Nov. 7, 1939. M. WACHSMAN 2,178,981

COMBINED STOP MOTION AND TENSIONING DEVICE

Filed Nov. 9, 1937 2 Sheets-Sheet 1

FIG. 1

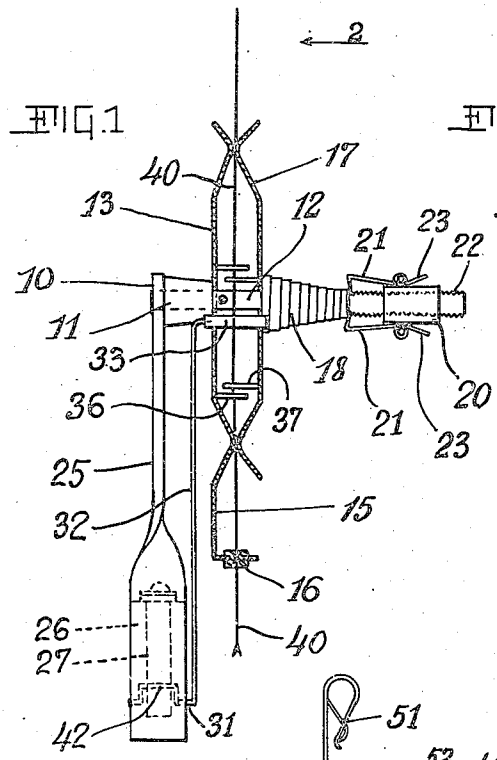


FIG. 2

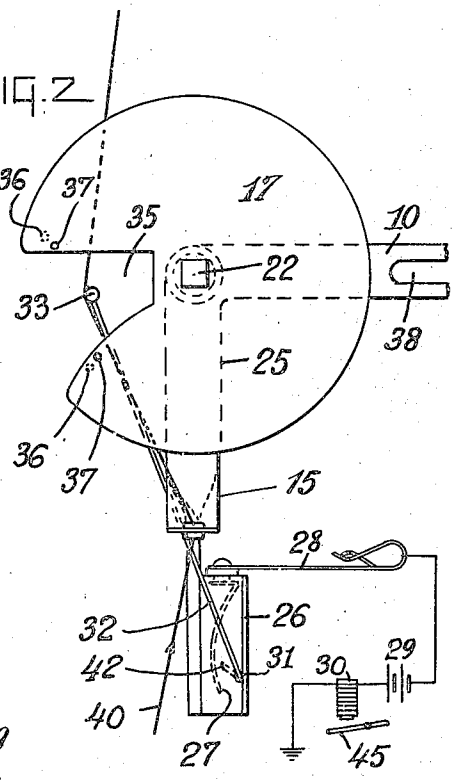
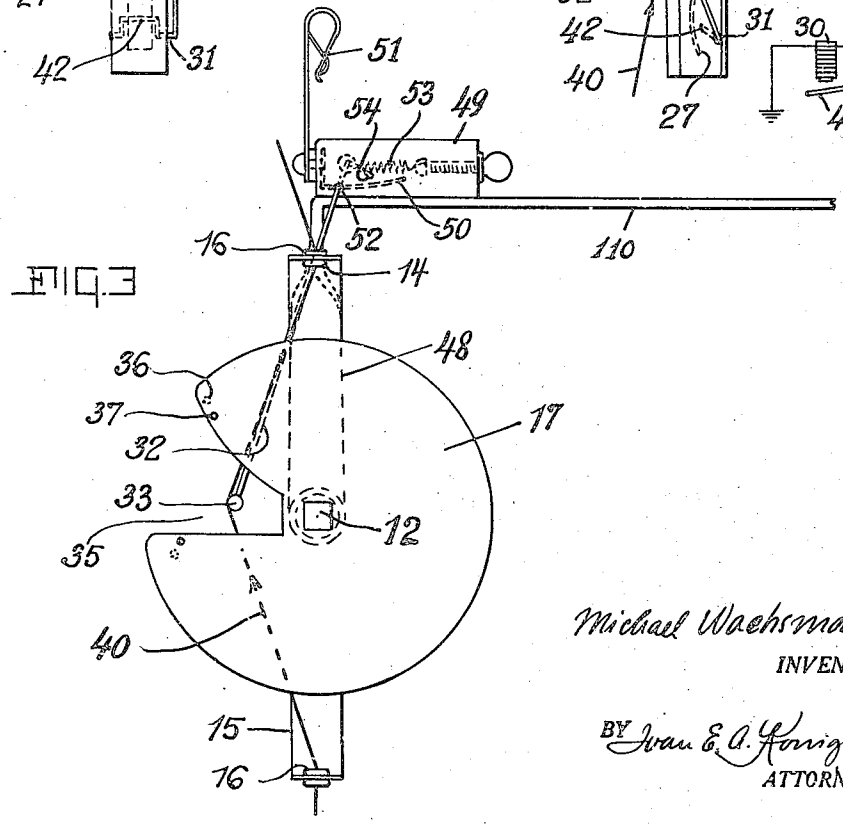


