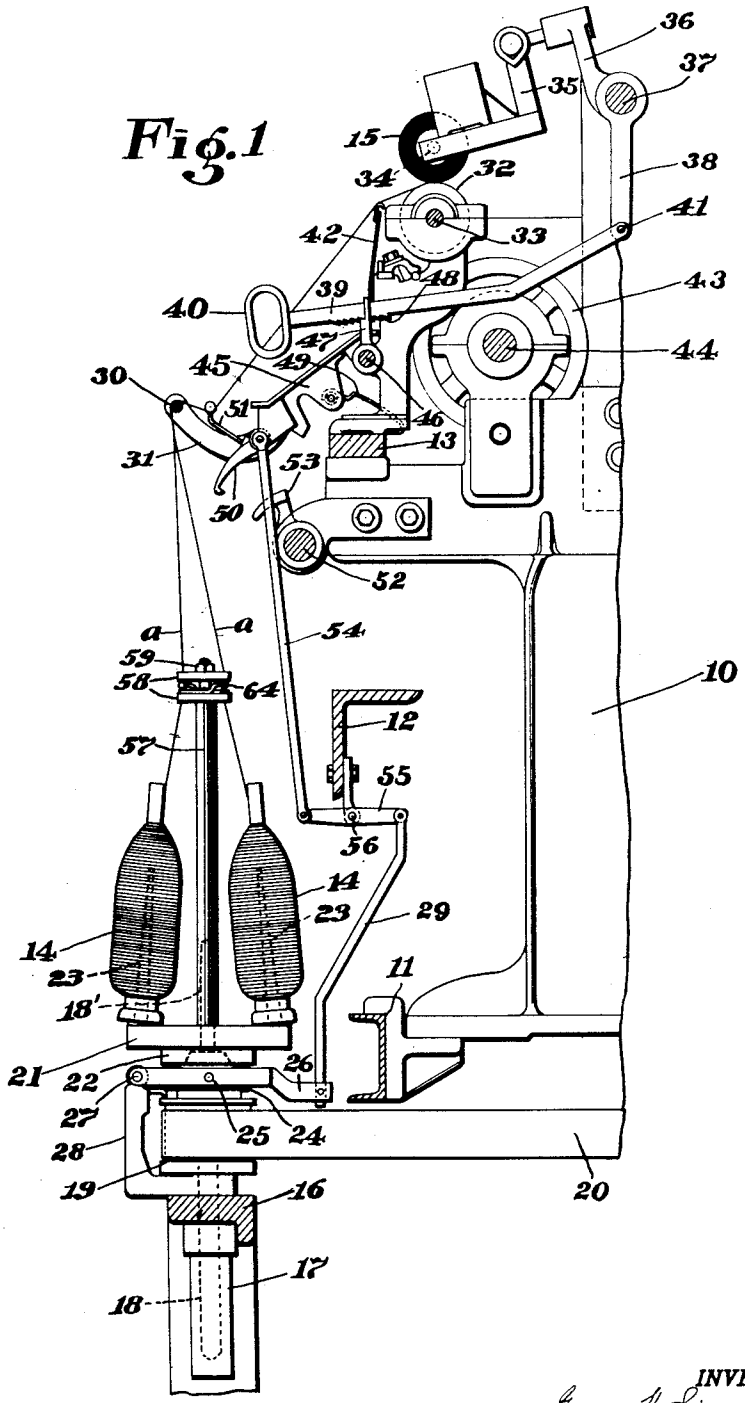
Jan. 5, 1932. G. H. SIMONSON ET AL 1,840,262

