

Nov. 24, 1942.

F. NEUKIRCH

2,302,794

LEVER TYPE FLARING TOOL

Filed March 10, 1941

3 Sheets-Sheet 1

Fig. 1.

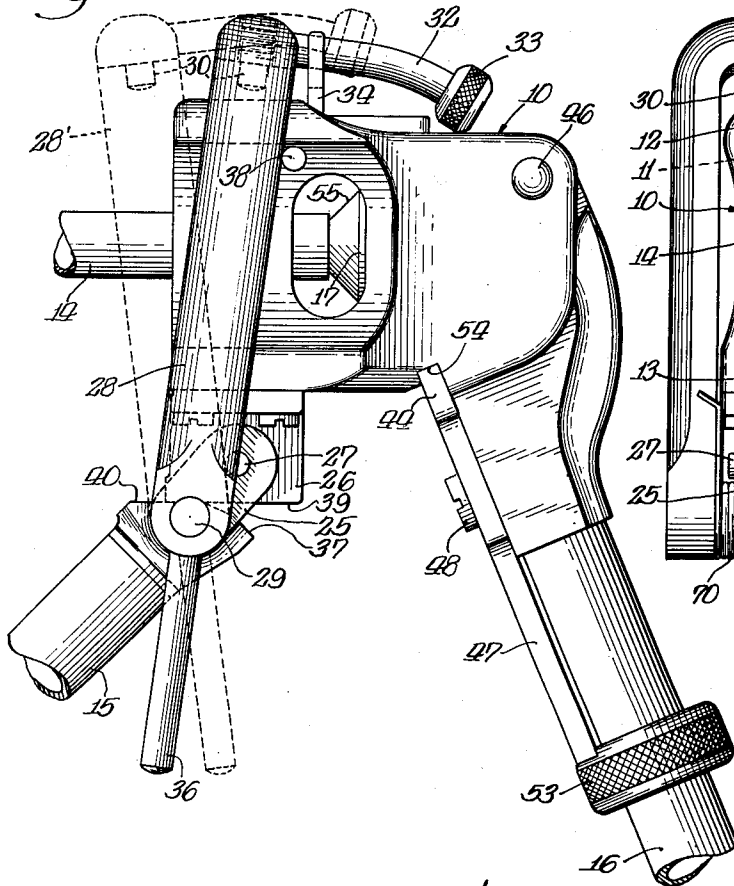


Fig. 2.

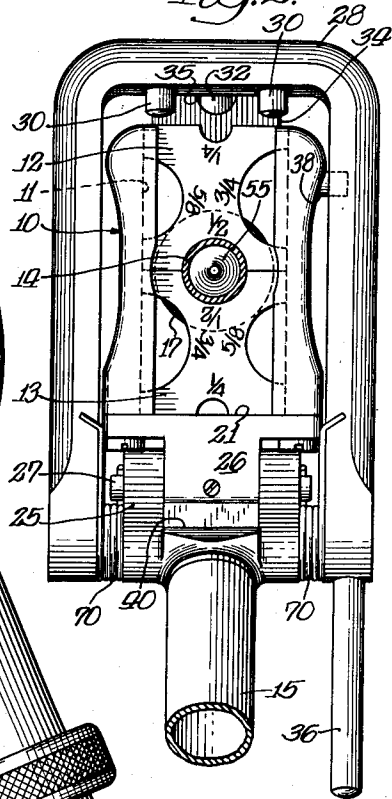
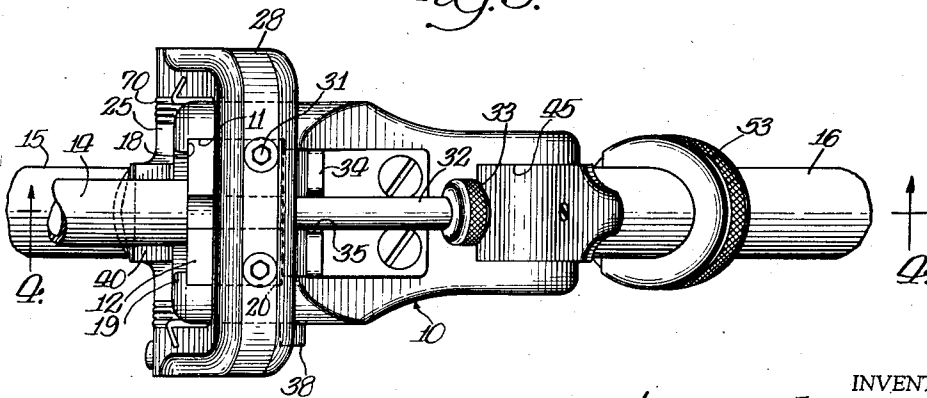


Fig. 3.



