Oct. 25, 1966 R. J. O'BRIEN ET AL 3,281,051

HERMETICALLY SEALED PACKAGE

Filed Aug. 12, 1963 5 Sheets-Sheet 1

Fig. 1.

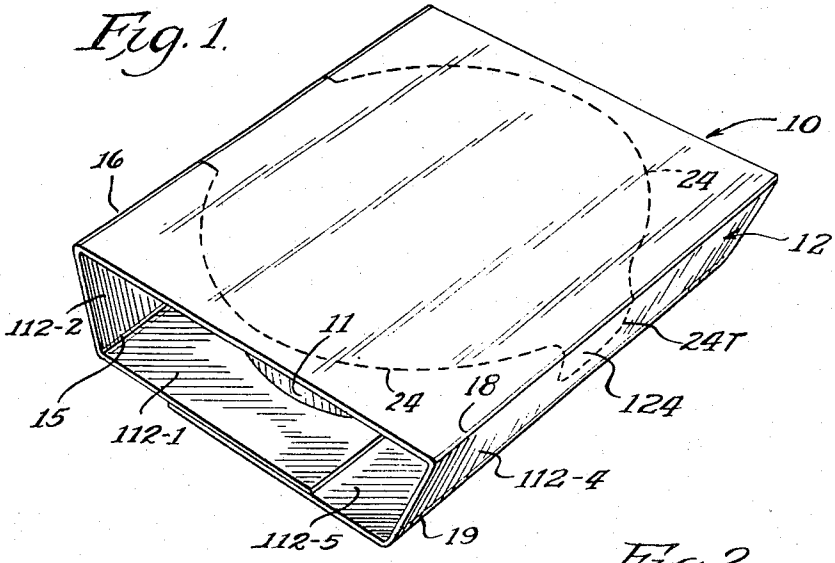


Fig. 2

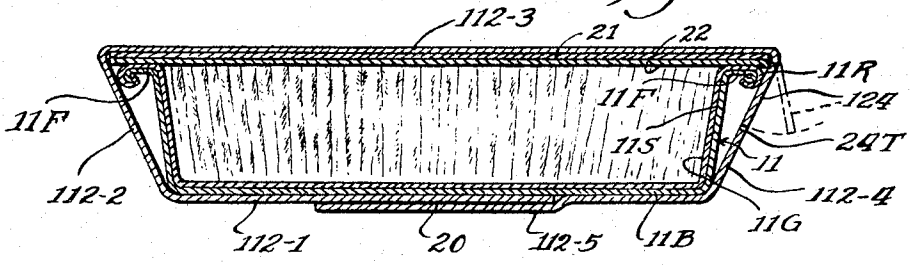
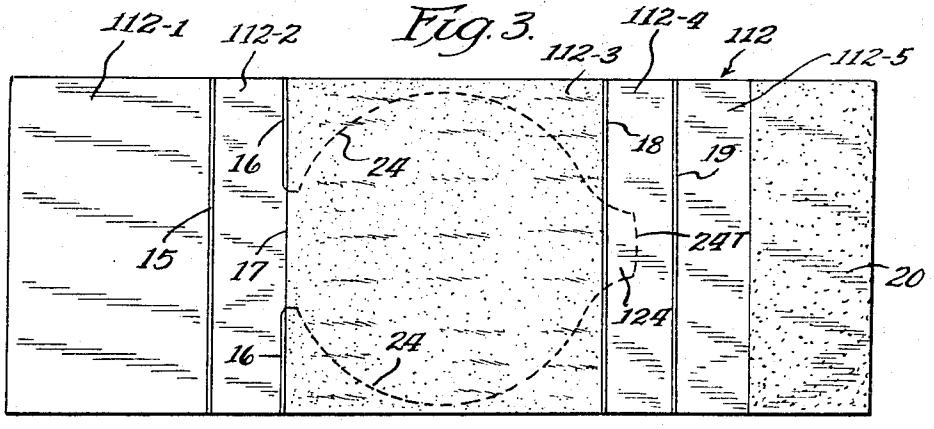


Fig. 3.



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Fig. 4.

