Sept. 25, 1956 W. V. OWENS 2,764,339

MULTI-PLY VALVE SACKS

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FIG. 1.

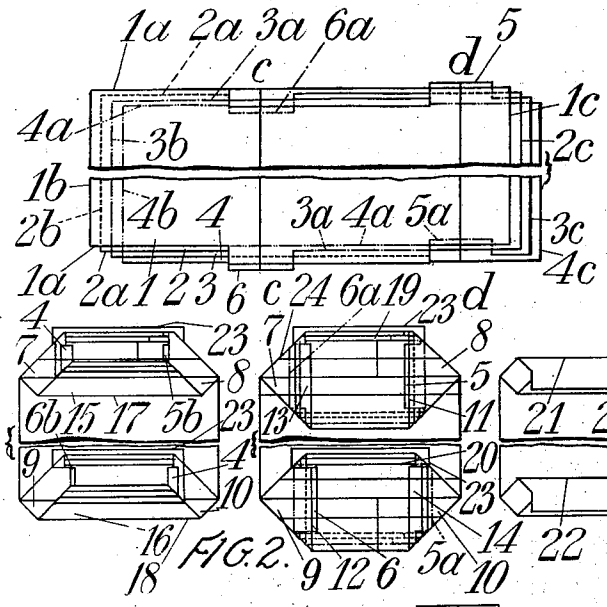


FIG. 3.

FIG. 2.

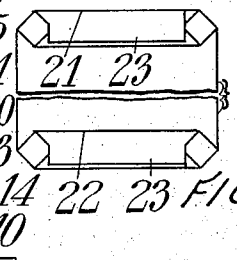


FIG. 4.

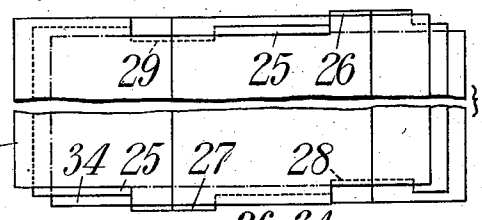
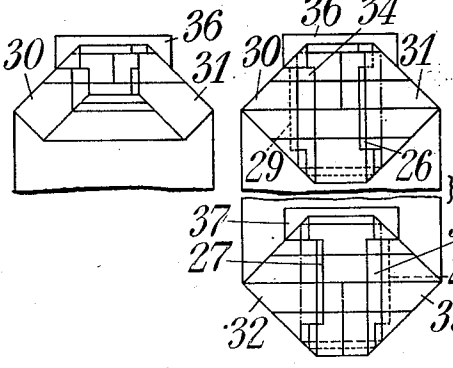


FIG. 5.

FIG. 7.



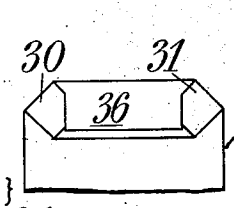


FIG. 8.

FIG. 6.

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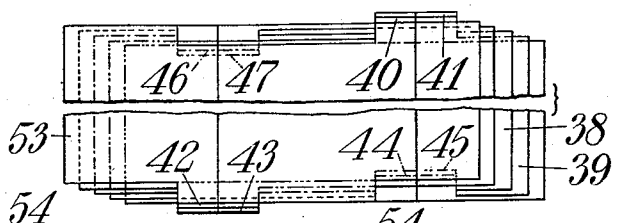
FIG. 9.



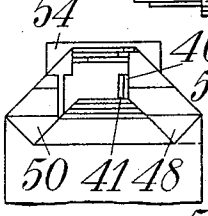
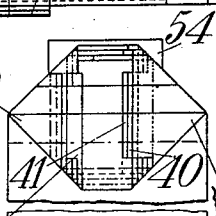


FIG. 11.



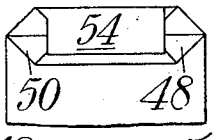


FIG. 12.

