United States Patent

[11] 3,587,844

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[54] **PACKAGE OF BAGS**
4 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **206/57A,** 206/56AB, 206/DIG.18, 229/69
[51] **Int. Cl.** **B65d 27/10,** B65d 85/62
[50] **Field of Search** ..... 206/57, 57 (A), 56 (A), 58, 59 (M), 59 (C); 229/69, 66, 53, 48 (T), (S.C. Digest)

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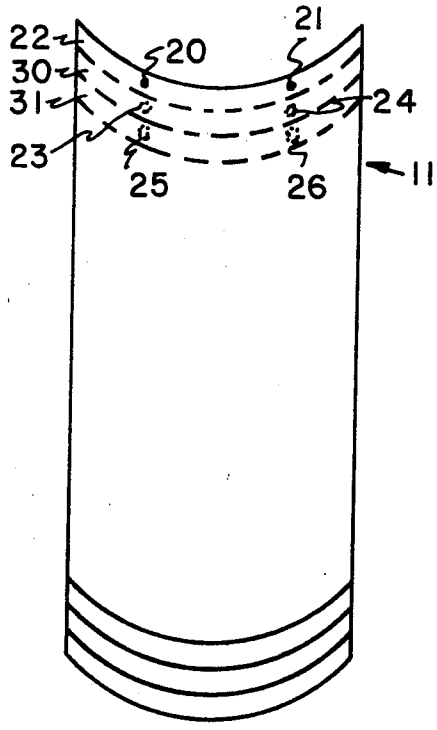
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Attorneys—John J. Toney, William D. Lee, Jr. and Edward J. Hanson, Jr.

ABSTRACT: This invention is directed to a package of imbricated bags, each of the bags after the bottom bag is offset forward from the next underlying bag and overlies the opening of the underlying bag and the top side of the underlying bag is attached to the bottom of the overlying bag in sequence; in one specie the bags are attached together by an adhesive applied in substantially equal amounts to each half of the bag from a medial division of one side thereof; in another specie the bags are attached together by fusing the sides together to provide a wholly self-supporting chain of imbricated bags; all as described hereafter.



