Dec. 31, 1940. A. C. DOBRICK 2,226,852

FLARING TOOL

Filed Sept. 12, 1938

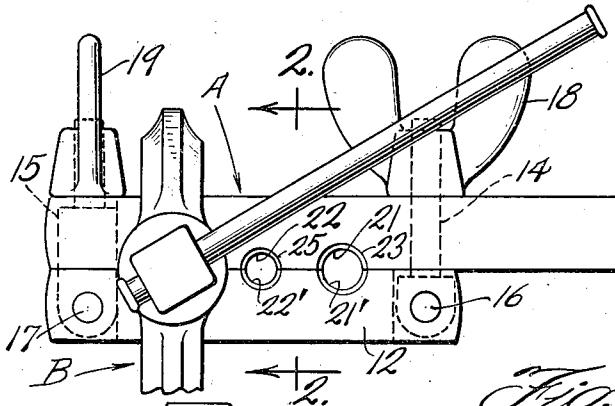

Fig. 1.

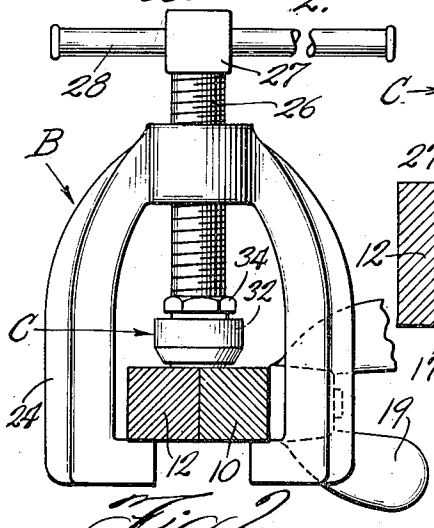

Fig. 2.

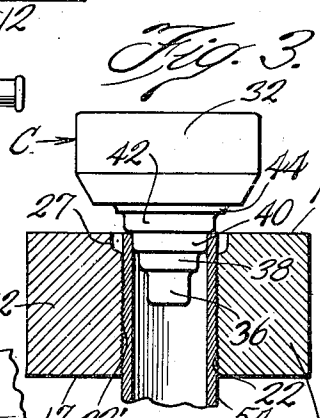

Fig. 3.

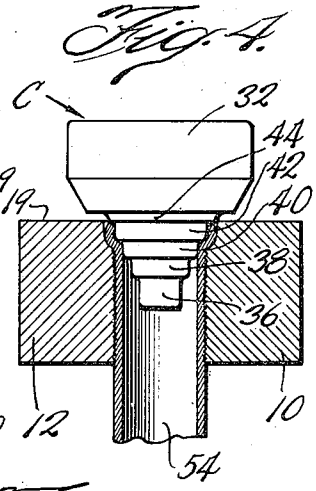

Fig. 4.

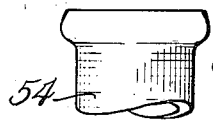

Fig. 9.

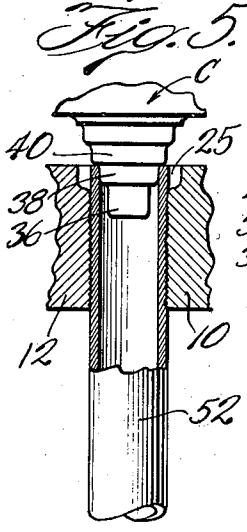

Fig. 5.

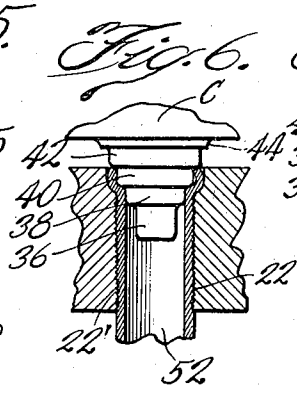

Fig. 6.

