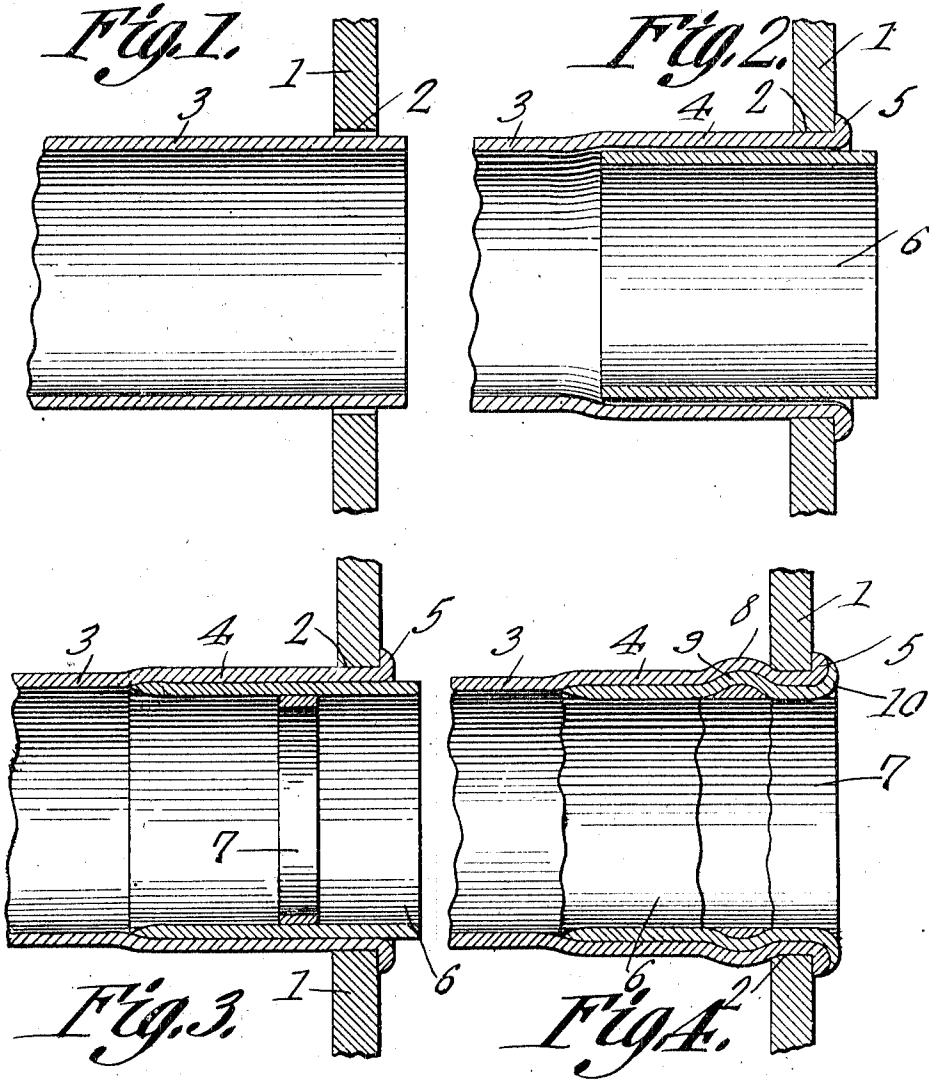


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BOILER FLUE REINFORCEMENT.
APPLICATION FILED JAN. 22, 1914.

1,102,163.

Patented June 30, 1914.



Witnesses

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UNITED STATES PATENT OFFICE.

HALDOR A. OPPERUD, OF LITCHVILLE, NORTH DAKOTA.

BOILER-FLUE REINFORCEMENT.

1,102,163.

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To all whom it may concern:

Be it known that I, HALDOR A. OPPERUD, a citizen of the United States, residing at Litchville, in the county of Barnes and State of North Dakota, have invented a new and useful Boiler-Flue Reinforcement, of which the following is a specification.

The present invention appertains to a boiler flue reinforcement, and aims to provide novel and improved means for effecting a tight and secure joint between the ends of the boiler flues and the heads or ends of the boiler.

It is also the object of the present invention to provide unique means for fastening or anchoring the ends of the flues to the heads or flue sheets of a boiler, to effect a tight joint between flue ends and the boiler heads or flue sheets, and to increase the holding or staying action of the flues for preventing the ends of flue sheets of the boiler from being bulged outwardly under the heavy pressure of the steam.

It is also the object of the present invention to provide means for reinforcing old flues, as well as new ones, the present invention being carried out in a simple, convenient, practical and efficient manner, and rendering the joint between the end of the flue and the boiler head or flue sheet, a highly effective and substantial one, without encumbering the flue internally.

