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Cothran et al.

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[54] **CONTAINER AND METHOD FOR PACKAGING MATERIAL SENSITIVE TO CONTAMINANTS**

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[52] **U.S. Cl.** **53/27,** 53/30, 206/58

[51] **Int. Cl.** **B65b 53/02**

[58] **Field of Search** .....53/30, 194, 33, 27; 206/58, 206/65 S, 78 BA; 229/37, 48, 87 R

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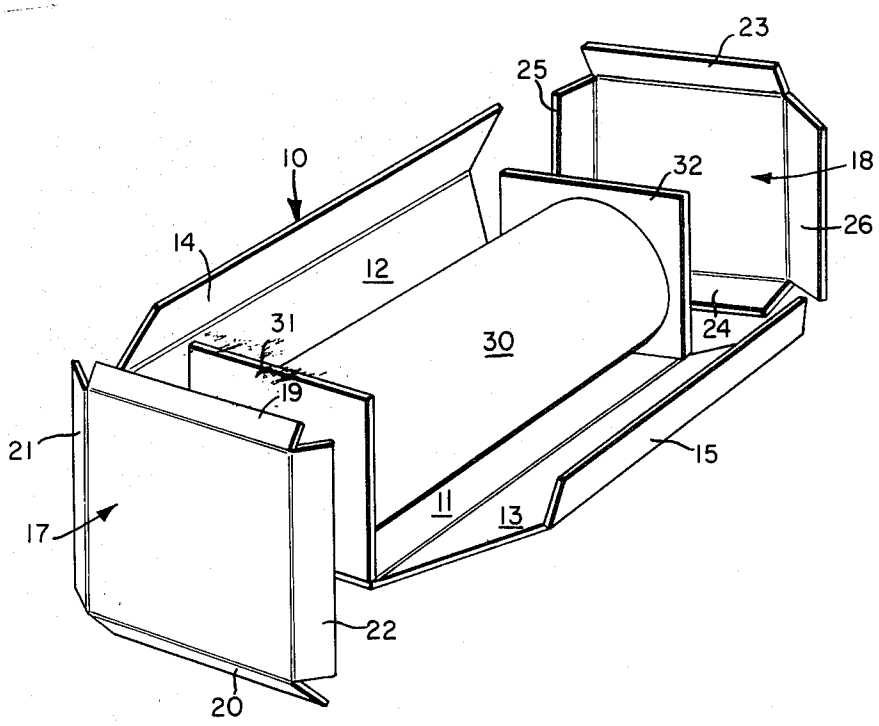
[57] **ABSTRACT**

A packaging method is disclosed using a container having an integral body member forming top, bottom and side walls, two end walls having flaps on all sides, and a plastic film shrink-fit around the container.

