

Aug. 31, 1965

R. E. HARTIG

3,203,623

BAGS

Filed Feb. 6, 1963

3 Sheets-Sheet 1

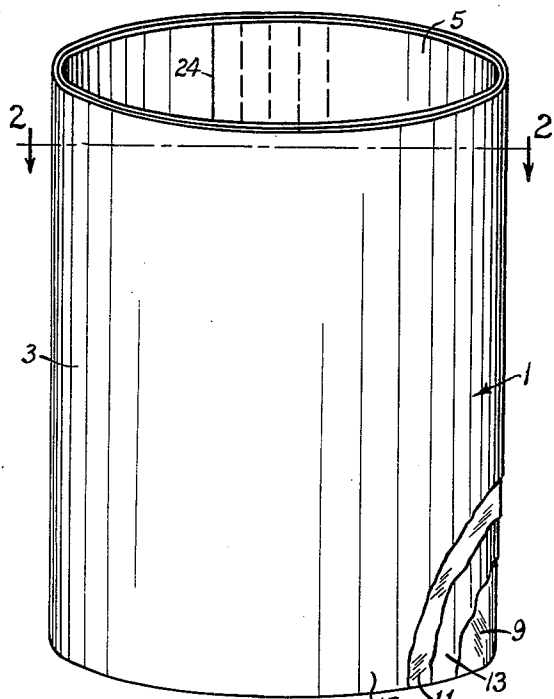


FIG. 1.

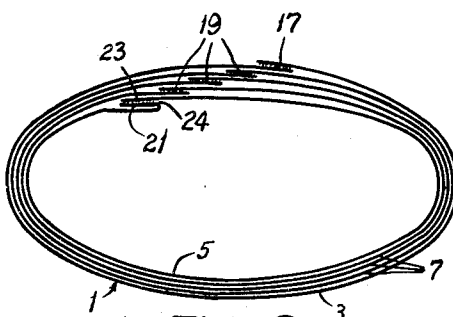


FIG. 2.

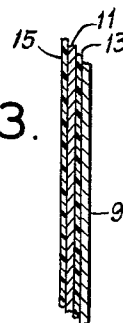


FIG. 3.

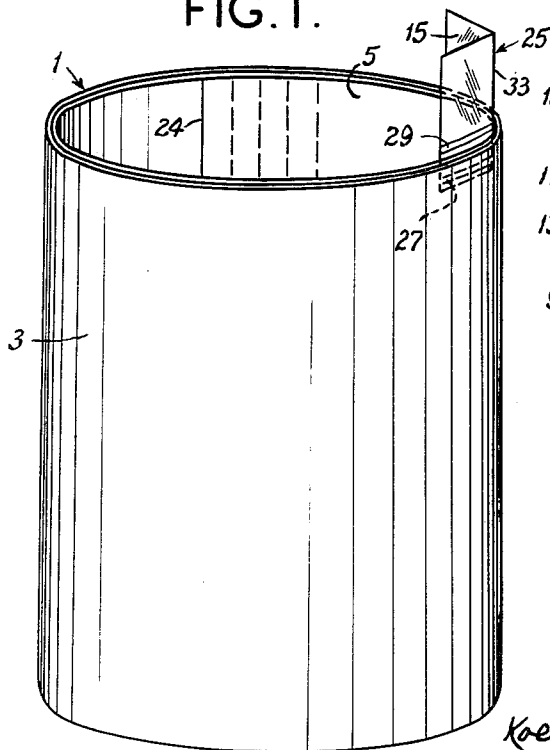


FIG. 5.

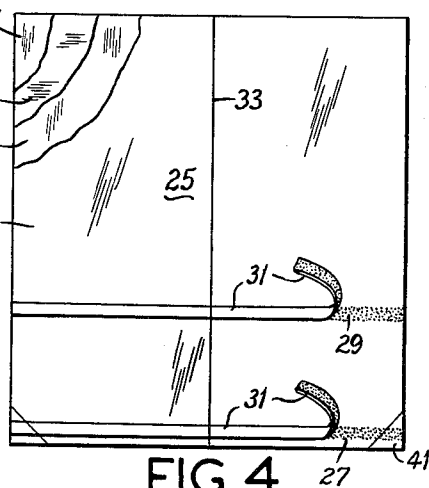


FIG. 4.

