Nov. 19, 1929. W. U. BOEDEKER 1,735,850

WIRE DRAWING APPARATUS

Filed Sept. 3, 1926

Fig. 1

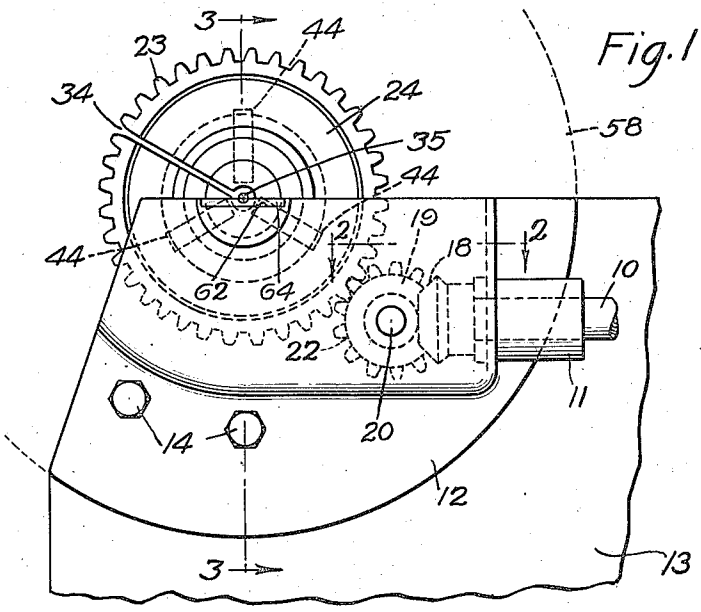
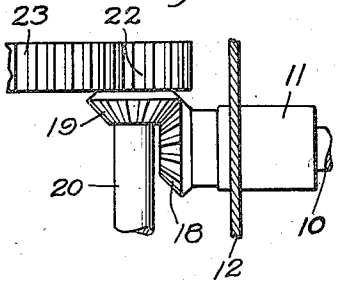


Fig. 2



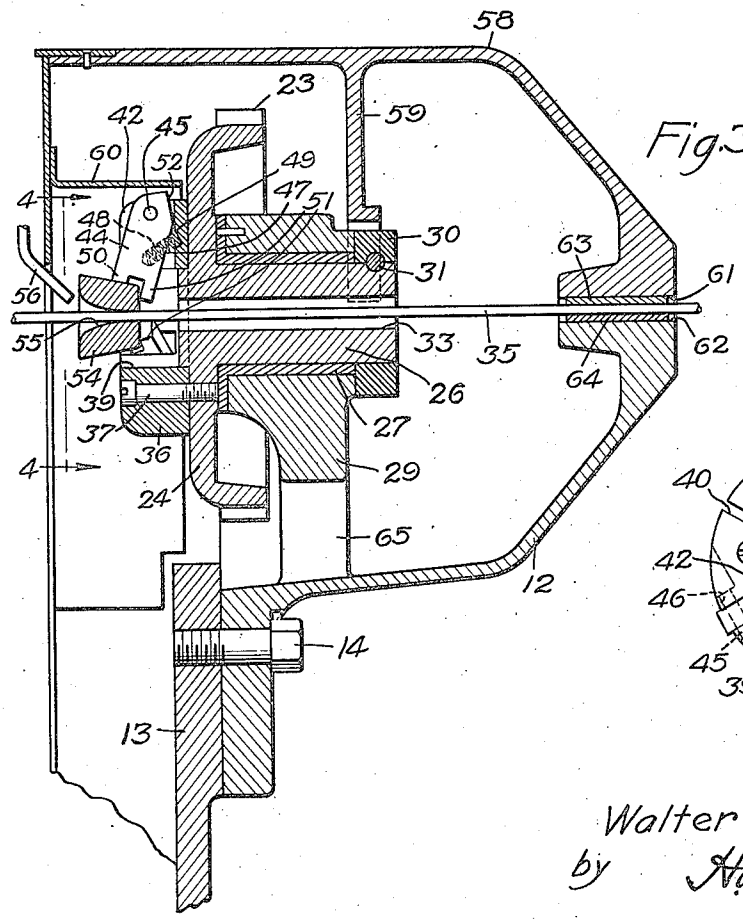
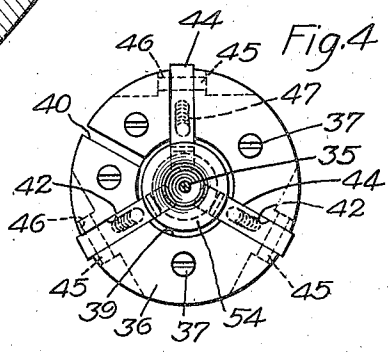


Fig. 3

Fig. 4



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UNITED STATES PATENT OFFICE

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WIRE-DRAWING APPARATUS

Application filed September 3, 1926. Serial No. 133,358.

