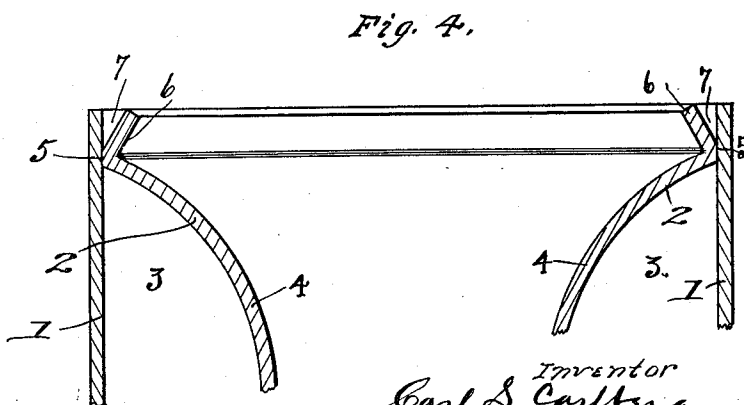
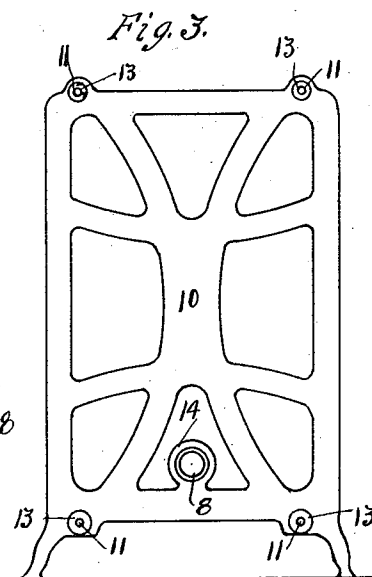
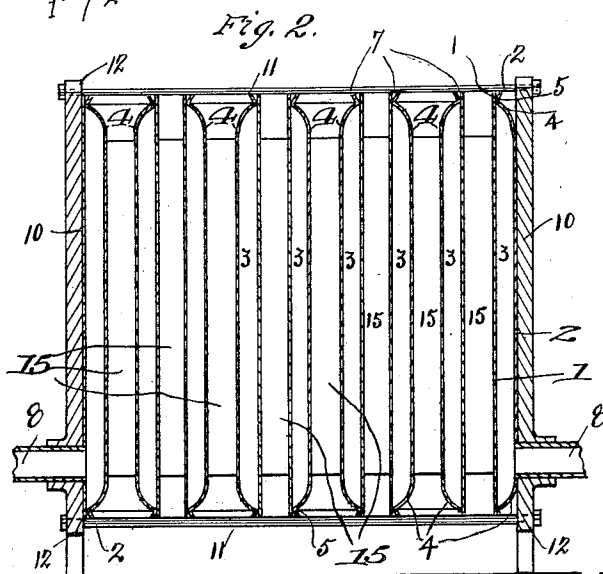
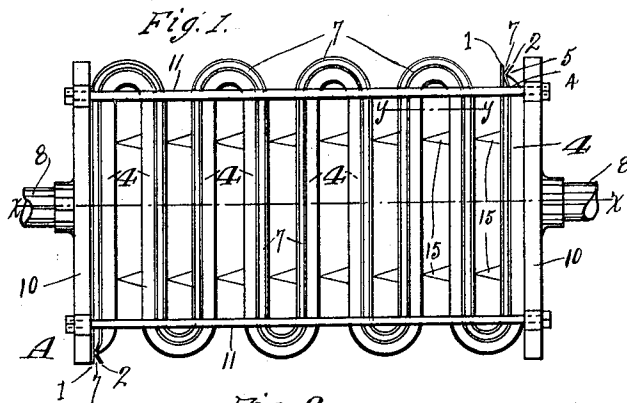


C. S. CARLBERG.  
RADIATOR.  
APPLICATION FILED NOV. 14, 1910.

1,022,620.

Patented Apr. 9, 1912.



WITNESSES  
L. J. Gorin.  
W. E. Brown

Inventor  
Carl S. Carlberg  
by Fred P. Gorin  
Attorney

# UNITED STATES PATENT OFFICE.

CARL S. CARLBERG, OF SEATTLE, WASHINGTON, ASSIGNOR OF ONE-HALF TO ERICK LUNDQUIST, OF SEATTLE, WASHINGTON.

## RADIATOR.

1,022,620.

Specification of Letters Patent.

Patented Apr. 9, 1912.

Application filed November 14, 1910. Serial No. 592,236.

*To all whom it may concern:*

Be it known that I, CARL S. CARLBERG, a citizen of the United States, and a resident of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Radiators, of which the following is a full, true, and exact specification.

This invention relates to radiators, and more especially to radiators of the sheet metal class, wherein weight and bulk are important features.

An important feature in this invention consists in the manner of joining the edges of the sheets, which, according to my improved construction, can be accomplished without difficulty and with but little danger of burning the galvanizing upon the surface adjacent the seam or joint.

Other objects will appear as the invention is more fully disclosed in the following specification and accompanying drawings, in which—

Figure 1 is a top or plan view. Fig. 2, a longitudinal sectional view upon the line  $x-x$  of Fig. 1, as viewed from the front, in both of which views the connecting pipes are shown as broken away. Fig. 3, an end elevation. Fig. 4, an enlarged detail, fragmentary view upon the line  $y-y$  of Fig. 1, as viewed from the front.

