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STOP MOTION FOR KNITTING MACHINES

Filed March 6, 1940

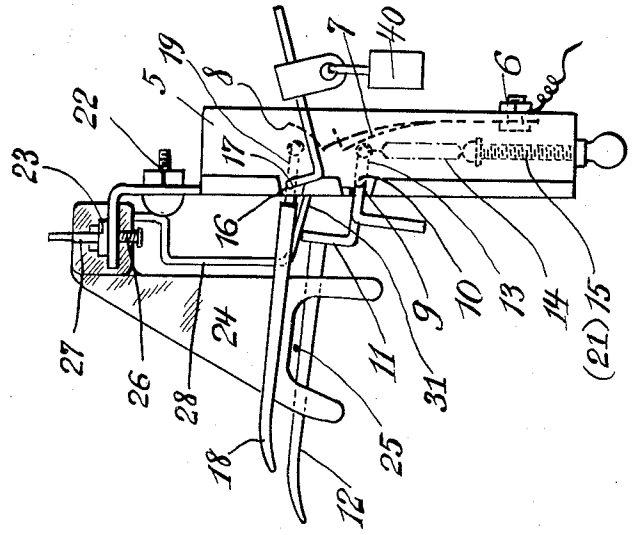


FIG. 2

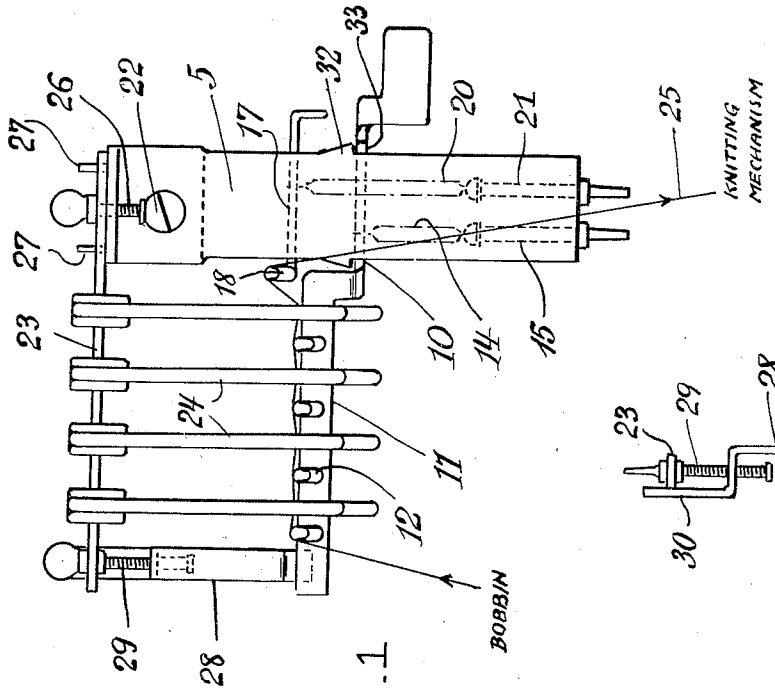


FIG. 1

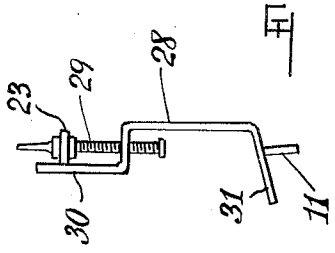


FIG. 3

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STOP MOTION FOR KNITTING MACHINES

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2 Claims. (Cl. 66—163)

This invention relates to improvements in stop motions for knitting machines of the type shown in my Patent No. 2,184,107, Dec. 19, 1939. The stop motion in said patent comprises a contact box upon which there are pivoted two sets of porcelain fingers with overhanging guards. Inside the box are suitable electric circuit closing members. The yarn of the knitting machine runs over and upon the porcelain fingers. When a knot or other obstruction occurs in the yarn it is tightened and pulls down one set of fingers and this action causes a normally open electric circuit to be closed. Then a drive stop mechanism is actuated and the knitting machine stops so the trouble can be attended to. Similarly when the yarn breaks or runs out another set of fingers, in said patent a single finger, is actuated to close the circuit and stop the knitting machine.

