(54) Title: AUTOMATIC PLASTIC BAG OPENING MEANS

(57) Abstract

A self-opening plastic bag (60) formed with opposing walls (70, 72) joined along their bottom edges (64) with one of the pair of opposed side edges being joined together by at least one inwardly extending gusset, and the other pair of opposed side edges of the walls being joined together by at least two gussets, and at least a portion of the upper edges of the walls being unjoined from each other, whereby, upon the application of opposed lateral forces, one first to each of said joined pairs of opposed edges, the bag mouth will open.
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AUTOMATIC PLASTIC BAG OPENING MEANS

TECHNICAL FIELD

This invention relates to plastic bags that may be used for a multitude of purposes such as, but not limited to, produce bags in supermarkets, retail merchandise bags or trash bags in a commercial, industrial or home application. More specifically, this invention relates to a means of making plastic bags open easily.

BACKGROUND ART

One common bag style is the flat bag that is put up on rolls, commonly used in produce departments in supermarkets and which is very difficult to open. Consumers are well aware of the tedious task of trying to separate the thin walls of flat produce bags. Typically these flat bags are about 11 x 14 inches in size and made from a very thin gauge film, usually about .0003 mil thickness in high-density polyethylene film and about .0006 mil thickness in low-density polyethylene film.

A second commonly used bag style is a merchandise bag with a flush, straight cut, open top defining the bag mouth, which bag style typically has side gussets. This bag style is frequently packed in cartons in units of 500 to 1000 bags and dispensed from the carton. They too can be difficult to open, as their gauges may be anywhere from .00045 to .00075 mil thickness. Most of these bags are used in retail stores and supermarkets and the time required to open them could become a serious problem with store operations. For instance, in taking 5 seconds to open a bag, this means that in a case of 1000 bags, 5000 seconds of labor time is needed just to prepare the bags for use. This equates to 1.388 hours of time wasted in simply opening 1000 bags and preparing them for use.

A third commonly used bag is the T-shirt style bag, for instance of the variety in U.S. Patent 4,165,832 or those used in the system in U.S. Patent 5,209,371. This
bag style when put up on rolls, in unitary bag packs or dispensed from cartons is also
difficult to open. The reasons are the same as the previous two styles, the thin gauges
of the walls, usually from about .00045 to .00055 mil thickness, make them difficult
to separate.

A fourth style of bag is one that has been used as a produce bag and a trash
bag that is commonly referred to as a star-seal bag. Typically these bags begin as a
flat web and are then folded in half lengthwise and then in half once again to form an
eight ply flat tube. They are then sealed across the web, which forms the bottom of
the bag. This creates a strong bottom seal resisting breakage. This type of seal can be
beneficial and can allow the bags to be made of thinner gauges than normal. For
instance, one bag of this variety is described in U.S. Patent 5,135,146 and can
effectively be made of a .0003 gauge high-density polyethylene film. These star seal
bags are also difficult to open because their thin gauge once again, make them
difficult to pull apart and separate.

All of the above bag styles, flat roll bags, merchandise bags in cartons, T-shirt
bags on rolls or in cartons and star seal bags, resist opening due to the "sticking" or
"clinging" effect of the inner surfaces of the bag walls. This sticking or clinging
phenomena is referred to as "blocking" and is inherent in virtually all thin gauged
plastic films. Blocking is caused by the compressing of the thin bag walls together
during the manufacturing process. Many series of rollers are used to feed the film
through printers and bag machines hence causing the ultimate compressing of the thin
bag walls together. It tends to be an even greater problem with roll bags as there is
continual pressure upon the bag walls in the wind-up process.

To overcome the blocking problem associated with thin gauged plastic bags,
manufacturers have tried a multitude of processes. These processes include the use of
various adhesives, excessive electrostatic treatment of the outer bag surface coupled
with pressure seal pins, blunted die cuts, etc. as illustrated in numerous patents, a few
of which are of note are those in U.S. Patents 4,989,732, 5,013,290 and 5,307,935.
All of these processes involve extra manufacturing considerations that can
undesirably lead to increased scrap and/or can negatively affect product performance. For instance, using adhesives is messy and inconsistent. Excessive electrostatic treatment can weaken a bag and increase the energy cost to manufacture.

