Jan. 2, 1945. D. R. HULL 2,366,336

YARN HANDLING

Filed May 8, 1942 4 Sheets-Sheet 1

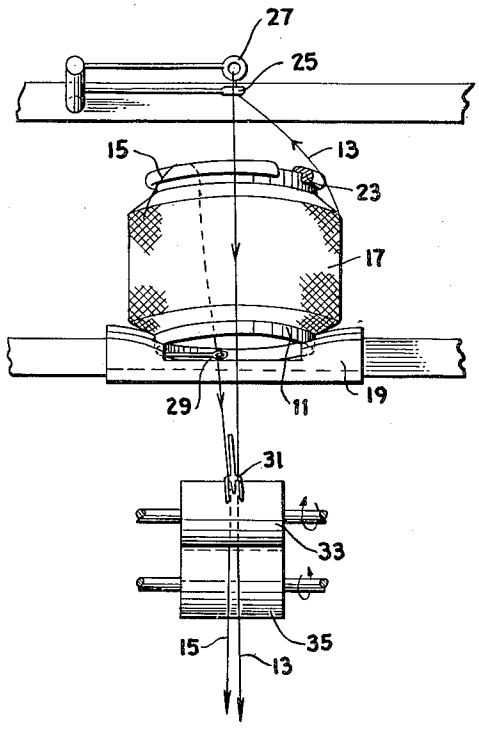


Fig. 2

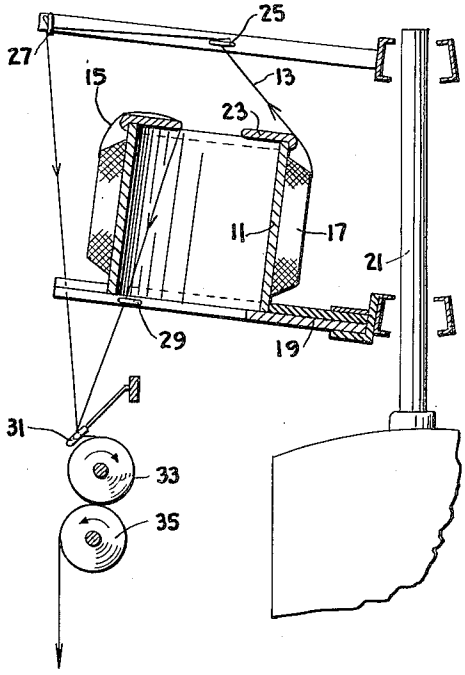


Fig. 1

Donald R. Hull INVENTOR

BY Louis Landiche

ATTORNEY

Jan. 2, 1945. D. R. HULL 2,366,336

YARN HANDLING

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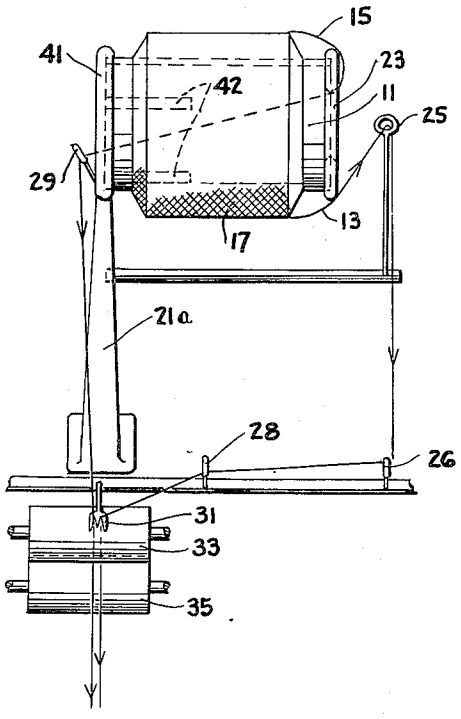


