June 18, 1940. J. F. SCHENCK, JR 2,204,869

METHOD AND MEANS FOR WINDING

Filed April 2, 1937 3 Sheets-Sheet 1

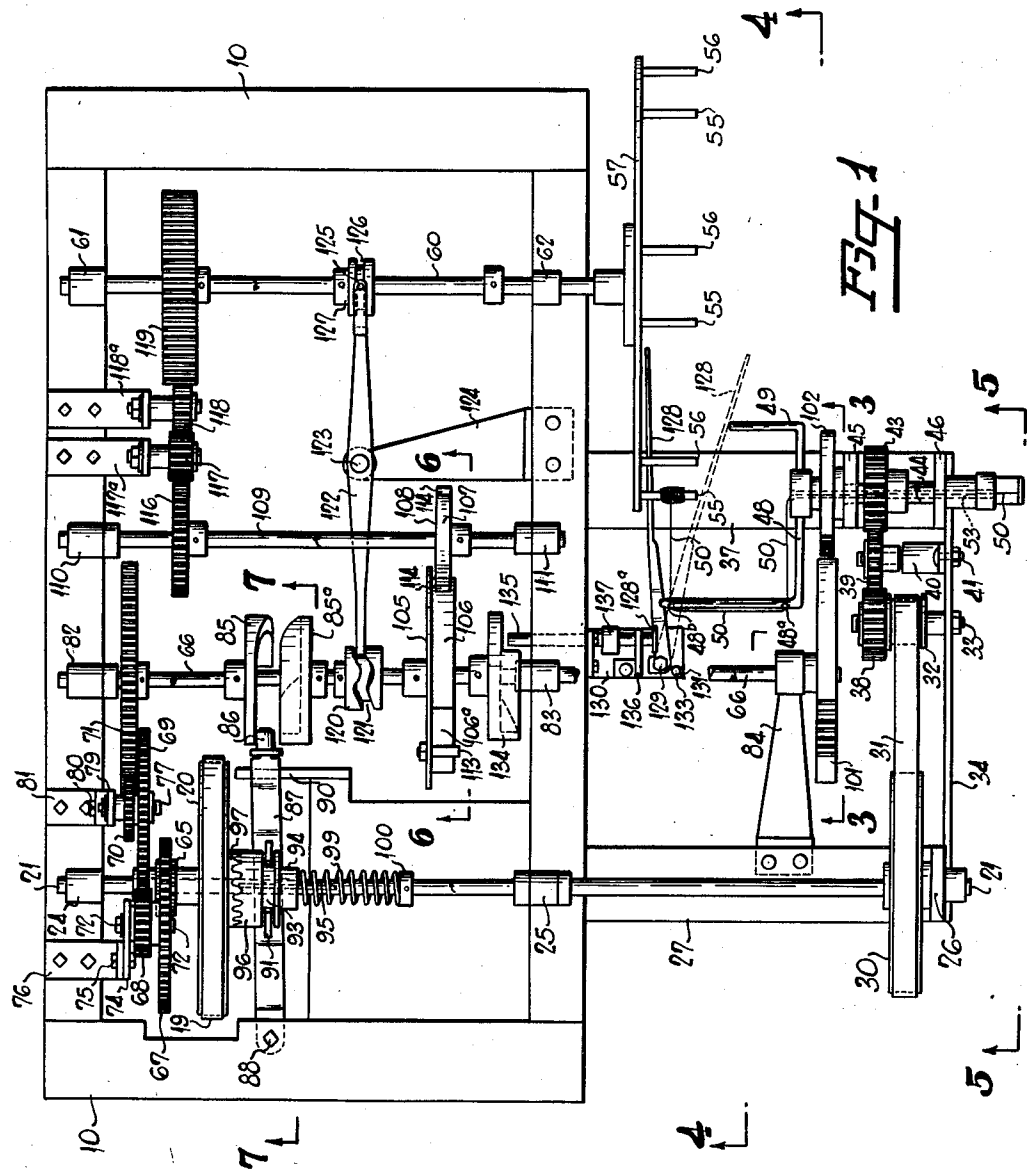


Fig. 1

JOHN F. SCHENCK, JR
Inventor

By

Attorney

June 18, 1940. J. F. SCHENCK, JR 2,204,869

METHOD AND MEANS FOR WINDING

Filed April 2, 1937 3 Sheets-Sheet 2

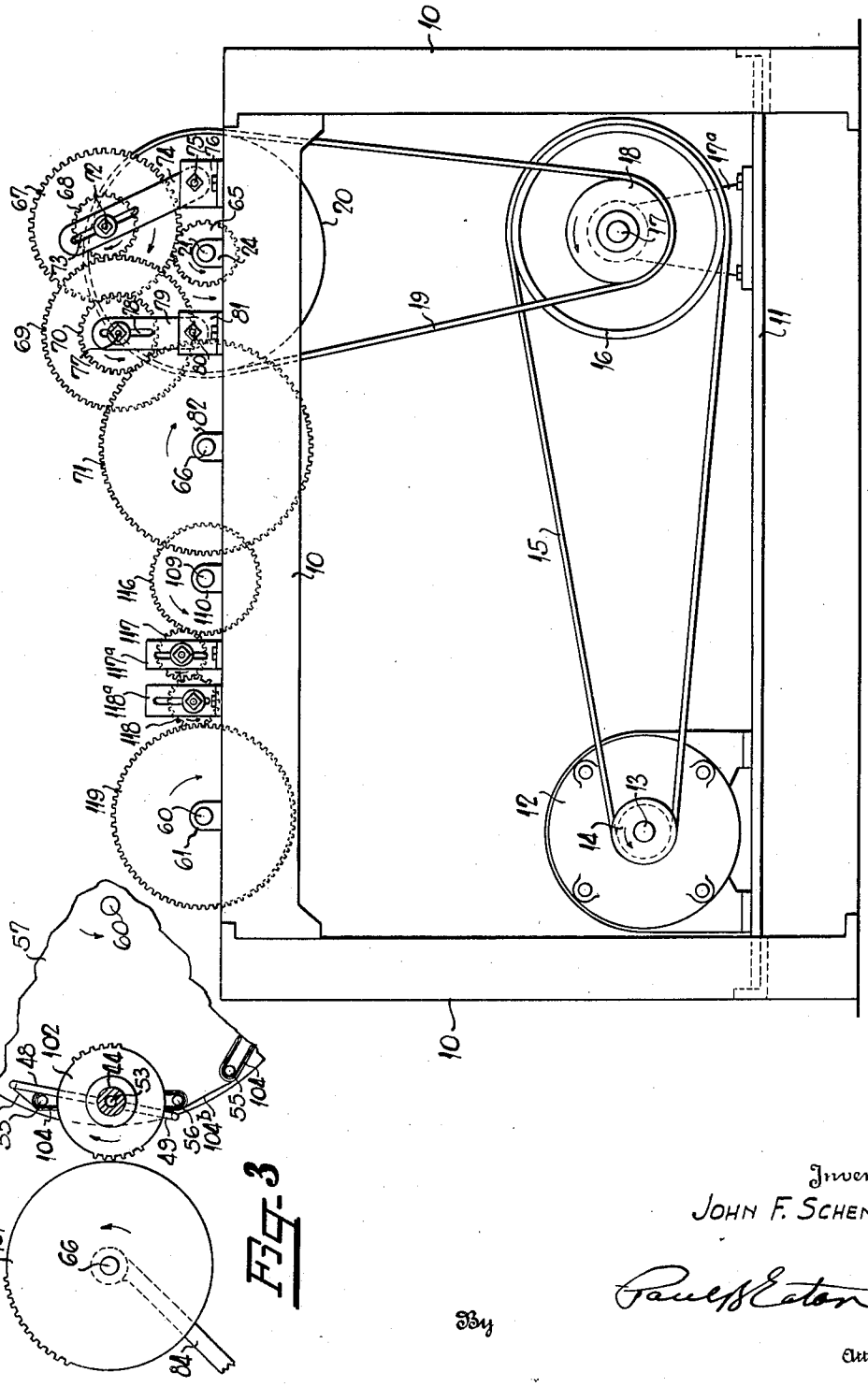


Fig. 2

Fig. 3

Inventor:
JOHN F. SCHENCK, JR

By Paul S. Eaton

Attorney

June 18, 1940. J. F. SCHENCK, JR 2,204,869

METHOD AND MEANS FOR WINDING

Filed April 2, 1937 3 Sheets-Sheet 3

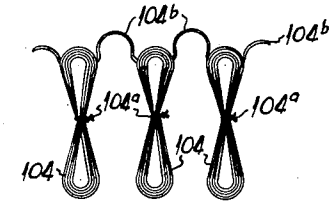


Fig. 8

Fig. 4

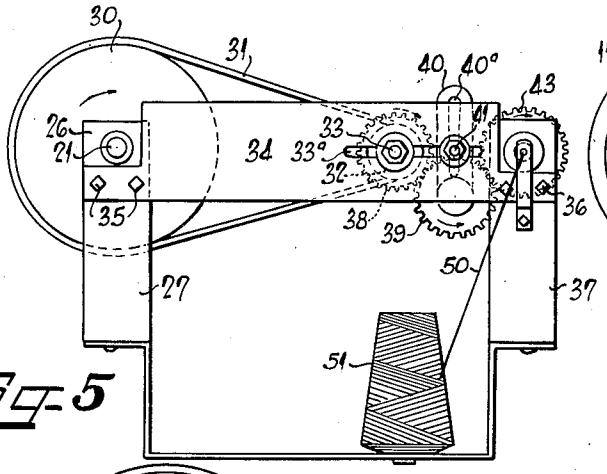


Fig. 5

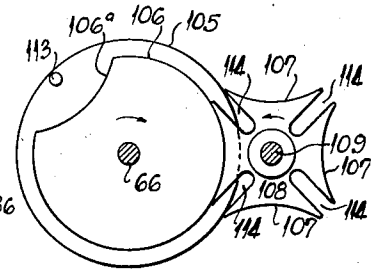


Fig. 6

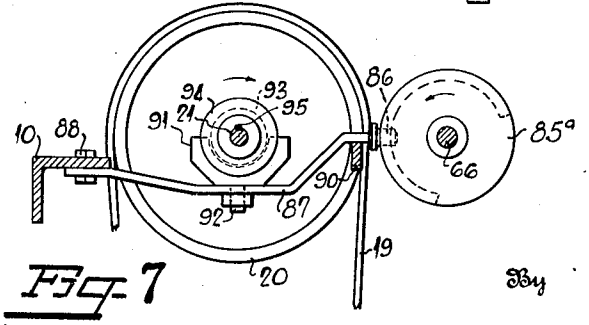


Fig. 7

JOHN F. SCHENCK, JR.
Inventor

By James & Eaton

Attorneys

