Aug. 15, 1939. L. C. CATTOI 2,169,790

TUBE FLARING TOOL

Filed Feb. 21, 1938

Fig. 1.

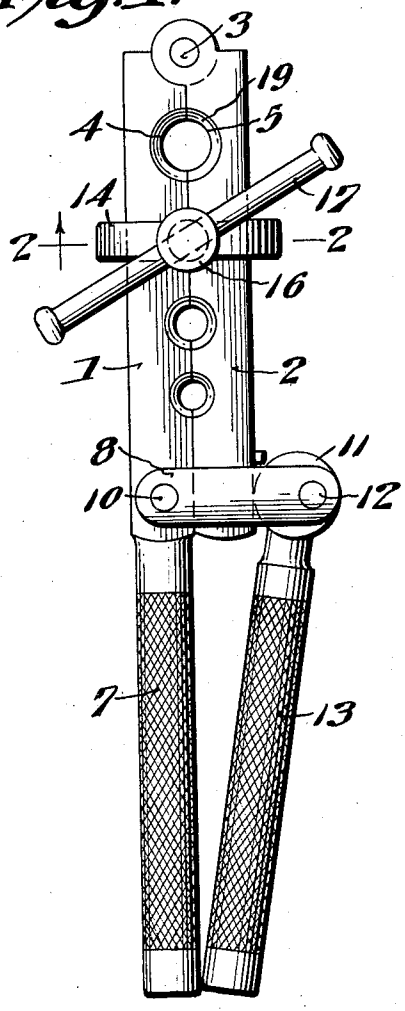


Fig. 3.

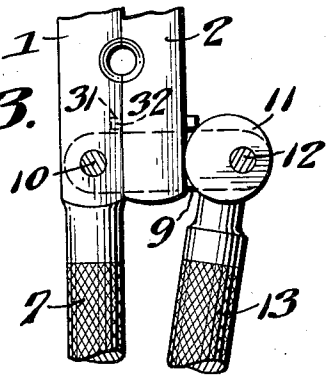


Fig. 4.

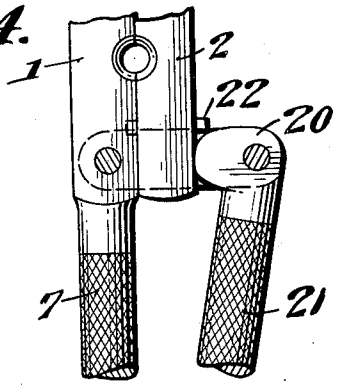


Fig. 5.

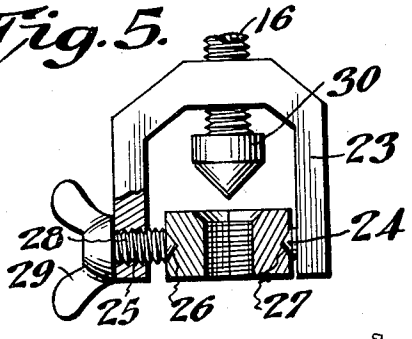
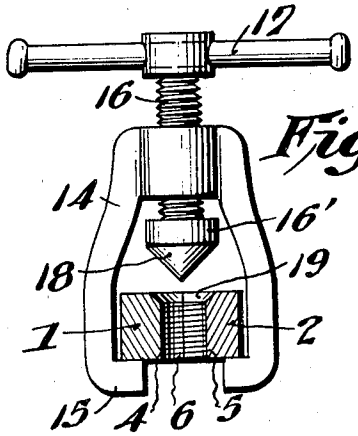


Fig. 2.



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TUBE FLARING TOOL

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Application February 21, 1938, Serial No. 191,801

3 Claims. (Cl. 153—79)

My present invention relates to improvements in tube flaring tools and has to do primarily with a tool for flaring or widening the ends of expansible metal, or other tubing or pipe, preparatory to making connection thereof with fittings or couplings or other parts.

A principal object of this invention is to provide, with clamping jaws by which the tube or pipe will be held, means by which the jaws are conveniently closed and are locked, which means serves also as a handle or support by which the tool can be grasped and held and manipulated, while in use.

A further object is to provide a tube flaring tool of this character which is of simple and inexpensive construction, and which has the parts thereof so constructed and assembled that there is little likelihood of breakage or damage or consequential wear, while the tool is in use.

With the above and other objects in view, which will be apparent to those skilled in the art, and some of which are inherent in and resultant from the construction and association and use of the parts, my present invention includes and embraces certain novel features of construction and certain combinations and arrangements of parts and elements, which will be hereinafter set forth in connection with the drawing and then pointed out in the claims.