SUMMARY OF THE INVENTION

The present invention is a simple means of allowing the thin bag walls to separate regardless of the manufacturing process and even in spite of severely blocked, thin gauged film. This means of opening is accomplished by incorporating overlapping gusset elements on the opposing portions of the bag walls. This unique gusseting process forces the bag mouth to blouse open when any one or more of the gusset elements are pulled by the user, for instance a side gusset panel, an opposing gusset panel, or, one or more T-shirt bag handles or ties attached to the side gusset panels. The unique opening means as described in the present invention can be applied during virtually any known manufacturing process including bags on rolls, bags that are stacked up and made into bag packs, or those that are simply loose packed in a carton.

This automatic opening process does not require adhesives or electrostatic treatment. It is simply accomplished by having the proper matched gusseters to create the desired overlapping gusset elements on the opposing bag walls. The process of manufacturing is simple, reliable and cost effective. The automatic opening process of the present invention can also be applied to any type of material or any size of bag.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of the present invention in a flush top, merchandise bag style with the bag mouth partially opened in order to illustrate the opposing gusset elements in which said elements are folded in the same direction;

Fig. 2 is a perspective view of the bag in Fig. 1 whereas the two side gusset panels are being pulled apart causing the adjacent opposing gusset elements to separate resulting in the bag mouth automatically blousing open;

Fig. 3 is a schematic top view of the bag of Figs. 1 and 2, partially opened with a variation in that the opposing gusset panels are folded in opposite directions;
Fig. 4 is a perspective view of a T-shirt bag of the present invention which incorporates the gusseting schematic in Fig. 3 and illustrates how the pulling of two opposing handles causes the bag mouth to automatically blouse open.

Fig. 5 is a partial perspective view of the bag in either Figs. 1 or 4, but with angled bottom seals on the outer gusset folds which will form a rounded bag bottom when loaded with articles; and

Fig. 6 is a perspective view of the bag in Fig. 4, with the angled bottom seals in Fig. 5, so that when fully opened, the angled seals at the bag bottom create the rounded bottom.

Fig. 7 is a schematic top view of a variation on the theme that can enable easy opening.

Fig. 8 is a schematic top view of another variation on the theme that can also enable easy opening.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

In Fig. 1 bag 10 has an open, flush cut mouth 12, a bottom 14 with a bottom seal 16, two side gusset creases 18 and 18', a front bag wall 20 and a rear bag wall 22. Located in the central portion of the front bag wall 20 are the first overlapping gusset elements defined as having two inside panels 25 and 27 which are connected at gusset crease 26 and a third component panel 29 which is connected to panel 27 at gusset crease 24. Located in the central portion of rear bag wall 22 are the second overlapping gusset elements defined as having two inside panels 25' and 27' which are connected at gusset crease 26' and a third component panel 29' which is connected to panel 27' at gusset crease 24'.

In Fig. 2 the bag of Fig. 1 is being pulled open by hands H and H' which are grasping two respective side gusset elements, namely left side gusset front panels 30 and 32 and right side gusset rear panels 34 and 36, then pulling these side gusset elements outward with force F, as illustrated by the arrows. The outward force F causes the bag mouth 12 to blouse open as the first opposing gusset elements and its three component panels 25, 27 and 29 move away from second opposing gusset elements and its three component panels 25', 27' and 29'. The forcing open of bag
mouth 12 can also be accomplished by pulling any two gusset panels such as 30 and 32 or 34 and 36 or; the grasping of multiple gusset panels as well; for instance, by simultaneous grasping and pulling outwards both front and rear panel components of the two side gusset elements. It is also seen that the two opposing gusset elements of the present invention on the front and rear bag walls can also be pulled outwards to force the opening of the bag mouth. And, it can be even be further seen that any one of the gusset panel elements, side or opposing, can be pulled outwards to force the opening of bag mouth 12.

