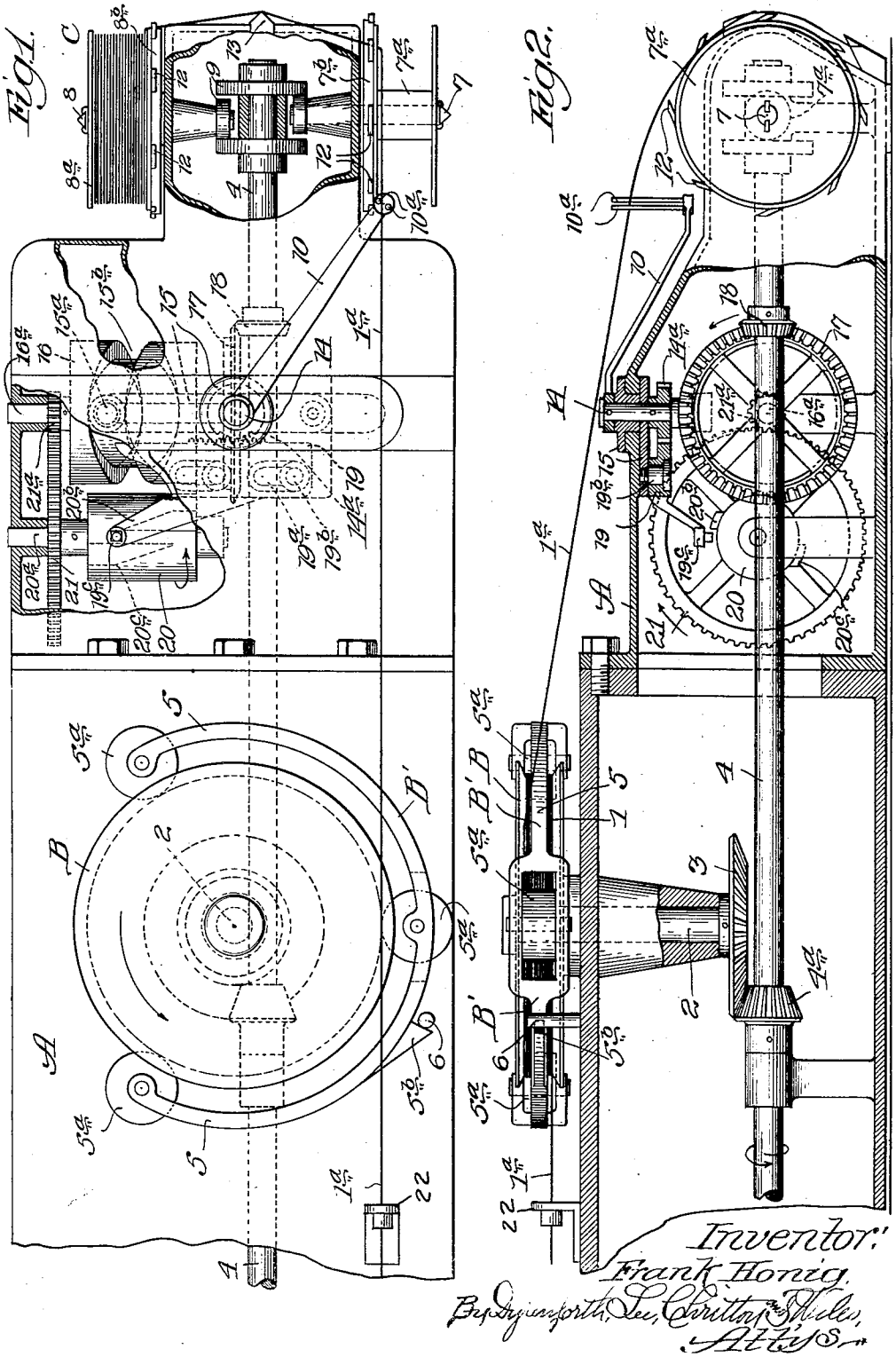
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MECHANISM FOR AND METHOD OF COILING WIRE OR THE LIKE

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MECHANISM FOR AND METHOD OF COILING WIRE OR THE LIKE

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This invention relates particularly to mechanism for drawing wire, or other strand-like flexible member and discharging the same, to enable a continuous or non-stop method to be employed, for coiling, spooling, or take-up purposes.