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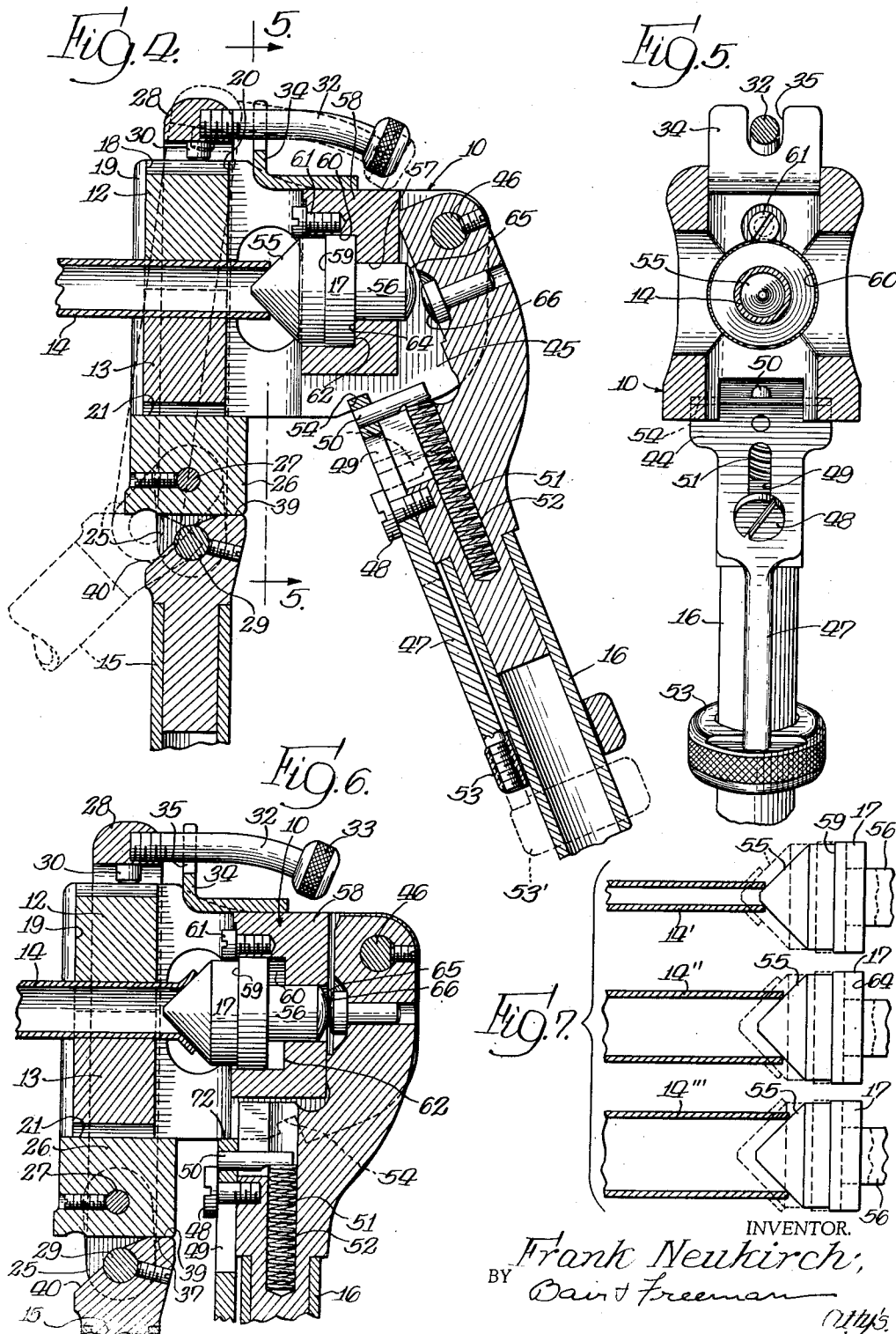
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3 Sheets-Sheet 2



