Sept. 4, 1956 W. E. GROSSET ET AL 2,761,612

MULTIPLY VALVE BAGS

Filed July 29, 1952 3 Sheets-Sheet 1

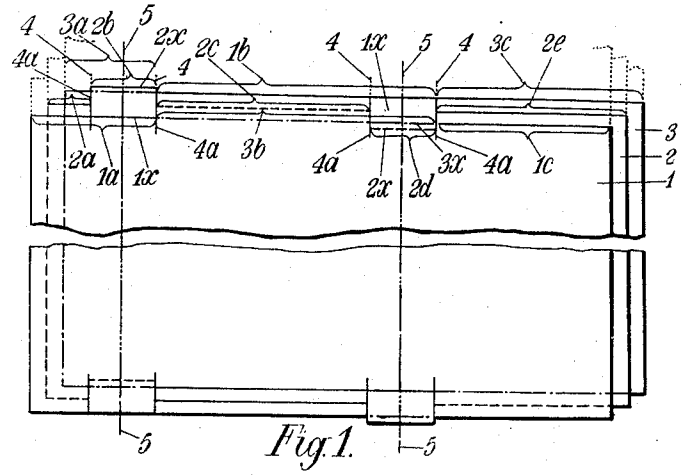


Fig. 1.

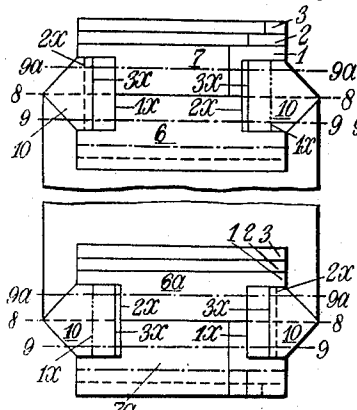


Fig. 2.

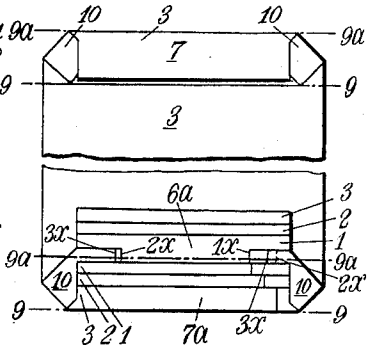


Fig. 3.

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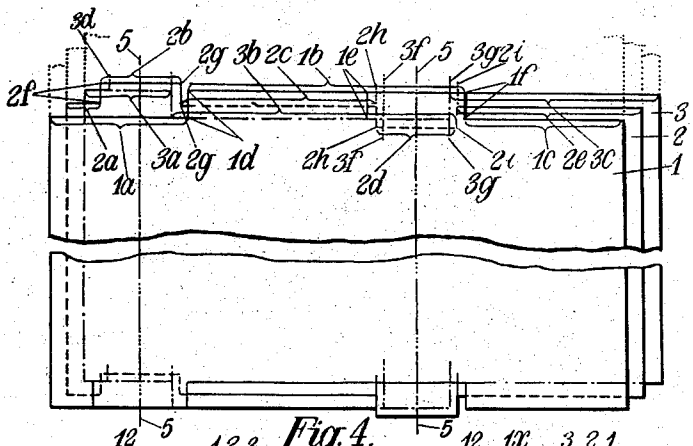


Fig. 4.

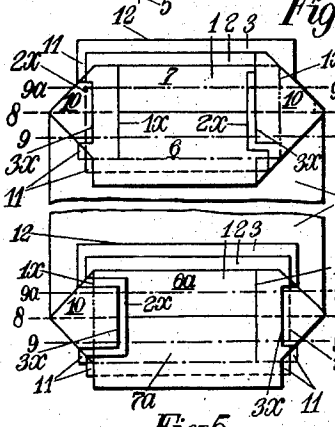


Fig. 5.

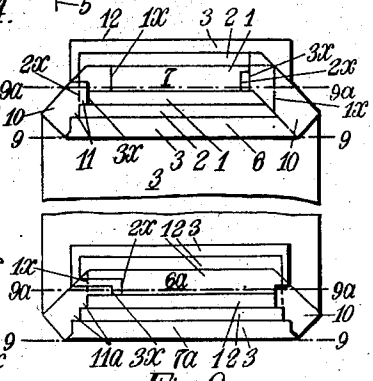


Fig. 6.

