

No. 736,991.

PATENTED AUG. 25, 1903.

J. W. MATTHEWS.
BOILER TUBE EXTRACTOR.
APPLICATION FILED SEPT. 9, 1902.

NO MODEL.

Fig. 1.

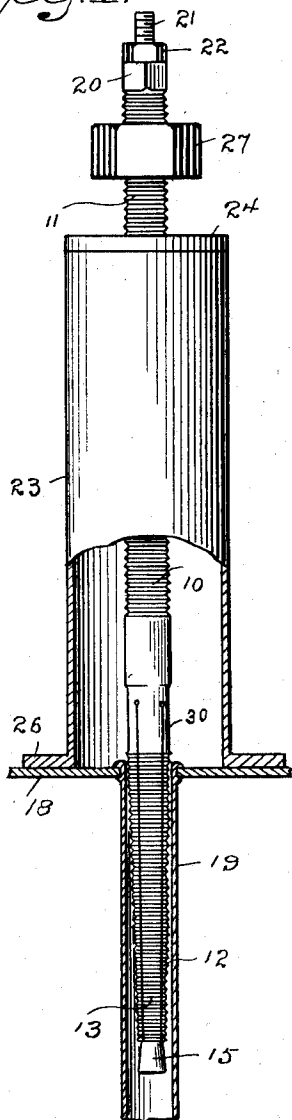


Fig. 2.

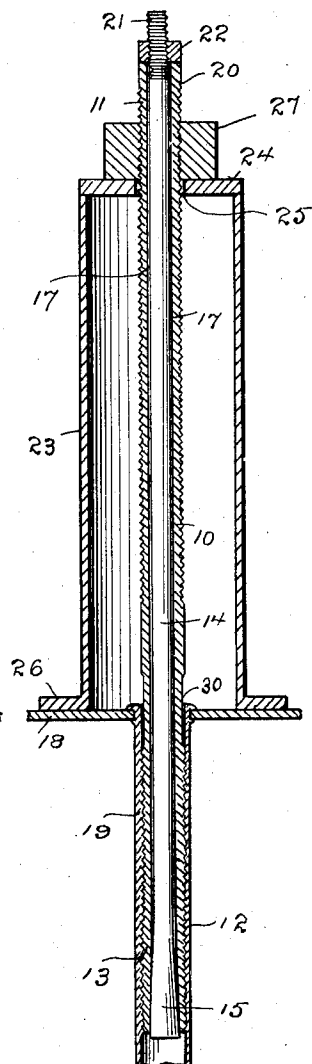


Fig. 3.

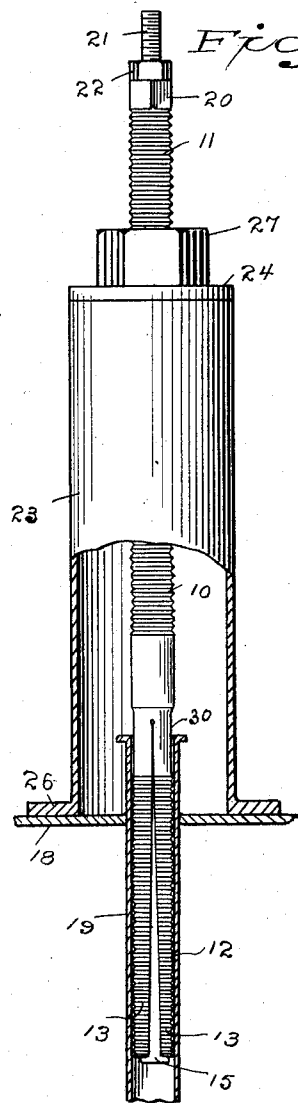
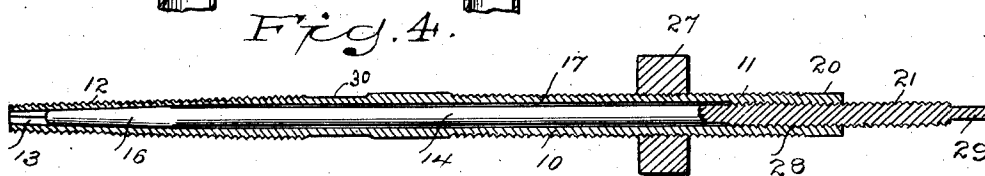


Fig. 4.



