

Sept. 19, 1961

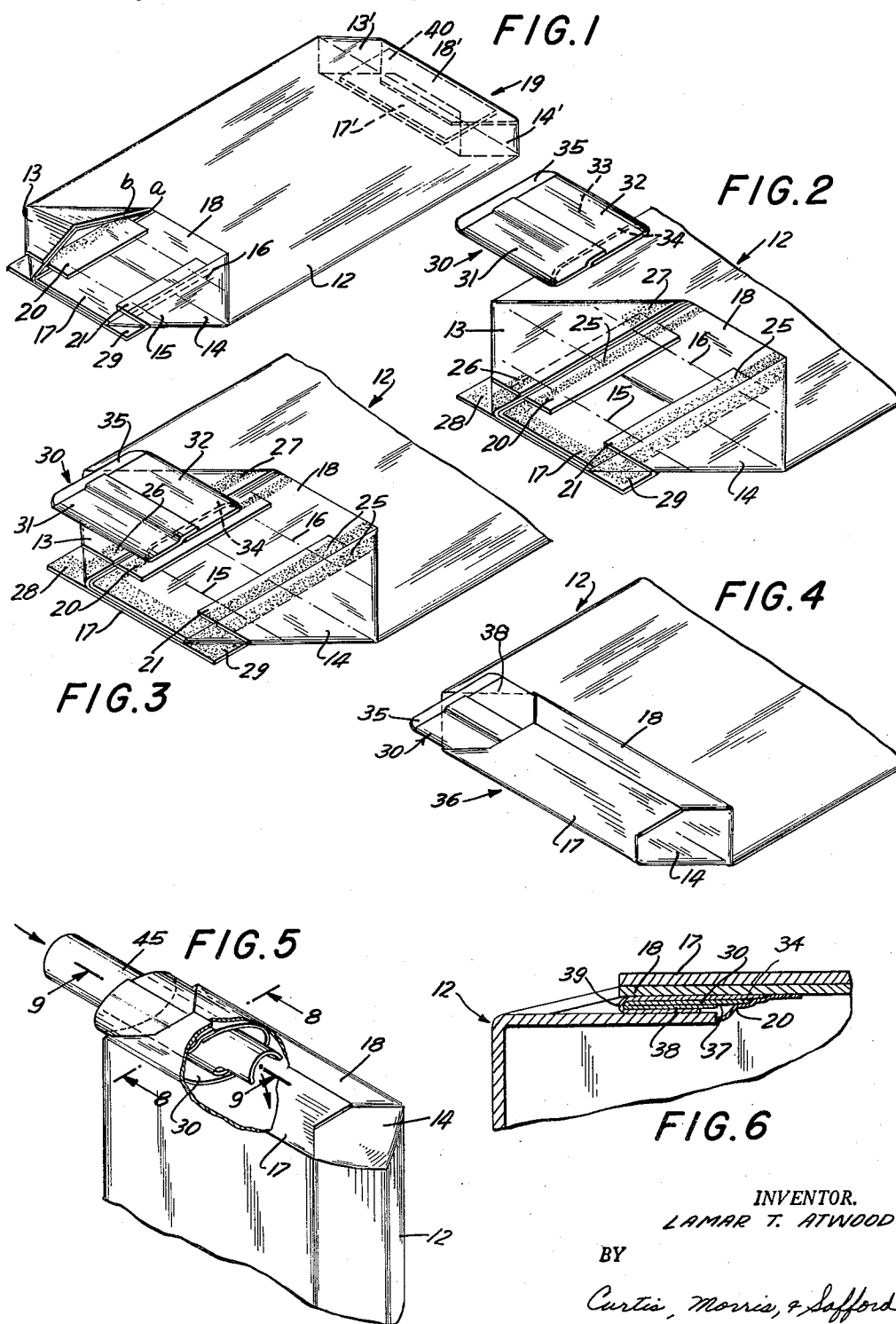
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3,000,551

