

Nov. 8, 1966

B. ZUIDEMA
YARN PACKAGE

3,284,026

Original Filed Dec. 11, 1963

FIG. 1

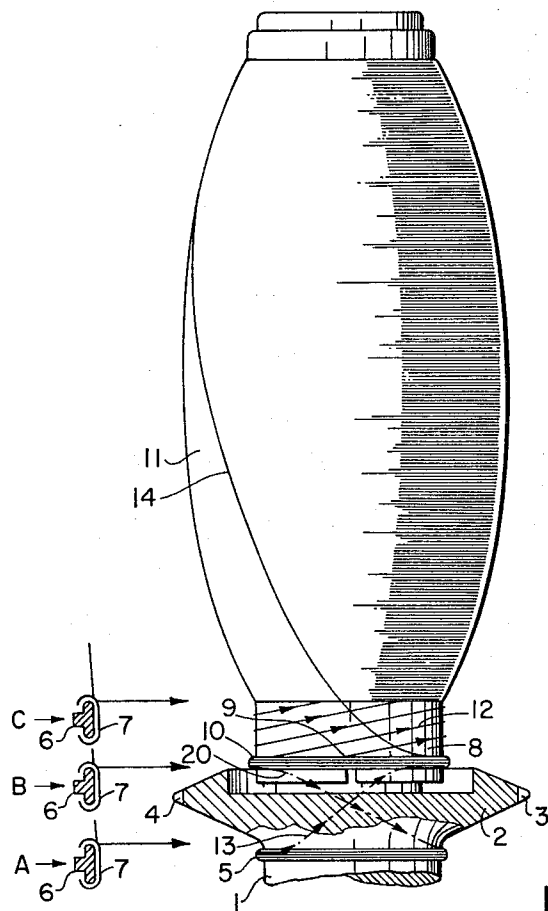


FIG. 2

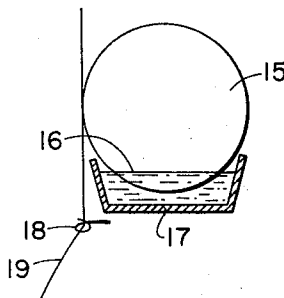
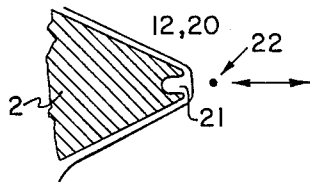


FIG. 3



INVENTOR
BERT ZUIDEMA
BY *B. G. Johnson*
AGENT

1

3,284,026

YARN PACKAGE

Bert Zuidema, Arnhem, Netherlands, assignor to American Enka Corporation, Enka, N.C., a corporation of Delaware

Original application Dec. 11, 1963, Ser. No. 329,685. Divided and this application Feb. 24, 1966, Ser. No. 529,801

Claims priority, application Netherlands, Dec. 19, 1962, 286,993

4 Claims. (Cl. 242—165)

This application is a division of application Serial No. 329,685, filed December 11, 1963.

This invention relates to a yarn package wound on a bobbin and more particularly a yarn package wound on a bobbin and provided with a transfer tail and an initial thread end which are fixed on the bobbin.

It is conventional to provide yarn packages with transfer tails which sometimes also are referred to as rat tails. Such transfer or rat tails are yarn ends which project from the lower ends of the yarn packages and immediately precede the yarn windings of the package which are initially laid on and consequently are nearest to the surface of the bobbin. The presence of such a transfer tail is desired to provide a plurality of yarn packages which are capable of supplying upon unwinding a single continuous thread. During the transport and handling of the yarn package, in order to prevent both the transfer and the initial thread end, the latter being the end from which the unwinding of the package is started, from getting dirty, becoming frayed and/or becoming difficult to locate among the windings, the yarn ends often are fixed on the bobbin. This may be done by sticking them either to an outside or inside surface of the bobbin. It has also been suggested to fix the yarn ends by wedging same in notches which are provided in the edges of the bobbin. Both methods, however, have their drawbacks and have not provided completely suitable results.

More specifically, in both of such previously available techniques the fixing of the yarn ends undesirably must be done by a time-consuming hand operation during which the yarn ends and the packages, moreover, may be, and often are, dirtied.

