

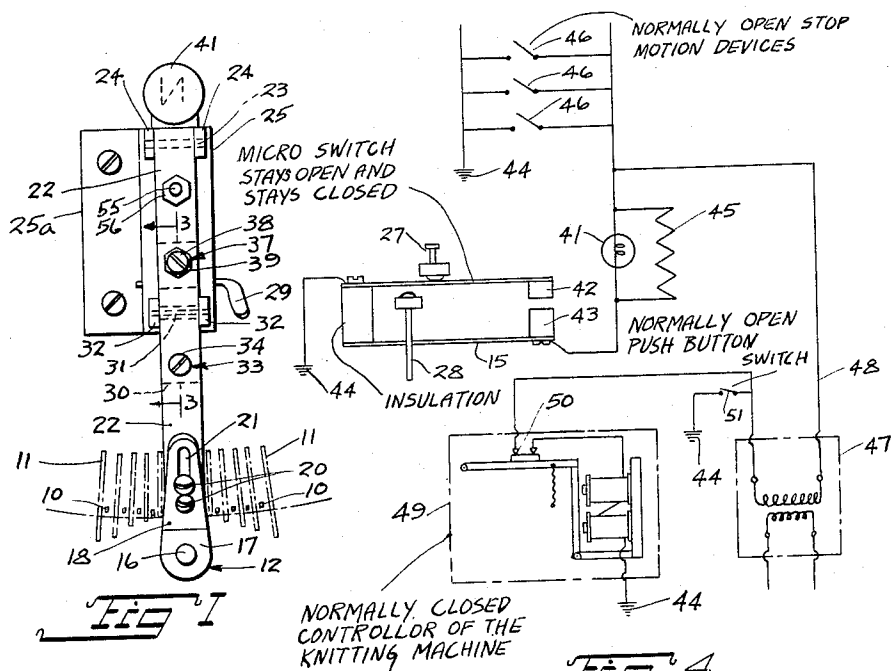
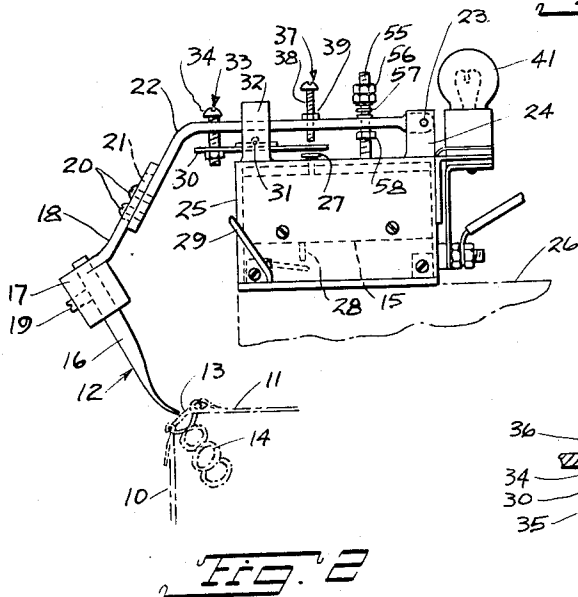
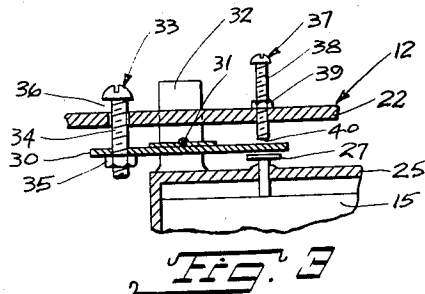
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PRESS-OFF AND LUMP DETECTOR FOR KNITTING MACHINES

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PRESS-OFF AND LUMP DETECTOR FOR
KNITTING MACHINES

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This invention relates to new and useful improvements in a press-off and lump detector for rib knitting machines.

It has always been recognized in the knitting industry that the best point to locate a stop motion control device for the knitting machine would be right at the thread feeds. The reason for this is that if a knot, or lump, or slub were caught in the guide holes of the feeds, and the thread or yarn breaks off at the needles, the conventional stop motion devices above the feeds cannot act to stop the machine, because the threads or yarns remain taut. A press-off results. However, in spite of this knowledge an effective stop motion control for location at the feeds has not been developed.

