Oct. 16, 1934. W. N. BAKER 1,976,760

VALVE BAG

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FIG.1.

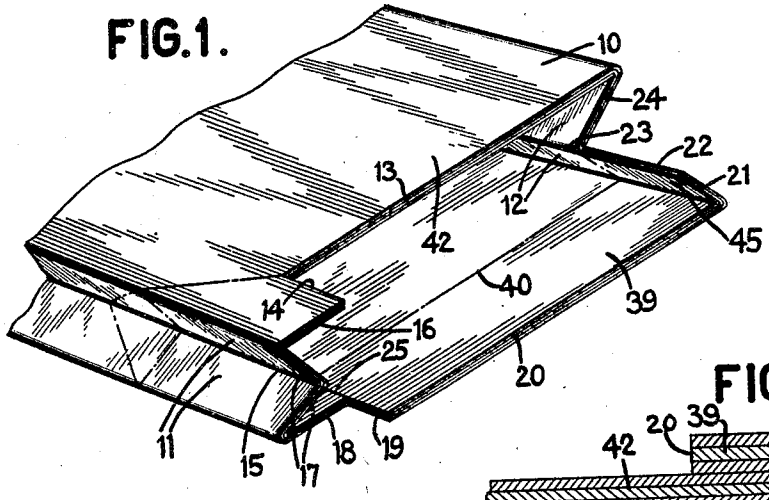


FIG.4.

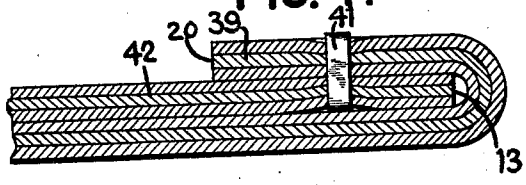


FIG.2.

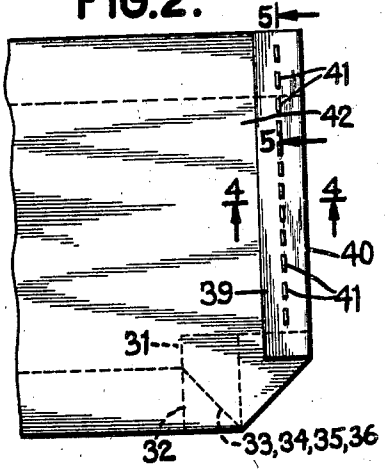


FIG.5.

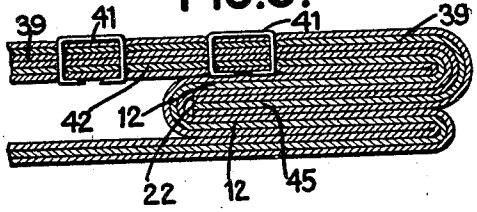


FIG.6.

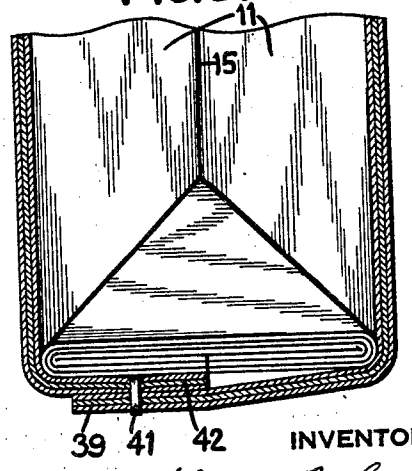
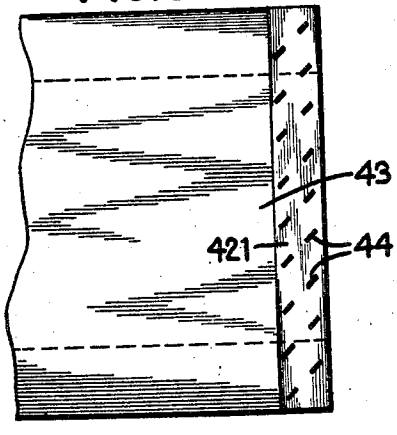


FIG.3.



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VALVE BAG

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FIG.7.

