

C. E. HEITMAN.
 FLUID TIGHT EXPANSION JOINT.
 APPLICATION FILED JAN. 19, 1910.

1,015,180.

Patented Jan. 16, 1912.

Fig. 1.

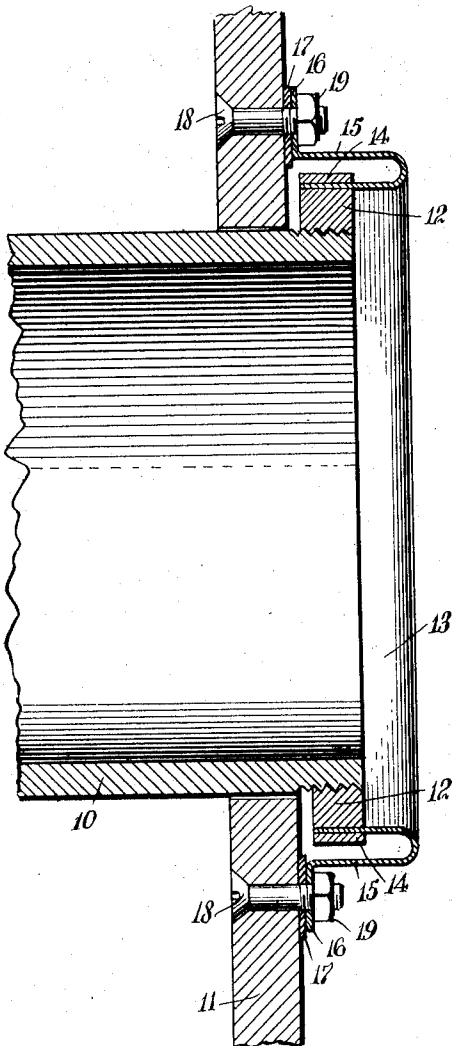


Fig. 2.

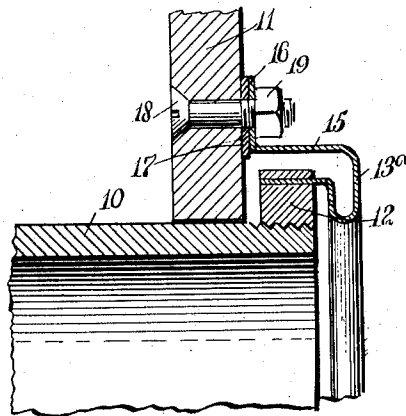
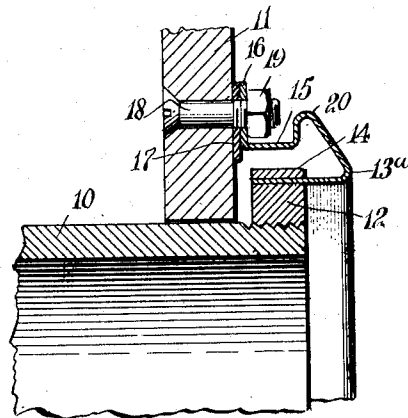


Fig. 3.



WITNESSES:

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FLUID-TIGHT EXPANSION-JOINT.

Specification of Letters Patent.

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1,015,180.

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To all whom it may concern:

Be it known that I, CHARLES EASTON HEITMAN, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Fluid-Tight Expansion-Joint, of which the following is a full, clear, and exact description.

10 This invention relates to certain improvements in joints for connecting pipes or conduits to walls, partitions, or tube sheets, and the object of the invention is to form a very simple and efficient joint which
15 will be perfectly fluid tight, and which will permit of a relative movement of the tube or conduit, and the wall or plate. Instead of using a cap about the tube, which not only impedes the free movement of the latter, but which often becomes disposed or
20 deranged, so as to leak, I employ an annular strip of sheet material, the opposite edges of the strip being so secured to the tube and plate that no liquid or gas can possibly
25 escape past the strip.

The invention involves the important features of construction hereinafter referred to, and particularly defined in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, and in which—

30 Figure 1 is a longitudinal section through a portion of a conduit and tube sheet in connection with which a packing constructed in accordance with my invention is employed; Figs. 2 and 3 are sectional details
35 similar to a portion of Fig. 1, but showing a somewhat modified arrangement of packing strips.

My invention is particularly adaptable for use in connection with that type of
40 heater in which a large bank of pipes or tubes are supported with their ends attached to walls or tube sheets, so that when a fire is built below the tubes, the gases of combustion may pass up through the casing around
45 the tubes to the chimney, while air may pass either by natural or forced drafts
50 through the tubes and to the space to be heated or dried by the heated air. It is particularly desirable that the smoke and gases of combustion surrounding the tubes
55 be prevented from passing out of the casing

except to the smoke stack, and that such gases and smoke be prevented from in any way gaining access to the interior of the tubes.

My improved joint serves to connect the
60 end of the tube or pipe to the end wall of the casing, that is, the tube sheet or crown sheet, so as to positively prevent any escape of gas through said wall or sheet from the interior of the chamber through which the
65 tubes pass. It is, of course, evident that my improved joint may be used in various other types of apparatus in which tubes and supporting walls are employed, and I therefore do not wish to be limited to any
70 particular application of the invention.