FIG. 3



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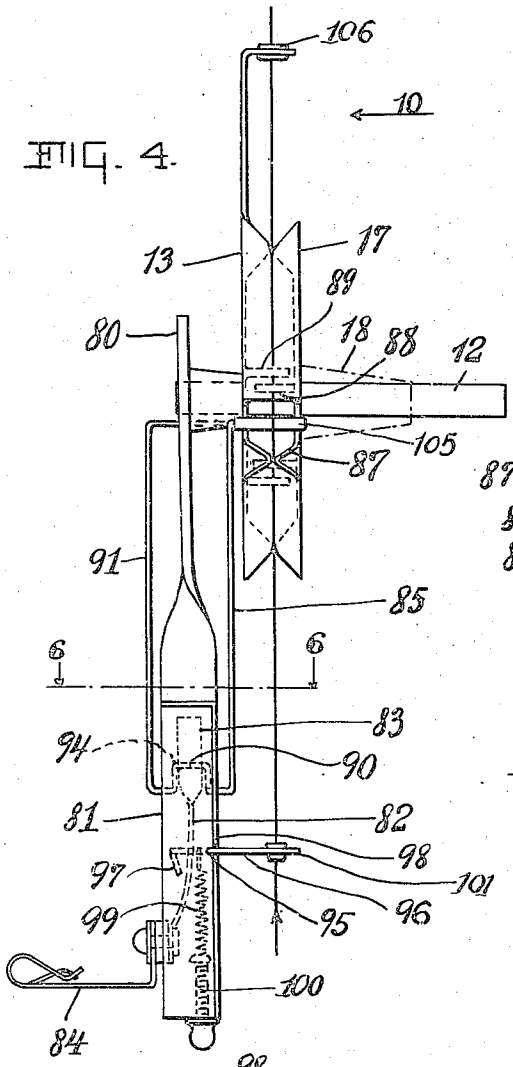
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COMBINED STOP MOTION AND TENSIONING DEVICE

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FIG. 4.



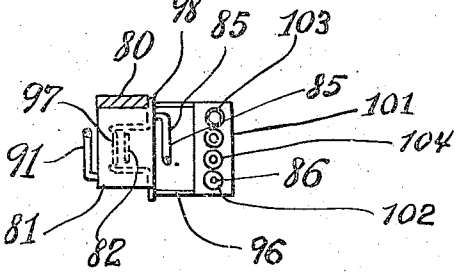
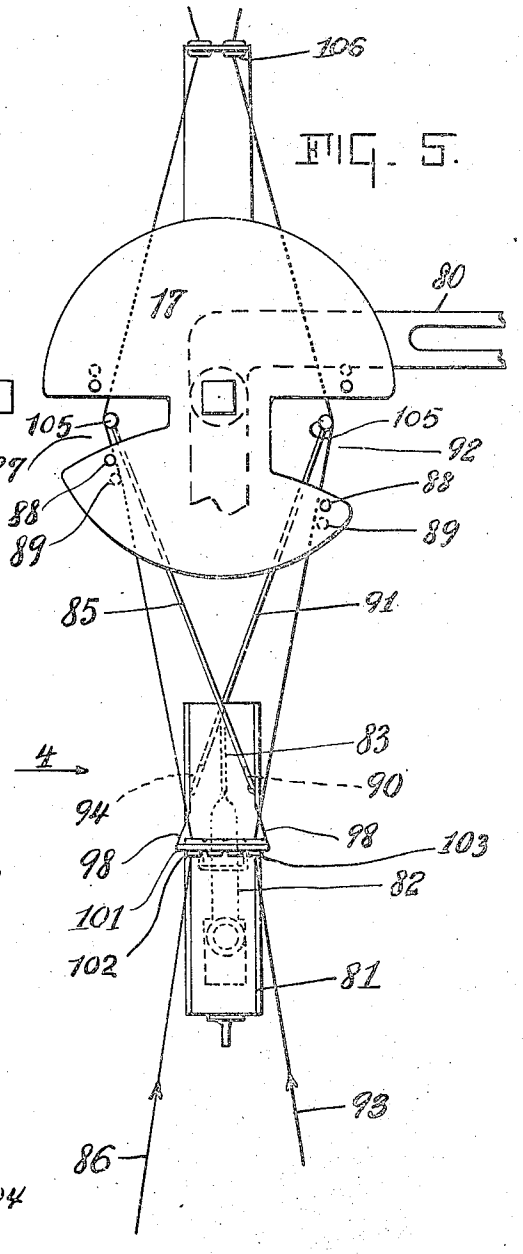