In Fig. 3 the schematic top view illustrates a partially opened bag mouth 40, front bag wall 42, first opposing gusset front panel portion 44, front panel crease 46, first inside panel portion 48, inside front panel crease 50 and second inside panel portion 52. Fig. 3 further shows the rear bag wall 42', second opposing gusset rear panel portion 44', rear panel crease 46', first inside panel portion 48', inside rear panel crease 50' and second inside panel portion 52'. Note that opposing gusset elements are folded at creases 50 and 50' in opposite directions which effects more or less the same outcome as the opposing gusset elements of the bag in Figs. 1 and 2.

In Fig. 4 the T-shirt bag 60 has a partially open bag mouth 62, a bottom 64 with a bottom seal 66, two side gusset creases 68 and 68', a front bag wall 70 and a rear bag wall 72. Located in the central region 69 of front bag wall 70 are the first overlapping gusset elements formed by two inside panels 75 and 77 which are joined at gusset crease 76 and a third component panel 79 which is joined to panel 77 at gusset crease 74. Located in the central region of rear bag wall 72 are second overlapping gusset elements formed by two inside panels 75' and 77' which are joined at gusset crease 76' and a third component panel 79' which is joined to panel 77' at gusset crease 74'. T-shirt bag 60 is further defined as having two handles 80 and 80', said left side handle 80 being an integral part of the top portions of the left side gusset panels 82 and 84 which are joined at front outer crease 85, and side gusset panels 86 and 88 which are joined at a rear outer crease (not shown), said panel pairs being joined at crease 68, and; said right side handle 80' being an integral part of the top portions of the right side gusset panels 82' and 84' which connected at front outer
crease 85', and side gusset panels 86' and 88' which are connected at a rear outer 
crease (not shown), said panel pairs connected at crease 68'. The outward force 
(represented by the arrows P) on handles 80 and 80' forces bag mouth 62 to blouse 
open as the first opposing gusset elements and its three component panels 75, 77 and 
79 move away from second opposing gusset elements and its three component panels 
75', 77' and 79'.

In Fig. 5 cut-away bag 90 is of essentially the same construction as that in 
Figs. 1 and 4 and, as illustrated, has a front opposing gusset panel 99, front gusset 
panel crease 96 with an inside front gusset crease 97; a left side gusset panel 102 and 
left side crease 105 and; a right side gusset panel 102' and 105' with an inside right 
side gusset crease 108. Gusset creases 97 and 108' virtually abut one another and 
along with the virtual abutment of the reciprocal gusset creases on the left side (not 
shown) of bag 90. The preferred version of the opposing gusset elements of the 
present invention is thus illustrated. Bag 90 has a bottom 92 defined by bottom seal 94 
with bag skirt 98 therebetween, the bag skirt typically being about ¼ inch wide. At 
the outer portions of bag bottom 92 and bottom seal 94 on the left gusset panel 102 
(along with all related left side gusset panel elements not shown but previous 
illustrated in Fig. 4) is illustrated as bottom seal portion 110 and angles upward and 
outward at about a 15-20 degree angle, and; on the opposing right side gusset panel 
102' (along with its related right side gusset panel elements not shown but previously 
illustrated in Fig. 4), bottom seal 94 and bag bottom 92 is illustrated as bag bottom 
portion 110' and also angles upward and outward at about a 15-20 degree angle. The 
bag bottom portions 110 and 110' are sealed by bottom seal 94 through the entire set 
of related left and side gusset panel elements, and are also defined by bag seal 94 
above, bag bottom 92 below and skirt 98 therebetween.

In Fig. 6 bag 120 (much like that of the bag in Fig. 4) is fully opened and 
loaded with articles, and illustrates a rounded bottom 122, which is facilitated by the 
angled outer bottom portions 124 and 124'. In the open and loaded position, the round 
bottom 122 is created by the expansion and opening up of all the gusset panel 
elements (not shown), such elements being the front opposing gusset elements, now
only defined by crease 126 near the bag bottom, rear opposing gusset elements (not shown), left side gusset elements, defined by panels 128 and 130 and right side gusset elements (not shown).

