Sept. 22, 1942. W. L. HALL 2,296,664

METHOD OF FORMING A PACKAGE

Filed July 13, 1938 3 Sheets-Sheet 1

Fig. 1.

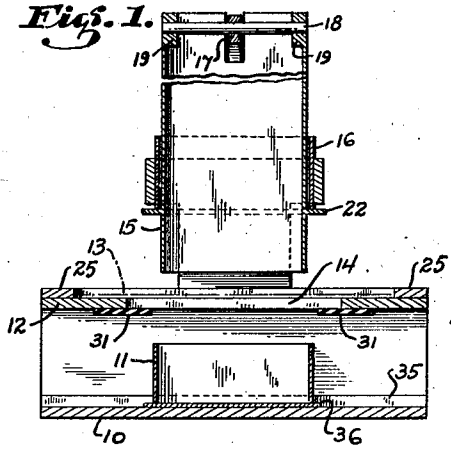


Fig. 2.

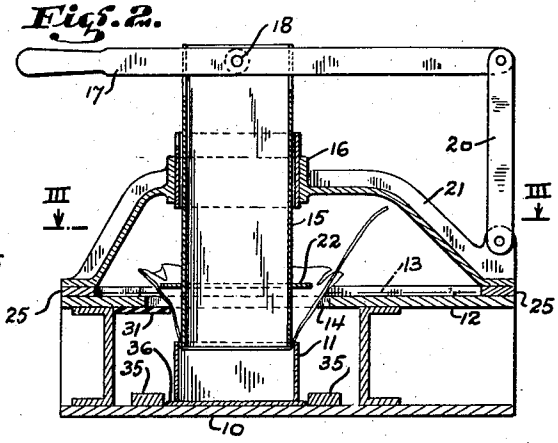


Fig. 3.

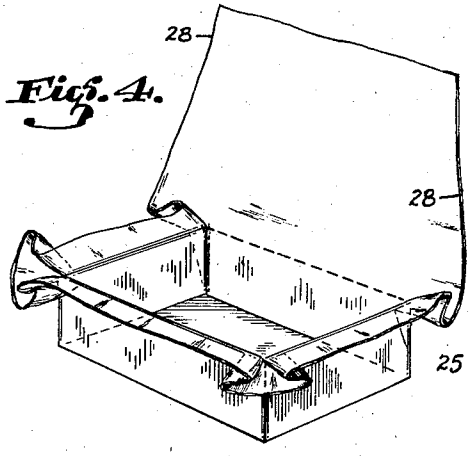


Fig. 4.

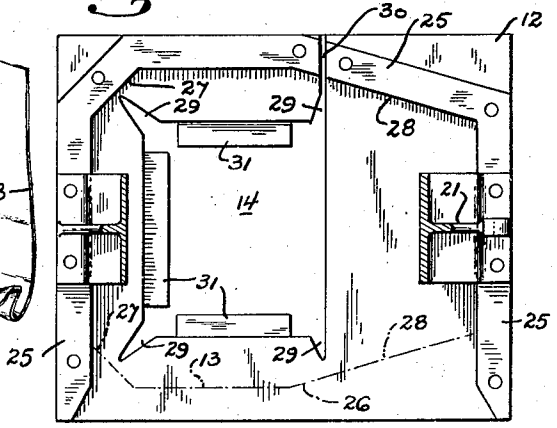


Fig. 5.

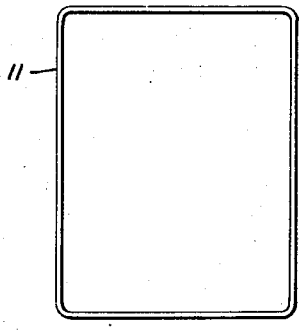


Fig. 6.

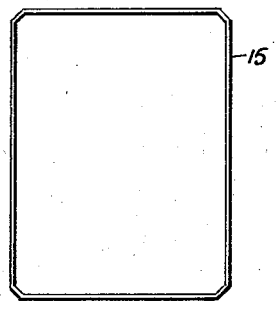
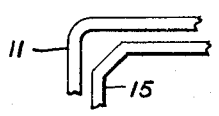


Fig. 7.



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Sept. 22, 1942. W. L. HALL 2,296,664

METHOD OF FORMING A PACKAGE

Filed July 13, 1938 3 Sheets-Sheet 2

Fig. 8.

