

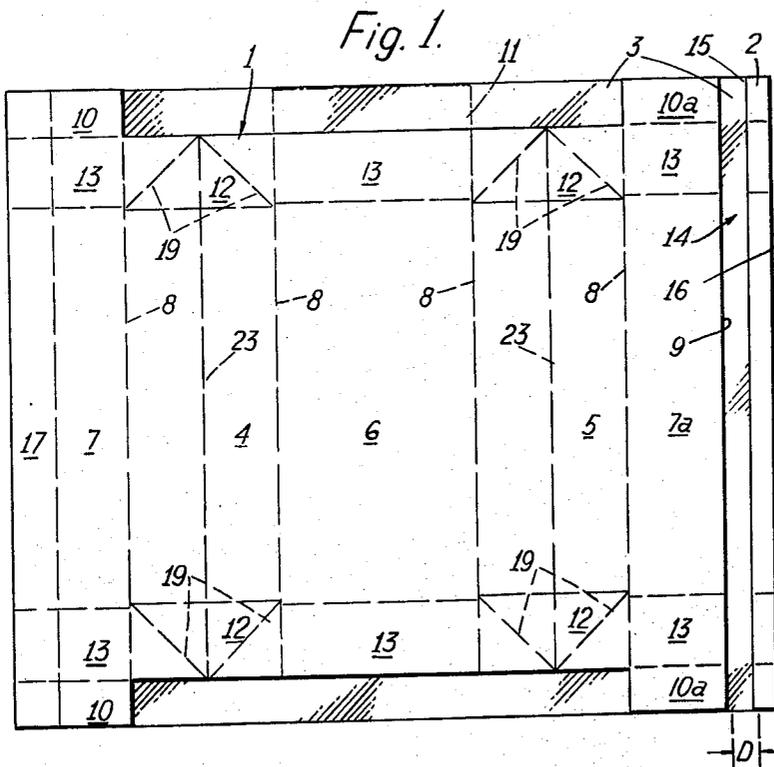
Nov. 8, 1960

R. W. E. MOSSE ET AL  
CARTONS

2,959,336

Filed May 28, 1957

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

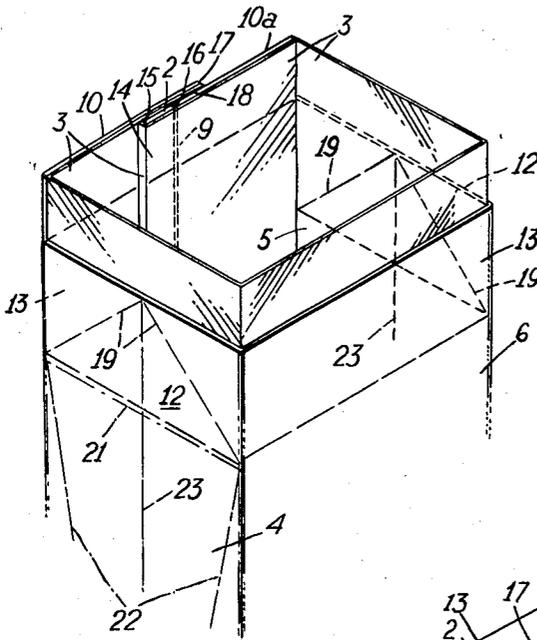
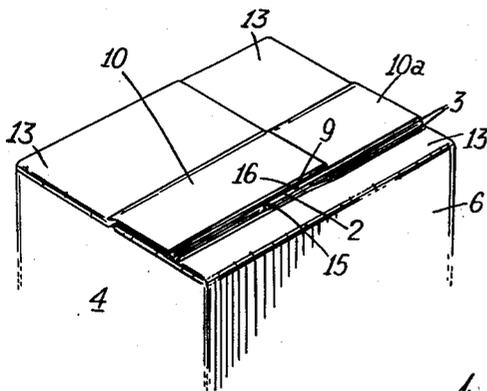
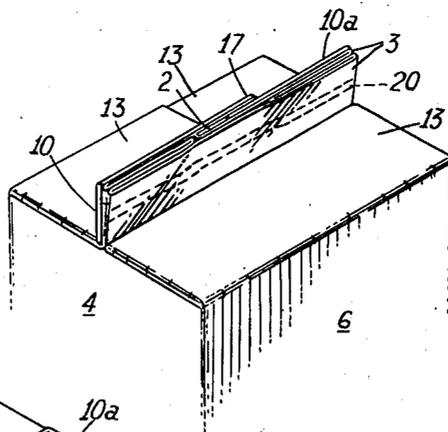


Fig. 2.

