

Sept. 30, 1958

R. J. WILLIAMS

2,854,186

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Filed March 15, 1954

4 Sheets-Sheet 1

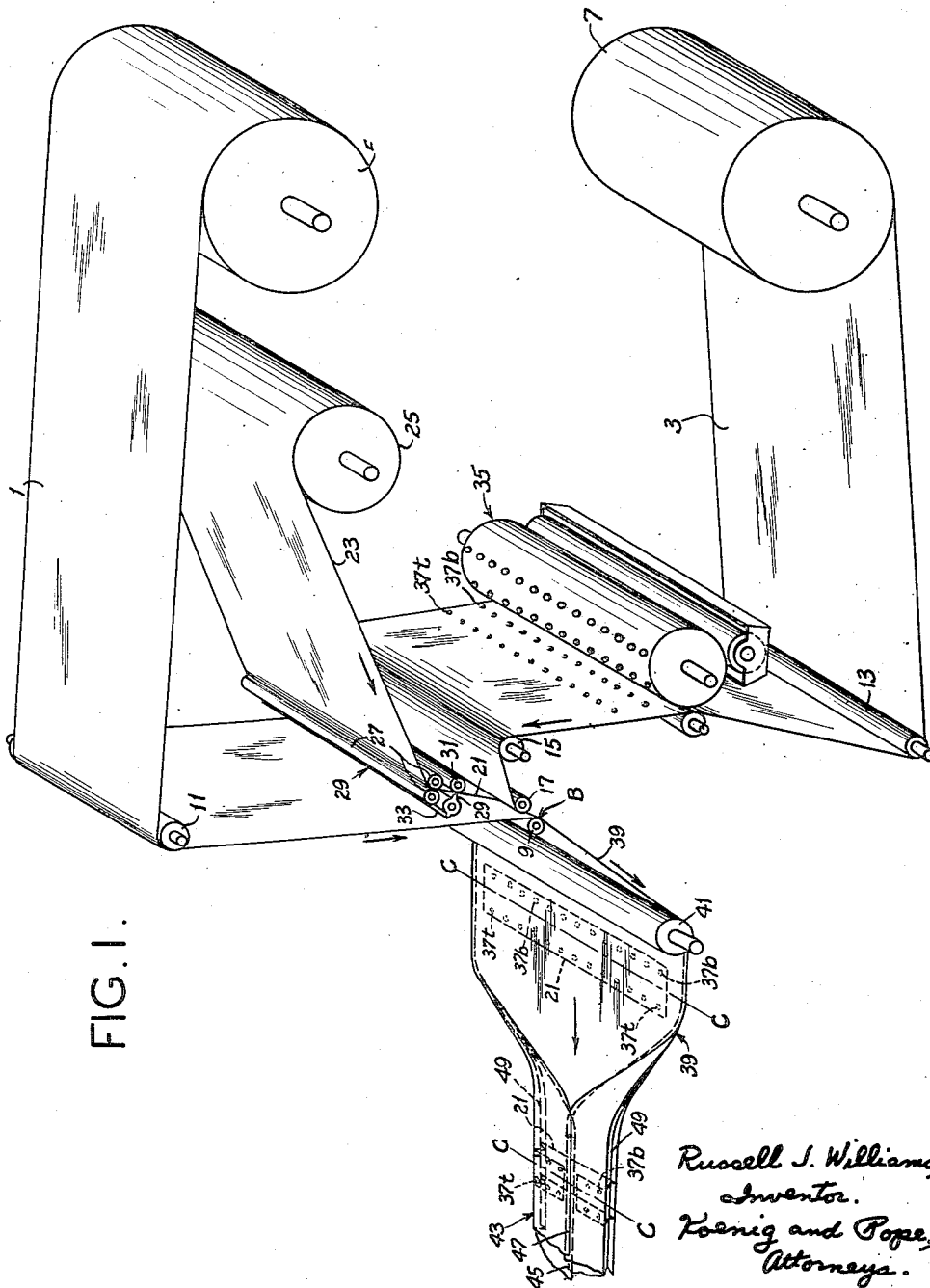


FIG. 1.

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FIG. 1A.

