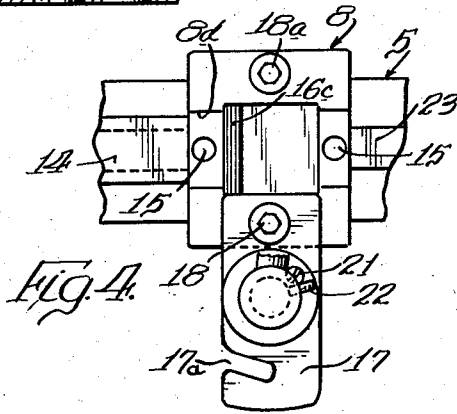
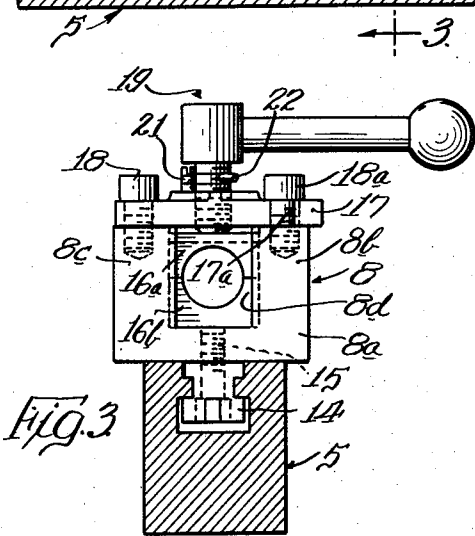
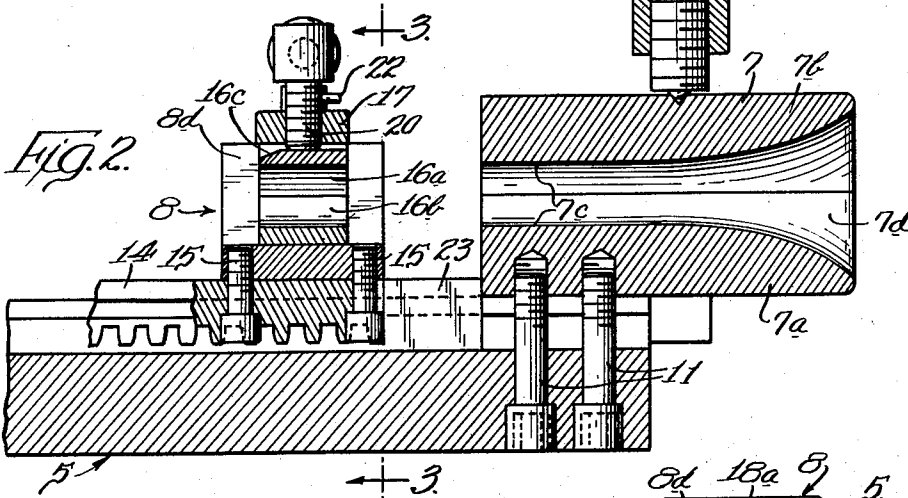
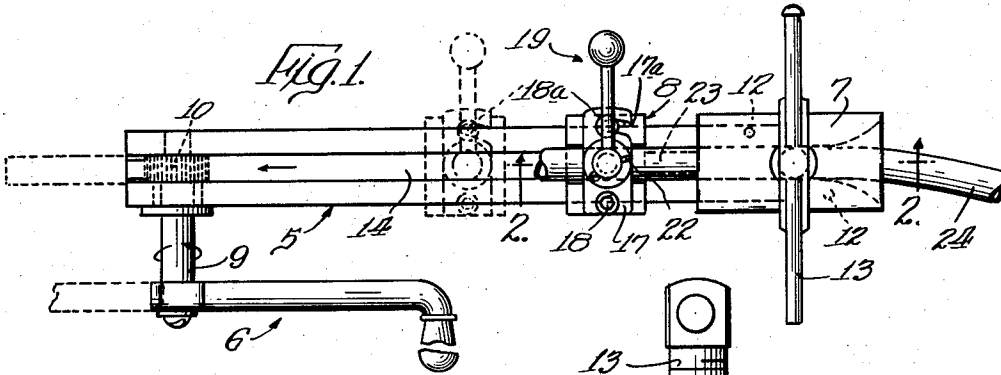


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 DRAW-TYPE TUBE STRAIGHTENER WITH CLAMPING
 MEANS ALLOWING TUBE TO BE LATERALLY
 INSERTED AND REMOVED
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DRAW-TYPE TUBE STRAIGHTENER WITH CLAMPING MEANS ALLOWING TUBE TO BE Laterally INSERTED AND REMOVED

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This invention relates to a metal tube straightener of the draw-type and has as a general object to provide a new and improved straightener.

