

June 19, 1956

C. V. BRADY

2,751,140

BAG

Filed April 6, 1953

2 Sheets-Sheet 1

FIG. 1.

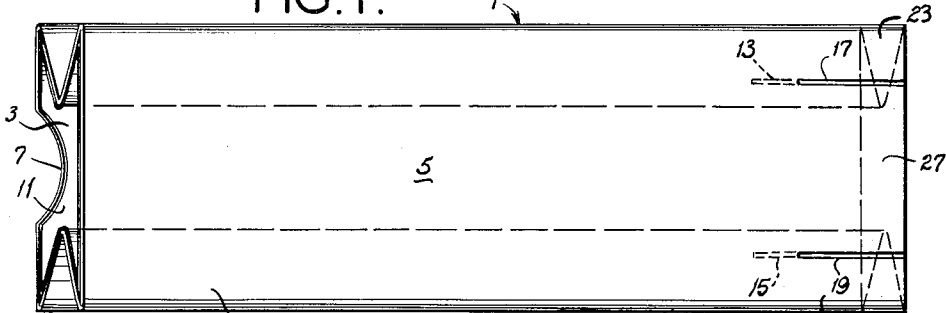


FIG. 2.

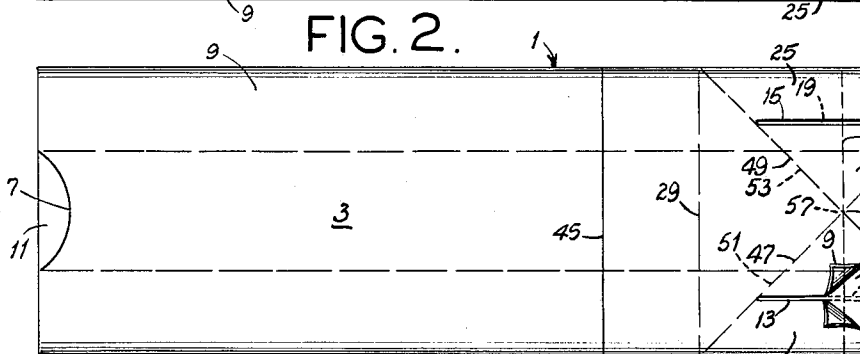


FIG. 3

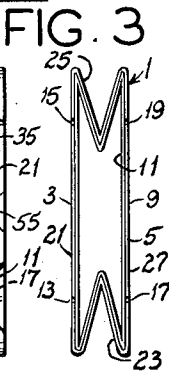


FIG. 4.

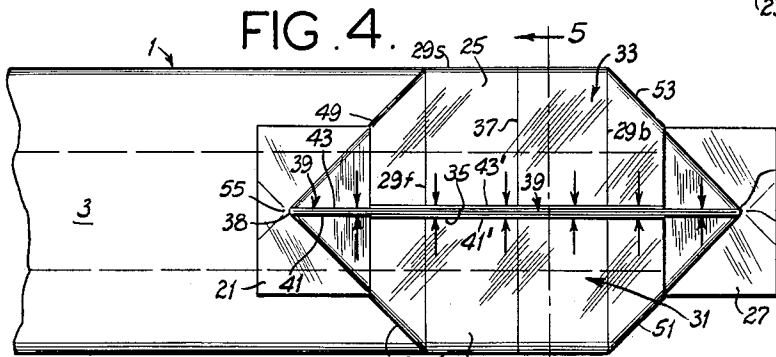


FIG. 5.

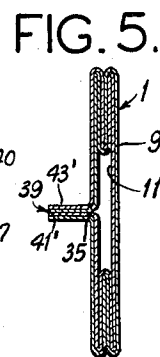


FIG. 6.