Richard E. Hartig,
Inventor.
Koenig, Pope, Senniger, and Powers,
Attorneys.

Aug. 31, 1965

R. E. HARTIG

3,203,623

BAGS

Filed Feb. 6, 1963

3 Sheets-Sheet 2

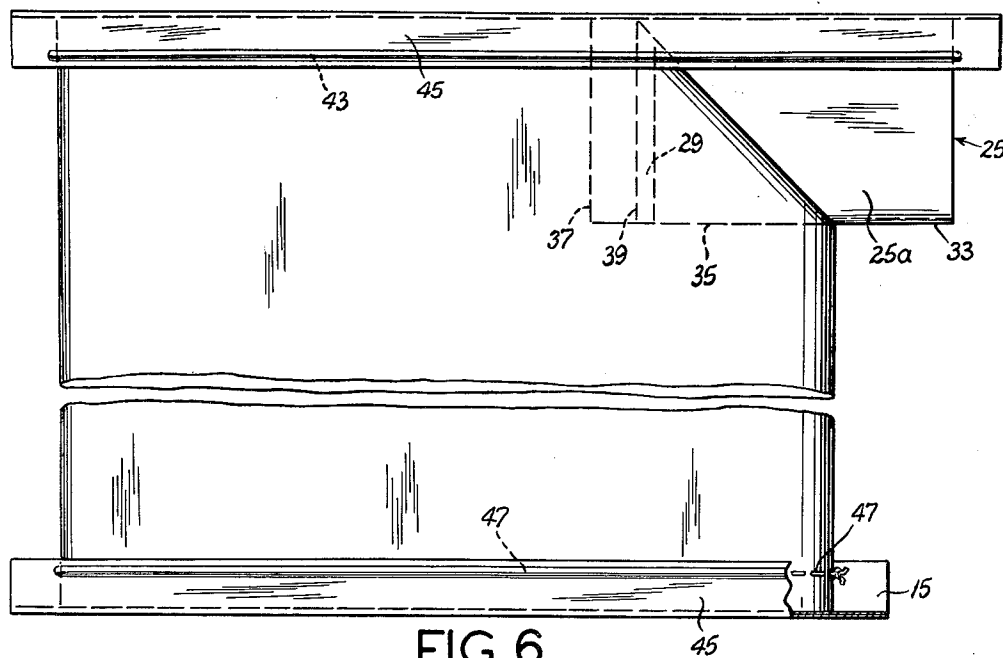


FIG. 6.

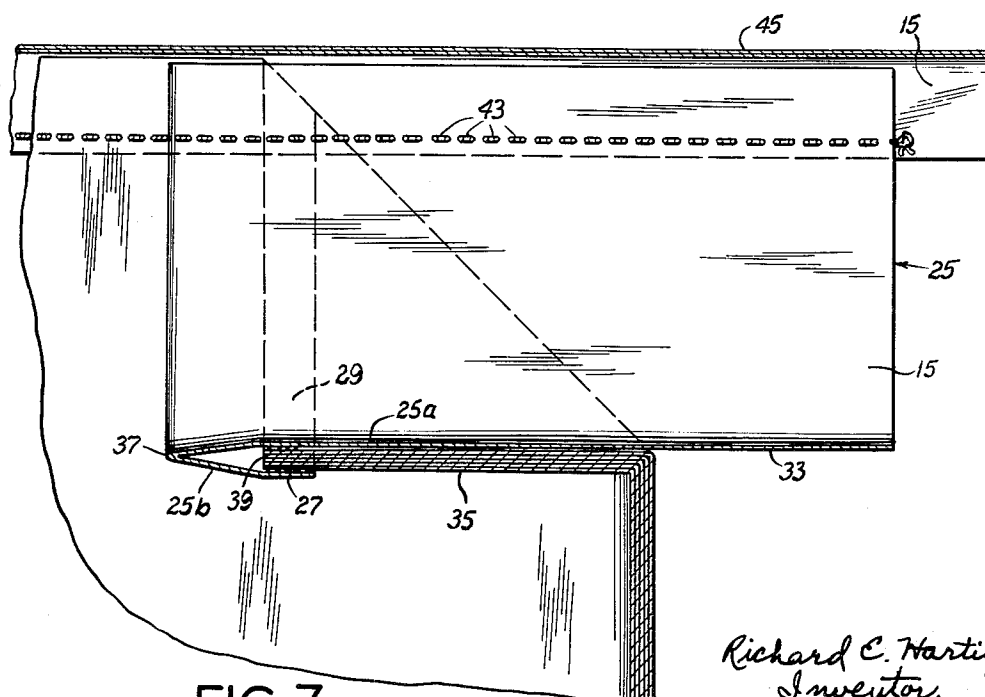


FIG. 7.

