

March 11, 1952

L. C. BROOKS

2,589,045

TUBE TYPE CONTAINER

Filed April 16, 1947

4 Sheets-Sheet 1

*Fig. 1.*

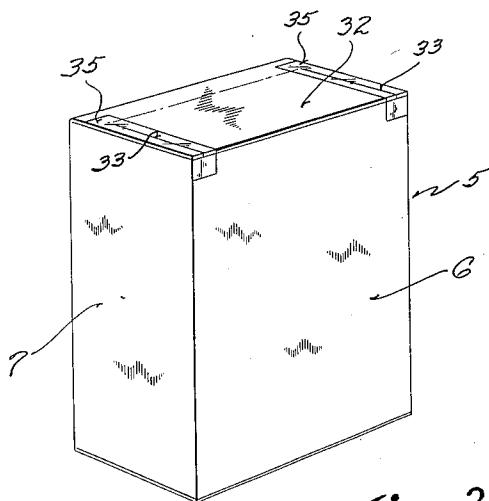


*Fig. 2.*

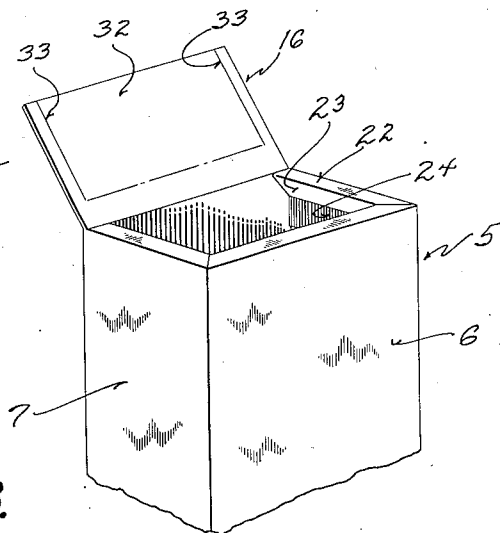
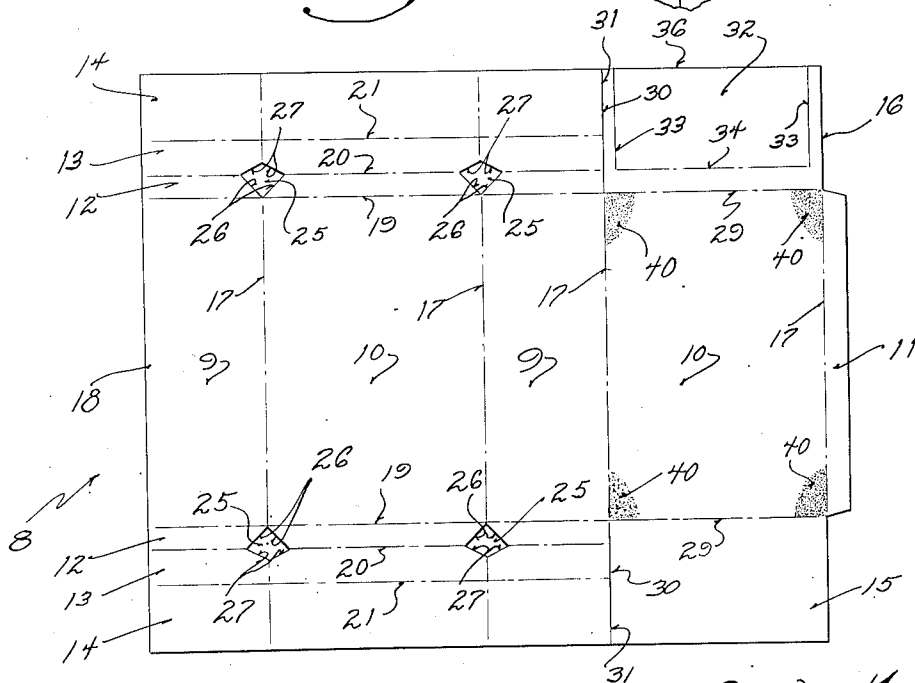


