March 6, 1934. I. B. ROSENBERG ET AL 1,950,154

PIPE REAMER AND FLARING TOOL

Filed July 30, 1932

Fig. 1.

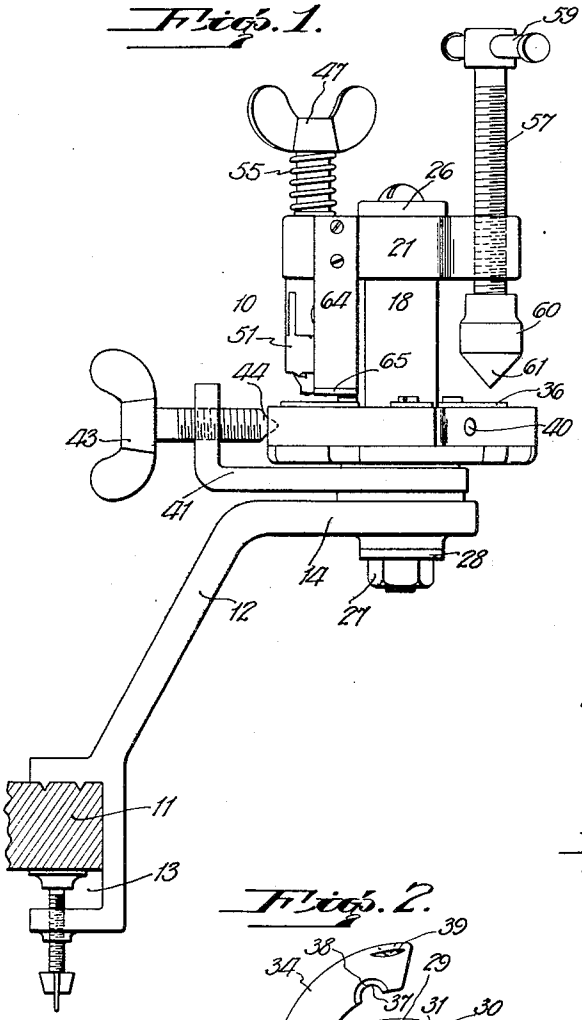


Fig. 3.

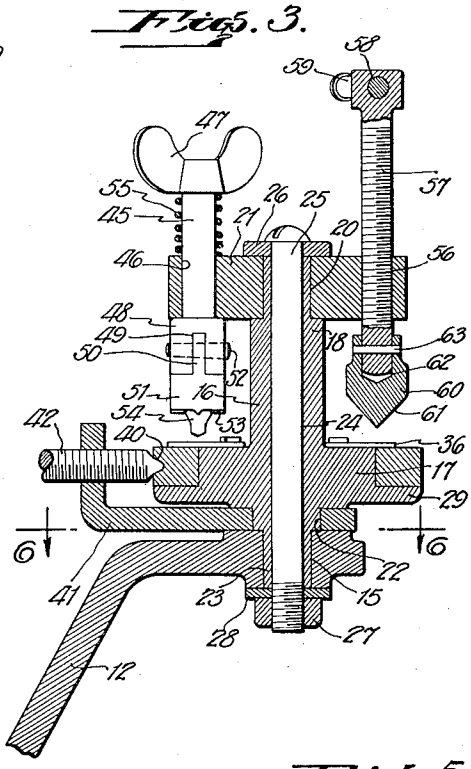


Fig. 5.

Fig. 4.

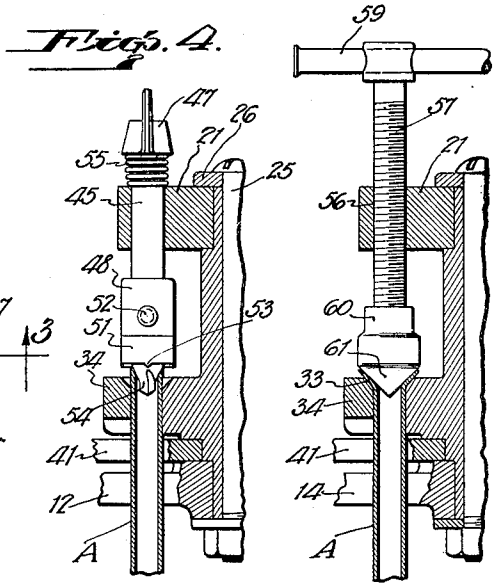


Fig. 2.