FIG. 6

FIG. 5.



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COMBINED STOP MOTION AND TENSIONING DEVICE

Michael Wachsman, Brooklyn, N. Y.

Application November 9, 1937, Serial No. 173,565

4 Claims. (Cl. 242—36)

This invention relates to improvements in combined stop motions and tensioning devices to be used on knitting, weaving and sewing machines. The object of the invention is to provide a stop motion in combination with a tension device which shall be of simple and efficient construction, easy to install and certain in operation. The invention is embodied in a tension device consisting of two disks. One disk is fixed. The other disk is movably held against the first disk by a spring to provide the tension in a well known manner. One or more detector levers are so mounted and held to operate between the disks so that when the thread breaks or runs out or when a knot occurs on the thread, the lever will be actuated by gravity or by a spring to move into an electric circuit closing position to close the usual stop circuit. One object of the invention is to include in the device a so called knot catcher or knot detector lever to operate in combination with the detector levers aforesaid for more efficient and quick operation. Other objects will appear as this specification proceeds. In the accompanying drawings illustrating the invention.

Fig. 1 is a front view of one form of the device with parts in section and parts removed.

Fig. 2 is a side view looking in the direction of arrow 2 in Fig. 1 with parts removed and broken away.

Fig. 3 is a view similar to Fig. 2 but shows a modification.

Fig. 4 is a front view of a stop motion device which includes a knot catcher lever and two detector levers looking in the direction of arrow 9 in Fig. 5.

Fig. 5 is a view looking in the direction of arrow 10 in Fig. 4 with parts broken away.

Fig. 6 is a sectional view on line 6—6 of Fig. 4 with parts removed and parts broken away.

Referring first to Figs. 1 and 2 the reference numeral 10 denotes a supporting bracket by means of which the device is attached to the machine. The place and manner of securing the stop motions and tensioning devices to the knitting machine vary depending upon the particular type of machine used. Preferably the device will be mounted as close to the bobbins as possible so as to leave a good length of thread to pass into the knitting mechanism. The bracket 10 has a hub 11 into which there is driven or otherwise secured a square shaft 12. Upon the latter and suitably secured against movement along the shaft there is mounted a fixed tension disk 13 having a lower thread guide 15 with a porcelain eyelet 16 which has an opening sufficient to pass the thread, but which will not permit the passage of a knot or similar obstruction upon the thread if the device is also to operate as a knot detector. Opposed to the fixed disk 13 is a tension disk 17 which is adapted to slide on the shaft 12. The disk 17 is held against the disk 13 by a tension spring 18 of novel design in this art. The spring is formed of strip material and as shown the convolutions overlie each other. Thus the spring is practically dustproof and self cleaning which is an advantage. The inner end of the spring forms a centrally disposed loop which closely surrounds the shaft and acts against the central part of the disk 17, thus preventing wobble and insuring an even pressure upon the disk. I have found such springs to be superior to ordinary springs coiled from wire and which have no central loop.

The tension of the spring may be adjusted by any suitable means. In the present instance there is mounted upon the shaft 12 a sleeve 20 having two jaws 21 pivoted thereon. The jaws are springy and tend to close upon and engage teeth 22 on the shaft to hold the sleeve 20 in adjusted position, the jaws engaging the spring as shown. The jaws have tails 23 whereby they may be opened in order to shift the sleeve 20 and adjust the tension as will be understood.

The bracket 10 has an arm 25 which supports a contact box 26 by screws or rivets not shown. In the box is mounted a fixed contact spring 27 to which a terminal clip as 28 may be secured. The terminal clip is in circuit with a battery 29 and an electromagnet 30. In the box 26 there is pivoted at 31 a detector lever 32 having a thread engaging porcelain covered arm 33. The lever extends to one side of the disks with the arm 33 extending across the disks in a cut out therein in each disk as at 35. The disks carry inwardly extending opposed staggered pins 36, 36 and 37, 37.

