

Jan. 17, 1961

P. CRAIGHEAD

2,968,432

GUSSETED PASTED VALVE BAGS

Filed Dec. 24, 1958

3 Sheets-Sheet 1

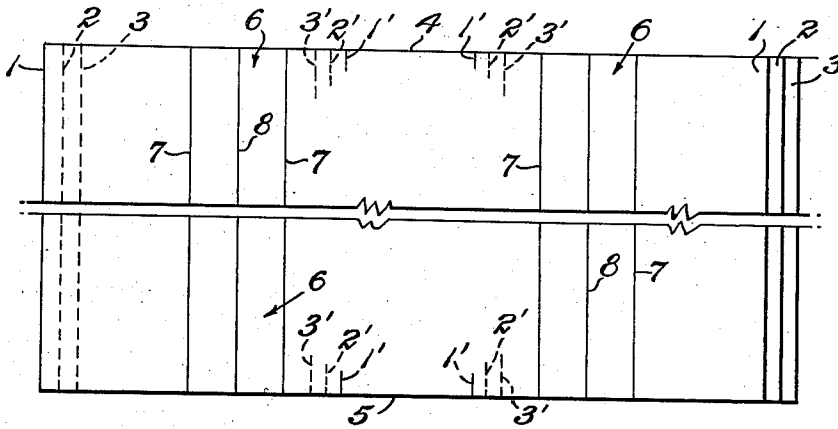


Fig. 1.

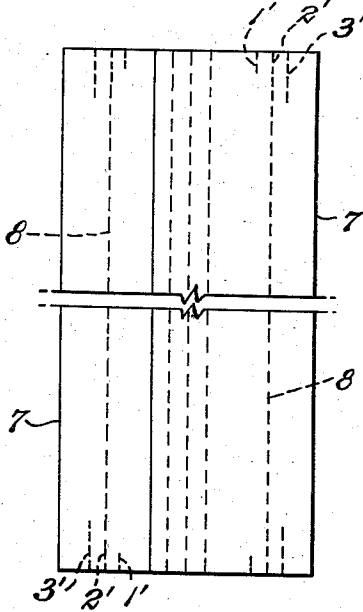


Fig. 2.

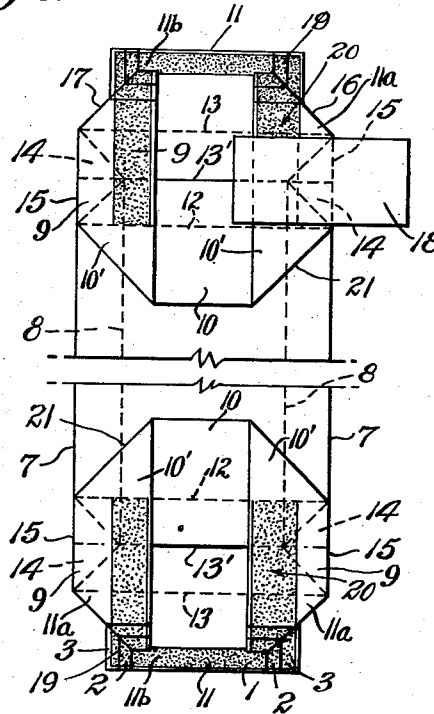


Fig. 3.

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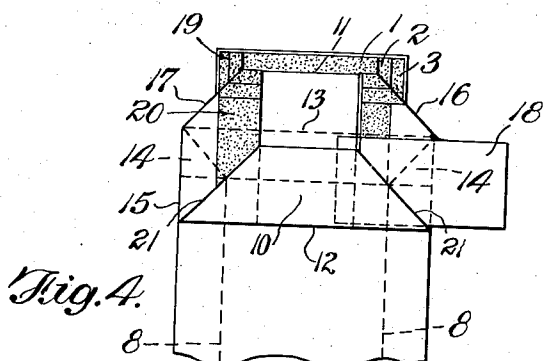


Fig. 4.

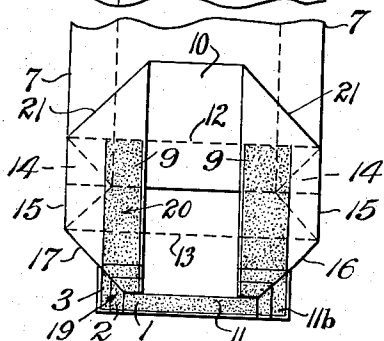


Fig. 10.