Richard E. Hartig
Inventor.
Koenig, Pope, Senniger, and Powers,
attorneys.

Aug. 31, 1965

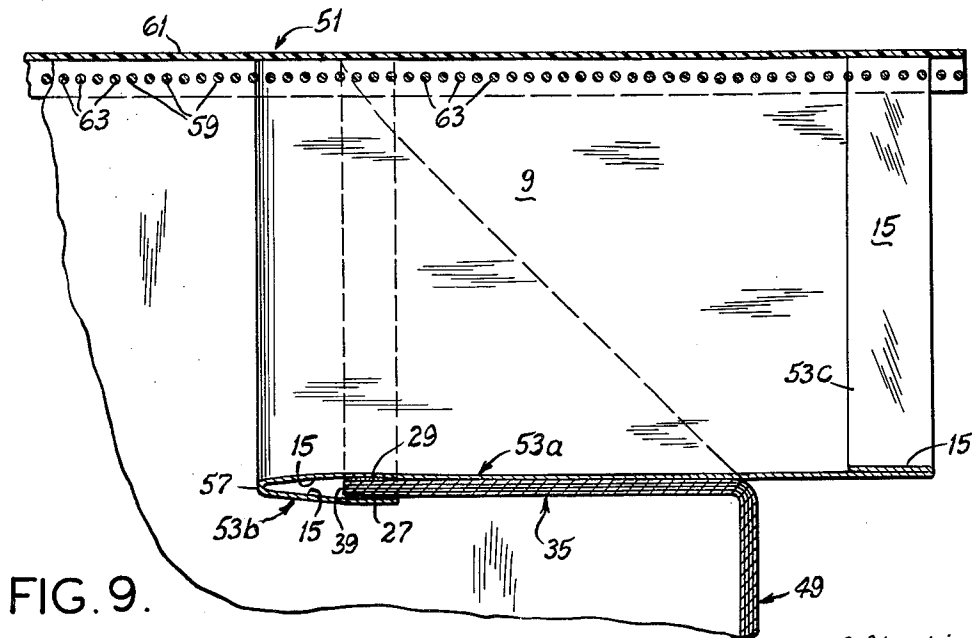
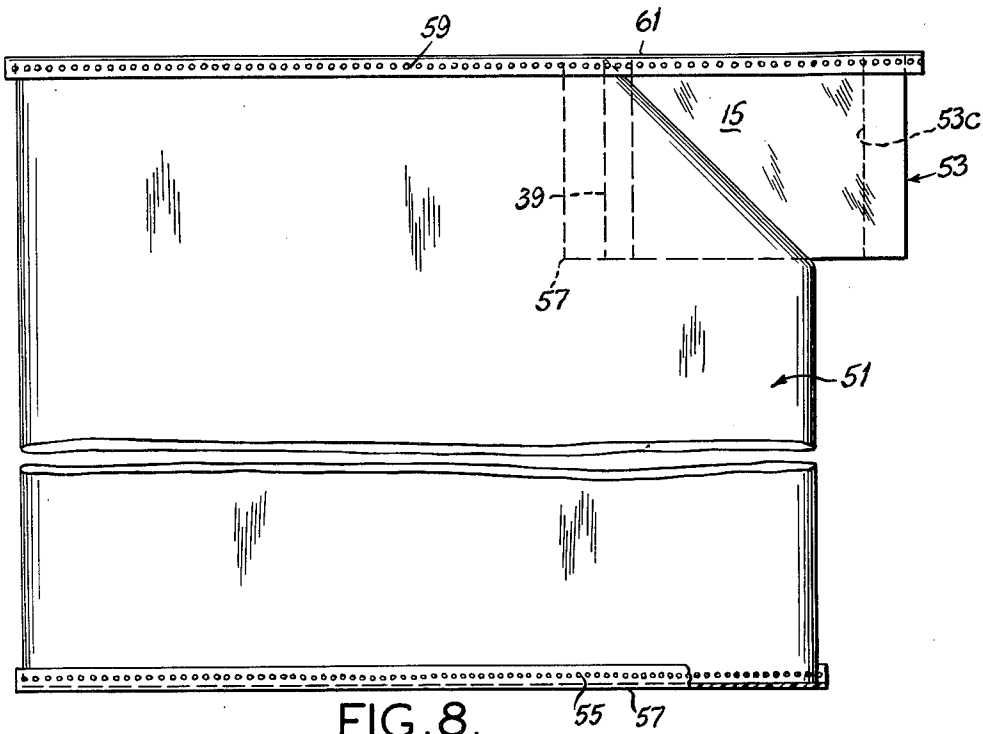
R. E. HARTIG