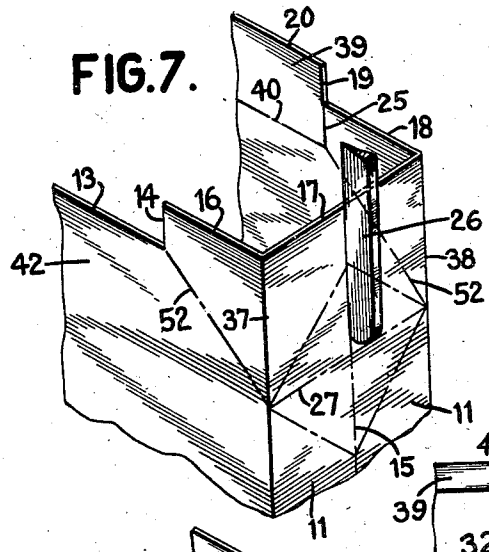
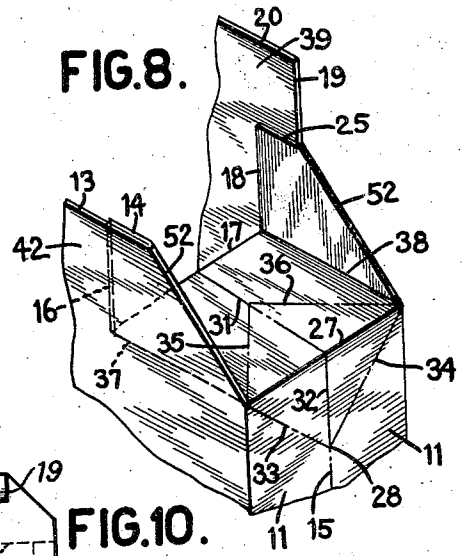


FIG.8.



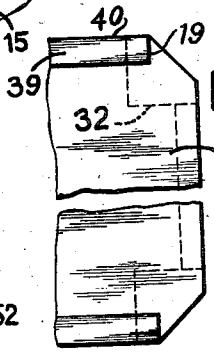


FIG.10.

FIG.9.

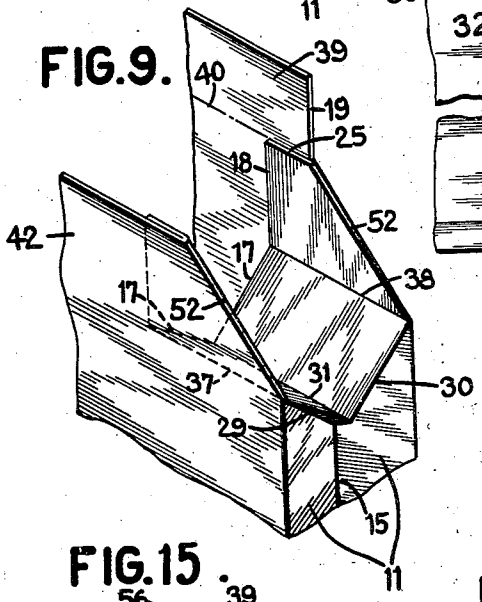


FIG.12.

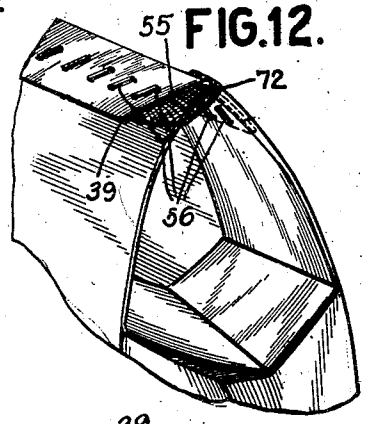


FIG.15.

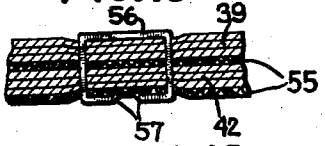
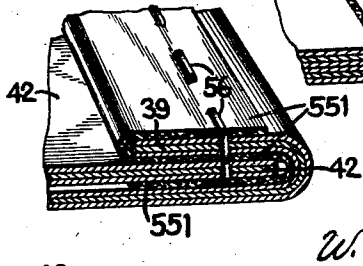


FIG.14.



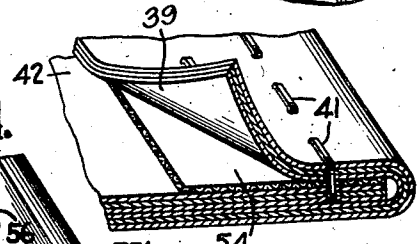
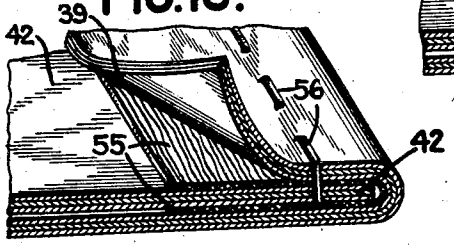


FIG.11

FIG.13.