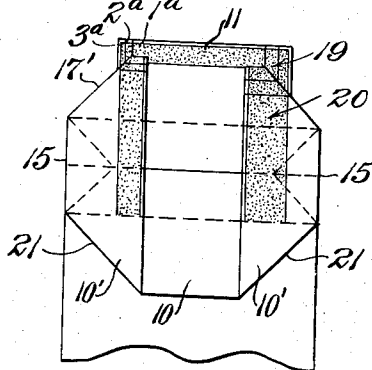


Fig. 11.

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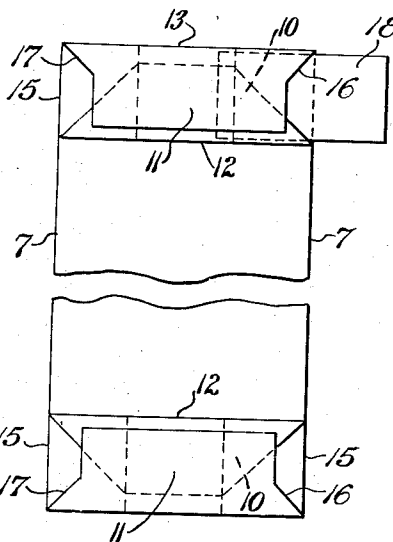


Fig. 5.

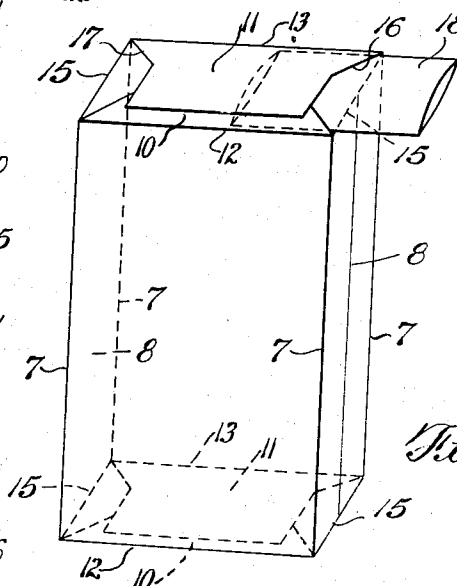


Fig. 6.