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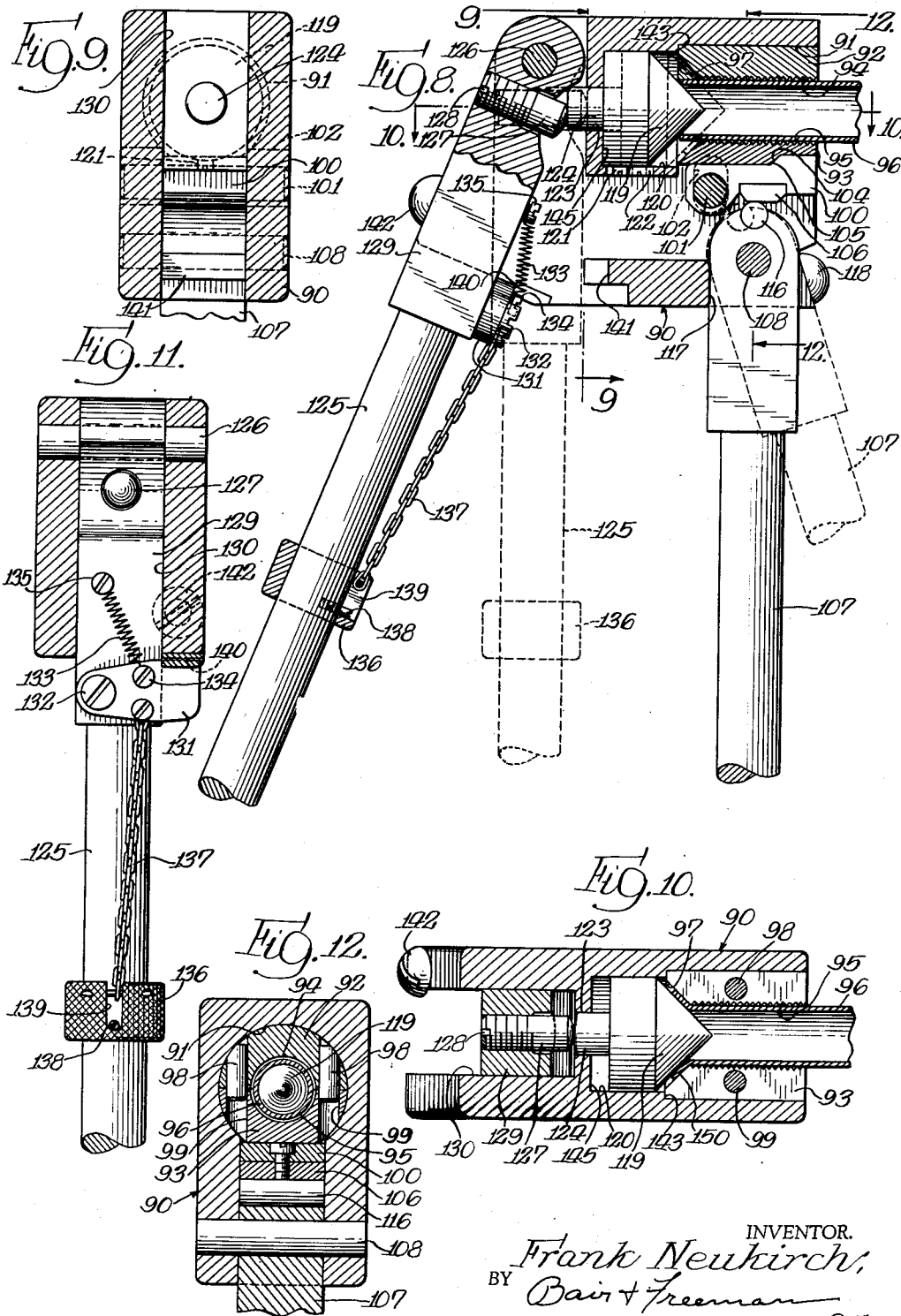
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LEVER TYPE FLARING TOOL

Filed March 10, 1941

3 Sheets-Sheet 3



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2,302,794

LEVER TYPE FLARING TOOL

Frank Neukirch, Chicago, Ill.

Application March 10, 1941, Serial No. 382,488

9 Claims. (Cl. 153—79)

My invention relates to tools and particularly a tool used to form a flare on relatively ductile tubing, such as copper or aluminum tubing.

Among the objects of my invention is to provide of a new and improved flaring tool which is adapted to both clamp and flare a tube in essentially one operation.

Another object of my invention is to provide of a new and improved flaring tool which utilizes the principle of lever action in order to clamp the tube in the tool and likewise produce a flare on the end of the tube so clamped.

Still another object of my invention is to provide a new and improved flaring tool which can be used with various sizes of tubing consisting of a body adapted to receive tube clamping jaws for a variety of sizes of tubing which are secured in place by movement of an adjustable lever and which is provided further with a flaring die urged in a straight line axially with respect to the tubing by movement of a second lever which is locked to the body during the initial clamping operation and then unlocked in order to complete the flaring operation.

Also included among the objects is to provide a flaring tool wherein parts of the body are normally latched together and may be separated in order to open up a space large enough to permit passage of a flared piece of tubing between the jaws.

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 drawings, in which:

Figure 1 is a side view of one form of my device with a tube in position ready for flaring;

Figure 2 is a bottom view of the device shown in Figure 1;

Figure 3 is an end view of the form shown in Figure 1;

Figure 4 is a vertical sectional view taken on the line 4—4 of Figure 3;

Figure 5 is a bottom view partly in section taken on the line 5—5 of Figure 4;

Figure 6 is a fragmentary vertical section similar to Figure 4 showing the tool in position completing the flare;

Figure 7 is a diagrammatic view showing the relative positions of the flaring die for various sizes of tubing prior to performance of the flaring operation;

Figure 8 is a side view of a modified form of

my device, shown partially in section with a tube clamped in place in the body;

Figure 9 is a cross section taken on the line 9—9 of Figure 1;

Figure 10 is a longitudinal section taken on the line 10—10 of Figure 1;

Figure 11 is a bottom view of the flaring lever with the adjacent part of the body shown partially in section, and

Figure 12 is a cross section view of the device taken on the line 12—12 of Figure 8.

In the formation of flares on tubing such as the usual thin-walled copper tubing used in gas and refrigeration lines, several points must be borne in mind if flares are to be made which will eventually make up into fittings capable of long and continued use without springing leaks at the joints. Also in the preparation of tubing so that it can be used with a fitting of the proper sort, the workman is often compelled to use his tools in extremely cramped quarters. Under such conditions it is highly desirable to have a tool, which can be pushed into a corner and operated close to a wall. Then too, where mechanics are working by the hour, a tool which can make a flare quickly, is much more satisfactory than one necessitating many operations to produce a proper flare.

In the past, flaring tools have consisted almost entirely of two parts, one a block having spaced clamping means for securing the tubing in tube-holding recesses, and the other a separate and distinct yoke of some description, having a flaring die, usually a conical piece, on a shaft adapted to be threaded into tube-flaring position by a separate and distinct operation after the tubing has been originally clamped in the tool.