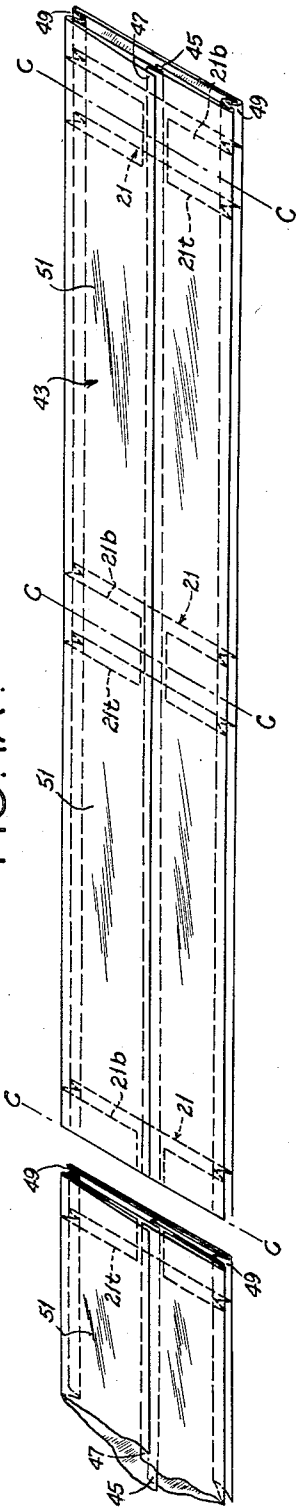


FIG. 4.

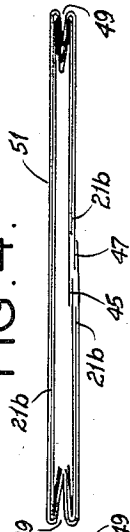


FIG. 6.

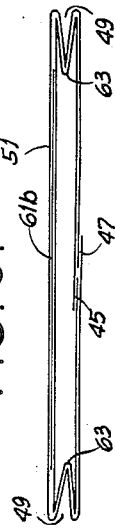


FIG. 5.

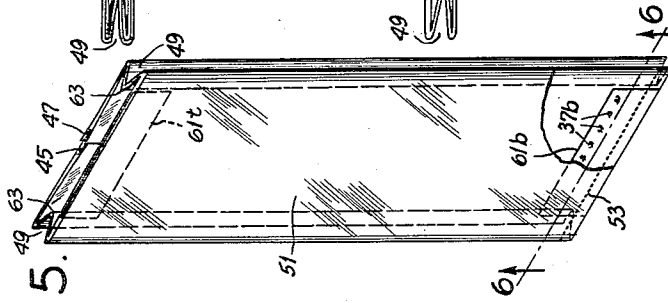


FIG. 3.

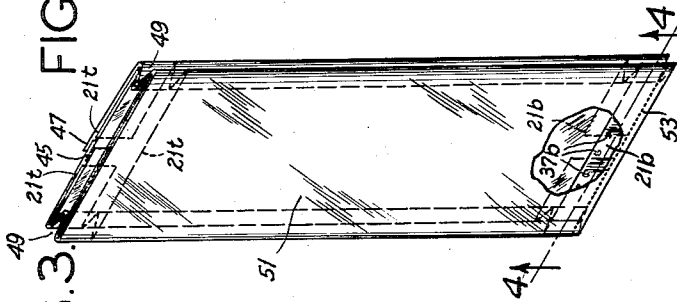
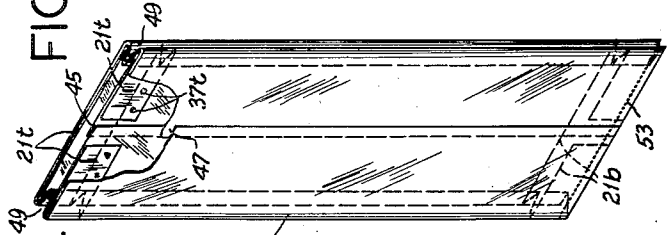


FIG. 2.



