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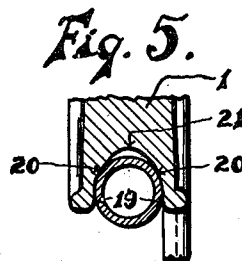
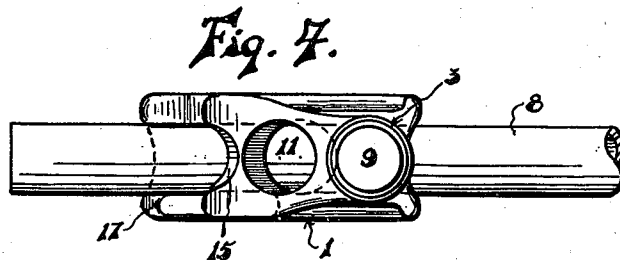
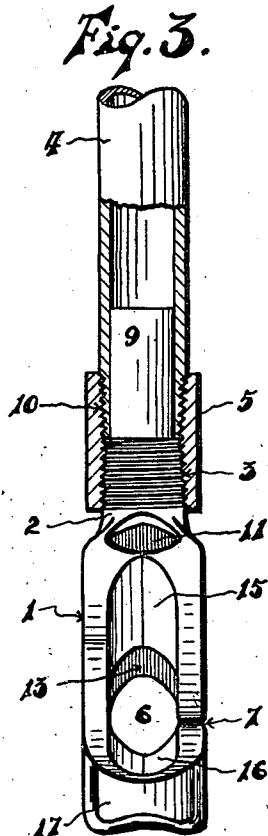
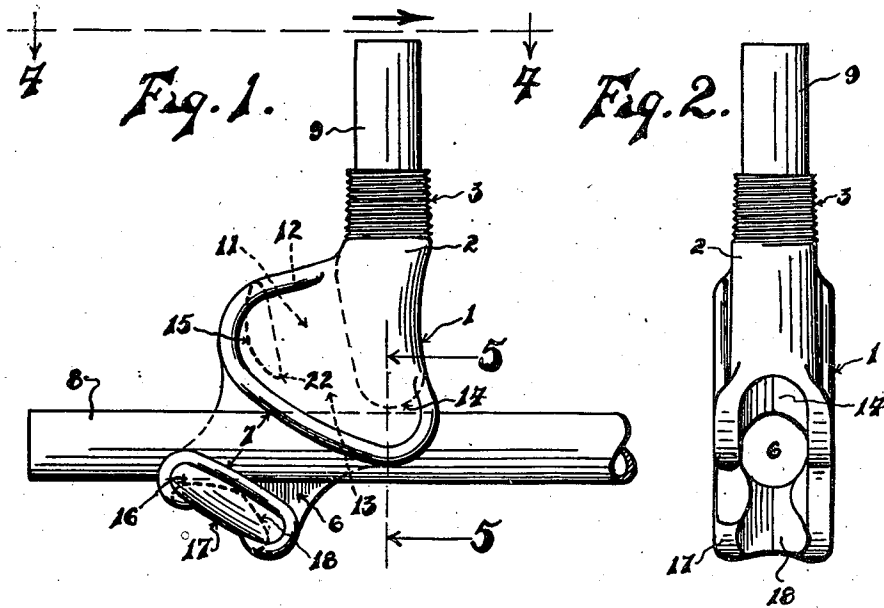
E. F. WHEELER