My invention contemplates the provision of a tool which by substantially a single operation is capable of both clamping the tool in the tube and producing a flare on the clamped end.

In an embodiment chosen to illustrate my invention, there is provided a body 10 shown in Figure 1 to which all of the parts of the tool are attached. In the body is a recess 11 rectangular in form and within the recess are positioned a pair of clamping jaws 12 and 13 respectively, which have complementary recesses in them to hold tubing 14 which may be one of several different sizes. A clamping lever 15 is attached to the body together with suitable mechanism for clamping the jaws in tube-holding relationship and a flaring lever 16 is provided for the purpose

of moving a flaring die 17 in order to spread a flare on the end of the tube.

As best seen in Figure 2, the clamping jaws 12 and 13 are provided on each of 4 sides with cylindrical hollows complementary to each other respectively, for holding tubes of each of 4 different sizes. The jaws can be withdrawn from the recess 11 and reinserted in such a position that any one of the 4 different cylindrical hollows in either jaw can be positioned at the center of the recess 11 in order to accommodate any one of the 4 sizes of tube for which the tool is built. It is also conceivable that clamping jaws of the same size, having still different sizes of cylindrical hollows, can be substituted for those shown in order to accommodate still other sizes of tubing.

At the lower or left hand end of recess 11 as viewed in Figures 4 and 6 are provided channels 18 having a leg 19 on the outside forming a lip and a leg 20 on the inside forming a shoulder, cooperable with the lip for guiding the clamping jaws into position. The jaws are inserted from the top as viewed in Figures 1 and 5, for example, and extend downwardly until the jaw 13 abuts against an end 21 of the recess.

The clamping lever 15 has a bifurcated end 25 which straddles a boss 26 on the body and is pivoted thereto by means of a pin 27. A yoke 28 is pivotally secured to the clamping lever at the base of the bifurcated portion by means of a pin 29. The yoke, as best seen in Figures 1 and 2, surrounds the lower portion of the body outside the recess 11 when in unclamped position. At the upper portion, as viewed in Figures 1 and 2, the yoke is provided with adjustable contact elements 30 threadably mounted in the end of the yoke. At the outside ends, the elements are provided with screwdriver apertures 31 in order that they may be rotated inwardly or outwardly to properly adjust the engagement of the yoke with the clamping jaws.

Likewise at the upper end of the yoke, as viewed in Figures 1 and 2, there is provided a bar 32, at the end of which is threaded a knurled nut 33. On the body is a bracket 34 in which is a cut-out portion 35 within which the bar 32 is received. At the opposite or lower end of the yoke, as viewed in Figures 1 and 2, is a push rod 36 by means of which the yoke can be tilted manually. On the body a projection 38 holds the yoke from passing beyond its proper clamped position on the body.

The flaring lever 15 is provided with a stop shoulder 37 between the bifurcated portions which in clamped position is brought against a face 39 of the boss 26. At an oblique angle to the shoulder 37 is a second shoulder 40 which in released position likewise contacts the face 39 of the stop shoulder.

When a tube is to be clamped in the tool, the clamping jaws are inserted, as shown in Figure 2. The tubing 14 is then inserted in the complementary hollows and pushed into the recess 11 within the body of the tool until it comes into contact with the flaring die 17. The yoke 28 is then pushed from the dotted position 28' shown in Figure 1 to the solid line position there shown so that the contact elements 30 are opposite the upper end of the clamping jaw 12. Then, when the clamping lever 15 is rotated in a counterclockwise direction about the pin 27, as shown by the arrow in Figure 1, the center of the pin 29 is moved from left to right. This shifting of the position of the pivot lengthens the distance between its center point and the upper edge of the clamping

bar 12 and has the effect of forcing the contact elements 30 against the adjacent side of the clamping jaw 12 tightly enough so that the tool 14 is securely anchored in place between the jaws. After the flaring operation, the clamping lever 15 is rotated in an opposite direction about the pin 27, shifting the yoke back to the solid line position of Figure 1. The yoke can then be moved freely to the dotted line position there shown, the clamping jaws separated a limited amount and the flared end of the tube withdrawn. Where it is desired to change the position of the clamping jaws to accommodate a different size of tubing, the knurled nut 33 may be unscrewed from the end of the bar 32 and the yoke 28 swung still further in a counterclockwise direction, as viewed in Figure 1. This will permit the upper end of the yoke to be passed free from its encircling position about the recess 11 so that the clamping jaws can be freely withdrawn and reinserted in any desired position.

The flaring lever 16 is inserted in a rectangular slot 45 and pivotally secured to the outside walls of the slot by a pin 46. At the end thus secured to the body there is provided a releasable spring-pressed detent comprising a reciprocating bar 47 secured to the lever by means of a screw 48 which is positioned in a slot 49 in the bar. The detent has a spade-shaped end 44 and a pin 50 at the right-hand end, as viewed in Figures 4 and 5. A coiled spring 51 positioned in a hole 52 at the end of the flaring lever bears against a flat on the pin 50 and normally urges the bar toward the right, as viewed in Figures 4, 5 and 6. A knurled sleeve 53 is attached to the lefthand end of the bar, as shown in Figure 4. The sleeve encircles the flaring lever 16 and permits the operator to easily grasp and manipulate the bar when it is desired to operate it.

