W. A. FINDLEY.

TURNING AND BEADING TOOL.

APPLICATION FILED JULY 1, 1920.

1,381,406.

Patented June 14, 1921.

2 SHEETS—SHEET 1.

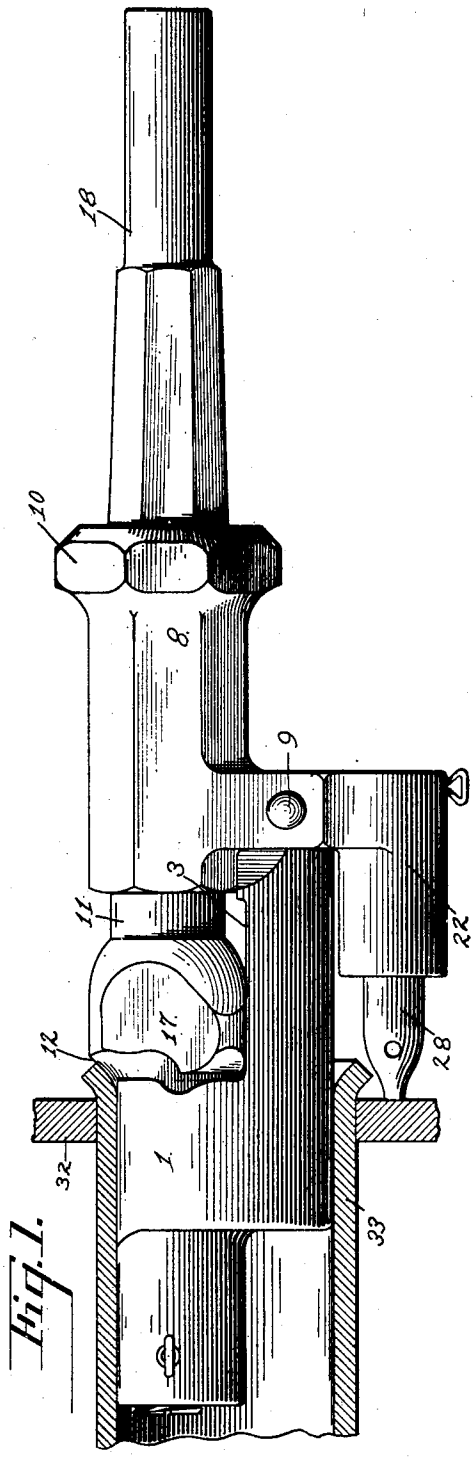


Fig. 1.

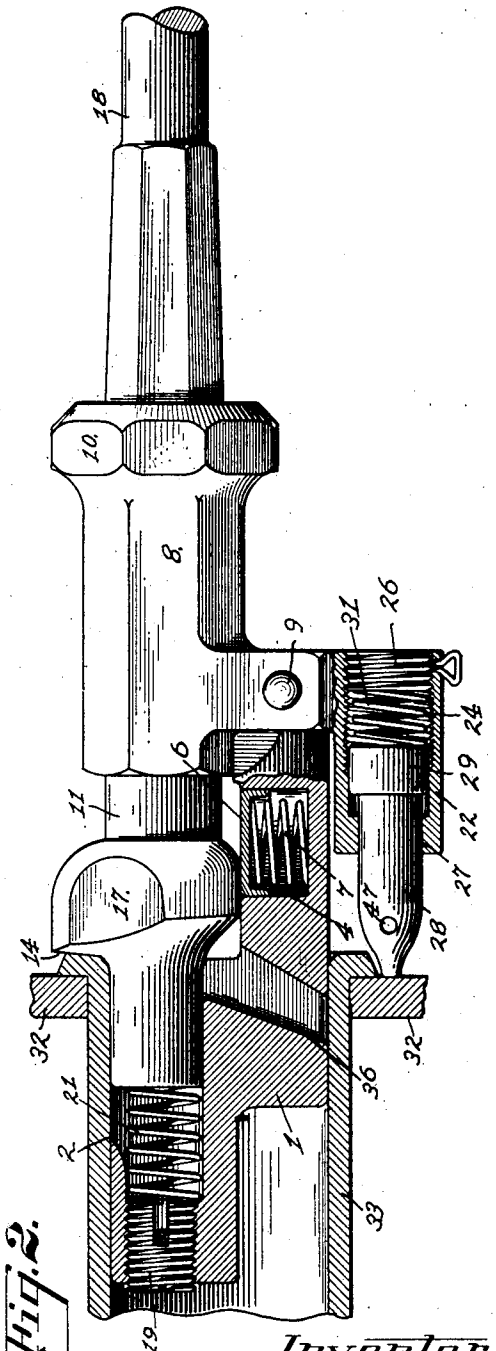


Fig. 2.