In Fig. 2 the sleeve 20 and the spring 18 are removed. The bracket 10 may be of any length and slotted as at 38 to provide for adjustable mounting upon the machine. In operation the thread 40 which runs between the bobbins and the knitting mechanism passes upwards through the eyelet 16, between the disks, in front of the end detector arm 33 and then on to the knitting needles or other part of the machine. So long as the thread is traveling through the device it is under tension by the disk 17 acting against the disk 13 and the detector lever is held in

position about as shown in Fig. 2. When the thread breaks or runs out or when a knot occurs, the detector lever falls forward by gravity and a contact heel 42 on the detector within the box 26 falls forward and engages the contact spring 27 to close the circuit to the ground through the machine. The electromagnet then becomes energized and attracts a lever 45 which conventionally indicates a stop motion actuating member which causes the stop motion of the machine to function and stop the machine.

After the trouble has been attended to the operator rethreads the device by passing the thread through the eyelet. Then he moves the disk 17 away from the disk 13 catching the detector arm 33 as he passes the thread upwards. The pins provide resistance during the operation in that as the detector arm tends to move outward the thread is pulled against the pins. As the operator moves the thread upward through the device, the disk 17 closes and the thread is automatically confined behind the pins 36 and 37. During the operation the thread jumps and vibrates and at times becomes more or less slack while moving between the disks. The thread might thus form a loop large enough to cause the detector lever to fall outward and thereby close the circuit accidentally. The pins serve to restrain such loop formation within the disks.

Fig. 3 illustrates a modification in which the detector lever is spring actuated to close the circuit. In this view the fixed tension disk has an additional eyelet guide 14 for guiding the thread above the tension disks if such is desired. The bracket 110 has a depending arm 48 which supports the square shaft 12. The spring and the adjusting device are not shown in Fig. 3. A contact box 49 is carried by the bracket and contains a contact spring 50 connected to the terminal clip 51. The detector lever 32 is pivoted in the box at 52 under tension by a spring 53 and is provided with a contact heel 54 within the box. The operation is as described above under Figs. 1 and 2 except that when the thread breaks or runs out or a knot occurs, the detector lever is swung upwards by the spring 53 so that the contact heel 54 engages the contact spring 50 to close the circuit.

The stop motion herein disclosed may be used as an end detector stop motion by simply making the eyelet guides of usual dimensions to permit easy passage of the thread, or it may be used also as a knot detector by making the eyelet 16 small eough. The fixed disks 17 may have one or two eyelet guides as desired.

Figs. 4 to 6 illustrate a stop motion which includes additional features besides those already described. In these views the supporting bracket 80 carries the square shaft 12, the fixed tension disk 13 and the movable tension disk 17. The spring 18 is shown diagrammatically in dotted outline. The adjusting device is not shown as it may be of any suitable type. The bracket supports a contact box 81 which contains a contact spring which is twisted to form two portions 82 and 83 at right angles to each other. A terminal clip 84 is connected to the spring. In the box are pivoted two detector levers. One of these marked 85 is designed to work against relatively fine thread 86 and therefore the cut out space 87 in the disks is relatively narrow so as to bring the opposed sets of thread restraining pins 88 and 89 closer to each other as shown. This detector lever has a contact heel 90 adapted to engage on one side of the contact spring portion 83. This detector lever moves on one side of the box 81. The other detector lever 91 is pivoted on the other side of the box 81 and operates within a larger cut out 92 in the disks being designed to operate on a heavier thread 93. Of course the two detectors 85 and 91 may operate on threads of the same size or in other words, the construction shown in Figs. 2 and 3 may be arranged to operate on two threads on opposite sides of the shaft similar to the construction shown in Fig. 5. The said other detector lever 91 has also a contact heel 94 which may engage on the opposite side of the contact spring portion 83. The opposed sets of thread restraining pins 88 and 89 are provided to function together with the second detector lever 91.

In contact box 81 there is also pivoted at 95 a knot catcher lever or knot detector 96 provided with a contact heel 97 adapted to engage the portion 82 of the contact spring. The lever 96 is held in a normal fixed position against suitable stops 98 by a spring 99 adjustable in a known manner by a screw 100. The knot detector lever carries a plate 101 provided with a plurality of eyelet guides which are bored to allow different thicknesses of thread to pass through them. Thus the eyelet 102 will allow only the very finest thread to pass, while the eyelet 103 will allow a thicker thread to pass. The eyelets 104 are graduated in between.