WITNESSES.

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JARIS W. MATTHEWS, OF BRIDGEPORT, CONNECTICUT.

BOILER-TUBE EXTRACTOR.

SPECIFICATION forming part of Letters Patent No. 736,991, dated August 25, 1903.

Application filed September 9, 1902. Serial No. 122,727. (No model.)

To all whom it may concern:

Be it known that I, JARIS W. MATTHEWS, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented a new and useful Boiler-Tube Extractor, of which the following is a specification.

My invention has for its object to provide a simple, inexpensive, and easily-operated device for extracting tubes from boilers singly. It is of course well understood that with most types of boilers, and especially with the type of boilers used upon steam-carriages, it is frequently necessary in making repairs to remove one or more tubes and substitute new ones. This removal of tubes has been an important element in the cost of making repairs, owing to the great amount of time required for removing each tube and the additional fact that it was not infrequently necessary with the methods heretofore in use to knock out and ruin quite a number of tubes, part or all of which might be perfectly sound, in order to get at the tube it was desired to remove, it being, furthermore, always necessary in the case of steam-carriages to remove the boiler from the carriage.

My present invention enables me to draw any tube from a boiler in three or four minutes without the necessity of removing the boiler from the carriage and without the slightest danger of injury to the boiler or to any of the tubes other than the one to be drawn.

With this end in view I have devised the simple and novel boiler-tube extractor of which the following description, in connection with the accompanying drawings, is a specification, reference characters being used to designate the several parts.

Figure 1 is a view, partly in elevation and partly in section, of my novel boiler-tube extractor complete and in position for extracting a tube, but not having been caused to engage the tube; Fig. 2, a view, wholly in section, showing the body of the extractor as expanded and tapped into the tube; Fig. 3, a view, partly in elevation and partly in section, showing the manner in which a tube is started, and Fig. 4 is a sectional view illustrating a form of my invention having a variant mode of expanding the jaws.

My invention comprises, essentially, a body 10, which is, in fact, a tapering tap, adapted to be inserted into the boiler-tube to be extracted and having a longitudinal bore 17. At one end of the body, which for convenience I will term the "outer" end, is an external thread 11, and at the other end, which for convenience I will term the "inner" end, is an external thread 12. The inner end of the body normally tapers and is slotted to form the expanding jaws 13, and above the threaded portion of the jaws the diameter of the body is reduced, as at 30, for a purpose presently to be explained. Lying within the bore is an expander 14, the inner or operative end of which may be an inverted or outwardly-tapering cone 15, as in Figs. 1 to 3, inclusive, or an inwardly-tapering cone 16, as in Fig. 4, the taper of the cone in either form corresponding with and engaging the inner wall of the body to expand the jaws, as clearly shown in the drawings. At the outer end of the body is an angular portion 20 for engagement by a wrench to turn the body into the tube to be extracted. The outer end of the expander is threaded, as at 21, and is engaged, in the form illustrated in Figs. 1 to 3, inclusive, by a nut 22, which corresponds in shape with the angular portion of the body, so that both may for convenience be engaged and operated by the same wrench. In the form illustrated in Fig. 4 the outer end of the bore is internally threaded, as at 28, said thread being engaged by the external thread 21 on the expander, and the outer end of the expander is provided with an angular portion 29 for engagement by a wrench to rotate it.

18 denotes the boiler-head, and 19 a boiler-tube, one boiler-tube only being shown, as it is obvious that the number, arrangement, and closeness of the boiler-tubes are wholly immaterial so far as the operation of my novel extractor is concerned.

23 denotes a shell having a head 24 with a central opening 25, through which the body passes freely, and a flange 26, adapted to rest upon the boiler-head, as clearly shown in the drawings, the inner diameter of the shell being greater than the flanged heads of the boiler-tubes, so that the latter will not touch the shell while being drawn out.

27 denotes a nut which engages external

thread 11 on the body and bears against the head of the shell.