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Patented Oct. 16, 1934 1,976,760

UNITED STATES PATENT OFFICE

1,976,760

VALVE BAG

Webster Noyes Baker, Glens Falls, N. Y., assignor, by mesne assignments, to Bagpak, Inc., New York, N. Y., a corporation of Delaware

Application April 13, 1931, Serial No. 529,563

11 Claims. (Cl. 150—9)

This invention relates to improvements in the construction of valve bags and methods of making the same. It has particular reference to a single or multi-walled gusseted bag of this type in which the folded ends are secured by rivets or staples or similar fastening devices. However, it will be apparent, as the description of the invention progresses, that many of its features are applicable to bags having their folded portions pasted or secured in other ways.

It has been a primary object of the invention to provide a simple, inexpensive and yet effective construction which lends itself readily to automatic production, is easily handled during the filling operation and is sturdy and capable of withstanding the shocks to which it may be subjected in usage.

A feature of the improved bag is the provision of a lapped joint at each end, in lieu of a butted joint, so constructed that loss of a pulverent material carried by the bag, due to sifting through the joints will be more or less completely obviated. By virtue of the lapped arrangement at the ends a tight joint is obtained, without the necessity of applying a tape or binding strip over the end. Another feature of the preferred form of the bag is the provision of an interlocking arrangement between a lapped portion or flaps and the gusset at one side of the bag. This arrangement also tends to make the construction more nearly sift proof.

In the employment of staples or similar metallic fastening devices there is a tendency to tear the material of the bag, whenever it is subjected to an unusual shock, due to the fact that there is substantially no yield in such a joint. Provision is made, however, in accordance with the present invention for the introduction of a certain amount of yield in the joint. This is very simply and readily accomplished by the introduction of a strip of suitable yielding material such as crepe paper, cloth, rubber or the like between the lapped edges of the joint.

Other features and advantages of the invention will appear from the detailed description of several suitable illustrative forms of the same which will now be given in conjunction with the accompanying drawings in which:

Figure 1 is a perspective view of one end of a bag, embodying features of the invention, opened out but showing the lines along which it may be folded.

Figure 2 is a face view of the valved end of a completed bag.

Figure 3 is a similar view of the opposite end of a bag not provided with a valve.

Figure 4 is an enlarged sectional view taken along the line 4—4 of Figure 2.

Figure 5 is an enlarged sectional view taken along the line 5—5 of Figure 2.

Figure 6 is a transverse, vertical sectional view, looking toward a closed valve, taken through a bag that has been opened out.

Figure 7 is a perspective view of the valve portion of the bag prior to folding.

Figure 8 is a similar view showing an intermediate stage in the folding.

Figure 9 is a similar view of a later stage in the folding operation.

Figure 10 is a face view of a complete folded bag.

Figure 11 is a perspective view of a small section of the lapped portion of the bag with a corner turned back to show the inserted yielding material.

Figure 12 is a perspective view of the valve end of the bag shown in Figure 1, with the edges folded and stapled and with the valve opened out.

Figure 13 is a sectional perspective view through the folded end of the bag showing a modified arrangement of the yielding material.

Figure 14 is a view similar to Figure 13 showing a further modification, and

Figure 15 is a sectional detail view showing the form of a staple which may be used in fastening certain of the parts.

Referring now to the drawings, it will be noted that the invention has been illustrated in connection with a bag having a three-ply construction but it is to be understood that the features of the invention are applicable also to a single ply bag or to a bag having a greater number of plys. They are particularly suited for application to bags used in the shipment of cement, these being normally of five-ply material. In accordance with the usual practice the different layers of the material which is formed into bags are fed as continuous webs in an offset relation so that when folded over to form a tube, the overlapping edges of each layer will not coincide. The continuous tube which is produced by pasting or otherwise securing the overlapping edges of the layers of material may have its sides folded inwardly in the usual way to form gussets and the tube may then be severed or cut into appropriate lengths and along suitable lines to form bags of desired size. Where the configuration at the end of a tube to be later folded into a bag is some-

what irregular the severing of the continuous tube into appropriate lengths may be accomplished by perforating the several sheets of material forming the tube, preferably prior to bringing the sheets together, along the lines required to produce the desired configuration and subsequently, after formation of the tube, separating it into sections by pulling it apart along the perforated lines. Or the tubes may first be cut into appropriate bag lengths with square cut ends and portions may then be removed at each end to produce the desired form.

