

Oct. 21, 1969

R. W. BOLLING, JR., ET AL

3,473,723

LEAKPROOF CONTAINER

Filed May 13, 1968

4 Sheets-Sheet 1

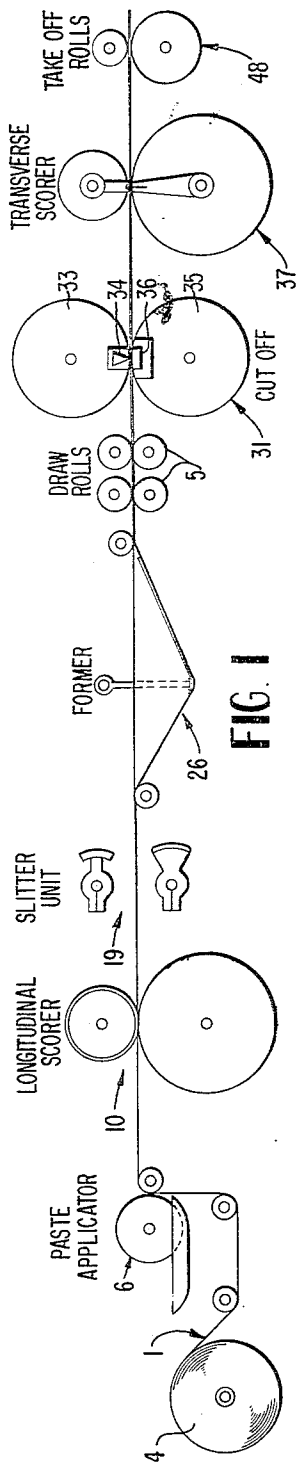


FIG. 1

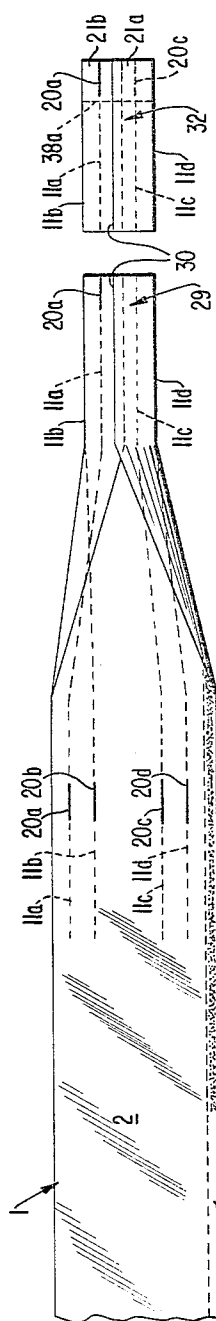


FIG. 6

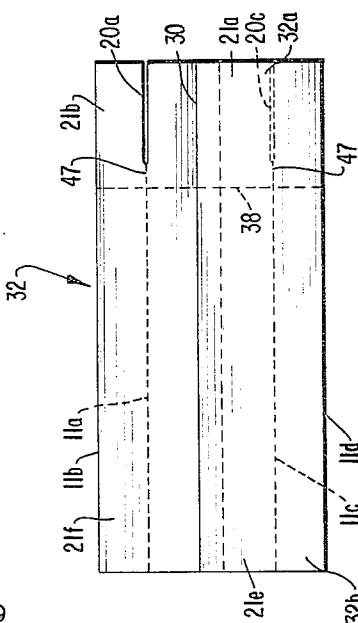


FIG. 7

