Oct. 11, 1938. G. R. GAGNE 2,132,947

TUBE FLARING DEVICE

Filed June 6, 1936

Fig. 1

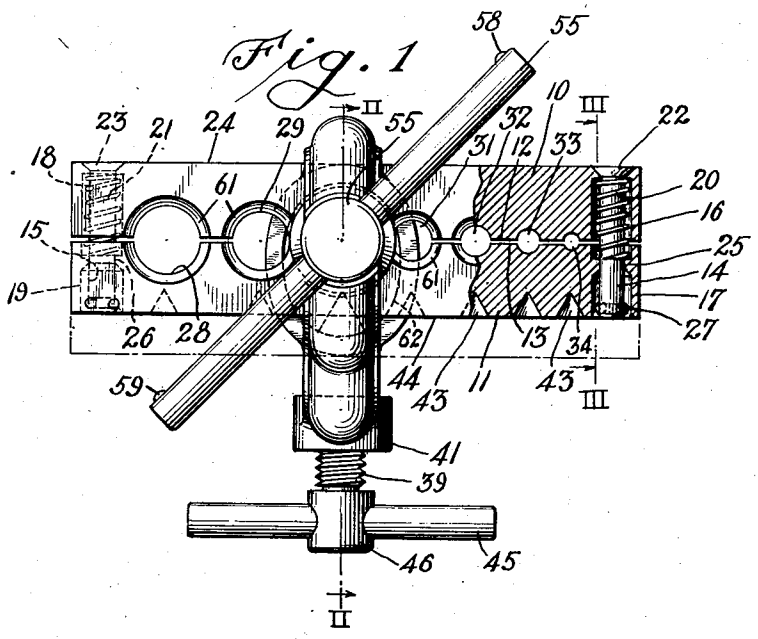



Fig. 2

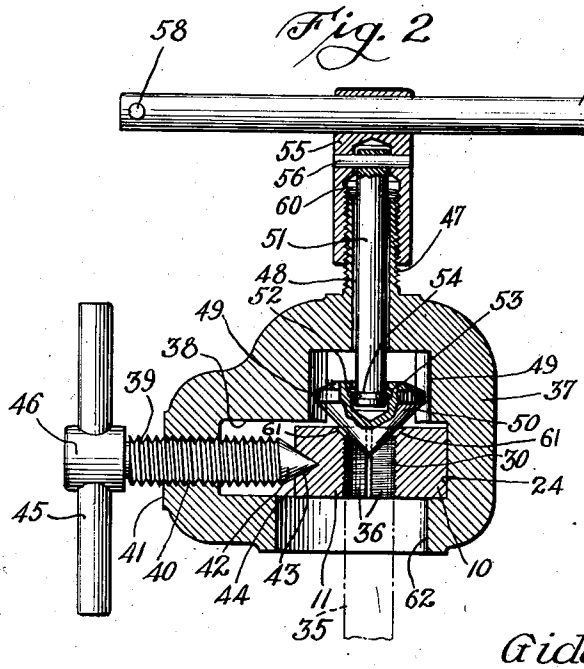
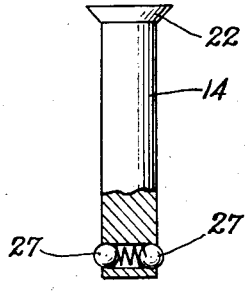



Fig. 3.




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## TUBE FLARING DEVICE

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11 Claims. (Cl. 153—79)

This invention relates to a flaring device and more particularly to a tube-flaring device, although certain features thereof may be employed within equal advantage for other purposes.

It contemplates more especially the provision of a portable device for flaring the tube extremities without requiring any appreciable equipment or special facilities.

There are numerous occasions for flaring the extremities of tubes in that replacements are frequently occasioned in automobiles and other installations. In fact, the copper tubing resorted to in automobiles for establishing communication between the gasoline tank and carbureter serves only to illustrate the far-reaching uses of tubing. Tubing of this character is connected to various instrumentalities by a union or threaded nipple which is mounted thereon for turning relative to a flared tube extremity serving to retain the nipple against removal.