Patented June 18, 1940

2,204,869

UNITED STATES PATENT OFFICE

2,204,869

METHOD AND MEANS FOR WINDING

John F. Schenck, Jr., Shelby, N. C.

Application April 2, 1937, Serial No. 134,611

13 Claims. (Cl. 242—53)

This invention relates to a method and means for packaging cord, yarn and the like and more especially to mechanical means for automatically winding a conventional strand of yarn into a plurality of packages, each package being connected by a portion of the strand.

More specifically, the apparatus provides means for winding a series of skeins of yarn from one continuous strand, comprising a disk having yarn supporting means thereon with means for intermittently rotating said disk and yarn supporting means, step by step, past a suitable flier whereby the flier will wind a package of yarn upon the yarn supporting means upon each rotation of the disk. The apparatus also has means for traversing the strand as it is wound and means for varying the length of strand in each package.

It is therefore, an object of this invention to provide a method and means for winding a strand of continuous length into a plurality of packages with means for traversing the strand as it is wound and means for varying the length of strand in each individual package. It is evident, by providing an apparatus of this type that a plurality of these connected packages may be placed in a suitable container and the purchaser of the package may instantly cut off the desired length within certain limits without the necessity of placing a measuring stick thereon. It also provides a cord or strand of the desired length with no knots therein.

