Nov. 28, 1961 M. H. STARK 3,010,637

FOLDING CONTAINER

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Fig 1

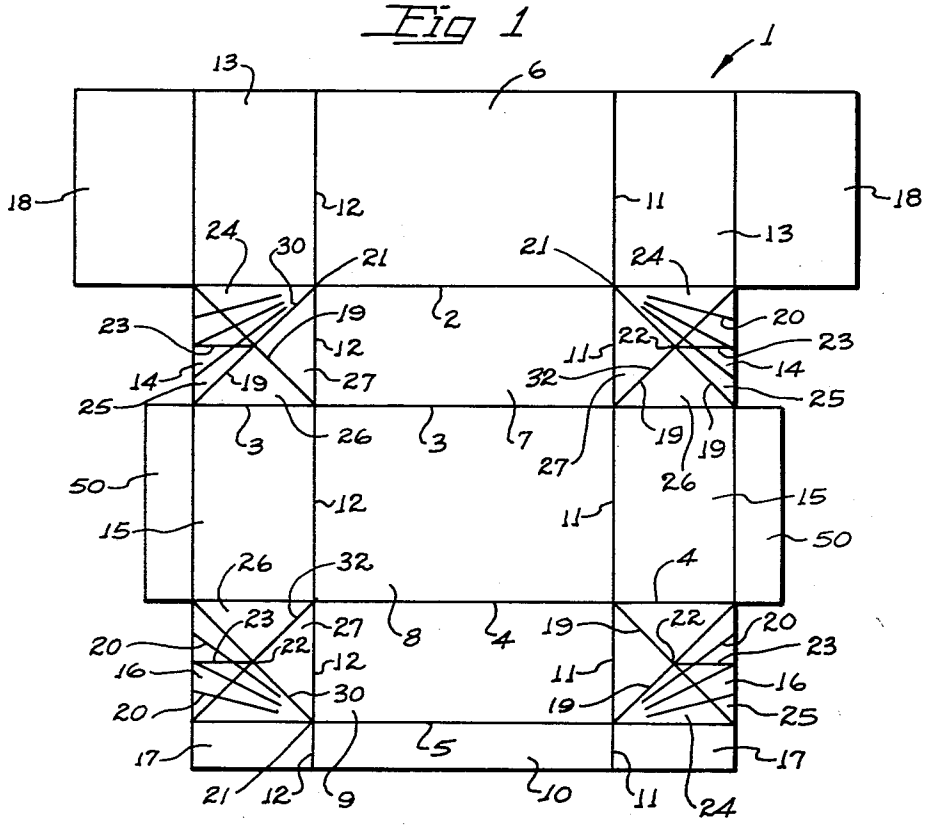


Fig 2

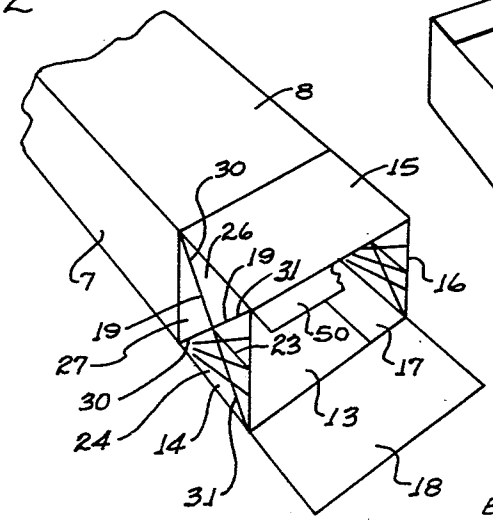
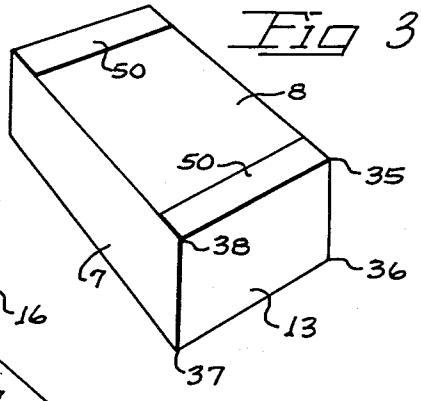


