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MULTIWALL BAG TEAR STRIPS

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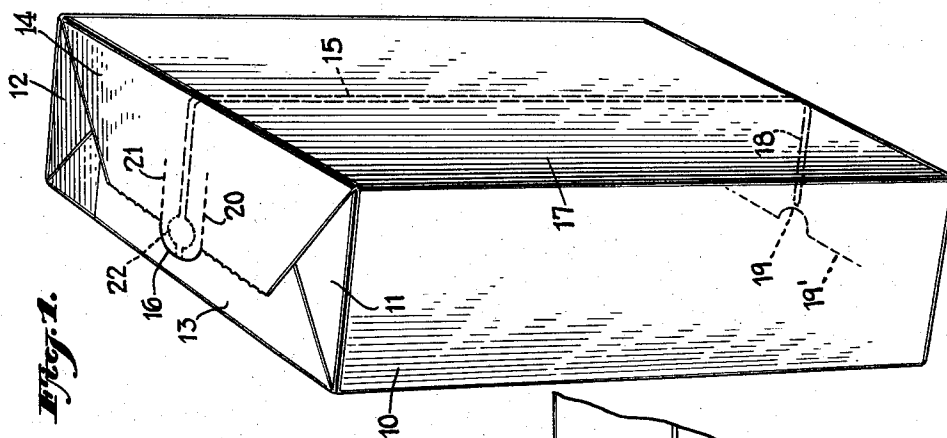
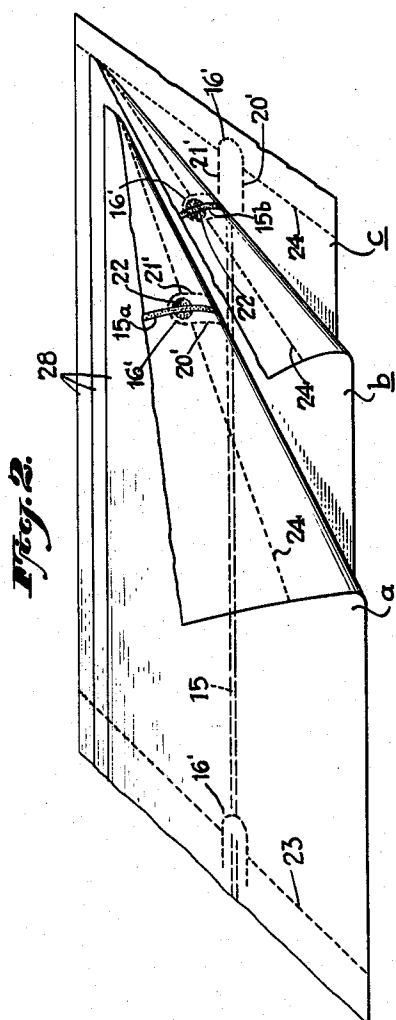


Fig. 1.



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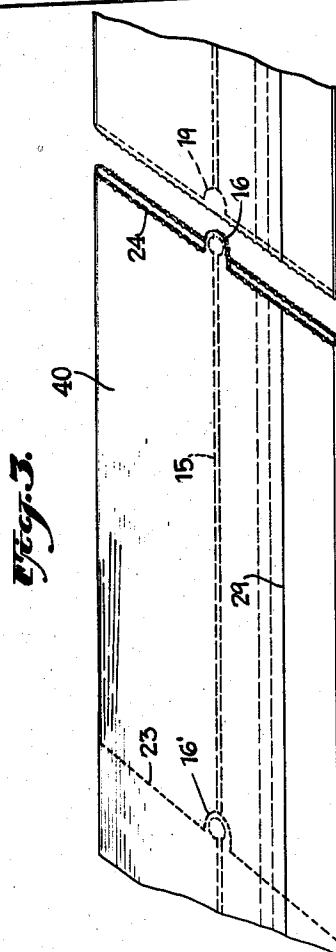


Fig. 3.

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MULTIWALL BAG TEAR STRIPS

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4 Claims. (Cl. 229—66)

This invention relates to tear strips as embodied in multi-ply or so-called multiwall paper bags to permit easy and rapid opening of such bags to release the contents.