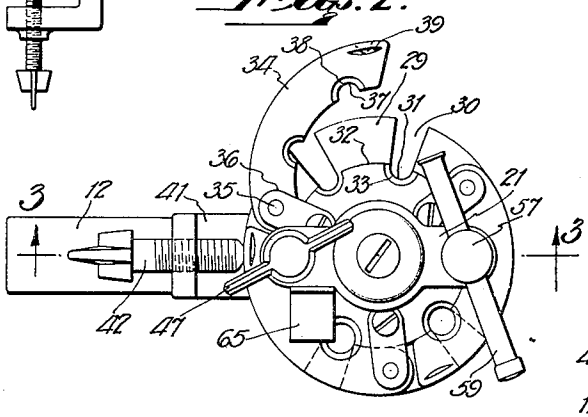
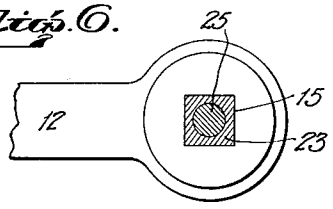


Fig. 6.



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PIPE REAMER AND FLARING TOOL

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4 Claims. (Cl. 153—79)

This invention relates to improvements in pipe tools and more particularly to a pipe or tube reaming and flaring tool.

One of the principal features of the invention resides in a tool by which the cut end of a pipe or tube may be reamed to free the same of any burrs which may be present thereon due to the cutting of a length of pipe or tube, the said pipe or tube being held fixed during the reaming, operation, after which the reamed end may be flared without disturbing the fixed position of the tube, to form a flange thereon which is desired in the forming of a union or connection between the same and another pipe or tube.

Another feature of the invention is to provide a hand tool embodying the above features which is capable of receiving pipes or tubes or various diameters.

A further object of the invention is the provision of a combination reamer and flaring tool embodying a fixed work holder and a rotatable tool carrier mounted thereabove by which the various tools may be selectively brought into operative position with respect to the work without disturbing the work held by the work holder.

A still further object of the invention is to provide a combination pipe tool capable of performing the above functions which is simple of construction, easy of operation, and which produces a highly efficient result.

With these and other objects in view, the invention resides in the certain novel construction, combination and arrangement of parts, the essential features of which are hereinafter fully described, are particularly pointed out in the appended claims, and are illustrated in the accompanying drawing, in which:

Figure 1 is a side elevational view of the invention shown in a clamped position upon a support.

Figure 2 is a top plan view with one of the clamping jaws in a swung out position.

Figure 3 is a vertical longitudinal sectional view on the line 3—3 of Figure 2.

Figure 4 is a fragmentary vertical sectional view illustrating the reaming tool in use.

Figure 5 is a similar view but showing the flaring tool in operation.

Figure 6 is a detail horizontal sectional view on the line 6—6 of Figure 3.

Referring to the drawing by reference characters, the numeral 10 designates the combined pipe reaming and flaring tool in its entirety. Although the tool may be constructed to be held and operated in the hand of a user, we have shown the same as attached to a support which may be in the form of a bench or table 11, by providing a tool with a bracket arm 12 having a releasable clamp 13 at one end thereof, by which the device may be securely held in position upon the support 11. The bracket 12 extends upwardly at an angle and terminates in a horizontal arm 14, the same being provided with a square opening 15.

Supported by the bracket 12 in a manner now to be explained is a work support or body member 16 which includes an annular flange or disc 17 from which a sleeve 18 rises, the upper end of the sleeve being reduced in diameter to provide a bearing surface 20 for rotatably supporting a tool carrier or head 21. Extending below the disc 17 is a reduced bearing portion 22, while extending beyond the bearing portion 22 is a square extension portion 23 which fits into the square recess 15 in the bracket arm 14. The body member 16 is provided with a bore 24 of uniform diameter throughout its length for the passage of a bolt 25, the head end of the bolt being disposed at the top of the body member and engageable with a washer 26 which overlies the carrier 21 to secure the same in position. The lower end of the bolt is screw threaded and receives a nut 27 which bears against the washer 28, the said washer in turn being interposed between the nut and the under side of the bracket arm 14. From the description thus far, it will be seen that the body member 24 is held against rotation with respect to the bracket 12 by which it is supported.

The periphery of the disc 17 is cut away to provide an annular flange or platform 29, and formed therein are a plurality of radially arranged notches 30 of various sizes, the side walls of the notches converging inwardly and terminating in half rounded walls or jaws 31. These walls or jaws 31 are of different sizes and are cut into the annular face 32 formed on the disc 17 by the formation of the reduced flange or platform 29 and the top edges of the walls or jaws 31 are beveled as at 33, although fixed receiving slots have been shown in the drawing, it will be understood that more or less may be provided if desired.