Some of the objects of the invention having been stated, other objects will appear when taken in connection with the accompanying drawings, in which:

Figure 1 is a plan view of my machine for winding a plurality of packages in series from a continuous strand the driving motor and certain pulleys and belts being omitted;

Figure 2 is an elevation looking at the top side of Figure 1;

Figure 3 is a sectional, detail view with the flier shown in a slightly different position and taken along the line 3—3 in Figure 1;

Figure 4 is a sectional elevation taken along the line 4—4 in Figure 1;

Figure 5 is an elevation taken along the line 5—5 in Figure 1;

Figure 6 is a sectional view taken along the line 6—6 in Figure 1 showing a Geneva stop movement;

Figure 7 is a sectional view taken along the line 7—7 in Figure 1 showing the clutch disengaging means;

Figure 8 is a view showing a plurality of skeins of yarn after they have been wound in series from one continuous strand and ready for packaging in a suitable container.

Referring more specifically to the drawings, the numeral 10 denotes a framework which has a platform 11 for supporting motor 12 said motor having a motor shaft 13 and a pulley 14. A belt 15 is mounted upon pulley 14 and upon a second pulley 16 which in turn is rotatably mounted on stud 17. The pulley 16 has integral therewith a smaller pulley 18 upon which is mounted a belt 19, said belt projecting upwardly and being also mounted upon a larger pulley 20 which is rotatably secured on main drive shaft 21. The stud 17 is supported by a suitable bracket 17a which rests upon the platform 11.

The main drive shaft 21 is supported by bearings 24, 25, and 26, which are supported at the same elevation, the bearings 24 and 25 being secured to the upper portion of framework 10, whereas, the bearing 26 forms a portion of Z-shaped member 27 which, in turn, is secured to the front side of the framework 10. Fixedly secured to the front end of shaft 21 is a pulley 30 which has a belt 31 mounted thereon. This belt is also mounted upon another pulley 32 which is rotatably mounted upon stud shaft 33, said stud shaft being fixedly secured to cross bar 34. The bar 34 has its ends secured as at 35 and 36 to Z-shaped supports 27 and 37 which in turn, are supported by the framework 10.

In order to provide adjustable means for supporting the stud 33, a slot 33a is provided in the member 34 so that the pulley 32 may be moved horizontally to effect the desired adjustment necessary for the proper operation of the parts.

The pulley 32 has integral therewith a change gear 38 which may be removed from the stud 33 along with the pulley 32 when it is desired to change the gear ratio between the main drive shaft 21 and the flier, which will be presently described. This gear 38 has meshing therewith an intermediate idler gear 39, said gear being rotatably secured to bracket 40. This bracket has vertically disposed slot 40a therein which is penetrated by a bolt 41, the bolt also penetrating slot 33a to adjustably secure the bracket in its proper position.

The gear 39 also meshes with a gear 43 which is fixedly secured to flier shaft 44. This shaft is rotatably mounted in bearings 45 and 46 which, in turn, are supported by L-shaped support 37. On one end of the flier shaft 44 an L-shaped flier 48 is secured and also a counter-weight 49. A

strand of flexible material 50 is drawn from a suitable package 51, upwardly through bore 53 in the flier shaft 44, and from bore 53, the strand is drawn through the outstanding leg of flier 48 as at 48a and 48b, whence it is wound around pins 55 and 56 on disk 57. The disk 57 has a plurality of pairs of pins such as 55 and 56, each pair being adapted to have wound thereon a skein of yarn as shown in Figure 4.

The flier 48 is adapted to be rotated a predetermined number of revolutions while the strand 50 is being wound around a pair of the pins 55 and 56, after which the flier is caused to cease rotation and then the disk 57 is caused to rotate another step so as to position a pair of empty pins 55 and 56 in a winding position. Then the flier resumes rotation and the same operation is repeated.

By providing such an apparatus for effecting this winding operation, any number of skeins of packages of yarn may be wound in series from one continuous length of material depending upon the size of disk 57. The disk 57 is fixedly secured upon cross shaft 60 which shaft is rotatably mounted in bearings 61 and 62 which in turn, are positioned on the top of framework 10.

