

April 14, 1942.

H. F. WATERS

2,279,358

SKIVED CONTAINER CONSTRUCTION AND METHOD OF MAKING THE SAME

Filed July 18, 1940

2 Sheets-Sheet 1

Fig. 1.

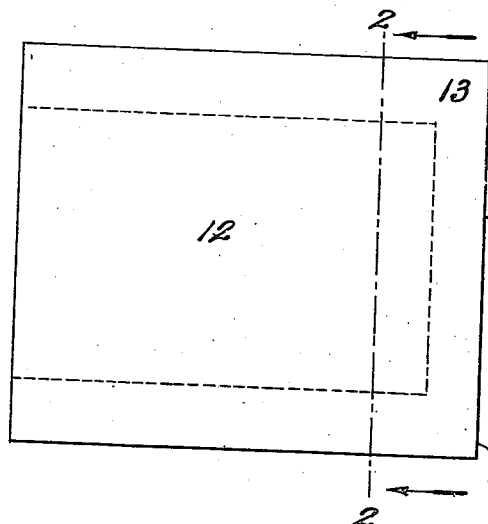


Fig. 3.

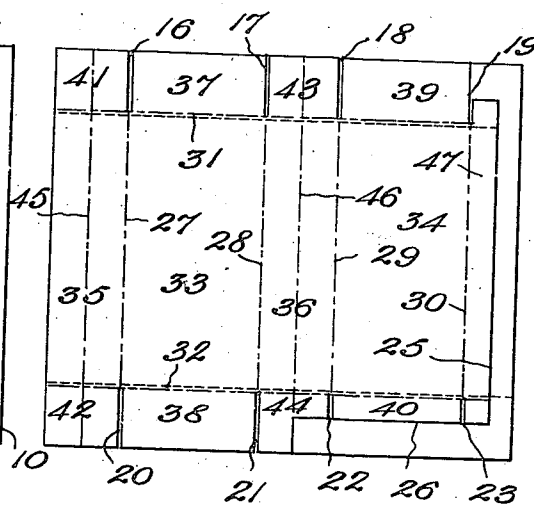


Fig. 2.

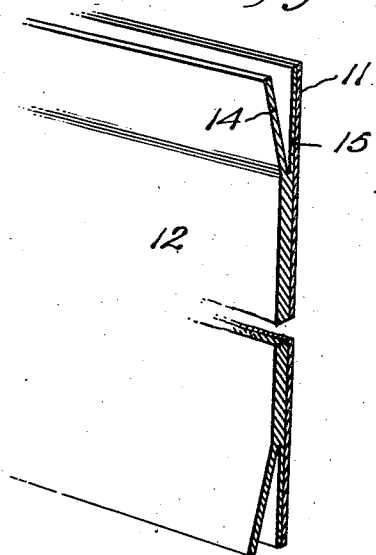
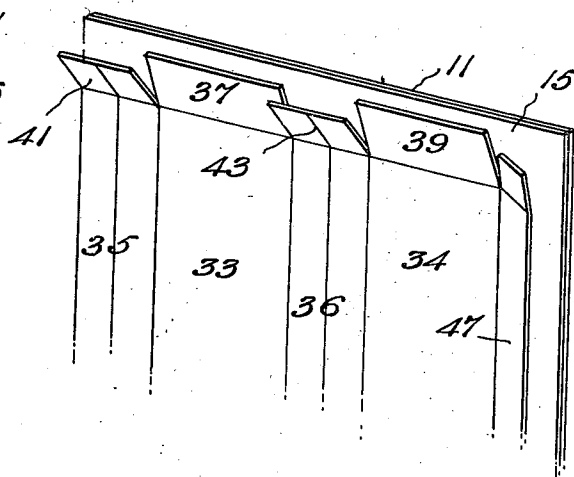


Fig. 4.



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2 Sheets-Sheet 2

Fig. 5.