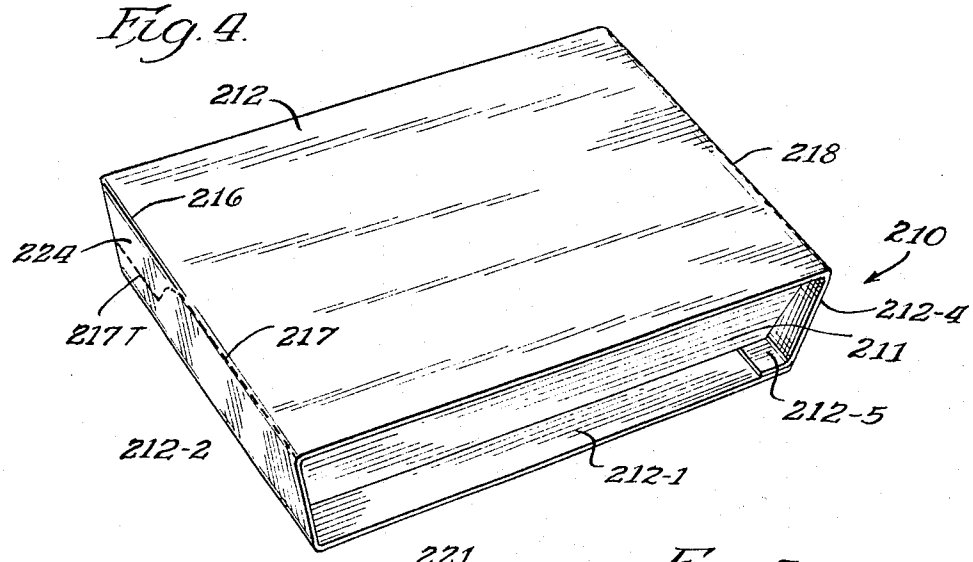


Fig. 5

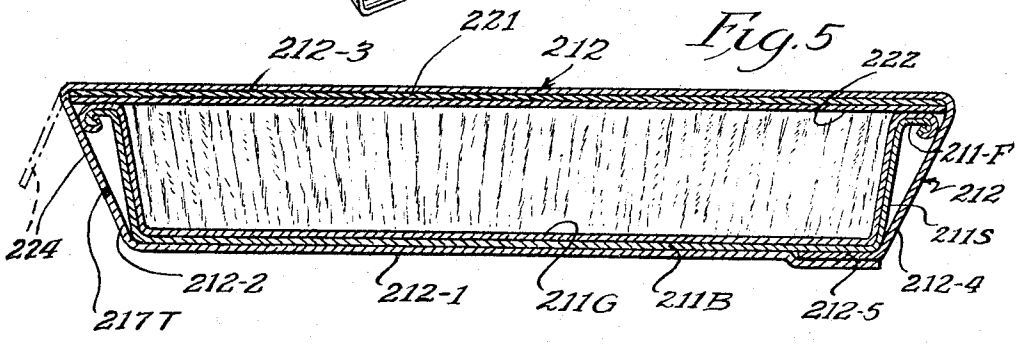
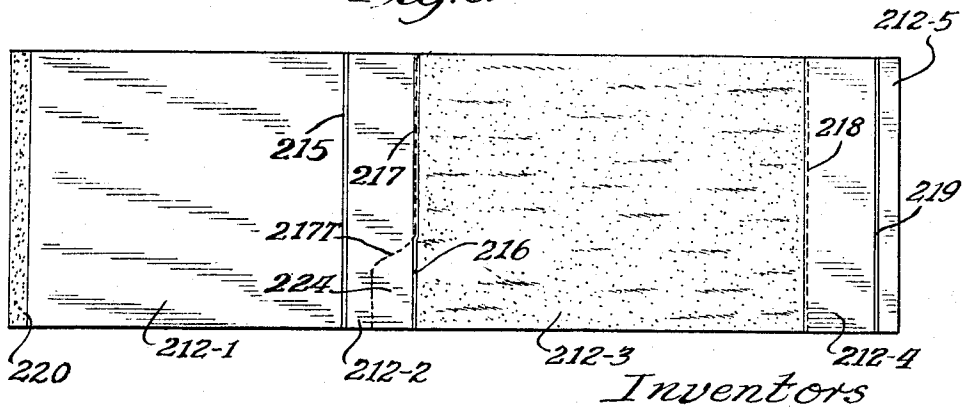


Fig. 6.



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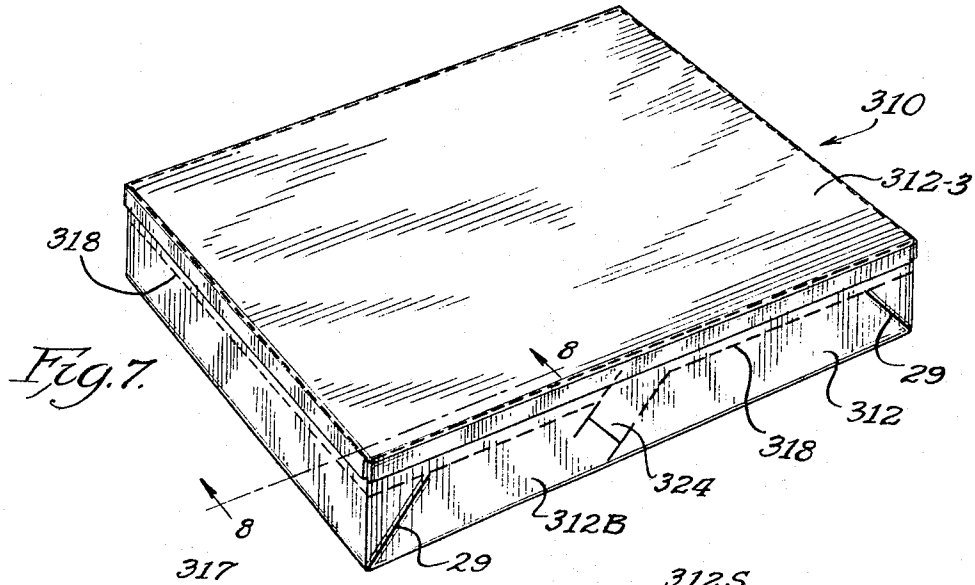


Fig. 7.