There are numerous occasions for replacing such tubes or inserting a new portion therein, and in consequence thereof it is necessary or at least highly desirable to enable the flaring of the extremities so that an effective connection may be established. The joints must necessarily be fluid-tight, and the effectiveness thereof depends largely on the type of tube extremity which engages the connecting union or nipple. In consequence thereof, it is exceedingly important to provide a uniform and more or less perfect flare on the tube extremity so as to afford a successful joint or tube connection.

One object of the present invention is to simplify the construction and improve the operation of devices of the character mentioned.

Another object is to provide an improved tool for flaring the extremity of tubes and similar devices.

Still another object is to provide a novel device for flaring the extremity of various sized tubular conduits.

A further object is the provision of a simple and effective portable device for flaring the extremities of tubular conduits so as to afford a fluid-tight connection therefor.

A still further object is to provide an effective and simple device for effectively flaring the extremities of tubes without entailing as much labor or time as heretofore required with similar purpose tools.

Still a further object is to provide a more efficient tube flaring device that is readily utilizable for tapering ends of tubes of varying diameter within a predetermined range.

An additional object is to provide an adjustable tube flaring device that has an adjustable flaring tool displaceable at predetermined positions for operation on tubes of different diameters without requiring any appreciable adjustment, care, or manual manipulation.

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the drawing:

Figure 1 is a plan view of a device embodying features of the present invention.

Figure 2 is a sectional view taken substantially along line II—II of Figure 1.

Figure 3 is an enlarged detail view of a pin taken substantially along line III—III of Figure 1.

The structure selected for illustration comprises confronting clamping members 10 and 11 which are preferably though not essentially of rectangular configuration so that one serves as a complement of the other with their adjacent surfaces 12 and 13 in confronting relation to serve as a clamping expedient for tubular conduits or other devices as will appear more fully hereinafter.

The clamping members 10 are preferably held in confronting assembled relation by means of guide pins 14 and 15 that project through apertures 16—17 and 18—19 extending in axial registry through the extremities of the confronting clamping members 10 and 11.

As shown, the apertures 16 and 18 extend partially through the clamping members 10 and 11 and their diameters are somewhat larger than the diameter of the pins 14 and 15 to accommodate coiled springs 20 and 21 in enveloping relation with the pins 14 and 15 for confinement in the apertures 16 and 18, thereby imparting a separating urge to the clamping members 10 and 11.

So as to maintain the clamping members 10 and 11 against accidental complete separation, the pins 14 and 15 have tapered heads 22 and 23 which occupy correspondingly shaped counter-sunk openings in the apertures 16 and 18 so as to communicate with the exterior edge surface 24 of the clamping member 10.

Consequently, the pins 14 and 15 are precluded from affording displacement of their enlarged heads 22 and 23 into the apertures 16 and 18. The enlarged portion of the apertures 17 and 19 are larger in diameter than the diameter of the pins 14 and 15 so as to present peripheral shoulders 25 and 26 which limit the separation of

the clamping members 10 and 11 commensurate with the length of the pins 14 and 15 that preferably are provided with spring impelled detents 27 that extend to a circumference that is larger than the opening presented by the shoulders 25 and 26 that serve as a stop therefor.

Should it be desired to completely separate the members 10 and 11, an unusual spreading force such as is created by manually pulling the members 10 and 11 apart with a force sufficient to compress the spring impelled detents 27 as such pass through the peripheral shoulders 25 and 26, affords their separation for cleansing, repair, replacement or other purposes.

The assembly of the clamping members 10 and 11 in confronting relation so that their edge surfaces 12—13 are in adjacent contacting relation, is effected by merely inserting coiled springs 20 and 21 over the pins 14 and 15 and effecting their displacement through the limit shoulders 25 and 26 against the urge of the spring impelled detents 27 that preclude accidental separation after such become lodged in the openings 17—19.

