March 3, 1959 E. R. DUFFIN 2,875,944

BLOCKBOTTOM MULTI-PLY VALVE BAG

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FIG. 1.

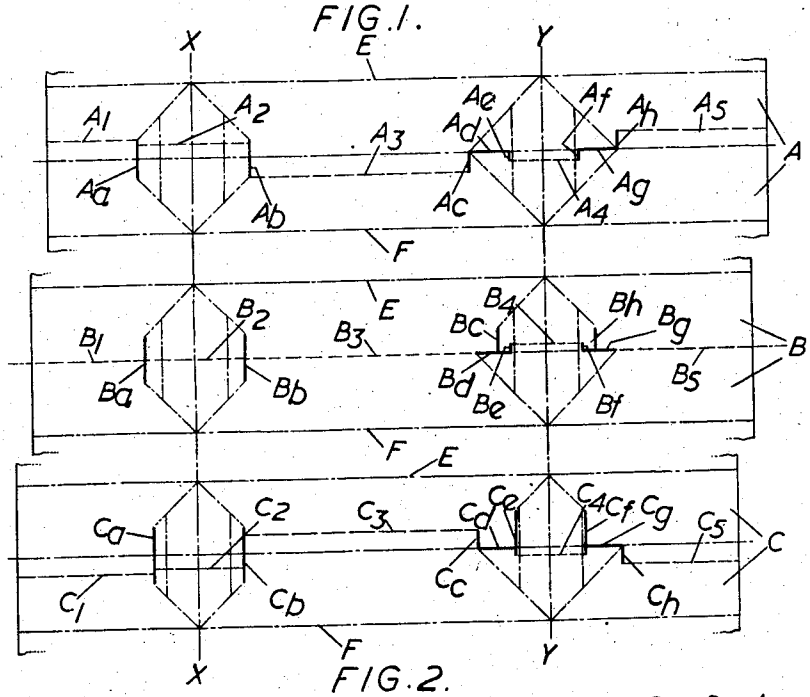
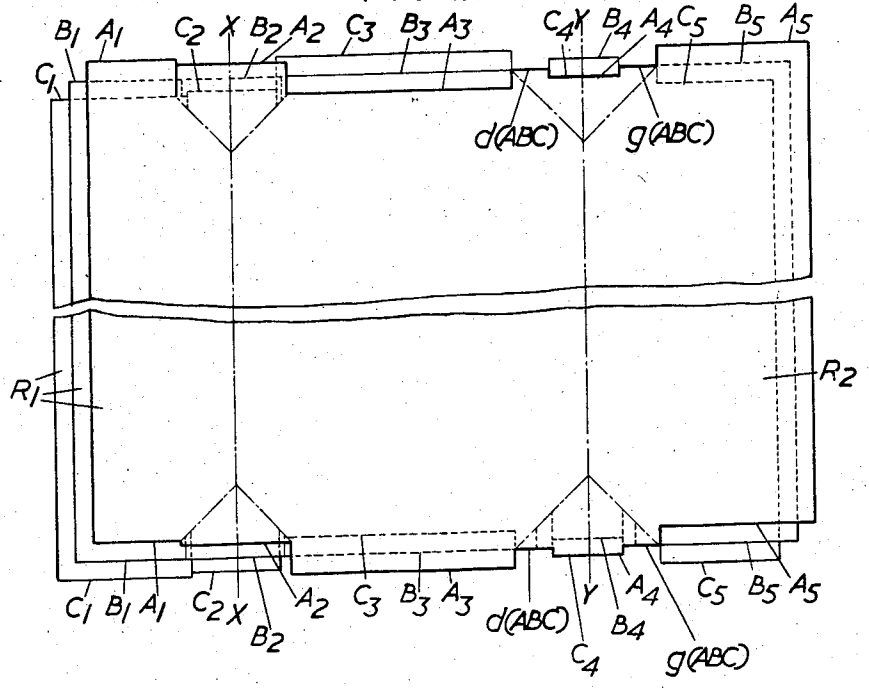



FIG. 2.




