

March 29, 1960

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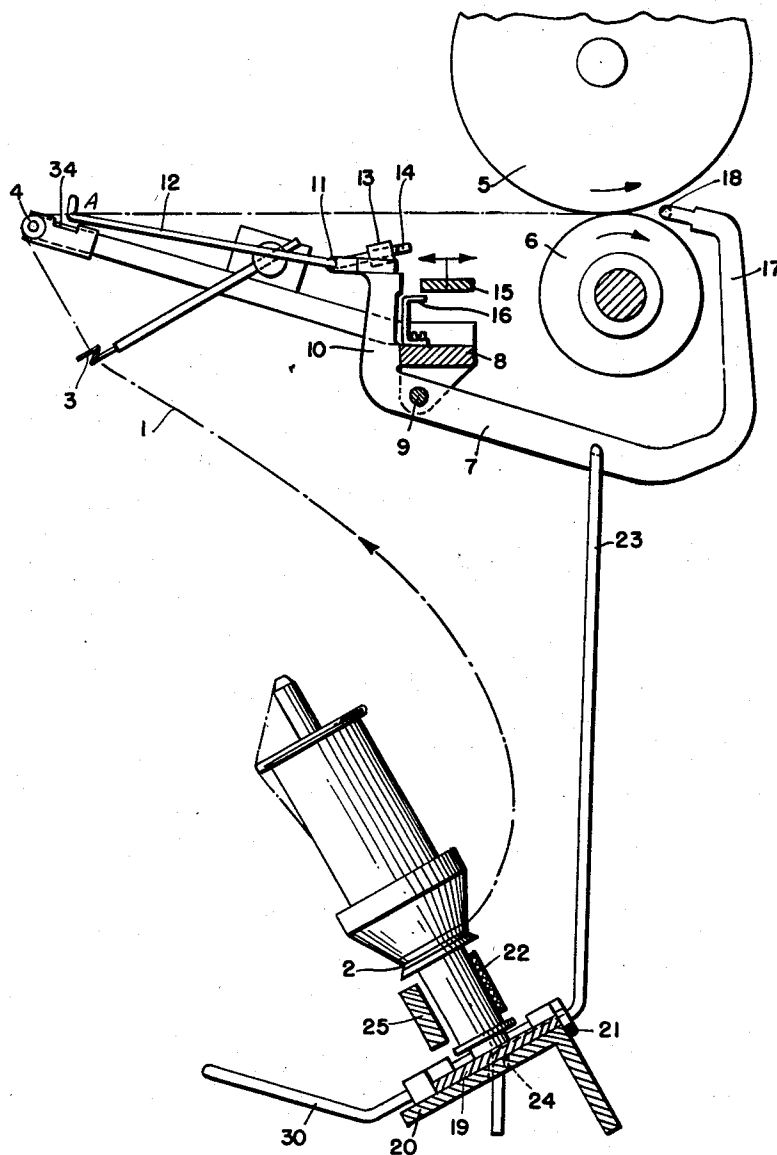
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AUTOMATIC STOPPING DEVICE FOR STOPPING THREAD TWISTING MACHINES