By referring to Figures 1 and 2, it will be seen that the pulley 20 has integral therewith a small gear 65 which drives the cam shaft 66 in a clockwise direction in Figure 2 through a series of gears 67, 68, 69, 70 and 71. The gears 67 and 68 are rotatably mounted around stud 72 which, in turn, is adjustably mounted in slot 73. This slot is cut in member 74 which is pivoted as at 75 to bracket 76. The gears 69 and 70 are supported in a like manner by stud shaft 77 which is likewise adjustably secured in slot 78. The slot 78 is cut in a member 79 which, in turn, is pivoted as at 80 to bracket 81. The brackets 76 and 81 are supported on top of framework 10.

The cam shaft 66 is supported by bearings 82, 83 and 84, the bearings 82 and 83 being secured to the top of framework 10 whereas, the bearing 84 is supported by Z-shaped support 27, (Figure 1).

In order to provide means for causing the flier 48 to periodically stop while the disk 57 is turning a new set of pins to winding position, means have been devised for disengaging the source of power from the shaft 21, to thereby cause the rotation of the flier to cease. This means comprises a cam 85 which has its side normally engaged by a roller 86. This roller is rotatably mounted on the free end of lever 87 which, in turn, is pivoted as at 88 to framework 10. The roller 86 is held in its proper horizontal position by means of a slide 90 which slide supports the free end of pivoted member 87 (Figures 1 and 7).

The intermediate portion of the pivoted member 87 has a Y-shaped member 91 pivoted thereto as at 92, and this Y-shaped member is adapted to have its upper end fit in a suitable groove 93 in hub member 94. This hub member is slidably keyed on the main drive shaft 21 by means of a suitable key-way 95, said hub having integral therewith a clutch face 96 which is normally adapted to engage another clutch face 97 which is integral with the hub portion of pulley 20.

Since the pulley 20 is loosely mounted around the main drive shaft 21, it is evident that the rotation of this wheel will not cause any rotation of the shaft 21 until the clutch faces 96 and 97 are caused to be engaged. The clutch faces are normally pressed to engaged position by means of a suitable compression spring 99 which is disposed around the main drive shaft 21 and has one end thereof abutting collar 100 and its other end abutting the hub member 94.

The flier 48 is rotated a predetermined number of revolutions through the members 20, 94, 21, 30, 31, 32, 38, 39, 43, and 44 (Figures 1 and 5). At the same time the cam shaft 66 is caused to rotate one revolution through the members 65, 67, 68, 69, 70 and 71 (Figures 1 and 2). When the cam 85 rotates so that its high side is engaging the roller 86, the clutch faces 96 and 97 will be disengaged thereby stopping the flier 48, and preventing any further rotation until after the disk 57 has been turned to the new position.

In Figures 1 and 7 a portion 85a is shown acting along with the cam 85, however, this portion is not absolutely essential to the operation of the apparatus since the spring 99 normally holds the roller 86 in contact with cam 85. Nevertheless this portion 85a serves as a positive means for holding the roller in proper contact with the cam 85, if, for any reason, the spring 99 should fail to act.

If, for any reason, the outstanding leg of flier 48 should stop in a position as shown in Figure 3, where one of the pins 55 or 56 would contact this outstanding leg when the disk 57 is turning to a new position, means are provided for positioning the flier in a non-engaging position prior to the movement of disk 57, so that a jamming of the parts will be prevented. I have provided a large gear 101 which is fixedly secured on the end of slow moving cam shaft 66. This gear has one section with only a few teeth therein and the other portion of its face is smooth. Fixedly secured to the flier shaft 44 is a gear 102 which has all of its face smooth except two sections in which there are a few teeth. These teeth are positioned on the gear 102 so that when the flier 48 stops in a position shown in Figure 3, the slow moving cam shaft 66 will cause the teeth in the gear 101 to engage a section of these teeth in gear 102 to turn the flier shaft 44 and the flier 48 to a position where the outstanding leg of the flier will not be engaged by either of the pins 55 or 56 when the disk 57 is being turned to a new position.

In Figure 3 the section of teeth in the gear 101 occupies a position immediately after the winding of a skein has begun. When a skein of yarn has been completed and the flier 48 has stopped, ready for the disk to be turned to a new position, then this section of teeth in gear 101 will have rotated in a counter-clockwise manner in Figure 3, to a position adjacent the gear 102. It is therefore, seen that the teeth in this gear will engage a section of the teeth in gear 102 should this gear be stopped in the proper engaging position, whereas, during the normal winding operation, the gear 102 will rotate along with the flier but will not engage the teeth in gear 101 since this gear only makes one revolution per skein.

