No. 692,300. Patented Feb. 4, 1902.

J. D. KARNAGHAN.

SHEET METAL RADIATOR.

(Application filed Nov. 26, 1900.)

(No Model.)

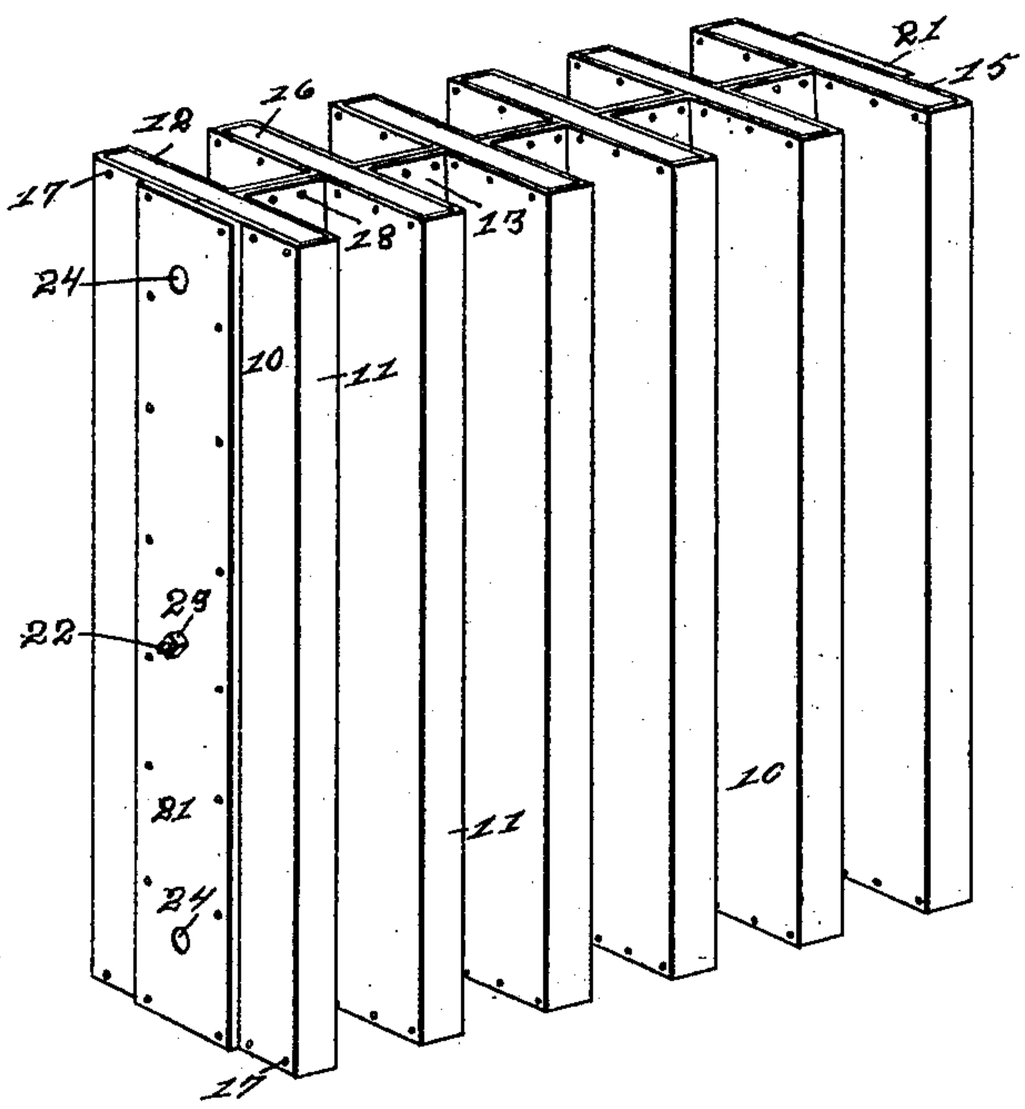


Fig. 1

Fig. 2

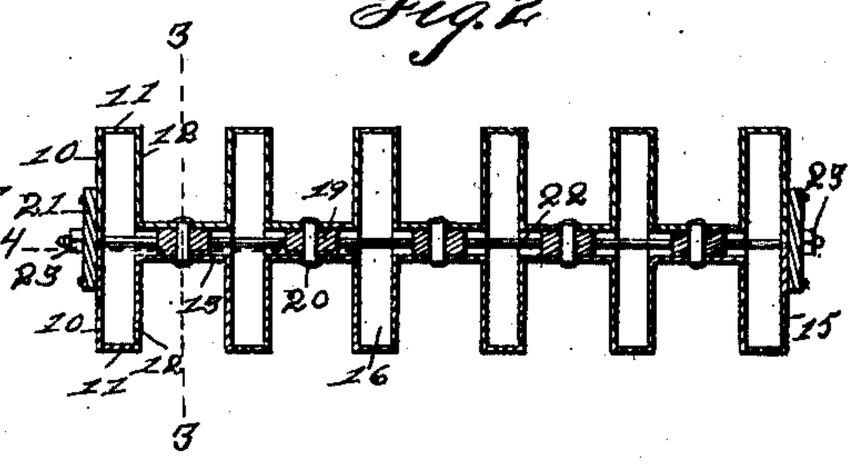


Fig. 3

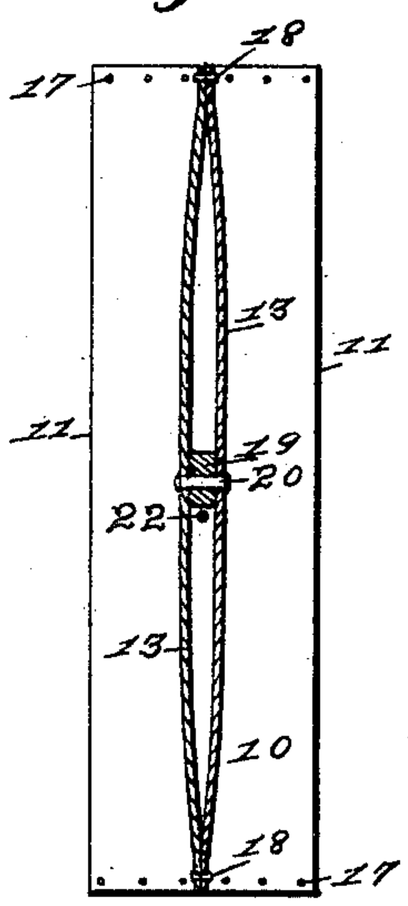
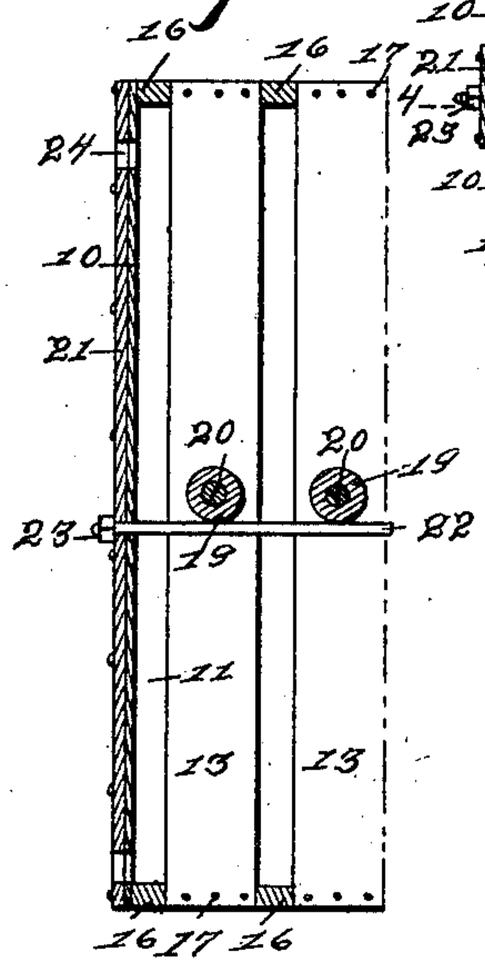


Fig. 4



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SHEET-METAL RADIATOR.

SPECIFICATION forming part of Letters Patent No. 692,300, dated February 4, 1902.

Application filed November 26, 1900. Serial No. 37,799. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. KARNAGHAN, a citizen of the United States, residing at Marshalltown, in the county of Marshall and State of Iowa, have invented certain new and useful Improvements in Sheet-Metal Radiators, of which the following is a specification.

The object of this invention is to provide a sheet-metal radiator for steam or hot water, that may be manufactured at a slight cost and yet have great strength and durability.

A further object is to provide a radiator of this class having any desirable number of chambers and in which the entire radiator may be made from two pieces of sheet metal, thereby effecting a great saving in the cost of construction by eliminating the great number of joints required in connecting the parts of each section together and of connecting the sections with each other, as in the usual form of radiator, and at the same time provide a radiator having a maximum radiating-surface in proportion to the floor-space it occupies—that is to say, as much or greater radiating-surface than the ordinary sheet-metal radiator built up of a number of sections and also having a maximum of strength in resisting internal steam-pressure. More specifically in this connection it is my object to provide a sheet-metal radiator of the class described so shaped as to be firmly braced against internal strains in every direction without requiring any other braces or stays than provided by the metal of which the radiator sides are formed, except for the two outside ends.

My object is, further, to provide a radiator of this class in which a free circulation of steam is provided between the various chambers and the water of condensation permitted to freely drain off.

My invention consists in certain details in the construction, arrangement, and combination of the various parts of the radiator, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows in perspective the entire radiator embodying my invention. Fig. 2 shows a central horizontal sectional view of the same. Fig. 3 shows a vertical transverse sectional view taken on the line 3 3 of Fig. 2. Fig. 4 shows a vertical longitudinal sectional view taken on the indicated line 4 of Fig. 2.