Fig. 3

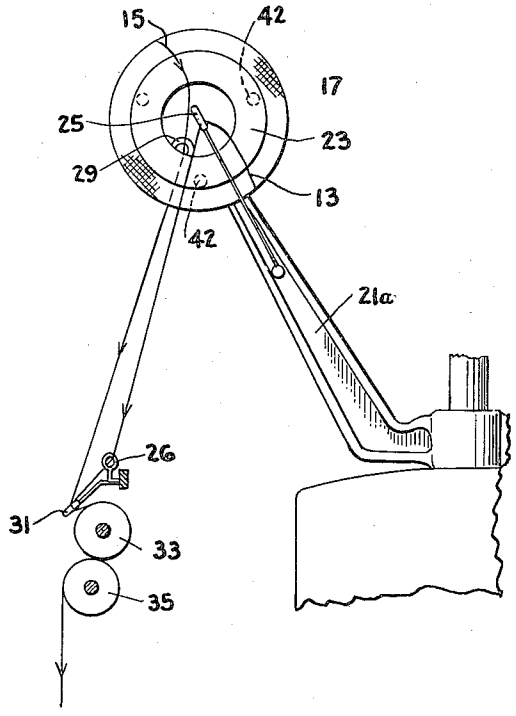


Fig. 4

Donald R. Hull INVENTOR

BY Louis A. Wiebe

ATTORNEY

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YARN HANDLING

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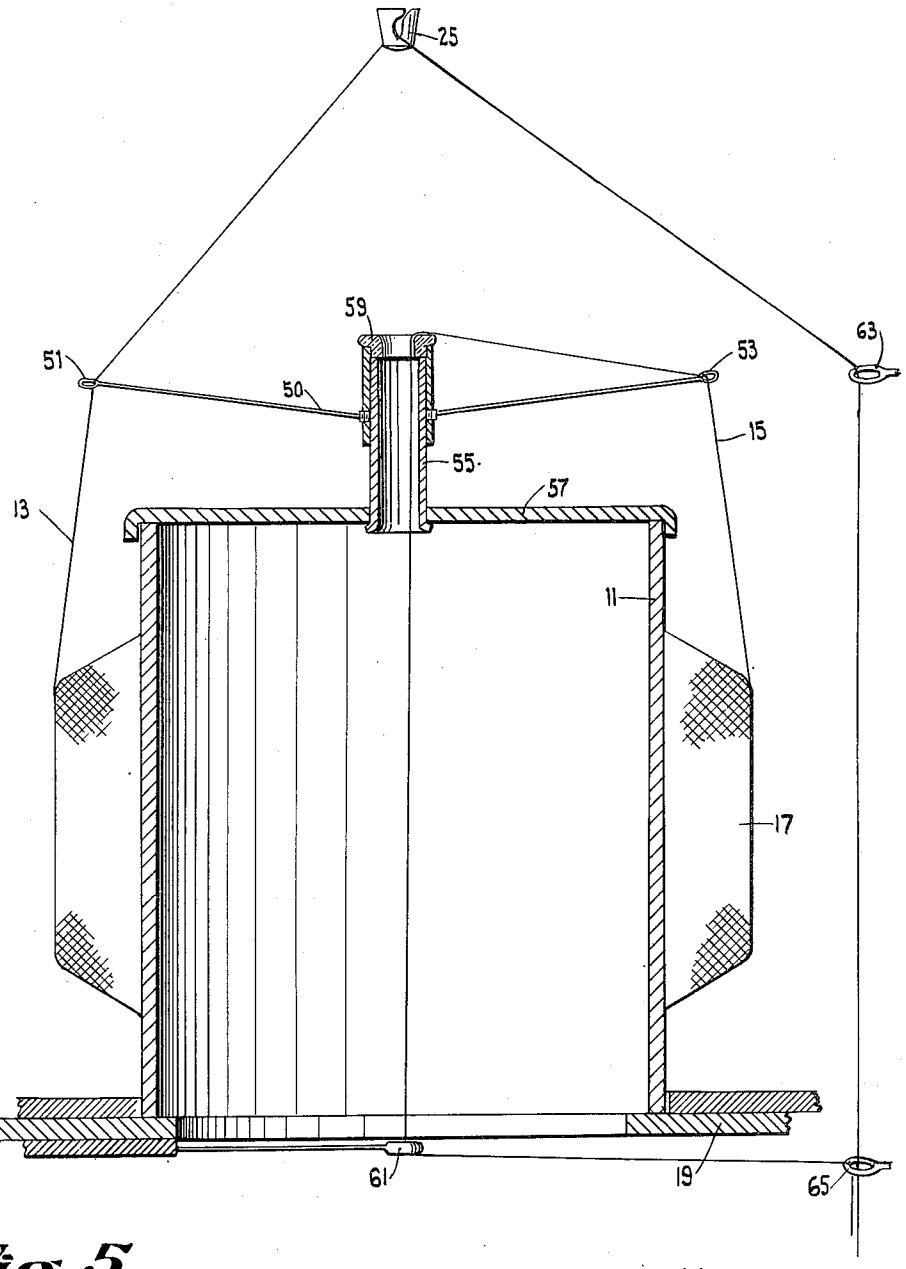