3,203,623

BAGS

Filed Feb. 6, 1963

3 Sheets-Sheet 3



Richard E. Hartig,
Inventor,
Koenig, Pope, Denniger, and Powers,
Attorneys.

1

3,203,623
BAGS

Richard E. Hartig, Edina, Minn., assignor to Bemis Bro. Bag Company, Minneapolis, Minn., a corporation of Missouri

Filed Feb. 6, 1963, Ser. No. 259,770

1 Claim. (Cl. 229—62.5)

This invention relates to bags, and more particularly to multiwall valve bags.

The invention is particularly concerned with multiwall valve bags for packaging materials such as, for example, pelletized polycarbonate resin, which must be kept in a very dry state until such time as they are needed. For example, it is important that polycarbonate resin be delivered to customers with a moisture content no higher than 0.025%. Heretofore, such material has been packed in cans to prevent the ingress of moisture. Among the several objects of this invention may be noted the provision of a multiwall valve bag adapted effectively to seal out moisture so as to keep the bag contents dry; the provision of a bag of this class which inhibits migration of moisture from the bag material itself into the contents; and the provision of an improved valve construction which prevents the ingress of moisture there-through after the valve has been closed. 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 several of various possible embodiments of the invention are illustrated,

FIG. 1 is a perspective view of a composite multiwall tube from which a bag of this invention is made, parts being broken away;

FIG. 2 is a section taken on line 2—2 of FIG. 1, ply thicknesses being exaggerated;

FIG. 3 is an enlarged section showing the construction of each of the innermost and outermost plies;

FIG. 4 is a plan view of the valve sleeve of a bag of this invention prior to its application to the bag;

FIG. 5 is a perspective view of the FIG. 1 tube showing the valve sleeve applied at the valve corner of the bag;

FIG. 6 is a view in elevation of a finished bag, with parts removed to reduce the height of the view;

FIG. 7 is an enlarged longitudinal vertical section through the valve;

FIG. 8 is a view similar to FIG. 6 showing a modification of the bag; and

FIG. 9 is a view similar to FIG. 7 showing the bag illustrated in FIG. 8.

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

Referring to the drawings, there is shown at 1 in FIG. 1 a multiwall tube having a length corresponding to the desired bag length. It will be understood that the tube 1 is formed by continuously feeding a multi-ply web through a tuber in which the web is formed into a continuous tube. The continuous tube is then transversely cut at bag length intervals to form tubes 1. This follows conventional practice in the art of bag manufacture, utilizing well-known standard equipment for forming bag length tubing.

Tube 1 is shown in FIG. 2 to comprise an outermost ply 3, an innermost ply 5 and intermediate plies each designated 7. It will be understood that more or less intermediate plies may be provided, the three plies shown merely being exemplary. The outer ply 3 and the inner

2

ply 5 are each of multi-ply water-resistant construction, each comprising a layer of paper 9, such as, for example, kraft paper, a layer of thin metal foil 11, such as, for example, aluminum foil having a thickness of approximately 0.0005 inch, laminated to the paper layer by a film 13 of heat-sealable material, such as polyethylene, with a coating 15 of heat-sealable material, such as polyethylene, on the foil. The plastic coating 15 is on the outside face of the outer ply 3 and on the inside face of the inner ply 5. Thus, the inner and outer plies constitute barriers to transmission of moisture through the tube walls. The intermediate plies 7 may consist of the usual kraft paper.

