The present invention relates to improvements in bags of the self-closing type or so-called "valve-bags" i.e., bags provided with a filling opening formed between the wall of the bag and a portion lining said wall at this point so as to provide a pair of lips or like elements which may be widened for inserting into the interior of the bag a tube used for the filling operation, both said lips being applied against each other under the weight of the material contained in the bag when the filling tube is removed. Bags of this kind may be made of paper, cloth and generally of any material adapted to the manufacture of bags.

One object of the invention is to provide such a bag that the filling tube may be used for wholly supporting the bag during the filling operation. For this purpose and according to the invention, the bag is provided with at least two valves facing each other in such a manner that they may be passed through by the filling tube which may thus support the whole weight of the bag.

Another object of the invention is to provide for the easy escape of the air contained in the bag during the filling operation as well as under the effect of shocks to which the bag may be subjected when filled. The above mentioned arrangement of two valves facing each other greatly furthers the easy escape of the air, due to the fact that the walls are pulled downwardly by the weight of the material discharged into the bag and consequently a rather large opening will be formed between the lowest portion of the horizontal filling tube supporting the bag and the lower lip of each valve, whereby the air may escape freely through said opening. It will thus be possible to fill in a few seconds a bag adapted to contain 50 kgs. of cement by means of a filling machine requiring but a small power. Hereinbefore, it was necessary to use a filling machine requiring a great expense of power because no sufficient means was provided for the escape of the air and consequently the latter was compressed within the bag and counteracted the discharge of the material out of the filling tube.

On the other hand, the filled bag contains still a certain amount of air which will cause the bursting out of the bag when it becomes suddenly compressed, for example under the effect of a shock. In order to avoid this undesirable bursting, a tongue of corrugated pasteboard or similar element provided with a plurality of small channels is associated with one of the lips of the valves in such a manner that said small channels are open, on the one hand, in the interior of the bag and, on the other hand, between said two lips whose close contact provides for the closing of the bag. In this manner, the bag will be normally thoroughly closed and when the air contained therein becomes suddenly compressed, it will rush into the said channels and enters tangentially between the two lips which are thus readily spaced apart, whereby the air may freely escape outwardly. It draws with it but small jets of material when the latter is in the powder state and the bursting out of the bag is thus avoided. This effect is further increased by the provision of similar devices at the end opposite the end provided with the filling valves which former end is more particularly exposed to bursting because it forms the top of the bag.

Other objects and characteristic features of the bag according to the invention will appear from the following description given with reference to the annexed drawings, which show more particularly by way of example a form of bag manufactured according to the invention.

In the appended drawings which are given by way of example:

Fig. 1 is a perspective view of a sack with parts broken away showing the air valve.

Fig. 2 is a section on the line 2—2 of Fig. 3.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Figs. 4, 5, 6, 7, 8 and 9 show the sack in the different stages of its manufacture, the paper tube being flattened upon itself according to the plane of the figure.

Figs. 10, 11, 12, 13 and 14 show in like manner the manufacture of the end of the bag opposite the end provided with the filling valves.

In the constructional form herein represented, the sack comprises paper walls having the opening R S T U upon the small sides of which are mounted by suitable means two corrugated tongues I K L M each of which extends for about 2 centimeters into the opening R S T U. The walls of the sack are folded on the lines R S and T U and are turned down and pasted to a separate tongue F H P V which is folded on the line E G and is pasted to the part already folded.

It will be observed that by pressing upon the middle of the parts H F Y and G E X, the tongue F H P V will be sufficiently separated from the tongues I K L M to allow the insertion of a filling tube. When the sack has been filled and the said tube removed, the material in the sack will press the tongues I K L M against the end F H P V, thus closing the sack. The corrugations of the tongues are too small to allow the
material to escape from the sack, but they allow the air to escape in case of shocks.

The sack is manufactured in the following manner, starting from a cylindrical paper tube open at the ends and flattened down.

**First operation (Fig. 1).**—The sack is opened on the line X Y (Figs. 4 and 5) and the parts A X C and B Y D are folded down.

