(No Model.)

W. L. HAYES.

APPARATUS FOR DRAWING WIRE.

No. 565,748. Patented Aug. 11, 1896.

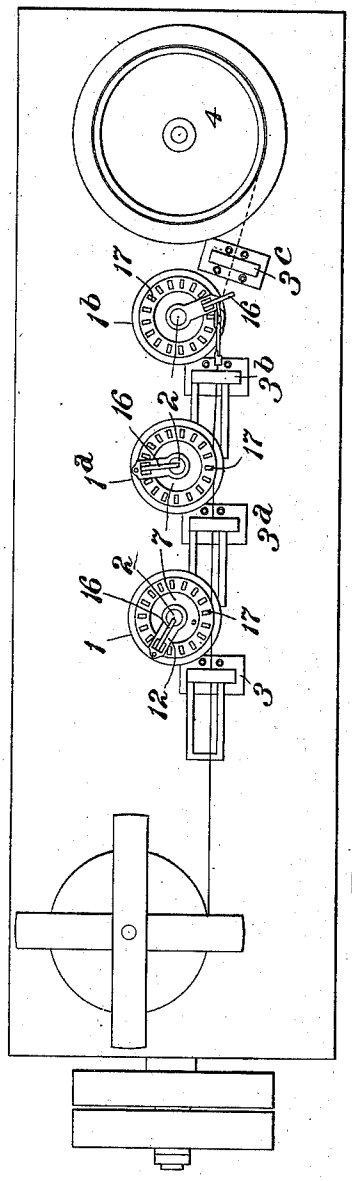

FIG. 1.

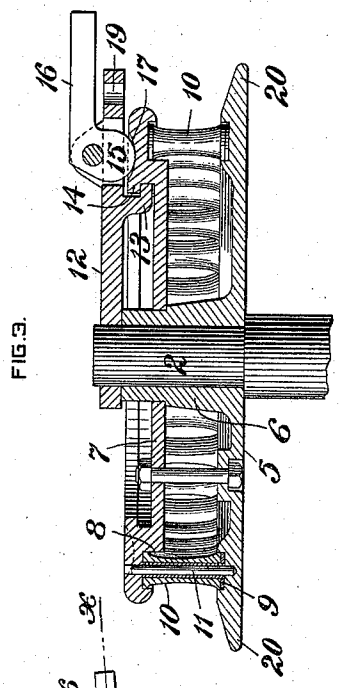

FIG. 3.

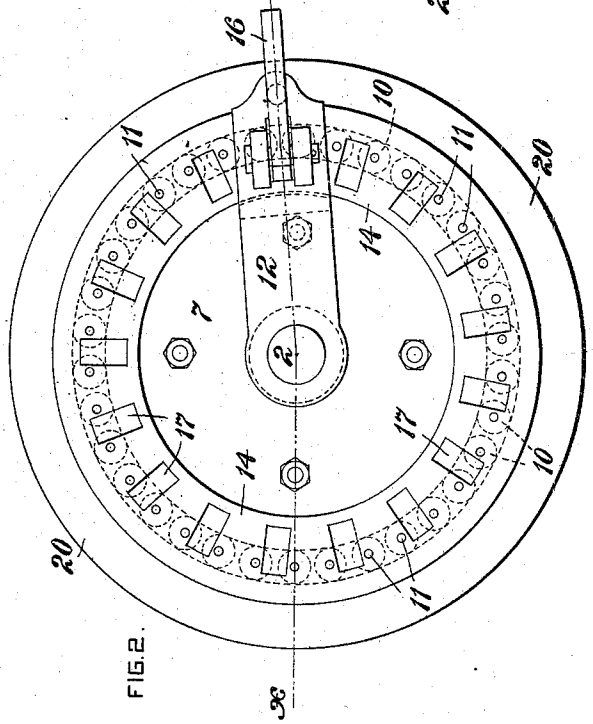

FIG. 2.

WITNESSES:

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR DRAWING WIRE.

SPECIFICATION forming part of Letters Patent No. 565,748, dated August 11, 1896.

Application filed June 1, 1895. Serial No. 551,363. (No model.)

To all whom it may concern:

Be it known that I, WILL L. HAYES, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented or discovered certain new and useful Improvements in Apparatus for Drawing Wire, of which improvements the following is a specification.

The invention described herein relates to certain improvements in wire-drawing mechanism, such improvements being more especially applicable to what is known in the art as "continuous" drawing, wherein two, three, or more dies are simultaneously operative on the wire.

In continuous drawing the wire is passed through a die, then around a drawing-sheave, through another die, and around another drawing-sheave, and so on to the drawing and receiving drum. In such an apparatus, as in a continuous rolling-mill, the speeds of the successive sheaves must be practically proportioned to the successive reduction and consequent elongation of the wire effected by each die. That is to say, the second sheave must be rotated at a higher speed than the first one, and the third at a still higher speed. In practice it has been found extremely difficult, on account of the wearing of the dies, to perfectly adjust the relative speeds of the sheaves, so that it has become the practice, except where diamond or like dies are employed, to adjust the sheave to a speed a little below what might be called "normal," so that at times the coils of wire around each sheave will become slackened, the sheave rotating within the coils. It results from this practice that the surface of the sheaves become grooved by rubbing on the wire, and the hardened surface of the latter is cut away and the wire thereby deteriorated in value.