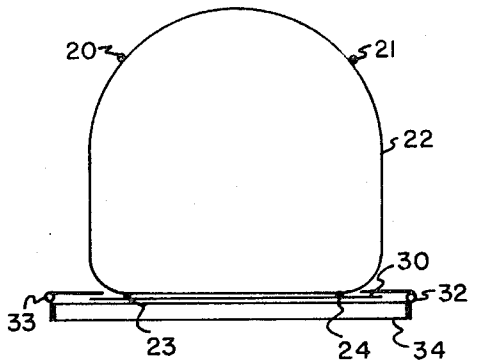


FIG. 4



FIG. 3

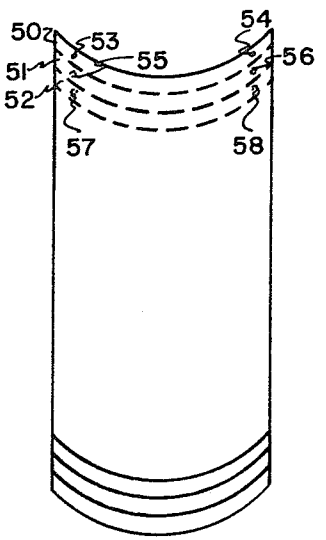


FIG. 5

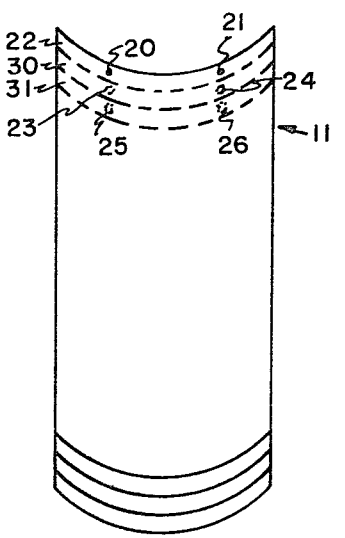


FIG. 2

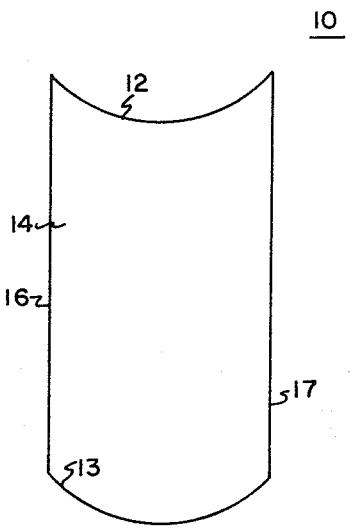


FIG. 1

PACKAGE OF BAGS

The present invention relates to packaging and more particularly to a new and improved package of imbricated bags.

It is an object of this invention to provide a compact package of bags that do not leave scrap as they are used.

It is a further object of this invention to provide a compact package of bags in which the bags may be easily loaded from the front end of the package in continuous sequence from the same position without requiring a long reach to gain entrance to the lead bag or a long movement of the package to place the next bag in the loading position.

It is a further object of this invention to provide such a package that is economical.

It is another object of this invention to provide a compact package of bags that allows the top bag to be loaded while it is guarding the underlying bags against contamination.

It is a still further object of this invention to provide a compact package of bags that will naturally inflate to a wide square-type opening.

Another object of this invention is to provide a compact package of bags that will not disassemble readily by accident and yet separate readily when used in hand packaging operations.

A still further object of this invention is to provide a compact package of bags that can readily be directly joined to other similar packages of bags or disassembled into sections of varying lengths and reassembled as desired.

In summary, carrying out my invention in one form thereof, a package of imbricated bags is provided with each of the bags after the bottom bag offset forward from the next underlying bag and overlying the opening of the underlying bag. The top side of the underlying bag is attached to the bottom of the overlying bag in sequence. The bags are attached together by an adhesive applied in substantially equal amounts to each half of the bag from a medial division of one side of the bag. The top side of the lead bag in the sequence is freed from attachment, after the first bag, by removal of the bag ahead of the lead bag in the sequence and the lead bag will inflate to a relatively square opening when the attached bags are positioned with the lead bag on a flat surface. The bag's attachment strength is sufficient to allow a pull in excess of 2 pounds to separate the bags from one another and to hold the bags securely to one another against a pull of less than one-half pound when the pull is applied at an angle of 30°.

By another aspect of my invention in one preferred form thereof, a package of imbricated bags is provided in which each of the bags after the bottom bag is offset forward from the next underlying bag and overlies the opening of the underlying bag. The top side of the underlying bag is attached to the bottom of the overlying bag in sequence by fusion with point seals. The point seals are adjacent to the outer edges of the bags and attach the bags with sufficient strength to allow a pull in excess of 2 pounds to separate the bags from one another and to hold the bags securely to one another against a pull of less than 1 pound when the pull is applied at an angle of 30°.

While two species of the principles of the present invention are illustrated in the accompanying drawings and described in detail in the following specification, it is to be understood that such embodiments are by way of example only and that various modifications may be made without departing from the spirit of the invention, the scope of which is limited only as defined in the appended claims.

FIG. 1 is a diagrammatic front view of a bag suitable for use in the package of bags of my invention.

FIG. 2 is a diagrammatic front plan view of a package of bags.

FIG. 3 is a diagrammatic side plan view of the package of FIG. 2.

FIG. 4 is a diagrammatic front end view of a support surface with the inflated lead bag of the package of FIGS. 2 and 3 shown inflated and the second bag clamped thereagainst.

FIG. 5 is a diagrammatic font plan view similar to FIG. 2 of a different specie of the package of bags of my invention.

Referring now to the drawings and in particular to FIGS. 2—4, a package of imbricated bags is shown therein embodying the invention in one preferred form thereof. FIG. 1 shows a single bag **10** which is the same as the bags in the imbricated chain of bags **11**. Only a small portion of the total chain of bags is shown in the drawing for purposes of illustration, the actual chain of imbricated bags may include 1,000 or more bags.

