July 18, 1933. J. L. ALDEN 1,918,237

WIRE DRAWING APPARATUS

Filed Jan. 9, 1930

Fig. 1.

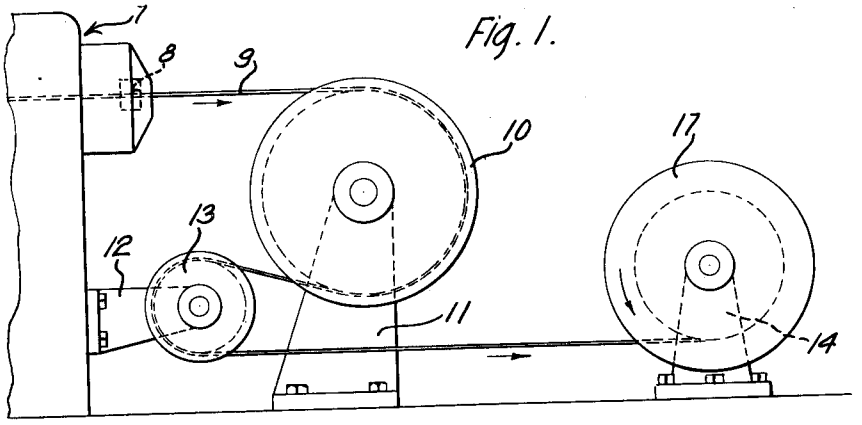


Fig. 2.

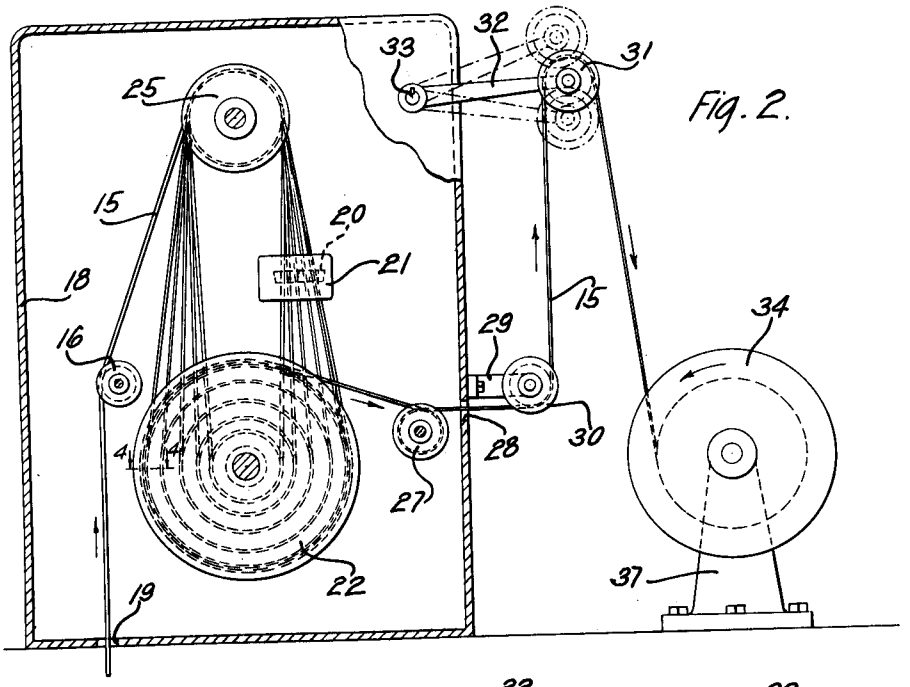


Fig. 3.

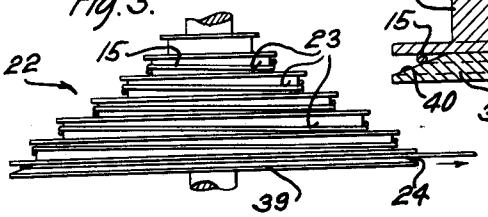


Fig. 4.