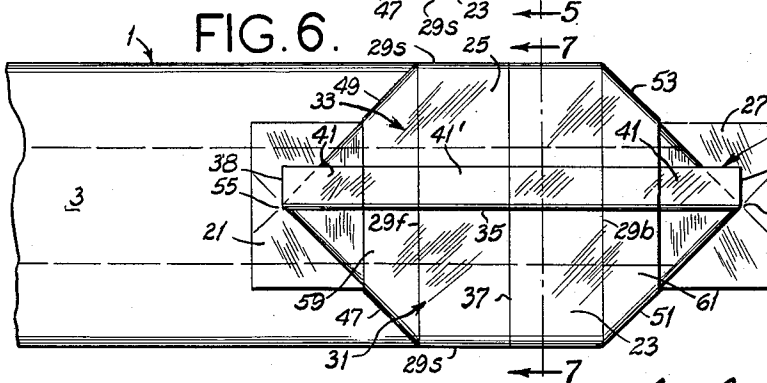
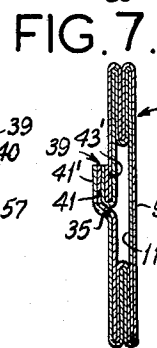


FIG. 7.



Charles V. Brady,
Inventor.
Koenig and Pope,
Attorneys.

June 19, 1956

C. V. BRADY

2,751,140

BAG

Filed April 6, 1953

2 Sheets-Sheet 2

FIG. 8.

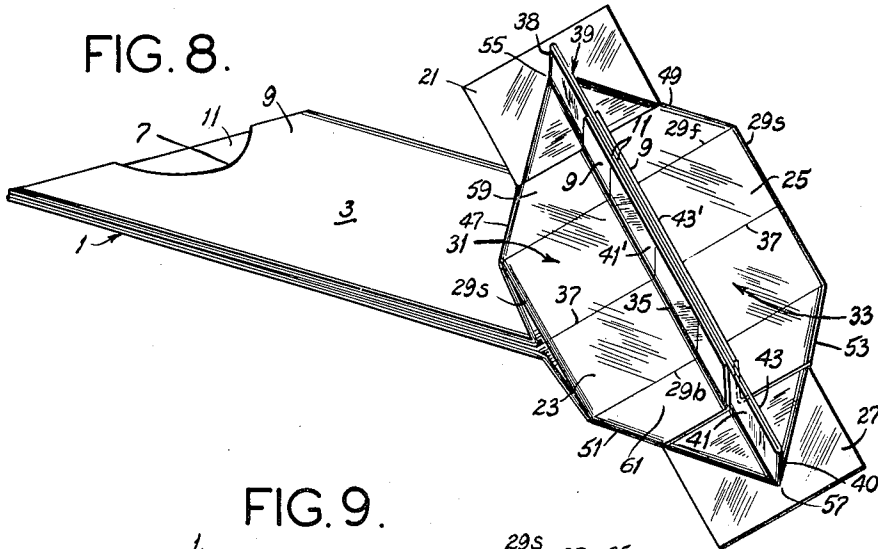


FIG. 9.

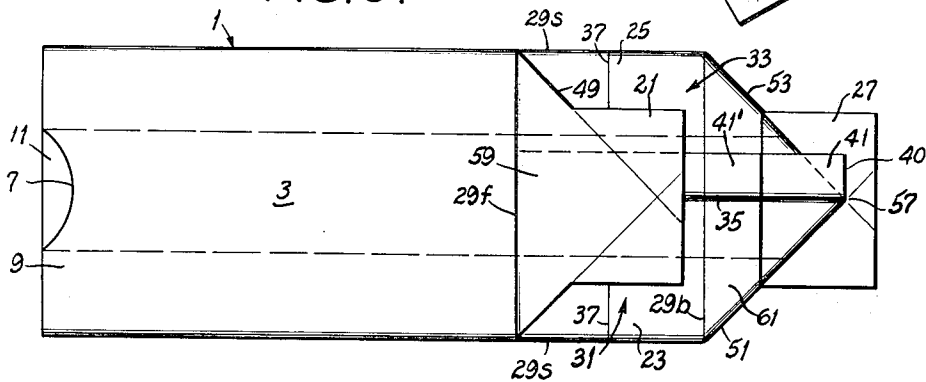
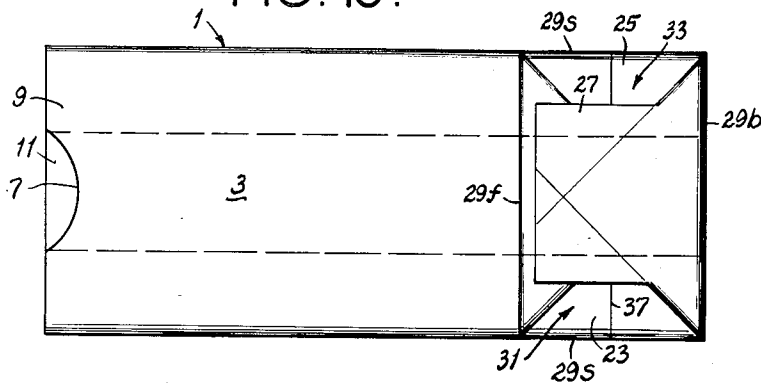


