Oct. 19, 1948. G. L. BOYCE 2,451,468

WINDING OF YARN

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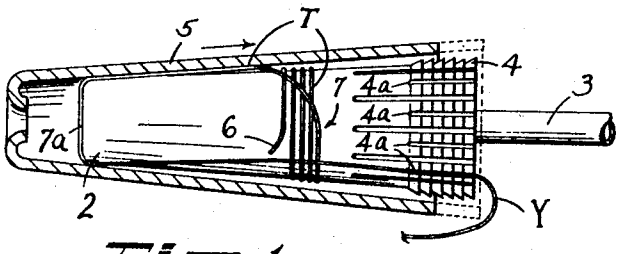


Fig. 1

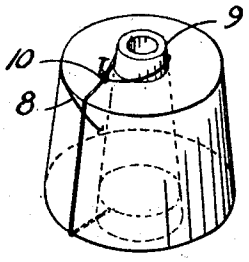


Fig. 2

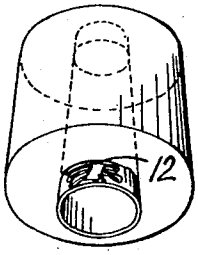


Fig. 4

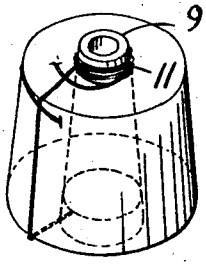


Fig. 3

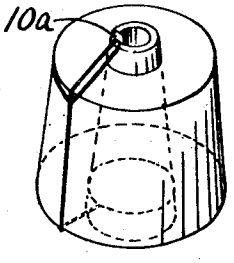


Fig. 2a

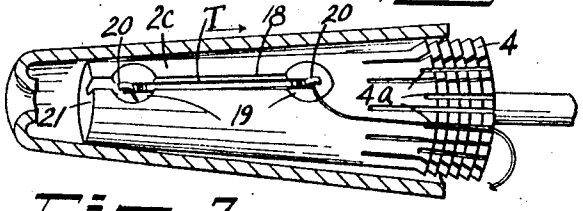


Fig. 7

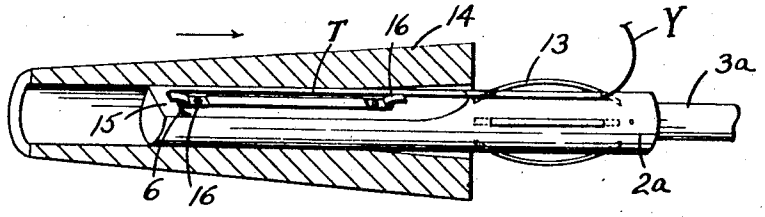


Fig. 5

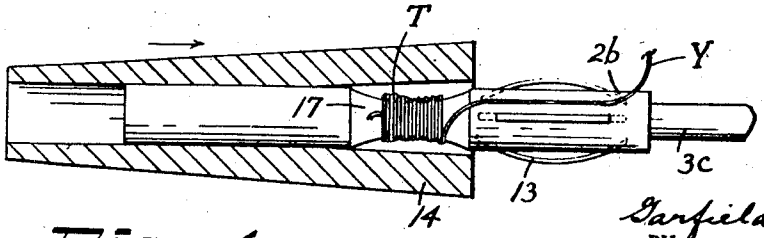


Fig. 6

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WINDING OF YARN

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14 Claims. (Cl. 242—161)

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This invention relates to the winding and packaging of yarns and the like on tubes, cones, or other carriers or cores and is particularly concerned with the production of packages provided with transfer tails.

The invention has special advantages for preparing yarn packages, especially when they are of large size or weight, which are adapted to be placed in creels for continuous warping. The purpose of the tail, as is well known in the art, is to provide a short length of yarn at the trailing end of a package being unwound, so that the tail of the package can be tied while the package is still being unwound to the leading end of the next package supported adjacent thereto, thereby providing for continuous operation. For the purposes of simplifying the description, the conventional practice may be considered with respect to the winding of cones, though it is to be understood that the description applies as well to other yarn cores or carriers. Conventionally, the leading end of the yarn to be wound is secured in a slit or notch in the edge of the base of the cone, so that a portion of the end extends inside the cone, and then a tail consisting of a plurality of convolutions of the yarn upon itself is wound at the base of the cone on a portion thereof which projects from the end of the main winding in the completed package. Particularly when large size packages are used, they are placed upon the pegs or other supports of the creel by one operator (usually boys) and then another operator (usually girls) in tying ends lifts each cone from its peg or support, detaches and unwinds the tail from the base of the cone, replaces the packages on the supports of the creel and then ties the leading end of the package thus replaced to the tail end of a previously prepared package being run off at the time.

It is an object of the present invention to simplify the procedure and equipment needed for producing a tail and for preparing wound packages, and to so dispose the tail with respect to the completed package as to eliminate the necessity to remove the cone or other package from its support on the creel after being once placed thereon, thereby greatly reducing the fatigue of the girl operators. In using tail-forming guides and methods heretofore common, it has frequently been necessary, especially for heavy denier yarns, to notch the base of the core in order to be certain that the tail would be formed properly. In the present procedure, a smooth, un-notched core is entirely satisfactory. Other objects and advantages of the invention will be

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apparent from the drawing and description thereof hereinafter.

