No. 881,270. PATENTED MAR. 10, 1908.

T. H. WALKER.

SHEET METAL RADIATOR MANUFACTURE.

APPLICATION FILED FEB. 8, 1907.

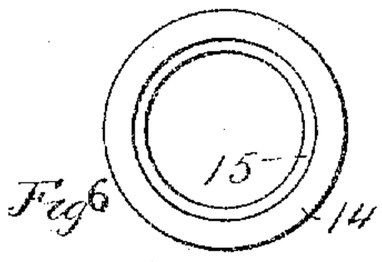

Fig 6

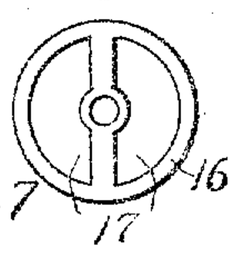

Fig 7

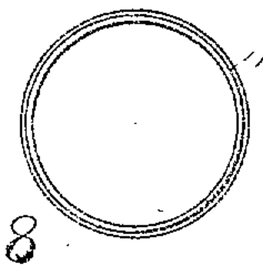

Fig 8

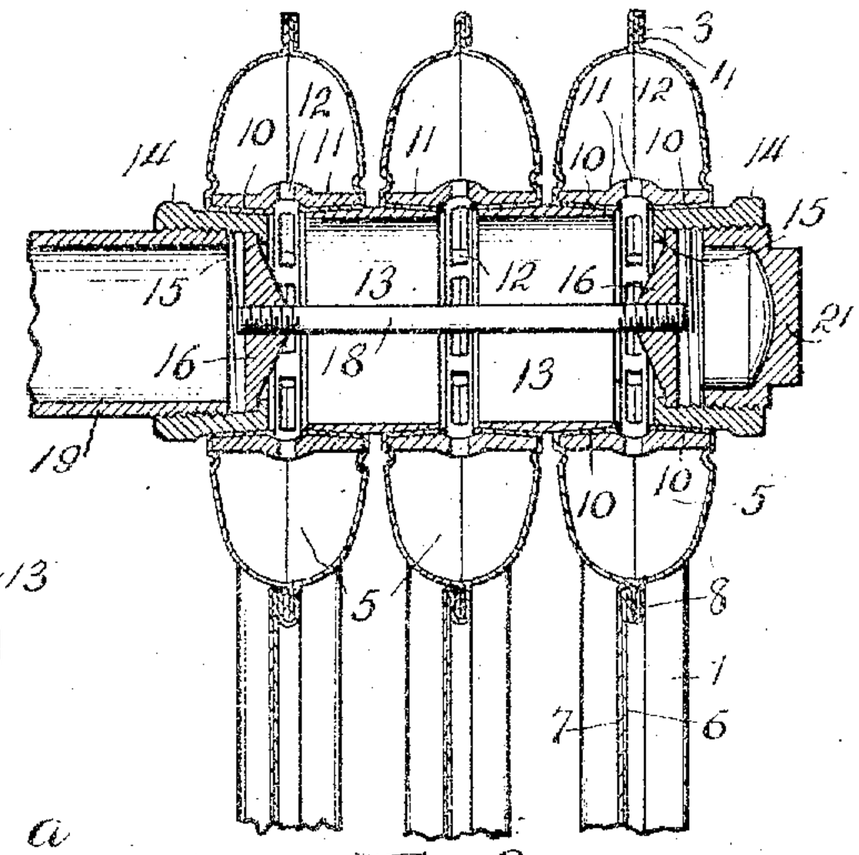

Fig 3

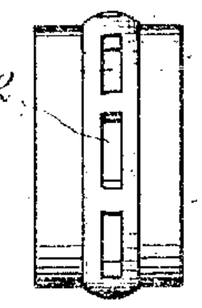

Fig 9

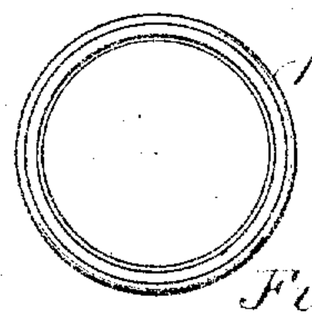

Fig 10

Fig 2

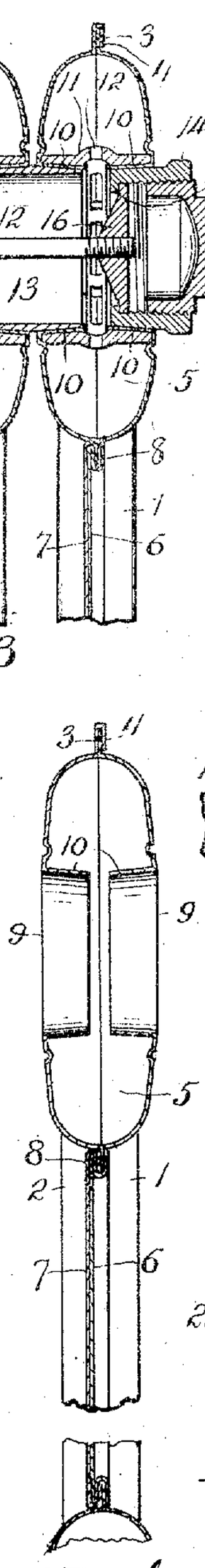

Fig 4

Fig 1

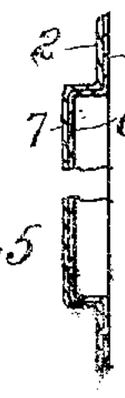

Fig 5

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SHEET-METAL-RADIATOR MANUFACTURE.

No. 881,270. Specification of Letters Patent. Patented March 10, 1908.

Application filed February 8, 1907. Serial No. 356,447.

To all whom it may concern:

Be it known that I, THOMAS H. WALKER, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Sheet-Metal-Radiator Manufacture, of which the following is a specification.

My invention relates to improvements in sheet metal radiator manufacture.

It relates particularly to sheet metal radiators composed of a plurality of connected sheet metal sections, each section comprising two sheet metal halves.

The object of my invention is to provide a sheet metal radiator section of the type described in which the outer edges of the halves are tightly joined, and each half is provided with an imperforate panel portion interlocked with a similar panel portion of the opposite half, whereby the radiator section is greatly strengthened and leakage inwardly or outwardly through the paneled portion, due to internal or external pressure, is wholly avoided.

Another object of my invention is to provide an improved method or process of making my improved sheet metal radiator section.

My invention provides further, novel means by which the radiator sections are firmly held together and leakage at the places of connection is avoided.

My invention provides further a construction of sheet metal radiator in which radiator sections may be readily added to or removed from a radiator, thereby permitting the quick construction of a radiator of any desired capacity.