It will be observed that the pins 14 and 15 are sufficiently long so as to afford the separation of the clamping members 10 and 11 responsive to the urge of the springs 20 and 21 for a distance necessary to incorporate tubular conduits that are disposed in and engaged by the confronting clamping members 10 and 11. Semi-circular bores or recesses 28, 29, 30, 31, 32, 33, and 34, in this instance seven, of different diameters are provided in the confronting edges 12 and 13 of the clamping members 10 and 11.

It will be noted that each of the clamping members 10 and 11 have correspondingly sized semi-circular recesses 28, 29, 30, 31, 32, 33 and 34 that serve as a complement of each other and provide the necessary encircling surface for most sizes of tubing within a range provided in any particular pair of confronting clamping members 10 and 11.

So that the tubular conduits 35 exemplified by the dotted outline in Figure 2 are more effectively held within the correspondingly sized and confronting semi-circular bores or recesses 28, 29, 30, 31, 32, 33 and 34, the latter are interiorly threaded as at 36 to securely hold the tube 35 thereon when the clamping members 10 and 11 are tightened thereon as will appear more fully hereinafter.

In order to flare the extremities of the tube 35 that is placed in the correspondingly sized confronting semi-circular recess 30, clamping action thereon by the confronting members 10 and 11 is effected by means of a bracket or yoke 37 having a horizontally disposed rectangular recess 38 provided therethrough in a lateral direction to receive the clamping members 10 and 11 along which the bracket or yoke 37 is displaceable.

An enlarged stud 39 is in engagement with a threaded aperture 40 extending through an edge 41 of the yoke 37 so that the conical extremity 42 of the stud 39 will be lodged in and engage correspondingly shaped depressions or cavities 43 provided in the edge surface 44 of the clamping member 11.

The conical depressions 43 are positioned in alignment with the axis of the confronting semi-circular recesses 28, 29, 30, 31, 32, 33 and 34 so as to index the position of the yoke 7 directly in line with any selected circular opening defined by the confronting semi-circular recesses 28 to 34 after the stud 39 has been tightened responsive to manipulating the handle 45 that extends through the head 46 of the stud 39.

In order to flare the edge of the tube 35 that is engaged by any selected recess 28 to 34, the yoke 37 is provided with a vertically upstanding circular boss 47 that is interiorily bored as at 48 to communicate with an enlarged cylindrical opening 49 provided in the yoke 37 for communication with the rectangular recess 38.

Consequently, the cylindrical opening 49 in the yoke 37 extends directly over the top surface of the confronting clamping members 10 and 11 so that a conical compressor 50 may be positioned thereon for manipulation by a shank 51 rotatively associated therewith through the connection afforded by a split ring member 52 that is lodged in confronting grooves 53 and 54 provided in the conical compressor 50 and its shank 51, respectively.

The compressor shank 51 extends upwardly through the exteriorly threaded boss 47 that connects with a tubular member 55 which has a pin 56 extending transversely therethrough to engage the extremity of the shank 51, thereby providing a fixed connection between the shank 51 and the tubular turning member 55. The turning member 55 has a handle rod 57 extending transversely over the upper extremity thereof so as to provide an effective handle that is movable in the turning member 55 within the limits of the handle extremities defined by the spring impelled detents 58 and 59 provided on the handle rod 57.

It is to be noted that the turning member 55 has its interior bore 60 threaded to engage the exterior of the tubular boss 47 provided on the yoke 37 so that the rotation of the turning member 55 relative to the boss 47 will raise and lower the conical compression member 50 to exert its flaring influence upon the extremity of the tube 35 within the limits defined by the inclined seats 61 which are provided in each of the semi-circular recesses 28 to 34 with a taper corresponding with the taper of the compression member 50.