The object of the present invention is to so construct drawing-sheaves as to overcome this rubbing action, whereby the surfaces of the wire and sheaves are injured in the manner described; and it is a further object of the invention to provide one or more of the sheaves in a continuous-drawing apparatus with a gripping mechanism, whereby a length of wire may be drawn through the dies to permit of its being wrapped once or twice around each sheave and around the receiving or drawing drum.

In the accompanying drawings, forming part of this specification, Figure 1 is a top plan view of a continuous wire-drawing apparatus embodying my invention. Fig. 2 is a top plan view, on an enlarged scale, of one of the drawing-sheaves; and Fig. 3 is a sectional elevation of the same.

In the practice of my invention the sheaves 1, 1^a, and 1^b are secured in any suitable or well-known manner on the vertical driving-shafts 2, which are rotated by suitable power mechanism in any manner desired. Die-holders 3, 3^a, 3^b, and 3^c are arranged in suitable relation to the sheaves and the receiving or drawing drum 4, which is also driven in any suitable manner. The sheaves 1, 1^a, and 1^b, and drum 4 are driven at higher speeds, respectively, such successively higher speeds being relatively proportional to the reduction and consequent elongation effected on the wire by the successive dies in the holders 3, 3^a, 3^b, and 3^c; but such successive speeds, should in no case be such that one of the sheaves, as 1^a, will take up the wire faster than it is delivered to its die 3^a by the sheave 1, as otherwise the wire will be broken. In order to overcome the difficulty of adjusting these successive speeds to compensate for the wear of the dies, provision is made in my improvements for the slipping of the coils on the sheaves without injury to the surfaces either of the sheaves or wire. The construction of sheaves whereby is obtained this result consists of a disk 5, preferably having the hub 6 formed integral therewith, and a disk 7, having a central opening fitting over the end of the hub, as clearly shown in Fig. 3. Grooves 8 and 9 are formed in the inner faces of the disks 5 and 7 for the reception of the ends of the spools or frictional cylinders 10. It is preferred to so proportion the diameters of these spools to the length of the grooves that the spools will bear against each other at least at their ends; and it is preferred, in order to prevent all liability of a progressive movement of the spools in the grooves to hold them in position by means of pins 11, passing through the disks and through axial openings in the spools, said axial openings

being enough larger in diameter than the pins to permit of a free axial rotation of the spools, as clearly shown in Fig. 3.

I have found from the practice of my invention that when the wire is drawn tightly against the spools of one sheave by the pull exerted by the next successive sheave the spools will not rotate axially, but the wire will bind as tightly and have as firm frictional engagement with the spools as though the operative faces of the sheave were made solid or integral, but that as soon as there is the slightest slackening of the wire the spools will rotate on their axes, the sheave, as a whole, moving independently of the coils around it and not exerting any pull upon the wire. While the coils are in constant contact with the surface of the spools the latter will rotate axially in a direction contrary to that of the sheave, of which they form a part. Hence there will not be any rubbing between the faces of the spools and the wire.

On the driving-shaft 2 is loosely mounted an arm 12, which is of sufficient length to project a short distance beyond the periphery of the sheave, as shown in Figs. 1, 2, and 3. This arm is provided on its under side with a lug 13, constructed to engage a flange 14 on the upper side of the disk 7, and on the arm is pivotally mounted a cam 15, provided with an operating-handle 16. This cam is so mounted on the arm that when turned down it will bear against the disk, thereby so forcing the arm away from the disk as to cause the lug to firmly engage the flange, whereby such a grip is obtained on the disk that the arm will move with it in its rotation. In order to prevent any liability of the arm's slipping on the disk, the latter is provided with a series of notches or indentations 17, into which the end of the cam may be turned or shifted for clamping the arm on the disk. When the cam is turned back to the operating position, the arm, being loosely mounted on the vertical shaft 2, will remain stationary. The portion of the arm projecting beyond the disk is provided with suitable means, as the holes 19, whereby the wire-gripping mechanism may be detachably secured to the arm when it is desired to draw a length of wire through the die at the beginning of the drawing operation. Each of the sheaves may be provided with one of these drawing-arms, as shown in Fig. 1, or only one, and that the first of the series, may have such drawing-arm. It is preferable to form the spools concave longitudinally, so as to prevent the wire coils from slipping down during the operation of the apparatus, and the lower disk 5 is also preferably constructed with the rim 20, projecting a short distance beyond the spools, for the same purpose, as shown in Figs. 2 and 3.

I claim herein as my invention—

1. A wire-drawing apparatus having in combination a series of two or more dies, and a series of two or more positively-driven drawing-sheaves, said sheaves having their operative faces formed by a series of loosely-mounted rollers movable in a direction opposite to the rotation of the sheaves by contact with the wire when slackened, substantially as set forth.

2. A wire-drawing apparatus having in combination a die, a drawing-sheave having its rim or face formed by a series of loosely-mounted rollers, and means for connecting the rim or face with a driving-shaft, said rollers being adapted to be held stationary or rotated in a direction opposite to that of the shaft when the wire coils are loosened, substantially as set forth.

3. A wire-drawing apparatus having in combination a die-holder, a drawing sheave or drum, a loosely-mounted arm and provided with means for connection with a wire-grip, and means for detachably connecting the arm to the sheave or drum at two or more points, and thereby cause the arm to move with the sheave or drum, substantially as set forth.

In testimony whereof I have hereunto set my hand.

WILL L. HAYES.

Witnesses:
WILL C. MARTIN,
B. F. HOPKINS.