F. M. FURBER.

TUBE FLANGING IMPLEMENT.

APPLICATION FILED FEB. 2, 1918.

1,297,457. Patented Mar. 18, 1919.

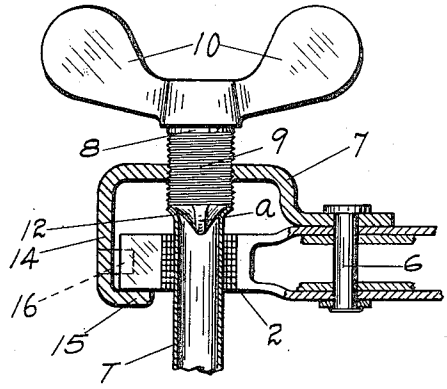

Fig. 2

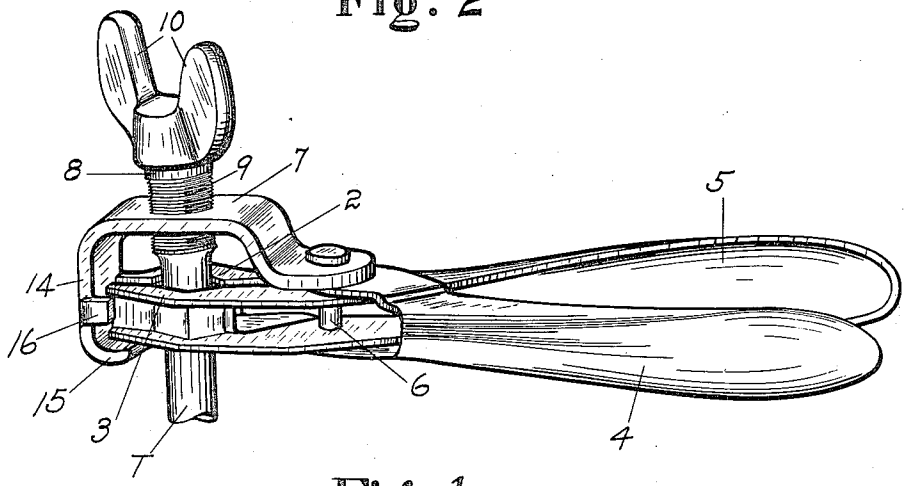

Fig. 1

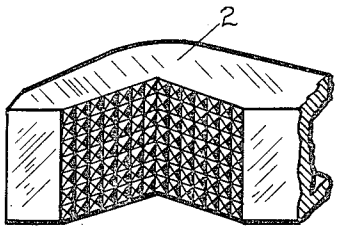

Fig. 4

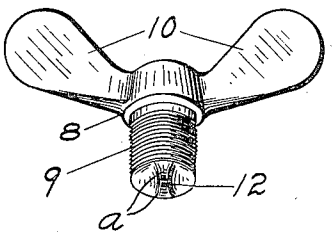

Fig. 3

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TUBE-FLANGING IMPLEMENT.

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To all whom it may concern:

Be it known that I, FREDERICK M. FURBER, a citizen of the United States, residing at Revere, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Tube-Flanging Implements, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to implements designed for use in flanging pipes and tubes, particularly those made out of relatively soft metals, such as copper, brass and lead. Such a flanging operation is often necessary in using pipe or tubing as for instance, in connecting or repairing gasolene lines for internal combustion engines. Usually copper or brass tubing of relatively small diameter is used to conduct the gasolene from the supply tank to the engine and it is necessary to flange the ends of the tube to fit it to the connectors at the opposite ends of the line or to couplings used at intermediate points in the line. It is difficult to perform this operation with any of the tools now available without splitting the tube, and if the tube has been cut exactly to the length required the splitting of the end is both annoying and expensive. Furthermore, it is often necessary to perform this flanging operation when the tube is in such a relatively inaccessible position so that the usual difficulties of making a satisfactory flange are greatly increased. The present invention aims to provide a tool with which such a flanging operation can be quickly and conveniently performed.

The nature of the invention will be readily understood from the following description of the embodiment of the invention at present preferred and the novel features will be pointed out more particularly in the appended claims.

Referring now to the drawings:

Figure 1 is a perspective view of a tube flanging tool constructed in accordance with this invention;

Fig. 2 is a vertical, longitudinal, cross sectional view through certain parts of the tool shown in Fig. 1 and showing the tool operating on a tube;

Fig. 3 is a perspective view of the tube flanging member; and

Fig. 4 is a perspective view of one of the jaws of the tool.

The implement shown comprises a tube clamping means and a tube flanging member designed to enter the end of the tube while it is held by said clamping means and to expand or flange the end of the tube.

