Sept. 30, 1969 W. GUENTHER 3,469,769

INTERCONNECTED BAGS HAVING CLOSURE FLAPS AND BOTTOM GUSSETS

Filed Oct. 9, 1967 2 Sheets-Sheet 1

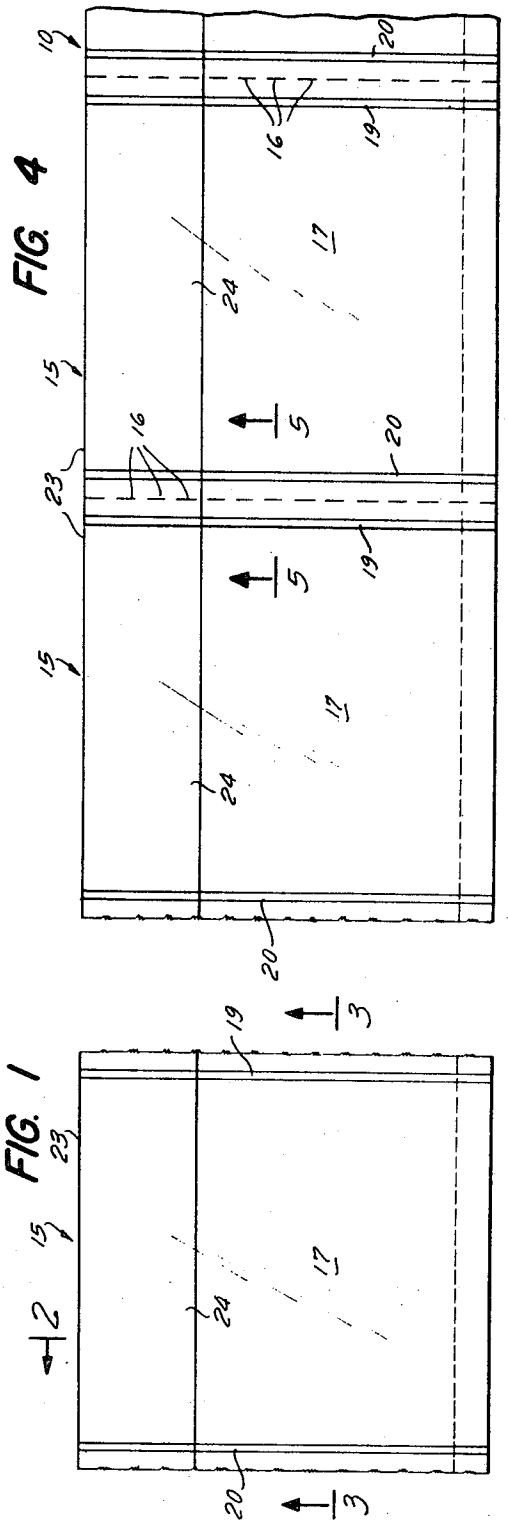

FIG. 4

FIG. 1

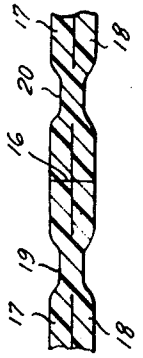

FIG. 5

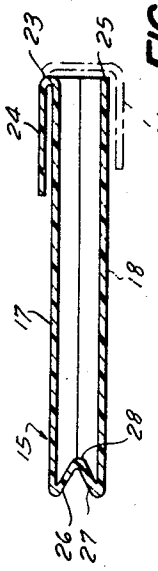

FIG. 2

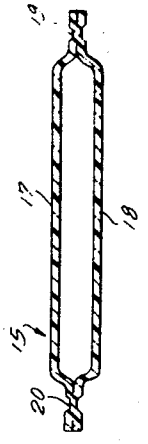

FIG. 3

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FIG. 6

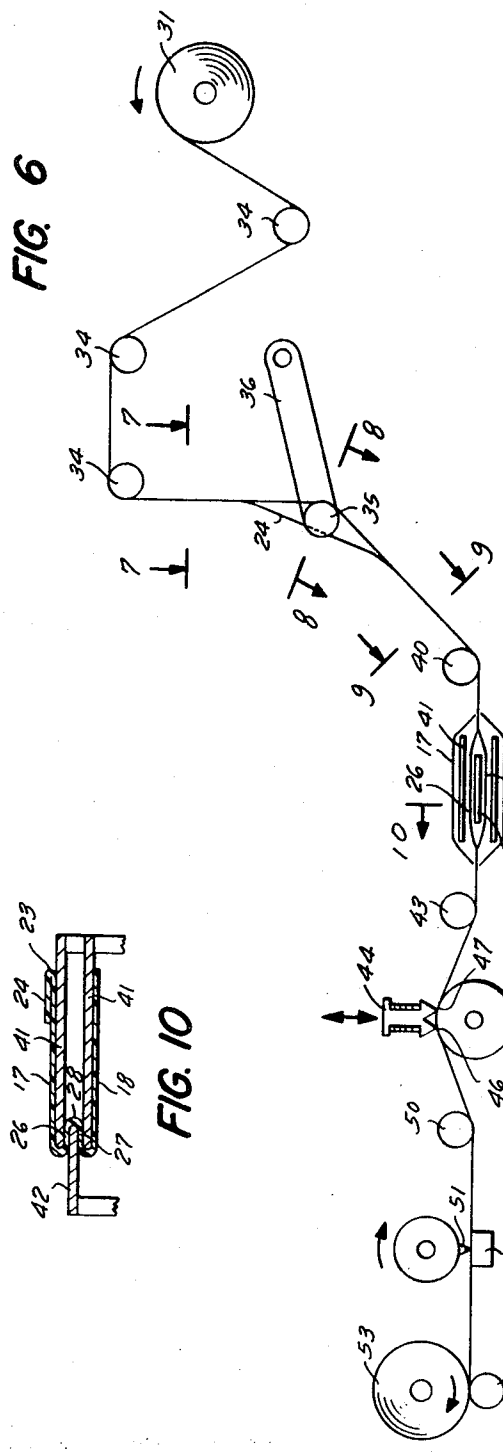

FIG. 7

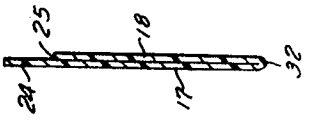

FIG. 8

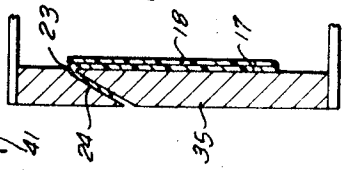

FIG. 9

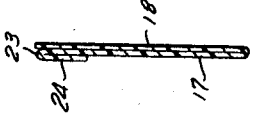

FIG. 10

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INTERCONNECTED BAGS HAVING CLOSURE FLAPS AND BOTTOM GUSSETS

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Int. Cl. B65d 27/10
U.S. Cl. 229—69 1 Claim

ABSTRACT OF THE DISCLOSURE

Series of bags formed of continuous length of heat-sealable sheet material. Material folded longitudinally defining superposed bag walls of unequal length. Projecting lip of longer wall folded against outer face of longer wall, defining closure flap. Regions adjacent to fold between bag walls pushed inwardly between bag walls, defining gusset. All plies of material sealed by pairs of spaced-apart seal lines defining side edges of individual bags, and all plies partially severed between each pair of seal lines to define tear line.

This invention relates to plastic bags of the type formed by two flat rectangular walls joined along three sides and open along the fourth side to define a filling opening. Coordinately, the invention relates to a method and apparatus for making such bags.

