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SEALING MEANS FOR VALVE BAGS

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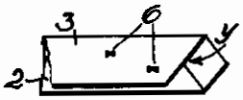

Fig. 6

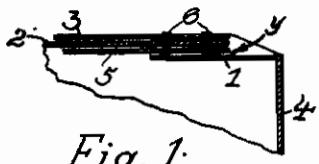

Fig. 1.

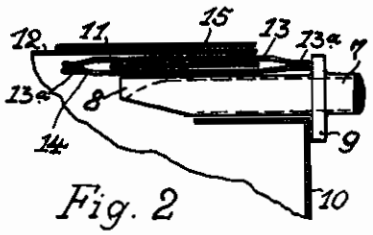

Fig. 2

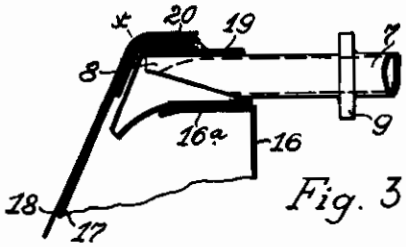

Fig. 3

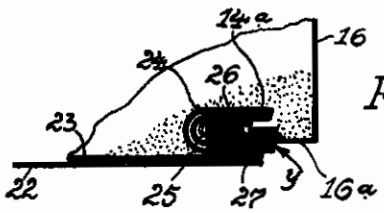

Fig. 4

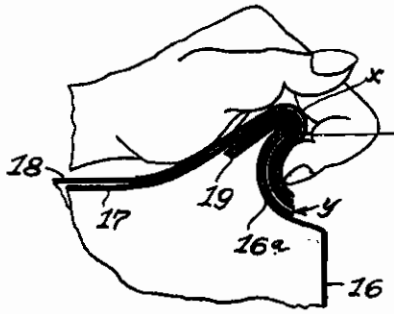

Fig. 5

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SEALING MEANS FOR VALVE BAGS

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The invention relates to a sealing means for valve bags of paper and similar material, such as are used for holding cement, lime, phosphate, and the like.

The main object of the invention is to provide means for sealing the valve of the filled bag in such way that it cannot be indiscernably opened and closed again by an unauthorized person.

Another object of the invention is the provision of simple and efficient means for sealing the valve of the bag without riveting and sticking nor using lead and adhesive.

Another object of the invention is to provide sealing means having no separate parts which might be lost before the bag is filled.

A further object of the invention is the provision of sealing means exclusively inside the bag, no parts extending from the valve to the outside which might be torn off when the filled bag is carried and conveyed.

Another object of the invention is to provide a bag of the above type which may be produced at a minimum cost and which may be filled, sealed, and opened again with the minimum expenditure of labor and time.

The invention consists of means for sealing a bag after being filled, said means consisting of a flexible member of inelastic material, said member being arranged in a valve channel of the bag and extending into the interior of the bag. The invention also consists in providing a paper enclosure for such inelastic material, and combining the so enclosed strip of metal or the like with the valve of a bag. The invention may be embodied in various forms of bag openings or valves, as will hereafter appear in connection with the embodiments disclosed.

The invention will be more fully described hereinafter in connection with the embodiments, such embodiments will be shown in the drawings, and the invention will be finally claimed hereafter.

In the accompanying drawings:

Figure 1 is a section through the valve corner of a bag having a crossed bottom and a valve in one corner of the latter;

Figure 2 shows another constructional example of a valve bag fitted on a filling nozzle;

Figure 3 shows a superior corner of a bag having a valve at each corner, the bag being shown during the withdrawal from the filling nozzle;

Figure 4 shows the inferior corner of the bag according to Figure 3;

Figure 5 shows the sealing of the upper valve of the bag illustrated in Figures 3 and 4 in another manner; and

Figure 6 is a plan view of Figure 1.

Similar characters of reference indicate corresponding parts throughout the various views.

In the drawings, the adhesive between the individual layers of paper is indicated in dotted lines. When considering the drawing, it is necessary to take into account the distortion from the actual form which is due to the fact that spaces are shown between the layers of paper lying one upon the other for purposes of greater clarity. The parts of the bag which are shown as simple layers of paper are in many cases formed of multiple layers, it being possible for the individual plies of one layer to consist of different types of paper and the like.

Referring to the drawings, and more particularly to Figure 1, the valve aperture (indicated by the arrow *y*) of the bag **4** is provided with a crossed bottom of the so called diamond bottom type by the formation of the turned-in corner part **1** and the overlapping of the flaps **2** and **3**, that it extends into the interior of the bag over the inner transverse edge of the turned-in corner part **1**. Above the turned-in corner part, a plate **5**, which consists of soft lead, a flexible but inelastic material, is connected by the rivet or rivets **6** to the crossed bottom formed by the flaps **2** and **3**.

In the embodiment shown in Figure 2, the bag destined to be filled is pushed on to the nozzle **7** which serves to fill the bag, and this has a sharp upper edge **8** at the forward end; the nozzle **7** being inserted until its collar **8** abuts against the bag **10** so that the bag hangs on the nozzle **7**. The bag **10** also has a crossed bottom formed by the flaps **11** and **12**. A tongue consisting of two paper sheets **13** and **14**, between which a soft lead strip **15** is disposed, is inserted in the valve aperture. The ends of the sheets **13** and **14** are suitably joined by adhesive **13***a*.

