METHOD OF FORMING A PACKAGE

Oscar E. Seiferth and Glenn M. Austin, Madison, and Maurice J. Gifford, Monona, Wis., assignors to Oscar Mayer & Co., Inc., Chicago, Ill., a corporation of Illinois

Filed Apr. 5, 1965, Ser. No. 445,579
Int. Cl. B65b 31/00

U.S. Cl. 53—22

3 Claims

ABSTRACT OF THE DISCLOSURE

A package and a method of forming the same wherein a quantity of a compressible product is arranged in the form of an upright mass on a bottom forming, raised panel portion of a semi-rigid preformed plastic base which has flange-like, peripherally extending marginal portions connected by a peelable adhesive to like marginal portions of an inverted cup-shaped, transparent body member of semi-rigid, preformed plastic and the product is compressed by a pressure applying plate engaging the bottom panel so as to completely fill the available space within the package with the product and to shape the product to conform substantially to the interior of the container while being sealed under vacuum.

This invention relates to packaging and is more particularly concerned with improvements in a package and method of forming the same, in which a quantity of a product is enclosed in a container which forms the top and side walls of the package and which has flanged margins sealed to like margins of a closure member which forms the bottom wall of the package.

It is a general object of the invention to provide an improved package which is characterized by a predetermined quantity of a product arranged in an upright mass in a preformed cup-shaped container, of relatively rigid, or semi-rigid, transparent plastic which snugly engages the top and sides of the product, and a bottom forming closure member on which the product is supported so that it is visible through the cup-shaped container, and with the cup-shaped container having flanged margins in sealed relation with co-operating flanged margins on the closure member.

It is a more specific object of the invention to provide a package for a product which has a certain degree of compressibility, for example, a food product such as a stack of meat slices, and a method of forming the same wherein a predetermined quantity of the product is arranged in the form of an upright mass and enclosed, while in compressed condition, in an impermeable container having a product accommodating body member preformed of relatively thin, transparent plastic so as to provide a product engaging top wall, depending side walls and flanged margins which are disposed in overlying relation with like margins of a combination supporting and closure member of a formable material and having a product engaging panel integrally connected at its periphery with the top edges of a narrow wall section which is telescoped within the bottom end of the body member.

It is a still more specific object of the invention to provide a package for a product which is moldable or which has a degree of compressibility wherein the product is enclosed in a container having a product receiving body portion semi-rigid plastic with a top wall forming panel which is integrally connected by a narrow hinge forming peripheral fold with the top edges of depending side walls, the latter terminating at a laterally extending peripheral flange disposed in superimposed relation with a like peripheral flange on a closure forming member, the closure forming member having a product engaging bottom wall forming panel disposed in an offset plane relative to the flange portions and integrally connected by a narrow hinge forming peripheral fold with relatively narrow side wall forming portions which are telescoped within the open end of the body member and with the product compressed between the top and bottom wall forming panels so as to completely fill the container and form therebetween a relatively rigid package which is free of voids and which is hermetically sealed.

It is another object of the invention to provide a package and a method of forming the same wherein a product having a degree of compressibility is enclosed in a two part plastic container comprising an inverted, cup-shaped body portion and a closure forming base on which a predetermined quantity of the product is arranged in the form of an upright mass on a raised panel in the base which is telescoped within the open end of the body portion, the top panel of the body portion and bottom panel of the base being in the parallel planes and being integrally connected at their periphery to the top edges of side wall forming portions, with the connection at the periphery of at least one of these panels being a hinge forming fold which enables the panel to move when the product is compressed by inward pressure applied to the top and bottom panels so as to accommodate variations in the volume required for the compressed product.

It is still another object of the invention to provide a package of the character described which includes a predetermined quantity of a product enclosed in a cup-shaped container of at least semi-rigid plastic material with the closure panel of like material wherein the product receiving space within the cup is completely filled by the product and the product is forced into close contact with the top, bottom and side wall panels so as to enhance the appearance of the package and eliminate localized stresses in the container walls.

It is another object of the invention to provide a package wherein a predetermined quantity of a compressible or moldable product is enclosed in a generally cup-shaped plastic container having a top wall forming panel adapted to engage with the product which is arranged in an upright mass and supported on a raised panel of a closure forming base member which is partially telescoped within the bottom of the cup-shaped container and with the top wall panel of the container integrally connected at its periphery to depending side walls by a hinge forming fold extending about the periphery of the top wall panel and defining an inner groove and an outer ridge so as to provide for inward and outward movement of the panel, depending on the degree of fill, and thereby permitting greater variation in the volume of the product when compressed or molded to form the final package.