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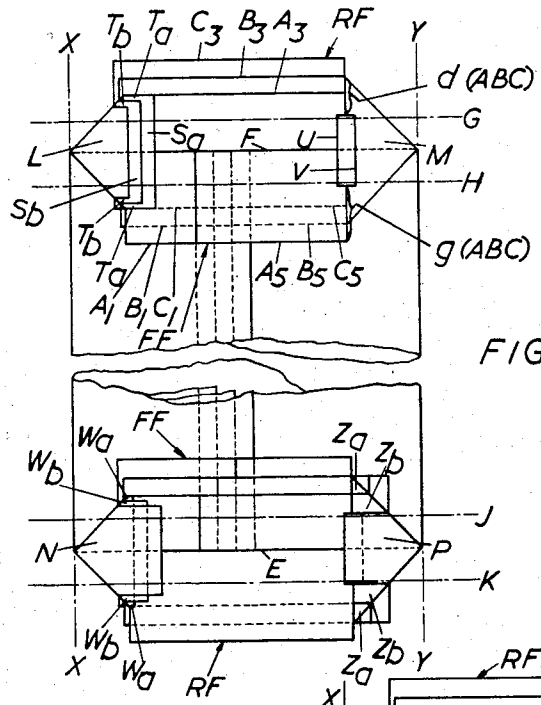



FIG. 3



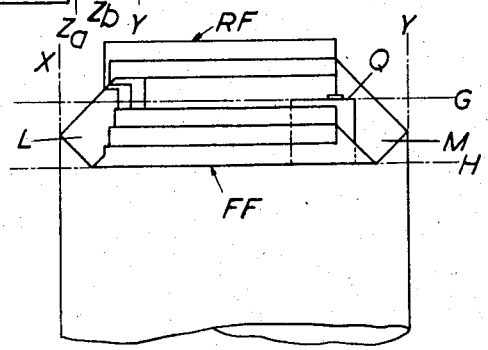
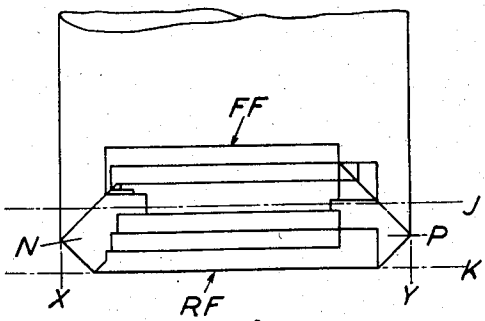




FIG. 4.




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BLOCKBOTTOM MULTI-PLY VALVE BAG

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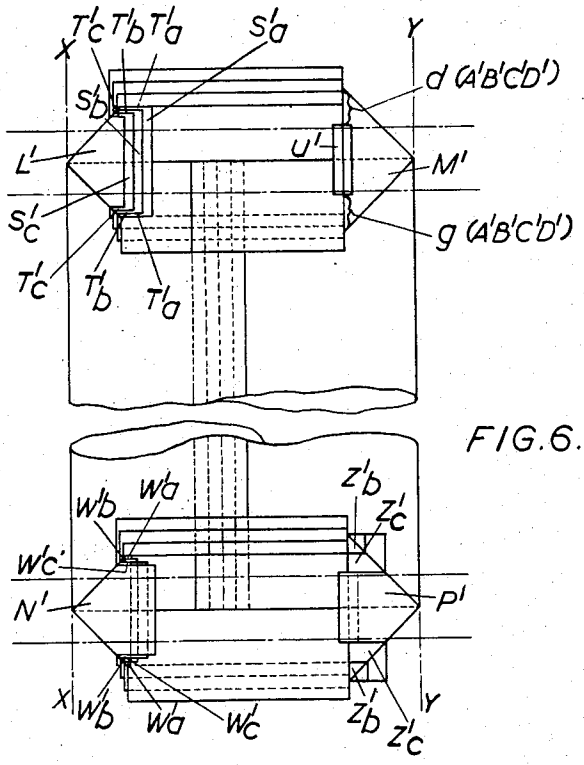



FIG. 6.



