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SIZING DEVICE FOR WINDING MACHINES

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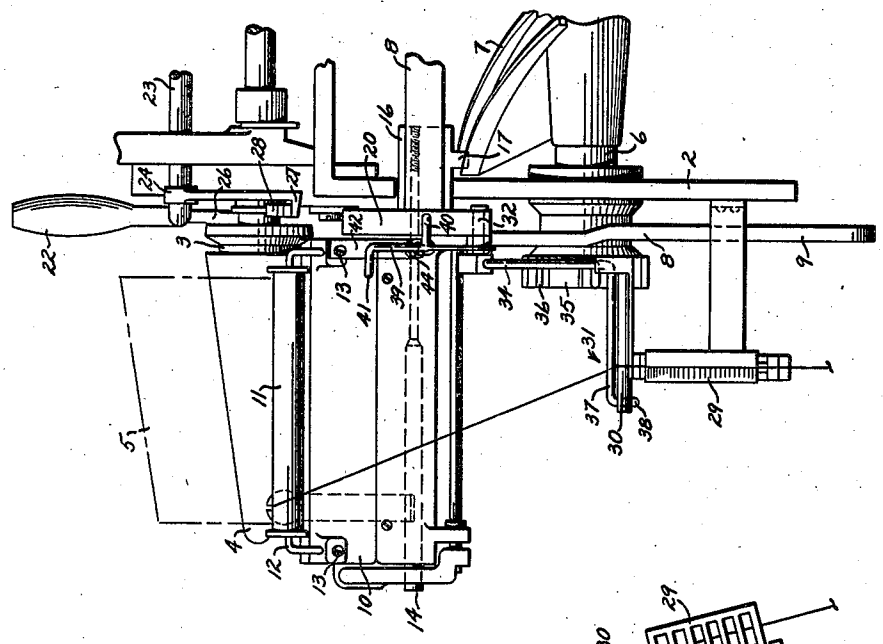


FIG-2-

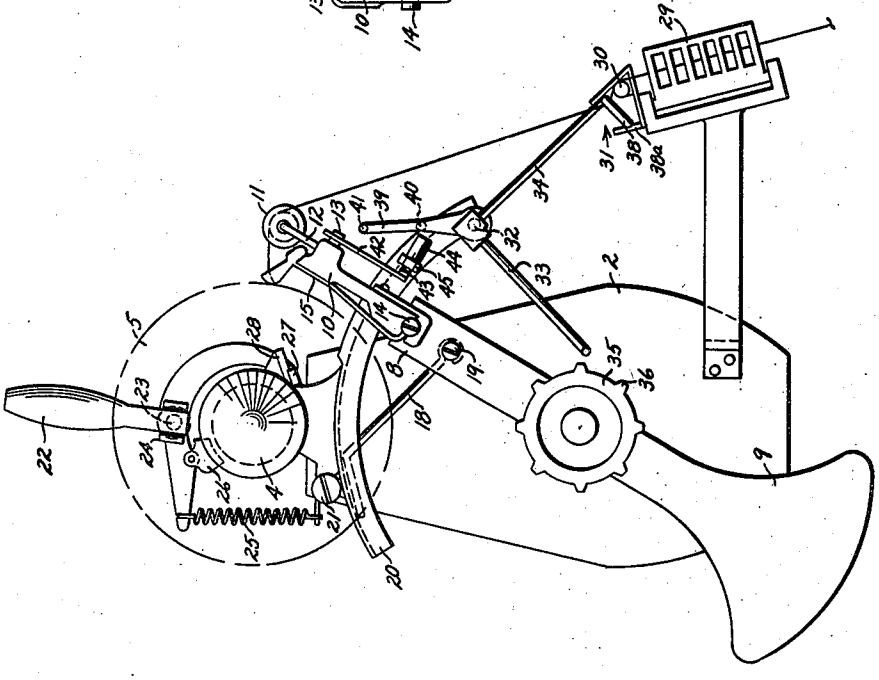


FIG-1-

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SIZING DEVICE FOR WINDING MACHINES

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15 Claims. (Cl. 242—37)

This invention relates to winding machines and more particularly to an improved device for arresting the operation of the machine when the package being wound reaches a predetermined size.