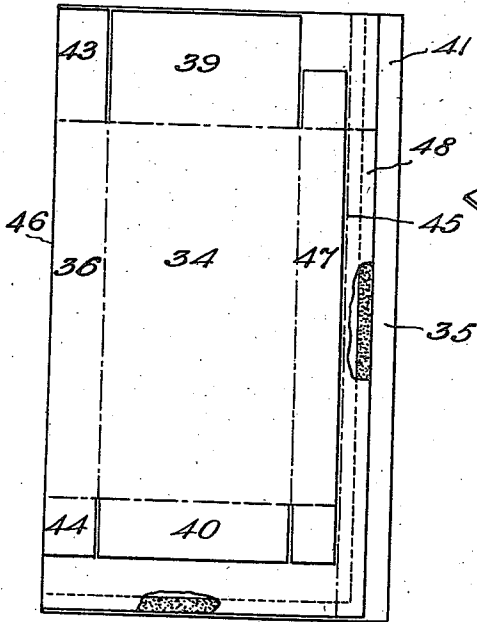


Fig. 7.

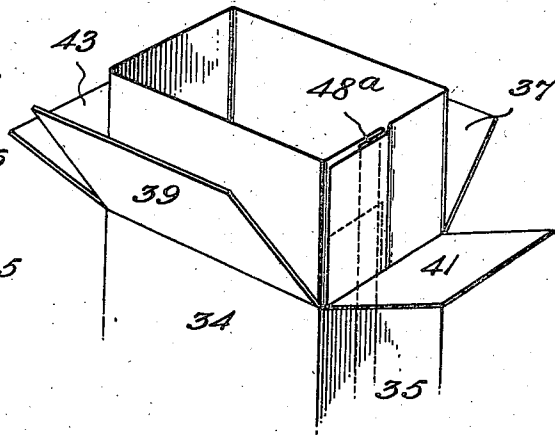


Fig. 8.

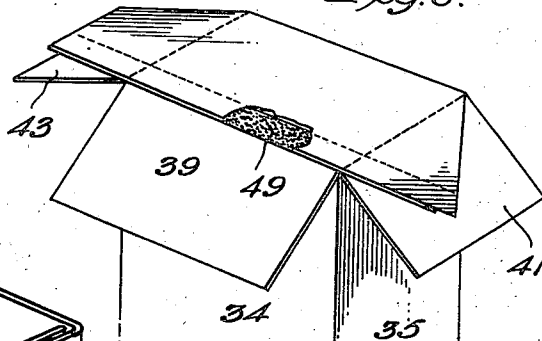


Fig. 6.

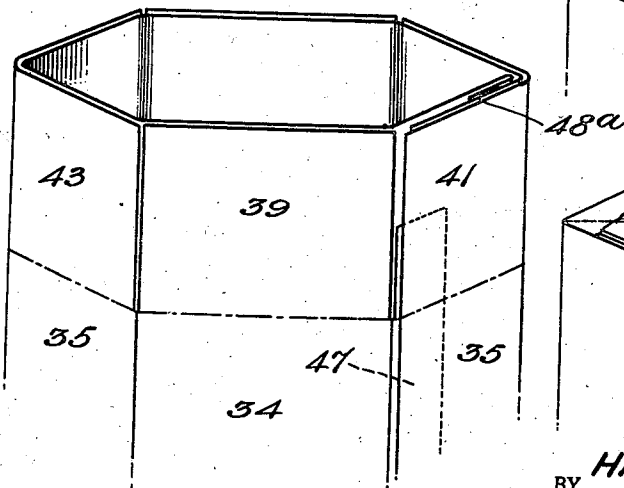
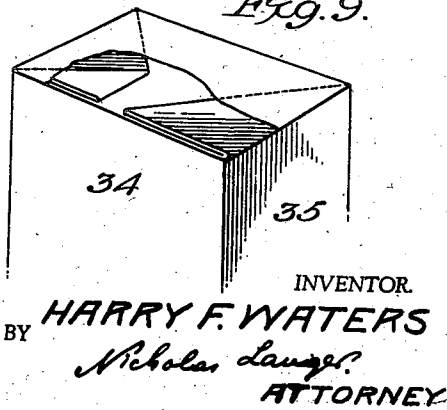


Fig. 9.



