No. 875,767. PATENTED JAN. 7, 1908.

G. L. BALLARD.

NEEDLE PROTECTOR FOR KNITTING MACHINES.

APPLICATION FILED JUNE 4, 1907.

Fig. 6.

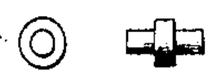


Fig. 5.

Fig. 4

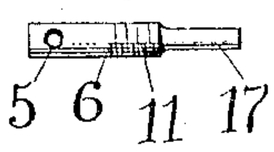


Fig. 1.

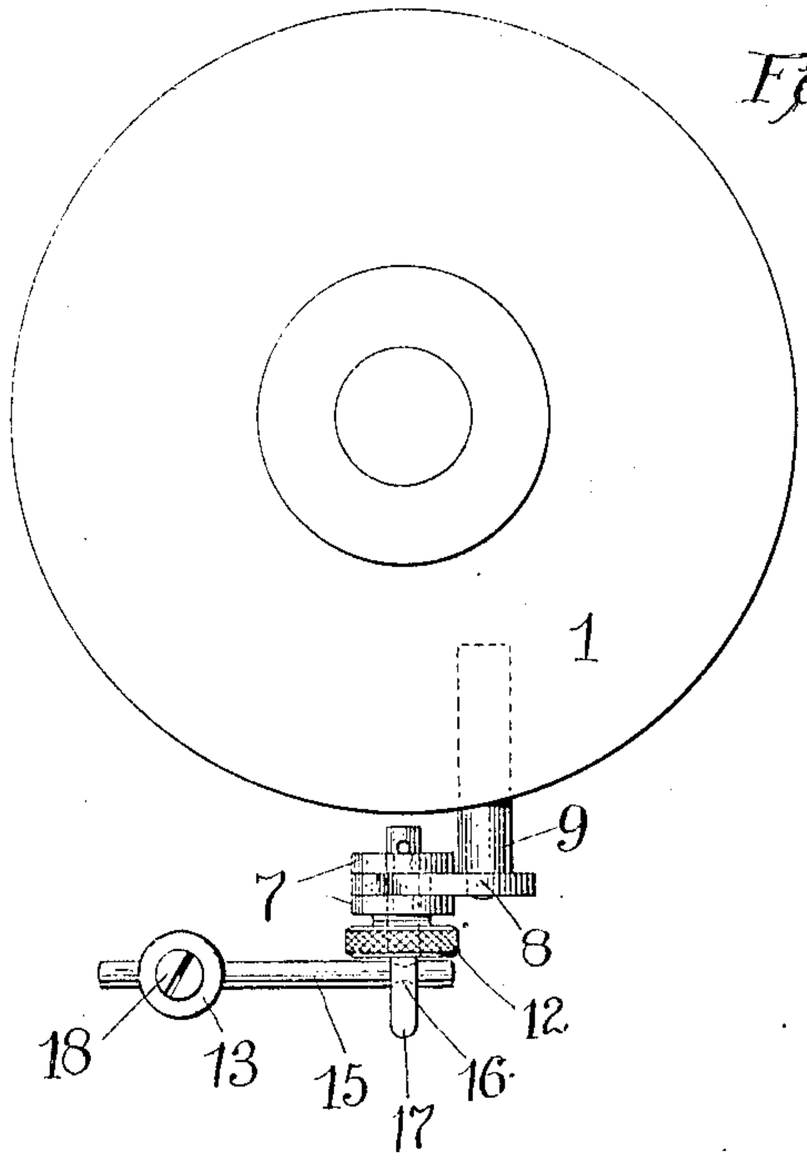


Fig. 2

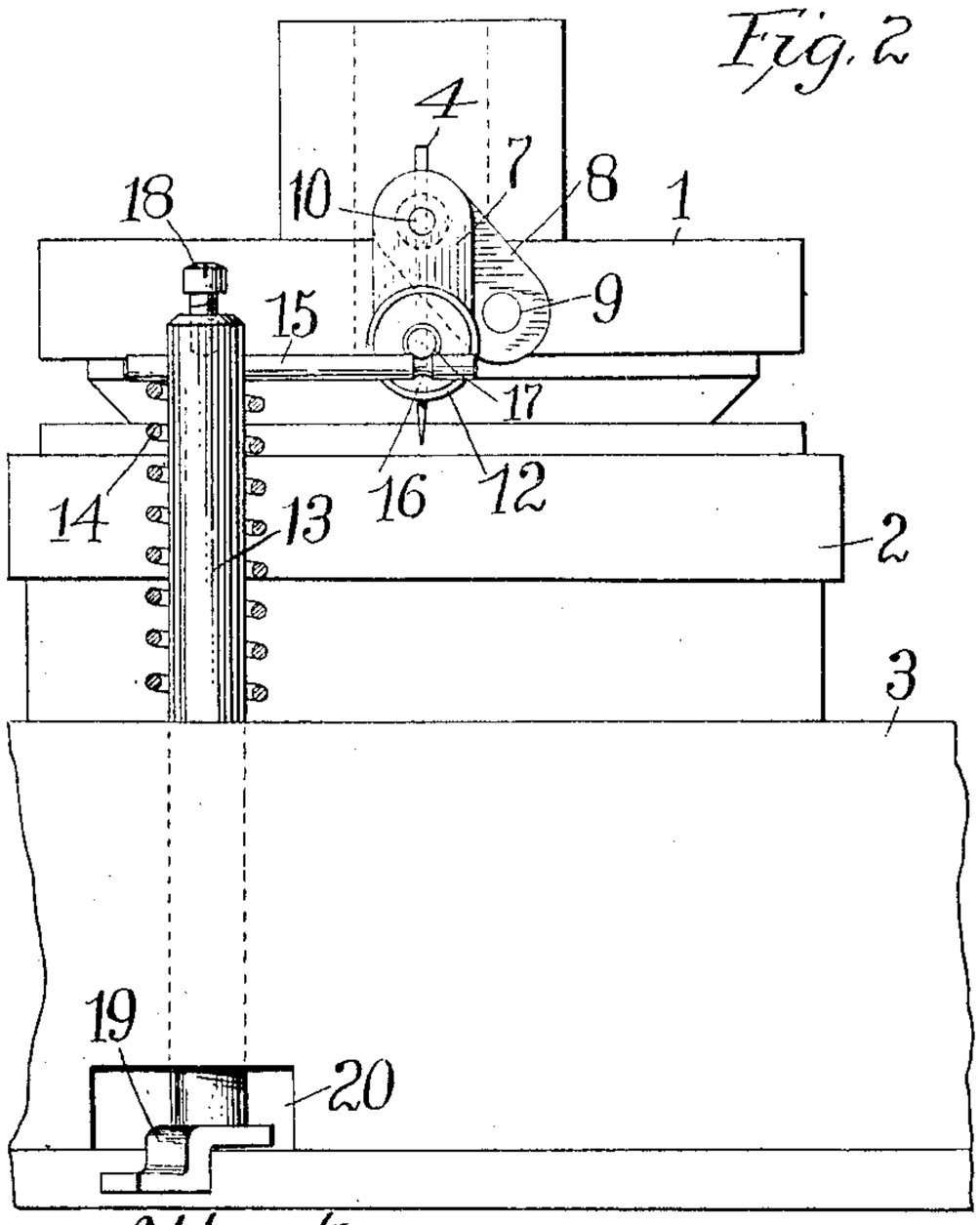
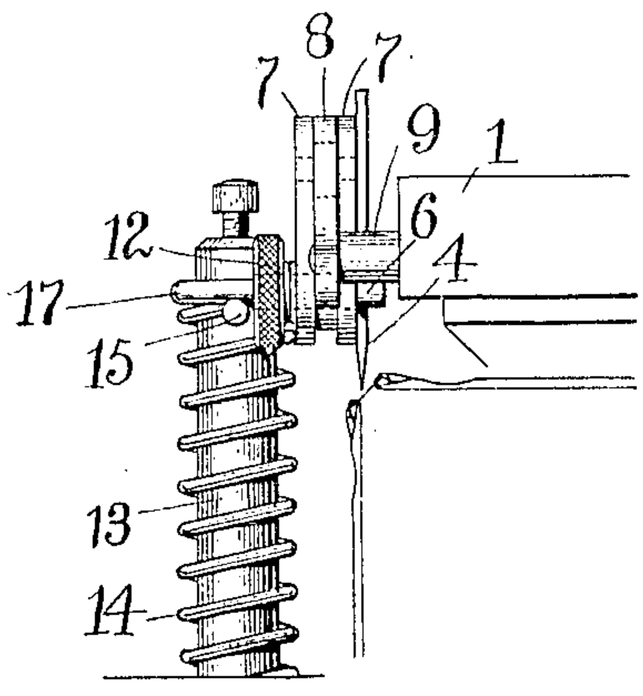


Fig. 3.