Fig. 5

Donald R. Hull INVENTOR

BY Louis A. White

ATTORNEY

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YARN HANDLING

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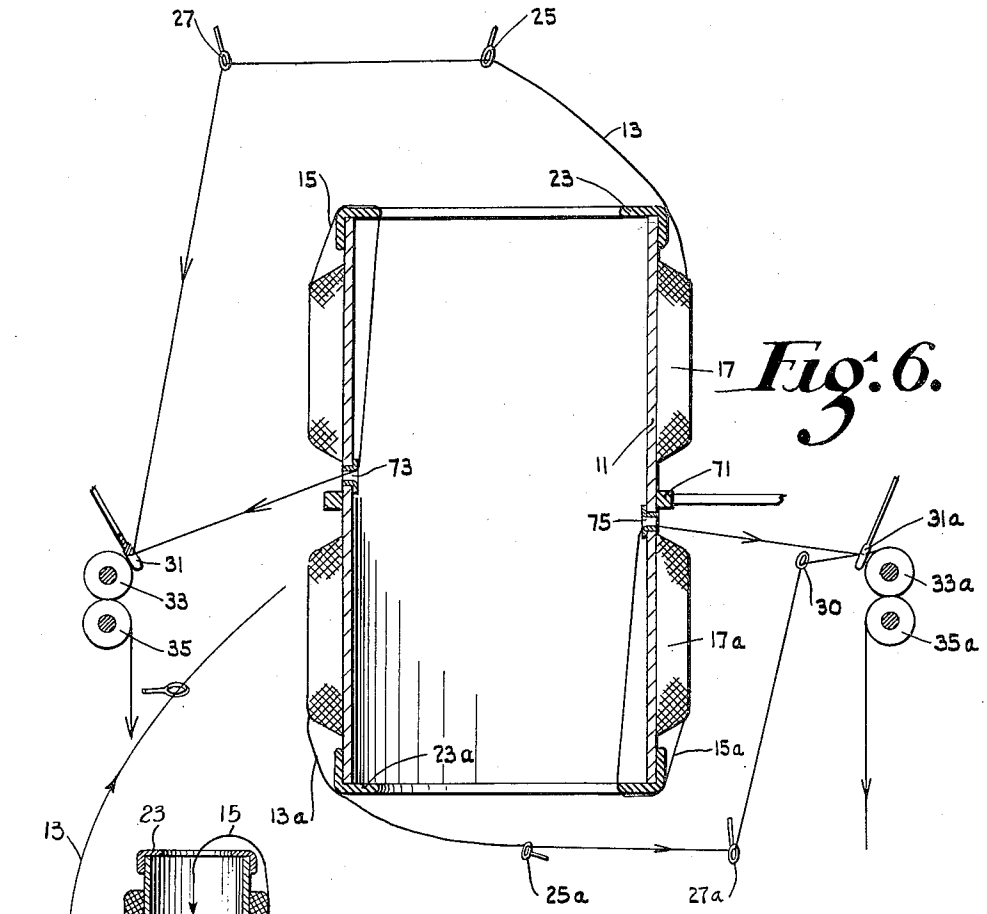


Fig. 6.

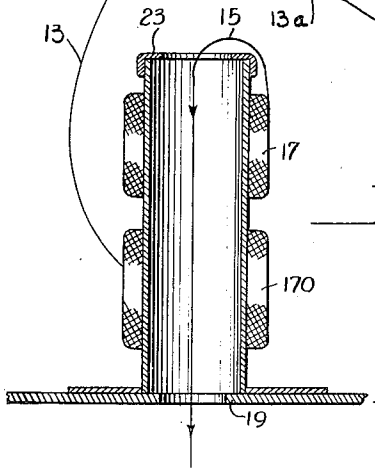


Fig. 7.