Another object of the invention is to provide a package wherein a product having a degree of compressibility, is disposed in the form of an upright mass on a closure member having a product engaging panel disposed in a plane above flange forming margins and connected to narrow wall forming sections by a head-like hinge formation which permits the panel to move relative to the plane of the flanges so as to permit variations in the volume of the product enclosed between the top and bottom panels with the product being compressed sufficiently to aid in reinforcing and rigidifying the walls of the package.

Still another object of the invention is to provide a package and a method of forming the same wherein a product which is formable or moldable to a predetermined degree is enclosed in a generally cup-shaped container which is at least partially preformed from a plastic material which has top and side wall portions for engaging the top and side walls of the product, the product being ar-
ranged in an upright mass on a raised panel portion of a closure forming base member which is partially telescoped within the bottom of the cup-shaped container and confines the product therein, the raised panel being connected serpently to a narrow depending side wall by a relatively narrow hinge forming section which provides for inward and outward movement of the panel depending upon the degree of fill, the side wall engaging marginal portions of the side wall of the container and forming a mechanical seal at the margins thereof which supplement a separable seal formed between superimposed flange forming margins on the container and base and the product being shaped by external pressure on the container and base so as to fill the space within the container and snugly engage the enclosing walls at least substantially throughout the container in material stress relieving relation.

These and other objects and advantages of the invention will be apparent from a consideration of the several forms of the package and the method of forming the same which are shown by way of illustration in the accompanying drawings wherein:

FIGURE 1 is a perspective view of a typical package of a sliced meat product which is formed in accordance with the principles of the invention;

FIGURE 2 is a cross section, to an enlarged scale and with portions broken away, taken on the line 2—2;

FIGURE 3 is an exploded sectional view, with portions broken away, illustrating the manner of assembling and supporting the packaging elements for the sealing operation;

FIGURE 4 is a fragmentary section, to an enlarged scale, on a diameter of the supporting member with the package elements assembled therewith in proper relation for forming the seal at the base of the package;

FIGURE 5 is a view partly in side elevation and partly in section illustrating an apparatus for use in closing and sealing the package;

FIGURE 6 is a plan view of a modified form of the package;

FIGURE 7 is a cross section taken on the line 7—7 of FIGURE 6, to an enlarged scale and with portions broken away;

FIGURE 8 is a cross sectional view illustrating another modified form of the package, the view being taken on a diameter of the package, and portions thereof being broken away;

FIGURE 9 is an exploded cross sectional view, with portions broken away, showing the package of FIGURE 8 partially assembled just prior to the closing and sealing operations;

FIGURE 10 is a cross sectional view illustrating another modified form of the package, the view being taken on a diameter of the package and portions thereof being broken away;

FIGURE 11 is an exploded cross sectional view, with portions broken away, showing the package of FIGURE 10 partially assembled just prior to the closing and sealing operations;

FIGURE 12 is a perspective view of another modified form of the package;

FIGURE 13 is a side elevation of the package shown in FIGURE 12;

FIGURE 14 is a cross section taken on the line 14—14 of FIGURE 12 to an enlarged scale and with portions broken away; and

FIGURE 15 is a fragmentary cross section taken on the line 15—15 of FIGURE 14:

The package is useful in the marketing of food products, particularly casing formed processed meat products, for example sliced bologna, or the like, which is customarily packaged in stacks of a predetermined weight with the result that the stack to be enclosed in the individual wrapper or container is of non-uniform volume and dimensions while at the same time having a degree of compressibility which enables it to be shaped or molded, within limits, so that it will fill the product accommodating space within a preformed container and not exert pressure at any point on the surface sufficient to distort the package or to cause it to tear or break or to slip in the container walls. Accordingly, for the purpose of illustration, a package 10 is shown in FIGURES 1 and 2, in which the product 11 is a stack of meat slices, the package being shown in an upright position in which it will normally be displayed.

