June 9, 1953 K. L. HALL 2,641,102

WOUND PACKAGE LINER-WRAPPER

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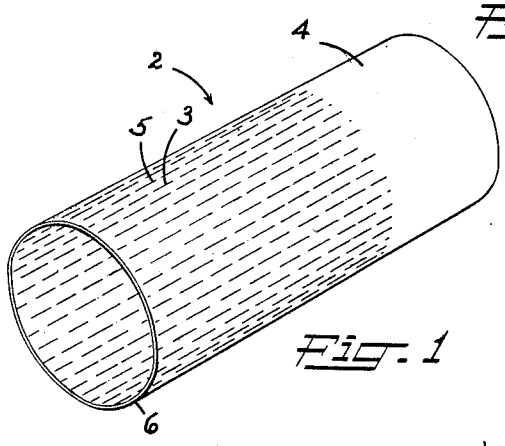

Fig. 1

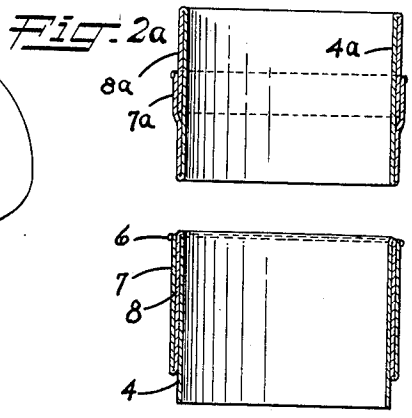

Fig. 2a

Fig. 2

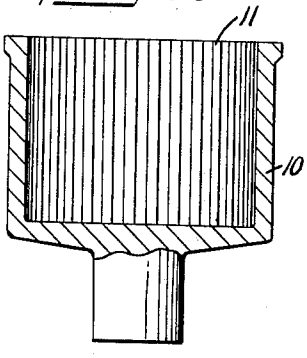

Fig. 3

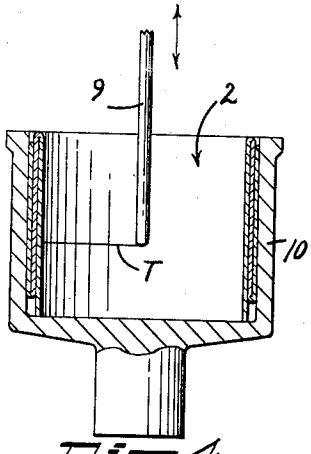

Fig. 4

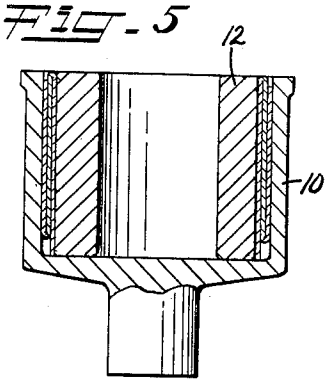

Fig. 5

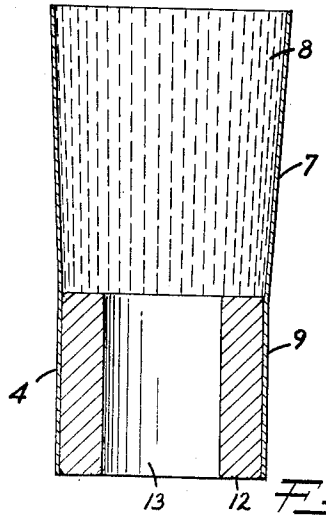

Fig. 6

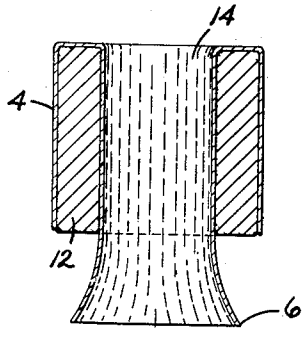

Fig. 7

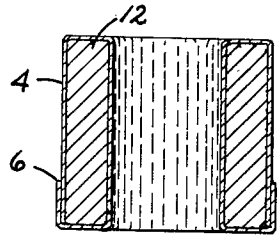

Fig. 8

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WOUND PACKAGE LINER-WRAPPER

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15 Claims. (Cl. 57—76)