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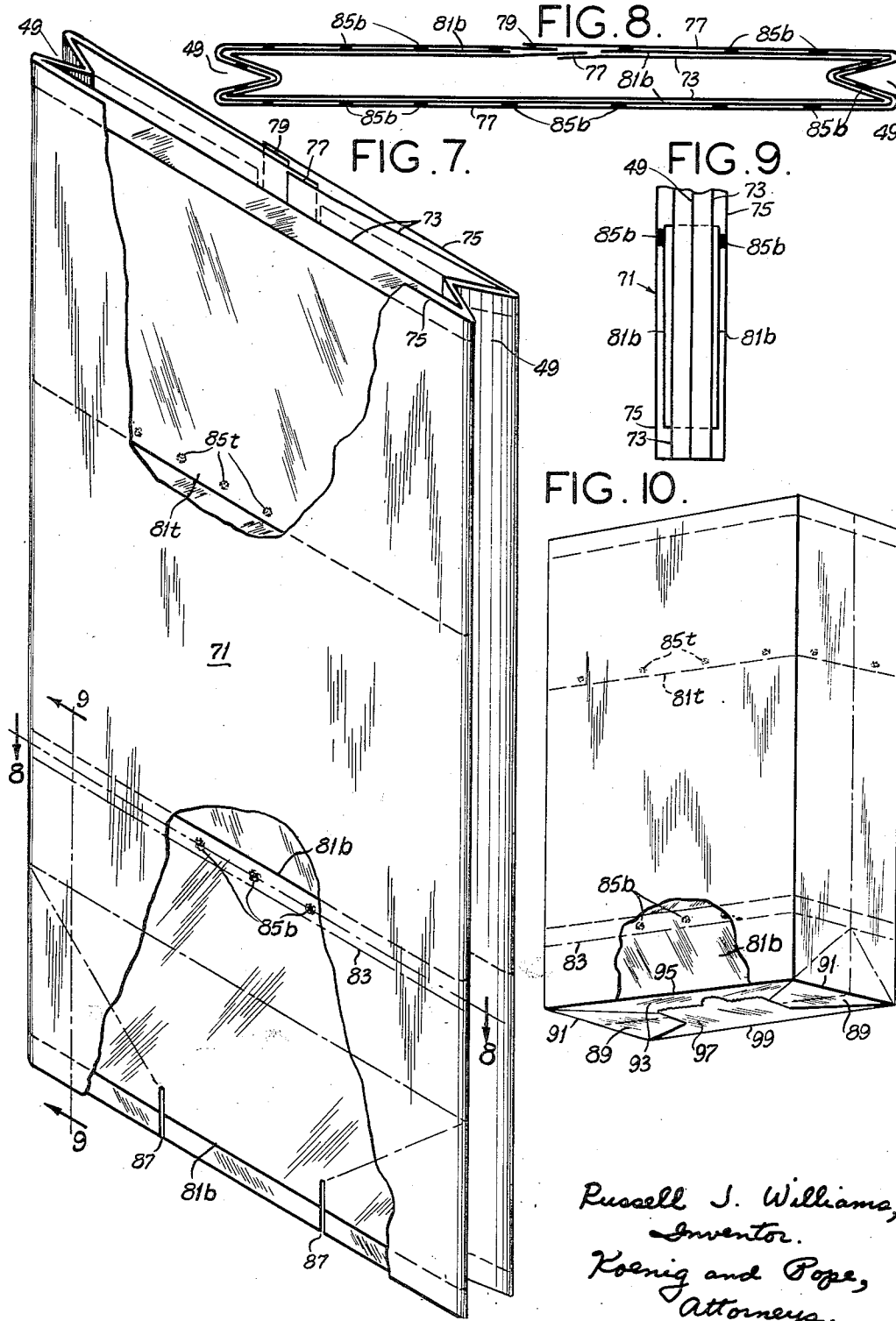
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