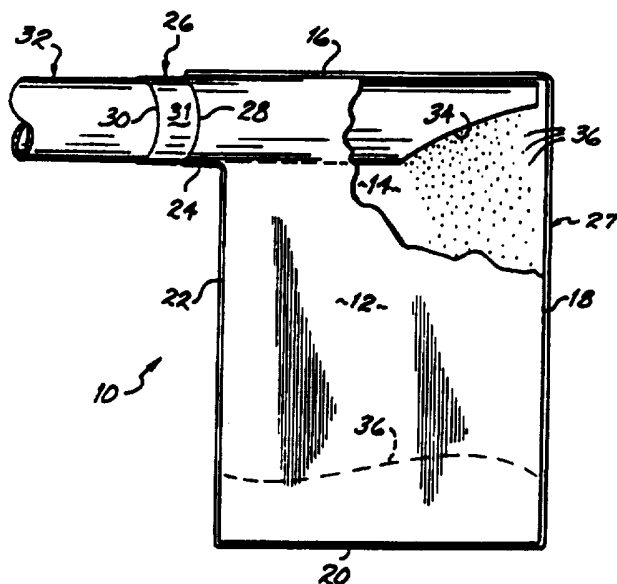




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<p>(21) International Application Number: PCT/US95/15958 (22) International Filing Date: 12 December 1995 (12.12.95) (30) Priority Data: 08/353,908 12 December 1994 (12.12.94) US (71) Applicant: SYNTHETIC PRODUCTS COMPANY [US/US]; 1000 Wayside Road, Cleveland, OH 44110 (US). (72) Inventors: KALANTA, James, J.; 20 Julia Court, Milford, CT 06460 (US). CAMMORATO, Gary, C.; 204 Diana Drive, Chalfont, PA 18914 (US). (74) Agents: JOSEPHIC, David, J. et al.; Wood, Herron & Evans, 2700 Carew Tower, Cincinnati, OH 45202 (US).</p>		<p>(81) Designated States: AL, AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, LS, MW, SD, SZ, UG).</p> <p>Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>

(54) Title: BAG AND METHOD FOR PACKAGING GRANULAR COMPOUNDS



(57) Abstract

A bag and method for packaging granular compounds and especially dust-prone, lead-based stabilizer compounds. The bag (10) is preferably formed from a thermoplastic film, such as low molecular weight ethylene vinyl acetate copolymer (EVA) film which is initially sealed around substantially its entire periphery (16, 18, 20, 22) prior to filling the bag (10) with the lead-based heat stabilizer compound (36). The bag (10) includes a relatively small diameter spout portion (26) extending outwardly from a main body portion (12). The spout portion (26) is sealed except for an open end (28) through which the bag (10) may be filled with granular compound (36) by a filling tube (32). The end of the spout portion (26) includes a cuff (31) which is folded back onto the spout portion (26) to prevent contamination thereof with the granular compound (36). When the cuff (31) is unfolded, a heat sealable area is defined between an outer edge (28) of the spout portion and a discretely formed fold line (30).

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BAG AND METHOD FOR PACKAGING GRANULAR COMPOUNDS**Background of the Invention**

The present invention generally relates to a bag and method for packaging granular compounds, especially lead-based, dust-prone granular compounds.

5 Lead-based compounds such as dibasic lead phthalate, tribasic lead sulfate, dibasic lead phosphite, dibasic and normal lead stearates, as well as others, are considered some of the most effective and least expensive polyvinylchloride (PVC) heat stabilizers. Lead-based compounds such as these are widely used as additives in
10 many applications using PVC, such as in the extrusion of wire coverings, despite their chronic toxicity. It is also well known that chronic toxicity problems involving lead-based compounds may be avoided by eliminating inhalation and ingestion of airborne dusts

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containing these lead compounds. Nonetheless, necessary precautions against inhalation and ingestion are often not taken by the personnel handling lead-based powders during the batch processing of PVC.