The present invention is particularly directed to winding machines of the type generally disclosed in United States Patent No. 801,941 to Wardwell, wherein the yarn is wound upon a supporting element, such as a core, mounted upon a rotating spindle, the yarn being traversed longitudinally of the core by a thread guide that bears against the surface of the winding swings away from the spindle as the wound package increases in size. The form of device for stopping the winding machine generally employed with this type of winding machine and shown in the Wardwell patent has the disadvantages of being somewhat slow-acting and of increasing the pressure of the thread guide against the surface of the winding as the package approaches the predetermined size to which the stopping device has been set. The slow-acting characteristic of the device results in cones of non-uniform weight but, what is more important, the increased pressure on the package during actuation of the stopping device deforms the cone.

It is an object of the invention to provide a novel form of device for automatically stopping the winding when the package reaches a predetermined size which device avoids the exertion of undue pressure of the guide against the package. Another object is to provide such a device which is simple in character and which may be readily attached to standard machines without altering the structure thereof. Another object is to provide such a device which is adapted to cooperate with the mechanism for stopping the device automatically upon breakage or exhaustion of the supply of the yarn or strand being wound. A further object is to provide a device which is adjustable in character so that a package of any desired size may be obtained upon the machine or machines to which the attachment is applied. Other objects and advantages will appear from the drawing and description thereof.

In the drawing, illustrative of the invention,

Figure 1 is a front elevational view of a conventional type of winding machine showing the present invention applied thereto,

Figure 2 is a side elevational view of the winding machine shown in Figure 1.

While the invention will be described hereinafter in relation to a particular type of conventional winding machine, it is to be understood that it is not limited to application thereto. In the description, the conventional parts of the winding machine will first be described and this will be followed by a description of the parts which constitute the present invention.

Referring to the drawing, reference numeral 2 designates the fixed main frame of the machine. At the top of frame 2, a rotating spindle 3 is journaled in suitable bearings and is adapted to be driven by means of a belt pulley or other suitable mechanism (not shown). The spindle is adapted to receive a cone or cop tube 4 upon which the package 5 is to be wound.

A shaft 6 is journaled in the frame 2 and extends in a direction parallel to the winding spindle 3. This shaft 6 is connected to the spindle and is driven therefrom by suitable means, such as gears, a belt and pulleys, sprockets and chain (not shown). The shaft 6 also carries a helical grooved cam 7 for rotation therewith.

A traverse frame 8 is pivotally mounted upon the shaft 6 upon which it is suitably balanced such as by the counterweight 9. This traverse frame 8 is provided with a backing plate 10 and a porcelain bail 11 may be rotatably supported on a wire 12 whose depending legs adjacent the ends of the bail are suitably fastened within recesses in the plate 10 by means of set screws 13. The traverse frame 8 is constructed to provide a horizontal groove through which a traverse bar 14 may reciprocate. A thread guide 15, whose upper end is adapted to press lightly against the package being wound is fastened to one end of the traverse bar 14 for reciprocation therewith. The other end of the traverse bar 14 is provided with a head 16 having a depending pin or roller 17 adapted to engage the groove in the helical cam 7. As the package builds up, it gradually swings the traverse frame 8 away from the spindle 3 and the traverse frame is prevented from swinging back toward the spindle by means of a lever 18 having one end fastened thereto at 19 and the other end engaging within a groove formed underneath a segment 20 which is pivotally fastened to the main frame 2 at 21.

