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R. J. WILLIAMS

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FIG. 1.

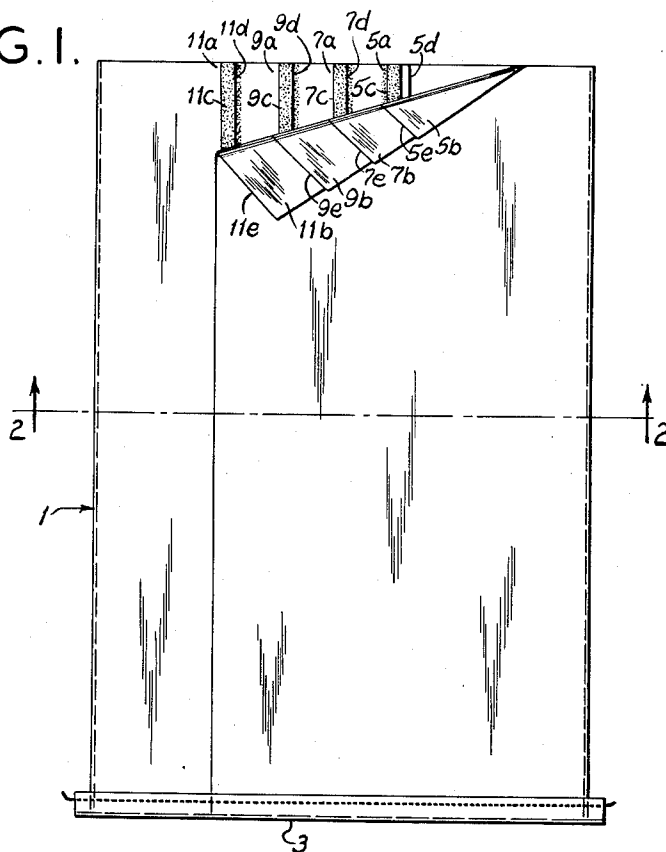


FIG. 2.

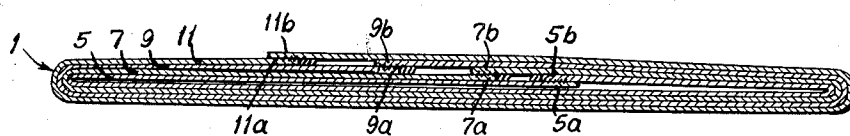
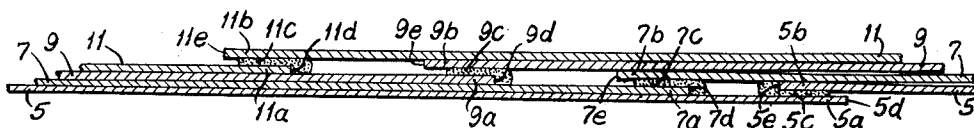


FIG. 3.



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1

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4 Claims. (Cl. 229—55)

This invention relates to bags, and more particularly to multi-ply paper bags.

Among the several objects of the invention may be noted the provision of multi-ply paper bags made from multi-ply paper tubing, in which each ply of the tubing has a longitudinal tube seam constituted by overlapping margins of the respective ply adhered together by a stripe of adhesive, wherein the seam construction is of a special nature making it possible to use a minimum width of seam overlap without sacrificing seam strength or otherwise adversely affecting the finished bag, thereby making it possible to effect great savings in the amount of paper used in the commercial production of such bags; and the provisions of multi-ply paper bags of this class capable of being manufactured by substantially standard processes and by present substantially standard bag machinery so that the savings in paper will not be offset by increased manufacturing costs. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a view in elevation of a bag made in accordance with this invention, with the bag plies shown peeled away to some extent in order to exhibit the seam construction;

Fig. 2 is an enlarged cross-section taken on line 2—2 of Fig. 1 with thicknesses exaggerated; and

