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C. D. JENCKS
WINDING MACHINE

2,486,031

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Fig. 1

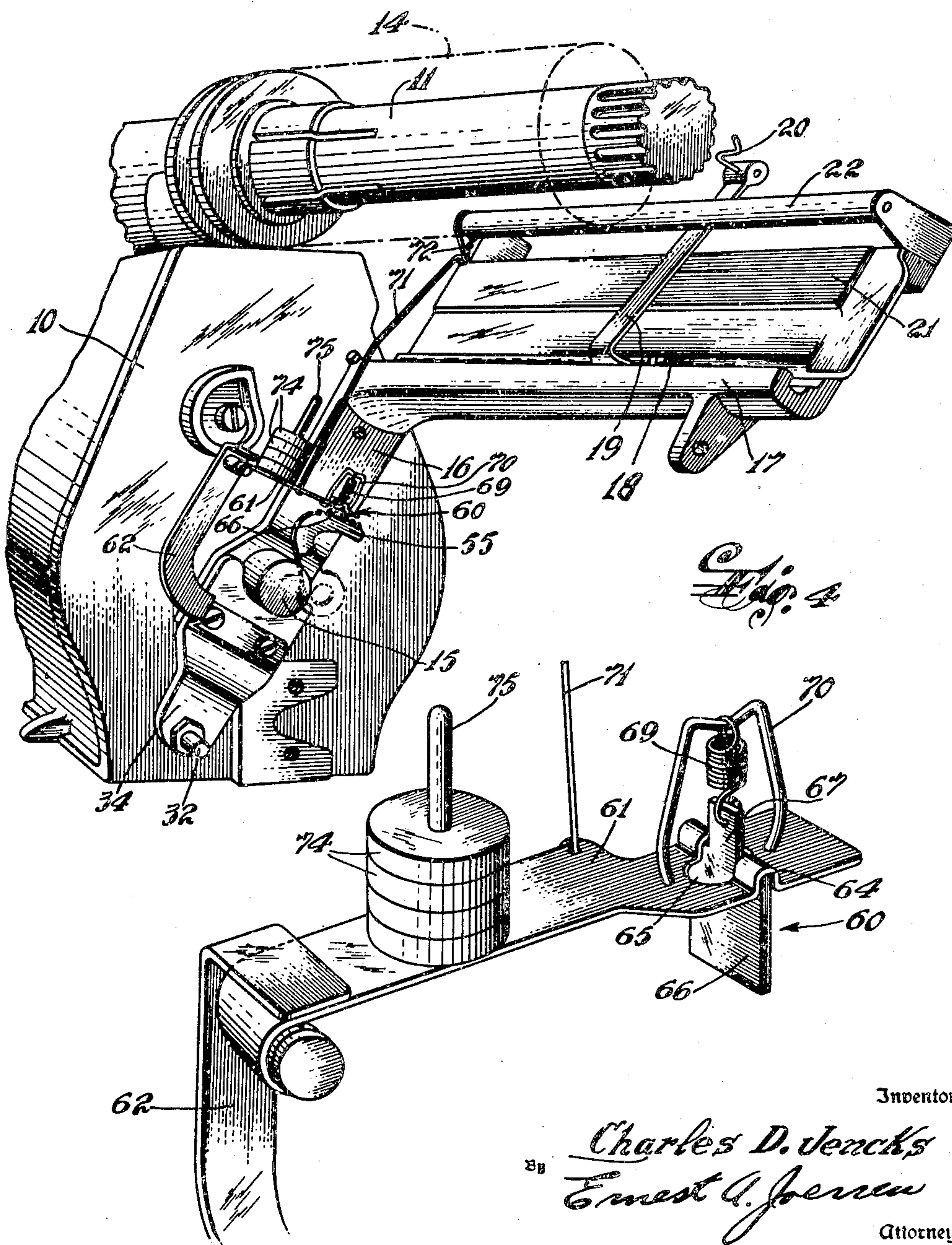
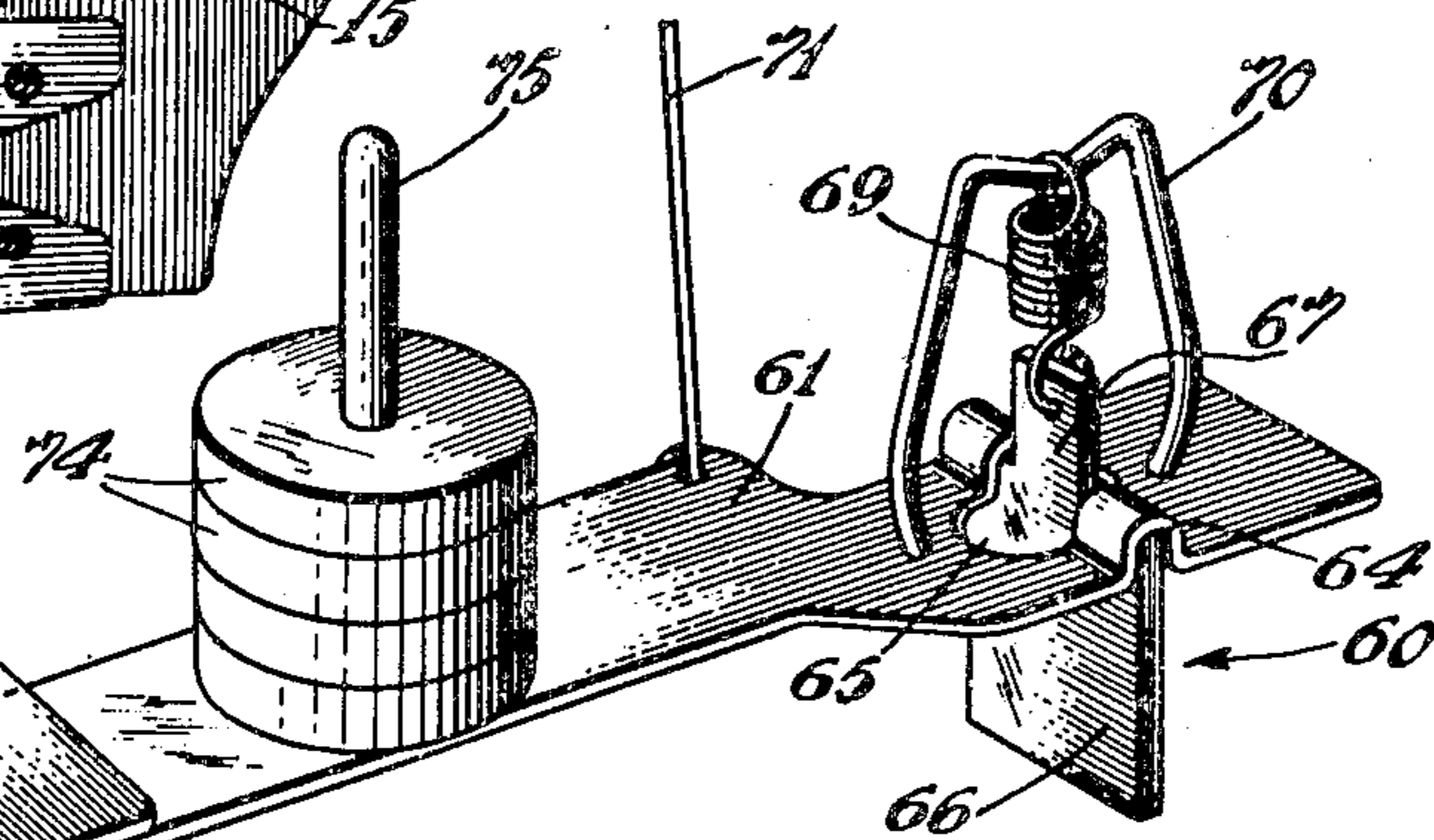


