Oct. 20, 1931. E. S. CORNELL, JR 1,827,733

TUBE FLANGING TOOL

Filed Oct. 4, 1930

Fig. 1.

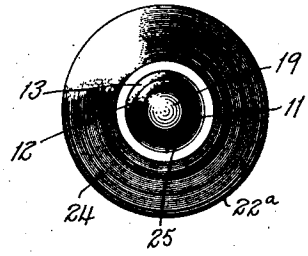


Fig. 2.

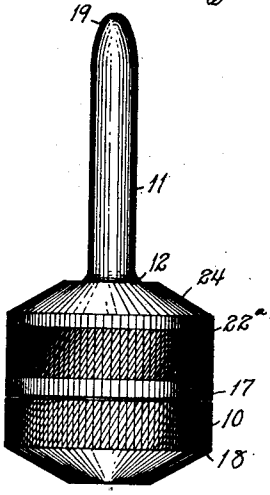


Fig. 3.

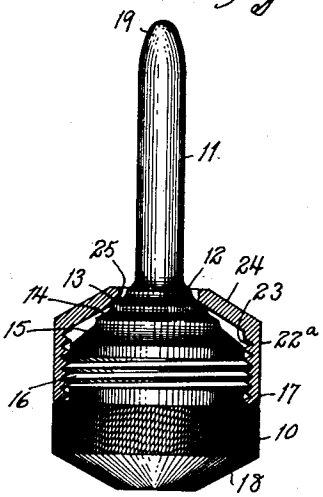


Fig. 4.

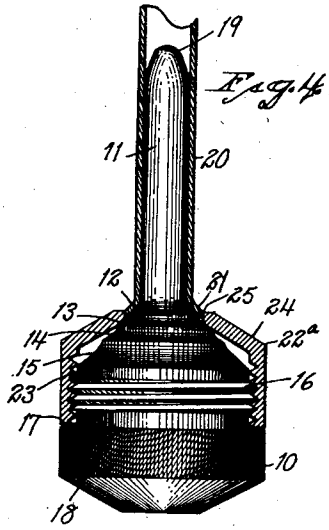


Fig. 6.

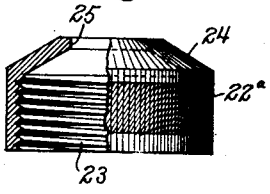


Fig. 7.

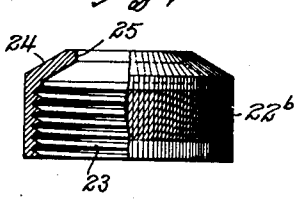


Fig. 5.

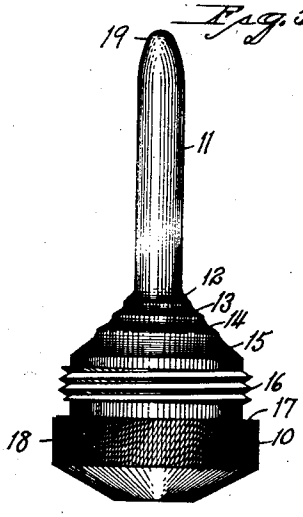


Fig. 8.

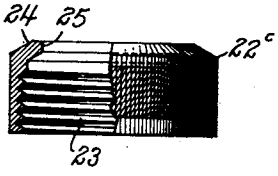
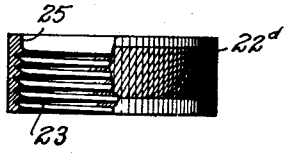


Fig. 9.



INVENTOR
EDWARD S. CORNELL, JR.
By Seymour, Earle & Nichols
ATTORNEYS

Patented Oct. 20, 1931

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UNITED STATES PATENT OFFICE

EDWARD S. CORNELL, JR., OF WATERTOWN, CONNECTICUT, ASSIGNOR TO THE CHASE COMPANIES, INCORPORATED, OF WATERBURY, CONNECTICUT, A CORPORATION

TUBE-FLANGING TOOL

Application filed October 4, 1930. Serial No. 486,318.

This invention relates to an improvement in flanging tools for forming flanges upon the ends of tubes or pipes of malleable metal, such as copper, lead, etc., and constitutes an improvement upon the tool disclosed in my copending application filed December 26, 1929, Serial No. 416,473.

The main object of this invention is to provide a simple and convenient tool of the type referred to characterized by its capacity for being readily converted to flange tubes or pipes of various diameters, whereby a flanging outfit may be provided at a low cost for manufacture and with minimum bulk and weight for flanging tubes or pipes of various diameters.

With the above and other objects in view as will appear from the following, my invention consists in a tube-flanging tool having certain details of construction and combinations of parts as will be hereinafter described and particularly recited in the claims.

In the accompanying drawings:

Fig. 1 is an end view of a flanging tool constructed in accordance with my invention;

Fig. 2 is a view thereof in side elevation;

Fig. 3 is a similar view but with the stop-sleeve in longitudinal section;

Fig. 4 is a view corresponding to Fig. 3 but showing a tube sleeved over the pilot and flanged by engagement with the deflecting surface;

Fig. 5 is a detached view in side elevation of the mandrel member; and

Figs. 6, 7, 8 and 9 are corresponding views partly in side elevation and partly in longitudinal section and illustrating a series of interchangeable stop-sleeves capable of being organized with the mandrel member to adapt the tool to flange tubes of various diameters.