BAGS

Filed Sept. 11, 1959

3 Sheets-Sheet 1



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FIG. 7

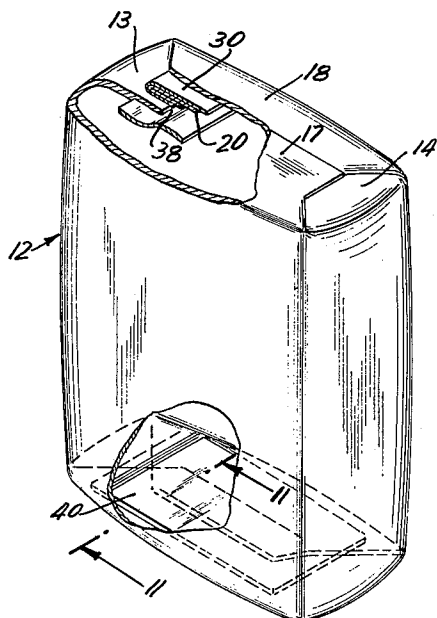


FIG. 8

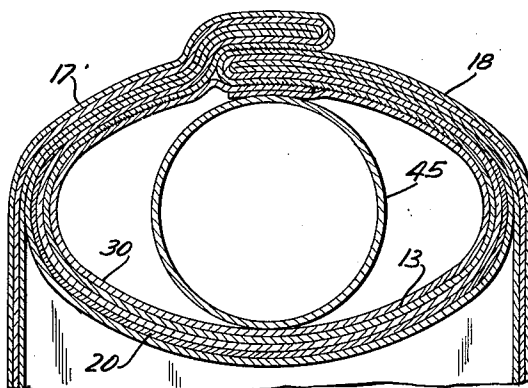


FIG. 11

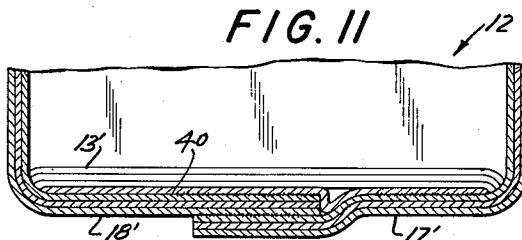


FIG. 9

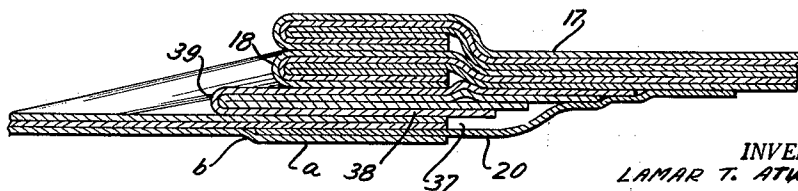
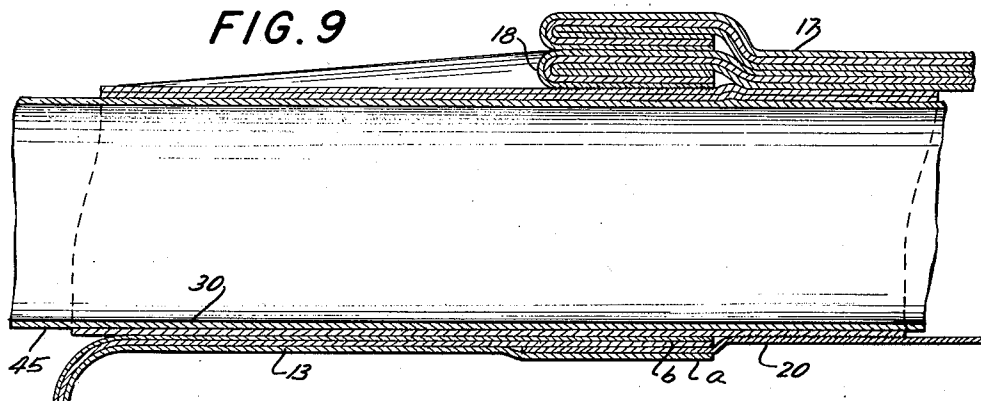