Each of the bags has a pair of overlying and aligned concave scalloped upper edges or lips **12** at the open end of the bag. The bottom end **13** of each bag is closed. The bags have a top side **14** and a bottom side (not shown in FIG. 1) and two outer edges **16** and **17**. Such a bag construction lends itself to particular utility with bags made from heat shrinkable plastic tubular film when the bottom closed end closure of the bag is formed by heat sealing. The polymers and copolymers and the like of vinyl chloride, such as saran are very desirable plastic materials for this use.

Looking now in particular at FIGS. 2 and 3, the chain of imbricated bags **11** may be seen to be secured together with splotches of adhesive **20** and **21**. The chain of bags is shown with the top bag removed to expose the adhesive on the top side of bag **22** in the chain **11**. Other splotches of adhesive **23**, **24**, **25** and **26** may be viewed in broken lines in FIG. 2 securing bags **30** and **31** in sequence from bag **22**.

The upper edge of bag **30** is spaced 1 inch below the upper edge of bag **22** and the upper edge of bag **31** is spaced 1 inch below the upper edge of bag **30**. In the package the top bag is always the forwardmost so that during filling the forwardmost bag can be opened without detaching the bags and an item inserted directly into the bag without reaching across other bags or the length of the bag. At the same time the top bag would maintain the mouth of the underlying bag closed to prevent contaminants from entering that bag during the loading of the top bag.

It is generally preferable to use a noncuring pressure sensitive adhesive to secure the bag together although other adhesives such as glues could be used in certain situations. Pressure sensitive glues are particularly beneficial when it might be desired to break up long chains of bags into shorter chains or to join chains of bags together. When a chain of bags is completed the top bag would normally not have any adhesive on its top side. When a new chain of bags is to be added to a chain of bags being used, it is only necessary to strip the top bag off and press the next bag in the sequence against the last bag in the old chain of bags. Preferably the lead bag in the new chain should have its upper edge spaced 1 inch below the upper edge of the last bag in the old chain to keep the sequence continuous and evenly spaced.

When other glues or adhesives are used they should generally be of the type that will not cure to a brittle end, particularly if the bags are of a very flexible or supple nature. If the glue is brittle it may crack during handling or cause a swatch of the bag to pull out. In some situations a nonpressure sensitive adhesive is preferable because of the characteristic of the small splotches of pressure sensitive adhesive to stick to things after the bag has been filled and separated from the chain. However, the sticky surface is usually quite small and the problem of no moment.

In the usual case two small splotches of adhesive about ¼ inch across and roughly circular will be sufficient to hold each adjacent bag to the next bag in the chain and in sequence secure the chain together for ordinary careful handling and lifting of the chain for short distances.

The tack strength should be such that from 2—4 pounds, more preferably about 2 pounds, will separate the bags from one another and 1½pound, more preferably 1 pound, will not separate the bags from one another when the pull is provided on an angle of 30° in the direction toward which the bags are normally stripped which is from the upper or leading edge toward the closed end of the bag.

The adhesive splotches **20** and **21** are spaced apart on the imbricated bags about one-fourth the width of the bag in from

each side within a tolerance of one-eighth the width of the bag so that the bags may open into a wide oval opening in response to inflation by a stream of air directed into the bag. The opening approaches a circular configuration or the somewhat square configuration of FIG. 4. The adhesive splotches are spaced inwardly from their respective sides about an equal distance. Thus in the example shown in FIGS. 2, 3 and 4, the bag is 12 inches wide, the adhesive splotches are 5½ inches from inside edge to inside edge, the splotches are one-fourth inch wide, the distance from the outside of each splotch to the nearest side edge of the bag is 3 inches. The adhesive is thus also evenly distributed in substantially even amounts of each half of the bag from a medial division of one side of the bag in the direction of the sequence and spaced inwardly from the sides of each bag about one-fourth the width of the bag within a tolerance of one-eighth the width of the bag.

