United States Patent [19]

Nimmo, Jr.

[11] **3,735,862**

[45] **May 29, 1973**

[54] **RIBBON PACKAGE AND PROCESS FOR PRODUCTION THEREOF**

[75] Inventor: **Philip E. Nimmo, Jr.**, Wayne, N.J.

[73] Assignee: **Sun Chemical Corporation**, New York, N.Y.

[22] Filed: **July 16, 1971**

[21] Appl. No.: **163,364**

[52] **U.S. Cl.** .....**206/46 Z**, 53/21, 206/52 R, 206/59 C, 242/74

[51] **Int. Cl.** **B65d 85/67**

[58] **Field of Search**.....206/52 R, 52 S, 45.33, 206/59 C, 59 R, 59 F, 53, 58, 46 Y, 46 Z; 242/74; 53/21, 30

[56] **References Cited**

UNITED STATES PATENTS

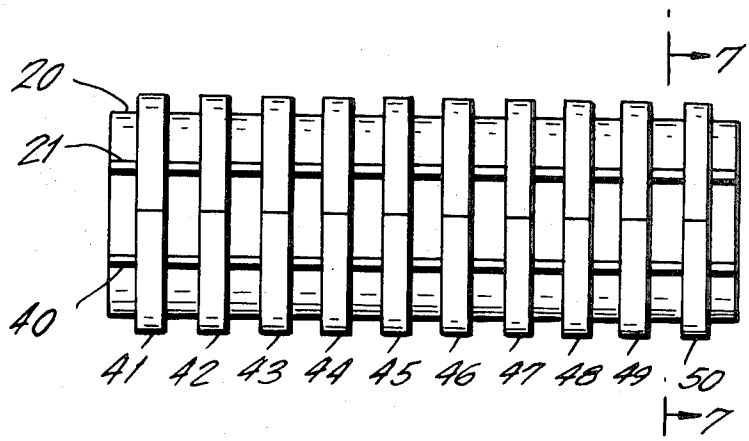
3,161,372	12/1964	Kaufmann	242/74
3,321,149	5/1967	Andersen et al.	242/74
2,094,454	9/1937	Keville	206/59 C
3,382,971	5/1968	Johnson	206/46 Y
2,748,931	6/1956	Taylor	206/59 C

Primary Examiner—William T. Dixson, Jr.
Attorney—Cynthia Berlow

[57] **ABSTRACT**

A ribbon package is formed of a plurality of spaced reels of ribbon wound on a cardboard tube. The inner end of each ribbon reel is secured to the tube by an adhesive strip or a line of adhesive applied in a hot melt state. The end of the last convolution of each ribbon reel is secured to its next inner convolution by a similar adhesive strip. The cardboard tube ends then receive plastic end caps and a label is placed on the ribbon reel surface. A transparent heat shrink plastic tube then receives this assemblage and overlaps the tube ends, and heat is applied to shrink the film tightly over the ribbon reels and around the outer sides of the caps to hold in position the outer caps and label, and to form a protective covering for the ribbon reels.

17 Claims, 12 Drawing Figures



PATENTED MAY 29 1973

3,735,862

SHEET 1 OF 2

FIG. 1.

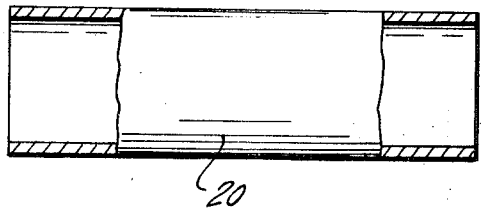


FIG. 3.

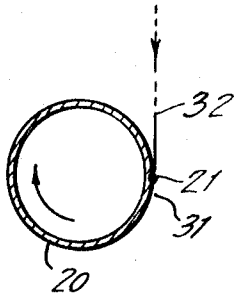


FIG. 2.

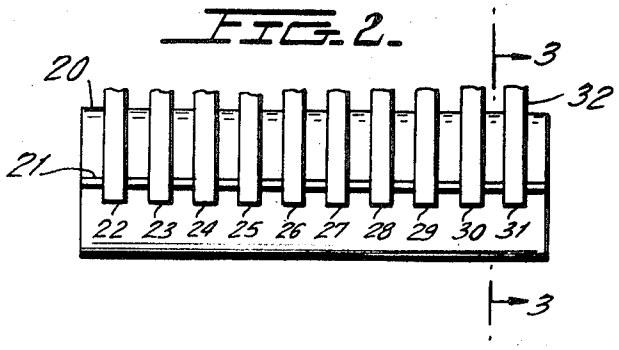


FIG. 5.