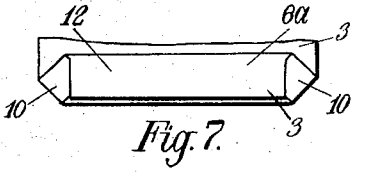


Fig. 7.

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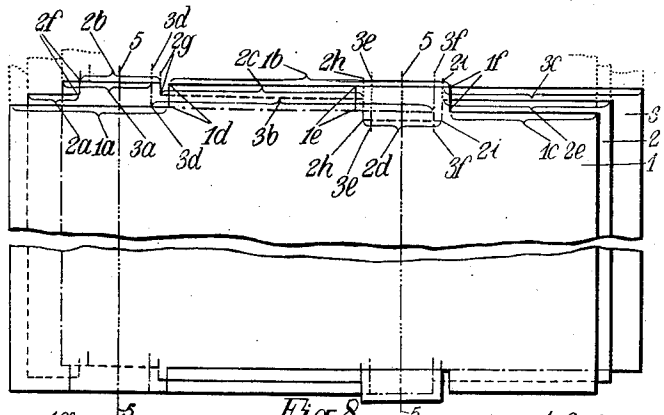


Fig. 8.

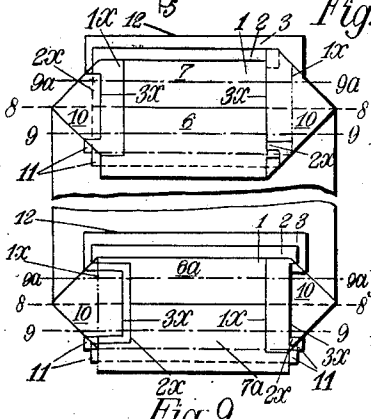


Fig. 9.

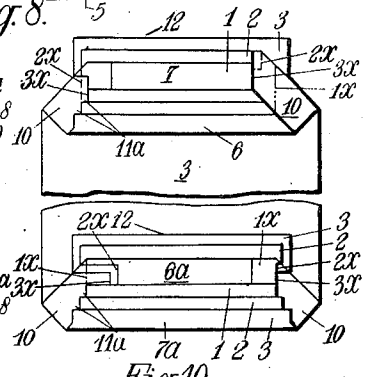


Fig. 10.

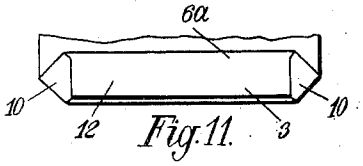


Fig. 11.

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United States Patent Office 2,761,612 Patented Sept. 4, 1956

2,761,612

MULTIPLY VALVE BAGS

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Application July 29, 1952, Serial No. 301,502

2 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 are of the length and are arranged so that the ends thereof progressively overlap to provide stepped or staggered margins or headings, those of the flap of one face being adhesively secured over 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 across the full width of the webs, to provide rupturing stepped lines for the headings on the severed lengths, the rupturing being accomplished by tensioning each leading bag tube length.

Various proposals have been made for making blockbottom closures in the 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 each bag tube length 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. Moreover the normal triangular corner fold produces a multiplication of the plies at the base angles of the triangle and consequently these parts are unduly stiff and are liable to tear away or make an insecure adhesive seal.

Proposals have been made to increase the adhesive sealing area at the corners of a bag of the type first mentioned above by cutting the ends of the bag lengths to provide stepped tongues at the corner folds but these proposals involved the excision of paper, with consequent waste, and the form of bag was unsuited to the perforating and rupturing method referred to above and manufacture on the normal bag tubing machine.

The aim of the present invention is to provide improvements in blockbottom multiply bags of the type indicated the bag tube lengths for which are capable of manufacture by the perforating and rupturing method on bag tubing machines and in which a more secure and siftproof adhesive seal is effected at the closed corner folds of the blockbottom, with preferably a flexible paper sealing element integral with one of the plies of the bag at the valve of the bags.

A further aim of the invention is to provide the above advantage and also effect such with the minimum local thicknesses of paper or substantially less thicknesses than employed in the normal triangular corner folds of blockbottom closures of the standard type.

