

[54] **PACKAGING METHOD**

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[52] U.S. Cl..... **53/34, 53/27, 53/227**

[51] Int. Cl..... **B65b 11/54**

[58] Field of Search..... 52/27, 30, 33, 34, 221, 52/227, 261, 370; 215/38 A; 229/DIG. 12

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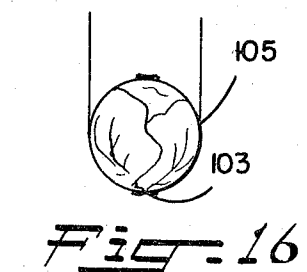
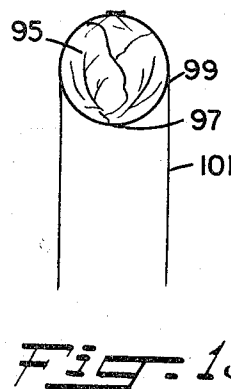
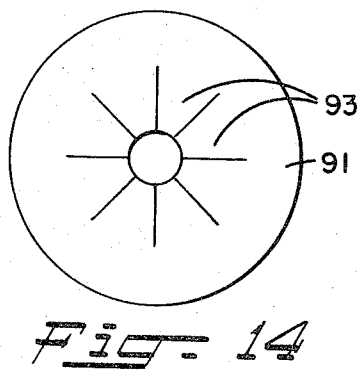
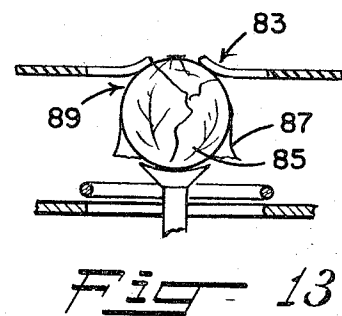
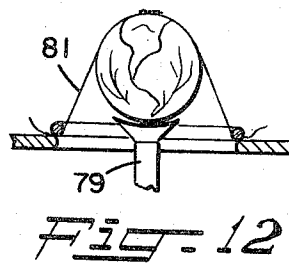
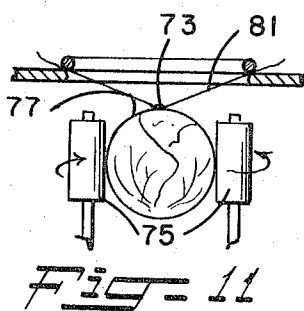
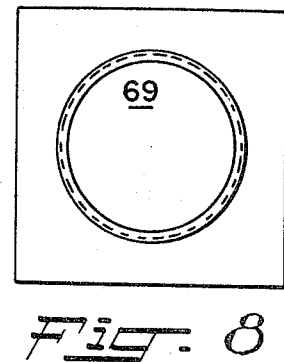
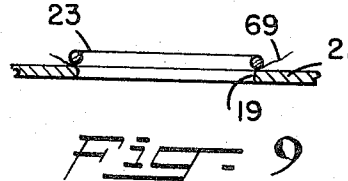
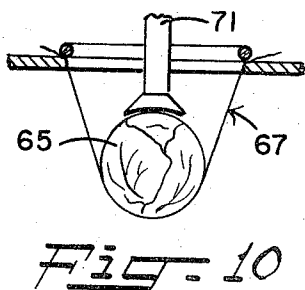
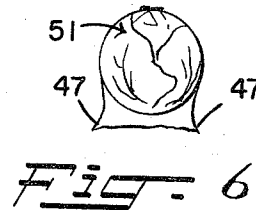
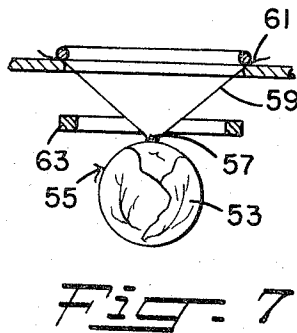
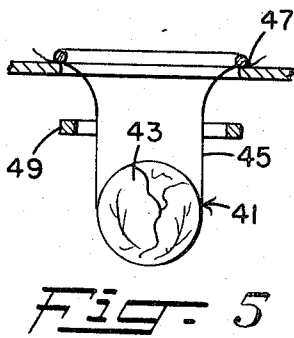
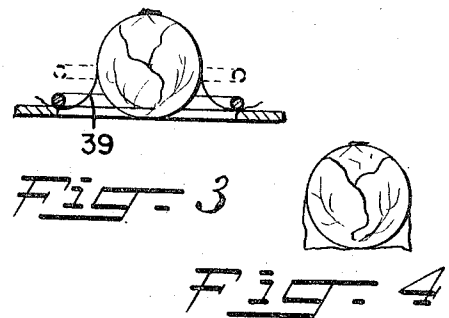
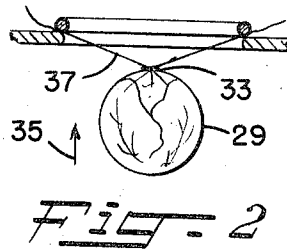
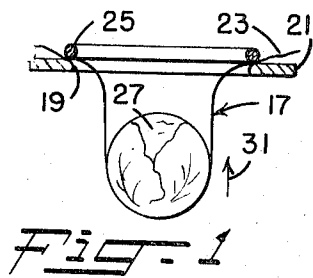
[57] **ABSTRACT**