The compositions employed in forming the package 10 comprises two principal parts or elements, namely, a body forming portion or member 12 and a closure forming and product supporting member 14 which co-operate to completely enclose the product 11. The body portion 12 of the container is preformed from a rigid or semi-rigid polyvinyl chloride sheet, selected because it has characteristics particularly desirable for packaging sliced meat or similar food products. Generally, for meat products, and many other products as well, it is found desirable to form the cup-shaped container 12 from a plastic having low oxygen permeability, good impact strength at 32° and sufficient rigidity to maintain its formed shape in use while being formable by vacuum and/or pressure thermal-forming methods. Other suitable plastics may be employed, for example, cellulose acetate, nylon, polycarbonate, high impact polystyrene, high impact polystyrene and high density polyethylene. These materials may be supported or coated when employed in the packaging of a food product. Also, copolymers of these plastics have been suitable for the forming of the container body. Other plastics can be used generally with suitable coatings depending upon the product which is being packaged. The container body 12 is shaped according to the general shape of the product when it is arranged in an upright mass, as in the case of sliced meat, or any similar product which is non-fluid and normally maintains a predetermined shape. In the form shown, the body 12 is of rectangular section so as to accommodate a stack of meat slices cut from a conventional rectangular load. The shape may, of course, be varied depending upon the general shape of the product. The body member 12 comprises a top wall forming panel 15 and a depending side wall formation 16 which terminates at a laterally directed marginal flange 17 extending around the periphery of the open bottom of the member 12, the flange 17 being of uniform width along three sides and having a greater width along the fourth side. The top wall forming panel 15 is joined at its peripheral edge to the top edges of the side wall formation 16 by a fold-like section 20 which results in an inner groove 21 extending about the periphery of the inside face of the panel 15 and an outer rib or bead-like formation 22 extending about the periphery of the outside face thereof. This fold or ridge section 20 constitutes a relatively flexible hinge which enables the panel 15 to have a range of movement inwardly and outwardly of the product receiving space within the member. In the form of the package shown, the flange 17 extends uniformly about three sides of the body 12 while the fourth side portion 18 thereof is extended or widened for accommodating a label 23 which may be printed to provide identification for the contents, instructions for handling and/or any other desired information. This side portion 18 may be provided with a hanger hole 24 so that the package may be suspended for display, if desired.

The closure forming base member 14 of the package 10 is preferably preformed from a sheet of suitable plastic and in the case of a food product, such as illustrated, it is desirable that the base 14 have properties which are generally the same as body 12. More often, it is desirable to have the base formed of a plastic with a pigmented filler, or the like, which renders it opaque with the result that the product is not visible through the base. The base 14 is shaped or preformed to provide a product engaging
panel 25 within the flange-like margin 26 which has a width corresponding to the width of the superposed flange 17 of the body member 12, three sides being of uniform width and the fourth side 27 being extended so that it has a width the same as the flange portion 18. The panel 25 is connected to the surrounding flange or margin 26 by a narrow peripheral side wall section 28 so that the panel 25 is in a plane generally parallel with and upward or inwardly offset relative to the plane of the margin 26. The peripheral edge of the panel 25 and the top edge of the side wall formation 28 are connected by a hinge forming fold 30 which results from a groove 31 extending about the periphery of the bottom face of the panel 25 and a bead-like ridge or rib 32 extending about the supermost or top face thereof so as to permit the panel 25 to have a limited amount of movement toward and from the inside of the package when it is assembled with the body 12, as illustrated, and pressure is applied to the surfaces. The narrow side wall forming section 28 is of a slant to allow the open bottom face or mouth of the body member 12 and to engage with the bottom marginal portions of the body side wall 16 forming a mechanical seal therewith. The panel 25 is located relative to the peripheral edges so that when it is telescoped within the body the flange portions 26 underlie the marginal flange portion 17 of the container body 12.

The forming adhesive material 33 is interposed between the flanges 17 and 26 about the entire periphery adjacent the bottom edges of the side wall 16. The adhesive substance 33 is of a character which will provide an hermetic seal when the product is food and the package is formed under vacuum so as to enhance the shelf life of the same. A number of suitable adhesives are available which are sealable so as to permit easy separation of the superimposed flanges and facilitate opening of the package. Examples of those which may be used successfully with a polyvinyl chloride plastic include a hot melt adhesive made by Stein Hall & Co., designated LHM 631 which is believed to be composed of rosin derivatives which act as tackifiers, paraffin and microcrystalline waxes, which act as sharp melting plasticizers, and ethylene vinyl acetate copolymers which provide tensile strength and flexibility. Solution-type adhesives which may be used are made by Union Carbide Plastics Co., New York, N.Y., one of which is designated AYAF and is understood to be prepared from a vinyl acetate polymer dissolved in acetol. This may be applied to the package components by printing and the solvent removed by drying. Another suitable adhesive adhesive produced by this same company is prepared from partially hydrozlated vinyl chloride vinyl acetate copolymer resin which is dissolved in a suitable solvent, such as ketones, esters, or chlorinated hydrocarbons and which may be applied to the package components and dried to remove the solvents.

