

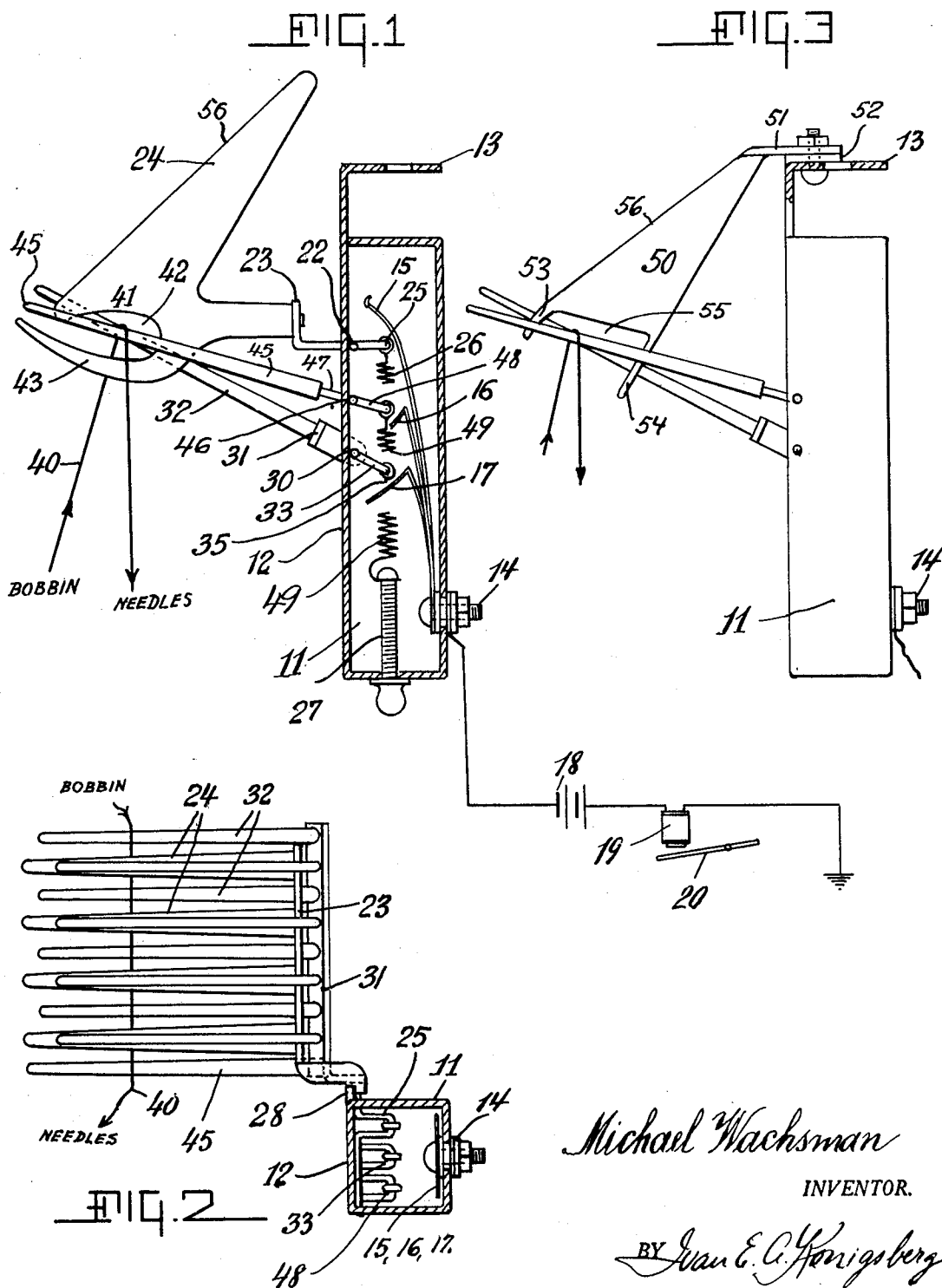
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STOP MECHANISM FOR KNITTING MACHINES

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STOP MECHANISM FOR KNITTING MACHINES

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This invention relates to improvements in stop mechanism for knitting machines of the type in which pivoted electric contact levers are under the control of a travelling thread. When a knot or other obstruction occurs in the thread, one lever is pulled down to cause an electric contact to be made whereby to actuate the stop mechanism of the knitting machine to stop the latter so that the thread can be attended to. The same operation takes place when a thread breaks or the thread runs out and another lever is moved up. The stop mechanism may also include so-called guards in place of some of said levers for the purpose of overlying the thread which is placed upon the levers whereby to prevent the yarn from jumping off the lever during the running of the machine. The guard also serves the purpose of preventing operation of the levers when a mere slack occurs in the thread.

One object of this invention is to provide a generally improved stop mechanism including novel features of construction whereby the mechanism becomes more efficient in operation and whereby instant operation is assured when the yarn breaks at the needles of the knitting machine. Another object is to provide end detector levers which are pivoted below the knot detector levers whereby to insure against the yarn jumping out of the mechanism and a better all-around operation is obtained. The advantage of such a construction is better spacing of the threads and more room for placing the thread on the stop mechanism.

