March 7, 1939. D. SCHMIDT 2,149,872

BAG AND METHOD OF MAKING SAME

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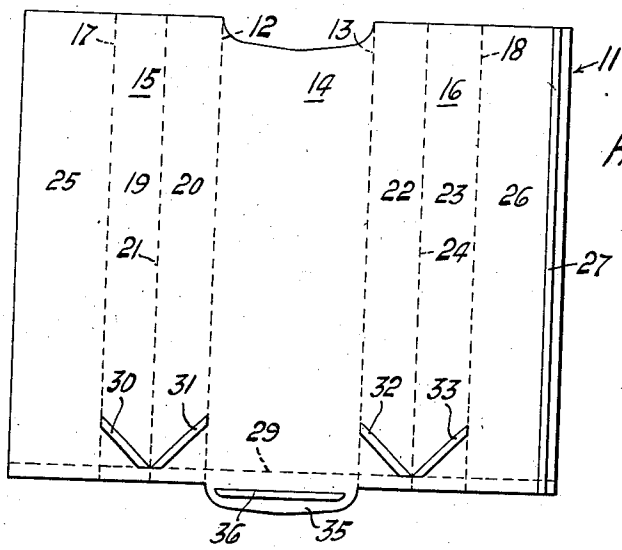


FIG.-1

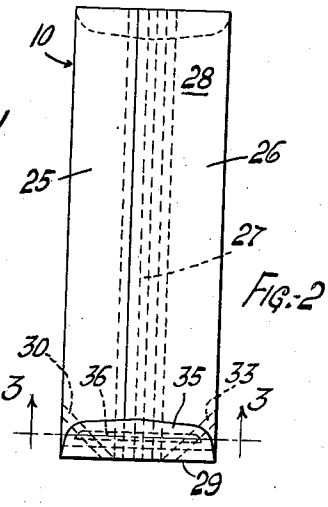


FIG.-2

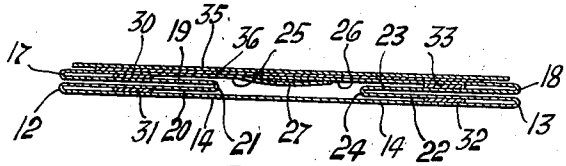


FIG.-3

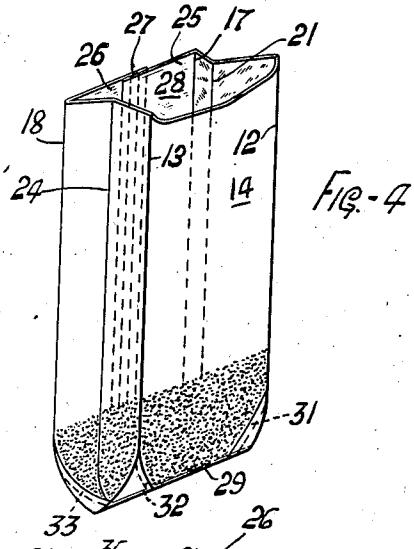


FIG.-4

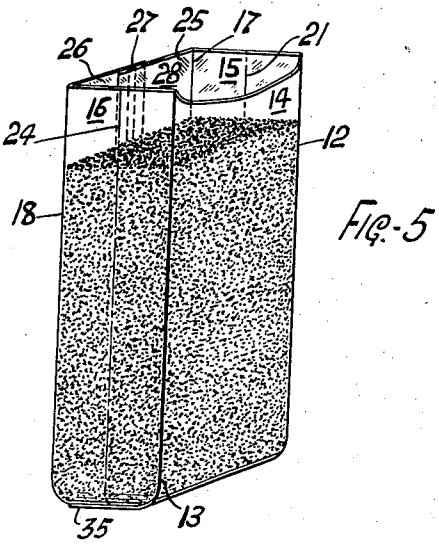


FIG.-5

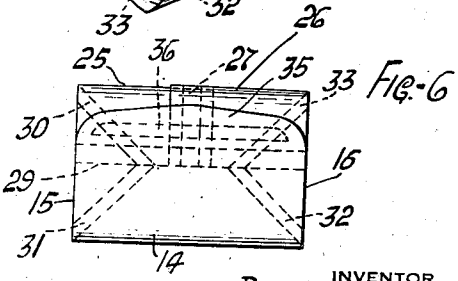


FIG.-6

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BAG AND METHOD OF MAKING SAME

