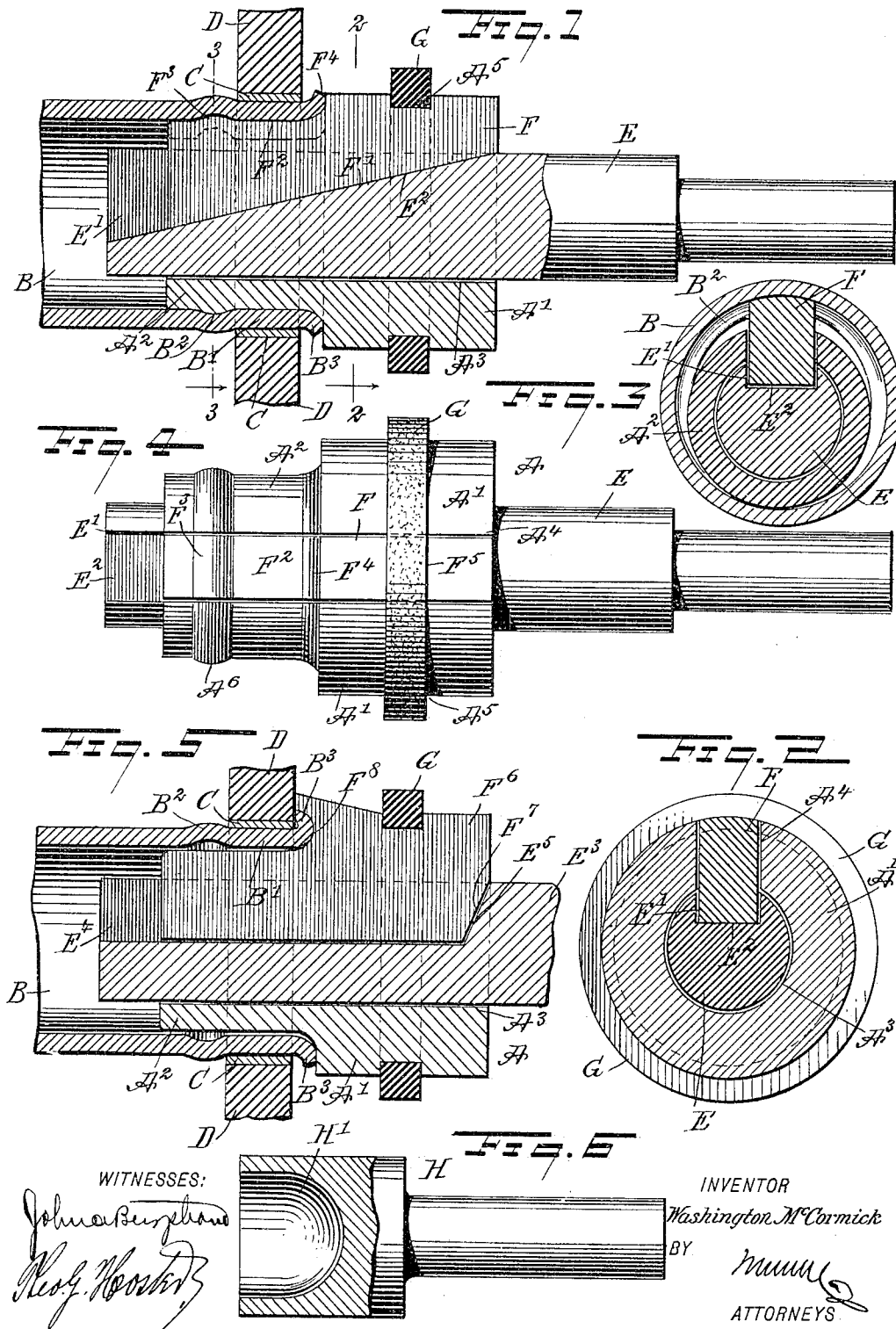


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PATENTED APR. 24, 1906.

W. McCORMICK.
TUBE EXPANDING AND BEADING TOOL.
APPLICATION FILED DEC. 16, 1905.



UNITED STATES PATENT OFFICE.

WASHINGTON McCORMICK, OF HILLYARD, WASHINGTON.

TUBE EXPANDING AND BEADING TOOL.

No. 818,843.

Specification of Letters Patent.

Patented April 24, 1906.

Application filed December 16, 1905. Serial No. 292,059.

To all whom it may concern:

Be it known that I, WASHINGTON McCORMICK, a citizen of the United States, and a resident of Hillyard, in the county of Spokane and State of Washington, have invented a new and Improved Tube Expanding and Beading Tool, of which the following is a full, clear, and exact description.

The invention relates to boilers; and its object is to provide a new and improved tube expanding and beading tool arranged to quickly expand the tube in the flue-sheet opening, to form beads on the tube on opposite faces of the flue-sheet, and to give a high finish to the outer bead.

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

A practical embodiment of the 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 longitudinal sectional elevation of the expanding-tool applied for expanding the tube in the flue-sheet and for forming inner and outer beads. Fig. 2 is a transverse section of the same on the line 2 2 of Fig. 1. Fig. 3 is a similar view of the same on the line 3 3 of Fig. 1. Fig. 4 is a plan view of the improvement. Fig. 5 is a longitudinal sectional elevation of the bead-finishing tool as applied; and Fig. 6 is a side elevation, partly in section, of the intermediate pounding-head for the mandrel.