Adjacent the righthand end, as viewed in Figure 4, there is a slot 54 in the body of the tool which is designed to receive the adjacent end of the bar 47 in the normal position shown in Figure 4. The flaring lever is thereby normally locked in that position, as shown also in Figure 1. When it is desired to operate the flaring lever and rotate it through a flaring operation, the sleeve 53 is pulled outwardly by hand to the dotted position 53' shown in Figure 4. This movement releases the end of the bar from the slot 54 and permits the lever to be rotated as desired.

The flaring die 17 has a conical end 55 which is designed to contact the tube, as shown for example in Figure 7 of the drawings. The die has a substantially cylindrical shank 56 received in a cylindrical aperture 57 carried by a block 58 within the body. On the die is likewise an enlarged portion forming a shoulder 59 received within a cylindrical aperture 60 of larger diameter. The flaring die has a loose sliding fit in the block and is permitted to move freely a limited distance in an axial direction.

In order to permanently retain the die within the block, there is provided a machine screw 61 threadably mounted in the block so that the head of the screw is in a position to contact the shoulder 59 when the die moves to the limit of its position upwardly and outwardly, as viewed in Figures 4 and 6. In a retracted position a face 62 on the opposite side of the die contacts the bottom 64 of the cylindrical recess 60.

The flaring die has at its extremity opposite from the flaring cone, a curved cam surface 65. A hardened pin 66 is mounted in the end of the

flaring lever in such a position that it can be pressed against the surface 65 of the die, for forcing the die through a flaring operation.

Operation

When the operator first picks up the tool to flare a tube of a given size, he first inserts the clamping jaws 12 and 13 in the recess 11 in such a way that the proper cylindrical hollows form a circular aperture at the center of the proper size to clamp the tube 14. The yoke 28 is then swung into the dotted position shown in Figure 1 and the knurled nut 33, previously removed, is replaced. Once the nut 33 is secured on the bar 32, it will not be possible to remove the clamping jaws entirely from the body of the tool since they will be permitted to separate only a distance sufficient to extract a flared piece of tubing. The jaw 12 which is itself shifted during released position of the parts, will be held within the recess by being brought into contact with the bar 32.

In normal released position, the shoulder 40 on the clamping lever is in a position abutting against the face 39 of the boss 26. The flaring lever is normally urged to this position by means of a spring 70 which is in contact with the body at one end and in contact with the yoke at its other end. After the tube 14 has been inserted in the proper recess and pushed against the conical end 55 of the flaring die, the operator, by manipulating the push rod 36 with his thumb, can readily tilt the yoke from the dotted position shown in Figure 1 to the solid position there shown.

Since in normal position the flaring lever 16 is locked in the oblique position shown in Figures 1 and 4, when the ends of the levers 15 and 16 are drawn together scissors-like, the only lever which moves is the clamping lever 15. As the lever 15 moves with relation to the body, the yoke 28 is clamped against the clamping jaw 12 and the tube 14 securely held in place preventing slipping of the tube during the subsequent flaring operation. In clamped position, the stop shoulder 37 of the clamping lever will be abutted against the face 39.

Once the tube has thus been securely clamped, the operator will pull the sleeve 53 toward him along the flaring bar 16, thereby withdrawing the end 44 of the bar 47 from its locked position in the slot 54. When this has been accomplished, the flaring lever is free to be moved rotatably about its pivot pin 46. As the flaring lever is moved through a flaring operation, the hardened pin 66 is pressed against the end 65 of the flaring die, driving it in an axial direction against the end of the tube 14. The flaring die is, of course, perfectly centered about the tube 14 and is driven in a straight line direction against it, thus forming a substantially perfect flare.

Movement of the flaring lever 16 at completion of a flaring operation is limited by means of properly positioning a flat end 71 of the bar 47 against an adjacent flat face 72 on the body. In this position, the end of the slot 49 nearest the adjacent end of the bar 47 is brought into contact with the screw 48, stopping movement of the flaring lever in its full flaring position.

Since, regardless of the size of the tube to be flared, the tube is always brought into contact with the conical end of the flaring die at the beginning of the flaring operation and since the amount of rotation of the flaring lever 16 is definitely limited, it will be moved only an amount

sufficient to properly spread the end of the tube to form a flare of the right size.

As soon as the flare has been completed, the operator spreads the levers 15 and 16 apart. First to move is the flaring lever 16 which is returned to its initial position wherein the coiled spring 51 automatically shifts the bar 47 into its locked position relative to the body. Thereafter, the clamping lever 15 is rotated to the solid line position shown in Figure 1. In this position, the yoke 27 can be shifted to the dotted line position there shown by manipulating the push rod 36, the clamping jaws can be separated and the flared end of the tube withdrawn between the clamping jaws.

Figure 7 shows the relative location of the flaring die when used with tubes 14', 14'', and 14''' of different diameter and the amount of flare on each for a given thrust of the flaring die.

In the modified form of my invention shown in Figures 8 through 12 inclusive, there is provided a flaring tool having a body 90 which is provided with a recess 91 extending inwardly from one side. Within the recess is positioned a pair of tube clamping jaws 92 and 93, having complementary recesses 94 and 95 screw-threaded in order to provide a tight grip on a length of tubing 96 inserted in the tool for flaring.