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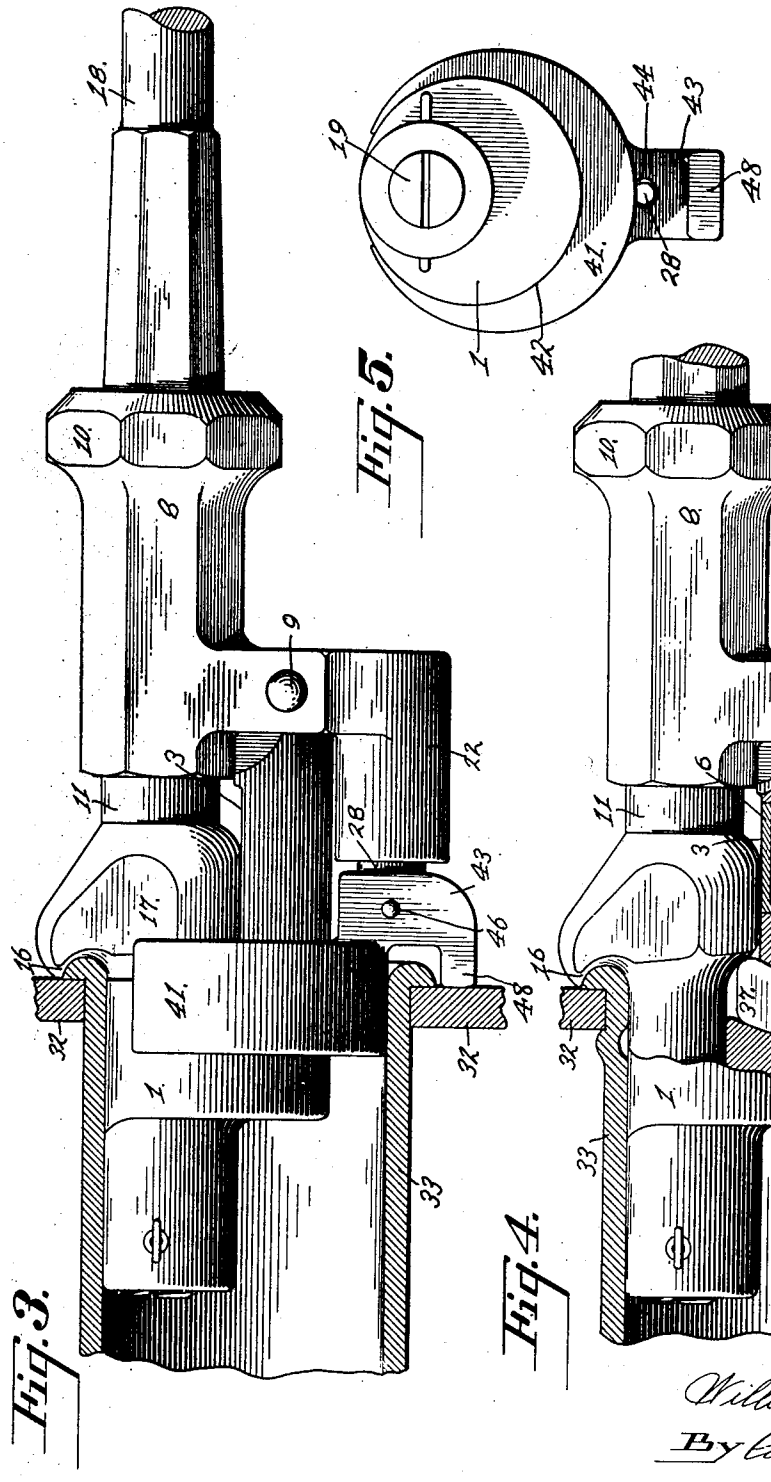


Fig. 3.

Fig. 5.