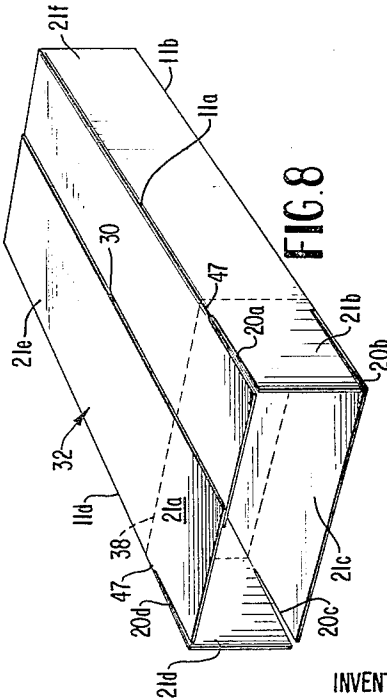


FIG. 8

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4 Sheets-Sheet 2

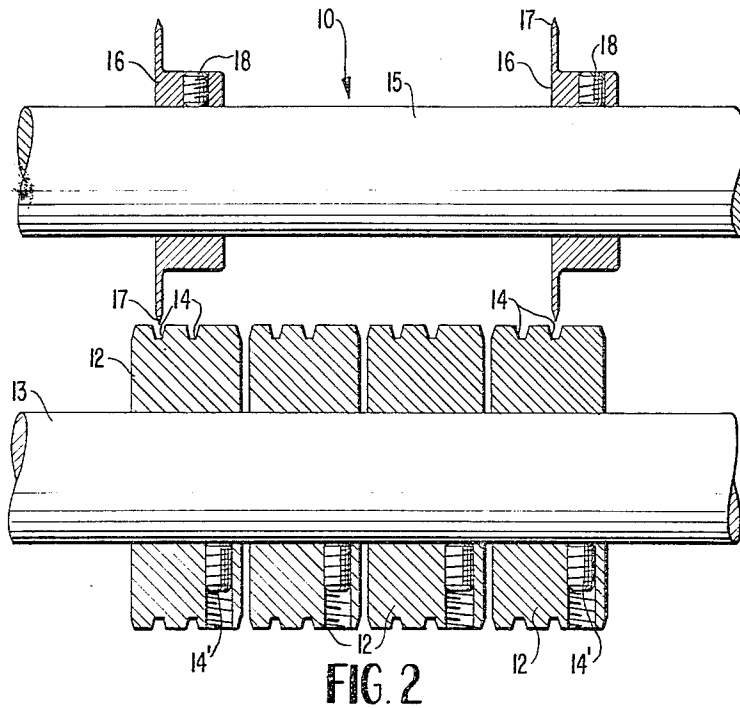
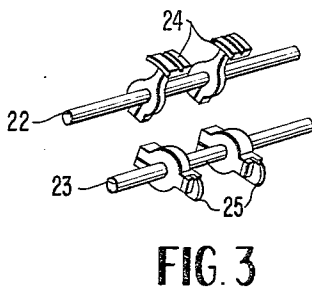
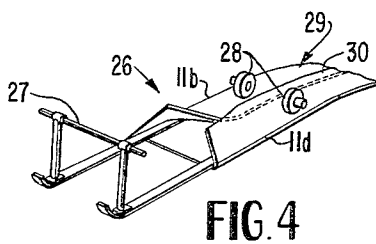
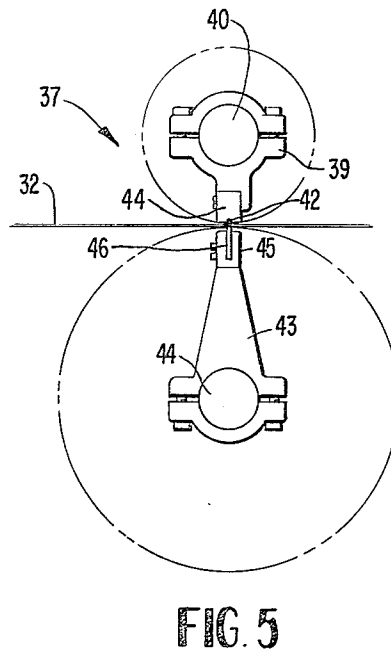