In the drawing:

Figure 1 is a view in side elevation of a tube flaring tool constructed in accordance with my present invention, and with the parts adjusted and set as they will be in tube clamping and flaring use.

Fig. 2 is a transverse sectional view through the jaw members, substantially on line 2—2 of Figure 1.

Fig. 3 is a fragmentary view in elevation, and with parts broken away, to better show the jaw clamping and locking means.

Fig. 4 is a view similar to Fig. 3 illustrating a modified construction.

Fig. 5 is a fragmentary sectional view similar to Fig. 2 disclosing another modification of the construction.

The jaw members 1 and 2 are pivotally or hingedly connected together, as at 3, and these jaw members are thus associated to be swung to edge abutting positions in substantially parallel relation, and to be opening outwardly or angularly around the center of pivot or hinge mounting, at 3.

On their adjacent or abutting faces, the jaw members are provided with grooved recesses 4 and 5, which recesses register and mate, when the jaw members are brought together, to form tube or pipe end receiving and clamping openings. As shown in Fig. 2, it is perhaps preferable that the grooves or recesses 4 and 5 be scored or otherwise roughened, as indicated at 6, to thus offer and afford a better grip upon a pipe or tube.

The jaw member 1 has a handle 7 extending from the swinging end thereof, substantially in longitudinal alignment, and this handle portion 7 can be made of any desired shape or form, and can be knurled or otherwise surfaced to afford a better grip, so that when the handle is grasped the tool is readily supported and moved and manipulated, as may be desired.

A pair of links 8 and 9 are pivotally and swingably mounted on opposite sides of the jaw member 1, adjacent to the outer or swinging end of this jaw, through the medium of a pivot pin 10, or other suitable hinge or pivot means. Through this mounting the links are positioned to receive the swinging end of the jaw member 2 and to lie on opposite sides of this jaw member to hold the jaw members 1 and 2 in substantially the same plane. A clamping cam 11, which in Figs. 1 and 3 is illustrated as being substantially of disc-like form, is fitted between the swinging ends of the links 8 and 9, and is eccentrically held and mounted therebetween for oscillatory movement, by a pivot or hinge pin 12, or by other suitable means. This clamping cam 11 is made of such size, and is so mounted on the pin 12, that when rocked to one position the cam is out of contact with the free end of the jaw member 2, thus permitting the link members 8 and 9 to be swung downwardly, or toward the handle 7, sufficiently that the cam member 11 clears the end of the jaw member 2 and thus permits opening of the jaw members. When the cam 11 is rocked or moved in the opposite direction, with the links 8 and 9 swung up to embrace the end of the closed jaw 2, this cam 11 will bear and clamp against the outer edge of the jaw member 2, in consequence of which the jaw members will be clamped and held together, in pipe or tube end clamping relation. A handle 13 is connected to or attached or associated with the cam 11 to extend substantially radially therefrom, and is so positioned that when the cam 11 is in the clamping relation the handle 13 will be swung to and will lie in proximity to the handle 7, the handle 13 in this position being presented to be readily grasped and held in one hand with the handle 7, so that the two handles 7 and 13 are retained against separation, while giving a widened and more or less hand fitting grip

portion or handle by which the tool can be held and can be moved and manipulated. As stated with the handle 7, this handle 13 can be shaped and surfaced in any manner desired.

Flaring means, as best shown in Fig. 2, comprises a substantially U-shaped yoke 14 which has the arms thereof sufficiently spaced to slidably receive the closed jaw members 1 and 2 and provided with inturned hook or flange portions 15 to catch or bear against the side faces of the jaw members to retain the yoke member 14 against pulling away therefrom. A flaring screw 16 is turned through a screw threaded opening in the head of the yoke member 14, and at its inner end is provided with a flaring head 16', which flaring head is thus disposed substantially axially in line with the abutting edge faces of the jaw members 1 and 2. A handle or hand grip portion 17 is provided on the outer end of the flaring screw 16, whereby the flaring screw can be turned to carry the flaring head toward and away from the end of a pipe or tube held in one of the pipe clamping openings formed by the recesses 4 and 5. As illustrated, the flaring head 16' has the flaring end thereof tapered, as at 18, and the jaw members 1 and 2 are countersunk or cut away, as at 19, around the recesses 4 and 5 to thus permit shaping of the flared end of the tube or pipe. Obviously, where it is desired to flare or flange a tube end to a particular shape or form, other than the exact flare as suggested by the present illustration, the countersink at 19 and the operative face 18 of the flaring head 16', can be appropriately shaped or formed.