FIG. 10

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3 Sheets-Sheet 3

FIG. 12

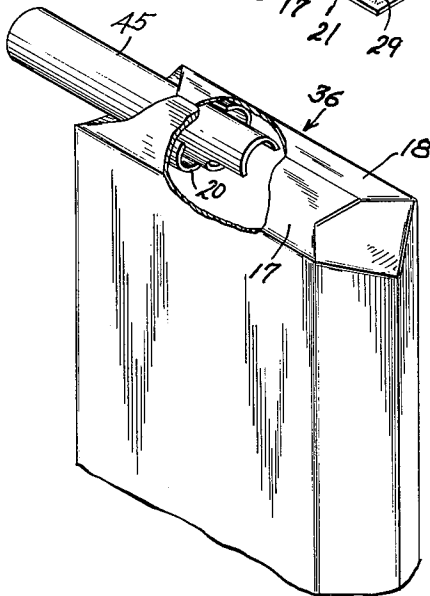
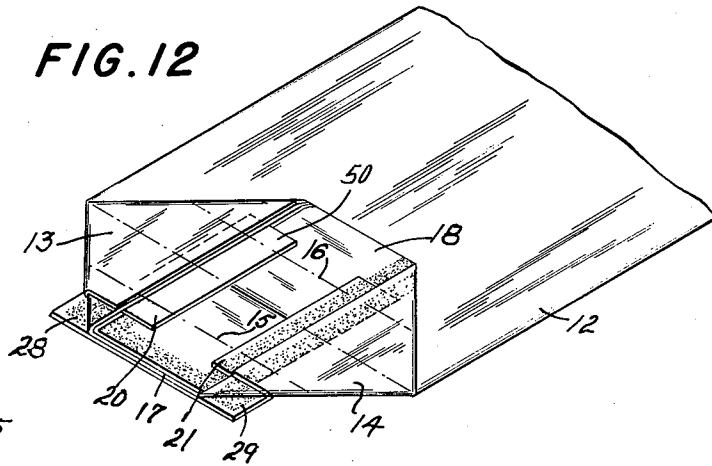


FIG. 13

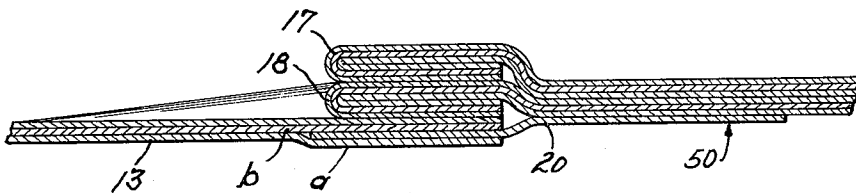


FIG. 14

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9 Claims. (Cl. 229—62.5)

The present invention relates to bags of the type having a valved opening through which the bags are filled and more particularly to improvements in the construction of bags to reduce sifting of materials, and especially very fine materials, from the bags during transit.

Paper bags having valved filling openings are in common use for packaging bulk material, such as cement, fertilizer, grain feed, flour and the like. Such bags are made of tough and strong paper or other fibrous materials and are filled by inserting a nozzle through the filling opening and blowing the bulk material therein. When the bag has been filled the nozzle is withdrawn and valve flaps at the sides of the opening are automatically closed by the material in the bag.

Valve sleeves of a relatively thin paper or other suitable flexible material also have been used to insure a tight closure of the filling opening and prevent material from sifting through the valve. Such valve sleeves are usually made of a single sheet of paper folded to form a tube and its opposite sides are adhesively secured to the valve flaps. When valve sleeves are used with bags having pasted ends the sleeve is adhesively secured between the overlapping pasted flaps of the bag with a free end projecting outwardly from the valve. After a bag has been filled, the free end of the sleeve may be twisted and tucked in between the overlying flaps to provide an additional closure to prevent material from sifting from the closed bag. Due to the fact that the opposite sides of the sleeve are adhesively secured to the opposed valve flaps, the opposite sides of the sleeve do not close the valve opening any better than the valve flaps to which they are attached, and it is difficult to securely tuck the end of the sleeve so that it will not be released during transit of the filled bag.

In order to provide a bag having the required strength to resist rupture from impact during handling, many bags are being made with multi-ply walls. Such a bag comprises a tube of separate sheets positioned one inside the other and may have as many as six plies or sheets. The multi-ply bag tube is made from separate flat sheets each folded to tubular form with its overlapping seams sealed with an adhesive and successive plies of the wall are formed one after the other. The formed tube is then flattened by creasing at opposite sides. The multi-ply walls have a substantial thickness which further reduces its flexibility. Furthermore, when the ends of the bag are folded to form closure flaps, the overlapping folds still further increase the thickness and ability of the wall to flex as well as forming irregular surfaces which are to be adhesively secured to each other. The difficulty of sealing the overlapping flaps of such bags increases as the thickness of the wall increases which reduces the flexibility of the wall and increases the degree of irregularity of the overlying surfaces to be pasted. As a result, a bag having a multi-ply wall is more apt to leak or sift material therefrom and the probability of leakage increases as the thickness in the wall increases.