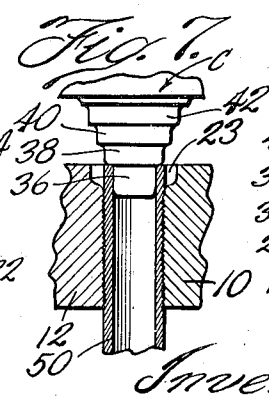

Fig. 7.

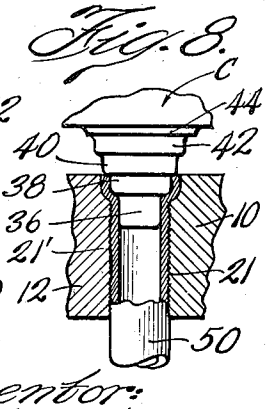

Fig. 8.

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FLARING TOOL

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Application September 12, 1938, Serial No. 229,566

3 Claims. (Cl. 153—79)

My invention relates to flaring tools and particularly those of a sort used with ductile tubing in order to flare the end of the tube outward into the form of a bead.

Among the objects of my invention is the provision of a new and improved flaring tool which can be used to form beads at the ends of tubing of different sizes.

Another object is the provision of a new and improved flaring tool which is adapted to form beads on tubing of different sizes which in each instance retain the same general width and thickness.

Still another object is the provision of a new and improved flaring tool for forming beads at the end of tubing of different sizes which includes a clamping device provided with suitable means for clamping tubing of a variety of sizes and a single so-called anvil or flaring head provided with a plurality of elements at the working end adapted to set up beads on the ends of tubing of different sizes, said flaring elements being so arranged that certain of said elements used in the operation of flaring a smaller tube may be used in a slightly different progression for flaring larger tubes in order that only one anvil may be necessary regardless of the diameter of the tube upon which the flare is to be made.

A further object is the provision of a flaring tool which is capable of setting up rounded beads at the ends of tubing of different sizes which has a flaring head or anvil made up of a succession of cylindrical elements so arranged that each three successive elements are utilized in the production of a flare or bead at the end of a piece of tubing, each performing a separate function, and with a further arrangement such that succeeding elements of progressively greater diameter may be used with some of the elements of smaller diameter in order that when flaring tubes of different sizes certain of the elements may do double duty.

A still further object is the provision of a new and improved flaring tool for forming a rounded bead at the end of a piece of tubing which comprises clamping bars or blocks used together with an anvil or flaring head supported by a frame constructed in such a manner that a succession of flaring elements thereon are operable simultaneously to form a bead at the end of a length of tubing, the adjacent elements being joined by a short fillet so as to produce rounded corners at the inside of the bead and also so that by means of a longitudinal displacement produced by the fillet at the exposed inside corner of a tube the bead may be bowed outwards to give it a rounded outside contour.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawing, in which.

Figure 1 is a top plan view of my device assembled and ready for operation.

Figure 2 is a side view of my device taken partly in section on the line 2—2 of Figure 1.

Figures 3 to 9 are enlarged end sectional views of steps in the operation;

Figure 3 showing a fragmentary view of my device with a tube and the anvil in the relative positions they would occupy before making a bead on the largest size tubing;

Figure 4 showing the completed operation for making a bead on the largest size tubing;

Figures 5 and 6 showing the first and last steps in the process of forming a bead on an intermediate size tubing;

Figures 7 and 8 showing the initial and final steps of forming a bead on the smallest size tubing; and

Figure 9 showing the end of a tube with a bead produced on it.

Flaring tools have been used in the art before, but their use has been largely confined to the formation of flares at the ends of tubing by means of which the end thereof has been bent outward at a predetermined angle. There has been little attempt during the many years that flaring tools have been in use to provide a flaring tool which is capable of forming flares of a uniform width and thickness upon tubing of different sizes.

The application herein disclosed contemplates the formation of flares which are herein termed beads having substantially a rounded outer surface and being of the same width and thickness for each size tubing regardless of whether the diameter of the tubing may be large or small.