With the foregoing and other objects in view the invention is embodied in a stop mechanism arranged and constructed as hereinafter set forth and as illustrated in the accompanying drawing in which—

Fig. 1 is a side view of the stop mechanism with parts in section.

Fig. 2 is a plan view with parts in section.

Fig. 3 is a side view showing a modification in which the knot detector levers are replaced by fixed guards.

Before describing the invention it should be recalled as well known in the art that a knitting machine is provided with an electrically actuated mechanism for stopping the machine when the thread breaks, runs out or a knot occurs. The electric circuit which controls the stop mechanism is normally open but is closed by the stop mechanism when a lever or member therein is caused to close the circuit. Hence each stop mechanism includes a circuit terminal to be engaged by the lever or like member to close the

circuit. The lever or member is itself the other circuit terminal as a part of the knitting machine upon which the circuit is grounded. All of this is common practise and well known in the art. Hence the drawing does not include any of such well known parts or mechanisms but is limited to illustrating only the stop mechanism itself.

In the present invention the stop mechanism comprises a contact box 11 which may be of the general type and construction shown in my Patent No. 2,080,903, May 18, 1937. The box is usually made of sheet metal bent up to form the box proper which is covered by a removable front cover 12 to be secured in any suitable manner not especially illustrated. As shown, the cover may have a portion as 13 for attachment to the knitting machine in any well known manner. The box carries, properly insulated, a fixed circuit terminal 14 to which is secured a contact spring which is divided and forms three contact springs 15, 16 and 17. The terminal 14 is connected in series with a battery 18 and an electromagnet 19. When the circuit is closed inside the box the magnet is energized and actuates a lever 20 which conventionally represents the stop mechanism of the knitting machine. When this lever is attracted by the magnet the knitting machine stops.

In the box 11 there is pivoted at 22 a knot detector unit consisting of a lever 23 which carries a number of porcelain knot detector levers 24 of the type shown in my said patent. The lever 23 has a contact heel 25 inside the box adapted to engage the contact spring 15 to close the circuit. The knot detector unit is held in thread receiving operating position as shown in Fig. 1 by a spring 26 hooked onto the contact heel and connected to a screw not shown but similar to the screw 27 for adjusting purposes. The spring 26 normally holds the unit lever 23 up against a stop 28 on the box, see Fig. 2.

It has heretofore been a universal practise to pivot the end detector lever or unit above the knot detector lever or unit, see for instance the patent to J. Wachsman, No. 2,079,341, May 14, 1937. Contrary to such practise I pivot the end detector lever or unit below the knot detector unit because I am then able to use a straight end detector lever which is cheaper to manufacture and a more efficient lifting action is obtained. It is also easier to thread the mechanism, that is placing the yarn on and between the several levers.

Accordingly there is pivoted at 30 on the box 11 an end detector unit consisting of a lever 31

which carries a number of straight end detector porcelain fingers 32 which are spaced to operate between the knot detector levers 24 as shown. The lever 31 also has a contact heel 33 inside the box adapted to engage the contact spring 17 being held in a normal circuit open position by a spring indicated at 35 and adjusting screw (not shown) similar to the screw 27.

The yarn 40 passes from the bobbins up to the stop mechanism and then down to the knitting needles of the knitting machine. These details are not shown being well known in the art. In the stop mechanism the yarn passes over all the levers but below the overhanging portion 41 of the knot detector levers, which portion therefore together with the end detector fingers form an enclosed space 42 for the yarn and whereby the yarn is prevented from jumping out of the mechanism. As the machine operates the yarn bobs up and down in a jumpy manner and will at times be in the position shown in Fig. 1. At other times there will be a pull on the yarn so that it will move down and temporarily rest upon the portion 43 of the lever 24. At all times however the yarn will be under an upward pull by the end detector fingers 32, the spring 35 being adjusted accordingly as will be understood.

When a knot or other obstruction occurs in the yarn, the knot detector unit 24 will obviously be pulled down against the pull of the spring 26 and the contact heel 25 will move up to close the circuit against the contact spring 15 and the machine will stop. It is common practise in the art to lead the yarn from the bobbin up through an eye plate before the yarn reaches the stop mechanism. The eye plate or guide permits only passage of the smooth yarn. When there is a knot in the yarn, the latter cannot pass through the eye plate and becomes taut between the plate and the stop mechanism so that the latter is moved down by the pull on the yarn from the needles. An eye plate or guide is not illustrated because such an element has been in use in the art for many years. When a yarn breaks or runs out the end detector fingers 32 will be lifted by the spring 35 and the contact heel 33 will move down and close the circuit by contact with the other contact spring 17 and the machine will stop. The arrangement by which the yarn is threaded over and between the several levers and fingers serves to straighten out the yarn as it passes through the stop mechanism and makes for a more steady operation. It has been found that when the yarn breaks at the needles it is desirable to provide for an immediate stop to prevent the loose end from passing into the knitting mechanism itself. Of course when the yarn breaks the end detector unit will move up and the machine will stop as stated above, but to insure immediate action I provide a separate end detector finger 45 which is pivoted at 46 on the box 11 and which is located close to the entire unit on the needle side thereof. The lever 47 which carries this separate special end detector finger 45 also has a contact heel 48 adapted to engage the third contact spring 16 to close the circuit. This special finger is held in adjusted position by a spring 49 and screw 27 similar to those described above. The spring 49 may be adjusted for quick upward pull when the yarn breaks. When such breakage occurs on the needle side of the unit, the finger 45 will be swung upwards and its contact heel 48 instantly closes the circuit. The loose end of the yarn will therefore hardly have time to pass into the needles.

