

No. 709,276.

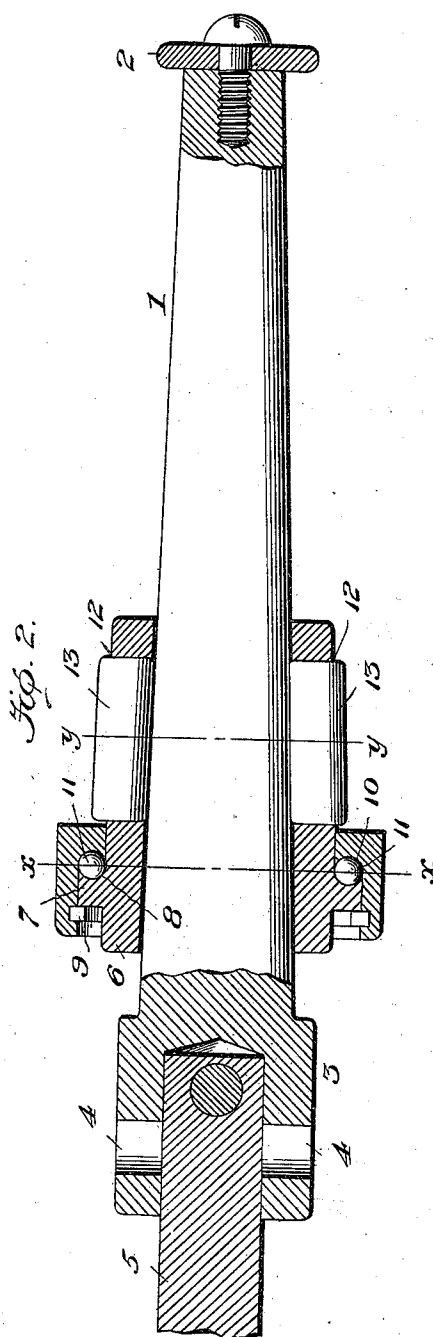
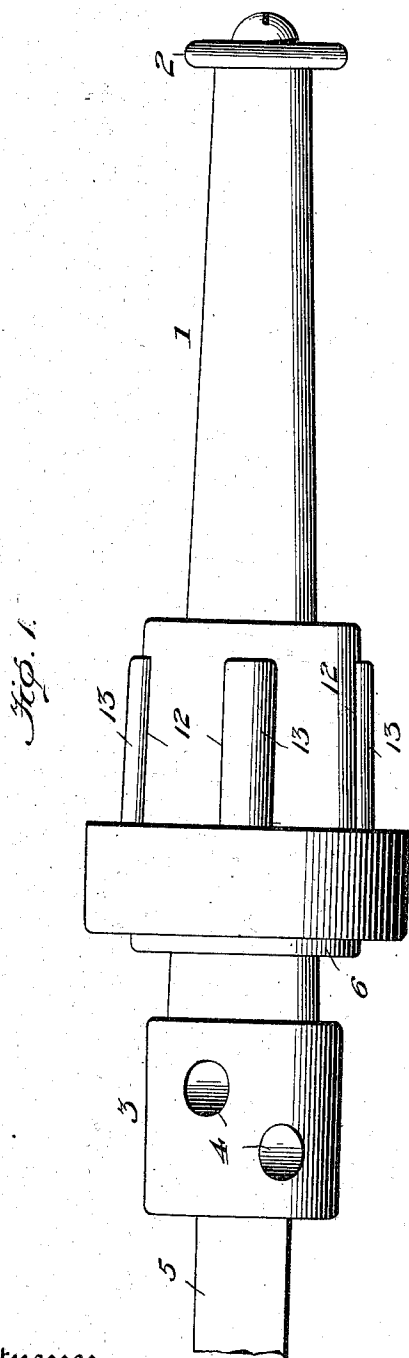
Patented Sept. 16, 1902.

F. PALFREY.
BOILER TUBE EXPANDER.

(Application filed Jan. 2, 1902.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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May 6, 1902.

by

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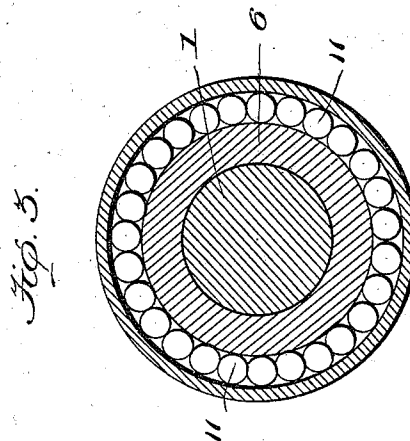
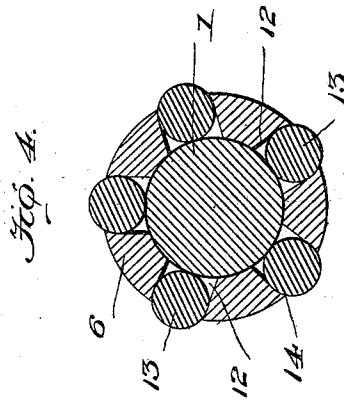
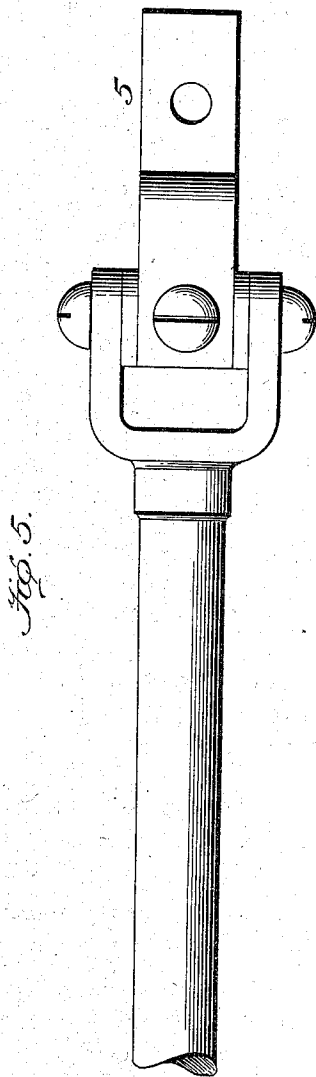
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2 Sheets—Sheet 2.



