Aug. 26, 1924. 1,506,152

A. E. BERDON

STOP MECHANISM FOR KNITTING MACHINES

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Fig. 1.

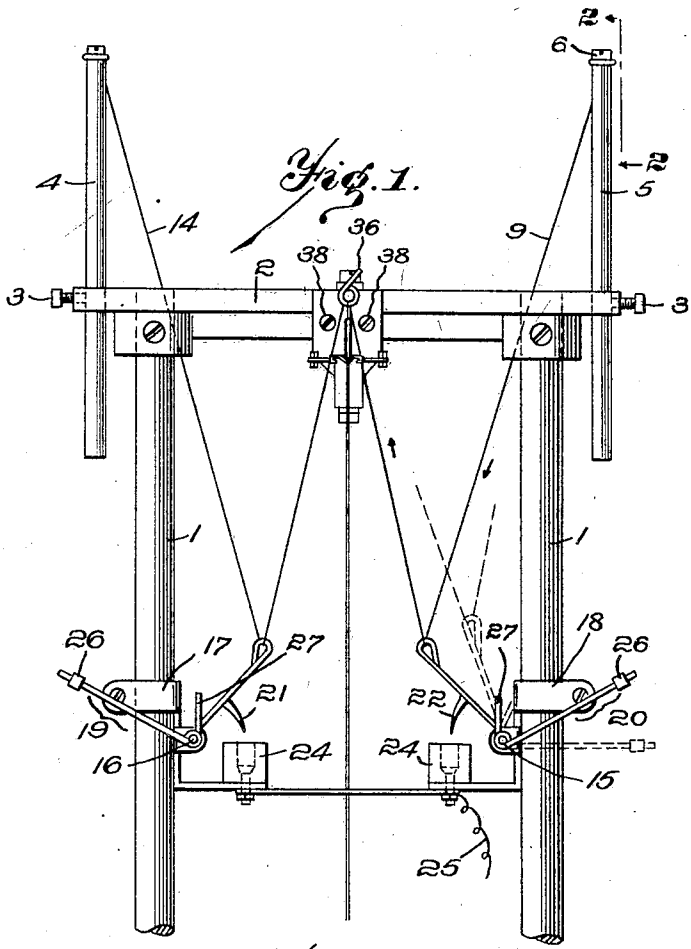
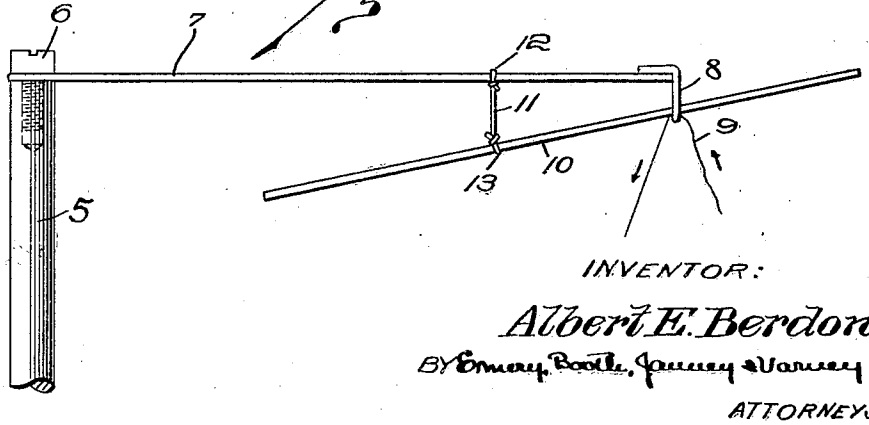


Fig. 2.



INVENTOR:

Albert E. Berdon,

BY Emery, Booth, Janney & Varney

ATTORNEYS.