Donald R. Hull INVENTOR

BY Louis Addison

ATTORNEY

Patented Jan. 2, 1945

2,366,336

UNITED STATES PATENT OFFICE

2,366,336

YARN HANDLING

Donald R. Hull, Newport, Del., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware

Application May 8, 1942, Serial No. 442,221

11 Claims. (Cl. 242—128)

This invention relates to a new method and apparatus for the unwinding of two yarns wound on a single yarn support. The invention is particularly applicable to the unwinding of a yarn package into which two yarns were simultaneously wound in side-by-side relationship without any intertwisting, and the passing of the two yarns, as they are unwound, separately to separate destinations.

Numerous methods have been proposed, heretofore, for the winding of two yarns on a single yarn support, either as two separate yarn packages on one support, or as one yarn package containing two yarns traversed and wound in substantial side-by-side relationship on a support. In many instances, it is desirable to unwind the yarn from a yarn package by drawing the same from one end thereof. Prior to the present invention, however, when two yarns were contained on one yarn support, they could not be unwound simultaneously and led to separate destinations by drawing them both from one end of the support.

It is, therefore, an object of this invention to provide a method and apparatus for simultaneously unwinding the two yarns contained on a single yarn support by drawing the same from one end of the support and leading said yarns separately to separate destinations.

It is another object of this invention to provide a method and apparatus for simultaneously unwinding the two yarns wound in side-by-side relationship on a support by drawing the same from one end of the support and leading them separately to separate destinations.

Other objects of the invention will appear hereinafter.

The objects of this invention are accomplished by drawing both of two yarns wound on a single, hollow cylindrical support from one end of the support, and passing one of the two yarns to its destination through guides positioned externally of the support, and simultaneously passing the other of said yarns over the end of the yarn support, then axially through the yarn support to its destination. In this manner, the yarns can be separately guided to separate destinations despite their continuous rotation about the end of the support from which they are drawn. The draw-off speed of the two yarns must, however, be maintained substantially equal within certain limits. This may be accomplished by drawing the two yarns from the support by means of a single yarn forwarding device.

The present invention will be more readily understood by reference to the following detailed description when taken in connection with the accompanying drawings, in which;

Figure 1 is a side elevational view, with parts shown in section, of a suitable arrangement of apparatus for carrying out the present invention.

Figure 2 is a front elevational view, with parts shown in perspective, of the apparatus shown in Figure 1.

Figure 3 is a front elevational view of a modified form of apparatus constructed in accordance with this invention.

Figure 4 is a side elevational view of the apparatus shown in Figure 3.

Figure 5 is a front elevational view, with parts shown in section, of another modification of the present invention.

Figure 6 is a side elevational view, with parts shown in section, of still another modified form of the present invention.

Figure 7 is a vertical sectional view showing still another modified form of the invention.

Referring to Figures 1 and 2 of the drawings, reference numeral 11 designates a hollow cylindrical yarn support, for example, a bobbin on which are wound two yarns, 13 and 15, in side-by-side relationship to form a yarn package 17. The yarn support 11 is positioned in a fixed manner on a supporting base 19 which is supported by a frame 21. An annular, smooth-surfaced cap member is positioned on the opposite end of the yarn support 11. The yarn 13 is passed from the yarn package 17 to a yarn guide 25 positioned substantially axially over the yarn support 11. The yarn 15 is passed from the package 17 over the cap 23 then through the hollow yarn support 11. The yarns 13 and 15 are then passed through the respective yarn guides 27 and 29 to a double slotted yarn guide 31, each of the yarns passing through one of the slots of guide 31 and then about yarn forwarding rollers 33 and 35. The two yarns are thus drawn at equal speeds from the yarn support 11 but are maintained in separated relationship to each other. From the yarn forwarding rollers 33 and 35, the yarns 13 and 15 are led separately to separate destinations as indicated by the two arrows in Figure 2.

It will be noted that yarn 15 by passing through hollow yarn support 11 will rotate about the yarn cap 23 within the cone of rotation of yarn 13. Therefore, the yarns will not permanently wind about each other and, consequently, they may be led separately to separate destinations, as shown. Obviously, if the yarns were both drawn exteriorly of the yarn package, they would be intertwisted

with each other, one turn for each rotation of the yarn about the yarn support. As shown in Figures 1 and 2, the yarn 13 is taken from the package 17 approximately one-half of a revolution (180°) in advance of yarn 15. This, however, is not essential. The yarns may be drawn together from the package in the same side-by-side relationship as they were originally wound thereon.