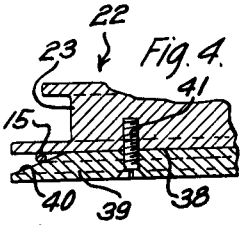
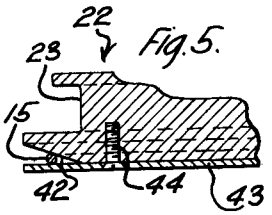


Fig. 5.



Inventor
John L. Alden
By H. B. Whitfield Atty.

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UNITED STATES PATENT OFFICE

JOHN L. ALDEN, OF LA GRANGE, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

WIRE DRAWING APPARATUS

Application filed January 9, 1930. Serial No. 419,669.

This invention relates to wire drawing apparatus, and more particularly to capstans for wire drawing machines.

An object of the invention is the provision in a wire drawing machine of a simple and efficient means for advancing the wire.

In accordance with one embodiment, the invention contemplates the provision, in wire drawing machines, of a capstan having a groove formed thereon for drawing the wire through the last or finishing die of the machine at a constant speed and consequently to reduce the tractive force required of a take-up device. This capstan may be formed by leaving an end face of the usual capstan plane and attaching thereto a plate having a beveled edge so as to provide a triangular peripheral groove for receiving and firmly gripping the wire during the operation of the capstan to draw it through the finishing die at a constant speed. This peripheral groove may also be provided by forming a beveled edge on the face of the capstan and attaching a flat plate thereto.

Other objects and advantages of the invention will be apparent from the following detailed description when considered in conjunction with the accompanying drawing, wherein

Fig. 1 is a fragmentary side elevational view of one type of wire drawing machine showing the improved capstan for advancing the wire from the last or finishing die of the machine to a take-up mechanism;

Fig. 2 is a fragmentary side elevational view, parts being shown in section, of another type of wire drawing machine showing the preferred form of the invention;

Fig. 3 is a detailed plan view of the capstan shown in Fig. 2;

Fig. 4 is an enlarged fragmentary sectional view taken on the line 4—4 of Fig. 2 in the direction of the arrows, showing one method of forming the triangular peripheral groove, and

Fig. 5 is a transverse horizontal sectional view through a capstan showing another embodiment of the invention in its method of accomplishment.

Referring now to the drawing wherein like reference characters designate the same parts throughout the several views, the numeral 7 designates generally a wire drawing machine of a well known type provided with a finishing die 8. A wire 9 is advanced through the machine in the usual manner to the finishing die 8, and then passed around a capstan 10 journaled in a standard 11 and driven synchronously with the driven members of the wire drawing machine 7 by gearing (not shown). A bracket 12 attached to the wire drawing machine 7 has mounted thereon an idler 13 which is so positioned as to maintain the wire 9 in contact with the capstan 10 for approximately 180°, the purpose of which will become apparent as the description progresses. Mounted on a standard 14 and driven in synchronism with the wire drawing machine by mechanism (not shown) is a take-up reel 17 provided with frictional driving mechanism (not shown) to permit the reel to be driven at varying speeds so as to maintain substantially constant the speed of travel of the wire 9 between the idler 13 and the reel 17, irrespective of the variation in the effective winding surface of the reel 17 which will vary as its diameter varies in accordance with the amount of wire wound thereon.

Referring now to Fig. 2, another type of wire drawing machine is shown comprising a casing 18 having an aperture 19 in the bottom thereof through which a wire 15 to be reduced may be passed to the drawing apparatus positioned within the machine. The wire, after being introduced through the aperture 19, is passed over an idler 16 and one of a plurality of idlers 25 and passed through one of a plurality of dies 20 supported in a die mounting 21 suitably secured to the sides of the casing 18. The wire is then directed to the smallest drum of a capstan 22 which is provided with a plurality of drums 23 of gradually increasing diameter, and from there is passed over the idlers 25 and back to the next largest drum 23 after passing through one of the dies 20 and being reduced thereby a predetermined amount.