Fig 3



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Fig 4

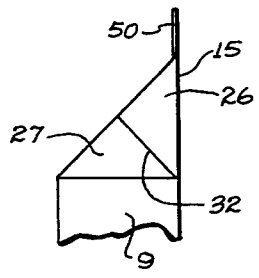


Fig 5

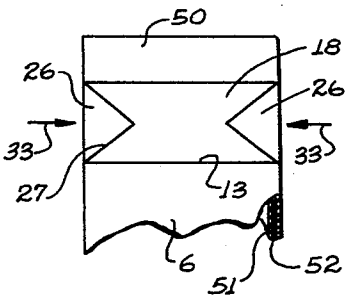


Fig 6

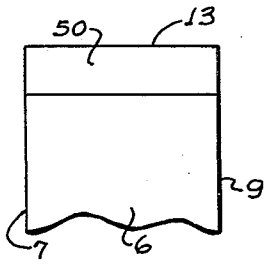


Fig 7

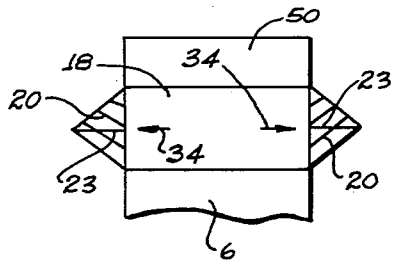


Fig 8

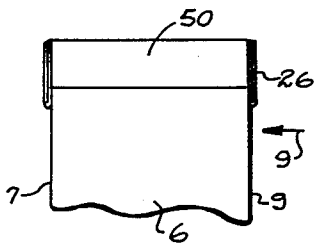


Fig 9

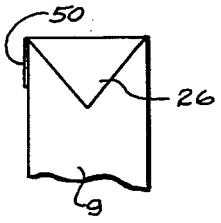


Fig 10

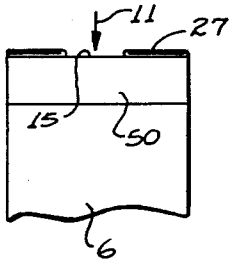
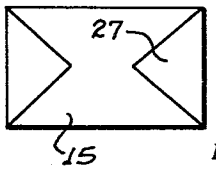