FIG. 10.



Charles V. Brady,
Inventor.
Koenig and Pope
Attorneys.

1

2,751,140

BAG

Charles V. Brady, St. Louis, Mo., assignor to Bemis Bro. Bag Company, St. Louis, Mo., a corporation of Missouri

Application April 6, 1953, Serial No. 346,924

2 Claims. (Cl. 229—55)

This invention relates to bags, more particularly to bags of the type having a heat-sealable liner and a so-called automatic or self-opening bottom.

Among the several objects of the invention may be noted the provision of an improved automatic or self-opening bottom construction for a bag of the type having a heat-sealable liner wherein the bottom is hermetically heat-sealed; the provision of a bag of this class wherein the bottom construction is such as to enable the hermetic heat seal to be made in a single operation, without any possibility of inadvertently sealing together the front and back of the bag; and the provision of a bag of this class which may be economically manufactured in quantity production. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a perspective of a length of bag tubing from which a bag of this invention is made, as viewed from what may be regarded as the back, the tubing being somewhat opened from its nominal flat condition;

Fig. 2 is a front elevation of Fig. 1;

Fig. 3 is a right-end view of Fig. 2;

Fig. 4 is a fragment of Fig. 2 illustrating a step in the bottoming of the length of tubing;

Fig. 5 is a cross section taken on line 5—5 of Fig. 4;

Fig. 6 is a view similar to Fig. 4 illustrating a subsequent step in the bottoming of the tubing;

Fig. 7 is a cross section taken on line 7—7 of Fig. 6;

Fig. 8 is a perspective of Fig. 4 illustrating the bottom structure in a tilted position more clearly to show the construction;

Fig. 9 is a view similar to Fig. 6, but showing the entire length of the tubing, and illustrating a further step in the bottoming of the tubing; and,

Fig. 10 is a view similar to Fig. 9 showing the completed bottom.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings, Figs. 1-3 illustrate a length of gusseted or intucked flat bag tubing 1 from which a bag of this invention is made. The front wall of the tubing is designated 3, and the back wall is designated 5. In the front wall at the end of the tubing which becomes the mouth of the bag (its left end as illustrated in Figs. 1 and 2) there may be the customary thumb notch 7. The tubing, as shown, is made of two-ply material, the outer ply being designated 9 and the inner ply being designated 11. The outer ply 9 constitutes an outer tube and the inner ply 11 constitutes a tubular liner nested inside the outer tube. The outer ply 9 is usually paper, although the invention encompasses other suitable materials for the outer ply. The inner ply or liner 11 is of impervious heat-sealable character, being impervious for sealing of

2

the bag contents against entry of outside air and moisture, and being heat-sealable for enabling closure of the bag with hermetically heat-sealed closures at top and bottom. Preferably, the inner ply or liner 11 consists of flexible sheet thermoplastic material, for example rubber hydrochloride such as is sold under the name Pliofilm. The invention encompasses the use of other flexible sheet thermoplastic materials for the liner 11 and also the use of non-heat-sealable sheet material having a coating of a heat-sealable material. For example, the liner 11 might consist of paper with a heat-sealable wax coating on the inside.