One of the objects of the present invention is to provide an improved construction in a pasted end bag having a multi-ply wall which insures a more perfect seal between the irregular surfaces of overlapping flaps.

Another object is to provide a valved bag of the type indicated with a sealing strip which is free to flex relative

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to one of the flaps to which it is attached to adapt it to conform to the irregular surface of the opposing flap.

Another object is to provide an improved construction in a bag of the sleeved valve type which provides additional space into which the outer end of the sleeve may be tucked.

Still another object is to provide a self-closing bag having a multi-ply wall which is of simple and compact construction, economical to manufacture and one which is especially effective in preventing very fine materials from sifting from the bag.

These and other objects will become more apparent from the following description and drawings in which like reference characters denote like parts throughout the several views. It is to be expressly understood, however, that the drawings are for the purpose of illustration only and are not a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawings:

FIGURE 1 is a perspective view of a partially formed bag having one end closed and the other end folded to form opposed inner valve flaps and showing sealing strips adhesively attached to the inner flaps and projecting inwardly therefrom;

FIGURE 2 is an enlarged view of the folded end of the bag and sleeve to be inserted and showing the area of the flaps and sealing strips to which an adhesive paste is applied;

FIGURE 3 is a view similar to FIGURE 2 showing the sleeve mounted over one of the inwardly folded inner flaps and adhesively secured at its inner end to the sealing strip only;

FIGURE 4 is a view similar to FIGURE 3 showing the outer flaps folded one over the other in sealing engagement with each other and the outer side of the sleeve to form a closure with the sleeve projecting from one end thereof;

FIGURE 5 is a perspective view of one end of the closed bag partially in section to show how a nozzle is inserted through the sleeve to fill the bag;

FIGURE 6 is a sectional view through the corner of the bag having the sleeved valve to show how the sleeve flexes relative to the inner flap and how the outer portion of the sleeve may be tucked-in between the inner portion of the sleeve and inner flap to which it is attached;

FIGURE 7 is a perspective view of the filled bag partly in section to show the relation of the inner and outer flaps, the sealing strip and tucked-in sleeve;

FIGURE 8 is a greatly enlarged transverse sectional view taken on line 8—8 of FIGURE 5 to show how the sealing strip is sealed between adjacent plies of the multi-ply wall and the position of the sleeve relative thereto;

FIGURE 9 is a greatly enlarged longitudinal sectional view taken on line 9—9 of FIGURE 5 to show the flexible sealing strip between the inner flap and one side of the sleeve to adapt the latter to flex relative to the inner flap;

FIGURE 10 is a greatly enlarged view similar to FIGURE 6 to show the additional space for the tucked in sleeve;

FIGURE 11 is a transverse sectional view taken on line 11—11 of FIGURE 7 to show the sealing sheet between the inner and outer flaps at the end of the bag opposite the end having the valve;

FIGURE 12 is a view similar to FIGURE 2 showing a modified construction in which the sealing strip forms a flexible extension of the valve flap;

FIGURE 13 is a view of the modified construction similar to FIGURE 5; and

FIGURE 14 is an enlarged sectional view showing the

sealing strip flexed into engagement with the overlapping flap.

Referring now to the drawings, FIGURE 1 illustrates a partially formed bag 12 of a conventional pasted end type to which the present invention is applied. The bag 12 is made in a conventional machine from a plurality of sheets of a material, such as paper, either treated or untreated with the overlapping edges of each sheet adhesively attached to form a continuous tube having successive plies or layers. The paper tube so formed is folded flat and sections of the tube corresponding to the length of the bags to be formed are severed successively from the tube. The opposite ends of each severed bag section are then folded and pasted to form closed boxed ends which fold against the side of the bag.

