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WARP BEAM PACKAGING

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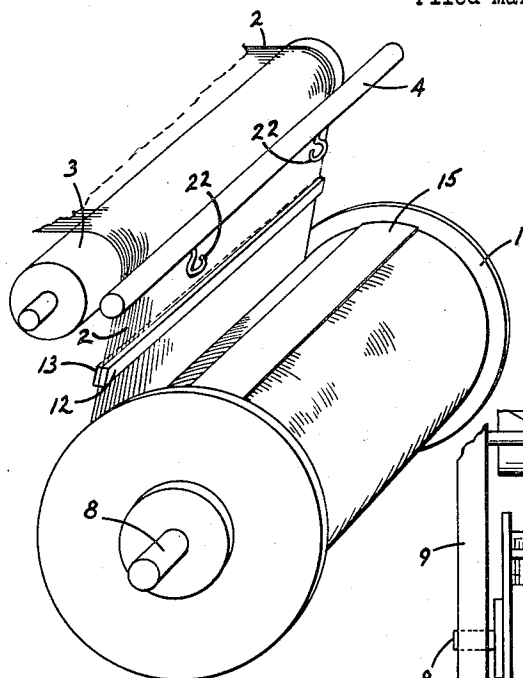


Fig. 1

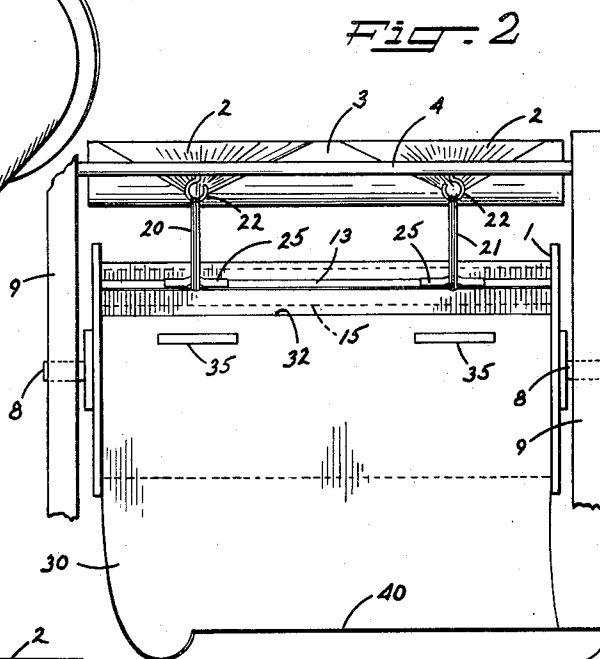


Fig. 2

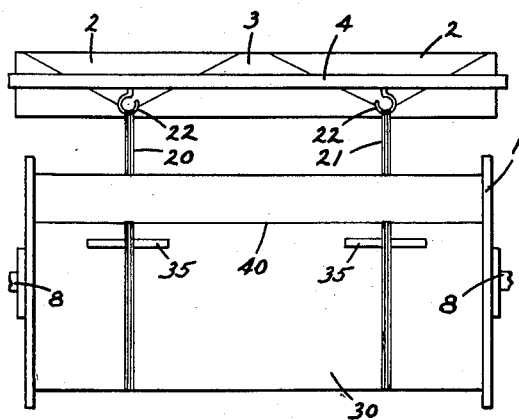


Fig. 3

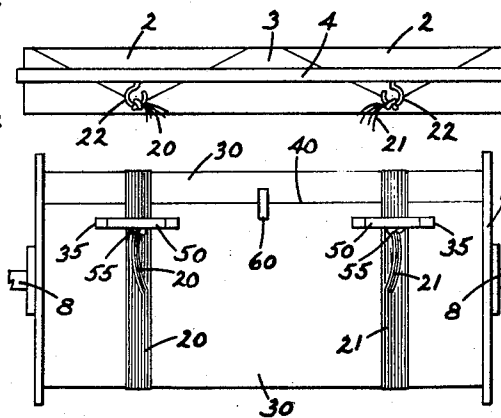


Fig. 4

1

2,844,923

## WARP BEAM PACKAGING

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8 Claims. (Cl. 53—3)

This invention relates to a method and apparatus for producing an improved packaged article. More specifically, the present invention relates to a method and apparatus for producing a packaged beam of filamentary material.