After the first skein 104 has been wound, a new set of pins is turned to a position where the flier can wind the strand thereon. This turning is effected by means of a Geneva stop movement comprising a pin wheel 105 which is fixedly secured around shaft 66. The pin wheel 105 has a convex portion 106 which normally coincides with one of arcuate concave surfaces 107 of a star wheel 108. This star wheel is fixedly secured on cross shaft 109 which, in turn, is rotatably mounted in bearings 110 and 111 secured upon framework 10. The pin wheel 105 has a concave portion 106a adjacent the convex portion 106 and disposed on

the flange of portion 106 opposite this concave portion 106a is a pin 113. This pin is adapted to move into one of radially disposed grooves 114 which are cut in star wheel 108 to cause the star wheel to rotate, in the present instance, one-quarter of a revolution. The pin wheel 105 and the star wheel 108 work together to make what is commonly known as a standard Geneva stop movement for periodically moving or rotating the shaft 109 a partial revolution. This partial revolution is transmitted tot he shaft 60 and the disk 57 through a driving connection comprising gears 116, 117, 118, and 119, and it should be stated that the movement produced by this quarter revolution, is only sufficient to turn the shaft 60 and the disk 57 one sixth of a revolution to cause a new set of pins 55 and 56 to turn to proper winding position relative to flier 48. The gears 117 and 118 are adjustably mounted in brackets 117a and 118a respectively.

Means have also been provided for causing the shaft 60, along with the disk 57, to reciprocate or move back and forth to cause the yarn on the pins to be equally distributed over a given area. That is, a traversing motion is effected during the winding operation. This traversing effect is produced by a grooved cam 120 and its associated parts which connect this cam to the shaft 60. The cam 120 has a zigzag groove 121 in its periphery into which one end of a lever 122 is adapted to fit. The lever 122 is pivoted as at 123 to a bracket 124 which, in turn, is secured to the framework 10. The other end of lever 122 is forked and has suitable pins 125 therein for engaging groove 126 in pulley 127. This pulley is fixedly secured to cross shaft 60. During the winding of a skein of yarn the cam shaft 66 makes a complete revolution during which time the lever 122 is caused to oscillate about pivot point 123 to cause the pins 55 and 56 to move towards and away from the observer in Figure 1 to give the desired traversing motion, and thereby prevent the yarn from being wound entirely in one plane on the pins 55 and 56.

When the first skein has been wound and the above described parts have been operated to cause the disk 57 to be turned to a new position, it is seen that there is a connecting portion 104b between the skeins. This portion, immediately after the turning or movement of the disk has been effected, will naturally be disposed in the path of travel of the flier 48, therefore, means must be provided for moving this connecting portion of the strand out of the path of rotation of the flier and against the disk 57. A finger 128 has been pivoted as at 129 to a bracket 130, which bracket is secured to the side of framework 10. The free end of finger 128 is normally held against the disk 57 as shown in Figures 1 and 4 and in this position the finger will engage the intermediate portion 104b and cause it to be pushed out of the path of travel of the flier 48. A torsion spring 131 is adapted to encircle the pivot pin 129 which spring has one end thereof engaging a pin 133 and its other end engaging upstanding projection 128a which is integral with the finger 128. During the normal operation while the strand is being wound around the pins 55 and 56, the finger 128 is held in bold line position as shown in Figure 1 to cause the intermediate portion 104b to be held out of the path of travel of the flier. After the skein or package of yarn has been completed it is then necessary to provide means whereby the finger 128 will be rotated to dotted line position (Figure 1) to allow the disk 57 and its associated pins 55 and 56 to move to a new position. A cam 134 is fixedly secured on the cam shaft 66 and the face of this cam is adapted to be engaged by one end of a loosely mounted pin 135, said pin being slidably mounted in framework 10 and also in upstanding projection 136 which is secured to bracket 130. A collar 137 is secured to the intermediate portion of this pin to prevent the pin from becoming removed from its bearings. The other end of the pin 135 is adapted to engage the upstanding projection 128a of finger 128 when the high side of the cam 134 moves against the other end of said pin. When this is done the pin 135 is moved toward the observer in Figure 1 to cause the finger 128 to rotate to dotted line position, after which the disk 57 and the pins 55 and 56 can move to new position, without having the finger 128 disposed within its path of travel.