5 One possible solution to the problem includes isolating the lead-based powders, or other dust-prone forms of lead-based compounds, within a contained system which would not expose the personnel to airborne, lead-containing dust created during batch processing. Another possible solution is to utilize lead-based PVC
10 heat stabilizers which have been processed into a "non-dusting" form, i.e., a form which does not create the airborne contaminants created by powders. Such non-dusting forms include, for example, prills and pastes. The installation of completely contained systems is very expensive and is therefore not a practical solution for most
15 applications. The use of lead-based compounds in non-dusting form also adds expense and, in addition, reduces the ease of incorporating the lead stabilizer into the PVC and leaves the problem of container disposal which is of critical environmental importance.

 A low melting temperature ethylene vinyl acetate
20 copolymer (EVA) film has been disclosed in U.S. Patent No. 5,120,787 (the '787 patent) as being useful for making bags and compounding tub liners. The '787 patent discloses that rubber dispersions contained in the bags or tub liners may then be added to high intensive mixers whereupon the contents thereof are mixed into

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the other contents in the mixer. The EVA film completely melts and disperses into the mixture.

The '787 patent, however, does not disclose any solution to the specific problems associated with lead-based powders. In this regard, while the formation of bags from low melting temperature EVA film is generally disclosed by the patent, the packaging of lead-based compounds in bags formed from this EVA film presents significant problems. For example, lead stabilizer powders are highly energy absorptive and, for this reason, they will often prevent the effective heat or ultrasonic sealing of the bag opening merely by being present at the open edges during the heat sealing operation. An ineffective seal at the bag opening may take the form of either an actual leak or a weakened portion of the seal which is likely to break open and cause a leak. The high density of the lead-based stabilizer powders exacerbates the problem by creating leaks through physical pressure applied at portions of the seal weakened due to the presence of the lead stabilizer powder during the sealing operation.

Certain bags have also been generally disclosed with filling spouts having a reduced diameter. Such bags are disclosed, for example, in U.S. Patent Nos. 2,918,958; 3,016,284; 3,051,605; and 3,208,661. These bags are not, however, directed to the specific problems mentioned above with respect to the packaging and containment of lead-based stabilizer compounds.

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It would therefore be desirable to provide a bag and a method of packaging powdered or other dust-prone forms of lead-based heat stabilizer compounds which would ensure full, effective sealing of the bag and its contents and allow the bag to be completely melted and dispersed when used, for example, in the batch processing of PVC.

Summary of the Invention

The present invention is directed to a bag and a method of packaging granular compounds, such as dust-prone, lead-based heat stabilizer compounds. More specifically, especially when packaging lead-based compounds, the bag is formed from a thermoplastic film which is preferably a low molecular weight EVA film. The bag is initially sealed around substantially its entire periphery prior to filling the bag with the lead-based heat stabilizer compound. The bag includes a main body portion and a reduced diameter spout portion or "snorkel mouth" extending outwardly therefrom. Preferably, the spout portion extends laterally from the main body portion of the bag adjacent to one end thereof. The spout portion is sealed about its periphery but includes an open end through which the bag may be filled with lead stabilizer compound by an inserted filling tube.

The end of the spout portion preferably includes a cuff which is folded back onto the spout portion. This cuff ensures that lead stabilizer compound does not contact the outer, unsealed edges

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of the spout portion during the filling operation. That is, since the outer, unsealed edges of the spout portion are folded over onto the outside of the spout portion, contact with the lead stabilizer compound being discharged into the bag is prevented. This, combined with the isolating effect of the spout portion itself, helps to completely prevent contamination of the outer, unsealed edges by lead stabilizer compound. As mentioned above, due to the energy absorptive properties of lead based compounds, such contamination would often result in disrupting the heat or ultrasonic sealing thereof after the filling operation and therefore create a weakened or leaking area in the seal. In addition, the isolated location and relatively small dimensions of the spout portion further prevent significant amounts of physical pressure from being exerted on the final, outer seal thereof.

The method of packaging lead-based stabilizer compounds according to the present invention includes providing a bag having a main body portion and a spout portion extending therefrom by sealing around the entire periphery of the main body portion but leaving an outer end of the spout portion open. The outer, open end of the spout portion is folded back into a cuff. A filling tube is inserted into the spout portion and the bag is filled with a dust-prone, lead-based stabilizer compound which may be a powder. When the bag is full, the filling tube is withdrawn from the spout portion and the cuff is unfolded. The outer, open end of the

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spout portion is then sealed by a heat sealing procedure. In this regard, as used throughout the specification and claims, the term "heat seal" broadly encompasses other forms of sealing by the use of radiant energy, such as ultrasonic energy. In the preferred embodiment, a defined fold line is formed by the cuff to indicate the uncontaminated area of the spout portion which should receive the heat or ultrasonic seal.