The tubular liner 11 is loosely nested inside and separated from the outer ply or tube 9, at least at the end of the tubing 1 which becomes the bag bottom (its right end as viewed in Figs. 1 and 2). At this bottom end of the tubing, the outer ply or tube 9 only has slits 13 and 15 in the front wall and slits 17 and 19 in the back wall extending lengthwise of the tubing from the bottom end of the tubing. The slits are spaced inward of the sides of the tubing and divide the lower end portion of the outer ply or tube 9 into a front flap 21, side flaps 23 and 25, and a back flap 27. The front flap 21 includes the portion of the outer ply between slits 13 and 15. The side flap 23 includes the portion of the outer ply between slits 13 and 17. The side flap 25 includes the portion of the outer ply between slits 15 and 19. The back flap 27 includes the portion of the outer ply between slits 17 and 19. It is important here to note that the inner ply or liner 11 is not slit, and is of completely tubular form at its bottom end.

It will be understood that in the manufacture of bags of this invention, tubing lengths 1 will be segmented from a continuous length of tubing made by combining a continuous web of the outer ply material and a continuous web of the inner ply or liner material, and then forming the combined webs into a continuous tube in accordance with standard practice in the art of bag manufacture. It will also be understood that the tubing so formed will have a longitudinal tube seam, usually in one of the gussets. This tube seam is purposely not illustrated to avoid excessive detail in the drawings. The slits 13, 15, 17 and 19 are made in the web of outer ply material before it is combined with the web of liner material, the slits recurring at bag length intervals in the web, and the continuous tube being segmented across one end of the slits.

The lower portion of the liner 11, below a bottoming line 29 (see Fig. 2), and the outer ply including side flaps 23 and 25, are folded into a diamond fold as best illustrated in Figs. 4, 6 and 8. The diamond fold has two infolded side areas generally designated 31 and 33 which reach to and beyond the front-to-back center line 35 of the diamond fold. At the center line 35 these side areas 31 and 33 are creased. Thus, so far as the inner heat-sealing ply 11 is concerned, adjacent marginal areas 41 and 43 (included in sides 31 and 33) are defined, which are continuous, being joined at their ends, as shown at 38 and 40. So far as the outer ply 9 is concerned, additional adjacent shorter marginal areas 41' and 43' (included in sides 31 and 33) are defined. These are not joined at their ends because of the slits 13, 15, 17 and 19. These slits relieve and allow the formation of the front and back flaps 21 and 27, which are not infolded with said sides 31 and 33.

The marginal areas 41, 43, 41' and 43' are obtained by reason of the fact that the bottoming line 29, which may be regarded as extending girthwise completely around the tubing, is spaced from the bottom end of the tubing a distance somewhat greater than half the width of the flattened tubing. Hence, the total transverse dimension of each side 31 and 33 of the diamond fold (including its angled marginal portions 41, 43, 41', 43'), perpendicular

3

to the center line 35 of the diamond fold (i. e., along the transverse center line 37) is somewhat greater than half the width of the flattened tubing. This, in view of the fact that there are no slits in the liner, produces a flattened tubular tab 39, extending out from the diamond fold. The bottom end portions 41' and 43' of the side flaps 23 and 25 of the outer ply lie on opposite sides of the tab 39. The front and back flaps 21 and 27 of the outer ply project from the front and back ends of the diamond fold.