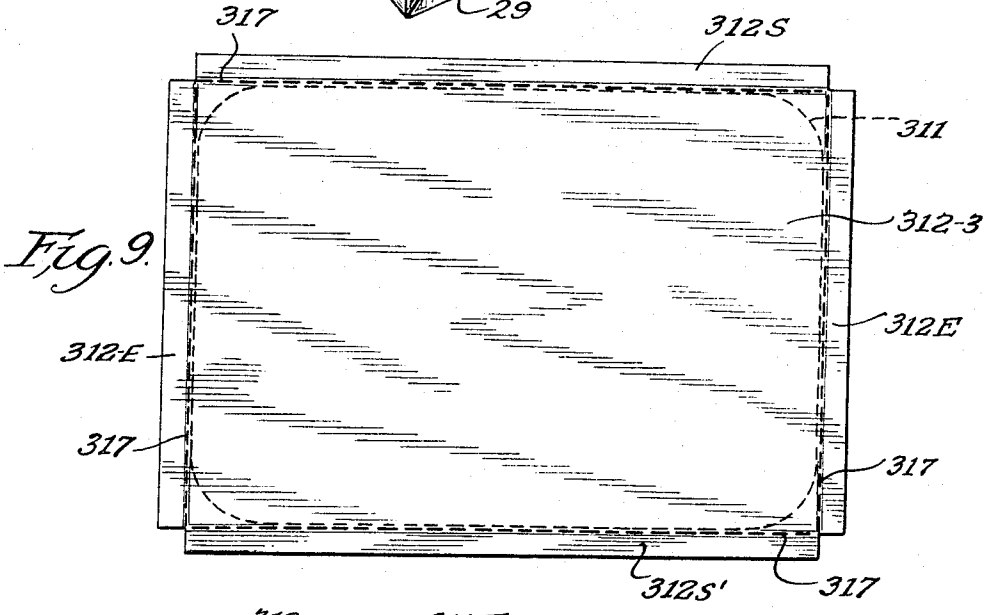


Fig. 9.

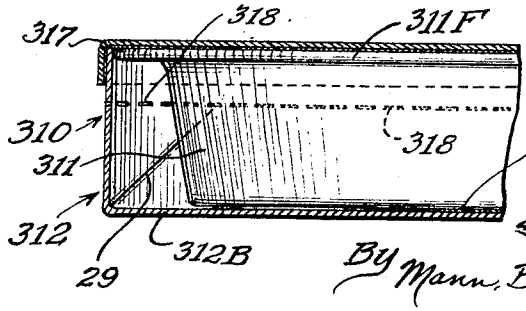


Fig. 8.

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Fig. 10.

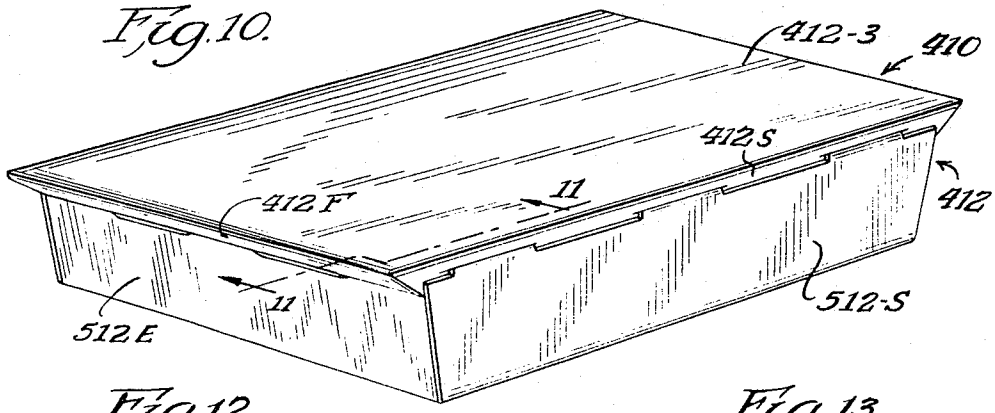


Fig. 12.

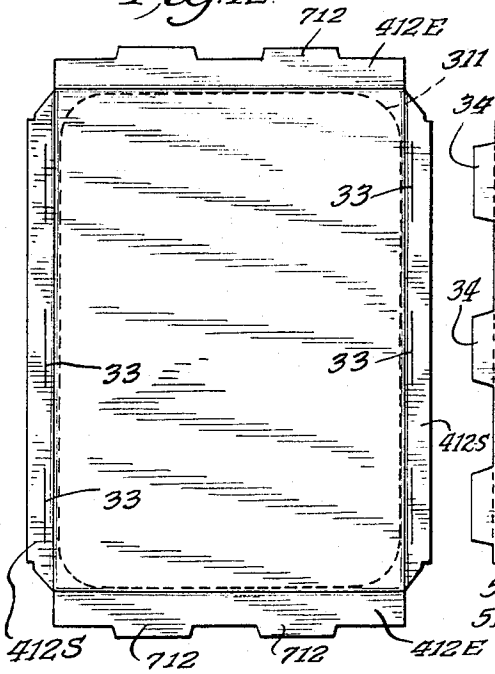


Fig. 13.

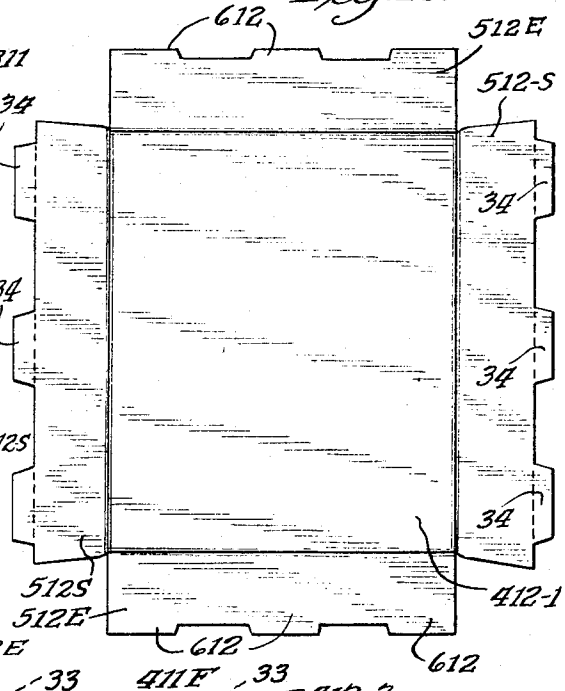
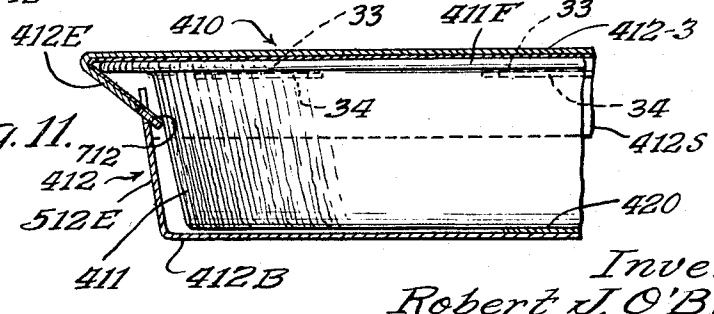


Fig. 11.