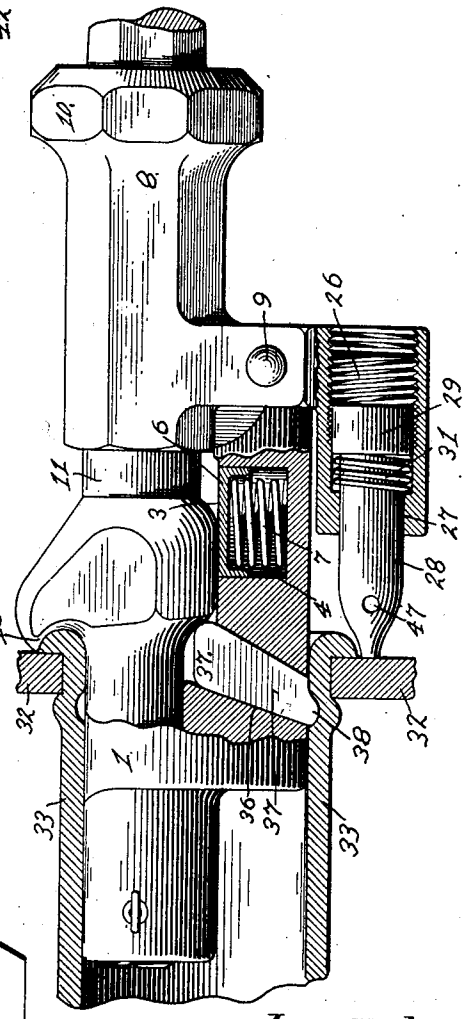


Fig. 4.

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UNITED STATES PATENT OFFICE.

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TURNING AND BEADING TOOL.

1,381,406. Specification of Letters Patent. Patented June 14, 1921.

Application filed July 1, 1920. Serial No. 394,354.

To all whom it may concern:

Be it known that I, WILLIAM A. FINDLEY, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented a new and useful Improvement in Turning and Beading Tools, of which the following is a specification.

My invention relates to improvements in tools of the class used for beveling, expanding and beading the ends of boiler tubes and is an improvement of the device disclosed in my allowed application Serial No. 338,970, filed November 15, 1919 (Patent No. 1,357,947, dated Sept. 7, 1920), reference to which is hereby made.

In the present invention provision is made of expanding a tube adjacent the inner side of a boiler head or the like, and the objects of my present invention are:

First, to provide a means for simultaneously expanding a boiler tube adjacent the inner and outer sides of a boiler head.

Second, to provide an improved tool adapted to expand a boiler tube adjacent the inner side of a boiler head and to successively bevel, expand and bead the ends of boiler tubes and the like.

Third, to provide an improved tool having a reciprocating hammer provided with a plurality of shoulders adapted to successively bevel, expand and bead the ends of boiler tubes and the like, and to actuate an inner expanding block within said tubes.

Fourth, to provide improved means for adapting a tool of the character described for use with tubes of various diameters.

Fifth, to provide improved means arranged to normally prevent rotation of the reciprocating element whereby the desired shoulder may be presented to the work.

I accomplish these and other objects by means of the improved device disclosed in the drawings forming a part of the present specification wherein like characters of reference are used to designate similar parts throughout said specification and drawings and in which:

Figure 1, is a side elevation of my improved tool as applied in beveling a boiler tube.

Fig. 2, is a broken side elevation of the tool partly in section positioned for expanding the end of a boiler tube.

Fig. 3, is a broken side elevation of the tool as applied in beading, disclosing my improved bushing for adapting the tool for use with tubes of a larger diameter.

Fig. 4, is a broken side elevation partly in section disclosing the means of expanding a tube within the boiler head.

Fig. 5, is a front elevation of the tool with an enlarging bushing applied thereto.

Referring to the drawings the numeral 1, is used to designate a core 1, having a longitudinally disposed bore 2, opening on one side thereof. A portion of one end of the core is cut away to provide a flat surface 3, having a recess 4, adapted to receive a plunger 6, actuated by a spring 7, the purpose of which will hereinafter be more fully described. A hammer guide 8, is removably secured to the core 1, by a pin 9, said guide 8, and core 1, constituting the body portion of the tool.

The hammer guide 8, is bored co-axially with the bore 2, to receive a hammer 11, provided with an enlarged portion providing a beveling shoulder 12, an expanding shoulder 14, and a beading shoulder 16, flattened faces 17, being provided intermediate the shoulders and adapted to engage the flat surface 3, of the core 1, to normally retain the hammer 11, with the desired shoulder presented to the work. When the enlarged portion of the hammer 11, is properly positioned above the plunger 6, said plunger 6, may be depressed against the tension of the spring 7, to permit rotation of the hammer 11, with respect to the core 1, when it is desired to present a different shoulder to the work the hammer being similarly retained in the new position by engagement of a different face 17, with the flattened surface 3, and plunger 6. The hammer is provided with a shank 18, adapted to be engaged by a reciprocating means such as pneumatic hammer or the like, not shown.