In the tube-flanging tool herein chosen for the illustration of my invention, I employ a mandrel member 10 consisting of an axially extending pilot 11 and a series of four (more or less) stepped conical deflecting surfaces 12, 13, 14 and 15, forming a stepped series of annular tube-flangers at the base of the said pilot and each adapted to deflect and flange a tube of a predetermined size. The mandrel member also consists of an externally threaded body-portion 16 and an annular sleeve-seat 17 formed by the inner surface of an overhanging head 18 which is designed to be struck by a hammer or mallet for the purpose of forcing the tool into a tube, as will hereinafter appear.

The pilot 11 is formed with a tapered outer end 19 and is adapted to be axially entered into a tube 20 (Fig. 4), the end of which it is desired to provide with a flange 21 for the purpose of attaching the tube to a tube-fitting such as straight-line couplings T's, elbows, etc., in accordance with common practice.

In flanging tubes or pipes for the purpose above referred to, it is necessary to determine and limit the degree to which tubes are flared and for this purpose, I employ a series of stop-sleeves 22^a, 22^b, 22^c and 22^d (four more or less in number, corresponding to the number of deflecting-surfaces upon the mandrel-member), each of which is formed with internal threads 23 for interengagement with the externally-threaded body-portion 16 of the mandrel-member 10, and with an inwardly-projecting annular stop-flange 24. The inner end of the stop-flange 24 terminates in an annular stop-shoulder 25 which constitutes the smallest internal diameter of the operative end of the stop-sleeve and is adapted to be engaged by the outer edge of the flange 21 of the tube 20 to limit the outward flare thereof, as clearly shown in Fig. 4.

The stop-sleeves 22^a, 22^b, 22^c, and 22^d correspond to each other with the exception that their respective annular stop-shoulders 25 are of different diameters to adapt them to limit the flare of the flanges of tubes of various diameters. For instance, the annular stop-shoulder 25 of the sleeve 22^a is the correct diameter to limit the outward flare of a tube of the appropriate size for deflection by the conical deflecting-surface 12. Similarly, the diameters of the stop-shoulders 25 of the sleeves 22^b, 22^c, and 22^d are respectively suited in size to check the flaring of tubes by the conical deflecting-surfaces 13, 14, and 15.

In the use of the particular form of my

invention herein chosen for illustration, the first step is to apply to the mandrel member 10 the correct size of stop sleeve for the particular tube which it is intended to flange or flare. This may be readily done by screwing on the desired stop sleeve, after which the pilot 11 of the mandrel is axially entered into a tube, such as 20. Hammer or mallet blows upon the head 18 of the mandrel will serve to drive the particular deflecting surfaces 12, 13, 14 or 15 (depending upon the size of the tube being flanged) into action to outwardly deflect the end of the tube to form a flange 21. The driving of the tool into the tube is continued until the edge of the flange 21 thereof firmly abuts against the annular stop shoulder 25 of the particular stop sleeve, which at the time is organized with the mandrel member.

While I have herein shown and described stop sleeves as adapted to be organized with the mandrel member by means of screw-threads, it will be apparent without further illustration that my invention comprehends other modes of securing the parts together for axial separation. I wish to call attention to the fact that the angle of the deflecting surfaces 12, 13, 14, and 15 may vary widely to meet different requirements.

By providing a series of stepped conical deflecting surfaces 12, 13, 14, and 15, instead of the continued surfaces shown in my copending application already referred to, the tube is more readily centered, should it exceed the size of the pilot 11. Furthermore, the annular stop shoulder of a given stop sleeve may lie well below the particular deflecting surface which it is intended to complement, so that even though the said stop sleeves are not fully screwed home, the likelihood of the flange of the tube working its way beneath the stop flange 24 is rendered negligible.

I claim:

1. In a flanging-tool, the combination with a mandrel-member provided at one end with a plurality of stepped tube-deflecting surfaces; of a separately-formed stop-sleeve axially removable from and adapted to embrace a portion of the said mandrel-member and provided with an inwardly-extending annular flange terminating in an annular stop-shoulder located in close proximity to one of the stepped tube-deflecting surfaces of the said mandrel-member for limiting and determining the flaring of a tube or similar article thereby.

2. In a flanging-tool, the combination with a mandrel-member formed upon its periphery with screw-threads and formed at one end with a plurality of stepped tube-deflecting surfaces; of a separately-formed internally-threaded stop-sleeve adapted to be axially threaded upon the said mandrel-member and provided with an inwardly-extending annular flange terminating in an annular stop-shoulder located in close proximity to one of the stepped tube-deflecting surfaces of the said mandrel-member for limiting and determining the flaring of a tube or similar article thereby.

3. In a flanging-tool, the combination with a mandrel-member comprising a relatively-large body-portion, a pilot projecting therefrom for entry into a tube, and a plurality of stepped tube-deflecting surfaces formed upon the said body-portion around the base of the said pilot; of a separately-formed stop-sleeve axially removable from and adapted to embrace a portion of the said mandrel-member and provided with an inwardly-extending annular flange terminating in an annular stop-shoulder located in close proximity to one of the stepped tube-deflecting surfaces of the said mandrel-member for limiting and determining the flaring of the tube or similar article thereby.

In testimony whereof, I have signed this specification.

EDWARD S. CORNELL, JR.