**Second operation (Fig. 5).**—The part E C D F is folded upon X Y E F, the fold being made on the line E F, and the part A G B is folded upon X Y G H, the fold being made on the line G H. In this manner an opening R S T U is formed within which the sack may be filled.

**Third operation (Fig. 6).**—The folds E F and G H being thus formed, the operator inserts a strip of heavy paper, coated with paste, below R G F E; this strip projects from the line R T by about 2 centimeters, the part thus extending at J K N L being corrugated; such corrugations are the same as are employed for the corrugated pasteboard in current use. A like strip is pasted in the same manner below S H U F.

**Fourth operation (Fig. 7).**—Between the lines E F and G H there is placed a rectangular paper strip O P Q V whose width is 2 cm. less than the distance between the lines E F and G H, the end C Q being placed above H F. This paper strip, which is coated with paste on its upper side, covers the two strips I K L M.

**Fifth operation (Fig. 8).**—The part A B G H is folded at G H A B upon the paste-covered strip O P Q V, the fold being made at G H; the part C D E F is folded down upon E C D F.

**Sixth operation (Fig. 9).**—The part of the strip O P Q V which projects from the line E G (Fig. 8) is folded down and pasted to the already folded parts E F C D and G H A B, folding along the line E G, and the end P V is placed at O Q.

This will afford a sack of the kind above specified.

The two end parts of the sack may be formed as above described, or if desired, only one end may be thus formed, and the other end of the paper tube is closed in such manner as to provide a lug by which the filled sack may be readily carried, while leaving an opening for the discharge of air.

The paper tube for the sack is placed flatwise, as before, and is folded on the line X Y (Fig. 10), and it is then opened in such manner that the lines A’ B’ C’ D’ form a rectangle (Fig. 11). The operator then secures in any suitable manner under the triangular parts X’ A’ C’ and Y’ D’ B’ two tongues L’ consisting for example of flexible pasteboard or like material which project respectively from the lines A’ C’ and B’ D’ at a suitable distance, and he then folds together the parts X’ A’ B’ Y’ and X’ C’ D’ Y’ (Fig. 12). He then places a paste-covered paper band of sufficient strength R’ J’ W’ Z’ below the part X’ A’ B’ Y’ and on the line W’ Z’ (Fig. 13), or folds the said band about C’ D’ upon the side X’ C’ D’ Y’. To provide a greater strength and to add to the pasting effect, the operator may make a horizontal row of stitches by machine on the K’ K line (Fig. 14) or may place suitable clasps upon the said line.

The tongues L’ form valves by allowing the air to escape at the corners, and the sack can be readily seized by its strengthened part C’ D’ J’ R’.

If the sack is to be tightly closed, it will suffice to employ but a single tongue, and this may consist of a thick and very flexible sheet of paper which is not corrugated. Herein, as shown in Figs. 7 and 8, the part O O of the band O P Q V will exactly cover the part S H U F; the other end of the band O P Q V is triangular and it is applied and pasted upon the part H F Y, thus entirely filling the tube. Only a single opening is provided at G E for the insertion of a filling tube. When the filled sack is inverted, the internal tongue will fit upon the end portion formed by the hand O P Q V and will tightly close the opening.

Obviously, the said invention is not limited to the constructions herein described and represented, which are given solely by way of example. For instance, the sack may comprise lateral expansions or bellows portions, and herein the internal corner of the bellows must be folded out so that the sack is to be opened on the line X Y (Fig. 5), and this arrangement is also comprised in the invention.

The corrugated tongues of the valve flaps K L in addition to providing channels to allow the escape of air while preventing the escape of the cement or other contents of the bag, serve as a cushioning means to absorb the shock against the valve end of the bag during the handling of the bag when filled.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a valve bag made of material not allowing air to escape therethrough and comprising at least a filling valve provided at one end of the bag, the provision of small air ducts in said end and arranged opposite said filling valve, whereby the air still contained within the bag may escape outwardly under the effect of a shock without causing the bursting of said bag.