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SKIVED CONTAINER CONSTRUCTION AND
METHOD OF MAKING THE SAME

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13 Claims. (Cl. 229—37)

The present invention relates to the art of containers and, more particularly, to a container constituted of an integral sheet of flexible material in which skived incisions are made in predetermined regions thereof to impart thereto a duplex structure in such regions.

Heretofore, various containers were proposed for the purpose of packaging, particularly for fluid-tightly packaging commodities, including an outer carton of substantial mechanical strength and an inner liner or bag having lower mechanical strength but good fluid-tight character. These prior fluid-tight containers were generally made by bonding a liner sheet or strip of suitable fluid-tight character to a carton blank and then subjecting carton and liner to various forming operations. I have now discovered that the advantages of this duplex structure may be obtained at a considerably lower cost and by means of greatly simplified operations.

It is an object of the present invention to provide a container particularly for the purpose of fluid-tight packaging which is constituted of an integral sheet of flexible material converted into a multi-layer structure in predetermined regions thereof.

It is another object of the invention to provide a container, or package, of novel and improved character which departs from the conventional practice of spotting or bonding a liner to a cardboard blank and which employs a construction in which the reinforcing carton and the fluid-tight liner are integrally formed.

It is a further object of the invention to provide a container in knocked-down form adapted to be squared-up prior to filling which is constituted of a single layer of material in the body portion thereof and which has integrally connected multi-layer structure in the end or flap portions thereof.

It is also within the contemplation of the invention to provide a skived container construction in which an integral sheet of flexible material is converted into a container of multi-layer construction by means of incisions parallel to the plane thereof which is simple in character and inexpensive to manufacture.

The invention also contemplates a novel method for converting a single and integral sheet of flexible material into a container of duplex construction by means of skiving, cutting, scoring and sealing operations.

Other and further objects and advantages of the invention will become apparent from the

following description taken in conjunction with the accompanying drawings in which:

Fig. 1 illustrates a plan view of an integral sheet of flexible material which is skived at the marginal portions thereof to form a blank for a preferred embodiment of the present invention;

Fig. 2 depicts a vertical sectional view taken on line 2—2 of Fig. 1 and being somewhat fragmentary and greatly exaggerated in thickness for reasons of clarity;

Fig. 3 shows the blank illustrated in Figs. 1 and 2 after the cutting and scoring operations;

Fig. 4 is a somewhat fragmentary perspective view of the upper portion of the blank shown in Fig. 3;

Fig. 5 illustrates a plan view of the container of the invention after the heat-sealing operation;

Fig. 6 depicts a fragmentary perspective view showing the container of the invention in the completed tubular form and in partially squared up condition in which the marginal portions of one of the end panels is adhesively secured to the glue flap of the main body of the container;

Fig. 7 shows a perspective view of the upper portion of the container in its squared-up position and ready for filling;

Fig. 8 is a similar view of the container after filling with the upper terminal portions of the inner layer folded down in the plane defined by the upper edges of the main body of the container and provided with a transverse seal; and

Fig. 9 is a perspective view of the upper portions of the container in its completely closed position and with portions of the top closure flaps broken away for clarity of illustration.