An important feature of the package is the utilization of the product to strengthen and rigidify the package wall. The product 11 is of a somewhat compressible or formable nature and is compressed between the product engaging panel 25 of the base 14 and the top wall forming panel 15 of the body 12 by application of pressure to the outside surfaces of these walls in the assembling or forming of the package components. The product 11 is compressed or shaped to completely fill the product receiving space between the panels 15 and 25 and the side wall 16 thereby eliminating localized stresses in the wall materials and removing or eliminating the voids and retained air prior to activating the sealing material 33. In packaging materials of a perishable nature such as meat products which readily spoil in the presence of oxygen, the package may be assembled in a vacuum and the sealing material 33 activated to form a vacuumized, hermetic sealed package which has enhanced keeping qualities.

The method of assembling the package elements and sealing the package is illustrated in FIGURES 3 and 4 and suitable apparatus for carrying out the method is illustrated in FIGURE 5. A support fixture 35 is provided in which the package elements are assembled for the closing and sealing operations and a series of these fixtures may be mounted on a carrier, such as an endless belt 36 (FIGURE 5), which is advanced intermittently to position successive fixtures or supporting forms 35 in upright position for a closing and sealing station, indicated at A, in FIGURE 5. The package elements are assembled in the fixture 35 prior to its arrival at station A where the fixture 35 is disposed beneath a vertically reciprocable closing and sealing apparatus 40. The fixture 35 is cup-shaped and has a resilient gasket 41 (FIGURES 3 and 4) seated in a peripheral groove 42 in the top edge 43 of the side wall 44. The product 11 is placed in the body member 12 and the assembly is positioned in the fixture as indicated in FIGURE 3 with the closure member 14 being seated on the open mouth of the body member 12 so that the narrow side wall 28 will telescope within the same. The fixture 35 is then positioned beneath the closing and sealing apparatus 40 with the body member 45 with an open bottom face which is suspended on the hanger rods 46 and raised and lowered the required amount by any suitable means (not shown). A gasket 47 is provided on the top surface of the base member 48 of the fixture assembly 35 so that it is engaged by the bottom edges of the vacuum box 45 and forms a seal as the mouth of the body is closed by the base member 48 of the fixture 35. The vacuum box 45 which houses the closing and sealing devices has a connection, indicated at 50, with a vacuum line through a suitable control valve 51 and also a connection, indicated at 52, with an air line through a suitable control valve 53. In a typical operation the vacuum employed has been 28 to 29 inches of mercury with a dwell time of approximately 3 to 6 seconds. A seal forming platen 54, which is heated by electric heating elements 55, is suspended by frame 56 from the bottom end of a vertically disposed piston 57 depending from a double acting air cylinder 58. A pressure plate 60 is supported for vertical movement beneath the sealing platen 54 by a yoke 61 which is slidably connected to the sealing platen 54. The pressure plate 60 is urged downwardly by a compression spring 62. The pressure plate 60 is of a size to fit within the side wall 28 of the closure member 14 so as to engage with an application of pressure to the panel 25 before there is any pressure applied by the sealing platen to the marginal flange 26 for the seal forming operation. The product 11 is compressed or shaped between the panels 15 and 25 while the assembly is enclosed in the vacuum box 45 and after air is exhausted from the same so as to completely fill the available space within the container. The seal between the body 12 and closure 14 is formed by activating the adhesive 33 as the sealing platen 54 is lowered to final position and pressures the flanges 17 and 26 together against the resilient gasket 41. While the sealing temperature depends somewhat on the exact materials employed ranging from 150° to 180° F. with pressure ranging from 30 to 100 lbs. per square inch and heat dwell time of approximately 3 seconds has been found suitable. The operative cycle is completed by closing the valve 51, opening the valve 53 and retracting the piston 57 to release the package, after which the assembly 40 is raised a sufficient distance to clear the fixture 35 for movement from beneath the assembly 40 and permit the next fixture 35 on the belt 36 to be moved into position for the closing and sealing operations. The heated sealing platen 54 may be relied upon to at least partially reform the product engaging panel 25 as well as the marginal flange 26 of the closure member during the sealing operation. However, the hinge forming fold 30 is primarily relied upon to accommodate variations in the space required for the amount of product in the package.
A modified package 70 is illustrated in FIGURES 6 and 7 wherein the product 71 may be, for example, a stack of round meat slices, or the like, enclosed in a container body 102 preformed as shown in FIGURE 7. The container body 72 is preformed of a suitable semi-rigid transparent plastic material to provide a top wall forming panel 75 and a depending side wall formation 76 which terminates at a laterally directed flange 77 extending around the periphery of the open bottom of the member 72 and having an outer periphery preferably of rectangular shape as shown. The product may be, for example, a Stack of 70 with one side 78 of greater width for accommodating a label etc. as in the form of the package shown in FIGURE 1. The top wall forming panel 75 is connected at its periphery to the top edge of the side wall formation 76 by a hinge forming section 80 derived by forming therein an inner peripheral groove 81 and an outer peripheral rib or bead 82 enabling the panel 75 to move inwardly and outwardly during the closing and sealing of the package. The side wall 76 is formed with a continuous thread-like groove 83 which serves to rigidify and reinforce the side wall and to facilitate adjustment of the wall to accommodate the product when overfill or underfill occurs. The groove 83 also facilitates the withdrawal of air during vacuumizing by providing a continuous passage way for escape of air from the top to the bottom of the container body during the closing and sealing operations. The container body 102 may be of a design that will facilitate the building up of a container body 14, of a construction identical with the base member 14, providing a raised product receiving panel 85 and a surrounding flange 86 which has one side extended at 87 and which is adapted to underlie the flange portions 77 and 78 of the container body. The panel 85 is connected to the flange portions 86 by a narrow peripheral wall section 88 which is of a size to fit within the bottom face of the body 72 in telescoped engagement with the bottom marginal portions of the side wall 76 of the body 72. The panel 85 is joined at its periphery to the top edge of the side wall section 85 by hinge forming section 90 derived by forming therein an outer peripheral groove 91 and an inner peripheral rib or bead 92. The package is assembled, closed and sealed in the same manner as described with respect to the package of FIGURE 1 with a suitably adhesive 93.