Fig. 3 is a further enlarged fragment of Fig. 2, with thicknesses further exaggerated.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings, a specific embodiment of the bag of this invention is shown to comprise a length of multi-ply paper tubing 1 closed at one end by a bag bottom closure 3. As shown, the tubing is of four-ply construction, the inner ply being designated 5, the intermediate ply next to the inner ply being designated 7, the next intermediate ply being designated 9, and the outer ply being designated 11. It will be understood that the tubing may be made of kraft paper or any other type of paper such as is conventionally used for bags, the particular type of paper being relatively unimportant so far as this invention per se is concerned. The bottom closure 3 is shown by way of example as a conventional taped and stitched type of closure well-known in the art, and it will be understood that any other suitable conventional closure may be used, the particular type of closure being relatively unimportant insofar as this invention is concerned. The tubing is shown as plain ungusseted tubing, but it will be understood that the invention is applicable to gusseted tubing.

Each ply of the tubing has a longitudinal seam constituted by overlapping inner and outer marginal portions of the ply adhered together by a stripe of adhesive ex-

2

tending the full length of the seam. The seams are laterally spaced. The overlapping inner and outer marginal portions of the plies 5, 7, 9 and 11 are designated 5a and 5b, 7a and 7b, 9a and 9b, and 11a and 11b, respectively. The stripes of adhesive in the seams of plies 5, 7, 9 and 11 are designated 5c, 7c, 9c and 11c, respectively. The adhesive may be of any suitable conventional type such as is customarily used in making paper bags, for example vegetable or dextrin glue, rubber-base adhesive or the like, the type of adhesive being relatively unimportant as far as the invention is concerned.

A critical element of the invention resides in having the stripe of adhesive 5c in the seam of the inner ply 5 laterally offset from the edge 5d of the inner marginal portion 5a of this ply and of such width as to extend somewhat beyond the edge 5e of the outer marginal portion 5b in the finished bag, and in having the stripe of adhesive 11c in the seam of the outer ply 11 laterally offset from the edge 11e of the outer marginal portion 11b of this ply and of such width as to extend somewhat beyond the edge 11d of the inner marginal portion 11a in the finished bag. This relationship is of utmost importance and cannot be altered. The adhesive extending beyond edge 5e adheres the inner ply 5 and the next ply 7 together along the inner ply seam. The adhesive extending beyond edge 11d adheres the outer ply 11 and ply 9 together along the outer ply seam. As to the intermediate plies 7 and 9, the stripes of adhesive 7c and 9c are shown as laterally offset from the edges 7e and 9e of the outer marginal portions 7b and 9b of these plies and of such width as to extend somewhat beyond the edges 7d and 9d of the inner marginal portions 7a and 9a of these plies in the finished bag. The adhesive extending beyond edge 7d adheres the plies 5 and 7 together along the seam of ply 7. The adhesive extending beyond the edge 9d adheres the plies 9 and 7 together along the seam of ply 9. This relationship may be reversed, i. e., the stripes of adhesive 7c and 9c could be laterally offset from the edges 7d and 9d of the inner marginal portions 7a and 9a and of such width as to extend somewhat beyond the edges 7e and 9e of the outer marginal portions 7b and 9b in the finished bag. As to each ply, the seam overlap (the width of the overlapping inner and outer margins of the ply) is slightly greater than the portion of the width of the adhesive between the margins. It will be understood that all four plies are made from paper web of substantially the same width, and hence the overlap decreases slightly (but inconsequentially) from the inner ply to the outer ply in view of the nested relation of the plies. Preferably substantially the same width of adhesive stripe is used in all four plies.

It will be understood that the showing in Fig. 3 of the adhesive extending beyond edges 5e, 7d, 9d and 11d is exaggerated in thickness in view of the exaggeration of paper thickness and the separation of the plies in order to illustrate the construction.

The manufacture of bags of this invention generally follows standard multi-ply paper bag manufacture practice in which webs of paper equal in number to the number of plies to be had in the finished bags are superposed and formed into tubing in standard tubing apparatus. The apparatus is adjusted to obtain the seam overlap requisite to this invention, and to apply the adhesive stripes to the paper webs in the width and lateral location according to this invention. The tubing is segmented into individual bag lengths, and each such length is provided at least with a bottom closure. It will be understood that in many instances the bags may be valve bags and in such cases will also be provided by the bag manufacturer with top closures.