FIG. 5

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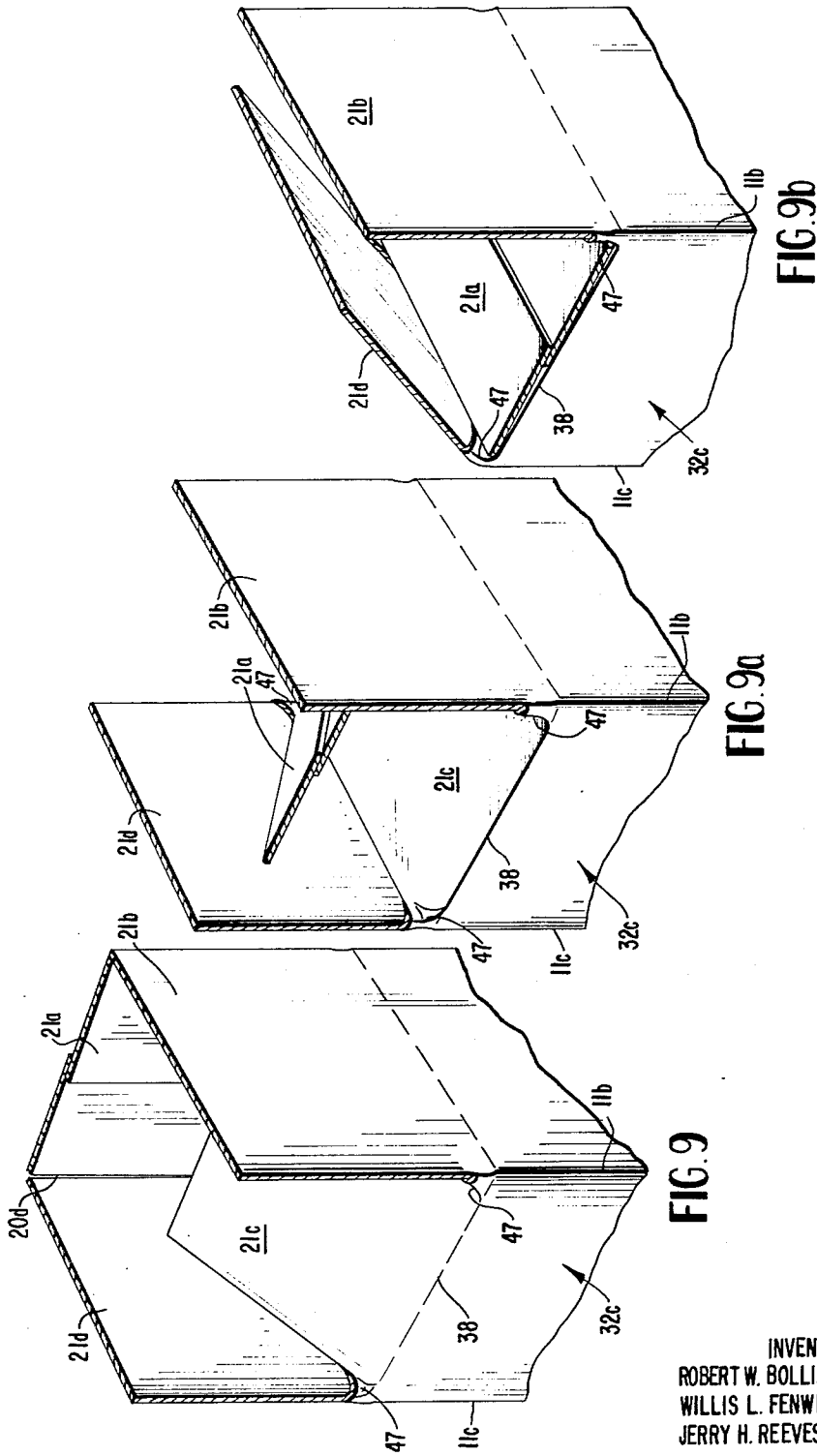
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4 Sheets-Sheet 3



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1

3,473,723

LEAKPROOF CONTAINER

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U.S. Cl. 229—37

1 Claim

ABSTRACT OF THE DISCLOSURE

A leakproof container comprising a tube body and a bottom closure formed by flaps extending from the end of the tube and infolded along a transverse score line whereby a crimped, leakproof joint is formed. The container is formed from a collapsed tube blank, continuously fabricated on a conventional bag making machine, by adjusting the usual assemblies of the machine to form the necessary longitudinal and transverse score lines and the slits of the blank as the web and the formed tube progress through the machine.

This invention is directed to containers, particularly to paperboard containers fabricated on tubers or bag machines.

