

[54] **PAPER PRODUCT FOLDABLE MANUALLY TO FORM A NON-LEAKING CONTAINER**

3,567,106 3/1971 Anderson..... 229/34 A  
 3,589,595 6/1971 White ..... 229/65  
 3,627,541 12/1971 Farquhar ..... 229/40

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[51] Int. Cl.<sup>2</sup> ..... **B65D 5/26**

[58] Field of Search..... 229/31 R, 31 FS, 32, 34 B, 229/35, 40, 65

[57] **ABSTRACT**

The present invention relates to a paper product which can be folded manually to form a non-leaking container, particularly to a paper sheet having proper hardness, one surface being treated with water-proof materials and having a plurality of fold lines roll-pressed thereinto, such that the product can be folded to a very small size for carrying or storage, and can be manually folded about said fold lines to form a non-leaking container.

[56] **References Cited**  
**UNITED STATES PATENTS**

2,251,627 8/1941 Johnson..... 229/31 FS  
 2,944,719 7/1960 Arneson ..... 229/31 FS

**9 Claims, 11 Drawing Figures**

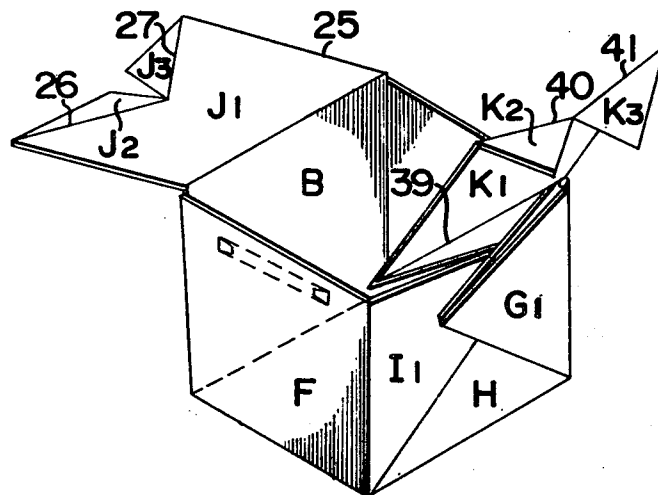


FIG. 1

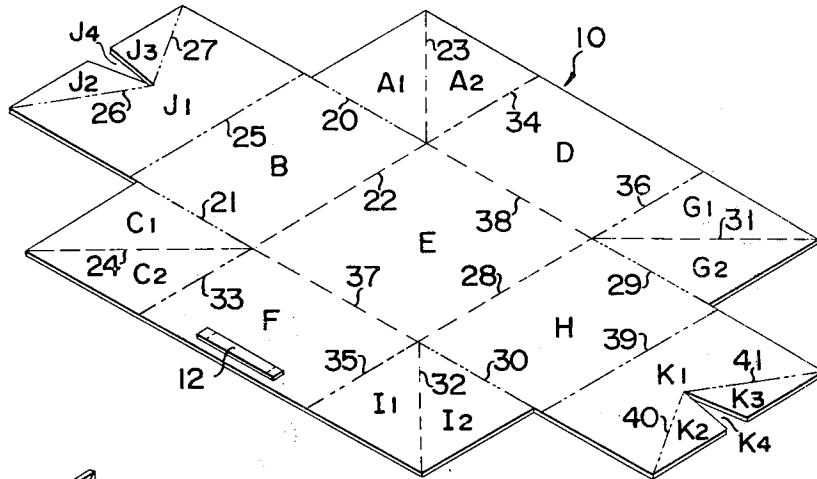


FIG. 3A

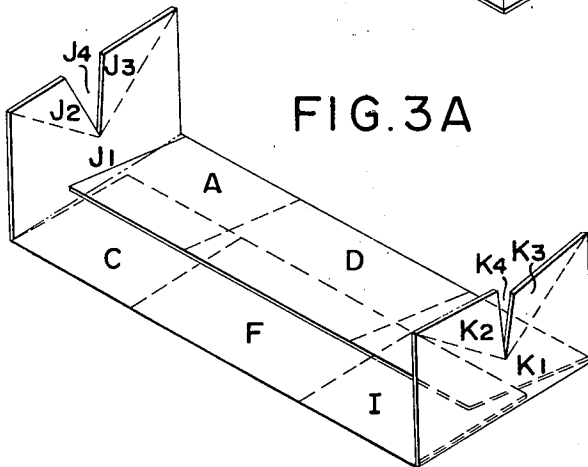


FIG. 3C

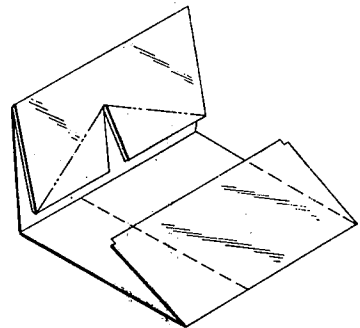


FIG. 3B

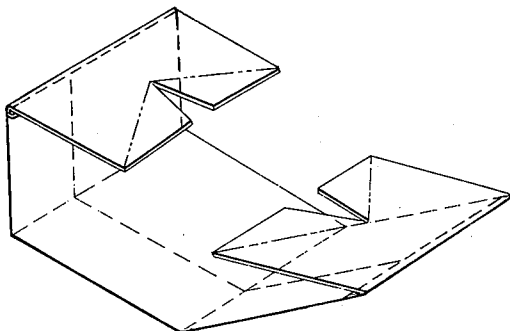
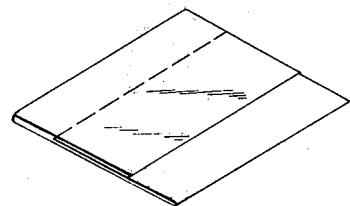
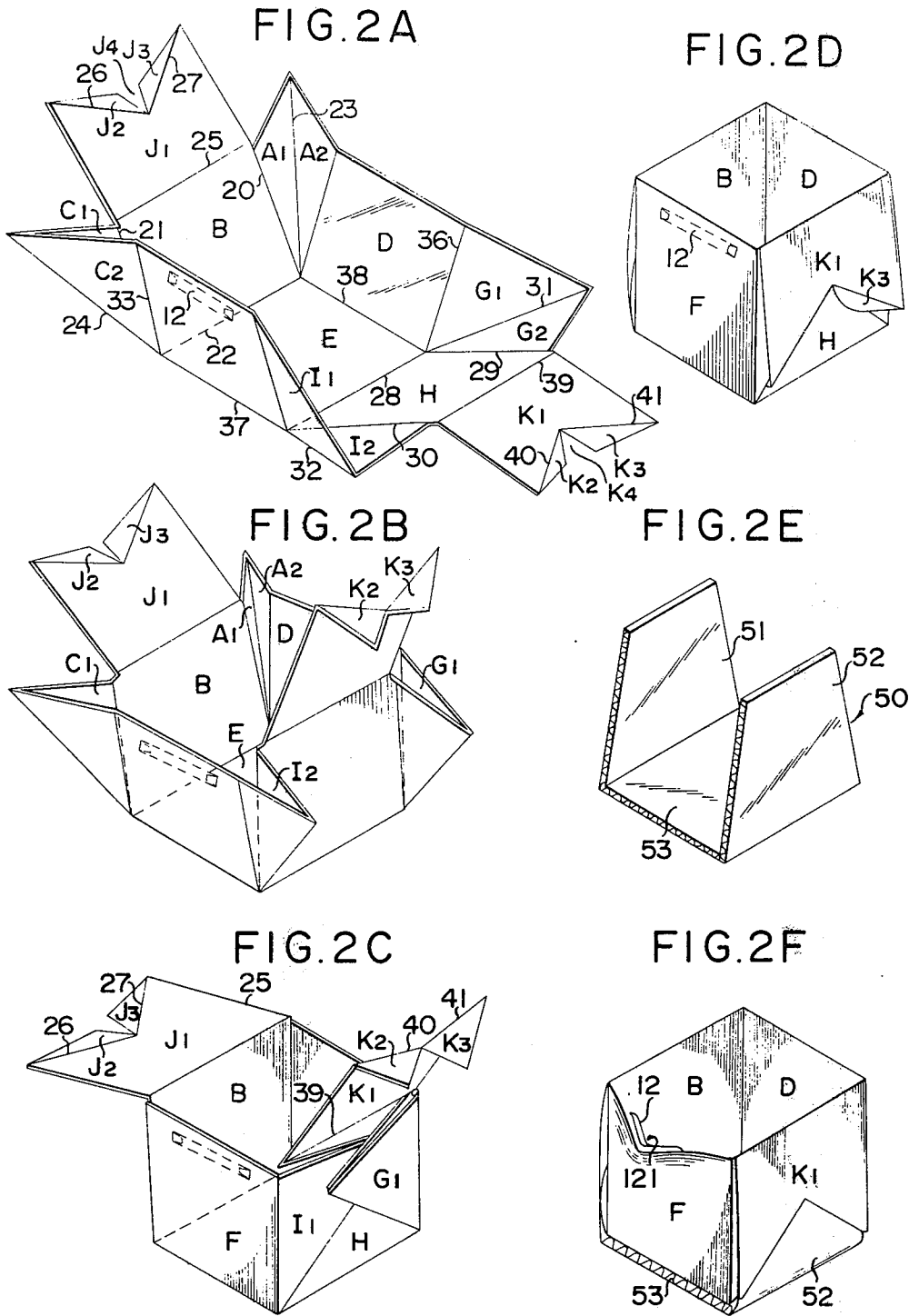