This invention relates to wire drawing apparatus, and more particularly to mountings for wire drawing dies.

The object of the invention is to provide an apparatus for accurately and rapidly producing wire of a desired diameter, which is free from irregularities and is of uniform cross section.

In accordance with the general features of the invention, there is provided a rotatable plate provided with an axial bore and a slot extending radially outwardly from the bore to the edge thereof through which the wire to be drawn may be inserted. A die block, also provided with a bore and slot is secured to the plate, which block is provided with levers for centering and gripping a die while tension is exerted on the wire being drawn therethrough and for forcibly ejecting the die from the die block when the trailing end of the wire passes through the die.

It is believed that the invention will be clearly understood from the following detailed description taken in connection with the accompanying drawing, in which

Fig. 1 is an end elevation of an apparatus embodying the invention with the cover portion thereof removed to disclose parts otherwise hidden;

Fig. 2 is a fragmentary sectional view thereof taken substantially on line 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional view thereof taken substantially on line 3—3 of Fig. 1, and

Fig. 4 is a fragmentary sectional view taken substantially on line 4—4 of Fig. 3.

In the drawing in which like numerals designate like parts throughout the several views, the numeral 10 designates a shaft which is mounted in a bearing 11 in a housing 12 which is in turn secured to a framework of the apparatus 13 in any suitable manner such as by bolts 14—14, which shaft may be connected to a source of power (not shown) and driven in any suitable manner. Upon one end of the shaft 10 is mounted a bevel gear 18 (Fig. 2) which engages with a corresponding bevel gear 19 mounted upon a shaft 20 also mounted in the housing 12. Formed integral with the bevel gear 19 is a spur gear 22 which meshes with gear teeth 23 formed upon the periphery of a plate 24 which is mounted by means of an integral hub 26 in a suitable bearing 27 carried by a standard 29 secured to the housing 12, a collar 30 pinned to the hub 26 by means of a pin 31 firmly locking the plate 24 in operative position. An axial bore 33 is provided through the plate 24 and the hub 26 for the passage of a wire 35 and a radial slot 34 extends therefrom through the hub 26 and the plate 24 to the edges thereof so that the wire 35 may be inserted.

A circular die block 36 is rigidly secured to the face of the plate 24 in any suitable manner such as by means of bolts 37—37, which block is provided with a large axial aperture 39 and a radial slot 40 registering with the radial slot 34 in the plate 24. A plurality of radially extending grooves 42—42 are provided in the die block 36, one of which is directly opposite the slot 40 and the others of which are symmetrically located with respect to the first mentioned groove and with each other. A lever or finger 44 is inserted in each of the grooves 42—42 and the levers are pivotally secured therein by means of pins 45—45 which are driven through holes 46—46 provided in the die block 36 at right angles to and intersecting the grooves 42—42. The levers 44—44 are pressed to the left as seen in Fig. 3 by coil springs 47—47 which are inserted in sockets 48—48 provided therein and which engage spring seats 49—49 provided in the bottom of the grooves 42—42. The levers 44—44 are provided at their inner ends with short arms 50—50 and longer arms 51—51 and at their outer ends with inclined surfaces 52—52 designed to contact with the bottom surfaces of the grooves 42—42 to prevent the levers 44—44 from being forced too far outwardly by the springs 47—47. A removable die 54 which is of the shape of a conical frustum and which is provided with a central opening 55, the diameter of the inner end of which corresponds with that of the finished wire, is threaded on the wire 35 and placed into contact with the levers 44—44 in the position shown in Fig. 3.

A small pipe 56 which may be connected to a source of supply (not shown) of a lubricating material such as a soap solution is se-

cured in any suitable manner to the apparatus adjacent the die 54 to furnish a lubricant for rendering the drawing operation easier, while a removable housing 58 is provided to cooperate with the lower housing 12 to cover the apparatus, which housing is provided with baffles 59 and 60 to prevent the lubricating medium from being hurled to the right as seen in Fig. 3 beyond the rotating mechanism. The upper and lower housings 58 and 12 are provided with slots 61 and 62 in which felt pads 63 and 64 are inserted to wipe off the lubricating material from the finished wire and an aperture 65 is provided in the standard 29 to permit the lubricating material to run into a suitable collecting chamber (not shown).