*Fig. 3.*



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*Fig. 4.*

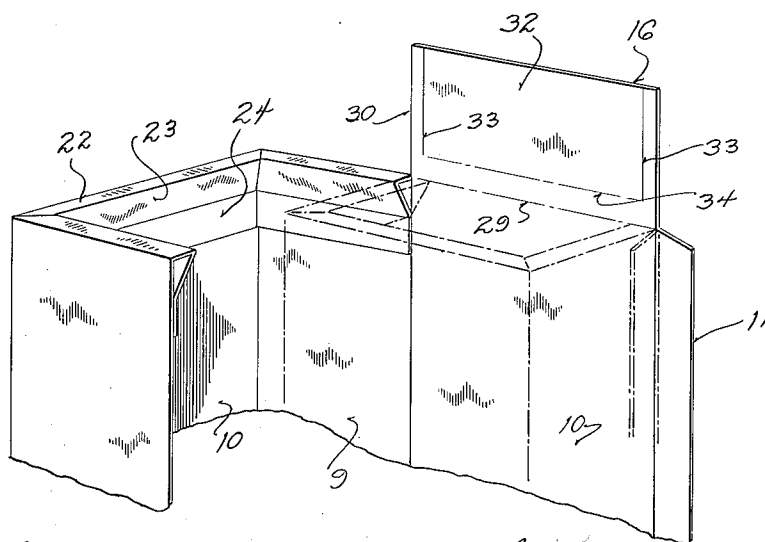


*Fig. 6.*

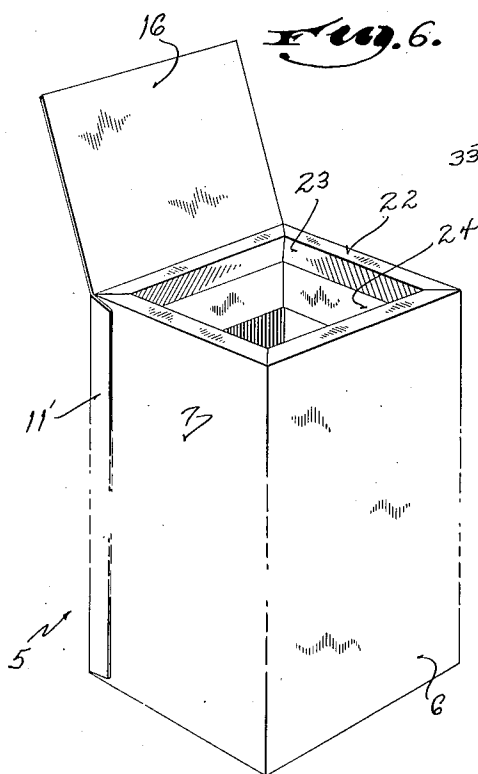
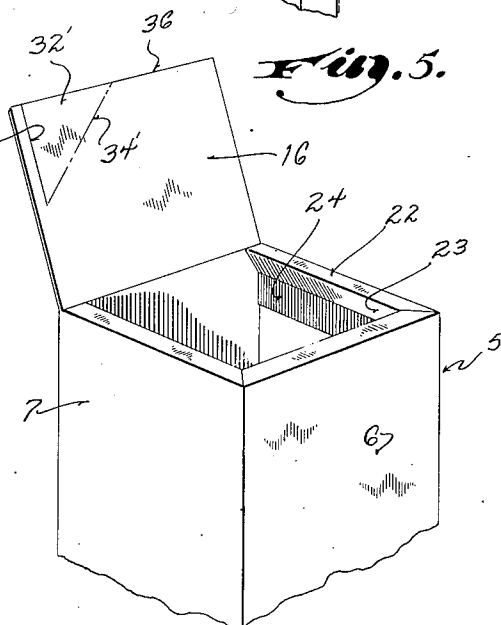