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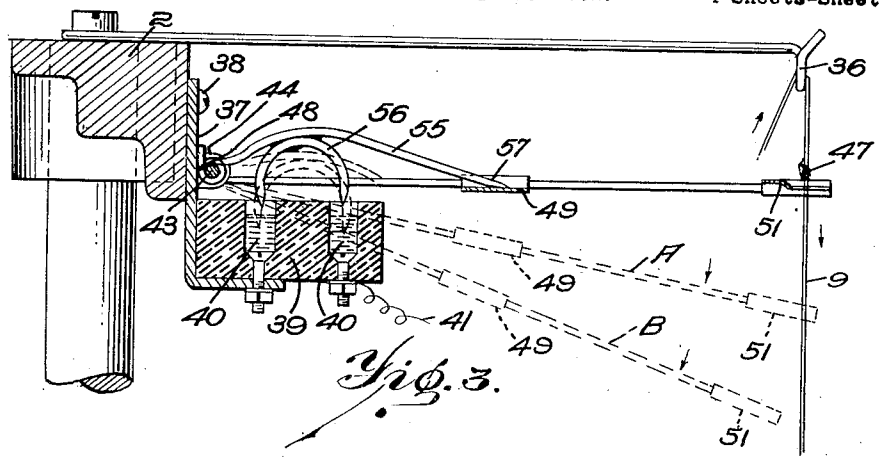


Fig. 3.

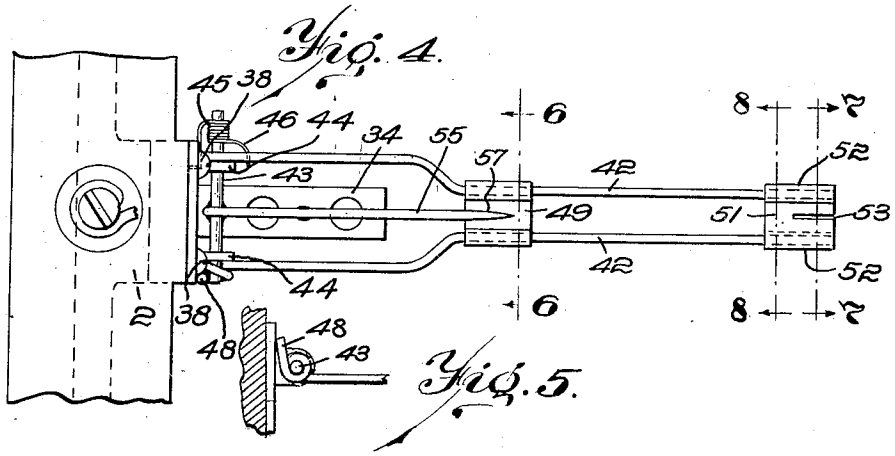


Fig. 4.

Fig. 5.

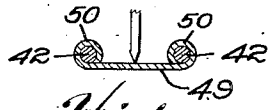


Fig. 6.

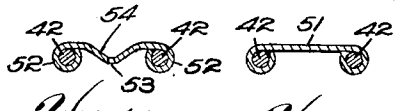


Fig. 7.

Fig. 8.

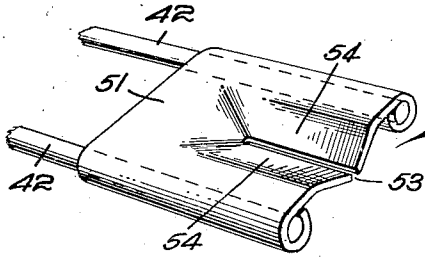


Fig. 9.

INVENTOR:
Albert E. Berdon,
BY Emery, Booth, Jamup & Varn

ATTORNEYS.

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A. E. BERDON

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Fig. 10.

