresponding portion 6 on the other half, and an inclined portion 10 at an angle to the portion 9 (preferably an angle of about 45 degrees), and with the extreme edge portion 11 at an angle to the portion 10 and preferably normal to the portion 9. The portions 9 and 10 form a sharp "break" at the line 12 and the portions 10 and 11 form a sharp "break" at the line 13.

In pressing the two sections to shape the section 1 has its side body portion 3 formed of considerably greater width (and also length) than the side body portion 3^a of section 2, as clearly appears in Fig. 1 where the edge body portion 4 of the section 1 lies outside of the corresponding portion 4^a of the section 2. The section or half 1 is also dished to considerably greater depth than the section or half 2, as also clearly appears from Fig. 1, so that the edge portions 6 and 9 of the two halves lie entirely at one side (in the drawings lying below) the median plane of the finished article, so that when the flanges are folded together to form the finished seam, the latter externally will be substantially symmetrical between the two faces of the radiator section. The edge portions 6 and 9 make fairly sharp angles with the edge body portions 4 and 4^a, with rather a sharp turn, as shown at 14. Preferably,

suitable packing material will be placed between the flanges before folding together, the drawings showing a thin layer of asbestos composition or other suitable packing material 15 applied to the inside of the flange portions 10 and 11 of the section 2, and which is shown exaggerated for purposes of illustration throughout the drawings.

Two sections or "halves" formed as above specified are assembled and the edge portions are then folded together to form a double seam. The successive folding operations to form the seam are indicated in Figs. 2, 3, 4, 5 and 6. In the first seaming operation the flange portion 11 of the larger section or half is folded partly inwardly around the edge of the flange on the smaller section or half. In the next operation the flange portion 11 of the larger half is folded downwardly over and parallel to the flange portion 7 of the smaller half, as shown in Fig. 3. On account of a sharp line or break being made at the point 13, the flange portion 11 folds exactly at this line, giving a very symmetrical edge. In the next operation the folded together portions 7, 10 and 11 are bent substantially normal to the median plane of the finished section, as indicated in Fig. 3; in the next folding operation these portions are bent inwardly to an angle of substantially 45 degrees, as shown in Fig. 4, and in the next and final operation these portions are bent down over and parallel to the edge portions 6 and 9, completing the operation and forming a seam which in cross section has five thicknesses of the metal. In the third, fourth and fifth seaming operations the metal bends along the "breaks" 8 and 12. These several folding operations may be effected by any suitable mechanism, but preferably by suitably shaped dies. The widths of the several portions of the edges of the two sections or halves are so chosen that when folded together in the manner described the larger section or half flattens out slightly, and particularly its edge body portion 4^a is drawn outwardly, so that it comes substantially into line with the corresponding edge body portion 4 of the other section or half; the angles at the points 14 are somewhat straightened out so that they are no longer as sharp as originally; and a seam is formed in which the edges of the flanges of the two sections abut very tightly up into the "throats" of the portions folded around the same. For instance, at the point 17 the edge of the flange of the small section abuts tightly into the "throat" of the folded-over portion of the flange of the larger section, and at the point 18 the edge of the flange of the larger section abuts tightly into the "throat" of the folded-over flange of the small section. Also, by providing an excess of metal in the flange portion 9 of the larger half plenty of room is provided for the gripping or pressing dies which give the final pressure to finish the joint. The parts are folded together under die pressure so that the thickness of the seam is substantially five times that of the thickness of the sheet metal, the packing material being pressed to an invisible film, and forming a joint which is practically metal pressed into metal.

By forming the larger section or half with its body portion of lesser width (and also lesser length) than the smaller section and folding the edge of the larger section over the edge of the smaller section, the ends of the flanges can be made to abut tightly into the throats of the portions folded over the same, which inevitably results in pulling outwardly on the section or half which is folded on the outside or over the edge of the other section or half, which drawing out is compensated for by forming the larger section of lesser width as to its body part than the smaller section, and leaving the finished section of symmetrical appearance. Inasmuch as the finished seam has five thicknesses of metal folded together, it is necessary to dish one of said sections to greater depth than the other, so that the folded together seam will be substantially symmetrical with reference to the two faces of the finished unit. As shown in Fig. 7, this seam extends entirely around the radiator unit, and while in Figs. 1 to 6 the operation is shown only on the side edges of the radiator unit, it will be understood that the same operation occurs entirely around the unit,—at the ends as well as at the sides.

The method described is adapted for the manufacture of radiator units of any desired number of columns, the drawings showing the same applied to a single-column radiator unit. It is likewise adapted for the formation of hollow sheet metal articles of various kinds.

What I claim is:—

1. The method of seaming sheet metal hollow articles, which consists in applying to each other two dished body sections with projecting edge portions, one of said sections being larger than the other but having its body portion of lesser width, and then rolling up the projecting edge portions of the two sections to form a several-walled seam and thereby drawing the body portion of the larger section outwardly to substantially the dimension of the body portion of the smaller section.

2. The method of seaming sheet metal hollow articles, which consists in applying to each other two dished body sections with projecting edge portions, one of said sections having its projecting edge portions of greater width than the other but having its

body portion of lesser width, the larger one of said sections being dished to lesser depth than the other, and then rolling up the edge portions of the two sections to form a several-walled seam and thereby drawing the body portion of the larger section outwardly to substantially the dimensions of the body portion of the smaller section and forming a seam symmetrical with reference to the external surfaces of the two sections.

3. The method of seaming sheet metal hollow articles, which consists in applying to each other two dished body sections with projecting edge portions, one of said sections being larger than the other but having its body portion of lesser width, folding the projecting edge portions of the larger section over the projecting edge portion of the smaller section, and then rolling up the folded edge portions of the two sections to form a many-walled seam and thereby drawing the body portion of the larger section outwardly to substantially the dimension of the body portion of the smaller section.

4. The method of seaming sheet metal hollow articles, which consists in applying to each other two dished body sections with projecting edge portions, one of said sections having its projecting edge portions of greater width than the other but having its body portion of lesser width, the larger one of said sections being dished to lesser depth than the other, folding the edge portions of the larger section over the edge portions of the smaller section, and then rolling up the folded edge portions of the two sections to form a many-walled seam and thereby drawing the body portion of the larger section outwardly to substantially the dimensions of the body portion of the smaller section and forming a seam symmetrical with reference to the external surfaces of the two sections.

5. The method of seaming sheet metal hollow articles, which consists in applying to each other two dished body sections with projecting edge portions, and rolling up the projecting edge portions of the two sections to form a several-walled seam and thereby drawing the body portion of one of said sections outwardly to increase its width.

6. The method of seaming sheet metal hollow articles, which consists in applying to each other two dished body sections with projecting edge portions, breaking said projecting edge portions on lines, folding said edge portions together along the lines of said breaks, and rolling up said folded edge portions to form a several-walled seam and thereby drawing the body portion of one section outwardly to increase its width.

In testimony whereof, I have hereunto set my hand.

CHARLES SONNEBORN.

Witnesses:

WILLIAM B. WHARTON,

ELBERT L. HYDE.