The operation of the winding machine is controlled by a starting lever or handle 22, mounted on one end of a rotatable rod 23, supported in bearings at the top of the main frame 2. The opposite end of the rod 23 carries means for operating a clutch or similar device (not shown) to control the operation of the spindle 3 and the other parts of the machine driven therefrom. A lever 24 is mounted adjacent the starting lever

22 on the rod 23 so that it rocks therewith. One end of lever 24 is normally biassed in a counterclockwise direction by a spring 25 fastened to the frame 2 and is provided with a braking means 26 which is adapted to press against the spindle 3 and to stop the rotation thereof when the lever 22 is in the stop position in which position the clutch or other device for operating the spindle 3 is disengaged. The other end of the lever 24 is formed as a curved arm having a hook 27 at its end. When the starting lever 22 is in operating position, in which the clutch is engaged with the spindle 3 and the brake is lifted therefrom (as shown in Figure 1), the hook 27 engages another hook 28 secured to or constituting part of the pivoted segment 20. The machine may be maintained in running position by setting these hooks 27 and 28 in opposition to the spring 25 which otherwise would tend to set the brake and to swing the starting lever 22 into the stop position.

In operation of the machine, the yarn passes first through a tension device 29 over the guide 30, under a break or exhaustion detector 31, over the porcelain bail 11 and through the traverse guide 15 to the package. The break detector 31 comprises a device pivotally mounted at 32 upon segment 20. The device is composed of two arms 33 and 34, one of which 33 extends toward a wheel 35 having numerous projections or ridges 36 thereon mounted upon the cam shaft 6 for rotation thereby. The other arm 34 is bent to form a horizontal extension 37 adapted to ride upon the yarn and along which the yarn may be traversed to a certain extent. The extension 37 may be bent at the end to form a hook 38 to prevent the yarn from accidentally slipping out of engagement therewtih. The first arm 33 is of such length and the entire detector device 31 is so balanced that upon breakage of the yarn, the device swings in a clockwise direction to bring arm 33 into the path of the projections 36 upon the rotating wheel 35 which in turn forces the segment 20 in a counterclockwise direction sufficiently to release the two hooks 27 and 28 and thereby permit the spring 25 to throw the starting lever 22 into the stop position to apply the brake and disengage the clutch. A stop 38*a* serves to limit clockwise motion of arm 34.

The parts of the machine so far described are conventional and constitute no essential part of this invention except as will appear hereinafter. In accordance with this invention, an arm 39 is mounted for independent and free pivotal motion with respect to the segment 20. This arm 39 may be pivoted upon the same pivot 32 as the end breakage detector 31 though this is not essential. This arm 39 is provided with one projection 40 which is adapted to serve as a resting stop to support the arm in an upright position upon the segment 20 at an angle slightly inclined from the vertical (as shown in Figure 1 which shows the machine as the package approaches full size). The amount of this angle is preferably as small as is consistent with the vibration inherent in the operation of the machine or associated with neighboring machines. The free end of the arm 39 is provided with a second projection 41 which is adapted to strike the arm 34 of the end breakage detector 31 when the upwardly extending arm 39 is swung out of its resting position. The weight of arm 39 may vary widely, being made heavier when operating with greater tension in the course of yarn approaching the package. If desired, the projection 41 may be threaded to receive interchangeable internally threaded sleeves of various weights similar to the sleeve 44 described hereinbelow.

This "sizing stop" arm or impact member 39 is adapted to be operated upon engagement by any part of the traverse frame 8. Preferably, the part which engages the stop arm 39 is readily adjustable. For example, an L-shaped member 42 may have one leg 43 provided with threads adapting it to receive an internally threaded sleeve 44 and a lock nut 45 to lock it in any desired position along the length of the threaded leg 43. This L-shaped member may be fastened to any part of the traverse frame 8. As shown in the drawing, it is fastened to the frame 8 by means of one of the set screws employed in holding the wire 12 for the porcelain bail 11.

Besides the adjustment that is possible by merely screwing the sleeve 44 to a different position, an adjustment may be accomplished in extreme cases by replacing the sleeve itself with a sleeve of longer or shorter length.

The operation of the sizing device is readily apparent from the preceding description and involves the swinging of the upright stop arm 39 through the slight angle from the vertical to throw it out of balance upon which the stop arm of its own weight strikes and swings the end breakage detector device 31 with its arm 33 into the path of the rotating wheel 35 which in turn causes the lifting of the segment 20 and disengagement of the hooks 27 and 28 with the consequent stopping of the machine. All that is required to set the sizing device upon starting the machine anew is to swing the stop arm 39 into its upright position with the projection 40 resting upon the segment 20.