The cylindrical body A of the expanding and beading tool is provided with a head A' and a reduced portion A², adapted to pass into the tube B to be expanded against a ring or gasket C, usually made of copper and held in the opening of the flue-sheet D, as illustrated in Figs. 1 and 5. The body A is provided with a central cylindrical bore A³, into which fits a mandrel E, having a longitudinally-extending recess E', into which fits the expanding and beading tool F, also fitting into a slot A⁴, formed lengthwise on the body A and extending from the outer or peripheral face of the body to the longitudinal bore A³.

The tool F is provided with an inclined bottom F', adapted to engage the inclined bottom E² of the recess E', and the said tool F is also provided with a straight surface portion F², terminating at its inner end in a transverse ridge F³ and terminating at its outer

end in a shoulder F⁴, the bottom portion of which is curved or rounded off, as plainly illustrated in the drawings.

In order to hold the tool F in position and to allow outward movement thereof, an elastic ring or band G is provided, fitting into an annular groove A⁵, formed in the head A' of the body A, and also extending through a groove F⁵, formed on the tool F.

In using the tool the reduced portion A² of the body A is passed into the tube B until the shoulder F⁴ of the tool F abuts against the outer end of the tube B. The operator now drives the mandrel E inwardly by the action of a suitable power-hammer or other means and at the same time rotates the mandrel E so that the tool F is driven outward by its inclined bottom F' traveling on the inclined bottom E² of the recess E', and consequently the tool F during this outward movement causes its straight surface F² to expand the portion B' of the tube B against the ring or gasket C, and at the same time the ridge F³ forms an annular bead B² on the tube B immediately adjacent to the inner surface of the flue-sheet D. The shoulder F⁴ of the tool F acts on the outer projecting end of the tube B so as to form an outwardly-extending bead B³ thereon, as will be readily understood by reference to Fig. 1. The above-described operation is continued until the portion B' is firmly seated on the ring or gasket C and the bead B² is well developed, as well as the bead B³.

In order to give a fine finish to the bead B³ and to completely form it over against the outer face of the flue-sheet D, I prefer to use another tool F⁶ in place of the tool F and also a mandrel E³, having a recess E⁴, one end of which is formed with a steep incline E⁵, adapted to engage a corresponding incline F⁷ on the tool F⁶. The latter is fitted in the head A' of the body A the same as above described and held in place thereon by the elastic ring G. The tool F⁶ has an overhang shoulder F⁸, adapted to engage the bead B³, so that when the mandrel E³ is driven inward and the incline E⁵, acting on the incline F⁷, moves the tool F⁶ outward then the shoulder F⁸ completely bends the bead over against the flue-sheet D, thus giving a fine finish to the bead.

In order to properly guide the body A while turning the same with the mandrel E, as previously mentioned, the body is preferably provided at its reduced portion A² with

an annular ridge A^6 in transverse alinement with the ridge F^3 to engage the bead B^2 as soon as the latter is started by the ridge F^3 .

When using a power-hammer for driving the mandrel E , an intermediate head H , such as shown in Fig. 6, may be employed, having a socket H' , adapted to engage the outer end of the mandrel E or E^3 .

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

1. A tube expanding and beading device, comprising an integral body formed in two diameters and having a central bore and a slot extending lengthwise and leading to the said bore, a mandrel fitting the said bore and formed with a longitudinal recess having an inclined bottom portion and registering with the slot of the body, and an expanding and beading tool fitting the said slot and the said recess.

2. A tube expanding and beading device, comprising a body having a central bore and a slot extending lengthwise and leading to the said bore, a mandrel fitting the said bore and formed with a recess having an inclined bottom portion and registering with the said slot, an expanding and beading tool fitting the said slot and the said recess, and an elastic ring fitting an annular groove in the said body and a groove in the said tool.

3. A tube expanding and beading device, comprising an integral body formed in two diameters and having a central bore and a slot extending lengthwise and leading to the said bore, a mandrel fitting the said bore and formed with a longitudinal recess having an inclined bottom portion and registering with the slot of the body, and an expanding and beading tool fitting the said slot and the said recess, the tool being provided with a straight expanding surface portion terminating at the inner end in a ridge and at the outer end in a shoulder.

4. A tube expanding and beading device, comprising an integral body formed in two

diameters and having a central bore and a slot extending throughout the length thereof and leading to the said bore, a mandrel fitting the said bore and formed with a longitudinal recess having an inclined bottom portion and registering with the slot of the body, and an expanding and beading tool fitting the said slot and the said recess, the tool being provided with a straight expanding surface portion terminating at the inner end in a ridge and at the outer end in a shoulder having a curved bottom portion terminating in a vertical surface.

5. A tube expanding and beading device, comprising a body formed in two diameters, the smaller diameter having an annular exterior ridge near its end, the body being provided with a central bore and a longitudinal slot leading to said bore, a mandrel fitting the bore of the body and provided with a longitudinal recess having an inclined surface, and an expanding and beading tool fitting in the slot of the body and the recess of the mandrel, the tool being provided near its inner end with a ridge and at about the middle with a shoulder.

6. A tube expanding and beading device, comprising a body having a reduced inner end and provided with a central bore and a longitudinal slot leading to said bore, a mandrel fitting in the bore of the body and provided with a longitudinal recess having an inclined surface, and an expanding and beading tool fitting the slot of the body and the recess of the mandrel and having an inclined surface corresponding to that of the recess of the mandrel, said tool having a ridge near its inner end and an overhanging shoulder at about the middle of its length.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WASHINGTON McCORMICK.

Witnesses:

THOS. C. TYRRELL,
MARTIN J. GUIRY.