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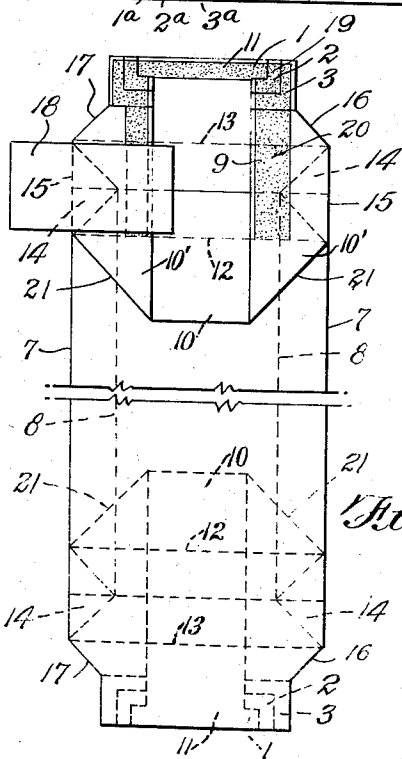
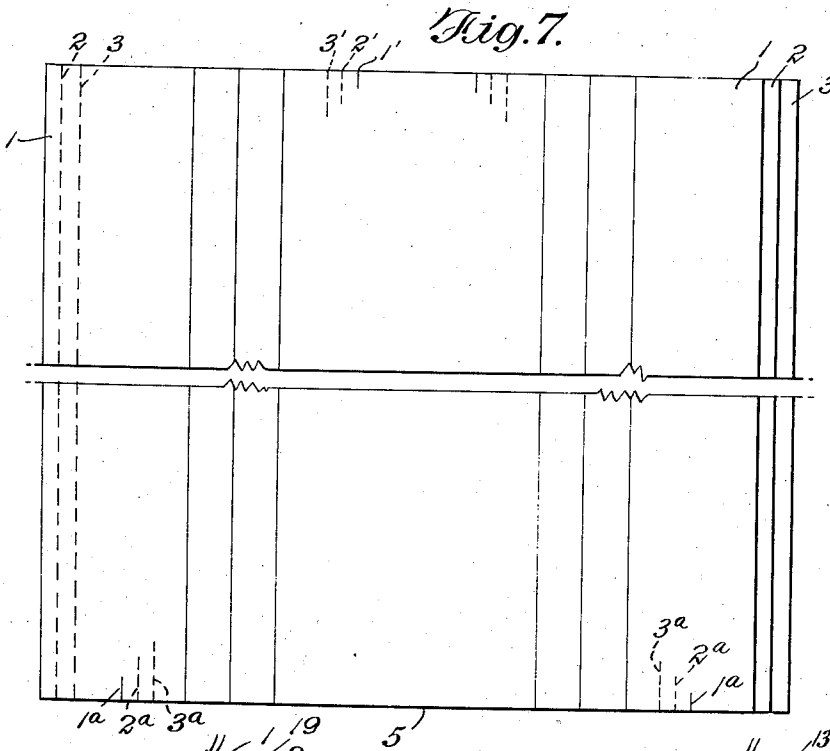
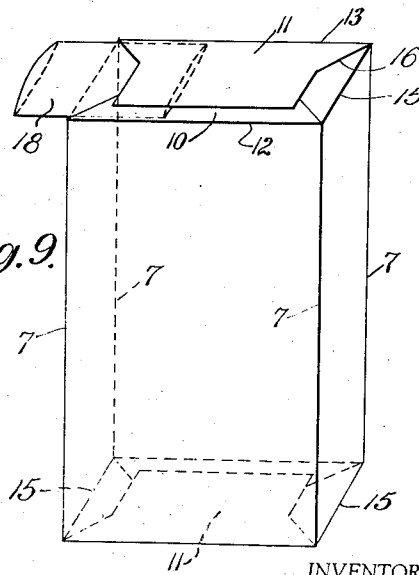


Fig. 9.



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GUSSETED PASTED VALVE BAGS

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3 Claims. (Cl. 229—62.5)

My invention relates to bags formed from paper or other flexible sheet material, and more particularly to gusseted multiwall valve bags having pasted end closures.

Heretofore, it has been suggested to provide multiwall bags for packaging finely divided materials, the ends of the bag being closed by pasting, sewing or stapling the folded end portions of the bag tube. It has also been suggested to provide valve bags wherein each end of the gusseted bag tube is formed with oppositely disposed flaps adapted to be adhesively secured in overlapping relationship and sealed with a cover sheet. While the aforementioned prior art arrangements are no doubt satisfactory for packaging certain types of particulate materials, they are open to objection as a packaging medium for very fine or dusty materials, since by reason of their construction there is a tendency for such materials to sift through unsealed channels or crevices, when the filled bags are being handled or shipped.

It will be appreciated that with various materials in finely divided form, for example, carbon black, pigments and chemicals, leakage from the bags not only results in contamination of merchandise in surrounding areas, but when the packaged material is of a combustible nature, it creates a serious fire hazard. Additionally, leakage or siftage represents loss of material, and it also detracts from the appearance of the bag, which is undesirable for packaging for consumer sales.

After considerable research and experimentation, in connection with the manufacture of gusseted open mouth bags having pasted or sewn bottoms, and satchel bottomed pasted open mouth bags, I have found that gusseted open mouth bags having pasted bottoms are more siftproof, and are characterized by a stronger bottom structure, than bags having satchel bottom arrangements, and accordingly, these desirable features of the gusseted open mouth pasted bottom bags are incorporated in the improved bag structure of the present invention.