The combination of porcelain fingers to act as knot detectors, in the first instance recited, and other fingers or one finger to act as an end detector as in the second instance referred to, together with overhanging guards, a contact box, means for closing a normally open electric circuit and mechanism actuated thereby to stop the knitting machine when yarn troubles appear is well known in the art. Hence it is not deemed necessary to refer further to such prior constructions, their function, operation and purpose except to point out for understanding this invention that all such stop motions necessarily include spring means for positioning the porcelain fingers and putting them under tension which acts against the pull of the yarn. This pull or drag upon the yarn is caused by the operation of the knitting mechanism itself in pulling or feeding the yarn into the needles. It is also caused by friction in pulling the yarn off the bobbins. Such drag or pull on the yarn is irregular because of the differences in yarns, the degree of tightness with which the yarn is wound upon the bobbins, stickiness caused by paraffin on the yarn, dirt, floss and the like.

I have discovered that tension means such as regulatable springs are not always to be depended upon for a proper balance against the drag of the yarn. For instance, referring to a construc- as disclosed in my said Patent 2,184,107, if the yarn for any reason pulls down too heavily on the knot detector fingers the trouble cannot very well be cured by tightening the springs because to do so leads in turn to frequent unnecessary stoppage because of the pull of the springs. If on the other hand for some other reason it is deemed necessary to ease the springs very much it is clear that the yarn may pull down the fingers too easily and too often and the yarn will fall off. Another point to be considered is the relative positions of the overhanging guards to that of the fingers. It is desirable that the space between the bottom effective surface of the guard and the top surface of the fingers be regulated irrespective of the spring tension in response to the kind and character of the yarn. If such relative position can be adjusted there is an additional means facilitating the even and easy run of the yarn and greater latitude is given in the regulation of the tension means.

Accordingly the object of my invention is to provide means in a stop mechanism of the character described for regulating and adjusting the relative horizontal positions of the guards and the fingers. This may be done by raising or lowering the guards. Or the object of the invention, namely changing the operation of the fingers irrespective of the tension of the springs, may be accomplished by providing a movable stop against which the fingers are moved by the springs. This is a second object. The invention is disclosed in connection with a stop mechanism of the character and type disclosed in my said patent. It may of course be embodied in other types of such mechanisms. In the accompanying drawing illustrating the invention

Fig. 1 is a front view of a stop mechanism embodying the invention with some details omitted.

Fig. 2 is a side view looking from the right in Fig. 1.

Fig. 3 is a detail view of the movable stop looking from the left in Fig. 1.

In the drawing the reference numeral **5** denotes the contact box which is provided with a circuit terminal **6** to which two contact springs **7** and **8** are attached. At **9** there is pivoted a shaft **10** which is in one piece with a finger bar **11**. Porcelain knot detector fingers **12** are secured to the bar **11**. The shaft **10** has a contact heel **13** which is adapted to engage the contact spring **7** when the shaft **10** is moved anticlockwise in Fig. 2 by pull of the yarn because of an obstruction thereon. The fingers **12** are balanced by the spring **14** which is adjustable by a screw **15**. At **16** in the box there is pivoted a shaft **17** which carries an end detector finger **18**. This shaft also has a contact heel **19** adapted to engage the other contact spring **8** when the yarn runs off **18**. A weight **40** may serve to balance the end detector finger **18** alone or in addition

to the pull of a spring **20** for pulling the contact heel **19** down into engagement with the spring **8**. The spring **20** is adjustable by a screw **21**.