While a wide variety of successful tear strips have been devised for easy opening of various forms of packages, the provision of such a means in multiwall paper bags presents peculiar problems from the standpoints of efficiency and competitive costs, so that so far as is known, it has heretofore not been the practice commercially to use tear strips in bags of that type, although such bags are used in great quantities and under conditions which have long given rise to a demand for a construction which could more easily be opened. The problems involved arise from the fact that multiwall paper bags are made from a plurality of webs of heavy strong paper which during the manufacture of the bags are superposed and rapidly run through a tube-forming machine. Thus if a tear strip in the form of a string or tape is attempted to be used, it would not only have to be quite strong and thus of relatively expensive material, but also it is difficult to apply such a tape during the tube-forming operation. That is, application of such strips transversely of the movement of the webs in the tubular obviously would involve mechanical complications and any attempt to apply such strips longitudinally of the webs involves the difficulty of securely adhering them in place on the inside of the bags without at the same time causing one inside bag wall surface to stick and adhere to the opposed inside surface.

In accordance with the present invention, the above-noted difficulties are obviated by providing a tear strip in the form of a band or bands of glue or other adhesive interposed between adjacent plies, the glue and the paper plies adhered thereto thereby providing in effect a strong quite firm laminated strip such that when one end of same is grasped and pulled, the paper of all plies of the bag may be readily torn along each side of such laminated strip to open the bag. Preferably, although not necessarily, the laminated strip thus formed may extend longitudinally of the bag tube and in the case of bags having pasted end closure flaps, such strip preferably terminates in a pull tab extending from an exposed edge of an overlying closure flap. Also such closure flap is preferably perforated along each side of such laminated band thereby to facilitate the tearing when the pull tab is grasped. The under side flap areas between these lines of perforation are preferably also left free of the usual adhesive to facilitate starting of the tear.

Each layer of paper in the bag wall by itself may, of course, be readily torn, but will ordinarily tend to tear irregularly. And each of the bands of adhesive if by itself, could be readily torn and thus not provide the desired localized line of tearing. However, the band or bands of glue when laminated with the layers of paper act to provide the above-described firm strong laminated band which will itself withstand a heavy force without breaking and will insure tearing the unlaminated paper

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walls along each side of the band when the latter is quickly pulled to open the bag. It has been found quite surprisingly that if such a laminated band is pulled from an empty multi-ply bag, it may tend to cause quite irregular tearing of the paper along each side, yet when the bag is filled, this form of tear strip permits tearing from the bag walls a multi-ply ribbon of paper along tear lines which are fairly uniformly spaced from the opposite sides of the laminated band.

Such a laminated band or strip in the walls of the multi-ply bags, may be formed by simply applying bands of glue along proper lines to the webs of paper entering the bag tubing machine, such glue being applicable either to provide transverse bands or preferably a longitudinal band or bands. In the case of a two-ply bag, but one line or band of such adhesive is necessary to adhere the inner ply to the outer ply to form the desired strong laminated strip. In the case of a three-ply bag, two superposed bands of adhesive are preferably used, the first to secure the inner ply to the intermediate ply and the second to secure the intermediate ply to the outer ply. Similarly, in case additional numbers of plies are used, at least several of the inner plies are laminated together along the desired band of tearing.

Such bands of adhesive to form a laminated tear strip may thus be applied on the bag tubing machine at almost a negligible cost, since no materials except a small amount of adhesive are required and glue applying means similar to that available on multiwall bag tubers may be used upon making minor changes or adjustments.

The invention is particularly well adapted for use on so-called multi-wall baler bags formed of heavy kraft paper and adapted to form a bale or container for containing pluralities of smaller bags or articles.

Other and more specific objects, features and advantages of the invention will appear from the detailed description given below, taken in connection with the accompanying drawings which form a part of this specification and illustrate by way of example the presently preferred embodiment of the invention.