Fig 11



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Fig 12

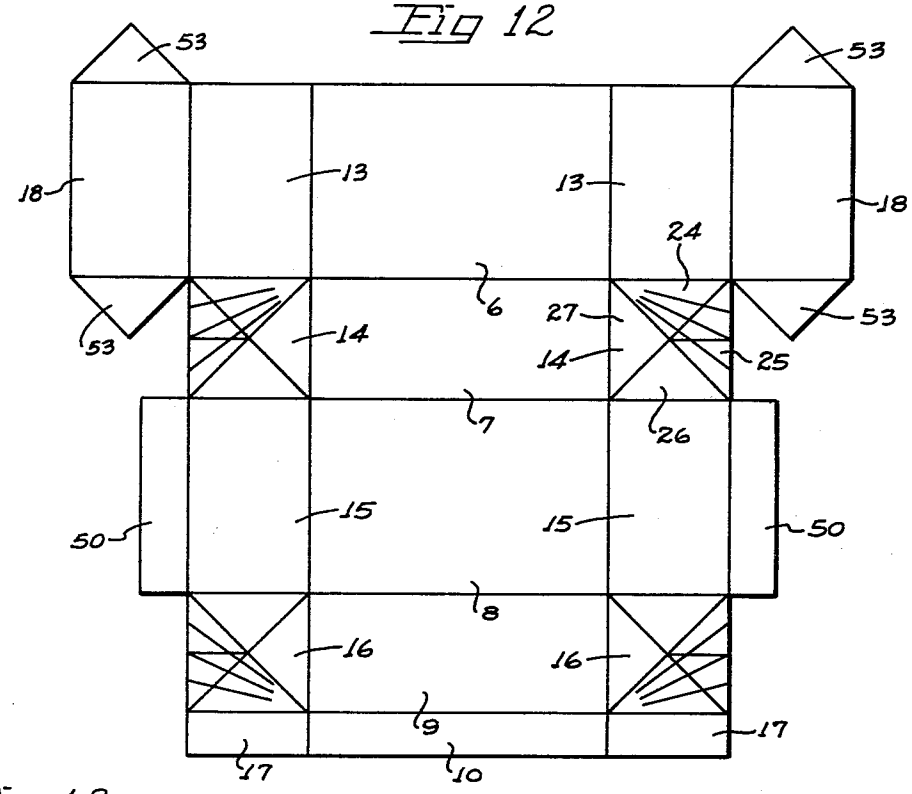


Fig 13

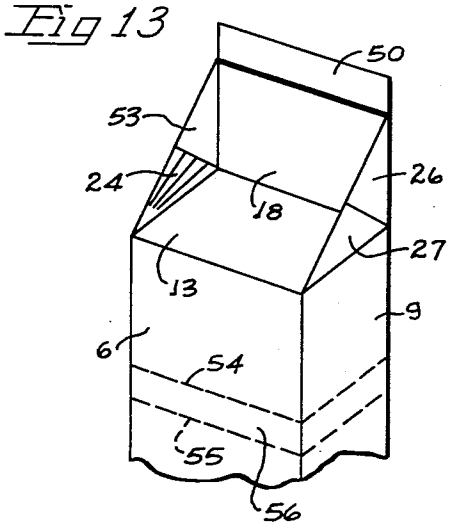


Fig 14

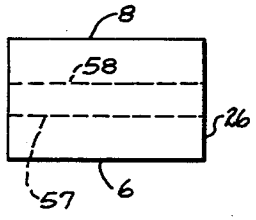
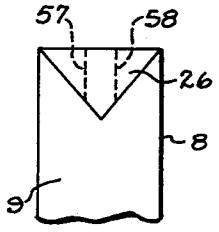


Fig 15



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United States Patent Office

3,010,637
Patented Nov. 28, 1961

3,010,637

FOLDING CONTAINER

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Filed Aug. 5, 1958, Ser. No. 753,322
4 Claims. (Cl. 229—37)

This invention relates to containers of the general types referred to as cartons, cans, boxes, tubes, or drums and particularly to improvements in such containers of the general type shown in U.S. Patent No. 459,543.

Objects of the invention are, singly and collectively, to provide an improved container wherein:

(1) No openings are formed at the container corners such as might permit leakage or escape of liquid, powder of granular material from within the container;

(2) One or more reinforcing sheets may be economically provided for the body section of the container so as to provide for increased strength;

(3) One or more fluid impervious sheets may be incorporated into the container, to provide a container having a high degree of resistance to the passage of fluids through the container walls;

(4) The container end walls and container side walls are formed from an integral flat blank of "foldable" material of either single or multiple ply construction as desired; thereby reducing fabrication costs and permitting large numbers of container blanks to be economically shipped in a flat condition requiring minimum shipping space. In certain instances, as for example, in the field of heavy duty containers, the end walls may be further reinforced by the provision of a cap element which may be secured thereto as desired.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

FIG. 1 is a plan view of a container blank utilized in one embodiment of the invention.

FIG. 2 is a perspective view of a partially-closed container constructed from the FIG. 1 blank.

FIG. 3 is a perspective view of the FIG. 2 container when fully closed.

FIG. 4 is a view showing one end of the FIG. 2 container in a partially closed state.

FIG. 5 is a view at right angles to FIG. 4 but taken at a further stage in the end-closing operation.

FIG. 6 is a view similar to FIG. 5 but taken after complete closing of the container end.

