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BOILER FLUE FASTENING MEANS.

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1,089,970. Patented Mar. 10, 1914.

Fig. 1.

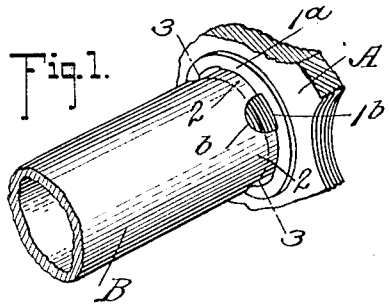


Fig. 2.

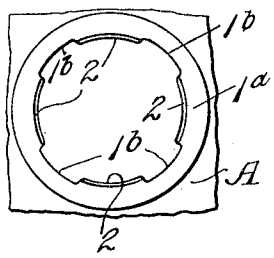


Fig. 3.

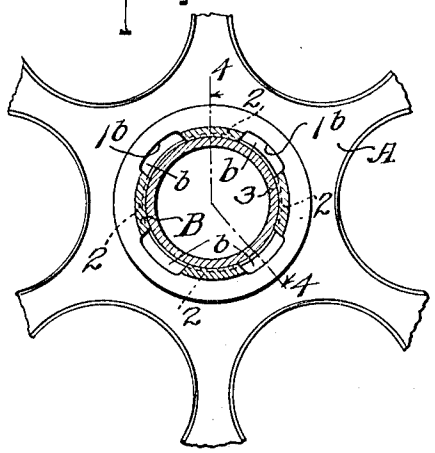
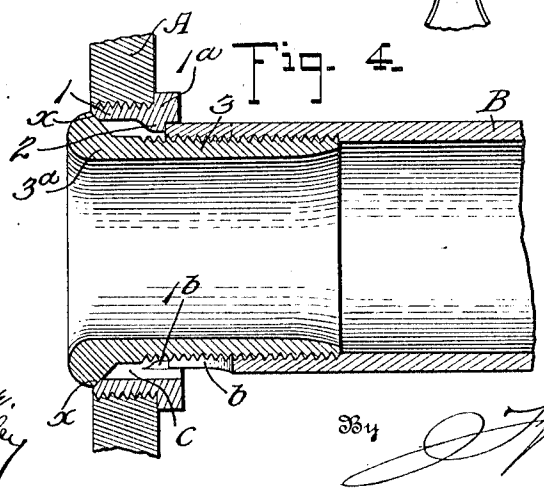


Fig. 4.



Witnesses

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BOILER-FLUE-FASTENING MEANS.

1,089,970. Specification of Letters Patent. Patented Mar. 10, 1914.

Application filed April 10, 1913. Serial No. 760,293.

To all whom it may concern:

Be it known that I, FREDERICK SCHMITT, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Boiler-Flue-Fastening Means, of which the following is a specification.

One of the most difficult problems in the art of boiler construction wherein the boiler is supplied with heating flues, has been to afford a connection between the flues and the flue sheet adjacent to the fire box, which connection is effective to eliminate leakage. A joint or connection for the purpose above referred to has long been sought by boiler makers and is especially required in the attachment of horizontal flues such as are commonly used in stationary and locomotive boilers.

The difficulty heretofore in flue connections has been that a too great amount of expansion and contraction of the flue sheet, and parts of the flue connection itself, is permitted, a distortion of the sheet as well as the attaching parts resulting to such an extent that the connection is rendered ineffective and leakage from the boiler follows.

An object of my invention has been to improve upon the flue fastening means set forth in my Letters Patent No. 953,062, issued March 29, 1910, and wherein adjacent parts of the flue connection are so arranged as to provide a water jacket at the joint between the flue and the flue sheet, which water jacket reduces materially sudden expansive and contractive tendencies of the parts owing to varying internal and external temperatures.

The improvements of this invention are also directed broadly to the provision of a connection between the flue and the flue sheet, whereby the flue becomes virtually a brace acting not only externally upon the flue sheet, as is common heretofore, but also having an internal bracing action. In other words, the connection aforesaid braces the flue sheet upon both the inner and outer sides in such a way as to minimize distortion of the sheet and for this reason proportionately reduce the liability of such expansion and contraction of the sheet, and the metal parts of the connection itself, as would cause leakage.

With the above and other objects in view, the specific construction of the present invention will be more fully understood upon reference to the following description and the accompanying drawings, in which—

Figure 1 is a perspective view showing a fragment of a flue sheet with a flue secured thereto by the connection of this invention. Fig. 2 is a front elevation showing the threaded bushing applied to the flue sheet and bringing out clearly the arrangement of the projections or ribs carried by said bushing and affording a bearing for the adjacent terminal of the flue. Fig. 3 is a sectional view taken about on the line 3—3 of Fig. 1. Fig. 4 is a section taken on the line 4—4 of Fig. 3.

