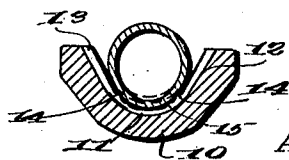
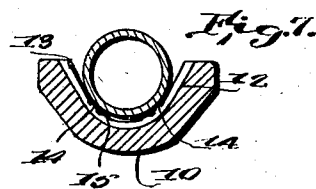
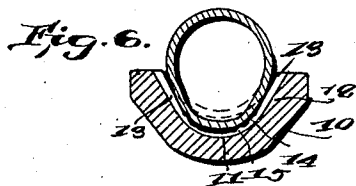
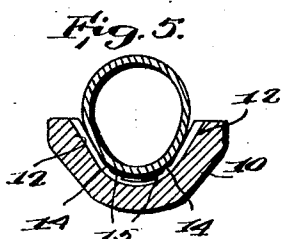
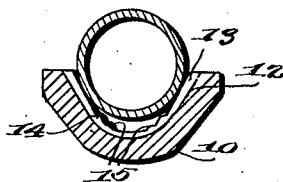
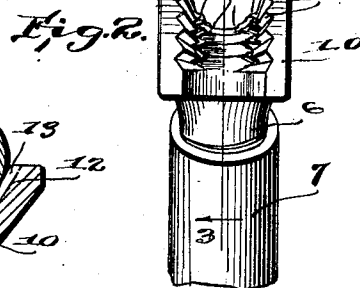
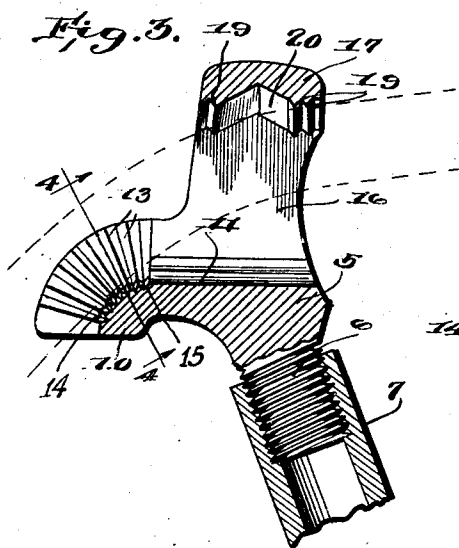
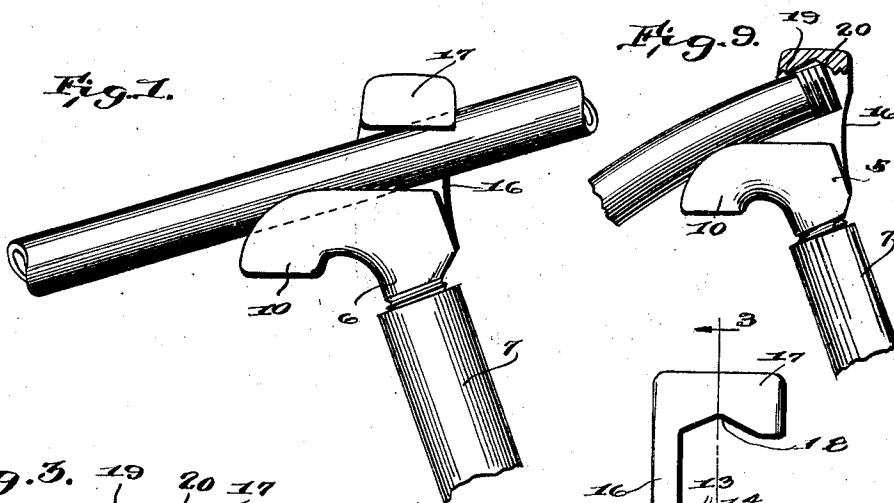


March 25, 1930.

A. B. ALLEN
PIPE BENDING TOOL
Filed March 12, 1929

1,752,220



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PIPE-BENDING TOOL

Application filed March 12, 1929. Serial No. 346,388.

