April 7, 1942. W. MORGAN ET AL 2,279,174

WIRE DRAWING APPARATUS

Filed Feb. 17, 1940 2 Sheets-Sheet 1

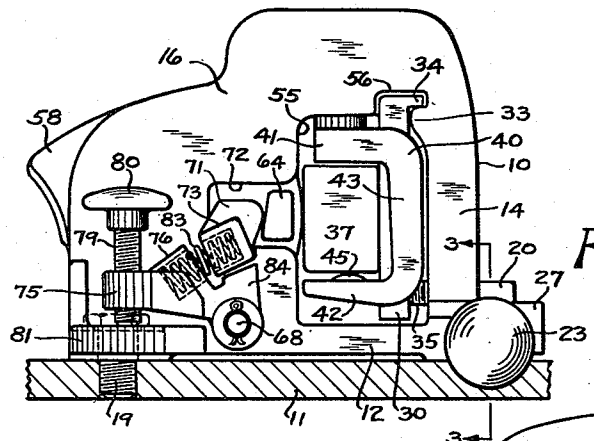


Fig. 1

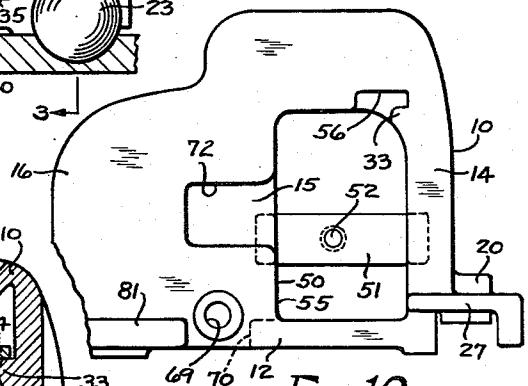


Fig. 10

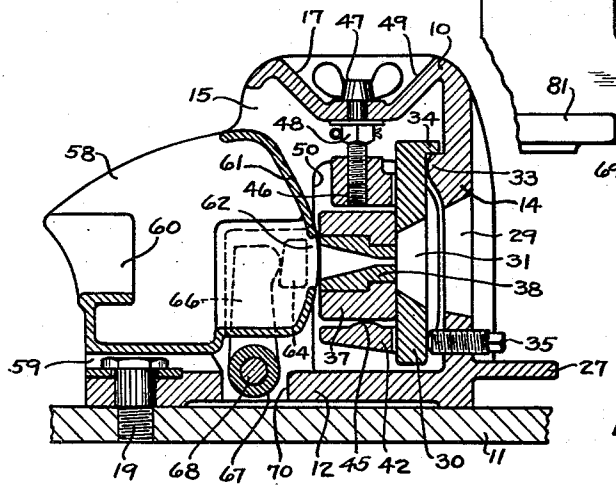


Fig. 2

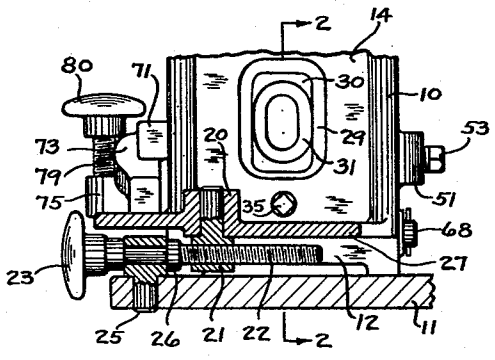


Fig. 3

INVENTORS
WELD MORGAN
JOHN N. WHALEN
BY Albert G. Blodgett
ATTORNEY

April 7, 1942. W. MORGAN ET AL 2,279,174

WIRE DRAWING APPARATUS

Filed Feb. 17, 1940 2 Sheets-Sheet 2

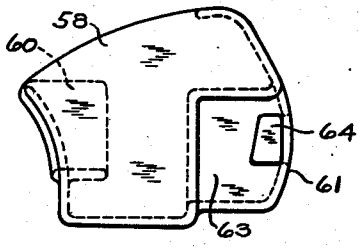


Fig. 4

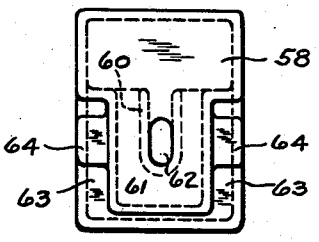


Fig. 5

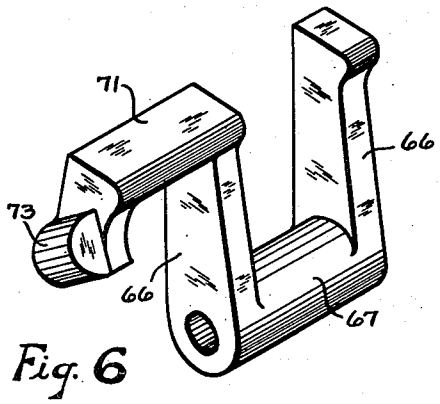


Fig. 6

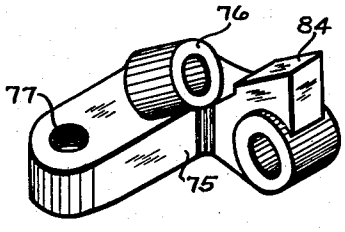


Fig. 7

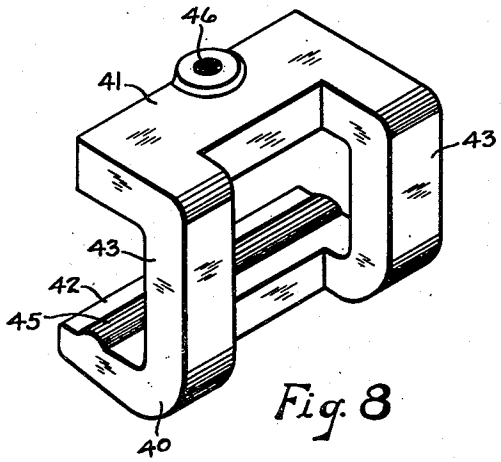


Fig. 8

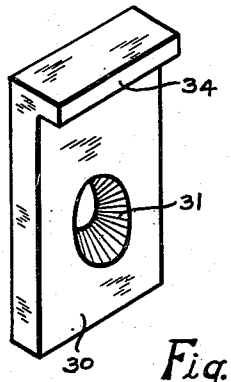


Fig. 9

INVENTORS
WELD MORGAN
JOHN N. WHALEN
BY Albert G. Blodgett
ATTORNEY

Patented Apr. 7, 1942 2,279,174

UNITED STATES PATENT OFFICE

2,279,174

WIRE DRAWING APPARATUS

Weld Morgan, Worcester, and John N. Whalen, Boylston, Mass., assignors to Morgan Construction Company, Worcester, Mass., a corporation of Massachusetts

Application February 17, 1940, Serial No. 319,388

14 Claims. (Cl. 205—25)

This invention relates to wire drawing apparatus, and more particularly to the construction and arrangement of holders for wire drawing dies.

In the drawing of wire the dies must be firmly supported to resist the tension of the wire, and yet they should be easily and quickly removable for replacement purposes when necessary. Provision for adjustment of the dies is also important. Not only should the dies be adjustable vertically and horizontally, but they should also be adjustable with respect to their angular position so that both the vertical and horizontal "cast" of the wire can be controlled. It is also necessary in many instances to provide for the application of soap or other lubricant to the wire.

It is accordingly one object of the invention to provide a holder for a wire drawing die which will support the die firmly in a desired position while allowing removal thereof rapidly and simply when desired.

It is a further object of the invention to provide a holder for a wire drawing die which will include relatively simple and conveniently operable mechanism for adjusting the position of the die.

It is a further object of the invention to combine a soap box with a die box and associated parts in a novel and advantageous manner whereby the die will be releasably held in a desired position.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

Referring to the drawings illustrating one embodiment of the invention and in which like reference numerals indicate like parts,

Fig. 1 is a side elevation of a die holder for a wire drawing die;

Fig. 2 is a longitudinal section through the device, taken on the line 2—2 of Fig. 3;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a side elevation of a soap box;

Fig. 5 is a front elevation of the soap box;

Fig. 6 is a perspective view of a clamp;

Fig. 7 is a perspective view of an actuating lever for the clamp;

Fig. 8 is a perspective view of a cage;

Fig. 9 is a perspective view of a plate; and

Fig. 10 is a side elevation of a die box.