In special situations, variations in the positioning of the adhesive may be used to change the shape of the bag opening. If the two splotches of adhesive are moved nearer to the edges of the bag the bag will open to a low broad oval opening when inflated. If the splotches of adhesive are moved nearer to the center of the bag the bag will open into a tall oval. These shapes of bag openings may be useful for packaging articles that have the general shape of the opening. In this manner special chains of imbricated bags can be prepared to accommodate flat wide articles and tall narrow articles. In certain cases it may also be found desirable to use additional splotches of adhesive, either because the adhesive has low tack or because greater break apart strength is desired. In certain instances it might also be desirable to use lines of adhesive or a continuous line of adhesive. However, the construction that is most preferable for wide application and usually most preferable in performance is the first described preferred embodiment.

By another aspect of my invention, I have provided a chain of imbricated bags in which the bags are not only substantially overlapped as shown in FIG. 5 but they are entirely self-supporting. The chain of imbricated bags **50**, **51** and **52** in FIG. 5 is point heat sealed together at points or seals **55**, **56**, **57** and **58**. The bags are made of a material that will seal to itself. The bag **10** of FIG. 1 is such a bag when made from a heat shrinkable saran film. In certain instances the bags could be sealed together using a solvent to cause the plastic film to form a bond with itself. The bags are entirely self-supporting in the package, they are fused by a homogeneous flow.

When the bags are attached by heat sealing, they may actually have a small hole made at the seals **55**, **56**, **57** and **58**. This will often provide more assurance of a secure fusion. Heat sealing will usually result in the top and bottom sides of the bags being sealed together when the bags are sealed or attached to one another. Thus, the seal is usually preferably formed adjacent to the outer edges of the bags to allow the maximum free width for opening the bag. This makes it easier to get a hand or another object into the bag far enough to strip the sides of the bags apart if desired. The bottom side of the bag could be clamped down inside adjacent to the seals, if desired, to prevent the bag that is being opened from separating from the underlying bag. At other times sufficient space may be provided to permit the bag to be loaded by lifting the top lip of the bag with the top and bottom sides of the bag still attached adjacent their edges. At still other times it may be desired to sequentially strip the bags one from the other and then hold the bag with one hand and fill it with the other hand.

In certain instances, it might be desirable to fuse the bags at other points than adjacent the edges or to fuse the bags along a line. However, the construction most preferable for wide application with fusion attachment is the first described fusion embodiment.

The upper edge of bag **51** is spaced 1 inch below the upper edge of bag **50** and the upper edge of bag **52** is spaced 1 inch below the upper edge of bag **51**. In the package the top bag is always the forwardmost so that the bag can be reached for loading or detaching without reaching across other bags or the length of the bag. At the same time the top bags maintain the mouths of the underlying bags closed to prevent contaminants from entering the underlying bags during loading or detaching of the lead bag. The bags are shown in FIG. 5 with the top bag removed exposing two points of fusion breakaway at points **53** and **54**.

The fusion strength should be such that from 2—4 pounds, more preferably about 2 pounds, will separate the bags from one another and 1-½ pound, more preferably 1 pound, will not separate the bags from one another when the pull is provided on an angle of 30° in the direction toward which the bags are normally stripped, which is from the upper or leading edge toward the closed end of the bag.

To use the package of bags of FIG. 2 in an expeditious hand operation, the chain of imbricated bags can be laid at the beginning of a long table and drawn out along the table to a flat end thereof as shown at flat surface **30** of FIG. 4. Clamps **32** and **33** are engaged on the second bag **30** and a stream of air is directed against the front end of bag **22** from a blower (not shown) to open or inflate the bag. Generally it is best to direct the air stream so that it passes just across at the top of the bag so the stream will act to initially reduce the air pressure above the bag and cause the bag to rise from natural internal air pressure fully into the stream of air. Once the bag is fully opened an article is easily placed in the bag and the bag can then be stripped from the underlying bag **30** which is held in place by the clamps **32** and **33**. The bag **22** may be easily stripped from the underlying bag **30** by grasping the bag at its top center and pulling upwardly and rearwardly at the same time at an angle of about 30° from the horizontal and backward over the chain of bags. The bag **22** separates from bag **30** at the point of attachment with a peeling apart separation. The loaded bag can then be passed on to another station for further processing, such as by closing or it can be closed by hand before it is lifted from support **34**.