In the drawing, which is illustrative of the preferred embodiments of the invention,

Figure 1 is a side elevation, with a foundation core in cross-section, showing the relationship of the parts of a winding machine in practicing one embodiment of the invention;

Figures 2, 2*a*, 3, and 4 are perspective views of complete packages made in accordance with the present invention;

Figure 5 is a modification of apparatus adapted to accomplish the invention;

Figure 6 is another modification of apparatus in accordance with the invention; and

Figure 7 is still another embodiment of apparatus in accordance with the invention.

Figure 1 shows a conventional rotatable support 2 mounted so as to be driven by the shaft 3. The rotatable support or winding head 2 is of general conical shape and has the conventional resilient fingers 4 which are adapted to be spread in known fashion to grip the internal surface of the foundation core 5 (which as shown in Figure 1 is only partially donned upon the support 2, dotted lines showing the position the cone 5 assumes when placed in its proper position). The leading end 6 of the yarn to be wound is taken by the operator and wrapped loosely about the body as at 7 and/or about the outer end of the support 2 as at 7*a*, to give the desired amount of tail. Then the operator inserts the cone 5 over the tail-wrapped support 2 until winding position is attained by the core. The adjoining portion of yarn Y to be wound is then threaded through the traverse guide (not shown) and winding proceeds.

After the package is completed, the end 8 last to be wound, as shown in Figure 2, may be secured in place by a knot or by slipping it under a previous convolution in conventional fashion. At any time after removal of the package from the rotatable table support 2, the tail is removed from within the core and from the winding head or support 2 if it tends to cling thereto and is drawn directly over the main winding mass or body to the other end of the cone. It may thus be secured to the package in any desired fashion. As shown in Figure 2, it is wrapped about the outer end 9 of the cone and it is tied to itself at 10. Instead, as shown in Figure 2*a*, it may be looped over the package and secured just inside the nose of the cone by a sticker 10*a* in this case, the leading end may also be secured by the same sticker. Alternatively, the end may be merely

slipped under one of the last windings in the main mass of winding, either before or after encircling the end 9 of the core. Again, as shown in Figure 3 the tail may be wrapped several times about the outer end 9 of the core as shown at 11. Instead of looping the tail over the mass of the winding, it can be bunched together and secured to the external surface of the core by any suitable means such as a sticker 12, as shown in Figure 4.

It will be seen that when the package is formed and the tail is secured either at a position entirely outside of the core or within the other end of the core without wrapping it about or looping it into the end of the core adjacent the end of the main winding mass from which it extends, the package can be transported without the possibility of the yarn ends becoming tangled or damaged, and the packages may be placed upon the creel supports or pegs and the tail may afterwards be freed therefrom for tying them without the necessity to remove the packages from their positions on the creel pegs. Thus, the tail shown in Figures 2 or 2*a* is simply slipped over the end 9 of the package, the slip knot 10 or sticker 10*a* being readily released for this purpose; or the sticker 12 of Figure 4 may be removed to immediately free the entire length of tail. Likewise, the several windings at 11 may be unwound readily without having to remove the package from the creel pegs.

Referring to Figure 1, a number of turns may be placed about the periphery of the body of the support 2 as at 7, or these may be entirely omitted and the tail merely looped over the end of the support 2 as at 7*a*. Alternatively, reliance may be placed entirely on a few turns about the periphery as at 7, omitting passage of the yarn over the outer end of support 2 as shown in Figure 1. The fingers 4 may be provided with axial grooves 4*a* to receive the yarn as it passes to the exterior of the core, so that there is no danger of the yarn being cut by the ridges of the fingers. Alternatively, the fingers may have blunt ridges.

In Figure 5, a modification is shown for use in winding wooden cones or cylindrical cores, the internal bore of which may have little or no taper. The winding head or spindle 2*a* driven by the shaft 3*a* is provided with the customary springs 13 for gripping the interior of the core 14. The head 2*a* is cut away at 15, preferably so that considerably more than a 180° arc remains of the periphery of head at the portion cut away. In the cut-away or recessed portion, hooks 16 are provided. The hooks are preferably of spring material and their flukes extend away from each other, so that the tail may be formed of the leading end 6 of the yarn by wrapping a desired number of turns about the two hooks. The resiliency of the hooks serves to temporarily hold the convolutions of the yarn in place. After insertion of the core 14 over the spindle 2*a*, the adjoining portion of yarn is inserted into the traverse guide and winding is performed. After completion of the winding, the tail may be removed and secured as in the case of that of Figure 1.

Figure 6 shows a winding head 2*b* similar to that of Figure 5, having an annular recess or groove 17 formed therein, in which a tail winding is made by hand before donning the core 14.