The end closure at each end of the bag is formed by folding end portions of the wall at opposite sides of the bag tube inwardly toward each other to form inner flaps 13 and 14 as illustrated in FIGURE 1. The remaining end portions are then creased on lines 15 and 16 to form closure flaps 17 and 18 adapted to fold one over the other to overlie the inwardly folded end flaps 13 and 14 to form a closure 19 as shown at the right-hand end of FIGURE 1. Such a closure 19 is known as a diamond fold and in conventional bag constructions the overlapping flaps 13, 14, 17 and 18 are adhesively secured to each other to seal the joints between overlapping flaps. A sleeve may be positioned between the overlapping flaps at one corner of the bag in accordance with conventional practice to provide a valved opening through which the bag is filled.

In accordance with the present invention sealing strips or sheets of a thin, flexible material are provided between the overlapping flaps at one end of the bag which are adapted to flex into sealing engagement with the irregular surfaces of the flaps. The sealing strips may be attached to the overlying flaps by an adhesive to provide a sift proof closure, or may constitute a flexible extension of the inner flap when the latter operates as a valve. Also, in accordance with a further feature of the present invention, a valve sleeve may be attached and sealed to a sealing strip at one corner of the bag to adapt the sleeve to flex relative to the valve flap to which the sealing strip is attached to engage and form a seal with the other valve flap and provide a space into which the outer end of the sleeve may be tucked.

The sealing strips 20 and 21 at the partially folded end of a bag tube 12 as illustrated at the left hand end of FIGURE 1 and a construction in which a sleeve 30 is attached to a sealing strip at one corner of the bag to be formed will first be described. In the illustrated embodiment the strips 20 and 21 are positioned between adjacent plies *a* and *b* of the multi-ply wall and adhesively secured thereto. As shown in FIGURE 1, each sealing strip 20 and 21 is of a length to extend beyond the crease lines 15 and 16 for the outer flaps 17 and 18. One side of each sealing strip 20 and 21 projects into flaps 13 and 14, respectively, between adjacent plies *a* and *b* of the multi-ply wall with its opposite faces adhesively secured to the separate plies. The opposite sides of the strips 20 and 21 project inwardly toward each other from the ends of the flaps 13 and 14 to which they are adhesively attached. The sealing strips 20 and 21 may be inserted manually, but preferably they are inserted by suitable mechanism operable in conjunction with the apparatus for manifolding the multi-ply webs into a bag tube.

After the end portion of the bag 12 is folded, as illustrated at the left-hand end of the bag in FIGURE 1, an adhesive paste 25 is applied to the inwardly projecting portions of the sealing strips 20 and 21 and edges of the flaps 13, 14 and 17 as illustrated in FIGURE 2. It will be observed that the adhesive is applied along the entire edge of the inner end flap 14 adjacent seal strip 21, the

entire edge portion of the outer flap 17, but only to the portions 26 and 27 of the inwardly folded end flap 13 outwardly beyond the crease lines 15 and 16. It also will be observed that the outer ply of the folded edge of the flaps 13 and 14 are cut to provide square tabs 28 and 29 which also have an adhesive paste applied thereto.

A tubular sleeve 30 of thin, flexible material is then placed over the inwardly folded inner flap 13 between the crease lines 15 and 16 as illustrated in FIGURE 3. The sleeve 30 may be formed of a rectangular sheet of crepe paper or other thin, flexible material having its side portions 31 and 32 folded inwardly into overlapping relationship and creased to provide a flat insert unit of a width to fit between the crease lines 15 and 16 on flap 13. In the illustrated embodiment, the upper folded over portions 31 and 32 of the sleeve 30 extend inwardly beyond the lower continuous sheet portions 33 having a marginal edge portion 34; and the lower continuous sheet 33 projects outwardly beyond the upper folded over portions 31 and 32 and form a projecting lip 35 to provide offset edges which facilitate separation of the overlying parts of the sleeve. Sleeve 30 may be placed on the inner flap 13 manually or may be inserted automatically by apparatus of the type described and claimed in an application for patent of George W. Mossor, Serial No. 676,342, filed August 5, 1957, and entitled Material Handling Apparatus and used in conjunction with a Cody double end machine for folding the flaps. As will be observed by reference to FIGURES 2 and 3, the marginal edge portion 34 of the continuous sheet 33 of the sleeve 30 overlies the sealing strip 20 and is secured thereto by the adhesive on the strip. The remainder of the sleeve 30 overlies the unpasted portion of the inwardly folded flap 13 between crease lines 15 and 16. The side flaps 17 and 18 are then folded one over the other to complete the closure. The portions 26 and 27 of the outer closure flaps 17 and 18 are attached to the upper overlapping portions 31 and 32 of the sleeve 30 by the adhesive paste thereon at one end of the closure, the flaps 17 and 18 are attached to the inwardly folded inner flap 14 and to strip 21 at the other end of the closure and the outer flaps 17 and 18 are attached to each other by the adhesive paste therebetween to form a closure 36 as illustrated in FIGURE 4.