My invention may assume various different forms, but in the form illustrated in Fig. 1, I employ a tube 10, which serves as
75 an air tube in a heater of the character above referred to. This tube adjacent its end, extends through the wall 11 and is sufficiently loose therein, so as to permit the tube to move lengthwise a limited distance during the expansion and the contraction of
80 the tube when the latter is heated and cooled. The outer end of the tube is exteriorly threaded, and a collar 12 interiorly threaded is fitted into the end of the tube 10 outside of the wall 11. An annular sheet metal
85 expansion ring, band or strip 13, has one edge thereof fitting the outer peripheral surface of the collar 12, and is permanently secured thereto by a second collar 14, which is heated and shrunk onto the collar 12,
90 to grip the edge of the band 13 therebetween. The sheet metal forming the expansion ring, band or strip 13, extends outwardly from the wall 11 and is folded back upon itself to form an outer portion 15 surrounding the collar 14 and concentric therewith.
95 The free edge of this outer portion 15 is bent outwardly, so as to form an outer flange 16 lying in a plane parallel to the outer surface of the wall 11, and is firmly
100 secured to the latter. An asbestos packing 17 may be inserted between the flange 16 and the wall 11, and bolts 18 may have their heads countersunk on the inner surface of the wall 11 and may extend out through the
105 asbestos packing and the flange 16, to receive nuts 19 serving to bind the flange in position. By this construction, gas is positively prevented from escaping from between the flange 16 and the wall, and the
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flange, as well as the entire expansion ring, may be removed from the wall by loosening and removing the nuts 19 on the outer surface of the wall. The expansion ring is permanently secured gas-tight to the collar 12, and as the collar is threaded to the tube 10, it is evident that gas escaping through the opening in the wall 11 around the tube 10, cannot pass the expansion ring. As the tube expands or contracts, the fold of the sheet metal expansion ring is caused to roll upon itself to vary the relative proportions of the two concentric portions of the expansion ring.

15 I do not rely upon a rolling of the sheet metal during the expansion or contraction of the tube, as I may rely simply upon a folding. In the form shown in Fig. 2, the expansion ring 13^a is secured in place the same as the ring 13, but the fold or bend is bent to lie adjacent the outer end of the collar 12, so that as the tube is expanded or contracted, the metal will be folded at an angle rather than being rolled. In this case, the fold of the metal also serves to partially conceal the collar 12, and it may in fact be brought closely adjacent the latter, so as to completely conceal the latter, as well as conceal the end of the tube 10.

30 In Fig. 2, the fold or bend of the metal extends inwardly from the other part 15, but I may, if desired, extend the bent portion outwardly, as indicated in Fig. 3. In this figure, the expansion ring 13^a has a band or fold 20, extending outward radially from the part 15. In this case, there is an opening or closing of the angle of the fold as the tube contracts or expands. It will be noted that the particular location of the fold or the character of the bend, is not of any great importance. It is only essential that the expansion ring be secured in place in substantially the manner illustrated.

40 Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. The combination with a tube sheet and a tube extending therethrough, of a fluid-tight expansion joint, including a collar 50 threaded to the exterior of said tube, a sheet metal expansion ring having one edge in engagement with the periphery of said collar, a second collar shrunk upon said edge to

hold the latter to said first-mentioned collar, the other edge of said sheet metal expansion ring being bent at an angle to lie in a plane parallel to said tube sheet, an annular packing intermediate said last-mentioned edge and said tube sheet, and a plurality of bolts extending through said last-mentioned edge, said tube sheet and said packing, for securing the ring and packing in position.

2. The combination with a tube and a tube sheet, of a fluid-tight expansion joint, including an annular sheet metal band encircling the tube but out of engagement therewith, two collars engaging with opposite sides of said band adjacent one edge of the latter and serving to hold said band therebetween, one of said collars being detachably secured to said tube, and means for securing the other edge of said sheet metal to said tube sheet.

3. The combination with a tube sheet and a tube movable longitudinally therethrough, of a fluid-tight expansion joint including an expansion ring of flexible sheet metal having two substantially concentric cylindrical portions integral with each other and an intermediate connecting portion, means for rigidly securing the edge of the inner one of said portions to the periphery of the tube to form a fluid-tight joint, and means for rigidly securing the edge of the outer one of said cylindrical portions to the surface of the tube sheet to form a fluid-tight joint, the inner and outer portions of said ring being relatively movable upon an expansion or contraction of the tube.

4. The combination of a tube sheet having an opening, a tube extending loosely through said opening, a packing ring engaging said sheet and concentric to said tube, a ring of sheet metal provided with a flange engaging said packing ring, said metallic ring being provided with another portion bent back upon itself, and a collar mounted upon said tube and engaging said portion thus bent back upon itself.

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

CHARLES EASTON HEITMAN.

Witnesses:

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