The tube clamping means comprises a pair of gas pliers consisting of jaws 2 and 3, preferably formed integral with handles 4 and 5, respectively, that are secured together by a pivot pin 6. The jaws 2 and 3 are recessed to provide a space between them for the reception of the tube or pipe to be operated upon and the adjacent surfaces of the jaws are toothed, as best shown in Fig. 4, so that they will securely hold the tube against both rotative and axial movement. The recesses in the jaws are shaped, as clearly shown in Fig. 4, to grip and securely hold a great variety of sizes of tubes and to center the tubes; that is, to so position the tubes that the center or axis of each tube will be at a fixed distance from the pivot 6 regardless of the diameter of the tube.

Mounted on the pivot pin 6 is a bracket 7 that extends forward over the jaws 2 and 3 and the tube flanging tool 8 is mounted in this bracket 7. This tool comprises a threaded body 9, projecting through a correspondingly threaded hole in the bracket 7, a winged head 10, and a tube expanding point 12. The point 12 may be made substantially conical in form and the opposite sides then filed off or concaved, as clearly shown in the drawings, so as to form two ridges or edges *a* at diametrically opposite sides of the tapered point.

In using the device the tube or pipe T to be flanged is slipped through the jaws, which at this time are opened, and the handles 4 and 5 are then squeezed together to clamp the tube substantially as shown in Figs. 1 and 2. The tool 8 at this time is threaded backwardly so that its point is relatively remote from the jaws. This tool next is advanced by rotating it until the point 12 enters the end of the tube. Since the tool 8 is free to swing about the pivot 6 and since the distance from the axis of this tool to the pivot is equal to the distance from the center of the cavity between the jaws 2 and 3 to the pivot, the tool will always center itself in the end of a tube clamped between the jaws. As soon as the ridges *a* engage

the bore of the tube the rotative movement of the tool causes these members to exert an expanding action on the tube at diametrically opposite points, these points of contact, of course, being transferred around the tube as the tool is rotated. This rotative movement also advances or feeds the tool forward, although at a very slow rate since the teeth on the threaded body 9 have a very small pitch. The rotation of the tool is continued until the end of the tube has been expanded to the desired degree. Since the expanding action is very gradual and the expanding force is exerted uniformly on the entire wall of the tube, any danger of splitting the tube is eliminated. The peculiar constuction of the end portion 12 of the expanding tool enables it to fit nearly as great a variety of sizes of tubes as the pliers can accommodate. The flanges produced by the use of this tool fit the couplings and connectors much more accurately than they would if flanged in the usual manner. That is, the flanged end or expanded portion is more symmetrical. Furthermore, the action of the ribs *a* on the inside of the tube scrapes off the scale and, if the tube is very soft as for instance, if made of copper, is scrapes off a certain amount of metal so that a clean smooth surface is presented for contact with the couplings and fittings.

It is obvious that during the flanging operation the thrust of the tool against the end of the tube will tend to push the tube axially through the jaws and will also tend to bend the bracket 7 away from the jaws. The tube can be securely gripped by exerting sufficient pressure on the handles 4 and 5 and, in order to resist the tendency to bend the bracket, a part of this bracket is bent downwardly, as indicated at 14, Figs. 1 and 2, and its end is turned under the jaws 2 and 3, as shown at 15. This construction effectually prevents any tendency to spring or bend the bracket due to the thrust of the tool. If desired, ears 16 may be turned inwardly from the opposite sides of the part 14 where they will lie in the path of movement of the forward ends of the jaws and limit the relative swinging movement of the jaws and the bracket.

While I have herein shown and described the best embodiment of the invention of which I am at present aware, it is obvious that the particular embodiment shown may be considerably modified within the skill of the mechanic and the discretion of the designer, while still retaining the essential spirit and characteristics of the invention.

What I claim as new, is:

1. A tube flanging implement having, in combination, a tool having a tapered point constructed and arranged to enter the end of a tube, said point being provided with ribs or ridges to engage the end of the tube at separated points, whereby said tool point is operative through rotative movement to expand the end of the tube, a tube clamp capable of holding a variety of sizes of tubes for the operation thereon of said tool, and means for holding said tool and said clamping means in coöperative relationship to each other.

2. A tube flanging implement having, in combination, a pair of gas pliers provided with jaws to receive a great variety of sizes of tubes, a bracket mounted on said pliers, a rotatable tube flanging tool threaded through said bracket and having a tapered point provided to enter the end of a tube held by said pliers and also having ribs or ridges on said point operative through rotative movement to expand the end of the tube, said bracket having a part coöperating with said jaws to resist the thrust tending to bend the bracket away from the jaws.

3. A tube flanging implement having, in combination, a pair of gas pliers provided with jaws to receive a great variety of sizes of tubes, a bracket mounted to swing on the pivot of said pliers, and a rotatable tube flanging tool threaded through said bracket and having a tapered point constructed to enter the end of a tube held in said jaws, said point being provided with ridges or ribs arranged to engage the end of the tube at separated points and operative through rotative movement to expand the end of said tube, said bracket having a part cooperating with said jaws to resist the thrust tending to bend the bracket away from the jaws.

In testimony whereof I have signed my name to this specification.

FREDERICK M. FURBER.