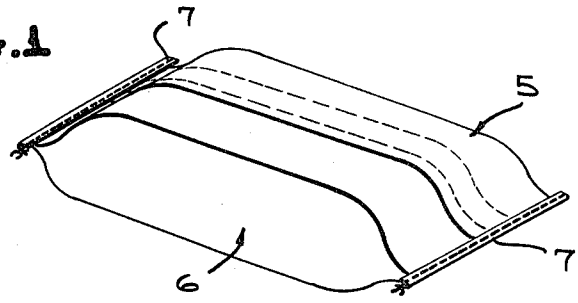
March 30, 1965 A. J. CIVITELLO 3,175,753

MULTI-WALL PAPER BAG

Filed Dec. 10, 1962

FIG. 1



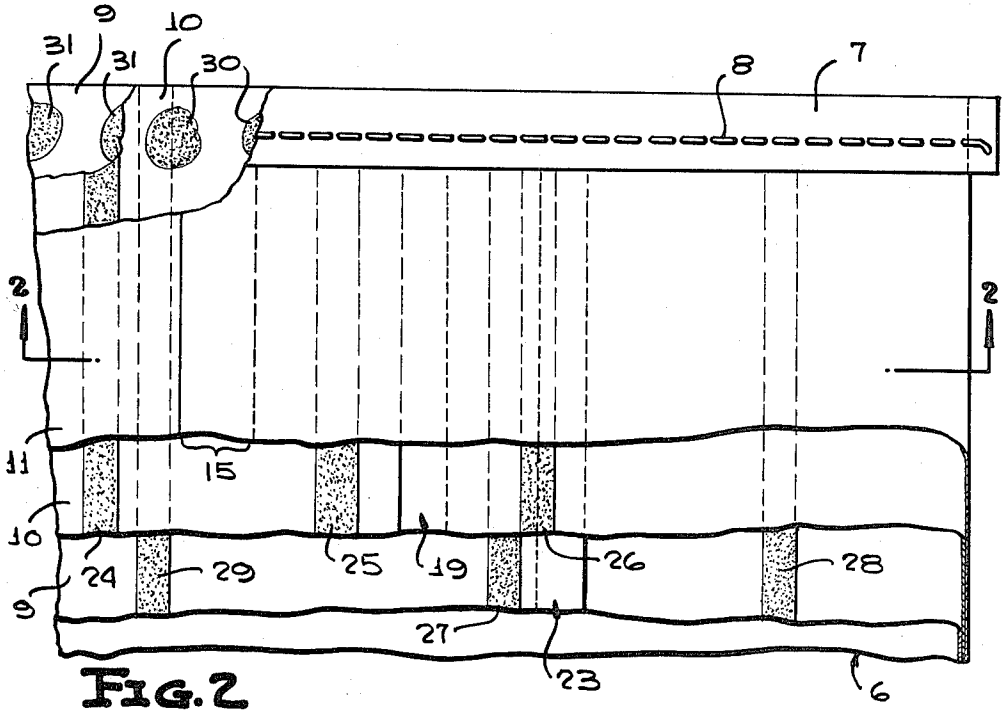


FIG. 2

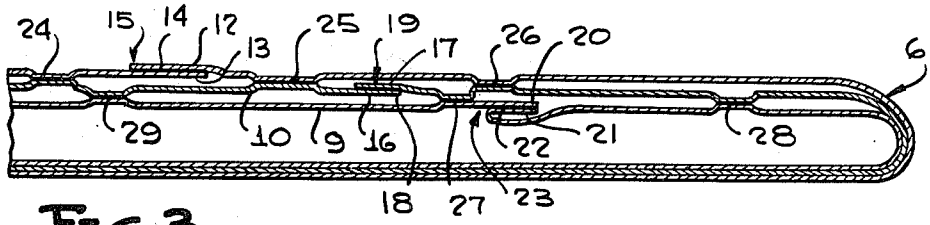


FIG. 3

INVENTOR.
ANTHONY J. CIVITELLO
BY

Mason, Porter, Miller & Stewart
ATTORNEYS

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MULTI-WALL PAPER BAG

Anthony J. Civitello, Chester, Pa., assignor to Continental Can Company, Inc., New York, N.Y., a corporation of New York

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This invention relates in general to new and useful improvements in the manufacture of large paper bags which are of the multi-wall or multi-ply type and are subject to rough handling.

