SELF-SEALING VALVES FOR MULTIWALL BAGS

INVENTORS

JOHN W. MEANS
KENNETH L. MOORE

BY N. BRITTON MOORE
ATTORNEY
SELF-SEALING VALVES FOR MULTIWALL BAGS

John W. Means, Cleveland Heights, Ohio, and Kenneth L. Moore, East Aurora, N.Y., assignors to Chase Bag Company, a corporation of Delaware

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5 Claims. (Cl. 229—62.5)

The present invention relates to self-sealing valves for multi-wall bags and it consists in the combinations, constructions and arrangements of parts herein described and claimed.

Generally there is provided a shipping bag formed of two or more plys of paper or other relatively non-elastic sheet material, the bag being closed at its upper and lower ends either by folding the upper and lower portions of the front and rear walls of the bag toward each other in overlapping arrangement with the inturnd portions pasted or otherwise adhered to each other, or by bringing the upper and lower portions of the front and rear walls together, folding a length of same over said edges and then joining the edges and the tape by sewing in conventional manner. A filling opening is formed by inwardly and downwardly folding the upper portion of an end wall of the bag in such manner as to define an inwardly and horizontally disposed sleeve-like portion into which a filling nozzle can be inserted in known manner. The novelty of the present disclosure resides primarily in the provision of a tubular extension of the filling portion of the bag, said extension being preferably constituted by a section of a relatively thin polyethylene tube, thermoplastic welded or adhesively secured at its outer end to the inner margin of the filling opening. The sleeve is desirably slit longitudinally at its lower inner end to facilitate the introduction of fluent material into the bag.

The sleeve formed of a section of polyethylene tube is best employed with a bag of the pasted-end type. However, in a bag of the open-end type, the sleeve may conveniently be formed of a piece of polyethylene joined by an adhesive or by thermoplastic welding along one edge to a piece of paper, which piece of paper can be inserted between the inturnd edges of the bag plys defining the lower portion of the filling opening. The pieces of paper and attached polyethylene are then folded upwardly about their common midline and their upper edges are caught in and sewed into the upper bag closing seam.

Self-sealing valves of the prior art have usually been made of paper, which to provide the necessary strength, has necessarily been somewhat stiff, resulting in an unreliable closing and an often ineffective seal after closing.

It is accordingly a principal object of the invention to provide a self-sealing valve for bags of the type disclosed, which is both highly reliable in closing and highly effective in producing a leakproof seal, due to the extreme flexibility of the relatively thin polyethylene sheet material which readily folds over on itself or crumples up upon slight back pressure from the contents of the filled bag.

It is another object to provide a self-sealing valve which can be simply and economically formed from a section of polyethylene tubing.

It is a further object to provide a self-sealing valve for multi-wall bags, in which the valve element comprises a piece of sheet plastic adhered to a piece of paper, wherein the paper portion produces an anchoring and attaching base for facilitating insertion and joining of the valve to the bag filling opening.

It also is an object to provide a device of the character set forth which is simple in construction, inexpensive to manufacture and yet effective and efficient in use.

Other and further objects of the invention will become apparent from a reading of the following specification taken in conjunction with the drawings, in which:

FIGURE 1 is a fragmentary perspective view of a preferred embodiment of the invention.

FIGURE 2 is a front elevational view partly broken away, of the showing of FIGURE 1.

FIGURE 3 is a perspective view of the disclosure of FIGURES 1 and 2 immediately prior to closing the upper end of the bag by sewing.

FIGURE 4 is a perspective view showing the assembling step preceding the folding illustrated in FIGURE 3.

FIGURE 5 is a perspective view of the valve element.

FIGURE 6 is a perspective view of the valve element of FIGURE 5 exploded to show its component parts.

FIGURE 7 is a perspective view showing the valve element with its parts in their relative functional positions.

FIGURE 8 is a perspective view of a modified form of valve element.

FIGURE 9 is a fragmentary perspective view of a pasted bag incorporating the valve element of FIGURE 8, and over which a polyethylene tube is placed.

FIGURE 10 is a view similar to FIGURE 9 but showing the valve in closed or sealing condition after the filling of the bag.

