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WIRE TIGHTENING AND TWISTING MACHINE

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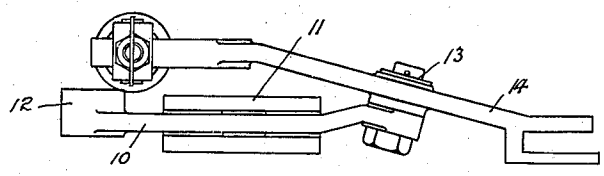


FIG. 1

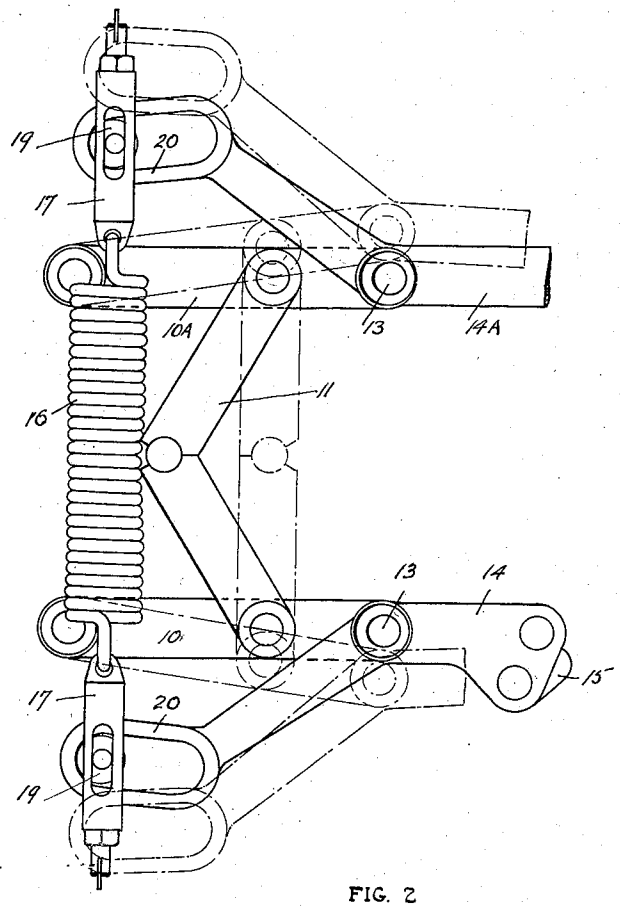


FIG. 2

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WIRE TIGHTENING AND TWISTING MACHINE

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Application February 19, 1937, Serial No. 126,720
In Australia August 22, 1936

5 Claims. (Cl. 140—93)

This invention relates to machines for drawing wires taut about a case, package, or other article, connecting the end portions of the tightened wires by twisting, and cutting off the excess wire remaining beyond the twisted connection.

More particularly, the invention is directed to means in such machines for moving the wire-gripping instrumentalities in tightening direction.

Among the objects of the invention is to provide mechanism for operating the wire-gripping parts in which the tension on the wire is adjusted automatically and maintained substantially uniform during the tightening operation.

When considered with the description herein, characteristics of the invention are apparent in the accompanying drawing, wherein an embodiment of the invention is disclosed, for purposes of illustration, that is adapted, for example, to form part of a wire tightening and twisting machine such as that disclosed in my copending application for patent filed February 19, 1937, Ser. No. 126,719, to which reference is made in connection with the explanations herein.

Although the disclosure exemplifies what now is considered to be a preferable embodiment of the invention, it is to be understood that it is not the intention to be limited necessarily thereto in interpretation of the claims, as modifications and adaptations within the limits of the claims can be made without departing from the nature of the invention.

Like reference-characters refer to corresponding parts in the views of the drawing, of which—

Fig. 1 is a side elevation of the mechanism;

Fig. 2 is a plan view thereof, certain parts being shown in dotted lines in positions they have at a stage of operation.

The mechanism includes an arm **10** adapted to be pivotally mounted at or near one end, and a complementary arm **10A**, which also may be pivotally mounted as shown or which may be fixed. One (or both) of these arms may be pivoted at **12** on the base of a machine, such as that disclosed in my other application hereinbefore identified, so that they are disposed in the same plane and at least one of them may be swung toward and from the other.

Two toggle-links **11** are provided, one of them being connected pivotally at one end to the arm **10** between its ends and the other similarly connected to the arm **10A**. At the other ends, the links are pivotally associated with a block (not shown) between the arms, by which they may be drawn to or toward the position indicated by dotted lines in Fig. 2 to effect swinging movement of one (or both) arms from the other. This actuation of the toggle-links may be caused in any suitable manner, as by that disclosed by my said other application.

