Nov. 30, 1937. J. W. WINSKILL 2,100,828

MULTI-PLY PAPER SACK

Filed Feb. 27, 1937

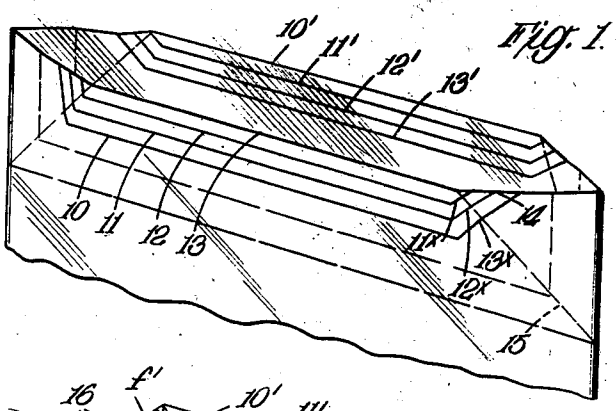


Fig. 1.

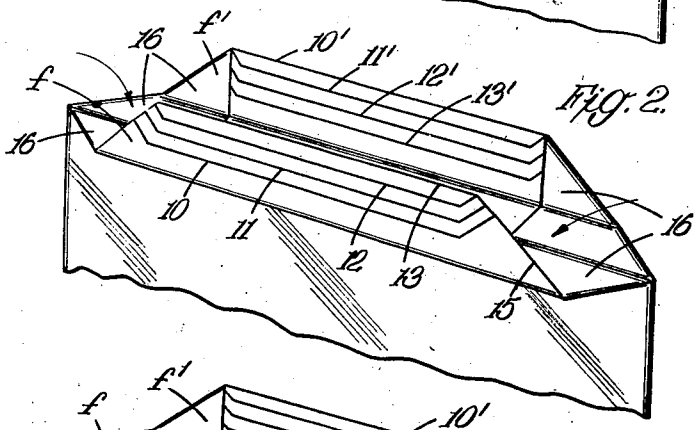


Fig. 2.

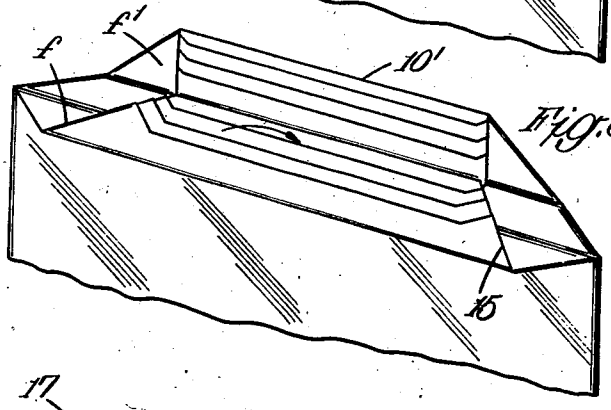


Fig. 3.

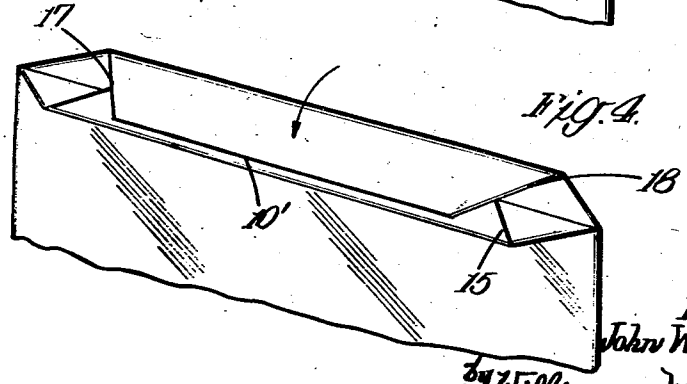


Fig. 4.

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Patented Nov. 30, 1937 2,100,828

UNITED STATES PATENT OFFICE

2,100,828

MULTI-PLY PAPER SACK

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Application February 27, 1937, Serial No. 128,257
In Great Britain February 3, 1936

3 Claims. (Cl. 229—55)

This invention relates to multi-ply paper sacks, more particularly for heavy duty such as the packing of cement and the like materials, and has particular reference to the formation of the end closure of such sacks.

In order to strengthen the end closure sufficiently to render stapling or sewing unnecessary, proposals have been made to cut the ends of the plies stepwise in reversed order on opposite sides of the sack so that when the side flaps are folded over to form the diamond folded end all of the plies take part in the glued joint.