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Fig. 14.

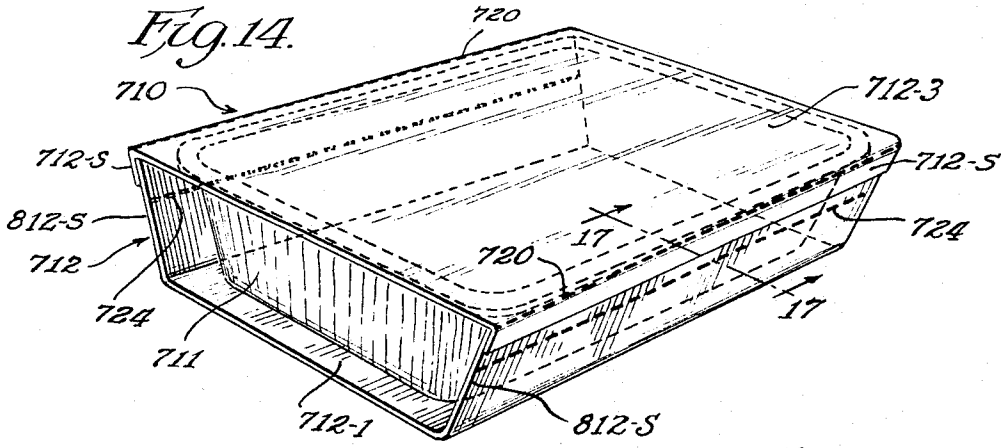


Fig. 15.

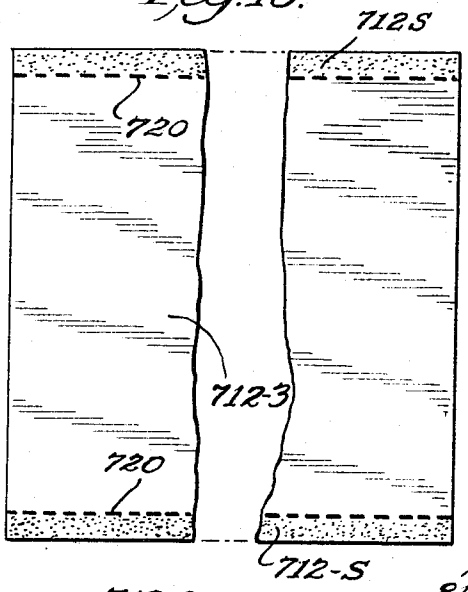
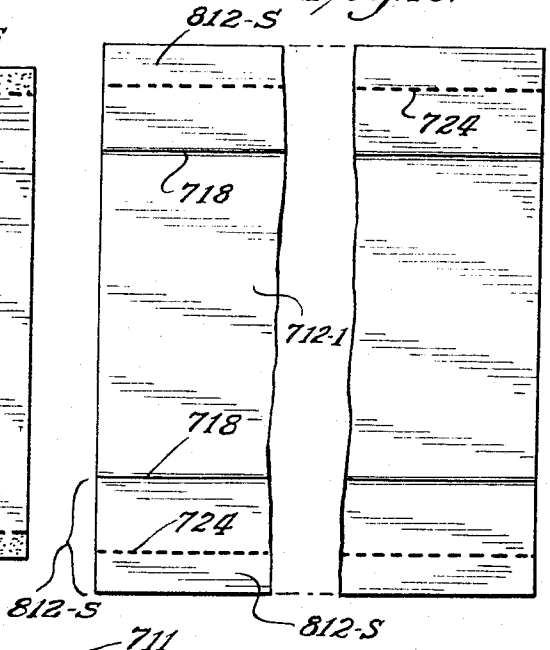


Fig. 16.



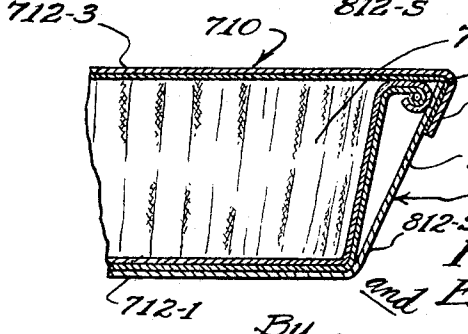


Fig. 17.

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United States Patent Office 3,281,051 Patented Oct. 25, 1966

3,281,051

HERMETICALLY SEALED PACKAGE

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Filed Aug. 12, 1963, Ser. No. 301,435
5 Claims. (Cl. 229—51)

This invention relates to food packages of the general kind used for frozen foods such as entrees, dinners and the like, and particularly the invention relates to an improved food package of the aforesaid general kind that is hermetically sealed and which embodies improved techniques and merchandising factors not available in prior packages.