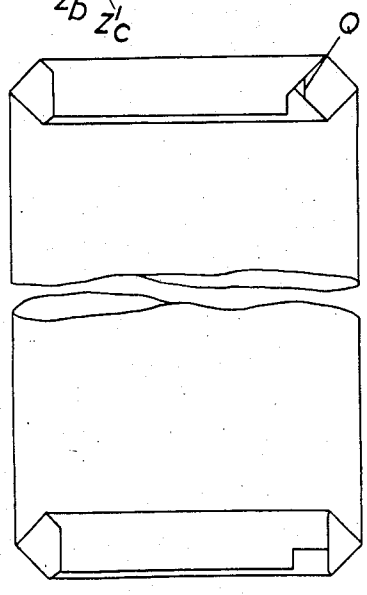




FIG. 5.

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2,875,944

# BLOCKBOTTOM MULTI-PLY VALVE BAG

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Application October 10, 1955, Serial No. 539,559

4 Claims. (Cl. 229—55)

This invention relates to blockbottom multi-ply paper valve sacks or bags (hereinafter referred to as "bags"), having an outer ply and at least two inner plies, of the type wherein the plies at each face of a flattened bag tube length are arranged so that the ends progressively overlap and afford stepped face flaps, the steps of one face flap being adhesively secured to the steps of the other face flap when folding to form the blockbottom closures, and wherein the plies forming the bag tube length are outlined from continuous webs without loss of paper.

It will be understood that the word "ply" when used above and in the following description includes a composite ply comprising two or more adjacent single plies having the same outline.

In the manufacture of this type of bag, the bag tube lengths are separated from a continuous bag tube and the blockbottom closures are formed in a continuous bottom-forming machine.

The object of this invention is to combine a construction which gives great strength and siftproofness at the non-valve corner of the blockbottom valve closure, with constructions at the remaining three corners of the bag which achieve siftproofness and adequate strength, the whole bag being made with economy of paper.

This object is achieved by a multi-ply paper valve bag of the type described wherein each of the inner plies (i. e. all the piles other than the outer ply) of the non-valve corner flap of the blockbottom valve closure, prior to folding over the face flaps, exposes for adhesive sealing of the closure a longitudinal step and a lateral step with respect to the ply above it.

In the preferred bag the valve corner flap has an intermediate ply which is longitudinally extended beyond the other plies to form a tongue which extends in width at least as far as the folding lines of the face flaps and wherein all the plies across the remainder of the corner flap have coincident edges. The coincident edges are produced by chopping through all the plies of a bag tube length when it is being separated from a continuous bag tube.

At the non-valve end of the bag each corner flap is so constructed that at least two inner plies expose for adhesive sealing of the closure lateral stops with respect to the ply above it, and at the corner diagonally opposite the valve corner preferably all the inner plies expose such steps.

The above construction has the following advantages:

*a*. The non-valve corner of a blockbottom valve closure which has to withstand great stresses during filling and must be siftproof to protect the operator filling the bag, is provided with the requisite strength and siftproofness combined with flexibility. Crosspasting between individual plies is unnecessary.

*b*. The valve corner which has to take the weight of the bag while it is being filled has a double thickness of all the plies over the valve opening to provide the requisite strength while the lower surface of the opening is stepped to provide a flexible seal.



*c*. The corners of the non-valve blockbottom closure are made siftproof by the provision of lateral stepping.