A further object is to provide a tube straightener with a small number of simple parts for ease of manufacturing.

Another object is to provide a tube straightener of light weight and easy handling qualities, yet retaining the durability necessary for long usage.

Yet another object is to provide a tube straightener to which may be adapted numerous dies in order properly to straighten tubes of different size.

Other objects and advantages will appear from the following description, reference being had to the following drawings, in which:

Fig. 1 is a top plan view of the device partially in section, the dotted lines showing an extended position of the tube clamping means;

Fig. 2 is an enlarged sectional view taken along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 2; and,

Fig. 4 is a fragmentary top plan view of the device showing in detail the top of the tube clamping means.

As shown in the drawings for purposes of disclosure and as best seen in Fig. 1, the tube straightener comprises generally an elongated base piece 5 carrying at one end thereof a hand crank assembly 6 and at the other end a tube straightening die 7. Intermediate its ends, the base piece carries a tube clamping means 8. Forming part of the crank assembly 6 is a crank shaft 9 having fast thereon a crank pinion 10 which is internally of said base piece.

Comprising the tube straightening die 7 are complementary parts 7a and 7b. The part 7a is attached to the base piece 5 by means of bolts 11 and the part 7b is carried on pins 12 projecting from 7a, with the two parts secured firmly together by means of a C-clamp 13. Each part, 7a and 7b, has a semi-cylindrical groove 7c extending longitudinally thereof a distance substantially greater than the diameter thereof with the groove flaring outwardly at one end to form a funnel-like throat 7d.

Extending longitudinally of the base piece 5 and opening through the top thereof is an I-shaped slot. Inserted and slidable therein is a rack 14 which has teeth along the entire bottom length. In mesh with the teeth of the rack 14 is the crank pinion 10 so that rotation of the hand crank assembly 6 causes the rack 14 to move longitudinally along said base piece 5.

The tube clamping means 8 comprises a block 8a attached by means of bolts 15 to the rack 14 at the end nearest the straightening die 7. The block 8a is U-shaped with arms 8b and 8c, and a passage 8d, and is mounted on the rack 14 with the passage 8d extending parallel with the rack and with the open side facing in a direction away from the rack. The passage 8d is not of uniform size but is slightly restricted at each end so as to

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provide in the center of the block 8a an enlarged passage portion in which a pair of complementary tube gripping parts 16a and 16b is received loosely while being held against movement longitudinally of the passage. Each part has a semi-cylindrical groove extending longitudinally thereof for the reception therein of a tube to be clamped or gripped. Parts 16a and 16b with grooves of different size may be inserted in the block 8a to grip tubes which in turn are of different size or diameter.

To retain the parts 16a and 16b in the block 8a and to cause the parts to grip a tube so as to prevent slipping of a tube through the clamping means, there is swingably secured to one of the arms of the block, here the arm 8c, by means of a bolt 18, a retainer bar 17. Near its free end the bar 17 is formed with a deep notch 17a to receive within it a bolt 18a and above all to pass underneath the head of the bolt so as to engage the shoulders formed by extension of the head of the bolt radially outwardly beyond the bolt proper. When extending in this manner crosswise of the block and of the passage 8d therein, the bar, of course, effectively secures the parts 16a and 16b in the block.

Threadably mounted in the bar 17 to project in both directions therethrough is a bolt 20. The lower end of the bolt is adapted to engage and to apply pressure to the upper gripping part 16a and the upper end has non-rotatably fixed thereto an actuating lever 19. Also upstanding from the bar 17 is a stop screw 21 positioned to be struck by a pin 22 extending radially from the bolt 20. The stop pin 21 and the radially extending pin 22 thus limit rotation of the bolt actuating lever 19 to just slightly less than one revolution. It will be apparent that when the bar 17 is swung in position over the parts 16a and 16b, rotation of the actuating lever 19 in a clockwise direction as viewed in Figure 1 will cause the bolt 20 to advance and force the two parts 16a and 16b into tight gripping relation with a tube of proper size inserted therebetween. To facilitate this movement the upper part 16a has a bevelled surface 16c. Conversely, counterclockwise rotation will withdraw the bolt and release the pressure on the two parts and as the actuating lever is swung sufficiently in a counterclockwise direction to cause the pin 22 to engage the stop screw 21, rotation of the bolt relative to the bar 17 is arrested and continued application of force to the lever 19 will then cause the bar 17 likewise to be swung in a counterclockwise direction which, as viewed in Figure 1, is in a direction that will release the bar 17 from engagement with the bolt 18a, and from its position transverse of the passage in which the parts 16a and 16b are received. The stop screw 21 and pin 22 also serve another function, namely, that of preventing the bolt 20 from being accidentally unscrewed completely from the bar 17 and thus possibly lost.