In the embodiment illustrated in Figures 3 and 4, a valve is provided at every corner. Thus the operator need not seek the corner of the bag which is to be fitted on the nozzle. Preferably, however, one of the valves of the superior bottom is to be used in filling the bag, the valves of the inferior bottom therefore being of a different construction. The superior diamond bottom formed by the flaps **17** and **18** as shown in Figure 3, has a sleeve **19** of paper fitted in the valve aperture, the outer sides of the said sleeve being stuck to the said diamond bottom lying above it and to the turned-in corner part situ-

ated below it, as shown in Figure 3. The nozzle 7 rests on the part 10*a* of the bag.

An inferior diamond bottom, as shown in Figure 4, is formed by the flaps 22 and 23. The nozzle 7 rests on the part 16*a* of the bag 16. A paper tube 24 consisting of two layers is fitted in the valve conduit. The turned-in corner part 16*a* of the bag 16 fits into this tube 24. Between the inner wall of the corner part 16*a*, and the wall 24*a* of the tube 24, a bent inelastic soft metal strip 25 is placed, held in position by pieces of paper 26 and 27.

The plate 5, the sheets 13 and 14, the sleeve 19 and the tube 24 are of equal width to the valve conduit when the latter is pressed flat and therefore cover the entire width of that part of the turned-in corner which is situated between the flaps of the crossed or diamond bottom. The metal parts 15, 20, and 25 are, on the other hand, considerably narrower than this part of the turned-in corner.

For filling, each of the bags mentioned before is fitted to the nozzle of a filling device regardless of its particular construction by introducing this nozzle into the valve aperture indicated by the arrow *y* in Figure 1. Figure 2 shows how one of the bags hangs on the nozzle 7 during the filling. During withdrawal from the nozzle 7 after filling has been completed, the bag is, as shown in Figure 3, forcibly bent downwards by a quick blow or pressure on the upper diamond bottom shortly before it completely leaves the nozzle so that this upper bottom is folded above the transverse line indicated by *x* in Figure 3. For this purpose, the filling nozzle 7 is advantageously provided on its upper side at the forward end with the projection 8. During this folding of the bottom, the metal insertion is also sharply bent over, through about 90° in the downward direction. Since it is constructed of inelastic material, it retains the bend imparted to it and remains lying transversely in front of the inner mouth of the valve conduit. When the plate 5 is so manipulated, it thus shuts off the conduit itself. When the narrow strips 15 and 20 are so manipulated, they carry round with them the paper sheets or paper sleeves connected thereto and hold them in the bent-over position, so that the valve conduit is closed in the inward direction by these sheets or sleeves. A particularly complete closure is effected when using a sleeve or sleeves 19, as shown in Figure 3.

If the bag is tilted over after it has been completely removed from the nozzle 7 by which it is carried during the filling, the charged material further bends over the metal plate or the metal strip 5 already bent over through about 90°, or the strip 15 together with the paper sheets 13 and 14, or the strip 28 with paper sleeve 19 secured thereto, until they bear against the turned-in corner part from below when thus bent completely through 180°.

The valve condult then remains completely clean on the outside, because any material remaining therein during filling falls out immediately. This is particularly important in the case of hygroscopic material, because such material forms with the water absorbed from the air a solution or paste which attacks the paper the bag is formed of and may destroy the bag valve after a short time. Such destruction is not possible according to the invention, because neither adhesive moisture nor material remains in the outer part of the valve conduit.

For sealing the opposite valve of the superior crossed bottom, the operator passes his hand over the bottom, so as to press the valve conduit flat. He then folds the bottom of the bag, as shown in Figure 5, by clenching his hand and thus bending in the entire valve corner. The insertion and the lower valve lip thus are grasped reliably and bent over through practically 180° without difficulty. This bending-in can always be carried out, as the bag is never so tightly filled as to render it impossible.

The valves of the interior crossed bottom are not yet sealed during the withdrawal of the bag from the filling nozzle. They are closed by the filling material acting upon them by pressure, or may be sealed in the same manner as mentioned before by the operator bending-in the valve corner after the bag being turned so that the inferior bottom is directed upwards. If the bag is then turned again to its initial position, i. e., the inferior bottom again bearing the bag, the paper tubes 24 and the metal strips 25 are automatically bent to the position shown in Figure 4.

The invention has the advantage that no special manipulation is required for closing the valve during filling, if care is taken that the valve sliding or falling off the filling nozzle 7 is properly tilted over.

Instead of making the strips 5, 15, 20 and 25 of soft lead, they may consist of other metal or other material, the elasticity of which is so small that the folding-in of the bottom of the bag during the removal of the filled bag from the filling nozzle 7 produces a permanent bend because the elastic limit is exceeded, while on the other hand, the strength must be so great that it is capable of overcoming the elastic action of the folded-over paper sheets or paper sleeves. This is facilitated by the fact that the plate of metal or other inelastic material is of considerably greater dimensions than the paper. At the most, two layers of paper have to be bent over, since the sleeves 19 preferably comprise only one layer, and the tubes 24 two layers, at least in their part projecting freely into the interior of the bag.

In all the constructional examples described in the foregoing, the metal insertion itself is not secured by adhesive to the paper layers connected thereto, but is disposed between the paper layers or under auxiliary paper sheets 26 and 27, because the adhesives generally employed for purposes of economy, such as water glass, glue and the like, do not adhere to metal with sufficient reliability. However, if bitumen or similar adhesive is employed, or if the insertions themselves consist of another material which sticks readily, instead of metal, sticking may be effected directly between the paper of the wall of the bag or of the closing part, of the sheet or of the sleeve, and the insertion.

In the same way as such bags are frequently constructed of water-tight and vapor-tight material, for example with insertions of metal foil, asphalt paper, cellulose glass and the like, the sheets sealing the valve may also consist of such material, whereby a complete water-tight or vapor-tight bag is produced.

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