W. H. BROWN & F. J. SEYMOUR.

Steam-Boiler.

No. 222,450. Patented Dec. 9, 1879.

Fig. 1.

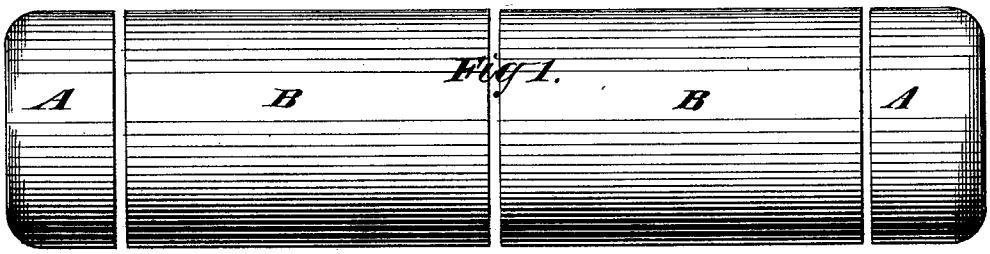


Fig. 2.

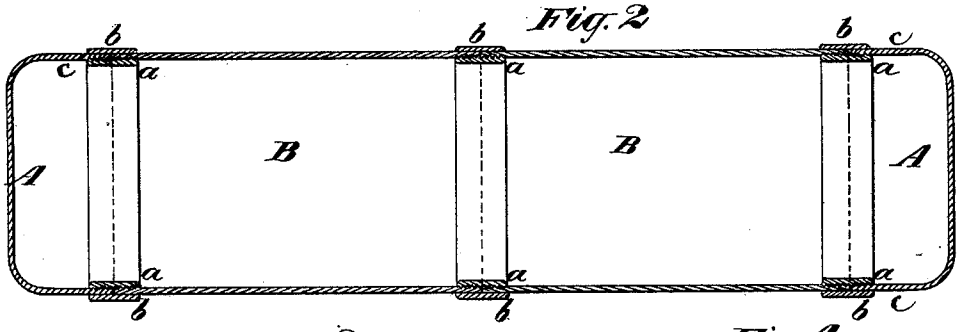


Fig. 3.

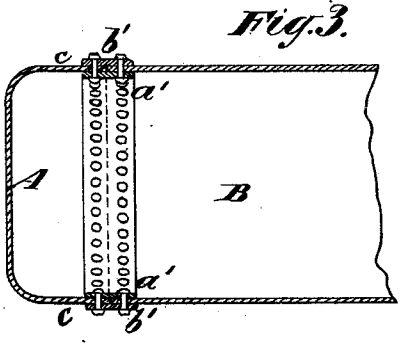


Fig. 4.

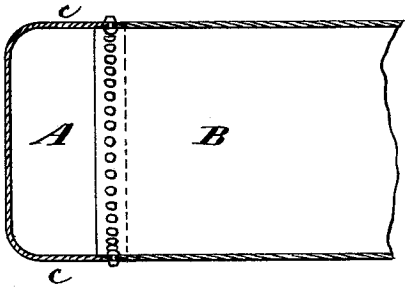
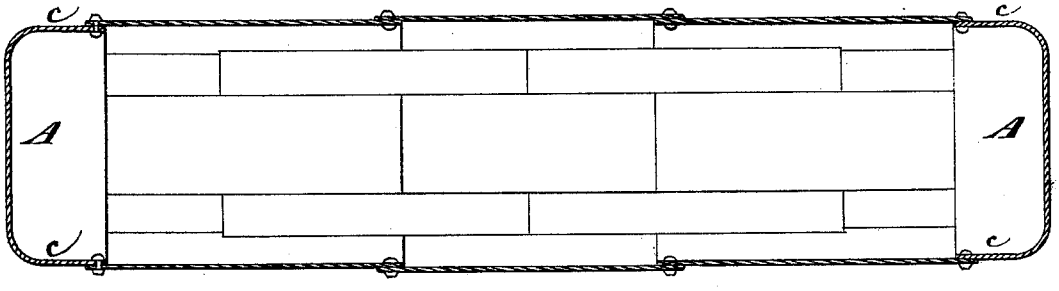


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM H. BROWN, OF WATERBURY, AND FREDERICK J. SEYMOUR, OF WOLCOTTVILLE, CONNECTICUT.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **222,450**, dated December 9, 1879; application filed June 27, 1879.