This invention proposes a new stop motion control device adapted particularly to be located at the thread feeds, right past the guide holes of the feeds, and preferably at the point where the cylinder and the dial needles are fully retracted. It is proposed to characterize this stop control device by a floating detector finger or part for riding on the top edge of the material being knitted at these points. It is proposed to associate this floating detector finger with electric switch means for controlling the controller of the knitting machine. Means is proposed for operating said switch means when the amplitude of motion of said floating finger exceeds a pre-selected amount.

With the above arrangement the new and improved stop control device will function not only to indicate breaks in the threads and yarns which occur past the thread feeds, but will also indicate knots, lumps and slubs which get past the guide holes of the thread feeds and which are being knitted into the material. If the machine is not quickly stopped when this occurs, and the knitting progresses, there is great likelihood that one or more of the knitting needles will become damaged.

The new and improved stop motion device will quickly stop the knitting machine as soon as any trouble develops past the thread feeds so that there is only a small press-off. With prior stop motion devices located before the feeds a complete press-off would result under these conditions.

The invention also proposes associating an indicator light, or other signal with each of the new and improved stop motion devices to show the operator which one stopped the machine so that he will not have to look around to find this

out. This saves a lot of time for the operator and results in greater production.

The invention also proposes to so construct the stop motion device that it may be adjusted to operate at different pre-selected amplitudes of motion of the floating finger so that it may be used for threads and yarns of different weights, and different types and kinds of materials.

Still further the invention proposes a simple mechanical system for transmitting the floating action of the detector finger to operate the electric switch means for the controller of the knitting machine.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawing, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawing forming a material part of this disclosure:

Fig. 1 is a plan view of a press-off and lump indicator for a knitting machine constructed in accordance with this invention, and schematically shown associated with the needles of the knitting machine.

Fig. 2 is a side elevational view of the indicator shown in Fig. 1 illustrated schematically associated with certain parts of the knitting machine.

Fig. 3 is a fragmentary enlarged sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a schematic wiring diagram of the device.

The press-off and lump detector, or stop motion control device for a rib knitting machine, in accordance with this invention is used in conjunction with each of the thread feeds of the knitting machine right past the guide holes of the thread feeds of said knitting machine. Said knitting machine has cylinder needles 10, (schematically indicated) and dial needles 11 (schematically indicated). Said stop motion control device includes a floating detector finger 12 for riding on the top edge of the material 14 (schematically indicated) being knitted at the point where said cylinder needles 10 and said dial needles 11 are fully retracted, see particularly Figs. 1 and 2 which show the relationship of the needles and the said floating finger 12. An electric switch 15 is provided for controlling the electric circuit to the controller of the knitting machine. The switch 15 is operated by means associated with the floating finger 12 when the amplitude of motion of said floating finger 12 exceeds a pre-selected amount.

The floating finger 12 is made from a number of sections. There is an outer tip 16 which is slidably mounted in the socket 17 of an intermediate section 18. A set screw 19 threadedly engaged through the socket 17 holds the tip 16 in adjusted extended positions. The intermediate section 18 is adjustably connected by several screws 20 and a cooperative slot 21 with a base section 22. The base section 22 is pivotally supported by a pintle 23 between a pair of lugs 24 mounted on a casing 25 provided with a bottom support flange 25a. It is intended that this casing 25 be mounted upon the head 26 of the knitting machine. The electric switch 15 is mounted within the casing 25. This switch 15 has an operator stem 27 projecting from the casing 25. The switch 15 is a conventional micro switch which when closed remains closed, when the operator stem 27 is depressed, and which may be opened by pressing inwards a stem 28 on the bottom of the switch 15. Then the switch 15 remains open. A lever 29 is pivotally mounted on the casing 25 which may be conveniently moved for pressing the stem 28 inwards to re-open the switch 15.