6 Claims, 6 Drawing Figures



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SHEET 1 OF 2

FIG. 1

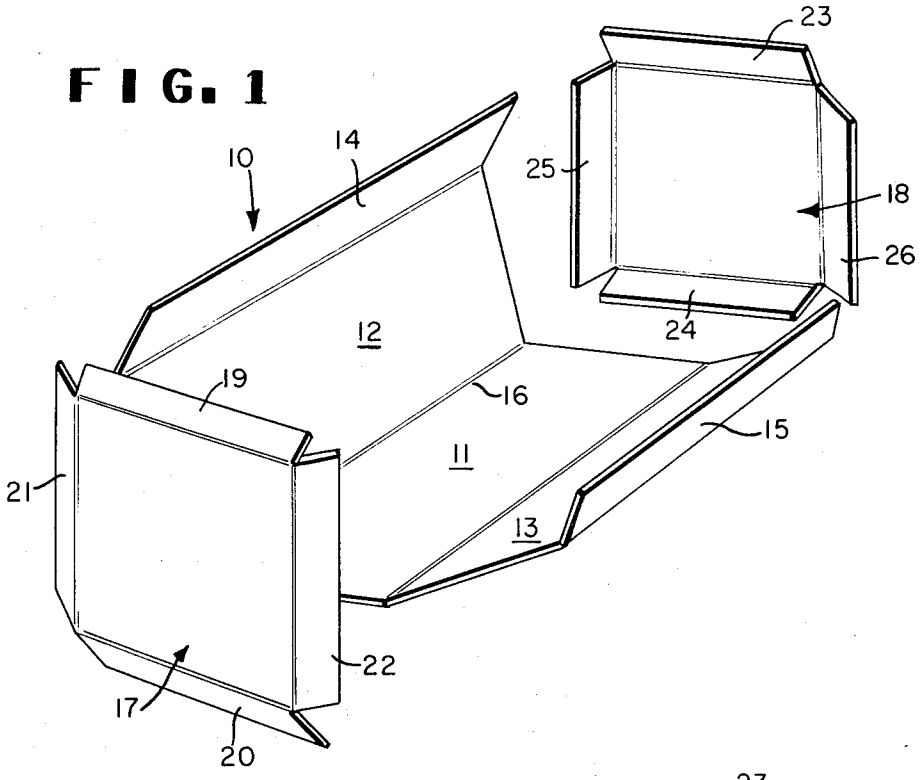

FIG. 2

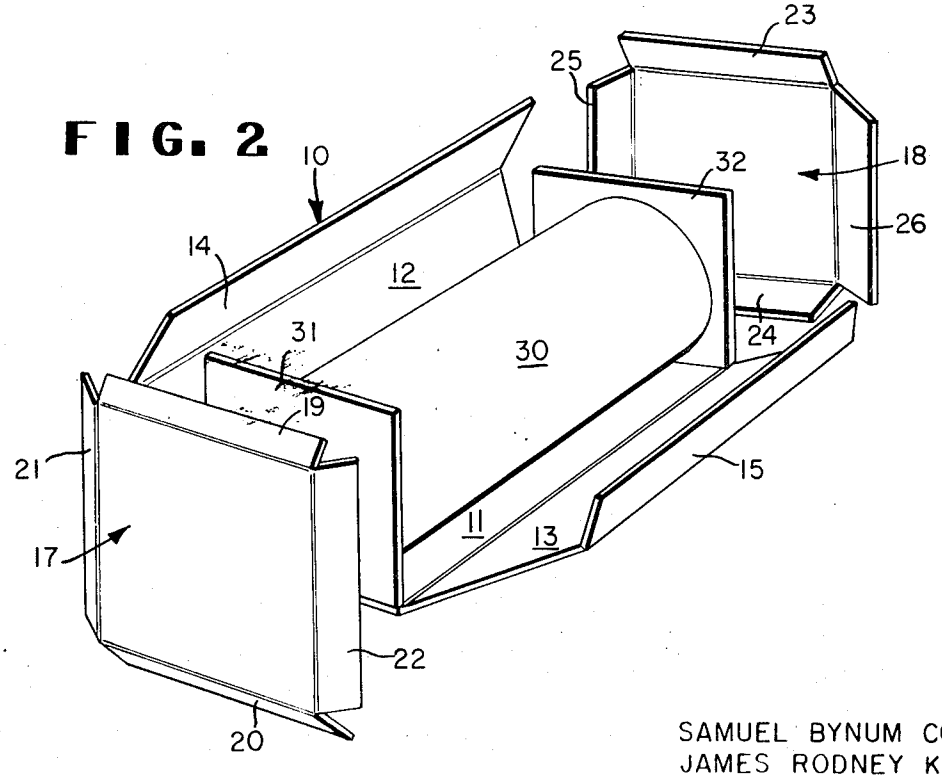

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FIG. 3

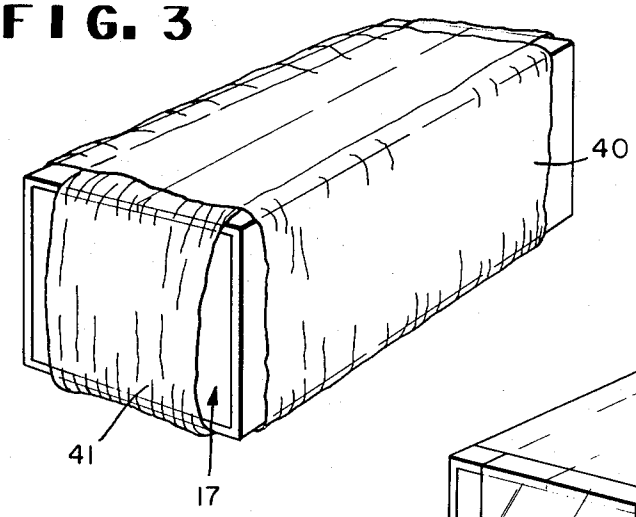


FIG. 4

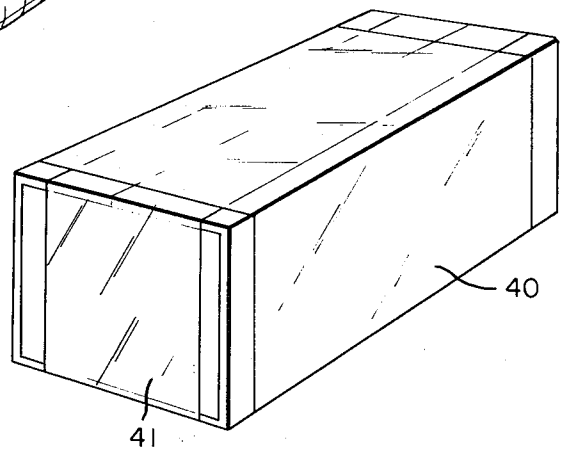


FIG. 5