It is further contemplated that the "snorkel mouth" bag construction which includes the cuff and fold line for the purpose indicated above may be useful in applications other than the packaging of dust-prone lead-based compounds. Therefore, for any granular compound which would tend, for example, to interfere with the heat sealing of a bag as mentioned above, the use of a bag having a cuffed spout portion including a defined fold line for indicating where the final heat seal should be made would be particularly advantageous.

The bags and packaging methods of this invention, along with the various advantages and other aspects thereof, will be further understood with reference to the following detailed description thereof taken in conjunction with the accompanying drawings.

Brief Description of the Drawings

Fig. 1 is a front elevational view of a bag formed according to the present invention and shown in an empty condition;

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Fig. 2 is a front elevational view of a bag as in Fig. 1 but showing a filling tube inserted to fill the bag with lead-based stabilizer powder; and,

5 Fig. 3 is a front elevational view of a bag as in Figs. 1 and 2 but showing the bag filled with a quantity of lead-based stabilizer compound and completely sealed.

Detailed Description of the Preferred Embodiment

Referring to Figs. 1 and 2, a lead stabilizer bag 10 made according to the a preferred embodiment of the invention is
10 illustrated. Specifically, bag 10 includes two sheets 12, 14 (Fig. 2) of polymer film. The film is a heat sealable, low molecular weight ethylene vinyl acetate copolymer (EVA) having a low melting point, preferably below about 170° F. The preferred EVA copolymers useful in the bag and method of the present invention are disclosed
15 in U.S. Patent No. 5,120,787 (the '787 patent), the disclosure of which is hereby fully and expressly incorporated herein by reference. Generally, the EVA copolymer used in forming bag 10 includes a vinyl acetate content of at least about 25% and may include other resins, fillers and additives, such as those disclosed in the '787
20 patent, while maintaining the low melting temperature and heat sealing properties thereof.

Bag 10 is initially formed by sealing peripheral edges 16, 18, 20, 22 and 24 together, as by heat or ultrasonic seals. As further shown in Fig. 1, for example, bag 10 includes a reduced

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diameter spout portion 26 extending laterally from a main body portion 27. Spout portion 26 is defined between edges 24 and 16 of bag 10. In the bag's empty state shown in Fig. 1, spout portion 26 includes two unsealed, outer edges 28 which define the only opening to bag 10. Spout portion 26 further includes a discrete fold line 30 at a distance spaced inwardly from outer edges 28. Fold line 30 is preferably a crease in spout portion 26. The distance between fold line and outer edges 28 may be, for example, approximately 2 inches when spout portion 26 has a length of about 6½ inches and a width of about 5¼", and main body portion 27 has a length of about 28 inches and a width of about 13 inches.

As shown in Fig. 2, the outer end of spout portion 26 may be folded back into a cuff 31 defined between outer edges 28 and fold line 30. During a filling operation, a fill tube 32 is inserted through spout portion 26 and into main body portion 27 of bag 10. Fill tube 32 includes a converging open end 34 to aid in the insertion thereof and to allow lead stabilizer compound 36 to be discharged into bag 10. As mentioned above, any of the typical lead-based PVC heat stabilizer compounds, in powdered or other dust-prone forms, may be introduced into the bag depending on the needs of the application or the desires of the end user. These may include, for example, powdered forms of dibasic lead phthalate, tribasic lead sulfate, dibasic lead phosphite, and dibasic or normal lead stearates. When bag 10 is filled with the desired amount of lead-based

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stabilizer powder 36, such as the exact amount required to be added to a PVC batch mixer, filling tube 32 is withdrawn, cuff 31 (Fig. 2) is unfolded and a final heat seal 38 is placed between outer edges 28 and fold line 30 as shown in Fig. 3.