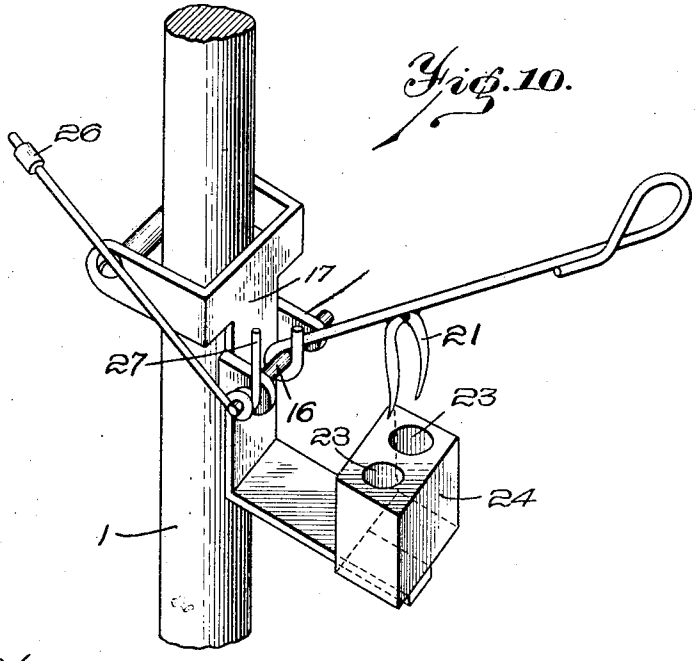


Fig. 12.

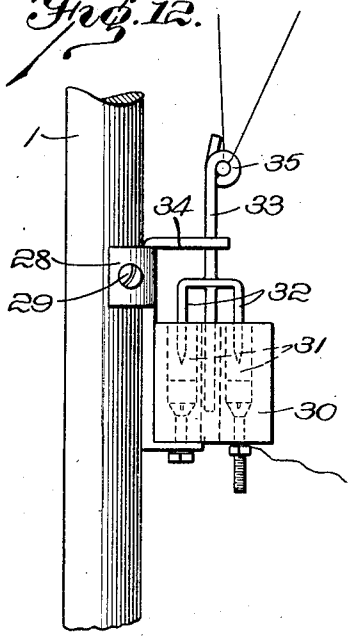
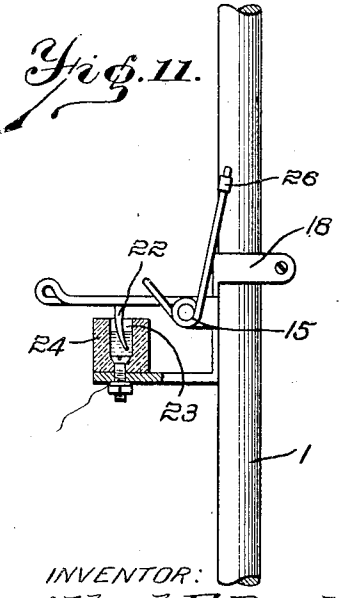


Fig. 11.



INVENTOR:
Albert E. Berdon,
BY Emery, Booth, Varney & Varney ATTORNEYS.

