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STOP MECHANISM

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Fig. 1.

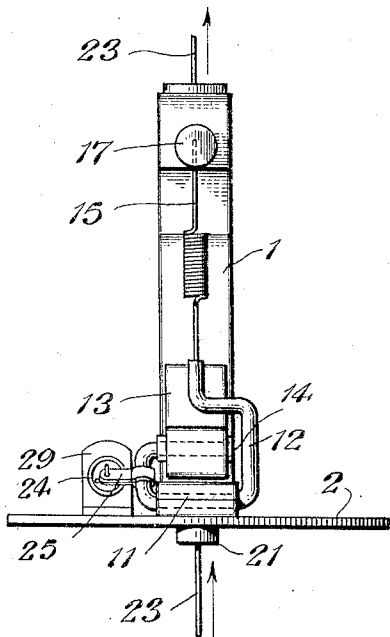


Fig. 2.

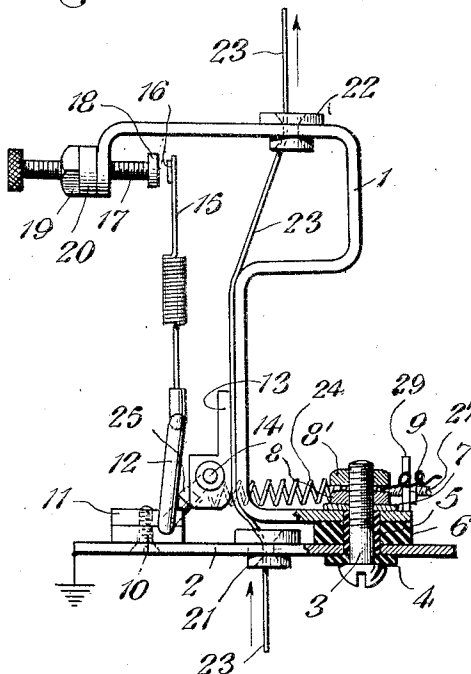
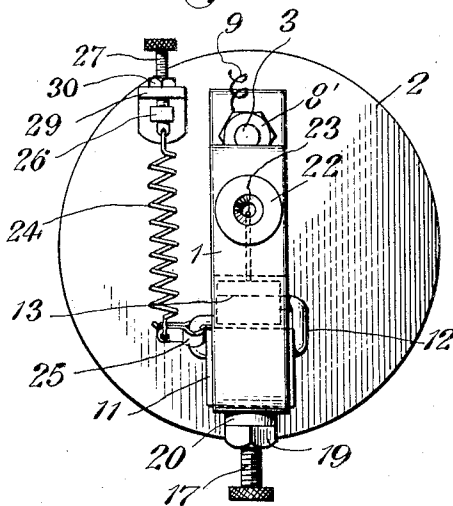


Fig. 3.



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STOP MECHANISM

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This invention relates generally to stop mechanism for textile machines to which yarns are supplied, for example, a knitting machine for applying a fabric cover to insulated electrical wires or cables, or to other articles of indefinite length.

The proper functioning of such a machine depends in part upon a correct tensioning of the yarn and partly upon a continuous supply of yarn free from lint, slubs, knots, kinks, or other defects large enough to interfere with the normal operation of the yarn utilizing means. Mechanism is available for stopping machines of this type upon breakage of the yarn that is being supplied thereto, or upon exhaustion of the yarn supply. Such mechanism is generally located on the machine close to the knitting head in which the yarn is used. So far as I am aware, there is no single mechanism which has the dual function of stopping the machine when the yarn is unusable by reason of any of the above mentioned defects, or when the yarn supply terminates or breaks. It is an object of this invention to provide a simple and effective single mechanism for use in connection with a knitting machine or the like, which will perform both of the functions described.

