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3,094,265

CORNER SEALED LEAKPROOF CARTON

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2 Sheets-Sheet 1

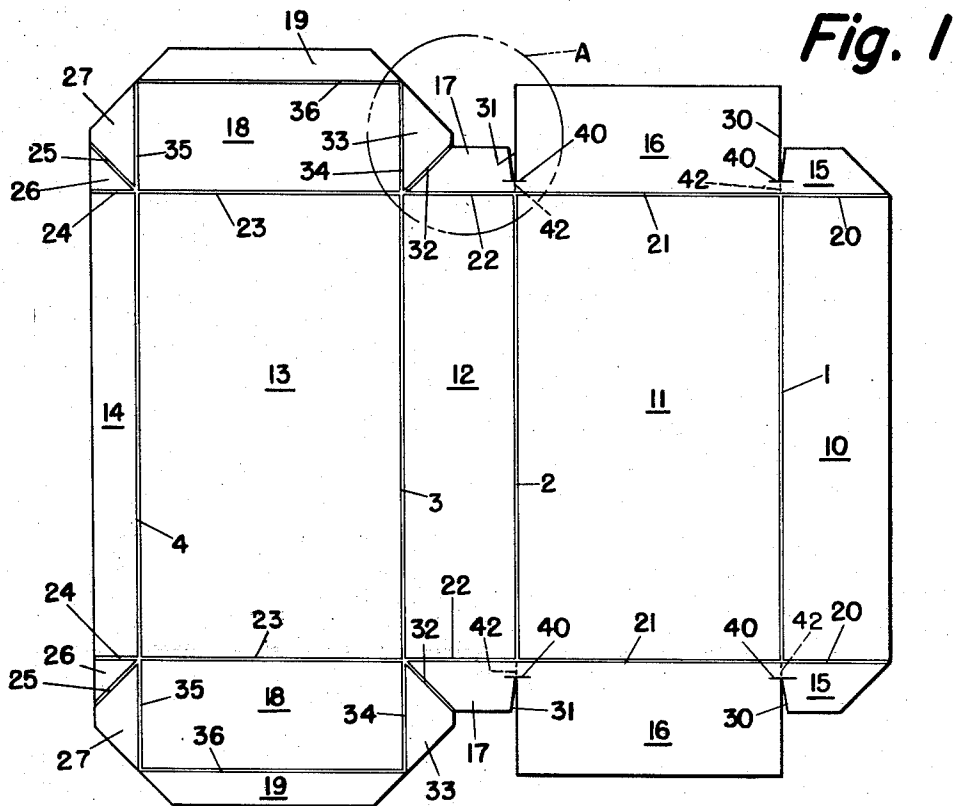
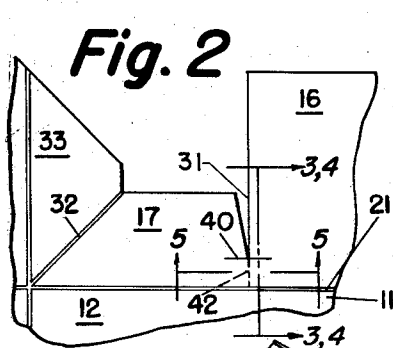
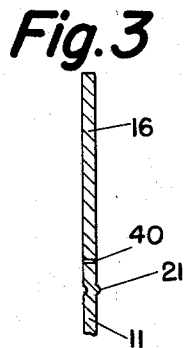
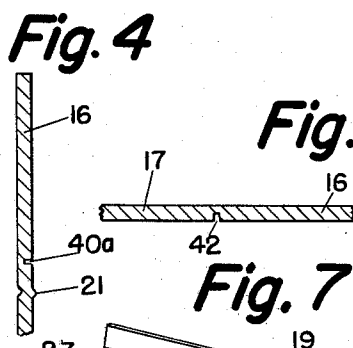
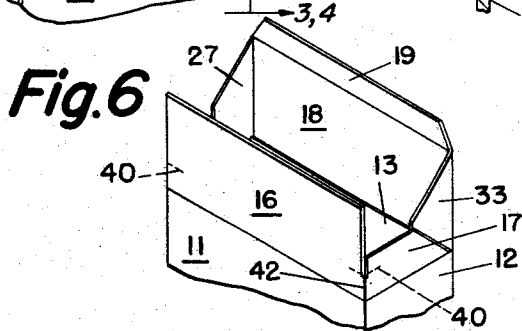
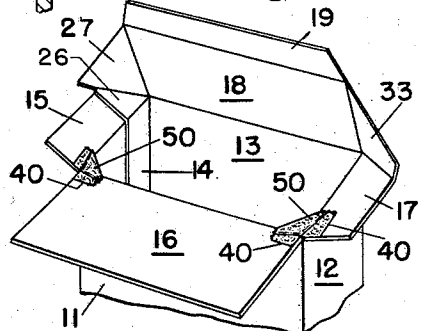