1

This invention relates to an improved method of encasing in a wrapper of permeable fabric, such as a knitted or woven cloth, paper or equivalent material, wound filamentary packages such as those formed in centrifugal buckets during the spinning of artificial filaments, to protect them during subsequent processing with liquids and gases and also during subsequent shipping.

In the production of artificial filaments it is the practice to spin the filaments in a rapidly rotating bucket to form a cake therein. When this cake is wound, often as much as three hundred yards of the outer windings are damaged because of slippage of the cake inside the bucket and other imperfections inherent in the production of said cake. The present invention minimizes these disadvantages by employing a permeable fabric that is prefolded and applied as both a liner for the spinning bucket and a wrapper for the completed cake.

Generally the invention comprises a tubular permeable fabric, which is prefolded before being positioned in the spinning bucket. This permeable fabric may be knitted or made of another type of fabric such as paper which may be slitted or unslitted. If it is knitted, it is preferably manufactured in tubular form initially. However if it is made of another permeable material the tubular wrapping member may be formed by overlapping and cementing the edges of flat stock.

The preferred form of the present invention is a tubular paper liner-wrapper which may be slitted. However it is to be understood that this liner-wrapper may be made of any of the aforementioned materials.

The main object of the present invention is to provide a method of enclosing wound cakes or the like quickly and neatly with a minimum of handling in a paper or paper-like wrapper.

Another object of the present invention is to provide a prefolded permeable fabric which will act as a protective liner in a centrifugal spinning bucket and later as a protective wrapper for the cake formed therein.

Other objects and advantages of the present invention will become more apparent from a study of the following drawings and description hereinafter.

In the drawings illustrative of the invention Figure 1 is an isometric view of one embodiment of the tubular wrapper prior to folding.

Figure 2 is a sectional view of the tubular wrapper of Figure 1 folded prior to positioning in the spinning bucket.

2

Figure 2a is a modification of Figure 2.

Figure 3 is a side elevation partly in section illustrating a preferred embodiment of the spinning bucket employed.

Figure 4 is a side elevation partly in section of Figure 3 showing the paper liner in position.

Figure 5 is a side elevation partly in section of Figure 4 showing the filaments formed into a cake on the paper liner.

Figures 6 to 8 show the steps in wrapping the cake after its removal from the centrifugal spinning bucket.

As shown in Figure 1 the wrapper is constituted of a tubular or sleeve-like structure 2 of paper or paper-like material which may optionally be provided with a multiplicity of short slits 3 extending generally parallel to the axis of the tube or sleeve. For simplicity and uniformity of structure, the slits when employed are preferably disposed in rows aligned longitudinally with the slits. As shown there are two sets of rows which extend to an unslitted tubular section 4. The rows of one set alternate with those of the other and the slits 3 of one set are offset with respect to those of the other set so that the former lie adjacent the unslit portions 5 between the slits of the other set and partially overlap the ends of the adjacent slits of the other set. The elastic band 6, made of rubber or a rubber-like material, is optionally provided as a means for securing the wrapper to the wound package.

The tubular or sleeve-like structure 2 may be folded to form the annular structure illustrated in Figure 2. If the tubular structure is modified so that the unslit portion 4 is between two slit portions, a fold such as is shown in Figure 2a may be employed. However the present invention may assume a variety of forms. In addition to the partially slitted wrappers to be described hereinafter, the wrapper may be made of paper that is slitted throughout its length or it may be made of unslitted paper or any other permeable fabric or knitted goods. To form the annular structure in Figure 2 the slitted portion is folded over the unslitted portion so that they are contiguous, i. e., in contact with one another, and then the slitted portion is folded back on itself until the elastic band 6 surrounds any portion of the periphery of the unslitted portion 4. As shown in the drawing the tubular structure is so folded that a telescopic effect is created between the outside lap 7, the intermediate lap 8 and the inside lap 4. It is important that the inside lap be at least as wide as any other lap of the folds. This structure is then placed in the spinning

bucket 10 so that it is generally concentric therewith as shown in Figure 4.