The operation of extracting a boiler-tube is as follows: The shell is placed in position as in Fig. 1, nut 27 being turned back on the body so as not to engage the shell and the expander being in position to leave the jaws in the contracted position. The body is then inserted into the tube it is desired to extract, as clearly shown in Fig. 1. The operator then moves the expander longitudinally, forcing the cone against the jaws internally and expanding them, so as to cause external thread 12 upon the jaws to engage the tube to be extracted. In the form illustrated in Figs. 1 to 3, inclusive, the longitudinal movement of the expander is produced by forward rotation of nut 22 on the threaded outer end of the expander. This nut bears against the end of the body and its forward rotation acts to draw cone 15 on the expander inward and expand the jaws from the position shown in Fig. 1 toward the position shown in Fig. 2. In the form illustrated in Fig. 4 this expansion of the jaws is produced by forward rotation of the expander itself, the expander in this form being provided with an angular portion 29 for engagement by a wrench and the bore in the body being provided with an internal screw-thread 28, which is engaged by the external thread on the expander, so that forward rotation of the expander will force cone 16 forward and will expand the jaws substantially in the same manner as in the other form. As soon as the jaws have been expanded sufficiently to cause thread 12 thereon to engage the inner wall of the boiler-tube the body is rotated forward in any suitable manner, as by means of a wrench or other tool applied to angular portion 20. As soon as the threads upon the jaws have engaged the wall of the tube the jaws are expanded a little more by longitudinal movement of the expander, and then the body is rotated again to tap the threads on the jaws farther into the tube, the jaws being alternately expanded and then rotated until the threads are thoroughly tapped into the tube. In order to have effected this engagement of the jaws with the tube, the expander and the body will have moved from substantially the positions shown in Fig. 1 to substantially the position shown in Fig. 2. It will be noted that the engagement of the threads on the jaws with the inner wall of the tube will be entirely below the point of engagement of the boiler-tube with the boiler-head, so that as soon as power is applied to move the body longitudinally the headed upper end of the boiler-tube may collapse slightly into the reduced portion 30 of the body, as will be readily understood from Figs. 2 and 3, which permits the tube to be drawn out readily. It is unimportant, so far as the principle of the invention is concerned, in what special manner longitudinal move-

ment is imparted to the body. I have shown a nut 27 as engaging thread 11 upon the body and bearing against the head 24 of the shell. It is obvious that forward rotation of this nut after the jaws have been tapped into a boiler-tube will act to draw the body upward and the tube with it, as clearly shown in Fig. 3.

Having thus described my invention, I claim—

1. A boiler-tube extractor consisting essentially of jaws externally threaded to adapt them to engage a boiler-tube from within, means for expanding the jaws, means whereby the jaws may be rotated to tap the threads into the tube and means for moving the jaws longitudinally to draw out the tube.

2. A boiler-tube extractor comprising an elongated body adapted to pass within a boiler-tube and longitudinally slotted to form jaws to engage the tube, said jaws being externally threaded, an expander within the body by which the jaws may be forced into engagement with the tube, means whereby the jaws may be rotated to tap the threads into the tube and means for directly moving the body longitudinally to extract the tube.

3. A boiler-tube extractor comprising an elongated body adapted to pass within a boiler-tube and having externally-threaded jaws to engage the tube, whereby rotation of the jaws will tap the threads into the tube, a longitudinally-movable expander within the body, a shell inclosing the body and adapted to bear against a boiler-head and a nut engaging the body and bearing against the head of the shell, whereby the body may be moved longitudinally to draw out the tube.

4. A boiler-tube extractor comprising an elongated body adapted to pass within a boiler-tube and having externally-threaded jaws to engage the tube from within, whereby rotation of the jaws will tap the threads into the tube, a longitudinally-movable expander whereby the jaws are caused to engage the tube, a shell inclosing the body and a nut engaging the body and bearing against the shell, substantially as described.

5. A boiler-tube extractor comprising a body adapted to pass within a boiler-tube and having externally-threaded jaws and means whereby it may be rotated, an expander within the body, a nut engaging the expander and bearing against the end of the body whereby the expander may be moved longitudinally, a shell inclosing the body and a nut engaging the body and bearing against the shell, whereby the body may be moved longitudinally.

In testimony whereof I affix my signature in presence of two witnesses.

JARIS W. MATTHEWS.

Witnesses:

A. M. WOOSTER,

S. W. ATHERTON.