An object of this invention is to fabricate in a continuous manner on a conventional bag making machine a collapsed container suitable for shipping materials, such as asphalt, tar, pipe enamel, certain cements and plastics, or like material which is molten under temperature conditions higher than ambient but not so high as to ignite paper or similar material. After the material is poured into the container at its molten temperature, it solidifies at ambient temperature. Therefore, it is necessary that the container be leakproof, at least for the time it takes the contents to solidify.

While there are containers on the market for the above purposes, such as drums and tubes, none of them is fabricated on a conventional bag making machine in the form of a continuous tube, properly scored, slitted and cut to form a collapsed unitary blank which can be expanded and bottomed to form a leakproof container for the reception of molten materials. Conventional containers are either an assembly of separate bodies and closures, or made from scored and slotted flat blanks, individually formed on sheeting, slitting, scoring, die cutting and folding equipment. Each of these blanks is thereafter assembled in a carton-like manner to form the container. Accordingly, the unitary container of the present invention provides stocking and inventory advantages over containers made up from two or more components.

Another object is to utilize a conventional bag making machine to form continuously a collapsed tube blank which may be easily expanded into a bottomed container. The necessary scoring, slitting, tube forming and cutting may be accomplished by utilizing the present feed, scoring, slitting and cutting means of a conventional bag making machine.

Another object is to form a tubular container wherein the end of the body is slitted to form a multiplicity of bottom flaps. The slits terminate a short distance from a transverse score line. When the flaps are infolded along the score line, a leakproof joint is formed between the flaps and body to prevent leakage of molten contents. Since the body is a tube, the tuck formed between the folded flaps and body has no break which needs further treatment to prevent leakage thereat, as in the prior art containers made from flat blanks.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

2

The invention accordingly comprises the several steps and the relation of one or more of such steps with respect to each of the others, and the article possessing the features, properties, and the relation of elements, which are exemplified in the following detailed disclosure, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

FIG. 1 is a diagrammatic layout of a conventional bag making machine and shows the manner in which the web progresses through the machine;

FIG. 2 is a sectional view through a portion of the longitudinal score roll assembly utilized in the machine;

FIG. 3 is a perspective view of a conventional slitter unit utilized to form the slits in the blank;

FIG. 4 shows a perspective view of a conventional former around which the tube is formed;

FIG. 5 is a view of the transverse score line forming means of the bag making machine;

FIG. 6 is a view of the web showing its progress through the machine as it is fabricated into the container blank;

FIG. 7 is a view of a completed collapsed container blank;

FIG. 8 is a perspective view of an expanded container showing the formation of the closure flaps;

FIGS. 9, 9a and 9b are perspective views showing the folding of the bottom flaps of an inverted container and illustrating the crimped, leakproof corners;

FIG. 10 is a view similar to FIG. 6 showing the web being folded between the score lines to form a tube in which the score lines and slits on each side are superimposed;

FIG. 11 is a view similar to FIG. 7 showing the container formed from the tube of FIG. 10;

FIG. 12 is a sectional view along the line 12—12 of FIG. 11; and

FIG. 13 is a view similar to FIG. 8 showing the expanded container formed from the tube of FIG. 10.

FIG. 1 shows a diagrammatic layout of the major assemblies of a conventional bag making machine, which assemblies may be adjusted to continuously score, form, slit and cut the web and tube from which the novel container is formed. While any type bag making machine may be used to fabricate the blanks, reference is particularly made to the machine shown in the patent to Coty et al., No. 1,816,361, for the disclosure of the various assemblies shown diagrammatically in FIG. 1.

Web 1 comprises material such as paperboard or similar flexible material suitable for the contents to be shipped in the finally formed container. As an example, if the contents is to be asphalt, the major portion 2 of the web is coated with a release agent, leaving a narrow uncoated band 3 of about one to two inches for the adhesive, as shown in FIG. 6. The web is fed or pulled from the stock roll stand 4 by draw rolls 5 engaging the formed tube, as will be described hereinafter. The specific form of draw rolls may be the means designated as F in the above Coty et al. Patent No. 1,816,361.