It has been found that under rough treatment, the greatest incident of failures has occurred at or immediately adjacent to the back seam of multi-ply paper bags. This is especially true when one or more of the plies of the bag is a plastic film or a plastic coated paper.

In view of the foregoing, it is the primary object of this invention to provide a novel multi-ply bag construction wherein the seams of the several plies of the bag are reinforced through the simple addition of adhesive between the plies so that the stresses are transmitted through uninterrupted portions of the plies in lieu of being concentrated in the seams.

Another object of this invention is to provide a novel multi-ply paper bag wherein the seams of the individual plies of the bag are staggered and each seam is reinforced by two lines of adhesive extending between the ply of the seam in question and the next adjacent ply wherein stresses normally directed solely to the seam of the particular ply are at least in part transmitted through an adjacent portion of the adjacent ply.

A further object of this invention is to provide an inexpensive multiple ply bag which may be formed solely of paper or a combination of paper and plastic plies and wherein the seams of the plies are staggered and are reinforced with the operation requiring a minimum of changes in existing equipment and a minimum of additional expense.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by a reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a perspective view of a bag formed in accordance with this invention;

FIGURE 2 is an enlarged fragmentary elevational view of the bag of FIGURE 1 with portions thereof broken away in order to clearly illustrate the arrangements of the seams of the plies of the bag and the longitudinal lines of adhesive reinforcing the seams;

FIGURE 3 is an enlarged fragmentary transverse sectional view taken along the line 3—3 of FIGURE 2 and shows more specifically the details of the seam construction of the bag.

Referring now to the drawings in detail, it will be seen that there is illustrated in FIGURE 1 a multi-wall or multi-ply bag which is formed in accordance with this invention, the bag being generally referred to by the numeral 5. The bag 5 is formed of a tube, generally referred to by the numeral 6, and a pair of closure members 7. The closure members 7 are merely in the form of elongated folded strips disposed over the ends of the tube 6 and secured thereto by means of suitable stitching 8. It is to be understood that the closure members 7 are conventional. It is also to be understood that the ends of the tube 6 may be closed in other conventional manners.

Referring now more particularly to FIGURES 2 and 3, it will be seen that the tube 6 includes an inner ply 9, an intermediate ply 10 and an outer ply 11. Although the bag 5 is readily considered a paper bag, it is to be understood that all of the plies 9, 10 and 11 need not be formed of paper. Depending upon the particular material to be packaged within the bag 5, the make-up of the plies 9, 10 and 11 will vary. However, the plies will normally be formed of kraft paper, kraft paper with a plastic coating or plastic.

The outer ply 11 has lapped longitudinally extending edge portions 12 and 13 which are adhesively secured together by a layer of adhesive 14 to define a seam generally referred to by the numeral 15. The intermediate ply 10 has lapped longitudinally extending edge portions 16 and 17 which are adhesively bonded together by a layer of adhesive 18 to define a seam generally referred to by the numeral 19. The seam of the inner ply 9 is different from the seams 15 and 19 and is between two longitudinally extending edge portions 20 and 21 of the ply 9 with the edge portion 21 being reversely folded and extending substantially in the same direction as the edge portion 20. The edge portions 20 and 21 are secured together by a layer of adhesive 22 to define a seam generally referred to by the numeral 23.

It is to be noted that the seams 15, 19 and 23 are staggered transversely of the tube 6. It is also to be understood that the seams 15, 19 and 23 are normally formed in what may be considered the back wall of the bag in that it is desired to have an unseamed front wall for receiving printing indicating the contents of the bag 5.