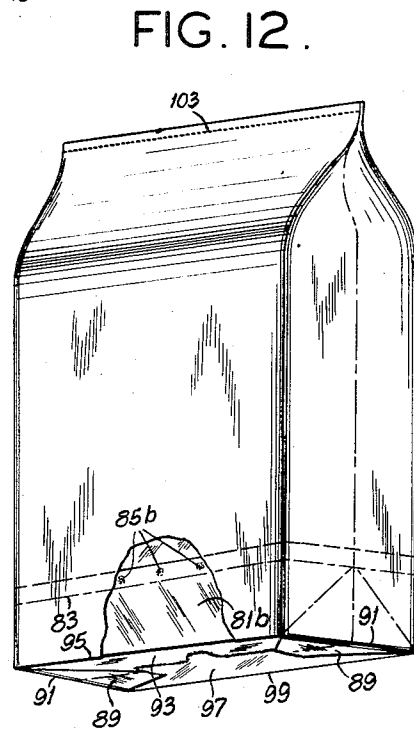
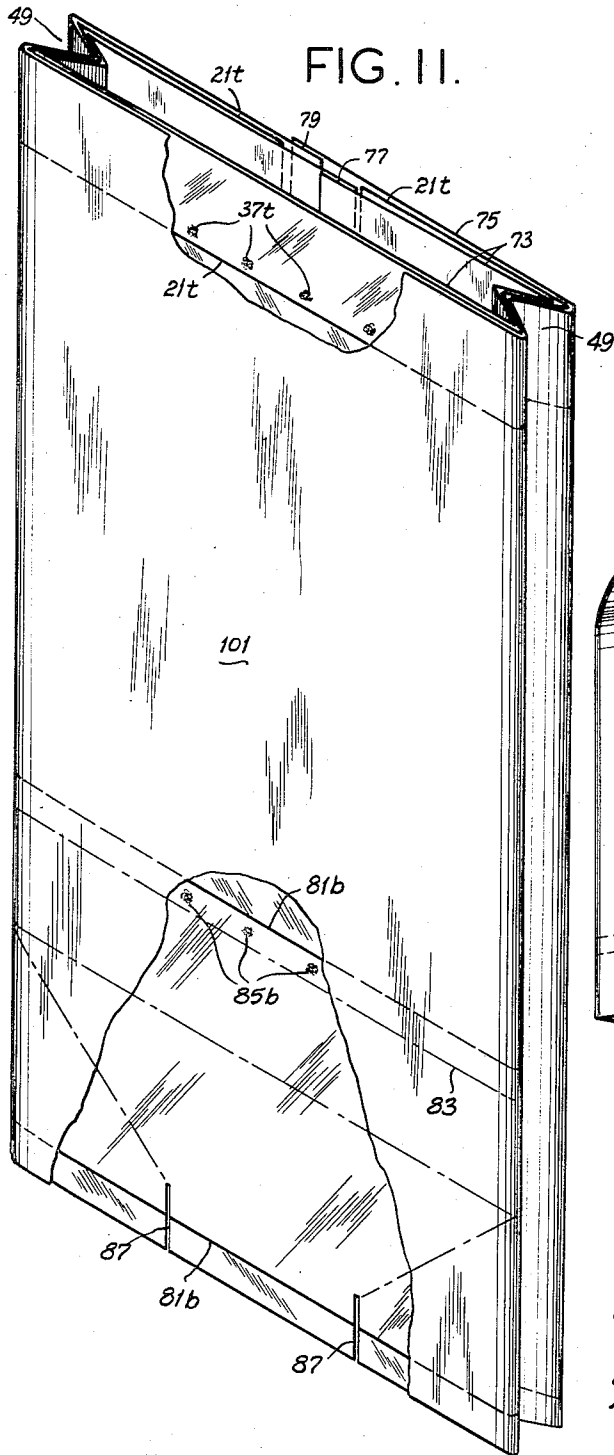
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BAG