STOP MECHANISM FOR YARN DOUBLING AND TWISTING MACHINES

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Fig. 1



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Fig. 2

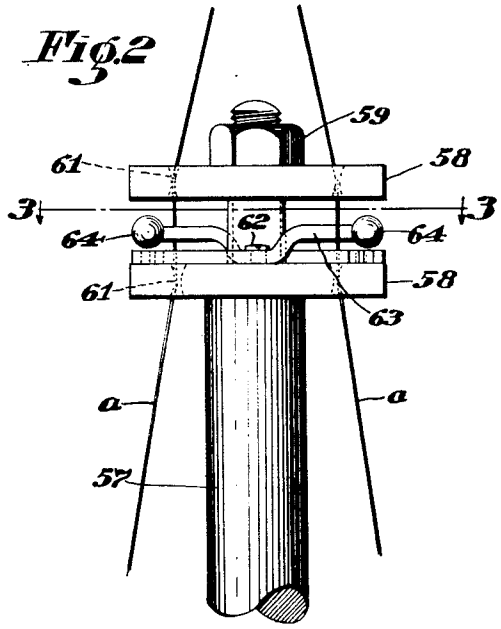
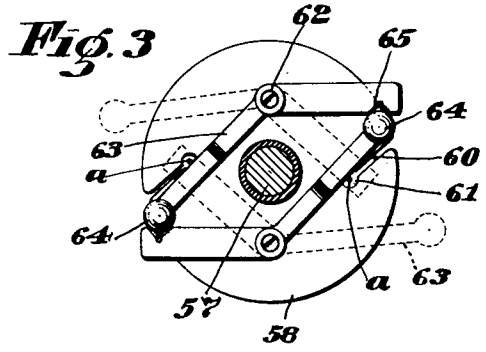


Fig. 3



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UNITED STATES PATENT OFFICE

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STOP MECHANISM FOR YARN DOUBLING AND TWISTING MACHINES

Application filed December 13, 1930. Serial No. 502,056.

This invention relates to winding machines for doubling and twisting yarns, and more particularly to stop mechanism for stopping the winding operation upon breakage of any one of the two or more yarns being twisted together.

Winding machines have been employed heretofore to wind yarn from a bobbin to a power driven package, and these machines have been provided with stop mechanism controlled by the yarn for automatically moving the package away from its driven roller upon breakage of the yarn.

The stopping mechanism of these prior winding machines, however, does not meet the requirements of a yarn doubling and twisting machine, since the winding operation should be stopped upon the breakage of any one of the two or more yarns being twisted together, but if the running yarn is relied upon to control the stopping mechanism, the winding operation will frequently continue after one yarn has broken thus winding a single yarn or yarns or less than the desired number of ends upon the package.

The present invention therefore relates to mechanism for stopping the winding operation upon breakage of any one of the yarns being twisted together and wound upon a package; and one important feature of the present invention resides in means for automatically severing all the yarns being twisted together upon breakage of one of these yarns.

A more specific feature of the invention resides in a power driven spindle provided with bobbin carriers, yarn guides supported and rotated by the spindle, and in yarn severing means associated with the guides and operable to cut one yarn when the other yarn breaks.

A further feature of the invention resides in mechanism for automatically stopping the spindle for rotating the bobbins when the yarns being twisted together break, and in mechanism for doubling, twisting and winding yarn direct from bobbins to a finished package of a convenient size for use in a creel.

Other features of the invention and novel combination of parts, in addition to the above, will be hereinafter described in connection with the accompanying drawings which illustrate one good practical form thereof.

In the drawings:—

Fig. 1 is a vertical sectional view through a yarn doubling and twisting machine embodying the features of the present invention.

Fig. 2, on an enlarged scale, is a side elevation of mechanism for guiding the yarns and for severing one yarn when the other breaks, and

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2.

The yarn doubling and twisting machine illustrated in the drawings may have the usual supporting frame 10 adapted to support the various operating parts at a desired height from the floor and this supporting frame is provided with the longitudinally extending braces or beams 11, 12 and 13.

The construction shown is designed more particularly to double and twist two yarns as they are delivered from the bobbins 14 to a power driven yarn package 15, but the features of the present invention may be employed with machines adapted to double and twist more than two yarns. The present machine obviously may be given any desired length and may be provided with as many yarn winding units as is deemed advisable, only one of such units being shown in the drawing.

The machine is shown as provided with the usual spindle supporting rail 16 having the desired number of spindle bearings 17, each of which is adapted to rotatably support a spindle 18. The spindles 18 may be variously driven, and to this end in the construction shown each spindle has rigidly secured thereto the driving pulley or whirl 19, adapted to be rotated by the driving belt 20. Each spindle 18 has a portion 18′ that extends upwardly some distance from the pulley 19 as will be apparent from Fig. 1 and upon this upper portion of the spindle is journaled and slidably mounted the bobbin supporting disc 21. This disc has the reduced downwardly extending portion 22 forming a clutch member adapted to be frictionally driven by a co-

operating clutch member secured to the spindle 18, such clutch mechanism may be of well known construction. The bobbin carrying disc is provided with the upwardly extending bobbin supports or spindles 23.