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13 Claims. (Cl. 229—58)

This invention relates to an improvement in bags and to the method of making the improved bag and particularly to a bag having an improved bottom construction and the method of making the same.

Heretofore, bags made from webs or sheet material, such as paper, "Cellophane", or like cellulose films, and similar materials, have been classifiable as either "pinch bottom" bags or "flat bottom" bags, according to the bottom construction of the bags.

"Pinch bottom" bags are simple in construction, comprising a tubular body having an end thereof folded back and secured to the body of the bag to form the bottom. The advantages of such bags are that they are simple in construction and may be cheaply and rapidly manufactured on relatively inexpensive machines. The disadvantages of such bags are that the volume is relatively small, the bottoms are weak, substantially the entire load of the contents of the bag being carried by the adhesive which secures the bottom fold to the bag body, and the bottom of the bag when filled is not a flat surface, so that filled bags will not maintain themselves in an upright position. Other disadvantages are that the bags are difficult to open up and cannot be used in automatic bag filling machinery. The volume of a "pinch bottom" bag may be increased by forming it from a pleated tube so that a "square" bag is formed, as, for example, see the U. S. patent to Schmidt, No. 2,074,992. Such "square" bags are easier to open than the ordinary "flat" bag, but otherwise possess the disadvantages characteristic of all "pinch bottom" bags.

Flat bottom bags may be of the type known as "satchel bottom" bags or of the type known as "automatic" bags, also called "coffee" bags. "Satchel bottom" bags, such as the bag disclosed in the U. S. patent to Schmidt, No. 2,074,277, are usually formed from a flat tube of sheet material. In making such bags, the one end of the tube is opened up and folded or "toggled" back against the body of the bag. The "toggled" end portion is then interfolded and adhered to form a bottom element which is "hinged" to the body of the bag. The advantages of such a bag are that, due to the flat bottom element, the volume is large and filled bags will maintain themselves in an upright position. The disadvantages are that the machinery for making them is necessarily complicated, expensive, and comparatively slow in operation, the bags are difficult to open, and tend to assume a cylindrical shape when filled. Another disadvantage is that several creases formed in the bag seriously weaken the structure, especially at points where the creases converge. A further disadvantage is that the unopened bags are bulky and are comparatively expensive to ship.

The "automatic" bags are made from a pleated tube in substantially the same way that the "satchel bottom" bags are made, except that an additional crease or crimp must be made across the body of the bag above the toggled bottom element. "Automatic" bags are easily opened and tend to retain a prismatic shape when filled, and thus are adaptable for use in automatic bag filling machinery. Otherwise the "automatic" bags possess all the disadvantages of "satchel bottom" bags.

It is the object of this invention to produce a bag having all of the advantages of the bags described above and none of the disadvantages. Specifically, it is the object of this invention to produce a bag which can be cheaply and rapidly made on relatively inexpensive machinery. Another object of this invention is to produce a bag which may be easily opened with an "automatic" action, and which has a strong flat bottom. A further object of this invention is to produce a bag having no sharp creases at the junction of the walls and the bottom and no converging creases in the walls of the bag.

Still further objects of this invention are to produce a bag which is adapted for use in automatic filling machines and which, when filled, will tend to retain a prismatic shape.

Other advantages and objects of this invention will be apparent from the following description and from the drawing, in which

Fig. 1 is a development of the improved bag;

Fig. 2 is an elevation of the completed bag;

Fig. 3 is a cross section taken along line 3—3 of Fig. 2;

Fig. 4 is an isometric view showing the bag partially filled;

Fig. 5 is another isometric view showing the bag fully filled; and

Fig. 6 is a bottom view of the filled bag.

