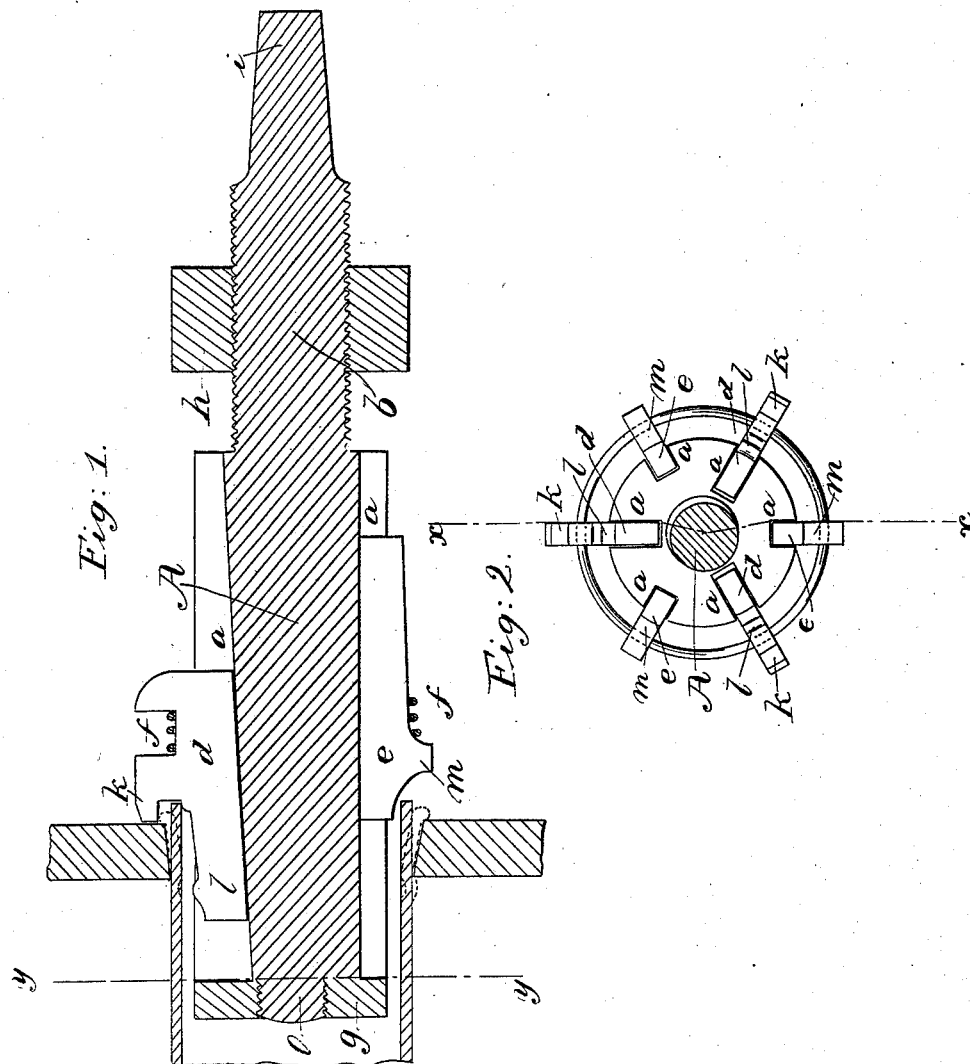


*R. Mc Connel,*  
*Pipe Expander.*

*No 49,287.*

*Patented Aug. 8, 1865.*



*Witnesses;*  
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# UNITED STATES PATENT OFFICE.

ROBT. McCONNELL, OF JACKSONVILLE, ILLINOIS.

## IMPROVED TOOL FOR FASTENING TUBES IN BOILERS.

Specification forming part of Letters Patent No. 49,287, dated August 8, 1865.

### *To all whom it may concern:*

Be it known that I, ROBERT McCONNELL, of Jacksonville, in the county of Morgan and State of Illinois, have invented a new and Improved Tool for Fastening Boiler-Tubes; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a longitudinal vertical section of this invention, the line *x x*, Fig. 2, indicating the plane of section. Fig. 2 is a transverse section of the same, taken in the plane indicated by the line *y y*, Fig. 1.

Similar letters of reference indicate like parts.

This invention relates to a tool composed of a mandrel provided with a series of inclined grooves which form guides for a double set of dies—one set for expanding and the other for flanging—in combination with a follower-nut, to be used particularly with the flanging-dies in such a manner that by the combined action of the mandrel and the expanding-dies the expansion-bead at the inner edge of the tube-sheet is formed, and at the same time the outer end of the tube is spread over the outer edge of the tube-sheet, thus keeping the tube firmly in its place, and by the subsequent action of the flanging-dies the outside flange of the tube is pressed up firmly against the tube-sheet and a tight joint is effected with little loss of time and without the use of a hammer, the mandrel being fed up and turned by the action of an ordinary ratchet-brace.

A represents a mandrel, made of steel or any other suitable material, and provided with a series of grooves, *a*, which are inclined or tapering down from the screw-shank *b* toward the tip or inner end, *c*, of the mandrel, as clearly shown in Fig. 1 of the drawings. The grooves *a* form the guideways for a double set of dies, *d e*, one set being intended for expanding the boiler-tube and the other set to press the flange formed on the outer end of the tube up solid against the outer surface of the tube-sheet.

In the tool represented in the drawings three dies are shown of each class; but it is obvious that this number might be increased, if desired, and perhaps it might also be decreased. At all events, I do not wish to confine myself to any particular number of dies, but reserve the

right to change the same as may appear desirable.

In order to hold the dies in their guide-grooves, a spiral spring, *f*, is brought to bear on them, and a nut, *g*, at the inner end or tip of the mandrel prevents the dies from dropping out when the tool is not in use.

The screw-shank *b* is fitted with a nut, *h*, which is used in combination with the flanging-dies *e*, as will be presently explained, and said shank terminates in a square, *i*, calculated to fit into an ordinary ratchet-brace, which serves to feed up the tool and to turn it when the dies begin to act on the tube.

The expanding-dies *d* are provided with a projection, *k*, which reaches over the end of the tube, and with a semicircular bead, *l*, intended to form the beading-projection at the back or inner surface of the tube-sheet.

The inner or working ends of the flanging-dies *e* are curved out and provided with noses *m*, formed to correspond to the desired shape of the flanges to be produced on the outer ends of the tubes.

The operation of this tool is as follows: After the end of the tube has been passed through the tube-sheet, the dies *d* are introduced and so adjusted that the edge of the projection *k* bears against the tube-sheet, as shown in Fig. 1, and thereby the beading-projection *l* is brought to its proper depth in the flue. By pressing the mandrel in by the feed of the ratchet and turning it at the same time a few revolutions, the flue is put solid in its place. After this has been accomplished the feed of the ratchet is eased off and the nut *h* is brought up to the flanging-dies and the mandrel is fed up with the ratchet until the flange at the outer end of the tube is pressed up solid against the tube-sheet, and a perfectly steam-tight joint is produced with little trouble and without jar on any part of the boiler.

I claim as new and desire to secure by Letters Patent—

A tool for fastening boiler-tubes, composed of a mandrel with a series of inclined grooves, in combination with a double set of dies, *d e*, and nut *h*, to be used in connection with the expanding-dies *e*, substantially as and for the purpose set forth.

ROBERT McCONNELL.

Witnesses:

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ROBT. SHIELDS.