Fig. 5

Fig. 7



1

3,094,265

CORNER SEALED LEAKPROOF CARTON
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This invention relates to a leakproof carton and its method of formation, particularly for the packaging of pulverulent, liquid and the like material. Cartons of this leakproof nature, commonly made of paperboard material, which may be lined, coated or otherwise treated, are in substantial use for the packaging of such materials as soap powders, ice cream, milk and other granulated and liquid products. The present invention provides an unusual and economical construction, easily formed, set up, filled and sealed by automatic equipment presently available or convenient modifications of such equipment.

Details of the advantages and specific objects of the invention will be readily apparent from the following description in connection with the appended drawings, in which:

FIGURE 1 is a plan view of the carton blank forming a part of this invention,

FIGURE 2 is an enlarged partial view of the part of the blank indicated at A in FIGURE 1,

FIGURE 3 is a cross-sectional view taken along the line 3—3 of FIGURE 2,

FIGURE 4 is a cross-sectional view, showing a modified construction, taken along the line 4—4 of FIGURE 2,

FIGURE 5 is a cross-sectional view taken along the line 5—5 of FIGURE 2,

FIGURE 6 is a partial perspective view of an end of the carton shell formed from the blank of FIGURE 1,

FIGURES 7, 8 and 9 are partial perspective views showing successive steps in the closing of an end of the carton,

FIGURE 10 is a perspective view showing the completed carton formed from the blank of FIGURE 1,

FIGURE 11 is a partial plan view of a modified form of the carton blank, and

FIGURE 12 is a partial perspective view of a step in the formation of a carton from the modified blank of FIGURE 11.

Referring first to FIGURE 1, the carton is formed from a substantially rectangular blank, preferably of paperboard, suitably divided by cut and score lines into a series of connected walls, flaps and panels, including alternate end walls 10 and 12 and side walls 11 and 13, and connecting flap or panel 14, defined from each other by hinge score lines 1 to 4. Top and bottom closure flaps 15, 16, 17, 18 and 26 are hingedly connected to the respective top and bottom end edges of the walls and panel along hinge score lines 20 to 24.

Panels 27 and 33 are hinged to the respective lateral edges of flaps 18 along hinge lines 34 and 35 and are integrally and hingedly connected respectively to flaps 26 and 17 along diagonal fold or hinge lines 25 and 32. Sealing flaps 19 are hingedly connected to the remote end edges of flaps 18 along score lines 36.

Referring also to FIGURES 2, 3 and 5, the lateral edges of flap 16 are defined from adjacent flaps 15 and 17 along cut lines or by cut-out portions as at 30, and 31 respectively, which lines or cut-outs terminate short of hinge lines 20 to 22 at laterally extending cut lines 40 lying substantially parallel to those hinge lines. Between cut lines 40 and the aforementioned hinge lines, the divisions between flaps 16 and adjacent flaps 15 and 17 are defined by cut score lines 42 impressed only partially through the blank material from the outside of the blank

2

(the reverse side of the blank as depicted in FIGURE 1). Cuts 40 are impressed completely through the blank material, and divisions 30 and 31 and cut score lines 42 are precisely arranged for purposes later to be detailed.