The clamps **32** and **33** are then released from bag **30** and the chain of imbricated bags is drawn forward on the supporting surface **34** until the edges of bag **31** are in position under clamps **32** and **33**. The clamps are then secured and the process is repeated.

To use the package of bags of FIG. 3 is an expeditious hand operation the chain of imbricated bags can be laid at the beginning of a long table and drawn out along the table to a flat end thereof as shown at flat surface **30** of FIG. 4. Clamps **32** and **33** are slipped under bag **50** and engaged over bag **51** just back of seals **55** and **56** which would be approximately over seals **57** and **58**. Bag **50** is then grasped by its edges and they are pulled toward the center and upward at an angle of about 30° from the horizontal to break the seal by a peeling separation. If this action has not entirely broken the inside seal between the top and bottom sides of the bag and it is necessary to have the bag fully open to load it then the hands may be inserted into the bag and the arms spread apart to press the hands toward each side edge of the bag to break these seals apart, passing through them. The bag can then be filled on the support and moved on.

The clamps **32** and **33** are then released from bag **51** and the chain of imbricated bags is drawn forward on the supporting surface **34** until bag **51** is in position and then the clamps are engaged under bag **51** and on bag **51** just back of seals **57** and **58** and the process is repeated.

I claim:

1. A package of imbricated bags comprising a plurality of bags, each of said bags having a top side overlying a bottom side, each of said bags after the bottom bag offset forward from the next underlying bag about 1 inch and overlying the opening of said underlying bag and an adhesive attaching the top side of said underlying bag to the bottom of said overlying bag in sequence, said adhesive present in substantially equal amounts on each half of the bag from a medial division of one side thereof in the direction of the sequence, spaced inwardly from the sides of each bag about one-fourth the width of the bag within a tolerance of one-eighth the width of the bag, hav-

ing a tack strength when adherred to the bags sufficient to allow a pull in excess of 2 pounds to separate the bags and to hold the bags securely against a pull of less than 1 pound when the pull is applied at an angle of 30°, and being a noncuring pressure sensitive adhesive applied in two splotches between each of the bags, each splotch about one-fourth inch in diameter, the top side of the lead bag in the sequence freed from attachment, after the first bag, by removal of the bag ahead of said lead bag in the sequence.

2. A package of imbricated bags comprising a plurality of bags, each of said bags having a top side overlying a bottom side, each of said bags after the bottom bag offset forward from the next underlying bag and overlying the opening of said underlying bag, the top side of said underlying bag fused to the bottom of said overlying bag in sequence by point seals, said point seals adjacent to the outer edges of the bags and attaching the bags with sufficient strength to allow a pull in excess of 2 pounds to separate the bags from one another and holding the bags securely to one another against a pull of less than 1 pound when the pull is applied at an angle of 30°.

3. The package of claim 2 wherein each bag is offset about 1 inch from the adjacent bag.

4. A package of imbricated bags comprising a plurality of open ended bags, each of said bags having two overlying sides of substantially identical dimension, the open end of each of said bags oriented in the same direction and each bag after the bottom bag offset and overlying the opening of the underlying bag; two splotches of noncuring pressure sensitive adhesive attaching the top side of each of said underlying bags to the bottom side of the next overlying bag in sequence with an attachment strength sufficient to allow a pull in excess of 4 pounds to separate the bags from one another and to hold the bags securely to one another against a pull of less than one-half pound when the pull is applied at an angle of 30°, said adhesive being present in substantially equal amounts on each half of the bag from a medial division of one side thereof in the direction of the sequence and spaced inwardly from the sides of each bag about one-fourth the width of the bag within a tolerance of one-eighth the width of the bag; and the top bag of said plurality of bags opening to a relatively square opening when inflated with the underlying bag held in fixed position on a flat surface at least in the region of said adhesive splotches.