Satisfactory results, furthermore, are particularly difficult to realize using such methods if the yarn package is obtained on a drawtwister. This is an apparatus for drawing yarns manufactured from a linear polymer. In such a case the yarn ends must be so fixed that no undrawn pieces of yarn form part of the transfer tail or the initial thread end. Moreover, when it is necessary to change bobbins in the operation, it is desirable to try to keep the twisted yarn on the machines, which makes it particularly difficult to satisfactorily carry out doffing of the packages and to deal with the transfer tail and the initial thread end in a proper manner.

Another disadvantage of the above-mentioned known methods for fixing the initial thread end and the transfer tail results from the fact that in the processing of a yarn package it often is difficult to detach the two yarn ends. In any case, normal operations entail two separate operations, namely, detaching the initial end and detaching the transfer tail. Such known methods for fixing the two thread ends thus are rather time-consuming, both for the manufacturer and for the user of the yarn package.

The present invention has for its primary object the providing of a yarn package which is not characterized by the drawbacks characterizing previously available yarn packages.

It is an additional object of the present invention to provide a yarn package having clean, perfect and easily accessible yarn ends.

2

It is a further object of the present invention to provide a yarn package requiring a minimum of hand labor in the preparation thereof.

It is another object of the present invention to provide a yarn package in which the initial thread end and transfer tail end thereof are fixed entirely, simply, and efficiently by machine.

It is yet another object of the present invention to provide a yarn package from which a package having a free transfer tail and free initial thread end easily may be obtained by carrying out a single operation, i.e., cutting the threads of a thread bundle laid on the bobbin adjacent the body windings of the yarn package.

Other objects and advantages of the present invention will be apparent from the following detailed description.

The fixing of the initial thread end and the transfer tail may be carried out in a simple manner in accordance with the present invention by means of a technique wherein a waste bundle initially is formed on the winding spindle of a bobbin assembly and a yarn package is formed on the bobbin by conventionally controlling the traverse motion of a thread guiding means such as a rail ring along the bobbin length. This technique includes, subsequent to the formation of the waste bundle and preliminary to the winding of the package on the bobbin, laying several separate windings, forming the transfer tail, on the bobbin between the waste bundle and the package windings, on which separate windings, after completion of the winding of the yarn package, additional windings are laid in the form of a fixation bundle which are maintained in place by adhesive applied to the thread being wound preliminary to the laying of said last mentioned windings. The transfer tail of the yarn package so produced is fixed under the fixation bundle of windings and the initial thread end is adhesively fixed to the fixation bundle windings.

In accordance with the method of the invention, the "adhesive" applied to the thread laid on said fixation bundle preferably is of the fast-drying latex type which, after drying, is characterized by substantially no adhesive properties but is cohesive. Adhesives of such types are preferred since with the use thereof the operating equipment is not unsuitably soiled. In accordance with the present method, a sufficient amount of the adhesive is applied to the threads forming the fixation bundle to maintain the last laid windings of the fixation bundle in place. The adhesive may be applied to all of the thread wound up in the fixation bundle or to only such a proportion of the last laid windings to provide a compact fixation bundle on which the initial thread end is fixed.

Using the method of the present invention to prepare a yarn package assembly, the yarn ends thereof simply may be fixed onto the bobbin tube entirely by machine in an operation which immediately follows the windings of the body of the package, as a result of which, the machine, in particular a drawtwister, produces packages which are immediately ready for further use. In this manner clean and perfect yarn ends are obtained and the work of the operating personnel is reduced to a minimum. In order to obtain a free transfer tail and free initial thread end, the user of the package need only carry out a single operation, namely, cutting the bundle of fixation windings.

The method of the invention may be carried out by the use of a down twister which has a twisting spindle upon which a bobbin is mounted and a circular rim is positioned on the spindle below the bobbin with the outer rim thereof projecting from the circumference of the bobbin. The circular rim advantageously may be provided with two notches therein which, in oppositely directed helices, run oblique to the axis of the twisting spindle and are

positioned relative to each other at an angular displacement, preferably of about 180°.

In one notch is laid or caught the thread connecting the initially laid waste bundle with the transfer tail, and in the other notch is laid or caught the thread connecting the waste bundle with the initial thread end. During the winding operation said connecting threads may be automatically caught by the respective notches. At any rate, when the package formed in accordance with the invention is being removed from the winding machine, the two aforementioned connecting threads are caught, tightened and are broken, unless previously cut, between the said notches in said circular rim.