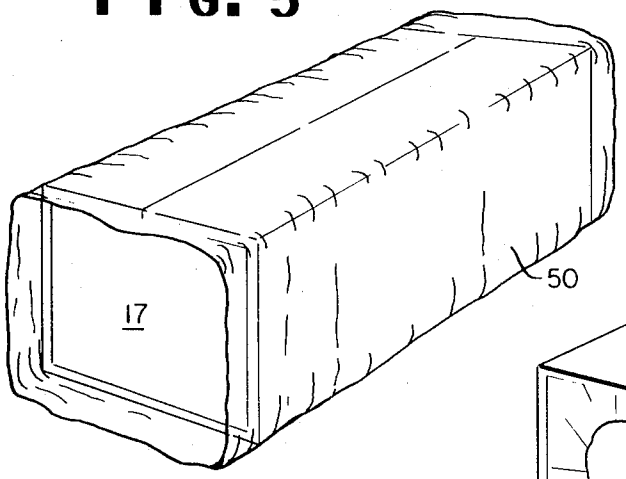
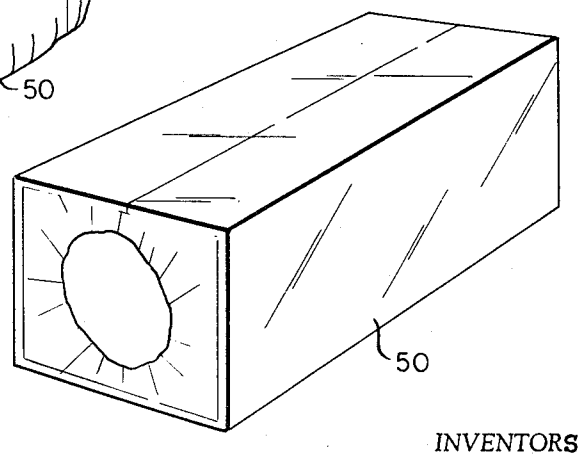


FIG. 6



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CONTAINER AND METHOD FOR PACKAGING MATERIAL SENSITIVE TO CONTAMINANTS

BACKGROUND OF THE INVENTION

This invention relates to the packaging of material sensitive to contaminants and, more particularly, to a container therefor.