It is a further object of the invention to provide in such mechanism an additional yarn tensioning means which may be located some distance from the knitting head and which will serve not only to reduce the tension that must be applied to the yarn by the usual tensioning devices located near the knitting head, but also will reduce vibration of the yarn between its source of supply and its place of utilization. The usual tensioning devices do not detect bad yarn, but on the contrary sometimes withhold the lint or slubs and become clogged so that they fail to exert proper tension and cause the knitting machine to drop a stitch.

Other objects and advantages will be apparent as the description proceeds.

A preferred embodiment of the invention has been selected for purposes of illustration and description and is shown in the accompanying drawings wherein:

Figure 1 is a front elevation of mechanism embodying the invention;

Figure 2 is a side elevation, partly in section; and

Figure 3 is a top plan view of the device.

The mechanism of the invention includes an electrically conductive member 1 secured to, but insulated from, the electrically conductive support 2 by suitable means such as the screw 3. A

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washer 4 serves to insulate the screw head from the support 2 and the shank of the screw passes upwardly through the insulating bushing 5 which is surrounded by the insulating block or collar 6.

5 An opening in the lower part of member 1 fits around the upper end of the bushing 5, and the lower end of the member 1 is clamped against the insulating block 6 by nuts 8, 8' and a washer 7 of conductive material. Electric connection is made to the member 1 from a source, not shown, through the wire 9, which is fastened between the nuts 8 and 8'. The support 2 is preferably a circular disk, as shown, for purposes hereinafter mentioned.

15 Mounted on the disk 2, as by the screw 10, is the two-part bearing block 11. An arm or lever 12 is pivotally mounted in this bearing 11 and carries at one end a shoe 13 which is preferably of hard material, such as hardened steel, and pivoted to an end 14 of the lever 12. A contact element 15 is connected to the other end of the lever 12 and a portion of the contact element 15 is wound as a helix to provide a coil spring section intermediate the ends of the contact element 15. 25 At the upper end of the element 15 there is preferably a contact 16 of platinum or the like. An adjustable screw 17 carrying on its end a contact member 18, passes through a suitable screw-threaded opening in the free end of member 1. 30 This screw is held in desired adjusted position by a lock nut 19 and washer 20.

A yarn guide 21 of porcelain or the like is mounted in the disk 2, and a similar guide 22 is mounted in the top of the member 1.

35 The yarn travels in the direction of the arrow from the source of supply to the knitting needles and in so doing passes through guide 21, along a vertical guide face of the member 1 and between this guide face and the shoe 14, thence through guide 22 and out of the attachment constituting the present invention. It will be noted that the yarn guides 21 and 22 are offset relative to the vertical guide face of the member 1 so that the 45 yarn is drawn in against this vertical guide face while passing between the porcelain guides 21 and 22. The guide face is of hard material, preferably hardened steel. It will be seen that the shoe 13 normally bears closely against the yarn which passes behind it, thereby holding the yarn under tension at that place, thus relieving or reducing the tension which has to be applied at the region just ahead of the knitting needles and also 50 reducing vibration of the yarn as it approaches the knitting machine. The yarn at the same time

holds the shoe 13 out of contact with member 1 when the machine is operating normally.

By dividing the tension between the shoe 13 of this invention and the usual tensioning device near the knitting head, the tension at that device may be reduced substantially, in some cases approximately by half. This reduces the danger of breakage of the yarn at a weak point, when a needle moves down and exerts a sudden pull on the yarn.

In order to adjust the tension that results from pressure of the shoe 13 against the yarn, means are provided for varying the pressure of the shoe. In the illustrated embodiment of the invention, these means include a spring 24 connected at one end with a bracket 25, which is secured to the lever 12, and connected at its other end with a collar 26 on the end of a screw 27. The collar 26 is rotatable with respect to the screw so that the spring 24 does not turn with the screw 27. There is a lug 29 connected to the disk 2, and the screw 27 threads through the lug 29. A lock nut 30 on the screw 27 is jammed against the lug 29, to prevent the screw 27 from turning, and thus holds the tension of the spring 24 in any set adjustment.