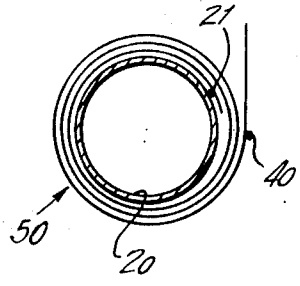


FIG. 4.

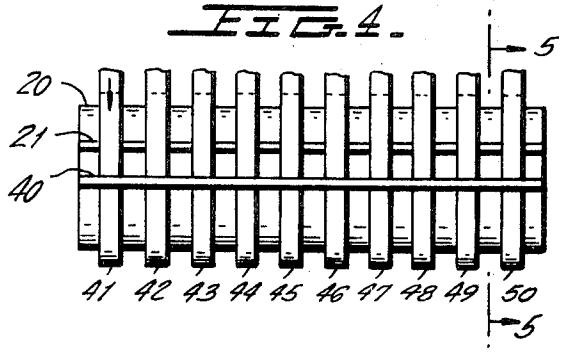


FIG. 7.

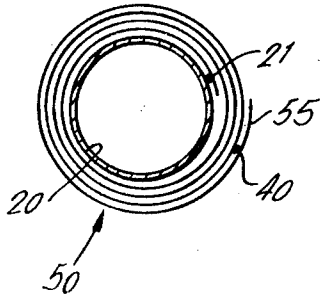
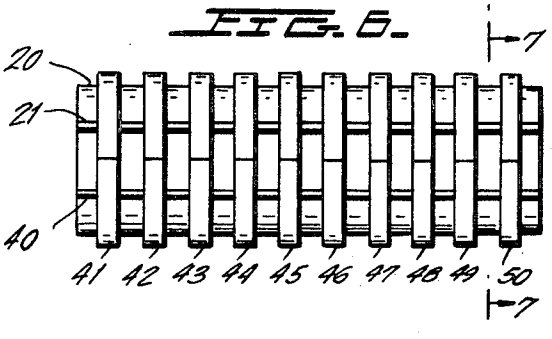


FIG. 6.



INVENTOR.
PHILIP E. NIMMO, JR.

FIG. 8.

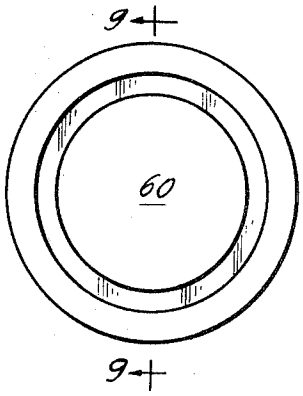


FIG. 9.

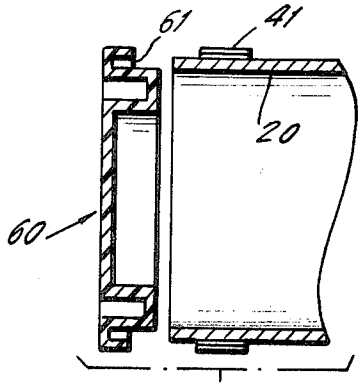
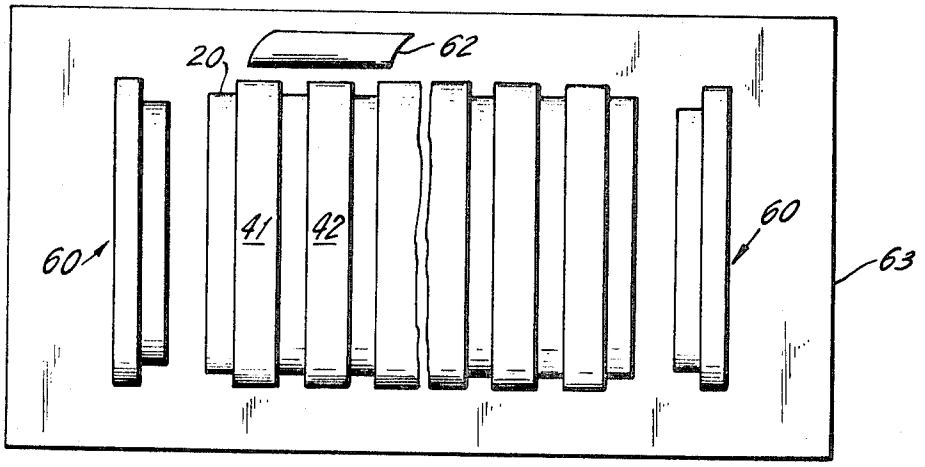


FIG. 10.