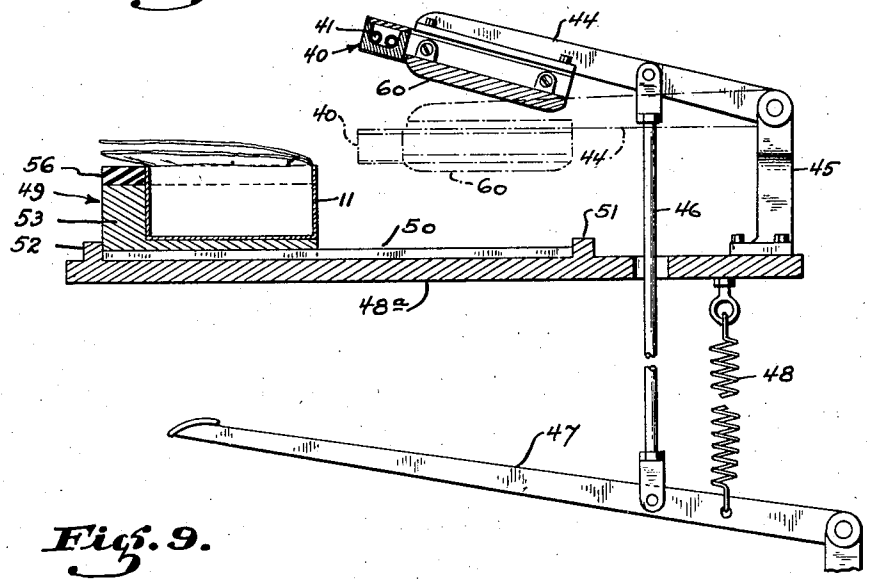
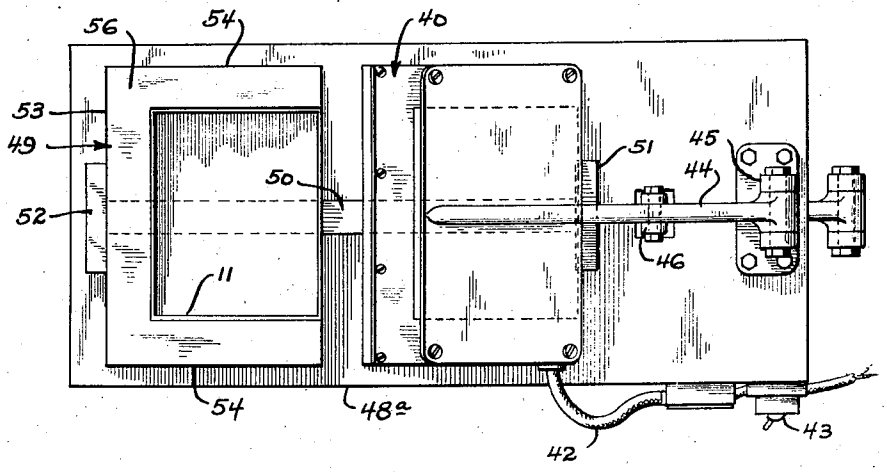


Fig. 9.



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Sept. 22, 1942. W. L. HALL 2,296,664

METHOD OF FORMING A PACKAGE

Filed July 13, 1938 3 Sheets-Sheet 3

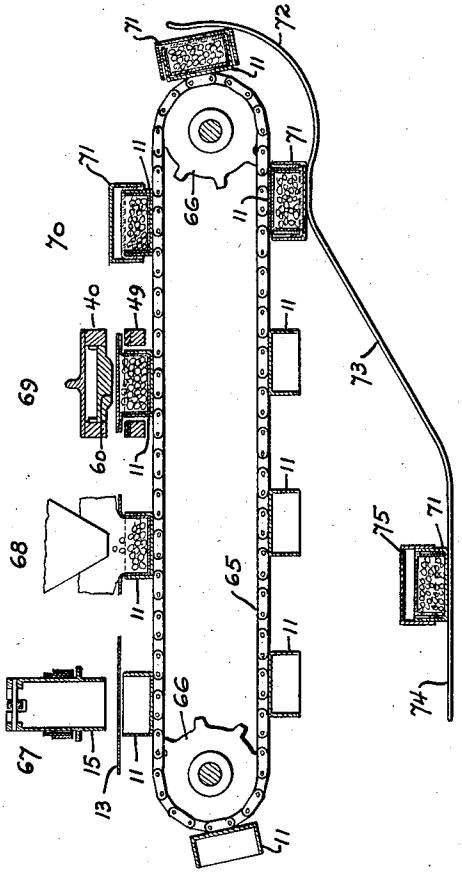


Fig. 10.

