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Ackley et al.

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[54] **FREE STANDING BAG**

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[52] **U.S. Cl.** **229/55**, 229/55, 229/58

[51] **Int. Cl.** **B65d 33/10**, B65d 33/02

[58] **Field of Search** .... 229/55, 54 R, 54 L, 229/53, 56, 57, 58, 55, 60

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[57] **ABSTRACT**

To provide a free standing bag of plastic material so that it will be useful as a grocery bag, a bag is formed folded with a triangular bottom insert to form a flat bottom having a central crease, the crease lines being preformed in the bag so that it can be erected and will have side walls completely free of creases; the side walls of the bags themselves are preferably embossed, striated, or quilted of double strength material, with embossing or quilted lines extending, preferably, in two vectorial directions with respect to the height of the bag so that the bag will have stiff, self-supporting free standing side walls and can be filled from the top without requiring any additional holders or supports.

18 Claims, 12 Drawing Figures

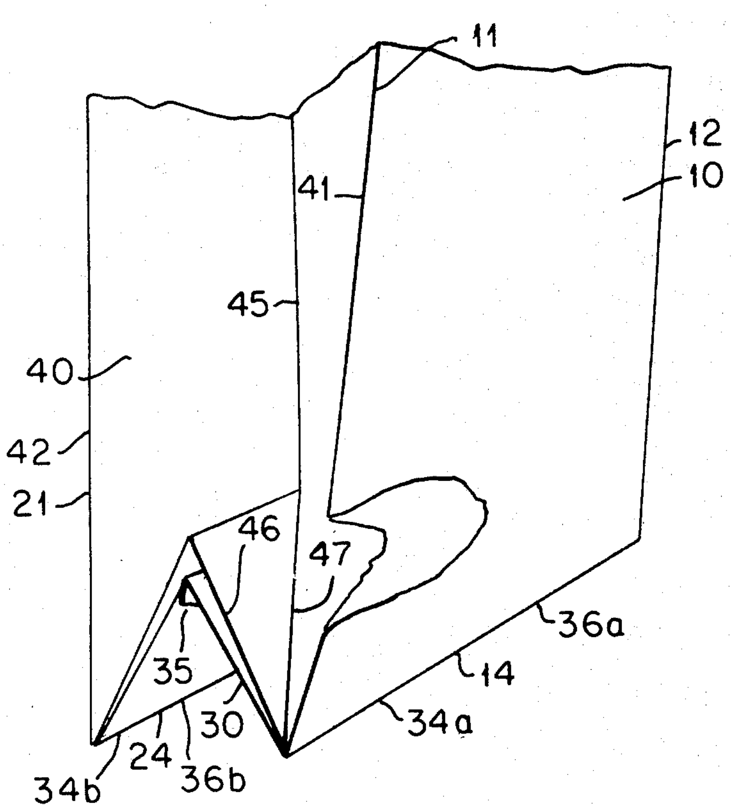


FIG.1

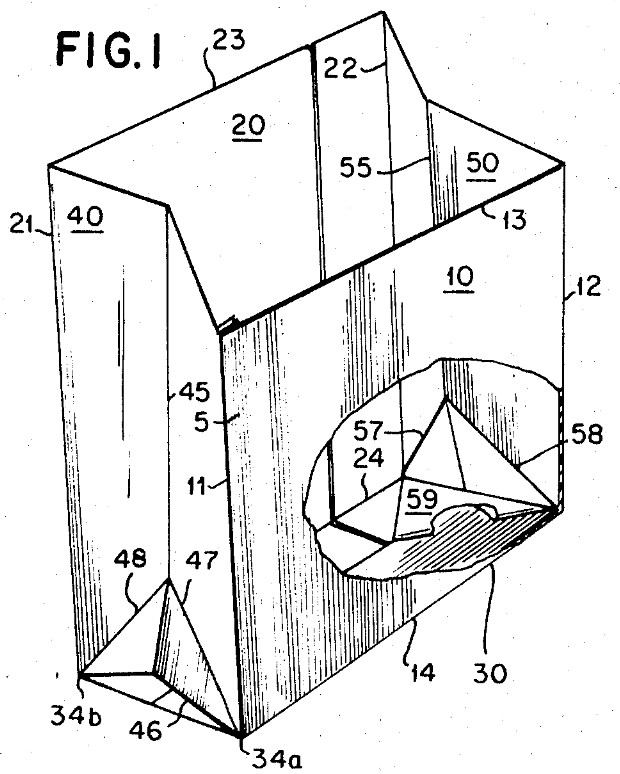


FIG.2

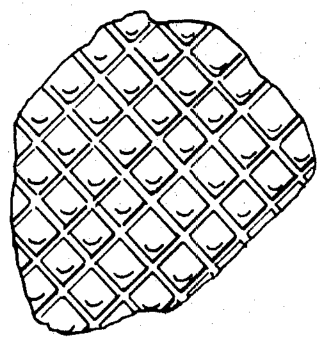


FIG.5

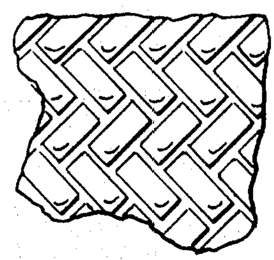
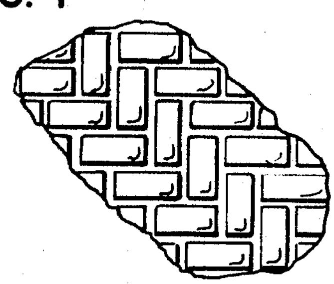


FIG.4



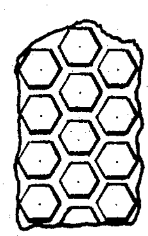
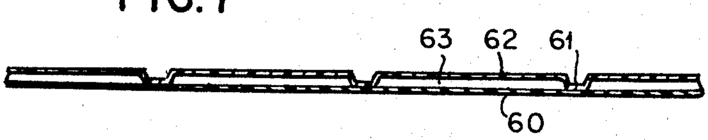