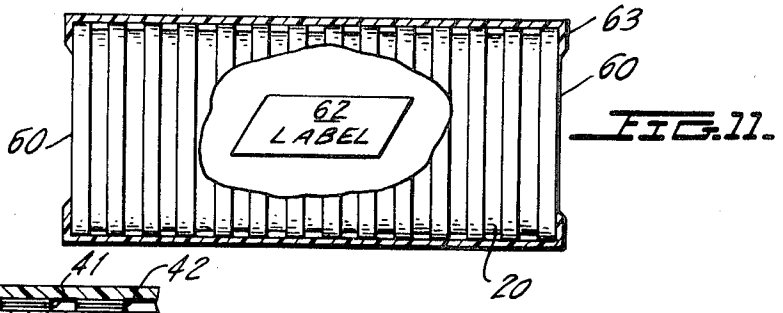


FIG. 11.

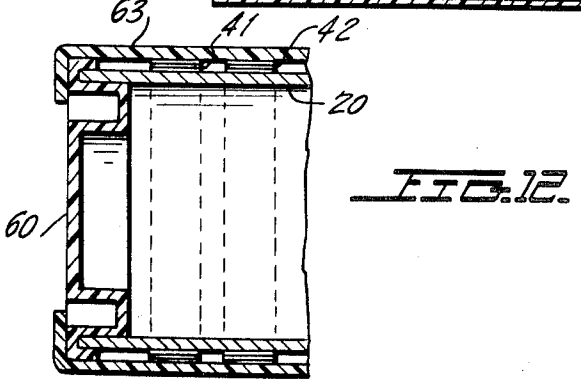


FIG. 12.

INVENTOR
PHILIP E. NIMMO, JR.

RIBBON PACKAGE AND PROCESS FOR PRODUCTION THEREOF

BRIEF SUMMARY OF THE INVENTION

This invention relates to a novel ribbon reel package containing one or more ribbon reels and to the process for the production of such ribbon reels.

Various types of decorative ribbon are commonly packaged by winding one or more reels of the ribbon on a support tube, which is commonly of cardboard. Such winding operations are commonly performed on winding machines operated by trained operators. These machines include a rotatable mandrel which receives the ribbon support tube, and a plurality of ribbon supply reels which supply the ribbon to be wound on the support tube. The operator operates a first control to clamp the tube over the rotatable mandrel, and then individually tapes the end of each of the ribbons to be wound on the tube to the surface of the tube with individual strips of pressure-sensitive tape. A second control is then operated by the operator which causes the mandrel and tube to rotate about their axis to wind a plurality of reels of ribbon for a given number of turns, related to a given length of ribbon for each reel. A suitable turn counter may be provided to automatically stop the rotation of the tube after the given number of turns. The operator then cuts the ribbon of each individual reel at the surface of the tube with a suitable scissors or knife and tapes the individual free ends to the top of the ribbon reel to hold it in place. A control is then operated to permit the operator to slide the wound tube off the mandrel and to load a new tube to be wound.

In accordance with the invention, the above-noted process is substantially simplified and automated to reduce the necessary number of manual operations and to permit several machines to be attended by a single operator. A first important feature of the new process is that a single adhesive strip extending along the full length of the tube is used to hold the free end of each of the ribbons on the tube blank. This replaces the previous step of taping the ends individually. This single strip may adhere to the tube in the spaces on the tube exposed between the spaced reels and the strip overlaps the ribbon ends. Alternatively, the strip may be adhesive on its both surfaces and is adhered to the tube blank or one of its surfaces, and the ribbon ends are adhered to its other pressure-sensitive surface. In place of such an adhesive strip, a hot melt gun of a commercially available type, and which can deposit a line of molten adhesive along the length of the tube, may be used. The ribbon ends are then applied to the hot melt line while it is still in a semifluid and tacky state to hold the ribbon ends on the tube prior to winding the ribbon reels. Note that the adhesive is such that it dries within a few seconds so that there is no prolonged delay in winding after the ribbon ends are applied to the tube. Note further that the ribbon ends can be applied to the hot melt line manually or automatically, as by any suitable gripping mechanism which is designed to grip the ribbon ends, apply them to the hot melt line, and thereafter to release the ends in an automatically timed manner.