To all whom it may concern:

Be it known that we, WILLIAM HENRY BROWN, of Waterbury, in the county of New Haven and State of Connecticut, and FREDERICK J. SEYMOUR, of Wolcottville, in the county of Litchfield and State of Connecticut, have invented certain new and useful Improvements in the Construction of Steam-Boilers; and we do hereby declare that the following is a description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention consists in a boiler for generating steam, in which are combined cold-wrought seamless iron or steel cylindrical middle sections and cold-wrought seamless iron or steel heads, as will be more fully hereinafter particularly described.

Figure 1 in the accompanying drawings represents outside views of two cold-wrought seamless iron or steel flanged heads and two cold-drawn seamless iron or steel cylindrical middle sections, suitable for the manufacture of a plain cylindrical steam-boiler. Fig. 2 represents a longitudinal section of a steam-boiler made of such flanged heads and middle sections. Figs. 3 and 4 are longitudinal sections, showing modifications of the joints of the boiler. Fig. 5 is a longitudinal section of a boiler having the principal portion of the length of its cylinder made of plates in the common way, but with our cold-drawn seamless flanged heads.

We will now proceed to describe a method of manufacturing, according to our invention, an iron or steel boiler of the diameter of four feet, with a length of sixteen feet, such a boiler being generally accepted as having a capacity of fifty-horse power.

Having provided an automatic press of sufficient capacity, propelled by hydraulic or other competent force, we provide circular blanks of iron or steel, of proper diameter and thickness, according to the length and strength of cylinders that may be required. In the construction of a boiler of the size hereinabove mentioned, circular blanks of iron or steel plate of the diameter of seventy-two inches and a thickness of three-eighths of an inch may be used for the flanged heads A A. One of these blanks being placed in a cold state in proper position in the press, which is provided for the purpose with dies of proper form, such as are used for converting sheet metal into cylinders, would have its form changed from that of a flat circular blank to a cylinder with sides at right angles to the inner or central portion of the blank, the diameter of which would then have been changed by this preliminary operation of the press and reduced to sixty inches, with cylindrical sides of a length something more than six inches. Then, after this partly-formed blank has been annealed and had its inner and outer surface coated with some lubricating substance, it may be again subjected to the action of the press, (suitable changes of the dies having been made,) this action resulting in another change, reducing the diameter of the head to four feet, or to the required size, at the same time reducing and elongating the cylindrical sides or flanges *c c* to the required length of, say, about eighteen inches. The distribution of thickness of the metal contained in the cold-wrought seamless flanged head would then be about three-eighths of an inch for the head proper, or interior portion, and one-fourth of an inch for the cylindrical sides. The proportionate length of the cylinders or flanged portions as compared with the diameter of the head proper may be changed to any required length by altering the diameter of the blank circle and multiplying or reducing the number of times to which they may be subjected to the action of the press. Two of these seamless flanged heads, A A, are shown in Fig. 1 ready for being made up into a boiler.

The cold-wrought seamless cylindrical middle sections B B of the boiler may be each constructed from circular blanks by the employment of means and the process hereinabove described in the construction of the flanged heads A A, until a cylinder with one head of a diameter equal to or somewhat larger than the intended diameter of the boiler has been produced, after which about two-thirds of the diameter of the head is cut out from its center, and the remaining portion of the head is then forced out to a position parallel with the cylindrical sides by the same means used for the

formation of the previously-formed portions of the cylindrical sides or flanges of the heads. These cylindrical middle sections of a boiler of the size which we have hereinabove mentioned may be of a length about four feet, requiring three sections to complete the boiler.