In Fig. 1 it should be noted that both ends of the spring 49 are shown, same extending between the contact heel 48 and the screw 27. Only the upper ends of the two other similar springs 26 and 35 are indicated. These springs extend downwards from the two other contact heels 25 and 33 respectively. Likewise the free end of the contact spring 16 is broken off for the sake of clearness. Only one screw 27 appears in Fig. 1 the two other screws being hidden behind the one shown.

In connection with the showing of the special end detector finger 45 it is pointed out that this is of special advantage for providing a quick stop in cases where yarn pulling detector units can not be used on a so-called lower detector ring unit because the knitting machine is too low. Such special yarn pulling unit is therefore embodied in the end detector finger 45.

Fig. 3 illustrates a modification in which the knot detector unit is replaced by guards 50 which may be thin porcelain plates in the form shown. Each guard has an attaching lug 51 whereby it is secured to a guard bar 52 secured to the box and extending therefrom parallel to the end detector lever 35. The guard is characterized by having a front finger 53 and a rear longer finger 54 providing, together with the detector fingers 32 a yarn enclosing space 55. In Fig. 3 when a knot occurs in the yarn the fingers 32 and 45 will be pulled down by the yarn and immediately snap back into circuit closing position by the springs 35 and 49 to close the circuit. If the yarn runs out the fingers 32 and 45 will rise and close the circuit.

In Fig. 1 when the yarn runs out the end detector fingers 32 will rise and abut the lower corner of the knot detector lever 23. These fingers 32 will form a wide angle with the surfaces 56 of the levers 24 into which the yarn is thrown in threading the stop mechanism. The yarn is then pulled down along the surfaces 56 and snapped in under the levers 24 into the space 42. The surface 56 of the guards in Fig. 3 serve the same purpose.

I claim:

1. In a stop mechanism for knitting machines under the control of a travelling thread, a circuit closer unit comprising a contact box, an electric circuit terminal thereon, a spring held knot detector lever pivoted on said box at a given point and including a thread receiving portion extending forwardly of said box and having a contact heel inside the box to engage said terminal when said lever is pulled down by the thread, a spring held end detector finger pivoted on said box at a point a distance below the said lever pivot, said finger extending forwardly of the box adjacent the said lever, said finger having a contact heel inside the box to engage said terminal when said finger is moved upwardly beyond a predetermined position when the thread breaks, said end detector finger having its fore end positioned underneath and in contact with the thread, a second spring held end detector finger pivoted on said box at a point intermediate the said two pivots, said second finger extending forwardly of the box closely adjacent to the said knot detector lever, said second finger also having a contact heel inside the box to engage said terminal when said second finger is moved upwardly beyond a predetermined position when the thread breaks, said second finger having its fore end positioned underneath and in contact with the thread.

2. In a stop mechanism for knitting machines

under the control of a travelling thread, a circuit closer unit comprising a contact box, an electric terminal thereon, a spring held knot detector unit pivoted on said box at a given point, 5
said unit including a plurality of forwardly extending spaced thread receiving portions and a contact heel inside the box to engage said terminal when the said thread receiving portions are pulled by the thread, a spring held end detector unit pivoted on said box at a point a distance 10
below the said knot detector unit pivot, said end detector unit including a plurality of forwardly extending spaced fingers in alternate relations, said end detector unit having a contact 15
heel inside the box to engage said terminal when said fingers are moved upwardly beyond a predetermined position when the thread breaks, said end detector fingers having their fore ends positioned underneath and in contact with the thread, 20
a second spring held end detector finger pivoted on said box at a point different from the said two mentioned pivots, said second finger extending forwardly of the box closely adjacent the said
25 knot detector unit on the needles side thereof,

said second finger also having a contact heel inside the box to engage said terminal when said second finger is moved upwardly beyond a predetermined position when the thread breaks, said second finger having its fore end positioned 5
underneath and in contact with the thread.

3. In a stop mechanism for knitting machines under the control of a travelling thread, a circuit closer unit comprising a contact box, a knot detector unit pivoted on said box at a given point, 10
an end detector unit pivoted on said box at a point a distance below the said first pivot, an end detector finger pivoted on the box at a point intermediate the said two pivots, said finger extending forwardly of the box closely adjacent said 15
knot detector unit on the needles side thereof, the said units and finger including means for supporting a travelling thread placed upon the same, an electric circuit terminal on the box and contact heels on said unit and finger extending 20
within the box for engaging the said terminal to close an electric circuit when the said thread breaks or a knot occurs on said thread.

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