The bore 2, provided in the core 1, is reduced in size at the forward end thereof, and threaded to receive a plug 19, adapted to retain a spring 21, provided in said bore 2, in compressed relation with the forward end of the hammer 11, whereby said hammer is unseated after each impact.

An extension 22, formed on the hammer guide 8, is provided with a bore 24, threaded at one end to receive a plug 26, and provided with a reduced bore 27, adapted to receive a plunger 28, having an enlarged portion 29, formed thereon to retain said plunger 28, within the bore 27.

A spring 31, is provided in the bore 24, for retaining the forward portion of the plunger 28, in engagement with the outer surface of a boiler head 32, thereby resiliently resisting forward longitudinal movement of the core 1, within a tube 33, to be beaded upon the head 32.

The core 1, is provided with an inclined recess 36, adapted to receive an expanding block 37, slidably mounted therein, said block extending above the surface 3, and provided at its lower end with a lip 38, adapted to expand the tube 33, adjacent the inner side of the boiler head 32, when said expanding block is actuated by impact of the enlarged portion of the hammer 11.

To accommodate the tool to use with tubes of a diameter greater than the core, I have provided a bushing 41, provided with an eccentric bore 42, adapted to fit the core 1. An extension 43, is formed upon the bushing 41, said extension 43, being provided with a tapered bore 44, adapted to receive the end of the plunger 28, and to be secured thereto by a pin 46, engaging registering apertures 47, provided in said extension 43, and the plunger 28.

It is obvious that any number of bushings 41, of various sizes may be provided for use with tubes of various diameters. A lug 48, is formed upon the lower end of the extension 43, to engage the boiler head 32, thereby resiliently resisting forward longitudinal movement of the core by engagement with the plunger 28, and spring 31.

In operation the core 1, is inserted in the tube 33, with the hammer 11, in operative relation to the end of the tube. The beveling, expanding and beading shoulders 12, 14, and 16, are successively turned to operative position and the hammer rapidly reciprocated by a pneumatic hammer or the like to deliver a succession of blows to the end of the tube, the entire tool being rotated during each operation. In this manner, the end of the tube 33, is effectively secured to the boiler head 32. The plunger 28, permits the hammer 11, to deliver an effective blow throughout each process by the resiliency of the spring 31, which is sufficiently compressed at each impact to permit full force of the hammer 11, to be delivered.

When it is desired to expand the tube 33, within the boiler, the tool is assembled with the expanding block 37, inserted in the recess 36. In this operation the spring 31, is removed from in back of the plunger 27, and placed in front thereof, as disclosed in Fig. 4, of the drawings. The plug 26, being adjusted to seat the plunger 28, in a position adapted to permit the core 1, to be advanced into the tube 33, only to such distance as will bring the lip 38, of the expanding block 37, adjacent the inner side of the boiler head 32. When the hammer 11, is operated the blow delivered by any one of the shoulders 12, 14, or 16, will be received upon the upper end of the expanding block 37, thereby causing the tube 33, to be expanded within the boiler by the lip 38, and the fastening of said tube 33, in the head 32, made doubly secure.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. The combination with a tool of the character described comprising a slidable and rotative hammer having a plurality of shoulders thereon, adapted to successively bevel, expand and bead the end of a tube into a boiler head or the like, of means actuated by said hammer for expanding said tube adjacent the inner surface of said boiler head.

2. The combination with a tool of the character described comprising a slidable and rotative hammer having a plurality of shoulders thereon adapted to successively bevel, expand and bead the end of a tube onto a boiler head or the like, of an expanding block operatively mounted within the body of said tool and adapted to be actuated by said hammer for expanding said tube adjacent the inner surface of said boiler head.

3. The combination with a tool of the character described comprising a slidable and rotative hammer having a plurality of shoulders thereon adapted to successively bevel, expand and bead the end of a tube onto a boiler head or the like, of an expanding block operatively mounted within the body of said tool and adapted to be actuated by said hammer for expanding said tube adjacent the inner surface of said boiler head; and means for limiting the longitudinal movement of the tool within the tube for positioning said expanding block within said tube.