Method of operation

Briefly, the method of operation of the machine is as follows:

When a complete package of yarn has been wound upon the pins 55 and 56, the clutch faces 96 and 97 are disengaged by the cam 85. This, of course, will stop the movement of the flier 48. Immediately thereafter, the Geneva stop movement comprising pin wheel 105 and star wheel 108 will turn the disk 57 and its associated pins to new position. Shortly before the movement of the disk 57 the cam 134 will move the finger 128 to dotted line position (Figure 1) to allow the movement of disk 57 to take place. After the movement of disk 57 the finger 128 will go back to bold line position under the force of torsion spring 131. After the finger goes back and forces the connecting portion 104a against the disk 57 and out of the path of travel of the flier 48, the roller 86 falls off of the high side of cam 85 and under the force of spring 99, thereby allows the clutch faces 96 and 97 to fall into engaged position so that the flier 48 will resume its rotative movement to wind another skein of yarn upon the pins 55 and 56.

After the skeins have been wound upon the pins 55 and 56 an operator usually ties a suitable band 104a around the central portion of the skein and thereafter the same are removed from the pins, connected in series by the portions 104b in a manner shown in Figure 8. While I have shown pins for the purposes of winding a skein, it is evident that only a single pin could be employed and with traversing mechanism a ball of yarn can be wound instead of the skein.

The pins for supporting the packages may be positioned in any desired manner in disk 57, so as to have longer or shorter skeins. Also the number of pairs may be varied provided the gear 116 is replaced with another gear of such a size as to give the proper rotation to the disk. When it is desired to vary the length of strand in the skeins the gear 33 is replaced with a larger or smaller gear as required.

It is therefore seen that I have provided means for winding a plurality of packages of yarn from a continuous strand with means for automatically moving each package from winding position after it has been completely wound, and simultaneously substituting an empty supporting means therefor, which may be a spindle or a plurality of spindles.

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are em-

ployed, they are used in a generic and descriptive sense only, and not for purposes of limitation, the scope of the invention being set forth in the appended claims.

I claim:

1. Apparatus for winding a plurality of packages connected to each other from one continuous strand, comprising a wheel having a plurality of members thereon for receiving the strand, a flier mounted for rotation around some of said holders for depositing said strand thereon, the longitudinal axis of the flier being parallel to the longitudinal axis of the wheel, means for stopping the flier and moving the wheel to present another holder to a point where it will be encircled by the flier in its rotation, means for moving the strand leading from the wound package to the package being wound from the path of the flier while a package is being wound, and means for positioning the flier while it is stopped so that it will be out of the path of the holders on the wheel as the wheel is being rotated a partial revolution to present a new holder to the flier.

2. Apparatus for winding a plurality of skeins of yarn from a continuous strand and preserving the connection therebetween comprising a wheel having a plurality of sets of pins thereon, a flier adapted to rotate around one set of said pins at a time to deposit a skein of yarn thereon, means for stopping the flier in a predetermined position while the wheel is being moved to present a new set of pins to the flier, and means for engaging the strand leading from the finished package to the new set of pins from the path of rotation of the flier while it is winding a package.

3. Apparatus for winding a plurality of skeins of yarn from a continuous strand and preserving the connection therebetween comprising a wheel having a plurality of sets of pins therein, a flier adapted to rotate around one set of said pins at a time to deposit a skein of yarn thereon, means for stopping the flier in a predetermined position while the wheel is being moved to present a new set of pins to the flier, means for moving the strand leading from the finished package to the new set of pins from the path of rotation of the flier while it is winding a package and means for moving the wheel longitudinally of the axis of the flier to spread the strand on the pins as it is being wound.