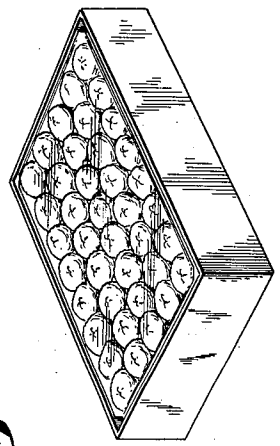


Fig. 11.

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UNITED STATES PATENT OFFICE

2,296,664

METHOD OF FORMING PACKAGES

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Application July 13, 1938, Serial No. 219,010

2 Claims. (Cl. 62—173)

This invention relates to a package and method of forming the same, and particularly to a package for food or other perishable products which it is desirable to pack in a carton of pasteboard or the like having a liner of paper-like moisture-resistant material.

The package and method of the present invention are particularly well adapted to the packing of frozen foods, as is the package disclosed in a copending application of Leigh J. McGrath and Wayne L. Hall entitled "Method of packing frozen food," Serial No. 205,587, filed May 2, 1938. When used for this purpose the package will preferably include a heat-sealed "Cellophane" liner, and the present description will be directed to such a liner as illustrative of the invention. It will be understood from the description, however, that other lining materials and other methods of sealing may be employed depending upon custom and the particular use to which the package is to be put.

The package of the present invention is generally rectangular like that of the above mentioned copending application, but differs therefrom principally in that it is flat or normally horizontal rather than vertical. In other words, the present package has one of its larger flat sides serving as a top which opens or is removable, while the vertical type of package opens at one of its smaller ends. In the vertical package it is customary to form a liner of tubular or bag-like shape so it may be filled from its small open upper end. In the flat package, such a liner is inconvenient and undesirable as it does not lend itself to being filled while it is in the carton and does not present a neat or attractive appearance when the package is open.

It is the object of the present invention to provide a package and method of forming the same in which a simple and inexpensive liner may be formed and filled either before or after it is placed in the carton and in which the liner will enhance the appearance of the contents of the package when the carton cover is removed.

It is also the object of the invention to provide a package and method of forming the same adapted to rapid automatic operations of forming, filling, sealing and closing.

A still further object is the provision of a package of the type described which is particularly adapted to the packing of frozen products in a manner which is efficient and which provides for their pleasing display through what appears to be a seamless and transparent packing material such as "Cellophane" and the like.

One form of the invention is described in the following specification where reference is made to the accompanying drawings illustrating a structure which is typical of that which may be used in practising the invention.

In the drawings—

Fig. 1 is a vertical sectional view of a liner-forming apparatus which may be employed in practising the present invention;

Fig. 2 is a vertical sectional view of the same taken at right angles to that of Fig. 1;

Fig. 3 is a horizontal sectional view taken along the line III—III of Fig. 2 with the liner former removed to illustrate the construction of the table which supports the liner before it is formed;

Fig. 4 is a perspective view of a liner illustrating the position that it will occupy after passing through the former shown in Figs. 1, 2 and 3.

Fig. 5 is a plan view of a pan in which the liner is formed;

Fig. 6 is a sectional view taken through the liner-forming plunger;

Fig. 7 is an enlarged fragmentary view of one corner of the pan shown in Fig. 5 and one corner of the plunger shown in Fig. 6;

Fig. 8 is a vertical sectional view of a heat-sealing apparatus typical of that which may be used in practising the invention;

Fig. 9 is a plan view of the apparatus illustrated in Fig. 8;

Fig. 10 is a diagrammatic view illustrating the manner in which the liner former and heat sealer may be embodied in automatically operating package filling and closing machinery; and

Fig. 11 is a perspective view of a package made in accordance with the present invention, the cover being removed to display the contents of the package through a liner of "Cellophane" or like material.