With the foregoing general objects outlined, and with other objects in view, which will be apparent as the nature of the invention is better understood, the present invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention has been illustrated in its preferred embodiment in the accompanying drawing, wherein:—

Figure 1 is a sectional detail taken through the end portion of a flue after being inserted into the flue opening in the boiler head or flue sheet. Fig. 2 is a similar view illustrating the end portion of the flue expanded and flanged or upset, in connection with the thimble inserted into the expanded portion. Fig. 3 is a similar view illustrating the thimble expanded, and the

locking ring inserted into the thimble. Fig. 4 is a similar view illustrating the reinforcement or joint in its completed or finished condition.

In carrying out the invention, the boiler head or flue sheet 1 is provided with an opening 2 slightly larger in diameter than the flue 3, the end of the flue 3 being inserted through the opening in the usual manner. The end portion of the flue is then expanded by any suitable implement, or apparatus, as at 4, so as to tightly engage the edges of the opening 2, and the end of the flue is upset to form the flange or lip 5 engaging the outer face of the boiler head or flue sheet 1. A thimble 6, cut from a pipe of slightly smaller diameter, than the flue 3, is then inserted into the expanded portion 4, with the outer end of the thimble 6 projecting slightly from the end or mouth of the flue 3, as seen in Fig. 3. The thimble 6 is then expanded, so as to fit tightly and snugly within the expanded portion 4 of the flue, and a ring 7 is slipped into the thimble 6 to a point slightly beyond or inwardly from the boiler head or flue sheet 1, as seen in Fig. 3.

It is to be understood, that the flue, thimble, and locking ring 7 are constructed of malleable or expansible metal in order that they may be expanded, as stated, the ring 7 being preferably cut from the same stock as the thimble 6, it being apparent that after the thimble 6 is expanded, the ring 7 may be slipped thereinto.

To complete the joint or seam between the flue and boiler head or flue sheet, the ring 7 is expanded directly within the boiler head or flue sheet 1, to bulge or expand that portion of the expanded portion 4 of the flue directly within the boiler head or flue sheet, to form the bulge or bead 8 engaging the inner face or side of the boiler head or flue sheet, the thimble 6 also being bulged or expanded, as at 9, to fit snugly within the bulge or bead 8 of the flue. The locking ring 7 is so expanded as to fit snugly within the bulge or bead 9 of the thimble, in order that the interior walls of the unexpanded portion of the flue, will be practically flush with the interior of the thimble 6, and in order that the interior of the thimble and locking ring 7 will be practically flush and unencumbered. Finally, the outer end of the thimble 6 is upset to form a flange or lip 10 engaging snugly over the flange or

lip 5 of the flue, whereby the flanges or lips 5 and 10 form a bead to effectively engage the outer face of the boiler head or flue sheet. Thus, it will be observed that the flue 3 is not only anchored to the boiler head or flue sheet 1 by means of the flange 5 and bulged as are common, but the thimble 6 disposed within the expanded portion 4 of the flue, is anchored to the flue due to the bulged portion 9 of the thimble engaging within the bulged portion or bead 8 of the flue so that the flange or lip 10 of the thimble engaging over the flange or lip 5 of the flue, will assist the flange or lip 5 of the flue in retaining the boiler head or flue sheet against bulging outwardly under the high pressure of the steam. The double bulged portions 8 and 9 of the flue and thimble, respectively, also serve as effective means for engaging the interior of the boiler head or flue sheet, so that the end of the flue will be thus effectively anchored or secured to the boiler head or flue sheet.

The present invention may be applied to old flues, by inserting the thimble 6 and completing the operation, as above described and as will be obvious.

The present invention is particularly useful in connection with light or thin flues, such flues being desirable, inasmuch as they

facilitate the rapid heating of the water surrounding the flues.

From the foregoing, taken in connection with the drawings, the several advantages and capabilities of the present invention will be obvious to those skilled in the art, further comment being deemed unnecessary.

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

In combination, a flue sheet having a flue opening, a flue having its end portion expanded within the said opening, the end of the flue having a lip engaging the outer face of the flue sheet and the said expanded portion having an expanded bead engaging the inner side of the flue sheet, an expanded thimble fitting snugly within the expanded portion of the flue and having an expanded bead engaging within the bead of the flue, the outer end of the thimble having a lip bent snugly over the lip of the flue, and an expanded locking ring fitting snugly within the bead of the thimble.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HALDOR A. OPPERUD.

Witnesses:

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GEORGE MCGREGOR.