A packaging method in which an article is contained within a flexible bag which is twisted at a location between its open end and the article to provide an envelope encasing the article, after which the portion of such bag extending between the twisted section and the open end thereof is urged as an envelope onto the encased article. Preferably, the bag is formed of a stretched or stretchable, thermoplastic web, with at least an annular section of the overlying envelope being at least partially relaxed from a stretched condition, so as to snugly grip the article encasing envelope.

7 Claims, 16 Drawing Figures



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PACKAGING METHOD

The present invention is directed to an improved packaging method.

U.S. Pat. No. 3,269,090 is typical of packaging methods in which a single sheet of wrapping material is enveloped about an article after which its edge portions are bunched, and/or twisted together, and sealed in place. With such method the overlapping folds of wrapping material, as well as the bunched and/or twisted portions thereof, provide the resulting package with a rather crude and unappealing appearance. Moreover, with the described method the bunched and/or twisted portions of the wrapping material must be bonded with care to assure the integrity of the resulting seal and thus this method is generally slow. Accordingly, a primary object of this invention is to provide a generally new or improved and more satisfactory packaging method.

Another object is to provide a packaging method in which an article is snugly encased within an integral web which is held in place without sealing or flexible ties or other web attaching devices.

Still another object is to provide a packaging method in which a web which is encased about an article by twisting yet exhibits a minimum of overlapping folds.

A further object is the provision of a packaging method in which an article is completely encased by a web, with at least portions of such article being covered with a double layer of such web.

A still further object is the provision of a method for packaging an article in a web of stretchable material in a manner as to completely encase the article and retain the web in place without sealing or web attaching devices and without damage to the packaged article.

A still further object is the provision of an article packaging method which is adapted for practice either manually or by machine and which renders article packaging a simple and inexpensive operation.

These and other objects are accomplished in accordance with the present invention by a packaging method in which an article is first contained within a flexible bag, the bag then being twisted upon itself at a location between its open end and the article to provide an envelope snugly encasing the article, after which the portion extending between the twisted section and the open end thereof is urged as an envelope into overlying relationship with the article encasing envelope. Thus, in the resulting package a pair of telescoped envelopes are disposed about the article, one of which encases the article and is closed at one end by a twisted section, while the other of which has a closed end defined by the twisted section and overlies the article encasing envelope.

In the preferred embodiments of the invention, the bag is formed of a flexible, thermoplastic web with at least an annular section of that portion of the bag which extends between the twisted section and the open end thereof being in a stretched condition when it is urged as an envelope onto the article encasing envelope. Relaxation of such section from its stretched condition causes the overlying envelope to snugly grip the article encasing envelope. Heat may be applied to the web forming the bag to encourage stretching of selected areas thereof and/or to effect relaxation of selected stretched areas to provide for the snug engagement between the overlying and article encasing envelopes.

The annular section of that portion of the bag extending between the twisted section and open end thereof may be stretched subsequent to the twisting of such bag. Stretching of this annular section may be effected prior to or concomitantly with the disposition of such annular section into overlying relationship with the article encasing envelope. Alternatively, after containing the article and prior to twisting, at least the portion of the bag extending between its open end and the contained article may be stretched. With this latter procedure, the area of the bag which is subsequently twisted would be in at least a partially stretched and thinned condition so that the twisted section ultimately provided would be rather compact and would be accompanied by a minimum of folds. In the above described procedures, the bags employed may be preformed and, desirably but not necessarily, are of such size that the article encasing envelope snugly hugs the packaged article and the overlying envelope snugly hugs the article encasing envelope and covers about one-half or more of the outer surface thereof.