In operation the threads are passed from the bobbins up through the knot catcher lever, up between the disks behind the restraining pins and in front of the arms 105 upon the detector levers and then preferably up through eyelet guides 106 and to the knitting mechanism.

If a thread breaks or runs out the detector lever 85 or 91 will fall outward and close the circuit within the box 81 and the machine will stop. If a knot occurs the thread cannot pass through the eyelet in the knot catcher lever. Consequently this lever will be pulled upward against the force of the spring 99 and its contact heel 97 will engage the contact spring 82 and the machine will stop.

When the knot catcher lever is pulled upward it may be that the thread will slack above it. In such event the particular detector lever 85 or 91 may fall outward and also close the circuit. If the circuit for any reason has not been closed by the knot catcher it will be closed by a detector lever.

Now as is well known in the art the threads or yarns in a knitting machine are led from the bobbins, up over a stop motion device of known construction and then down to the knitting mechanism. This is done in order to allow sufficient thread to be knitted into the fabric before the machine stops. It is not desirable that the thread should break if a knot occurs. All that is desired is that the machine stops. It follows that in the present disclosure the machine will be stopped shortly after the thread leaves the bobbin, and because of the long stretch of thread between this device and the knitting mechanism, there will be sufficient leeway so that the machine will stop before the thread breaks. The practice of mounting the stop motion in the most advantageous position is known in the art, hence it is not deemed necessary to disclose other than the constructional features of the present invention.

The eyelets in the knot catcher plate need not be graduated. The machine may run with threads of the same thickness all the time. In

such case the device in Fig. 5 merely provides for two threads. Neither is it absolutely necessary to provide the overhead eyelet guides at 106. They are of advantage in that they bring the thread well within the grip of the two disks.

Constructional details such as rivets, screws and bolts, and other parts for properly securing the various elements have purposely been omitted from the drawings because these are matters of ordinary mechanical skill in constructing and mounting the devices.

I claim:

1. In a device of the character described a support, a contact box thereon, a normally open electric circuit terminal on the box, a detector lever pivoted on the box and having a contact heel adapted to engage said terminal to close the circuit, a pair of tension disks mounted on the said support, pins on said disks in spaced staggered relation for guiding a traveling thread passing between the disks, said detector lever having an arm engaged by the thread between the disks within their peripheries to keep said contact heel in open circuit position, said detector lever being actuated when the thread breaks to move its contact heel into engagement with the said circuit terminal to close the circuit.

2. In a device of the character described a support, a contact box thereon, a normally open electric circuit terminal on the box, a detector lever pivoted on the box and having a contact heel adapted to engage the said terminal to close the circuit, a shaft in said support, a fixed tension disk on the shaft, a second tension disk movably supported on the shaft, a spring for applying tension between the said disks, means on the fixed disk for guiding a traveling thread passing between them, said detector lever having an arm engaged by the thread between the disks within their peripheries to keep said contact heel in open circuit position, said detector lever being actuated when the thread breaks to move its contact heel into engagement with the said circuit terminal to close the circuit.

3. In a device of the character described a support, a contact box thereon, a normally open electric circuit terminal on the box, a detector lever pivoted on the box and having a contact heel adapted to engage the said terminal to close the circuit, a pair of tension disks mounted upon the support, means for applying tension to said disks, means for guiding a traveling thread passing between the disks, said detector lever having an arm engaged by the thread between the disks in a cut out space in the disks to keep said contact heel in open circuit position, said detector lever being actuated when the thread breaks to move its contact heel into engagement with the said circuit terminal to close the circuit, the said tension disks having opposed thread restraining pins disposed above and below the said cut out space in the disks.

4. In a device of the character described, a support, a contact box thereon, a normally open electric circuit terminal on said box, a detector lever pivoted on the box and having a contact heel within the box adapted to engage the said terminal to close the circuit, a square shaft on said support, a first tension disk fixed on said shaft, a second tension disk movable on the shaft, a spring for pressing the second disk against the first disk to apply tension between the disks, guiding means on one of the disks for guiding a traveling thread passing between them, said detector lever extending from its pivot to within the circumference of the disk in radially disposed open spaces in the disks, said detector lever having an arm parallel to said shaft engaged by the thread passing between the disks to keep the said contact heel in open circuit position, said detector lever being actuated when the thread breaks to move its contact heel into engagement with the said terminal to close the circuit, said tension disks having opposed thread restraining pins for the purpose described.

MICHAEL WACHSMAN.