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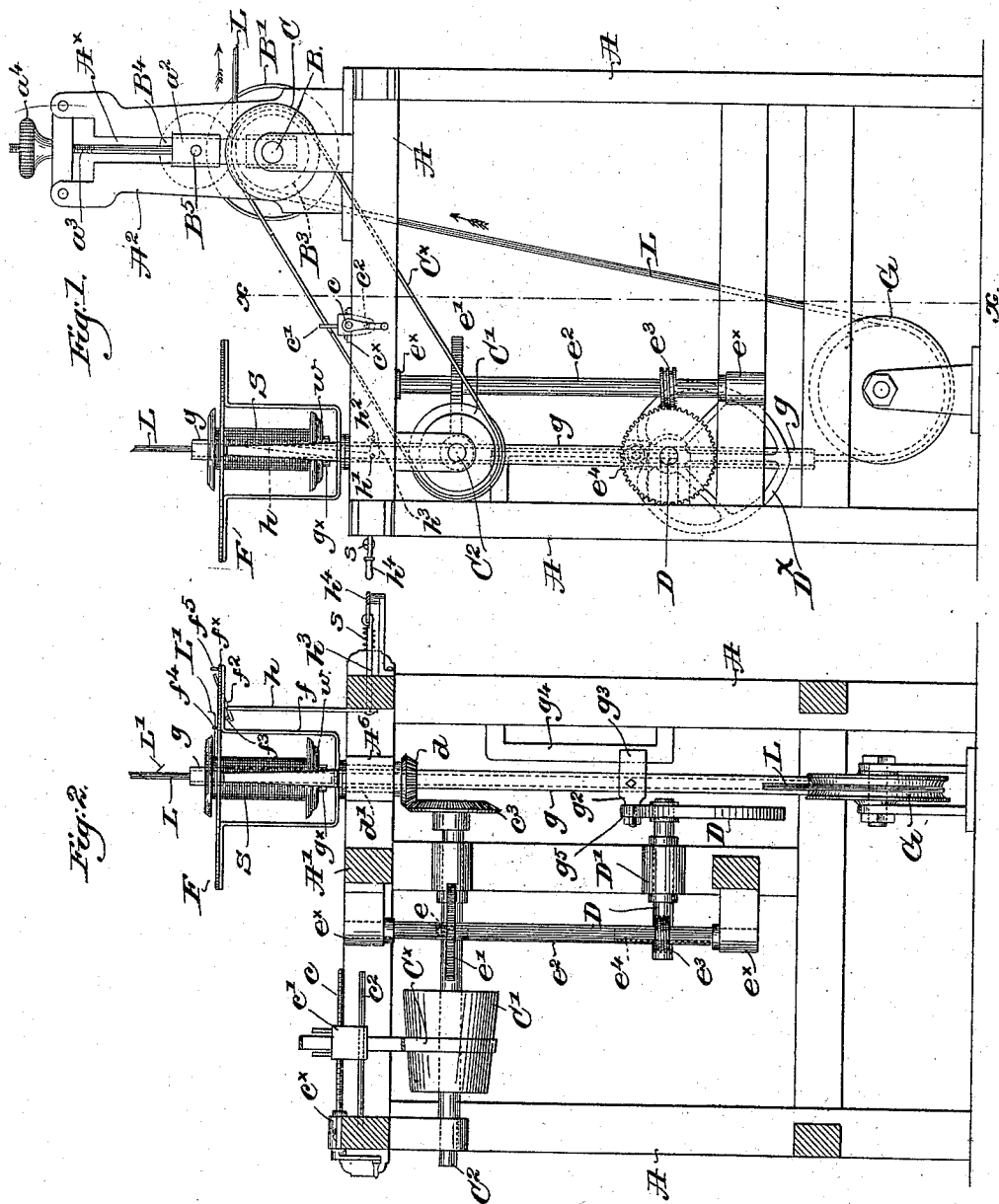
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H. F. STRAW.

UNWRAPPING MECHANISM FOR YARN CHAINS.

No. 550,657.

Patented Dec. 3, 1895.