5 Referring now to Figs. 1-3, the preferred method of packaging lead-based stabilizer powders in a bag 10 of the present invention includes providing bag 10 with a main body portion 27 and a spout portion 26 extending therefrom with bag 10 including completely sealed edges around substantially the entire periphery thereof, i.e., at edges 16, 18, 20, 22 and 24, while leaving an outer end 28 of spout portion 26 open. The outer, open end 28 of spout portion 26 is folded back into a cuff 31 (Fig. 2) at fold line 30, preferably well prior to the insertion of filling tube 32 for the purposes of speeding the packaging process. Filling tube 32 is inserted into spout portion 26 and bag 10 is filled with a dust-prone lead-based stabilizer compound 36, such as a powder. When bag 10 is filled with the desired amount of lead stabilizer powder 36, filling tube 32 is withdrawn from spout portion 26 and cuff 31 is unfolded as shown in Fig. 3. Using outer edges 28 and fold line 30 of spout portions as boundary lines marking the area of spout portion 26 uncontaminated by lead stabilizer powder 36, a final heat seal 38 is applied therebetween to completely seal the periphery of bag 10. Bag 10 may then be added to a PVC mixer whereupon it will melt and completely disperse in the PVC.

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By way of the foregoing, it will be appreciated that a bag and method for packaging dust-prone lead stabilizer compound has been provided with the combined advantages of enabling fast, efficient addition of potentially hazardous lead compounds to PVC mixers while minimizing exposure of personnel to airborne particles containing lead compounds.

It is contemplated that the unique combination of a thermoplastic bag having a cuffed spout portion as described above would be advantageous for applications other than the lead stabilizer application detailed above but in which similar problems may exist. For these reasons, the invention in this broader aspect, should not be limited to the details given herein with respect to lead-based compounds.

While preferred embodiments of the present invention have been described above, various modifications will become readily apparent to those of ordinary skill without departing from the spirit and scope of the invention and Applicant therefore intends to be bound only by the claims appended hereto.

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WHAT IS CLAIMED IS:

1. **A bag for packaging dust-prone, lead-based stabilizer compounds, the bag comprising a film formed from an ethylene vinyl acetate copolymer and shaped to define a main body portion and a reduced diameter spout portion extending from said main body portion, said main body portion being sealed around a periphery thereof and said spout portion having an open outer end for allowing introduction of said dust-prone, lead-based compounds into said main body portion.**

5
- 10 2. **The bag of claim 1 wherein said bag is formed from two sheets of said ethylene vinyl acetate copolymer heat sealed about their periphery except at said open outer end of said spout portion.**
3. **The bag of claim 1 wherein said spout portion includes a cuff folded back at said outer end.**
- 15 4. **The bag of claim 3 wherein said cuff is defined between outer edges of said spout portion and a discrete fold line in said spout portion, said outer edges and said discrete fold line thereby defining boundary lines for receiving a final heat seal therebetween.**
- 20 5. **The bag of claim 1 wherein said spout portion extends laterally from one end of said main body portion.**

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6. The bag of claim 1 wherein said ethylene vinyl acetate copolymer has a vinyl acetate content of at least about 25% by weight and a melting point below about 170° F.

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7. A bag formed of a thermoplastic film and shaped to define a main body portion and a reduced diameter spout portion extending from said main body portion, said main body portion being sealed around a periphery thereof and said spout portion having an open outer end for allowing introduction of granular material into said main body portion, said spout portion further including a cuff folded back at a discrete fold line at said open outer end.
- 5

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8. A method of packaging a granular compound comprising the steps of:

providing a bag formed from a thermoplastic film and having a main body portion and a reduced spout portion, said bag being sealed around a peripheral portion thereof but open at an outer end of said spout portion and said spout portion including a cuff portion defined by a discrete fold line disposed at said outer end;

filling said bag with said granular compound through said spout portion;

10 unfolding said cuff portion; and,

heat sealing across said spout portion at a position between an outer edge of said spout portion and said fold line to completely seal said granular compound within said bag.

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9. A method of packaging a dust-prone, lead-based stabilizer compound comprising the steps of:

5 providing a bag formed from an ethylene vinyl acetate copolymer film and having a main body portion and a reduced spout portion, said bag being sealed around a peripheral portion thereof but open at an outer end of said spout portion;

filling said bag with said dust-prone, lead-based stabilizer compound through said spout portion; and,

10 heat sealing said spout portion to completely seal said dust-prone, lead-based stabilizer compound within said bag.

10. The method of claim 9 wherein further comprising the step of folding an outer end of said spout portion back into a cuff before filling said bag and unfolding said cuff before heat sealing said spout portion.