The embodiment illustrated comprises a die box 10 which is mounted on a flat horizontal plate 11 forming part of a wire drawing machine. This box is provided with a bottom wall 12, a front wall 14, an inner side wall 15, an outer side wall 16, and a top wall 17. The top wall 17 extends rearwardly from the front wall 14 for about half the length of the box, and the rear portion of the box is open both rearwardly and upwardly.

The die box 10 is secured to the plate 11 therebeneath by means of a vertical screw 19 which extends through the rear portion of the bottom wall 12, the construction being such that the box may be swung about this screw as a pivot. On the front of the box there is provided a boss 20 in which a vertical swivel pin 21 (Fig. 3) is mounted, the lower portion of this pin being tapped to receive a horizontal screw 22 having a handle 23 on its outer end. This screw is supported in the upper portion of a second vertical swivel pin 25 mounted in the plate 11, the screw having a collar 26 thereon so that it may be rotated within the pin 25 but cannot move axially. It will be apparent that by turning the handle 23, the die box 10 may be swung in either direction desired about its pivot 19. The screw 22 may be concealed and protected by a horizontal plate 27 immediately above the same and preferably integral with the die box 10.

The front wall 14 of the die box is provided with an opening 29 through which the wire may pass, and immediately in the rear of this wall there is mounted an upright rectangular plate 30 having an opening 31 therein in substantial alignment with the opening 29. A horizontal rib 33 is formed on the rear face of the wall 14, above the opening 29, this rib providing a shoulder which is engaged by a flange 34 projecting forwardly from the upper edge of the plate 30. The upper portion of the plate engages the rear surface of the rib 33, and the lower portion of the plate engages the rear end of a horizontal set screw 35 which extends through the wall 14. By turning this set screw, the plate 30 may be tilted to a desired angle.

The plate 30 serves as a support for a die block 37 which engages the rear surface of the plate. This die block is of usual and well-known construction and includes an apertured wire-drawing die 38 (Fig. 2) which may be integral with the block but which is preferably made of some suitable material having a greater hardness than the main body of the block.

In order to support and adjust the block 37 vertically there is provided a cage 40 (Fig. 8) comprising an upper transverse horizontal bar 41 and a lower transverse horizontal bar 42 spaced therebeneath. These bars are connected at the

front by means of two laterally spaced uprights 43 which at assembly are located on opposite sides of the plate 30. On the upper surface of the lower bar 42 there is formed a rib 45 which engages the bottom surface of the die block 37. The upper bar 41 is provided with a tapped hole 46 arranged to receive the lower end of a vertical thumb screw 47 (Fig. 2) which is supported by the upper wall 17 of the die box and retained in position by a nut 48 beneath said wall. This wall 17 is upwardly concave to form a recess 49 for the reception of the upper handle portion of the screw, whereby the screw is protected from contact with loops of wire which might otherwise become caught thereon during the operation of the machine.

The inner side wall 15 of the die box is provided with a substantially rectangular opening 50 (Fig. 10) across which a horizontal bridge piece 51 extends. This bridge piece has a tapped hole 52 therethrough for the reception of a horizontal set screw 53 (Fig. 3). At assembly the die block 37 engages the end of this set screw and is thereby adjustably positioned laterally. The outer side wall 16 of the die box is likewise provided with a substantially rectangular opening 55, this opening being of sufficient size to allow the insertion of the die block therethrough. In order that the cage 40 and plate 30 may likewise be inserted from the outer side of the die box, the opening 55 is enlarged at its upper front corner, as indicated at 56, to correspond with the shape of the upper portion of the plate with its flange 34.