The primary object is to provide a non-stop method for enabling wire, or other flexible member, to be coiled or spooled, and to provide improved mechanism for effecting such purpose. The invention finds an exceedingly useful application to the purpose of coiling or spooling wire as it comes from the wire drawing die or dies. It may however be applied to various situations where it is desirable to coil or spool wire, or other flexible member.

The present application constitutes a modification of the invention set forth in my pending application for Letters Patent of the United States, Serial Number 442,024, filed February 3, 1921. Other embodiments are shown in my pending applications, as follows: No. 611,061, filed January 6, 1923; No. 611,062, filed January 6, 1923; No. 626,833, filed March 22, 1923; No. 626,834, filed March 22, 1923.

In the present embodiment of the invention, I employ a self-discharging drawing capstan or drum, which has a stationary axis. That is, in this case, the self-discharging capstan is non-travelling, in the sense that it is not bodily movable. It is non-planetary, that is it does not travel in an orbit, as distinguished from constructions shown in other pending applications. The wire, or other flexible member, is discharged from the self-discharging capstan and is suitably coiled; or it may pass to suitable take-up mechanism and be deposited on spools.

The invention is illustrated in a preferred embodiment in the accompanying drawing, in which—

Fig. 1 represents a broken plan view of mechanism embodying the invention, said mechanism including take-up or spooling mechanism; and Fig. 2 represents a view partly in elevation and partly in longitudinal section, of the mechanism shown in Fig. 1.

In the construction illustrated, A represents a frame which may be of any suitable construction; B, a self-discharging capstan having associated therewith a yielding presser-device B′, which operates to yieldingly clamp convolutions 1 of the wire, or other flexible member 1^a, to the winding-drum or capstan B; and C, take-up mechanism, or spooling mechanism, associated with the self-discharging capstan.

The winding-drum, or capstan B is fixedly secured on a shaft 2 equipped with a beveled gear 3 which is actuated by a longitudinal shaft 4 equipped with a beveled pinion 4^a meshing with the gear 3.

The presser-device B′ is shown as comprising a yielding or spring frame 5, equipped with presser-rollers 5^a which serve to press the convolutions 1 against the capstan B. The frame 5 is equipped with a stop 5^b which engages a stop 6 carried by the main frame A, thus preventing the presser-device from being carried around with the capstan.

The spooling mechanism C comprises a pair of spindles 7 and 8, upon which are removably mounted spools 7^a and 8^a. These spindles are actuated by friction-disc connections 9 between the spindles and the shaft 4.

It is necessary, in the operation of the machine, to provide for a distribution of the wire upon the spool which is being filled, and for shifting the wire, periodically, from the filled spool to a fresh spool. This is accomplished by means of a distributing arm 10, combined with suitable mechanism. The arm 10 is equipped at its free extremity with studs 10^a between which the wire passes.

Mounted on the spindles 7 and 8 are discs or flanges 7^b and 8^b, which are equipped with grippers 12 which serve to engage the wire 1^a. These grippers rotate with the spindles. When the wire is shifted from one spool to another, it is carried across a knife 13 which is adapted to sever it.

The distributing arm 10 has its inner end fixedly mounted on a short shaft 14 which is journaled in a transversely reciprocating slide 15 mounted on the main frame. Beneath the main frame, the shaft 14 is equipped with a pinion 14^a. The slide 15 is equipped

with a cam stud 15^a which engages a cam groove 15^b with which the large cam wheel 16 is provided. The cam wheel 16 is mounted on a shaft 16^a which is rotated by a bevel gear 17, driven from the shaft 4 through the medium of a pinion 18. The cam 16 reciprocates the slide 15 regularly so as to effect distribution of the wire on the spool which is being filled. Periodically, it is necessary to shift the distributing arm 10 from one side of the machine to the other. This is accomplished by means of a rack 19 which is provided with guide-slots 19^a engaged by studs 19^b depending from the slide 15. The rack 19 is equipped with a cam stud 19^c which is adapted to be actuated by a control drum 20 which is mounted on a shaft 20^a. The shaft 20^a is actuated from the shaft 16^a through the medium of gears 21 and 21^a. Any desired ratio of gears may be employed at this point, depending upon the timing period of the rack 19. The control drum 20 is equipped with cams 20^b and 20^c which are suitably beveled, as shown, to effect shifting of the rack 19 through the medium of the cam stud 19^c. In the position shown in the figures, the cam 20^b has operated to shift the rack 19, and thus has thrown the distributor arm 10 to the position shown in Fig. 1, where it will serve to distribute wire on the spool 7^a. By the time the spool 7^a is filled, the cam 20^c will have advanced sufficiently to engage the cam stud 19^c and effect shifting of the rack 19 in such direction as to throw the arm 10 over into position to distribute wire on a fresh spool placed upon the spindle 8.