According to prior practice in this field, shallow containers, made from aluminum foil or the like, have been used as the basic component of such frozen food packages, and after the food has been prepared and deposited in such containers, covers were secured in place by crimping of an upstanding edge flange into position over the border portions of the cover. The filled containers were then subjected to freezing temperatures, and after freezing of the contents, the covered containers were placed in an outer carton which was then closed to provide the completed food package. In the ultimate use of such frozen foods, the covered container was removed from the outer carton, and the cover was then removed so that the container might serve as the cooking utensil for the food.

While it is recognized that it is highly desirable that frozen foods be hermetically sealed, prior packages of the aforesaid character have lacked such hermetic sealing characteristics and this has been considered to be objectionable. Despite the absence of a hermetic seal, and despite the rather involved series of handling operations required in production, such prior packages have gained wide acceptance in the production and marketing of frozen dinners, entrees and the like.

It is therefore the primary object of this invention to provide a new and improved frozen food package of the general character above described but which hermetically seals the food, and a related object is to provide such a hermetically sealed package which may be produced rapidly and economically by automatic machines and mechanisms of known capabilities, which has a structural form that provides broad unbroken outer surfaces for graphic advertising and display material, and which protects the flange of the container against bending when the package is subjected to various types of physical mishandling thereby to preserve the hermetic seal of the container in handling and transit.

Another important object of this invention is to provide such an improved hermetically sealed package that enables improved air circulation to be attained about the package and in contact with the container, thus to facilitate not only the initial freezing but also the maintenance of the proper holding temperature during storage, shipment and final display in commercial freezer cabinets.

Another and more specific object of the invention is to provide a frozen food package of the aforesaid character wherein a protective enclosure about at least four sides of the food container includes one panel that serves as a cover for the container and which is hermetically sealed across the top of the container, and a related object is to relate the sides and bottom of such enclosure to the sides and bottom of the container in such a way as to protect the hermetic seal between the cover and the container.

Other and further objects of the present invention will be apparent from the following description and claims, and are illustrated in the accompanying drawings, which,

by way of illustration, show preferred embodiments of the present invention and the principles thereof, and what is now considered to be the best mode in which to apply these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the invention.

In the drawings:

FIG. 1 is a perspective view of a hermetically sealed package embodying the features of the invention and in which a circular aluminum foil container is sealed and protected by a surrounding sleeve-like enclosure;

FIG. 2 is a transverse sectional view of the package in FIG. 1;

FIG. 3 is a face view of the blank that is used in providing the protective enclosure for the package of FIG. 1;

FIG. 4 is a perspective view of another hermetically sealed package embodying the invention and in which a rectangular container is enclosed and sealed by a sleeve-like protective enclosure;

FIG. 5 is a longitudinal vertical cross sectional view of the package shown in FIG. 4;

FIG. 6 is a plan view of the blank used in providing the enclosure for the package of FIG. 4;

FIG. 7 is a perspective view of an alternative form of package wherein all six sides of the container are enclosed;

FIG. 8 is a fragmental vertical sectional view taken along the line **8—8** of FIG. 7;

FIG. 9 is a plan view of the cover in place on the container but before association with the lower box section of the package;

FIG. 10 is a perspective view of an alternative form of package wherein all six sides of the container are enclosed;

FIG. 11 is a fragmental vertical sectional view taken along the line **11—11** of FIG. 10;

FIG. 12 is a plan view of the cover in place on the container but before association with the lower box section of the passage;

FIG. 13 is a plan view of the blank of the lower box section of FIG. 10;

FIG. 14 is a perspective view of another alternative embodiment of the invention;

FIGS. 15 and 16 are fragmentary plan views of the cover and bottom members of the package shown in FIG. 14; and

FIG. 17 is a fragmentary vertical sectional view taken along the line **17—17** of FIG. 14.

For purposes of disclosures the invention is herein illustrated in several different embodiments in each of which a shallow aluminum foil container, having a smooth surfaced top flange with an imprevious and relatively strong cover secured in hermetically sealed relation to the smooth surfaced top flange, has a protecting enclosure rigidly related to the edges of the cover and extended across the bottom and along at least two of the sides or ends of the container. Thus the protective enclosure, in some instances, takes a form in which the cover, the bottom wall and the opposed side walls define an open-sided sleeve which surround the container and leave two sides of the container exposed, or in other instances, the cover, and the bottom wall and the four side walls provide a six-sided enclosure for the container. Several specific embodiments of these two basic forms of the invention will now be described in detail.

In the specific from illustrated in FIGS. 1 to 3 of the drawings, the invention is embodied in a heremtically sealed package **10** that comprises a round, top-flanged container **11** that is sealed, surrounded and protected by a protective enclosure **12** that has the sleeve-like form above described and which includes an impervious cover

panel 112–3 that seals the top of the container 11. The protective enclosure 12 is rectangular in plan form so as to facilitate stacking of the sealed packages in a freezer or in shipping containers.

The container 11 is of conventional shape and is made from aluminum foil with a smooth walled configuration and with a smooth surfaced top flange 11F. The container 11 has a bottom wall 11B, and a smooth sloping side wall 11S, and about at the upper edge of the side wall 11S, the outwardly projecting smooth flange 11F is provided. The flange 11F has its outer edge formed in a rolled configuration 11R.

The hermetic seal for the container 11 is established by sealing the impervious cover panel 112–3 to the smooth top surface of the flange 11F, and to accomplish this it is only necessary to provide sealant in the area between the flange 11F and the opposed area of the cover panel. Thus, the sealant may be provided by pattern printing the same on either the flange 11F or the cover panel 112–3, or on both of these elements; or in those instances where the inside surfaces of the cover panel or the container require a protective surface, the sealant may be applied as an overall coating on either one or both of such elements. In the form of the embodiment shown in FIGS. 1 to 3 of the drawings, the sealant is applied to as an overall coating 11G on the foil from which the container 11 is made so as to protect the inner surface of the container and serve as sealant on the smooth upper face of the flange 11F.