Figure 7 is a modification of Figures 1 and 5. The winding head 2*c* is provided with a longitudinal recess 18 joining together spaced recesses 19 in which hooks 20 are secured, the

hooks being of resilient construction as in Figure 5. The longitudinal slot 18 may extend to the outer end 21 of the support 2*c* to facilitate winding of tail T about the hooks 20.

The tail-forming system of the present invention and the system of utilizing the tail formed thereby are applicable to the winding of yarns on at least partially hollow foundation cores of any conventional construction, such as substantially cylindrical tubes, cones, and the like. In the specification and the claims, the term "yarn" is intended in a generic sense to include threads of all types such as single filament threads, multi-filament threads whether twisted or untwisted, cords, yarns in the strict sense and strands of any material, whether textile or non-textile.

It is to be understood that changes and variations may be made without departing from the spirit and scope of the invention, as defined in the appended claims.

What I claim is:

1. A package comprising a core about which a yarn is wound in a mass, a tail end extending from under one end of the mass of the winding and being secured to the package by a sticker at a position inside the other end of the core without being wound about the end of the core projecting from the end of the mass from which the tail extends.

2. A package comprising a core about which a yarn is wound in a mass, a tail end extending from under one end of the mass of the winding and being secured to the package at a position inside the other end of the core, said tail end being looped directly over the mass of wound yarn to its position of ultimate securement.

3. A package comprising a core about which a yarn is wound in a mass, a tail end extending from under one end of the mass of the winding and being secured to the package at a position outside of the core, said tail end being looped directly over the mass of wound yarn to its position of ultimate securement.

4. A package comprising a core about which a yarn is wound in a mass, a tail end extending from under one end of the mass of the winding and being secured to the package at a position outside of the core, said tail end being looped directly over the mass of wound yarn and around the other end of the core to its position of ultimate securement.

5. The method of forming a package of yarn comprising taking a desired length of the yarn to be wound, placing an at least partially hollow foundation core about the length of yarn, leading the adjoining yarn around one end of the core to the outside thereof and winding the yarn on the core, removing the length of yarn entirely from within the core and securing it to the package without winding it about the end of the core from which it was removed.

6. The method of forming a package of yarn comprising taking a desired length of the yarn to be wound, placing an at least partially hollow foundation core about the length of yarn, leading the adjoining yarn around one end of the core to the outside thereof and winding the yarn on the core, removing the length of yarn entirely from within the core, looping the length of yarn directly over the mass of wound yarn and securing it to the package near the other end of the core.

7. A rotatable support having a projecting portion thereof adapted to receive thereabout a

foundation core for winding yarn and the like, the projecting portion of said support having an intermediate recessed portion adapted to receive a small yarn winding.

8. A rotatable support having a projecting portion thereof adapted to receive thereabout a foundation core for winding yarn and the like, the projecting portion of said support having a recessed portion adapted to receive a small yarn winding and means spaced longitudinally with respect to the recessed portion of temporarily securing said winding thereto.

9. A rotatable support adapted to receive a foundation core for winding yarn and the like, said support having a recessed portion adapted to receive a small yarn winding and resilient hooks with their flukes facing away from each other spaced longitudinally with respect to the recessed portion for temporarily securing said winding thereto.

10. The method of forming a package of yarn comprising taking a desired length of the yarn to be wound, placing an at least partially hollow foundation core about the length of yarn, leading the adjoining yarn around one end of the core to the outside thereof and winding the yarn on the core, removing the length of yarn entirely from within the core and securing it to the package.

11. The method of forming a package of yarn comprising taking a desired length of the yarn to be wound, placing an at least partially hollow foundation core about the length of yarn, leading the adjoining yarn around one end of the core to the outside thereof and winding the yarn on the core, removing the length of yarn entirely from within the core and securing it to the package, with all of the tail disposed away from that portion of the interior of the core adapted to receive a supporting member for subsequent unwinding and so that the entire tail can be detached therefrom without unwinding it.

12. A package comprising a core about which a yarn is wound in a mass, said core having one end thereof projecting axially beyond one end of the wound mass, a tail end having a knot-free portion of substantial length extending from under said end of the mass of the winding, said tail end being bunched together and the bunched mass being secured to the package without being wound about the end of the core projecting from the end of the mass from which the tail extends, all of the tail being disposed away from that portion of the interior of the core adapted to receive a supporting member for subsequent unwinding and the tail being so secured to the package that the entire tail can be detached therefrom without unwinding it.

13. A package comprising a core about which a yarn is wound in a mass, said core having one end thereof projecting axially beyond one end of the wound mass, a tail end having a knot-free portion of substantial length extending from under said end of the mass of the winding, said tail end being bunched together and the bunched mass being secured to the package by a sticker at a position outside of the core without being wound about the end of the core projecting from the end of the mass from which the tail extends.

14. A package comprising a core about which a yarn is wound in a mass, said core having one end thereof projecting axially beyond one end of the wound mass, a tail end having a knot-free portion of substantial length extending from under said end of the mass of the winding, said tail end being bunched together and the bunched mass being secured by a sticker to the external surface only of the adjacent end of the core projecting therefrom without being wound about said end of the core.

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