In accordance with the present invention the bags are formed from gusseted tubes comprising one or more plies of paper or other suitable material, the tubes being provided with an improved integral, non-sift pasted closure assembly at either or both ends thereof, and a preformed valve or tuck-in sleeve, to facilitate filling of the bags, having one end portion adhesively secured within one of the closure assemblies. The use of a gusseted tube, in conjunction with a tuck-in sleeve and pasted bottom closure, is particularly well adapted for valve filling, for the reason that as the gussets are forced outwardly by the material entering the bag, the bottom of the bag is simultaneously forced downwardly into fully opened position, thus permitting the material to settle in the corners of the bag without need of manual or mechanical assistance. In the filling of the bags having a satchel type bottom difficulty is frequently encountered since the material tends to settle on a knee formed by the inner half of the side wall of the flat tube where the bottom folds back against the face of the bag, and on such occurrence manual assistance must be given during

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the filling operation, in order to flip or force the bottom down so that material being deposited in the bag will fill all corners at the bottom of the bag. As above indicated, valve filling of my improved bag is easily and quickly accomplished without need of manual or mechanical assistance. By reason of its novel design the bag opens automatically as the material is deposited therein during the filling operation.

It is customary with industries using valve filled bags to compress the filled package for freight rate advantages, particularly with overseas shipments. Whether the compression is accomplished by means of hydraulic or roller presses, the filled bag package of the present invention is well suited for compressing. The bag is filled uniformly and rectangularly because of the preformed corners along the side walls and the box-like form of the resultant filled package. With roller compressing, the package is fed into a machine with a series of rollers carrying a metal slatted belt or a heavy composition belt on the top and the bottom of the bag, the bag being in a horizontal position, with a side metal guide or side belt to support the gusset area to form a rectangular package. In feeding satchel bottom or sewn type bags through these compressing machines, the gusset area protrudes and must be forced into a rectangular shape. Considerable breakage is experienced on satchel bottom or sewn type bags by the gusset area catching or hanging on the side belts or gusset guides of the compressing machine, as the package enters the machine. There is also breakage of satchel bottom type bags in the machine due to contortion of the bag walls as the material is being forced into a rectangular shape. My improved bag lends itself perfectly to roller pressing because the package is rectangular when it enters the machine, and consequently, the gusset area does not protrude so as to hang on the gusset guides or side belts. Breakage is minimized in the machine because the package is already rectangular when it enters the machine, and since the material within the package has been pre-shaped, it is readily pressed into the desired size and shape without undue stress and strain on the paper bag walls.

An object of my invention is to provide an improved valve bag, and method of producing the same from a gusseted tube having pasted end closures.

Another object of my invention is to provide an improved valve bag formed from a gusseted, multiwall paper tube having pasted end closures.

Still another object of my invention is to provide a bag formed from a gusseted, multiwall tube having improved pasted end closure assemblies, and a preformed filling sleeve incorporated in one of the assemblies.

Yet another object of my invention is to provide an improved valve bag adapted to automatically open as the material with which it is to be filled is deposited therein, the filled bag being of rectangular box-like shape.

A further object of my invention is to provide an improved valve bag adapted for packaging finely divided and dusty materials of the character of carbon black, pigments and the like, wherein the filled package may be subjected to roller or hydraulic compression to compact the contents, without undue stress or strain on the paper walls of the bag.

Yet a further object of my invention is to provide an improved valve bag adapted to form a rectangular shaped box-like package after it has been filled, without any voids at the ends or edges of the package.

A still further object of my invention is to provide an improved valve bag which is strong and rugged in construction, attractive in appearance, and characterized by minimum leakage or siftage of the contents even when subjected to rough handling.

With these and other objects in view, which may be

incident to my improvements, the invention consists in the parts and combinations to be hereinafter set forth and claimed, with the understanding that the several necessary elements, comprising my invention, may be varied in construction, proportions and arrangement, without departing from the spirit and scope of the appended claims.

In order to make my invention more clearly understood, I have shown in the accompanying drawings means for carrying the same into practical effect, without limiting the improvements in their useful applications to the particular constructions, which for the purpose of explanation, have been made the subject of illustration.

In the drawings:

Figure 1 is a plan view of a multi-ply bag blank used in forming a gusseted tube, in accordance with one embodiment of the present invention;

Fig. 2 shows the bag blank of Fig. 1 after it has been arranged in tubular form and pressed into flat rectangular shape;

Fig. 3 shows the arrangement of the closure assembly elements formed at each end of the tube, and an associated filling sleeve;

Fig. 4 shows a filling sleeve at the valve end of the tube, with one of the closure flaps folded thereover;

Fig. 5 shows the completed bag after the flaps at the ends of the tube have been folded inwardly and adhesively secured in over-lapping relationship.