Other novel features of my invention are hereinafter fully described and claimed.

In the accompanying drawings illustrative of my invention, Figure 1, is a side elevation view of my improved radiator. Fig. 2 is an end elevation view of the upper portion of the improved radiator. Fig. 3 is a vertical sectional view taken on the dotted line *a*—*b* of Fig. 2. Fig. 4 is a vertical sectional central view of one of the radiator sections, partly broken away. Fig. 5 is a central vertical sectional view of the panel portion of a radiator section, before the bosses in such panel portion have been interlocked. In Fig. 4 the bosses of the panel portion are shown interlocked by upsetting. Fig. 6 is an end view of one of the end thimbles. Fig. 7 is an end view of one of the perforated nuts. Fig. 8 is an end view of one of the intermediate thimbles. Fig. 9 is a side elevation view of one of the sleeves. Fig. 10 is an end view of one of the sleeves.

Similar characters of reference denote similar parts.

I will first describe the construction of and method of making my improved radiator section. Each radiator section comprises two sheet metal halves or members 1 and 2, the outer edges of which are tightly joined to each other, preferably by a lap seam in which the peripheral flange 3 of the sheet 1 is overlapped by the peripheral flange 4 which extends around the outer edge of the sheet 2. The sheets 1 and 2 are provided on their adjoining sides with depressed portions which register with each other and form a flue space 5 into which the heating fluid, such as steam, is admitted. Each sheet is provided with a central longitudinal panel portion which interlocks with the opposite panel portion, thereby strengthening the section. In my improved construction this panel portion is imperforate, and there is, therefore, no opportunity for the heating fluid to escape where the panel portions of opposite sheets join, nor, when a partial vacuum occurs due to steam condensation, can air enter the radiator section.