In the course of the tube-forming operation, the over-

lapping inner and outer marginal portions of each web or ply are pressed together. This squeezes the adhesive between the overlapping inner and outer marginal portions and causes it to spread out laterally. With the stripes of adhesive offset from the edges of the plies in accordance with this invention, it is insured that no adhesive will be exposed inward of the edge 5d of the inner marginal portion of the inner ply, thereby avoiding any sticking together of the front and back of the bag, and it is also insured that no adhesive will be exposed outward of the edge 11e of the outer marginal portion of the outer ply 11, thereby avoiding sticking together of stacked bags and also avoiding unsightly areas of adhesive on the outside of the bag. Some adhesive is squeezed past the edge 5e of the outer marginal portion of the inner ply and past the edges 11d, 9d and 7d of the inner marginal portions of the outer ply 11 and the intermediate plies 7 and 9, thereby adhering together the plies 5, 7, 9 and 11 along the seams. This has an advantage in that it eliminates any necessity for any additional spot pasting of the plies together around the mouth of the bag in the seamed wall of the bag. However, spot pasting of the plies in the other wall of the bag is still necessary. In this respect, it will be understood that it is desirable to have the plies spot-pasted together around and adjacent the mouth of the bag in order that the bag may be readily opened without separation of the plies at the mouth.

By following the present invention, it is possible to manufacture the larger sizes of multi-ply bags in commercial quantity production with a seam overlap width in some instances as low as $\frac{1}{2}$ " and in no case more than approximately $\frac{3}{4}$ ", with the width of the adhesive stripe as applied from $\frac{5}{16}$ " to $\frac{3}{8}$ ", which is adequate to develop full seam strength. Heretofore, it has not been considered commercially practical to use a seam overlap less than one inch wide in such bags. As to smaller size two-ply bags (for example bags 8" wide and 13" long), the seam overlap would be from $\frac{5}{16}$ " to $\frac{1}{2}$ " wide, and the stripe of adhesive approximately $\frac{3}{16}$ " wide. Heretofore, seams for these bags have been at least $\frac{3}{4}$ " wide. The reduction in seam width represents great savings in paper in quantity production.

It will be understood that the four-ply bag herein illustrated is only exemplary of the invention, and that the principles of the invention are applicable to bags having two or more plies. In the case of a two-ply bag, the construction will follow that shown for plies 5 and 11 herein.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A bag comprising a length of multi-ply paper tubing and having at least a bottom closure, each ply of the tubing having a longitudinal tube seam constituted by overlapping inner and outer marginal portions of the ply adhered together in face-to-face relation by a stripe of adhesive extending the full length of the seam, the seams being laterally spaced across the width of the tubing, the edge of the outer marginal portion of the seam for the inner ply being spaced from the edge of the inner marginal portion of the seam for the ply adjacent the inner ply, the edge of the inner marginal portion of seam for the outer ply being spaced from the edge of the outer marginal portion of the seam for the ply adjacent the outer ply, the stripe of adhesive in the seam of the inner ply being laterally offset from the edge of the inner marginal portion of the inner ply seam and being of such width as to extend somewhat beyond the edge of the outer marginal portion of the inner ply seam, the stripe of adhesive in the

seam of the outer ply being laterally offset from the edge of the outer marginal portion of the outer ply seam and being of such width as to extend somewhat beyond the edge of the inner marginal portion of the outer ply seam, whereby the inner marginal portion of the inner ply projects on the inside of the bag beyond the adhesive in the inner ply seam and the outer marginal portion of the outer ply projects on the outside of the bag beyond the adhesive in the outer ply seam, and the plies are adhered together along the seams.

