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2,723,703

PIVOTED FLARING TOOL WITH TUBE GRIPPING MEANS

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2 Sheets-Sheet 1

FIG. 1

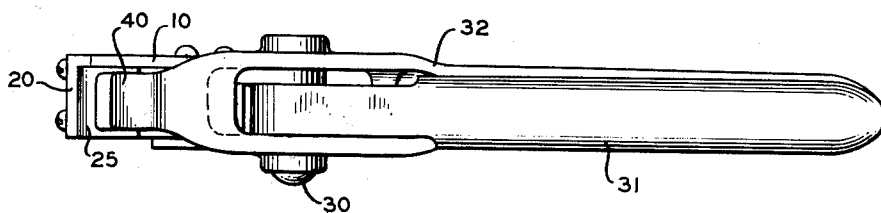


FIG. 2

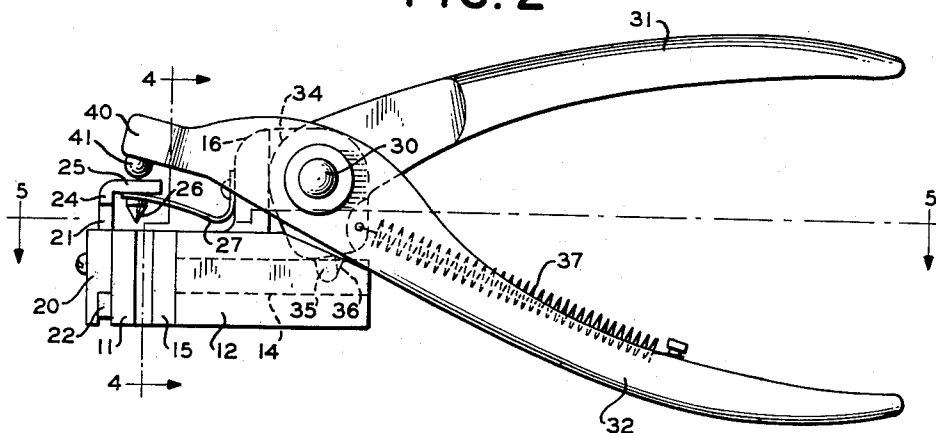


FIG. 3

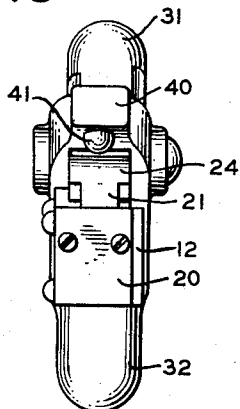
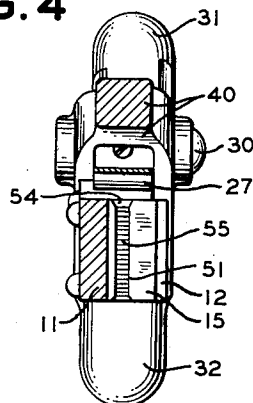