The invention consists in providing at each of the corners of the blockbottom closures of a bag having three or more plies, which is to be adhesively sealed, at least two tongues, one extending inwards in overlapping relation to the other and preferably overlapping laterally, such that additional areas are exposed for adhesion with the paper of the stepped front and rear face flaps, the tongues being outlined laterally by locally slitting the webs longitudinally forming the plies without loss of paper and before assembly for passing into the bag tubing machine.

The invention also consists in a bag having three or more plies wherein the tube forming webs are perforated and slit without waste to provide at the corners of the bag, other than the valve corner, stepped tongues exposing for adhesive sealing at least two plies, with at least one ply unexposed and preferably with a tongue on one ply extending beyond the other plies at the valve corner so as to provide a flexible valve seal of known kind.

The invention further comprises slitting the webs such that the stepped headings are also stepped laterally to expose additional adhesion areas on the triangular corners.

Another feature of the invention lies in the provision of a rectangular integral overall closure flap which is adhesively sealed both transversely and longitudinally of the bag.

In the accompanying drawings:

Figure 1 shows in plan a layout of the ply sheets for a blockbottom multiply bag according to one form of the invention, the figure representing the perforating and slitting operations which form the tongues at the corners of the bags, the figure showing a severed bag tube as opened out by releasing the longitudinal tube forming seams, and its association with the preceding bag tube lengths in dotted lines.

Figure 2 is a bag tube formed from sheets of Figure 1 and showing the first stage in forming the blockbottom closure.

Figure 3 is a similar view to Figure 2 showing in the lower half the second stage in making the blockbottom closure while the upper half of the figure illustrates the final stage in which the blockbottom is sealed.

Figures 4 and 5 illustrate a modification of the invention and correspond with Figures 1 and 2.

Figure 6 illustrates the second stage of forming a blockbottom closure at each end of the bag, while Figure 7 shows the final closure of the blockbottom seen in the lower part of Figure 6.

Figures 8 to 11 correspond with Figures 4 to 7 and illustrate a variation of the modification shown in those figures.

As Figures 1, 4 and 8 have been drawn representing a bag tube length opened out it will be observed that in reading Figures 2 and 3, 5 and 6, and 9 and 10, that the tongues shown in these figures on the right- and left-hand sides of the bag come from the tongue formations on the left and right sides, respectively, of the figures showing the laid out sheets.

In carrying the invention into effect according to one mode described by way of example, the webs of which the multiply bag tube is to be formed are each perforated transversely and slit longitudinally, without waste of paper, at bag length intervals to provide shoulders, tongues or recesses in the bag length ends as described below, the irregular severance line simultaneously producing the head of one length and the complementary tail of the next. For this purpose the perforating mechanism is set up with

perforating knives for perforating the transverse portions of the severance line and with slitting knives for making incisions in those parts of the line which lie longitudinally (or possess a longitudinal component) such that the bag lengths may separate from the tube in the bag tubing machine by rupturing them under tension in the manner known for separating bag lengths from a perforated bag tube.

Each web is perforated and slit so that the respective bag length plies are equal, both at the front and rear faces of the flattened tubes, but the webs are brought together in superimposition with the severance lines each in advance of the next succeeding ply by a small margin to afford stepped or staggered headings of known type, such that in adhesively securing a blockbottom closure the stepped margins on one face flap overlap and are secured approximately to corresponding margins on the other face flap.

In the present examples the construction of a three-ply bag is illustrated, the innermost ply being numbered **1**, the outermost **3** and the intermediate ply **2**.

In Figure 1 a bag length tube is opened out with ply **1** uppermost and the plies laterally staggered in the usual way to afford margins which are overlapped and adhesively secured together respectively, to form a nested series of tubes in the bag tubing machine. The ply **1** is perforated transversely to provide two aligned portions **1***a*, **1***c* and a third portion **1***b* at a different level as viewed in the figure. Ply **2** is perforated to provide portions **2***a*, **2***b*, **2***c*, **2***d* and **2***e*, the portions **2***a*, **2***c* and **2***e* being aligned and the portions **2***b* and **2***d* at different levels. The outermost ply **3** is simlarly perforated with portions **3***a*, **3***b* and **3***c*, the portions **3***a* and **3***c* being aligned with one another and with the portion **1***b* on ply **1**, while the portion **3***b* is aligned with the portions **1***a* and **1***c* of ply **1**. The portions of plies which lie behind another ply (or plies) are shown in dash and dash-dot lines.