In the present description of the invention, the carton disclosed is of the flat shallow type having a bottom and four side walls but being entirely open at its top. The cover for the carton is identical in shape and slightly larger so that it telescopes over the open top thereof. The invention is readily adaptable, however, to various types of cartons such, for example, as one-piece cartons with hinged tops. According to the present invention, a liner for the carton will be made of a size and shape to conform to the interior thereof and, after being filled, will be sealed at its edges. In order that this liner will be neat in appearance when the cover of the carton is removed and will display the contents of the carton in an attractive manner, the sealed

edges thereof should occupy a position at the bottom of the carton. To accomplish this positioning of the liner in the carton, the liner is shaped in a form or pan corresponding in size to the carton. It is then filled, closed and sealed, and thereafter transferred from the pan to the carton so that that side of the liner forming the top of the pan and having the sealed or joined edges exposed to view will, upon transfer of the same to the carton, occupy the bottom where it will not be seen. It is possible, however, to form the liner directly in the carton, eliminating the form or pan referred to, in which case the sealed edges of the liner will remain at the top of the package. While in this latter method the appearance of the package is not as neat when the cover is removed from the carton, other valuable features of the invention are present.

Referring now to Figs. 1, 2 and 3 of the drawings, the apparatus for forming a liner to fit within a carton is illustrated as comprising a base 10 upon which a form or pan 11 is supported beneath a table 12, which table is adapted to support a sheet of lining material in the position illustrated in dotted lines at 13 over an opening generally indicated at 14 so that a plunger 15 above the table may be brought down to force the flat sheet of liner material into the pan 11, thereby forming it to the shape of the interior of a carton. The plunger 15 is preferably a tube of rectangular cross-section and may be mounted for vertical reciprocation in a bearing 16. For purposes of illustration, a hand lever 17 is shown for raising and lowering the plunger. The lever 17 is connected by a pin 18 with bearings 19 at the upper end of the plunger and is pivoted to a link 20 which is in turn pivoted to a bracket 21 which supports the bearing 16. A flange 22 preferably projects outwardly from the exterior of the plunger at a distance from the bottom of the plunger which is substantially equal to the depth of the pan 11.

The table 12, as best illustrated in Fig. 3, is provided with a molding or low fence 25 of a shape to receive a flat blank of liner material and position it properly over the opening 14 through which it is forced into the pan 11. The shape of the liner blank is illustrated in Fig. 3 by the shape of the molding together with the broken line 26, as the molding is discontinued along the side where the line 26 appears for the purpose of permitting the liner blanks to be inserted conveniently. The liner blank is preferably generally rectangular, having two corners cut away as illustrated at 27, and having its opposite two corners, as illustrated at 28, cut away on lines which taper toward the center of one end of the blank to form a cover for the formed liner, as will hereinafter appear. The opening 14 has V-shaped notches cut at its corners, as illustrated at 29, to permit passage and cause proper folding of the corners of the liner which are gathered as it is forced through the opening and into the pan. It is preferable, for convenience in removing the pan after the liner has been formed therein from its position beneath the table 12, that a slot 30 be formed coextensive with one of the notched corners 29 so that the cover of the liner which projects upwardly through the table after it has been formed will pass through the slot 30 as the pan with the formed liner is withdrawn.

Flexible wipers 31, formed of sheet rubber or other suitable material, are secured to the under side of the table 12 with one edge projecting into the opening 14 at three sides thereof. In this embodiment of the invention, such a wiper is undesirable at the fourth side where the cover is formed. These three projecting wipers serve to cause the liner to be shaped with properly arranged folds at its corners and without being torn or destroyed by the action of the plunger as it passes through the opening 14 to press the liner into the pan 11, or by the flange 22 which, upon descent of the plunger, causes the edges of the liner to extend horizontally outwardly from the upper edges of the pan. In the operation of the liner former, a flat liner blank of "Cellophane" or the like is placed on top of the table 12 in the area defined by the fence 25. The plunger 15 is then brought downwardly to the position illustrated in Fig. 2 until the liner blank is pressed into the pan 11 and caused to assume the shape illustrated in Fig. 4.

When the plunger is retracted, the pan 11 containing the liner in this shape may be slid out from beneath the table, it being preferably guided between rails 35 as illustrated in Fig. 2, the cover, which at this stage stands vertically upwardly as illustrated in Fig. 4, being free to pass through the slot 30 shown in Fig. 3. The liner, while still in this position and preferably while still retained in the pan 11, may be filled with the contents that are ultimately to be the contents of the package. After the liner is filled, the cover portion may be swung from its vertical position downwardly to overlie the contents and the horizontally extending skirts around the upper edges of the pan and may be sealed to these skirts in any suitable manner. Thus with the liner still contained by the pan 11 and filled, closed and sealed, an inverted carton may be slipped over the pan and then, by inverting the entire assembly, the pan may be removed leaving the filled liner in the carton with the seams of the liner disposed at the bottom of the carton and the contents thereof visible through that portion of the liner which has the appearance of a seamless glass box. As the pan is removed its side walls are disposed between the liner and the walls of the carton, and it is preferable that the bottom of the pan be made slightly enlarged so that flanges 36, as shown in Figs. 1 and 2, project from the bottom edges thereof in order to form a projection by which the pan may be grasped to pull it away from the carton and liner.