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Application March 15, 1954, Serial No. 416,281

7 Claims. (Cl. 229-55)

This invention relates to bags, and more particularly to multi-ply paper bags having laterally offset ply seams.

Multi-ply paper bags of the class described are conventionally formed with either stitched or folded and pasted closures. Bags with stitched bottom closures are usually provided with a stitched top closure. Bags with folded and pasted bottom closures (for example, self-opening squared bottoms or satchel bottoms) may be provided either with a stitched top closure or a folded and pasted top closure. In the case of a stitched closure, the line of holes punched in the bag by the needle which drives the stitches through the bag weakens the bag at the closure. Under strain such as may occur when the filled bag is dropped, the stitches may cut through the paper. In the case of a pasted closure, the bag is weakened by the creasing and folding incident to the closure, particularly at crease intersections. To offset the weakening effect of the closures bags of the class described have usually been made with enough plies to resist cutting the paper in the case of stitched closures and to resist tearing at the creases in the case of pasted closures. This means that one or more plies is useful only as regards its end portions at the closures, and that its intermediate portion between closures has no useful effect, representing a waste of paper.

Among the several objects of this invention may be noted the provision of a mode of reinforcing multi-ply bags of the class described at their end closures to offset the weakness otherwise caused by the stitching in the case of stitched closures or by the creases in the case of pasted closures, which eliminates any necessity for the use of one or more complete extra plies to offset the weakening effect of the closures, thereby effecting great saving of paper in quantity production; and the provision of bags with the stated reinforcement adapted for economical manufacture. 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 several of various possible embodiments of the invention are illustrated,

Fig. 1 is a semi-diagrammatic view in perspective illustrating procedure in the manufacture of gusseted stitched-bottom bags in accordance with this invention;

Fig. 1A is an enlarged continuation of Fig. 1 illustrating further steps in the procedure;

Fig. 2 is a view in perspective of a gusseted stitched-bottom bag of this invention as it appears from one side thereof, part of the outer ply of the bag being broken away;

Fig. 3 is a view in perspective showing the other side of the Fig. 2 bag, part of the outer ply of the bag being broken away;

Fig. 4 is an enlarged line cross-section taken on line 4-4 of Fig. 3;

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Fig. 5 is a view similar to Fig. 3 showing a modification; Fig. 6 is an enlarged line cross-section taken on line 6-6 of Fig. 5;

Fig. 7 is a view in perspective of a length of multi-ply gusseted tubing adapted to be provided with a pasted self-opening square bottom and a pasted top closure, parts of the outer ply of the tubing being broken away;

Fig. 8 is a horizontal cross-section taken on line 8-8 of Fig. 7;

Fig. 9 is a vertical cross-section taken on line 9-9 of Fig. 7;

Fig. 10 is a view in perspective, on a reduced scale, of a self-opening square bottom bag formed from the length of tubing shown in Fig. 7, the bag being shown as open, and part of the outer ply of the bag being broken away;

Fig. 11 is a view in perspective of a length of multi-ply gusseted tubing adapted to be provided with a pasted self-opening square bottom and a stitched top closure, parts of the outer ply of the bag being broken away; and,

Fig. 12 is a view in perspective, on a reduced scale, of a bag formed from the length of tubing shown in Fig. 11 having a self-opening square bottom and a stitched top closure, part of the outer ply of the bag being broken away.

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

Referring to the drawings, Figs. 1-4 illustrate the manufacture of gusseted multi-ply stitched-bottom paper bags in accordance with this invention. To avoid complication of the disclosure, the manufacture of two-ply bags is shown, but it will be understood that the principles of the invention are applicable to the manufacture of bags with more than two plies. In accordance with this invention as it pertains to the manufacture of two-ply bags, two webs of paper 1 and 3 are continuously drawn from supply rolls 5 and 7, combined to form a two-ply web at a combining guide 9, and the two-ply web is continuously fed through a conventional tuber (not illustrated) to be formed into tubing. Guide 9 is shown as a roll. The webs 1 and 3 travel to the roll 9 in spaced paths, converging together at the roll to form a two-ply web. The web 1, which eventually becomes the inner ply of the tubing, is shown as travelling from supply roll 5 over an upper guide roll 11 from which it leads downward to the combining roll 9. The web 3, which eventually becomes the outer ply of the tubing, is shown as travelling from supply roll 7 around a lower guide roll 13, from which it travels upward to a guide roll 15, thence forward to a guide roll 17, and thence forward and downward to the combining roll 9. The bite of webs 1 and 3 (i. e., the transverse line on which they come into engagement) is indicated at B. The webs 1 and 3 are combined in laterally offset relation, as is conventional in the manufacture of multi-ply paper bags.

As the webs 1 and 3 are combined at the combining roll 9, reinforcing patches or bands 21 are fed in between the webs and pasted in between them, the patches or bands being spaced at bag length intervals along the length of the composite two-ply web formed at the combining roll. The patches or bands 21 are severed from a continuous web 23 of material drawn from a supply roll 25. This material may be paper, cloth or any other suitable reinforcing material. As shown in Fig. 1, the width of web 23 is preferably somewhat less than the width of webs 1 and 3. The web 23 is drawn from the supply roll 25 at a speed less than the speed of webs 1 and 3 by a pair of draw rolls 27. It is fed by the draw rolls in a preferably downwardly inclined path through a cutter 29 and between the converging webs 1 and 3 into the bite B of the webs. The cutter 29, as shown,

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may comprise an anvil roll 31 and a double-blade cutter 33, and is adapted to sever the web 23 into patches which are of an appropriate dimension in the longitudinal direction of the webs 1 and 3. What the appropriate longitudinal dimension is will be later made clear in reference to the finished bags. The line on which the cutter cuts web 23 is preferably spaced from the bite B of webs 1 and 3 a distance corresponding generally to the desired longitudinal dimension for the patch. The timing of the cutter is such that it severs the web 23 to form a patch substantially at the instant that the end of the web 23 is caught in the bite of webs 1 and 3, and the severed patch is thereupon drawn in between the webs 1 and 3 at the speed at which webs 1 and 3 are travelling. The patch is pulled away from the freshly cut end of web 23 since web 23 is fed by the draw rolls 27 at a speed lower than the speed of the webs 1 and 3, the patches drawn in between the webs 1 and 3 are spaced along the length of the webs 1 and 3 at equal intervals. The speed of web 23 in relation to the speed of webs 1 and 3 is made such that the spacing of the patches corresponds to the desired length of the bags to be manufactured.