*Fig. 5.*



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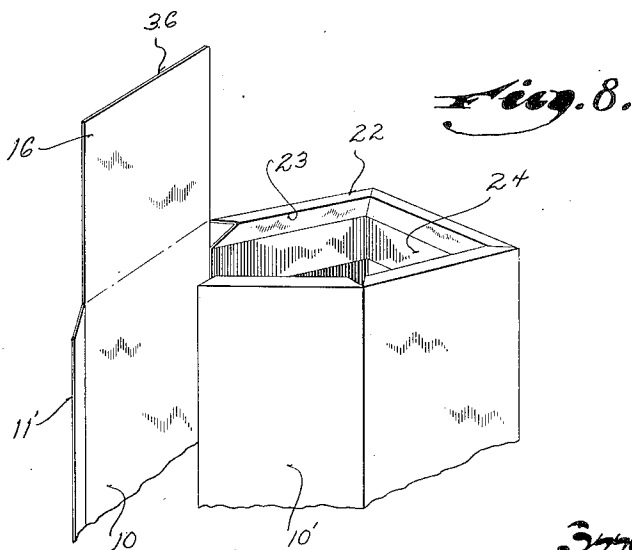
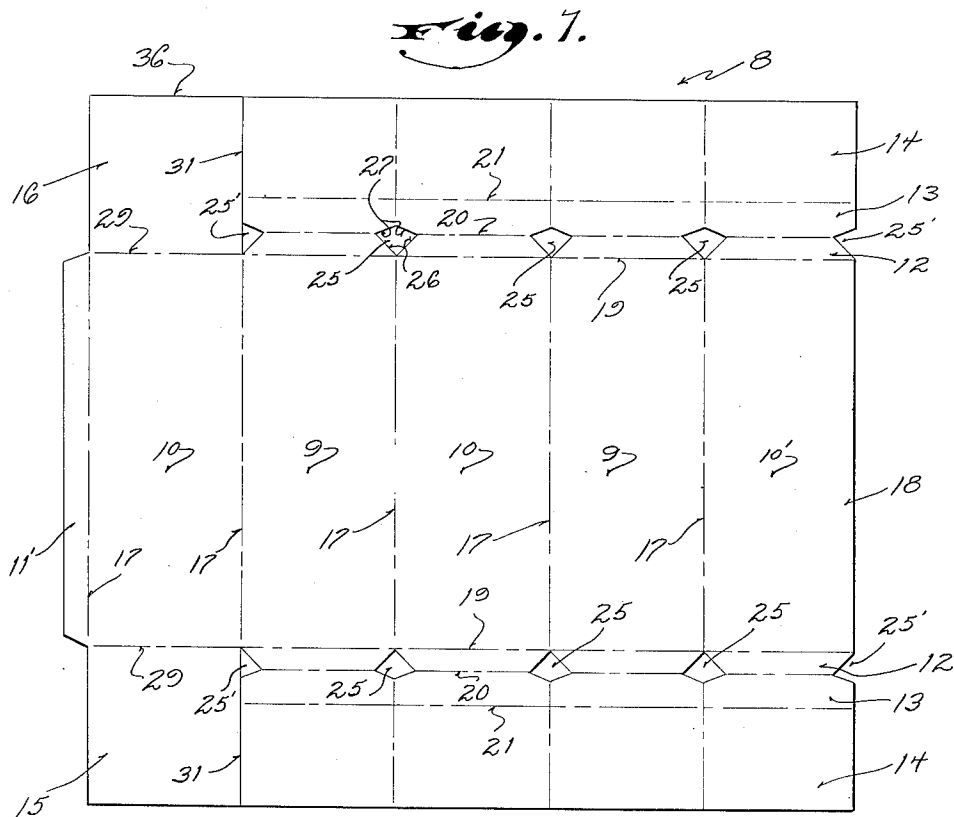
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**2,589,045**

Filed April 16, 1947

4 Sheets-Sheet 3



B46 ~~344~~ ~~Wentworth~~  
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~~Chambers~~

March 11, 1952

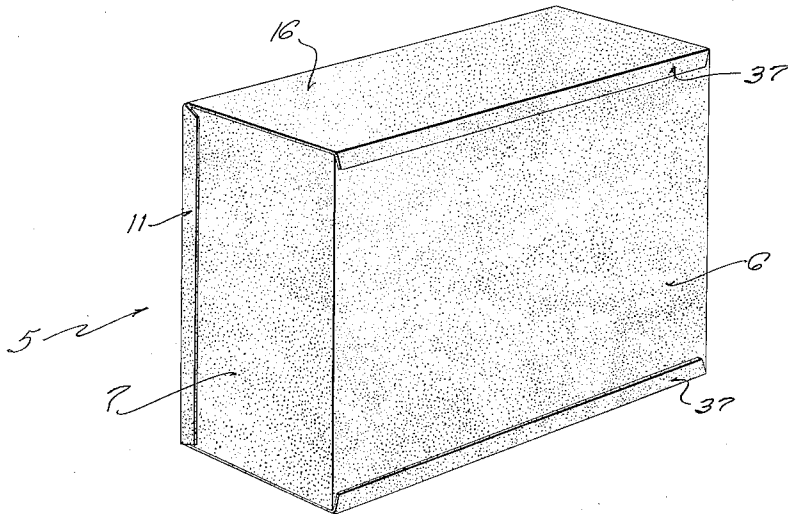
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Filed April 16, 1947