It is to be noted that the compression member 50 is in alignment with the indexing and tightening stud 39 that exerts its influence on the confronting clamp members 10 and 11 which are clamped tight upon the tube 35 disposed in the proper confronting semi-circular recesses 28 to 34, inclusive.

Consequently, the compression member 50 will be in axial alignment with the selected openings 28 to 34 to insure accurate and uniform flaring of the extremity of the tube 35 disposed therein and indexed by the tapering extremity 42 that is lodged in the correspondingly sized recess 43 provided in the edge 44 of the clamping member 11.

It should be observed that the yoke 37 has a circular opening 62 in its lower region to provide ample room for the insertion of the tubular conduit 35 within the proper engaging recess 28 to 34. In order to adjust the yoke 37 so that the compression member 50 is disposed over the selected tube engaging recess 28 to 34 inclusive, it is only necessary to disengage the conical extremity of the stud 39 from any one of the recesses 43 and leave the compression member 50 above the confronting clamping members 10 and 11 so that the yoke 37 is completely displaceable along the clamping parts 10—11.

When the tube 35 is disposed within the proper recess 28 to 34, the stud 39 is tightened so as to securely hold the tube 35 for clamping engagement between the confronting members 10—11. Thereupon, the handle 57 is rotated to lower the compression member 50 against the interior orifice of the tube 35 so as to flare its extremity against the tapered seat 61 of the selected recess 28 to 34, inclusive.

The tube 35 is, thereupon, released or removed by releasing the stud 39 and permitting the clamping members 10 and 11 to separate within the limits of the pins 14 and 15 or the recess 38 provided in the yoke 37. The compression member 50 may be elevated to a position above the clamping members 10—11 and the yoke 37 may be displaced to any recess 28 to 34 depending upon the diameter of the tube 35.

It will be apparent, therefore, that the yoke 37 need not be removed entirely from the clamping members 10 and 11 in order to allow the insertion of the tube 35 of any size within the range of the recesses 28 to 34 provided in the confronting clamping members 10—11.

Various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages of the invention or any features thereof, and nothing herein shall be construed as limitations upon the invention, its concept or structural embodiment as to the whole or any part thereof except as defined in the appended claims.

I claim:—

1. In a device of the character described, the combination with confronting body members having a plurality of sectional bores provided therein, pins extending between said body members for limiting the extent of their separation, springs interposed between said body members to normally maintain a spreading urge thereon, said sectional bores each being of different diameters for receiving correspondingly sized tubes, each of said sectional bores having tapered seats at corresponding extremities thereof, a yoke slidably associated with said body members for displacement over any one of said sectional bores, means for maintaining said yoke in adjusted position against displacement, means for clamping said body members together to retain a tube in a correspondingly sized bore, and a compression member mounted for displacement in said yoke to axially confront any one of said sectional bores for the purpose set forth.

2. In a device of the character described, the combination with confronting body members having a plurality of sectional bores provided therein, said sectional bores each being of different diameters for receiving correspondingly sized tubes, each of said sectional bores having tapered seats at corresponding extremities thereof, a yoke slidably associated with said body members for displacement over any one of said sectional bores, means for clamping said body members together and maintaining said yoke in adjusted position against displacement, and a compression member mounted for displacement in said yoke to axially confront any one of said sectional bores for the purpose set forth.

3. In a device of the character described, the combination with confronting body members having a plurality of sectional bores provided therein, said sectional bores each being of different diameters for receiving correspondingly sized tubes, each of said sectional bores having tapered seats at corresponding extremities thereof, a yoke slidably associated with said body members for displacement over any one of said sectional bores, means for clamping said body members together and maintaining said yoke in adjusted position against displacement, there being a series of indexing means on one of said body members for cooperation with said clamping means to index the position of said yoke directly over any one of said sectional bores, and a compression member mounted for displacement in said yoke to axially confront any one of said sectional bores for the purpose set forth.

4. A tube flaring tool comprising a pair of separable clamping members having a series of sectional confronting tube receiving openings of various sizes therein, a yoke slidably mounted to receive said clamping members therethrough, said yoke having an opening therein for selected alignment with any one of said sectional bores to admit a tube therein for clamping between said members, a member in threaded engagement with said yoke to abut against one of said clamping members to effect their engagement of a tube in any one of said openings, and a conical compression member carried by said yoke and engageable into the extremity of a tube held by any one of said sectional bores for flaring purposes.

5. A tube flaring tool comprising a pair of separable clamping members having a series of sectional confronting tube receiving openings of various sizes therein, spring means interposed between said clamping members to normally impart a separating urge thereto, a yoke slidably mounted to receive said clamping members therethrough, said yoke having an opening therein for selected alignment with any one of said sectional bores to admit a tube therein for clamping between said members, a member in threaded engagement with said yoke to abut against one of said clamping members to effect their engagement of a tube in any one of said openings, and a conical compression member carried by said yoke and engageable into the extremity of a tube held by any one of said sectional bores for flaring purposes.

6. A tube flaring tool comprising a pair of separable clamping members having a series of sectional confronting tube receiving openings of various sizes therein, guide pins for retaining said clamping members in reciprocable relation, spring means interposed between said clamping members to normally impart a separating urge thereto, a yoke slidably mounted to receive said clamping members therethrough, said yoke having an opening therein for selected alignment with any one of said sectional bores to admit a tube therein for clamping between said members, a member in threaded engagement with said yoke to abut against one of said clamping members to effect their engagement of a tube in any one of said openings, and a conical compression member carried by said yoke and engageable into the extremity of a tube held by any one of said sectional bores for flaring purposes.

7. A tube flaring tool comprising a pair of separable clamping members having a series of sectional confronting tube receiving openings of various sizes therein, guide pins for retaining and clamping members in reciprocal relation against complete separation, spring means enveloping said guide pins and interposed between said clamping members to normally impart a separating urge thereto, a yoke slidably mounted to re-

ceive said clamping members therethrough, said yoke having an opening therein for selected alignment with any one of said sectional bores to admit a tube therein for clamping between said members, a member in threaded engagement with said yoke to abut against one of said clamping members to effect their engagement of a tube in any one of said openings, and a conical compression member carried by said yoke and engageable into the extremity of a tube held by any one of said sectional bores for flaring purposes.

8. A device of the character described comprising a pair of relatively movable clamping bars having sets of registering, substantially semi-circular, recesses in their opposing surfaces for receiving tubes the ends of which are to be flared, a member in which said bars extend, a tool on said member for flaring the ends of the tubes clamped between said bars, and bar-engaging means located substantially in the plane, transverse of said bars, in which said tool is located, for clamping said bars against the tubes.

9. A device of the character described comprising a pair of relatively movable clamping bars having sets of registering, substantially semi-circular, recesses in their opposing surfaces for receiving tubes the ends of which are to be flared, a member in which said bars extend, a tool on said member for flaring the ends of the tubes clamped between said bars, and an element threaded on said member and engaging one of said bars for clamping said bars against the tubes, said element being located substantially in the plane, transverse of said bars, in which said tool is located.

10. A device of the character described comprising a pair of relatively movable clamping bars having sets of registering, substantially semi-circular, recesses in their opposing surfaces for receiving tubes, the ends of which are to be flared, a member in which said bars extend, said bars and member being relatively movable in the direction of the length of the bars, a tool on said member for flaring the ends of the tubes clamped between said bars, and bar-engaging means on said member located substantially in the plane, transverse of said bars, in which said tool is located, for clamping said bars against the tubes.

11. A device of the character described comprising a pair of relatively movable clamping bars having sets of different sized registering, substantially semi-circular, recesses in their opposing surfaces for receiving tubes of different sizes the ends of which are to be flared, a member in which said bars extend, a tool on said member for flaring the ends of the tubes clamped between said bars, and bar-engaging means located substantially in the plane, transverse of said bars, in which said tool is located, for clamping said bars against the tubes.

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