15 11. The method of claim 10 wherein said cuff is defined between an outer edge of said spout portion and a discrete fold line in said spout portion and the step of heat sealing said spout portion further includes placing a heat seal between said outer edge and said fold line.

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12. The method of claim 9 wherein the step of filling said bag further comprises introducing a dust-prone, lead-based stabilizer compound including at least one compound selected from the group consisting of dibasic lead phthalate, tribasic lead sulfate, dibasic lead phosphite, dibasic lead stearate and normal lead stearate.
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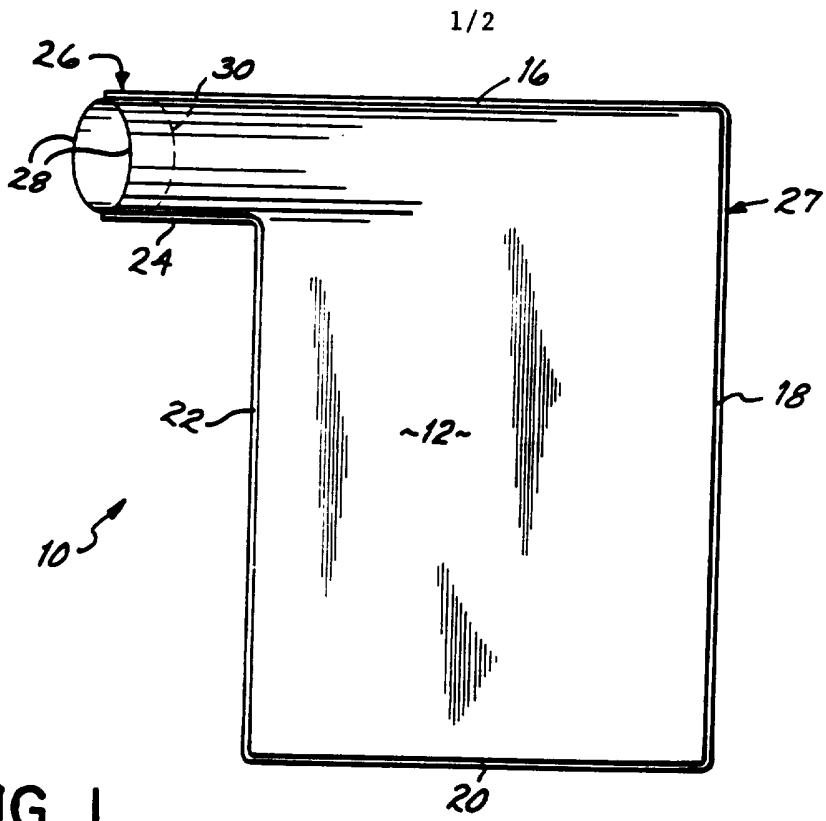