In the accompanying drawings I have shown a radiator made of two pieces of sheet metal, each piece forming one complete side of the radiator. Beginning with one end of one of the sheets, which end is arranged along a vertically-central line at one end of the radiator, the sheet metal extends straight outwardly at 10 to the outer edge of the first section. It then extends at right angles parallel with the longitudinal center of the radiator at 11 and then inwardly at right angles to the part 11 and parallel with the part 10 at 12 to the longitudinal center of the radiator. It then extends parallel with the longitudinal center a short distance at 13, and at the end of the part 13 it extends straight outwardly, the same as the part 10, the parts 10, 11, 12, and 13 forming one side of a complete chamber. Thereafter as many chambers as it is desired to provide in the radiator are shaped from the same piece of metal in the same manner as the parts just described. The part corresponding to the part 12 on the last chamber of the radiator extends to the central longitudinal line of the radiator and is indicated by the numeral 15.

The foregoing description applies to the opposite side of the radiator, the said sides being counterparts. When these parts are assembled as shown in the drawings, a block or head 16 is placed in the top and bottom of each chamber of the radiator and firmly secured in position by means of rivets 17, passed through the sides of the radiator and through said heads. The upper and lower end portions of the parts 13 are connected with each other by means of the row of rivets 18.

I have provided means for the passage of steam or hot water from one chamber to another, as follows: At the horizontally central portion of the parts 13 between each section I have placed the block 19 between said parts, thus forcing them apart, and a rivet 20 is passed through the parts 13 and through said block, thereby bracing against internal pressure and at the same time providing a passage-way between the parts 13. I have also provided a simple and inexpensive means for providing a tight joint at the ends of the

radiator and at the same time bracing said ends against internal pressure, as follows: To each end I have fixed by rivets the vertical plates 21, and a rod 22 is passed through each plate and between the parts 13 of each chamber and beneath the blocks 19. Obviously when the nuts 23 on the ends of said rod are screwed up the plates 21 will be firmly held in position against internal pressure. The openings whereby the pipes of ingress and egress are connected with the radiator are made in these plates 21 and are indicated by the reference-numeral 24.

It is obvious that a radiator constructed in this manner may be made at much less expense than a radiator built up of a number of independent sections, because the time and labor required in connecting the edges of the independent sections and then in connecting the independent sections with each other are by means of my construction wholly dispensed with. Furthermore, the cost of providing pipes, push-nipples, or the like to connect independent radiator-sections is in my construction dispensed with. Furthermore, by forming the radiator into the same shape that a number of sections would assume and then in using the same piece of metal that forms the sections for a connecting passage-way between the sections it is obvious that a firm brace is thereby provided, so that the internal pressure in the sections cannot force the sides of the radiator apart, and they also serve to brace the radiator against expansion from internal pressure in a direction toward the ends of the radiator. The two end portions of the radiator are firmly braced by the simple and inexpensive application of the rod 22, passed through said ends. Furthermore, perfect circulation between each of the sections is attained by the use of the simple application of internal blocks 19, held in place by rivets 20. The tops and bottoms of the chambers are firmly and securely closed at slight expense by means of the heads 16, held in place by rivets, brazing, or the like.

I use the term "chamber" to apply to those portions of the radiator that stand transversely of the longitudinal axis of the radiator, and the word "passage-way" to apply to those portions of the radiator that connect the chambers. In either form the passage-ways being at right angles to the chambers serve as braces to the chambers and prevent them from expanding on account of internal steam-pressure. Furthermore, these passage-ways have a distinct advantage over the usual connecting-pipes or push-nipples employed where radiators are built up from a number of sections in that the sides of the passage-way from the top to the bottom of the radiator provide additional radiating-surface, so that a maximum of radiation is obtained with a minimum of floor-space.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States therefor, is—

1. In a sheet-metal radiator the combination of two opposing sheets, said sheets formed into a series of tubes and connections between said tubes, those portions of the sheets forming the connections being secured together at top and bottom and spaced therebetween forming passages, and means for closing the ends of said tubes.

2. In a sheet-metal radiator the combination of two opposing sheets, said sheets formed into a series of tubes and connections between said tubes, those portions of the sheets forming the connections being secured together at top and bottom, blocks interposed between the portions of the sheets forming the connections, rivets passed through the sheets and blocks, and means for closing the ends of said tubes.

3. In a sheet-metal radiator the combination of two opposing sheets, said sheets formed into a series of tubes and connections between said tubes, those portions of the sheets forming the connections being secured together at top and bottom, and spaced therebetween forming passages, and means for closing the ends of said tubes, and plates at the ends of the radiator and rods fixed to the plates and passed through the tubes and connections.

4. In a sheet-metal radiator the combination of two opposing sheets, said sheets formed into a series of tubes and connections between said tubes, the tubes being substantially rectangular in cross-sections of a width at right angles to the longitudinal axis of the radiator materially greater than their thickness, the portions of the sheets forming connections being secured together at top and bottom and spaced therebetween forming passages, and means for closing the ends of said tubes.

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Witnesses:
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