Fig. 6 shows the rectangular box-like shape of the bag of Fig. 5, when it is expanded;

Fig. 7 is a plan view of a modification of the bag blank shown in Fig. 1;

Fig. 8 is a view of the bag tube formed from the blank of Fig. 7, showing the arrangement of the elements of the tube of the closure assemblies at each end of the tube;

Fig. 9 shows the completed bag expanded into rectangular box-like form;

Fig. 10 is a detail view of a modified form of closure flap at the valve end of the tube; and

Fig. 11 is a detail view, showing the flaps of Fig. 10 secured in over-lapping relationship.

Referring to the drawings, and more particularly to Fig. 1, the bag blank is comprised of plies 1, 2 and 3, formed from paper or other suitable flexible material having slits 1', 2' and 3', of graduated length formed therein at the upper and lower margins 4 and 5, respectively of the blank, the gusset portions being designated generally by numeral 6, which portions are defined by fold lines 7 and an intermediate fold line 8. The plies 1, 2 and 3 are arranged in superposed relation, and stepped as shown, so that when the blank is folded into the tubular form of Fig. 2, the joints at the over-lapping portions of the plies will be in vertical staggered relationship. In the process of arranging the plies in superposed stepped relation, they are spot pasted to prevent relative movement therebetween during the folding of the blank into tubular form, and during the subsequent steps of securing the over-lapped ends of the plies, folding the slitted portions of the plies and the end portions of the blank, in connection with the formation of the flaps, and panel members of the closure elements at the ends of the tube.

As will be seen in Fig. 3, the closure assembly at each end of the tube or bag blank, comprises inwardly folded rectangular shaped end flaps 9, an isosceles trapezoidal shaped side flap 10, having re-entrant triangular shaped portions 10' adjoining the end flaps, and a second side flap 11, embodying a pair of stepped, re-entrant trapezoidal shaped portions 11a, and a contiguous overlying stepped rectangular shaped portion 11b, the side flaps 10 and 11, being adapted to be turned inwardly in over-lapping relationship about fold lines 12 and 13, respectively. It will be noted that the gussets are defined by the fold lines 7 and 8, together with the triangular shaped inturned portions 14 at the top and bottom of the tube, and that when the tube is expanded it is of rectangular cross-section, the rectangular shaped ends of the tube being defined by the

fold lines 12 and 13, and the bases 15 of the triangles 14. It will be further noted that the free end portion 11b of the side flap 11 is of rectangular shape, and that it is formed by folding the plies inwardly at the bottom ends of the slits 1', 2' and 3' (Fig. 2), along the diagonal lines 16 and 17, whereby the exposed areas of the individual plies are in stepped relation. A filling sleeve 18, formed from paper or other flexible material, is interposed between and adhesively secured to the upper exposed surface of one of the inturned end flaps 9, and to the exposed portion 10' of the side flap 10 which overlies the sleeve. The flap 10 is then folded over the previously inturned flap 10 and is adhesively secured thereto, and to the valve sleeve and to the oppositely disposed end flap 9, as shown in Fig. 5.

In connection with the closing and sealing the ends of the tube, the adhesive or paste is applied to the exposed stepped areas of the plies constituting the flaps 11, and to portions of the end flaps 9, (Fig. 3), said pasted areas being designated generally by numerals 19 and 20. It will thus be seen that a tight closure is effected by reason of the seal formed by the stepped areas of the side flaps 11, the end portions of the plies thereof being severally adhesively secured in over-lapping relationship with respect to end flaps 9 and flap 10, whereby a substantially sift-proof closure is obtained.

The use of a gusseted tube, in conjunction with a pre-formed filling sleeve and the improved closure assemblies as above described, provides a bag structure which is particularly well adapted for valve filling.

During the filling operation, the gussets are forced outwardly by the material entering the bag, and the bottom is simultaneously forced downwardly into fully opened position, whereby the material settles in the corners of the bag and completely fills the same, without requiring manual or mechanical assistance. When the bag is filled, it is in the form of a box-like container of rectangular cross-section, as shown in Fig. 6, thus providing a package which lends itself to easy handling. Additionally, the rectangular shaped package is ideally suited for roller pressing, by reason of its smooth rectangular shaped lateral faces, and the fact that the material within the container has already been pre-shaped before the package enters the pressing machine. The rectangular shape of the container also permits the package to be set in an upright position while the sleeve is being tucked in, or while tape is automatically applied as the container moves away from the filling machine, in event that a different type of filling opening is provided. It will be further noted that the rectangular portions of flaps 11 (Figs. 5 and 6) extend a substantial distance over the flaps 10, and are adhesively secured thereto along their peripheral edges and body portions, thus providing a tight sift-proof seal between the elements of the closures, without requiring the use of separate cover sheets for the bottoms.