Coacting with pairs of the fixed jaws 31 are segmental shaped jaw members 34, one end of each member being pivoted as at 35, the said pivots having one end entering the platform 29, while the opposite end is mounted in a bearing plate 36 fixedly secured to the flange or disc 17 and extending out over the flange or platform 29. Each segmental jaw member 34 is provided with a pair of notches 37 of semi-circular shape and of a size the same as the size of the fixed jaws 31 with which they are adapted to coact. The tops

of the notches 37 are beveled as at 38 to correspond to the bevels 33 so that when the jaw members 34 are swung to a closed position, they provide pipe receiving openings in the flange or disc 17 of the body member 16. The top face of each segmental jaw member 34 adjacent its free end is provided with a finger nail notch 39 in order to enable the fingernail of a user to be inserted when it is desired to swing the segmental members to a released or open position. The outer curved face of each of the segmental shaped jaw members adjacent the free end thereof is provided with a recess 40 for a purpose to be presently explained.

In order to lock any selected segmental jaw member 34 in closed position, we provide an L-shaped arm 41, the horizontal portion of which is provided with an opening for receiving the bearing portion 22 of the body member 16, while the vertical leg or portion of the arm 41 is disposed in spaced relation to the periphery of the disc 17 whereby the arm is permitted free turning movement about the axis of the member 16. Threaded in the vertical portion of the arm 41 is a clamping screw 42. The outer end of the screw 42 is provided with a manipulating knob or wing 43, while the opposite or inner end of the said screw terminates in a point 44 which when the axis of the screw is brought into alinement with any recess 40 of the segmental shaped jaws 34 by the rotation of the arm 41, may be turned so as to cause the pointed end 41 to seat in a recess 40 to securely hold the segmental jaw 34 in clamping position with respect to the fixed jaws 31 with which that particular segmental member coacts.

Mounted for vertical movement in the carrier 21 is a reaming tool which comprises a plunger 45 slidably mounted in a bore 46 in the said carrier. The top end of the plunger 45 is provided with a manipulating wing 47, while the opposite lower end terminates in an enlarged head 48 provided with a bifurcation 49. Fitting into the bifurcation 49 is the flange 50 of a reaming tool element 51, while a pipe 52 passes through the head 48 and flange 50 to removably secure the tool element 51 to the head. The tool element 51 is undercut and provided with horizontally disposed teeth 53 while extending beyond the under cut face is a conical shaped reamer 54. A coil spring 55 encircles the plunger 45 and is interposed between the manipulating end 47 of the plunger and the top face of the carrier 21. This spring tends to normally support the working end of the reaming tool above the plane of the disc 17, and the shoulders formed by the enlarged head 48 limits the upward movement of the plunger 45.

Threaded in a threaded bore 56 provided in the carrier 21 diametrically opposite the bore 46 is a screw shaft 57, the upper end of which terminates in a head provided with an opening 58 for slidably receiving an actuating handle 59, the opposite ends of these handles being provided with knobs to prevent the handle from pulling free of the opening 58. This handle is used to manually impart rotation to the screw shaft 57. Carried by the lower end of the screw shaft 57 is a flaring tool element 60 having a conical working base 61, and provided with a socket 62 for receiving the lower end of the screw shaft 57. A pin 63 passes through the flaring tool element 60 and lower end of the screw shaft 57 for removably supporting the tool element on the lower end of the said shaft.

The device just described is especially adapted for use in the reaming and flaring of the ends of relatively soft pipe or tubing such as copper, brass and the like, and by reason of the construction previously mentioned, the same is capable of use for the reaming and flaring of different diameter pipes or tubes. In practice, a burr or roughened edge is left upon the end of a pipe after a length has been cut which must be trimmed up or reamed before the end of the pipe or tube may be flared to prepare the said end for connection with a coupling. By the use of the tool herein described, the end of the pipe or tube may be successively reamed and flared without removing the same from the work holder or without effecting any adjustment of the pipe or tube after positioning the same within the device.

Assume that it is desired to ream and flare the end of a pipe or tube shown by the letter A in Figures 4 and 5 of the drawing. The particular jaw adapted to receive a pipe of the diameter of the pipe A is selected, and the particular segmental shaped member 34 is swung to an open position after which the pipe A is inserted through the selected notch 30 so as to seat against the fixed jaw or curved wall 31. The segmental member 34 is then swung to a closed position, but before clamping the said segmental member, it is first necessary to adjust the end of the pipe A with respect to the plane of the upper face of the disc 17. For this purpose we provide a gauge 64 which is fixed to the carrier 21 and depends therefrom, the lower end terminating in a horizontal flange 65 disposed in spaced relation to the upper face of the flange or disc 17. The flange 65 may be brought directly over any one of the pipe receiving openings and when so positioned, the upper end of the pipe A is brought into abutting engagement with the under side of the said flange. This is for the purpose of obtaining a uniform flare on all pipes or tubes worked on by this device.