To form the annular structure illustrated in Figure 2a the slitted portions 7a and 8a are folded in opposite directions over and adjacent to the unslitted portion 4a. It is irrelevant as to whether the slitted portion 7a overlaps the slitted portion 8a or vice versa, as it will neither affect the formation of the cake nor the wrapping of the same thereafter. This structure is then placed in the spinning bucket 10 in the same manner as the afore-described wrapper.

Although the wrapper may be placed in any type of spinning bucket, including those having a smooth inside wall, to form a liner therein, it has been found through actual practice that a bucket of the type illustrated in Figure 3 is the most satisfactory. This type bucket is substantially the same as the ones in common use except that the inside surface is fluted as shown by reference character 11. The interior of the bucket is grooved parallel to the axis of rotation of the bucket to provide a better gripping action between the paper liner 2 and the bucket. Due to the centrifugal force created by the rapidly rotating spinning bucket, the paper is thrown against the wall of the bucket and conforms to the shape of the grooves which hold the liner tightly in place. The outside laps of the wrapper tend to form a cushion for the inside lap. There is sufficient serration on the inside lap to prevent slippage of the wound package, but not enough to damage any of the outer windings.

As shown in Figure 4 the paper or paper-like folded structure which acts as a liner for the cake is placed inside the bucket assembly prior to the formation of the cake and is substantially coextensive with the inside peripheral dimensions of the bucket. When the bucket starts rotating the funnel 9 reciprocates and feeds the filament T into the bucket to form a cake therein. The folded liner-wrapper separates the cake from the surface of the bucket and thereby minimizes any damage that might occur to the outer filaments of the cake.

When the formation of the cake 12 is completed and the rotation of the bucket ceases the dissipation of centrifugal force causes the cake to contract to its normal dimensions which simplifies its removal from the bucket, after which the wrapping is accomplished as illustrated in Figures 6, 7 and 8. As shown more particularly in Figure 6, the solid portion 4 surrounds the exterior of the cake 12 when the folded slitted portions 7 and 8 are protracted above the cake. When the slitted portion is pushed through the center of the cake at 13 it is of such a length that part of it extends below the bottom surface of the cake as shown in Figure 7. As illustrated in Figure 8, this slitted extension is then folded over the inside lap adjacent the cake so that it completely encases the cake and is held in place by the elastic band 6 and the slits on the tubular structure. The slits are expansible and provide resiliency in the wrapper thus forming a neat and compact package. Although the liner-wrapper depicted in Figure 2a has not been illustrated as to its method of wrapping it can readily be understood how it may be utilized. The slitted portions 7a and 8a are extended to their full length at each end of the cake and folded into the center of the cake until they overlap.

The expansible and "elastic" permeable paper wrappers described have numerous advantages over the use of knitted wrappers in this invention. The greatest is that they are inexpensive and hence they may be disposed of after being used as a protective means for the wound filamentary packages during liquid treatment, vapor treatment, drying and the like and finally during transportation of the package to another plant for rewinding, throwing and other textile or preparatory operations.

By utilizing a cake lifter as shown in the patent to Pape 2,367,339 the actual handling of the cake prior to complete wrapping can be further minimized. At present there is an opportunity for the occurrence of great waste and damage to filaments as a result of handling while removing the cake from the spinning bucket and wrapping it. If this ejector were used there would be no necessity to touch any of the filaments of the cake, thereby making a big saving in material.