In the drawings:

Fig. 1 is a perspective view of a bag embodying the tear strip of the invention in a preferred form;

Fig. 2 is a perspective view showing three superposed webs of paper and indicating the formation of the tear strip features thereon before such webs are formed into a bag tube;

Fig. 3 is a view similar to Fig. 2, but showing the webs after same have been formed into bag tubes;

Fig. 4 is a perspective view showing on an enlarged scale one end of such a bag tube; and

Fig. 5 is a somewhat schematic diagram of a bag tuber and illustrating the method by which bags with tear strips according to the invention may be made on such a tuber.

Referring to the drawings in further detail, in Fig. 1 a bag is indicated at 10 of the type for example which has an end closure formed of returned corner flaps as at 11, 12, and with overlying side flaps as at 13, 14. Such a bag may be made of a plurality of plies, sometimes of two plies, but usually with three or as many as six plies. Bands of adhesive are located between each pair of adjacent plies to extend longitudinally of the bag at the position indicated by the dash lines 15 in Fig. 1. The adhesive used may be the same as the so-called paste or glue often used, for example, in interply spot pasting on tubing machines, or in some cases, if desired, stronger types of adhesive may be preferred or the adhesive may comprise extruded bands of synthetic plastic material such as polyethylene, firmly adhered to the paper to provide in effect the desired strong laminated band.

With the form of pasted end closure shown in Fig. 1,

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preferably the overlying side flap 14 is provided with a protruding thumb tab as at 16 and the laminated band 15 thus extends from the end of such thumb tab across the flap 14 and down preferably along the middle of the front wall 17 of the bag, thence across the bottom of the bag as at 18 to terminate at a cut-out portion 19 corresponding to the location of the thumb tab on the next adjacent bag which is formed on the bag tuber. The location of the edge of the outer bottom closure flap is indicated by the dotted line at 19'.

Preferably lines of perforation as at 20, 21 are formed through all plies, these lines starting at the edge of flap 14, at the ends of thumb tab 16, and such perforations are continued as indicated at least to a point midway across the flap 14.

In the usual pasted end bag construction, the overlying side flap such as at 14 is adhered throughout its under-surface to the underlying flap areas with which it comes into contact. However, preferably according to the present invention, the area on the underside of flap 14 which is located between the lines of perforation 20 and 21, is left unadhered to the underlying flap 13. Thus when the thumb tab 16 is pulled, the multiple plies may be readily torn back along the perforation lines 20, 21 to start the tearing along the desired lines without danger of tearing across the laminated tear strip portion. Also, preferably the band or bands of adhesive 15 are enlarged to a spot-like area within or adjacent the thumb tab 16, as indicated by dotted lines at 22. That is, the contacting surfaces between the plies are preferably adhered together over the area indicated at 22 so as to give the thumb tab and adjacent portions greater firmness and rigidity, but it will be understood that the thumb tab at this area is preferably, however, not adhered to the underlying flap 13.

As shown in Fig. 2, three superposed paper webs *a*, *b* and *c* are shown with their ends turned back, these webs being shown otherwise in the relationship which same occupy as they are about to enter the tube former of a bag tuber. Such webs have been perforated or otherwise weakened along transverse lines as at 23, 24 and at bag length intervals so that when the assembly of webs emerges from the tuber, same may be pulled apart into bag lengths along these weakened lines. The straight transverse lines of perforation are interrupted and formed with curved perforated portions as at 16' where each thumb tab as at 16 is finally to occur. The thumb tab perforations are also supplemented by the perforations 20', 21' located in the proper positions to form finally the above-mentioned lines of perforation 20, 21 as shown in Fig. 1.

It will be noted that the webs as shown in Fig. 2 are positioned in laterally stepped relation in accordance with conventional practice so that the stepped longitudinal edges on one side as indicated at 28 may be pasted to correspondingly stepped edges on the other side respectively when the webs are folded into a tube and whereby a longitudinal seam as at 29 (Fig. 3) will be formed in the uppermost wall of the tube, whereas the pull tab 16 and the tear strip 15 will then respectively be on and in the lower wall of the tube. However, as will be clear from Fig. 2, the glue lines 15*a* and 15*b* will be fully covered between plies of paper forming such lower wall and thus there will be no possibility that the glue thus used will have any opportunity to cause the lower wall to adhere to the upper wall of the tube.