The seam 15 is reinforced by the provision of a first line of adhesive 24 and a second line of adhesive 25 between the plies 10 and 11. The lines of adhesive 24 and 25 are disposed generally parallel to the seam 15 and are on opposite sides thereof.

The line of adhesive 25 also serves to reinforce the seam 19. In addition to the line of adhesive 25 reinforcing the seam 19, a line of adhesive 26 extends between the plies 10 and 11 to the opposite side of the seam 19 from the line of adhesive 25. Thus the lines of adhesive 25 and 26 serve to transfer a portion of the shock normally imparted to the seam 19 through the adjacent portion of the ply 11 and the lines of adhesive 24 and 25 serve to transmit at least a part of the shock normally transmitted to the seam 15 through the ply 10.

Fourth and fifth lines of adhesive 27 and 28 extend between the plies 9 and 10 on opposite sides of the seam 23. A sixth line of adhesive 29 extends between the plies 9 and 10 on the side of the seam 19 remote from the line of adhesive 27. The lines of adhesive 27 and 28 serve to transmit part of the shock normally imparted to the seam 23 through the adjacent portion of the ply 10. In a like manner, the lines of adhesive 27 and 29 cooperate to transmit a part of the shock normally imparted to the seam 19 through the adjacent portion of the ply 9.

In view of the foregoing, it will be readily apparent that the specific arrangement of the adhesive lines 24, 25, 26, 27, 28 and 29 serve to prevent any undue shock or forces being imparted to the individual seams 15, 19 and 23. In this manner, the seam construction of the bag is greatly reinforced.

In addition to the adhesive lines 24, 25, 26, 27, 28 and 29 which extend longitudinally of the tube 6, the plies 9, 10 and 11 are secured together by adhesive extending generally transversely of the tube 6 at opposite ends thereof. The adhesive, which extends about the periphery of the tube 6, is preferably in the form of spots although it could be in the form of continuous lines. The adhesive between the plies 10 and 11 is indicated by the numeral 31.

Although it is feasible to additionally reinforce the tube by the provision of scattered spots of adhesive, the present bag construction has proved to be highly successful and the additional cost of such spots of adhesive is not warranted.

Experiments have been made with the bag and whereas with customary constructed bags seam failure resulted from a three foot free-fall of a filled bag, a like filled bag formed in accordance with the invention never failed under 12 feet free-fall and then all failures occurred in the face of the bag and not at the seam. Bags were tested from heights up to 20 feet without seam failure.

Although a preferred embodiment of the invention has been illustrated and described herein, it is to be understood that minor modifications may be made in the bag construction within the spirit and scope of the invention, as defined in the appended claims.

What is claimed is:

1. A multi-ply bag comprising a tube adapted to be closed at each end, said tube being of a multi-ply construction and including at least three plies, every ply of said bag having a seam extending longitudinally of said bag, said seams being in adjacent staggered relation, and a longitudinal line of adhesive on each side of each seam securing each ply to adjacent ones of said plies to thereby reinforce said seams.

2. The bag of claim 1 wherein said seams are progressively offset from one another.

3. The bag of claim 1 wherein the innermost one of said plies is reversely folded along one edge thereof and the seam of said innermost ply is formed by two coextensive edge portions facing in the same direction.

4. The bag of claim 1 wherein said plies are adhesively secured together adjacent the ends of the tube by peripherally disposed spots of adhesive.

5. A bag including a tube adapted to be closed at each end, said tube being formed of three plies including an inner ply, an intermediate ply and an outer ply, each of said plies having a longitudinal seam and said seams being in staggered relation, first and second longitudinal lines of adhesive on opposite sides of said outer ply seam and between said outer ply and said intermediate ply reinforcing said outer ply seam, third and fourth longitudinal lines of adhesive on opposite sides of said intermediate ply seam and between said inner ply and said intermediate ply reinforcing said intermediate ply seam, and a fifth longitudinal line of adhesive between said intermediate ply and said inner ply with said inner ply seam being disposed intermediate said fourth and fifth lines of adhesive and reinforced thereby.