By my improved process the sheet 1 has formed therein a central longitudinal boss 6 adapted to fit into a corresponding boss 7 when the sheets 1 and 2 are placed side by side with their outer edges abutting each other. The bosses 6 and 7 are then interlocked, preferably by upsetting the side walls thereof, as shown by 8 in Fig. 4. The depressions in the sheets which form the flue space 5 encircle the bosses 6 and 7. Prior to placing the sheets side by side, each sheet adjacent its upper and lower ends is provided with two perforations 9, each encircled by an inwardly extending tapering annular flange 10. The flanges 10 in adjacent ends of sheets 1 and 2 are oppositely disposed but do not meet. The sheet 2 is slightly larger than the sheet 1 so that when placed side by side as described, the outer edge of the sheet 2 may be lapped over the outer edge of the sheet 1, thus forming an inwardly extending flange 4 which is tightly compressed against the flange 3 in the manner usual if forming a lap seam.

Corresponding ends of the several radiator sections are connected with each other in the manner I will now describe.

As the upper and lower ends of the radiator sections are connected to adjacent sections in the same manner, a description of the mechanism connecting the upper radiator ends, as illustrated in Fig. 3, will suffice also for a description of the mechanism connecting together the lower ends of the sections.

In each section is provided a horizontal sleeve 11, the inner wall of which tapers from the ends toward the middle. Said tapering walls encircle the tapering annular flanges 10 in the adjacent end of the radiator section. The sleeve 11 is provided intermediate the ends of the flanges 10 with one or more peripheral openings 12. Horizontal tubular thimbles 13 connect adjacent radiator sections. Each of these intermediate thimbles comprises a tube having its outer wall tapering from the middle toward each end. The tapering ends of each intermediate thimble 13 is inserted in the adjacent annular flanges 10 of adjacent sections. The diameter of the intermediate thimble 13 is such that when forced lengthwise into the flanges 10 it will tightly compress said flanges against the inner tapering wall of the sleeve 11 which encircles such flanges. Two end thimbles 14 are provided. Said thimbles are each tubular throughout and are each provided with an outer wall having a tapering inner end. Said thimbles 14 are respectively mounted in the outer annular flanges 10 of the end sections, and respectively compress the said flanges 10 against the inner walls of the two end sleeves 11. Each end thimble 14 is provided at its inner end with an internal annular flange 15. Rotatively mounted in the end thimbles 14 are two nuts 16 each having one or more longitudinal perforations 17 which serve as means for turning said nuts and also to permit the passage therethrough of the heating fluid. Said nuts 16 are respectively mounted on the screw threaded ends of a horizontal rod 18 disposed longitudinally in the thimbles 13 and 14. The uts 16 are respectively supported by the outer sides of the annular flanges 15 of the end thimbles 14.

The parts having been assembled as described, to tightly connect the different radiator sections with each other, it is but necessary to properly rotate one of the nuts 16 on the rod 18, thereby drawing the end thimbles 14 toward each other and forcing said thimbles and the thimbles 13 tightly against the adjacent annular flanges 10, which in turn are tightly compressed against the adjacent sleeves 11. The outer ends of the four end thimbles 14 in each radiator are internally screw threaded. In one of the upper end thimbles 14 is secured the end of one of the steam pipes, denoted by 19. In the opposite lower thimble 14 is fitted one end of the other steam pipe denoted by 20. Removable threaded plugs 21 are mounted respectively in the other two end thimbles 14. By removing the plugs 21, the nuts 16 adjacent thereto may be rendered accessible for the purpose of tightening or loosening the same.

To increase or decrease the number of radiator sections, it is but necessary to supply duplicate parts as needed, or remove sections not needed, together with the connecting intermediate thimbles 13 not required, and employ rods 18 of suitable length.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:—

1. In a sheet metal radiator, a radiator section comprising two sheets of metal having bosses formed therein respectively, one boss fitting within the other, a depression in one sheet forming a flue space encircling the boss in said sheet, the outer edges of the sheets being locked together, and the bosses being upset so that they interlock at their peripheries.