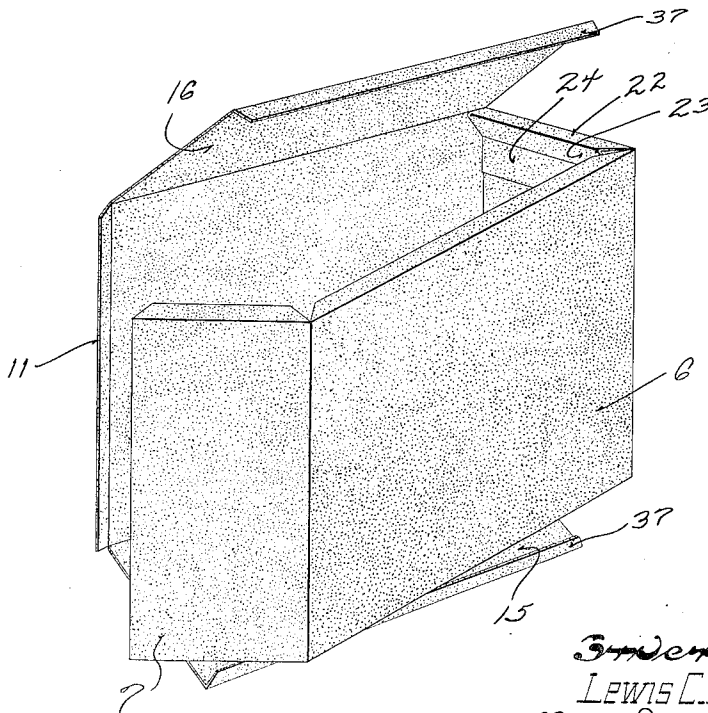
4 Sheets-Sheet 4

*Fig. 9.*



MICRO-CRYSTALLINE WAX COATING ON  
ALL INNER AND OUTER SURFACES OF BLANK

*Fig. 10.*



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## UNITED STATES PATENT OFFICE

2,589,045

## TUBE TYPE CONTAINER

Lewis C. Brooks, Milwaukee, Wis., assignor of  
one-third to Ira Milton Jones, River Hills, Wis.

Application April 16, 1947, Serial No. 741,904

2 Claims. (Cl. 229—37)

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This invention relates to containers made of flexible material, such as fiber, plastics, and thin sheet metal, and has particular reference to consumer containers of the type used for household commodities and foods.

Heretofore, there has been no satisfactory fiber container which may be formed from a single sheet blank and which is capable of holding liquids, powders or frozen foods without leakage of the contents itself or at least its moisture content.

The conventional one-piece carton structure, having four closure flaps at each end, one extending from each side wall, is an unsatisfactory container for liquids and powders because of inadequate sealing of its closure flaps. It is only when such containers are filled with substantially solid contents that anything approaching a good seal can be accomplished, for it is obvious that a sift-proof or liquid-proof seal can be approximated at the end closures of such cartons only in the presence of an internal support against which pressure may be applied to the mating flaps to bond them together satisfactorily.

This disadvantage is particularly important in connection with containers for frozen food products, which must not only be leak-proof and sift-proof, but must also be water-vapor-penetration proof in order that their contents will be protected against dehydration at low refrigerating temperatures. It has heretofore been customary to use a triple carton for frozen foods. The frozen food contents are first wrapped in an inner cellophane bag, and this is placed in an ordinary cardboard container. Since the container cannot be sealed satisfactorily, an outer waxed wrapper is provided to hold it shut and to provide additional insurance against dehydration.

The outer waxed wrapper, however, gives the container an unsightly appearance, especially under refrigerating temperatures, thus reducing sales appeal; and the necessity for using three separate wrappers entails considerable expense for labor, materials, and packaging.