FIG.3

FIG.7



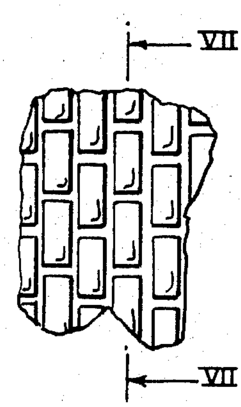


FIG.6

FIG.8

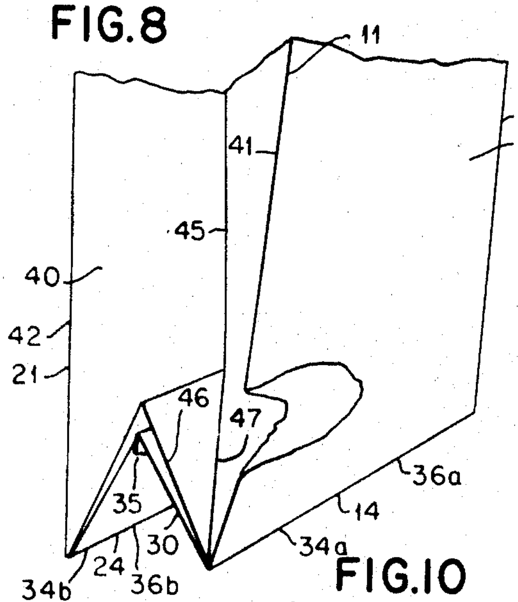


FIG.9

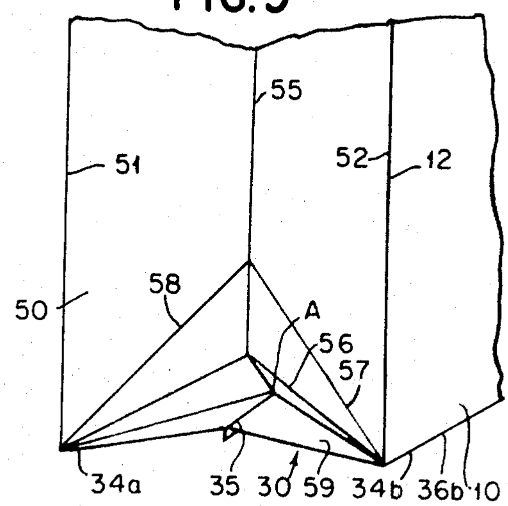


FIG.10

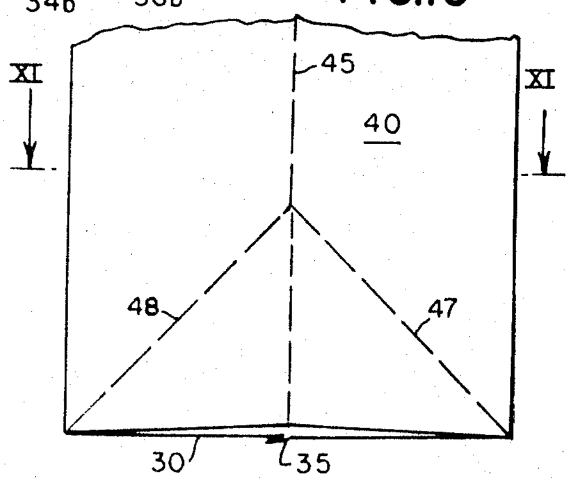


FIG.11

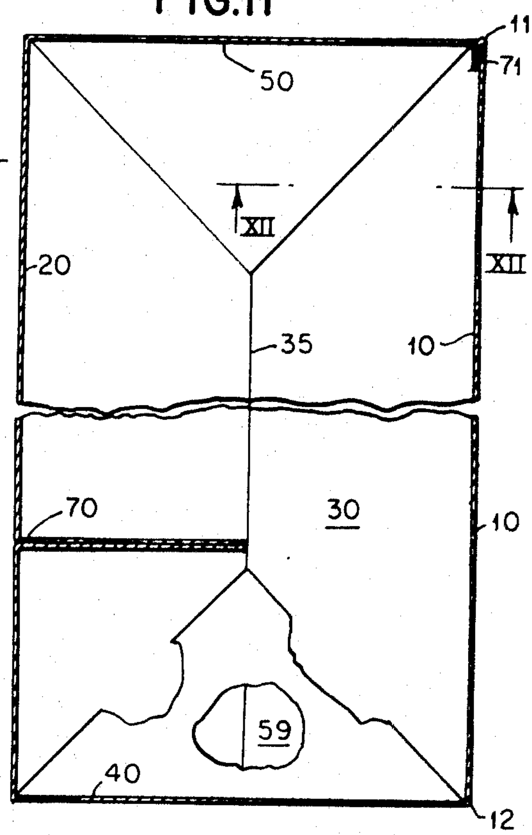
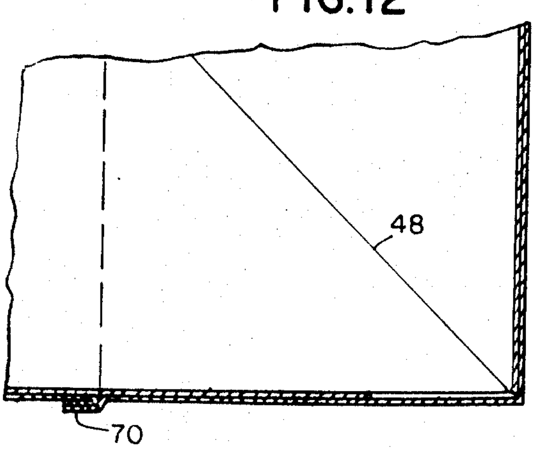


FIG.12



FREE STANDING BAG

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The present invention relates to free standing bags of plastic material, and more particularly to bags which can be used as grocery bags or the like, shipped and stored folded flat and easily erected to be free standing for packing of groceries, canned goods and the like therein.

Grocery bags, particularly for use in supermarkets, must stand on their own bottom, with their vertical sides upright for easy filling. Paper bags fulfill these requirements; they do, however, have the disadvantage of generally low strength and, particularly, low "wet strength" that is, rapidly losing any retention capability when becoming wet and, upon even localized wetting, readily disintegrating. Coating paper bags with water-repellent or water-proof materials, such as plastics, is excessively expensive. Paper bags have the additional disadvantage that paper sheets must be secured together, at fold lines with a separately applied adhesive. Some types of adhesives used, as well as the bags themselves, attract vermin which is imported in the homes of the purchasing customer, frequently concealed between folds of the paper bag.

Bags made of plastic material have the outstanding advantage of being waterproof, verminproof, resistant to penetration by grease, oils or the like, and sufficiently flexible to follow contours of articles packed within the bag to prevent tearing, for example by corners of square boxes, cans or the like. In spite of these advantages, however, plastic grocery bags have not found substantial acceptance due to their inability to remain open, and erected, for ease of packing without any additional external support devices.