According to one form of the present invention the end of the tube 10 to be formed into a bag may be provided with gussets 11 and 12 and cut or severed as indicated in Figure 1. One side of the tube may be severed along a line 13 over to a shoulder 14 which, when the tube is folded flat, is near the inner edge 15 of the gusset 11. The shoulder 14 extends outwardly at right angles from the edge 15 a sufficient distance to form a valve when folded inwardly in a manner to be explained. The remaining portion of the side of the bag is severed along an edge 16 at right angles to the shoulder 14, and the end of the gusset 11 is severed along an edge 17 in direct alignment with the edge 16. So also that portion of the opposite wall of the bag which is adjacent the gusset 11 is severed along a line 18, forming a continuation of the edges 16 and 17. At the inner end of the edge 18 a shoulder 19 is formed, this being in direct alignment with the shoulder 14 when the tube is folded flat and being preferably of the same dimensions. The remaining portion of this side of the bag is then severed along an edge 20 which is parallel with the edge 13. One side of the gusset 12 terminates along an edge 21 which is simply an extension of the edge 20. A shoulder 22 extending inwardly substantially in line with the inner folded edge 23 of the gusset 12 serves to join the edge 21 with the edge 24 of the opposite side of the gusset. This completes the contour of the end of the bag. It will be observed that the shoulder 22 is of a length equal to the combined lengths of the shoulders 14 and 19.

By forming the end of the tube in the manner indicated, it will be noted that a corresponding but inverted formation is produced at the adjoining end of the tube which is severed from the one shown. Thus on the adjoining tube the shoulder formed along the line of separation from the shoulder 19 will correspond with the shoulder 14 of the tube shown and vice versa. Similarly at the opposite side of the bag the shoulder 22 is matched by a corresponding shoulder on the adjoining tube section. This permits severing the continuous tube into suitable bag lengths without waste of material. As a result of the complementary arrangement of the various edges and shoulders, both ends of a bag may be of substantially the same form, except for a partially inverted relation between the outlines of the two ends. This, as will appear more clearly hereinafter, will serve to place the valves at the two ends of a bag along the same gusset. If desired the inverted relation at the two ends may be eliminated and the formation may be made such that the extreme outer edge 20 at the two ends of the bag will be carried by the same wall. Correspondingly, the edges 13 at the two ends will then be carried by the same wall rather than opposite walls. In this event one tube section will have its upper wall of less length than its lower wall to the extent of double the length of shoulder 22, while the next tube section will have its upper wall correspondingly longer than its lower wall and so on. An advantage of this construction is that it will permit folding the longer or extended portions of one wall in the same direction over the ends of the shorter wall, in the manner to be later explained, so that the stapling machines, or the like, may operate on both ends of the bag from the same side.

As an extension of the shoulder 19 there is provided a slit 25 which, when the bag is folded flat, lies directly beneath and is coextensive with the shoulder 14. Should it not be considered important to eliminate waste of a small portion of the material between the successive bags, the edges 16, 17 and 18 of the valve may be extended so as to be on a line with the edge 20. This will provide a valve which will extend for a greater distance into the bag as is desirable. The ends of the tube sections may then be cut off square to provide the appropriate bag lengths and a small section bounded by the edges 13, 14, 22 and 24 may subsequently be removed and discarded from one or both ends of each section, depending upon whether valves are to be formed at one or both ends.

Now after the tube has been cut and slit along the lines mentioned the valve may be formed by an appropriate folding operation. For this purpose the gusset 11 is preferably expanded until its two sides are substantially in the same plane as shown in Figure 7. If now the upper portion of the gusset is folded inwardly, as by moving a folding bar 26 in a plane parallel to the sides of the bag at the mid point of the gusset, and at the same time the gusset is constrained along the line 27 to compel inward folding along this line, the various portions of the bag will be brought into the position shown in Figure 8. Upon then folding the gusset together again while applying an inward pressure at the point 28 the parts will fold together in the manner indicated in Figure 9 forming creases 29 and 30 and reforming a central crease 31 which is a continuation of the crease or fold 15 but is now located at right angles to the latter. At the same time a portion 32 of the crease 15 (Figure 8) is folded into and laid along the crease 31 while creases 33 and 34 are placed in coincidence with creases 35 and 36 respectively. In the course of infolding the valve the edges 37 and 38 of Figure 7 become creases as shown in Figures 8 and 9. The shoulder 14 and the corresponding edge of the slit 25 become short, inwardly extending edges at the top of the valve as best indicated in Figure 9.