In the closure 36 as described above, the marginal edge portion 34 of sleeve 30 adhesively attached to strip 20 provides a seal between the inner flap 13 and sleeve, see FIGURES 6 and 10, and the portions 31 and 32 of the sleeve adhesively attached to the overlapping outer flaps 17 and 18 completes the seal around the entire filling opening formed by the sleeve. The sleeve 30 of thin paper, or the like, flexes relative to the outer overlying flaps 17 and 18 to conform to the irregular surfaces illustrated in the greatly enlarged views in FIGURES 8, 9 and 10 of the folded over layers of the thick multi-ply wall to seal the sleeve thereto. The attachment of the marginal edge portion 34 of the inner sheet 33 of sleeve 30 to the flexible strip 20, only, permits the remainder of the inner sheet to freely flex relative to the flap 13 to which it is attached to, in turn, conform to the irregular surface of the upper overlying portions 31 and 32 of the sleeve to form a seal therebetween. Furthermore, the attachment of the inner end of sleeve 30, only, to sealing strip 20 provides a space or pocket 37 between the sleeve and inner flap 13 into which the outwardly projecting end 38 of the sleeve may be tucked, as shown in FIGURES 6, 7 and 10. The outer end 38 of the sleeve 30 may be twisted and tucked into the pocket 37 without interfering in any way with the engagement of the underside 33 with the overlying portions 31 and 32 of the sleeve, or the end of the sleeve may be merely folded back on itself in a reverse fold, as shown in the drawings for the purpose of simplicity of illustration; but in either case, the pocket 37

provides the space required to receive the tucked in end of the sleeve and insure against its displacement during transit.

The sealing strip 21 at the opposite end of the closure 36 flexes relative to the end of the inner fold 14 into engagement with the overlapping flaps 17 and 18 to insure sealing the corner of the bag. The seal formed by the thin, flexible strip 21 with the outer overlying flaps 17 and 18 is in addition to the seal formed by the adhesive between the inner flap 14 and overlapping portions of the flaps 17 and 18 to provide a double seal. As explained above, the folds of the relatively thick multi-ply wall produces an irregular or uneven surface which is difficult to completely close so that the sealing strip 21, which is adapted to flex into the joints between folds, supplements the conventional attachment and provides an additional second and more complete seal.

The closure 19 at the opposite end of the bag, or right-hand end as illustrated in FIGURE 1, also may be provided with sealing strips 20 and 21 used in the closure 36 for sealing the joints between the overlapping flaps. However, as illustrated in FIGURES 1, 7 and 11 a single sheet 40 is substituted for the separate sealing strips 20 and 21 which is positioned between the overlapping flaps 13', 14' and 17', 18'. The sheet 40 is of the same thin, flexible material as the strips 20 and 21, such as a crepe paper, of rectangular form having a length to extend between and overlie the edges of the inner flaps 13' and 14' and a width to extend between the crease lines 15 and 16 forming the overlapping outer flaps 17 and 18. The end portions of the inner flaps 13 and 14 are secured to the ends of the sheet 40 by adhesive paste and the inner sides of the outer flaps 17 and 18 are attached to the sheet by the adhesive on the flaps. In addition, the overlapping edge portions of the flaps 17 and 18 are attached to each other by the adhesive as in the case of the strips 20 and 21. The sheet 40 of thin, flexible material flexes to conform to the irregular surface formed by the folded layers of the multi-ply wall to insure a complete sealing of the joints between the overlapping flaps. One form of sift-proof bag construction in accordance with the present invention having now been described in detail the mode of operation is explained below.

A bag 12 having end closures 19 and 36, as described above, is filled by inserting a nozzle 45 into the filling opening formed by the tubular sleeve 30. The offset lip 35 projecting from the outer end of sleeve 30 provides offset edges at the outer end 38 of the sleeve 30 to facilitate the separation of the overlying outer portions 31 and 32 from underlying sheet 33 to insert the nozzle 35 into the filling opening without tearing the sleeve. The bulk material such as cement, flour, seed, fertilizer, or the like, is then blown into the interior of the bag through the filling tube 45. The air displaced by the bulk material flows outwardly through the opening at the sides of the filling tube 45. The filling operation is continued until the required amount of bulk material is contained in the bag after which the filling nozzle 45 is withdrawn.