A soap box 58 is mounted within the rear portion of the die box and rests upon two ledges 59 (Fig. 2) on opposite sides of the screw 19. The rear wall of the soap box is provided with a forwardly extending flange 60 forming a U-shaped trough through which the wire may enter. The front wall 61 of the soap box is provided with an opening 62 through which the wire may pass into the die opening. The front surface of this wall 61 is convex in side elevation, and bears against the rear face of the die block 37, the convex surface permitting the rocking of the die block thereon as the screw 35 is adjusted.

The soap box is urged forwardly against the die block with a yielding pressure to hold the block in position against the plate 30. For this purpose the lower front portion of the box 58 is made narrower than the remaining portion, as shown in Figs. 4 and 5, to provide recesses 63 on opposite sides of the box. Near the front of each recess there is provided a laterally projecting lug 64, these lugs being engaged by the upper portions of two arms 66 which extend upwardly from opposite ends of a hub 67 located beneath the soap box. This hub is pivotally mounted on a transverse horizontal pin 68 which extends through aligned openings 69 in the side walls 15 and 16 of the die box 10. The bottom wall 12 of the die box is cut away at 70 to accommodate the hub 67. The outer arm 66 is provided with a lateral extension 71 which passes outwardly from the guide box through a suitably shaped rearward enlargement 72 in the opening 55. This extension 71 is formed with a spring socket 73 at its outer end. A lever 75 is pivotally mounted on the outer end of the pin 68, this lever being provided with a spring socket 76 and with a tapped hole 77. An upright screw 79 is mounted in the hole 77, with a handle 80 on its upper end, and with its lower end engaging a horizontal shelf 81 on the outer side of the guide box. At assembly, the sockets 73 and 76 are opposed, and serve to support the ends of a coiled compression spring 83 (Fig. 1). The lever 75 is provided with a lug 84 arranged to engage the spring socket 73 and limit the expansion of the spring 83 when the screw 79 is released sufficiently, thus relieving the die block from all pressure.

It will now be apparent that in the operation of the apparatus the screw 79 will bear against the shelf 81, and the spring 83 will be compressed, holding the arms 66 in firm engagement with the lugs 64. The soap box 58 will thus be urged forwardly against the die block 37, which will be supported in opposition to this forward thrust by the plate 30. By adjusting the screw 35, the plate 30 may be swung about the rib 33, this movement being permitted by the flexibility of the spring 83 which will expand or contract as may be necessary. In this manner the vertical cast of the wire can be controlled. By means of the screw 22 the entire die box can be swung in either direction about the pivot 19 to control the horizontal cast of the wire. The vertical position of the die block can be controlled by raising or lowering the cage 40 through the medium of the screw 47, and the horizontal position of the die block can be adjusted by means of the screw 53. When a die is to be replaced, the screw 79 will be released until the lug 84 is brought into contact with the spring socket 73. This will prevent further expansion of the spring 83 and relieve the die block 37 from the pressure of the soap box. The die block can then be removed laterally through the opening 55. The flange 60 makes it possible to fill the soap box with powdered lubricant to a greater depth without leakage thereof at the rear end of the box, thereby avoiding the necessity for adding lubricant at frequent intervals.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. Wire drawing apparatus comprising a die box, a member mounted therein, a die block mounted behind said member, spring means yieldably urging the die block forwardly into engagement with said member, and means to adjust the angular position of the member relative to the die box and thereby vary the cast of the wire.

2. Wire drawing apparatus comprising a die box, a member mounted therein, a die block mounted behind said member, a soap box located behind the die block, spring means yieldably urging the soap box forwardly against the die block to hold the die block in contact with said member, and means to adjust the angular position of the member relative to the die box and thereby vary the cast of the wire.

3. Wire drawing apparatus comprising a die box, an upright plate mounted therein, a die block mounted behind the plate, spring means yieldably urging the die block forwardly into engagement with the plate, and means to adjust the plate relative to the die box about a transverse horizontal axis and thereby vary the vertical cast of the wire.

4. Wire drawing apparatus comprising a die box having a front wall, a horizontal rib on the rear face of the wall and above the draft line, an upright plate mounted behind the wall and engaging the rib, a screw extending rearwardly

through the wall below the draft line and into engagement with the plate, a die block mounted behind the plate, and means urging the die block forwardly against the plate.