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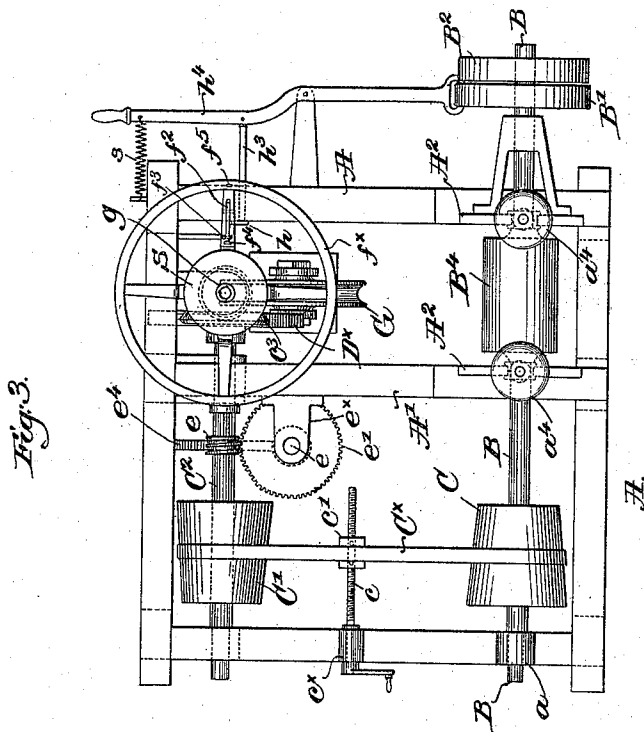
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UNITED STATES PATENT OFFICE.

HERMAN F. STRAW, OF MANCHESTER, NEW HAMPSHIRE.

UNWRAPPING MECHANISM FOR YARN CHAINS.

SPECIFICATION forming part of Letters Patent No. 550,657, dated December 3, 1895.

Application filed February 19, 1895. Serial No. 538,912. (No model.)

To all whom it may concern:

Be it known that I, HERMAN F. STRAW, of Manchester, in the county of Hillsborough and State of New Hampshire, have invented an Improvement in Unwrapping Mechanism for Yarn Chains, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In another application for United States Letters Patent, Serial No. 533,846, I have fully set forth the requirements in a machine for economically and effectively removing or unwinding a wrapping-cord coiled around a yarn chain prior to the process of bleaching or dyeing. As stated in said application, the successful and practical operation of an unwrapping-machine is dependent upon certain conditions. The angle at which the cord as it is unwound leaves the chain must be obtuse enough to reduce to a minimum the liability of the cord clinging to the chain. This is mainly effected by the position of the point at which the cord leaves the chain, and obviously the position of this point is governed by the relation between the linear speed of the chain and the rotary speed of the unwrapping-flier. Increased linear or decreased rotary speed tends to lower the point. Decreased linear or increased rotary speed tends to raise it. Could these speeds be exactly proportioned to the rate at which the cord to be unwrapped is coiled around the chain, and could this rate as well as these speeds be continuously maintained, the point at which the cord leaves the chain would not vary. In practice, however, many causes combine to effect irregularities in all these respects and the point is constantly rising or falling. If the point rises too high, the cord is broken by contact with the guide above the machine. If it falls too low, the cord is broken by contact with the hollow spindle of the cord-receiver or spool upon which the cord is wound as it is unwrapped from the chain.

In the application referred to means were shown for varying the ratio of the linear speed of the chain and the rotary speed of the flier at the will of the operator by regulating or varying the linear speed of the chain; and in this present case I have shown my invention embodied in a machine wherein the ratio

of the linear speed of the chain and the rotary speed of the flier is varied by regulating or varying the rotary speed of the flier, the linear speed of the chain remaining substantially constant. I have also herein provided a stop-motion to stop the machine automatically and at once if the cord breaks or slackens during the unwinding process.

Figure 1 is a view in elevation of a mechanism embodying my invention arranged for unwinding or unwrapping the cord from the yarn chain; Fig. 2, a sectional view thereof taken on the line *x x*, Fig. 1, looking toward the left; and Fig. 3 is a top or plan view of said mechanism.