In Fig. 7 the schematic top view illustrates a partially opened bag mouth 140, front bag wall 142, a first front bag wall gusset element 144, a second front bag wall gusset element 146, a first inside panel portion 148, a second inside panel portion 150, a rear bag wall 142', first rear bag wall gusset element 144' and second rear bag wall gusset element 146'. Upon applying an outward lateral force to any one or more gusset elements, it will produce more or less the same outcome as the opposing gusset elements of the bag in Figs. 1, 2, 3 and 4.

In Fig. 8 the schematic top view illustrates a partially opened bag mouth 160, front bag wall 162, a first front bag wall gusset element 164, a second front bag wall gusset element 166, a first inside panel portion 168, a second inside panel portion 170, a rear bag wall 162', first rear bag wall gusset element 164' and second rear bag wall gusset element 166'. Upon applying an outward lateral force to any one or more gusset elements, it will produce more or less the same outcome as the opposing gusset elements of the previously illustrated bags.

From the foregoing description of the structure comprising the present invention, it will be appreciated that each bag may be easily opened by simply grasping the upper gusseted edges of the bag. Such grasping will result in the opening of one or more gussets, thereby immediately enabling one to access the bag mouth and fully open the bag. It is not necessary, then, to attempt to separate the upper edges of the bag as is the case heretofore with available prior art bags.
CLAIMS

What is claimed as being new and therefore desired to be protected is as follows:

1. A self-opening plastic bag comprising:
   a front wall and a rear wall, each said wall having a top edge opposite side edges and
   a bottom edge, said walls being joined together at their bottom edges, and also at their
   top edges to define at least in part an open bag mouth, said front and rear walls having
   opposed first side edges and opposed second side edges, the first opposed side edges
   being joined together by at least one inwardly extending gusset, and the second
   opposed side edges being joined together by at least two inwardly extending adjacent
   gussets, said walls and said gussets being pressed together, initially to appear as a
   compact flattened sheet-like assembly.

2. The method of opening the self-opening plastic bag described in Claim 1
   which comprises applying an outward lateral force to the first gusset joined side
   edges, and simultaneously applying an opposite lateral force to the second gusset
   joined side edges, thereby opening the mouth of the bag commencing at the second
   gusset side edges.

3. A self-opening plastic bag as described in Claim 1 wherein there extends
   upwardly from each side of the front wall and each side of the rear wall and unitary
   with the respective wall side a handle member portion which is joined to the
   corresponding handle member portion extending upwardly from the opposite side
   wall.

4. The method of opening a self-opening plastic bag as described in Claim 3 which
   comprises applying an outward lateral force to one handle member and
   simultaneously applying an opposite lateral force to the other handle member, thereby
   to open the mouth of the bag commencing at the second gusset joined side edges of
   the front and rear walls of the bag.
5. A self-opening plastic bag as described in Claim 1 wherein the ends of bottom portions of the front and rear walls are angled to define a rounded bag bottom when the bag is opened and filled with articles.
## INTERNATIONAL SEARCH REPORT

### A. CLASSIFICATION OF SUBJECT MATTER

**IPC(6):** B65D 30/20, 33/06  
**US CL:** 383/8, 35, 120, 121  
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)

**U.S.:** 383/8, 35, 120, 121

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 practicable, search terms used)

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>DE 2,526,961 A (MARSAL ET AL.) 26 May 1976, see Fig. 7.</td>
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<td>Y</td>
<td>US 4,911,560 A (HOOVER ET AL.) 27 March 1990, see Figs. 3 and 4 and col. 5, lines 15-50.</td>
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<td>US 5,219,220 A (KUCERA ET AL.) 15 June 1993, see col. 2, lines 25-33</td>
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<td>A</td>
<td>US 2,279,327 A (KEHR) 14 April 1942</td>
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<td>US 2,628,764 A (RUBINSTEIN ET AL.) 17 February 1953</td>
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<td>A</td>
<td>US 3,023,947 A (MCDUFFIE) 06 March 1962</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search: 25 JUNE 1998  
Date of mailing of the international search report: 14 JUL 1998

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<td>US 3,180,557 A (THULIN) 27 April 1965</td>
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