While preferred embodiments have been shown herein, it is to be understood that the description is merely illustrative and that modifications may be made without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. In combination, a spinning bucket, a tubular permeable wrapper placed inside the spinning bucket and forming an annular liner therein adjacent the inside peripheral wall of the bucket, said tubular wrapper being folded to form a plurality of overlapping telescoping portions so that the inside portion of the wrapper is substantially coextensive with the inside peripheral dimensions of the bucket, and means for directing filamentary material into the spinning bucket to form a cake therein.

2. In combination, a spinning bucket, a tubular paper wrapper placed inside the spinning bucket and forming an annular liner therein adjacent the inside peripheral wall of the bucket, said tubular wrapper being folded to form a plurality of overlapping telescoping portions so that the inside portion of the wrapper is substantially coextensive with the inside peripheral dimensions of the bucket, and means for directing filamentary material into the spinning bucket to form a cake therein.

3. In combination, a spinning bucket, a tubular permeable paper wrapper placed inside the spinning bucket and forming an annular liner therein, said tubular wrapper comprising a longitudinally extending slitted portion and a longitudinally extending unslitted portion folded to form a plurality of overlapping telescoping portions with the unslitted portion on the inside and the slitted portion on the outside, means for directing filamentary material into the spinning bucket to form a cake inside said annular liner.

4. In combination, a corrugated spinning bucket, a tubular permeable paper wrapper placed inside the spinning bucket and forming an annular liner therein, said tubular wrapper comprising a longitudinally extending slitted portion and a longitudinally extending unslitted portion folded to form a plurality of overlapping telescoping portions with the unslitted portion on the inside and the slitted portion on the outside, means for directing filamentary material into the spinning bucket to form a cake inside said annular liner.

5. In combination, a corrugated spinning bucket, a tubular permeable paper wrapper

placed inside the spinning bucket and forming an annular liner therein, said tubular wrapper comprising a longitudinally extending slitted portion and a longitudinally extending unslitted portion, said wrapper folded to form a plurality of overlapping telescoping slitted portions with the unfolded unslitted portion on the inside and the folded slitted portion on the outside, means for directing filamentary material into the spinning bucket to form a cake inside said annular liner.

6. In combination, a corrugated spinning bucket, a tubular permeable paper wrapper placed inside the spinning bucket and forming an annular liner therein, said tubular wrapper comprising a longitudinally extending slitted portion with an elastic band around the circumference at the end of said slitted portion and a longitudinally extending unslitted portion, said wrapper folded to form a plurality of overlapping telescoping slitted portions with the unfolded unslitted portion on the inside and the folded slitted portion on the outside, means for directing filamentary material into the spinning bucket to form a cake inside said annular liner.

7. A method of forming wrapped wound filamentary packages comprising the steps of folding a tubular paper wrapper, comprising a longitudinally extending slitted portion and a longitudinally extending unslitted portion, to form a plurality of overlapping telescoping portions with the unslitted portion on the inside and the slitted portion on the outside, placing the folded wrapper inside a spinning bucket and delivering filamentary material thereto to form a cake of said filamentary material therein, removing said cake surrounded by the folded paper wrapper, unfolding the slitted portion to extend it, passing the slitted portion through the center of the cake and securing it around the lower portion of the unslitted paper wrapper that is positioned against the outside of the cake.

8. A method of forming wrapped wound filamentary packages comprising the steps of folding a tubular paper wrapper comprising a longitudinally extending slitted portion and a longitudinally extending unslitted portion, to form a plurality of overlapping telescoping slitted portions with the unfolded unslitted portion on the inside and the folded slitted portion on the outside, placing the folded wrapper inside a spinning bucket and delivering filamentary material thereto to form a cake of said filamentary material therein, removing said cake surrounded by the folded paper wrapper, unfolding the slitted portion to extend it, passing the slitted portion through the center of the cake and securing it around the lower portion of the unslitted paper wrapper that is positioned against the outside of the cake.

