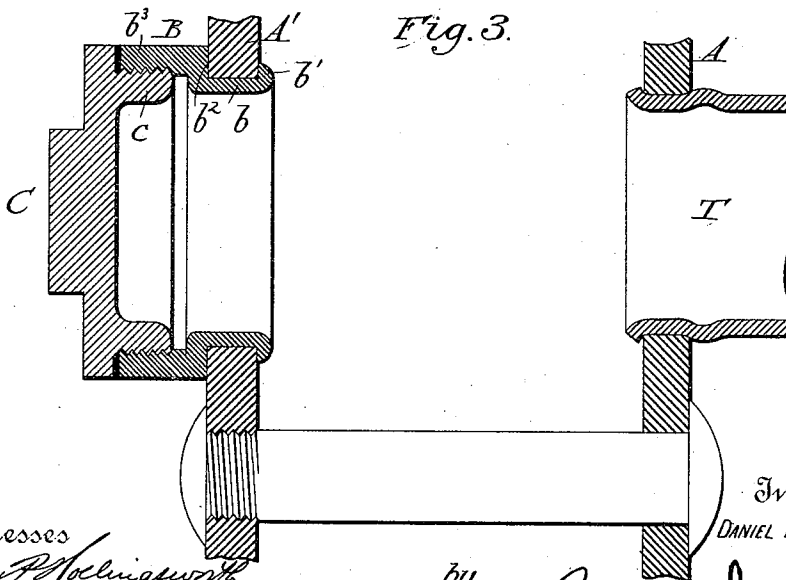
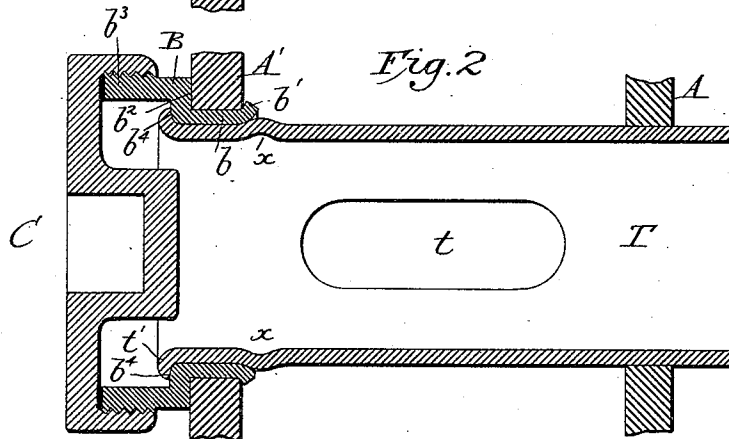
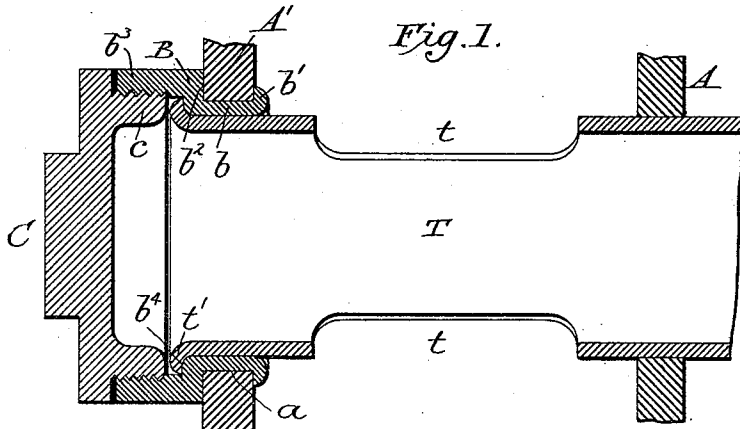


(No Model.)

D. P. McQUEEN.
STEAM BOILER.

No. 463,805.

Patented Nov. 24, 1891.



Witnesses
Samuel P. Hollingsworth
Washington Miller

by

Inventor
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UNITED STATES PATENT OFFICE.

DANIEL P. McQUEEN, OF SCHENECTADY, NEW YORK, ASSIGNOR TO SARAH M. McQUEEN, OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 463,805, dated November 24, 1891.

Application filed July 11, 1891. Serial No. 399,222. (No model.)