The wire 15 is passed a predetermined num-

ber of times about the capstan 22, the drums of which increase in diameter as the wire passes through dies of smaller diameter until the wire has been wound around the largest drum 23, whereupon it is again directed to one of the idlers 25, then back through one of the dies 20, which is known as the finishing die, and from thence is directed to a peripheral groove 24 formed on the face of the capstan 22. Positioned adjacent the capstan 22 and within the wire drawing machine is an idler 27 about which the wire 15 is wound before being passed through an aperture 28 formed in the side of the machine, adjacent which is positioned a bracket 29 having freely rotatable thereon a second idler 30. The idler 30 serves to direct the wire 15 to a tension idler 31 mounted upon a yieldingly mounted tension arm 32 pivoted to the casing 18 and designed to maintain a substantially constant tension in the wire 15 which is directed from the tension idler 31 to a driven take-up reel 34 mounted upon standards 37.

The peripheral groove 24 may be formed preferably in either of two ways as shown in Figs. 4 and 5. In Fig. 4 the groove is formed adjacent the last drum 23 of the capstan 22 by securing to a plane face 38 of the capstan 22 a circular cover plate 39 having a beveled edge 40, the degree of slope of which bevel depends upon the amount of wedging required to draw the wire through the finishing die 20. The plate 39 is secured to the capstan 22 in any suitable manner as; for example, by means of screws 41.

Referring now to Fig. 5, the edge of the plane face of the capstan 22 is beveled as shown at 42 and a circular cover plate 43 having a rectangular cross-section, is attached thereto by means of screws 44, thereby forming the desired triangular peripheral groove for gripping and wedging the wire 15 so that it will be drawn through the finishing die 20 at the desired speed.

Referring now to Figs. 1 and 2, it will be noted that the wires 9 and 15 are passed around the capstans 10 and 22, respectively; in the triangular peripheral grooves for a distance of at least 180° in order to permit the surfaces of the groove to grip the wires and draw them through the respective finishing dies.

It will be obvious that the use of a capstan of the type disclosed herein will reduce the tractive force required of the take-up device materially and will consequently expedite the drawing of the wire by eliminating to a great degree the possibility of breakage in the strand due to variations by feeding the wire from the finishing die to the take-up at a constant speed. With the particular type of capstan covered by the present invention, this desirable result is effected because the wire positively grips the wedge shaped groove in the capstan thereby advancing it through the finishing die with substantially no slippage and feeding it to the take-up device which need only exert sufficient pull on the wire to advance it from the capstan to the take-up reel. Therefore, since the wire upon engaging the capstan will be firmly gripped thereby and maintained in close and firm contact therewith throughout the contact area of the capstan and the wire, it will be advanced at a constant speed and a delicate tension device for controlling the speed of rotation of the take-up reel is not necessary due to the fact that the take-up device does not have the double duty of pulling the wire through the finishing die and winding it on the reel. Under such conditions the wire will be advanced to the take-up reel at a constant rate and breakage of the wire will be minimized which will result in a materially higher efficiency in the operation of the machine.

Although the capstan 10 is not provided with a plurality of drums of various diameters, it will be understood that a suitable mechanism is provided within the wire drawing machine 7 for advancing the wire 9 therethrough to the finishing die 8. The capstan 10 therefore is equipped with but one wire engaging surface, and this surface is in the form of a peripheral groove which may be constructed in accordance with the groove shown in Fig. 4 or the groove shown in Fig. 5, it being understood that the groove may also be formed in any other manner so long as the desired wedging of the wire is effected.

What is claimed is:

1. In a wire drawing apparatus, means for advancing a wire through the apparatus comprising a plurality of cylindrical wire engaging drums for receiving convolutions of the wire, one of the drums being provided with a V-shaped peripheral groove for receiving and wedging the wire therein, a die for the convolutions of wire of each drum including a finishing die for the drum having the V-shaped peripheral groove, which drum assures positive advancement of the wire through the finishing die.

2. In a wire drawing apparatus, means for advancing a wire through the apparatus comprising a plurality of cylindrical wire engaging drums for receiving convolutions of the wire, a die for receiving the convolutions of wire of each drum, means secured to one of the drums and having an inwardly tapered peripheral wall cooperating with a wall of the adjacent drum for forming a V-shaped groove for receiving a convolution of the wire, and a finishing die for receiving the wire passing to said V-shaped groove, the latter assuring positive advancement of the wire through the finishing die.

JOHN L. ALDEN.