9. A method of forming wrapped wound filamentary packages comprising the steps of folding a tubular paper wrapper, comprising a longitudinally extending slitted portion with an elastic band around the circumference at the end of said slitted portion and a longitudinally extending unslitted portion, to form a plurality of overlapping telescoping portions with the unslitted portion on the inside and the slitted portion on the outside, placing the folded wrapper with the elastic band at the top inside a spinning bucket and delivering filamentary material thereto to form a cake of said filamentary material therein, removing said cake surrounded by the folded paper wrapper, unfolding the slitted portion to extend it, passing the slitted portion through the center of the cake and securing it around the lower portion of the unslitted paper wrapper that is positioned against the outside of the cake.

10. A method of forming wrapped wound filamentary packages comprising the steps of folding a tubular paper wrapper, comprising a longitudinally extending slitted portion with an elastic band around the circumference at the end of said slitted portion and a longitudinally extending unslitted portion, to form a plurality of overlapping telescoping slitted portions with the unfolded unslitted portion on the inside and the folded slitted portion on the outside, placing the folded wrapper with the elastic band at the top inside a spinning bucket and delivering filamentary material thereto to form a cake of said filamentary material therein, removing said cake surrounded by the folded paper wrapper, unfolding the slitted portion to extend it, passing the slitted portion through the center of the cake and securing it around the lower portion of the unslitted paper wrapper that is positioned against the outside of the cake.

11. A method of forming wrapped wound filamentary packages comprising the steps of folding a tubular permeable wrapper to form a plurality of overlapping telescoping portions, placing the folded wrapper inside a spinning bucket and delivering filamentary material thereto to form therein an annular package of said filamentary material having inner and outer peripheral walls and end walls, removing said package surrounded by the folded permeable wrapper, unfolding the outer laps while leaving the inside lap of the wrapper clinging to the outer peripheral wall of the package, and wrapping the end walls and inner peripheral wall of the package with the unfolded laps.

12. A method of forming wrapped wound filamentary packages comprising the steps of folding a tubular permeable wrapper to form a plurality of overlapping telescoping portions, placing the folded wrapper inside a spinning bucket and delivering filamentary material thereto to form therein an annular package of said filamentary material having inner and outer peripheral walls and end walls, removing said package surrounded by the folded permeable wrapper, unfolding the outer laps while leaving the inside lap of the wrapper clinging to the outer peripheral wall of the package, passing the extended portions around each end into the center of the package and securing them therein.

13. A method of forming wrapped around filamentary packages comprising the steps of folding a tubular permeable wrapper to form a plurality of overlapping telescoping portions, placing the folded wrapper inside a spinning bucket and delivering filamentary material thereto to form therein an annular package of said filamentary material having inner and outer peripheral walls and end walls, removing said package surrounded by the folded permeable wrapper, unfolding the outer laps while leaving the inside lap of the wrapper clinging to the outer peripheral wall of the package, passing the extended portion through the center of the package and securing it around a portion of the paper wrapper that is positioned on the outside of the package.

14. A method of forming wrapped wound filamentary packages comprising the steps of folding a tubular paper wrapper to form a plural-

ity of overlapping telescoping portions, placing the folded wrapper inside a spinning bucket and delivering filamentary material thereto to form therein an annular package of said filamentary material having inner and outer peripheral walls and end walls, removing said package surrounded by the folded paper wrapper, unfolding the outer laps while leaving the inside lap of the wrapper clinging to the outer peripheral wall of the package, passing the extended portion through the center of the package and securing it around a portion of the paper wrapper that is positioned on the outside of the package.

15. In combination, a spinning bucket having a plurality of grooves in the inside wall extending parallel to the axis of rotation of the bucket, a tubular permeable wrapper placed inside the spinning bucket and forming an annular liner therein adjacent the inside peripheral wall of the bucket, said tubular wrapper being folded to form a plurality of overlapping telescoping portions so that the inside portion of the wrapper is substantially coextensive with the inside peripheral dimensions of the bucket, and means for directing filamentary material into the spinning bucket to form a cake therein.

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