After the pipe or tube A has been positioned to the proper level by the gage 64, the arm 41 is swung around so that the screw 43 may be turned to cause the end 44 to seat in the notch 40 of the segment 34 to be locked. The screw 43 is tightened whereupon the pipe A is securely clamped and held against vertical or turning movement. The carrier 21 is next turned to bring the axis of the reaming tool into registration with the axis of the pipe A at which time the operator grasps the manipulating wing 47 and presses downwardly upon the reaming tool against the action of the spring 55, thus causing the cutting teeth 53 and reaming element 54 to cut away any burrs which might be present on the end of the pipe. This reaming operation is clearly illustrated in Figure 4 of the drawing.

After the pipe or tube has been properly reamed, the operator releases the manipulating wing 47 whereupon the spring 55 returns the reaming tool to normal position. The pipe or tube is now ready to be acted upon by the flaring tool whereupon the carrier 21 is rotated to bring the axis of the screw 57 into alinement with the axis of the pipe or tube A. When thus positioned, the operator grasps the handle 59 and imparts turning movement to the screw 57 so as to cause the screw to move downwardly and the beveled or conical face 61 of the flaring tool to engage the protruding end of the pipe A. The downward force imparted to the flaring tool by the turning of the screw 57 effects an outward flaring of the protruding end of the pipe A, and forms a flare on an angle equal to the angle of

the beveled portions 33 and 38. After the pipe or tube has been flared, the screw 57 is turned in an opposite direction to cause the working end of the flaring tool to clear the top of the pipe A, at which time the screw 43 is turned in a direction to release the segmental shaped member 34, and allow the operator to slide the flared pipe out through the open end of the notch 30.

It is essential that the axes of the openings formed by the coacting jaw elements are the same distance from the axis of the member 16, and also that the axes of the reaming and flaring tools are the same distance from the axis of the carrier in order that the beveled tool may be selectively brought into position over any selected pipe receiving opening.

While we have shown and described what we deem to be the most desirable embodiment of our invention, we wish it to be understood that such changes as come within the scope of the appended claims may be resorted to if desired.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent of the United States, is:—

1. In a tool of the class described, a fixed member provided with an annular flange, spaced notches of different sizes provided in the periphery of said flange, jaws pivoted to said flange and having complementary notches therein for coaction with the corresponding notches in said flange when said jaws are in closed position, a pivoted arm movable about said annular flange, a clamping screw carried by said arm for bearing engagement with any selected jaw to secure the same in closed position, a carrier rotatably mounted upon said fixed member above said openings, and tools mounted in said carrier and respectively movable to a position above any of the coacting notches.

2. In a tool of the class described, a fixed member provided with an annular flange, spaced notches of different sizes provided in the periphery of said flange, jaws pivoted to said flange and having complementary notches therein for coaction with the corresponding notches in said flange when said jaws are in closed position, a pivoted arm movable about said annular flange, a clamping screw carried by said arm for bearing engagement with any selected jaw to secure the same in closed position, a carrier rotatably mounted upon said fixed member above said openings, beveled seats provided at the top of the walls of the notches in said member and said jaws, a carrier rotatably supported by said member, and a flaring tool mounted in said carrier including a screw, a pivoted head on one end of said screw, and a manipulating element on the opposite end of said screw.

3. In a tool of the class described, a fixed member provided with an annular flange, spaced notches of different sizes provided in the periphery of said flange, jaws pivoted to said flange and having complementary notches therein for coaction with the corresponding notches in said flange when said jaws are in closed position, a pivoted arm movable about said annular flange, a clamping screw carried by said arm for bearing engagement with any selected jaw to secure the same in closed position, a carrier rotatably mounted upon said fixed member above said openings, a plunger slidably mounted in said carrier, a reaming tool mounted on one end of said plunger, a manipulating head on the opposite end of said plunger, and a coil spring encircling said plunger and interposed between said head and said carrier.

4. A tool of the character described comprising a bracket, clamping means at one end of said bracket for securing the same to a support, the opposite end of said bracket having a square opening therein, a body member having a bore extending therethrough, a square extension at one end of said member fitting in said square recess, a bolt extending through said bore, a nut threaded to the free end of said bolt, said member having various size pipe receiving openings therein arranged about the axis of said member, clamping means for securing pipe in said openings, a carrier rotatably supported upon said member above said openings, and a tool mounted in said carrier for vertical movement and disposed at the same radial distance from the axis of said bolt as said openings.

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