Many materials which are sensitive to contaminants, e.g., polyethylene terephthalate film destined for use as a base film for magnetic tape, present difficult problems in packaging the material for shipment. Not only must great care be taken to protect the material from damage due to impact, but also the container must present an effective barrier to contaminants from the outside. But merely having these measures of protection is not enough. If the container is sealed by fastening the flaps thereof in place with means such as staples or glue, merely opening the container will generate sufficient dust and particulate matter to contaminate the materials stored within the container. It is also highly desirable to avoid any method of packaging the material which involves the need for maneuvering it during the packaging operation; such methods involve the possibility of damage to roll surfaces.

Another problem encountered by a commercial film manufacturing facility is the need for a large number of containers of different lengths to accommodate the wide variety of film lengths sold. If one tries to reduce the number of different container lengths, it results in using a longer container than required in many cases which must be filled with stuffing material between the roll ends and the end walls. Such stuffing material is a prime source of contamination internal to the container.

Finally, it is desirable to provide a container which on opening will present the material stored therein in a free-standing position without the need for maneuvering to remove it from the container.

DETAILED DESCRIPTION OF THE INVENTION

The packaging of materials sensitive to contaminants can be improved in accordance with the instant invention which is particularly pointed out in the appended claims and is illustrated, in its preferred embodiments, in the accompanying drawings wherein:

FIG. 1 is a perspective view of the elements which make up the container of this invention;

FIG. 2 is the same perspective view of the elements described in FIG. 1 illustrating how a roll of material fits therein;

FIG. 3 illustrates the container of the invention covered with two sleeves of heat-shrinkable plastic film;

FIG. 4 illustrates the container of the invention after the film has been shrink-fitted around the container;

FIG. 5 illustrates the container of the invention covered with a single sleeve of heat-shrinkable plastic film of extended length; and

FIG. 6 illustrates the container of FIG. 5 after the film has been shrink-fitted around the container.

Referring now to the drawings, a container body member **10** is made up of bottom wall **11**, side walls **12** and **13** and two portions of the top wall **14** and **15**. All the walls and portions thereof **11** through **15** are integral with the body member **10** which is preferably formed of a material such as corrugated Kraft board

sheet. The boundaries, e.g., **16**, between the walls such as bottom wall **11** and side wall **12** are formed by creasing the sheet material. This is preferably done in such a way that the crease retains some resilience so that the body member **10** tends to spring open as illustrated in FIGS. **1** and **2** when not restrained. End wall members **17** and **18** each have four inwardly directed flaps arranged along their peripheries: end wall member **17** has top flap **19**, bottom flap **20** and two side flaps **21** and **22**; and end wall member **18** has top flap **23**, bottom flap **24** and two side flaps **25** and **26**. Again, it is preferred that the creases which form the boundaries between the end wall members and their flaps be resilient. It may be desirable to fasten flaps **20** and **24** to the interior side of bottom wall **11** along the respective ends thereof, since in opening the container as will be described hereinafter it will not be necessary to remove those flaps from their fastened position on bottom wall **11**; staples or adhesives can be used without the problems discussed hereinabove. If desired, the same result as fastening of the end wall flaps **20** and **24** to the bottom wall **11** can be accomplished by cutting the body member **10** and both end walls **17** and **18** from a single sheet of corrugated board making all walls integral.

A roll of plastic film material **30** wound on a concentric core (not shown) is supported between the pair of end-suspension support panels **31** and **32**. Suitable means of suspension is accomplished by the insertion of a flanged plug (not shown) through a central opening in each of panels **31** and **32**. The plug also engages the interior of the concentric roll core (not shown). Such means of suspension are well known to those skilled in the art. A particularly suitable end-suspension support panel for use in connection with this invention is that shown and described in assignee's copending U.S. patent application of S. B. Cothran and C. A. Henry, Ser. No. 60,422, filed concurrently herewith.