In the manufacture of various types of filamentary materials such as rayon, it is often necessary to collect yarn laid together in parallel order upon a large take-up spool or, as more generally known, a beam to form a warp. The beam with the warp collected thereupon is then shipped to fabric converters who use the warp in the production of knitted or woven fabrics. As the warp is unwound from the beam, it may be fed directly into the fabric converting apparatus such as a loom.

Considerable difficulty, however, has been experienced in the past in satisfactorily packaging the beams filled with warp for shipment so that the warp pattern will be properly maintained on the beam and so that the warp will not be damaged. In accordance with the practice now observed for preventing the 800-1200 end warp wound on the beam from becoming disarranged and entangled during shipment or storage, it has been customary to apply a pair of strips of adhesive tape to opposite sides of the warp across the width thereof. After the tape-off portion is wound onto the beam, a protective paper wrapper may be positioned under the warp and wound onto the beam. The warp is then severed to disconnect it from the supply after which the warp is then secured to the periphery of the warp package on the beam in any convenient manner such as by dividing and narrowing the warp to form two tows which may then be wound around the package and tied.

A heavy type of packaging or wrapping paper is then tightly drawn around the beam and secured at the lap by pieces of masking tape. Several additional strips of masking tape are then affixed to the ends of the beam and to the heavy wrapping paper to prevent the wrapping paper from turning on the warp package.

The above described method for packaging the beam for shipment and the final packaged beam itself have not proved to be entirely satisfactory and have been the subject of numerous complaints from the converters. Urgent requests have been submitted by the converters for the development of improved methods for packaging the beams to provide better packaged beams. These complaints are directed to the fact that the inner or outer, or both, wrappers around the warp package on the beam turn or come loose whenever it comes in contact with other objects. The turning of the wrapper or wrappers chaffs or otherwise damages the layers of warp on the beam and, in addition, the parallel pattern of the warp becomes mixed up. These damaged or disturbed layers of warp must therefore be disposed of before the remainder of the warp may be used to produce fabric.

It is therefore a primary object of my invention to provide a novel and improved method for packaging warp filled beams for shipment or storage wherein the numer-

2

ous layers of warp on the beam are protected from being damaged or disturbed.

Other objects and advantages of my invention will become apparent from a study of the following description and drawing in which:

Figure 1 is a perspective of the beaming apparatus and a warp beam showing the initial beam packaging steps.

Figure 2 is a front view of the beaming apparatus and beam showing the outer protective wrapper in position to be wrapped around the beam;

Figure 3 is a front view of the beaming apparatus and beam showing the outer protective wrapper after it has been wrapped around the beam; and

Figure 4 is a front view of the beam apparatus and beam showing the beam wrapped in the outer protective wrapper and ready for shipment or storage.

Referring now to Figure 1 of the drawing, there is shown a yarn beam 1 having layers of warp yarn 2, 2 wound thereupon and ready to be packaged for shipment or storage. In filling the yarn beam 1, the yarns 2, 2 of the warp are passed over a feed or delivery roll 3 from a creel or other supply source. The warps then pass under a guard bar 4 for the feed roll 3 and are wound upon the beam 1 which is driven in the winding direction through the beam shaft 8 by a suitable driving means not shown. The feed or delivery roll 3, the guard bar 4, and the beam 1 are supported in suitable vertical end frames 9, 9 (Figure 2).

The warp is taped by applying thereto a pair of adhesive tape strips 12 and 13 to opposite sides of the warp with the adhesive side of the strip 12 pressed against the adhesive side of the strip 13. The taping off of the yarn with strips 12 and 13 keeps the individual yarns 2, 2 in their parallel pattern during the packaging, shipping or storing, and the unpackaging of the beam. A guard strip of kraft paper or other suitable paper 15 is then so positioned upon the surface of the warp package already on the beam 1 whereby the tape strips 12, 13 will be seated upon the guard strip 15 when the beam is further rotated in its winding direction. The guard strip prevents the tapes from adhering or otherwise damaging the already collected warp.

After the tapes 12 and 13 and the piece of kraft paper 15 are in place, the beam is rotated a full revolution so that the tape 13 is positioned as shown in Figure 2. At this point, the operator divides the sheet of warp beyond the tape 13 into two or more groups by reaching under the guard bar 4 and manually grouping the yarns. The groups are then narrowed and twisted to form tows 20 and 21. The tows are approximately 2 inches wide. The operator then draws off more of the warp from the creel supply by grasping tow 20 and pulling it in a downward direction after which the tow 20 is laid upon the tape 13 and taped thereto by an adhesive strip 25 which is preferably about 3 inches in length. This operation is repeated with respect to tow 21. The tows 20 and 21 are then inserted by the operator into the broken ring guides 22, 22 affixed to and extending down from the guide bar 4 wherewith the yarn forming tows 20 and 21 will be kept in tow form.