The main frame A, of suitable shape to support the operating parts, has mounted thereon at one end and on the cross-girt A' standards A², provided with bearings for the main driving-shaft B, having, as shown only in Fig. 3, usual fast and loose pulleys B' and B² thereon. A cylindrical roll B³ is rigidly secured to the main shaft B between the standards, (see dotted lines, Fig. 1,) and a second roll B⁴ has its journals B⁵ mounted in boxes a², longitudinally adjustable in vertical slots A^x in the standards A², the said boxes having secured thereto threaded rods a³, engaged by threaded collars a⁴, rotatably mounted in the standards, but held from longitudinal movement. Rotation of the collars in one or the other direction will by raising or lowering the journal-boxes a² adjust the pressure of the upper roll upon the lower roll B³, by which it is driven.

The main shaft B is extended beyond the roll B³ and through the standard A² to the side of the frame A, where it is supported in a bearing *a*, a cone-pulley C being secured to the shaft between the said bearing and the standard, connected by a belt C^x with and to drive a reverse cone C', fast on a worm-shaft C². A threaded rotatable rod *c*, mounted in and held from longitudinal movement by the bearing c^x, engages a belt-fork c', longitudinally movable on a guide c², rotation of the rod moving the fork c' and thereby shifting the belt C^x from one to the other end of the cones, and as the speed of the shaft B is constant that of the shaft C² will be varied relative thereto.

One or both of the rolls B³ B⁴ will prefer-

ably be of rubber or rubber covered, and the yarn chain, after the end has been unwrapped, is led between said rolls, rotation of the latter drawing the chain through the apparatus at a substantially-uniform speed.

The shaft C^2 has fast thereon a bevel-gear c^3 in engagement with a smaller bevel-gear d , whose hollow hub is reduced in diameter and extended through a sleeve-like bearing d' , (see dotted lines, Fig. 2,) secured to a bracket A^6 on the frame, and a flier F is secured to the upper end of the hub of the gear d to rotate therewith, the rotative speed of the flier F depending on the position of the belt C^X upon the speed-cones C C' .

A worm e , fast on the shaft C^2 , engages a worm-wheel e' on an upright shaft e^2 , mounted in bracket-like bearings e^X , the said shaft e^2 having fast thereon near its lower end a worm e^3 in mesh with a worm-wheel e^4 , fast on a cam-shaft D , mounted in a bearing D' and having secured thereto a heart-shaped or traverse cam D^X . I have shown a hollow spindle g , extended loosely through the hub of the gear d , and a collar g^2 , fast on said spindle and provided with ears g^3 to embrace a guide g^4 , has mounted loosely upon it a roll g^5 , resting on the periphery of the traverse-cam D^X , rotation of the latter reciprocating the spindle g , giving it a traverse motion in accordance with the shape of the cam.

The mechanism for rotating the flier and imparting a traverse motion to the spindle g is substantially as shown in my application, Serial No. 533,846, hereinbefore referred to.

A spool S or other cord-receiver is slipped over the upper end of the traverse tube or spindle g , projecting slightly above the flier F and also beyond the upper head of the spool, which latter rests on a washer w , held in place by a collar g^X , fast on the spindle g . The wrapped yarn chain L is drawn over a guide-sheave (not shown) located above and at a suitable distance from the top of the traverse-spindle g , the chain entering the latter after the cord L' has been unwrapped therefrom, the unwrapped chain passing out of the lower end of the hollow spindle, around a guide-sheave G , and up through the rolls B^3 B^4 in the direction of the arrow, Fig. 1. As in my former application, I have herein provided the unwrapping mechanism with a stop-motion controlled as to its operation by the cord L' as it is unwrapped. One of the supporting-arms f of the flier, bent outwardly at their upper ends, is slotted in its horizontal portion, and a latch f^2 is pivoted therein, provided with an eye f^3 , adapted to be interposed between the guide-eyes f^4 and f^5 on the slotted upright and flier-rim f^X , respectively, the detached end of the cord L' being passed through the guide-eye f^5 , eye f^3 on the latch, and finally through guide-eye f^4 to the spool S , the tension of the cord normally lifting the latch or drop-wire to be free to rotate with the flier. Upon breakage or slackening of the cord sufficiently to permit the drop-wire