2,356,716

PIPE BENDING TOOL

Filed Feb. 8, 1941

2 Sheets-Sheet 1



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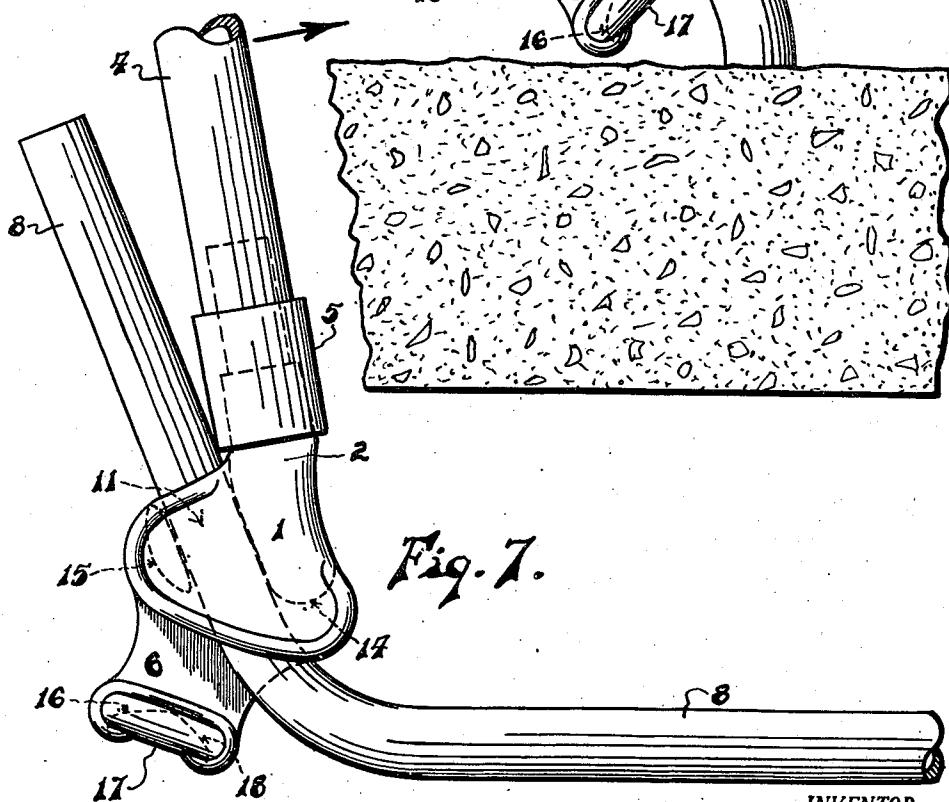
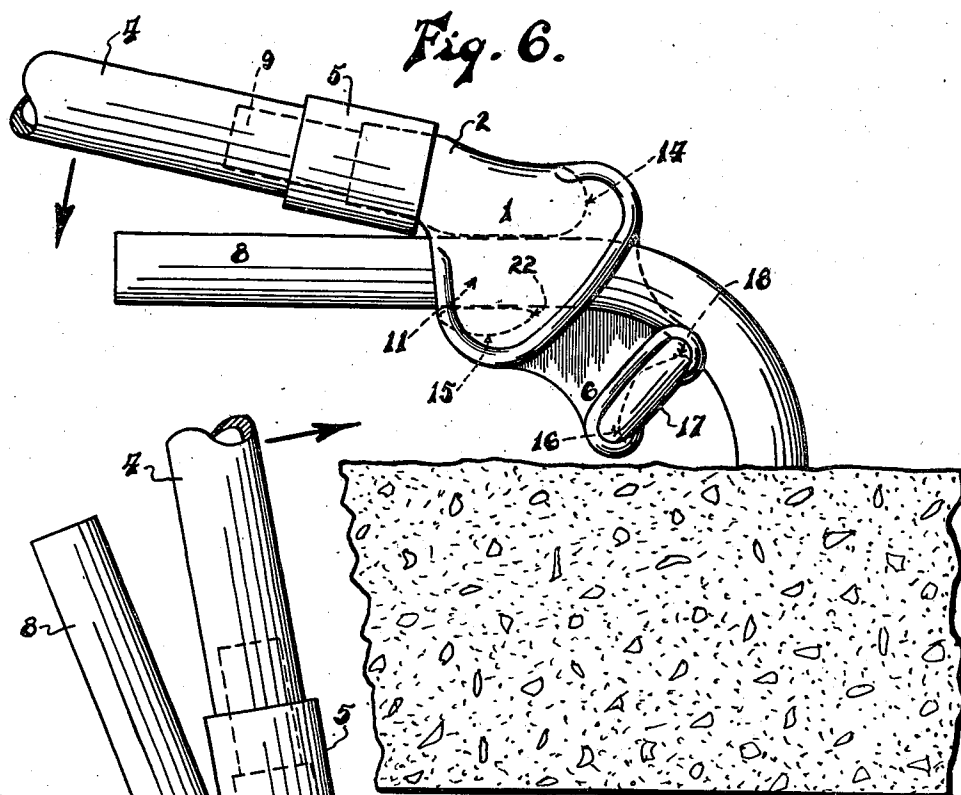
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,356,716

PIPE-BENDING TOOL

Edwin Frederick Wheeler, Baltimore, Md.