An outer protective heavy wrapper 30 such as a pebbled paper is then positioned over the warp on the beam. The wrapper 30 extends the width of the beam with the leading edge 32 of the wrapper lying immediately below the tape strip 13 as shown in Figure 2. Two strips of tape 35, 35 approximately 10 inches long are then applied to the wrapper as shown to lie approximately 6 inches below and parallel to the leading edge 32 of the wrapper 30.

The beam 1 is then rotated in its winding direction until the trailing edge 40 of the wrapper 30 overlaps the leading edge 32. As the beam is rotated, additional warp

will be drawn from the supply and pass through the guides 22, 22 to continue the tow formation. The tows 20, 21 will, of course, wind around the wrapper 30 and over the wrapper tapes 35, 35 applied thereto. Since the trailing edge 40 of the wrapper 30 now overlaps the leading edge 32, it may be necessary to reposition the tapes 35, 35 since they must lie about three inches below the lap line. To accomplish this repositioning step, the tapes 35, 35 are pulled up by their ends off of the wrapper 30 and slid down under the tows 20, 21 to the desired position below the lap line of the wrapper. The tapes 35, 35 are applied to the wrapper 30 before rather than after the wrapper is wrapped around the beam 1 since it would be difficult for the operator to apply the tapes under the tows 20, 21 after they have been wound around the wrapper 30.

Figure 3 shows the condition of the warp beam after completion of the steps discussed with reference to Figure 2. The beam is then rotated three complete revolutions to wind three convolutions of the tows 20, 21 around the wrapper 30. The operator then grasps the tow 20 and pulls enough slack yarn from the creel supply so that the tow formed therefrom, when pulled down onto the wrapper, will extend about 10 inches below the trailing edge 40 of the wrapper 30. The tow 20 is then twisted and severed. As seen in Figure 4, the creel or supply end of the tow 20 is knotted around guide 22. The loose end of the tow 20 is then drawn tightly down against the convolutions of tow 20 already wrapped around the wrapper 30. A 3-inch piece of tape 50 is positioned over the end of tow 20 and pressed down against tape 35 to hold the tow 20 firmly in place. A knot 55 is then made in the tail of tow 20 and drawn up tightly against the tape strip 50. The same steps are repeated with respect to tow 21.

A piece of adhesive tape approximately 3 inches in length is then applied over the lap line of the wrapper 30 to further aid in holding the wrapper 30 together. The beam is now completely packaged and ready for shipment or storage. To remove the outer wrapper 30 from the beam, the ends of the tapes 35, 35 are merely pulled up to remove the tape from the wrapper. The tows 20 and 21 wound around the wrapper 30 will also be raised with the tapes 35, 35 and they may be easily cut at a point between the tapes 35, 35 and the trailing edge of the wrapper 40. The wrapper 30 is then easily removed from the beam after the tape 60 has been removed from the lap line of the wrapper.

With the above method and apparatus for packaging a warp beam, the outside wrapper will be firmly held in place around the warp on the beam thus eliminating damage to the warp because of movement of the wrapper therearound. The wrapper also protects the warp from being damaged by objects striking the beam unit.

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

1. A method for packaging a warp beam having a warp wound thereupon comprising the steps of applying face-to-face a pair of adhesive strips to opposite sides and across a portion of the warp not yet wound onto the beam and which is still connected with the source of supply, positioning a guard strip of paper upon the surface of the warp package collected upon the beam so that it will move directly under the adhesive strips upon rotation of the beam, rotating the beam in a winding direction a sufficient amount to wind thereupon that portion of the warp with the adhesive strips applied thereto and to leave one of the adhesive strips exposed on the beam, narrowing the warp to form a tow, positioning the leading edge of an outer wrapper adjacent the exposed adhesive strip, further rotating the beam until the trailing edge of the wrapper laps the leading edge and several convolutions of the tow have been wound around the wrapper, severing

the tow from its supply, drawing the tow down tight upon the convolutions of tow around the wrapper, and securing the tow to the wrapper.