Next the flap 39 formed by the extension of the under side of the bag beyond the line 40 in Figure 1 may be folded over the edge 13 of the upper side. This flap, it will be noted, includes a portion of the gusset 12 having the bounding edges 21 and 22, while at its opposite end the flap is defined by the shoulder 19 and one edge of the slit 25. By means of one or more rows of rivets or staples 41, or other suitable fastening means, the flap 39 may be secured to the upper side 42 of the bag. In order to avoid passing the rivets or staples or the like through both walls of the bag an anvil arm may be inserted through the valve opening to cooperate with the inner ends of the fastening elements as they are being riveted.

The opposite end of the bag may, if desired, be formed in identically the same way, although as previously mentioned the formations at the

two ends may be in partially inverted relation with respect to each other as in the first form described, or they may be folded in toward each other on the same side of the bag as later explained. The two valves, as shown in Figure 10, will be placed along the same longitudinal edge of the bag.

In lieu of providing the lower end of the bag with a valve, this end may be cut off square, if desired, and the entire end simply folded over, as shown in Figure 3, and the folded portion 421 secured to the upper wall 43 of the bag by means of fastening devices 44. The anvil arm of the stapling machine may, for this purpose, be inserted through the other end of the tube before it is valved and stapled. The provision of valves at both ends is considered preferable, however, since it is simpler to handle in the course of production, avoids or reduces waste in the severing of the continuous tube into the sections to be folded, and provides a bag which may be more readily utilized since the valve at either end may be used in filling the bag.

In order to avoid any possibility of the contents of the bag working its way out between the gusset portion of the flap 39 and the main upper wall of the bag an interlocking or infolded relation may be brought about. Thus, referring to Figure 1, the shoulder 22 instead of being placed along the upper surface 42 of the bag may be inserted between the outer surfaces of the walls of the gusset 12 prior to the riveting or similar operation. This will bring about the relation shown in Figure 5 in which the portion 45 of the flap 39, having the edges 21 and 22, is pinched between the walls of the gusset 12.

Another feature which may be embodied in the bag is illustrated in Figure 11. This consists in the placing of a narrow strip 54 of some suitable yielding material, such as creped or crinkled paper, flexible fibre board, cloth of various sorts, rubber, or various compositions, or materials of similar nature, between the flap 39 and the wall 42. The provision of this strip of yielding material in the manner explained serves to provide a desirable yield in the lapped joint. It will be understood that in the handling of bags of this character loaded with cement, for example, they will be subjected to considerable shocks and strains and unless a certain amount of yield is allowed to absorb the shocks the material of the bags is apt to become torn adjacent the staples. The introduction of a strip of material in the way specified has been found to greatly increase the life of a bag subjected to hard usage. As a further variation of this feature of the invention it has been found desirable to utilize a strip 55 of this sort of sufficient width to surround the free upper edge of the wall 42, as shown in Figure 13. The staples 56 are then passed through both layers of this material as well as the flap 39 and wall 42. As indicated in Figure 15 there is a tendency for the pointed ends of the staples to turn inwardly as they are applied. When the strip 55 is placed in the manner indicated the curled ends 57 of the staples will merely bite into the yielding strip and will not take hold in the wall of the bag. It will be apparent that when the staples enter the bag wall there is a tendency to produce a tear at these points as the result of any shock or strain. This is eliminated by the provision of the strip as indicated in Figure 13.

A still further variation which may be made in the arrangement of the reinforcing strip is illustrated in Figure 14. As here shown the strip 551 may be bent around the end of the flap 39 as well as around the end of the wall 42 so that in cross section it will be substantially S shaped. This will provide several advantages. In the first place it will serve to reinforce the construction beneath the heads of the staples. Any tendency of the material to rip along the edges of the staple heads will be eliminated. Furthermore this construction will definitely prevent any sifting of the contents of the bag through the end of the latter. These advantages are in addition to those already mentioned. The strip 551 may be formed of any of the materials suggested for the strips 54 or 55. A relatively thin flexible strip of cardboard or fibre board or Kraft board will be found to be very satisfactory for the purpose.