Application February 8, 1941, Serial No. 378,087

6 Claims. (Cl. 81-15)

This invention relates to an improved pipe or conduit bending tool, and its principal object is to bend electrical conduit under all conditions and in all positions without injury, so that wires may be readily pulled into the same without impairing their insulating properties.

A particular object is to bend pipe or conduit, extending vertically down or up out of concrete, brick or other building material at right angles to its previous position, or horizontally, without kinking or flattening the same in the bending operation.

Another object of my invention, is to provide a pipe bending tool, which will bend pipe at various radii, at any point or points along the full length of the pipe.

Another object is to provide a pipe or conduit bending tool, which has double fulcrum concave bending jaws constructed so that a conduit may be bent either backward or forward without reversing the tool, and without kinking the conduit in the bending thereof.

Still another object is to provide a pipe or conduit bending tool having an extension constructed on the handle shank which will strengthen the pipe handle at its weakest point, the threads, thereby preventing breakage, and possible injury to the operator of the tool.

A further object is to provide a pipe or conduit bending tool, having concave bending jaws constructed partially V-shaped to bear against grip and bend the conduit, and partially U-shaped to grip and hold the conduit to prevent flattening thereof.

It is the purpose of the inventor to provide, more especially for the electrical industry, a conduit bending tool, which will be universal in its application to bending conduit under all conditions without injury to the same. While there are similar tools previously invented, which bend conduit satisfactory under certain conditions, all of them have disadvantages which make them impractical for use as a universal tool for electricians. The present invention is constructed therefore, in such a manner as to overcome all the disadvantages of previously invented conduit benders, and in addition provide several practical improvements which will become apparent in the reading of the following description and by reference to the attached drawings, in which

Figure 1 is a front elevation of the tool with a small section of pipe or conduit in the tool in position to be bent,

Figure 2 is a side elevation of the tool, without the pipe, taken from the right,

Figure 3 is a side elevation of the tool, without the pipe, taken from the left, with part of the pipe handle and the pipe handle coupling in section,

Figure 4 is a plan view of the tool, with the pipe, taken on the line 4-4 of Figure 1,

Figure 5 is a transverse section taken on the line 5-5 of Figure 1,

Figure 6 is a view similar to Figure 1, showing the tool being used to bend a conduit at right angles to its original vertical position in a concrete floor,

Figure 7 is a view similar to Figure 1, but showing the pipe placed in the tool in a position to secure a sharper bend therein.

The pipe bending tool comprises a body portion 1, having a shank 2, a portion of which is threaded as at 3 in order to be attached to a pipe handle 4, by means of a coupling 5. The body portion 1 has a hole or passageway 6 extending from end to end which is exposed on one side of the body 1, by the opening 7, which is of sufficient width to allow the pipe 8, which is to be bent, to longitudinally pass through.

The hole 6 and its associated opening 7, forms two concave bending jaws within the body 1, the upper jaw formed above the opening 7 and adjacent to the main portion of the body 1, and the lower jaw formed below the opening 7 and within the lower extremity 17 of the body 1. Each of these jaws have two bending fulcrums as at 14, 15 and 18, 16.

In previously invented bending tools, the inventors' purpose was to provide a tool which has only one bending fulcrum, located at one end of the upper jaw. The other three ends or fulcrums of the two bending jaws were not designed to bend the pipe without subsequent kinking. Therefore, when it is necessary to use the tool in reverse, so that the pipe to be bent bears against one of these three fulcrums, the pipe is kinked or damaged. The present invention has four bending fulcrums each of which is designed similarly, as described above, and hereinafter described in detail.

The inventor has found by close observation and experiment over years of practical experience, that in order to bend pipe or conduit without kinking or flattening the same, it is necessary to use a bending tool which does not impart bending pressure at the inside of the bend of the pipes, as this portion of the pipe has a natural tendency to buckle or kink.

In the design of the curved concave fulcrum jaws of the present invention the backs of the jaws (as at 21, Fig. 5) never touch the pipe to

be bent. The pressure which tends to bend the pipe is imparted by the two opposite side walls of the V-shaped section of the fulcrums between points 20 and 21 (Fig. 5). The pressure from these surfaces is imparted at an angle of approximately 45 degrees towards the point 19 of the opposite side walls of the partially U-shaped section of the jaws, which walls prevent the tendency of the pipe to flatten from its normal circular cross section to an oval cross section.