2. A method for packaging a beam having a warp wound thereupon comprising the steps of applying face-to-face a pair of adhesive strips to opposite sides and across a portion of the warp not yet wound onto the beam and which is still connected with the supply, positioning a guard strip of paper upon the surface of the warp package wound upon the beam so that it will move directly under the adhesive strips upon rotation of the beam, rotating the beam in a winding direction a sufficient amount to wind thereupon that portion of the warp with the adhesive strips applied thereto and to leave one of the adhesive strips exposed on the beam, narrowing the warp to form a tow, suspending the tow not yet wound upon the beam above the beam in a confined manner whereby additional warp drawn from the supply will be formed into a tow before passing to the beam, positioning the leading edge of an outer wrapper adjacent the exposed adhesive strip, further rotating the beam until the trailing edge of the wrapper laps the leading edge and several convolutions of the tow have been wound around the wrapper, severing the tow from its supply, drawing the tow down tight upon the convolutions of tow around the wrapper, and taping the tow to the wrapper.

3. A method for packaging a beam having a warp wound thereupon comprising the steps of applying face-to-face a pair of adhesive strips to opposite sides and across a portion of the warp not yet wound around the beam and which is still connected with the supply, positioning a guard strip of paper upon the surface of the warp package wound upon the beam so that it will move directly under the adhesive strips upon rotation of the beam, rotating the beam a sufficient amount in a winding direction to wind thereupon that portion of the warp with the adhesive strips applied thereto and to leave one of the adhesive strips exposed on the beam, dividing the warp not yet wound upon the beam into at least two groups, narrowing each group to form tows, taping the tows to the exposed adhesive strip, suspending the tows not yet wound upon the beam above the beam in a confined manner whereby additional warp drawn from the supply will be formed into tows before passing to the beam, positioning the leading edge of an outer wrapper adjacent the exposed adhesive strip, applying two tape strips to the wrapper parallel with and immediately below the leading edge, further rotating the beam until the trailing edge of the wrapper laps the leading edge but does not cover the tape strips and until several convolutions of the tows have been wound around both the wrapper and the wrapper tape strips, severing the tows from their supply, drawing the tows down tight upon the wrapper strips of tape on the wrapper, and taping the tows to the wrapper tape strips.

4. A method for packaging a yarn beam having a warp wound thereupon according to claim 3 which comprises the steps of narrowing the two groups of warp to form tows of about two inches in width and taping the tows to the exposed adhesive strip with three-inch pieces of tape.

5. A method for packaging a yarn beam having a warp wound thereupon according to claim 4 which comprises the step of twisting the tows before they are taped to the exposed adhesive strip.

6. A method for packaging a filled yarn beam according to claim 3 which comprises the steps of applying a pair of wrapper strips of tape which are 10 inches in length to the wrapper and spacing the wrapper strips on the wrapper so that they are in alignment with the tows.

7. A method for packaging a filled yarn beam according to claim 3 comprising the step of applying a piece of tape across the lap line of the wrapper to aid in retaining the wrapper in place.

5

8. A method for packaging a yarn beam having a warp wound thereupon comprises the steps of applying face to face a pair of adhesive strips to opposite sides and across a portion of the warp not yet wound around the beam and which is still connected with the supply, positioning a guard strip of paper upon the surface of the warp package wound upon the beam so that it will move directly under the adhesive strips upon rotation of the beam, rotating the beam one revolution in a winding direction to wind up thereupon that portion of the warp with the adhesive strips applied thereto and to leave one of the adhesive strips exposed on the beam, dividing the warp not yet wound up on the beam into two groups, narrowing each group of yarns to form tows about two inches in width, twisting the tows, taping the twisted tows to the exposed adhesive strip with three-inch pieces of tape, suspending the tows not yet wound up on the beam above the beam in a confined manner whereby additional warp drawn from the supply will be formed into tows before passing to the beam, positioning the leading edge of an outer wrapper adjacent the exposed adhesive strip, applying two pieces of tape to the wrapper about six inches below the leading edge of the wrapper which tape strips are in alignment with the tows, further ro-

6

tating the beam until the trailing edge of the wrapper laps the leading edge and one convolution of the tows has been wound around both the wrapper and the additional tape strip, removing the two pieces of tape now under the tows and re-applying them so that they are three inches below the trailing edge of the wrapper, rotating the beam three complete revolutions, cutting the tows to sever them from their supply, drawing the tow tightly down upon the ten-inch adhesive strips on the wrapper, and taping the tows to the ten-inch adhesive strips with three-inch pieces of tape.

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