In the modification shown in Figs. 7, 8, and 9, the bag blank (Fig. 7) is the same as shown in Fig. 1, except for the location of the slits 1a, 2a, and 3a, at the lower margin 5 of the blank. By arranging the slits in the plies, as shown, the closure assemblies are formed in apposed relation, that is to say, on opposite sides or faces of the tube, in lieu of forming them on the same side or face as previously described. The closure assemblies are identical, except for the difference in location, as those of the first described embodiment of the invention, and they are folded and sealed in the same fashion.

By arranging the bottoms in apposed relationship, more printing area is provided for advertising purposes, the bags can be pressed more effectively, and movement of the bag into and out of the printing press is facilitated, since the trailing bottom is down, and accordingly, can not snag on the printing mechanism or other parts of the press.

Referring to Figs. 10 and 11, there is shown a modified form of flap arrangement at the valve end of the bag.

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In this modification, it will be noted that the lengths of the stepped portions 1'a, 2'a and 3'a have been decreased, and accordingly, fold line 17' of the inturned panel 9 at the valve corner of the tube is substantially longer than the corresponding fold lines 17 of the bag tubes shown in Figs. 4 and 8. It will thus be seen that when flap 11 is folded into over-lapping relationship with respect to flap 10 (Fig. 11) the fold lines 17' and 21 of the side flaps form a triangle with fold line 15 as a base, the vertex 22 of the triangle being at the intersection of the fold lines. The purpose of this arrangement is to provide reinforcement in the vicinity of the filling end of the bag, and to minimize the possibility of tearing flap 11 during the filling operation. In this connection, it will be appreciated that while various filling techniques are employed, it is customary practice to introduce the filling nozzle into the sleeve a sufficient distance to enable the bag to be supported thereon, while the bag is being filled. By constructing the flap at the valve corner of the bag, as above described, the forces created as the bag is being filled are distributed along diagonal lines, and a reinforced area of contact is provided between the filling tube and the flaps.

In making a bag, in accordance with the present invention, the plies are spot pasted, slit, and brought together, as shown in Fig. 1, and after adhesive has been applied to the seam margins of the plies, the bag blank is folded and pressed into the tube form of Fig. 2. It will be noted that the resultant open-ended tube comprises three separate tubes, one tube from each ply, and that the marginal over-lapping edges of each ply are bonded by inter-lineal pasting, thus providing a strong and rugged multiwalled tubular unit. The bag tube is now creased at the fold lines 12, 13 and 13', at the end of the tube opposite the valve end, which end of the tube is then opened (Fig. 3), flaps 10 and 11, and end flaps 9 formed, the side flap 11 and end flaps 9 being pasted in accordance with the paste patterns designed generally by numerals 19 and 20. The end of the tube is now closed by folding flap 10 about fold line 13, and then folding flap 11 about fold line 12 into over-lapping engagement with flap 10.

The valve end of the bag is closed in substantially the same fashion as above described, that is to say, the tube is creased at the fold lines 12, 13 and 13', the end of the tube is opened and paste applied to side flap 11 and end flaps 9, however, the paste pattern at the valve or sleeve corner is modified by decreasing the pasted area of the end flap 9, whereby to provide a pocket to receive the tucked-in free end of the filling sleeve. After the end of the tube is opened, and side flaps 10 and 11, and end flaps 9 are formed and portions thereof pasted, sleeve 18 is positioned on the inturned end flap 9 at the valve corner as shown in Fig. 3, the inner end 18' of the sleeve projecting beyond the inner edge 9' of the end flap. Thereafterwards, the valve end of the bag is closed by folding flaps 10 and 11 inwardly about their respective fold lines, as explained in connection with the steps of closing the bottom end of the tube.

It will thus be seen, that by reason of the construction and arrangement of the flaps and panels at the ends of the tube, in conjunction with the paste patterns associated therewith, the elements of the closure assemblies are adhesively secured in such manner as to assure a substantially sift-proof closure.