6. The bag of claim 5 wherein the innermost one of said plies is reversely folded along one edge thereof and the seam of said innermost ply is formed by two coextensive edge portions facing in the same direction.

7. The bag of claim 5 wherein said plies are adhesively secured together adjacent the ends of the tube by peripherally disposed spots of adhesive.

8. The bag of claim 1 wherein said plies are adhesively secured together adjacent the ends of the tube by peripherally disposed spots of adhesive, and said bag is devoid of adhesive between said plies except for said longitudinal lines of adhesive adjacent said seams and said peripherally disposed spots of adhesive.

9. A bag including a tube adapted to be closed at each end, said tube being formed of three plies including an inner ply, an intermediate ply and an outer ply, each of said plies having a longitudinal seam and said seams being in staggered relation, a first set of at least three lines of adhesive between said outer ply and said intermediate ply, and a second set of at least three lines of adhesive between said intermediate ply and said inner ply, and one of said seams being disposed intermediate two adjacent ones of said lines of adhesive of each set.

10. The bag of claim 9 wherein the innermost one of said plies is reversely folded along one edge thereof and the seam of said innermost ply is formed by two coextensive edge portions facing in the same direction.

11. The bag of claim 9 wherein said seams are progressively offset from one another.

12. A multi-ply bag comprising a tube adapted to be closed at each end, said tube being of a multi-ply construction and including at least three plies, every ply of said bag having a seam extending longitudinally of said bag, said seams being in adjacent staggered relation, and a longitudinal line of adhesive on each side of each seam securing each ply to an adjacent one of said plies to thereby reinforce said seams.

13. A multi-ply bag comprising a tube adapted to be closed at each end, said tube being of a multi-ply construction and including at least three plies, every ply of said bag having a seam extending longitudinally of said bag, said seams being in adjacent staggered relation and a longitudinal line of adhesive on each side of each seam securing each ply to an uninterrupted portion of an adjacent one of said plies to thereby reinforce said seams.

14. A bag including a tube adapted to be closed at each end, said tube being formed of three plies including an inner ply, an intermediate ply and an outer ply, each of said plies having a longitudinal seam and said seams being in staggered relation, a first longitudinal line of adhesive between said outer ply and said intermediate ply on the side of said outer ply seam remote from said intermediate seam ply, a second longitudinal line of adhesive between said outer ply and said intermediate ply intermediate said outer ply seam and said intermediate ply seam, a third longitudinal line of adhesive between said intermediate ply and said inner ply intermediate said inner ply seam and said intermediate ply seam, and a fourth longitudinal line of adhesive between said intermediate ply and said inner ply on the side of said inner ply seam remote from said intermediate ply seam.

15. A bag including a tube adapted to be closed at each end, said tube being formed of three plies including an inner ply, an intermediate ply and an outer ply, each of said plies having a longitudinal seam and said seams being in staggered relation, a first longitudinal line of adhesive between said outer ply and said intermediate ply on the side of said outer ply seam remote from said intermediate seam ply, a second longitudinal line of adhesive between said outer ply and said intermediate ply intermediate said outer ply seam and said intermediate ply seam, a third longitudinal line of adhesive between said intermediate ply and said inner ply intermediate said inner ply seam and said intermediate ply seam, a fourth longitudinal line of adhesive between said intermediate ply and said inner ply on the side of said inner ply seam remote from said intermediate ply seam, a fifth longitudinal line of adhesive between said outer ply and said intermediate ply in the general vicinity of said inner ply seam, and a sixth longitudinal line of adhesive between said intermediate ply and said inner ply in the general vicinity of said outer ply seam.

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