The attachment operates to stop the machine in the following manner. When a slub, knot, kink or similar defect in the moving yarn comes in contact with the lower end of the shoe 13, it forces the shoe to turn about its pivot 14 so that the entire weight of the shoe is moved gradually avoiding abrupt shock which would break the yarn. The curved surfaces at the lower ends of the shoe 13 and guide face of the member 1 give the knots or similar defects in the yarn a cam action in displacing the shoe 13 without shock. This movement of the shoe 13 about its pivot 14 shifts the pivot to the left with a mechanical advantage and swings the lever 12 in a counter-clockwise direction (Figure 2) about its pivot in the bearing block 11. This moves the contact 16 at the upper end of element 15 to the left until it strikes the contact member 18 and closes a circuit from the conductor 9 through the metal member 1, screw 17, contacts 18 and 16, and through the contact element 15 and lever 12 to the bearing block 11 which is grounded on the disk 2. The closing of this circuit may be made to operate suitable switch mechanism for stopping the machine.

The machine operator may then remove the knot or other defect, and tie the two good ends of yarn together with a simple knot before the defective part has been drawn into the knitting machine and caused a defect in the covering.

When the supply of yarn passing between the shoe 13 and the member 1 is exhausted, the shoe 13 is pressed, by its own weight and the spring 24, against the member 1. This closes the circuit from the conductor 9 through the member 1, and shoe 13, to actuate the machine-stopping mechanism. The operator will then replenish the supply of yarn and tie the ends together with a simple knot before the end of the broken or exhausted yarn has reached the knitting needles and caused a defect in the covering.

The arrangement above described has many advantages over those found in attachments currently in use for similar purposes because the device can be located in position to contact the yarn some distance away from the knitting head and the shoe serves three useful purposes. It acts as a tensioning means for the yarn; it acts to operate machine stop mechanism when a flaw in

the yarn is encountered; and it acts to operate the stop mechanism of the machine when the yarn breaks or when the supply of yarn being fed to the machine is exhausted, and the operation is effected when the flaw or break is at sufficient distance from the knitting head so that the machine will stop before a defect occurs in the knitted covering. The pivoted shoe is so shaped and dimensioned that while one end of it is swinging on its pivot under the influence of a slug or like flaw in the yarn, the other end is bearing against the yarn to tension it so that at no time is the tension on the yarn at that point reduced. The tensioning of the yarn at a point near the source of supply also serves to remove difficulties caused by vibration of the yarn, which sometimes results in looping of the yarn as it comes off the cop and during its transit to the knitting needles, or in possible breakage of the yarn due to the fact that large loops have caught on the guides. The support 1 is preferably a circular disk as shown so that no projections will be presented to any loops which may fly off from the cop of yarn which will usually be mounted directly below this disk.

The use of mechanism embodying the present invention increases the efficiency of machines to which it is applied, improves the quality of the product, and also increases the number of machines which can be handled by a single operator.

The invention herein disclosed may be variously modified and embodied within the scope of the subjoined claims.

I claim as my invention:

1. A stop mechanism for a machine that operates upon yarn including a fixed guide plate along one side of and adjacent the course of the yarn serving as a fixed contact, a second contact on the other side of the course of the yarn, switch means movable between the contacts and biased toward the fixed contact, said switch means including a contact area in the form of a pivotally mounted shoe confronting the fixed contact and held away therefrom by the yarn that passes along said fixed contact, said switch means also including another contact area confronting the said second contact, and means providing an electrical circuit that is closed by contact of the switch means with either the fixed contact, or the said second contact.

2. A stop mechanism comprising a fixed guide plate serving as an electric contact, switch means biased toward said contact and having a pivotally mounted shoe that touches the contact when not held away from said contact by a run of yarn that passes through the stop mechanism and between said electric contact and switch means, and a second electric contact in position to be touched by the switch means when said switch means move away from the first contact for a distance greater than a predetermined permissible yarn diameter, and means providing an electrical circuit that is closed by contact of the switch means with either of the said electric contacts.