Similar members **14** and **14A**, of somewhat bell-crank-lever form, are fulcrumed between their ends at **13** on the outer or free end portions of the arms **10** and **10A**, respectively. Each of these members is fitted at its outer end with any suitable wire-gripper, one such gripper **15** being shown in outline on member **14**. The other end portion of each of these members is formed as a link **20** containing a runway.

A transversely-disposed coil spring **16**, under contracting effort, is connected at each end with a slotted yoke **17** in which the link end **20** of one of the members **14—14A** is disposed. Each yoke has a roller **19** in its slot that is capable of traverse in the runway of its associated link end **20**.

The parts as shown by full lines in Fig. 2 are in their normal or inactive positions. The spring and associated parts are adjusted so that, when the spring is closed or the toggle-links are in the inactive position shown, the other members of the mechanism then are maintained in the positions shown.

Due to the fact that the runways of the links **20** then incline slightly toward each other, the rollers therein remain at the outer ends of the runways. The spring is tensioned against elongation to that degree required for it to resist the pull of a binding-wire that is necessary for its proper tightening and for it to yield if the drag increases enough to make the wire too tight, to break it, or to render parts of the mechanism liable to breakage.

When the mechanism is to be actuated to tighten a wire when its overlapping end portions are held by grippers on the free ends of the members **14—14A**, pull is exerted at the adjacent ends of the toggle-links **11** by any suitable means, as by that shown in my said other application, for example, and the links are brought to or nearly to the position shown by dotted lines in Fig. 2. This action of the toggle-links connected to the arms **10—10A** gives swinging movement to one or both of those arms away from the other and imparts corresponding movement to the members **14—14A** carried by those arms.

As this movement is resisted by the wire

gripped at the free ends of those members and by the spring 16, both of those members are moved bodily away from each other in the form of mechanism in which both of the arms 10—10A are pivotally mounted. In the initial stage of this spreading movement, the resistance of the spring becomes overbalanced by the drag on the wire, due to the fact that resistance of a coil spring is less at the beginning of elongation than later, so that the members 14—14A swing on their pivots 13 and shift inclination of the runways of the links 20 from convergence (as shown by full lines) toward and to divergence (as shown by dotted lines). This results in shift of the rollers 19 and yokes, and thus the points of spring resistance, nearer to the fulcrums of the members 14—14A. Consequently, as resistance of the spring increases with its elongation, the length of leverage of those members from their pivots 13 correspondingly diminishes and thereby compensation had for increasing spring resistance.

Therefore, during ordinary tightening operation of the mechanism, spring and wire resistance remain substantially balanced for practical purposes. However, the parts are subject to overbalance by give of the spring when excessive resistance is encountered in the wire and breakage obviated before tightening action on the wire ceases at the maximum spread of the toggle-links.

Although both of the arms 10—10A have been referred to as pivoted, it is apparent that the pivot or fulcrum point 13 of one of the members 14—14A may be fixed. In this case, when the other arm is swung by exertion of the toggle, the member 14 or 14A mounted thereon is shifted bodily. Then, through the instrumentality of the spring 16 pull is exerted on the other member 14A or 14, as the case may be, and that arm swung in wire-tightening direction.

When operative effort on the toggle is released, the spring tends to return the toggle to inactive or normal position.

I claim:

1. In wire tightening mechanism, a swingably mounted arm, a member pivoted between its ends on said arm and having a wire gripper on one side of its pivot and a runway on the other side thereof, a yoke shiftable on said runway, a compensatory spring connected with said yoke, and means for swinging said arm and thereby moving said member against the resistance of gripped wire and said spring.

2. In wire tightening mechanism, complementary members pivotally mounted between their ends and each of said members having a wire gripper at one side of its pivot and a runway at the other side thereof, a swingably mounted arm on which one of said members is pivoted, a yoke shiftable on each of said runways, a compensatory spring connected with said yokes, and means for swinging said arm and thereby moving the member thereon away from said other member in wire tightening action.

3. In wire tightening mechanism, a pair of swingably mounted arms, a member pivotally mounted between its ends on each of said arms and having a wire gripper on one side of its pivot and a runway cn the other side thereof, a yoke shiftable on each of said runways, a compensatory spring connected with said yokes, and toggle mechanism between and connected with said arms operable to swing said arms and said members mounted thereon against the resistance of gripped wire and said spring.

4. In a machine of the class described, wire-tightening mechanism comprising a member pivotally mounted between its ends, a wire-gripper on one end portion of said member, a spring connected with and urging the other end portion of said member in one direction, and means whereby said spring self shifts with respect to the pivotal point of said member and the leverage thereof altered.

5. In a machine of the class described, wire-tightening mechanism comprising a member pivotally mounted between its ends, a wire-gripper on one end portion of said member, a runway on the other end portion of said member, a yoke having a part movable on said runway, and a spring connected with and urging said yoke in one direction.

HENRY WILFRED COX.