In the construction shown the weight of the spindle supporting disc 21 and parts carried thereby is relied upon to hold the downwardly extending portion 22 thereof, in frictional engagement with the upper end portion of the spindle 18 to drive this disc from the spindle, and when it is desired to stop the rotation of the bobbins 14 while the spindle 18 continues to rotate, this is accomplished by elevating the disc 21 slightly. To this end in the construction shown a lifting ring 24 loosely surrounds the upper portion of the spindle 18, and this ring is pivotally secured at 25 to the spaced arms of the bifurcated lever 26. The outer ends of the bifurcated arms of the lever 26 are pivotally secured at 27 to a supporting bracket 28, the arrangement being such that when the free end of the lever 26 is elevated by the connecting rod 29 the ring 24 carried by this lever will engage the lower face of the portion 22 of the driving disc to disengage the same from the driving spindle 18 and at the same time frictionally retard the rotation of the disc 21.

The yarns *a* supplied by the bobbins 14 are drawn upwardly through rotating guides, to be described, and may pass over a guide bar 30 supported by a bracket 31 shown as secured to a movable lever to be described, and as the yarns *a* are drawn from the bobbins 14 to the guide bar 30 they are twisted together by the rotative movement imparted to the bobbins by the power driven spindle 18.

The twisted or doubled yarns pass from the guide bar 30 to the yarn package 15 which rests upon the package driving roller 32 driven by the power shaft 33. This package is rotatably mounted on a spindle 34 that is supported by the connected arms 35 and 36 for rocking movement about the shaft 37. The arrangement is such that as the size of the yarn package 15 increases, its supporting spindle 34 will be gradually moved upwardly away from the driving roll 32, and the yarn package 15 may be lifted out of engagement with its driving roller 32 by pulling frontwardly on the arm 38 which is rigidly secured to and extends downwardly from the rocking lever 37. The desired rocking movement is imparted to the arm 38 by shifting the operating rod 39 in the direction of its length. This rod being provided with a handle 40 at its forward end and its rear end is pivotally secured at 41 to the lower end of the arm 38.

The desired traversing movement is imparted to the doubled and twisted yarn as it is delivered to the package 15 by the yarn guide 42 which may be moved back and forth lengthwise of the roll 32 by the traversing cam or drum 43 provided with the usual traversing slot, and this drum is rigidly secured to its driving shaft 44.

It is desirable to provide means for automatically elevating the yarn package 15 out engagement with the driving roll 32 when the yarn being delivered to this package breaks. This is accomplished in the construction shown by providing the lever 45, which is pivotally supported by the shaft 46, and rigidly connected to the lever 45 is the upwardly extending arm 47 at the upper end of which is provided a slot adapted to slidably receive the rod 39. This rod is provided at its lower face with the teeth 48, adapted to engage an end portion of the arm 47 and permit the rod to slide in one direction over the end of the arm 47 but not in the opposite direction. The lever 45 is normally held in the raised position in which it is shown in Fig. 1 of the drawings, by a curved portion of the spring 49 but may be rocked downwardly in order to elevate the package 15 by causing the arm 47 to exert a frontward pull upon the rod 39. When this lever 45 is moved to its lowered position it will be yieldingly held in such position by a bent portion of the spring 49.

To the outer end of the lever 45 is pivotally secured the latch 50 and this latch is normally held in its inactive position in which it is shown in Fig. 1 by the tension of the yarn passing under a laterally extending portion of an arm 51 secured to the latch 50. Below the lever 45 is rockingly supported the oscillating shaft 52 to which is rigidly secured the arm or vibrator 53. The arrangement is such that when the yarn breaks or becomes too slack the latch 50 will be lowered into position to be engaged and pulled downwardly by the vibrator 53. This will serve to rock the lever 45 downwardly and operate through the connections 39, 38, 36, and 35, to lift the yarn package 15 out of engagement with its driving roller 32. The downward movement of the lever 45 serves also to disengage the bobbin supporting disc 21 from the driving spindle 18 and to this end the link 54 is provided which extends downwardly from the outer end of the lever 45 to one end of the transversely extending bar 55, that is pivotally supported intermediate its ends at 56. The opposite end of this bar 55 is pivotally secured to the upper end of the connecting rod 29, above mentioned.

