No. 648,765. Patented May 1, 1900.

H. G. LYKKEN & J. C. HOISVEN.

TUBE EXPANDING, BEADING, AND CUTTING TOOL.

(Application filed Sept. 1, 1899.)

(No Model.)

Fig. 1.

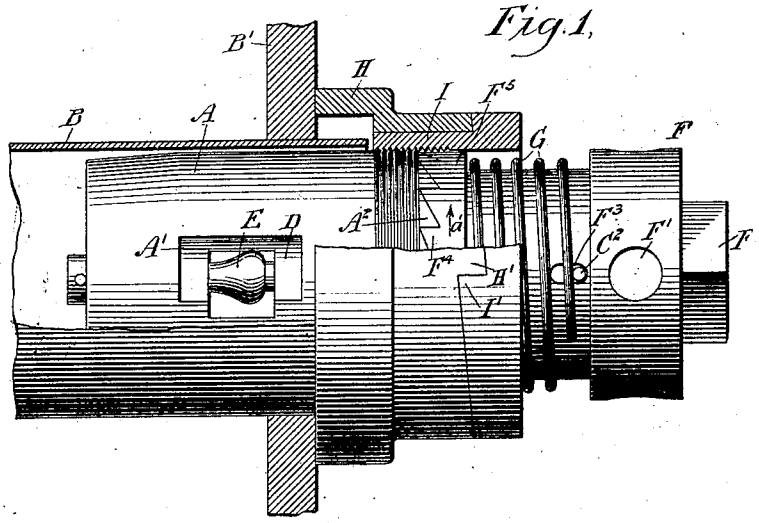


Fig. 2.

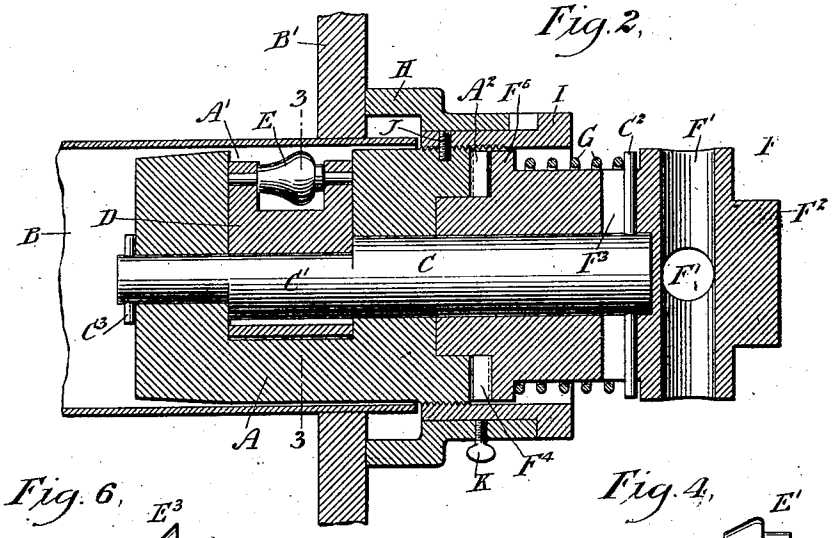


Fig. 6.

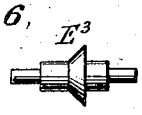


Fig. 7.

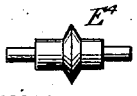


Fig. 3.

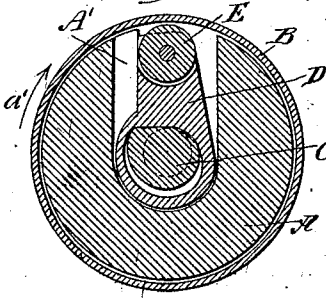


Fig. 4.

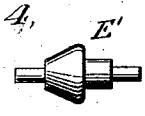
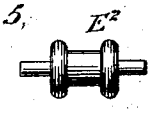


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY G. LYKKEN AND JOHN C. HOISVEN, OF GRAFTON, NORTH DAKOTA.

TUBE EXPANDING, BEADING, AND CUTTING TOOL.

SPECIFICATION forming part of Letters Patent No. 648,765, dated May 1, 1900.

Application filed September 1, 1899. Serial No. 729,232. (No model.)

To all whom it may concern:

Be it known that we, HENRY G. LYKKEN and JOHN C. HOISVEN, of Grafton, in the county of Walsh and State of North Dakota, have invented a new and Improved Tube Expanding, Beading, and Cutting Tool, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved tube expanding, beading, and cutting tool which is simple and durable in construction, very effective in operation, and more especially designed to properly expand and bead the boiler-tubes against the flue-sheet and to cut out old tubes in boilers and to cut new tubes to the proper length.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

A practical embodiment of our invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a plan view, partly in section, of the improvement as applied. Fig. 2 is a longitudinal sectional elevation of the same. Fig. 3 is a transverse section of the same on the line 3 3 in Fig. 2. Figs. 4 and 5 are side elevations of different forms of expanding and beading tools, and Figs. 6 and 7 are side elevations of different forms of cutters.

The improved tube expanding, beading, and cutting tool is provided with a body A, preferably made of cylindrical form and of a diameter somewhat less than the tube B in which the tool is to be used, so that the body A can be readily inserted in the tube, as illustrated in Figs. 1 and 2.