The patches or bands 21 are shown as being adhered between the webs 1 and 3 by applying a pattern of adhesive (paste) to the inside surface of the web 3 as it travels toward the combining roll 9. As illustrated, this is accomplished by means of a spot paster 35 adapted to apply a pair of rows of spots 37b and 37t across the width of the web 3, the two rows of the pair being spaced longitudinally of the web a distance somewhat less than the longitudinal dimension of the patches 21, and with successively applied pairs spaced at bag length intervals along the length of the web. The timing of the paster is such that each pair of rows of paste spots 37b and 37t registers with a patch 21 as the patch is drawn in between the webs 1 and 3, with the two rows 37b and 37t lying on opposite sides of the transverse center line C—C of the patch and closely adjacent those edges of the patch which extend transversely of the webs.

Thus, there issues from the combining roll 9 the composite web 39 consisting of the webs or plies 1 and 3 with the patches or bands 21 pasted in between the plies at bag length intervals along the length of the composite web. In accordance with the invention as illustrated in Fig. 1, the bands extend from near one side margin of the composite web 39 to near the other. The composite web travels around a guide roll 41 and thence to a tuber (not illustrated) where it is formed in conventional manner into gusseted tubing 43 in which the two edges of each ply are overlapped and secured directly together throughout their length by adhesive to form an individual tube having a longitudinal seam. The seams of the resultant inner and outer tubes are designated 45 and 47. These are laterally offset from one another, extending generally centrally of the back wall of the tubing. The gussets are designated 49. As a result of the previously described operations, the tubing 43 is two-ply tubing and has the bands 21 pasted in between its plies spaced at bag length intervals along its length, as shown in Fig. 1A. The bands extend substantially completely girthwise of the tubing from near one side of the seamed region of the tubing to near the other side thereof. Here it will be understood that the width of the band-forming web 23 and hence the transverse dimension of the bands is preferably somewhat less than the width of the ply-forming webs 1 and 3 so that the bands do not extend into the ply seams, otherwise the tubing (and bags to be formed therefrom) would be unduly thickened at the seam.

The tubing 43 is severed into individual bag lengths 51 substantially on the transverse center lines C—C of the patches or bands 21 (see Fig. 1A). This divides each individual patch or bands 21 into two patches or bands 21b and 21t, and results in each bag length 51

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having a patch or band 21b at one end, and a patch or band 21t at the other. The band 21b of each bag length is pasted in between the two plies 1 and 3 of the bag length by the row of spots 37b, and the band 21t is pasted in between the plies by the row of spots 37t. Rows 37b and 37t, having originally been located adjacent the transverse edges of bands 21, are spaced from the respective ends of the bag length. Each bag length is bottomed by stitching together its front and back walls adjacent one end of the bag length (the end including band 21b) as indicated at 53 in Figs. 2 and 3. The stitches extend through the band 21b and also through the gussets 49. The line of stitching is located outward from (below) the row of paste spots 37b. This is important in order that the stitches not be driven through pasted areas, and accounts for the disposition of the rows 37b (and 37t) adjacent the transverse edges of the bands 21. Here it will be observed that the dimension of band 21b heightwise of the bag (longitudinally of plies 1 and 3) need be only sufficient to account for the spacing of the stitching above the bottom of the bag (standard spacing being one-half inch) plus enough space for the paste spots, and it will be clear that the appropriate longitudinal dimension for each band 21 is twice this. Each bag length is also ultimately closed at its top by a line of stitching like stitching 53, with the top stitches extending through the band 21t above the row of paste spots 37t. It will be understood that the top closure may be formed either after filling, or after the formation of a valve and before filling.

In the filled bag provided with the stitched bottom and top closures, the patches or bands 21b and 21t act as reinforcement to prevent the stitches from cutting through the bag plies under strain such as is incurred when the bag is dropped. This reinforcement results from the bands being pasted in between the bag plies, whereby they are locked or anchored against moving outward from between the plies. Each band provides two extra thicknesses of paper for reinforcement, except in the region of the ply seams, but here there are two extra thicknesses irrespective of the bands in view of the overlapping of the margins of the plies. Hence, the absence of band material in the region of the ply seams is not detrimental to the strength of the bag. The bands also provide reinforcement at the corners of the fitted bag.