The filling opening is then closed by folding the outwardly projecting free end 38 of the sleeve 30 back on itself to provide a reverse fold 39 and the end portion of the folded sleeve is tucked into the pocket 37 between the sleeve and inner flap 13. The flexible sealing strip 20 permits the sleeve to flex relative to flap 13 to which it is attached to receive the end 38 of the sleeve. In addition, the strip 20 flexes to permit the underlying sheet 33 of the sleeve 30 to adjust itself and conform to the contour of the upper portions 31 and 32 of the sleeve which are adhesively attached to the overlying flaps 17 and 18. This flexibility of the under sheet 33 adapts it to form a seal with the overlying portions 31 and 32 to prevent the material in the bag from sifting therebetween and if the filled bag is turned upside down the weight of the material augments the seal. In addition, the reverse fold 39 in the sleeve 30 provides an additional seal to

prevent the material from sifting through the filling opening. Still further, the inner end of the inner flap 13 bears against the tucked in portion 38 of the sleeve 30 to hold it from accidental displacement and holds the opposite sides of the sleeves in sealing engagement with each other.

The sealing strip 21 at the opposite end of the closure 36 provides a double seal between the joints of the inner flap 14 and outer overlying outer flaps 17 and 18 to prevent sifting of material therefrom. The sheet 40 between the inner flaps 13', 14' and overlapping outer flaps 17', 18' of closure 19 insures the sealing of the joints therebetween. Thus, the improved construction provides a valve sleeved bag having a filling opening which is automatically closed and which provides a substantially increased resistance over conventional bags to the sifting of material, and especially of fine material, from the interior of the bag during transit.

FIGURES 12 to 14, inclusive, illustrate a modified construction in which the sealing strip 20 provides a flexible extension of inwardly folded flap 13 for sealing the valve opening without the use of a sleeve. As shown in FIGURE 12, adhesive is applied to the inwardly folded end flap 14, and the overlapping flap 17 in the same manner as in FIGURE 2, but no adhesive is applied to the sealing strip 20 or inwardly folded inner flap 13.

Flaps 17 and 18 are folded one over the other in the same manner as explained with respect to FIGURES 1 to 4, to form a closure 36. When folded, the attached flaps 17 and 18 overlying the flap 13 provides a valve opening through which a filling pipe 45 may be inserted to fill the bag and the thin single ply sealing strip 20 provides a flexible extension 50 of the valve flap 13. Flexible extension 50 conforms to the irregular contour of the overlying flaps 17 and 18 to augment the valve flap 13 in sealing the joint therebetween. Thus, the sealing strip 20 operates to seal the joint between the overlapping flaps without the use of a sleeve.

It will now be observed that the present invention provides a sift-proof construction in a bag having a multi-ply wall which insures a more perfect seal between the irregular surfaces of overlapping flaps. It also will be observed that the present invention provides a bag with a sealing strip which is free to flex relative to one of the flaps to which it is attached to adapt it to conform to the irregular surface of the opposing flap. It also will be observed that the present invention provides an improved construction in a bag of the sleeved valve type which provides an additional space between the sleeve and flap into which the outer end of the sleeve may be tucked. It will still further be observed that the present invention provides a self-closing bag of the multi-ply wall type which is of simple and compact construction, economical to manufacture and one which is especially effective in preventing very fine materials from sifting therethrough.

While a single embodiment of the invention is herein illustrated and described it will be understood that changes may be made in the construction and arrangement of elements without departing from the spirit or scope of the invention. Therefore, without limitation in this respect the invention is defined by the following claims.

I claim:

1. In a bag of the type having overlapping end flaps forming an opening through which material is delivered to the interior of the bag and in which the overlapping flaps form a valve for closing the opening, a strip of thin, flexible material sealed to one of the valve flaps and extending inwardly from the end of the flap into the bag throughout the width of the flap, a valve sleeve in the opening between the valve flaps, one side of the sleeve being attached to one of said valve flaps with an adhesive and the other side of the sleeve having its end portion, only, attached to the strip beyond the edge of

the flap to provide a space into which the outer end of the sleeve may be tucked.