One means for obtaining a satisfactory seal resides in the use of a carton formed from two or more blanks, such as that described in the patent to Lewis C. Brooks, dated April 16, 1946, No. 2,398,404.

From the standpoint of cost and convenience, however, a container formed from more than one blank is highly undesirable, as separate dies are required for each blank and the cost of the complete carton becomes proportionately higher with the increase in the number of its component parts.

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Moreover, when a container is not shipped as a single unit there is always the possibility that one of its component parts will be lost, damaged or delayed in shipment between the manufacturer and the packer, so that the part which does arrive is useless. Also, the cost of using such a carton is higher than that for one formed from a single sheet blank, since special machinery is required to seal the carton and extra labor is required to handle the extra parts.

Such one-piece consumer containers as have been devised are likewise unsatisfactory. An example of a one-piece container suitable for packaging fluids is found in the patent to Jacob H. Strack, dated September 21, 1943, No. 2,329,797. Containers produced in accordance with designs such as this have been found in practice to include a small but uneconomical percentage of "leakers," and, what is of greater importance, the container exemplified in the patent to Strack embodies a sloping roof-like top which makes stacking of the filled containers extremely difficult, if not impossible.

It is therefore an object of this invention to provide a one-piece container suitable for packaging all varieties of consumer goods including liquids, powders and the like, that will have flat end closures to permit convenient stacking of filled containers.

Another and very important object of this invention resides in the provision of a container made from a single sheet blank of fibrous material, which is especially adapted to the packaging of frozen food products and which eliminates the requirement for additional inner or outer wrappings to prevent undesirable vapor penetration.

Another object of this invention resides in the provision of an inexpensive one-piece container for liquids, powders and other dry foods, which may be filled and sealed with extremely simple packaging machinery and which will be leak-proof and sift-proof when so sealed.

A further object of this invention resides in the provision of a container of the character described which may be made from relatively light stock and which will have unusually high structural strength.

It is another object of this invention to provide a one-piece container blank having a nearly rectangular outline, with little or no material wasted in cutouts, which may be formed up into a flat-sided leak-proof and sift-proof container.

Still another object of this invention resides in the provision of a container of the character described wherein the single sheet blank from which the container is formed may have a thermoplas-

tic substance applied thereto which will at once seal the fibers of the blank against undesired interpenetrations and provide a bonding adhesive whereby adjacent overlapping surfaces of the container may be permanently secured to one another by the application of heat and pressure to them.

Another object of this invention resides in the provision of a one-piece container of the character described in which one of the end closures is provided with a readily openable pouring tab that may be resealed by the application of pressure thereto.

With the above and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate several complete examples of the physical embodiment of the invention constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a perspective view of a general purpose container constructed in accordance with the principles of this invention and provided with a readily openable pouring tab;

Figure 2 is a perspective view of the top portion of the container depicted in Figure 1 before sealing of the top cover;

Figure 3 is a plan view of the single sheet blank from which the container shown in Figure 1 is formed;

Figure 4 is a perspective view showing the Figure 3 blank partially folded and in the process of being formed into the container depicted in Figure 2;

Figure 5 is a perspective view of the top portion of a container similar to that depicted in Figure 1 but having a modified type of dispensing tab, and shown with the upper end closure flap open;

Figure 6 is a perspective view of another container embodying the principles of this invention and having end closure supporting shoulders running completely around the upper end of the container body;

Figure 7 is a plan view of the single sheet blank from which the container shown in Figure 6 is formed;

Figure 8 is a perspective view of the Figure 7 blank partially folded and in the process of being formed into the container depicted in Figure 6;

Figure 9 is a perspective view of a container embodying the principles of this invention and particularly adapted to the packaging of frozen food products; and

Figure 10 is a perspective view of the container depicted in Figure 9, partly unfolded, to illustrate the manner in which the frozen foods are quickly removable from the package.

Referring now more particularly to the accompanying drawings, in which like numerals designate like parts throughout the several views, the numeral 5 designates the body of a flat-sided paper or fiber container having pairs of rectangular side walls 6 and 7. For maximum economy of materials, two opposite sides 6 may be made somewhat wider than the other two sides 7, as is the case in the container illustrated in Figures 1 to 4 inclusive, although if desired the body sides can be exactly equal in width to form

a square container such as illustrated in Figure 5.