FIG. 1

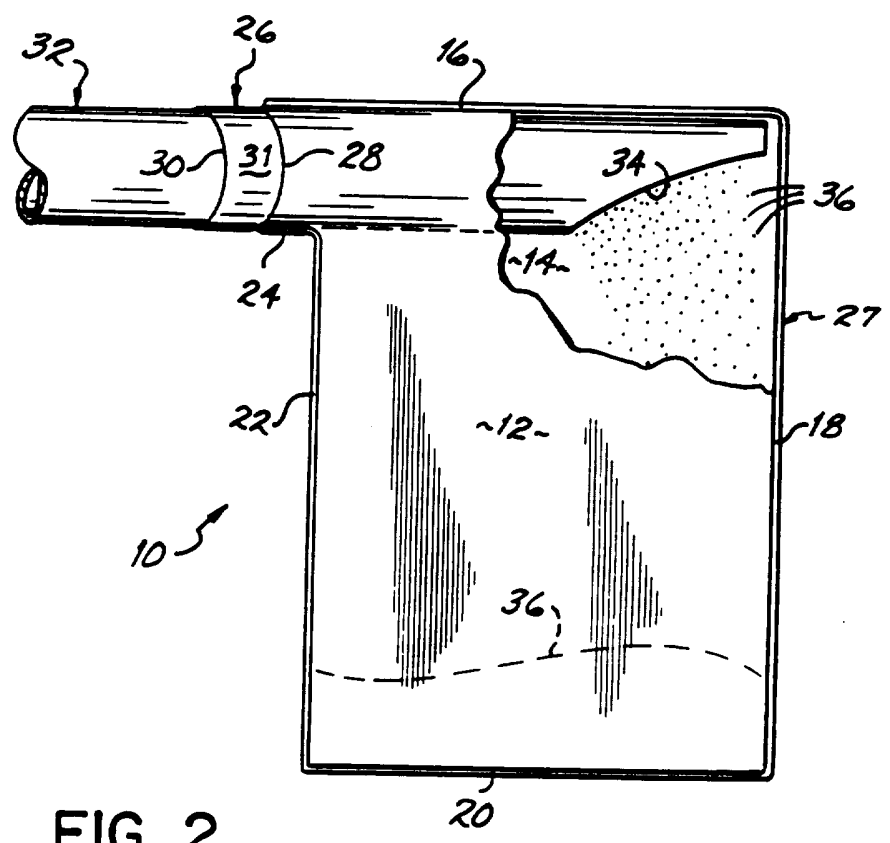


FIG. 2

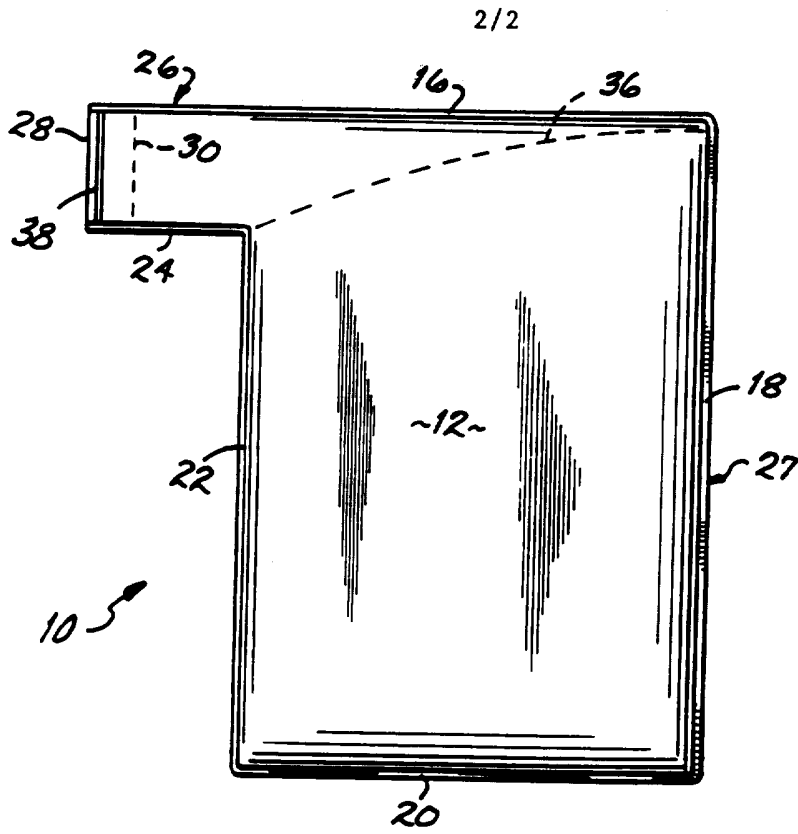


FIG. 3

INTERNATIONAL SEARCH REPORT

Int. Application No
PCT/US 95/15958

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B65B55/24 B65D30/02 B65D30/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 B65B B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US,A,3 646 726 (DEAN WALTER B) 2 September 1969	7,8
Y	see the whole document	1-4,6, 9-11
Y	--- US,A,5 120 787 (DRASNER JOSEPH) 9 June 1992 cited in the application see the whole document	1-4,6, 9-11
A	--- US,A,3 051 605 (STANNARD) 28 August 1962 cited in the application see the whole document	1,5,7,8
A	--- NL,C,84 823 (S.A.KEF) 15 November 1953 see the whole document -----	1,3

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

10 April 1996

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 95/15958

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-3646726	07-03-72	NONE	
US-A-5120787	09-06-92	CA-A- 2069561	06-01-93
US-A-3051605	28-08-62	NONE	
NL-C-84823		NONE	