Attest

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NEEDLE-PROTECTOR FOR KNITTING-MACHINES.

No. 875,767. Specification of Letters Patent. Patented Jan. 7, 1908.

Application filed June 4, 1907. Serial No. 377,223.

To all whom it may concern:

Be it known that I, GEORGE LAWSON BALLARD, a citizen of the United States, residing at Norristown, Pennsylvania, have invented certain new and useful Improvements in Needle-Protectors for Knitting-Machines, of which the following is a specification.

My invention relates to means for detecting imperfections, such as knots or lumps at the needles of a knitting machine and for arresting the operation of said machine when such imperfections occur in the fabric at the needles.

I aim to provide a needle protector of simple construction and one which will be sensitive and effective in operation.

The invention consists in the features and combination of parts hereinafter described and particularly pointed out in the claims.

In the accompanying drawing, Figure 1 is a plan view of a dial cap or cam carrier of a circular knitting machine with my improvement associated therewith. Fig. 2 is a side view of a portion of the knitting head with my improvement thereon, and, Fig. 3 is a side view of the needle protector device in its relation to the needles. Figs. 4 to 6 are views of details.

In these drawings 1 indicates the dial cap or cam carrier or support of a circular knitting machine.

2 represents, conventionally, a needle cylinder and 3 indicates, conventionally, a cam ring. The needle protector comprises a finger 4 consisting of a straight rod or wire extending vertically through an opening 5 of a pin 6 which extends through a pair of depending arms 7 arranged parallel with each other and located upon opposite sides of an arm 8 which is attached to and extends upwardly at an inclination from the bar or pin 9 which is inserted horizontally in an opening in the dial cap or cam support 1. The arms or links 7 are pivoted to the upper end of the arm or link 8 at the point 10 and they depend vertically or substantially so from their pivot connection. The pin 6 carrying the detector finger 4 is screw threaded at 11 and receives a nut 12 so that by turning this nut the pin 6 may be drawn forwardly through the openings in the depending arm 7 and draw the side of the finger or wire 4 firmly against the rear or inner face of the innermost depending arm 7 to thus clamp the said finger or wire in place. This wire or finger as shown in Fig. 3 depends so that its lower end is in close proximity to the needles and thus if any lump or knot occurs at the needles the detector finger will strike the same in the revolution of the machine and said finger will therefore be pressed aside from vertical position so as to cause the operation of the stop motion connections which may be of any suitable character well known for this purpose. For controlling these stop motion connections I employ a vertical extending post 13 movable vertically in the cam ring 3 and pressed upwardly normally by a spring 14, the said post carrying an arm or pin 15 extending laterally therefrom and having a groove at 16 extending circumferentially thereabout in which groove an extension 17 of the detector clamping pin 6 lies when the detector mechanism is in normal position ready to be operated. This laterally extending arm or pin 15 is adjustably connected with the vertical post 13 by the set screw 18.

The lower end of the vertical movable post 13 has connected thereto an arm 19 extending out through an opening 20 in the cam cylinder or ring. This arm is adapted when in a certain position to operate the stop motion connections for instance, such as are shown in patent of Wilcomb, #698090 of April 22, '02, wherein a finger 8 is shown projecting inwardly to be struck at certain times by an arm 9 connected with the needle protector 10. In the present arrangement the arm 19 normally lies in a lower plane than the said arm of the patent above referred to but when the detector finger is pressed aside by a lump of knot at the needles the extension 17 of the pin 6 will move laterally out of the groove 16 and the arm 15 and post 13 will then be free to rise under the pressure of the spring 14 and when said post has raised the arm 19 will then lie in the path of the finger of the stop motion connections shown in said patent so that in the revolution of the machine the said stop motion and finger will be operated to stop the machine.

It will be observed that the point of contact between the upwardly pressed arm 15 and the holding pin or extension 17 is directly under the pivot point 10 of the links or arms 7 and while a certain and sure retaining device is thus provided against upward movement of the arm 15 and post 13 it will be

clear that upon a very slight movement of the pin or retainer 17 to one side of the vertical plane of pivot 10 the pressure of the spring 14 will immediately become effective to raise the post 13 and thus the arm 19 will be brought into the plane of the stop motion finger to operate the same as it is brought thereagainst by the revolution of the machine.

The groove 16 insures a certain contact between the retaining pin 17 and the arm 15 until such time as the detector finger is positively operated to move the pin 17 laterally from the groove 16 and while the force necessary to do this is slight an appreciable force is required and this is derived from the pressure of the finger against the knot or lump.