The box **5** carries a bolt **22** whereby it may be secured to the knitting machine. At the top there is adjustably mounted a guard bar **23** carrying porcelain guards **24** which overlie the yarn **25** between the porcelain fingers. As is known in the art, the guards function to prevent escape of the yarn from the fingers and act to prevent closing of the circuit when a mere slack occurs in the yarn. The guard bar and therewith the guards may be adjusted vertically upon the box with relation to the knot detector fingers **12** by means of a screw **26**, the bar being guided by guide pins **27, 27**. On the free end of the guard bar **23** there is mounted an adjustable stop **28** by means of a screw **29**. The stop has an upright arm **30** which glides against the bar **23** to keep the stop moving vertically as will be understood. The stop is also formed with an inclined stop arm **31** for controlling the extent of the anticlockwise movement, Fig. 3, of the finger bar **11** when the latter is rotated by the spring **14** after the knot detector fingers have been pulled down by the yarn and the latter has slid down off said fingers. The box **5** may have fixed stops **32** for limiting the movement of the shaft **10** the latter having a stop **33** which moves against a stop **32**.

The operation is as follows. The yarn is placed upon the fingers **12** and **18** underneath the guards **24**. The fingers are balanced normally by their balancing springs **14** and **20**. When a knot occurs the yarn pulls down the fingers **12**, the contact heel **13** moves up to engage the contact spring **7**, the circuit is closed and the machine stops. The yarn slips off the fingers. The spring **14** immediately pulls the contact heel down away from **7** and the circuit is again open. When the yarn breaks or runs out its pull on the end detector finger **18** ceases. The finger swings upward, its contact heel **19** moves down to engage the other contact spring **8** and the circuit will be closed. The spring **20** alone or together with the weight **40** or the weight alone will serve to swing the finger **18** upwards. During certain conditions of the work the stop **32** will serve to limit the upward swing of the knot detector fingers **12**. However, as pointed out above, it may be that these fingers must be controlled otherwise. The movable stop **28** serves this purpose. By lowering the stop **28** the finger bar **11** may swing backwards until it engages the stop arm **31** apart from the limitation made by a fixed stop **32** if such is provided. The movement of the bar **11** may be made very short by lowering the stop **28** as is obvious. It may also happen that due to the character of the yarn the space below the guards and above the fingers should be decreased or increased. Such change obviously influences the run of the yarn between these parts. The movable guard bar affords such adjustability.

I have found that the added means for regulating the yarn space below the guards and at the same time separate therefrom also the movable stop for the knot detector bar is at times indispensable for obtaining a relatively great range of adjustability and accommodating the stop motion more particularly to the operation of the knitting machine in response to the kind of yarn used and the knitting to be made.

It is known of course that during the operation of the knitting machine the pull of the yarn upon the knot detectors and the end detectors is not constant. These detector elements vibrate more or less under the tension of the yarn and the tension of the springs. A very fine adjustment of the upward movement of the knot detector fingers may be made by raising or lowering the movable stop **28** to compensate for the pull of the yarn and insure general better operation. This regulation or adjustment does not in any manner influence the downward movement of these fingers so as to prevent closing of the circuit.

I claim:

1. In a stop motion for knitting machines having movable yarn supporting knot detector fingers in combination with a plurality of guard members for the purpose described, means for supporting said fingers and guards in cooperative relation including a bar for supporting the guard members, the yarn resting upon said fingers below the guard members and exerting a downward pull upon the fingers during the operation, a spring urging said fingers upwards against the pull of the yarn and movable means upon said bar for adjustably limiting said upward movement of said fingers.

2. In a stop motion for knitting machines having movable yarn supporting knot detector fingers in combination with a plurality of guard members for the purpose described, means for supporting said fingers and guards in cooperative relation including a bar for supporting the guard members, the yarn resting upon said fingers below the guard members and exerting a downward pull upon the fingers during the operation, a spring urging said fingers upwards against the pull of the yarn, movable means upon said bar for adjustably limiting said upward movement of said fingers and means for adjusting the guards at different levels with relation to said fingers.

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