The entire container is formed from a single sheet blank 8, appropriately cut and scored to provide similar pairs of side wall forming panels 9 and 10 corresponding to the body sides 6 and 7 respectively, a glue flap 11, shoulder and reinforcing strips 12, 13 and 14, and end closure flaps 15 and 16 on one of the end panels of the blank. The panels extend in a row across the medial portion of the blank, with a narrow panel 9 alternating with a wider one 10 if it is desired to have the width of the box greater than its depth.

The panels are defined from one another and from the glue flap 11 by parallel score lines 17 which enable the blank to be folded to form a tube of rectangular cross section (see Figure 4). The glue flap 11 is hinged by one of the score lines 17 along the side of one of the panels at the end of the row thereof and is adapted to be secured to the side edge portion 18 of the panel at the opposite end of the row of panels to hold the body tube assembled.

The series of shoulder forming strips 12, 13 and 14 lie adjacent to the ends of the side wall forming panels and in fact constitute extensions of all but one end panel, in this case the panel 10, extending in the direction of the score lines 17. These shoulder and reinforcing strips preferably extend continuously across the three remaining side wall forming panels and are defined from one another and from the side forming panels by spaced score lines 19, 20 and 21 which are perpendicular to the score lines 17 defining the side wall panels from one another. The innermost score lines 19 define the top and bottom ends of the panels in the finished container.

The innermost shoulder forming strips 12 form closure supporting ledges 22 at the opposite ends of the assembled container, being folded "in the flat" at right angles to the side wall forming panels along the score lines 19. The intermediate strips 13 are folded downwardly on the score lines 20 beneath and at an angle to the shoulders 22 to form truss supports 23, and the outermost strips 14 are folded on the score lines 21 to lie flatwise against the inner surface of the body side walls for securement thereto to form anchor strips 24 for the truss shoulders.

Kite-shaped cutouts 25 between the two panels 9 form, in effect, mitered corners when the shoulder strips are folded and permit the blank to be bent up into tubular shape after the closure supporting ledges or shoulders are produced "in the flat." The inner edges 26 of these cutouts, extending from the intersection of score lines 17 and 19 to score line 20, must be at right angles to one another and at a 45 degree angle to the scores 17 so that the ends of the cover supporting ledges 22 will abut one another closely.

Preferably, however, the outer edges 27 of the cutouts 25 converge from the score lines 20 to a point on the score lines 17 intermediate score lines 20 and 21. The ends of the intermediate strips 13 will thus be caused to crowd into the corners of the container beneath the ledges 22 when the body of the container is folded into tubular form thereby forming a secure seal at the corners of the shoulder truss supports 23.

In the Figure 3 blank, the open ends of the shoulder forming strips, when folded, are perfectly square, and are adapted to abut the rear wall of the container. To provide a good seal at this point, insuring against the entry of liquid contents of the container into the hollow interior of the ledge 22, an area 40 at each of the inner

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corners or the side wall forming panel 10 which forms the rear container wall may be coated with any suitable thermo-plastic adhesive to provide for permanent sealing of the open ends of the ledges thereto.

The end closure flaps 15 and 16 project as full width extensions from both ends of the end panel 10 and are defined from it by score lines 29 which may be considered continuations of the score lines 19. One side edge 30 of each end closure flap lies adjacent to the inner ends of the shoulder forming strips in the blank and is defined from them by a slit or cut 31 in line with the adjacent score 17. The cuts 31 enable the end closure flaps to be folded along the score lines 29, independently of the shoulder forming panels, to have their free edge portions overlie the closure supporting ledge 22 for securement thereto.

To assure complete closure of the ends of the container by the flaps 15 and 16, it will be noted that their length in the direction of the score lines 17 must be at least equal to the width of the panels 9 which form the opposite side walls of the container.

A dispensing or pouring tab 32 may be provided in one of the end closure flaps 16 to permit ready access to the contents of the container. This tab may take a variety of forms. For example, it may be substantially rectangular, as shown in Figures 1 to 4 inclusive, or triangular, as shown at 32' in Figure 5.