From the description of the device of the invention, it is apparent that it is quick in action and involves only a slight amount of pressure for a relatively short time during the last part of the winding. It is simple in character, readily attachable to any winding machine and is easily adjusted.

In the present specification and claims, the term "package" is used in a general sense to indicate any form of wound mass and the term "yarn" is intended to designate any kind of strand material whether textile or otherwise.

While a preferred embodiment of the invention has been disclosed, it is to be understood that changes and variations may be made without departing from the spirit and the scope of the invention as defined by the appended claims.

We claim:

1. In a winding machine, a winding spindle, a traverse mechanism, means for swinging said spindle and traverse mechanism relative to each other about an axis substantially parallel to that of the spindle as the winding proceeds, means for stopping said machine automatically, a movably mounted impact member responsive to the relative swinging of the spindle and traverse mechanism arranged to be set in a position of rest and to be displaced through a position of instability by said relative swinging when a predetermined size of winding is obtained, the member being mounted for automatic independent motion upon displacement through its position of instability to a third position to initiate operation of the stopping means.

2. In a winding machine, a pivotally mounted traverse frame, means for stopping said machine automatically, a movably mounted impact member arranged to be set in a position of rest in the

path of an element secured to said traverse frame and to be displaced through a position of instability to a position of initiating the operation of said stopping means, the member being mounted for automatic and independent motion to stopping means initiating position upon displacement to its position of instability, means for swinging said traverse frame as the winding proceeds to cause said element to displace said member from its rest position through its unstable position when a predetermined size of winding has been obtained.

3. In a winding machine, a pivotally mounted traverse frame, means for stopping said machine automatically, a movable member arranged to be set in a position of rest approaching a position of gravitational instability in the path of an element secured to said traverse frame, said member being arranged to move automatically and independently to a third position to initiate the operation of said stopping means upon displacement from its rest position through its unstable position, means for swinging said traverse frame as the winding proceeds to cause said element to displace said member from its rest position through its unstable position when a predetermined size of winding has been obtained.

4. In a winding machine, a pivotally mounted traverse frame, means for stopping said machine automatically, a pivoted member arranged to be set in a position of rest approaching a position of gravitational instability in the path of an element secured to said traverse frame, said member being arranged to move automatically and independently to a third position to initiate the operation of said stopping means upon displacement from its rest position through its unstable position, means for swinging said traverse frame as the winding proceeds to cause said element to engage said member and to displace it from its rest position through its unstable position when a predetermined size of winding has been obtained.

5. In a winding machine, a traverse frame, means for pivotally swinging said traverse frame as the winding proceeds, means for stopping said machine, means responsive to the breakage of the yarn being wound for initiating said stop means, an impact member for initiating said stopping means arranged in the path of said traverse frame to be set off thereby when a predetermined size package has been obtained.

6. In a winding machine, a traverse frame, means for pivotally swinging said traverse frame as the winding proceeds, means for stopping said machine, means responsive to the breakage of the strand being wound for initiating said stopping means, an impact member arranged to be set in a position of rest in the path of said traverse member and to be displaced through a position of gravitational instability by a predetermined extent of swing of said traverse frame and thereupon to strike said breakage responsive means to initiate said stopping means.

7. In a winding machine, a winding spindle, a rotatable element, means for rotating said element, means for stopping said machine, a member having an arm movable into engagement with said element to initiate the operation of said stopping means, an impact member movable from a rest position to striking engagement with said first-mentioned member to effect movement of said arm into engagement with said element and means movable by the growth of the package being wound on said spindle into engagement with said impact member to move it from its rest position into striking position.

8. In a winding machine, a winding spindle, a rotatable element, means for rotating said element, means for stopping said machine, a pivotally suspended member having an arm movable into engagement with said element to initiate the operation of said stopping means, a pivotally mounted member movable from a rest position to engagement with said first-mentioned member to effect movement of said arm into engagement with said rotatable element and means movable by the growth of the package being wound on said spindle into engagement with said second member to move it from its rest position into striking position.