While I have shown and described the preferred embodiment of my invention, I wish it to be understood that I do not confine myself to the precise details of construction herein set forth by way of illustration, as it is apparent that many changes and variations may be made therein, by those skilled in the art, without departing from the spirit of the invention or exceeding the scope of the appended claims.

What is claimed:

1. A valve bag of the character described, formed

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from a gusseted, multi-ply bag tube having an outer ply and at least one inner ply, said tube, when expanded, being of rectangular cross-section and having rectangular-shaped side and end panels, each of said plies having a pair of parallel, longitudinal slits at each end of one side panel of the tube, the slits in the inner ply being inwardly spaced from and shorter than the slits in the outer ply; an integral, sift-proof, pasted closure assembly at each end of the tube, comprising a pair of oppositely disposed, inwardly folded rectangular-shaped end flaps, an isosceles trapezoidal-shaped first side flap having re-entrant, triangular-shaped portions adjoining the end flaps, the said first side flap, at one end of the tube, being folded inwardly along a base fold line, the triangular-shaped portions thereof being adhesively secured to the subjacent surfaces of the end flaps; and a second side flap, embodying a pair of stepped, re-entrant, trapezoidal-shaped portions and a contiguous overlying stepped, rectangular-shaped portion, folded inwardly in overlapping relation with the first side flap, the stepped, re-entrant trapezoidal portions and overlying the stepped, rectangular shaped portion of said second side flap being adhesively secured to the exposed, subjacent surfaces of the end flaps and the first side flap; a preformed flexible filling sleeve adhesively secured to one of the end flaps at the opposite end of the tube, the first side flap at said opposite end of the tube being folded inwardly into overlapping relation with the end flaps and adhesively secured to the subjacent surfaces of the filling sleeve and the opposite end flap, the second side flap being folded inwardly into over-lapping relation with the first side flap, and adhesively secured to the exposed subjacent surfaces of the first side flap, the filling sleeve, and the end flap opposite the sleeve.

2. A valve bag of the character described, formed from a gusseted, multi-ply tube having an outer ply and at least two inner plies, said tube, when expanded, being of rectangular cross-section and having rectangular-shaped side and end panels, each of said plies having a pair of parallel, longitudinal slits at each end of a side panel of the tube, the slits in the inner plies being inwardly spaced from and progressively shorter than the slits in the outer ply; an integral sift-proof, pasted closure assembly at each end of the tube, comprising a pair of oppositely disposed, inwardly folded rectangular-shaped end flaps, an isosceles trapezoidal-shaped first side flap having re-entrant, triangular-shaped portions adjacent the end flaps, the said first side flap, at one end of the tube, being folded inwardly along a base fold line, the triangular-shaped portions thereof being adhesively secured to the subjacent surfaces of the end flaps; and a second side flap, embodying a pair of stepped, re-entrant, trapezoidal shaped portions and a contiguous overlying stepped, rectangular-shaped portion, folded inwardly into overlapping relation with the said first side flap, the stepped, re-entrant trapezoidal-shaped portions and the contiguous overlying stepped, rectangular-shaped portion of said second side flap being adhesively secured to the exposed, subjacent surfaces of the end flaps and the first side flap; a preformed flexible filling sleeve adhesively secured to one of the end flaps at the opposite end of the tube, the first side flap at said opposite end of the tube being folded inwardly into overlapping relation with the end flaps, one of the re-entrant triangular-shaped portions of said first side flap being adhesively secured to the subjacent surface of the filling sleeve, and the remaining triangular-shaped portion of said side flap being directly, adhesively secured to the subjacent surface of the opposite end flap, the second side flap being folded inwardly into overlapping relation with the first side flap, the stepped, re-entrant trapezoidal-shaped portions and the contiguous overlying stepped, rectangular-shaped portion of said second side flap being adhesively secured to the exposed subjacent surfaces of the first side flap the filling sleeve, and the end flap opposite the sleeve.

3. A valve bag according to claim 2, in which the filling sleeve is adhesively secured to its associated end flap in an area adjacent the inner end of the flap, the inner and outer free ends of the sleeve projecting beyond the end of the flap and the fold line thereof, respectively. 5

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