In making the diamond fold, the bottom portion of the front wall 3 of the tubing is folded back on a line 45 spaced from the bottom end of the tubing a distance equal to half the gusset width plus half the width of the flattened tubing plus the desired width for tab 39. It is preferable that the tubing be prescored on line 45 to facilitate this operation. The line 29 is spaced from line 45 toward the bottom end of the tubing a distance equal to half the gusset width, i. e., a distance equal to the width of one panel of either gusset. The diamond fold is then made by folding the side flaps 23 and 25 together with the liner 11 on diagonal fold lines 47, 49, 51 and 53 and on the side portions 29s of line 29 which extend across the gussets. The diagonal fold lines 47 and 49 are in the front of the tubing, extending at an angle of 45° from the intersections of line 29 and the sides of the tubing, intersecting at a point 55 in the front of the tubing coincidental with the end 38 of tab 39. The diagonal fold lines 51 and 53 are in the back of the tubing, extending at an angle of 45° from the intersections of line 29 and the sides of the tubing, intersecting at a point 57 in the back of the tubing coincidental with the end 40 of tab 39. The locations of diagonal lines 47, 49, 51 and 53 and points 55 and 57 are indicated in Fig. 2. The length of slits 13, 15, 17 and 19 is determined by the location of the diagonal lines, the slits extending from the bottom end of the outer ply to these lines. In forming the diamond fold, the gussets are opened up at their lower ends, flattened out and folded on the portions 29s of line 29 extending across the gussets. These portions 29s of fold line 29 define the sides of the bag bottom. The side apexes of the diamond fold are folded into the gussets, and this accounts for the trapezoidal shape of the sides of the fold outward of line 35.

The flattened tubular tab 39, together with portions 41' and 43' of flaps 23 and 25, is folded on center line 35 to stand erect as illustrated in Figs. 4, 5 and 8, and heat and pressure are applied all along its length as indicated by the arrows in Fig. 4 to effect heat sealing of the tab to form a hermetic bag bottom closure. It will be understood that the heat sealing, being along a single straight line, may be quickly effected in a single operation. After the heat sealing, tab 39 and end portions 41' and 43' of flaps 23 and 25 in face contact with the opposite sides of the tab are folded on line 35 to lie flat against the diamond-fold bottom as illustrated in Figs. 6 and 7. Then, the triangular front portion 59 of the diamond fold outward of the portion 29f of line 29 which extends transversely across the front of the tubing together with front flap 21 and a portion of tab 39 is folded over on 29f to lie flat against the diamond-fold bottom (see Fig. 9), and the triangular back portion 61 of the diamond fold which lies outward of the portion 29b of line 29 extending transversely across the back of the bag together with flap 27 and a portion of tab 39 is folded over upon flap 21 and triangular portion 59 and secured thereto by adhesive, as illustrated in Fig. 10, thus completing the formation of an automatic or self-opening rectangular bag bottom.

From the above, it will be seen that the completed bag comprises the heat-sealable tubular liner 11 nested inside the outer tube 9. The outer tube only has the slits 13, 15, 17 and 19 forming the front and back flaps 21 and 27 and the side flaps 23 and 25 from the material of the outer tube. The front and back flaps are separated from the liner 11. The side flaps 23 and 25 and the lower portion of the liner 11 are folded into a diamond fold

4

which is full and complete as to the liner (but not as to the outer tube 9). The width of each side 31 and 33 of the diamond fold across the transverse center line 37 of the diamond fold (which center line is defined by the lower end portions of the central folds of the gussets in the case of the gusseted bag illustrated) is somewhat greater than half the width of the bag. Thus, the front-to-back center line 35 of the diamond fold is spaced from the bottom edge of the liner 11 and the bottom edges of the side flaps 23 and 25. The portion of the liner 11 between line 35 and the bottom edge of the liner has the form of a flattened tubular tab 39, and this tab is heat-sealed to form a complete hermetic bag bottom closure. It will be understood that sealing is effected by melting and bonding of the opposed contacting faces of the liner in the flattened tubular tab throughout the bottom end of the liner. The end portions 41' and 43' of the side flaps 23 and 25 between line 35 and the bottom edges of the side flaps 23 and 25 lie on opposite sides of the tab 39 and are in face contact therewith, and the tab and these portions of the side flaps are folded over on line 35 to lie flat against the diamond fold. The triangular front and back sections 59 and 61 of the diamond fold together with the front and back flaps 21 and 27 (and portions of the folded-down tab 39) are folded one upon the other and secured together by adhesive.