Web 1 is pulled by the draw rolls 5 past adhesive applying means 6 whereby the uncoated band 3 is coated with a suitable adhesive. After adhesive is applied, the web passes through longitudinal scoring means 10, whereby longitudinal score lines 11a, 11b, 11c, and 11d are formed in the web.

The longitudinal scoring means or score roll assembly is shown in FIG. 2 and comprises a series of rollers 12 fastened to shaft 13 by set screws 14¹. Grooves 14 of suitable shape and width are formed in the rollers. Parallel

to shaft 13 is shaft 15 carrying scoring discs 16. Each disc 16 has a peripheral edge 17 aligned with a chosen groove 14 to score the web as it passes between a roller 12 and disc 16. The discs are secured to shaft 15 by means of set screws 18 passing through their hubs. Shaft 15 carries the desired number of discs, that is, a disc for each longitudinal score line. In the present instant, since four score lines are formed, there are four discs 16 spaced on shaft 15 at predetermined points. Shaft 13 carries more rollers than there are discs to support the web.

Scoring assembly 10 is driven by suitable gearing, in accordance with the desired speed of draw rolls 5 in the manner well known in the bag making machine art. The assembly may be mounted on the machine frame in the same manner as the other assemblies are mounted in the above Coty et al. patent.

From the scoring means 10, the web travels to the slitter unit 19 where slits 20a, 20b, 20c and 20d are formed at regularly spaced intervals along the aligned score lines 11a, 11b, 11c, and 11d respectively, as shown in FIG. 6. These slits will form the flaps for the bottom closure of the container. When the tube blank is expanded, as shown in FIG. 8, flaps 21a, 21b, 21c and 21d will be formed between the respective slits, which flaps are extensions of the panels designated 21e, 21f, 21g and 21h.

To slit the tube blank in a continuous process, the knife means designated as E in the above Coty et al. patent (FIG. 5) is used, but the slitting blade means are replaced by slitting blades or discs, as shown in FIG. 3 herein. Although the slitter unit 19 may be located after the tube former for some styles of tubes, it is desirable to place the slitter means 19 before the tube former so that the slits are cut in the web. As shown in FIG. 3, the slitter means comprise parallel shafts 22 and 23 driven in timed relation with the blank or web, as explained in the above Coty et al. patent. Shaft 22 has secured thereto for rotation therewith slitter bars 24. Similarly, shaft 23 carries for rotation therewith slitting blades 25. The several bars and blades are spaced on the shafts to form the two pairs of slits 20a-20b and 20c-20d, as the web 1 is fed past the cooperating slit bar and blade means 24, 25.

From the slitting unit 19, the web travels to tube forming means 26. Means 26, shown in FIG. 4, may be similar to the tube forming means of the above Coty et al. patent designated as H and shown in FIG. 11 of the patent. As the folding operation is well known, no specific description is necessary. The web is folded over the frame of the tube former and arm 27 and rollers 28 cooperate therewith to form a tube 29 with the longitudinal score lines 11b and 11d constituting the outer edges of the tube. In forming the tube the edges of the web are overlapped and secured together by an adhesive seam 30.

From tube former 26, the tube passes to the draw rolls 5 which present the web to cutter means 31 to cut off a blank 32 (shown in FIGS. 6, 7 and 8) from the web. The cutter means may be the same as designated as G in the above Coty et al. patent (FIGS. 3 and 6), and reference is made to the patent for the specific detailed construction of the cutter means 31. It is shown in FIG. 1 diagrammatically and broadly comprises top roller 33 carrying knife blade 34 and bottom roller 35 carrying cutoff bar 36. Cutting means 31 is driven at such rate that knife and cutoff bar means 34, 36 come together at the proper point of tube travel to cut off a blank 32 of desired length having a flap portion 32a and a body portion 32b.