FIG. 3D





## PAPER PRODUCT FOLDABLE MANUALLY TO FORM A NON-LEAKING CONTAINER

### BACKGROUND OF THE INVENTION

The paper containers of prior art are normally cast away or disposed of after use for sanitary reasons and because of their low cost. But, some paper containers, such as paper cups, require three steps to manufacture them, that is, the paper is first rolled into a hollow cylinder; secondly, the longitudinal seams are glued together; and thirdly, a bottom is attached to it. Thus, although such cups can be packed into one another for storage or transportation and the like, the roundness or volume thereof is inconvenient. Another example of prior art container is the paper plate. However, the plate can be made with a shallow bottom only, because paper, limited by inherent fibrous structure, cannot be formed into a deep bottom, since it will burst or wrinkle, especially at the rims or edges of paper bowls or plates.

### SUMMARY OF THE INVENTION

The present invention relates to a paper product which can be folded manually to form a non-leaking container, particularly to a paper sheet having sufficient strength and rigidity, one surface being treated with water-proof materials and having a plurality of fold lines roll-pressed thereinto, whereby the container can be folded to a very small size and handled easily, and during use, it can be easily manually folded about said fold lines to form a non-leaking container for general uses.

### OBJECTS OF THE INVENTION

The primary object of the present invention is to eliminate the problems mentioned above and to provide a paper product which can be folded manually to form a non-leaking container, and which can be folded to a very small size for storage or transportation and when desired to be used can be easily folded by hand to form a non-leaking container which can be filled with hot soup or beverage or serve foods without leaking or hurting the hand.

Another object of the present invention is to provide a paper product which can be folded manually to form a non-leaking container, the upper edges of which are imbedded with a flexible metal strip which, when bent, enables one upper edge of the container to form a V-shaped channel that is convenient for pouring the fluid into the mouth without overflow or spills.

A further object of the present invention is to provide a paper product which can be folded manually to form a non-leaking container, the outside walls of which can be lined with a heat-resistant material, such as corrugated board and the like to increase the stiffness of the container and to insulate the container so that it will not deform or hurt the hand when filled with hot soup, beverage or other foods.

### BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the invention will be more apparent from the following description taken in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of the blank for making a paper product according to the present invention.

FIGS. 2A to 2F are perspective views of sequential steps of folding said paper product into a non-leaking container by hand.

FIGS. 3A to 3D are perspective views of sequential steps of folding said paper product to a very small size by hand when carried.

### DETAILED DESCRIPTION OF THE INVENTION

As shown in FIG. 1, the present invention comprises a paper sheet 10 with proper or sufficient hardness, such as 80-250 pound kraft paper or woodfree paper, the inner surface of which is treated with waterproof materials. Several fold lines are roll-pressed by means of a press roller on the sheet of paper.

The blank in FIG. 1 includes a bottom panel E bounded by fold lines 22, 37, 28 and 38, and opposite wall panels B, F, H and D are joined to opposite edges of the bottom panel E by the fold lines 22, 37, 28 and 38. Also, corner members A<sub>1</sub>, A<sub>2</sub>, C<sub>1</sub>, C<sub>2</sub>, G<sub>1</sub>, G<sub>2</sub> and I<sub>1</sub>, I<sub>2</sub> are joined to the corners of the bottom panel and are joined to opposite side edges of the wall panels by fold lines 20, 21, 33, 35, 30, 29, 36 and 34. Additionally, diagonally extending fold lines 23, 24, 32 and 31 extend outwardly from the corners of the bottom panel E to the outer corners of the corner members, respectively. Locking panel members J<sub>1</sub> and K<sub>1</sub> are joined to the outer edges of opposite wall panels B and H along fold lines 25 and 39, respectively, the fold lines 25 and 39 being spaced slightly outwardly beyond the adjacent edges of the corner members to facilitate folding of the locking panel members. Further, the locking panel members J<sub>1</sub> and K<sub>1</sub> have slits J<sub>4</sub> and K<sub>4</sub> therein, respectively, extending from the outer edges thereof toward the respective fold lines 25 and 39, and additional diagonal fold lines 26 and 27 extend from the inner end of the slit J<sub>4</sub> to the outer corners of the locking panel member J<sub>1</sub> and fold lines 40 and 41 extend from the inner end of slits K<sub>4</sub> to the outer corners of locking panel member K<sub>1</sub>, thus defining locking flaps J<sub>2</sub> and J<sub>3</sub> and K<sub>2</sub> and K<sub>3</sub>, respectively.