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3 Sheets-Sheet 1

FIG. 1



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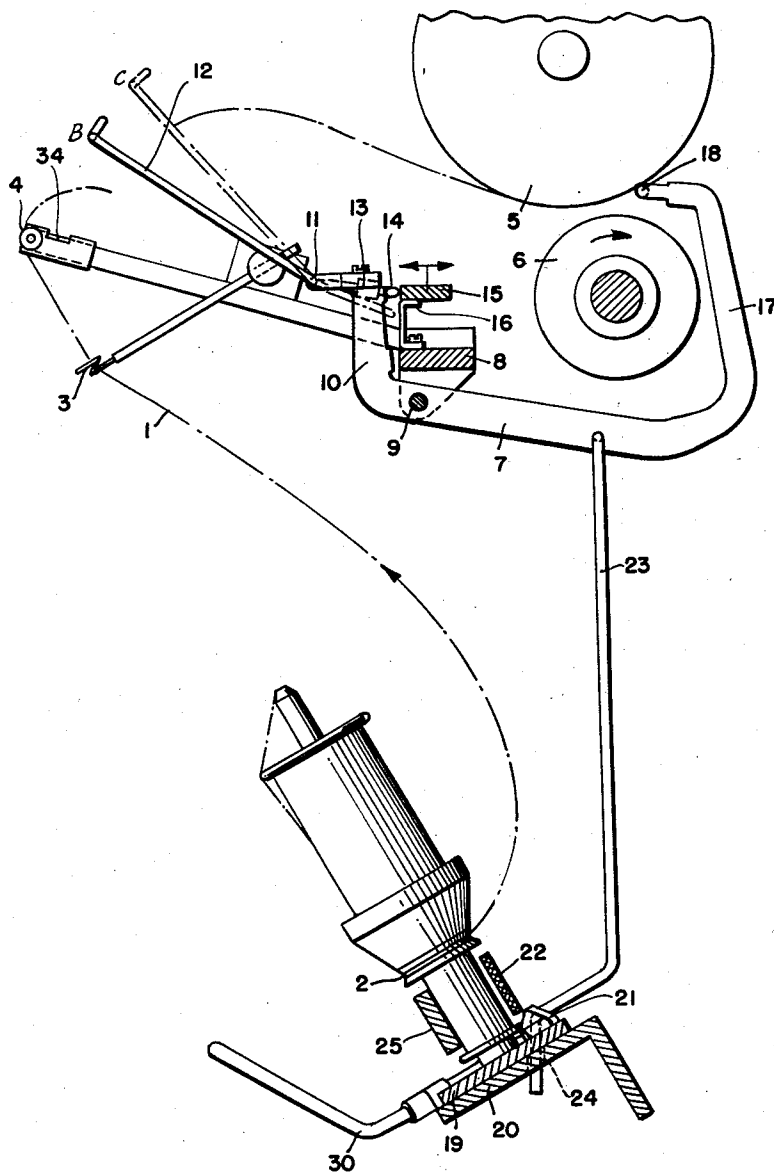
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# AUTOMATIC STOPPING DEVICE FOR STOPPING THREAD TWISTING MACHINES

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3 Sheets-Sheet 2

FIG. 2



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3 Sheets-Sheet 3

FIG. 3

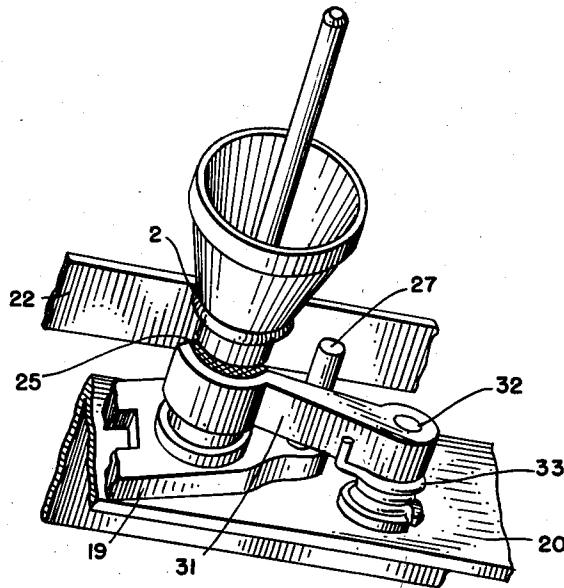
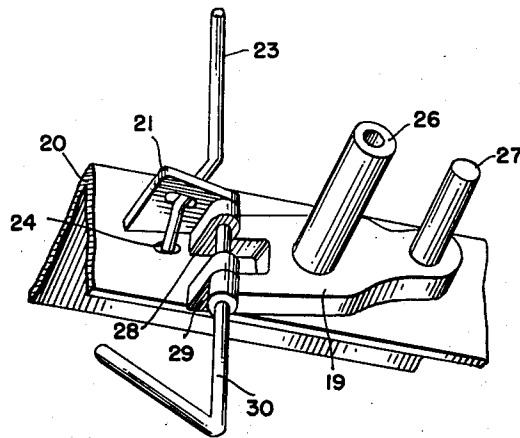


FIG. 4

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1

2,930,182

## AUTOMATIC STOPPING DEVICE FOR STOPPING THREAD TWISTING MACHINES

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7 Claims. (Cl. 57—84)

This invention relates to thread twisting machines, and more particularly to an apparatus for automatically stopping a thread twisting machine in the event of thread breakage or exhaustion of the thread supply.