Broadly stated, in accordance with the principles of my invention, I provide an integral sheet of flexible material such as, for example, a sheet of cardboard or of a similar board of cellulosic material. I prefer to provide one face of this sheet with a suitable layer or coating of a thermoplastic and fluid-tight material such as, for example, Pliofilm, Koroseal, Vinylite, and the like. Hereafter, I provide incisions in the marginal regions of this sheet or board in a direction parallel to the plane thereof. This may be accomplished by means of various devices such as a skiver having a cutter blade which may be adjusted with great accuracy to cut into the thickness of the material and to separate it into a plurality of layers without injuring any of such layers. Thus, the original integral sheet or board has been converted into one which is of a single layer structure in the main or body

portions thereof and has an integrally connected multi-layer structure in certain marginal regions thereof. This blank is now provided with incisions in the regions thereof where it has more than one layer, said incisions being of such character that they vertically extend through at least one of the layers of the blank but leave at least another one of such layers integral. In this manner, the sheet is converted into a blank having an integrally formed, unslitted and imperforate liner connected therewith while the slitted regions of the other layer form top and bottom closure flaps therefor. This novel blank may be scored in various ways to provide four or six-sided containers, as those skilled in the art will readily understand. It will be noted that a blank of the described character is in most respects the equivalent of a container in which a liner sheet is adhesively secured to a separate carton blank of appropriate character.

The novel blank thus obtained may be readily converted into a container by folding it along a medial score line so that its coated side will be inside of the folded structure. This will bring the side and bottom edges of the inner surface into substantially overlapping position so that they may be secured together, for example by means of a suitable heat-sealing device. One of the end panels obtained may be adhesively secured to a glue flap provided at the other extremity of the blank whereby a tubular carton structure is obtained. The container of the invention may be stored or shipped in this condition and may be squared up for the purpose of filling. After filling, the inner layer which is coated with a thermoplastic and fluid-tight material may be separately sealed with a transverse top seal and the top flaps constituting the outer layer of the skived sheet will form closure flaps which may be closed thereafter, as it will be explained more fully hereinafter.

Referring now to the drawings a preferred embodiment of the invention will be described in which the concept of the invention is applied to a six-sided box. Reference character 10 generally denotes a sheet or board of flexible material such as cardboard, pasteboard, or the like. Although this sheet or board in itself may be a laminated product, for the purpose of the invention it is assumed to be an integral material having a uniform structure throughout. This sheet or board is laminated or coated on one face thereof with a suitable thermoplastic material of a fluid-tight and fusible character, this layer or coating being denoted by reference character 11.

The first step in converting this thermoplastic coated sheet into a fluid-tight and hermetically sealed container consists in making incisions therein parallel to the plane thereof and extending to a predetermined distance from the top and bottom and one side edge thereof. This operation may be accomplished by a skiver or some other similar device. The result is a sheet or blank having a single layer structure in the main or body portion 12 thereof and having a two layer structure along a U-shaped marginal area 13. Preferably these incisions made by the skiver are so arranged that the outer layer 14 is of a much greater thickness than the inner layer 15 bearing the thermoplastic coating or layer 11, as this will be observed in Fig. 2. Thus, the outer layer, which subsequently will form the closure flaps of the finished container, is of greater rigidity and strength than the inner layer bearing the coating of thermoplastic mate-

rial which subsequently will form the liner of the finished container.

The sheet thus formed and skived is now provided with incisions in a direction vertical to the plane of the sheet, the depth of said incisions being so adjusted that it will extend merely through the outer layer of the skived region but leaves the inner or liner layer integral. These vertical incisions are denoted by reference characters 16, 17, 18 and 19 at the top edge of the sheet and similar incisions 20, 21, 22 and 23 are provided at the bottom edge of the sheet. In addition, a similar incision is made along lines 25 and 26 of the sheet whereby an L-shaped portion of the outer layer in the skived region may be removed. Longitudinal score lines 27, 28, 29 and 30 are provided in the skived and slitted sheet and cooperate with transverse score lines 31 and 32 to define main panels 33 and 34 and end panels 35 and 36. As it will be best observed in Fig. 3, main panel 33 is provided with top and bottom closure flaps 37 and 38, respectively, and main panel 34 is provided with top and bottom flaps 39 and 40, respectively. End panel 35 is provided with top and bottom closure flaps 41 and 42, respectively, and end panel 36 is provided with similar top and bottom closure flaps 43 and 44, respectively. A medial score line is provided in both end panels 35 and 36 and is denoted by reference characters 45 and 46, respectively. Glue flap 47 is formed at the right extremity of the blank, the operation of which will presently appear. Thus, it will be noted and it will be readily observed in Fig. 4 that the foregoing operation converted sheet or board 10 into a structure having an integral thermoplastic-coated inner lining and having a reinforced outer carton formed therewith. The main body of the carton and of the liner are in common while in the marginal regions the outer layer is separated therefrom and takes the form of hingedly connected closure flaps.