4. The combination with a tool of the character described comprising a slidable and rotative hammer having a plurality of shoulders thereon adapted to successively bevel, expand and bead the end of a tube onto a boiler head or the like, of an expanding block operatively mounted within the body of said tool and adapted to be actuated by said hammer for expanding said tube adjacent the inner surface of said boiler head; and adjustable means for limiting the longitudinal movement of the tool within the tube for positioning said expanding block within said tube.

5. A tool of the character described comprising a body portion; a slidable and rotative hammer operatively mounted therein for successively beading, expanding and beveling the end of a tube onto a boiler head or the like; an expanding block operatively mounted within said portion and adapted to be actuated by said hammer for

expanding said tube within the interior of a boiler; a plunger slidably mounted adjacent the body portion for limiting the longitudinal movement of the tool within the tube; and means for adjusting the longitudinal position of said plunger for positioning said expanding block adjacent the inner edge of the boiler head.

6. The combination with a tool of the character described comprising a slidable and rotative hammer having a plurality of shoulders thereon, adapted to successively bevel, expand and bead the end of a tube onto a boiler head or the like, of means actuated by said hammer for expanding said tube adjacent the inner surface of said boiler head; faces formed intermediate the hammer shoulders; and means mounted adjacent said hammer to normally engage one of said flattened faces for retaining said hammer with the desired shoulders in operative position.

7. The combination with a tool of the character described comprising a slidable and rotative hammer having a plurality of shoulders thereon, adapted to successively bevel, expand and bead the end of a tube onto a boiler head or the like, of means actuated by said hammer for expanding said tube adjacent the inner surface of said boiler head; faces formed intermediate the hammer shoulders; and a spring operated plunger mounted adjacent said hammer to normally engage one of said flattened faces for retaining said hammer with the desired shoulder in operative position.

8. The combination with a tool of the character described comprising a slidable and rotative hammer having a plurality of shoulders thereon, adapted to successively bevel, expand and bead the end of a tube onto a boiler head or the like; of means actuated by said hammer for expanding said tube adjacent the inner surface of said boiler head; flattened faces intermediate the hammer shoulders; a spring operated plunger mounted adjacent said hammer adapted to normally engage one of said flattened faces and to be depressed to permit said hammer to be rotated to place the desired shoulder in operative position.

9. A tool of the character described comprising a body portion; a slidable and rotative hammer operatively mounted therein for successively beading, expanding and beveling the end of a tube onto a boiler head or the like; an expanding block operatively mounted within said body portion and adapted to be actuated by said hammer for expanding said tube within the interior of a boiler; a plunger slidably mounted adjacent the body portion for limiting the longitudinal movement of the tool within the tube; means for adjusting the longitudinal position of said plunger for positioning said expanding block adjacent the inner edge of the boiler head; and a bushing provided with an eccentric bore engaging the body at the forward portion thereof, to adapt said body for use with tubes of larger diameter.

10. A tool of the character described comprising a body portion; a slidable and rotative hammer operatively mounted therein for successively beading, expanding and beveling the end of a tube onto a boiler head or the like; an expanding block operatively mounted within said body portion and adapted to be actuated by said hammer for expanding said tube within the interior of a boiler; a plunger slidably mounted adjacent the body portion for limiting the longitudinal movement of the tool within the tube; and means for adjusting the longitudinal position of said plunger for positioning said expanding block adjacent the inner edge of the boiler head; a bushing provided with an eccentric bore engaging the body at the forward portion thereof to adapt said body for use with tubes of a larger diameter, said bushing being removably secured to the plunger.

11. A tool of the character described comprising a body portion; a slidable and rotative hammer operatively mounted therein for successively beading, expanding and beveling the end of a tube onto a boiler head or the like; an expanding block operatively mounted within said body portion and adapted to be actuated by said hammer for expanding said tube within the interior of a boiler; a plunger slidably mounted adjacent the body portion for limiting the longitudinal movement of the tool within the tube; and means for adjusting the longitudinal position of said plunger for positioning said expanding block adjacent the inner edge of the boiler head; a bushing provided with an eccentric bore engaging the body at the forward portion thereof to adapt said body for use with tubes of a larger diameter, said bushing being removably secured to the plunger, and a lug formed integrally with the bushing to engage the boiler head and prevent longitudinal movement forward within the tube.

In witness whereof, I have hereunto set my signature this 26th day of June, 1920.

WILLIAM A. FINDLEY.