A rack stop 23 is pressed into the horizontal slot of the base piece 5 and next to the straightening die 7 in order to prevent the rack and the attached clamping means 8 from accidentally sliding out of the base 5 when the die 7 is removed.

To operate the tube straightener, a die 7 of proper size is first secured to the base 5 and the parts of 16a and 16b with grooves of the proper size are inserted in the block 8a. A tube 24 to be straightened is then threaded through both the tube straightening die 7 and the clamping means 8 as in Fig. 1. The clamping means 8 is then brought into tight gripping relation to the tube by rotating the lever 19 clockwise. With the tube now firmly gripped in the clamping means, the hand crank assembly 6 is rotated so as to move the clamping means 8 away from the straightening die and thus draw the tube through the die causing the tube to be straightened.

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When the clamping means 3 reaches the end of the base piece 5, the front bolt 15 strikes the pinion 10 preventing further rotation. The lever 19 is then rotated counterclockwise so as to release the tight hold of the parts 16a and 16b on the tube 24. The clamping means 3, by means of the hand crank 6, is then returned to its original position on the base piece 5, and the process repeated until the desired length of tube is straightened. Upon completion, the clamping means 3 is released and the tube pulled back through the die 7. If the portion of a tube to be straightened is separated from an end thereof, it is best to remove the upper half 7b of the die 7 and the upper part 16a and insert the tube laterally. Removal can be similarly effected.

It will be understood that the invention is not limited to the exact details of the illustrative device but that the device may be variously modified without departing from the spirit and scope of the invention.

I claim:

1. In a draw-type tube straightener having an elongated base, means for moving and forming a tube, comprising in combination: a clamping member having an outwardly opening groove; means for moving the clamping member longitudinally on the base; a die member fixedly secured to the base and having an outwardly opening forming groove longitudinally aligned with the clamping member groove, said grooves being arranged to allow the lateral insertion therein of any portion of a tube to be straightened; and removable outer clamping and forming means on the clamping member and die member respectively, the outer clamping means being readily operable alternatively to effect a clamping of a tube during a movement of the clamping member away from the die member and to permit release of the tube and movement of the clamping member and clamping means longitudinally of the tube and toward the die member.

2. In a draw-type tube straightener, a clamping means for fixedly holding a tube, comprising: a block having a slot in the top thereof and extending from one side to the other; a two-piece clamp inserted in said slot, each piece being complementary of the other and having a semi-circular passage extending from one side to the other, said clamp being inserted in said block so that the passage of the clamp parallels the slot of the block; a retainer rotatably engaged at one end to one top side of said block so as to be swingable alternatively over and away from the top of said slot, the other end of said retainer being hook-like for engagement with a vertical extension on the top side of said block opposite the side where the retainer is rotatably engaged, said retainer having a threaded portion; a threaded clamping device received in said threaded portion, said clamping device being rotatable to exert pressure on the two-piece clamp so as to hold the tube fixedly therein; handle means for rotating said clamping device; and stop means including a horizontally extending pin on the clamping device above the retainer, and a vertically extending pin upstanding from said retainer adjacent said clamping device so as to contact said horizontal pin, said stop means acting to limit the rotation of said clamping device relative to the retainer, the direction of rotation of said clamping device to effect pressure release from said clamp being correlated

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directly with the direction of rotation of said retainer to swing away from the slot whereby operation of said handle means in one direction of rotation of said clamping device effects successive rotation of the clamping device and the retainer, the transfer of rotation from said clamping device to said retainer being controlled by said stop means.

3. In a draw-type tube straightener, clamping means for fixedly holding a tube, comprising in combination: a block having a pair of upstanding, laterally spaced arms; a retainer bar pivotally secured at one end to the outer end of one arm to extend alternatively across the space between the arms and outwardly therefrom; a bolt threadably mounted in the retaining bar and having an inner end projecting from said bar toward the block and an outer end extending outwardly from said bar; disengageable stop means associated with said bolt and bar to preclude positively, when engaged, the rotation of said bolt in one direction relative to said bar, said stop means including a pin on the bolt adjacent the retainer bar, and a pin projecting from the retainer bar to contact the pin on the bolt; handle means connected to the outer end of the bolt to rotate the same and defining a manipulating means arranged, when the stop means are engaged, to be disposed diametrically opposite said outer end of the bolt relative to said outer end of the one arm, the direction of rotation of said bolt when said inner end is being moved away from the block being correlated directly with the direction of pivoting of said bar to swing outwardly from said space whereby operation of said handle means in one direction of rotation effects successive rotation of the bolt and the retainer bar; and gripping parts carried between the arms and adapted to engage forcibly the periphery of a tube when acted upon by said inner end of the bolt.

4. The device of claim 3 wherein the handle means extends radially from the bolt in one direction only.

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