Referring to Figures 3 and 4 of the drawings, the yarn support 11 is positioned in a shallow groove in a support 41 which in turn is held in a supporting base 21*a*. The yarn may be fastened in the support in any desired manner, for example, by means of prongs 42 attached to the support 41 and projecting against the internal side walls of the yarn support 11. The yarn support 11 and the yarn package 17 are thus held in a horizontal direction. The yarns 13 and 15 are drawn from one end of the yarn support in the same manner as above described with reference to Figures 1 and 2. Yarn 13 is passed through guides 25, 26, and 28 exteriorly of the support 11 and the yarn 15 is drawn about the smooth-surfaced cap 23 through the interior of the bobbin, then through guide 29. In this case, the yarns are again passed through the double slotted guide 31 and drawn off in separate relationship by means of yarn forwarding rollers 33 and 35.

Referring to Figure 5 of the drawings, the yarn support 11 is provided with a cover member 57. A hollow sleeve 55 is fixedly positioned substantially axially in the cover member 57. A smooth-surfaced annular yarn guide 59 is positioned in the top of the sleeve 55. A two-armed flyer 50 is positioned freely rotatable about the sleeve 55. Thread guides 51 and 53 are positioned at the extreme ends of the two arms of the flyer. The yarn 13 passes through yarn guide 51, then through fixed yarn guides 25, 63, and 65 positioned exteriorly of said yarn support 11. The yarn 15 passes through yarn guide 53, then through the annular yarn guide 59, through the hollow yarn support 11, then through yarn guides 61 and 65. From yarn guide 65, the two yarns may be moved separately to separate destinations, preferably, first being drawn off at substantially equal speeds. In this modification of the invention, the yarns 13 and 15, while being unwound, will be encouraged to remain substantially one-half a revolution in advance of the other. As the yarns rotate about the end of the yarn package, the flyer is caused to rotate about the sleeve 55.

In Figure 6 of the drawings is shown a yarn support 11 on which two packages of thread 17 and 17*a* are wound. Each of the wound packages of yarn is composed of two yarns wound in side-by-side relationship. The yarn package 17 is composed of yarns 13 and 15, and the yarn package 17*a* is composed of the yarns 13*a* and 15*a*. The yarn support 11 is supported from its middle section by means of support 71. A smooth-surfaced yarn cap 23 is mounted on one end of the yarn support and a similar cap 23*a* is mounted on the opposite end of the support. Yarns 13 and 15 are removed from one end of the yarn support and yarns 13*a* and 15*a* are removed from the opposite end of the yarn support. Yarn 13 passes through guides 25 and 27 to one slot of the double slotted yarn guide 31. Yarn 15 passes about the cap 23 and then through an opening 73 in the yarn support 11 to the other slot of the double slotted yarn guide 31. The opening 73 is positioned between yarn package 17 and yarn package 17*a*. Similarly, the yarn 13*a* is passed through yarn guides 25*a* and 27*a* and then through yarn guide 30 to one slot of the double slotted yarn guide 31*a*. The yarn 15*a* is passed about the yarn cap 23*a*, then through the interior of the yarn support and out through an opening 75 in said support. From the opening 75, the yarn passes to the other slot of the double slotted yarn guide 31*a*. The opening 75 is positioned between the yarn package 17*a* and yarn package 17. Yarns 13 and 15 are drawn from the package 17 at a substantially uniform speed by passing them both about the yarn forwarding rollers 33 and 35, whereas, the yarns 13*a* and 15*a* are drawn from the package 17*a* at substantially equal speeds by passing both of these yarns about yarn forwarding rollers 33*a* and 35*a*. The removal of the yarns from the packages in separate paths to separate destinations is accomplished in the same manner as above described with reference to Figures 1 and 2.

In Figure 7 of the drawings is shown a yarn support 11 containing wound thereon two packages of yarn 17 and 170. Yarn 13 is wound in package 170 and yarn 15 is wound in package 17. Both of these yarns may be drawn from one end of the yarn support 11 and led to separate destinations in the same manner as in the apparatus above described. Yarn 15 is passed from package 17 about the yarn cap 23 through the interior of the yarn support 11 and out from the bottom of the support. Yarn 13 is passed from package 170 to an exterior yarn guide positioned substantially axially of the yarn support 11.