FIG. 7 is a view similar to FIG. 5 by illustrating an alternative method of closing the container end.

FIG. 8 is a view similar to FIG. 6 but illustrating the container end construction after being closed by the method of FIG. 7.

FIG. 9 is a view taken in the direction of arrow 9 in FIG. 8.

FIG. 10 is a view similar to FIG. 8 but illustrating another method of closing the container end.

FIG. 11 is a view taken in the direction of arrow 11 in FIG. 10.

FIG. 12 is a view similar to FIG. 1 but of a second embodiment of a container blank constructed according to the present invention.

FIG. 13 is a perspective view of a partially-closed container constructed from the FIG. 12 blank.

FIGS. 14 and 15 are end and side views of a "perforated-easy opener" container constructed according to the present invention.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

In the drawings there is shown a container blank sheet of paperboard or other fibrous material **1** having four parallel fold marks **2**, **3**, **4**, and **5** which serve to define tube-forming areas **6**, **7**, **8**, **9**, and **10**. Fold marks **11** and **12** extend at right angles across fold marks **2**, **3**, **4**, and **5** so as to define a plurality of rectangular areas **13**, **14**, **15**, **16**, and **17** at each end of the blank. A flap **18** extends from the outer end of each area **13**, and a flap **50** extends from the outer end of each area **15**.

Each of areas **14** and **16** are provided with intersecting diagonal fold marks **19**, whereby to form four triangular sections **24**, **25**, **26**, and **27** in each of the respective areas. There are also formed in each of areas **14** and **16** a plurality of fold marks **20** which radiate from adjacent juncture points **21** outwardly across an outer portion of one of the fold marks **19**. Another fold mark **23** extends from the intersection point **22** of the diagonal folds **19** directly away from the corresponding tube-forming area **7** or **9**.

Formation of a container from the FIG. 1 blank may be accomplished by first bending sheet **1** along fold marks **2**, **3**, **4**, and **5**, and adhesively securing the outer edges of areas **10** and **17** to the outer edges of areas **6** and **13** so as to form the open-ended tube shown in FIG. 2.

Thereafter wall area **13** is forced inwardly to a position at right angles to the tube axis with flap **18** positioned flatwise against the inner surface of wall area **15**. During this forcing movement of wall area **13** wall areas **14** and **16** first buckle outwardly and then triangular sections **24** and **25** turn inside of sections **26** and **27** so as to produce the article configuration shown in FIG. 4. The initial outward buckling of wall areas **14** and **16** occurs around lines **12** and **23**, it being understood that lines **23** allow the half portions of section **25** to move toward each other so as to permit the outward buckling action. The "inside turning" of section **24** occurs around portion **30** of line **19**; and the "inside turning" of section **25** occurs around line **23** and portion **31** of line **19**. During this "inside turning" of section **25** said section tends to bend around lines **20**; these lines therefore serve to facilitate this bending action and prevent inadvertent breaking or irregular creasing of said section.

The FIG. 4 article is further acted upon by the application of inward pressure against portion **32** of line **19** in the direction of arrows **33**. This application of pressure causes the outer surfaces of sections **26** and **27** to bend toward one another so as to bring wall area **15** and flap **18** toward wall area **13**, with section **24** through **27** taking overlapping positions between flap **18** and areas **13** and **17**.

The final step in the container-forming operation is the bringing of flap **50** down onto the outer surface of wall area **6** as shown in FIG. 6. Flap **50** and any or all of sections **13** through **18** may be provided with adhesive to aid in securing the end closure components in their FIG. 6 positions.

Instead of forcing sections **24** through **27** inwardly between wall area **13** and flap **18** as illustrated in FIG. 5, sections **24** through **27** may be forced outwardly by the application of pressure in the arrow **34** direction as illustrated in FIG. 7. Thereafter the overlapping triangular sections may be adhesively secured to walls **7** and **9** as illustrated in FIGS. 8 and 9, or the triangular sections may be adhesively secured to wall **15** as illustrated in FIGS. 10 and 11.