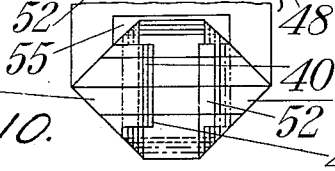
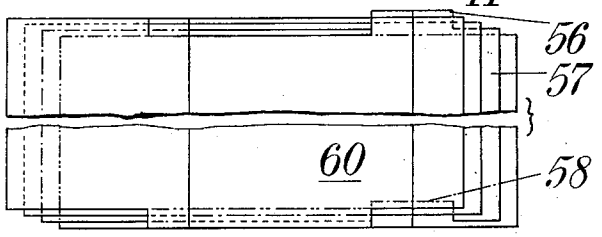


FIG. 10.

FIG. 13.



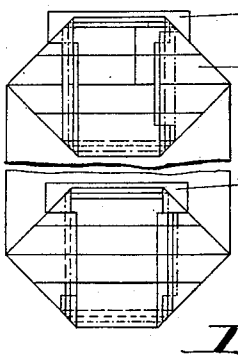


FIG. 14.

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MULTI-PLY VALVE SACKS

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Application July 17, 1950, Serial No. 174,170

Claims priority, application Great Britain July 20, 1949

5 Claims. (Cl. 229—55)

This invention relates to multiply paper blockbottom valve sacks or bags (hereinafter referred to as bags) and their manufacture, of the type wherein the plies at each face of the flattened bag tube length are arranged so that the ends thereof progressively overlap to provide stepped or staggered margins, those of the flap of one face being adhesively secured to those of the flap of the other face, in folding them to form the blockbottom closure. The invention also relates to multiply blockbottom bags of the above character comprising three or more plies, wherein the bag tube lengths are ruptured from a continuous multiply bag tube formed on the bag tubing machine by the assembly therein of the several webs for the plies which have been perforated transversely normally across the full width of the webs and slit longitudinally without waste of paper, to provide notched and shouldered rupturing lines for forming the stepped margins, the rupturing being accomplished by tensioning each leading bag tube length.

Certain blockbottom bags of the stepped margin type have been manufactured and various proposals have been made for making blockbottom closures in bag tube lengths, but all these have involved a modification of the normal diamond corner fold of the blockbottom, such that the end closures could not be carried out on one or other of the standard blockbottom forming machines in which the bag tube lengths continuously travel through the folding means, but had to be treated in machines in which the bag tube was halted at each folding stage.

Furthermore, although these stepped margin bags possessed a satisfactory adhesive seal transversely across the bag mouth at the several plies one to the other by virtue of the stepped end margins, the adhesive seal at the triangular fold of the corners of the bag were imperfect or weak such that sifting of the contents of the bags might occur through the corner folds, as the stepped margins are covered or partially covered by the outer ply at the triangular fold, such that adhesion occurred only or mainly with the outermost ply of said triangular folds.

It will be appreciated that with a stepped margin blockbottom bag, the stepping at one end is the reverse of that at the other and while at one end the inner plies at the triangular fold are exposed (or partly exposed) affording flexibility and a good adhesive closure, at the other end the outer ply covers the margins of the inner plies at the triangular fold and hence only one ply is available for adhesively securing to the flap folds and the present invention is directed to overcome this objection.

The aim of the present invention is to remove defects of the above character and to provide for the manufacture of a multiply stepped margin bag, wherein the blockbottom closure is adhesively sealed not only to more than one ply at the stepped end transverse margins of the face flaps, but also at two or more plies at the corner fold, and furthermore wherein the blockbottom closure is of the normal or standard diamond corner type capable of being adhesively closed on a blockbottom machine of the continuous folding character referred to above.

The invention consists in a method of manufacturing multiply stepped valve bags for diamond fold blockbottom closure, by slitting and perforating paper webs for the plies of the bag tube on rupturing lines transversely of the web characterised in this that a ply (or plies) is slit and perforated to outline a recess and a complementary tongue projecting longitudinally beyond the outermost ply at diagonally opposite corners of the bag tubes and extending laterally to or beyond the transverse folding lines of the face flaps, and folding the ends of the tubes to diamond blockbottom form in a continuous blockbottom machine with adhesive sealing, including the projecting tongues, to more than one ply at all the corners except a valve fold corner.