Fig. 2



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WINDING MACHINE

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7 Claims. (Cl. 242—18)

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The present invention relates to machines for winding yarn, thread or other filaments, and more particularly relates to improvements in devices for controlling the density and size of the packages wound by such machines.

The present invention is adapted to be practiced in connection with winding machines in which a thread is caused to reciprocate while feeding onto a package through means carried by a support known as a back, the package being wound on a rotatable package support, the back and the support being relatively movable and being adapted to be urged into separated position by the action of gravity or other suitable means. The thread guide is maintained either at a predetermined light pressure in contact with, or barely out of contact with, the surface of the package being wound, whereby the density and size of the package may be accurately controlled. To accomplish this, the package support and the back are locked against relative separating movements by suitable means which are adapted to be released intermittently as the package grows in size under the control of means contacting the package such as a feeler roll. This feeler roll is adapted to be rotated upon frictional engagement with the rotating package being wound to effect actuation of means controlling the release of the locking means.

The present invention aims to provide improved control means for operatively connecting the package contacting means and the locking means, whereby operation of the contacting means by the package renders the locking means ineffective and thereby permits separation of the back and the package support. More specifically, the present invention aims to provide nonelectrical control means for accomplishing the foregoing, thus eliminating the necessity of electrical wiring and contending with different electrical service currents in various localities and thereby making the winding machines equipped with devices embodying the invention adaptable for use anywhere.

An object of the present invention is to provide simplified means for controlling the separation of the back and package support of a winding machine of the character indicated.

Another object is to provide mechanical means

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for controlling the separation of the back and package support, which are easily installed.

A further object is to provide improvements of the foregoing character which are positive in operation, rugged in construction, are not likely to get out of order, and do not require supervision or repair.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawing, forming a part of the specification, wherein:

Figure 1 is a fragmentary perspective view of the back and package support portion of a winding machine embodying the present invention with the back retarding means broken away.

Figure 2 is a fragmentary side elevational view, illustrating in detail the means for retarding separation of the back and package with the cover removed therefrom.

Figure 3 is a front elevational view of the retarding means shown in Figure 2 illustrating details thereof.

Figure 4 is an enlarged fragmentary perspective view of latch control means.

The present invention may be embodied in any desired winding machine of commercial construction insofar as the elements for supporting and rotating the winding spindle and for imparting traversing movement to the thread guide are concerned. Accordingly, in Figure 1 there is shown only one of the upright side frames 10 of such a winding machine. A horizontal spindle 11 is supported in this frame by suitable journal boxes and is arranged to be rotated at high speed. The spindle has a flange at its inner end and a removable collar at its outer end between which is clamped a cop or bobbin on which the thread package 14 is to be wound.

A back carrying the thread guide is supported to rock freely about the axis of a shaft 15 projecting outwardly from the side frame 10, whereby the package supporting spindle 11 and the

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back are arranged for relative separating movement. The back includes an upwardly extending arm 16 carrying a transversely extending frame 17 provided with a bearing for a slide 18 from which extends an upright arm 19 carrying a thread guide 20. The slide 18 is reciprocated at high speed by a cam mechanism (not shown) to traverse the thread guide 20 back and forth in a longitudinal path parallel to the surface of the thread package 14.

In the upper portion of the frame 17 an elongated yoke 21 is secured having forwardly extending arms at each end between which is journaled a long feeler roll 22. This roll is pivoted for rotation or pivotal movement about its longitudinal axis and is adapted to engage the rotating package 14 being wound as it grows in size, whereby the roll is turned about its pivot. Such turning of the roll is utilized to control the separation of the back and package support in response to the growth of the package as will appear hereinafter.

Separation of back and package normally is prevented or governed by retarding means herein illustrated (Figures 2 and 3) as an escapement mechanism 25 which is secured to the side frame 10 by a bracket 26.

The escapement mechanism comprises a spaced apart pair of side frames 27 and 28 having a rotatable hollow shaft 29 journaled therein having its axis in alignment with the axis of the shaft 15. The inner end of the shaft extends beyond the side frame 28 and has an arm 30 secured thereto which has a slot 31 at its free end for receiving a stud 32 on an extension 34 of the arm 16 (Figures 1 and 2), whereby the back and escapement mechanism are operatively connected.

A gear 35 is mounted for rotation on the shaft 29 between the side frames 27 and 28 and is connected for rotation with the shaft 29 by clutch means comprising a member 36 having a face frictionally engaging one side of the gear 35 and a second member 37 having a face frictionally engaging the other side of the gear 35. In this manner the back can be moved towards and away from the package by applying a force overcoming the clutch friction without imparting rotative movement to the gear 35 through the extension 34, the arm 30 and the shaft 29.