It will be seen that the detector finger being straight can be set in the opening of the clamping pin in any position, as regards its circumference and under all adjustments its end will be directed to the proper point in relation to the needles. This is not the case in some other constructions in which the finger of the needle protector is bent and therefore must be fixed in a certain relation to the parts to which it is attached.

It will be understood that the position of the depending pivoted support, consisting in the present instance, of the links or arms 7, is determined by adjusting or turning the stem 8 in its opening in the dial cap or cam support and as above indicated I prefer to have this turned or set so that the depending arms or links 7 will be directly vertical. This will bring the pin 17 and pivot 10 on centers or in other words in the same vertical plane. I do not limit myself to the precise form of the pivoted support shown and described, nor to the bearing or connection between it and the stop motion connections. These may be altered without departing from the spirit of my invention.

The pivot of the links 7, 7 is shown in Fig. 6. In Fig. 5 I show a spacing ring which fits between the lower ends of the links 7, 7 and surrounds the pin 6.

I claim as my invention:

1. In combination in a needle protector for knitting machines, the depending finger, a support therefor, pivotally supported and depending from said pivot to swing and carry the finger bodily therewith, and means held normally in a lowered position by the said depending support until the same is swung aside by the engagement of said finger with a lump, knot or the like at the needles, substantially as described.

2. In combination in a needle protector for knitting machines, a finger to be engaged by a lump, knot or the like, a support therefor pivotally supported and depending from said pivot to swing and carry the finger bodily therewith, and means restrained by the said pivoted support against upward movement, the point of contact between said support and the said means being in the same vertical plane with the pivot of said support, substantially as described.

3. In combination in a needle protector for knitting machines, a detector finger, straight from end to end and a support therefor, pivoted and depending from said pivot, and means for operating the stop motion restrained by the said support, said straight detector finger being adjustable in its support, substantially as described.

4. In combination in a needle protector for knitting machines, a detector finger straight from end to end, and extending vertically, and a movable support for the said detector finger on which it is vertically adjustable and means controlled by the movement of said support, substantially as described.

5. In combination in a needle protector for knitting machines, a movable support, a detector finger, a clamping pin extending through the movable support and having an opening through which the detector finger extends and means for drawing upon said pin to draw it through the support to clamp the detector finger against the side of said support, substantially as described.

6. In combination in a needle protector for knitting machines, an arm, a stud or pin to connect said arm with a part of the knitting head, a supporting arm pivoted to the arm first mentioned and depending therefrom a detector finger carried by the depending arm and adjustable in relation thereto and means controlled by the movement of the depending arm for operating the stop motion, substantially as described.

7. In combination in a needle protector for knitting machines, a movable support, a detector finger, a clamping pin extending through the said support and engaging the detector finger to draw the same against the support, a nut on the said pin, said pin having an extension and means pressed upwardly against the said extension and adapted to control the stop motion connections, substantially as described.

8. In combination in a needle protector for knitting machines, a detector finger, a pivot support carrying the said finger and depending from its pivot, a vertically movable member consisting of the horizontal arm 15 having a groove or notch therein engaging a part on the said depending support at a point substantially in the vertical plane of the pivot and means controlled by the said vertically movable member, substantially as described.

9. In combination in a needle protector for knitting machines, a supporting arm, a pair of links pivotally connected to said arm, a needle protector, a pin extending through the pair of links or pivot supports having an

opening through which the detector extends, a nut on the said pin for clamping the detector in place, said pin having a forward extension and means bearing on the said forward extension and controlled thereby said means controlling in turn the stop motion, substantially as described.

10. In combination, a pivoted support, a pin extending transversely through the same, a detector engaged by the said pin and clamped thereby against the pivoted support and means for drawing the pin into place, and means controlled by the movement of the detector, substantially as described.

11. In combination with a knitting head, a depending supporting arm pivoted at its upper end, a support therefor connected with the knitting head, a detector finger on the inner side of said depending support, a pin carried by the said support and extending outwardly, and upwardly pressed stop motion controlling connections controlled by the said outwardly extending pin, substantially as described.

12. In combination with a knitting head, a supporting arm adjustably connected therewith, a depending support pivotally connected with the adjustable supporting arm, a detector carried by the said depending pivoted support, and stop motion connections controlled by said depending pivoted support, substantially as described.

In testimony whereof, I affix my signature in presence of two witnesses.

GEORGE LAWSON BALLARD.

Witnesses:
CARRIE LANDIS,
GEO. R. RALSTON.