f^2 to fall into the position shown in Fig. 2 the rotation of the flier will bring the drop-wire against the upper end of an arm h , pivoted at h' to the frame A , and provided with a finger h^2 , (see dotted lines, Fig. 1,) the arm being rocked sufficiently to withdraw the finger h^2 from a notch in a detent h^3 , pivoted to the shipper-lever h^4 and longitudinally movable in an opening or bearing in the frame. A spring s tends to draw the outer end of the shipper-lever h^4 to the left, Fig. 3, to thereby shift the belt from the fast pulley B' to the loose pulley B^2 , the tendency of the spring under normal conditions being counteracted by the engagement of the finger h^2 with the notched detent h^3 , such engagement maintaining positively the shipper in inoperative position. The impact of the drop-wire f^2 upon the upper end of the arm h is quite sufficient to disengage the finger and detent, so that the apparatus will be instantly stopped automatically upon either slackening or breakage of the wrapping-cord.

It will be readily understood that the rotation of the flier unwraps the cord from the yarn chain and winds it upon the spool, the traverse motion laying the cord smoothly upon the spool from end to end as it is wound thereon.

The speed of the flier is regulated by the speed-changing mechanism comprising the cones C and C' and their connecting-belt.

I have shown a simple form of stop-motion herein; but any other suitable or desirable stop-motion may be used instead thereof.

I do not herein claim in a machine for unwrapping yarn chains means to vary the ratio between the linear speed of the chain and the rotary speed of the unwrapping mechanism, as the same is broadly claimed in my prior application hereinbefore referred to.

I claim—

1. In an apparatus for unwrapping yarn chains, a cord-receiver, mechanism to move the chain longitudinally at a constant speed, means to unwrap the cord and to wind it upon the receiver, and mechanism independent of the unwrapping means by which the speed of the unwrapping mechanism may be increased or diminished, substantially as described.

2. In an apparatus for unwrapping yarn chains, a cord-receiver, mechanism to move the chain longitudinally, means to wind the unwrapped cord upon the receiver, variable speed mechanism independent of and to actuate said means, and a stop motion controlled by the cord, to stop the apparatus automatically by slackening or breakage of the cord, substantially as described.

3. In an apparatus for unwrapping yarn chains, a cord-receiver through which the chain passes as unwrapped, means to draw the chain therethrough at a constant linear speed, a flier to wind the unwrapped cord upon the receiver, speed changing mechanism between the flier and chain drawing means, operated by the latter to continuously

and positively rotate the flier at desired speed, a stop motion for the apparatus, and a controlling device therefor governed by slackening or breakage of the cord, to actuate the stop motion, substantially as described.

4. In an apparatus for unwrapping yarn chains, a cord receiver through which the chain passes as unwrapped, mechanism, including rolls, to draw the chain through the receiver, variable speed mechanism, means to wind the unwrapped cord upon the receiver and positive connections between said unwrapping means and the variable speed mechanism, substantially as described.

5. In an apparatus for unwrapping yarn chains, a cord receiver through which the chain passes as unwrapped, a traverse motion therefor, a rotatable flier to take the cord from the chain in advance of the receiver and at an angle to the wrapped portion of the chain, to unwrap the cord from the chain and to wind it upon the receiver, variable speed mechanism independent of and to positively rotate the flier, and means to draw the chain as unwrapped through the receiver, substantially as described.

6. In an apparatus for unwrapping yarn chains, a cord-receiver through which the chain passes as unwrapped, means to draw the chain therethrough at a constant speed, means to wind the unwrapped cord upon the

receiver, variable speed mechanism, including speed changing cones, interposed between and connecting the chain drawing and cord winding means, to operate the latter at desired speed, and a stop motion controlled by the cord to automatically stop the apparatus upon slackening or breakage of the cord, substantially as described.

7. In an apparatus for unwrapping yarn chains, a cord-receiver through which the chain passes as unwrapped, means to draw the chain therethrough at a constant linear speed, a flier to wind the unwrapped cord upon the receiver, speed changing mechanism, including cone pulleys and a connecting belt, between the flier and chain drawing means and operatively connecting them, a device to vary the position of the belt on the pulleys, and thereby rotate the flier at desired speed, and a stop motion controlled by the cord to automatically stop the apparatus upon slackening or breakage of the cord, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HERMAN F. STRAW.

Witnesses:

AUGUSTA E. DEAN,
JOHN C. EDWARDS.