To assemble the container, the body member **10** can be formed into walls **11** through **15** by longitudinal creases and cut to an over-all length somewhat greater than the over-all length of roll **30** with its support panels **31** and **32**. End wall members **17** and **18** are formed of a size and shape that will closely fit over panels **31** and **32**, respectively, when the container is in the closed position.

If desired, flaps **20** and **24** can be fastened into position along the ends of bottom wall **11** by staples or other suitable means. End panels **31** and **32** are mounted on a roll of material **30** as described above and the roll can be lowered onto bottom wall **11** with end panels **31** and **32** resting on the interior side of flaps **20** and **24**, respectively. End walls **17** and **18** can then be pressed up flush against panels **31** and **32**, respectively. Walls **12** and **13** are then brought to a vertical position with flaps **21**, **22**, **25** and **26** held in position inside the container by walls **12** and **13**. Flaps **19** and **23** are depressed downward and wall portions **14** and **15** are placed thereover holding those flaps in position inside the container.

With wall portions **14** and **15** held in a horizontal position defining the top wall of the container, a tubular sleeve of heat-shrinkable plastic film **40** (e.g., a sleeve of polyvinyl chloride film) is slipped around the entire body member **10** of the container as shown in

FIG. 3. Other suitable films for making such sleeves are heat-shrinkable films of polyethylene, polypropylene, polyethylene terephthalate, and the like. Holding wall portions **14** and **15** may be accomplished by temporary holding means such as a fugitive adhesive which would adhere the underside of portions **14** and **15** to the top side of flaps **19** and **23** but would cease to function as an adhesive shortly after the container is assembled and thus would not continue to hold the portions **14** and **15** in place. An easily-removed mechanical brace or the like can serve the same function as long as it is removed before the sleeve is shrunk on. Another sleeve of similar heat-shrinkable plastic film **41** is slipped around the container so as to cover the end walls **17** and **18** as shown in FIG. **3**. The container walls are loosely held in position at this point. Next, the entire container with sleeves **40** and **41** in position is subjected to an exterior source of heat sufficient to cause the heat-shrinkable plastic film to be shrink-fit tightly around the container as shown in FIG. **4**. Suitable means such as heat tunnels are well known in art.

Although sleeves **40** and **41** are depicted as not enveloping the entire surface of the container, that can be done by making sleeve **40** coextensive in width with the length of the container and sleeve **41** coextensive in width with the width of the container. The two sleeves can be heat sealed together, if desired, along the vertical edges of the end walls **17** and **18** to seal the entire container. Moreover, a third sleeve (not shown) can be placed around the container so as to cover end walls **18** and **19** and side walls **12** and **13**; after heat shrinking all such sleeves, the container would be sealed at all sides and edges thereof.

FIGS. **5** and **6** illustrate an alternative way of fitting the plastic film around the container. In this embodiment, sleeve **50** corresponds to sleeve **40** in FIG. **3** but is of extended length as shown. Preferably, in this embodiment, sleeve **50** is formed from a biaxially-oriented film so that shrinkage will occur in both directions. When the container with sleeve **50** in position is subjected to an exterior source of heat sufficient to cause the heat-shrinkable plastic film to shrink-fit tightly around the container, the extended length of the sleeve **50** shrinks tightly against end walls **17** and **18**. Thus, all edges and openings of the container are covered thereby protecting the contents from exterior contamination.

The material packaged and shipped in the container as described hereinabove is tightly held suspended between end panels **31** and **32** such that any movement of the roll during shipment is effectively prevented. Moreover, damage to the roll surface is greatly inhibited by the distance between the roll surface and the walls of the body member **10**. Wrapping the exterior of the container with the plastic material greatly inhibits entry of contaminants through openings, cracks and the like.

