United States Patent [19]

Newman

[11] **3,748,817**

[45] **July 31, 1973**

[54] **METHOD OF PRODUCING A PACKAGE OF FLEXIBLE MATERIAL WITH RADIAL INNER END FEED OUT**

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[73] Assignee: **Windings, Inc.**, Yonkers, N.Y.

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[21] Appl. No.: **180,767**

[52] **U.S. Cl.** ..... **53/21 FW**, 53/13, 242/163, 242/168

[51] **Int. Cl.** **B65d 63/04**

[58] **Field of Search** ..... 53/21 FW, 13; 242/163, 168, 169

[56] **References Cited**

UNITED STATES PATENTS

2,780,191	2/1957	Philips	242/168
3,178,130	4/1965	Taylor	242/163

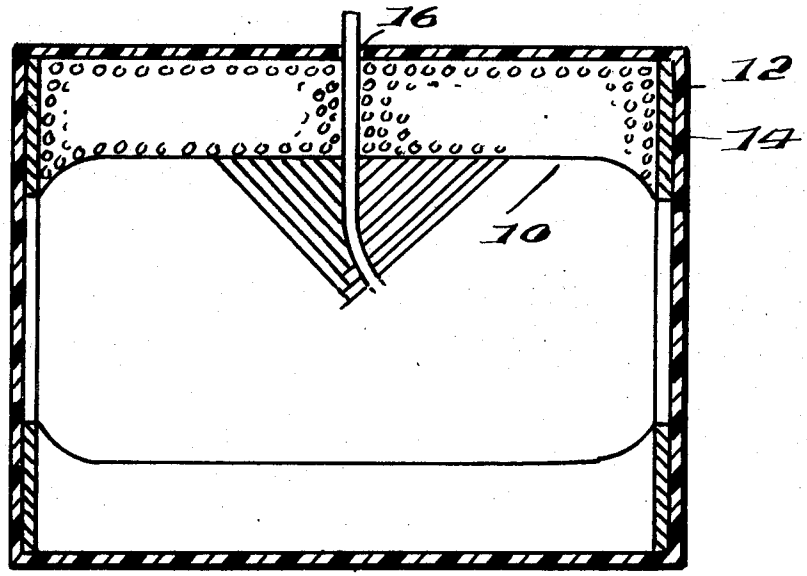
Primary Examiner—Travis S. McGehee

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[57] **ABSTRACT**

A package of flexible material having a radial opening into the axial opening through which the inner end of the material is led out is formed by winding the material on a mandrel having outwardly sloping end forms with a guide moving with a constant stroke at a constant distance from the axis of the spindle and the stroke of which is coordinated with the rotation of the spindle. The resulting package has outwardly sloping end walls. After the package is completed, it is compressed endwise until the end walls are substantially perpendicular to the longitudinal axis of the package.

1 Claim, 3 Drawing Figures



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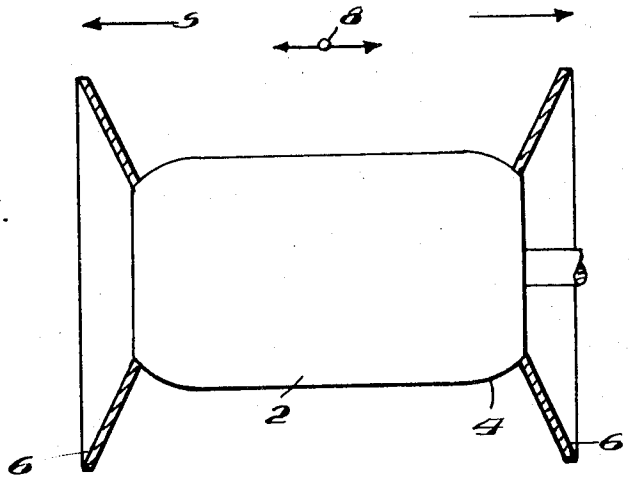


Fig. 1.

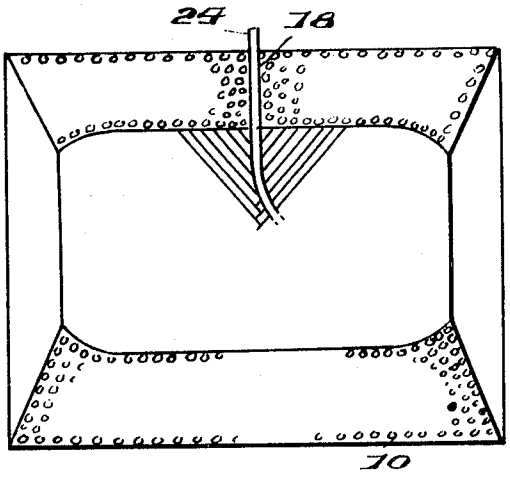


Fig. 2.