The rectangular dispensing tab 32 is formed by making a pair of side cuts 33 in the top flap 16, parallel to the opposite side edges thereof and spaced inwardly from said edges a distance less than the width of the closure supporting ledge strip 12. The cuts extend from the free front edge 36 of the flap rearwardly toward the hinge score 29 a distance determined by the size of the dispensing opening desired, and the inner ends of the cuts 33 are connected by a score line 34 parallel to the score line 29.

When the end closure flap 16 is bent downwardly along the score line 29 onto the ledge 22, the free marginal edge portions of both the flap itself and of the tab portion will overlie and receive support from the closure supporting ledge 22, so that the tab as well as the flap may be sealed to the ledge in one operation.

The flaps 15 and 16 may be secured in position sealing the ends of the container by any suitable adhesive. One type of adhesive which may be used to advantage is a synthetic wax initially activated to adhesiveness by the application of heat and pressure to establish a seal between the flap and the ledge 22, the effectiveness of which increases with the heat and pressure applied. Sufficient heat and pressure must be employed, however, to seal the tab 32 against accidental opening, but the tab must not be adhered so securely as to interfere with intentional opening thereof. This synthetic wax is also desirable in that it has repeatedly effective pressure sensitive characteristics so that after the factory seal has once been broken the tab may be secured in place by pressure alone to protect the partially dispensed contents of the container.

As additional security against leakage and vapor penetration, glassine strips or lengths of "Scotch tape" 35 may be secured along the upper surface of the closure flap to overlie the cuts 33, and to extend around the front corner of the container and a short distance downwardly along the side wall.

The triangular dispensing tab 32' is readily

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formed in the end closure flap 16 by making only a single cut 33' parallel to one of the free side edges 30 of the flap and spaced inwardly therefrom a distance less than the width of the closure supporting ledge 22, as shown in Figure 5. A score line 34', extending from the inner end of the cut 33' to the free front edge 36 of the closure flap, permits the flap to be lifted upwardly into dispensing position, producing a triangular dispensing opening at one of the front corners of the container. As in the case of the rectangular dispensing tab, the free edges of both the end closure flap and the triangular tab are secured to the closure supporting ledge 22 when the end closure is sealed, and though not essential, a strip of glassine or "Scotch tape" may also be secured over the cut 33' if desired as an additional safeguard against leakage.

In some applications it may be desirable to have the end closure supporting shoulder extend around all four sides of the container, as shown in Figure 6, either to obtain the advantages of a more secure end closure seal or the greater rigidity which this feature provides. This may be readily accomplished by providing the blank with an additional side wall forming panel 10' equal in width to the panel 10 having the flaps 15 and 16 thereon, but at the opposite end of the row of panels, as shown in Figures 7 and 8. The shoulder forming strips 12, 13 and 14 are extended integrally across the ends of the extra panel 10' and the necessary cutouts 25 and 25' must then be provided to enable the adjoining ends of the fourth shoulder to abut the others smoothly.

As will be seen by reference to Figure 7, the panel 10 from which the end closure flaps extend completely overlaps the fifth panel 10' at the opposite end of the blank when the container is assembled. The fifth panel thus may take the place of a glue flap, although a flap 11' may be provided if desired to secure "right angle" bonding. The fifth panel also adds considerably to the rigidity of the finished container inasmuch as it produces a double rear wall on the container.

The blank depicted in Figure 7 is intended to be formed up into a square container having four sides of equal width. The width of the anchor strip 14 is entirely optional, but is preferably such that its outer edge will align with the outer edge 36 of the end closure flaps, so that the blank will be substantially rectangular, thus affording maximum economy in the use of materials. As will be seen by comparing the blanks shown in Figures 3 and 7, the anchor strip will then be relatively wider in the case of the square container since the end closure flaps 15 and 16 extend outwardly farther from the side forming panel 10. The disadvantage entailed in this use of extra material, however, may in some instances be outweighed by the additional rigidity imparted to the container by the wide anchor strips, and in fact the additional reinforcing achieved allows the container to be made from lighter stock.

In instances where the closure flaps 15 and 16 are hinged to one of the narrow panels of a container having a rectangular cross section, as for instance one of the side walls 7 in the Figure 2 container, it is possible that the increased length of both the flap and shoulder strips will result in a double wall construction by reason of the anchor strips extending inwardly toward each other to practically meet at the center of the carton. When this feature is combined with the extra panel feature previously described,

it will be apparent that all of the side walls of the container will have double thickness, allowing paper stock of relatively lightweight to be used.