The tube blank 32, supported on rollers (not shown), is delivered to transverse scoring means 37, where score line 38 is formed. Such score line is made a short distance 47, such as one-half to one inch, behind the ends of the slits 20a, 20b, 20c and 20d, for the purpose hereinafter stated. The scoring means shown in FIG. 5 may take the place of the first pair of feed rolls designated g⁶, g⁷ in the above Coty et al. patent. The transverse score line forming means comprises an arm 39 secured to shaft 40 to rotate therewith, and a block 41 having a groove 42 therein adjustably

secured to arm 39. Depending upon the length of the score line, there may be several arms 39 secured to shaft 40 to which block 41 is attached. A second arm 43 is secured to shaft 44, parallel to shaft 40, and a block 45, carrying a scoring blade 46, is adjustably secured to arm 43. Arms 39 and 43 are rotated in timed relation with the feed of blank 32 so that at the proper time, groove and score blade means 42, 46 cooperate to form the transverse score line 38 between the flap and body portions 32a and 32b of blank 32.

The blank 32 is finally delivered by take-off rolls 48 to a conveyor means in the usual manner.

To utilize the container, tube blank 32 of FIG. 7 is expanded to form a tubular body as shown in FIG. 8. While a general rectangular form is shown, in view of the four longitudinal score lines and flaps and folds of the tube body, the shape may be varied to assume a different polygonal form. As flaps 21a to 21d are infolded at transverse score lines 38, the portion 47 of the tube body between the score lines and the termination of slits 20a to 20d is folded to form a crimp or seal between the body of the container and the bottom closure comprising the infolded flaps 21a to 21d, as shown in FIGS. 9, 9a and 9b. The flaps may be secured to each other as by stapling or adhesive. The final product is a container formed from a tube with a flap-formed bottom closure having a crimped joint therewith, whereby a leakproof seal is formed. The joint is sufficiently leakproof for the reception of molten materials as heretofore specified.

If desired, a similar top closure flap means may be added to the blank 32, using the same means as described above. Obviously, transverse scoring means 37 and slitter means 19 would then be timed to form a second set of transverse score lines and a second set of slits along the longitudinal score lines at the other end of blank 32.

FIGS. 10, 11, 12 and 13 show a modification of the container in which the tube is scored and slit in the same manner as shown in FIGS. 1 and 6, but the web 1 is folded around the former between the score lines 11a-11b and 11c-11d rather than on the lines 11b and 11d as described above. In such case the score line 11a and the slit 20a are superimposed over the score line 11b and the slit 20b, and similarly the score line 11d and the slit 20d are superimposed over the score line 11c and the slit 20c. The fold lines made by the former are designated 11e and 11f and serve as median fold lines in the panels 21h and 21f and the flaps 21d and 21b, and permit the blank to be collapsed as shown in FIG. 12. In making this blank 49 it will be understood that the slits may be made in the tube after it has been scored and formed into a tube as heretofore pointed out.

As the container of the present invention is being filled with the molten material, the four sides of the container bulge out so that the container assumes an oval or cylindrical shape. Consequently, after the molten material has solidified, it retains such oval or cylindrical shape permitting it to be rolled. When the material is ready for use, the release coating on the inside of the container allows the container to be peeled away from the material. It will thus be apparent that this container affords all the requirements necessary in the industry.

While the container is disclosed as coated with a release agent, it may be left uncoated, or may be coated with any other chosen coating, either on the inside or outside, to give the container such properties as waterproofing, absorbing resistance, etc.

Since certain changes in carrying out the above process, and certain modifications in the article which embody the invention may be made without departing from its scope, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Having described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A unitary leakproof container blank formed of a

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collapsible flexible tube, said collapsible tube blank comprising:

- a body portion;
- an open top at one end of said body portion and a bottom portion projecting from the other end of said body portion;
- a glued seam extending along said blank from bottom to top;
- a transverse score line separating said body portion from said bottom portion which extends across the width of the blank;
- a pair of parallel longitudinally extending score lines on each side of the central longitudinal axis, from the top to beyond the transverse score line;
- the spacing between parallel lines on one side of said blank being the same as the spacing of the pair on the other side of said blank, whereby folding the tube along said longitudinal score lines provides a rectangular cross section for the container set up from said blank;

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and four cut slits of uniform length extending from the end of said bottom portion in line with each of said longitudinal score lines, each of said slits ending at an inner termination point spaced outwardly from said transverse line, said cut slits forming side, front and back flaps at the bottom thereof and said flaps folding inwardly along the transverse score line to provide a leakproof bottom joint.

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U.S. Cl. X.R.