Fig. 4 shows on an enlarged scale an end portion for one of the bag tube lengths and further shows more clearly the laminated tear strip band 15 and its relationship to the pull tab 16.

Fig. 5 illustrates schematically a manner in which the glue or other adhesive tear strip band or bands may be applied for example to the webs *a*, *b* as they enter at the intake portion of a bag tuber for forming a three-ply bag. Conventional known means may be provided

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at a suitable point in advance of the parts shown in Fig. 5 for transversely perforating or weakening the webs at lines such as 23, 24 at bag length intervals and with the perforated outlines for the pull tabs as at 16'. Such perforating means may also be arranged to form the lines of perforation as at 20' and 21'. Suitable conventional well-known glue applicator means (not shown) may be provided for spot pasting the webs at desired points in the usual way so that the various plies at or adjacent the ends of the bag tube lengths will be adhered together.

Glue applicator assemblies as at 30 and 31 are provided respectively for applying bands of adhesive 15*a* and 15*b* to the underside of webs *a* and *b* before same are assembled in superposed relation along with web *c*. The assemblies 30 and 31 may be provided with glue applicator wheels as at 30' and 31' suitably shaped to provide the adhesive bands 15*a*, 15*b* of desired width and with the enlarged areas of adhesive as at 22 at bag length intervals. The webs may be guided and assembled as by any suitable arrangement of rollers such as indicated at 32-36 inclusive. Glue applicator means as at 37 of a well known type may be used to apply the adhesive to the longitudinal edges of the webs to form the longitudinal seam and then the assembled webs pass around under a guide roller as at 38 and thence into the tube former schematically indicated at 39. The folded multi-ply tube 40 passes out of the tube former and to suitable known equipment as schematically indicated at 41 for separating the tube into bag lengths which are advanced by suitable conveyor means 42 to a point of discharge. Subsequently the bag tubes may be passed through known forms of bag bottoming equipment to form the end closures thereon such as shown in Fig. 1.

Although a preferred embodiment of the invention is herein disclosed for purposes of explanation, various modifications thereof, after study of this specification, will be apparent to those skilled in the art to which the invention pertains. Reference should accordingly be had to the appended claims in determining the scope of the invention.

What is claimed and desired to be secured by Letters Patent is:

1. A multi-ply paper bag of the type having an end closure formed of pasted flaps including one or more underlying and overlying flaps, an overlying flap comprising a closure flap, and with a pull tab protruding from the edge of the overlying closure flap, the construction being characterized in that the outer surface of the inner ply is adhered to the inner surface of the next ply by a narrow band of adhesive which extends from within said tab at one end of the bag across said overlying flap and thence longitudinally along within a wall of the bag to the other end of the bag, such adhesive band and the paper of the plies adhered thereto forming a laminated tear strip which by grasping said tab may be torn out along tear lines at each side of the band, to open the bag, said inner ply and next ply being otherwise disconnected along said band of adhesive.

2. A multi-ply paper bag construction in accordance with claim 1 and in which lines of perforation in said overlying flap are formed respectively at each side of the adhesive band, such lines starting substantially at said tab and extending at least part way across said flap, said tab and the area of said flap located between said lines being substantially free to be pulled away from the underlying flap.

3. A paper bag formed of several plies and having a tear strip construction comprising a laminated band formed of the paper of the plies together with superposed bands of adhesive between each ply and the next ply and securing such plies together, such band extending throughout the greater part of one of the dimensions of a wall of the bag, and tab means adjacent one end of

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such band accessible for pulling such band to tear same from the bag wall.

4. A multi-ply paper bag comprising at least two plies each ply extending fully around and comprising a part of the periphery of the bag, one ply thereof being within the other and each individual ply having overlapping marginal portions which are adhered together by marginal adhesive, such multi-ply paper bag having a tear strip construction comprising a laminated band formed of the paper of the plies with adhesive therebetween and securing together all of the plies, such band extending throughout the greater part of one of the dimensions of a wall of the bag, such adhesive of said band being separate from such marginal adhesive, and tab means adjacent one end of such band accessible for pulling such

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band to tear same from the bag wall, said plies being otherwise disconnected along said band.

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