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A. E. BERDON

STOP MECHANISM FOR KNITTING MACHINES

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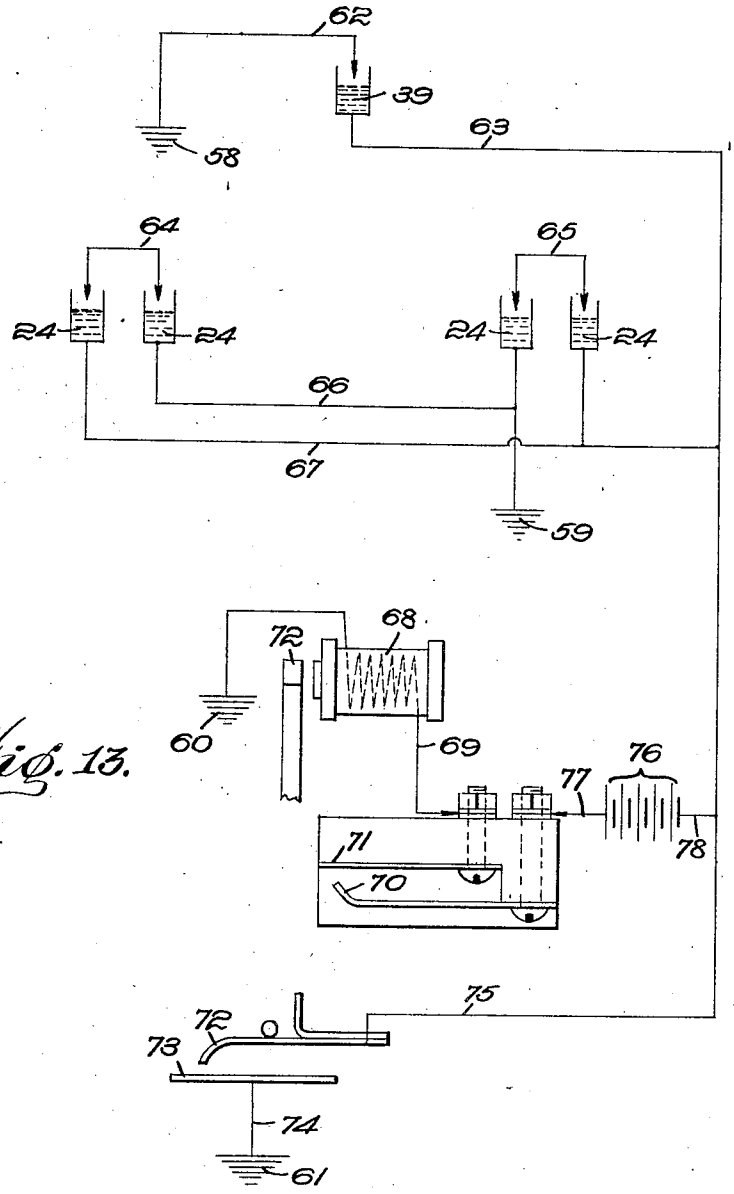


Fig. 13.

INVENTOR:
Albert E. Berdon,
BY
Emery, Booth, Janney & Varney
ATTORNEYS.

Patented Aug. 26, 1924. 1,506,152

UNITED STATES PATENT OFFICE.

ALBERT E. BERDON', OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO JAMES K. LANNING, OF FALL RIVER, MASSACHUSETTS.

STOP MECHANISM FOR KNITTING MACHINES.

Application filed August 19, 1921. Serial No. 493,639.

To all whom it may concern:

Be it known that I, ALBERT E. BERDON', a citizen of the United States, and a resident of Detroit, county of Wayne, and State of Michigan, have invented an Improvement in Stop Mechanism for Knitting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to stop motions for textile machines and particularly to stop motion for knitting machines. In order that the principle of the invention may readily be understood, I have disclosed a single embodiment thereof in the accompanying drawings wherein—

Fig. 1 is a front elevation of that portion of my invention pertaining to the detection of thread or yarn break or undue slackness;

Fig. 2 is a side elevation, looking toward the left from the line 2—2 in Fig. 1, of the means for maintaining uniform tension upon the yarn;

Fig. 3 is a view in vertical section of the mechanism for detecting the occurrence of a knot in the yarn or thread, and the stoppage of the machine without breakage of the yarn;

Fig. 4 is a plan view of the mechanism shown in Fig. 3;

Fig. 5 is a detail partly in vertical section of the stop provided with the construction shown in Figs. 3 and 4;

Figs. 6, 7 and 8 are respectively vertical transverse sections upon the lines 6—6, 7—7 and 8—8 of Fig. 4;

Fig. 9 is a perspective view of the member or plate having the knot detecting slot or opening therein;

Fig. 10 is a perspective view of the thread break detector represented in Fig. 1 and representing the parts in machine running position;

Fig. 11 is a view partially in side elevation and partially in vertical section of the detector shown in Fig. 10 when in machine stopping position;

Fig. 12 is a side elevation of another form of thread break detector; and

Fig. 13 is a diagrammatic view of the electric circuit for the stop motion and indicating as a part thereof the fabric take-up stop disclosed in my co-pending application Serial No. 497,402.

In my co-pending applications Serial Nos. 493,637, 493,638 and 497,402, I have disclosed a knitting machine to which this invention is particularly adapted. It is, however, to be understood that the invention herein disclosed is adapted to be used with other types of knitting machines or with textile machines operating upon a yarn or thread, as, for example, in certain types of braiding machines.