A second important improvement in the process of the invention is in fixing the end of the ribbon reels in place after the reels have been wound with a given number of turns. Thus, just prior to the winding of the last turn, the mandrel is stopped (by a suitable control mechanism operated from a mandrel turn counter). An adhesive strip, which may be a line of hot melt, or an adhesive strip which is adhesive on both surfaces, is laid along the full length of the tube and over the ribbon reels. The mandrel and tube are then rotated one further turn, bringing the ribbon of each reel around and on top of the above-described adhesive surface. The ribbon of each reel is then cut from the main supply reel at a point just beyond the point at which the ribbon end adheres to the adhesive line on the next to the last ribbon convolution on the reel. Thus, the ribbon of each reel will not unravel.

If desired, the ribbon strands may first be received in respective clamps and their ends severed thereafter by a single hot wire cutter extending the length of the tube to sever each ribbon at the same time. The same clamp can then apply the new ribbon ends held therein to the next tube blank mounted on the mandrel.

The above-noted operations replace the formerly required manual taping of the ribbon to the tube blank and the taping of the ends of the wound ribbon reels. It will be apparent that these process steps will allow a substantial reduction in the number of manual operations needed to form such ribbon reels. Moreover, these process steps permit the full automation of the manufacturing process when carried out with any desired process for automatically loading tube blanks on the mandrel and for discharging the wound tubes. It is also possible in the fully automated process to wind a plurality of ribbon reels on an elongated support tube, which subsequently is cut into two or three or more individual tubes, each carrying a plurality of spaced ribbon reels.

As a further important feature of the invention, after the securement of the ribbon reels to the tube, the tube is formed into an attractive and protective package. Thus, a pair of end caps are pressed onto the ends of the hollow tube, and a label is laid atop the package. This assemblage is then loaded into a tube of transparent heat shrinkable plastic film. The package is then heated in a suitable heating apparatus, and the film tube contracts tightly over the outer surface of the ribbon reels, and over the surfaces of the end caps. Thus, the film holds the end caps and label in place and further protects the ribbon reels from being soiled.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a partly sectional plan view of the tube blank to receive ribbon reels in accordance with the invention.

FIG. 2 shows the tube of FIG. 1 after a line of adhesive has been formed on the tube and one end of the ribbons from a plurality of supply sources have been applied to the adhesive line.

FIG. 3 is a cross-sectional view of FIG. 2 taken across the section lines 3 — 3 in FIG. 2.

FIG. 4 shows the tube of FIGS. 2 and 3 after all turns but one have been wound for each ribbon reel, and after an adhesive line has been applied over the length of the tube.

FIG. 5 is a cross-sectional view of FIG. 4 taken across section lines 5 — 5 in FIG. 4.

FIG. 6 shows the tube of FIG. 4 after the last ribbon winding is formed.

FIG. 7 is a cross-sectional view of FIG. 6 taken across section lines 7 — 7 in FIG. 6.

FIG. 8 is a plan view of one of the end caps to be applied to the ends of the wound tube of FIG. 6.

FIG. 9 is a cross-sectional view of the end cap of FIG. 8 taken across the section lines 9 — 9 in FIG. 8.

FIG. 10 is an exploded view of the wound tube of FIG. 6 with end caps and a label disposed within a tube of transparent heat shrinkable film wrap.

FIG. 11 is a plan view of the completed package after the heat-shrinking of the film of FIG. 10.

FIG. 12 is a cross-sectional view of one end of the tube of FIG. 11 to illustrate the manner in which the end cap is held in position by the heat shrink film.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring first to FIG. 1, there is shown a typical tube blank 20 which will receive ribbon reels in accordance with the invention. Tube 20 may be of any desired material and typically is of cardboard. The tube dimensions may be any desired to supply a given length of ribbon and a given number of reels of ribbon having a particular width. For illustrative purposes, tube 20 may have a length of 12 inches, a diameter of 4 inches and a wall thickness of one thirty-second inch. Such a tube can receive fourteen reels of ribbon which are three-fourths inch wide each, and spaced from one another by about 0.1 inch. Obviously, the reels may be of different color ribbon. Note that any number of reels, including a single reel, could be mounted on the tube and that the reels can have any desired width and spacing.