Instead of the cold-wrought seamless middle sections B B being formed as above described, they may be constructed from cylindrical hollow ingots of steel or forgings of steel or iron of any proper size, and from thence drawn in a cold state into any required lengths or expanded to any required diameter by means of the press before mentioned, or by any proper mechanical means, such as are or may be used for drawing or producing cold-wrought seamless metal cylinders.

The flanged heads and seamless middle sections having been provided substantially as described, the construction of the boiler may be proceeded with as follows: We provide seamless cylindrical rings *a a* of an external diameter about equal to or slightly larger than the inner diameter of the cylindrical heads and cylinders, with an axial length of about eight inches and thickness of about three-eighths of an inch. These rings may be constructed by being drawn into the required form by the same means employed in the construction of the cylinders, or they may be forged from a flat band of iron or steel. We cut screw-threads on the outer surfaces of these rings running from each end to the center, also cut or swage corresponding threads on the inner surfaces of the ends of the seamless flanged heads A A and seamless middle sections, making the fastening of the sections and heads together (after they have been headed in the usual way for steam-fitting) by screwing the flanged heads and middle sections onto the inner externally-threaded rings, bringing the sections and flanges of the heads end to end butt-joint together; and as additional fastening, we provide outer rings, *b b*, of any proper width and thickness and of somewhat less internal diameter than the outer surface of the cylinders. These rings, after having been expanded by heat, should be placed centrally over the butt-joints before mentioned and allowed to shrink into position, thus by the use of a greater or lesser number of cylinders constructing a boiler of any desired capacity, such as is shown in Fig. 2, without longitudinal seams or rivets. This kind of joint made by the screw-threaded internal rings *a a* and external bands or rings *b b* is not, however, considered by us as a part of the invention embraced in this specification, but is considered as a separate invention and intended to be the subject of a separate patent.

The before-mentioned flanged heads and cylinders, instead of being fastened together, as above described, may be fastened together at each joint, as shown in Fig. 3, by means of an inner ring, *a'*, and outer ring, *b'*, covering the butt-joint from both sides, and riveted through the three thicknesses. This method would produce a boiler without longitudinal seams, and with two lines of rivets to each joint, running radially around the same.

Another method of fastening the sections together may be by overlapping the ends and the use of a single line of rivets to each joint, as shown in Fig. 4.

The substance used in the construction of the cylinders for lubricating and coating the inner and outer surfaces of the blank circles and partially-formed cylinders may be of some metal, as tin or copper, softer than and not so easily oxidized as iron and steel, so that, in addition to their property as a lubricator, great advantage may result from the capacity of a boiler so coated in preventing oxidation, adding largely to their durability, and considerable relief from troubles universal with boilers constructed under the present system. If tin be used for this purpose it may be applied by the ordinary tinning process. If copper be employed, it might be deposited on the iron or steel by means of a battery.

In some cases cold-wrought seamless flanged heads A A may be used with advantage in boilers the other portions of the cylinders of which are made up of plates riveted together in the common way, as shown in Fig. 5, the flanges of the said heads being placed either outside or inside of the main cylindrical portions of the boiler and riveted thereto.

The superiority of boilers made with our cold-wrought seamless iron or steel heads and cylindrical sections depends upon the superior density and tenacity of iron or steel which has been subjected to the drawing process as compared with that which has been simply hot-rolled and bent into shape; and, moreover, in the drawing process any defects in the metal will be made to show themselves, so that the manufacturer may detect and discard all defective material.

We are aware that shells of boilers have been made of seamless metal; but such we do not broadly claim.

What we claim as our invention is—

In a boiler for generating steam, the combination of cold-wrought seamless iron or steel cylindrical middle sections with cold-wrought seamless iron or steel flanged heads, constructed substantially as and for the purpose described.

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Witnesses:
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