In the machine disclosed in the said applications the product is a knitted tube, preferably of small diameter, issuing at a high rate of speed from the knitting head, the latter being driven in any suitable manner but desirably by friction as fully set forth in said application.

Owing to the high rate of speed at which the machine disclosed in my said applications is or may be operated, it is important that the thread or threads fed thereto be maintained under substantially uniform tension and that the machine may be stopped quickly in the event of thread break or in the event of undue slackness of the thread, or in the event of the occurrence of a knot in the thread provided the knot be of at least a predetermined size, it being important that even in the event of the occurrence of a knot, the machine be stopped without breaking the thread. It is also important that the product of the machine, which issues therefrom at a high rate of speed be maintained at a substantially uniform tension within certain well defined and relatively close limits, so that the machine may be quickly stopped in the event that one or the other of said limits be reached.

Desirably the stop motion of my invention is electrical, though certain features thereof are adapted to be carried out or employed in a mechanical stop motion.

I will first refer to the means shown in Figs. 1 and 2, for maintaining a uniform tension upon the yarn and for stopping the machine in the event of thread break or undue slackness.

To the upper end of two upright posts or standards of the knitting or other textile machine, I secure a transverse plate or bracket 2, through vertical openings in opposite ends or edges whereof are supported

by set screws 3—3 two vertical posts 4, 5, each of which may be provided with the mechanism shown in Fig. 2, which being duplicated at each side of the structure shown in Fig. 1, maintains both threads under substantially uniform tension in the event that two threads are employed as is preferably done in the disclosed embodiment of the invention. It is to be understood, however, that a single thread may be used if desired.

As shown most clearly in Fig. 2, there is secured to the upper end of one of the posts 1 by a screw 6 a rod or wire 7 having a loop or eye 8 formed therein and through which the yarn or thread 9 passes in the direction of the arrow adjacent thereto. Upon the thread in the eye 8 bears a light rod or wire 10 which is itself supported by a cord or like strand 11, secured at 12 about the rod or wire 7 and secured at 13 about the wire or rod 10, but in such manner that said cord or strand 11 may be slid along either or both the wires or rods 7, 10. In this manner I cause the wire or rod 10 to bear with exactly the desired pressure upon the yarn or thread 9 and in such manner as to produce uniform tension thereof. The thread 9 and also the thread 14 pass downwardly from the corresponding eyes 8 through suitable stop devices constituting a part of the electric stop motion.

Herein for the purpose I have provided a pair of levers represented in Fig. 1 and in detail in Figs. 10 and 11, and respectively pivoted at 15, 16 upon ears or brackets 17, 18 adjustably or otherwise secured upon the posts or uprights 1, 1, said levers being indicated in their entirety at 19, 20. Each of said levers may be formed as a single piece or wire in the angular form illustrated in Fig. 1, but desirably I provide each complete lever as two wires tightly wound upon or connected to the pin or pivot 15 or 16 as most clearly shown in Fig. 10. One part of each lever is provided with spurs or projections 21, 22 adapted when the thread becomes unduly slack or is broken to enter the opening or openings 23 of a mercury cup 24 connected by wire 25 with an electrical stop motion system diagrammatically illustrated in Fig. 13. The other portion of each lever 19 or 20 may be provided with a weight 26 and if desired one of the parts of the lever may be provided with a stop or projection 27 adapted in one extreme of movement to bear against the bracket 18. It will be observed that each bracket 17, 18 supports not only its lever 19 or 20, but also the mercury cups 24 pertaining thereto and that such brackets may be secured adjustably to the posts or standards 1 at any height. The lever composed of the parts 42, 42 is relatively long with respect to the member 55, thus a sufficient movement of the said lever is accompanied by a relatively slight swinging movement of the part 56, so that small cups 40 may be employed. Moreover the disclosed construction is a convenient one for centrally positioning the part 56 with respect to the two members 42, 42.