It is an object of the present invention to provide a plastic grocery bag or sack which is capable of standing open by itself during the filling operation.

SUMMARY OF THE INVENTION

Briefly, the plastic grocery bag has side wall and front and back wall portions, as well as a flat bottom, which are so folded for storage and shipping that none of the side or front and back walls have a transverse crease; the side walls have a longitudinal crease, with a pair of angled crease lines extending, when the bag is erected, at 45° from the central crease to the base; the bottom wall, or base has a longitudinal central crease which, during shipping, may be folded outwardly - for ease of erection, then preferably, inwardly. Absence of transverse creases permits the bag to stand erected when opened. The material of the side walls of the bag is, preferably, stiffened by quilting, embossing or the like, the quilting or embossing lines having vectorial dimensions extending both vertically, as well as horizontally, to provide for stiffening lines tending to keep the bag both open, as well as the walls erected. Vertical stiffening ribs, in the form of seam lines or projecting tabs formed during manufacture of the bag may also be provided.

A particularly suitable material is a double-ply material, in which the material facing the inside of the bag is smooth, and the outside embossed and quilted by means of quilting lines to the inside material, with air pockets formed between the two layers of materials, the air pockets providing for additional stiffness.

Various quilting or embossing patterns may be used, e.g., diamond, bee-hive (hexagonal), brick-wall type, "brick walk" type, (that is, interlaced rectangles arranged with respect to each other in such a manner that continuous lines extending in any direction are avoided) or other patterns providing for embossing lines, or for quilt lines interconnecting the two walls of the bag material in two vectorial directions. A particularly useful pattern is the diamond pattern. Some materials can be embossed with vertical striations.

BRIEF DESCRIPTION OF THE DRAWINGS

Advantages of the invention will become apparent to those skilled in the art from the following description considered in conjunction with the drawings wherein;

FIG. 1 is a perspective view, partly broken away, of a bag in accordance with the present invention just prior to being fully erected;

FIG. 2 illustrates a diamond pattern for the walls of the bag;

FIG. 3 illustrates a hexagonal pattern;

FIG. 4 illustrates a straight brick walk pattern;

FIG. 5 illustrates a 45° brick walk pattern;

FIG. 6 illustrates a straight brick pattern;

FIG. 7 is a cross-sectional view along line VII—VII of FIG. 6, to an enlarged scale;

FIG. 8 is a fragmentary perspective view of the bag made of a unitary tube of material and being unfolded;

FIG. 9 is a further fragmentary view of a bag of FIG. 8 just before being erected and having an inturned bottom reinforcement pocket formed by a double fold in the side walls;

FIG. 10 is a fragmentary side elevation of a bag of FIG. 8 which has been erectedp erected;

FIG. 11 is a sectional view along line XI—XI of FIG. 10 and illustrating a modification of a bag, partly broken away to show the construction; and

FIG. 12 is a fragmentary sectional view along line XII—XII of FIG. 11.

DETAILED DESCRIPTION

To permit easy loading of bags, for example in grocery stores, supermarkets and the like, the bags must be free standing and self-supporting as generally illustrated in FIG. 1. Paper bags will readily do this; plastic bags, however, due to the generally limp nature of the plastic material, present special problems. It has been found that one of the important features of such a bag is that the side walls do not have any transverse creases, but rather that the bag is so shaped that any crease lines, which may be preformed in the plastic, have at least a substantial vertical component, that is have a vectorial direction which extends vertically when the bag stands on a flat bottom. The plastic material, itself, can be of various types. Polyethylene (PE), and particularly quilted polyethylene is a preferred material. Polyvinyl chloride (PVC) is equally useful. PVC sheet material can readily be pre-creased, and made in such a way that it is substantially stiff.

The bag of FIG. 1 has, generally, a front wall **10** of self shape retaining plastic material, with side edges **11, 12,** a top edge **13** and a bottom edge **14.** The back wall **20** is of similar material, and has side edges **21, 22,** a top edge **23** and a bottom edge **24.** The bottom is flat, and is formed of a panel **30** of stiff plastic material to join the bottom edges **14, 24** of the front and back panels **10, 20,** respectively. The bottom panel need not be unitary, but may, for example, form a continuation of the side panels and be seamed in the middle as seen, for example, in FIG. 1; alternatively, it may comprise a separate panel seamed to the side panels **10, 20**, at the bottom edges **14, 24**.