With reference now to FIGURES 1 through 7 of the drawings, the numeral 10 generally designates a shipping bag of the type commonly used for shipping Portland cement or other similar comminuted materials. Bag 10 is herein disclosed as comprising four plys of paper 11 through 14, said bag having a front wall 15, a rear wall 16 and a pair of side walls 17 (only one of which is herein disclosed). The side walls 17 are medially creased at 18 to define a gusset so that the side walls can be infolded as partially indicated in FIGURE 3 to permit collapsing of the bag 10 for space saving during shipping or storage of the empty bags.

The upper portion of the side walls 17 is also horizontally creased at 19 so that the portions 20 and 21 of the side wall 17 can be folded inwardly and downwardly (as best seen in FIGURES 2 and 3) to constitute the nozzle receiving portion of the valve hereinafter more fully described.

The valve member proper is disclosed best in FIGURES 5 and 6. A sheet of polyethylene plastic material of a thickness of one to two mils, with one and one-half mils having been found suitable for most uses, is designated by the numeral 22. Sheet 22 is adhered along its outer margin 23 in FIGURE 2, or lower margin in FIGURES 5 and 6 by thermoplastic welding or by the use of a suitable adhesive, to the longer base of the trapezoidal piece of paper 24. The piece of paper 24 serves as a handing and attaching element for the valve member, being insertable between the plys constituting the small panels 20 and 21 by which it is temporarily held against displacement as the top of the bag is closed into the positions of the panels shown in FIGURE 1. Thereafter the upper edges of the front and rear panels 15 and 16 and the upper extremities of the inturnd panels 20 and 21 are embraced by a closing and sealing strip 25, the assemblage being completed by sewing to produce the stitches indicated at 26. Prior to assembly the valve element 22 is desirably slit at 27 to facilitate the filling operation.

In the species of FIGURES 8 through 10, the numeral 30 generally designates a bag of the pasted closure type. Bag 30 is likewise formed of a plurality of plys of paper or similar sheet material, and has its rear wall 32 folded forwardly and downwardly at its upper end while wall 31 folded rearwardly and downwardly to overlap the margin of the forwardly extending portion of the rear wall 32 along the pasted seam indicated at 33.

The end wall 34 is creased at 35 to form an infolding
gusset for flat packing of the empty bag and with further fold lines 36 and 37 to define the downwardly and inwardly folding panels 38 and 39, which when infolded define the floor and side walls of the nozzle receiving portion of the filling valve next to be described.

The valve element proper is a sleeve 40 (FIG. 8) which may conveniently be cut from a continuous tube of 1 to 2 mil polyethylene plastic. The section 40 is inserted into the nozzle receiving opening formed by the panels 38 and 39 and the overlying turned upper end edges of the front and rear panels 31 and 32. The inserted sleeve 40 is thermoplastically welded or adhesively secured in place, as along the adherence line 41, with the unattached end 42 of sleeve extending well beyond the inner margin of the nozzle receiving portion of the bag. Sleeve 40 is also desirably slit longitudinally along the free lower portion thereof to facilitate filling of the bag.

While but certain forms of the invention have been shown and described herein, it will be readily apparent to those skilled in the art that many minor modifications may be made without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. In a bag formed of at least two plies of relatively non-elastic and somewhat stiff sheet material and having the upper and lower ends thereof closed by permanently joined forwardly and rearwardly turned upper and lower portions of the front and rear walls respectively of said bag, said bag having a horizontally extending sleeve-like filling portion at an upper corner thereof defined by a downwardly and inwardly folded upper portion of a side wall and the overlying bag-closing upper portions of the front and rear walls, the improvement comprising: a sleeve attached to said sleeve-like portion and constituting an inwardly orientation thereof, whereby said sleeve will readily crumple up or fold upon itself from slight back pressures from the bag filling fluent material to provide an effective and reliable bag sealing valve, said sleeve being a piece of highly flexible tough sheet material fixed adjacent its outer edge to a piece of somewhat stiff sheet material with a major portion of said flexible sheet projecting inwardly of said stiff sheet material and constituting the entire inner end portion of said sleeve, said pieces being folded upwardly about a common mid-line, and said piece of relatively stiff material being substantially entirely inserted between plies of the portions of said bag defining said sleeve-like filling portion.

2. Structure according to claim 1, said sleeve being provided with a slit in its lower inner portion to facilitate filling of said bag.

3. Structure according to claim 1, said sleeve being formed of a moisture-resistant material thereby to protect hygroscopic filling substances.

4. Structure according to claim 1, said material being polyethylene.

5. Structure according to claim 4, wherein the upper margins of said pieces are sewn into a seam by which the upper end of said bag is closed.

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