It will be seen from the foregoing that when the yarn breaks to permit the latch 50 to swing downwardly into position to be engaged by the vibrator 53 the lever 45 will be shifted to raise the package 15 out of driving engagement with the roll 32 and actuate the clutch to release the disc 21 from its driving spindle 18. When the defect in the

winding operation has been corrected the lever 45 may be elevated by hand to the position in which it is shown in Fig. 1, whereupon the package 15 will be automatically lowered into engagement with the roller 32 and the clutch operating lever 26 will be lowered to drive the bobbins 14 from the spindle 18.

It will be seen that the mechanism so far described will operate to stop the winding operation and the rotation of the bobbins 14 when both yarns *a* break, but if one of these yarns should break, and not the other, the winding operation will continue to wind a single-ply rather than a two-ply yarn upon the package 15. In order to overcome this difficulty an important feature of the present invention resides in mechanism for automatically severing one yarn *a* when the other yarn breaks.

This is accomplished in the embodiment of the invention shown by providing the bobbin supporting disc 21 with an upwardly extending post 57 that is rigidly secured to the disc and is made hollow throughout part of its length to receive the portion 18′ of the driving spindle. The upper end of the post 57 is provided with a platen formed of spaced plates 58 clamped to the post by the nut 59. In the edge of each plate are formed the yarn receiving slots 60 through which the yarn is readily introduced into the yarn guiding eyes 61. Between the spaced plates 58 are pivotally mounted trap means adapted to be actuated by centrifugal force to cut one yarn when the other yarn breaks. The trap means illustrated comprises a pair of bent levers, each of which is pivoted intermediate its ends by a pivot pin 62 to the lower plate 58, as best shown in Fig. 3 and one arm 63 of each lever is provided at its outer end with a weight 64 while the opposite arm of each lever is provided with a yarn receiving notch 65 with which notch is associated a cutter for severing a yarn when an arm is permitted to swing outwardly under the influence of centrifugal force from its full line position of Fig. 3 to its dotted line position.

The construction is such that the tension of each yarn *a*, passing through the guide eyes 61, will serve to hold the arm 63 of a yarn cutter in the inoperative position, or full line position of Fig. 3, but as soon as a yarn breaks the trap means controlled thereby will be actuated by centrifugal force to cut the opposite thread. In the construction shown each pivoted lever 63 has its oppositely extending arms disposed in different horizontal planes so that each arm provided with a cutter 65 lies close to the lower plate 61 while the opposite or weighted arm 63 of each lever swings in a plane above the cutter carrying arm to clear the same, as best shown in Fig. 2.

It will be seen from the foregoing that the bobbin supporting disc 21, post 57 and platen 58 are rigidly secured together and form a unit that may be readily placed upon the spindle 18 and removed therefrom.

As a result of the construction shown and described whereby, as soon as one yarn breaks the other will be cut the danger of winding a single-ply upon the package 15, when a two-ply is desired, is avoided and the entire construction is such that the yarns *a* may be wound direct from the bobbins 14 onto a finished package 15 having a convenient size for use in a creel, thus eliminating a number of winding operations which have been employed heretofore in placing the yarn supplied by bobbins in condition for use upon a creel.

What is claimed is:—

1. In a yarn doubling and twisting machine, the combination of a yarn package holder, means for rotating a package supported by the holder to wind yarn thereupon, a spindle provided with bobbin carriers, power means for driving the spindle to twist together the yarns delivered from the bobbins to said package, yarn guides supported and rotated by the spindle, and a yarn cutter associated with each yarn guide to be held in an inoperative position by the yarn passing through the guide and to be released to cause its cutter to sever the remaining yarn or yarns when its holding yarn breaks.

2. In a yarn doubling and twisting machine, the combination of a yarn package holder, means for rotating a package supported by the holder to wind yarn thereupon, a spindle provided with bobbin carriers, power means for driving the spindle to twist together the yarns delivered from the bobbins to said package, yarn guides supported and rotated by the spindle, and a yarn cutter associated with each yarn guide to be held by the yarn passing through the guide and adapted to be operated by centrifugal force when its holding yarn breaks to sever the remaining yarn.