In the above-described mechanism, the various parts of the apparatus can be made of any desired materials which will resist possible corrosion by fluids contained in the yarn and which will suitably resist wear caused by the constant movement of the yarns in contact with the apparatus. The numerous yarn guides may be of any desired type so long as they will suitably guide the yarn in the manner described.

The yarn support may be fixedly positioned to the apparatus or it may be free to rotate, it being only necessary that the support be arranged in such a manner that both of two yarns can be withdrawn from the same end of the yarn package, and that the yarn passing through the interior of the support will have an outlet in the means supporting the bobbin in its position on the apparatus.

The numerous guides are preferably so arranged that the yarn passing exteriorly of the package will be tensioned to substantially the same degree as the yarn passing through the interior of the yarn package. If one of the yarns is tensioned to a materially greater extent than the other yarn, the stretch imposed thereon will cause it to be removed from the yarn package at a slightly slower rate of speed than the other yarn. Thus, it may be possible that the removal of one yarn from the yarn package will gain by as much as several revolutions over the removal of the other yarn. Within certain limits, the gain in removal speed of one yarn over the other is not objectionable. Naturally, when one yarn is removed at a faster rate than the other yarn, the former will be spirally wrapped about the other yarn. The yarns will, of course, pass through this spiral wrapping as they advance in their individual paths. It has been observed, in actual practice, that the yarn passing exteriorly

of the package will have a tendency to unwind at a faster rate than a yarn passing through the interior of the yarn package. When the advance of removal of one yarn over the other is less than one complete revolution (360°), there is no visible spiral wrapping between the two yarns. If, on the other hand, one yarn has been removed more than one complete revolution in advance of the other, there will be a visible spiral wrapping of the two yarns as they are removed from the package. Such spiral wrapping of the two yarns is not serious unless one yarn is removed at least twenty turns in advance of the removal of the other yarn. Preferably, however, the yarns are drawn at substantially equal speeds from the package so that in the unwinding of the entire package of yarn, the removal of one yarn does not gain over the removal of the other yarn more than about seven revolutions (2520°). The number of revolutions by which one yarn may be in advance of the other yarn increases with the increase in denier of the yarn being unwound. Preferably, the two yarns being drawn from one end of the yarn package are directed to a single yarn forwarding device; however, this is not essential. The two yarns may be drawn from the package by independent yarn forwarding devices so long as these two devices rotate at approximately the same peripheral speed. Furthermore, the two yarns may, if desired, be passed from the yarn package to a sizing machine or other yarn finishing apparatus. The individual yarns may be wound directly on a salable package or they may be wound and twisted or they may be sized or drawn into any desirable form of package.

The present invention is, of course, applicable to packages of yarn in which more than two yarns are wound. However, the yarn will always be removed from such a package in only two separate paths to two separate destinations. For example, when four yarns have been wound in side-by-side relationship to form a single yarn package, two of the yarns will be drawn to form a single path exteriorly of the package and the other two yarns will be drawn through the interior of the package to their separate destination.

The method and apparatus of the present invention is applicable to the unwinding of any type of filament, yarn, thread, cord, filament bundle or the like. The filaments, yarns, cords or filament bundles may be composed of rayon, nylon, cotton, wool, silk or any other type of material.

The mechanism of the present invention is exceedingly simple and the yarn support may be fixedly positioned on the apparatus. The yarns drawn from the package in the manner of the present invention are subject to very little degradation and, therefore, permit the spinning of more than one yarn on to a package and the removal of these yarns into two separate packages while maintaining such yarns of good quality. By unwinding yarns in accordance with the present invention, it is possible to eliminate the use of rotatable creels or similar mechanism whereby it is necessary to turn the yarn package about its axis.

Since it is obvious that many changes and modifications can be made in the above-described details without departing from the nature and spirit of the invention, it is to be understood that the invention is not to be limited to the details described herein except as set forth in the appended claims.