The protective enclosure 12 is formed from a rectangular sheet 112, as shown in FIG. 3 of the drawings, this sheet being made primarily of food grade paperboard, but being provided with a non-permeamble coating in those areas where the sleeve is to serve as a hermetically sealed cover for the container 11. Thus the blank 112 ins of elongated rectangular form and at its left hand end as shown in FIG. 3, it has a partial bottom panel 112–1 that is separated by a fold line 15 from a side panel 112–2. The other edge of the side panel 112–2 is defined in part by an interrupted fold line 16 and between the adjacent ends of the portions of the fold line 16, a slit 17 is formed for purposes that will hereinafter appear.

The side panel 112–2 is connected by the fold line 16 to the cover panel 112–3 which is substantially square and is adapted to form the cover that overlies and is sealed to the rim of the round container 11. At its other side the cover panel 112–3 is connected to a side panel 112–4 by a fold line 18, and at its other side the side panel 112–4 is connected by a fold line 19 to another partial bottom panel 112–5.

The partial bottom panel 112–5 is provided with an adhesive coating 20 throughout a portion of its area as indicated in FIG. 3, and this adhesive coating area may be a hot melt adhesive applied with standard equipment when the panel 112–5 is adhered to the other bottom panel 112–1 to complete the sleeve and hold it in the desired form about container 11.

The cover panel 112–3 must of course serve as an impervious barrier layer to complete the hermetic sealing of the container 11, and in order to enable this to be accomplished, the cover panel has a impervious layer or coating on its inner face. In the present instance the imprevious characteristic is provided by forming the cover panel as a metal foil-paperboard laminate in which a layer 21 of aluminum foil is laminated to the paperboard. The foil layer 21 is provided merely as a strip which covers only the rectangular area of the panel 112–3. Also, in this instance, the aluminum foil, on its exposed inner surface, has a coating 22 of a protective sealant that functions in sealing the cover to the flange 11F of the container as will hereinafter be described.

In order that the ultimate user may readily remove the sealed container 11 from the protective enclosure 12 while maintaining the container in its sealed relation, the area of the panel 112–3 that is to form the actual closure for the container 11 is arranged so that it may be easily and quickly removed or separated from the balance of the panel 112–3. It will be recalled that a slit 17 is formed as a part of the border between the side panel 112–2 and the cover panel 112–3, this slit 17 constitutes part of a continuous line of separation which enables removal of the sealed container from the enclosure 12 to be accomplished. Thus, weakened lines 24 of separation are extended to the opposite ends of the slit 17 in a concentric arcuate arrangement so as to extend to the fold line 18 and define a roughly circular central portion of the panel 112–3 that is to constitute the actual closure of the container 11. The arcuate lines of separation 24 extend across the fold line 18 and are connected together at 24T to define a removal tab 124 that extends downwardly into and is formed by the material of the side panel 112–4. The removal tab 124 is employed to initiate the removal of the sealed container from the protective sleeve 12, and then the removal tab 24 may be used to peel the cover panel from the container 11 so as to expose the contents.

With the blank that is thus formed, the top panel 112–3 is put in position over the filled container 11, and by usual processes of heat sealing or pressure sealing, or a combination thereof, the sealant in the area between the flange and the cover is activated so that the cover panel 112–3 is hermetically sealed across the top of the filled container 11. Then the panels 112–1, 112–3, 112–4 and 112–5 are bent into position about the container and the sealant or adhesive 20 is activated or applied so as to seal the overlapped portions of the panels 112–1 and 112–5 together in the relationship shown in FIG. 2.

In FIGS. 4 to 6 inclusive, the invention is illustrated as embodied in a hermetically sealed package 210 that comprises a rectangular aluminum foil container 211 that is surrounded and protected by a sleeve-like protective enclosure 212. As shown in FIG. 5 of the drawings, the container 211 has side walls 211S, a bottom wall 211B, and a smooth outward border flange 211F about the upper edges of the side walls 211S. Here again, the inner surfaces of the aluminum foil that provides the container 211 has a coating 211G of heat and pressure sensitive sealant.

The sleeve-like enclosure 212 is provided by an elongated rectangular blank made from food grade paperboard, and this blank constitutes essentially a bottom panel 212–1, a side panel 212–2, a top or cover panel 212–3, a side panel 212–4, and a relatively narrow end panel 212–5. The cover panel 212–3 is rendered impervious by a sheet 221 of aluminum foil laminated thereto, and as shown in FIG. 5, the exposed surface of the foil sheet 221 has a coating of sealant 222.

The panels 212–1 and 212–2 are joined by a fold line 215, while the panels 212–2 and 212–3 are joined by a fold line 216 and an aligned weakened line of separation 217. The weakened line 217 is extended at 317T into the side panel 212–3 opposite the fold line 216 to provide a removal tab 223 that is employed in the same manner as the removal tab 24 in removing the container 211 in its sealed relation from the protective enclosure 212, and in removing the cover from the container 211. At its other end the cover panel 212–3 is joined by a weakened line of separation 218 to the side panel 212–4 and the other edge of the side panel 212–4 is joined by a fold line 219 to the end tab 212–5.

When a rectangular container has been filled, the top panel 212–3 of the blank 212 is put in position across the container and is sealed thereto in the manner described above. The other panels of the blank are then folded into position about the container 211 to thereby complete the sleeve-like enclosure 212, and the securing tab 212–5 is sealed to the sealant area 220.