As shown in the drawing, in which like reference characters refer to like elements, the bag 10 is formed from a portion of web or sheet material 11 in which the longitudinally extending corner creases 12 and 13 define a front wall 14 having an arcuate recessed upper edge. On either side of the front wall 14 are located the side walls 15 and 16 defined by the corner creases 17 and 12 and 18 and 13, respectively. The side wall 15 is divided into panels 19 and 20 by the pleat crease 21. Similarly, the side wall 16 is

divided into panels 22 and 23 by the pleat crease 24. A back panel 25 is defined between the corner crease 17 and one side edge of the sheet 11. Similarly, a second back panel 26 is defined between the corner crease 18 and the other side edge of the sheet 11. As shown most clearly in Figs. 4 and 5, the back panels 25 and 26 are joined together in a lap seam by the longitudinal strip of adhesive 27 to form a back wall 28.

Extending across the bottom of the sheet 11 is the bottom crease 29. A diagonal strip of adhesive 30 extends upwardly at an angle of 45° from the intersection of the bottom crease 29 and the pleat crease 21 to the corner crease 17 across the lower corner of the side panel 19. Another diagonal strip of adhesive 31 extends upwardly at an angle of 45° from the intersection of the bottom crease 29 and the pleat crease 21 to the corner crease 12 across the lower corner of the side panel 20. Diagonal strips of adhesive 32 and 33 are similarly located with respect to the intersection of the bottom crease 29 and the pleat crease 24, extending across the lower corners of the panels 19 and 20, respectively.

The strips of adhesive 30, 31, 32, and 33 may be of any suitable width, but in the preferred form of this invention, they extend up to but not over the 45° angles from the intersection of the pleat creases and the bottom crease. Nor do they extend beyond the corner creases.

Integral with the front panel 14 along the bottom crease 29 is the bottom tab 35. A band of adhesive 36 is usually placed across the end of the tab 35.

In the preferred method of making the improved bag, a web of material is fed off a roll of stock through a suitable spot adhesive applying device which prints or otherwise applies the diagonal bands of adhesive 30, 31, 32, and 33 to the web of material at suitably spaced intervals. The web on which the diagonal bands of adhesive have been applied is then passed through a suitable tubing device and formed into a tube having corner creases 12, 13, 17, and 18 and reentrant pleats creased along the pleat creases 21 and 24. As the web passes through the tubing device, the longitudinal band of adhesive 27 is applied by any suitable means adapted to apply a continuous strip of adhesive. The continuous tube may then be passed through a bag forming mechanism, in which the tubing is cut into bag lengths and one end of the bag length is folded along the bottom crease 29 and adhered to the body of the bag by the band of adhesive 36 which adheres the bottom tab 35 to the back wall 28 to form the completed bag shown in Fig. 2. For a more detailed description of the method of forming the bag, reference may be made to the U. S. patent to Schmidt 2,074,992.

The locations and functions of the several bands of adhesive in the completed bag are clearly shown in Fig. 3. Thus, the strip of adhesive 27 joins the back panel 25 to the back panel 26 to form the back wall 28. The diagonal strip of adhesive 30 adheres the side panel 19 to the back panel 25; the diagonal strip of adhesive 31 adheres the side panel 20 to the front wall 14; the diagonal strip 32 adheres the side panel 22 to the front wall 14; and the diagonal strip 33 adheres the side panel 23 to the back panel 26. The band of adhesive 36 adheres the bottom tab 35 to the back wall 28 to form the end closure for the tube.