Fig. 3.



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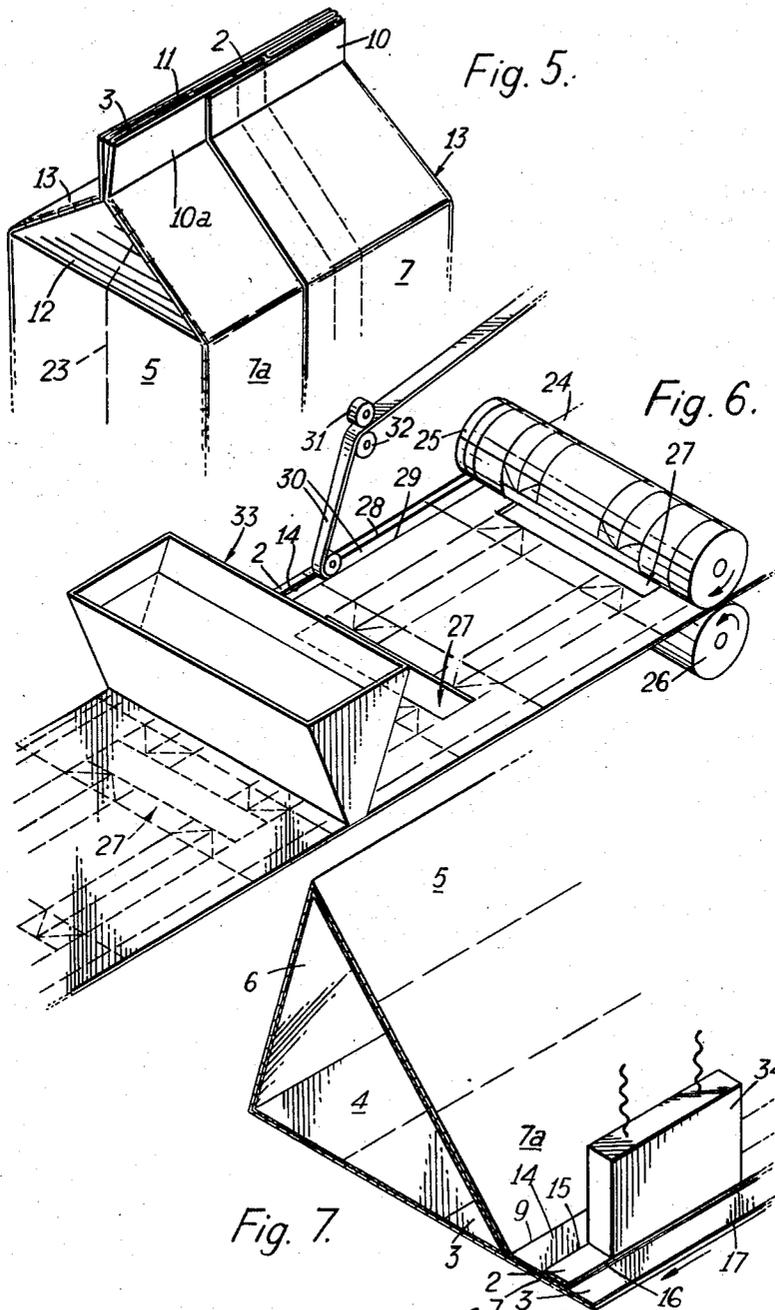
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4 Sheets-Sheet 3