Also, an easily bendable metal member 12 is affixed to wall panel F adjacent an upper or outer edge portion thereof, such that when the blank is erected to form a container, the metal member may be bent outwardly to form a spout or V-shaped notch in the side wall or wall panel to facilitate pouring of liquid from the container.

To erect a container from the blank in FIG. 1, the wall panels B, D, H and F are grasped and folded upwardly or inwardly about fold lines 22, 38, 28 and 37, respectively, and the corner members are bent outwardly about fold lines 20, 34, 36, 29, 30, 35, 33 and 21, respectively, with the respective portions A<sub>1</sub>, A<sub>2</sub>, G<sub>1</sub>, G<sub>2</sub>, I<sub>1</sub>, I<sub>2</sub> and C<sub>1</sub>, C<sub>2</sub> of the corner members folded toward one another about the respective fold lines 23, 31, 32 and 24, such that the corner members are folded outwardly, as seen in FIGS. 2A and 2B. The locking panel members J<sub>1</sub> and K<sub>1</sub> are folded outwardly or downwardly along their fold lines 25 and 39, and the locking flaps J<sub>2</sub>, J<sub>3</sub> and K<sub>2</sub>, K<sub>3</sub> are folded downwardly or outwardly along their fold lines 26, 27 and 40, 41, as seen in FIG. 2B. The corner members are then bent inwardly toward one another in overlapping relationship with opposite wall panels B and H, as seen in FIG. 2C, and the locking panel members are bent downwardly thereover with the locking flaps folded upwardly beneath the upwardly converging bottom edges of the

corner members, as seen in FIG. 2D, to form an erected leak-tight container.

The several fold lines in the blank are pressed or formed in either an upward or downward direction, as viewed in FIG. 1, for appropriate folding of the respective panels in an inward or outward direction about the fold lines, as described above. Also, the width of the locking panel members  $J_1$  and  $K_1$  is slightly less than the height or width of the wall panels B and H.

Thus, a paper product foldable manually to form into a non-leaking container according to the present invention is completed. However, if it is intended to be filled with hot foods or beverage, an additional heat-resistant paper material may be used for reinforcement. For example, a U-shaped, folded corrugated paper board 50 can be inserted between the backs of areas B,H and the inner sides formed by Areas A, C; G, I with one another. By using five fingers to hold the flap portions 51,52 and the palm to support the bottom portion 53 of the container, there will be no danger of burning the hand with the hot beverage or foods; besides, the corrugated board can increase the stiffness and strength of the container to prevent deformation thereof. In addition, during eating or drinking, the metal strip 12 can be bent outward to form a V-shape channel 121 for alignment with the mouth to avoid overflow or spills and thus ensure good table manners and cleanliness.

As the inner surface of the container formed in accordance with the present invention is treated to render it water-proof, if it is used to serve beverage or other fluid foods it will not be wetted, and thus will not burst.

Also, because of the particular folded configuration of the container, the fluid will not flow out by way of any seams or clearances, since the four sides B, D, F, H stand upward and the open ends of  $A_1, A_2, C_1, C_2, G_1, G_2, I_1, I_2$  are folded by respective diagonals 23, 24, 31, 32 and are of the same level as the upper edges of sides B,H (FIG. 2C) and further are covered by portions  $J_1, K_1$ . Hence, a complete leak-proof container is insured.

FIGS. 3A to 3D show the processes of folding the paper sheet to a very small size for the convenience of carrying or packing according to the present invention. However, it should be understood that this folding method is merely an example for illustration and our invention is by no means limited thereto; but by folding it properly along these pressed folding lines, the smallest size of packing as shown by FIG. 3D may be achieved.

As a first step, areas A, D, G; C, F, I are folded inward oppositely to superimpose each upon the other by using the pressed lines 20,38,29; 21,37,30 as shown in FIG. 3A.

