No. 800,532. PATENTED SEPT. 26, 1905.

J. ALMADA.

STEAM BOILER.

APPLICATION FILED FEB. 23, 1905.

Fig. 1.

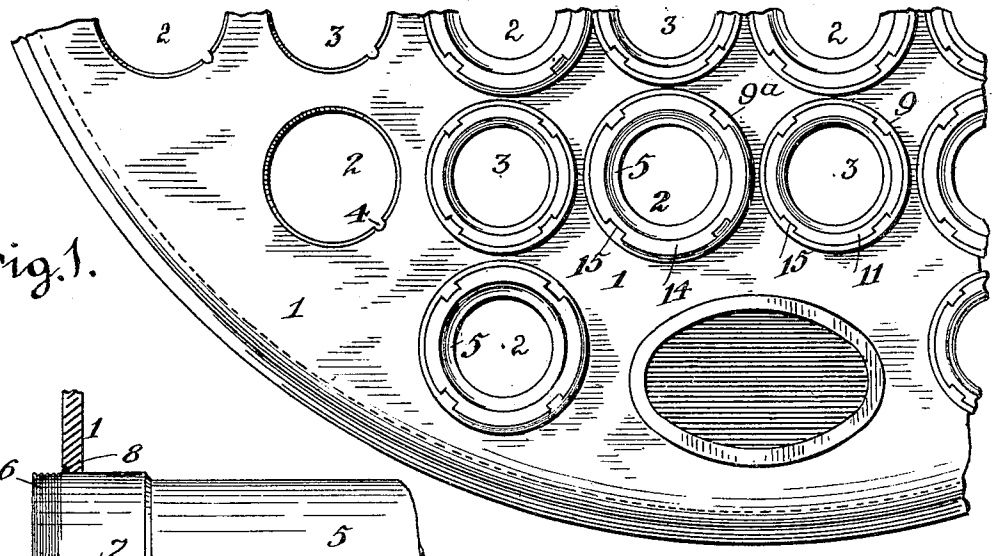
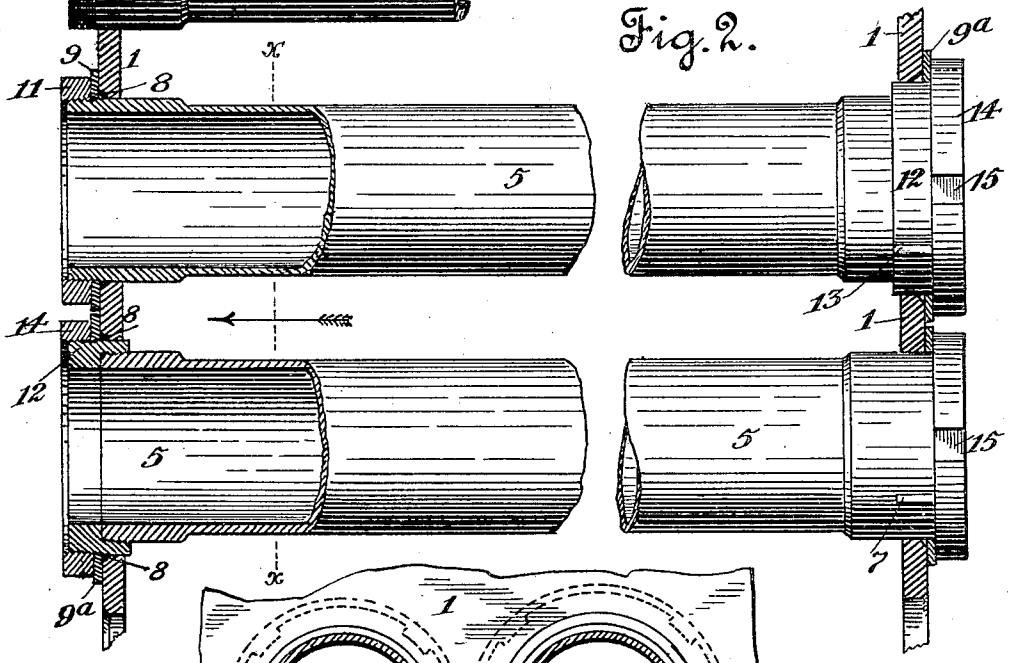


Fig. 2.



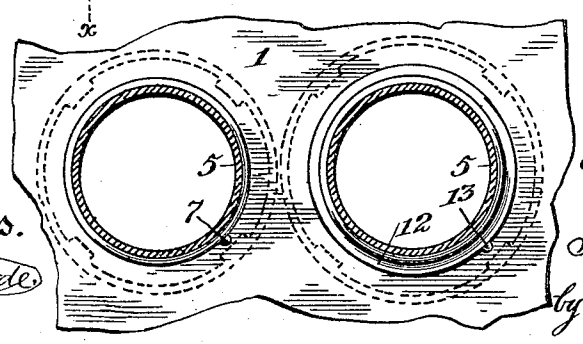


Fig. 3.

Witnesses.

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UNITED STATES PATENT OFFICE.

JESUS ALMADA, OF CULIACAN, MEXICO.

STEAM-BOILER.

No. 800,532. Specification of Letters Patent. Patented Sept. 26, 1905.