2. A radiator section, comprising two sheets of metal having bosses formed therein, one boss fitting within the boss of the opposite sheet, each sheet having therein a depression encircling the boss in said sheet, said depressions forming a flue space, the outer edges of the sheets being locked together, and the bosses being upset so that they interlock at their peripheries.

3. A sheet metal radiator section comprising two sheet metal parts having respectively two bosses fitted one within the other, both bosses being closed and interlocked with each other, one part having a depression encircling the boss, the other part covering said depression, and the outer edges of the parts being tightly joined to each other.

4. A sheet metal radiator section comprising two sheets of metal having respectively two bosses fitted one in the other, both bosses being closed and interlocked with each other, each sheet having a depression encircling the boss, the depressions forming a flue space, and the outer edges of the sheets being joined tightly with each other.

5. A sheet metal radiator section comprising two metal sheets having respectively two bosses fitted one in the other, both bosses having closed ends and interlocked at their peripheries, each sheet having a depression encircling the boss, the depressions of the sheets forming a flue space, and the outer edge of one sheet overlapping the outer edge of the other sheet.

6. A sheet metal radiator section comprising two metal sheets having their outer edges tightly joined and depressions on adjacent sides forming flue spaces, each sheet having an imperforate panel portion interlocking

with the corresponding panel portion of the opposite sheet.

7. A sheet metal radiator section comprising two metal sheets having their outer edges formed into a lap seam, said sheets on adjacent sides having depressions forming a flue space, each sheet having an imperforate panel portion interlocked with the corresponding panel portion of the opposite side.

8. A sheet metal radiator section comprising two metal sheets tightly joined at their outer edges and provided with depressions on adjacent sides forming a flue space, each sheet having in the depressed portion a perforation encircled by an annular flange, each sheet having an imperforate panel section interlocked with a corresponding panel portion of the opposite sheet.

9. A sheet metal radiator section comprising two metal sheets the outer edges of one sheet overlapping the outer edges of the other sheet, the sheets on adjacent sides being provided with depressions forming a flue space, each sheet adjacent opposite ends having two perforations each encircled by an annular flange, each sheet having an imperforate panel section interlocked with a corresponding panel portion of the opposite sheet.

10. A sheet metal radiator section comprising two metal sheets, the outer edges of one overlapping the outer edges of the other sheet, the sheets on adjacent sides having depressions forming a flue space, each sheet having adjacent opposite ends two perforations through said depressed portion, the sheets having each a longitudinal panel portion provided with a boss, the boss of one sheet being fitted into the boss of the other sheet, and the two bosses interlocking one with the other.

11. In a sheet metal radiator, the combination with a sheet metal radiator section having a flue space and provided with a perforation communicating with said flue space and encircled by an annular integral tapering flange, of a sleeve encircling said annular flange and having a tapering inner wall, and a thimble having a tapering outer wall fitted in said annular flange and tightly compressing the flange against the sleeve.

12. In a sheet metal radiator, the combination with a sheet metal radiator section having a flue space and provided on opposite sides with oppositely disposed perforations communicating with said flue space, said opposite sides having respectively annular flanges encircling said perforations and extending inwardly, of a sleeve encircling said flanges and having its inner wall tapering inwardly from each end, and two thimbles having tapering outer walls mounted respectively in said annular flanges and tightly compressing said flanges against the tapering wall of the sleeve.

13. In a sheet metal radiator, the combination with a sheet metal radiator section having a flue space and provided on opposite sides with oppositely disposed perforations encircled by annular inwardly extending flanges of a sleeve having its inner wall tapering from each end, the sleeve having a perforation intermediate the inner ends of said annular flanges, and two thimbles having tapering outer walls respectively mounted in said annular flanges and tightly compressing said flanges against the tapering portions of said sleeve.

14. In a sheet metal radiator, the combination with a sheet metal radiator section having a flue space and provided on opposite sides with oppositely disposed perforations encircled by annular flanges extending inwardly, of a sleeve encircling said annular flanges and having its inner wall tapering from each end toward the middle, the sleeve having a perforation intermediate said annular flanges, two thimbles having tapering outer walls fitted respectively in said annular flanges for holding said flanges tightly against the tapering wall of the sleeve, and means for forcing said thimbles toward each other.