The tube of FIG. 1 is mounted over a suitable mandrel (not shown), which is rotatable about its axis so that ribbon reels can be wound on tube 20. In accordance with a first feature of the invention, and as shown in FIGS. 2 and 3, an adhesive line 21 is deposited along the full length of tube 20. The adhesive line 21 may consist of an adhesive strip which has both surfaces pressure sensitive, or may be a line of hot melt adhesive applied in a line with a hot melt gun. Such hot melt adhesive may be of any desired type and will have a setting time of about 2 to 3 seconds and may be applied in a line having a thickness of about one thirty-second inch. While FIGS. 2 and 3 show only a single adhesive line 21, a plurality of such lines could be used.

Thereafter, the ends of a plurality of ribbons, shown as ends 22 to 31 in FIG. 2, are applied against adhesive strip 21 to secure them to tube 20. Each of ribbon ends 22 to 31 are ends of ribbon strands, such as strand 32 having end 31 (FIGS. 2 and 3), which are disposed parallel to one another and which are supplied from respective large supply spools through suitable guides of any desired variety (not shown). Note that these ends may be simultaneously applied against a strip 21 by any suitable ribbon end gripping arrangement.

Once the ribbon ends 22 to 31 are secured to adhesive strip 21, the tube 20 (and the mandrel on which it is mounted) is rotated one turn less than the number of turns to be formed on the reel. Thus, where each reel is to contain 15 feet of ribbon, the reel will contain about fourteen convolutions on a 4 inch diameter tube. Thus, after a counter (not shown) counts thirteen full turns, the mandrel mounting tube 20 stops rotating and is held stationary. An adhesive strip 40, or line of hot melt, is then deposited along the length of tube 20 and over the surface of partly formed reels 41 to 50.

The tube 20, as shown in FIGS. 6 and 7, is then rotated one further and last turn to bring the last convolution on top of adhesive strip 40. Where the adhesive strip 40 is a line of hot melt adhesive, it will be understood that the tube 20 will be rotated before the hot melt adhesive has solidified and while it is still tacky.

Once the last convolution has been secured to strip 40, the ends, such as end 55 of reel 50 shown in FIGS. 6 and 7, of the last convolution may be cut to sever the reels from their respective supply spools. Where the ribbon is a polypropylene type, a single elongated hot wire cutter may cut each end simultaneously. However, any desired cutting mechanism may be used. Just prior to this severing operation, the end gripping mechanism, referred to previously for applying initial ends 22 to 31 to an empty spool, may grip the ribbon strands above the region which is cut.

The wound tube 20 may now be ejected and a new tube loaded in its place and the above winding process is repeated.

It should be noted that the adhesive strip is such that the ribbon can be easily pulled away from the strip when the ribbon reel is to be unwound, without tearing the ribbon.

It will be apparent that the use of the adhesive strips 21 and 40 in the manner described above can be adapted for use with automatic tube loading and ejecting equipment and with automatic ribbon-end grippers and cutters, thereby to allow automation of the entire process.

Once the tube 20 has reels wound and secured thereon, it is desirable to wrap the tube with a protective covering and to cover the open tube ends. FIGS. 8 and 9 show an end cap 60 which may be used to cap the ends of tube 20. Cap 60 is formed of a thin vacuum formed plastic disk which contains an annular channel 61 which has a depth (axial length) of about one-fourth inch which receives the end of tube 20.

As shown in FIG. 10, two end caps are disposed at either end of tube 20 and a label 62 is laid atop the tube 20. This assemblage is then placed in a sleeve or tube 63 of a transparent heat shrinkable film. The assemblage is then placed in an over to cause the film to shrink as shown in FIGS. 11 and 12, to complete the packaging of the ribbon reels. It will be noted that the ends of the film sleeve 63 overlap the end caps 60, thereby to hold the end caps in position. In addition, film 63 holds the label 62 in place, and provides a transparent protective covering for the ribbon reels wound on tube 20.