9. In a winding machine, a winding spindle, a traverse frame, means for pivotally swinging said frame from said spindle as the winding proceeds, a rotatable element, means for rotating said element, means for stopping said machine, a member having an arm movable into engagement with said element to initiate the operation of said stopping means, an impact member movable from a rest position to striking engagement with said first-mentioned member to effect movement of said arm into engagement with said element, said impact member being arranged in its rest position in the path of swinging of said traverse frame so that it is engaged thereby and moved into striking position when a predetermined size of winding is obtained.

10. In a winding machine, a winding spindle, a traverse frame, means for pivotally swinging said traverse frame from said spindle as the winding proceeds, means for stopping said machine, a pivotally suspended member having an arm movable into engagement with said element to initiate the operation of said stopping means, a pivotally mounted member movable from a rest position to engagement with said first-mentioned member to effect movement of said arm into engagement with said element, said second member being arranged in its rest position in the path of swinging of said traverse frame so that it is engaged thereby and moved into striking position when a predetermined size of winding is obtained.

11. In a winding machine, a winding spindle, a rotatable element, means for rotating said element, means for stopping said machine, a member having an arm movable into engagement with said element to initiate said stopping means, and having a second arm in engagement with a running course of yarn, said member being normally withheld from movement to initiate operation of the stop means by said running course of yarn and being constructed to move of its own weight into engagement with said element to initiate operation of the stop means upon breakage or termination of said yarn, an impact member movable from a rest position to striking engagement with the second arm to effect movement of the first arm of the first-mentioned member into engagement with said element and means movable by the growth of the package being wound on said spindle into engagement with said impact member to move it from its rest position into striking position.

12. In a winding machine, a winding spindle, a traverse frame, means for pivotally swinging said frame from said spindle as the winding proceeds, a rotatable element, means for rotating said element, means for stopping said machine, a pivotally suspended member having an arm movable into engagement with said element to ini-

tiate the operation of said stopping means and having a second arm in engagement with a running course of yarn, said member being normally withheld from movement to initiate operation of the stop means by said running course of yarn and being constructed to move of its own weight into engagement with said element to initiate operation of the stop means upon breakage or termination of said yarn, a pivotally mounted impact member movable from a rest position to striking engagement with the second arm to effect movement of the first arm of the first-mentioned member into engagement with said element, said impact member being arranged in its rest position in the path of swinging of said traverse frame so that it is engaged thereby and moved into striking position when a predetermined size of winding is obtained.

13. In a winding machine, a winding spindle, a traverse mechanism, means for swinging said spindle and traverse mechanism relative to each other about an axis substantially parallel to that of the spindle as the winding proceeds, means for stopping said machine automatically, and movable means for initiating operation of the stopping means, said initiating means being arranged to be set in a condition of rest and being placed in a condition of instability by said relative swinging when a predetermined size of winding is obtained, said initiating means comprising a movable impact member mounted for automatic independent motion from its position in the condition of instability to initiate operation of the stopping means.

14. In a winding machine, a traverse frame, means for pivotally swinging said traverse frame as the winding proceeds, means for stopping said machine, means responsive to the breakage of the strand being wound for initiating said stopping means, an impact member constructed to be set in a position of rest in the path of said traverse frame and to be displaced to a position of gravitational instability by a predetermined extent of swing of said traverse frame and thereupon to fall and strike said breakage responsive means to initiate said stopping means.

15. In a winding machine, a traverse frame, means for pivotally swinging said traverse frame as the winding proceeds, means for stopping said machine, means responsive to the breakage of the yarn being wound for initiating said stop means, movable impact means for initiating said stopping means having an inactive position during normal winding operation in which a part thereof lies in the path of said traverse frame, said impact means being arranged to be set off for automatic, independent motion into stopping means initiating position upon contact of said part thereof by the traverse frame when a predetermined size of package has been obtained.

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