The clutch members 36 and 37 are mounted for rotation with the shaft 29 and are connected for rotation with each other by an extension 39 on the member 36 having a slot 40 and an extension 41 on the member 37 having a lateral projection 42 extending into the slot 40. The clutch members are urged to rotate the shaft 29 in a direction to assist moving the back away from the package through the arm 30 and extension 34 by means of a spring 44 coiled about the shaft 29 and having one end secured to the side frame 28 and having its other end secured to the clutch member 37.

Rotation of the gear 35 normally is prevented by an escapement pawl 45 engaging a star wheel 46 which is connected to the gear 35 by a train of gears 48, 49, 50, 51 and 52 rotatably mounted on the side frames of the escapement mechanism 25.

The pawl 45 is mounted for oscillating movement to permit the same to move out of and into engagement with the star wheel 46. This is accomplished by a rod 54 extending through the hollow shaft 29 having the pawl 45 secured thereto at one end thereof and having a latch

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segment 55 secured thereto at the other end thereof.

A device is provided to take up the back-lash of the gear train when the back is pushed against the package which back-lash allows the back to fall away from the package by the amount of backlash. This device comprises a rotatable rubber covered wheel 56 and a spring-like arm 57 having the wheel 56 mounted on one end thereof and having its other end secured to the cover of the retarding means (Figure 3). When the wheel 56 is manually pushed inwardly and turned counterclockwise it engages the star wheel and turns it, which rotates the gear train sufficiently to move the back the amount that it had fallen away.

The segment 55 has a series of detents adapted to be engaged by a latch element 60 (Figures 1, 2 and 4) on one end of an arm 61 pivoted at its other end on a bracket 62 secured to the extension 34 of the back. The latch element shown herein is formed of spring steel to absorb shock upon engagement of the detents and is mounted to jump out of engagement to allow the back to be moved manually. This is accomplished by forming a pair of recesses 64 on the underside of the arm 61 which are spaced apart transversely by an opening 65. The latch element has upwardly facing edge portions 66 seated in the recesses and has a portion 67 of reduced width extending through the opening 65. The portion 67 has one end of a spring 69, under tension, secured thereto and the other end of the spring is secured to a yoke 70 mounted on the arm 61.

The latch element is adapted to be moved out of the detents of the segment 55 upon lifting the arm 61. The latter is accomplished by linkage means mechanically connecting the feeler roll 22 and the arm 61. As shown herein such linkage means may comprise a link 71 such as a wire-like rod having one end secured to the arm 61 and a chain 72 or the like having one end connected to the other end of the link 71 and having its other end connected to the feeler roll in a manner to exert a pull on the link upon turning of the feeler roll, whereby the feeler roll causes the latch element to be lifted out of the detents of segment 55.

In order to control the density of the package being wound, the friction between the package and the feeler roll necessary to effect turning of the latter by the former is varied by increasing or decreasing the force on the chain opposing turning of the roll. This is accomplished by mounting removable weights 74 on a pin 75 secured to the arm 61. By increasing the number of weights the force opposing the rotation of the roll is increased and likewise the friction necessary to effect rotation of the roll by the package is increased, whereby the roll exerts greater pressure on the package to produce a more densely wound package. The opposite effect is accomplished by reducing the number of weights.

In operation, when the thread package is being wound, the back is moved towards the spindle 11 by hand with sufficient force to overcome the friction between the clutch members 36 and 37 to position the feeler roll 22 on the surface of the package 14 or the cop on which the package is to be wound. As the package grows in size the friction contact between the feeler roll and package gradually increases until the package effects turning of the feeler roll. The chain 72

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is then wound on the feeler roll and exerts a pull which is effective through the link 71 to raise the latch arm 61 to thereby cause the latch element 60 to release the latch segment 55.

When the latch segment is released, the rod 54 carrying the escapement pawl 45 is free to oscillate, thus releasing the pawl to enable the star wheel 46 to rotate step by step under the actuation of the spring 44. The back is then free to move away from the spindle under the influence of gravity and the spring 44, but the back moves away very slowly due to the train of gears 48, 49, 50, 51 and 52 between the star wheel and the back.