The slitting knives are set to incise coinciding slits (or slits which are brought into coincidence in the superimposition assembly in the tubing machine) extending longitudinally on the lines **4**—**4***a*, to outline a tongue on each of the plies and located symmetrically on either side of the longitudinal flattened tubing fold lines **5**—**5**, the root of each tongue being located at the end **4***a* of the slits. The respective tongues, which extend inwards at each of the four corner triangular folds of the blockbottom formation, are more clearly distinguished in Figure 2 where they are numbered respectively 1^x, 2^x and 3^x.

The tail or opposite end of the bag tube to that above described has complementary portions and tongues, a projection or tongue at the head of one bag tube length producing a corresponding recession at the tail of the preceding tube length and vice versa. By this arrangement, according to this example of the invention precisely similar tongues are produced at diagonally opposite corners of the bag.

The tongues overlap one another and thus in a three-ply bag at least two tongue surfaces are exposed for adhesively securing to the stepped headings transversely in respect to such and the blockbottom closure. These additional adhesions afford a more secure seal against the dusting or sifting of the contents at the ends of the blockbottom closure than with the triangular side fold of the normal blockbottom closure when usually one surface only is exposed for adhesion and due to the thickness of plies at the folds of the base corners of the triangular side fold there is less flexibility in the normal closure.

The slits **4**—**4***a* which outline the sides of the tongues also free front and rear face flaps **6** and **7** in rectangular form. After the tubes have been delivered from the bag tubing machine to the blockbottom machine the tube lengths are creased with a centre crease **8**—**8** and with secondary fold lines **9**—**9** and **9***a*—**9***a* to facilitate the blockbottom folding operations.

In the standard blockbottom machines adapted for continuous folding operations the triangular side (or corner) folds are automatically bent inwards as the headed flaps **6**, **6***a* are folded against the face of the bag. With the modified triangular corners **10** and free tongues, the automatic tendency to folding inwards (when the primary face flap fold is formed) is not so pronounced but still takes place, and if a more positive action is required the machine may be fitted with ancillary depressing fingers adapted to operate upon these triangular corners.

When this first stage folding on the centre crease **8** has taken place, the flaps **6** and **7***a* are again folded on the lower line **9**—**9** (see lower half of Figure 3), adhesive is applied to the stepped head of the flaps **6**, **7***a* or to flaps **7**, **6***a* (or both) and the flaps **7** and **6***a* are folded down over the flaps **6** and **7***a*, respectively, the stepped heading of one flap roughly coinciding with and being secured to the stepped heading of the other flap. Adhesive is also applied previously to the folding of the flaps **6**, **6***a* and **7**, **7***a*, to the tongue surfaces of the corners of the bag with the exception of the corner whereat the valve is to be formed, this corner being left open for entry of the filling tube.

The valve may be located at any of the corners but it is preferred to employ either the right-hand top corner or the left-hand bottom corner of the bag (Figure 2) for the valve.

In the modification of the invention illustrated in Figures 4–7, not only do overlapping tongues provide exposed areas for adhesion transversely of the blockbottoms (i. e. at right-angles to the centre crease **8**) at the adhesively secured corners of the blockbottoms but areas are exposed for adhesion at the sides of the tongue (i. e. parallel to the centre crease **8**) and further, at said secured corners the headings in addition to being stepped longitudinally of the bag tube are stepped laterally (i. e. parallel to the tube folds **5**), which again affords increased adhesion areas transversely of the blockbottom.

According to this modification ply **1** is perforated on the lines **1***a*, **1***b*, **1***c* at different levels and incised by slitting knives to slit the web at **1***d*—**1***d* to form a rebate with the perforated portion **1***a*, and also slit the web at **1***e*—**1***e* and **1***f*—**1***f* to outline a flexible valve seating tongue of known kind at what is to be the valve corner. The ply **2** is perforated at different levels **2***a* to **2***e* and incised by the slitting knives on the lines **2***f*—**2***f*, **2***g*—**2***g*, **2***h*—**2***h* and **2***i*—**2***i*, producing on the left-hand side of the figure a tongue and on the right-hand side a recess. The ply **3** is perforated at different levels on the lines **3***a*—**3***c* and is slit at **3***d*—**3***d*, **3***e*—**3***e*, **3***f*—**3***f* and **3***g*—**3***g*. These slits penetrate, where indicated by dots, the adjacent bag length of the ply web **3** and outline tongues on the tail of the adjacent bag length as will be seen on referring to the tail of the bag length illustrated in Figure 4 where these slits are depicted in dot-and-dash lines.