The completed bag, as shown in Fig. 2, has no distinct or discernible bottom element such as is always present in "satchel bottom" or "automatic" bags. The present bag, however, is "automatic" in action, as is shown most clearly in Figs. 4 and 5. The top of the present bag may be opened in any convenient manner. As the material which is to be contained in the bag, usually a pulverulent material, such as coffee, rice, salt, or the like, is poured into the bag, it falls against the diagonal seams in the bottom corners of the bag and against the portion of the bottom crease included between the diagonal seams. As shown in Fig. 4, as more material is poured into the bag, the pleated side walls bellow out and space the front and back walls. At the same time, the walls hinge inwardly along the diagonal bottom seams and along lines extending across the walls between the outermost tips of the diagonal seams. This "automatic" action continues until the filled bag, as illustrated in Fig. 5, comprises a prismatic structure having a flat bottom comprised of interfolded wall portions of the unopened bag.

It should be observed that the corner creases 12, 13, 17 and 18 serve to retain the walls of the bag in a prismatic relationship with each other but that at the juncture of the walls and the bottom, no crease exists. Instead, the walls curve inwardly to form the bottom. As may be noted from Fig. 1, the only converging creases present in the bag are located at the intersection of the bottom crease and the corner and pleat creases. It will be seen in Figs. 4, 5, and 6 that all converging creases are located in the bottom of the filled bag at points which are reinforced by at least two other thicknesses of material. The absence of unreinforced converging creases and the curved, uncreased juncture between the bottom and the walls of the bag greatly increase the strength of the structure. It will also be observed in Fig. 6 that the diagonal strips of adhesive reinforce the bottom of the filled bag and minimize the load carried by the band of adhesive 36 not only when the bag is filled, but also while it is being filled.

It is apparent that the essence of this invention lies in forming diagonal seams between the outer walls of the bag and the adjacent panels of the pleated side walls, the seams extending at an angle of substantially 45° from the intersection of the pleat creases to the corner creases. In the preferred form of the invention these seams are formed by bands of adhesive, but it is obvious that to perform the same function of uniting the bottom corners of the front and back walls with the pleated side walls, many equivalent means could be used, such as, for example, heat seals, staples, stitches, clips, creases, crimps, or any other means which will prevent the separation of the walls along the diagonal seams.

This improved bag and the method of making it are especially adapted for the manufacture of bags from "Cellophane" or like films, which material was not adaptable heretofore to the manufacture of "automatic" bags because of the excessive number of folding and creasing operations in the manufacture of such bags. This invention is not limited to "Cellophane" bags, however, but may be used with a variety of other materials, such as paper, cloth, laminated stock, or any other sheet or web material.

In the preferred method of manufacturing the improved bags from sheet or web stock, tubing devices are employed. However, it is apparent that the invention may be practiced on other types of bag making machinery.

Preferably a bag made according to this invention is rectangular in cross-section. It is ap-

parent, however, that this invention may be used for any bag which is substantially prismatic in form and has a substantially polygonal cross-section.

It is apparent, therefore, that this invention is not limited to the preferred form disclosed, either in whole or in part, but only by the appended claims.

What is claimed is:

1. As an article of manufacture, a bag comprising a pleated tube, an end closure for said tube, and means uniting a panel of the pleat to an adjacent wall of said tube along a line extending diagonally from the inner fold of said pleat adjacent said closure to an outer fold of said pleat and closing off the volume of the bag included between said panel and said adjacent side wall below said diagonal line.

2. As an article of manufacture, a bag comprising a pleated tube, a seam extending across said tube to form an end closure and means uniting a panel of the pleat to an adjacent wall of said tube along a line extending upwardly from the intersection of the inner fold of said pleat and said seam to the outer fold of said pleat and closing off the volume of the bag included between said panel and said adjacent side wall below said diagonal line.

3. As an article of manufacture, a bag comprising a pleated tube, a transverse fold in one end of said tube adhered to the body of the tube to form an end closure, and means to unite a panel of said pleat to an adjacent wall of said tube along a line extending diagonally from the inner fold of said pleat at said transverse fold to the outer fold of said pleat and closing off the volume of the bag included between said panel and said adjacent side wall below said diagonal line.