As the back and package separate, the feeler roll is moved out of contact with the surface of the thread package or only lightly contacts the package to permit the roll to return to its initial position under the influence of the weight of the latch arm 61 connected thereto by the link 71 and chain 72. The latch element then enters one of the detents of the latch segment 55 to lock the rod 54 carrying the pawl, whereby the pawl prevents further movement of the star wheel. When the package again grows in size these operations are repeated.

From the foregoing description it will be seen that the present invention provides an improved arrangement for periodically and intermittently locking the back and releasing the back for separation with respect to the package. Mechanical linkage between the feeler roll and the locking means eliminates electrical connections. The device is rugged in construction and can readily withstand any rough usage to which it may be subjected.

As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

The escapement mechanism and the latch therefor, illustrated and described herein, constitute the subject matter of copending application Serial Number 717,188 filed December 19, 1946.

I claim:

1. In a winding machine having a rotatable package support and a thread guide, means supporting said thread guide, said supporting means and said package support being relatively movable into separated position, means for locking said supporting means and package support against relative separating movement, means for contacting the package adapted to be operated thereby as the package grows in size, and linkage element means having its ends connected to said contacting means and said locking means respectively whereby upon operation of said contacting means movement thereof effects movement of said linkage means which in turn operates said locking means to render the same ineffective to permit separation of said supporting means and said package support.

2. In a winding machine having a rotatable package support and a thread guide, means supporting said thread guide, said supporting means and said package support being relatively movable into separated position, means for locking said supporting means and package support against relative separating movement, means for contacting the package adapted to be operated thereby as the package grows in size, and means in-

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cluding a chain for connecting said contacting means and said locking means and being constructed and arranged whereby upon operation of said contacting means said chain is pulled in a direction to render said locking means ineffective and thereby permit separation of said supporting means and said package support.

3. In a winding machine having a rotatable package support and a thread guide, means supporting said thread guide, said supporting means and said package support being relatively movable into separated position, means for locking said supporting means and package support against relative separating movement, a feeler roll for contacting the package adapted to be turned thereby as the package grows in size, and linkage means mechanically connecting said feeler roll and said locking means and being constructed and arranged whereby upon turning of said feeler roll said linkage means is moved in a direction to render said locking means ineffective and thereby permit separation of said supporting means and said package support.

4. In a winding machine having a rotatable package support and a thread guide, means supporting said thread guide, said supporting means and said package support being relatively movable into separated position, means for locking said supporting means and package support against relative separating movement, a feeler roll for contacting the package adapted to be turned thereby as the package grows in size, and linkage means including a chain at one end having one end connected to said feeler roll and the other end of said linkage means being connected to said locking means whereby upon turning of said feeler roll said linkage means is pulled in a direction to render said locking means ineffective and thereby permit separation of said supporting means and said package support.

5. In a winding machine comprising a rotatable package support and thread guide supporting means, the supporting means and the package support being relatively movable into separated position; the combination of means for contacting the package adapted to be operated thereby as the package grows in size, an escapement device for retarding separating of the supporting means and package support including locking means, and linkage means connecting said contacting means and said locking means and being constructed and arranged whereby operation of said contacting means renders said locking means ineffective, thereby to permit said escapement device to operate and enable the supporting means and the package support to separate.

6. In a winding machine comprising a rotatable package support and thread guide supporting means, the supporting means and the package support being relatively movable into separated position; the combination of means for contacting the package adapted to be operated thereby as the package grows in size, an escapement device for retarding separating of the supporting means and package support including locking means and friction means connecting said device to said package support, and linkage means connecting said contacting means and said locking means and being constructed and arranged whereby operation of said contacting means renders said locking means ineffective and thereby permit said escapement device to operate and enable the supporting means and the package support to separate.

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7. In a winding machine comprising a rotatable package support and thread guide supporting means, the supporting means and the package support being relatively movable into separated position; the combination of means for locking the supporting means and the package support against relative separating movement including a latch arm pivotally mounted on the supporting means, means on the supporting means for contacting the package and operable thereby as the package grows in size, and linkage means mechanically connecting said contacting means and said latch arm constructed and arranged

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whereby operation of said contacting means effects raising of said latch arm.

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