In general, my device operates by first clamping a tube of the chosen diameter in between a pair of clamping bars and then by use of a frame and a flaring head or anvil threadedly extendable into said frame, force the end of the clamped tube outward into a flared or beaded shape.

In the embodiment of my invention herein disclosed I have shown a clamping device A

with a frame B mounted thereon provided with a flaring piece or anvil C extendable into the frame against a length of tube which may be secured in the clamping device.

The clamping device as shown by Figure 1 is comprised of a clamping bar 10 adapted to be secured to a clamping bar 12 by means of a pair of bolts 14 and 15 pivoted respectively at points 16 and 17 in the clamping bar 12. Bolts 14 and 15 are provided respectively with wing nuts 18 and 19 by means of which the clamping bar 10 is secured against the clamping bar 12. Each of the bars is provided with a series of circular recesses 21, 22 and 23 in the bar 10 cooperable with recesses 21', 22' and 23' in the bar 12 forming thereby tube holding means extending from the bottom surface 17 to the top surface 19 of the clamping device. At the upper ends of the recesses there are provided bead forming enlargements 23, 25 and 27 respectively.

The frame B is in its turn made up of a somewhat U-shaped member 24 well ribbed for purposes of rigidity and having mounted therein a screw threaded rod 26 provided with a head 27 through which is inserted a cross piece 28. At the lower end of the screw threaded rod there is provided an anvil 32 swivelly mounted and connected to the rod by means of a threaded nut 34. The anvil as best seen in Figures 3 to 8 is comprised of a pilot projection or element 36 which is adapted to enter the end of tubing 50 of the smallest size, clamped in the recesses 21, 21' rather snugly so that the pilot projection may hold the wall in place during the flaring operation.

Adjacent the pilot element is a spreader element or shoulder 38, having a rounded fillet or corner between itself and the pilot 36, which is adapted when the anvil is forced downward to spread the ends of a tube outward into the bead forming enlargement 23. A set up element 40 is likewise provided whose lower edge bears endwise upon the edge of the tube clamped therein and particularly by means of the fillet on the inside edge so that as the anvil is forced against the small tube, for example, the inner edge may be displaced a slightly greater amount than the outer edge and thereby bulge the tube into the form of a bead. These parts are best seen in Figure 8.

For the next larger size tube 52 the recesses 22, 21' are used, to hold the tube in place with the top or exposed end thereof projecting substantially even with or only slightly above the upper surface 19 of the clamping member A. In this case, however, the tube is larger in diameter and therefore the pilot 36 is inoperative. In its place the spreading element 38 acts as a pilot to fit into the end of the tube during the flaring operation so that the straight walled portion of the tube may not collapse.

Succeeding the element 38, now operative as a pilot, is the element 40 which in this case serves rather the function of a spreader element only for the intermediate size tubing. Immediately above the presently designated spreader element 40 is another element 42 which is adapted now to the purpose of a set up element for tubing of the intermediate size but which for the next larger size tubing would act as a spreader.

In still another case when tubing 54 of the largest diameter for which the tool is built is desired to be beaded the tube is clamped in recesses 23, 23' of a corresponding size and there the anvil may again be pressed down against it to bring it to its proper shape. In an instance of this sort neither the original pilot 36 nor the succeeding element 38 can be used. The element 40 which was before used as a spreading element is in this instance utilized as a pilot element to keep the walls of the tube from collapsing during a flaring operation.

The succeeding and still larger element 42, which was used as a set up element in connection with an intermediate tube shown in Figures 5 and 6, is now in Figures 3 and 4 used as a spreader element, as best illustrated in Figure 4. For this operation upon the largest size tube for which the tool chances to be designed there is additionally provided a set up element 44 which has rounded or fillet connection with the element 42 in order that when the anvil 32 is pressed downwardly against the tube the fillet between the elements 44 and 42 will bear against the inside edge of the flared end of the tubing thereby tending to bow the flared portion outward into the form of a round surfaced hollow bead of the general sort shown in Figure 9.