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4 Sheets-Sheet 4

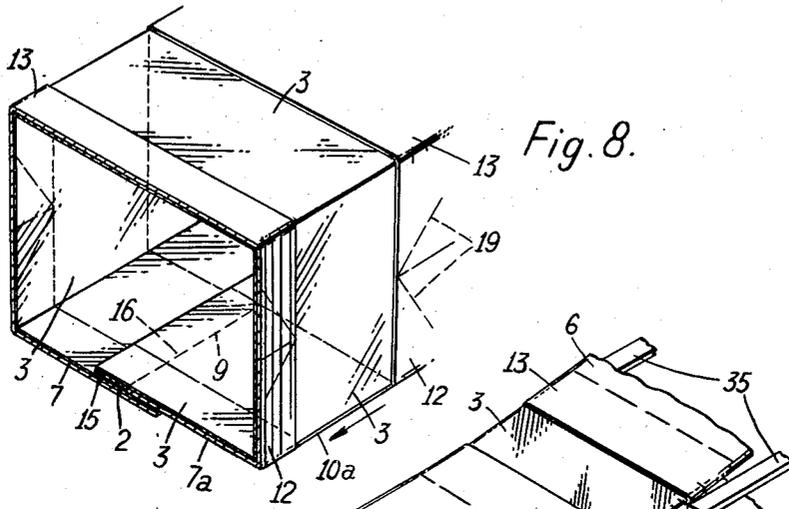


Fig. 8.

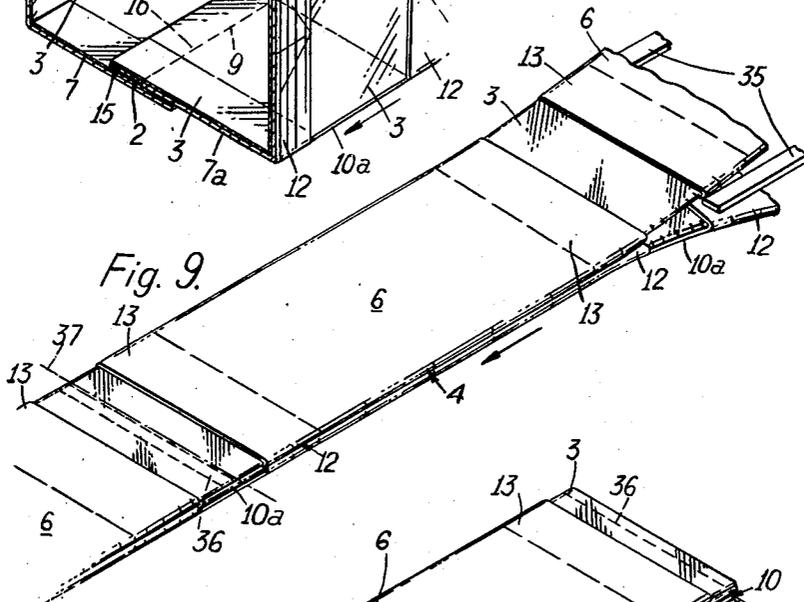


Fig. 9.

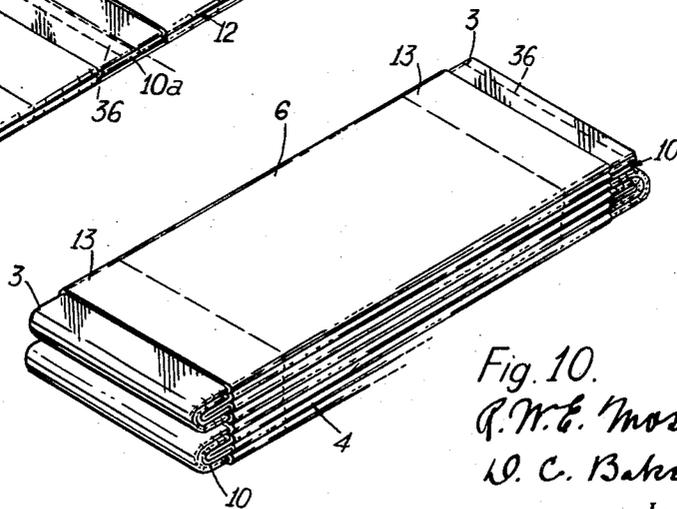


Fig. 10.