Referring to Figure 5, the sides of the curved concave fulcrum shoulder 14 are partially U-shaped from points 19 to 20, but from points 20 to 21 they converge toward the point 21 to form an egg-shaped jaw as shown. Likewise, both internal jaws of the hole 6, with the shoulders 14 and 15 forming the ends of the upper jaw, and the shoulders 18 and 16 forming the ends of the lower jaw, are of the same shape. The V-shaped section of the jaws exert pressure against the pipe, during the course of the bending operation, causing the pipe to bend as desired, and the partially U-shaped portions of the sides of the jaws tend to prevent spreading or flattening of the pipe during the bending operation. The natural tendency of the pipe to flatten against the partially U-shaped sides of the jaws causes the pipe to tightly grip the said sides, thereby preventing the pipe from slipping, during the bending operation.

The extremity 9, of the shank 2 is of sufficient diameter and length to extend snugly into the pipe handle 4 in order to reinforce it to prevent breakage at the threads 10.

Extending through the body 1, obliquely with respect to the shank 2, and adjacent to the hole 6, is a hole 11, which has a diameter a little greater than the outside diameter of the pipe 8. The end 12 of the hole 11, adjacent to the threads 3, is flared or enlarged slightly, while the other end 13 opens into the upper jaw portion of the hole 6, forming at 14 a curved concave fulcrum shoulder over which the pipe is bent.

If the pipe is either in position as shown in Figure 1 or Figure 7, the said curved concave shoulder 14 is commonly used as a fulcrum, when the handle of the tool is moved in the direction of the arrow. If the pipe is in position as shown in Figure 1, and the handle of the tool is moved in a direction opposite to that of the arrow, the curved concave shoulder 15 is used as a fulcrum.

During the first mentioned bending operation with the pipe in position as shown in Figure 1, a second curved concave fulcrum area 16, provided adjacent to, and on the left side of the lower extremity 17 of the body 1, is used to hold the pipe. During the second mentioned bending operation, as shown in Figure 1, when the handle of the tool is moved in a direction opposite to that of the arrow, a second curved concave fulcrum area 18, provided adjacent to, and on the right side of the extremity 17 of the body 1, is used to hold the pipe. These second fulcrum areas 16 and 18 formed in the lower jaw hold the pipe, while the first mentioned fulcrums 14 and 15 respectively, in the upper jaw, bear against the portion of the pipe where the bend is to be made.

Referring to Figure 6, when a conduit is extending vertically out of concrete, brick, etc., and it is desired to bend the conduit down to a horizontal position close to the concrete, etc., requiring a short bend, the natural tendency of

the conduit is to kink or flatten out in the course of this bending operation with previously invented conduit bending tools. However, with the present invention, the hole 11 of the tool is passed over the conduit to a point close to the concrete, brick, etc., and a movement is imparted to the handle 4 in the direction of the arrow. With the first movement of the tool the conduit bears against the concave shoulder 22, formed at the intersection of the holes 6 and 11, as a fulcrum, and is bent until it comes into contact with the curved concave shoulder 18, which then also acts as a bending fulcrum, and due to the co-action of these two fulcrums the conduit is not kinked or flattened during the bending operation.

If it is desired to bend the conduit down to a horizontal position, (Fig. 6) but a longer bend, and not too close to the concrete, brick, etc., the conduit may be passed through the opening 7 into the hole 6, and with either the curved shoulder 18 or 16 as a fulcrum, and a movement of the handle in a direction with or opposite to, respectively, the arrow, this bending operation may be made. Of course, this bending operation requires considerably more skill in manipulation of the tool than if the bending is done by use of the hole 11, in order to prevent flattening or kinking of the pipe.

Of course, although the description of the bending operations of the two previous paragraphs pertain to conduit rising vertically from concrete, brick, etc., it is understood that the same bending operations may also pertain to conduit dropping out of concrete, brick, etc., in other words, the operator of the bending tool may stand on the floor, and by reaching the tool aloft bend the conduit horizontally from its previous vertical position. In this bending operation, if the conduit to be bent is extending down from a ceiling of a height from eight to eleven feet and the bending tool has a handle four feet long attached thereto, it will be necessary to shift the tool using both holes 6 and 11 to complete the bend.