It is desirable, in order to obtain uniformity and neatness in the formation of liners, that the pan be formed with rounded corners as illustrated in Fig. 5, and that the corners of the plunger be angular or slightly beveled as illustrated in Fig. 6. There should also be sufficient space between the plunger and the pan to accommodate the liner freely as it is being forced into the pan, the relative positions of the two being illustrated in Fig. 7. It has been found that by so shaping the corners of the pan and plunger and by cutting away the corners of the opening 14 through which the lining is forced and employing the rubber wipers 31, this uniformity can be readily obtained and the corners of the liner neatly folded. The cut-away corners 28 of the liner blank are for the purpose of shaping the blank at that end which is to form the cover of the liner in a manner to eliminate any waste material or material other than is necessary to form a good seal with the marginal edges of the liner which project outwardly over the upper edges of the pan.

It is desirable in the packaging of many prod-

ucts to seal the carton liners in a manner making them impervious to air or moisture. The heat seal is a common expedient in connection with certain types of "Celophane" and wax-coated papers, and is accomplished by pressing a heated iron against the surface of the paper where it is to be sealed. The heat sealer designed for sealing the edges of the liner illustrated in Fig. 4 is shown in Figs. 8 and 9 of the drawings. Heat sealers of this general type are in common use and are in many cases power driven. In the present instance, however, the heat sealer is shown for purposes of illustration in the form of a manually and foot operated apparatus. As shown in Figs. 8 and 9, the heat sealer comprises a U-shaped sealing iron 40 which is hollow and contains electric heating elements 41 energized from a suitable source of current supply through an electric conductor 42 controlled by a switch 43. The sealing iron 40 is supported at the outer end of a lever 44 which is pivoted at its inner end to a bracket 45. A connecting rod 46 extends between the lever 44 and a pivoted foot lever 47, and a spring 48 normally urges the foot lever 47 and sealing iron upwardly.

A table 48a positioned below the sealing iron 40 supports an anvil 49 for sliding movement to and away from a position directly beneath the sealing iron on a guide bar or track 50, suitable stops 51 and 52 being positioned at opposite ends of the track 50. The anvil 49 has a front wall 53 and side walls 54 defining a space of a size to receive the pan 11 containing the formed liner. The tops of the walls 53 and 54 are preferably provided with a resilient pad 56 which may be of rubber or similar material and which cooperates with the heated surface of the sealing iron 40 when the anvil is pushed to a position beneath the iron and the iron is brought downwardly to the dotted-line position illustrated in Fig. 8 by pressure on the foot lever 47. The marginal edges of the liner, as illustrated in Fig. 4, overlie the resilient pad 56 of the anvil, and the cover portion of the liner is folded downwardly, as illustrated in Fig. 8, so that its free edges also overlie the anvil and so that the U-shaped sealing iron causes a continuous seal to be formed between the edges of the cover member and the marginal edges of the main portion of the liner upon application of pressure and heat. The lower surface of the sealing iron 40 is preferably corrugated to crimp the sealed edges of the liner and thereby form a more permanent and durable seal.

In the packaging of products which are to be frozen after they are packed and sealed, it is desirable, as described in the copending application above referred to, that sufficient space be left within the sealed liner to permit of expansion due to freezing so as to avoid rupturing of the liner when the product is frozen. This is accomplished in the present apparatus by means of a pad 60 illustrated in Fig. 8, which pad is of rectangular shape and slightly smaller than the interior of the carton, and which is secured to the sealing iron in a position to project downwardly where it will engage and form a depression in the cover of the liner just before the sealing operation takes place. This pad may be formed of any suitable material, but in some cases where the product being packaged is of a kind which may be bruised or fractured by pressure, it will be desirable to form the pad 60 of a highly resilient material such as sponge rubber, or an air-inflated bag of rubber or the like may be used, so that the pad will conform readily to the shape of the contents of the package, and will serve to expel air from the liner without crushing the contents. As the heat sealer is brought into operative position, the pad contacts the cover of the liner and expels therefrom a certain quantity of air just before the seal takes place, thereby forming a depression in the liner which will, upon expansion caused by freezing, be filled out and prevent the creation of undesirable pressures within the liner.