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2,959,336

CARTONS

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11 Claims. (Cl. 229—14)

This invention relates to cartons and in particular to cartons constructed to contain liquids such for example as milk, edible fats, or oils.

As is well understood, many cartons have been proposed for the purpose of containing liquids for storage and transport and such cartons have usually been provided with wax-coated interior surfaces or with liquid impermeable liners, for example liners made of heat-sealable material, which may be bonded to the primary carton-forming material, usually cardboard, strawboard, or like material. With containers provided with liners, however, it has not been possible to line the inside edge of the primary carton-forming material without forming a seam consisting of at least three thicknesses of the primary carton-forming material and this results in a bulky seam which is unsightly and increases the difficulty of forming a good heat seal along the seam.

It is a main object of the present invention to provide an improved form of liquid-tight carton in which the inside edge of the primary carton-forming material for a lined container can be fully protected by the liner material without increasing the thickness of the seam above the two thicknesses of material usually employed in the making of a seam by the overlying of one portion of material on another.

According to the present invention there is provided a blank for a four-sided carton the ends of which are arranged to be closed by two outer flaps extending from opposite sides of the carton to be substantially in edge-wise abutting relation and to overlie inner flaps hingedly connected thereto and infolded from the other opposite sides of the carton, said blank comprising a liner of heat-sealable material, for example polyethylene, having adhering to one side thereof a carton body and a parallel-sided strip each made of cardboard, strawboard or like material, the carton body including fold lines about which the four sides and the outer and inner flaps are foldable, the strip being parallel to the fold lines about which the sides are foldable and retained by the liner to be spaced from an edge of the carton body parallel with the fold lines about which the sides are foldable by a distance not less than the width of the strip, and the liner extending beyond said outer and inner flaps.

The invention also contemplates a collapsed open-ended tube made from a blank as just set forth, a method of making such tubes, and cartons made from the tubes.

Some embodiments of the invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings in which:

Fig. 1 illustrates a blank from which one form of carton according to the invention can be constructed and also illustrates a modification applied to the blank,

Fig. 2 is a pictorial view of one end of the blank according to Fig. 1 when the blank is folded to form a four-sided tube,

Fig. 3 is a pictorial view illustrating the method of closing the end of the carton,

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Fig. 4 is a pictorial view illustrating the end of the carton after all closing operations have been completed,

Fig. 5 is a pictorial view of a modified closure formation for the carton,

Figs. 6 to 9 together diagrammatically illustrate a continuous method of making carton blanks and carton tubes for forming cartons in accordance with the invention, and

Fig. 10 illustrates a stack of superimposed fan-folded flattened carton tubes.

Referring to Fig. 1 of the drawings, a blank for making a liquid-tight carton consists of a portion 1 of cardboard, strawboard or like material which is to form the carton body, a strip 2 also of cardboard, strawboard or similar material, and a liner 3 of liquid-resistant heat-sealable material, such for example as polyethylene, which liner is adhered to and extends across the body 1, the strip 2, and a space between the body 1 and strip 2.

The carton body 1 is provided with panels 4 and 5 which are to form two opposite sides of the carton, with a panel 6 which is to form a third side of the carton, and with panels 7, 7a which together will form the fourth side of the carton. The carton body is provided with fold lines 8 about which the panels 4, 5, 6, 7 and 7a are folded to form the four sides of the carton and the strip 2 is parallel to the fold-lines 8 and is retained by the liner 3 to be spaced from the edge 9 of the carton body by a distance D which is not less than the width of the strip 2. The panels 7, 7a are provided at the opposite ends thereof with extensions 10, 10a which together are to form a seam-covering flap as described below. If desired, one end of the panel 6 may be provided with a similar seam-covering flap 11. As described above, the liner 3 covers one side of the carton body and one side of the strip 2 extends beyond flaps 12 articulated to panels 5 and which are to form inner flaps on closing of the ends of the carton, and also beyond flaps 13 which are articulated to panels 6 and 7, 7a and which are to form outer flaps on closing of the ends of the carton.