The blank of the described character may be converted into a container by folding it about score line 46 in the center of end panel 36. This operation will provide the structure depicted in Fig. 5. It will be noted that the bottom and the right-side marginal portions of the inner or liner layer are exposed and are lying flat on the corresponding portions of the outer layer. Heat and pressure may be applied to this flattened folded blank along and L-shaped marginal region 48 whereby the inner or liner layer will be sealed at the bottom and side edges, leaving only the top edge thereof open for the introduction of the contents. After this sealing operation, end panel 35 may be folded about its longitudinal medial line 45 and may be adhesively secured to glue flap 47. Thus, the outer layer will be converted into a tubular carton structure while the inner or liner layer will form a bladder or bag within this outer layer. This may be seen in Fig. 6 which is a perspective view of the upper portions of the finished container. Of course, the container is preferably stored and shipped in the completely flattened condition in which it requires a minimum of storage space. When it is desired to fill the container of the invention, the knocked-down or flattened container is squared up into the shape illustrated in Fig. 7. It will be noted that in this squared up condition the carton is closely similar to the container disclosed in my copending application Serial No. 329,254, filed April 12, 1940. The difference resides in the body portion of the container in which the liner

or inner layer and the carton or outer layer are integrally connected same as they were in the original sheet while at the top and bottom extremities of the container the outer layer forms hingedly connected closure flaps extending independently and disconnected from the inner or liner layer. Likewise, the sealed region 48 is converted into a lateral fin 48a extending in the direction of end panel 35. In this squared up condition, the bottom portions of the inner or liner layer form tabs which may be tucked in and the corresponding flaps may be closed thereabout. Hereafter, the container may be filled with any desired commodity by means of a conventional filling device. After the filling operation has been completed, the top portions of the inner or liner layer extending beyond the hinge lines of the container may be brought together and provided with a completely flat transverse top seal 49 in which only two layers of material are in a face to face relationship. Although this top seal may be provided in various ways, I prefer to provide it by means of a suitable heat-sealing device and to apply it in the way it is disclosed, for example, in my copending application Serial No. 329,254. After the top portion of the inner liner layer has been sealed, top closure flaps 37, 39, 41 and 43 may be closed thereabout providing a finished package shown in Fig. 9. Likewise, the bottom portion of the package is closed in similar manner by means of closure flaps 38, 40, 42 and 44.

It will be noted that the container of the invention provides all of the advantages of a duplex fluid-tight container by means of a greatly simplified structure. While in prior fluid-tight collapsible containers an entirely separate inner liner was formed to a bag and was inserted into or was simultaneously formed with an outer reinforcing carton, in the present instance the complete container is formed from a single integral sheet or board of flexible material which by means of skiving, scoring and cutting operations is converted into a container having a single layer structure in the main or body portion thereof and having a two layer structure in the top and bottom portions thereof.

It is also to be observed that due to the special construction of the container of the invention it may be hermetically sealed and may be advantageously used for holding commodities in a hermetically sealed condition. Moreover, the container of the invention is extremely simple in structure and may be readily produced on a practical and industrial scale at a low cost.

Although the present invention has been described in connection with a preferred embodiment thereof, to wit: applied to a six-sided container, it may be employed with equal or similar results in containers of other types such as four-sided containers, containers in which lap type seams rather than turned fin-type seams are employed, etc. I consider all of these variations and modifications as within the true spirit and scope of the present invention as disclosed in the foregoing description and defined by the appended claims.