The invention will now be illustrated by way of example with reference to the accompanying drawings in which:

Figure 1 is a diagram of the outlines of the ends of the various plies for a three-ply bag as obtained by perforating, cutting and slitting the continuous webs of paper from which the plies are separated, each ply being taken from a separate web;

Figure 2 shows a severed bag tube length opened out, by releasing the tube forming seams, for the purpose of illustrating the construction;

Figure 3 shows the bag tube length of Figure 2 after initial operations in the forming of the blockbottom closures have been performed;

Figure 4 shows the bag tube length of Figure 3 at a later stage of forming the closures;

Figure 5 shows a completed bag; and

Figure 6 is a view similar to Figure 3 but shows a four-ply bag tube length.

Referring now to Figure 1, the web for the innermost ply A is perforated across part of its width along the dash lines A (**1**, **2**, **3**, **4** and **5**) and slit in the direction of its length along the lines A (*a*, *b*, *c*, *e*, *f* and *h*). The web for the intermediate ply B is perforated across part of its width along the lines B (**1**, **2**, **3**, **4** and **5**) and slit in the direction of its length along the lines B (*a*, *b*, *c*, *e*, *f* and *h*). The web for the outermost ply C is perforated across part of its width along the lines C (**1**, **2**, **3**, **4** and **5**) and slit in the direction of its length along the lines C (*a*, *b*, *c*, *e*, *f* and *h*). The lines A (*d* and *g*), B (*d* and *g*) and C (*d* and *g*) indicates where the webs will subsequently be cut. In each case the outline of the head of one ply simultaneously outlines the tail of the ply before it so that there is no waste of paper.

If desired, the sharp corners between C3 and C*c*, and C5 and C*h* respectively, may be removed by perforating (not shown) the lines C*c* and C*h* respectively in a direction diagonally to the length of the bag, such that the lengths of the lines C (**3** and **5**) are shortened.

In Figure 1 the lines X—X and Y—Y are the lines about which the plies are folded to form a bag tube. After perforation and slitting, the webs are superposed on one another in a tubing machine so that they are staggered to provide stepped side edges $R_1$ and $R_2$ as shown in Figure 2, for securing together when formed into a tube.

A continuous tube having been thus formed, bag tube lengths are separated therefrom by tensioning the leading length to rupture along the perforation lines whilst chopping through all the webs along the lines A (*d* and *g*), B (*d* and *g*) and C (*d* and *g*), where the edges of all the plies are to be coincident. This will be seen best from Figure 2, the lines *d* (A, B and C) and *g* (A, B and C) showing where the plies are coincident. The method of separating the bag tube lengths described above ensures that the outlines of the tube end will be ruptured cleanly due to the sudden shock on chopping all the webs along the coincident lines referred to.

Figure 3 shows a bag tube length whereof the corner flaps have been folded in and the front face flaps FF folded back about the lines E and F. Considering first the blockbottom valve closure, it will be seen that the corner flap at the non-valve corner indicated generally at L exposes areas of both inner plies A and B for adhesively sealing the closure when the face flaps are folded in about their folding lines G and H. The innermost ply A has a longitudinal step S*a* and lateral steps T*a*, while the intermediate ply B has a longitudinal step S*b* and lateral steps T*b*. In this connection by "longitudinal" is meant in a direction parallel to the folding lines of

the face flaps, and "lateral" means in a direction perpendicular to the folding lines of the face flaps. Thus, each of the inner plies of the non-valve corner flap L of the blockbottom valve closure exposes for adhesive sealing of the closure a longitudinal step projecting from and beyond the corner flap part of the ply above it toward the axis of the bag tube and a lateral step projecting from and beyond the corner flap part of the ply above it in the direction of extent of the bag tube axis.

Turning now to the valve corner flap indicated generally at M, the intermediate ply B is longitudinally extended beyond the other plies to form a tongue U to constitute a valve seal and which extends in width slightly beyond the folding lines G and H of the face flaps. The other two plies A and C are set back as at V for the same width as the tongue U and all the plies across the remainder of the corner flap have their edges coincident at *d* (A, B and C) and *g* (A, B and C).