In the initial stage of the formation of a carton from the blank shown in FIGURE 1, elements 13 and 14 are together folded about hinge score line 3 to overlie walls 11 and 12, and wall 10 is then folded about hinge score line 1 to overlie the exterior surface of panel 14, to which it is fastened by any suitable means, preferably an adhesive. Flaps 15 are simultaneously adhered to the exterior surface of flaps 26, the diagonally-cut lateral edges of flaps 15 substantially coinciding with diagonally hinge score lines 25. It is in this form, commonly referred to as a "glued" shell or blank, that the carton is made by the carton manufacturer, for shipment to the packager who will set up, fill and seal the carton for shipment and sale of the contained product.

FIGURE 6 shows one end of the tube formed by squaring of the shell previously described, the opposite end of the construction described of course being identical thereto. Referring also to FIGURE 7 closing of an end of the carton is initiated by first outfolding flaps 16, 17 and 15, 26. This outfolding results in a substantially planar cleavage of the carton material intermediate of the surfaces, the cleavage being initiated at the juncture of cut lines 40, separations 30, 31 and cut scores 42, and progressing outwardly along cuts 40 and downwardly along cut scores 42 as the outfolding continues. When the cleavage reaches the ends of cut lines 40, the webs 50 of material which have thus separated away from flaps 15 to 17 tear downwardly to the hinge lines 20 to 22. As seen in FIGURE 7, as the outfolding of flaps 15 to 17 reaches the point where they lie in approximately the plane of the open end of the tubular shell, webs 50 by virtue of the tearing action described have been formed to lie in substantially this same plane. This same action produces only a partial infolding of flap 18 since that flap is connected to flaps 17 and 15—25 by fold panels or flaps 27 and 33.

Flap 18 is then folded over the open end of the tubular shell, as seen in FIGURE 8, fold flaps 27 and 33 are adhered to underlying flaps 17 and 15, 26, and sealing flap 19 is adhered to flap 16. At this same time, the overlying portions of flap 18 may be adhered to the exposed surfaces of webs 50.

Combined flaps 15, 27 and 17, 33 are then folded inwardly, as seen in FIGURE 9, and flap 16 with flap 19 adhered thereto is folded over the end of the carton and adhered in position as shown in FIGURE 10.

The carton, with one end thus closed, may then be filled with the product to be contained, and the other end then sealed in the same manner as previously described.

The adhering and sealing of the various elements of the carton construction, as above described, may be achieved by any suitable sealing or adhesive means, such as glues of various sorts. However, it is preferred that this sealing be achieved through the use of a thermoplastic or heat-sealing adhesive, which conveniently may be provided by applying over the entire surface of the blank which will ultimately form the interior of the carton a heat-sealable coating, such as, for example, polyethylene. In an economical method of manufacture, the heat-sealable coating, such as polyethylene, may be continuously extruded onto a continuous web of paperboard, from which the blanks of FIGURE 1 are cut or stamped. It will be clear from the construction and method, as above described, that there will result at each of the sealing points noted a polyethylene-to-polyethylene contact, except at the contact of the corners of flaps 18 with the exposed surface of webs 50 and at the seal of panel 14 to

wall 10, permitting an exceptionally fine leakproof seal.

In the construction described, all cuts, cut-scores and scoring may be impressed into the carton material from the same side or surface of the blank, specifically, that surface which will become the exterior of the carton. However, referring also to FIGURE 4, a satisfactory construction will result if the transverse cut line 40, instead of being a cut completely through the material, is instead only a cut-score line 40a impressed into the carton material from the interior surface of the blank. While the efficiency of the finished carton and of its erection will not thereby be adversely affected, this modification does require impression of the cut-score 40a into a surface of the blank opposite to that from which the other cuts and scores commonly are impressed. This ordinarily involves an additional and separate manufacturing step with attendant increased cost, and is therefore generally less desirable than the construction first described.

Referring also to FIGURE 11, the final tearing of the carton material from the remote ends of cut lines 40, in the formation of webs 50, may be facilitated and given better directional control by providing downwardly extending terminal cut portions 40b at the ends of cut lines 40 or cut-scores 40a. The advantage resulting from this modification is readily apparent from FIGURE 12, where the formation of webs 50 from the modified construction is shown.