I claim:

1. A container construction comprising in combination a quadrangular sheet of flexible material, skived incisions in three marginal strips of said sheet separating the same into integrally formed and connected inner and outer layers within the area of such strips while retaining a one-layer structure outside of such area, longitudinal

score lines in said sheet defining a plurality of panels, and vertical incisions in said outer layer in the direction of said score lines defining hingedly connected top and bottom closure flaps for said panels, the ends of said inner layer and the flaps formed from said outer layer being adapted to be selectively secured together to form a sealed and closed container structure.

2. A container construction comprising in combination a sheet of flexible cellulosic material bearing fluid-tight thermoplastic material on at least one face thereof, skived incisions in marginal areas of said sheet separating the same into connected inner and outer layers extending within said area, said inner layer being thinner than said outer layer and being fusible on the exposed face thereof, incisions in said outer layer extending vertically to the plane of said sheet and defining hingedly connected closure flaps, and heat-sealed seams securing the ends of said inner layer together independent of said outer layer.

3. A container in knocked-down form comprising in combination a quadrangular sheet of flexible cellulosic material bearing fluid-tight thermoplastic material at least on one face thereof, spaced longitudinal and transverse score lines on said sheet defining a plurality of panels constituting the body portion of said container, skived incisions in marginal areas of said sheet beyond said body portion separating the same into an inner thermoplastic-lined layer and an outer layer, vertical incisions in said outer layer to define top and bottom flaps for said panels, and a heat-sealed seam bonding at least the lateral edges of said inner layer together forming an erectable container including an outer tubular carton with closure flaps at the ends thereof and an inner fluid-tight bag, said bag and carton having their body portion integrally formed and having their top and bottom portions separable for closure independent from each other.

4. A container in knocked-down form comprising in combination a quadrangular sheet of flexible cellulosic material bearing fluid-tight thermoplastic material at least on one face thereof foldable about at least four spaced longitudinal score lines and having at least two transverse score lines thereon to define opposed pairs of main and end panels constituting the body portion of said container, skived incisions in the areas of said sheet beyond said body portion separating the same into an inner thermoplastic-covered liner layer and an outer reinforcing layer, vertical incisions in said outer reinforcing layer defining top and bottom flaps for said main and end panels, and an L-shaped heat-sealed seam bonding the lateral edges of said inner liner layer fluid-tightly together to form an erectable fluid-tight container including an outer tubular reinforcing element with hingedly connected closure flaps at each end thereof and an inner fluid-tight element within said reinforcing element, said elements having their body portion integrally formed and having their top and bottom portions separable for closure independent from each other.

5. A container in erectable flattened form comprising in combination a sheet of flexible material bearing fluid-tight thermoplastic material on one face thereof, six spaced longitudinal score lines and two transverse score lines on said sheet defining opposed pairs of main and end panels and a glue flap constituting the body portion of said container, two of said longitudinal score

lines being medial lines in a pair of opposed panels on which said container is collapsed, skived incisions in marginal areas of said sheet beyond said body portion separating the same into an inner thermoplastic-covered liner layer and an outer reinforcing layer within said marginal areas, vertical incisions in said outer reinforcing layer defining top and bottom flaps for said main and end panels, means for securing the lateral terminal portions of one of said panels to said glue flap, and a heat-sealed seam bonding the lateral edges of said inner layer fluid-tightly together to form an erectable container including an outer tubular reinforcing element with hinged connected closure flaps at each end thereof and an inner fluid-tight liner element within said reinforcing element, said elements having their body portion integrally formed and having their top and bottom portions separable for closure independent from each other.