The front and back walls **10, 20** are interconnected by a pair of side walls **40, 50**, which are preferably gusseted, that is have a longitudinal central crease **45, 55**, respectively. The crease lines are pre-formed and so arranged that, upon opening the bag from a flat position, the respective panels will fold along the crease lines to form the erected bag.

The gusseted form of side walls **40, 50**, provides additional stiffness and further results in a roomy, easily packed bag. It does, however, cause problems in shipping the bag folded flat, to take up as little space as possible not only for shipment, but also for storage and to be easy to handle. The bags must, in addition to being self-supporting, be so arranged that a store clerk can take one at the free edge and with a minimum of handling open the bag to its fully extended position, preferably with a single shake which may catch air in the opening bag.

The side walls **40, 50** which may be separate elements heat-seamed to the front and back walls, or integral therewith, are joined to the front and back walls at the edges **11, 21** and **20, 22**, respectively. The bottom panel **30** will have side edges **34*a*, 34*b*** which are integrally, or by means of a seam joined to the bottom edges **14, 24** of the front and rear panels, respectively. The edges form a crease line **36*a*, 36*b*** which is inwardly extending, that is, about which half of the bottom panel **30** can fold, but which is never completely straightened out, forming a 90° angle (see FIG. **1**) interconnecting the bottom and side walls, when the bag is erected.

To enable inward folding of the gusseted side walls **40, 50** an inwardly extending crease line **46, 56** interconnects the bottom panel **30** and the respective side wall. If the bottom panel, and the respective side wall are made of a single unitary sheet of material then, in order to provide for proper folding, an additional triangular in-fold will result, as seen at **59** (FIG. **9**); a similar triangular inward fold **49** will be hidden in FIG. **1**. Triangularly extending crease lines **47, 48** and **57, 58** interconnect the junction of the bottom panel **30** and the side edges of the front and back walls with the outwardly extending central crease line **45, 55**, respectively, of the side walls **40, 50**. Upon grasping one of the side or front or back walls of the bag, and shaking it to provide a small opening, air will catch in the air-impervious plastic of the walls and the bag will fold open by itself. The pre-formation of the crease lines described, as well as the absence of transverse crease lines when the bag is erected will permit it to stand freely on the flat bottom formed by bottom panel **30**.

The material of the bag of FIG. **1** is best seen in FIGS. **2–7**. Preferably, the material is quilted, as seen in cross-section in FIG. **7**. For purposes of clarity, the showing of the material as double-ply has been omitted in all other drawings.

The material of the bag thus, preferably, has an inner wall element **60** joined at quilting lines, which may be thermoplastic seams **61**, to an outer sheet of material **62**. The appearance of the bag, therefore, will be embossed. Between layers **60, 62**, an air pocket **63** will be formed. Manufacture of such double-ply quilted material is known. It has been found, from experiments, that

the stiffness of quilted material, particularly including air pockets, is substantially greater than that of materials of equivalent thicknesses which are single-ply. If the material is not quilted, but single-ply, it is preferably embossed. FIG. **1** shows vertical striations **5**. FIG. **2** shows a diamond pattern, illustrating embossing (or quilting) lines extending both in horizontal as well as vertical direction, that is having vectorial components both horizontally as well as vertically of the bag. The small diamonds have, in one example, sides which are about 4 – 9 mm long. FIG. **4** is a straight "brick walk" pattern. There are no continuous horizontal break lines. The brick walk pattern may be angled, for example between 30° and 60°; FIG. **5** illustrates the pattern offset at 45°. FIG. **6** illustrates a brick pattern which may be placed either vertically, as shown, or horizontally or at angles, depending upon the size of the bag and its final shape, and on the direction in which maximum stiffness and resistance against distortion is desired. A good compromise based on stiffness, ease of opening, and shape retention has been found to be the pattern of FIG. **2**. Many patterns are, of course, possible; another suitable one is a hexagonal, or bee-hive shaped pattern with the flats of the hexagons arranged either as in FIG. **3** that is horizontally, or vertically, as desired.

The brick wall and diamond patterns exhibit excellent directional stiffness, i.e., they are relatively stiffer in directions bisecting the angles formed by the embossing, or quilting lines, than along those lines. The brick walk, and hexagonal (bee hive) patterns have an approximately even omnidirectional stiffness, which, however, is less than the maximum directional stiffness of the diamond or brick wall pattern. Other patterns than those shown may, of course, be used.