3. In a yarn doubling and twisting machine, the combination of a yarn package holder, means for rotating a package supported by the holder to wind yarn thereupon, a spindle provided with bobbin carriers, power means for driving the spindle to twist together the yarns delivered from the bobbins to said package, an extension projecting upwardly from the spindle and provided with yarn guides and with trap means including a cutter arranged so that a breakage of one yarn will release the trap means to cause the cutter to move across the path of and to sever the other yarn.

4. In a yarn doubling and twisting machine, the combination of a yarn package holder, means for rotating a package sup-

ported by the holder to wind yarn thereupon, a spindle provided with bobbin carriers, power means for driving the spindle to twist together the yarns delivered from the bobbins to said package, an extension projecting upwardly from the spindle, a platen upon said extension and provided with yarn guides, yarn cutters pivotally mounted on the platen and each adapted to be held by a yarn in its inactive position and to be released when its holding yarn breaks to sever the other yarn.

5. In a yarn doubling and twisting machine, the combination of a yarn package holder, means for rotating a package supported by the holder to wind yarn thereupon, a spindle provided with bobbing carriers, power means for driving the spindle to twist together the yarns delivered from the bobbins to said package, an extension projecting upwardly from the spindle, a platen upon said extension and provided with yarn guides, levers pivotally mounted upon the platen and each provided with one arm adapted to rest against the running yarn and a second arm adapted to cut the remaining yarn when the arm holding yarn breaks.

6. In a doubling and twisting machine, the combination of a yarn package holder, means for rotating a package supported by the holder to wind yarn thereupon, a spindle provided with bobbin carriers, power means for driving the spindle, a clutch for driving the bobbins from the spindle to twist together the yarns delivered from the bobbins to said package, a power actuated vibrator, a latch normally hold by the tension of the yarn out of the path of the vibrator and adapted to be shifted by the vibrator when the yarn breaks or becomes too slack, and means operable by the shifting of said latch to release the bobbin driving clutch.

7. In a doubling and twisting machine, the combination of a yarn package holder, means for rotating a package supported by the holder to wind yarn thereupon, a spindle provided with bobbin carriers, power means for driving the spindle to twist together yarns delivered from the bobbins to said package, a power actuated vibrator, a latch normally held by the tension of the yarn out of the path of the vibrator and adapted to be shifted by the vibrator when the yarn breaks or becomes too slack, and means operable by the shifting of said latch to stop the rotation of the bobbins.

8. In a doubling and twisting machine, the combination of a yarn package holder, means for rotating a package supported by the holder to wind yarn thereupon, a spindle provided with bobbin carrier means, power means for driving the spindle to twist together yarns delivered from the bobbins to said package, an extension projecting upwardly from the bobbin carrying means and provided with yarn guides and with trap means arranged so that a breakage of one yarn will release the trap means to sever the other yarn, a power actuated vibrator, a latch normally held by the twisted yarns out of the path of the vibrator and adapted to be shifted by the vibrator when a yarn breaks, and means operable by the shifting of said latch to stop the rotation of the bobbins.

9. In a yarn doubling and twisting machine, the combination of a yarn package holder, means for rotating a package supported by the holder to wind yarn thereon, a spindle provided with bobbin carriers, power means for driving the spindle and bobbins to twist together yarns delivered from the bobbins to said package, a power actuated vibrator, a latch normally held by the tension of the yarn out of the path of the vibrator and adapted to be shifted by the vibrator when the yarn breaks, and means operable by the shifting of said latch to stop the rotation of said package and release the bobbin drive to stop the rotation of the bobbins.

10. In a doubling and twisting machine, the combination of a yarn package holder, means for rotating a package supported by the holder to wind yarn thereon, a spindle provided with bobbin carriers, power means for driving the spindle and bobbins to twist together yarns delivered from the bobbins to said package, means driven by the rotating spindle and actuated by centrifugal force to sever one yarn when the other breaks, and means controlled by the twisted yarns and operable to stop the package and bobbins when the yarns part.

11. In a doubling and twisting machine, the combination of a yarn package holder, means for rotating a yarn package supported by the holder to wind yarn thereon, a spindle provided with bobbin carriers, power means for driving the spindle to twist together the yarns delivered from the bobbins to said package, yarn guides supported by the spindle, a cutter mounted for movement across the path of each yarn and held from said movement by the unbroken yarns and released to said movement when one yarn breaks that the cutter may sever the other yarn.

In testimony whereof, we have signed our names to this specification.

GEORGE H. SIMONSON.
FRANK V. GRENNOR.