FIG. 4



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FIG. 5

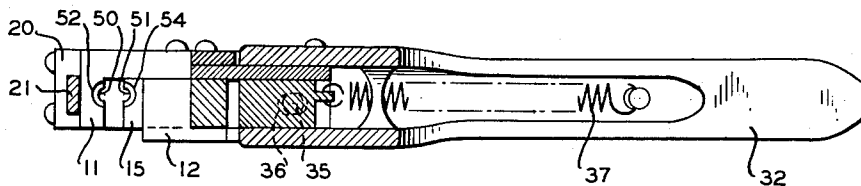


FIG. 6

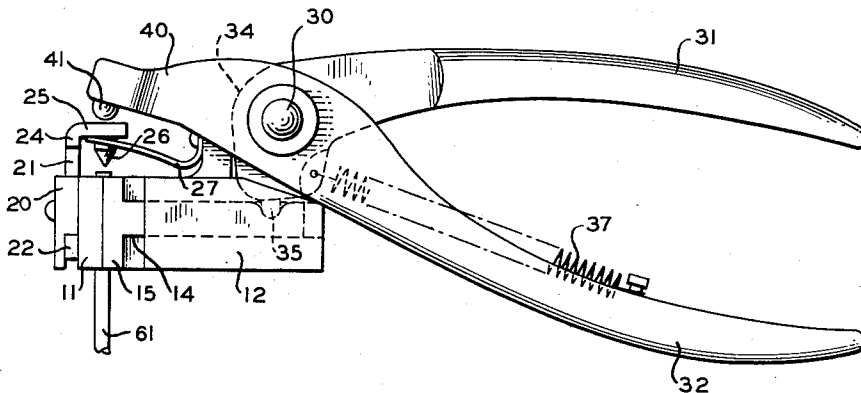


FIG. 7

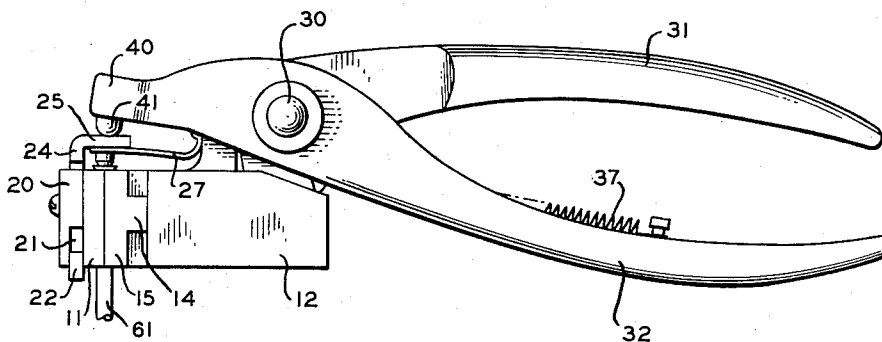
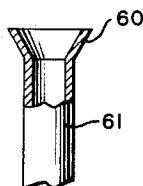


FIG. 8



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PIVOTED FLARING TOOL WITH TUBE GRIPPING MEANS

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Application August 12, 1952, Serial No. 303,938

2 Claims. (Cl. 153-79)

This invention relates to flaring tools and more particularly to tools for imparting a flare or flange to the end of relatively soft metal tubing.

The object of the invention is to provide a tool for accomplishing the foregoing purposes which includes means for holding a tube against movement, together with means for imparting a flare to the end of the tube.

Another object is to provide a tool made up of a vise frame having a fixed jaw and a movable jaw slidably mounted thereon, together with a pointed mandrel-like member movable to engage the end of the tube held by the vise and to spread the same into a flange or flare.

Another object of the invention is to provide a tool as before described in which two handle members operate the tool to provide sequential gripping of the tube and flaring of the end thereof.

A further object of the invention is to provide a tool as before described in which sequential movement of the various parts is obtained by properly biased springs associated with the mechanism.

Other features, objects and advantages of the invention will be readily understood by reference to the following detailed description of the accompanying drawings, wherein—

Fig. 1 is a plan view of a hand operated tool embodying the invention;

Fig. 2 is a side view thereof;

Fig. 3 is an end view of the device;

Fig. 4 is a section taken substantially on the line 4—4 of Fig. 2;

Fig. 5 is a section taken substantially on the line 5—5 of Fig. 2;

Fig. 6 is a view similar to Fig. 2 showing a length of tubing held in the vise of the tool;

Fig. 7 is a similar view showing the flaring mandrel engaging the tube; and

Fig. 8 is a view partially in vertical section of the tubing after being processed by the tool of this invention.

Referring to the drawings, 10 indicates a frame of a vise made of suitable metal and principally of generally flat construction with a right angular integral fixed jaw 11. Secured to one surface of the frame 10 is a slideway 12 hollowed out to receive the slide 14, to one end of which is secured a jaw 15 complementary to the jaw 11. The slideway 12 has a lateral ear 16, the purpose of which will be described later. Secured to the outer edge of jaw 11 is a second slideway 20 which holds captive a substantially I-shaped slide 21, the ears 22 and 24 of which limit sliding movement of the slide. The end of the slide adjacent the ears 24 is bent at right angles to form a support 25 to which is secured a tapered, pointed plunger or mandrel 26. A leaf spring 27 has one end thereof secured to the lateral ear 16 while the other end thereof is forked to surround the mandrel 26. This spring is so biased that in normal condition slide 21 is forced away from the vise jaws 11 and 15.