Various devices have been designed for automatically stopping thread twisting machines in case of thread breakage. In some of these devices a thread feeler controlled by the thread tension is used to actuate the stopping device. The thread feeler may be associated with a reciprocating change bar which supplies the stopping power. However, all of these devices, because of their light construction, lack sufficient power to stop heavy bobbins. This is particularly so where high change speeds are used or where several bobbins must be stopped at one time. Springs or weights can be employed to give added power but to do so greatly complicates the construction and makes maintenance difficult.

It is an object of the invention to provide an effective apparatus for automatically stopping a thread twisting machine in the event of thread breakage or exhaustion of the thread supply.

In accordance with the invention this object is accomplished by an apparatus comprising a movable member having a part for engaging the bobbin of the thread twisting machine, a thread tensioning means responsive to the tension of the thread, a reciprocating drive means, and a means associated with the tensioning means adapted to couple the reciprocating drive means to the movable member. By this means the movable member is actuated by the drive means in response to a decrease in thread tension, the movable member becoming operable to engage and stop the rotation of the bobbin upon breakage of the thread.

The twisted thread wound on the winding bobbin is supplied by a rotatable twister spindle which is mounted eccentrically and urged into engagement with a brake means and out of engagement with a drive means. A catch means is associated with the twister spindle to hold it in engagement with the drive means and out of engagement with the brake means. A catch releasing means is associated with the catch means to release the catch means upon breakage of the thread, thereby causing the spindle to disengage the drive means and to engage the brake means.

The invention will be more clearly understood by reference to the accompanying drawings wherein:

Fig. 1 is a side elevational view, partly in cross section, of the stop apparatus with relation to a winding bobbin and a twister spindle in their operative positions;

Fig. 2 is a view similar to that of Fig. 1 except that the winding bobbin and the twister spindle are in their inoperative positions due to breakage of the thread;

Fig. 3 is a detailed perspective view of the twister spindle and a catch means therefor, the catch means being unlatched and the twister spindle being in the inoperative position shown in Fig. 2; and

Fig. 4 is a detailed perspective view of the twister spindle in the inoperative position as shown in Figs. 2

2

and 3 with relation to a braking means and a drive belt.

Referring to Fig. 1, a twisted thread 1 evolved by a rotatable twister spindle 2 is passed through a guide eye 3 and over a guide roller 4 to a winding bobbin 5 on which it is wound. The winding bobbin 5 is driven by a drive roller 6 on which it rests. The stopping device comprises a generally U-shaped lever 7 which is pivotally attached at an intermediate point to the machine frame 8 by a pivot pin 9. One leg 10 of the U-shaped lever 7 is normally at rest against the machine frame 8. The leg has an extension at its end with a horizontal oblong slot 11 in which a thread feeler 12 is pivotally mounted. One arm of the thread feeler bears a weight 13 which urges the other end against the thread 1 between the guide roller 4 and the winding bobbin 5. The weighted arm of the thread feeler has a protrusion 14 on its end. The protrusion 14 extends at a right angle to the arm of thread feeler 12 on which the weight 13 is mounted. A reciprocating change bar 15 or drive member moving in the directions indicated by the arrows is positioned near the leg 10 but slightly short of striking distance. In the event of thread breakage or exhaustion of the thread supply, the thread feeler 12 pivots from position A in a clockwise direction (as viewed in Figs. 1 and 2) to position B. In moving to position B, the protrusion 14 is interposed between the leg 10 and the reciprocating bar 15 so that when the bar 15 moves toward the leg 10 it strikes the protrusion 14 and causes the leg 10 and the remainder of the U-shaped lever 7 to pivot in a counterclockwise direction. The mounting of the thread feeler 12 in the oblong slot 11 permits the protrusion 14, upon pivoting thereof when the thread breaks, to clear the adjacent edge of the U-shaped lever 10 when the feeler 12 is at the rear end of the slot. When the protrusion 14 is struck by the reciprocating bar 15, the thread feeler can slide forwardly in the oblong slot 11 and thereby avoid bending forces from being exerted on the relatively delicate thread feeler 12. In this manner, the pushing force of the reciprocating bar 15 is transmitted through the protrusion 14, which is in contact with the bar 15 along one side thereof and the U-shaped lever 10 along the other side thereof when the protrusion 14 is interposed between bar 15 and lever 10. A bracket 16 fixed to the machine frame 8 (see Fig. 1) serves to stop the clockwise movement of the thread feeler 12 when the protrusion 14 is in the interposed position described above. However, when the bar 15 moves away from the protrusion 14 after pivoting the leg 10 (see Fig. 2), the thread feeler 12 resumes its clockwise motion to position C. The protrusion 14 is then between the leg 10 and the bracket 16 and in such position, with the bracket 16 acting as a stop, holds the leg 10 in the pivoted position. When the U-shaped lever 7 pivots as described, the leg 17 having a stop roller 18 at its tip raises the winding bobbin 5 out of engagement with the drive roller 6 and thus stops the rotation of the bobbin.