When folding the blank shown in Fig. 1 to form the carton the strip 2 is folded to overlie the flap 7, which is the flap remote therefrom, and the lined portion of the strip is brought into contact with the lined portion of the flap 7, as illustrated in Fig. 7, and is heat-sealed thereto to form a longitudinal seam between overlying portions of body material 1, 2. The portion 14 of the liner which extends across the space between carton body edge 9 and strip 2 is then folded to overlie the uncoated surface of the strip 2 and in so folding the said portion of the liner, the inner edge 15 of the strip 2 is covered by the liner portion 14 and the interior of the four-sided tube, as illustrated in Fig. 8, is provided with a continuous liquid-tight interior surface. The folding of the liner portion as just described causes the outer edge 16 of the strip 2 to be juxtaposed with the edge 9 of the panel 7a. In a preferred embodiment of the invention the panel 7 is provided with a flap 17 by which the panel 7 is secured to the panel 7a by the provision therebetween of any suitable form of adhesion 18, Fig. 2.

From the foregoing description, and from Fig. 2, it will be understood that due to the provision of strip 2 and liner portion 14, and to the manner of disposal thereof, the four-sided tube is provided with a longitudinal seam which is composed of only two overlying thicknesses of cardboard and the seam is entirely liquid-tight because it includes no unlined portion of cardboard.

After formation of the four-sided carton tube in the manner just described, one end of the container is closed by folding towards each other the inner closure flaps 12 which closure flaps, as can be seen from Fig. 2, extend from opposite sides of the carton and are hingedly con-

ected to the outer flaps 13. The inner flaps 12 are provided with fold lines 19 which permit the inner flaps to be folded inwards so that the outer flaps 13 can overlie them and be in substantially edge-wise abutting relation as illustrated in Fig. 3, the outer flaps 13 when so folded lying in a plane which is substantially at right-angles to the sides of the carton. Closing of the container by folding the inner and outer flaps in the manner just described causes the portions of the liner which are adhered thereto and which extend beyond the inner flaps 12 to be infolded upon each other, and the portions 3 of the liner which are adhered to and which extend beyond the outer flaps 13 to be folded against the infolded portions and against each other. The portion of the liner which is folded as just described is provided with a heat seal as indicated at 20, Fig. 3, thereby to form a flat heat-sealed liquid-tight seam, as illustrated in Fig. 3, such seam being substantially co-extensive with the substantially abutting edges of the outer flaps 13 and also exterior of the closed end of the carton. After forming the heat seal 20, the flat heat-sealed seam can be folded down into engagement with one of the outer flaps 13 by the seam-covering flap 10, 10a and may be caused by the use of a suitable adhesive to adhere to the said outer flap or, if desired, the seam and flap 10, 10a may be retained in the down-folded position thereof by a label or the like secured across the closed end of the container. In a preferred embodiment of the invention, however, the heat seal 20 is formed slightly closer to the end of the container than illustrated in Fig. 3, and the down-folded portion, Fig. 4, is heat-sealed to the end of the container by a second seal similar to seal 20 and located between seal 20 and the free edge of the down-folded portion. The second seal so formed acts as a protection against accidental or unintentional breaking or opening of seal 20. The container, sealed at one end in the manner just described, is inverted and filled with the liquid to be contained therein and, thereafter, the open end of the container is closed and sealed in the manner described above.

If desired, one end of the container may be closed in the manner described above and the end of the container which is closed after filling of the container may be closed by outer flaps 13, as illustrated in Fig. 5, in which the outer flaps are folded to form an inverted V. The liner will be infolded to form a flattened seam as described with reference to Fig. 3 and will be heat-sealed as previously described, but the blank for forming this kind of carton is preferably provided with the flap 11 so that the liner portion which is folded to form the flattened seam and which extends beyond the inner and outer flaps in the closed positions thereof is sandwiched between the flaps 10, 10a and 11 thereby to permit, in known manner, the use of a clip not shown, or the like in conjunction with the flaps 10, 10a and 11.