Referring now to the non-valve blockbottom closure, the corner flap N diagonally opposite the valve M is constructed so that both inner plies A and B expose lateral steps for sealing the closure, the steps on the innermost ply A being indicated at W*a* and those on the intermediate ply B at W*b*. At the corner P under the valve the innermost and outer plies A and C have their edges coincident for a distance extending slightly beyond the folding lines J and K of the face flaps and the outer and intermediate plies C and B are so slit that areas of the intermediate and innermost plies B and A are exposed forming lateral steps Z*b* and Z*a* respectively for adhesively sealing the closure.

Referring now to Figure 4, this shows a later stage in forming the blockbottom closure wherein the front face flap FF of the blockbottom valve closure has been folded about its folding line H and the rear face flap RF of the non-valve closure has been folded about its folding line K. At the valve corner a piece Q of relatively stiff paper is inserted to reinforce the valve. The bag is completed by folding over in the rear face flap RF of the valve closure about its folding line G and the front face flap FF of the non-valve closure about its folding line J so as to get a completed bag as shown in Figure 5.

Referring now to Figure 6 there is shown a four-ply bag in which the non-valve corner of the blockbottom valve closure indicated generally at L′ is so constructed that each of the three inner plies A′, B′ and C′ exposes longitudinal and lateral steps for adhesively sealing the blockbottom valve closure. The longitudinal steps of the plies taken from the inside towards the outside are shown at S′*a*, S′*b* and S′*c* and their lateral steps at T′*a*, T′*b* and T′*c* respectively. The valve corner flap M′ is similar to that shown at M in Figure 3 except that the outermost ply but one, i. e. ply C′ is disposed straight across the corner flap and the innermost ply but one, i. e. ply B′, is extended to form the valve seal tongue U′.

At the non-valve closure the corner flap N′ diagonally opposite the valve is so constructed that lateral steps



of all three inner plies A′, B′ and C′ are exposed for adhesively sealing the closure, these steps being indicated for the plies reading from the inside towards the outside at W′*a*, W′*b* and W′*c* respectively. At the corner P′ under the valve and plies C′ and D′ are so slit that areas of plies B′ and C′ are exposed as lateral steps for adhesive sealing indicated at Z′*b* and Z′*c* respectively. Although areas of only plies B′ and C′ are shown exposed it will be appreciated that ply B′ may be slit so as to expose areas of ply A′ in addition to the areas of plies B′ and C′.

What is claimed is:

1. A blockbottom multi-ply paper valve bag comprising a bag tube having an outer ply and at least two inner plies, wherein the plies at each face flap of a flattened bag tube are arranged so that the ply ends progressively overlap and afford stepped face flaps, the steps of one face flap being adapted to be adhesively secured to the steps of the other face flap when folded to form the blockbottom closures, the outline of each ply at one end of the bag tube being the reverse of the outline at the other end of said ply, and wherein prior to the folding over of the face flaps each of the inner plies of the non-valve corner flap of the blockbottom valve closure exposes for adhesive sealing of the closure a longitudinal step projecting from and beyond the corner flap part of the ply above it toward the axis of the bag tube and a lateral step projecting from and beyond the corner flap part of the ply above it in the direction of extent of the bag tube axis.

2. A bag according to claim 1 wherein the valve corner flap has an intermediate ply which is longitudinally extended beyond the other plies to form a tongue which extends in width at least as far as the folding lines of the face flaps and wherein all the plies across the remainder of the valve corner flap have coincident edges.

3. A bag according to claim 1 wherein each of at least two inner plies of each corner flap of the blockbottom closure at the non-valve end of the bag tube, prior to folding over the face flaps, exposes for adhesive sealing of the closure a lateral step with respect to the ply above it.

4. A bag tube according to claim 1, wherein each of the inner plies of the corner flap, which is diagonally opposite the corner valve, of the blockbottom closure at the non-valve end of the bag tube, prior to folding over the face flaps, exposes for adhesive sealing of the closure a lateral step with respect to the ply above it.

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