At the inner end the recesses are flared outward at the point 97 to permit expansion of the tubing during a flaring operation.

The jaws are held in position with respect to each other by means of a pair of pins 98 on one of the jaws which fit into a pair of apertures 99 in the other jaw.

At one side of the recess 91 there is provided a locking member 100. The member is held loosely in place by means of a pin 101 in the body inserted through an elongated aperture 102 in the locking member. By securing the member in this manner it is permitted to move freely backward and forward. The locking member is provided also with an interlocking shoulder 104 designed to engage a corresponding shoulder 105 on the clamping jaw 93. The locking member is further provided with a hardened element 106 at one side.

A clamping lever 107 is pivoted to the body by means of a pivot pin 108 adjacent the locking member. At the end of the lever there is provided a hardened cam 116 which is designed to bear against the element 106. The body is likewise provided with a shoulder 117 designed as a stop to prevent rotation of the lever 107 beyond a fixed distance clockwise, as viewed in Figure 8.

A bolt head 118 provides a second shoulder to prevent movement of the lever 107 beyond a predetermined distance counterclockwise as viewed in Figure 8.

When the tube clamping jaws are inserted in the tool, the lever 107 is moved to the dotted position shown in Figure 8 permitting the locking member 100 to shift downwardly as viewed in Figure 8. This leaves sufficient space within the recess 91 for insertion of the pair of jaws which are held together by the pins 98 and 99 previously described. When in place, the lever 107 can be moved toward the full line position of Figure 8 shifting the locking member so that the shoulders 104 and 105 engage and hold the jaws within the recess.

To produce a flare upon the tool, there is provided a conical flaring die 119 which is designed to reciprocate freely within a cylindrical recess 120 at the inner end of the recess 91. A screw 121 in the die extends into a slot 122 at the side

of the cylindrical recess for holding the die in place in the body. At the very bottom of the recess there is provided an aperture 123 within which fits a cylindrical projection 124 on the die. The sliding fit between the projection and the aperture provides an additional guide for the anvil during its operation.

An operating or flaring lever 125 is pivoted by means of a pin 126 to the body at a point adjacent to the flaring die. The lever is provided with a hardened button 127 threaded crosswise within it near the pivot and in such a position that the exposed tip of the button is in a position to bear against the projection 124 of the flaring die. A screwdriver slot 128 is provided in the button so that it may be adjusted to compensate for wear.

The flaring lever has an end 129 with flat sides which is received within a slot 130 in the body. Likewise on the lever there is provided a latch element 131 pivotally positioned on the lower end by means of a bolt 132. The latch is normally urged in a counterclockwise direction as viewed in Figure 11 by means of a coiled spring 133 secured by a screw 134 to the latch, and another screw 135 to the lower end of the flaring lever. For operating the latch there is provided a sleeve 136 slidably positioned on the flaring lever and connected to the latch by means of a chain 137.

A set screw 138 positioned in a slot 139 in the sleeve which opens only in a direction toward the body permits the sleeve to be moved outwardly along the handle a limited distance, sufficient to release the latch and prevents it from sliding inward along the handle toward the body of the tool.

The latch 131 is designed in normal position to seat upon a shoulder 140. Movement of the flaring lever 125 in a counterclockwise direction as viewed in Figure 8 is limited by a shoulder 141 on the body of the tool. Movement in an opposite or clockwise direction is limited by the head of a screw 142, which is secured in place after the flaring lever has been pivoted within the slot 130.

In operation the pair of jaws 92 and 93 are selected to fit the particular size of tube 96 upon which a flare is to be made. The clamping lever 107 is then swung toward its dotted position as shown in Figure 8 and the jaws inserted in place. The insertion of the jaws beyond a predetermined position is limited by a shoulder 143 (Figure 10) within the recess 91. During this part of the operation the flaring arm 125 is held outwardly in the full line position shown in Figure 8 where it is locked in place by the latch 131. The tube 96 is then inserted into the space between the jaws and pushed inwardly until it comes into contact with the conical end of the flaring die, as shown in Figure 8.

By pushing the tubing inwardly, the die is pushed into its recess until it abuts the bottom 145. When this has been accomplished the clamping lever 107 is rotated in a clockwise direction as viewed in Figure 8 from the dotted line position there shown to the solid line position. During this movement the cam 116 at the end of said lever is brought into contact with the hardened element 106 and by this means the locking member 100 is urged upwardly as viewed in Figure 8 into position against the clamping jaw 93 and from this position is pushed tightly against the tube 96 which is thereupon clamped immovably within the body of the tool.

During this movement the flaring lever is held stationary and can be used as a brace when

pulling the clamping lever 107 toward it until movement of the lever is stopped by the shoulder 117.

With the tube thus clamped and secured in place, the sleeve 136 on the flaring lever 125 is pulled outward thereby releasing the latch 131. The lever is then squeezed in a counterclockwise direction toward the other lever 107 until the flaring lever assumes the dotted line position as shown in Figure 8. During this movement the button 127 is pressed steadily against the projection 124 on the flaring die thereby driving the die in a direction from left to right, as viewed in Figure 8.