It will be understood that in some cases it may be desirable to have the bands pasted to both plies more securely to anchor them in between the plies. This may be particularly desirable where the band material is of considerably higher strength than the bag ply material and additional pasting is needed to utilize the full strength of the band material. Under these circumstances, paste may be applied to web 1, as well as to web 3, by a paster similar to the paster 35.

The bags may be manufactured with more than two plies simply by combining additional webs with webs 1 and 3 at the combining roll 9, as will be readily understood. It is also contemplated that bags which have more than two plies may have more than one band at each end. For example, a three-ply bag may have two bands at each end, one pasted in between the inner ply and intermediate ply, and the other pasted in between the intermediate ply and the outer ply.

It will be observed that the stitched closure for a gusseted bag is inherently reinforced where it traverses the gussets and where it crosses the longitudinal ply seams, in view of the extra thicknesses of paper present in these regions. This reinforcing effect of the gussets and ply seams may be availed of in some cases to reduce the girthwise extent of the bands further to save paper, where corner reinforcement is not important, and Figs. 5 and 6 illustrate a modification to this effect. The bag shown in Figs. 5 and 6 is in all respects like that shown in Figs. 2-4 except in respect to the girthwise extent of the patches or bands, which are designated 61b and 61t to distin-

guish them from bands **21b** and **21t**. Each of bands **61b** and **61t** is pasted in between the plies of the front wall (the unseamed wall) of the bag, the bottom edge of the bottom band **61b** being coincident with the bottom edges of the plies, the top edge of the top band **61t** being coincident with the top edges of the plies. The transverse dimensions of the bands and their position are such that their side edges are approximately coincident with the inner creases **63** of the gussets. Thus, the bands reinforce the stitching in the two-ply region of the front wall of the bag between the gussets. Outward of the side edges of the bands, the gussets provide reinforcement. In the back wall of the bag, the longitudinal ply seams provide reinforcement. It will be understood that bags of the type shown in Figs. 5 and 6 may be manufactured in the same manner as illustrated in Figs. 1 and 1A, using a relatively narrow patch-forming web.

Figs. 7-9 illustrate a length of gusseted two-ply paper tubing **71** provided toward its ends with patches or bands pasted in between its plies and specially adapted to be provided with a pasted self-opening square bottom and a pasted top closure. The inner ply of the tubing is designated **73**, and the outer ply **75**. The seam for the inner ply is indicated at **77** and the seam for the outer ply at **79**. The bottom band is designated **81b** and the top band **81t**. Each of these bands extends substantially completely girthwise of the tubing from near one side of the seamed region of the tubing to near the other side thereof. The lower edge of the bottom band is spaced from the bottom edges of the plies and the upper edge of the top band is spaced from the top edges of the plies to avoid undue stiffening of the end regions of the tubing. The heightwise dimension of the bottom band **81b** is such that it extends somewhat above the uppermost crease **83** which is made in forming the bottom according to conventional and well-known bag bottoming procedure. The heightwise dimension of the top band is shown as corresponding to that of the bottom band. The bottom band is pasted in between the plies by a row of spots of paste **85b** which is located above the uppermost crease **83** adjacent the upper edge of the band. The extension of the band above this crease need be only sufficient for the pasting. The top band is similarly pasted in between the plies by a row of spots of paste **85t** adjacent the lower edge of the band. Conventional bottoming slits are indicated at **87**.

Fig. 10 illustrates the self-opening square bottom bag formed from the length of tubing shown in Fig. 7. The bottom comprises side flaps **89** folded in one lines **91**, a flap **93** folded in from the front wall of the bag on line **95**, and a flap **97** folded in from the back wall of the bag on line **99** overlying and pasted to flap **93**. It will be understood that in the conventional manufacture of bags with self-opening square bottoms, they are creased on the line **83** where the front wall is folded back in forming the bottom. All the bottom creases, including the creases **83**, are reinforced by the band **81b**. Band **81t** similarly reinforces the creases made in forming a pasted top closure for the bag.