A container constructed in accordance with the principles of this invention and particularly designed for packaging frozen food products is shown in Figures 9 and 10. The blank from which this container is formed is cut to an almost exactly rectangular shape similar to the blank of Figure 3, and scored in much the same manner. Before "foldup" however, a suitable thermoplastic material is applied, preferably to both sides of the blank, to seal the same against undesirable vapor penetration. This thermoplastic material may be applied in sheets, or as a coating, and has such characteristics as to form a bond between overlapping layers of the blank when heat and pressure are applied thereto.

Microcrystalline wax is a very satisfactory agent for this purpose, and meets the additional requirement of being inert in the presence of most of the products which might conceivably be packaged in containers of the type with which this invention is concerned. When dipped in such molten wax, so as to provide a coating thereof on all surfaces of the blank, no other adhesive is required in the forming up of the carton, including the sealing of the closure flaps.

Assembly of the container blank so coated is extremely simple as each step in the folding process brings various overlapping surfaces adjacent to one another, heat and pressure are simultaneously applied to them to bond the same together.

Since frozen food products are generally frozen into a single solid mass, no dispensing tab is provided on the frozen food container. Instead, relatively narrow extensions 37 on the free front ends of the closure flaps may be provided if desired to facilitate opening of the package. These extensions are folded down over the front wall of the container and may either be free to be readily grasped to pull the flaps open, or they may be bonded to the front wall of the container in the manner described. In this latter instance, a knife blade or the finger nail may be readily inserted under them to facilitate unsealing of the container for access to its contents, and the glue flap 11 is lifted in the same manner. Hence, the entire container may be easily "unwrapped" from the solidly frozen contents.

It is to be understood, of course, that the tenacity of the bond afforded by the microcrystalline wax is controlled as by the addition of paraffin thereto to enable the container to be securely sealed against accidental opening but to readily enable unwrapping of the package for access to its contents.

The permanence of the bond when thermoplastics other than microcrystalline wax are employed, may of course, be governed by controlling the heat and pressure through which the bond is established.

The frozen food package of this invention not only eliminates the expensive inner and outer wrappings hitherto employed together with a paper board container, but has the advantage that it is better suited to fast freezing of the products packaged therein. Also, the substan-

tial reinforcing afforded by the truss shoulders at the opposite ends of the container permit the same to be made from very thin stock such as a heavy paper rather than fiber or paper board.

From the foregoing description, taken together with the accompanying drawings, it will be seen that the container of this invention is unique in that it has rigid reinforcing means at its ends to receive and support the end closures of the container, yet is made from a single sheet blank of relatively lightweight flexible material.

I claim:

1. A consumer type container made from a single blank of flexible sheet material cut and scored to provide a tubular body substantially rectangular in cross section, characterized by: inwardly directed substantially rigid supporting ledges flush with the opposite ends of the body sides and substantially perpendicular thereto, said ledges extending around three sides of the body, a single cover flap at each end of the body, integral with the fourth side thereof, and foldable so as to seat on said ledges to completely close the opposite ends of the container, and further characterized by the provision in one of said cover flaps of a tab foldable out of the plane thereof along a score on said cover flap so positioned that the free edge portions of the tab seat on the adjacent ledge.

2. A consumer type container made from a single blank of flexible sheet material cut and scored to provide a tubular body substantially rectangular in cross section, characterized by: inwardly directed substantially rigid supporting ledges flush with the opposite ends of the body sides and substantially perpendicular thereto, said ledges extending around three sides of the body, a single cover flap at each end of the body, integral with the fourth side thereof, and foldable so as to seat on said ledges to completely close the opposite ends of the container, and further characterized by the provision in one of said cover flaps of a tab foldable out of the plane thereof along a score on said cover flap so positioned that the free edge portions of the tab seat on portions of the ledge adjacent thereto for releasable securement to said ledge portions; means substantially permanently securing said cover flaps, except the free edges of said tab, to said ledges; and means for releasably securing the free edges of said tab to said ledge portions.

LEWIS C. BROOKS.

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