My invention relates to pipe bending tools and more particularly to improvements in the tool set forth in my copending application Serial Number 166,200, filed February 5, 1927 now issued as Patent No. 1,712,414, dated May 7, 1929.

An object of the invention is to provide a pipe bending tool which may be conveniently and effectively employed to bend various sized thin wall conduits as well as the usual standard rigid heavy wall conduit.

Further the invention provides a bending tool of this character which will not cause the conduit to flatten out when being bent, but to the contrary will cause the conduit to assume a substantially circular configuration in cross section.

Still another object of the invention is to provide a bending tool which will positively grip the conduit so as to prevent slipping of the tool and incidental injury to the operator.

More specifically the invention provides a tool having coacting offset jaws, one of which is provided with an arrangement of teeth whereby the initial pressure exerted on the conduit will allow the same to expand or assume an egg shape in cross section and a further pressure on the conduit will force the same into its original cross sectional shape.

With the preceding and other objects and advantages in the mind the invention consists in the novel combination of elements, constructions and arrangements of parts and operations to be hereinafter more fully described, claimed and illustrated in the accompanying drawings, wherein:

Figure 1 is side elevation of my improved tool having a length of conduit engaged therewith;

Fig. 2 is an elevation taken at right angles to Fig. 1;

Fig. 3 is a vertical sectional view of the device and showing the conduit bent, the conduit being indicated by broken lines;

Fig. 4 is a transverse section taken on line 4-4 of Fig. 3;

Fig. 5 is a similar view illustrating the cross-sectional shape of the conduit after the initial pressure has been applied;

Fig. 6 is a similar view and showing the conduit after the full bending pressure has been applied, the dotted line indication illustrating the true outline of the conduit after the bend has been effected;

Fig. 7 is a view taken on line 4-4 similar to Figure 4 but showing a smaller pipe in position for bending;

Fig. 8 is a similar view, the full line position of the pipe indicating the shape of the same after the initial pressure and the dotted lines indicating the shape of the conduit after the full bending pressure has been applied; and

Fig. 9 is a side elevation of the device, partly in section and disclosing a length of conduit engaged therewith.

Referring to the invention in detail an elongated metallic head or casting is designated at 5 and is formed with a cylindrical exteriorly threaded shank 6 upon its under face. The shank 6 extends obliquely with respect to the vertical and receives a removable tubular handle or lever 7. At its opposite end the head is formed with a downwardly curved extension or jaw 10 whose curve corresponds to the curve to be given to the conduit to be bent.

A longitudinal groove extends throughout the length of the upper face of the head and extension and has a substantially concave or depressed bottom wall 11 and divergent side walls 12.

In practice the bend to the conduit starts from the inner end of the curved extension or jaw and from this point to the outer end of this member, the groove is formed with parallel teeth 13 which extend transversely along the side walls 12 and bottom wall 11. At the lower ends of the side walls the teeth are formed with inwardly directed lateral shoulders 14 which present longitudinally aligned rows of bearing points for the conduit when initial pressure has been applied through the medium of the lever 7. Below the shoulders 14 the teeth are formed with less prominent shoulders 15 which are stepped from the shoulders 14 and are located upon opposite sides of the longitudinal center of the bottom wall 11 of the groove.

A web 16 is formed with the head or casting 5 and projects at right angles from the upper face of the latter at one side of the head and is offset from the jaw or extension 10. An inwardly directed jaw 17 is formed with the upper end of the casting and extends at right angles thereto and overlies the head. An inverted V-shaped groove 18 is formed in the inner face of the jaw 17 and extends longitudinally of the latter. Groups of transversely extending teeth 19 are fashioned in the groove 18 at the ends of the jaw 17, one set of which is brought into play in making the bend as disclosed in Fig. 3. The other set of teeth are utilized in making short left hand bends. In this connection it will be apparent that the conduit will be arranged in the device in the reverse manner from that disclosed in Fig. 3.