3. The combination with a yarn guide of a switch element movable into contact with the yarn guide to close an electric circuit, a pivotally mounted shoe on the switch element in position to contact with a run of yarn passing over the guide to hold said switch element out of contact with the guide, a second contact in position to be touched by the switch element to close the electric circuit when said switch element moves away from the guide, and a device for adjusting

said second contact to determine the minimum change in yarn diameter that will displace the switch element from the first contact far enough to touch the second contact.

4. A stop apparatus for closing an electric circuit in the event of breakage or termination of a yarn supply, or substantial increase in the diameter of the yarn from lint or slubs, said apparatus comprising a conductor over which the yarn passes, a lever structure biased toward said conductor, a pivotally mounted shoe on said lever structure held out of contact with the conductor by the yarn, a contact against which said lever structure strikes when moved away from said conductor further than a predetermined distance, and means providing an electric circuit that is closed when the shoe touches the said conductor or the lever touches the said contact.

5. In a stop mechanism for a machine which operates upon yarn supplied thereto, the combination of a guide for a length of yarn, a fixed guide plate offset from the axis of said guide and against which the yarn bears, a shoe pivotally mounted to bear against said guide plate except when separated therefrom by an intervening yarn, and means providing an electrical circuit adapted to be closed when said shoe contacts said face plate or when said shoe is moved away from said face plate to an extent greater than the maximum permissible diameter of the yarn.

6. In a stop mechanism for a machine which operates upon yarn supplied thereto, the combination with two spaced guides for a length of yarn, of a fixed guide plate offset from the axis of one of said guides and against which the yarn bears, a pivoted lever carrying a contact blade at one end, an abutment adjacent an end of the contact blade, a shoe pivoted to the other end of the lever, said shoe being mounted to bear against the fixed guide plate except when separated therefrom by an intervening yarn, means providing an electrical circuit that is closed by contact of the shoe with said fixed guide plate and by contact of the contact blade with said adjacent abutment.

7. Apparatus for a stop mechanism of a machine which operates upon yarn supplied thereto, said mechanism comprising a guide for the yarn, a fixed guide plate offset from the axis of said guide and over which the yarn travels, a device movable toward and from the surface of said guide plate, means biasing said device toward said surface so that the device contacts with the

yarn as it passes over said surface, and electric contacts that close a circuit whenever said device moves out of a given range either toward or from said surface over which the yarn travels.

8. The combination of a guide plate over which yarn passes, a shoe extending for a substantial distance along the length of the yarn and biased toward the guide plate so as to press the yarn against the guide plate and maintain a tension on the run of yarn beyond said shoe, a lever by which the shoe is supported, a pivot connection between the lever and shoe, a fulcrum on which the lever rocks to move the pivot connection toward and from the guide plate, conductors forming an electric circuit with the shoe and guide plate when said shoe and guide plate touch one another at the termination of the yarn, a movable contact carried by the lever, and a conductor in position to be touched by said movable contact when the lever is rocked to move said pivot connection away from the guide plate.

9. A stop mechanism for closing an electric circuit in the event of breakage or termination of a yarn supply, or substantial increase in the diameter of the yarn from lint or slubs, said apparatus comprising a guide plate over which yarn passes a shoe extending for a substantial distance along the length of the yarn, means urging the shoe against the yarn to maintain a tension on the run of yarn beyond the stop mechanism, means for changing the pressure of the shoe against the yarn to adjust the tension, switch means operated by a movement of the shoe away from the guide plate beyond a predetermined distance, and an electric circuit that is closed by contact of the shoe with the guide plate.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
551,920	Canning	Dec. 24, 1895
1,423,398	Connell et al.	July 18, 1922
1,791,289	Scott	Feb. 3, 1931
2,003,774	Gruna et al.	June 4, 1935
939,750	Schmitt	Nov. 9, 1909

FOREIGN PATENTS

Number	Country	Date
548,923	British	Oct. 29, 1942