In Fig. 12, I have represented a slightly modified form of thread break detector, it being adapted to move vertically instead of swinging as in that form shown in Figs. 1, 10 and 11. In said Fig. 12 I have provided a bracket 28 which may be secured by screw 29 to the post or standard 1 at any proper height, said bracket having attached thereto the mercury cup 30 into the opening or openings 31 whereof are adapted to enter the prong or prongs 32 of the drop detector 33 guided by the extension 34 of the bracket and having an eye 35 for the passage of the thread.

In the event of break in the yarn or thread or undue slackness thereof, the spurs 32 contact with the mercury in the cups 31 and complete the circuit, it being understood that suitable wires are in electrical contact with the mercury in said cup.

I provide means to detect the occurrence of a knot in the yarn or yarns and to stop the machine in such event if the knot be above a predetermined size, but desirably without causing thread break. For this purpose, I desirably provide the construction shown in end elevation in Fig. 1 and in detail in Figs. 3 to 9 inclusive. As clearly shown therein, I secure to the transverse plate 2 a thread eye 36 through which the two threads 9 and 14 pass, and I also secure to said plate 2 a right angled bracket 37 by screws 38. Upon said bracket is secured a mercury cup 39 having one or more wells or pockets 40 for the mercury, the necessary wire or wires 41 extending from the mercury cup whereby the circuit is completed when a spur or spurs carried by a movable part enter into and touch the mercury in the pocket or pockets. I provide a relatively long lever herein represented as composed of two wires 42, 42 pivoted upon a transverse rod 43 in ears 44 of the bracket 37. Surrounding the rod 43 is a coiled spring 45, one end of which may be connected to the bracket and the end 46 whereof takes under one of the wires 42 so as normally to hold the same in horizontal position as illustrated in full lines in Fig. 3, but yieldingly so as to permit said lever 42, 42 to yield upon the presentation of a knot indicated at 47 in Fig. 3. If desired the end of one of the wires 42 may be prolonged as indicated at 48 to constitute a stop to prevent undue swinging movement of the said lever, said stop 48 being shown in its functioning position in Fig. 5.

Desirably the two wires 42 are connected

intermediate their ends as herein shown at about mid length by a plate 49, the edges whereof are wrapped about said wires 42 as indicated at 50. It is of course evident that the lever may be otherwise formed and that the plate 49 may be an integral portion thereof of any suitable construction. Desirably the outer ends of the wires 42 are connected by a plate 51, desirably coiled as at 52, 52 about said wires, said plate being provided with a slot 53 of suitable length and of predetermined diameter, so that in the event of the presentation of a knot such as 47, the thread 9 or 14 wherein it occurs will in its downward movement cause or permit contact to be made at the mercury cup 39 so as to stop the machine. The plate 51 may if desired be an integral part of the lever and formed in any suitable manner. Desirably said plate 51 has a concaved or depressed portion indicated at 54 in Figs. 7 and 9, as such constructon allows a larger knot to pass through the block 53 without sufficient movement of the levers 42, 42 to stop the machine. The inclined sides of the depression act as guides to the slot and tend to compact the knot on its movement to the slot, and thus not to present a sudden obstruction which otherwise would result in breaking the thread.

Loosely mounted upon the rod 43 is a lever 55 carrying one or more prongs 56 adapted to enter the pocket or pockets in the mercury cup 39 and incompletely shown in its dotted line position Fig. 3. The free end 57 of said lever 55 is adapted to rest lightly upon the plate 49 and to be thereby supported in non-functioning relation as indicated in full lines in Fig. 3 and so as to permit the machine to continue to function. In the event of the presentation of a knot 47 the lever 42, 42 is depressed into the dotted line positions indicated respectively at A and B, thereby permitting contact to be made in the mercury cup 39 with stoppage of the machine. In the dotted line position indicated at A, the knot 47 is still in contact with the plate 51, but when the lever 42, 42 moves into the position shown at B, the knot 47 is free from restraint and the feeding of the yarn 9 continues so that the thread is not broken, although the machine is stopped.

It will be evident that the relatively long leverage of the lever 42, 42 as compared with that of the lever 55 results in great sensitiveness of operation of this portion of the stop mechanism.