It is not necessary that the outside surface, that is sheet **62** and the inside surface, that is sheet **60** (FIG. **7**) are the same. As illustrated, the inside sheet **60** will be smooth, whereas the outside sheet **62** will have an embossed appearance. It is preferred that the inside be smooth, for ease of packing. The sheets may for example, have otherwise different characteristics or appearance, for example, they may be of different thickness. If single-ply material is used, then high-density polyethylene of approximately 2 to 3 mil gauge is suitable; the embossing lines may form an interlocked pattern as, for example, illustrated in FIGS. **3, 4** and **5**; a partially interlocked pattern (FIG. **6**), or extending lines (FIG. **2**) or form vertical striations **5** (FIG. **1**).

FIG. **8** illustrates the bag of FIG. **1** in which the bottom wall is integral with the side walls, and particularly shows the double fold-in of the side walls, of which side wall **40** is shown. The bag is made of tubular material having a central seam which will form the seam line **35**. The formation of the gusseted side walls **40, 50**, having a width equal to the bottom panel **30** can readily be accomplished by providing pre-formed crease lines **47, 48**, as well as additional edge creases, seen at **46**, which, with a pair of additional creases parallel to creases **47, 48**, and not visible in FIG. **8**, will form an in-turned pocket, seen between the extension of the central crease **45** and the tip of the bottom seam **35**, as seen in FIG. **8**. The tip of the folded-in triangle, which forms an inwardly extending pocket, can be secured at an inner point A to the central line **35** of the bottom panel **30**, or can be left free. The entire bottom triangular fold-in can even be heat-sealed, or otherwise secured to the bottom wall **30**, as seen at **59** in FIG. **9**; or the lower edges of the gussets of the side wall can be seamed to a seam along central crease line **35** of the bottom panel **30** with or without an additional seam at crease lines **46, 56** to the adjacent edge of the bottom panel **30.** Point A, lying on the central line **35** of the bottom panel **30** will be inward from the side edges of the bottom wall by a distance equal to half the width of the side wall, or of the bottom panel respectively.

The side walls can be stiffened by stiffening folds **70** (FIG. **11**, FIG. **12**), which can extend lengthwise of the bag, as well as across the bottom panel. If the bag is made of tubular material which is formed from an originally flat sheet, these stiffening folds may, simultaneously, form the junction seam of the flat sheets, as best seen in FIGS. **11** and **12.**

When the bag is flattened for shipment, then it is preferably folded to be completely flat, by compressing the bag in the position of FIG. **8.** Upon grasping a side wall, for example side wall **10**, and shaking the bag, it will catch air and expand through the position of FIG. **8** towards the position of FIG. **9** and FIG. **1.** Very little additional manual handling, if any, is needed to completely straighten the bag. As will be seen, the side walls of the erected bag will not have any circumferential, or transverse crease lines which might induce collapse of the bag when erected. The stiffening ribs **70, 71** (FIGS. **11** and **12**), if provided, as well as the nature of the material (for example embossed, or two-ply quilted) will contribute to keep the bag in erect, upright position. If the bag is made of PVC, pre-formed crease lines are particularly easy to apply, although most suitable materials, such as polyethylene, or other similar plastics, can be made with pre-formed crease lines into which the bag can naturally fold, or which will be the lines around which the bag will crease for shipment and subsequently when erected. Approximately 1–4 mil preferably 2– 3 mil gauge high-density polyethylene is a strong, and suitable material, particularly when embossed in a suitable pattern, for example, as illustrated in FIGS. **1** through **6.**

I claim:

1. Bag of limp plastic material capable to stand free, when expanded, comprising

a front wall (**10**) of stiffened plastic material having side edges (**11, 12**), a top edge (**13**) and a bottom edge (**14**);

a back wall (**20**) of stiffened plastic material having side edges (**21, 22**), a top edge (**23**) and a bottom edge (**24**);

a bottom panel (**30**) of stiffened plastic material joined to said bottom edges (**14, 24**) of said front and back panels (**10, 20**) and formed with a central crease line (**35**);

a pair of gussetted side walls (**40, 50**) of stiffened plastic material, each said side walls being joined (**41, 51; 42, 52**) to the side edge (**11, 21; 12, 22**) of the front and back walls (**10, 20**);