The longitudinal edge portions of the outer ply are overlapped and sealed together as indicated at 17 as by means of a suitable waterproof adhesive. Each of the intermediate kraft paper plies 7 is overlapped and the longitudinal edge portions thereof pasted together to provide seams 19. Kraft paper itself normally has about 6% moisture content, and may have even more if the bag is manufactured on high humidity days. Accordingly, provision must be made for preventing such moisture from passing through the seam of the inner ply to the contents. For this purpose, the longitudinal edge portions 21 and 23 of the inner ply 5 are positioned in inside face to inside face relation with the heat-sealable plastic coating 15 on one portion in direct contact with the plastic coating 15 on the other portion, and the edge portions are hermetically sealed together as indicated at 24 as by means of a suitable waterproof adhesive or heat-sealing the plastic surface together. Thus, moisture is prevented from passing through the seam of the inner ply.

FIG. 4 illustrates a valve sleeve 25 per se, in its initial state, prior to application to the bag tube 1. As shown, this sleeve is generally rectangular in shape and comprises, like the plies 3 and 5, a layer of paper 9, a layer of thin metal foil 11 laminated to the paper layer by a film of heat-sealable material 13, and a plastic coating 15 of heat-sealable material covering the thin metal foil 11. Thus, the sleeve is moisture resistant. The sleeve is provided with two stripes 27 and 29 of heat-resistant pressure-sensitive adhesive extending across the sleeve on the paper layer thereof. The adhesive may be a heat-resistant adhesive particularly in the case where material such as polycarbonate resin mentioned above is to be bagged, since such material may be heated to a temperature of 240° F., for example, during the filling operation, to keep it dry. If desired the adhesive may be of a type that cures at high temperature. Stripe 27 is located at one end of the sleeve and stripe 29 is spaced inward from the stripe 27, located on an intermediate portion of the sleeve. Each stripe of adhesive may consist of, for example, a 0.0005 inch thick Mylar carrier strip having pressure-sensitive adhesive on each side thereof. The stripes are initially covered by tapes 31 which are peeled off prior to inserting the sleeve in the tube 1.

The sleeve is folded in half on a longitudinal center line 33, with its plastic-coated face on the inside, and inserted with its adhesive-carrying end first in the valve corner of the bag tube 1 to dispose the stripe of adhesive 27 against the plastic-coated face of the innermost ply 5 and to cause the sleeve to become adhered thereto (see FIG. 5). Stripe 29 is spaced outward from the end edge of tube 1. The valve corner of the bag is tucked in to form a valve flap 35, and a portion 25a of the sleeve is folded back on a transverse line 37 lying somewhat inward from the inward edge 39 of the valve flap 35 to extend back outward over the valve flap. This leaves a relative short portion 25b of the sleeve extending inward from the inner edge 39 of the valve flap, this portion 25b being secured to the inside of the inner margin of the

3

valve flap by reason of adhesive 27 securing it thereto. Stripe 29 of adhesive overlies the valve flap 35, i.e., the plastic-coated face of the outer ply 3, and seals the sleeve to the valve flap. The sealing function of stripe 29 prevents atmospheric moisture which may enter between the sleeve and the outer ply 3 from reaching the upper end edges of the several plies at 39 (see FIG. 7). If this were to happen, the moisture would be conveyed by capillary action down through the plies to the bottom thereof, where it would either pass through the ends of the plies or needle holes hereinafter described and moisturize the contents. As the valve formation is completed, the portion 25b of the sleeve becomes reversely folded on center line 33 as regards the initial folded condition so that the plastic-coated face 15 of portion 25b is on the outside of the reversely folded portion 25b. Portion 25a becomes folded on center line 33 in such manner that the plastic-coated face 15 is on the inside. Corners 41 of the sleeve fold over between the sides of the valve flap 35 and the bag walls. These are of no consequence, and could be eliminated, if desired, by trimming off the corners of the sleeve when it is originally made.