Flat plastic bags of this type have in recent years gained wide acceptance, and are merchandised primarily for household use. Such bags are shown, for example, in U.S. Patent Nos. 3,098,594 and 3,173,601. These bags are usually made, on a mass production basis, from a continuous flattened tube of relatively thin gage plastic material. The tube is provided with transverse heat-seal lines spaced apart along its length, each seal line joining the superposed flat walls of the tube and defining the bottom of one bag. Close and parallel to each seal line the tube walls are perforated or slit to define weakened tear lines. In this condition a length of the flattend tube, representing a quantity of interconnected bags, may be wound on a rigid core and packed in a box. When a bag is needed, the endmost bag is unwound from the core and torn from the next adjacent bag. The bag will be closed along three sides, but open along the fourth side created by the newly torn edge.

Bags of this type serve satisfactorily for many uses, but they do present certain problems. First, they cannot readily be closed. Customarily, short pieces of paper-covered wire are sold with such bags, the wire being twisted aronud the gathered open end portion of the bag to close it. This procedure is obviously cumbersome. Furthermore, such bags suffer from being "two dimensional," i.e., their walls lie in contiguous planes with their edges joined. Hence, the ratio between the holding capacity of these bags and their flat area is relatively small. Solutions to both of these problems are illustrated in U.S. Patent Nos. 2,709,467 and 2,842,179, wherein plastic bags are shown having closure flaps and bottom gussets. However, the bags of these patents must be made individually, i.e., they cannot be made in an interconnected series, as described above. Consequently, the convenience of a roll of such bags which can be separated one-by-one, as needed, is not available.