In operation the length of tubing of a selected diameter which may fit the clamping member is selected and clamped tightly between the clamping bars 10 and 12 with the cut end of the tubing made approximately flush with the upper surface 19 of the clamping device. Then the frame B is placed over the aperture and the anvil C screwed downwardly so that the pilot 36 enters and establishes a minimum width for the end of the tubing. Next, the spreading element 38 spreads the tubing outward into the enlarged upper portion 23 of the recess. Then as pressure is continued to be exerted through rotation of the cross piece 28 and the threaded rod 26 forces the set up element 40 against the cut end of the tubing, displacing it slightly in a longitudinal direction, thereby compacting it into the enlarged portion of the recess for determining a bead of prechosen size which varies at most only a slight amount therefrom.

It will be apparent from Figures 3 through 8 that the same anvil can be used with any of the several sizes of tubing for which the tool is designed and that certain of the flare or bead producing elements used for a tubing of one size will be used in a slightly different manner for the production of a bead upon tubing of a different size. There has therefore been produced a compact combination tool capable of producing beads of uniform size upon tubes of widely varying diameters.

I claim as my invention:

1. In a flaring tool for setting up beads on the ends of tubing of different sizes including clamping members having tube holding recesses for the different size tubes, annular enlargements at the ends of the recesses corresponding to the size of the next larger size tube and a frame cooperable therewith, the combination of an anvil operable with all said sizes of tubing having tube engaging elements of progressively increasing diameters for each size including a pilot element for fitting into the end of the tubing to hold it to size during the operation, a spreader element for spreading the end of the tubing laterally into the recess to form the bead and a set-up element for displacing the tubing longitudinally in order to compact said tubing into the recess, the spreader and set-up elements for tubing of one size being respectively the pilot and spreader elements for tubing of the next larger size.

2. A flaring tool for setting up rounded beads

on tubing of different diameters comprising clamping members having recesses therein of different sizes to fit tubes of corresponding size and annular enlargements at the ends of said recesses substantially equal in diameter to the outside diameter of the next larger size tube, a frame cooperable with said members, and an anvil mounted on the frame extendible to and away from said members at any one of said recesses comprising a generally tapered end having for each size tube a substantially cylindrical pilot projection adapted to fill the inside of the tube, a substantially cylindrical spreader shoulder next adjacent for spreading the end of the tube into said enlargement and adapted to serve as a pilot projection for the next larger size tubing, a substantially cylindrical set-up shoulder adjacent the spreader shoulder for displacing the spread end of the tube longitudinally so that the tube end snugly fills the enlargement, said set-up shoulder being adapted to serve as a spreader shoulder for the next larger size tubing.

3. A flaring tool for setting up rounded beads of uniform width and thickness on tubing of different diameters comprising clamping members having recesses therein of different sizes to fit tubes of corresponding sizes, and annular enlargements, one at the end of each of said recesses, having uniform depths measured lengthwise with respect to the recesses and of diameter substantially equal to the outside diameter of the next larger size tube, a frame cooperable with said members, and an anvil mounted on the frame extendable to and away from said members at any one of said recesses including a generally tapered end having a substantially cylindrical pilot projection adapted to fill the inside of the smallest tube, a spreader shoulder next adjacent having a rounded connection between itself and the pilot projection for spreading the end of the tube into said annular enlargement and adapted to serve as a pilot projection for the next larger size tubing, a set-up shoulder adjacent the spreader shoulder having a rounded connection between itself and the spreader shoulder for displacing the spread end of the tube longitudinally so that the tube end snugly fills the enlargement and for rounding out said bead by exerting a longitudinal displacement by the rounded connection at the inner surface of the wall thereof prior to a displacement at the outer surface of said wall, said set-up shoulder being adapted to serve as a spreader shoulder for the next larger size tubing, and a succeeding shoulder operable as a set-up shoulder for said next larger size tube and adapted to serve as a spreader shoulder for a still larger size tubing.

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