The upper end of the tube 1 is closed by a line of stitching 43 extending across the top of the bag through the upper margins of the several plies of the bag. This line of stitching constitutes the top seam of the bag. It extends through and secures together the upper margins of the folded sides of the sleeve so that the sleeve is formed into a tube adapted to receive a filling spout. The stitching is run off the side of the bag and throughout the length of the outwardly extending tuck-in portion 23a of the sleeve. A moisture-resistant tape 45 constructed like the innermost and outermost plies 3 and 5 and the sleeve 25, i.e., having a paper layer 9, a layer of metal foil 11 laminated to the paper layer by a film of polyethylene 13, and a plastic coating 15 on the layer of metal foil is folded over the stitching 43 with the plastic coating 15 on the inside and heat-sealed to the outermost ply 3 and sleeve 25 to prevent the ingress of moisture through the top of the bag and the needle holes. The lower end of the bag length is similarly closed by a line of stitching 47 and a tape 45 to prevent the ingress of moisture at the bottom of the bag. After the bag has been filled by means of a filling spout extending through the sleeve and into the bag, the outer end of the sleeve may be heat-sealed closed by heat-sealing the plastic coating 15 of the sleeve together. The sleeve may then be tucked into the bag.

A modified embodiment of the bag is indicated at 51 in FIGS. 8 and 9. This bag is generally the same as the bag shown in FIGS. 6 and 7, but has a different valve sleeve construction and a different type of end closure. The valve sleeve in FIGS. 8 and 9 is designated 53. Like sleeve 25, it comprises a layer of paper 9, a layer of thin metal foil 11 laminated to the paper layer by a film 13 of heat-sealable material, such as polyethylene, and a coating 15 of heat-sealable material, such as polyethylene, covering the foil 11. Thus the sleeve 53 is moisture resistant. Also, sleeve 53 may be provided with two stripes of adhesive 27 and 29 of heat-resistant pressure-sensitive adhesive extending across the sleeve, but these are provided on the plastic coating 15, rather than on the paper layer 9, as in the case of sleeve 25.

The sleeve 53 is folded in half on its longitudinal center line, with its plastic-coated face 15 on the outside and inserted with its adhesive-carrying end first in the valve corner of the bag tube to dispose the stripe of adhesive 27 against the plastic-coated face of the innermost ply 5 and to cause the sleeve to become adhered thereto in the same manner that sleeve 25 is adhered to the bag shown in FIG. 5. After the valve corner of the bag is tucked in to form valve flap 35, a portion 53a of the sleeve is folded back on a transverse line 57 (corresponding to line 37) lying somewhat inward from the inward edge 39 of

4

the valve flap to extend back outward over the valve flap. This leaves a relatively short portion 53b of the sleeve 53 extending inwardly from the inner edge 39 of the valve flap, the plastic-coated face 15 of this portion 53b being secured to the inside of the inner margin of the valve flap by reason of adhesive 27 securing it thereto. Stripe 29 of adhesive overlies the valve flap 35, i.e., the plastic-coated face of the outer ply, and seals the sleeve to the valve flap.

An outer end portion 53c of the sleeve is folded back inward toward the inner end of the sleeve and forms a cuff. The plastic-coated face 15 of this cuff 53c is thus on the inside of the sleeve so that the plastic coatings on each of the halves of the cuff are in face to face relation. It will be understood that the cuff 53c may be formed either before or after the sleeve is inserted into the bag.

As shown in FIGS. 8 and 9, the ends of the bag are closed in a manner such as shown in Kindseth U.S. Patent 2,899,347 by first providing a plurality of holes 59 through the bag plies and the sleeve. A heat-sealable closure tape 61 of polyethylene, for example, is folded over the ends of the bag and the holes. Heat and pressure are applied to the folded-over portions of the tape 61 to cause the latter to adhere to the bag plies and the sleeve and also to cause the heat-sealable material to flow through holes 59 to form plugs 63 which join the two halves of the tape through the holes. After the bag has been filled by means of a filling spout extending through the sleeve into the bag, the outer end of the sleeve may be sealed by heat-sealing together the two halves of the cuff 53c. The sleeve may then be tucked into the bag.