An object of the present invention is to provide an improved end closure of this type in which there shall be substantially no exposed cut edges.

A further object is to form the stepwise cuts in such a way that the parts of the end closure adjacent the valve opening will possess the necessary strength to enable the bag to be suspended on the filling spout with less liability than heretofore to tear.

With these and other objects in view, according to the present invention the stepwise cuts on opposite sides of the bag run parallel over the greater part of their length, but in place of extending straight through to the edges of the sack the cuts are turned in the direction of the ends of the plies in such a way that they cross the diagonal folds when the diamond fold is made. This results in a successive reduction in the number of plies at the valve opening instead of leaving all the edges of the plies coinciding at that part. In the latter case there would be a large number of thicknesses of paper, the edges of which would form a pronounced line of demarcation and the greater part of the bending which occurs when the sack is suspended on the filling nozzle would take place on this line. By turning the cuts so as to cross the diagonal folds the number of plies in the fold is progressively reduced, leaving the outer part of the valve opening pliable and with no single line along which the whole or most of the bending would occur.

Moreover at the place of maximum stress on the bag during filling, the outerside flap is glued to each ply of the innerside flap. Also, when the end closure is complete, there are substantially no exposed cut edges in the valve opening, and in these multi-ply sacks a tear usually begins at an exposed edge.

The invention will be more fully understood by reference to the accompanying drawing, in which:—

Fig. 1 shows the open end of the bag tube before making the diamond fold end closure;

Fig. 2 shows the end closure partially made by folding in the ends of the edges of the bag tube;

Figs. 3 and 4 show further and final stages in which first one and then the other of the longitudinal flaps are folded over, the direction of folding being indicated by arrows.

The bag walls have four plies, whose edges are indicated by the reference 10, 10'; 11, 11'; 12, 12'; and 13, 13' respectively.

The overlapping of the ends of the successive plies is effected by removing from the end of each successive ply except the inner end 13 and the outer end 10' a narrow strip extending substantially over the width of the extremity of the overlapping flap of the completed diamond fold; the breadths of the strips removed from the successive plies 12, 11, 10 and 11', 12', 13' respectively increasing successively by equal amounts, so that a substantially equal area of each successive ply is exposed.

The ends of these cuts are not square but are turned towards the ends of the plies preferably at an angle of about 45° as shown at 14, that is to say perpendicular to the diagonal fold 15 of the diamond end closure and it is preferable to arrange these sloped ends 11×, 12×, 13× etc., of the removed portions so that they are bisected by the said diagonal fold 15 and in this case the length of the full breadth of each of the strips removed from plies 10—12, 11'—13', is exactly equal to the length of the straight edges of the overlapping flaps *f*, *f'* of the diamond fold (Fig. 2).

It will be seen that in this case there are no free edges of plies exposed anywhere on the outside when the diamond fold is formed, the diagonal edges 11×—13× being covered by the infolded end parts 16 (Fig. 2); and even within the valve opening which may be at 17 or 18 (Fig. 4) there are substantially no free edges of plies. At the same time the stepped formation of the glued joint between the overlapping flaps of the diamond fold extends over the full width of the straight edge 10' of the overlapping flap of the diamond fold as shown in Fig. 3.

What I claim is:—

1. A multi-ply paper sack comprising a series of nested flattened tubes having a diamond fold end closure comprising side and end flaps joined by diagonal folds, each of said side flaps being cut stepwise in reversed order to the other side flap along lines generally parallel to the ends of the plies over most of the length of said side flaps

and then obliquely to the ends of the plies across the said diagonal folds.

2. A multi-ply paper sack comprising a series of nested flattened tubes having a diamond fold end closure comprising side and end flaps joined in the closed position by diagonal folds, each of said side flaps being cut stepwise in reversed order to the other side flap along lines generally parallel to the ends of the plies over most of the length of said side flaps and then obliquely to the ends of the plies so as to cross the said diagonal folds at approximately right angles thereto.

3. A multi-ply paper sack comprising a series of nested flattened tubes having a diamond fold end closure comprising side and end flaps joined by diagonal folds, the plies in one side flap being cut stepwise from the inner to the outer ply and in the other side flap from the outer to the inner ply along lines substantially parallel to the ends of the plies over most of the length of said side flaps and thence obliquely to the ends of the plies across said diagonal folds, said end flaps being tucked under said side flaps in completing the closure.

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