The down twister of the invention is provided with means for applying the adhesive to the thread in the formation of the fixation bundle to which and under which the respective ends of the yarn package are fixed. Any suitable adhesive applying means may be employed. Preferred embodiments of the down twister are adapted with a rotating adhesive transfer roller mounted on the down twister frame and positioned adjacent the means for guiding the thread to the twisting spindle. Adhesive is delivered to the surface of the transfer rolls by any suitable means, such as by positioning the roller so that the surface thereof is partially submerged in a bath of the adhesive. The roller may be provided with means for adjusting the position thereof so that the roller surface may be moved in and out of contact with the thread fed to said fixation bundle.

With certain embodiments of the down twister of the above-mentioned type, a portion or all of the edge of the circular rim advantageously may be provided with a groove extending inwardly of the rim body in a plane vertical to the axis of the rim. The groove preferably has a circular cross-section. The groove is adapted to receive a cutting member, such as a blade or hot wire to sever the threads connecting the yarn package assembly of the invention to the waste bundle laid on the spindle therebelow. By means of such embodiments of the down twister, the connecting ends advantageously easily may be cut entirely by machine operations when it is desired to doff the yarn package assembly from the twisting spindle.

Advantageous results are obtained if the circular rim of the twisting spindle is provided with bevelled side faces. In the operation of such a down twister, when the thread guiding member, i.e., a twisting ring of a ring rail, passes downwardly past said rim to the level of the waste bundle in the phase of the operation involving the laying of the fixation bundle and the initial thread end, windings slip upwards along the upper bevelled side face of the rim and are pulled and tightened on the windings of the previously laid fixation bundle. In certain embodiments, the outer circumference of the rim may also be rounded.

Preferably, the bobbin of the apparatus of the present method is provided with one or more grooves in its surface extending parallel to the axis thereof in the region on which the fixation bundle windings are laid. By the use of such a bobbin, the ultimate user of the yarn package may easily cut the fixation bundle to obtain a package having a free initial thread end and transfer tail.

With the use of a down twister of the aforementioned type, the invention contemplates embodiments for winding of one or more of the above-mentioned yarn packages. The rail ring is first raised from an initial position where the twisting ring is opposite a waste receiving portion of the twisting spindle, below the yarn bobbin and at its lower limit on a normal traverse stroke. Then, upon traversing the twisting ring upwards, the thread passes over the rim edge and is caught in one notch in the circular rim of the twisting spindle and a few windings forming a transfer tail are laid on the bobbin. The rail ring then is caused to traverse the bobbin to lay on superimposed windings and form a yarn package, after which the ring rail is then moved to a point below the lower

limit of its normal traverse stroke to lay windings at the bottom end of the bobbin forming a fixation bundle and an initial thread end. At this point the ring rail is again lowered to its initial position. The latter of the initial thread windings on said fixation bundle is coated with adhesive to fix same to said fixation bundle. The thread then passes over the edge of said circular rim and is caught in the rim's second notch. When the thread passes the circular rim of the twisting spindle, one or more additional windings are then laid on the waste bundle and the threads formed thereby which connect said yarn package and waste bundle are severed by tensioning or cutting for the removal of the yarn package assembly from the twisting spindle. If the connecting threads are not caught in the two notches in said circular rim during the winding of the yarn package, the connecting threads can be broken by tensioning upon merely lifting the yarn package assembly from the spindle. The connecting threads will then be caught in said notches and broken.

The invention will be further described with reference to the accompanying drawings, of which—

FIGURE 1 is a schematic side view partially in section of a down twister of the invention on which there is wound a yarn package;

FIGURE 2 is a schematic view of a device employed in the present method for applying adhesive to the thread; and

FIGURE 3 is a view in section of the circular rim of the twisting spindle employed in the present invention, showing an embodiment of a device for severing the threads connecting the yarn package to the waste bundle.

With reference to FIGURE 1, numeral 1 designates a twisting spindle which has a circular rim 2 provided with two notches 3 and 4. Notches 3 and 4 are directed in oppositely oblique directions relative to the direction of rotation of twisting spindle 1. The portion of the twisting spindle 1 below rim 2 serves as waste retainer on which there is a bundle of waste windings 5. A twisting ring 6 with a traveller 7 movable thereon is shown in three positions A, B, and C. Mounted on twisting spindle 1 is a bobbin 8 on which is laid yarn package 11. Bobbin 8 is provided at its bottom end with one or more axial grooves 9 over which a fixation bundle 10 is laid. Between bundle 10 and package 11 on bobbin 8 a few steep windings 12 are wound which form the transfer tail.