The under face of the jaw 17 is further provided with an inverted V-shaped recess 20, one bevelled wall of which will be utilized as a protection housing for the threaded end of the pipe in making short bends or elbows. That is to say in making a short right hand bend one end of the conduit will be positioned against the jaw 17 with the threaded end projecting into the recess 20 while the conduit proper will be engaged by the jaw 10. As disclosed in Fig. 9 the threaded end of the conduit is received in the recess 20 and is protected against mutilation by reason of the conduit being engaged by the teeth in advance of the recess.

In the operation of the device the conduit is first engaged between the jaw 17 and the jaw 10. As the casting is rocked to the right by means of the hand lever, pressure is exerted against the conduit by the jaws. The first pressure is exerted against the pipe by the tooth at the inner end of the jaw 10 and the far end of the jaw 17. Due to the arrangement of the teeth in the groove in the jaw 10 the initial pressure expands or causes the conduit to assume the egg-shape disclosed in Fig. 5 bringing the under face of the conduit against the longitudinally aligned shoulders 14 and 15. By reason of the conduit being limited in its expansion by abutting the shoulders 15, continued strain on the conduit causes the shoulders 15 to press against the under face of the conduit and bend the same back to normal cross sectional shape as indicated in dotted lines in Fig. 5. In addition to the teeth acting as above stated these teeth and the teeth 19 successively grip the conduit thus insuring positive grip without any danger of the tool slipping.

The above outlined mode of operation applies to the bending of three-quarter inch thin wall conduit and in bending one-half inch conduit the same action takes place except the conduit first rests upon the shoulders 14 and out of contact with the portions

of the teeth on the divergent walls of the groove as disclosed in Fig. 7. When pressure is brought to bear on this size conduit it initially expands to the full line position disclosed in Fig. 8 so that upon continuous application of pressure the conduit being unable to expand any further than the bottom wall 11 of the groove the teeth 12 at this point press against the conduit to force the same to its original configuration as disclosed in broken lines in this figure. Inasmuch as no expansion occurs in bending heavy walled rigid conduits they may be bent in the same manner as thin walled conduits. That is to say the bending action is obtained by the teeth on the divergent walls of the groove and the teeth on the jaw 17.

From the above description it will be manifest that I have provided a tool which can be readily used for bending various sized thin walled conduits as well as the standard heavy walled or rigid conduit.

I claim:

1. In a pipe bending tool, a casting having an attaching shank upon its under face and a longitudinally curved channelled jaw at one end, a second jaw carried by the casting and offset inwardly from the curved jaw, the inner face of the curved jaw having transversely stepped surfaces whereby to permit the pipe to initially expand to an irregular configuration and then forced back into normal configuration during the bending operation.

2. In a bending tool, a casting having an attaching shank projecting from its under face, a downwardly curved channelled jaw formed with one end of the casting, a web formed with the casting at one side of the channelled jaw, a jaw projecting at right angles from the web and overlying the casting and cooperating with the channelled jaw in grasping a pipe therebetween, the channelled jaw having longitudinal rows of shoulders located upon opposite sides of the longitudinal center of the jaw, and with one row stepped beyond the other, so that application of pressure against the pipe will cause the latter to engage the shoulders upon cross sectional distortion of the pipe and thereby forced into normal cross section shape.

3. In a bending tool, a casting having an attaching member upon one face, and a downwardly curved channelled jaw projecting laterally from one end thereof, the channelled jaw having divergent side walls and a substantially concave bottom wall, teeth extending transversely of the bottom and side walls, the teeth having stepped surfaces to allow for expansion of the conduit and the subsequent reshaping when pressure is brought to bear upon the latter, and a second jaw fixed to the casting and disposed in opposed relation to its inner face and being offset from the channelled jaw.

4. In a variable diameter pipe bending tool,
a casting having an attaching shank pro-
jecting from its under face and a curved chan-
nelled jaw at one end upon one side of the
5 attaching shank, the curved jaw being sub-
stantially V-shaped in cross section and hav-
ing toothed stepped surfaces whereby to ac-
commodate pipes of various diameters and
to reshape the expanded pipe during the
10 bending operation.

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