The flaring die is accurately guided by the recesses within which it fits into contact with the end of the tubing 96 by which operation the tubing is bent outwardly at the end forming a flare 150 shown in cross section in Figure 10.

Once the flare has been made, both lever arms are returned to their outward positions. Return of the flaring lever releases the die and return of the clamping lever to its dotted position permits the locking member to move away from its clamping jaw 93, whereupon the pair of jaws together with the flared tubing can be extracted from the recess 91. The jaws are then knocked loose from the tube and are ready for reception of a second piece of tubing to be flared.

It will be clear that where tubes of different sizes are to be flared, clamping jaws 92 and 93 having tube-holding recesses of different radii can be used in the tool in the same manner as described for the clamping jaws of the particular size illustrated.

I have thus provided a quick operating tube flaring tool which is capable, with substantially a single pincer-like movement of levers of convenient length, to both securely clamp a tube in place in the tool and to produce a satisfactory flare on the tube. I have further provided thereby a tool which by a single movement of the levers in a reverse direction is capable of completely releasing a flared tube.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure, or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. A lever action flaring tool for tubing comprising a body having a recess therein, removable complementary tube clamping elements in the recess, a clamping lever, a connection securing said lever to the body, a tightening means at the connected end of said lever operatively engaging the tube clamping elements when said lever is in a clamping position and adapted to clamp said clamping elements upon tubing inserted therein, an axially movable flaring die mounted in the body adjacent said recess having axial movement, stop elements on the body respectively engaging said die and defining the limits of its movement in each direction, and a flaring lever having the axis thereof movable in the same plane as the axis of said clamping lever and having a connection to the body adjacent the die, a portion of the flaring lever bearing on the die and having a progressively operative movement for thrusting said die endwise through a flaring operation within said defined limits of movement.

2. A lever action flaring tool for tubing com-

prising a body having a recess therein, a pair of removable complementary tube clamping jaws in the recess, a locking member having a loose-fitting, permanent attachment to the body, one side of said locking member forming part of the recess wall at one side thereof, said locking member including an interlocking element cooperable with one of said jaws, a clamping lever, a pivot connection securing said lever to the body adjacent the locking member, a cam at the pivoted end of said lever engaging the locking member on rotation of said lever and adapted to clamp said jaws upon tubing inserted therein, and a stop on the body engageable with the lever limiting the extent of its movement, an axially movable flaring die mounted at the inside end of said recess and a flaring lever pivotally connected to the body adjacent the die, a portion of the flaring lever having a bearing on the die for thrusting said die endwise to flaring position, cooperating stop means respectively on the flaring lever and on the body normally holding said flaring lever in inoperative position relatively close to said clamping lever while the tube is being locked in place, and means for releasing said cooperating means adapted when actuated to free the flaring lever for pivotal movement through a flaring operation to a position substantially parallel with the clamping lever.

3. A lever action flaring tool for tubing comprising a body having a recess therein, removable complementary tube clamping elements in the recess, a clamping lever having a pivotal connection to the body and having a released position extending in one angular direction from the body and a fixed clamping position extending in another angular direction from the body, said lever and said body having co-acting stops engageable with each other at said fixed clamping position and a tightening means at the connected end of said lever operatively engaging the tube clamping elements on movement of said lever from said released position to said fixed clamping position to clamp said elements upon tubing inserted therein, an axially movable flaring die slidably mounted in the body adjacent said recess, a flaring lever having a pivotal connection to the body adjacent the die and having the axis thereof lying in the same plane of rotation as the axis of said clamping lever, said flaring lever having an initial fixed position in angularly disposed relation to the clamping lever, said flaring lever being adapted to cooperate with the clamping lever during the manual clamping of tubing, a temporary detent simultaneously engaging said flaring lever and said body for holding the flaring lever in initial position, said detent having a released position permitting rotation of the flaring lever toward the clamping lever when the clamping lever is in its fixed position, a portion of the flaring lever having engagement with the flaring die during movement of said flaring lever toward the clamping lever for thrusting said die axially through a flaring operation.

4. A lever action flaring tool for tubing comprising a body having a recess therein, removable complementary tube clamping elements in the recess, a clamping lever having a released position and a clamping position, a pivotal connection securing said lever to the body, a tightening means at the connected end of said lever operatively engaging the tube clamping elements when said lever is in clamped position and adapted to clamp said clamping elements upon tubing in-

serted therein, a flaring die having axial movement and slidably mounted in the body adjacent said recess, and a flaring lever having a pivotal connection with the body adjacent the die and having the axis of the flaring lever movable in the same plane as the axis of said clamping lever, a portion of the flaring lever having a position engaging the die for thrusting said die axially through a flaring operation, said levers having initial positions extending outwardly from the body with an angle between them of less than 90° and respective operative positions where the angle between said levers is less than the initial angle.