The reference character 1 designates a section of sheet metal which forms one of the walls of the radiator. 2, the sheet which forms the opposite wall of the same. The sheet 1 begins near the upper right hand corner (Fig. 1) and, following the serpentine course shown, terminates at the lower left hand corner. Spaced slightly to the right of sheet 1 is the sheet 2, which parallels sheet 1 in its course, and terminates near the lower left hand corner, the space inclosed between the sheets 1 and 2 forming the circuitous steam or hot water chamber 3. The upper and lower edges of sheet 2 are formed into a curve, as at 4, the edge of which meets the sheet 1 at 5, where it is flared backwardly as at 6, forming the trough 7. The vertical edges of the sheets 1 and 2 meet at the corners A and B respectively and are joined together to close the ends of the serpentine chamber 3 in exactly the same manner as the horizontal edges of the sheets 1 and 2, as plainly seen in Figs. 1 and 4. From either side of the lower por-

tion of the radiator extend the connecting pipes 8, which communicate with the chamber 3, and to which may be connected in the usual manner, the steam or hot water pipes of the heating system. The radiator proper is supported a suitable distance from the floor by the end frames 10, preferably of cast iron, which are tied together by the rods 11, which are slightly reduced as at 12 shown in dotted lines Fig. 2, to form shoulders, and which are suitably threaded to receive the nuts 13, the openings 14 in the frames 10 permitting the passage of the pipes 8 there-through. To prevent undue distention of the walls formed by the sheets 1 and 2, when under pressure of steam or water, I provide the braces 15 interposed between the folds, as shown, and preferably of V shape and which are slipped into the approximate positions shown in Fig. 2 before the nuts 13 are fully screwed up, which operation firmly clamps the braces 15 in position; the shoulders formed on the tie rods 11 by the reduced portions 12 limiting the forward travel of the nuts 13 so that the braces 15 will not unduly dent into the walls of the chamber 3.

From the above description it will be seen that the sheets 1 and 2 are identical with each other, and, by means of a suitable forming die, may be cheaply bent into the shape as shown in the drawings. The interchangeability of these sheets greatly facilitates and cheapens the cost of assembling, as will be understood, there being no "rights" and "lefts" when the sheets are folded in the manner shown. The operation, heretofore known in the art, of forming a suitable steam or water tight joint in a sheet metal radiator, so far as I am informed, has been expensive and troublesome. In brazing an ordinary joint of this kind there is constant danger of flooding portions of the outer walls adjacent the joint, with the hot brazing mixture, which burns away the galvanizing and leaves the surface so burned open to rust and corrosion. This danger is entirely removed in my improved construction, no flooding being, ordinarily possible. When the sheets 1 and 2 are placed in the positions shown in the drawings, an approximately sufficient quantity of the brazing mixture may be placed along in the trough 7, and kept at the proper temperature by means of a suitable torch, which op-

eration, if attended by even ordinary care and skill, results in a perfectly brazed joint, any burning of the adjacent outer surface of the walls being entirely prevented by the sides of the trough 7.

I am fully aware that the provision of troughs of various constructions, for such use as herein described, is not, in itself new in the art, and I do not, therefore, claim the same without qualification. The important detail of this feature of the invention is the cheap and effective manner in which this trough is formed. As above indicated, the sheets 1 and 2 after being folded are identical with each other, and, of course, may be packed, stored or otherwise handled without sorting, it being only necessary to treat half the number of folded sheets in such manner as to form the bead 4 and flaring portion 6, the remaining sheets being complete in themselves and ready for assembling without further treatment.

Attention is directed to the manner of forming the supporting frame and bracing the walls of the radiator against undue distention when under steam or water pressure. It has heretofore been usual to pass the tie rods through the walls of the radiator, thus necessitating a great number of water or steam tight joints at the points where the rods enter and emerge from the walls. In my improved construction no such joints are necessary, the V shaped braces 15 between the folds effectually preventing any distention of the walls. These braces are preferably formed of thin and light sheet metal, bent into V shape as plainly shown in Figs. 1 and 2, and secured in the positions there shown in the manner already fully described.

The pipes 8 extending through the lower portions of the frames 10, prevent any side-wise movement of the lower portion of the radiator, with relation to the end frame 10,

the upper set of the rods 11 preventing a like movement of the upper portion of the radiator. The radiator, resting upon the lower set of tie rods 11, is thus supported a sufficient distance from the floor to insure proper upward draft.

Having described my invention, what I claim as new and desire to protect by Letters Patent of the United States, is—

1. In a radiator the combination of a serpentine chamber formed of a pair of sheet metal plates the edge of one of which is first curved over and then the extreme edge bent backwardly until it is inclined to its original plane, thus forming a brazing trough between the plates when they are placed together and contact near their extreme edges, V shaped braces between the windings of said serpentine chamber, end frames and common means for drawing the same together and holding said serpentine chamber in place and for clamping said braces in position.

2. In a radiator the combination of a serpentine chamber formed of a pair of sheet metal plates the edge of one of which is curved over and then the extreme edge bent backwardly until it is inclined to its original plane, thus forming a brazing trough between the plates when they are placed together and contact near their extreme edges, vertically disposed V shaped braces between the windings of said serpentine chamber, end frames and common means for drawing said end frames together and holding said serpentine chamber in place between the same and for clamping said vertical braces in position.

CARL S. CARLBERG.

Witnesses:

M. E. BREWER,  
FRED P. GORIN.