As a still further alternative, the article which is to be packaged may be contained within a heat-shrinkable bag formed of flexible, thermoplastic, polymeric material which has been uniaxially or biaxially stretched and oriented prior to or during bag fabrication or during the insertion therein of the article which is to be packaged. For example, the bag employed may be preformed from a thermoplastic, polymeric web or film which has been molecularly oriented along one or both of its axial directions or a web of unoriented or partially oriented thermoplastic, polymeric material may be oriented by being stretched as a bag about the article which is to be packaged or a preformed bag formed of unoriented or partially oriented thermoplastic, polymeric material may be stretched and oriented during the insertion therein of an article having transverse dimensions which are slightly larger than the bag opening. With all three of these procedures, the bag portion extending between the open end thereof and the contained article will be in at least a partially stretched condition and, when subsequently twisted, will provide a compact section having a minimum of folds.

Shaping a web as a bag about an article, as mentioned above, may be achieved by disposing a web of stretchable material across an opening extending through a plane and then moving the article which is to be packaged in one direction against the web and completely through such opening. During this movement of the article, the web yields into the form of a bag which conforms at least generally with the article configuration. This bag is then twisted to provide an envelope which encases the article, after which this encased article is moved completely through the described opening but in a direction opposite to that of its first movement therethrough. By this last mentioned movement, the stretched portion of the bag extending between the twisted section and the open end thereof is embraced as an envelope about the encased article. stretched practice

As heretofore mentioned, the package provided by the above described procedure will have a pair of telescoped envelopes about the article with one of such envelopes encasing the packaged article and being at least partially closed at one end by a twisted section, while the other of such envelopes has a closed end, as defined by such twisted section, and overlies the article encas-

ing envelope. In accordance with the preferred packaging methods described, at least an annular section of the overlying envelope will be in a stretched condition when applied onto the article encasing envelope. Thus this stretched section, when relaxed, will snugly grip or hug the article encasing envelope and will secure the package. As will be more apparent from the following detailed description of the invention in the practice of the method of the present invention the peripheral edge of the article containing bag undergoes no significant stretching, and thus in the finished package such edge protrudes annularly from the package and serves well as a package-opening tab.

Access to the packaged article can be achieved by simply drawing the encased article out from the overlying envelope, followed by untwisting of the article encasing envelope. With bags formed of certain materials, the package may be reclosed and perhaps exhibit its original protective characteristics even after repeated opening of the package.

The term "article," as employed throughout the description and claims, is intended to cover any mass which may be comprised of a single unit or multiplicity of elements. Where preformed bags are employed, the article being packaged may be a liquid or a solid which is comprised of a single unit or a plurality of like or different elements. On the other hand the procedure involving the stretching of a web into a bag form is best suited for use with rigid or solid, unitary articles. Additionally, the term "web" is intended to include unbroken or continuous flat films, foamed films having a closed cell or reticulated structure, nettings and the like.

In the practice of the above-described method of the present invention the bag is twisted to at least such degree as to prevent the article from being forced through the twisted section during the subsequent stage of the method and, desirably to completely encase the article, yet minimize the introduction of folds along the twisted section of such bag. By moving that portion of the bag containing the article toward its open end during bag twisting, the twisted section will be located nearer to the article and will provide for a snug encasement of the article and a more compact, secure, and attractive package.

The length of that portion of the bag which extends between the twisted portion and the open end thereof may be varied so that the overlying envelope of the resulting package covers only a portion, and preferably at least one-half, or all of the encased article. Shrinkage of the annular portion of the overlying envelope may be effected by the ambient atmosphere or a heated gas.

While the package provided by the method of the present invention has been described as including a pair of telescoped envelopes about the packaged article, it will be apparent that the packaged article may be enclosed within three or more of such envelopes, if desired. For example, the portion of the bag extending between its open end and the contained article may be of such length that, after formation of the article encasing and overlying envelopes, as described above, such portion may be again twisted at a location adjacent to the end of the article encasing envelope which is remote from its twisted end and then urged onto the enclosed article as a second overlying envelope. If desired, such bag portion may be subsequently twisted at a location adjacent to the first twisting thereof and then urged

onto the enclosed article as a third overlying envelope. Obviously, this procedure can be repeated as long as the material forming such bag can be stretched or flexed as to accommodate itself to the outer dimensions of the package as they are increased with each added overlying envelope.

In accordance with the preferred method of the present invention the bag employed in packaging may be formed of a flexible, thermoplastic web material which is stretched or is capable of stretching, without rupturing, under the forces which are to be applied thereto and is adapted to be subsequently shrunk by heat. Oriented, partially oriented or unoriented webs formed of thermoplastic polymeric materials are well adapted for use in the present invention and include, for example, webs formed of polyvinyl chloride, polyethylene, polypropylene, rubber hydrochloride, saran, etc. The webs may be of laminated construction, providing all the layers of such web are capable of yielding as a unit to the necessary degree, and may be colored and/or printed with desired indicia. As heretofore mentioned, the webs or bags may be heated to encourage the flow of polymer molecules during the web stretching and to release tensions therein when shrinkage is desired.