4. Apparatus for winding a plurality of packages from a continuous strand comprising a rotatable member having a plurality of holders thereon, a flier for winding the strand onto one of the holders, means for moving the rotatable member to move another holder to winding position, and means for moving the strand out of the path of the flier while a package is being wound on a holder.

5. Apparatus for winding a plurality of connected packages from a strand which comprises a rotatable member having a plurality of holders thereon, a rotatable flier adapted to encircle a holder to wind the strand thereon, means for stopping the flier and moving another holder to a position to receive the strand from the flier and means for starting the flier after the new holder has been moved to a position to receive the strand from the flier.

6. Apparatus for winding a plurality of packages from one strand and leaving the packages joined together, comprising a rotatable reel having a plurality of holders thereon for receiving the packages of the strand, a flier for depositing the strand on the holders one at a time and means for stopping the flier and moving the reel to a position where the flier will deposit the strand on another holder on the reel.

7. Apparatus for winding a plurality of packages from one strand and leaving the packages joined together, comprising a rotatable reel having a plurality of holders thereon for receiving the packages of the strand, a flier for depositing the strand on the holders one at a time, means for stopping the flier and moving the reel to a position where the flier will deposit the strand on another holder on the reel, and means for moving the reel longitudinally of the flier while the strand is being wound onto a holder.

8. Apparatus for winding a plurality of packages from one strand and leaving the packages joined together, comprising a rotatable reel having a plurality of holders thereon for receiving the packages of the strand, a flier for depositing the strand on the holders one at a time, means for stopping the flier and moving the reel to a position where the flier will deposit the strand on another holder on the reel, and means for holding the strand leading from a wound package to a package being wound from the path of the flier while the new package is being wound.

9. Apparatus for winding a plurality of packages from one strand and leaving the packages joined together, comprising a rotatable reel having a plurality of holders thereon for receiving the packages of the strand, a flier for depositing the strand on the holders one at a time, means for stopping the flier and moving the reel to a position where the flier will deposit the strand on another holder on the reel, means for moving the reel longitudinally of the flier while the strand is being wound onto a holder, and means for holding the strand leading from a wound package to a package being wound from the path of the flier while the new package is being wound.

10. Apparatus for winding a plurality of packages from a continuous strand comprising a rotatable member, a plurality of holders on the member onto which packages of the strand may be wound, a rotatable flier for depositing the strand on the holders one at a time, means for moving said member to present a new holder to the flier after a predetermined amount of the strand has been deposited on the preceding holder, means for stopping the flier while said member is moved, and means for moving the strand leading from the wound package to said new holder from the path of the flier while the flier is winding the strand on the new holder.

11. Apparatus for winding a plurality of packages from a continuous strand comprising a rotatable member, a plurality of holders on the member onto which packages of the strand may be wound, a rotatable flier for depositing the strand on the holders one at a time, means for moving said member to present a new holder to the flier after a predetermined amount of the strand has been deposited on the preceding holder, means for stopping the flier while said member is moved, means for moving the strand leading from the wound package to the new holder out of the path of the flier while the flier is winding the strand on the new holder, and means for reciprocating said member longitudinally of the axis of the flier during a winding operation.

12. Apparatus for winding a plurality of packages from a continuous strand comprising a rotatable member, a plurality of holders on the member onto which packages of the strand may be wound, a rotatable flier for depositing the strand on the holders one at a time, means for

moving said member to present a new holder to the flier after a predetermined amount of the strand has been deposited on the preceding holder, means for stopping the flier while said member is moved, means for moving the strand leading from the wound package to the new holder out of the path of the flier while the flier is winding the strand on the new holder.

13. Apparatus for winding a plurality of packages from a continuous strand comprising a rotatable member, a plurality of holders on the member onto which packages of the strand may be wound, a rotatable flier for depositing the strand on the holders one at a time, means for moving said member to present a new holder to the flier after a predetermined amount of the strand has been deposited on the preceding holder, means for stopping the flier while said member is moved, means for moving the strand leading from the wound package to the new holder out of the path of the flier, while the flier is winding the strand on the new holder, means for reciprocating said member longitudinally of the axis of the flier during a winding operation, and means for moving the flier out of the path defined by the holders while said member is being moved to present a new holder to a winding position.

JOHN F. SCHENCK, JR.