I claim:

1. The method of simultaneously unwinding two yarns wound on a single yarn support which comprises drawing both of said yarns in separate and independent paths from one end of said support whereby said yarns separately and independently rotate about said support end, and maintaining the path of rotation of one of said yarns within the path of rotation of the other yarn, the speed of unwinding of the two yarns being maintained substantially equal.

2. The method of simultaneously unwinding two yarns wound on a single, hollow cylindrical yarn support which comprises drawing both of said yarns in separate and independent paths from one end of said support whereby said yarns separately and independently rotate about said support end, passing only one of said yarns through said cylindrical support to its destination, and passing the other of said yarns exteriorly of said support to its destination, the speed of unwinding of the two yarns being maintained substantially equal.

3. The method of simultaneously unwinding two yarns, wound, in side-by-side relationship on a hollow cylindrical yarn support to form a single yarn package, which comprises drawing both of said yarns in separate and independent paths from one end of said support whereby said yarns separately and independently rotate about said support end, passing only one of said yarns through said cylindrical support to its destination, and passing the other of said yarns exteriorly of said support to its destination, the speed of unwinding of the two yarns being maintained substantially equal.

4. The method of simultaneously unwinding two yarns, wound, in side-by-side relationship on a hollow cylindrical yarn support to form a single yarn package, which comprises separately drawing both of said yarns from one end of said support whereby said yarns rotate about said support end, maintaining said yarns separated from each other at least a fraction of a revolution about said package, passing only one of said yarns through said cylindrical support to its destination, and passing the other of said yarns exteriorly of said support to its destination, the speed of unwinding of the two yarns being maintained substantially equal.

5. The method of simultaneously unwinding two yarns, wound, in side-by-side relationship on one end of a hollow cylindrical yarn support to form a single yarn package, which comprises separately drawing both of said yarns from said end of said yarn support whereby said yarns rotate about said support end, said yarn support having an opening in the cylindrical wall thereof, passing only one of said yarns through said cylindrical support and through said opening to its destination, and passing the other of said yarns exteriorly of said support to its destination.

6. In an apparatus for simultaneously unwinding two yarns wound on a hollow cylindrical yarn support, means for holding said yarn support from one end thereof, guide means for passing one of said yarns from one end of said support, guide means separate from said first named guide means for passing the other of said yarns through said hollow support, said guide means being so disposed with respect to the yarn support that said yarns are separately removed from said support, yarn forwarding means, and guide means for passing said yarns in side-by-

side relationship to said yarn forwarding means whereby said forwarding means will draw said yarns from said support at substantially the same speed.

7. In an apparatus for simultaneously unwinding two yarns wound on a hollow cylindrical yarn support, means for holding said yarn support from one end thereof, guide means for passing one of said yarns from one end of said support, guide means for passing the other of said yarns through said hollow support, and means for maintaining said yarns separated from each other during their removal from the package.

8. In an apparatus for simultaneously unwinding two yarns wound on a hollow cylindrical yarn support, means for holding said yarn support from one end thereof, guide means for passing one of said yarns from one end of said support, guide means for passing the other of said yarns through said hollow support, and flyer means for maintaining said yarns separated from each other during their removal from the package.

9. In an apparatus for simultaneously unwinding two yarns wound on a hollow cylindrical yarn support, means for holding said yarn support from one end thereof, fixed annular yarn guide means positioned on the other end of said yarn support, guide means for passing one of said yarns about said annular yarn guiding means and through said support, guide means spaced from said annular yarn guiding means for passing the other yarn from the annular means to a point exterior of said support.

10. In an apparatus for simultaneously unwinding two yarns from each of two yarn packages positioned on opposite ends of a hollow cylindrical yarn support, means for holding said support from the middle portion thereof, two openings in the side wall of said cylindrical support adjacent the middle thereof, means for guiding one yarn from each package over the adjacent end of the support, through the support and through one of said openings, means separate from the aforementioned guiding means for guiding the other yarn of each package from the adjacent end of the support to a point exterior of said support, said guiding means being so disposed as to separately remove each yarn of each package from the support.

11. In an apparatus for simultaneously unwinding two yarns wound on a hollow cylindrical yarn support, means for holding said yarn support, guide means for passing one of said yarns from one end of said support, and guide means separate and independent from said first named guide means for passing the other of said yarns through said hollow support, said guide means being so disposed with respect to the yarn support that said yarns are separately and independently rotated about said support.

DONALD R. HULL.