According to the invention a pair of diagonally opposite tongues may be formed on one ply only or one tongue may be formed on one ply and the other tongue on another ply, or two pairs of diagonally opposite tongues may be provided, one pair being on one ply (or distributed between two plies) and the other pair may be on another ply (or distributed between two plies). Where more than one tongue is provided at any one corner, that on the inner ply is dimensioned longitudinally to project at the triangular fold beyond the other tongue so as to expose a margin for adhesive sealing.

It is known according to British patent specification No. 623,313 to provide a projecting integral tongue by the perforating and slitting method at a valve fold for the purpose of providing a flexible margin which operates to prevent sifting of the contents through the valve opening and in carrying out the present invention it is preferred to embody such tongue in the bags on an appropriate ply including the outermost for the same purpose.

A further feature of the invention resides in the formation of an integral label-like cover flap on the outermost ply for adhesive sealing over the stepped flap and over a portion of the diamond corner folds, this cover flap being formed by perforating and slitting the outermost ply web on a shouldered and notched line. At one end of the bag one shoulder or longitudinal edge of the flap is produced by the slitting, and the other may be produced by interrupting the paste and leaving a free end of the longitudinal edge of the seam the remainder of which is adhesively secured in forming the outer bag tube.

In the accompanying drawings:

Figure 1 illustrates a series of plies for a 4-ply bag arranged in staggered relation.

Figures 2 to 4 show the various folding steps to form the diamond blockbottom.

Figures 5 to 8 are similar views showing the invention applied to a 3-ply staggered margin bag.

Figures 9 to 12 are similar views showing the invention applied to a 5-ply bag.

Figures 13 and 14 are views showing the invention as applied to only one corner of the bag.

In certain of the figures the configuration of the plies is indicated by using dash, dash-and-dot, dash-and-two dots, etc. to show parts that are to the rear of an outer ply.

In carrying the invention into effect in constructing a 4-ply blockbottom bag having integral ply extensions at diagonally opposite corners the web plies **1**, **2**, **3** and **4** (Figure 1) are provided in known manner with transverse perforations and longitudinal slittings to form the shoulders and notches in the end margins **1***a*, **2***a*, **3***a* and **4***a*, to which will give the appropriate staggering or stepping of such ends when the webs are folded over about the lines *c*—*c* and *d*—*d* to form a tube.

The notches and shoulders may be traced out in Figure 1 but form no part of the present invention.

It will be noted that in Figure 1 the ply **1** is the outermost ply so that the folding about the lines *c*—*c* and *d*—*d* takes place beneath the intermediate portions between said lines.

The innermost ply but one of the bag, i. e. ply **3**, is formed with a tongue or integral ply extension **5** which will lie at one corner of the bag tube and a tongue or integral ply extension **6** which will lie at the opposed diagonal corner of the tube. These tongues **5** and **6** will project beyond the outermost ply **1** of the tube, i. e. beyond the normal transverse end lines of the tube length.

Corresponding to the tongues **5** and **6** the ply **3** will be provided with recesses **5***a* and **6***a*. Thus the tongues will be formed on succeeding bag lengths without waste of material.

When the plies **1**, **2**, **3** and **4** are folded about the lines *c*—*c* and *d*—*d* and the longitudinal edge margins **1***b*, **2***b*, **3***b*, **4***b* and **1***c*, **2***c*, **3***c*, **4***c*, are adhesively secured to form the nested tubes and the bag length is severed by a longitudinal pull thereon, the tongues **5** and **6** will be folded in half about the lines *c*—*c* and *d*—*d* and will be provided at diagonally opposite corners of the bag length. The valve may be formed at either of said corners.

The ends of the bag length are formed into diamond blockbottoms by normal continuously operating blockbottoming mechanism.

The first step in forming the diamond blockbottom is illustrated in Figure 2 by which triangular corners **7**, **8**, **9** and **10** are formed.

At the corner **8** at which the valve may be formed the tongue **5** projects beyond the normal edges **11** of the corner and will provide an improved valve construction as it provides a flexible projection preventing sifting through the valve.