In the drawings A designates the flue sheet which is commonly located adjacent the fire box of the boiler and between which and the flues it is absolutely necessary to prevent leakage.

B designates an ordinary flue of conventional form excepting in reference to the formation of its terminal for connection with the flue sheet A.

It will be understood, of course, that any suitable number of flues are attached to the flue sheet A, this depending upon the capacity of the boiler, and each flue opening in sheet A is formed with a left hand screw thread to permit of securing therein the bushing 1. The bushing 1 is of peculiar formation having at its inner end an enlargement or collar 1^a adapted to bear against the inner surface of the flue sheet A when the bushing is tightly screwed in the flue opening. Internally the bushing is formed with a plurality of short, transverse ribs or abutments 2 inset from the inner end of the bushing and against which the adjacent terminal or end of the flue B impinges. The bushing 1 practically affords a bearing for the adjacent end of the flue B and the flue is secured firmly in said bearing by the clamping and securing member 3 which is similar to the one employed in my previous patent referred to. The member 3 is formed at its outer end with an annular head 3^a, the inner side of which is beveled at a suitable angle for operative engagement with a similarly beveled or inclined portion at the outer extremity of the bushing 1. Externally the member 3 is screw threaded from its innermost end, the direction of the thread thereof being preferably opposite to that of the member 1. By the application of a suitable tool which I have specially devised for

this purpose, the member 3 may be tightly screwed into the flue B which has internal threads for this purpose, until the head 3^a of the member 3 is sufficiently impinged or engaged with the outer end of the bushing 1, to afford a water tight joint at the point designated x in Fig. 4.

In view of the foregoing it will be observed that when the flue B is secured in position, assuming that the member 3 is virtually a detachable extension of the flue, the said flue practically has bearings at opposite sides of the flue sheet A, the bearings being directly on the bushing 1. Under such conditions it is obvious that when the parts 1, 3 and B are assembled as shown in Fig. 4 the flue B acts with a bracing effect internally and externally upon the flue sheet A and renders the latter extremely rigid against distortion by contraction and expansion in either direction from its sides. With a large number of flues connected in the manner described, to the flue sheet, the tremendous rigidity under which the sheet will be maintained may be appreciated.

In the present improvements it is contemplated not only to minimize the expansion and contraction of the flue sheet and parts of the joint by the means above set forth, but the water jacket availed of according to the construction of my device in my previous patent, is also used, said jacket prescribing the space between the inner wall of the bushing 1 and the outer wall of the member 3. Owing to the provision of the water space designated C the water in the boiler is in contact with the parts of the connection at the joint x. Owing to the fact that in the present device the flue B is seated against the bushing 1 it is necessary that the end of the flue be formed with cut-away portions b which afford a passage for the water from the boiler into the space C aforesaid. To render the passages b most effective the inner surface of the bushing 1 is notched at the points 1^b, said notches being opposite the cut-away portions b of the flue B, as quite clearly shown in Fig. 4. It may be noted that the abutments or projections 2 of the bushing 1 are preferably located in a plane beyond the inner side of the flue sheet A so that the bracing stress of the flue B under distortion tendencies of the sheet A is resisted by the bearing afforded by the flue end, in a direction somewhat diagonally outward from the latter.

By the employment of a flue connection such as herein set forth and the rendering more rigid of the flue sheet through the bracing action of the flues attached thereto I am enabled to utilize a flue sheet of practically one-half the thickness of that ordinarily employed, this resulting not only in decreased expense for the boiler structure, but affording the advantage that the thinner sheet is much less likely to become scaled than the heavier sheets ordinarily utilized. This is a matter of great importance in this particular art and has been borne in mind in the provision of the internal threads for the flues B for coöperation with the members 3, said threads not being likely to be damaged by scale collections upon the flues, a trouble incidental to many ordinary devices of this type.

Having thus described the invention, what is claimed as new is:—

1. In combination, a flue sheet provided with a bearing, a flue seated in said bearing, and a clamping and securing member connected with the flue and coacting with the flue sheet to hold the flue against its bearing, said clamping member being spaced from the flue sheet and the adjacent end of the flue being formed with passages permitting water to enter the space between the clamping member and flue sheet.

2. In combination, a flue sheet having a flue opening, a bushing detachably mounted in said opening and having a bearing at one end, a flue seated at one end on said bearing, and clamping means exerting a pressure against the opposite end of the bushing to draw the flue against the bearing, the opposite ends of the bushing being located substantially at opposite sides of the flue sheet, the bushing and the clamping means being spaced apart, and the adjacent terminal of the flue being cut away to form passages permitting water to enter the space aforesaid.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK SCHMITT.

Witnesses:
H. C. Robb,
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."