While the invention is herein disclosed as it is embodied in a two-ply bag, it will be understood that its principles are applicable to a bag consisting of more than two plies wherein the inner ply is of heat-sealable character, and that in such case all plies except the inner ply will be slit in a manner corresponding to the slitting of the single outer ply 9. In such case, all the plies outside the inner ply may be regarded as constituting an outer tube.

Also, while the invention is herein disclosed as it is embodied in a gusseted bag, it will be understood that its principles are applicable to a flat un-gusseted bag. Such a bag would correspond to the bag shown in Fig. 10 with the gussets pushed out and flattened, and without the gusset folds.

Bags of this invention may be economically manufactured in quantity production because in view of the nature of the bottom construction, only a single simple straight-line heat-sealing operation is required to produce the hermetically sealed bottom closure of the heat-sealable liner. Since the heat sealing is carried out on the tab 39 as it stands out from the bottom, there is no danger of sealing together the front and back of the bag. Also, the bottom presents a neat appearance, without any undue bulkiness due to excessive superimposed thicknesses of material. It will be understood that bags such as herein disclosed are particularly useful for packaging products, such as coffee, requiring hermetic sealing for best preservation, and that the bags are heat-sealed across the top after filling.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A bag comprising a heat-sealable tubular liner inside an outer tube, the outer tube only having slits extending from its bottom end in the front and back walls spaced inward of the sides of the bag forming front, back and side flaps from the material of the outer tube, at least the front and back flaps being separated from the liner, the side flaps and the lower portion of the liner being folded into a diamond fold which is complete as to the liner, the width of each side of the diamond fold across the transverse center line of the fold being somewhat greater than half the width of the bag so that the front-to-back center line of the diamond fold is spaced from the bottom edge

5

of the liner and the bottom edges of the side flaps, the portion of the liner between said front-to-back center line and the bottom edge of the liner having the form of a flattened tubular tab and being heat-sealed to form a complete hermetic bag bottom closure, the end portions of the side flaps between the front-to-back center line and the bottom edges of the side flaps lying on opposite sides of the tab and being in face contact therewith, the tab and said contacting portions of the side flaps being folded over on said front-to-back center line to lie flat against the diamond fold, and front and back triangular sections of the diamond fold together with the front and back flaps and portions of the tab being folded one upon the other and secured together.

2. A bag comprising an outer paper ply and an inner ply of flexible sheet thermoplastic material, the outer ply only having slits extending from its bottom edge in the front and back walls spaced inward of the sides of the bag forming front, back and side flaps from the paper of the outer ply, at least the front and back flaps being separated from the inner ply, the side flaps and the lower portion of the inner ply being folded into a diamond fold which is complete as to the inner ply, the width of each side of the diamond fold across the transverse center line of the

6

fold being somewhat greater than half the width of the bag so that the front-to-back center line of the diamond fold is spaced from the bottom edge of the inner ply and the bottom edges of the side flaps, the portion of the inner ply between said front-to-back center line and the bottom edge of the inner ply having the form of a flattened tubular tab and being heat-sealed to form a complete hermetic bag bottom closure, the end portions of the side flaps between the front-to-back center line and the bottom edges of the side flaps lying on opposite sides of the tab and being in face contact therewith, the tab and said contacting portions of the side flaps being folded over on said front-to-back center line to lie flat against the diamond fold, and front and back triangular sections of the diamond fold together with the front and back flaps and portions of the tab being folded one upon the other and secured together by adhesive.

References Cited in the file of this patent

UNITED STATES PATENTS

2,246,911	Baker	June 24, 1941
2,396,565	Gardner	Mar. 12, 1946
2,496,796	Kardon	Feb. 7, 1950