It will be observed that the perforations and various slits forming rebates, recesses and tongues at the head of the bag tube length, produce corresponding shoulders, tongues and recesses at the tail of the bag tube length with no excised paper and consequently no waste.

Figure 5 illustrates a bag tube according to the layout of Figure 4 (reversed) in the first stage of forming the blockbottom closures, the front face flaps **6** at each end of the tube being folded against the front face of the tube. The arrangement of perforating as slitting above described provides two tongue surfaces at all the corners of the bag extending inward from the triangular folds **10**, which in the case of the non-valve corners provide additional adhesion areas transverse to the blockbottom closure while at the valve in the right-hand top corner the extended tongue provides a flexible sealing effect against escape of the contents.

In this modification the positioning of the slits relatively out of register together with the perforated lines at different levels, form tongues which overlap inwardly (i. e. towards the longitudinal axis of the bag) and also transversely of the central crease **8** exposing surface ad-

hesion areas on three sides of the tongues and correspondingly forming stepped lateral margins **11** at the ends of the front and rear flaps (except at the valve corner). On the flaps **6** and **7***a* the inward stepping and the headings stepping form notches **11***a*, which when these flaps have been folded in the secondary operation (see Figure 6) on the fold lines **9—9** leave uncovered areas **11***a* on the adjacent triangular corners **10** thereby affording surfaces for adhesion thereto of the laterally stepped portions **11** of the final closing flaps **7** and **6**, respectively, when the blockbottom closure is completed as in Figure 7. Thus at the completely closed corners of the bag the blockbottom folds are adhesively secured at additional ply areas viz. the inward overlap and the lateral overlap of the tongues, the stepped lateral margins **11** of the flaps and the notched area **11***a*.

The slits at the roots of the tongues eliminate some of the thicknesses of paper at the triangular corner folds as compared with the full triangular corner folds made in the normal blockbottom closures and thus avoids undue local stiffness which, with the increased adhesion areas, adds strength to the closure.

The heading **12** of the outermost ply of the flaps **7** and **6***a* is rectangular to form an integral overall closure member which is adhesively secured at its three margins to the underneath flap and also to the triangular corner **10** except at the valve fold. At the left-hand side of Figure 5 the rectangular form is produced by the slitting while at the right-hand side it is convenient to effect this result by leaving the terminal portion of the tube closing or longitudinal seam of the bag unsecured by adhesive in the tube-forming operation and to apply adhesive only in the blockbottoming operation.

In Figures 8–11 is illustrated a variation of the modification shown in Figures 4–7. In this variation the plies 1, 2 and 3 in the web form are perforated and slit in a similar manner to that described in reference to the last-mentioned figures. The chief differences are that the flexible valve tongue **1***x* is omitted at the upper right corner

fold and the tongues **2***x*, **3***x* are coterminous, as are also the tongues **2***x* and **3***x* at the right-hand bottom corner of the bag tube with the tongue **1***x* on the innermost ply extending inward beyond the coterminous tongues.

We claim:

1. A multi-ply stepped margin diamond corner blockbottom 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; at least two of said tube lengths, including the outermost and an intermediate one of said tube lengths, having at their ends, located in diagonally opposite corner folds, tongues projecting beyond the edge of another tube length, and at the remaining corner folds, recesses corresponding to said tongues in shape and position; the tongue of the outermost tube length being in each case shorter than that of the intermediate tube length, the stepped edges at the bag ends being folded one set over the other and adhered to one another with the projecting portions of all of said tongues being adhered to portions of the other tube lengths.

2. A multi-ply stepped margin diamond corner blockbottom bag in accordance with claim 1, in which the widths of the tongues formed in the outermost one of said tube lengths are narrower than those formed on the intermediate length, to provide additional stepped adhesion areas.

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