Thus, in the case of either the multiwall valve bag, as completed, of FIGS. 6 and 7 or FIGS. 8 and 9, the bag has outer and inner plies 3 and 5 adapted to prevent the ingress of atmospheric moisture therethrough into the bag contents. The inner ply 3 is also adapted to prevent the ingress of any moisture in the intermediate plies 7 into the bag contents. The valve formation is adapted substantially to prevent the ingress of atmospheric moisture therethrough into the bag and also to prevent the ingress of atmospheric moisture between the sleeve (25 or 53) and the valve flap 35 to the upper end edges 39 of the kraft paper intermediate plies 7. The top and bottom closures prevent ingress of atmospheric moisture therethrough into the bag contents. While in the case of the bag shown in FIGS. 6 and 7, as to which the paper layer of sleeve 25 is on the outside, there may be some possibility of migration of atmospheric moisture through the paper layer of the sleeve to the interior of the bag, this is relatively minor. The construction of FIGS. 8 and 9, wherein the plastic-coated foil layer of the sleeve 53 is on the outside, effectively prevents the possibility of any such migration of atmospheric moisture, since, after cuff 53c is heat-sealed, the paper layer of the sleeve is sealed off from the atmosphere.

It will be understood that the outer ply of either bag shown may be a plastic-coated paper ply without metal foil, the plastic coating being on the outside. In the case of the bag shown in FIGS. 8 and 9, wherein the plastic-coated face 15 of the sleeve 53 faces the valve flap, the sealing at 27 may be by heat-sealing instead of by means of a separate adhesive. In such case, the stripe of adhesive 27 could be omitted from sleeve 53, the attachment being made by utilizing the plastic 15 on the sleeve and on the inside of the inner ply for heat-sealing. Where end closures are used of such nature as to preclude moisture which has wicked through the intermediate plies of the bag from entering the interior of the bag, it is possible that the adhesive at 29 could be omitted. Thus, if plugs 63 should be effective to keep moisture that may wick through the intermediate plies from entering the interior of the bag, the seal at 29 may not be needed, although it is desirable to include this seal to avoid any possibility of entry of moisture in such manner.

5

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 construction 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.

What is claimed is:

A bag having a valve at one of the corners at one end thereof, said bag being a multiwall bag having a plurality of plies, the inner ply comprising a layer of paper and having a moisture-resistant plastic coating on the inside thereof, the outer ply comprising a layer of paper and having a moisture-resistant plastic coating on the outside thereof, each ply having edge portions extending throughout the length of the bag which are sealed together thereby forming an individual longitudinal seam for each ply, the longitudinal seam of the inner ply being an inside-face-to-inside-face longitudinal seam in which one edge portion of the inner ply is folded back on the inner ply and has its plastic-coated face adhered to the plastic-coated face of the other edge portion of the inner ply, the valve being constituted by an intucked valve flap at said one corner and a valve sleeve extending from the valve flap, said sleeve comprising a layer of paper and having a moisture-resistant plastic coating on one face thereof, said sleeve being folded in half on a generally central fold in line with the central fold of the valve flap, said sleeve having an end portion lapping the inner end of the valve flap on the inside of the portion of the inner ply contained in the valve flap and being adhered

6

to the inner end of the valve flap, said sleeve having a portion folded back on a fold line extending transversely with respect to the sleeve and spaced inward from the inner end of the valve flap into a position overlying and extending out of the valve flap, the plastic-coated face of the sleeve being on the outside and said sleeve having an inturned cuff at its outer end, said folded-back portion of the sleeve being adhered to the outside of the portion of the outer ply at the inner end of the valve flap along a line extending completely across the inner end portion of the valve flap in such manner as to prevent atmospheric moisture which may enter between the sleeve and the outer ply of the bag from reaching the portions of the edges of the plies at the inner end edge of the valve flap, and moisture-resistant closures at the ends of the bag.

References Cited by the Examiner

UNITED STATES PATENTS

1,754,769	4/30	Redington.	
2,437,693	3/48	Hartman	229—62.5
2,496,796	2/50	Kardon	229—55
2,576,322	11/51	Waters	229—62.5
2,714,983	8/55	Potdevin	229—62.5
2,731,046	1/56	Bachner	161—216 X
2,811,300	10/57	Landell	229—62.5
2,975,074	3/61	Jankens	117—76
3,040,967	6/62	Klein	229—62.5

FOREIGN PATENTS

1,066,481 10/59 Germany.

FRANKLIN T. GARRETT, *Primary Examiner*.