In the body A is mounted to turn centrally a longitudinally-extending shaft C, formed with an eccentric or cam C', engaged by a carrier D, fitted to slide in a recess A' in the body A in a transverse direction to the longitudinal axis of the body and the shaft, and on the free or outer end of said carrier D is journaled the expanding, beading, or cutting tool adapted to engage the tube at the inside for beading, expanding, or cutting the tube. As shown in Fig. 2, the beading-tool E is approximately pear-shaped; but different forms of expanding and beading tools may be used, as indicated at E' E^2 in Figs. 4 and 5, and when it is desired to cut the tube cutters, such as shown at E^3 E^4 in Figs. 6 and 7, are inserted in the carrier D in lieu of the tools E, E', or E^2.

On the outer end of the shaft C is mounted to turn and to slide longitudinally a head F, formed with apertures F' for the insertion of a rod or other instrument to permit the operator to conveniently turn the head, the latter being also provided at its outer face with a polygonal offset F^2 for applying a wrench or the like to turn the head, if desired, for working the device. The head F is also provided with a transverse slot F^3, into which projects a pin C^2, carried on the outer face of the shaft C, so that when the head is turned the pin C^2 is carried around with the head to turn the shaft C and at the same time the head is free to slide longitudinally on the shaft C as the slot is elongated in a longitudinal direction, as indicated in Fig. 1. The inner end of the shaft C is provided with a pin C^3 abutting against the inner face of the body A to prevent the shaft C from sliding in an outward direction.

On the head F, at or near the inner end thereof, are formed teeth F^4 in mesh with similar teeth A^2, formed on the outer end of the body A, so that when the head F is turned in the direction of the arrow a' (see Figs. 1 and 3) then the head carries the body A around with it, and as the shaft C turns with the head F it is evident that the body, together with the carrier D and the expanding, beading, or cutting tool, is turned around in the tube to cause the said tool to act on the tube. When the head F is turned, however, in the inverse direction of the arrow a', then the teeth F^4 glide over the teeth A^2, so that the body A remains stationary for the time being, while the head F is turned and carries with it the shaft C. Now as the latter is turned in the temporarily-stationary body A the eccentric of this shaft causes an outward sliding of the carrier D, so that the expanding, beading, or cutting tool is moved in a like direction, and consequently fed against the inside of the tube. Thus the head F serves a twofold purpose—that is, it turns the body A and with it the carrier D and ex-

panding, beading, or cutting tool within the tube B, and it feeds the carrier and its tool outward upon turning the head F in a reverse direction, as above described.

In order to hold the teeth F' in mesh with the teeth A^2, a spring G is provided, one end of which rests against the pin C^2 and presses with the other end against a shoulder F^5 on the head F.

When beginning to use the tool, the eccentric C' is in such position that the carrier D is in an innermost position, with the peripheral surface of the cutting, beading, or expanding tool within close proximity of the inner surface of the tube B. When the head F is turned in the inverse direction of the arrow a', the eccentric C' is turned around and the carrier D is moved outward, together with the expanding, beading, or cutting tool, so that the latter is moved in engagement with the inner surface of the tube, and then the head F is turned in the direction of the arrow a' for bringing the tool in contact with the inner surface of the tube at the place where the tube is to be expanded, beaded, or cut. The head F may be turned once, twice, or several times around in the direction of the arrow a' before a reverse movement is given to the head in the inverse direction of the arrow a' to feed the beading, expanding, or cutting tool outward, it being understood that for ordinary purposes the head F is turned in the inverse direction of the arrow a' a distance corresponding to the length of one or two teeth F'.

In order to bring the beading, expanding, or cutting tool in the proper position within the tube B, a gage is provided, consisting, essentially, of two members H and I, both ring-shaped, and the member H being adapted to abut against the outer face of the flue-sheet B'. The member H is mounted to turn on the ring-shaped member I, and both members are provided with meshing teeth H' I', so that when one member is turned on the other they are moved longitudinally apart, owing to the inclined backs of their teeth sliding upon one another. The member I is secured by a set-screw J or other means to the body A, (see Fig. 2,) so that when the member H abuts against the flue-sheet B' and is turned, then the other member I is moved outward or inward and with it the body A, so as to bring the beading, expanding, or cutting tool the desired distance within the tube B. When the desired position of the tool is reached, the two members H and I are fastened together by a set-screw K (shown in Fig. 2) to hold the body A and the tool against longitudinal shifting during the expanding, beading, or cutting operation.

The eccentric or cam C' is so arranged that it moves the carrier D outward during a whole revolution, as will be readily understood by reference to Fig. 3.

Having thus fully described our invention, we claim as new and desire to secure by Letters Patent—

1. A tube expanding, beading and cutting tool, comprising a body having a recess near its inner end, a tool-carrier in said recess and movable to project outside the same, a shaft extending through said body and formed near its inner end with a cam fitted in said recess and inserted through the tool-carrier, there being provided ratchet-teeth on the outer end of said body, a head having its inner end fitting in the outer end of said body and formed with ratchet-teeth adapted to mesh with the teeth of the body, the said head being further provided with a transverse slot longitudinally elongated, and a pin extending from the shaft and inserted through said slot, as and for the purpose set forth.

2. In a tube expanding, beading and cutting tool, a gage comprising two members, one of which is adapted for attachment on the tool and the other of which is mounted to turn on the first-named member, and means whereby the turning of one member relatively to the other will move the members longitudinally with respect to each other, as set forth.

3. In a tube expanding, beading and cutting tool, a gage comprising two members one of which is adapted for attachment on the tool and the other of which is mounted to turn on the first-named member, the said members being formed with inclined abutting surfaces, as and for the purpose set forth.

4. A gage for a tube expanding, beading and cutting tool, comprising two members, one of which is turnable and adapted to abut at one end against the flue-sheet and formed with teeth at the other end, the second member being secured to the tool-body and formed at its inner end with teeth in mesh with the teeth of the first-named member, and means for securing the members together after adjustment, substantially as shown and described.

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