Next, areas  $J_1, K_1$  are pressed together by using the pressed lines 25,39 as shown in FIGS. 3B and 3C. Finally, areas B,H and the superimposed areas A,C,J; G,I,K are folded oppositely together at the central position E by using folding lines 22,28 and the pressed lines 33,34,35,36 superimposed with 22,28; thus, a small square is formed as shown in FIG. 3D.

It can be readily seen from the foregoing description the proportional relationship shown in these figures that the area of FIG. 3D is one-third to one-ninth of that of FIG. 1. If a plurality of articles as shown in FIG. 3D be superimposed and packed into a box, it can be conveniently carried and utilized in a trip, during picnic or travel in a sedan and the like.

I claim:

1. A blank of foldable sheet material for forming a leaktight container for liquids comprising: a multi-sided, bottom-forming panel substantially centrally of said blank; a plurality of wall-forming panels joined to the sides of said bottom-forming panel along a continuous fold line; corner panels substantially commensurate in width with the wall-forming panels and joined along fold lines to adjacent edge portions of the wall-forming panels, said corner panels each having a diagonally extending fold line therein extending outwardly from said continuous fold line; a locking panel joined along a fold line to an outer edge portion of each wall-forming panel in an opposed pair of said wall-forming panels, each of said locking panels having a slit therein extending inwardly from an outer edge portion thereof toward the fold line joining the locking panel with a respective wall-forming panel; and a fold line extending diagonally outwardly from an inner end of the slit to an adjacent outer corner of the respective locking panels, thus defining a pair of generally triangularly shaped locking flaps on each of said locking panels, whereby the blank may be folded along said fold lines to dispose said wall-forming panels in an upright position and said corner panels folded inwardly over an exterior surface of said opposed pair of wall-forming panels and the locking panels folded downwardly over said pair of wall-forming panels and the locking flaps folded inwardly and upwardly beneath the corner panels to form a leak-tight container for liquids and the like.

2. A blank of sheet material as in claim 1 wherein the blank comprises a paper material and the fold lines joining the locking panels to an outer edge portion of the wall-forming panels are spaced slightly outwardly from the adjacent edges of the corner panels to facilitate outward bending of the locking panels.

3. A blank as in claim 2, wherein the width of the locking panels is slightly less than the weight of the wall panels.

4. A blank as in claim 3, wherein an easily bendable metal strip is affixed to one of said wall-forming panels adjacent an outer edge portion thereof, whereby the metal strip may be bent to retain the wall forming panel in a substantially V-shaped configuration when the panel is erected to facilitate use thereof.

5. A manually foldable container for liquids and the like comprising: an imperforate bottom panel having opposite side edges; a plurality of upright, imperforate wall panels extending upwardly from the edges of said bottom panel and connected to the bottom panel by a continuous fold line; outwardly folded, triangularly shaped corner members connected by fold lines to adjacent edge portions of adjacent side wall panels, the fold line connections of the corner members to the wall panels being substantially coextensive with the height of said wall panels and the corner member fold lines terminating at said continuous fold line; said corner members folded in overlying relation with respect to an exterior surface of an opposed pair of said wall panels; said corner members having upwardly converging lower edge portions; a locking panel member joined along a fold line to an upper edge portion of each of the wall panels of said pair and each having a free edge portion parallel to said fold line and having a slit therein extending inwardly from said free edge toward said fold line, said locking panel member folded downwardly over the corner members and a pair of wall panels; and a pair of fold lines extending diagonally outwardly from

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the inner end of the slit to opposite ends of said free edge thus defining a pair of locking flaps on the free edges of said locking panel members, said locking flaps folded inwardly beneath the converging edges of the corner members to thus maintain said container in erected position.

6. A container as in claim 5, wherein said corner members are substantially commensurate in height with the height of the wall panels, and the locking panel members are slightly in width than the height of the wall panels.

7. A container as in claim 5, wherein a bendable metal strip is affixed to one of the wall panels adjacent an upper edge thereof, such that the metal strip may be bent outwardly to form a V-shaped notch in the upper

edge portion of the wall panel to facilitate pouring of liquid therefrom.

8. A container as in claim 7, wherein the container comprises a paper material and the inner surfaces of the container are coated with a water-proofing material to enable use of the container with liquids.

9. A container as in claim 8, wherein a substantially U-shaped reinforcing member of cardboard and the like has a bottom portion disposed in underlying relationship to the bottom panel of the container, and a pair of upstanding side portions inserted between the opposed pair of wall panels and the locking panel members folded thereover.

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