The twister spindle 2 (see Fig. 1) is rotatably attached to a base plate 19 which rests on an inclined surface of the machine frame 20 and is pivotally attached thereto by a catch bolt 27 (see Fig. 3). A catch 21 holds the base plate 19 and rotatably attached twister spindle 2 to the top edge of the spindle frame 20. In this position the twister spindle 2 engages a drive belt 22 by which means it is driven. A link member 23 or catch releasing means hangs pivotally from the U-shaped lever 7 and has a hook-like lower end which passes through an oblong hole in the catch 21 (see Fig. 3) and thence through a hole 24 in the inclined surface of the spindle frame 20. When thread breakage causes the U-shaped lever 7 to pivot, the link member 23 is raised and thereby lifts the catch 21 from its catching position on the spindle frame 20, causing the twister spindle 2 urged by gravity

3

to pivot to an inoperative position in frictional engagement with a brake shoe 25, thus stopping rotation of the twister spindle.

Fig. 3 shows details of the twister spindle base plate and the catch means therefor. The oblong base plate 19 has a rotatable spindle shaft 26 on which the twister spindle is mounted. One end of the base plate 19 is pivotally attached to the spindle frame 20 by a bolt 27 and the other end is bifurcated to form support eyes 28 and 29 in which are journaled a hand lever 30, the end of which is fixedly attached to the catch 21. To place the twister spindle in operative position, the base plate 19 is pivoted upwardly and the hand lever 30 turned in a counterclockwise direction, as viewed in Fig. 3, so as to cause the catch 21 to catch on the edge of the spindle frame 20.

In Fig. 4 the brake means is shown as a brake shoe 25 mounted on a brake arm 31 which is pivotally attached to the spindle frame 20 by a pivot pin 32 and urged by a spring 33 into braking engagement with the twister spindle 2 when the latter is in the inoperative position. When the twister spindle 2 is pivoted to its operative position in engagement with the drive belt 22, the bolt 27 serves as a stop preventing the brake arm 31 from pivoting along with the twister spindle.

Figs. 1 and 2 also show a holding device 34, such as a ratchet or spring clamp, which is used to hold the thread feeler 12 in position A during the rethreading operation which follows any stoppage of the twisting machine due to thread breakage. The thread feeler is placed manually in holding relationship with the ratchet or spring clamp is released from the holding device by hand after the bobbin and spindle have been put back in operation and the thread is under tension.

The invention is hereby claimed as follows:

1. In a machine having a rotatable bobbin for winding thread evolved by a twister spindle, apparatus for stopping the rotation of the bobbin, said apparatus comprising a generally U-shaped lever mounted to pivot at an intermediate point thereon, a reciprocating drive member, a thread feeler adapted to engage a span of thread at an intermediate position between the spindle and the bobbin, said feeler being pivotally mounted and having a weighted end to urge the end remote from the weighted end into contact with the thread, said feeler further having a protrusion suspended in spaced relation above the drive member and a first leg of the U-shaped lever, said feeler being operable to pivot upon breakage of the thread and to interpose the protrusion between the drive member and the first leg of the U-shaped lever thereby causing the drive member to pivot the U-shaped lever, a fixed bracket positioned beneath the drive member to hold the protrusion of the feeler in an interposed position between the drive member and the first leg of the U-shaped lever and thence to provide a stop retaining the U-shaped lever in a pivoted position, said U-shaped lever having a second leg for engaging and lifting the bobbin from the drive roller when the lever pivots.

2. The apparatus of claim 1 wherein the U-shaped lever has mounted thereon a rod adapted to be connected with a braking release mechanism of a twist spindle operated in conjunction with the winding bobbin.