If desired, one side of the carton may, in known manner, be provided with a line of weakening 21, Fig. 2, and fold lines 22 by which a pouring spout may be formed in the carton. The spout is formed by slitting the carton along the line 21 and then folding outwards the portion of material between the lines 22 and a further fold line 23.

Referring to Figs. 6 to 9 of the drawings there is diagrammatically illustrated therein a method by which, as a continuous process, blanks and carton tubes may be formed by cartons according to the invention.

Referring to the drawings a web 24 of cardboard, strawboard or like material is fed between guiding and scoring rollers 25, 26, which are arranged to provide on the web the score or fold lines illustrated in Fig. 1 and to cut in the web openings 27 which form the cut-out portions for the opposite ends of adjoining carton body blanks. The strip 2 is formed by the rollers effecting a cut 28 longitudinally of the web and a further cut 29 defines the edge 9 of the carton bodies. The web

portion 30 which is located between the strip 2 and the body blanks remains in position to space the strip 2 from the body blanks and is removed, for example as by rollers 31, 32, Fig. 6, just before the continuous strip 2 and continuous flat web of carton bodies is fed beneath an extruding device 33 by which heat-sealable material such as polyethylene is extruded on to the carton bodies and strip to adhere thereto and to form a liner which extends across the bodies, the strip and the space between the bodies and strip and which extends across the openings 27. After passing the extruder device the continuous web of carton blanks is engaged by folders, not shown, which fold it over until the strip 2 is superimposed on the panel 7, as illustrated in Fig. 7, with the lined portions of the panel 7 and strip 2 engaging each other. The web so folded is moved beneath any suitable form of heater device 34 by which the longitudinal heat-sealed seam is formed. Further folder elements, not shown, then engage the partly folded blanks and cause the liner portion 14 to be folded over the unlined portion of the strip 2 so that the two panels 7, 7a overlie each other with the outer edge 16 of the strip 2 in substantial abutting relation with the edge 9 of the panel 7a. Preferably, prior to panels 7, 7a being caused to overlie each other, the edge portion of the panel 7a is provided with adhesive to cause the overlying portions of panels 7, 7a to adhere to each other. The web is now folded to form a four-sided tube, substantially as illustrated in Fig. 8, and from this figure it will be seen that due to the manner in which the strip 2 is located relative to the edge 9 of panel 7a and to the manner in which the liner portion 14 is folded about the strip the longitudinal seam for the carton tube is formed by only two thicknesses of cardboard and the liner, as the result of the seam formation, provides a continuous liquid-tight tube.

The panels 4, 5 are engaged by folders 35, Fig. 9, which engage the sides 4, 5 of the tube and infold them, about the fold lines 23, towards each other to form bellow-folded sides the folding of which causes the two sides 6, and 7, 7a to be drawn into close overlying relationship, as illustrated in Fig. 9, thereby to form a continuous flattened tube. The tube, so flattened, is passed between flattening rollers, not shown, which also serve to express air from the interior of the flattened tube and suitable heat-sealing means, not shown, are provided to form transverse heat seals 36, Fig. 9, in the exposed folded liner portion extending between the endwise adjoining folded and flattened carton tubes. By this means the succession of adjoining tubes is rendered air-tight as between tubes and as the temperature at which the blank-making and tube forming process is effected is relatively high the interiors of the flattened tubes are substantially sterile and will remain sterile until a flattened tube is severed from the web for filling. Severing of the adjoining tubes is effected, in any suitable manner, along a line 37, Fig. 9, so that each carton tube severed from the web has one closed end and one open end. On setting-up the carton, the closed end will assume the condition illustrated in Fig. 4 except that end seamed portions remain to be secured to the outer flap 13, as by adhesion, a label, or by heat sealing, in the manner described above. The container may then be filled and the open end closed in the manner described above with reference to Figs. 2 to 4 or to Fig. 5 of the drawings.