Fig. 11 illustrates a length of gusseted two-ply paper tubing **101** the lower part of which is like the lower part of the length of tubing **71** of Fig. 7, including a band **81b** for reinforcing a self-opening square bottom, and the upper part of which is like the upper part of the bag shown in Figs. 2 and 3, including a band **21t** for reinforcing a stitched top closure. Fig. 12 shows the bag made from the length of tubing shown in Fig. 11 with a self-opening square bottom identical to that shown in Fig. 10, and a line of stitching **103** at its top with the stitches extending through the band **21t** in the unpasted area above the row of paste spots **37t** which secure band **21t** between the plies.

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 multi-ply paper bag formed from a length of multi-ply paper tubing and having a front wall and a back wall, the plies of the tubing having the edges thereof which extend lengthwise of the tubing laterally offset, the two edges of each ply being overlapped and secured together by adhesive to form an individual tube having a longitudinal seam, the seams of said individual tubes being laterally offset by reason of the lateral offset of the edges of the plies, and all of the seams being located in the back wall of the length of tubing, said tubing having at least at one end thereof a band of reinforcing material extending girthwise of the tubing between two of said individual tubes across the front wall and around into the back wall, the length of said band being less than the girth of said tubing and said band being so positioned in relation to the girth of said tubing as to terminate short of the seam of at least one of said two tubes, and the two edges of each ply included in the seam of the respective tube being adhered directly together throughout the entire length of the seam, means anchoring the band between said two tubes, and means securing together portions of said front and back walls of the tubing at said end of the tubing to provide a closure, said band having a portion thereof located within and reinforcing said closure.

2. A multi-ply paper bag formed from a length of multi-ply paper tubing and having a front wall and a back wall, the plies of the tubing having the edges thereof which extend lengthwise of the tubing laterally offset, the two edges of each ply being overlapped and secured together by adhesive to form an individual tube having a longitudinal seam, the seams of said individual tubes being laterally offset by reason of the lateral offset of the edges of the plies, and all of the seams being located in a region of the back wall of the length of tubing, two bands of reinforcing material, one at each end of the length of tubing, extending girthwise of the tubing between two of said individual tubes thereof across the front wall and around into the back wall, the length of each of said bands being less than the girth of said tubing and said bands being so positioned in relation to the girth of said tubing as to extend from near one side to near the other side of the said seamed region of the back wall of the length of tubing and terminate short of said seamed region, and the two edges of each ply included in the seam of the respective tube being adhered directly together throughout the entire length of the seam, means anchoring the bands between said plies, and a line of stitching closing at least one end of the bag and extending through the band at said end of the bag, said band through its anchorage between the plies acting as reinforcement to prevent the stitching from cutting through the bag plies.

3. A multi-ply paper bag as set forth in claim 2 wherein the anchoring means comprises adhesive applied on a line offset from the line of stitching.

4. A multi-ply paper bag as set forth in claim 3 wherein the adhesive is applied on a line spaced inward from the line of stitching.

5. A multi-ply paper bag formed from a length of multi-ply paper tubing and having a front wall and a back wall, the plies of the tubing having the edges thereof which extend lengthwise of the tubing laterally offset, the two edges of each ply being overlapped and secured together by adhesive to form an individual tube having a longitudinal seam, the seams of said individual tubes being laterally offset by reason of the lateral offset of the edges of the plies, and all of the seams being located

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in a region of the back wall of the length of tubing, two bands of reinforcing material, one at each end of the length of tubing, extending girthwise of the tubing between two of said individual tubes thereof across the front wall and around into the back wall, the length of each of said bands being less than the girth of said tubing and said bands being so positioned in relation to the girth of said tubing as to extend from near one side to near the other side of the said seamed region of the back wall of the length of tubing and terminate short of said seamed region, and the two edges of each ply included in the seam of the respective tube being adhered directly together throughout the entire length of the seams, said bands being anchored between the plies by adhesive, at least one end of the bag being formed with a folded and pasted closure, said band having a portion thereof included within the closure and said band spanning the folds made in forming the closure.

6. A multi-ply paper bag as set forth in claim 5 wherein the bands are spaced from the ends of the length of tubing.

7. A multi-ply paper bag as set forth in claim 5 wherein the bands are anchored between the plies by adhesive only in region located inward from the ends of the

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length of tubing a distance greater than the spacing of the innermost of said folds from the respective end of the length of tubing.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,854,186

September 30, 1958

Russell J. Williams

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 7, line 22, for the claim reference numeral "5" read -- 6 --;
line 24, for "region" read -- regions --.

Signed and sealed this 30th day of December 1958.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON
Commissioner of Patents