3. The apparatus of claim 1 wherein said stop retaining the U-shaped lever in its pivoted position results from the protrusion being pivotable to a position in wedged relationship between said bracket and said first leg of said U-shaped member.

4. In a machine having a rotatable bobbin and an associated drive means, apparatus for disengaging the drive means from said bobbin comprising a movable member having a part adapted to disassociate the bobbin and associated drive means upon movement of said movable member, pivotable thread feeler means pivotally responsive to tension of the thread, a reciprocating bar, a contact surface on said movable member adjacent to one

4

end of the path of reciprocal travel of said reciprocating bar and normally out of range of contact with said reciprocating bar, means pivotable with said thread feeler means and extending from said thread feeler means to a point immediately adjacent, but normally out of the range of contact, with said reciprocating bar when said thread feeler means is engaged with the running thread, the means extending from said thread feeler means being adapted to pivot into a position between said reciprocating bar and said contact surface of said movable member upon pivoting of said last-mentioned means with said thread feeler means due to breakage of the thread, thereby to transfer the lateral movement of said reciprocating bar to said movable member and thus disengage, via said movable member, the bobbin from its associated drive means.

5. In a thread twisting and winding machine the combination of a rotatable twister spindle for evolving a twisted thread, a rotatable winding bobbin upon which the thread from the twister spindle is wound, a drive means associated with said bobbin for rotating the latter, and apparatus for disengaging said bobbin from said drive means including a movable member having a part adapted to engage the bobbin to disengage said bobbin from its associated drive means, pivotally mounted thread feeler means for feeling the running thread between the bobbin and the spindle, a reciprocating bar, a contact surface on said movable member adjacent to one end of the path of reciprocal travel of said reciprocating bar and out of range of contact with said reciprocating bar, a lateral protrusion on said thread feeler means at the end remote from the thread feeling end and pivotable with the thread feeling end, said lateral protrusion being positioned immediately above but normally out of the range of contact with said reciprocating bar when said thread feeler means is in thread feeling position, said lateral protrusion being adapted to come between the reciprocating bar and said contact surface of said movable member upon pivoting of said thread feeler means due to breakage of the thread, thereby to transfer the lateral movement of said reciprocating bar to said movable member and thus disengaging via said movable member, the bobbin from its associated drive, and means to hold said movable member in its bobbin-disengaging position after the bobbin has been initially disengaged from its associated drive means.

6. Apparatus for passing thread from a twister spindle to a winding bobbin resting on a drive roller, said apparatus comprising a twister spindle and a winding bobbin, a generally U-shaped lever mounted to pivot at an intermediate point thereon, a reciprocating drive member, a thread feeler adapted to engage a span of thread at an intermediate position between the spindle and the bobbin, said feeler being pivotally mounted and having a weighted end to urge the end remote from the weighted end into contact with the thread, said feeler further having a protrusion suspended in spaced relation above the drive member and a first leg of the U-shaped lever, said feeler being operable to pivot upon breakage of the thread and to interpose the protrusion between the drive member and the first leg of the U-shaped lever thereby causing the drive member to pivot the U-shaped lever, a fixed bracket positioned beneath the drive member to hold the protrusion of the thread feeler in an interposed position between the drive member and the first leg of the U-shaped lever and thence to provide a stop retaining the U-shaped lever in a pivoted position, said U-shaped lever having a second leg for engaging and lifting the bobbin from the drive roller when the lever pivots.

7. In an automatic stopping device for stopping thread twisting machines having a rotatable bobbin for winding thread evolved by a twister spindle, a mechanical amplifier device comprising a lever having a vertical leg, said lever mounted to pivot at an intermediate point thereon, a reciprocating drive member, a thread feeler adapted to engage a span of thread at an intermediate position

5

between the spindle and the bobbin, said feeler being pivotally mounted and having a weighted end to urge the end remote from the weighted end into contact with the thread, said feeler further having a protrusion suspended in spaced relation above the drive member and said leg of said lever, said feeler being operable to pivot upon breakage of the thread and to interpose the protrusion between the drive member and said leg of said lever, thereby causing the reciprocating drive member to pivot said lever, a fixed stop member positioned beneath the drive member to hold the protrusion of the feeler in an interposed position between the drive member and said leg of said lever and thence to provide a stop retaining the lever in a pivoted position.

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