Application filed February 23, 1905. Serial No. 246,965.

To all whom it may concern:

Be it known that I, JESUS ALMADA, a citizen of the Republic of Mexico, residing at Culiacan, State of Sinaloa, Republic of Mexico, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

My invention relates to steam-boilers, and more particularly to the setting and fixing of the tubes of such boilers. Heretofore it has been customary to fix such tubes rigidly in the boiler-heads by beading and flanging. If they are water-tubes, they become internally incrusted with deposits of solid material from the water passing through them. If they are fire-tubes, they become externally incrusted with solid deposits from the water which surrounds them. In either case it is a matter of great difficulty to clean the tubes while in position, while if a tube must be removed it can only be done by cutting it off at both ends. This reduces its length and makes it impossible to use it again in the same boiler.

The object of my invention is to provide means for setting the tubes in the boiler in such a way that they can be easily removed when necessary and easily replaced and at the same time to provide joints between the tubes and heads which shall be as tight and efficient as joints produced by the old style of beading and flanging.

An embodiment of my invention is shown in the accompanying drawings.

Figure 1 is an elevation of part of a boiler-head, showing the ends of several tubes. Fig. 2 is an enlarged vertical section through the two heads, showing a number of longitudinal tubes, some of which are shown in section. Fig. 3 is an enlarged cross-section on the line x x of Fig. 2 looking from the interior in the direction of the arrow intersecting said line x x.

The two heads of the boiler are shown at 1 1, each provided with countersunk holes 2 3. These holes are of two different sizes in each head arranged alternately in order that the strength of each head may be equal—that is to say, a relatively large hole in one head is opposite and in longitudinal line with a relatively small hole in the other end. Each hole is formed with a recess 4.

In Fig. 2 is a tube supposed to be a fire-tube (shown at 5) and one end of such tube represented as passing through one of the relatively small holes. It is preferably thickened at and near its end and has an external thread 6 and an integral lug, projection, or key 7. The tube at the upper left-hand corner of Fig. 2 and the tube beneath it are shown as of similar construction and attachment, both being set in relatively small holes in the boiler-head with their threaded ends projecting beyond such head. In the countersink at the outer edge of each hole 2 3 is placed a packing 8, of hemp or other suitable material. Then a washer 9 is fitted upon the projecting tube and lies against the head. Then a nut 11 is screwed upon the end of the tube, so as to hold everything in place. The key 7 fits the recess 4 and keeps the tube from turning. This assemblage of parts is fully shown in Fig. 2 as applied to the left-hand end of the middle tube of the three tubes shown in that figure. Of course that tube was introduced through the large hole at the opposite end of the boiler.

The fitting of any tube to a large hole in the boiler-head is shown in Fig. 2 in two views, the right-hand end of the middle tube of the three represented being shown in elevation and the left-hand end of the lower tube of the three shown being represented in section. Referring to the latter, it will be seen that the thickened end of the tube is externally threaded and does not extend beyond the hole in the boiler-head. Its threaded end receives a nut 12, having a key, lug, or projection 13, and which is turned up upon the tube to such a position that such lug or key enters the recess in one of the large holes 2. The nut thus practically becomes a part of the tube and as such exactly fits the large hole. The nut 12 is externally threaded at its extreme end. A packing of hemp or other suitable material is fitted to the countersink in the large hole in the manner previously described when referring to the small hole. A similar washer 9^a is slipped over the nut and against the boiler-head, and then an outside nut 14 is turned up on the exterior thread of nut 12 and against the washer. All the exterior nuts have peripheral recesses, as 15, to receive a suitable tool or implement for turning in either direction. In setting the tubes in place they are introduced through either end through the large holes, passed through the opposite small holes, so that their keys 7 enter the recesses in said small holes. The packings and washers are fitted. The nut 11 is turned directly upon the end of each

tube projecting through a small hole. The nut 12 is already in place upon the other end of the tube and is turned to such a point that its key or lug enters the recess in the countersink of the large hole. All parts having been fitted, nuts 11 and 14 are turned up tightly and the tube, securely packed, is now held rigidly in position.

Evidently it is easy to remove a tube as follows: The nut 11 is removed. The nut 14 is removed, which leaves an end of the tube loose in a large hole, and the whole tube can be drawn out through the large hole, the difference in the diameters of the holes being such as to permit a considerable amount of external incrustation to pass through the large hole.

I do not limit myself to the construction and arrangements herein described and shown in the accompanying drawings, as I desire to avail myself of such modifications and equivalents as fall properly within the spirit of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a boiler, boiler-heads having large and small holes so arranged that a small hole in one head shall be opposite a large hole in the other head, tubes arranged in said holes, so as to project beyond the small holes and having nuts for securing said projecting ends, nuts in and projecting beyond the large holes and carried by the tubes and external securing-nuts.

2. In a boiler, heads having countersunk holes provided with recesses, boiler-tubes provided at one end with keys or lugs to fit said recesses, and nuts at the other end of each boiler-tube having projections to fit the recesses in the opposite holes.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 26th day of January, 1905.

JESUS ALMADA.

Witnesses:

B. Z. CASTLEOFF,

F. GREGOIRE.