The sealing of the extended overlapped flaps 16, 19, 17, 33 and 15, 27 shown in FIGURE 8 may be accomplished by running the extended flaps between conventional heat-sealing bars whereby the thermoplastic heat-sealable coating will be actuated to form a leakproof seal. In conjunction therewith, a heating element may be applied against the end of the carton closed as shown in FIGURE 8 to activate the coating on the interior surface of flap 13 to achieve a seal of the corner portions of that flap to the webs 50. A similar application will seal flap 16 over the end of the carton to achieve the final closure shown in FIGURE 10.

It is preferred that the carton blank of FIGURE 1 be formed from relatively stiff paperboard, preferably of a thickness from about .010 to .020 inch, in which range the material is of sufficient strength to react suitably to the application of heat-sealing temperatures and pressures, but not of such great stiffness as to make such application unduly difficult. However, any suitable type and weight of material may be employed, so long as it is capable of reasonably controlled planar splitting to provide webs 50 and proper folding and adhesion of the elements in accordance with the foregoing description.

Also, as indicated, a polyethylene coating provides excellent resealing, both from the point of view of providing general leakproofness and of providing excellent sealing and handling characteristics. It is preferred to coat the carton material with about 10 to 20 pounds of coating or extruded film per ream (2880 sq. ft.) of carton material, but any weight sufficient to achieve the objective will be satisfactory. It has also been found that particular wax blends may be used to provide a satisfactory overall construction. As noted, it is not necessary in particular uses that an overall coating or film be applied to the blank, but rather it may be sufficient to employ a thermoplastic or other adhesive only in the areas in which a seal is required. Obviously, in any of these constructions the resulting carton may be wrapped, overwaxed, or otherwise treated to provide primary or additional leakproofness, improved printing or merchandising qualities, or other features. It will also be apparent that the carton could

include the web corner construction at all four of its corners, rather than at only two as shown.

Although only certain modifications and preferred forms of this invention have been shown and described, it is clear that obvious departures from the disclosure herein may be made without departing from the spirit of the invention. Accordingly, it is intended that the invention is to be limited only as specifically set forth in the appended claims.

I claim:

1. A leakproof carton corner construction, the carton including a pair of main walls connected together along adjacent edges and an end closure flap hingedly connected to the end edge of each of said walls and folded in overlapping relation to overlie the end of the carton substantially normally with respect to the walls, the leakproof construction being provided by an integral web of carton material lying in a plane parallel to and immediately inwardly of the adjacent flaps at the corner of the carton and perpendicular to the walls and comprising a layer of carton material separated from the inner surface of said flaps at said corner and integrally connected to said flaps of the carton immediately adjacent the hinge connection of the flaps to the walls.

2. In a paperboard blank adapted to form a carton, the blank being divided by cuts and scores to include opposed pairs of end and side walls and top and bottom closure flaps hinged to the ends of the walls, a leakproof corner construction comprising a first cut separating a pair of adjacent closure flaps, said cut terminating outwardly of the hinge connection of said flaps to the respective adjacent walls, and a second cut through at least the inner surface of the blank extending into both of said flaps from the inner terminal end of said first cut and substantially perpendicular thereto, to provide a leak-preventing web over the corner of the carton formed from the blank upon outward folding of said adjacent flaps.

3. A corner construction according to claim 2, in which said second cut is extended completely through the blank.

4. A corner construction according to claim 3, in which said cut at each end terminates in a cut extending toward said hinge connection.

5. A corner construction according to claim 2, in which said second cut at each end terminates in a cut extending towards said hinge connection.

6. In a paperboard blank adapted to form a carton, the blank being divided by cuts and scores to include opposed pairs of end and side walls and top and bottom closure flaps hinged to the ends of the walls, a leakproof corner construction comprising a first cut separating a pair of adjacent closure flaps, said cut terminating outwardly of the hinge connection of said flaps to the respective adjacent walls, a cut score impressed into the exterior surface of the blank and extending from said termination of the first cut to said hinge connection, and a second cut through at least the inner surface of the blank extending into both of said flaps from the inner terminal end of said first cut and substantially perpendicular thereto, to provide a leak-preventing web over the corner of the carton formed from the blank upon outward folding of said adjacent flaps.

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