In the operation of the machine, the wire, or other flexible member, 1^a is drawn from any suitable source, as for example, through a finishing die 22. The wire takes several coils about the winding-drum or capstan B and is pressed against the winding-drum by the presser-device B′. As the winding-drum rotates, therefore, it progressively discharges convolutions from itself and simultaneously therewith forms new convolutions. The wire, as discharged from the winding-drum, passes to the spools of the take-up mechanism. The distributing mechanism operates to distribute the wire on one spool until it is filled, and then the wire is shifted to a fresh spool. The wire becomes severed when the winding upon the fresh spool begins. An attendant can then remove the filled spool and apply a fresh spool, without stopping the operation of the machine.

Any suitable timing mechanism may be employed for regulating the number of turns of wire to be placed on a spool. A simple way of effecting variation in the number of turns of wire to be placed upon a spool is to replace the gears 21 and 21^a by other gears of a different ratio.

Where, as in the illustration given, the wire passes from the self-discharging capstan to the take-up mechanism, it is unnecessary to place the wire under any greater tension between the discharge capstan and the take-up mechanism than is essential to produce reasonably taut winding of the wire on the spool. This renders it feasible to employ the improved mechanism in connection with take-up mechanism having provision for shifting the wire from one spool to another, in combination with a high speed wire-drawing machine. It is unnecessary that there should occur even an instantaneous slacking of the operation of drawing the wire from the finishing die of the wire-drawing machine, and thus the wire-drawing tension may be kept uniform, so that breakage of the wire may be avoided.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the art.

What I regard as new and desire to secure by Letters Patent, is:

1. In mechanism of the character set forth, the combination of a self-discharging winding-drum having associated presser-means for holding convolutions of a strand against said drum, take-up mechanism comprising a pair of spindles adapted to support spools, distributing mechanism adapted to distribute the strand first on one spool and then on another, means for driving said spindles, and timing mechanism serving to periodically effect shifting of said distributing mechanism, said winding-drum and co-acting presser-means being capable independently of said take-up mechanism of maintaining uniform tension upon the strand being drawn thereto.

2. In mechanism of the character set forth, the combination of a self-discharging winding-drum having associated presser-means for holding convolutions of wire against said drum, take-up mechanism comprising a pair of spindles adapted to support spools, a distributing arm adapted to distribute the wire first on one spool and then on another, means for oscillating said arm normally with relation to either spool, and means for shifting said arm to carry the wire from one spool to the other, said winding-drum and co-acting presser-means being capable independently of said take-up mechanism of maintaining uniform tension upon the wire being drawn thereto.

3. In mechanism of the character set forth, the combination of a self-discharging winding-drum equipped with presser-means for holding convolutions of wire against said drum and operative to exert uniform drawing tension and effect discharge, regardless of the action of the take-up spools, a plurality of spools adapted to receive wire from said winding-drum, distributing mechanism

adapted to distribute the wire first on one spool and then on another, and means for periodically effecting shifting of said distributing mechanism.

4. In mechanism of the character set forth, the combination of a self-discharging winding-drum having associated presser-means for holding convolutions of a strand against said drum and capable independently of the take-up mechanism of exerting uniform drawing tension to and effecting discharge from the winding drum, and take-up mechanism comprising a plurality of spindles adapted to receive spools, distributing mechanism adapted to distribute the wire first on one spool, and then on another, and means for periodically effecting shifting of said distributing mechanism.

5. The method of spooling wire, or the like, which comprises progressively forming upon and discharging from a self-discharging winding-drum convolutions, passing the strand as discharged under uniform tension to take-up mechanism equipped with a plurality of spools, and shifting the wire periodically from the filled spool to the fresh spool, the strand being progressively clamped to the winding-drum as it is drawn thereto and progressively freed from clamping action at the discharging point.

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