2. In a valve bag as claimed in claim 1, the further feature residing in that said air ducts are formed between the walls of an inwardly tucked corner of said end and arranged opposite said filling valve, the two sides of the bag being attached together in the vicinity of the bottom of said inwardly tucked corner, whereby is provided both small apertures allowing escape of the air and a lug or grip for seizing the bag.

3. In a valve bag, the provision of a strip or corrugated material, i.e. of material provided with projections so as to form a plurality of small rigid channels, attached to the filling opening and prolonging the same inwardly, whereby the air contained within the bag may freely escape through said channels while the suckered material is substantially prevented from escaping.

4. In a valve bag, the provision of a strip or corrugated material, i.e. of material provided with projections, so as to form a plurality of small rigid channels, attached to the filling opening and prolonging the same inwardly, and so disposed that said channels open in said filling opening, whereby the air contained within the bag may freely escape through said channels while the suckered material is substantially prevented from escaping.

5. In a valve bag, the provision of two valves, one of which has the walls thereof adapted to closely fit together so as to close the passage to substantially prevent the sucked material from escaping and the other valve comprising a plurality of small channels leading into the interior of the bag.

6. A valve bag comprising a tube, two inwardly folded corners on one end of the tube, so as to...
form two opposite triangular flaps, the transverse edges of the sides of the bag being tucked inwardly at substantially 90° and secured together, a tongue of corrugated pasteboard secured under each of said flaps in such a manner that the channels formed by said corrugations are disposed longitudinally of the valve and open in the space between said flaps and said tucked edges.

7. In a multi-ply bag of the class described having a satchel type bottom formed in one end and a valve provided in one end of the satchel bottom, the improvement which comprises a reinforcing strip extending over the outer side of the side flaps of the satchel bottom and extending over the portion of the under side of said side flaps which constitutes the upper wall of said valve.

8. In a multi-ply bag of the class described having a satchel type bottom having a filling valve in one end of said bottom, the improvement which comprises a strip folded over the outer edge of the top wall of the valve and pasted to the portions of the under and outer sides of the side flaps of the satchel bottom that constitutes the upper wall of the valve.

9. In a multi-ply bag of the class described having a satchel type bottom formed on one of its ends and a valve in one end of the satchel bottom, the improvement which comprises a valve provided in the other end of the satchel bottom, and a reinforcing strip folded over at least one valve end of the side flaps and pasted to substantially the entire areas of the outer and inner sides of the valve flaps.

10. In a multi-ply bag of the class described having a satchel type of bottom formed on one of its ends, the improvement which comprises a reinforcing strip extending over the outer and inner sides of the side flaps with the portion of the strip extending over the underside of the side flaps having its ends extending over portions of the top sides of both of the end flaps of the satchel bottom, said strip being secured to the side flaps throughout substantially their length.

11. In a multi-ply bag of the class described having a satchel type bottom on one of its ends and a valve provided in one end of the satchel bottom, the improvement which comprises a reinforcing strip extending over at least one side of the satchel bottom and attached to both of the side flaps thereof, one end of said strip constituting a portion of the top wall of said valve.

12. In a multi-ply bag of the class described having one end provided with a satchel type bottom and a valve provided in one end of the satchel bottom, the improvement which comprises a valve formed in the other end of the satchel bottom, and a reinforcing strip pasted over the underside of the satchel bottom and attached to both of the side flaps, the ends of said strip constituting portions of the top walls of said valves.

13. In a valve bag comprising a filling valve formed adjacent one end by a passageway between two lip-like members obtained by tucking the walls, a second valve substantially opposite the first one in order that a suitable filling tube may be inserted through both valves so that it will serve at the same time to support the bag during the filling operation, and means for strengthening the bottom adjacent said valves, the improvement wherein the inner one of said lip-like members of each valve is formed by flaps obtained by tucking inwardly both corners of a flattened down tube and the outer one by the bottom of the bag formed by tucking inwardly at 90° the transverse edges of the sides of the bag and securing said edges together, the provision of a reinforcing strip passed through said passageways secured to the inner face of said bottom, tucked back over and secured to the outer face of the bottom.

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