Similarly at the corner **9** the tongue **6** extends beyond the normal edges **12** and thus provides additional pasting area where normally the staggered margins are masked. The tongue will thus be a two-ply lock at this corner whereas normally, owing to the masking the corner is only one-ply strong as the pasting in closing the corner would necessarily be limited to the masking triangular portion.

At the other corners **7** and **10** the recesses **6***a* and **5***a* provide greater flexibility and as the areas **13** and **14** of the innermost ply **4** are exposed by the recesses for pasting purposes they also facilitate the making of sift proof closures.

In the next stage of closing shown in Figure 3 in which the side portions **15**, **16** are folded over about the lines **17**, **18** it will be noted that portions of the tongues **5***b* and **6***b* are still exposed after the fold is made and such exposed portions provide additional paste receiving areas available for the final fold, thus providing improved adhesion of the staggered parts.

At the other corners **7** and **8** there is still a considerable area of the inner ply **4** exposed for pasting when the final fold is made.

The final fold is illustrated in Figure 4 in which the side portions **19** and **20** are folded over about the lines **21**, **22**.

In this final fold it will be noted that the outer ply is formed with an integral sealing label **23** for providing a sift proof corner closure, avoiding the necessity of supplementary labels for the purpose.

This integral sealing label **23** is formed by slitting the outer ply **1** longitudinally a distance conforming to diamond edge **24** (Figure 2) at one corner **7** and by interrupting the paste line at the longitudinal seam or join at the other corner **8**.

At the lower corners **9** and **10** the slitting must be effected at both corners as the seam lies on the inner side of the folded end.

The position for the slits in forming the integral label may be varied in relation to the longitudinal folds of the bag.

It will be noted that the width of the tongues **5** and **6** is such that the tongue extends laterally beyond the transverse folding lines **18** and **21** of the face flaps **15**, **16**, **19**, **20**, but the tongues may be narrower if desired provided the desired adhesion area is obtained.

The invention is illustrated in Figures 5 to 8 as applied to a 3-ply bag.

In this bag the intermediate ply **25** is provided with extension tongues **26**, **27** which will be located at diagonally opposite corners of the bag and corresponding recesses **28**, **29** which are located at the other corners.

In the first fold illustrated in Figure 6, by which the triangular corners **30**, **31**, **32**, **33**, are formed, the tongues **26**, **27** provide the staggering and additional exposed areas at corners **31**, **32**, while the recesses **28**, **29**, at corners **33**, **30**, provide an increased exposed area of the innermost ply **34**.

The outermost ply **35** is also slit longitudinally and has an interrupted paste area at the longitudinal join at one end of the bag length to form the sealing labels **36**, **37**.

The further folding to form the diamond blockbottom is illustrated in Figures 7 and 8, all stages of the folding being effected on a continuous operation blockbottoming machine.

In applying the invention to a 5-ply bag, see Figures 9 to 12, tongue extensions may be applied to two of the plies thus providing a 3-ply lock at the corner which is normally only 1-ply strong.

Referring to Figure 9 the third and fourth plies **38**, **39** are formed with tongues **40**, **41** at one corner position and tongues **42**, **43** at the diagonally opposite corner position. At the other corner positions corresponding recesses **44**, **45**, **46**, **47** are formed.

When the first fold to form the blockbottom is made, see Figure 10, it will be noted that at the corner the two tongues **40**, **41** are exposed providing the 3-ply lock at the corner which is to be sealed. At the other corners **50**, **51** an increased sealing area of the innermost ply **52** is provided.

The outer ply **53** is formed with sealing labels **54**, **55** by longitudinal slits as described in the previous examples.

The further stages of folding are shown in Figures 11 and 12 and here again all folding steps to form the diamond blockbottom are effected by continuously operating blockbottoming mechanism.

Figures 13 and 14 illustrate the application of the invention in which the tongue or integral ply extension is formed at one corner only, the complementary corner being provided with a recess.

Thus the tongue **56** is formed on the ply **57** which is the innermost ply but one of the bag. At the other end of the bag a corresponding recess **58** is formed.