said plastic material being embossed along embossing lines having a vectorial direction longitudinally of said bag, the front, back and side walls being free from embossing crease lines extending transversely of the bag;

the junction (**34***a*, **34***b*) of the side edges of said bottom panel (**30**) and the bottom edges (**14, 24**) of said front and back walls (**10, 20**) forming a bottom edge crease line (**36***a*, **36***b*);

the central crease line (**35**) of the bottom panel being parallel to said bottom edge crease lines (**36***a*, **36***b*) and the bottom panel being folded inwardly, with respect to the top edge of the side walls of the bag, to fold the bottom panel within the outline of the front and back walls (**10, 20**) when the bag is flat, without introducing a crease into either of said walls, the bottom panel (**30**) being formed integrally with the front and back walls (**10, 20**) and the central crease line (**35**) of the bottom panel (**30**) being defined by a plastic heat seam line interconnecting the material forming the front and back walls (**10, 20**);

a central point (A) of the respective bottom edge of the side walls being folded over said bottom panel (**30**) at the central crease line;

the side walls (**40, 50**) each being formed with a longitudinal central crease line (**45, 55**) parallel to said side edges (**41, 51; 42, 52**) and a transverse crease (**46, 56**), forming an interconnecting continuation of said bottom edge crease line (**36***a*, **36***b*) and continuing said crease line around said bag;

the width of said side wall being the same as the width of said bottom panel;

and a pair of triangular crease line (**47, 48, 57, 58**) extending at angles of about 45° from the intersections of the bottom edge crease lines (**36***a*, **36***b*) at the junctions of the bottom panel (**30**) and said front and back walls (**10, 20**), respectively, and the side walls (**40, 50**), to the longitudinal central crease line (**45, 55**) of the side walls (**40, 50**).

2. Bag according to claim **1**, wherein the side walls (**40, 50**) have top edges and bottom edges;

a central point (A) of the respective bottom edge being joined to the bottom panel (**30**) at the central crease line (**35**) and at a distance inwardly from the outer edge of the bottom panel (**30**) equal to one-half the width of a side wall.

3. Bag according to claim **2**, wherein at least a portion of the material of said side walls (**40, 50**) forming a triangle and defined by said transverse crease line (**46, 56**) and said central point is adhered to the bottom panel (**30**).

4. Bag according to claim **1**, wherein said plastic material is polyvinylchloride material.

5. Bag according to claim **1** wherein said plastic material is polyethelene material.

6. Bag according to claim **1** wherein said plastic material is single ply approximately one to four mil gauge high density polyethylene.

7. Bag according to claim **1**, wherein said plastic material is quilted.

8. Bag according to claim **1**, wherein said embossing lines form an interlocked pattern, the pattern being defined by lines extending other than uninterruptedly transversely of the walls of the bag.

9. Bag according to claim **1**, wherein said plastic material is a two-layer quilted material having one layer with a substantially smooth surface and another layer with an embossed surface, the layer having the substantially smooth surface forming the inside of said bag, and said layer having the embossed surface is heat-sealed to the smooth layer along embossing lines and forming the outside of the bag.

10. Bag according to claim **1** wherein said plastic material is formed with striations extending longitudinally of the bag.

11. Bag according to claim **1**, wherein at least one of said walls has a longitudinally extending seam line to provide increased stiffness.

12. Bag according to claim **1**, wherein said plastic material is a two-layer quilted material, having one layer with a substantially smooth surface and another layer with an embossed surface and connected at predetermined quilting lines with said smooth layer, the embossed portions of said other layer forming, with the smooth layer, air pockets.

13. Bag according to claim **12**, wherein the quilting pattern formed by said quilting lines is a diamond pattern (FIG. **2**).

14. Bag according to claim **12**, wherein the quilting pattern formed by said quilting lines is a staggered brick pattern. (FIG. **6**).

15. Bag according to claim **12**, wherein the quilting pattern formed by said quilting lines is a brick walk pattern (FIG. **4**).

16. Bag according to claim **15**, wherein the brick walk pattern is angled with respect to the sides at an angle of between 30° to 60° (FIG. **5**).

17. Bag according to claim **16**, wherein said angle is about 45° (FIG. **5**).

18. Bag according to claim **12**, wherein the quilting pattern formed by said quilting lines is a hexagonal pattern (FIG. **3**).

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