The heat-sealing apparatus described above is designed for cartons of a certain size. The same apparatus may be employed for cartons of various sizes by replacing the anvil 49 and the sealing iron 40 with elements designed to fit any size or shape of carton or, if desired, one of the arms 54 of the anvil 49 may be made adjustable to and away from the opposite arm 54, and the corresponding portion of the sealing iron 40 may be similarly adjustable, thus making it possible by a simple adjustment to accommodate cartons of various sizes, as in sealing liners made in accordance with the present invention it is necessary to form a seal at only three sides of the carton.

The liner-forming and heat-sealing apparatus hereinabove described is readily adaptable to the packaging of products by automatic machinery in the manner typified in the diagrammatic view in Fig. 10 of the drawings. In this figure, a plurality of the pans 11 are illustrated as carried by a chain 65 driven by a pair of sprockets 66 by suitable mechanism not shown which will serve to impart an intermittent drive to the pans, causing them to stop momentarily at stations illustrated at 67, 68, 69 and 70. A liner former such as that illustrated in Figs. 1 to 3 of the drawings is positioned at station 67 and may be operated to form a liner in one of the pans 11 as it comes to a stop at this station. The liner may also be filled at this station, or it may be filled through a spout as illustrated at station 68. At station 69 the heat-sealing mechanism may be employed to close and seal the liner, the cover having been previously folded to its closed position by hand or by any suitable mechanism not shown. At station 70 a carton 71 may be placed over the filled and sealed liner, the carton serving to bend the sealed edges thereof downwardly and also temporarily embracing the pan 11.

As the pan 11 proceeds around the arc formed by one of the gears 66, the carton may be retained in place by a guide rail 72, and after the carton is completely inverted and traveling on the lower flight of the chain 65, the weight of the contents will cause the carton and filled liner to slide away from the pan 11 and fall onto a chute 73 from which it will precipitate by gravity to a table 74. On the table 74 a cover 75 may be placed on the carton. From this point the completed carton may be passed to wrapping or freezing apparatus after which it is ready for storage or delivery to the consumer.

If the carton is to be frozen, it is desirable for the sake of appearance that it be inverted, as there is frequently an undesirable frosty appearance given to the top surface of the frozen product. Consequently, by inverting the product, any frostiness or unevenness of appearance will occur at the bottom of the carton, and thus when the carton is turned right side up and opened, the top surface of the contents which are exposed will present an attractive and appetizing appearance.

This method of packaging is particularly desirable in connection with what is known as the "face and fill" method of arranging fruits, vegetables and other food products. The "face and fill" method is that method in which the first layer is carefully arranged in an inverted package and the remainder of the contents poured into the package in a hit-or-miss fashion so that when the package is turned right side up and the top removed, the product exposed to view presents an attractive arrangement of articles selected for their size and perfection. Thus the completed package of the present invention is illustrated in Fig. 11 of the drawings wherein a carton is shown with the cover removed and with the top layer of fruit attractively displayed through what appears to be a seamless liner.

While the foregoing description is directed to a carton of a particular shape and apparatus of specific form, it is to be understood that the invention is not limited to this disclosure which is illustrative only, but that the method and apparatus may be varied within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. The method of forming a package for frozen products which comprises shaping a liner to fit within a carton, filling the liner with the products to be frozen, closing and sealing the liner along upper edges thereof, placing an inverted carton over the filled liner whereby the sealed edges of the liner will be disposed in the bottom of the carton, and then subjecting the packages in an inverted position to freezing temperature.

2. The method of packaging and hermetically sealing frozen foods, comprising the following steps: forming a liner from a single sheet of suitable lining material, with the liner so formed as to present an imperforate bottom and sides, with one of said sides longer than the others and of sufficient length to form a cover when folded over as a closure, and with the edges of the other three sides being longer than the depth of the finished package; partially filling the space so formed by the liner; folding the cover over the contents of the liner, with the edges of the cover overlapping and in contact with the outwardly extending folded edges of the other three sides of the carton; leaving said contacting upper edges of the cover and three sides projecting beyond the contents of the package; heat-sealing said outer edges without applying pressure directly against the contents of the package; placing an inverted carton over the filled liner, whereby the sealed edges of the liner would be disposed in the bottom of the carton; and then subjecting the package to freezing temperature.

WAYNE L. HALL.