A lever 30 controls the operator stem 27. This lever 30 is pivotally mounted by a pintle 31 intermediate of its ends. The pintle 31 is supported on lugs 32 on the casing 25. The lever 30 extends over the operator stem 27. An adjustable loose connector 33 is arranged between the lever 30 and the floating finger 12. This connector is illustrated as a screw 34 and a nut 35. The screw 34 is threadedly mounted on and rigidly projects from the outer end of the lever 30. The nut 35 locks the screw 34 in position. The screw 34 passes through the finger 12 so that its head is located a selected distance above the top face of the finger 12. This distance is indicated by reference numeral 36. The screw 34 may be adjusted to vary the distance 36 which represents one of the controls of the amplitude of motion of the finger 12 previously referred to.

An adjustable member 37 is mounted on the finger 12 for moving the lever 30 to directly operate said lever 30 and switch 15. This adjustable member 37 comprises a screw 38 threadedly mounted through the finger 12 and a nut 39 for locking the screw 38 in adjusted positions. The bottom end of the screw 38 is normally slightly spaced from the inner end of the lever 30. This space is indicated by reference numeral 40, see Fig. 3, and represents another control of the amplitude of motion of the finger 12 previously referred to. The connector 33 and adjustable member 37 are located on opposite sides of the pivot 31 of the lever 30.

An electric lamp 41 is mounted on the casing 25. This electric lamp 41 is connected in series with said switch 15. The switch 15 has a pair of contacts 42, 43. One of these contacts is connected with the ground 44. A resistance 45 is shunted across the lamp 41. The lamp 41 and switch 15 are connected in series with the normally open stop motion switch devices 46 used on the knitting machine above the thread feeds. These stop motion switch devices 46 are connected with the ground 44. Current is supplied from an electric transformer 47. The circuit 48 from the transformer includes the normally closed contacts 50 of controller 49 for the knitting machine. The controller 49 has said pair of normally closed contacts 50 which open up when the controller snaps off. The controller 49 is also connected with the ground 44. A nor-

mally open push button switch 51 is connected in parallel with the controller 49 and in series with the circuit through the lamp 41 and switch 15.

A threaded stud 55 projects from the casing 25 and passes through an opening in the base section 22 of the finger 12. Nuts 56 are mounted on the top portion of the stud 55. A small spring 57 is coaxially mounted on the stud 55 beneath the nuts 56 and engages the top face of the base section 22 for urging the finger 12 resiliently downwards. The nuts 56 may be adjusted to control the resilient pressure of the spring 57 upon the finger 12. An adjustable stop nut 58 is threadedly mounted on the stud 55 beneath the base section 22 for limiting downward motion of the finger 12 so that the finger 12 does not move too far downwards when a press-off occurs.

The operation of the device is as follows:

The knitting machine operates in the usual way. The floating detector finger 12 rides on the top edge of the material being knitted at the point where the cylinder needles 10 and the dial needles 11 are fully retracted. If a small lump comes along the floating finger 12 will move up slightly. If a larger lump comes along it will move up a greater distance. If a press-off occurs and the material 14 being knitted starts falling off the knitting needles, the finger 12 will move downwards.

The normally open stop motion switch devices 46 located above the thread feeds of the knitting machine will function to stop the knitting machine under the various contingencies which these stop motion switch devices guard. However, if a knot or large lump or piece of fuzz comes along on one of the threads and becomes jammed in the guide hole of one of the thread feeds and the thread breaks below the guide hole, the stop motion switch devices 46 above the thread feeds will not function. But, now a press-off starts and the floating detector finger 12 of the particular thread feed at which the trouble developed will move downwards, because it no longer is being supported by the top edge of the material 14 being knitted. When the floating finger 12 moves downwards a pre-selected amount the adjustable member 37 will engage against the inner end of the lever 30, pressing said inner end downwards, and pressing the operator stem 27 inwards. This closes the switch 15.

In the event that a knot or lump passed through the guide hole of one of the thread feeds and is being knitted into the knitted material, it is advisable that the machine be immediately stopped before the knitting has progressed to a point in which one or more of the knitting needles will become damaged. As this knot or lump rides beneath the floating finger 12 of the particular thread feed, it will raise the finger 12 so that the base section 22 of the finger 12 closes the space 36 and then lifts the head of the screw 34. This pivots the front end of the lever 30 upwards. The rear end of the lever 30 moves downwards, depressing the operator stem 27 and closing the switch 15.