Witnesses

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UNITED STATES PATENT OFFICE.

FREDERICK PALFREY, OF MACON, MISSOURI.

BOILER-TUBE EXPANDER.

SPECIFICATION forming part of Letters Patent No. 709,276, dated September 16, 1902.

Application filed January 2, 1902. Serial No. 88,097. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK PALFREY, a citizen of the United States, residing at Macon, in the county of Macon and State of Missouri, have invented certain new and useful Improvements in Boiler-Tube Expanders, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in boiler-tube expanders; and the object of my invention is the provision of a tube-expander which will overcome the defects of expanders heretofore used and produce an efficient and thoroughly practical device of this character and not requiring near the power to operate as all the others do in use.

With the above-stated object in view my invention consists of a boiler-tube expander embodying novel features of construction and combination of parts, substantially as disclosed herein.

For a more perfect understanding of principles, details of construction, and operation of my tube-expander I call attention to accompanying drawings.

Figure 1 represents a side view of a boiler-tube expander constructed in accordance with and embodying my invention. Fig. 2 represents a side view of the expander with parts thereof shown in section. Fig. 3 represents a sectional view taken on the line *x x* of Fig. 2, and Fig. 4 represents a sectional view on the line *y y* of Fig. 2. Fig. 5 represents a detail view of the means for rotating the device in the operation of expanding the ends of the tubes.

Referring by numerals to the drawings, the numeral 1 designates the tapering mandrel, which is of suitable length and at the end is provided with the detachable screw-secured cap 2, which prevents the expanding mechanism from detachment accidentally from the mandrel, and the other end is formed with the head or enlargement 3, which has the openings 4 to receive the turning devices 5, which are of any desired and preferred construction. Mounted upon the tapering mandrel is the body 6, having the shoulder 7, provided with the track or way 8, and fitting upon said body is the sleeve, with its spring-ring 9, which is also provided with a track or

way 10, and in the track formed by the collar and sleeve are arranged the small antifric-tion-balls 11.

In operation the mandrel, with the body, is placed in the tube and the end of the tube rests against the outer wall of the collar, and the body is provided with five openings 12, which receive the five expanding-rollers 13, and the said openings or bearings are contracted at their outer walls at 14 to hold the expanding-rollers from detachment, but to allow them perfect freedom of revolution in the act of expanding, and the mandrel is revolved by means of the handle or turning devices and the five rollers expand the ends of the tubes in the sheet and operate effectively to perfectly expand the tube without fear of damage thereto. The ball-bearings between the shoulder of the body and the other of the sleeve allow the body, with the expanding-rollers, to move with ease and freedom and to expand the tube smoothly and evenly and without fear of cracking or injuring the tube or tube-sheet partition.

I have found by test and experience that the use of five rollers overcomes the many objections found to exist where three or four are used, and with five rollers, disposed as in my expander, with the ball-bearing construction, a perfect-working expander is insured.

I claim—

1. A boiler-tube expander consisting of a tapering mandrel equipped and mounted with the parts as hereinbefore described, the body with its ball-bearing shoulder mounted on the mandrel, the five expanding-rollers in the body, the sleeve with its ball-bearing collar mounted on the body; the antifric-tion ball-bearings placed between sleeve-collar and body-shoulder; and the spring-ring inserted in the groove of the sleeve when placed in position on the body.

2. In a tube-expander, the combination of a mandrel, a sleeve fitting on said mandrel and carrying a series of expanding-rollers, a shoulder formed on said sleeve and having a ball channel or way, a collar fitting on said shoulder and having an overlapping portion formed with a ball channel or way, a series of balls in said ball track or channel, and means for holding the collar on the shouldered portion of the sleeve.

3. A tube-expander, consisting of a mandrel having a cap and screw at one end and having a hollow head at the other end, a sleeve on said mandrel carrying a series of expanding-rollers, a shoulder on said sleeve having a ball-channel, a collar fitting said shoulder having a ball-channel coincident with the channel of the shoulder and also having a groove, balls fitting in the way or channel of

the collar and shoulder, and a spring in the groove of the collar to secure the collar.

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

FREDERICK PALFREY.

Witnesses:

F. W. WILDER,

WM. J. STOOPS.