The corner **59** having the tongue **56** may be the valve corner of the bag.

The outermost ply **60** is also formed with a label flap **61** as in the previous modification.

The blockbottom folding is effected on a continuous operation machine, the first fold being shown in Figure 14. The second and final folds are as in the modification already described.

Where the bag is provided with more than three plies the integral ply extensions or tongues may be provided at all four corners in which case two tongues are formed on one ply at diagonally opposite corners while the other tongues are formed on another ply at the remaining corners.

In multiply bags formed with integral tongues according to the invention it will be found that the improved formation at the closed corners renders them siftproof whereby the necessity of supplementary labels is avoided

thus effecting a considerable saving in labour, material and plant.

Moreover, such siftproof qualities are increased by the provision of the integral label flap on the outer ply of the sack which again being formed integral without waste of material avoids the necessity of supplementary labels.

The formation of the integral label closure also avoids the springiness of the final corner fold as it reduces the thickness at this fold.

I claim:

1. A multi-ply stepped margin diamond corner block-bottom bag comprising at least three substantially co-extensive nested and flattened tube lengths each having a longitudinal seam displaced laterally from the seams of the other tube lengths, a diamond corner fold closure at each end of the set of tube lengths, the terminal edges of the tube lengths at each end of the bag being stepped with respect to one another throughout the lengths of said edges; an intermediate one of said tube lengths having at one end, located in one corner fold, a tongue projecting beyond the edge of the overlying tube length, and at its other end located in the corresponding corner fold, a recess corresponding to said tongue in shape and position; the stepped edges at the bag ends being folded one set over the other and adhered to one another with the projecting portion of said tongue being adhered to portions of the other tube lengths.

2. A multi-ply stepped margin diamond corner block-bottom bag in accordance with claim 1, in which said intermediate one of said tube lengths has an additional projecting tongue located in the diagonally opposite corner fold from the first-named tongue, and a corresponding recess at the remaining corner fold.

3. A multi-ply stepped margin diamond corner block-bottom bag comprising more than three substantially coextensive nested and flattened tube lengths each having a longitudinal seam displaced laterally from the seams of the other tube lengths, a diamond corner fold enclosure at each end of the set of tube lengths, the terminal edges of the tube lengths at each end of the bag being stepped with respect to one another throughout the lengths of said edges; a first intermediate one of said tube lengths having at one end, located in one corner fold, a tongue projecting beyond the edge of the overlying tube length, and at its other end, located in the corresponding corner fold, a recess corresponding to said tongue in shape and position; a second intermediate one of said tube lengths having, at the end opposite the tongue of the first intermediate tube length, and located at the diagonally opposite corner fold, a similar projecting tongue, and a corresponding recess at the other end of the second intermediate tube length in the remaining corner fold; the stepped edges at the bag ends being folded one set over the other and adhered to one another with the projecting portions of said tongues being adhered to portions of the other tube lengths.

4. A method of making multi-ply stepped valve bags for diamond fold block-bottom closure, comprising the steps of slitting and perforating a plurality of at least three laterally-offset webs to define substantially superposed panels having both their lateral and longitudinal margins stepped with respect to one another, folding each set of superposed panels about spaced longitudinal lines to superpose the longitudinal edges of respective plies thereof and adhering said edges each to each to form nested tubes with staggered seams, the perforations being so disposed in the respective plies as to define longitudinally stepped margins at both bag ends when the tubes are severed into individual lengths; at least one intermediate panel being slitted and perforated to define at each end, in the region of diagonally opposite corner folds, a tongue projecting beyond the lateral margins of the other panels and at the end opposite each tongue a corresponding recess; pulling said tubes lengthwise to separate individual bag lengths from the remainder of the tube, and thereafter folding and adhesively sealing the ends of the respective individual lengths of nested tubes to diamond block-bottom form, including sealing the projecting tongue at at least one end to more than one of the other panels.

5. The method in accordance with claim 4, in which two intermediate panels are so slitted and perforated, to provide such tongues and recesses at complementary corner fold regions of said respective two intermediate panels.

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