For the purpose of convenience of storage and transit and in order to retain the sterile condition of a plurality of flattened tubes until the tubes are required for use, the flattened tubes, as they issue from the forming apparatus, may be folded fanwise about the centre portion of the connected seam-covering flaps 10, 10a of adjoining tubes thereby to superimpose the flattened tubes to form a pile as illustrated in Fig. 10. The number of flattened tubes so fan-folded to form a pile will be determined according to the height of the pile required for storage

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or transit. It will be understood that the flattened tube at one end of a fan-folded pile will not retain the sterile condition as one end of each of such end tube will be open, but all of the other tubes will retain their sterile condition until the tubes are severed from the fan-folded pile for use.

It will also be understood that, if desired, a continuous succession of flattened tubes may be made from blanks the liners for which are applied to the cardboard as by lamination or by calendering instead of being extruded on to the cardboard as described above.

We claim:

1. A four-sided carton, comprising a carton body made of cardboard or like material and having two opposite open bellows-folded sides connected by two flat sides of which one consists of two overlying side-forming panels, and inner and outer flaps formed respectively in continuation of said bellows-folded and flat sides, said inner flaps being folded towards each other and the outer flaps folded towards each other to overlie the inner flaps with one edge of one outer flap substantially abutting the like edge of the other outer flap, a liner of heat-sealable material such as polyethylene adhered to the inner surfaces of said bellows-folded and flat sides, said liner covering and extending beyond said inner and outer flaps and at one end of the carton being folded with the inner and outer flaps and forming a flat end seam substantially co-extensive with said substantially abutting edges, a heat seal extending lengthwise of and through said end seam to form a liquid-tight seam, and a cardboard or like strip having one side adhered to said liner and spaced from the adjacent edge of the body, the strip being located in the plane of the underlying panel with one longitudinal edge thereof covered by the liner and the opposite edge adjacent to the longitudinal edge of the underlying panel, said portion of the liner which is adhered to the strip being heat-sealed to the liner portion adhered to said overlying panel to form therewith a liquid-tight longitudinal seam, and the opposite side of the strip being covered by the portion of the liner between the strip and the carton body.

2. A blank for a carton comprising a rectangular liner of plastic heat-sealable material, a body member attached to one surface of the liner and extending laterally from one side edge thereof to a line parallel to and spaced within the adjacent edge of the liner and a separate body strip of narrow width attached to the liner along said edge and spaced from the edge of the body member by a distance substantially equal to and not less than the width of said strip.

3. A blank for a carton comprising a rectangular liner of plastic heat-sealable material, a body member attached

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to one surface of the liner and extending laterally from one side edge thereof and having a plurality of foldable side panels, one end panel overlying the corresponding edge of the liner and the opposite end panel lying parallel to and spaced within the opposite edge of the liner and a separate body strip of narrow width attached along said opposite edge of the liner and spaced from the adjacent edge of the body member by a distance substantially equal to and not less than the width of the strip.

4. A carton according to claim 1, wherein the outer flaps are folded to lie in a plane substantially at right angles to the sides of the carton.

5. A carton according to claim 4, wherein one outer flap has hinged thereto a seam-covering flap to overlie the flat seam when the seam is folded to lie against the other of the outer flaps.

6. A carton according to claim 5, wherein the opposite end thereof is similarly closed and provided with a liquid-tight heat-sealed end seam.

7. A carton according to claim 5, wherein at the opposite end of the carton the outer flaps form an inverted V and each has hinged thereto a seam-covering flap arranged to be folded towards each other and sandwich the flat end seam formed by the infolding of the flaps.

8. A carton according to claim 1, wherein the opposite end thereof is similarly closed and provided with a liquid-tight heat-sealed end seam.

9. A carton according to claim 8, wherein the flat end seam, or each flat end seam is provided with a second heat-seal parallel to said first heat seal, said second heat seal being located between the first heat seal and the free edge of the flat end seam and securing the end seam to the end of the carton.

10. A carton according to claim 1, wherein the flat end seam, is provided with a second heat-seal parallel to said first heat seal, said second heat seal being located between the first heat seal and the free edge of the flat end seam and securing the end seam to the end of the carton.

11. A carton according to claim 1, wherein at the opposite end of the carton the outer flaps form an inverted V and each has hinged thereto a seam-covering flap arranged to be folded towards each other and sandwich the flat end seam formed by the infolding of the flaps.

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