To all whom it may concern:

Be it known that I, DANIEL P. McQUEEN, a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

My invention relates to that class of steam-boilers which involves the use of water-tubes.

The object of my invention is to provide improved means for securing the tubes to the boiler-shell and for closing their ends.

My improvements are illustrated in the accompanying drawings, in which—

Figure 1 is a detail view in section showing the manner of securing a boiler-tube to the boiler-shell in accordance with my invention. Fig. 2 is a similar view of a modification. Fig. 3 is a similar view showing the manner of closing a hand-hole in a boiler in which the tubes extend through the inner sheet of the shell.

I propose to connect all the tubes to the boiler-shell in the same way, and therefore do not deem it necessary to illustrate the arrangement of the tubes, my invention relating to the improved device for connecting the tube to the shell and for closing the end thereof.

In Fig. 1 the tube T is shown as extending through the inner and outer sheets A A' of the boiler-shell. As shown, the tube is provided with lateral openings *t*, so that there may be a free circulation of water between the tubes and the water-space in the shell. The tube is secured to the sheet A in any preferred way. The opening *a* in the outer sheet A' is made somewhat larger than the tube. Within the opening *a* and around the end of the tube is interposed a ferrule B, and this ferrule receives a cap C, which closes the end of the tube. The ferrule is shown as formed with an inwardly-projecting flange *b*, which may be made to tightly fit the opening *a*, and which may have its inner end flanged or beaded at *b'*. The inner bore of the flange *b* corresponds with the size of the tube T, which it closely fits.

At *b*² the ferrule is provided with a shoulder which rests against the outer face of the sheet A', and from this part of the ferrule projects outwardly a flange *b*³, which, as shown,

is screw-threaded on its interior to receive the screw-threaded flange *c* of the cap C. The ferrule, as shown, is provided with a shoulder *b*⁴, adapted to receive a flange *t'*, projecting outwardly from the end of the tube. This flange may be formed by tools usually used for analogous purposes.

By my improvements the necessity for screw-threading the boiler-sheets and the tubes is avoided, and a tight joint is formed between the boiler-sheet and the tubes. The tubes may also be more readily removed in my boiler than in those in which screw-threads are employed or in which the tubes are expanded directly in the boiler-head, as it will be observed that in my boiler the ferrules need not be removed and the tubes need not be expanded in the ferrules.

Should a leak occur between the tube and the ferrule, the water will return to the tube after having passed over the end *t'* of the tube. No leak is likely to occur between the ferrule and the sheet A', as the ferrule is permanently attached thereto.

In Fig. 2 I have shown a slight modification. The cap C fits a screw-thread formed on the outside of the ferrule, instead of being formed on the inside thereof, and the tube T is expanded at *x*. Otherwise the construction is the same as that shown in Fig. 1.

In Fig. 3 the ferrule and cap are the same as that shown in Fig. 1; but the tube T terminates in the inner sheet, this figure serving to illustrate how the ferrule and cap may be used to close a hand-hole, which I sometimes employ.

I claim as my invention—

1. The combination of a tube, a boiler-shell, a ferrule extending through an opening in the boiler-shell and having a shoulder resting against the face of the front sheet of the boiler, and a screw-cap secured to the ferrule and closing the opening in the boiler-shell.

2. The combination of a boiler-shell, a ferrule having a flange extending through an opening in the boiler-shell and beaded on its inner end, a shoulder resting against the face of the front sheet of the boiler-shell, and a screw-cap secured to the ferrule and closing its end.

3. The combination of a tube, a boiler-shell,

a ferrule extending through an opening in the boiler-shell and having a shoulder resting against the face of the front sheet of the boiler, a tube having its end arranged within
5 the ferrule, and a cap secured to the ferrule and closing the end of the tube.

4. The combination of a boiler-shell, a tube extending through the inner and outer sheets thereof and having a lateral opening between
10 the sheets, a beaded shouldered ferrule ex-

tending through an opening in the front sheet and surrounding the outer end of the tube, and a screw-cap fitting the ferrule and closing the tube.

In testimony whereof I have hereunto sub- 15
scribed my name.

DANIEL P. MCQUEEN.

Witnesses:

HARRY W. DENNINGTON,
FRANK L. SANTEE.