It is an object of the present invention to provide a series of interconnected yet readily separable plastic bags having closure flaps and expandable gussets.

Further objects of the invention involve the provision of a method and apparatus for producing such bags.

To accomplish these objectives, the invention contemplates starting with a continuous length of heat-sealable sheet material longitudinally folded to yield a J-shaped cross-sectional shape. The material is advanced longitudinally, and during this advancement the lip of the wider ply is guided through an angular slot in a bar over which the material passes, whereby the lip is folded back upon the outer face of the wider ply. Thereafter, as the plies pass over the outer surfaces of two spaced-apart support plates, an intermediate plate pushes the folded edge between the two plies into the region between the plies. In this condition, the material is provided with pairs of closely spaced transverse heat seal lines, the seals serving to fuse together the two plies, to define the opposed side edges of two adjacent bags, the folded back lip, to define a closure flap secured at its ends to the bag sides, and the pushed-in folded edge, to define a bottom gusset for each bag also secured at its ends to the bag sides. Finally, a line of perforations or slits is provided between each pair of seal lines to define a weakened tear line separating adjacent bags.

Additional objects and advantages of the invention will be apparent from the following description in which reference is made to the accompanying drawings.

In the drawings:

FIG. 1 is a face view of an individual bag according to this invention after it has been detached from the remaining bags of its series;

FIGS. 2 and 3 are cross-sectional views taken on lines 2—2 and 3—3, respectively, of FIG. 1;

FIG. 4 is a face view of interconnected bags according to this invention;

FIG. 5 is cross-sectional view taken on line 5—5 of FIG. 4;

FIG. 6 is a schematic view of a bag-making apparatus according to this invention;

FIGS. 7, 8, 9, and 10 are cross-sectional views taken at various points along the length of the bag material as it moves through the apparatus of FIG. 6.

At the outset, it should be mentioned that the thickness of the bag material has been exaggerated for the sake of clarity in FIGS. 2, 3, 5, and 7–10. The material employed is preferably thin heat-sealable material such as polyethylene sheeting.

A series of interconnected, but readily separable, bags **15** according to this invention is shown in FIG 4, the adjacent bags being separated by transverse lines of slits **16** (see also FIG. 5). The slits **16** constitute lines of weakness between adjacent bags along which the bag material may easily be torn to separate the bags **15**. Thus, to obtain an individual bag, as shown in FIG. 1, the bag material is torn along the line of slits **16** between the endmost bag in the series and the next successive bag.

Each bag is formed by two superposed plies or walls **17** and **18** fused together along their side edges by heat seal lines **19** and **20**. As will be described below, each pair of relatively closely spaced seal lines **19** and **20** (see FIG. 4) is formed simultaneously, but the relatively large distance between each two successive seal lines **20** and **19** defines the width of an individual bag **15**. Each line of slits **16** is located in the relatively small spacing between each pair of seal lines **19** and **20**.

Joined to the upper edge of the bag wall **17**, by a fold line **23**, is a flap **24**. The regions near the end edges of the flap are fused to the plies **17** and **18** at the seal lines **19** and **20**. The bag is formed, and supplied to the consumer with the flap **24** lying against the outer face of the bag wall **17**, as shown in solid lines in FIG. 2. After the bag is filled, through the open mouth defined by the fold edge **23** and the free upper edge **25** of the bag wall **18**, the bag may be closed by turning the flap

24 over the bag mouth into the position shown in dot-dash lines in FIG. 2. Manipulation of the flap 24 in this way is permitted, despite the fact that the ends of the flap are secured to the bag walls, by the flexibility of the bag material.

The bottom edges of the bag walls 17 and 18 are joined by two plies 26 and 27 (FIG. 2) defining a gusset. The plies 26 and 27 are joined along their inner edges by a fold line 28. The plies 26 and 27 are joined by fold lines along their outer edges to the lower edges of the bag walls 17 and 18, respectively. The regions near the ends of the plies 26 and 27 are fused to the bag walls 17 and 18 at the seal lines 19 and 20. Thus, the gusset 26, 27 is normally maintained in flattened condition between the bag walls 17 and 18. However, when the bag is filled, the plies 26 and 27 can swing away from each other to enlarge the volume of the bag.