A lateral extension of the vise frame 10 is provided with a through opening for the reception of a pin 30 about

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which are pivoted two handle members 31 and 32. Handle member 31 terminates in a rounded top end 34 with a lateral protrusion from which extends a stud 35 fitting in a properly shaped recess 36 in the slide 14. A spring 37 has one end secured to a part of the handle 31 while the other end is secured to a part of the handle 32 as shown clearly in Fig. 2.

The handle 32 has an extension 40 from one side of which extends a stud 41 normally bearing against or in close proximity to angle extension 25 of slide 21.

The jaws 11 and 15 are provided with longitudinal semi-circular recesses 50 and 51 respectively, the outer ends of which are flared outwardly as indicated by the boundary lines 52 and 54 respectively of Fig. 5. The surfaces of these semi-circular recesses 50 and 51 are lightly serrated as indicated at 55 in Fig. 4. The spring 37 is biased to be weaker than spring 27 so that any movement of the handles toward each other will cause rotation of handle member 31 relative to vise frame 10 before rotation of handle member 32.

When it is desired to impart a flare such as indicated at 60 to a length of tubing 61, such length of tubing is introduced into the vise to fit in the semi-circular recess 50 of the fixed jaw 11 with one end of the tubing extending a short distance beyond the end of the jaw as shown in Fig. 6. If the operator then manually compresses the handles 31 and 32 toward each other, the first movement as the result of manual compression rotates handle 31 about the fulcrum pin 30 thereby causing slide 14 to be moved to force vise jaw 15 into substantial contact with vise jaw 11, or at least into such relation to this jaw as to cause the tube 61 to be gripped by the serrations 65 in the tube jaw recesses. This condition is shown clearly in Fig. 6. Further compression of these handles toward each other will cause movement of handle member 32 about the fulcrum pin forcing the extension 40 thereof toward the vise and causing the stud 41 to move the slide 21 toward the vise jaws with the result that as this compression of the handles continues the pointed mandrel or flarer 26 engages the end of the tube gripped in the vise and expands this end outwardly into the shape shown in Fig. 8. Release of manual compression of the handles restores the parts to the Fig. 2 position at which time the length of tubing can be removed with its end flared for engagement with suitable fittings as is well known in the tube art.

While the present tool has been described as being a manually operable tool, it will be readily apparent that the same mechanism can be embodied in a power operated mechanism so long as the sequential steps described herein are accomplished.

The invention is to be limited only by the scope of the following claims.

What is claimed is:

1. A tool of the type described, comprising a vise frame having a fixed jaw, a movable jaw slidably secured to said frame, a flaring mandrel slidably secured to said fixed jaw for rectilinear motion relative thereto, the confronting faces of said jaws being shaped to hold a tube therebetween, a pin carried by said vise frame, first and second handle members pivotally carried by said pin, one end of each of said handle members being arranged to be placed operatively in contact with a respective one of said flaring mandrel and said movable jaw upon pivoting of the other ends of said handle members toward each other thereby to cause said movable jaw and said fixed jaw to grip a tube and to cause movement of the mandrel into the end of the tube so gripped, and means to cause the motion of the movable jaw to occur before the motion of the mandrel, said last mentioned means comprising a first spring arranged to oppose said motion of the mandrel and a second spring biased to be weaker than said first spring

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and arranged to oppose said motion of the movable jaw.

2. A flaring tool for sequentially gripping a tube adjacent one end thereof and for flaring the gripped end of the tube, comprising a vise frame having a fixed jaw, a movable jaw slidably secured to said frame, a flaring mandrel slidably secured to said fixed jaw for rectilinear motion relative thereto, the confronting faces of said jaws being shaped to hold the tube therebetween, a pin carried by said vise frame, first and second handle members pivotally carried by said pin, one end of each of said handle members being arranged to be placed operatively in contact with a respective one of said flaring mandrel and said movable jaw upon pivoting of the other ends of said handle members toward each other thereby to cause said movable jaw and said fixed jaw to grip the tube and to cause movement of the mandrel into the end of the tube so gripped, a first spring member intercoupling said mandrel and said vise frame and arranged to oppose said

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motion of the mandrel, and a second spring member intercoupling said handle members and arranged to oppose pivoting of said other ends of said handle members toward each other, said second spring member being biased so as to be weaker than said first spring member whereby said motion of said movable jaw into engagement with the tube occurs before said motion of said mandrel into the end of the tube.

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