One of the greatest advantages provided by this invention, however, is attendant in opening the container. This can be accomplished by slitting the plastic film covering the container. When this is completed, the plastic film portions fall away and the resilience in the creases between the walls of body member **10** and the flaps of end walls **17** and **18** (plus any entrapped air) cause the container to spring open to a position similar to that depicted in FIG. **2** leaving the roll of material **30** suspended between panels **31** and **32** in a free-standing position permitting easy access from all directions without manipulating the material, and thereby decreasing the risk of damaging it. Also, this method of opening does not generate particulate matter which can contaminate the material before it is removed for use.

Another outstanding feature of the invention is that of versatility. By this it is meant that it is no longer necessary to have a wide variety of lengths of containers to accommodate the many different lengths of film rolls produced in a commercial film manufacturing plant. Neither is it required to stuff the ends of a ready-made container to prevent jostling movement of a roll significantly shorter than the container. These advantages are realized because a large number of standard size end walls like **17** and **18** with the flaps thereon can be made up to receive standard size panel members such as **31** and **32**. No matter how long the roll or how little material is wound on it, a single size panel and end wall can be employed. The only varying factor will be length of the body member **10**. However, body members can be readily cut to custom lengths from longer sections. Even in the body members, the widths of walls **11** through **15** will be standardized to go with the standard size panels and the end walls. Eliminating the need for stuffing material to fill void spaces between the roll ends and container ends eliminates a prime source of contamination internal to the container. Shrinkwrap encapsulation provides a barrier to moisture, air-borne particulate contamination, etc. from sources external to the package. The wrap-around concept of applying the container reduces the need for maneuvering the roll in certain axes thereby reducing the probability of damage of roll surfaces, as is inherent with existing end-opening containers.

As many widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that this invention is not limited to the specific embodiments thereof except as defined in the appended claims, and all changes which come within the meaning and range of equivalence are intended to be embraced therein.

We claim:

1. In a method of packaging a material sensitive to contaminants, the steps of

enclosing opposing ends of said material with a pair of separate end walls each having inwardly directed flaps arranged along its periphery,

enclosing the remainder of the material with an integral body member having a top wall, a bottom wall, and a pair of side walls, which walls substantially cover said top, bottom and sides,

holding the flaps of said end walls in position solely by positioning said flaps inside and in contact with the walls of said body member, and

shrink-fitting a plastic film around said body member and said end walls.

2. The method as defined in claim **1** wherein said shrink-fitting is accomplished by placing a sleeve of heat-shrinkable plastic film around said body member and a sleeve of heat-shrinkable plastic film around said end walls and exposing said films to sufficient heat to cause them to shrink tightly around said body member and end walls.

3. The method as defined in claim 1 wherein one flap on each end wall is fastened to the inside of said bottom wall.

4. In a method of packaging a roll of plastic film wound on a cylindrical core, which film is sensitive to contaminants, the steps of

suspending said roll between a pair of end-suspension support panels,

enclosing each of said panels with a closely fitting separate end wall having inwardly directed flaps arranged along its periphery,

enclosing the remainder of the space between said panels with an integral body member having a top wall, a bottom wall, and a pair of side walls, which walls substantially cover said top, bottom and sides,

one flap on each end wall being fastened to the inside of said bottom wall,

holding the remaining flaps of said end walls in position solely by positioning said flaps inside and in contact with the walls of said body member, and

shrink-fitting a plastic film around said body member on said end walls.

5. The method as defined in claim 4 wherein said shrink-fitting is accomplished by placing a sleeve of heat-shrinkable plastic film around said body member and a sleeve of heat-shrinkable plastic film around said end walls and exposing said films to sufficient heat to cause them to shrink tightly around said body member and end walls.

6. The method as defined in claim 4 wherein one flap on each end wall is fastened to the inside of said bottom wall.

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