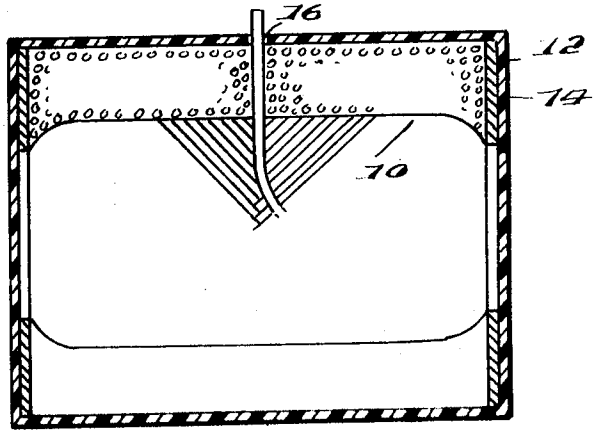


Fig. 3.

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METHOD OF PRODUCING A PACKAGE OF FLEXIBLE MATERIAL WITH RADIAL INNER END FEED OUT

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to a method of producing a wind of the universal type having a radial opening into the axial opening through which the inner end of the material is brought out for twistless payout.

2. The Prior Art

The present invention utilizes a technique which is related in some ways to what is shown in the Taylor U.S. Pat. No. 3,178,130 of Apr. 13, 1965. That patent shows the winding of a package of flexible material on a spindle having outwardly sloping end forms. While such a package is satisfactory for many purposes, it has disadvantages both because of its unusual shape and because the space between successive figure-8 coils increases outwardly from the inner layers to the outer layers and produces an instability which is likely to cause bridsnesting or falloff in many types of material.

SUMMARY OF THE INVENTION

According to the present invention, a package wound on the spindle of the general type shown in the patent referred to above, after being wound, is removed from the spindle, and the end forms are taken off, after which the package is compressed inwardly by flat end members into a substantially cylindrical shape with flat radial ends.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 shows a mandrel for winding a package according to the invention, together with the travel of the thread guide;

FIG. 2 shows in cross-section the package wound on the mandrel; and

FIG. 3 shows a completed package enclosed in a container.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, the rotating mandrel has a main body 2, previously within curved ends 4, and outwardly flared end walls 6. The guide 8 moves back and forth along the package at a constant distance from the axis of the mandrel and at the point further from the axis than the outer edges of the end walls 6.

The guide 8 has a constant stroke of a length S substantially equal to the distance between the outer edges of the end forms. Thus during the building up of the stroke the end forms guide the successive coils into place, but with very little contact force. By maintaining a constant ratio between the rotation of the spindle and the reciprocation of the guide, so that the number of coils in each layer is kept constant, a package can be built up beginning with a relatively narrow spacing between the successive coils which increases as the diameter increases. Likewise the angle of wind tends to become greater as the surface of the material approaches the guide.

After such a package has been wound, the mandrel is collapsed and the package with one of the end forms is removed from the mandrel. The end form which is removed with the package is then taken off the package and returned to the machine for winding another package. The wound package (FIG. 2) is put on a package spindle on which a straight-sided end form of the same inner diameter as the package spindle and the same outer dimeter as the end forms, or a slightly greater diameter, is located. A second straight-sided end form of the same size is then put onto the packaging spindle and mechanical pressure is then applied axially to both end forms so that uniform pressure is distributed over the end surface of the wind. This pressure is increased until both ends of the wind assume a straight configuration (FIG. 3) and are completely in touch with the straight end forms. In the resulting package, the spacing between the coils is substantially constant in all the layers.

The package is shown at 10 in FIG. 2. The straight end forms 12 are applied to the package and the resultant pressure brings them into the position shown in FIG. 3. Thereafter the device is wrapped in a cover 14 which has an opening 16 communicating with the radial hole 18 through which the inner end 20 of the packaged material is brought out.

The reason why this procedure is advantageous is that (1) it reduces the space occupied by the wind; (2) it takes the air out of the outer layers of the wind which was put in during the course of the wind by the increase in gain; (3) it reduces the inherent torque of the universal wind traverse; (4) it relaxes the wind by reducing the angle of the crossover; (5) it makes a much more stable package and enables the wind to be made originally at relatively low tension so that the material so wound and packaged can be in an inert state; (6) it thus enables a slippery or hard material to be wound without relying on excessive tension to hold the wind formation; (7) it also enables a highly stretchable material to be wound at very low tension and still have a regular formation.

I claim:

1. A method of making a package of flexible material of the universal type having a radial opening into the axial opening which comprises winding the flexible material on a spindle while moving a guide for the flexible material back and forth longitudinally of the spindle and laying up on the spindle layers of gradually increasing ratio while maintaining the number of coils in each layer constant, thereby forming a package having outwardly sloping ends, compressing the ends inwardly to a substantially flat radial condition by applying end members on each end of the package and pressing said members towards each other, and thereafter enclosing the compressed package and end members in a wrapping.

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