In a simple form, the apparatus employed in the method of the present invention includes a means for supporting a bag at its open end or for securing a web in position across a fixed opening through which may be projected the article which is to be packaged. The remaining manipulative steps of the method of the present invention may be effected manually or automatically by machines which are within the purview of one skilled in the art.

For a greater understanding of this invention, reference is made to the following detailed description and drawing in which

FIGS. 1-3 are diagrammatic illustrations of successive steps of the method of the present invention;

FIG. 4 is an article package as produced by the method shown in FIGS. 1-3;

FIG. 5 illustrates a modification of the method shown in FIGS. 1-3;

FIG. 6 illustrates an article package as produced by the method shown in FIG. 5;

FIG. 7 is a view similar to FIG. 5 illustrating another modification of the method shown in FIGS. 1-3;

FIGS. 8-13 diagrammatically illustrate successive steps of another modification of the method of the present invention;

FIG. 14 is a plan view of a portion of an apparatus which is adapted for use with the method of the present invention and

FIGS. 15 and 16 illustrate steps of still another modification of the method of the present invention.

With reference to FIGS. 1-3, reference character 17 denotes a preformed bag which extends through an opening 19 in table 21 and has its peripheral edge portion 23 gripped against the surface of such table by a movable ring or hoop 25. An article 27 which is to be packaged is inserted and contained within the bag 17 after which the bag is twisted upon itself to provide an envelope 29 which encases the article 27, as shown in FIG. 2. As indicated by the arrow 31 in FIG. 1, the bag 17 together with the contained article 27 is raised while the bag is twisted to insure that the twisted section 33 is positioned close to the encased article.

To complete the packaging, the encased article is moved upwardly as indicated by the arrow 35 to cause the portion 37 of the bag to overlie the encased article as an envelope 39. During the terminal portion of this upward movement, the ring or loop 25 is elevated into a position, as shown by broken lines in FIG. 3, to release the peripheral edge of the original bag and permit the same to assume a position as shown in the article package illustrated in FIG. 4.

Of significance is that the bag 17 is twisted to at least such degree as to prevent the article 27 from being forced through the twisted section 33 during the step illustrated in FIG. 3 and, more desirably, is twisted to such extent that the envelope 29 completely encases the article. Excessive twisting should be avoided to minimize folds along the twisted section 33 and generally a twist of about one-half turn is sufficient.

The bag 17 may be preformed from a heat-shrinkable material, as for example from a web of uniaxially or biaxially oriented polypropylene, whereby the package shown in FIG. 4 may be heated to cause the overlying envelope 39 to shrink and snugly hug the embraced article. Alternatively, the bag 17 may be formed from a web of stretchable material, as for example an unoriented or partially oriented web of polypropylene. Such bag can be stretched during article insertion if the transverse dimensions are slightly smaller than those of the article which is to be packaged and/or during the movement of the encased article against the bag portion 37, as illustrated in FIG. 3. Subsequent heating of such stretched bag would cause the overlying envelope 39 to shrink and tightly embrace the encased article.

A modified procedure is illustrated in FIG. 5 wherein a bag 41 formed of a stretchable thermoplastic material, such as unoriented or partially oriented polypropylene, is gripped in the same manner as described with reference to FIGS. 1-3 after which an article 43 is inserted therein. Before twisting, the portion 45 of the bag 41 extending between its gripped edge 47 and the contained article 43 is stretched, as by drawing or pulling the article and bag downwardly relative to the support table. The bag portion 45 may be elevated in temperature by a heater 49 to encourage the stretching thereof.

After this stretching stage and while the portion 45 is in its stretched condition, the bag and contained article are subjected to the steps shown in FIGS. 2 and 3 and then heated to effect shrinkage of at least the overlying stretched envelope to provide a package 51 as shown in FIG. 6. Since the peripheral edge 47 of the bag 41 undergoes no apparent stretching or shrinkage, it protrudes from the package 51 and may be employed for gaining access to the packaged article.