5. A lever action flaring tool for tubing comprising a body having a recess therein, removable complementary tube clamping elements in the recess, a clamping lever, a connection securing said lever to the body, a tightening means at the connected end of said lever operatively engaging the tube clamping elements on movement of said lever relative to the body and adapted to clamp said clamping elements upon tubing inserted therein, said lever having movement of its axis about the body in a predetermined direction during a tightening operation, an axially movable flaring die mounted in the body adjacent said recess, a flaring lever having a connection to the body adjacent the die and movement of the axis thereof about the body toward said clamping lever when making a flaring operation, a portion of the flaring lever having a progressively operative movement and engaging the die for thrusting said die axially through a flaring operation, and a releasable detent normally engaging said body and said flaring lever temporarily fixing the flaring lever in position relative to the body and in a position sufficiently close to the clamping lever to permit the hand of an operator to span both levers, said detent having a disengaged position to permit movement of the flaring lever relative to the body and toward said clamping lever after a tube has been clamped in place.

6. A lever action flaring tool for tubing comprising a body having a recess therein, removable complementary tube-clamping elements in the recess, a clamping lever pivotally connected to the body having a released position and a predetermined clamped position wherein a portion of said lever adjacent the pivot connection is in engagement with the body and said lever is fixed in position relative to the body, a tightening means at the connected end of said lever surrounding and engaging the tube-clamping elements in clamped position for holding a tube between said clamping elements, an axially movable flaring die mounted in the body adjacent said recess and a stop element on the body normally disengaged from said die when said clamping lever occupies said predetermined clamped position with said clamping elements in place, said stop element having an engagement with said die when on removal of the clamping elements said die is moved toward the recess a distance slightly beyond the position occupied when completing a flare, and a flaring lever having a pivotal connection to the body adjacent the die and movable relative to the body toward and away from said clamping lever, a releasable detent normally engaging both said flaring lever and said body and initially temporarily anchoring said flaring lever in place sufficiently close to said clamping lever to permit the hands of an operator to span both levers while the clamping lever is manually pulled against the flaring lever

to clamped position to lock a tube in the tool, said flaring lever having a portion engaging the die and adapted to urge said die into tube-flaring position, said detent having a released position permitting the flaring lever to be manually pulled against the clamping lever during the making of a flare.

7. A lever action flaring tool for tubing comprising a body having a recess therein, removable complementary tube-clamping elements in the recess, a clamping lever having released and clamping positions, a pivotal connection securing said lever to the body adjacent one side of the clamping elements, a tightening means comprising a yoke engaging the lever at the connected end thereof and engaging the tube clamping elements on the other side of said elements when said lever is in clamping position and adapted to clamp said clamping elements upon tubing inserted therein, a retaining member engaging both the body and the yoke limiting the movement of said yoke to a partially open position withdrawn from the clamping elements a limited distance sufficient to permit limited separation of the elements from each other, whereby flared tubing may be withdrawn from the clamping elements, said tightening means having a second position disengaged from the body to permit removal of the clamping elements from the recess, an axially movable flaring die mounted in the body adjacent said recess, and a flaring lever having a pivotal connection to the body adjacent the die, the axis of said flaring lever having a position in the same plane as the axes respectively of said clamping lever and said tube, a portion of the flaring lever having a progressively operative movement and having engagement with the die during said movement for thrusting said die endwise through a flaring operation.

8. A lever action flaring tool for tubing comprising a body having a recess therein, removable complementary tube-clamping elements in the recess, a clamping lever having released and clamping positions, a pivotal link connection securing said lever to the body comprising link means pivoted to the body at one end thereof and pivoted at the other end to the clamping lever providing thereby a floating pivot at the connected end of said clamping lever whereby said floating pivot can be moved a limited distance toward or away from the body, a tightening means comprising a yoke engaging the lever at the connection of said link means thereto and engaging the tube clamping elements when said lever is in clamping position and adapted to

clamp said clamping elements upon tubing inserted therein, a retaining member engaging both the body and the yoke limiting the movement of said yoke to a partially open position withdrawn from the clamping elements a limited distance sufficient to permit limited separation of the elements from each other, whereby flared tubing may be withdrawn from the clamping elements, said tightening means having a second position disengaged from the body to permit removal of the clamping elements from the recess, an axially movable flaring die mounted in the body adjacent said recess, and a flaring lever having a pivotal connection to the body adjacent the die, the axis of said flaring lever having a position in the same plane as the axes respectively of said clamping lever and said tube, a portion of the flaring lever having a progressively operative movement and having engagement with the die during said movement for thrusting said die endwise through a flaring operation.

9. A lever action flaring tool for tubing comprising a body having a recess therein, removable complementary tube clamping elements in the recess, a clamping lever having a released position and a fixed clamping position, a connection securing said lever to the body, a tightening means at the connected end of said lever including adjustable contact means operatively engaging the tube clamping elements when said lever is in clamped position and adapted upon adjustment to vary the pressure on said clamping elements when in said fixed clamping position, a detent engaging the body and the tightening means in a semi-released position wherein the tightening means has been rotated relative to the body, said tightening means in said released position being engageable with the clamping elements and said clamping elements during said engagement being separated a limited distance one from the other sufficient to permit removal of the flared tube, said body having a portion thereof in engagement with the clamping lever at one limit of its movement in clamping position providing a stop therefor, a flaring die having axial movement and slidably mounted in the body adjacent said recess, and a flaring lever having its operative positions adjacent the clamping lever and having a movable connection to the body adjacent the die, a portion of the flaring lever having an engagement with the die and having a progressively operative movement for thrusting said die axially through a flaring operation.

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