2. A bag comprising a length of multi-ply paper tubing having an inner ply, at least one intermediate ply, and an outer ply, and having at least a bottom closure, each ply of the tubing having a longitudinal tube seam constituted by overlapping inner and outer marginal portions of the ply adhered together in face-to-face relation by a stripe of adhesive extending the full length of the seam, the seams being laterally spaced across the width of the tubing, the edge of the outer marginal portion of the seam for the inner ply being spaced from the edge of the inner marginal portion of the seam for the ply adjacent the inner ply, the edge of the inner marginal portion of seam for the outer ply being spaced from the edge of the outer marginal portion of the seam for the ply adjacent the outer ply, the stripe of adhesive in the seam of the inner ply being laterally offset from the edge of the inner marginal portion of the inner ply seam and being of such width as to extend somewhat beyond the edge of the outer marginal portion of the inner ply seam, the stripe of adhesive in the seam of the outer ply being laterally offset from the edge of the outer marginal portion of the outer ply seam and being of such width as to extend somewhat beyond the edge of the inner marginal portion of the outer ply seam, whereby the inner marginal portion of the inner ply projects on the inside of the bag beyond the adhesive in the inner ply seam and the outer marginal portion of the outer ply projects on the outside of the bag beyond the adhesive in the outer ply seam, the stripe of adhesive in the seam of the intermediate ply being laterally offset from the edge of one marginal portion of the intermediate ply seam and being of such width as to extend somewhat beyond the edge of the other marginal portion of the intermediate ply seam, and the plies being adhered together along the seams.

3. A bag comprising a length of multi-ply paper tubing having an inner ply, intermediate plies, and an outer ply, and having at least a bottom closure, each ply of the tubing having a longitudinal tube seam constituted by overlapping inner and outer marginal portions of the ply adhered together in face-to-face relation by a stripe of adhesive extending the full length of the seam, the seams being laterally spaced across the width of the tubing, the edge of the outer marginal portion of the seam for the inner ply being spaced from the edge of the inner marginal portion of the seam for the ply adjacent the inner ply, the edge of the inner marginal portion of seam for the outer ply being spaced from the edge of the outer marginal portion of the seam for the ply adjacent the outer ply, the stripe of adhesive in the seam of the inner ply being laterally offset from the edge of the inner marginal portion of the inner ply seam and being of such width as to extend somewhat beyond the edge of the outer marginal portion of the inner ply seam, the stripe of adhesive in the seam of the outer ply being laterally offset from the edge of the outer marginal portion of the outer ply seam and being of such width as to extend somewhat beyond the edge of the inner marginal portion of the outer ply seam, whereby the inner marginal portion of the inner ply projects on the inside of the bag beyond the adhesive in the inner ply seam and the outer marginal portion of the outer ply projects on the outside of the bag beyond the adhesive in the outer ply seam, the stripe of adhesive in each of the intermediate ply seams being laterally offset from the edge of one marginal portion of the respective ply and being of such width as to ex-

5

tend somewhat beyond the edge of the other marginal portion of the respective ply, and the plies being adhered together along the seams.

4. A bag comprising a length of multi-ply paper tubing and having at least a bottom closure, each ply of the tubing having a longitudinal tube seam constituted by overlapping inner and outer marginal portions of the ply adhered together in face-to-face relation by a stripe of adhesive extending the full length of the seam, the seams being laterally spaced across the width of the tubing, 10 the edge of the outer marginal portion of the seam for the inner ply being spaced from the edge of the inner marginal portion of the seam for the ply adjacent the inner ply, the edge of the inner marginal portion of seam for the outer ply being spaced from the edge of the outer 15 marginal portion of the seam for the ply adjacent the outer ply, the stripe of adhesive in the seam of the inner ply being laterally offset from the edge of the inner marginal portion of the inner ply seam, and the stripe of adhesive in the seam of the outer ply being laterally 20 offset from the edge of the outer marginal portion of the outer ply seam, whereby the inner marginal portion of the

6

inner ply projects on the inside of the bag beyond the adhesive in the inner ply seam and the outer marginal portion of the outer ply projects on the outside of the bag beyond the adhesive in the outer ply seam, the stripe 5 of adhesive in at least one of the seams being of such width as to extend somewhat beyond an edge of the marginal portion of said seam between plies and securing the plies together along said seam.

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