When the switch 15 is closed for any reason whatsoever, an electric circuit will be completed through the controller 49, the ground 44, the switch 15, and the lamp 41. The controller 49 then functions to stop the knitting machine, and simultaneously the contacts 50 of the controller 49 open. The operator now investigates why the knitting machine stopped. The first thing he should do is to close the push button switch 51.

Since the push button switch 51 is connected in parallel with the controller 49, a complete circuit will now exist from the switch 51 to the ground 44 through the closed switch 15 and the lamp 41. The operator immediately sees that said switch 15 has been closed. Of course, it should be understood that there is one press-off and lump indicator for each of the feeds of the knitting machine. For example, there may be eight or more feeds. Consequently, there are as many switches 15. However, these switches 15 and their associated lamps 41 should be connected in parallel in the circuit 48. Only one of the lamps 41 will become illuminated when the switch 51 is closed, indicating which one of the press-off and lump indicators function. The operator then investigates the reason. If there is partial press-off, correction is made. If there is a knot or lump which caused the stoppage, correction is correspondingly made.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. A press-off and lump detector for each of the thread feeds with the guide holes of a rib knitting machine having cylinder and dial needles, comprising a floating or movable detector finger for riding on the top edge of the material being knitted at the point where the cylinder and dial needles are fully retracted, an electric switch for the electric circuit of the controller of the knitting machine, and means for operating said switch when the motion of said floating finger exceeds a pre-selected amount.

2. A press-off and lump detector for each of the thread feeds with the guide holes of a rib knitting machine having cylinder and dial needles, comprising a floating or movable detector finger for riding on the top edge of the material being knitted at the point where the cylinder and dial needles are fully retracted, an electric switch for the electric circuit of the controller of the knitting machine, and means for operating said switch when the motion of said floating finger exceeds a pre-selected amount, said detector finger being made of several sections adjustably connected with each other.

3. A press-off and lump detector for each of the thread feeds with the guide holes of a rib knitting machine having cylinder and dial needles, comprising a floating or movable detector finger for riding on the top edge of the material being knitted at the point where the cylinder and dial needles are fully retracted, an electric switch for the electric circuit of the controller of the knitting machine, means for operating said switch when the motion of said floating finger exceeds a pre-selected amount, and means for limiting downward motion of said indicator finger to a pre-selected amount.

4. A press-off and lump detector for each of the thread feeds with the guide holes of a rib knitting machine having cylinder and dial needles, comprising a floating or movable detector finger for riding on the top edge of the material being knitted at the point where the cylinder and dial needles are fully retracted, an electric switch for the electric circuit of the controller

of the knitting machine, means for operating said switch when the motion of said floating finger exceeds a pre-selected amount, and resilient means for urging said detector finger resiliently against the top edge of the material being knitted.

5. A press-off and lump detector for each of the thread feeds with the guide holes of a rib knitting machine having cylinder and dial needles, comprising a floating or movable detector finger for riding on the top edge of the material being knitted at the point where the cylinder and dial needles are fully retracted, an electric switch for the electric circuit of the controller of the knitting machine, means for operating said switch when the motion of said floating finger exceeds a pre-selected amount, resilient means for urging said detector finger resiliently against the top edge of the material being knitted, and means for controlling the force of said resilient pressure.

6. A press-off and lump detector for each of the thread feeds with the guide holes of a rib knitting machine having cylinder and dial needles, comprising a floating or movable detector finger for riding on the top edge of the material being knitted at the point where the cylinder and dial needles are fully retracted, an electric switch for the electric circuit of the controller of the knitting machine, and means for operating said switch when the motion of said floating finger exceeds a pre-selected amount, said electric switch being normally open.