The manner in which the series of bags 15 shown in FIGS. 1–5 may be produced is illustrated in FIGS. 6–10. A supply roll 31 of so-called J-stock is provided. This supply is a web of heat sealable material folded along an off-center longitudinal line 32 (see FIG. 7) parallel to the edges of the web to form a relatively wide ply 17 and a relatively narrow ply 18, the plies being in superposed relation. Before operation of the apparatus is initiated, the J-shaped web is threaded through the machine. The web is drawn around guide rollers 34 and a slotted bar 35, the latter being supported at its ends by a bracket 36 secured to the machine frame (not shown). The lip 24 of the wider ply 17, which extends beyond the free edge 25 of the narrower ply 18, is turned back toward the outer face of the ply 17 and slipped into a slot 37 (see FIG. 8) in the bar 35. The slot 37 is arranged at an acute angle to the plane of the web so that the slotted bar 35 serves to continuously fold the lip 24 back toward the outer face of the ply 17 as the web is continuously advanced.

After leaving the bar 35, the web travels to a roller 40 in the region of which the folding of the lip 24 against the ply 17 is completed (FIG. 9), so that the ply 24 now constitutes a flap. From the roller 40, the plies 17 and 18 are guided around the outer faces of two parallel, spaced-apart, rigid support plates 41 (see FIG. 10). A third intermediate plate 42 extends part way into the space between the plates 41. The region of the web adjacent to the fold line 32 (FIG. 7) is threaded between the margins of the plates 41 and 42 in a sinuous fashion to form the gusset plies 26 and 27 and the fold line 28, the latter being the fold line 32 reversed.

After leaving the plates 41 and 42, the web travels to a roller 43, at which the gusset plies 26 and 27 and the bag walls 17 and 18 are flattened against each other, and then to a heat sealing station comprising a heat sealing device 44 and a platen roller 45. The heat sealer 44 reciprocates, as indicated by the double-headed arrow, toward and away from the platen roller 45, and is provided with two parallel, spaced apart sealing edges 46 and 47. Thus, each time the heat sealer 44 strikes the platen roller 45, with the bag material between them, a pair of relatively close seal lines 19 and 20 are formed by the sealing edges 46 and 47, respectively. The reciprocation rate of the heat sealer 44 is related to the speed of advancement of the web so that lengths of the web equal to the desired width of the bags pass between the heat sealer and platen roller during the intervals between successive engagements of the heat sealer and platen roller. Any appropriate tensioning means (not shown) for the web to permit instantaneous halting of the web at the heat sealing station without interfering with the continuous web advancement may be employed.

From the sealing station, the web moves around a guide roller 50 to a cutting station comprising a rotating knife 51 and a stationary platen 52. The cutting edge of the knife is serrated, so that only short unconnected regions of the cutting edge contact the platen 52. The knife rotates in the direction indicated by the arrow at a speed related to the speed of advancement of the web. In this way, the knife 51 is caused to contact the platen 52 with the web between them only when the relatively narrow region of the web between the seal lines 19 and 20 is between them. The serrated edge of the knife thereby produces a line of slits 16 serving as the tear lines between adjacent bags.

The completed series of interconnected bags is then wound on a take-up roll 53 with the aid of a pressure roll 54. Rotation of the take up roll 53, by means not shown, serves to advance the web in a longitudinal direction through the apparatus. After operation of the apparatus has been terminated, either because of depletion of the supply roll 31 or for some other reason, the bags on the take-up roll 53 may be rewound on rigid cores (not shown) in suitable quantities, and the core-bearing bags packed in boxes.

The invention has been shown and described in preferred form only, and by way of example, and many variations may be made in the invention which will still be comprised within its spirit. It is understood, therefore, that the invention is not limited to any specific form or embodiment except insofar as such limitations are included in the appended claims.

What is claimed is:

1. A series of interconnected but separable bags comprising a length of heat-sealable material, said material being arranged in two main superposed plies defining the side walls of the bags, one longitudinal edge of each ply being connected to the corresponding edge of the other ply to define the bottoms of the bags, a relatively narrow third ply connected to the other longitudinal edge of one of said main plies to define closure flaps for the bags, all three plies being joined along a series of pairs of transverse, spaced-apart seal lines, each pair of seal lines defining two opposite side edges of two adjacent bags, and all three plies being provided with superposed weakened lines of separation located between each pair of seal lines, said weakened lines of separation being spaced from both of the pair of seal lines between which they are located the bottom longitudinal edges of said two main plies being connected by two additional superposed plies, one longitudinal edge of each additional ply being connected to the corresponding edge of the other, and the other longitudinal edge of each additional ply being connected to the bottom longitudinal edge of one of said main plies, said two additional plies being joined to said main plies by said seal lines, whereby the endmost bag of the series may readily be separated from the others by tearing along the weakened line between it and the next successive bag, each bag having a closed bottom and sides, an open top, and a flap secured at its side edges to the side edges of the bag and secured at its top edge to the top edge of one of said main plies.

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U.S. Cl. X.R.

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