4. As an article of manufacture, a bag comprising a tube having a front wall, a back wall, and pleated side walls, said tube being pinched at one end to form an end closure, and means uniting the inner surfaces of the front and back walls of said tube to the inner surfaces of the adjacent pleated side walls along lines extending diagonally and upwardly from the inner folds of said pleats at said end closure to the outer folds of said pleats.

5. A bag comprising a pleated tube of web material, front, back, and pleated side walls in said tube, said tube being folded at one end to form an end closure and inner surfaces of the said front and back walls of said tube being adhered to inner surfaces of the said pleated side walls along lines extending diagonally outwardly from the intersection of the inner folds of said pleats and said end closure.

6. A bag comprising a tube of web material, reentrant pleats formed in the sides of said tube, an end portion of said tube folded back against the body of said tube, a transverse band of adhesive securing said folded portion to said tube to form a pinched end closure in said tube, and strips of adhesive located within said tube to adhere said reentrant pleats to the unpleated portions of said tube, said strips extending at an angle of 45° to said bottom fold from the inner folds of said pleats to the outer folds of said pleats.

7. A bag of cellulosic film having an automatic action, comprising a front wall, a back wall and pleated side walls forming a flat tube, a single seam pinching the end of said tube to form an end closure, diagonal seams adhering the outer corners of the front and back walls to the adjacent pleated side walls, said seams extending outwardly from the junction of the inner folds of said pleats and said end closure, and said front and back walls being adapted to curve inwardly along lines extending between the outermost points of said diagonal seams to form a flat bottom for said bag.

8. A bag of cellulosic film having an automatic action, comprising a front wall, a back wall and pleated side walls forming a flat tube, a single seam pinching the end of said tube to form an end closure, diagonal seams adhering the outer corners of the front and back walls to the adjacent pleated side walls, said seams extending outwardly from the junction of the inner folds of said pleats and said end closure, said pleated side walls being adapted to bellow outwardly, hinging along said diagonal seams and curving inwardly along lines extending between the outermost points of said diagonal seams to form a flat bottom for said bag.

9. A bag of cellulosic film having an automatic action, comprising a front wall, a back wall and pleated side walls forming a flat tube, a single seam pinching the end of said tube to form an end closure, diagonal seams adhering the outer corners of the front and back walls to the adjacent pleated side walls, said seams extending outwardly from the junction of the inner folds of said pleats and said end closure, said bag being adapted to open up to form a flat-bottomed prismatic structure, said front, back, and side walls curving inwardly at the juncture of the walls and flat bottom of the prismatic structure.

10. A method of forming bags having an automatic action, comprising the steps of applying short diagonal strips of adhesive to a web of sheet material, forming said web into a flat pleated tube enclosing said strips of adhesive between the pleats and the unpleated walls of said tube, severing said tube into bag lengths adjacent the location of said diagonal strips of adhesive and pinching the severed end of the tube adjacent the location of the diagonal strip of adhesive to form a seam extending across said tube contiguous to said diagonal strips of adhesive.

11. A method of forming bags having an automatic action, comprising the steps of applying pairs of short strips of adhesive to a web, the strips of adhesive in each pair being applied at substantially right angles to each other and diagonally to the length of the web, forming the web into a pleated tube, severing the tube adjacent the pairs of short strips of adhesive, and folding an end of said severed tube to form an end closure.

12. In the process of forming a pleated bag, the steps of adhering the inner surfaces of the front and back walls of a pleated tube to the inner surfaces of the adjacent panels of the pleated side walls along outwardly divergent seams, and folding and adhering an end portion of said tube against the body of the tube adjacent the outwardly divergent seams.

13. In the process of forming a pleated bag, the steps of forming a pleated bag body, forming an end closure in said bag body and uniting the outer corners of the inner surfaces of the outer walls of the bag body to the inner surfaces of the panels of the adjacent pleats along diagonal lines extending outwardly from the junction of the inner folds of the pleats and the end closure.

DAVID SCHMIDT.