7. A press-off and lump detector for each of the thread feeds with the guide holes of a rib knitting machine having cylinder and dial needles, comprising a floating or movable detector finger for riding on the top edge of the material being knitted at the point where the cylinder and dial needles are fully retracted, an electric switch for the electric circuit of the controller of the knitting machine, and means for operating said switch when the motion of said floating finger exceeds a pre-selected amount, said electric switch being normally open, said electric switch remains open when opened and closed when closed.

8. A press-off and lump detector for each of the thread feeds with the guide holes of a rib knitting machine having cylinder and dial needles, comprising a floating or movable detector finger for riding on the top edge of the material being knitted at the point where the cylinder and dial needles are fully retracted, an electric switch for the electric circuit of the controller of the knitting machine, and means for operating said switch when motion of said floating finger exceeds a pre-selected amount, comprising a leverage system connected with said finger and with said switch.

9. A press-off and lump detector for each of the thread feeds with the guide holes of a rib knitting machine having cylinder and dial needles, comprising a floating or movable detector finger for riding on the top edge of the material being knitted at the point where the cylinder and dial needles are fully retracted, an electric switch for the electric circuit of the controller of the knitting machine, means for operating said switch when the motion of said floating finger exceeds a pre-selected amount, an electric lamp in series with said switch, a normally open switch, and a shunt circuit connected in parallel with said controller and including said lamp and said normally open switch.

top edge of the material being knitted, an electric switch for the electric circuit of the controller of the knitting machine and having an operator stem, a lever for controlling said operator stem, an adjustable loose connector between said lever and finger for moving said lever to operate said operator stem, and an adjustable member mounted on said finger for moving said lever to operate said operator stem, said switch being mounted within said casing and its operator stem projecting from said casing, said lever being centrally pivotally mounted on said casing and having its inner end extending over said operator stem, said connector being mounted on the outer end of said lever and extending through an opening in said finger and having a head above said finger.

15. A press-off and lump indicator for each of the thread feeds with the guide holes of a rib knitting machine having cylinder and dial needles, comprising a casing for attachment on the head of said knitting machine, a finger pivotally mounted on said casing for riding on the top edge of the material being knitted, an electric switch for the electric circuit of the controller of the knitting machine and having an operator stem, a lever for controlling said operator stem, an adjustable loose connector between said lever and finger for moving said lever to operate said operator stem, and an adjustable member mounted on said finger for moving said lever to operate said operator stem, said switch being mounted within said casing and its operator stem projecting from said casing, said lever being centrally pivotally mounted on said casing and having its inner end extending over said operator stem, said connector being mounted on the outer end of said lever and extending through an opening in said finger and having a head above said finger, said connector being adjustable for changing the distance from said head to said finger.

16. A press-off and lump indicator for each of the thread feeds with the guide holes of a rib knitting machine having cylinder and dial needles, comprising a casing for attachment on the head of said knitting machine, a finger pivotally mounted on said casing for riding on the top edge of the material being knitted, an electric switch for the electric circuit of the controller of the knitting machine and having an operator stem, a lever for controlling said operator stem, an adjustable loose connector between said lever and finger for moving said lever to operate said operator stem, and an adjustable member mounted on said finger for moving said lever to operate said operator stem, said switch being mounted within said casing and its operator stem projecting from said casing, said lever being centrally pivotally mounted on said casing and having its inner end extending over said operator stem, said connector being mounted on the outer end of said lever and extending through an opening in said finger and having a head above said finger, said adjustable member comprising a member adjustably mounted on said finger and normally slightly spaced from the inner end of said lever.

17. A press-off and lump indicator for each of the thread feeds with the guide holes of a rib knitting machine having cylinder and dial needles, comprising a casing for attachment on the head of said knitting machine, a finger pivotally mounted on said casing for riding on the top edge

75 mounted on said casing for riding on the top edge

of the material being knitted, an electric switch for the electric circuit of the controller of the knitting machine and having an operator stem, a lever for controlling said operator stem, an adjustable loose connector between said lever and finger for moving said lever to operate said operator stem, an adjustable member mounted

5 on said finger for moving said lever to operate said operator stem, an electric lamp in series with said switch, a normally open switch, and a shunt circuit connected in parallel with said controller and including said lamp and said normally open switch.

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