FIG. 7 illustrates a further modification wherein an article 53 which is to be packaged is contained within a bag 55, similar to the bag 41 heretofore described. This bag 55 is twisted at 57 and then stretched along the portion 59 extending between its twisted section 57 and its gripped edge 61. The encased article is then manipulated in a manner as shown in FIG. 3 and heated to cause shrinkage of the stretched portion of the overlying envelope. The resulting package is similar to that as shown in FIG. 6. A heater 63 may be employed to encourage stretching of the portion 59 and a similar heater, not shown, may be used to shrink such portion after it has been urged onto the encased article as an envelope.

In lieu of employing preformed bags as described above, an article 65 which is to be packaged may be initially contained within a bag 67 which is formed in situ. Thus, as shown in FIGS. 8 and 9 a web 69 of stretchable thermoplastic material, such as an unoriented polyvinyl chloride film, may be disposed across the opening 19 of the table 21 and clamped in place by the ring or hoop 23. As seen in FIG. 10, the article 65 is urged against the web 69 by a ram 71 until the article is below the plane of the table surface, thus shaping the same into the desired bag form. This bag 67 is then twisted at 73 as shown in FIG. 11, either manually or by rollers 75 to provide an envelope 77 which completely encases the article 65. As shown in FIG. 12, and in a manner similar to that illustrated in FIG. 3, the encased article is moved up through the table opening 19 by a ram 79 to cause the portion 81 of the bag 67 to overlie the encased article as an envelope. The package provided by this procedure is then heated to effect shrinkage of the overlying portion 81 into snug contact with the encased article, with the final package being similar to that shown in FIG. 6.

In all of the above-described procedures, a deflector 83 may be employed in a manner as shown in FIG. 13 in sweeping onto the encased article, such as indicated at 85, that portion 87 of a bag 89 which is to form the overlying envelope in the resulting package. The deflector 83 as shown in FIG. 14, simply consists of a perforated disk 91 having a series of flexible, radially extending fingers 93.

In each of the packages shown in FIGS. 4, 6 and 13 an article is enveloped within an article encasing envelope, such as 29, and a single overlying envelope, such as 39. With all of the above-described procedures, and particularly with those shown in FIGS. 1-7, the package may be provided with additional overlying envelopes if desired. Thus, as shown in FIG. 15, and in a manner as heretofore described, an article 95 may be provided with an encasing envelope 97 and an overlying envelope 99. The bag portion 101 may be then twisted at 103 as shown in FIG. 16 and then applied as a second overlying envelope 105. If desired, this procedure may be repeated further by twisting the bag portion 101 at a location adjacent to the first twist section and then disposing the same onto the article as a third overlying envelope. Once all desired overlying envelopes have been provided, the package may be heated to effect shrinkage of at least the outermost of such envelopes.

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

I claim:

1. An article packaging method including the steps of containing an article which is to be packaged within a flexible bag, twisting the bag on itself at a location between its open end and the contained article to provide an envelope encasing the article, stretching at least an annular section of the portion of the bag extending between the twisted section and the open end thereof, urging such portion of the bag onto the encased article as an overlying envelope, and at least partially relaxing the stretched section of the overlying envelope to cause the same to engage snugly with the article encasing envelope.

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2. A method as defined in claim 1 wherein heat is applied to at least the stretched section of the overlying envelope to relax the same from its stretched condition.

3. A method as defined in claim 1 wherein the bag is preformed from a stretchable material and has transverse dimensions which are slightly less than those of the article which is being packaged whereby such bag is stretched transversely during insertion therein of the article which is to be packaged.

4. A method as defined in claim 1 wherein the bag is preformed of a stretchable material and wherein at least the annular section of that portion of the bag extending between its twisted section and the open end thereof is stretched concomitantly as such portion is urged onto the encased article as an overlying envelope.

5. A method as defined in claim 1 wherein the annular section of that portion of the bag extending between

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the twisted section and the open end thereof is stretched after such bag is twisted upon itself and before such portion is urged as an envelope onto the article encasing envelope.

6. A method as defined in claim 1 wherein the article which is to be packaged is contained by stretching a web of flexible, stretchable material as a bag about such article.

7. A method as defined in claim 1 wherein the portion of the bag extending between the twisted section and the open end thereof is of a length substantially greater than the encased article and further including the steps of twisting such portion at a location adjacent to the end of the encased article remote from the first location of bag twisting, and urging the remainder of such portion onto the packaged article as a second overlying envelope.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,851,440 Dated December 3, 1974

Inventor(s) Eugene G. Horsky

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 1, line 24, "web which is encased" should read
--web is encased--.

Col. 2, lines 60 and 60, "stretched practice" should be
deleted.

Col. 3, line 8, "practive" should read --practice--.

Signed and sealed this 11th day of March 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks