

V. L. GRAF ET AL

FLARING TOOL

FIG.1.

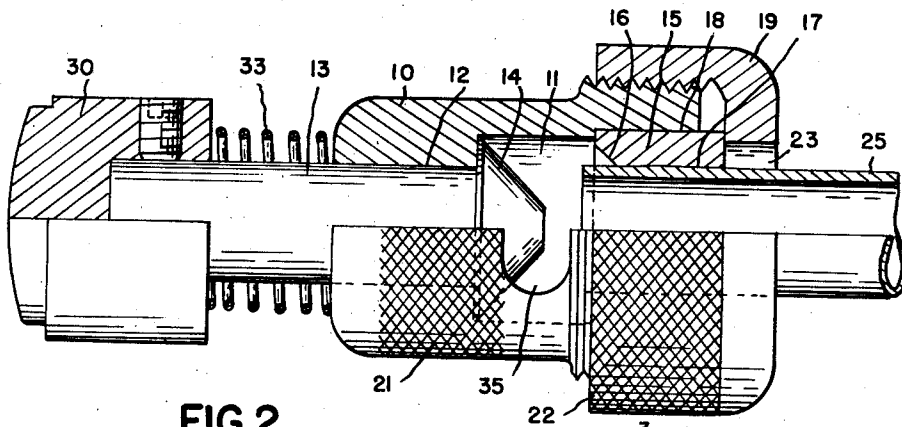


FIG.2.

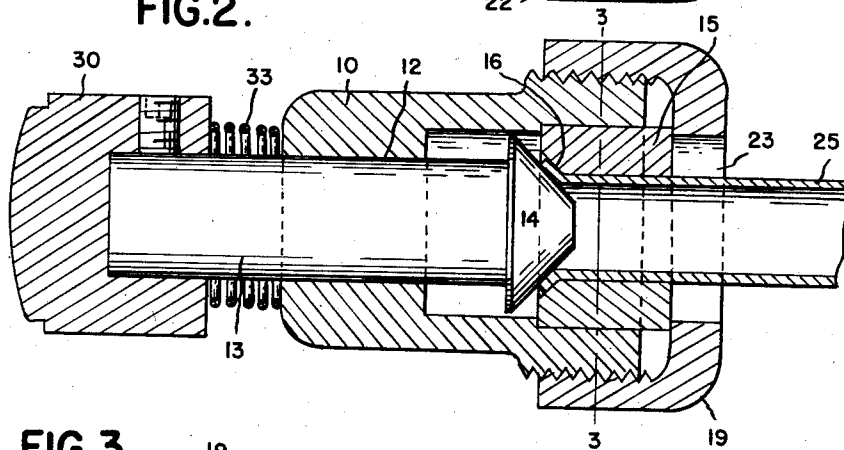
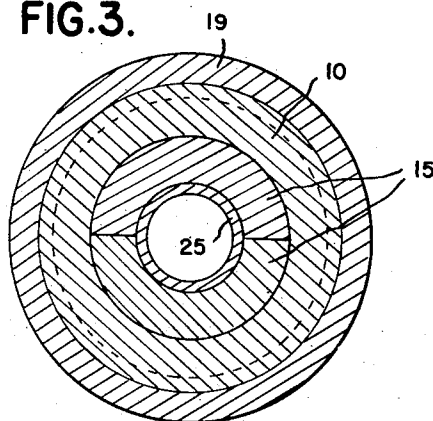


FIG.3.



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FLARING TOOL

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1 Claim. (Cl. 153—79)

This invention relates to metal forming tools, and particularly to an improved, compact, easily portable and easily operable device for flaring the ends of pipe, tubing and the like, to provide a tapered flange such as is required in the making of unions between sections of relatively thin walled tubing.

An important object of the invention is to provide an improved flaring tool operable with the aid of no other tools than a hammer, and adapted to flange the tubing or other work by a swaging action, the work being located between swaging dies which are accurately positioned and positively guided with relation to each other, the resultant flange being formed with great accuracy, despite which the flanging operation is performed very quickly and easily.

Still another object is to provide a flaring tool of the class described having a permanently installed male die and a series of interchangeable female dies, by means of which tubing of variant dimensions may be flared, the female dies being formed in sections and readily removable both to free the work after flaring, and to permit interchanging dies to accommodate different sizes of tubing.

A related object is to provide such a flaring tool whose interchangeable die sections are of relatively small size and inexpensive construction, and readily portable with the tool itself, so that flanging equipment for a large variety of tubing sizes may be provided at less expense, accommodated in less space, and carried about with greater convenience, than has been the case with previously known flaring tools of this general class.

In the drawing:

Figure 1 is a composite view partly in side elevation and partly in radial longitudinal section, showing a flaring tool incorporating the present invention, together with a length of tubing fitted thereinto and ready for flaring.

Figure 2 is a view similar but in full diametric section, showing a different female die assembly installed in the tool to convert it to accommodate tubing of a different size, the tubing being shown flared and the male die in contact with the work.

Figure 3 is a cross section taken substantially on the line 3—3 of Figure 2.

Referring now to the drawing: Reference character 10 designates the generally cylindrical body of the tool, which may be turned of suitable tool steel, and the interior of which is hollow, as indicated at 11. At one end the opening in the

body is reduced to provide an axial slideway portion 12 in which is slidably fitted the stem 13 of the male die, the head of which is designated 14. The female die assembly 15 is formed in two complementary semi-annular sections, removably fitted into the opposite end of the body, which is provided with an enlarged opening 18 to receive them. A screw cap 19 holds the die sections in place, and the exterior of both the body and the cap may be knurled, as indicated at 21—22, to facilitate assembly and disassembly of the parts.

The upper surfaces of the die sections 15 are countersunk to provide an accurate frusto-conic surface 16, which is in effect continuous when the die sections are assembled as shown. This constitutes the seat against which the flare is formed, under the impact of the conformably tapered male die head 14. The central cylindrical opening 17 which extends through the female die assembly is of such size as to slidably but accurately receive the tubing to be flared, which is thrust therethrough through an enlarged opening 23 in the cap 19, as shown in Figure 1. The opening 23 is larger than the finished flange on the work, but smaller than the overall diameter of the female die assembly, as shown.

An impact head 30 is provided on the outer end of the stem 13, and a compression spring 33, trapped on the stem between the head and the body, projects the stem and retracts the die head after each impact.

An inspection opening 35 is formed in the side of the body to enable the workman to observe the formation of the flange and the degree of projection of the tubing during initial positioning of the latter preparatory to formation of the flange.

It is believed that the operation of the device will be evident from the foregoing, but it may briefly be summarized as follows: A female die assembly of the correct size to accommodate the tubing to be flared having first been installed, the tool is slipped over the tubing to the approximate extent indicated in Figure 1. The tubing then projects above the tapered seat 16 sufficiently to provide the requisite material to form the flange. The tube and die body are positioned by hand, the workman, for this purpose, grasping the tube directly below the cap 19 of the tool. The head 30 is then struck with a hammer. The male die is thus driven into the work to flare and swage the latter to the desired extent, which can be observed through the inspection of opening 35. The operator then grasps the tool itself, and strikes the head 30 several sharp blows,

to finish the flare against the conforming tapered seat 16 of the female die surfaces 15. After formation of the flange, the cap is unscrewed from the body to permit removal of the die sections 15, and the opening 23 in the cap 19 being larger than the flange, the cap easily slips off the end of the tubing.

We are aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and we therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive; reference being had to the appended claim rather than to the foregoing description to indicate the scope of the invention.

We claim:

In a flanging tool of the class described, in combination with a hollow body having a continuous opening therethrough of stepped diameter including an enlarged counterbored portion at one end of the body, a female swaging die assembly formed in substantially radially divided sections removably slidable into said counterbored

portion at one end of the body, a cap removably affixable to said end of the body to retain said die assembly, the die assembly being deeper than the counterbored portion, whereby such assembly when fully installed projects longitudinally from the body, the cap and die assembly having registering longitudinal openings therein through which a tube to be flanged may be inserted, whereby the tube may project through and from the opposite side of said die assembly, the opening in the cap being larger than the flange formed by the tool but smaller than the maximum diameter of the die assembly, whereby the flanged tube may be removed through the cap after separation of the die sections, and a cooperating male die arranged upon said opposite side of the female die assembly and movable toward and from the same and having a head portion projecting outside the body to be engageable by a hammer or the like.

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