5. Wire drawing apparatus comprising a die box having a front wall, a horizontal rib on the rear face of the wall and above the draft line, an upright plate mounted behind the wall and engaging the rib, a screw extending rearwardly through the wall below the draft line and into engagement with the plate, a die block mounted behind the plate, and means yieldably urging the die block forwardly against the plate.

6. Wire drawing apparatus comprising a die box having an upper wall, a cage mounted within the die box beneath the wall, a die block mounted in the cage, and a vertical screw extending through the wall to provide an adjustable support for the cage, the screw having a handle portion at its upper end, and the wall being upwardly concave to form a recess for the reception of the handle portion.

7. Wire drawing apparatus comprising a die box, a die block therein, a soap box within the die box and behind the die block, the soap box having two lugs projecting laterally from opposite sides thereof, a hub mounted beneath the soap box and arranged to pivot about a transverse horizontal axis, two arms extending upwardly from the hub on opposite sides of the soap box and engaging the rear surfaces of the respective lugs, and means to turn the hub about its axis and thereby urge the soap box forwardly into engagement with the die block.

8. Wire drawing apparatus comprising a die box, a die block therein, a soap box within the die box and behind the die block, the soap box having recesses on opposite sides and a laterally projecting lug in each recess, a hub mounted beneath the soap box and arranged to pivot about a transverse horizontal axis, two arms extending upwardly from the hub into the respective recesses and engaging the rear surfaces of the lugs, and means to turn the hub about its axis and thereby urge the soap box forwardly into engagement with the die block.

9. Wire drawing apparatus comprising a die box, a die block therein, a soap box within the die box and behind the die block, the soap box having two lugs projecting laterally from opposite sides thereof, a hub located beneath the soap box, a transverse pin forming a pivotal support for the hub, two arms extending upwardly from the hub on opposite sides of the soap box and engaging the rear surfaces of the respective lugs, one of said arms having a lateral extension which passes outwardly through an opening in the adjacent side of the guide box, and means cooperating with said extension to urge the same forwardly and thereby hold the soap box in engagement with the die block.

10. Wire drawing apparatus comprising a die box, a die block therein, a soap box within the die box and behind the die block, the soap box having two lugs projecting laterally from opposite sides thereof, a hub located beneath the soap box, a transverse pin forming a pivotal support for the hub, two arms extending upwardly from the hub on opposite sides of the soap box and engaging the rear surfaces of the respective lugs, one of said arms having a lateral extension which passes outwardly through an opening in the adjacent side of the guide box, a lever mounted on the pin adjacent the said extension, a screw mounted in the lever, means on the die box forming an abutment for engagement by the end of the screw, a compression spring arranged to transmit a yielding force from the lever to the extension and thus urge the soap box forwardly against the die block, and means providing an angularly adjustable support for the front surface of the die block.

11. Wire drawing apparatus comprising a die box, a die block therein, a soap box within the die box and behind the die block, the soap box having two lugs projecting laterally from opposite sides thereof, and means engaging the rear surfaces of the lugs to urge the soap box forwardly into engagement with the die block.

12. Wire drawing apparatus comprising a die box, a die block therein, and a soap box within the die box and behind the die block, the soap box having a rear wall provided with a flange which extends forwardly into the soap box and forms a U-shaped trough through which the wire enters the soap box.

13. As an article of manufacture a soap box for wire drawing apparatus, said box comprising a rear wall provided with a flange which extends forwardly into the box and forms a U-shaped trough through which the wire enters the box.

14. Wire drawing apparatus comprising a die box having an upper wall, a cage mounted within the die box beneath the wall, the cage including spaced upper and lower transverse bars connected at the front by two laterally spaced uprights, means mounted on said wall for adjusting the cage vertically, a die block mounted between said bars, an upright plate separate from the cage and mounted in the die box between the said uprights of the cage, the plate engaging the front surface of the die block to support the same against the pull of the wire, and means to adjust the plate relative to the die box about a transverse horizontal axis and thereby vary the vertical cast of the wire.

WELD MORGAN.
JOHN N. WHALEN.