It will be understood that the general contour and design of this bending tool may be varied within wide limits, without departing from the spirit of the invention, and the scope of the appended claims.

I claim:

1. In a pipe bending tool, comprising a body and a solid shank extending therefrom, the shank being provided with handle attaching means thereon, said tool including bending means within the said body consisting of curved upper and lower concave smooth walled bending jaws having portions which are V-shaped and other portions which are U-shaped in cross section from end to end of each said jaw, said jaws longitudinally forming a continuous changing convex bending fulcrum from end to end of each said jaw, and an opening in one side of the said body of sufficient width to receive the pipe to be bent and communicating with the said upper and lower jaws, said opening coacting with the said bending means to function and create bends at any point or points along the entire length of the pipe to be bent.

2. In a pipe bending tool, comprising a body and a solid shank extending therefrom, the shank being provided with handle attaching means thereon, said tool including bending means within the said body consisting of curved upper and lower concave smooth walled bending jaws

having portions which are V-shaped and other portions which are partly U-shaped in cross section from end to end of each said jaw, and an opening in one side of the said body of sufficient width to receive the pipe to be bent and communicating with the said upper and lower jaws, said upper and lower jaws being longitudinally convex from end to end in opposite directions from each other and forming two continuous changing bending fulcrums over either of which a pipe may be bent without kinking or otherwise damaging its cylindrical walls.

3. In a pipe bending tool, comprising a body and a solid shank extending therefrom, the shank being provided with handle attaching means thereon, said tool including bending means within the said body consisting of curved upper and lower concave smooth walled bending jaws having portions which are V-shaped and other portions which are partly U-shaped in cross section from end to end of each said jaw, said V-shaped portions of the said jaws being adapted to bend the pipe without kinking or otherwise damaging its cylindrical walls, and said U-shaped portions of the said jaws being adapted to grip and securely clamp the pipe during the bending operation, and an opening in one side of the said body of sufficient width to receive the pipe to be bent and communicating with the said upper and lower jaws, the said concave jaws being longitudinally convex from end to end to form bending fulcrums at each end of each said jaw over any of which the pipe may be bent without kinking or otherwise damaging its cylindrical walls.

4. In a pipe bending tool, comprising a body and a solid shank extending therefrom, the shank being provided with handle attaching means thereon, said tool including bending means within the said body, consisting of curved upper and lower concave smooth walled bending jaws having portions which are V-shaped and other portions which are partly U-shaped in cross section from end to end of each said jaw, and an opening in one side of the said body of sufficient width to receive the pipe to be bent and communicating with the said upper and lower jaws, and a second bending means included within the said body including a hole slightly larger in diameter than the pipe to be

bent, said hole located in the body obliquely both in respect to the said shank and the said jaws, said hole having two entrances, one located at the exterior of the said body adjacent to the base of the said shank and the second located within the said upper jaw of the first mentioned bending means.

5. In a pipe bending tool, comprising a body and a solid shank extending therefrom, the shank being provided with handle attaching means thereon, said tool including bending means within the said body, consisting of curved upper and lower concave smooth walled bending jaws having portions which are V-shaped and other portions which are partly U-shaped in cross section from end to end of each said jaw, said V-shaped portions of the said jaws being adapted to bend the pipe without kinking or otherwise damaging its cylindrical walls, and said U-shaped portions of the said jaws being adapted to grip and securely clamp the pipe during the bending operation, and an opening in one side of the said body of sufficient width to receive the pipe to be bent and communicating with the said upper and lower jaws, and a second bending means included within the said body including a hole slightly larger in diameter than the pipe to be bent, said hole located in the body obliquely both in respect to the said shank and the said jaws, said hole having two entrances, one located at the exterior of the said body adjacent to the base of the said shank and the second located within the said upper jaw of the first mentioned bending means, said second mentioned bending means also including portions of each of the said upper and lower concave bending jaws of the first mentioned bending means, which portions respectively and progressively act as bending fulcrums over which the pipe may also be bent by the second mentioned bending means.

6. In a pipe bending tool as described in claim 5, the first mentioned bending means being adaptable to create a bend of one radius, and the second mentioned bending means being adaptable to create a bend of another radius, selectively, at any point or points along the entire length of the pipe without kinking or otherwise damaging its cylindrical walls.

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