Although this invention has been described with respect to its preferred embodiments, it should be understood that many variations and modifications will now be obvious to those skilled in the art, and it is preferred, therefore, that the scope of the invention be limited, not by the specific disclosure herein, but only by the appended claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows:

1. A ribbon reel package comprising, in combination:
a hollow support tube having a central axis and an outer surface;
at least one reel of ribbon wound helically on said outer surface of said hollow support tube;
first adhesive means securing the interior end of said at least one reel of ribbon to said outer surface of said tube;

second adhesive means securing the outside end of said at least one reel of ribbon to the next interior convolution;

first and second end cap means removably connected over the opposite ends of said hollow support tube; and

a heat shrink film sleeve wrapped over said outer surface of said tube and reel and extending at its ends, at least partly over the outer surface of each of said first and second end caps, thereby to hold said end caps in position.

2. The package of claim 1 wherein said film sleeve is transparent.

3. The package of claim 1 which further includes a label disposed at least partly atop said reel of ribbon and held thereon by said film sleeve; said film sleeve being transparent.

4. The package of claim 1 which further includes a plurality of reels of ribbon disposed on said tube and axially spaced from one another along the axis of said tube; said first adhesive means securing the interior ends of each of said plurality of reels to axially spaced regions of said tube; said second adhesive means securing the outside end of each of said plurality of reels to their respective next interior convolution.

5. The package of claim 4 wherein said film sleeve is transparent.

6. The package of claim 5 which further includes a label disposed at least partly atop said reel of ribbon and held thereon by said film sleeve; said film sleeve being transparent.

7. The package of claim 4 wherein said first and second adhesive means are comprised of elongated adhesive strips extending generally parallel to the axis of said tube.

8. The package of claim 4 wherein said first and second adhesive means are formed of a hot melt adhesive deposited in liquid form.

9. The package of claim 1 wherein said first and second adhesive means are comprised of elongated adhesive strips extending generally parallel to the axis of said tube.

10. A ribbon reel package comprising, in combination:

an elongated support tube having a central axis;

a plurality of reels of ribbon, each having a plurality of convolutions wound around said tube and being axially spaced from one another along said central axis;

first adhesive means securing the interior end of each of said plurality of reels to the outer surface of said elongated support tube at spaced regions corresponding to the position of said spaced reels;

second adhesive means extending across the outer surface of the next to the outermost of the convolutions of each of said plurality of reels and securing the outer end of each of said plurality of reels to the surfaces thereof.

11. The package of claim 10 wherein said first and second adhesive means constitute elongated adhesive strips extending generally parallel to said central axis.

12. The package of claim 10 which further includes a transparent cover surrounding said plurality of reels and said tube.

13. The package of claim 11 wherein said first and second adhesive means are formed of a hot melt adhesive deposited in liquid form.

14. The package of claim 12 wherein said tube is hollow and which further includes end cap means connectable respectively to the opposite ends of sald tube; said transparent cover comprising a shrink film; the outer ends of said shrink film enclosing at least portions of the outer surfaces of said end cap means to hold said end cap means in position.

15. The process of winding a reel of ribbon on a support tube; said process comprising the steps of:

depositing an adhesive strip on the surface of said tube, said strip extending generally parallel to the axis of said tube;

connecting one end of a ribbon strand to said adhesive strip;

rotating said tube around its said axis for a given number of rotations to cause said ribbon to wind into a reel having a given number of convolutions;

stopping the rotation of said tube and depositing a second adhesive strip over the outer surface of said reel, said second strip extending generally parallel to the axis of said tube; and

thereafter rotating said tube to form a further convolution of ribbon on said reel, which further convolution wraps over said second adhesive strip; and

thereafter cutting said ribbon at a region displaced from the point at which said ribbon is secured to said second adhesive strip.

16. The process of claim 15 which further includes the steps of placing caps over the opposite ends of said tube, and inserting said tube and end caps in a heat shrinkable sleeve and heating said sleeve to cause it to shrink onto the surface of said reel and the outer surfaces of said end caps.

17. The process of claim 15 wherein a plurality of reels are wound on said tube at axially spaced locations along said tube axis; the interior end of each of said reels being secured to said adhesive strip and being formed into reels when said tube is rotated said given number of rotations; said second adhesive strip extending over the surface of each of said plurality of reels; each of said plurality of reels being rotated by one further revolution to wrap said respective reels with one further convolution over said second adhesive strip.

* * * * *