

## STEAM BOILER.

979,135.

Patented Dec. 20, 1910.



Witnesses

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# UNITED STATES PATENT OFFICE.

JOHN A. DOARNBERGER, OF ROANOKE, VIRGINIA.

STEAM-BOILER.

979,135.

Specification of Letters Patent.

Patented Dec. 20, 1910.

Application filed March 19, 1908, Serial No. 422,093. Renewed October 24, 1910. Serial No. 588,899.

*To all whom it may concern:*

Be it known that I, JOHN A. DOARNBERGER, a citizen of the United States, residing at Roanoke, in the county of Roanoke and State of Virginia, have invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in steam boilers and particularly to locomotive boilers of the type covered by Letters Patent No. 823,399 granted to be on the 12th day of June 1906, in which is shown and described a supplementary flue sheet secured in fixed relation with the back flue sheet. The object of such is to limit to a large extent the vibration of the tubes or flues, and to thus avoid leakage at the joint between such flues and the back flue sheet, and while the desired result is accomplished in a degree rendering such construction desirable over other well known constructions, yet of necessity it follows that in time by reason of the constant and intense heat the joints between the flues and the back sheet become impaired and necessitate the removal of the defective flues.

My present invention has for its object to repair such defective flues without removing the entire tube, thus accomplishing the desired result both economically and expeditiously.

With these ends in view my invention consists in the novel method of repairing boiler tubes as will be hereinafter and in detail explained.

In order that those skilled in the art to which my invention appertains may fully understand and be able to practice the same, I will proceed to describe the manner in which the defective tubes are to be repaired, referring by numerals to the accompanying drawing in which—

Figure 1 represents a longitudinal vertical section of a single boiler tube in its relation with the front, back, and supplementary flue sheet as shown and described in the Letters Patent hereinbefore referred to, and Fig. 2 is a similar view illustrating my im-

proved method of repairing the construction shown at Fig. 1.

Similar reference numerals indicate like parts in both figures of the drawing.

1, is the first barrel ring; 2, the front flue sheet; 3, the crown sheet; 4, the back flue sheet; 5, the supplementary flue sheet; 6, one of the flues or tubes, and 7, one of the bolts for securing the supplementary flue sheet in fixed relation with the back flue sheet all as shown, and described in the Letters Patent referred to.

Referring now particularly to Fig. 2, of the drawing I will proceed to describe my improved method of repairing a construction such as shown in Fig. 1. Under ordinary circumstances should any one of the flues become defective by reason of the impairment of the joint between it and the back flue sheet it would be necessary under ordinary conditions to remove the tube entirely, which as is well understood by those familiar with the art involves the necessity of removing the front of the engine, the exhaust pipes, netting, spark arrester &c., all of which have to be replaced after the repair of the tube.

According to my invention, instead of removing the entire tube, with a suitable tool I simply cut or sever the tube or flue, at a locality slightly in rear of the supplementary flue sheet as indicated by the dotted line 8, in Fig. 1, and remove the rear severed portion of the tube. I then take a short section of tube such as shown at 9, (Fig. 2), with its front end reduced in diameter sufficiently to enter the severed end of the tube 6, as clearly shown at Fig. 2. This reduced end of the section 9, is then expanded into close water tight relation with the severed end of the tube 6, and the rear end secured in the back flue sheet in the usual or any preferred manner.

From what has been stated it will be apparent that the novelty and advantages of my invention are due to, and are rendered practical by the circumstance of the presence in the boiler construction of the supplementary flue sheet constituting the subject matter of the Letters Patent hereinbefore referred to, and it will be further apparent that the boiler department of any railroad system may be equipped with short sectional

tubes such as shown at 9, and that when a locomotive is reported with leaky flues, it will be only necessary to remove the comparatively short rear ends of any such tubes  
5 and to repair the same in the manner herein set forth which involves economy both as to material and time.

Having described my invention what I claim as new and desire to secure by Letters  
10 Patent is:

A locomotive boiler having front and back flue sheets; and a supplementary flue sheet in fixed parallel relation with the back flue sheet; tubes or flues consisting of two sec-

tions; the main section in fixed relation 15 with the front and supplementary flue sheets and the second section located within and in water tight relation with the main section, and secured at its rear end in proper relation with the back flue sheet as herein- 20 before set forth.

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

JOHN A. DOARNBERGER.

Witnesses:

W. H. LEWIS,

JOHN A. PILCHER.