2. A multi-ply pasted-end bag in accordance with claim 1 in which the strip is positioned between plies of the multi-ply wall and sealed thereto by an adhesive paste.

3. In a pasted end bag having a multi-ply tubular wall with overlapping flaps at one end forming a valved opening at one corner of the bag, a strip of thin, flexible material positioned between adjacent plies of the wall forming the inner flap and adhesively secured thereto, said strip extending throughout the width of the flap and inwardly into the bag beyond the end of the flap, a valve sleeve in the valve opening, the end portion of the side of the sleeve overlying the inner flap being adhesively attached to the strip to adapt the strip and end portion of the sleeve to flex independently of the multi-ply inner valve flap to which it is sealed by the strip.

4. A multi-ply pasted-end bag in accordance with claim 3 in which a strip of thin, flexible material is attached to the inner flap at the other corner at the end of the bag by an adhesive paste to insure a sealing engagement with the overlapping pasted flaps.

5. A multi-ply pasted end bag in accordance with claim 3 in which a sheet of thin, flexible material is positioned between and adhesively attached to the overlapping inner and outer flaps at the end of the bag opposite the end having the valve opening.

6. A multi-ply pasted-end bag in accordance with claim 3 in which a strip of thin, flexible material is attached to the inner flap at the other corner of the end of the bag having the valve opening, the strip being positioned between plies of the multi-ply wall and attached thereto by an adhesive paste, the strip projecting inwardly from the inner flaps, and a sheet positioned between and adhesively attached to the inner and outer flaps at the end of the bag opposite the end having the valve opening.

7. A sift-proof pasted-end bag having a multi-ply wall, the wall of said bag being folded to provide overlapping outer flaps attached to each other with an adhesive paste and an inner flap underlying the overlying pasted flaps to provide a valve opening therebetween, a sleeve of thin, flexible material in the valve opening having one side attached to the outer overlying pasted flaps by an adhesive paste, and a strip of thin, flexible material attached to the inner flap and opposite side of the sleeve inwardly beyond the end of the inner flap by an adhesive paste to seal the sleeve to the flap whereby to adapt the strip and sleeve to flex relative to the inner flap to which it is attached to engage the opposite side of the

sleeve and provide a space for tucking the folded over outer end of the sleeve.

8. A sift-proof pasted-end bag having a multi-ply wall of superimposed layers, the wall at each end of the bag being folded to provide opposed inwardly extending inner flaps and opposed side flaps folded inwardly one over the other and over the inner flaps to form a closure, a sheet of thin, flexible material between the inner and outer flaps at one end of the bag, said sheet being attached to each of the flaps by an adhesive paste to insure a complete seal of all of the joints between the folded flaps, strips of a thin, flexible material attached to the inner flaps at the opposite end of the bag by an adhesive paste and extending inwardly beyond the ends of the flaps, the inner and outer flaps at one side of the end forming a valve opening in one corner of the bag, a sleeve of a thin, flexible material in the valve opening having the inner end at one side attached to the strip beyond the end of the inner flap and its opposite side attached to the outer flap by an adhesive paste whereby the sheet at one end of the bag and the strip and sleeve at the other end of the bag flex into sealing engagement with the flaps of the multi-ply wall to insure a seal at each pasted joint.

9. A sift-proof pasted-end bag having a multi-ply tubular wall, at least one end of the tubular wall of said bag being folded in diamond folds at opposite sides to provide inwardly extending inner flaps and outer flaps folded one over the other and over the inner flaps in generally parallel planes, said multi-ply wall forming uneven ridges at the folds and edges, relatively short single-ply inserts of a thin, flexible material positioned between adjacent plies on each inner flap, said inserts having a width less than the total width of the two opposed overlapping inner and outer flaps, a length of only a fraction of the length of the bag and adhesively attached to an adjacent ply of the inner valve flap of the bag wall on at least one side, each of said inserts extending throughout the width of the inner valve flap to which it is attached and projecting inwardly from the end of the inner flap only to underlie the uneven surface of the overlying outer flaps, and said flexible single-ply extensions of the inner flaps conforming to the contour of the overlying flaps to provide a seal therebetween.

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