In the present instance, the side panels 212–2 and 212–4 slope inwardly, as shown in FIG. 5, so that the size of the bottom wall of the pan, and the lower portions of the side panels 312–2 and 312–4 engage the lower corners of the container. The triangular space between

the container **211** and the side panels **312–2** and **312–4** serve as air circulating passages that are advantageous in freezing and storage of frozen foods.

It has been pointed out that under the present invention the protective enclosure **12** acts to protect and preserve the hermetic seal of the container **11** during handling and shipping, and this is accomplished by relating the enclosure **12** to the container **11** in such a way as to resist any tendency of the container to move or shift within the enclosure due to inertia of the contents of the container. To this end the side panels **112–2** and **112–4** of the embodiment shown in FIGS. 1 and 2 are arranged to slope inwardly and downwardly so that their junctures with the bottom panels **112–1** and **112–5** snugly engage the opposed junctures of the side and bottom walls of the container **11**. With this relationship of the parts, the bottom of the container **11** is held by a combined structural and frictional action against any tendency to shift with respect to the protective enclosure **12**.

Similar protection may be afforded in the event that the side panels **112–2** and **112–4** are to be arranged in vertical positions, this being accomplished by an adhesive or sealant **20A** applied as indicated in FIG. 3, to the panel **112–1** so that it will act to fix the bottom wall of the enclosure **12** to the bottom wall **11B** of the container **11**. This arrangement may also be employed in combination with the sloping wall structure of FIG. 2.

Two embodiments of the invention that have been thus far described constitute packages wherein the container is surrounded on but four sides by an enclosure that is sleeve-like in character and which provides cover means hermetically sealed across the top of the container. This sleeve-like arrangement may be produced in a continuous machine operation where the cover material is first sealed onto the rim of the container and the extensions of the cover material are then folded around and secured together to provide the sleeve-like form for the protective enclosure. This provides a rugged package that may be handled in freezing, packing and shipping without excessive danger of disturbance or breaking of the hermetic seal, and because of the passages through the sleeve along the ends or opposite sides of the container, the package is particularly advantageous where the contents are to be frozen by an air blast type of freezing installation.

When the package is in the hands of the user, the container in its sealed relationship may be quickly and easily removed from the bottom and the end elements of the enclosure by use of the removal tab **24** or **224** which enables the cover to be detached by being torn along the tear lines that are provided at opposite ends of the cover. After removal of the sealed container from the enclosure, the removal tab may then be utilized to break the hermetic seal and remove the cover from the container.

As pointed out hereinabove, the present invention may also be embodied in a hermetically sealed package wherein a protective enclosure is extendes along the bottom and the four sides of the container and provides a cover in hermetically sealed relationship to the flange of the container. One such embodiment is shown in FIGS. 7 to 9 of the drawings wherein the invention is embodied in a package **310** that has a container **311** surrounded by a protective closure **312**. The container **310** is of the kind hereinbefore described, and has upper edge flanges **311F** that have smooth upper surfaces so that a cover panel **312–3** may be hermetically sealed and secured across the top of the container in the manner that has been hereinbefore described.

In this embodiment of the invention, the top panel **312–3** is initially formed as a flat blank that is shown in FIG. 9 of the drawings and the cover panel **312–3** is independent of a lower box section **312B** which is associated with the cover panel **312–3** at a later stage in the packaging operation, as will be described.

The cover panel **312–3** is rectangular in character and has glue flaps **312S** along its opposite sides and has glue flaps **312E** extended from opposite ends of the cover panel. Initially the blank for the cover panel **312** is left in its flat condition and is secured in the manner hereinbefore described to the smooth upper surfaces of the edge flanges **311F**. This provides the desired hermetic seal for the container **311**.

The sealed container is then secured to the lower box section **312B** and this may be accomplished through the use of conventional box making apparatus. The lower box section **312B** as herein disclosed is formed as a collapsible or folding box where fold lines **29** are provided in the side walls of the box section **312B** to that the end walls may be folded down and the box section **312B** may be preformed and shipped flat to the place where it is to be assembled as a part of the package **310**. After the collapsed lower box section has been erected and the sealed container **311** has been placed therein, glue flaps **312S** and **312E** have glue applied thereto and are bent downwardly against the upper outer surface of the side and end walls of the lower box section **312B**, thus to permanently associate the lower box section with the several glue flaps. This provides a rugged package, and if desired, adhesive **320** may be applied between the bottom wall of the container **311** and the bottom wall of the box section **312B** to prevent shifting movement of the lower part of the container due to inertia of the frozen contents of the container **311**.

To simplify removal of the sealed container **311** from the protective enclosure **312**, the flaps **312E** and **312S** are joined to the top panel **312–3** along weakend lines of separation **317**, and the side and end walls of the bottom section **312** have weakened lines of separation **318** formed therein spaced downwardly from the lower edges of the glue flaps. A pull out tab **324** is formed in a least one side wall of the lower box section **312B** to enable the user to start the tearing of the removal or tear strip that is provided by the weakened lines **317** and **318**. Thus the user may use the removal tab **324** to release the sealed box section **321B**, and after this has been done, the top or cover panel **312P** may be peeled from its closing position.

In FIGS. 10 to 13 another form of fully enclosed package is illustrated as embodied in a package **410** that has a container **411** housed within a protective enclosure **412** that extends about all six sides of the container. The container may be of the form hereinbefore described with a smoothed surface top flange **411F** to which a cover panel **412–3** may be sealed in the manner hereinbefore described. The cover panel **412–3** is initially independent of a lower box section **412B**. Such association in the present instance is accomplished through the use of an interlocking system that is well-known in the packaging art as the Klicklok system that is widely licensed in the packaging industry by Klicklok Division, Atlas General Industries, 405 Lexington Avenue, New York 17, New York, and which is of such a character that the two elements of a box may be mechanically interlocked with each other by automatic machinery that is made and sold by the aforesaid company.