6. A fluid-tight, hermetically sealed package comprising in combination a sheet of flexible material fluid-tight and fusible on one face thereof, incisions in said sheet in a direction parallel to the plane thereof separating restricted regions of said sheet into connected inner and outer layers one of which bears said fusible surface, and incisions within said restricted regions extending vertically through one of said layers but leaving the layer with the fusible face continuous, the terminal portions of said continuous layer being fused together by means of completely flat seams free from reentrant folds and intervening layers to provide a hermetically sealed inner packaging space, and the terminal portions of said other layer being brought together to provide a reinforcing structure for said packaging space.

7. A container comprising a blank of flexible material having a plurality of incisions therein parallel to the plane thereof separating marginal areas of the blank into a plurality of layers including an inner and an outer layer, the terminal regions of said inner layer and of said outer layer being selectively brought and secured together in contacting position to provide a duplex packaging medium.

8. A container comprising a sheet of flexible material having incisions therein parallel to the plane thereof separating restricted marginal areas of the blank into an inner and an outer layer, and incisions within said restricted areas extending vertically through one of said layers but leaving the other layer continuous, the terminal regions of said inner layer and of said outer layer being selectively brought together and secured in contacting position to provide a duplex structure.

9. A container construction comprising a sheet of flexible cellulosic material having incisions therein extending parallel to the plane thereof separating restricted longitudinal and transverse marginal strips of the sheet into hinged connected inner and outer layers, a longitudinal seam including the inner and outer layers of said longitudinal marginal strip selectively secured together, and a transverse seam including the inner and outer layers of one of said transverse marginal strips selectively secured together, thereby defining a packaging space with a filling opening, said filling opening adapted to be closed after introduction of the contents by selectively securing together the inner and outer layers of the other transverse marginal strip.

10. A container construction comprising a sheet of fluid-tight flexible material, skived incisions in longitudinal and transverse marginal strips of the sheet separating the same into connected inner and outer layers in such regions, vertical incisions in said outer layer defining hinged connected top and bottom closure flaps, a longitudinal seam including the inner and outer layers of said longitudinal marginal strip selectively secured together, and a transverse seam including the inner layer of one of said transverse marginal strips selectively secured together with said bottom flaps closed thereabout thereby defining a fluid-tight packaging space closed at one end and having a filling opening at the other end, said filling opening being adapted to be closed after introduction of the contents by securing the inner layer of the other transverse marginal strip together and closing said top closure flaps thereabout.

11. A container construction comprising a sheet of flexible material bearing thermoplastic material on at least one face thereof, skived incisions in marginal areas of said sheet separating the same into connected inner and outer layers extending within said area, said inner layer being continuous and fusible on the exposed face thereof and said outer layer having incisions therein extending vertically to the plane of said sheet and defining hinged connected closure flaps, and heat-sealed seams securing the ends of said inner layer together independent of said outer layer.

12. A blank for a container comprising in combination a sheet of laminated flexible material having different surface characteristics on its two faces, incisions in said sheet parallel to the plane thereof separating restricted transversely and longitudinally extending marginal regions of said sheet into inner and outer layers, and incisions within said restricted regions extending vertically through one of said layers but leaving the other of said layers continuous, the terminal regions of the said inner layer being adapted to be secured in contacting position to form transverse and longitudinal seams, and the terminal regions of said outer layer being adapted to be secured in contacting position to reinforce the regions of said seams thereby to provide a container structure of a unitary character in the body portion thereof and of a duplex character in the seam portions thereof.

13. A blank for a container comprising in combination a flexible sheet constituted of fluid-tight and fusible material on one face thereof and of other material on the other face thereof, incisions in said sheet parallel to the plane thereof separating restricted transversely and longitudinally extending marginal regions of said sheet into inner and outer layers, and incisions within said restricted regions extending vertically through one of said layers but leaving the layer with the fusible face continuous, the terminal regions of the said continuous inner layer being adapted to be fluid-tightly fused together to provide a hermetically sealed inner packaging space and the terminal regions of said outer layer being adapted to be independently secured in contacting position to reinforce said fused regions thereby to provide a container structure of a unitary character in the body portion thereof and of a duplex character in the seam portions thereof.