The operation of the apparatus is as follows: The advance end 35 of a supply of wire to be drawn is reduced in size in any suitable manner and is inserted through the aperture 55 in the die 54. The cover 58 is then removed and the advance end of the wire is inserted through the slots 34 and 40 in the plate 24 and the die block 36 into the position shown in Fig. 3 when the advance end of the wire is secured to any suitable tensioning means such as a capstan (not shown). The cover 58 is then replaced, the supply of lubricant is connected with the pipe 56, and the mechanism driving the shaft 10 and the tensioning device is started, when the plate 24 will be revolved through the gears 23, 22, 19 and 18 and the wire 35 will begin to advance to the right as seen in Fig. 3 through the apparatus. The die 54 will be drawn along with the wire 35 through the apparatus by the tensioning device until it contacts with the arms 51—51 on the levers 44—44 and will force them to the right as seen in Fig. 3 against the force of the springs 47—47 until the shorter arms 50—50 contact with the inclined edge thereof whereupon the die 54 will be accurately centered and will be gripped tightly in operative position. The levers 44—44 will grip the die 54 so tightly that the die will be rotated by the plate 24 as if integral therewith and the wire will be drawn through the die and reduced to the desired diameter until the supply of wire is exhausted. When the trailing end of the wire passes through the die 54, there is no longer any force urging the die against the levers 44—44 and the springs 47—47 will then force the levers to the left as seen in Fig. 3, thereby ejecting the die which will fall to the bottom of the apparatus. The various driving mechanisms may then be stopped and the above operation repeated.

By making the side surface of the die conical and by spacing the gripping levers symmetrically around the die block the die is automatically centered in the die block when it is drawn against the levers, while by causing the die to rotate with the die block as the wire is being drawn therethrough the reduced wire is made of uniform cross-section and is free from any irregularities which might result from unequal wearing of a stationary die. Also by providing springs to cause the gripping levers to expel the die when the trailing end of the wire passes therethrough, the apparatus is automatically placed in condition for the reception of another wire with a die threaded thereon without loss of time for removing the die.

What is claimed is:

1. In a wire drawing apparatus, a rotatable member, a die, means responsive to tension on the wire for securing the die in operative position with respect to the rotatable member, and resilient means controlling said means for forcibly ejecting the die from operative position and rendered effective when tension on the wire is removed.

2. In a wire drawing apparatus, a rotatable member, a die block rigidly mounted thereon, a die, and levers pivotally mounted on the die block and controlled by the wire passing through the die for centering and gripping the die in the die block while wire is being drawn therethrough.

3. In a wire drawing apparatus, a rotatable plate, a die block rigidly mounted thereon provided with a central opening, a die, means for centering and securing the die in the opening in the die block while wire is being drawn therethrough, and means for forcibly ejecting the die from the opening in the die block when tension on the die is removed.

4. In a wire drawing apparatus, a rotatable member provided with a central bore and a radial slot extending from the bore to the edge thereof, a die block rigidly mounted thereon provided with a central opening and a radial slot registering with the first mentioned slot, for the admission of the wire, a die, and levers pivotally mounted on the die block and controlled by the wire passing through the die for centering and gripping the die to cause the die to rotate with the die block when wire is drawn therethrough.

5. In a wire drawing apparatus, a rotatable member provided with a central bore and a radial slot extending from the bore to the edge thereof, a die block rigidly mounted thereon provided with a central opening and a radial slot registering with the first mentioned slot, a die, levers pivotally mounted on the die block for centering and gripping the die to cause the die to rotate with the die block when wire is drawn therethrough, and means for forcibly ejecting the die from operative position when tension on the wire being drawn is removed.

6. In a wire drawing apparatus, a die, a rotatable member, a die block carried thereby, a plurality of levers pivotally mounted and

radially positioned on the die block for securing and centrally positioning the die and provided with die receiving recesses, and a spring associated with each lever to actuate the lever for forcibly ejecting the die from the die block when tension on a wire being drawn is removed.

7. In a wire drawing apparatus, a die having a tapered external wall, a mounting therefor, a plurality of spring controlled levers pivoted thereon and having bifurcated ends extending inwardly in a radial direction toward the die, shorter furcations of the levers engaging the tapered wall of it thereby wedging the die therebetween in response to the tension exerted by the drawing of a wire through the die and longer furcations of the lever engaging the forward end wall of the die to eject it from the mounting upon the removal of the tension from the wire.

8. In a wire drawing apparatus, a die mounting therefor, a plurality of levers pivoted thereon and having bifurcated ends extending inwardly toward and engaging the die, one furcation of each lever engaging the forward end surface of the die, and the other and shorter furcation engaging the side wall of the die to cooperate with the other levers in securing the die in the mounting when the levers are actuated by the passage of a wire through the die, and springs associated with and compressed by such actuation of the levers and becoming effective when the tension on the wire is removed to move the levers in a reverse direction causing the longer furcations thereof to eject the die from the mounting.

In witness whereof, I hereunto subscribe my name this 19th day of August, A. D. 1926.

WALTER ULRIC BOEDEKER.