In Fig. 13, I have diagrammatically indicated the circuit of the electrical stop motion. Desirably the framing of the machine, being metallic, is used as ground and is indicated at the points 58, 59, 60, 61 in said figure. The mercury cup for the knot detector is indicated at 39 and the wiring pertaining thereto is indicated at 62, 63. The mercury cups for the thread break detectors are represented at 24 and the wires associated therewith at 64, 65, 66, 67, the latter being connected to the wire 63.

In my co-pending application Serial No. 497,402 I have represented means for maintaining the knitted tube or product under substantially uniform tension and have provided means whereby if the tension vary beyond certain well defined and close limits the machine will be stopped. It is unnecessary to describe such mechanism in detail. It, however, includes a magnet diagrammatically indicated at 68 in Fig. 13 and having wiring 69 which when energized by contact of the terminals 70, 71 attracts the armature 72, thereby completing the circuit. The contacts 70, 71 are closed in the event of a predetermined maximum tension upon the knitted product. In the event of minimum tension of said product the contacts 72, 73 are closed and through the wires 74, 75 the circuit is closed and the machine is stopped. The battery of the circuit is diagrammatically indicated at 76, and is connected with the circuit by the wires 77, 78.

Having thus described one illustrative embodiment of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims:

1. Knot detecting and stopping mechanism for textile machines comprising in combination, a contact member and a second contact member composed of two levers, the first of which bears upon the second and has a contact, said second lever having a slot or opening for the detection of knots.

2. Knot detecting and stopping mechanism for textile machines comprising in combination, a contact member and second contact member composed of two levers, the first lever being relatively short and resting by gravity upon the second lever and having a projecting contact, and said second lever being of relatively great length and having at a point relatively remote from its fulcrum a slot or opening for the detection of a knot.

3. Knot detecting and stopping mechanism for textile machines comprising in combination, an electrical contact member and a second electrical contact member composed of a short lever and a long lever having a bearing relation with respect to each other, the shorter lever having a projecting electrical contact and the longer lever having a slot or opening for the detection of a knot.

4. Knot detecting and stopping mechanism for textile machines comprising in

combination, a mercury cup and a pair of levers mounted in proximity thereto, one of said levers bearing upon the other and having a contact projection to enter said mercury cup and the other lever having a slot or opening for the detection of a knot.

5. Knot detecting and stopping mechanism for textile machines comprising in combination, an electrical contact member, a second contact member composed of a lever 42, 42 having a plate 51 provided with a slot or opening 53, and a lever 55 bearing upon the first lever and provided with a projecting contact 56.

6. In a knot detector for textile mechanism, a member having a plate provided with a slot or opening for the detector of a knot, said plate having a depressed portion wherein said slot or opening is located.

7. In a knot detector for textile machines, a lever composed of the spaced parts 42, 42 and a plate 51 provided with a recessed portion 54 having a slot 53 for the detection of a knot.

8. Knot detecting and stopping mechanism for textile machines comprising in combination, a contact member and a second contact member above the same and composed of two levers, the shorter lever resting by gravity upon the longer lever at a point intermediate the ends of the latter and having a projecting contact, and the longer contact having at a point relatively remote from its pivot a slot or opening for the detection of a knot.

9. Knot detecting and stopping mechanism for textile machines comprising in combination, an electrical contact stationarily mounted, a second contact member mounted thereabove and composed of two levers having the same pivot, one of said levers being of relatively short length and adapted to rest by its weight upon the other lever and having a contact, and the other lever being of relatively great length and having at a point remote from its fulcrum a slot or opening for the detection of a knot.

10. Knot detecting and stopping mechanism for textile machines comprising in combination, a stationary mercury cup, a pair of levers mounted above said cup, said levers being pivoted adjacent to each other and engaging each other by gravity only, one of said levers having a projecting electrical contact and the other lever having a slot or opening for the yarn or thread.

In testimony whereof, I have signed my name to this specification.

ALBERT E. BERDON'.