Thus the cover panel **412–3** has foldable side flaps **412S** along its opposite side edges and has foldable end flaps **412–3** extended from its opposite ends and initially these flaps are disposed in the plane of the cover panel **412–3**. In this condition, the cover panel **412–3** is put in position in its hermetically sealed relationship on the container **411**, and thereafter the flaps are bent downwardly and are locked in association with cooperating elements on the lower box section **412B**.

It is noted that FIG. 13 shows a plan view of the blank that is used in forming the lower box section **412B**, and this bottom blank includes a rectangular bottom wall **412–1** that is of a size such that the bottom wall of the container **411** may be rested thereon. The bottom wall **412–1** has side flaps **512S** and end flaps **512E** that are joined to the bottom wall **412–1** along fold lines.

The end flaps **412E** and **512E** of the upper and lower

blanks have a relatively simple interlocking relationship wherein the end flaps **512E** have a plurality of spaced tongues **612** with spaces therebetween along the free edge of the end flap. The end flaps **412E** of the cover panel have similar tongues **712E** that are spaced apart and are located in different positions so that the tongues **612E** may extend into and through the spaces between the tongues **712E**, and this produces an interlocking relationship that holds the flap **412** and **512** together to form a continuous end wall.

The manner of joining or associating the side flaps is quite different, in that the side flaps **412S** of the cover panel **412–3** have a plurality of slits **33** formed therein parallel to the edges of the flaps. The side flaps **512S** of the lower box section have projecting, foldable locking tongues **34** formed thereon in a spaced relationship so that these locking tongues may be bent to positions substantially at right angles to the side flaps **512S** and may be forced endwise into the slots **33**. The form and relationship of the tongues and the slots is such that a definite interlocking relationship is established when the tongues **34** are forced in their extreme positions within the slots **33**. This interlocks the lower box sections **412B** with the cover panel **412–3** and provides a full enclosure for the container **411**. As above pointed out, this assembly operation may be performed on commercial machines of tested capabilities. In this instance the lower box section **412B** may be readily separated from the container and the associated cover panel **412–3** merely by withdrawing the tongues **34** from the slots **33** with which they are engaged, and the user may then strip the cover panels **412–3** from the top of the container **411**.

In FIGS. 14 to 17 another alternative embodiment of the invention is illustrated wherein a package **710** is provided having a container **711** housed within a protective enclosure **712** that is sleeve-like in form. The container **711** may be of the form hereinbefore described, and the container is hermetically sealed by a cover panel **712–3** in the manner described. The panel **712–3** is initially formed as a flat blank that is shown in FIG. 15, and this blank has glue flaps **712S** formed along opposite edges and defined by weakened tear lines **720** for purposes that will appear hereinafter.

The panel **712–3** constitutes part of the sleeve-like protective enclosure **712**, and the balance of the enclosure is provided by a paperboard blank shown in FIG. 16 which has a bottom panel **712–1** with side panels **812S** along opposite edges thereof and joined thereto along fold lines **718**. The side panels **812S** also have weakened tear lines **724** parallel to and spaced from the fold lines **718**, for purposes to be described.

After the container **711** has been sealed by the cover panel **712–3**, the sealed container is moved into position over the bottom panel **712–1**, and the glue flaps **712S** are bent down and glued against the outer surfaces of the side panels **812S**. The tear lines **720** and **724** then define a tear strip for use in opening the package. The juncture of the panel **712–1** with the side walls **812S** embraces the lower side corner of the container so as to impart strength to the package as described in connection with FIGS. 1 to 6, and the sleeve-like protective enclosure provides for free air flow within and through the package to facilitate the original freezing as well as maintenance of the required low holding temperature in storage and transit.

From the foregoing description it will be apparent that the present invention provides a new and improved food package wherein the contents of relatively light and disposable containers are hermetically sealed in such a way that the seal is protected during handling and shipping, and it will also be apparent that this invention provides a food package of the aforesaid character that may be assembled in a simple manner, and which provides a protective enclosure that serves as a carrier for graphic advertising and display material of the kind that is desirable in merchandising frozen foods. It will also be evident that the loading, sealing and completion of the package of this invention may be provided in a continuous manner by machines and mechanisms of known capability, thus to adapt the package particularly for use where high volume protection is desired.

Thus, while preferred embodiments of the invention have been illustrated herein, it is to be understood that changes and variations may be made by those skilled in the art without departing from the spirit and scope of the appended claims.

We claim:

1. A package for food or the like comprising a metal foil container having a bottom wall, side walls and an open top, said side walls terminating in a flat flanged portion, and an enclosure of paperboard construction encircling said container, a portion of said enclosure sealed to said flange of said container so as to serve as the cover thereof, said enclosure being provided with weakened lines of separation disposed outwardly of said seal so that said wrap may be detached from said package without breaking said seal.

2. The package as set forth in claim **1** wherein said cover portion and flange are coated with an adhesive and are hermetically sealed.

3. A package as set forth in claim **1** wherein only said cover portion of said enclosure is formed with a layer of foil or the like to provide an impervious barrier covering said container.

4. A package as set forth in claim **1** wherein said weakened line of separation defines a tab adapted to be grasped manually to facilitate removal.

5. A package according to claim **1** wherein two opposide side walls of the enclosure slope toward each other to locate the junctures of such side walls and bottom wall of the enclosure in snug engagement with the adjacent junctures of the side and bottom walls of the container.

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