In the operation of the down twister, empty bobbin 8 is mounted on twisting spindle 1 and the machine is started up, twisting ring 6 being in position A whereby waste bundle 5 is formed. As soon as the process runs satisfactorily, twisting ring 6 is raised to position C. During the passage from positions A to C, the thread passes over the edge of rim 2 or is caught by notch 3 or 4 in rim 2 running in the corresponding oblique direction and a few steep windings 12 are laid on bobbin 8 which form the transfer tail. Thread 13 is shown as that which connects waste bundle 5 with transfer tail 12. As soon as twisting ring 6 reaches position C, it starts its normal traverse motion for winding yarn package 11. When the package 11 is completed, twisting ring 6 is rapidly moved downwards to position B, laying yarn on package 11 along a steep helical line 14. In position B the twisting ring 6 remains stationary for some time to lay fixation bundle 10. With the aid of the bevelled faces of rim 2, it is also possible to lay fixation bundle 10 without the twisting ring being stationary in position B. At least the last portion of the threads laid on bundle 10 is brought into contact with a licking roller 15 (shown in FIGURE 2). The surface of roller 15 is partly submerged in an adhesive 16 contained in a vessel 17. The licking roller 15 is, in a manner not shown, attached to the frame of the machine. In the embodiment shown in FIGURE 2, the licking roller 15 is positioned just above a thread guide 18 of thread 19 ballooning above twisting ring 6. The adhesive causes the windings of the bundle 10 to ad-

5

here to each other. The adhesive is preferably a fast-drying latex of the type which, after drying, adheres only to itself. After bundle 10 is laid, twisting ring 6 is rapidly moved downwardly into initial position A, in the meantime laying a connecting thread 20 which passes over the edge of rim 2 or is caught by the other of notches 3 and 4 in rim 2 running in the corresponding oblique direction, and winding yarn again on waste bundle 5. The machine may now be stopped. Connecting thread 13 is fixed under fixation bundle 10 and connecting thread 20 is fixed to bundle 10 by means of the adhesive. When bobbin 8 with package 11 wound thereon is lifted to be removed from twisting spindle 1, connecting threads 13 and 20, if not already caught, are then caught in notches 3 and 4, are tightened, and break.

The ultimate user of the yarn package prepared by the method of this invention will then obtain a yarn package with a free transfer tail 12 and a free initial end 14 by simply cutting bundle 10 at groove 9.

FIGURE 3 shows another embodiment of a device useful for breaking connecting threads 13 and 20. To this end rim 2 of twisting spindle 1 is provided with a circular groove 21 opposite to which groove a hot wire 22 or some other cutting member is positioned. Before the yarn package is removed from spindle 1, the hot wire 22 is moved (by means not shown) into groove 21 and back, in the direction indicated by the arrows, the connecting threads thereby advantageously being cut entirely by machine operation. If use is made of this connecting thread breaking method, the connecting threads need not be fixed to the bobbin quite so firmly.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of this invention.

6

What is claimed is:

1. A yarn package assembly comprising a yarn package wound on a bobbin and provided with a transfer tail and an initial thread end which are fixed on the bobbin, characterized in that on one end of the bobbin and at a distance from said yarn package a separate small bundle of windings is laid, under which bundle said transfer tail is fixed by means of the windings of said bundle, and to which bundle said initial thread end is fixed by means of an adhesive.

2. The yarn package assembly according to claim 1 wherein the surface of said bobbin in the region of said bundle of windings is provided with at least one groove therein extending parallel to the axis of said bobbin.

3. The yarn package assembly according to claim 1 wherein said adhesive is present as a coating applied to the yarn forming the last said windings of said bundle of windings.

4. The yarn package assembly according to claim 1 wherein said adhesive is formed of a fast-drying latex which, upon drying, provides a cohesive coating which is non-adherent to the surfaces of said bobbin.

References Cited by the Examiner

UNITED STATES PATENTS

2,395,891	3/1946	Lodge	242—165
2,747,359	5/1956	Keefe.	
2,800,290	7/1957	Hess	242—165
3,075,715	1/1963	Hensen et al.	242—165 X

FOREIGN PATENTS

452,734	11/1948	Canada.
231,721	2/1911	Germany.

STANLEY N. GILREATH, *Primary Examiner*.