In Fig. 4 I have illustrated a modified embodiment, in which the jaw clamping or locking cam 20 is of somewhat different shape and form, and with this construction the use and operation of the parts will be substantially the same as is set forth above, the modified construction perhaps offering some advantages in more rapid clamping and releasing of the jaws. The handle 21 by which this cam 20 is operated, and in fact the handle 13, can be positioned and associated with the cam in such manner that when the cam is brought to a proper clamping and locking position the handle will abut with and further swinging movement thereof will be restrained by the handle 7 or, if desired, a pin or stop 22 can be provided for the cam. It is perhaps desirable that, in either instance, the cam be swung to carry the greatest width thereof substantially beyond a dead center between the pivot centers at 10 and 12, as in this way the cam portions will be held or retained against casual release or forced return or release.

While the form of flaring means illustrated in Fig. 2 can be readily moved along and can be manually centered with respect to the tube or pipe end to be operated upon, it may be found desirable to provide for positive location and centering of the flaring means, and this function and purpose can be accomplished through the modified construction of parts as illustrated in Fig. 5. Here the substantially U-shaped member 23 has a substantially conical or tapered pin 24 extending inwardly from one arm thereof, with a screw threaded opening 25 substantially axially aligned through the remaining arm. The jaw members are provided with countersunk or tapered recesses 26 and 27, on their outer edge faces, substantially aligned with axial lines taken through the tube or pipe clamping openings, and a clamp screw 28 is turned into the screw threaded opening 25 to enter into the recess 26, while the pin 24 enters into recess 27. A wing head 29, or other suitable manual manipulating means, is provided upon the clamp screw 28. With this construction and arrangement of the parts, the yoke 23 is readily and quickly positioned and is clamped or held in a desired relation so that the flaring head 30 is axially centered and aligned with respect to the particular clamping opening in which the pipe or tube end is held.

As illustrated in Figs. 3 and 4, one jaw member can be provided with a recess 31 in its abutting face, while the other jaw has a stud or lug 32 correspondingly placed to fit into the recess when the jaws are brought together, thus positively holding the jaws against shifting in any direction in the plane of the abutting faces. Obviously, the pin 32 might be the opposite end of the pin 22.

While I have herein shown and described only certain specific embodiments and have suggested only certain possible variations and modifications of my invention, it will be appreciated and realized that many changes can be made in the form and the construction and the arrangement and the association of parts, and in the configuration of the tube of pipe clamping openings and in the flaring head, and in the other parts and features, without departing from the spirit and scope of my invention.

I claim:

1. A tube flaring tool comprising, a pair of jaw members pivotally connected together and having grooved recesses registering when the jaws are brought together thus forming tube end receiving and clamping openings, a handle extension at the swinging end of one jaw member, link means swingably mounted on said jaw member adjacent to the handle extension, clamp means at the swinging end of said link means for clamping the free ends of the jaws, a clamp operating handle movable to operative relation juxtapositioned to said handle extension and available with said extension as a hand grip portion for handling and manipulation of the tool, and tube flaring means on said jaw members.

2. A tube flaring tool comprising, a pair of jaw members pivotally connected together for swinging adjustment to juxtapositioned substantially parallel relation and to opened and spread relation, said jaw members having grooved recesses in side faces thereof registering as tube end receiving and clamping openings when the jaws are brought into juxtapositioned relation, a handle extension at the swinging end of one jaw member, a link pivotally mounted on one side of the jaw member adjacent to the handle extension and swingable to lie across the swinging end of the other jaw member, a clamping cam carried at the swinging end of said link, and tube flaring means carried on and movable along the length of said jaw members when closed to thus center the flaring means for use upon a tube end held in any tube clamping opening.

3. A tube flaring tool comprising, a pair of jaw members pivotally connected together for swinging adjustment to juxtapositioned substantially parallel relation and to opened and spread relation, said jaw members having grooved recesses in side faces thereof registering as tube end receiving and clamping openings when the jaws are brought into juxtapositioned relation, a handle extension at the swinging end of one jaw member, a link pivotally mounted on one side of the jaw member adjacent to the handle exten-

sion and swingable to lie across the swinging end of the other jaw member, tube flaring means carried by and movable along the length of the closed jaw members thus allowing positioning for flaring operation on a tube end clamped in any tube receiving opening of said jaws, a clamping cam carried by the swinging end of the link, and a clamping handle extending from said clamping cam swingable to a position adjacent to the handle extension to thus cooperate with the handle extension to form a considerable hand grip portion and to at the same time leave the sides of the clamping jaws free of obstruction.

LOUIS C. CATTOI.