It will be noted that corners **35**, **36**, **37**, and **38** of the completed container are devoid of any openings or slots

such as might permit leakage or escape of liquid, powdered, or granular material from within the container. This elimination of openings results from the fact that end areas **13** through **17** are contiguous and integral with one another, there being no slots or cuts between adjacent ones of the end areas. The "elimination of openings" feature cooperates with flap **18** to provide a "sealed" container structure which is particularly adapted for holding liquid, powdered or granular materials in a "leak proof" manner.

In order to prevent passage of fluid through the container walls the inner and/or outer surfaces of the container walls may be provided with a wax coating; alternately one or more sheets of fluid-impervious material such as "Saran," "Pliofilm" or polyethylene may be applied to the inner surface of sheet **1** while the sheet is in the FIG. 1 flat condition for the same purpose. Also, in order to reinforce and strengthen the container walls one or more sheets **51** and **52** of paperboard or similar material may be applied on the inner surfaces of wall areas **6** through **9** while the FIG. 1 sheet is in the flat condition. The reinforcing sheets should preferably not extend over wall areas **13** through **17** because the presence of reinforcing sheets on these areas would prevent easy bending of the triangular sections in the manner shown in FIGS. 4 through 11.

The embodiment shown in FIGS. 12 and 13 is similar in many respects to the FIG. 1 embodiment, and similar reference numerals are employed wherever applicable. In the FIG. 12 embodiment flaps **18** are provided with triangular tabs **53**. When wall sections **13** and **18** are moved to the FIG. 13 position tabs **53** take positions along the inner surfaces of sections **25**. The opposed surfaces of sections **25** and **53** are provided with adhesive for rigidly securing said sections together in a manner to materially strengthen the container structure. This strengthening of the container is particularly desirable where the containers are constructed in large sizes or where the containers are required to contain high density, small particle size materials. The tabs **53** provide an extra barrier for sealing the container end against the escape or sifting of fine, powdery materials. Tabs **53** may be omitted when the containers are constructed in small sizes or when the containers are not required to contain fine, powdery material.

The FIGS. 12 and 13 container may have its triangular sections **24** through **27** turned inside of end area **15** as in FIG. 6 or outside of end area **15** as in FIGS. 8 and 11.

It is contemplated that containers of the present invention may be provided with "easy opener" features, as for example the series of perforations **54** and **55** shown in the FIG. 13 container body. These perforations permit

section **56** of the container body to be manually torn away from the remaining body portions of the container so as to break the container into two sections for easy access to the container contents.

When the container is constructed with the triangular sections **24** through **27** on the outside of the container body sidewalls **7** and **9** (as in FIGS. 8 and 9) the "easy opener" perforations may be formed in the triangular sections and container end wall areas as shown in FIGS. 14 and 15 at **57** and **58**. Opening of the container can be easily effected by manual raising of the triangular sections and tearing across the container end wall in directions parallel to walls **6** and **8**.

I claim:

1. A container blank comprising a sheet of material devoid of slots and divided by fold marks into four contiguous, aligned tube-forming areas, and four contiguous, aligned end-forming areas integral with corresponding ends of the tube-forming areas; alternate ones of the end-forming areas being divided by two diagonal intersecting fold marks into four triangular areas; at least one fold mark extending from the juncture point between two of the tube-forming areas and two of the end-forming areas toward a portion of a diagonal fold mark outside of the diagonal fold mark intersection point; and a fold mark extending from the diagonal fold mark intersection point directly away from the corresponding tube-forming area.

2. The combination of claim 1 and further including a flap extended integrally from an edge of an end-forming area directly opposite the corresponding tube-forming area.

3. The combination of claim 2 and further including triangular tabs extending integrally from lateral edges of the flap.

4. The combination of claim 1 and further including flaps extending integrally from the outer edges of those end-forming areas which are not provided with diagonal fold marks.

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