15. In a sheet metal radiator, the combination with a radiator section comprising two metal sheets depressed on adjacent sides to form a flue space and tightly jointed to each other at their outer edges, each sheet having a perforation disposed opposite the perforation in the other sheet, each sheet having an annular flange encircling the perforation and having its inner wall tapering from each end and tapering inwardly, of a sleeve encircling said annular flanges and having a perforation intermediate the ends of said flanges, and means for tightly compressing said flanges against the tapering wall of said sleeve.

16. In a sheet metal radiator, the combination with plurality of sheet metal sections, each having in opposite sides inwardly extending oppositely disposed annular flanges each encircling a perforation in the adjacent side, of a plurality of sleeves mounted one in each radiator section and having tapering inner walls encircling the annular flanges of said section, and having a perforation intermediate the annular flanges in said section, and a plurality of thimbles for connecting the radiator sections each having tapering ends mounted in and bearing against said annular flanges, and when moved toward each other having the tapering ends tightly compressing the flanges against the tapering walls of said sleeves.

17. In a sheet metal radiator, the combination with two sheet metal radiator sections having in adjacent sides oppositely disposed perforations encircled by annular integral flanges extending inwardly, of two sleeves mounted one in each radiator section and encircling the annular flange in said section, the inner wall of each sleeve tapering

inwardly from the outer end, and a thimble having its outer wall tapering to the middle from each end and mounted in said annular flanges and forcing said flanges tightly against the tapering walls of said sleeves.

18. In a sheet metal radiator, the combination with a plurality of sheet metal radiator sections each having two oppositely disposed inwardly extending tapering annular flanges encircling perforations in opposite sides of the section, of a plurality of sleeves mounted one in each radiator section and encircling the annular flanges therein, each sleeve having a perforation intermediate the adjacent annular flanges, the inner wall of each sleeve tapering toward the middle from each end, intermediate thimbles connecting respectively adjacent sections and having each an outer wall tapering toward each end from the middle, the tapering ends being mounted in the adjacent annular flanges of adjacent sections, two end thimbles mounted respectively in the outer annular flanges of the end sections, the end thimbles each having an outer wall tapering toward the inner end, and adjustable means for drawing the end thimbles toward each other and thereby tightening all the thimbles in the annular flanges in which they are mounted, and compressing said flanges against the tapering walls of the adjacent sleeves and thimbles.

19. In a sheet metal radiator, the combination with a plurality of sheet metal radiator sections each having two oppositely disposed inwardly extending annular flanges, of sleeves mounted one in each radiator section and encircling and serving as a support for the annular flanges of said section, intermediate thimbles for connecting adjacent sections, said intermediate thimbles having each an outer wall tapering from the middle toward each end, the tapering ends being mounted in and bearing against adjacent annular flanges, end thimbles having inwardly tapering outer walls, and respectively mounted in the outermost flanges of the end radiator sections, a rod disposed longitudinally in said thimbles, and means mounted on said rod by which the end thimbles may be drawn toward each other.

20. In a sheet metal radiator, the combination with a plurality of sheet metal radiator sections each having oppositely disposed openings in opposite sides, encircled by inwardly extending annular flanges, of sleeves mounted one in each radiator section, each sleeve encircling the annular flanges of said section and having its inner wall tapering from the ends toward the middle, the tapering portions serving as supports for the annular flanges encircled thereby, each sleeve having a perforation intermediate the ends of the adjacent annular flanges, intermediate thimbles connecting adjacent sections, each thimble having tapering ends fitted respectively in and bearing against the adjacent annular flanges of adjacent sections, two end thimbles each tapering toward its inner end and fitted respectively in the outer flanges of the end sections, each end thimble having at its inner end and on its inner wall an annular flange, a rod extending longitudinally through the intermediate thimbles, and two longitudinally perforated nuts having screw threaded connection respectively with the ends of said rod and respectively supported by the flanges on said end thimbles.

In testimony whereof I have signed my name to this specification in presence of two subscribing witnesses.

THOMAS H. WALKER.

Witnesses:
WARREN D. HOUSE,
E. B. HOUSE.