A finished bag is partially illustrated in Fig. 12 which shows the corner of a bag having a valve therein. One of the forms of strips, such as 55 is in position and is shown as extended around the valve lip to strengthen the corner of the bag. The free end 72 of the strip may be secured to the outer wall of the bag by rivets 56.

While various illustrative forms of bags embodying features of the invention have been described in considerable detail and certain sequences of steps in the production of the bags have been set forth it will be understood that various changes in the construction and method followed may be made without departing from the general spirit and scope of the invention.

I claim:

1. A valve bag comprising a gusseted tubular member, a valve formed by an infolded portion of a gusset, a flap formed as an extension of one wall of the bag, one portion of said flap being inserted between the walls of a gusset and means for securing said flap to the opposite wall of the bag.

2. A valve bag comprising a gusseted tubular member, a valve formed by an infolded portion of a gusset, a flap formed as an extension of one wall of the bag, one portion of said flap being inserted between the walls of a gusset, and mechanical fastening elements for securing said flap to the opposite wall of the bag.

3. A valve bag comprising a gusseted tubular member, a valve formed by an infolded portion of a gusset, a flap carried by one wall and projecting beyond the edge of the opposite wall of the bag, said flap being folded over against the said opposite wall with a portion thereof inserted between the walls of a gusset, a strip of yielding material inserted between said flap and said opposite wall, and means for securing said flap, strip and wall together.

4. A valve bag comprising a gusseted tubular member, a valve formed by an infolded portion of a gusset, a flap formed as an extension of a wall of the bag, said flap being folded over against the opposite wall with a portion thereof inserted between the walls of a gusset, a strip of yielding material inserted between said flap and said opposite wall and folded over the end of said wall, and staples passed through said flap, strip and wall for securing the same together, said staples having their free, bent ends in contact with the inner fold of said strip.

5. A valve bag comprising a gusseted tubular member, a valve formed by an infolded portion of a gusset, a flap formed as an extension of one wall of the bag folded over a portion of the opposite wall with a portion thereof inserted between the walls of a gusset, means for securing said flap to said opposite wall, and means for securing the

free, inner corners of said valve to the adjacent bag walls.

6. A valve bag comprising a gusseted tubular member, a valve formed by an infolded portion of a gusset, a flap formed as an extension of one wall of the bag folded over a portion of the opposite wall with a portion thereof inserted between the walls of a gusset, a strip of yielding material between said flap and said opposite wall, said strip being extended around the upper end of said valve to the other wall, means for securing said flap and strip to said opposite wall, and means for securing the free end of said strip to the adjacent bag wall.

7. A method of making gusseted valve bags which comprises forming a continuous tube with gusseted sides severing said tube into sections, each section being formed with a flap as an extension of a wall at one end adapted to be folded over the end of the opposite wall, slitting each tube section longitudinally thereof to provide a shoulder adjacent one end of the flap, folding the gusset inwardly at the end of the section to form an inwardly extending valve, folding the flap over the end of the opposite wall with said shoulder inserted between the walls of a gusset, and securing the flap to said opposite wall.

8. A method of making gusseted valve bags which comprises forming a continuous tube with gusseted sides, severing said tubes without waste into sections of desired length each section being formed with a flap extending from a wall at each end, the flaps at the two ends being extended from the same wall, slitting each section longitudinally adjacent one end of each flap, folding one of the gussets inwardly at both ends to form two inwardly extending valves, folding the flaps over the opposite walls with portions thereof inserted between the walls of a gusset, and fastening the flaps to said opposite walls.

9. A valve bag comprising a gusseted tubular member, a valve formed at each end of said member by infolded portions of the same gusset, and flaps formed as extensions at each end of one wall of the bag folded over and secured to the opposite wall with portions thereof inserted between the walls of a gusset.

10. A valve bag comprising a gusseted multi-wall tubular member, a valve formed by an infolded portion of a gusset, a flap carried as an extension of one side of said multi-wall member and folded over the end of the opposite side with a portion thereof inserted between the walls of a gusset, and means for securing said flap to said opposite side.

11. A valve bag comprising a gusseted multi-wall tubular member, a valve formed by an infolded portion of a gusset, a flap carried as an extension of one side of said multi-wall member and folded over the end of the opposite side with a portion thereof inserted between the walls of a gusset, a reinforcing member bent around the end of said flap and around the end of said opposite side, and fastening devices passed through said flap, member and opposite side to provide a lapped joint.

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