Another modified form of the package is illustrated at 100 in FIGURES 8 and 9. The package 100 comprises a compressible or moldable product 101 enclosed in a container body 102 preformed of suitable plastic material, as shown, and a co-operating closure forming member 104 which is wholly or partially preformed of a suitable plastic material. The package 100 may have the general shape and appearance of the package of FIGURES 6 and 7. The container body 102 is preformed to provide a panel 105 which constitutes the top wall in the upright position of the package. A side wall formation 106 depends from the top wall 105 and terminates at a laterally directed flange 107 extending around the periphery of the open bottom of the body 102, with an outer periphery preferably of rectangular shape and with one side of greater width for accommodating a label etc. as in the forms of the package shown in FIGURES 1 and 6. The top wall 105 is connected at its periphery to the top edge of the side wall formation 106 by a hinge forming section 108 of the container body 72 and a co-operating closure groove 109 derived by forming therein an inner peripheral groove 111 and an outer peripheral rib or bead 112 enabling the panel 105 to move inwardly or outwardly during the closing and sealing operations so as to accommodate variations in the volume of the product 102. The side wall 106 is preferably formed with circumferential grooves 113 which permits further variation in the product accommodating space within the container and serves to rigidify and reinforce the side wall. The closure member 104 is initially formed of rigid or semi-rigid heat formable plastic material with a product engaging panel 115 which is connected by a narrow side wall formation 116 with a laterally extending flange 117, the latter being disposed initially in the lowermost plane of the member 104 as shown in FIGURE 9 and indicated by dotted line in FIGURE 6. The container body 102 thereby enabling the edge 121 of the panel 115 to sit in the internal groove 123 adjacent the mouth of the container when it is forced past the shoulder 122 and providing the member 104 with satisfactory re-closure characteristics after the package has been opened. The flanges 107 and 117 are provided with heat sealable contacting surfaces or a heat activatable seal forming material, as indicated at 124, is provided between the same. When the package elements are assembled in a fixture for closing and sealing as heretofore described in connection with the packages of FIGURES 1 and 6, the product is actuated by applying inward pressure to the panels 105 and 115 and heat and pressure are applied to the flange 117 sufficient to force it into engagement with flange 107 and activate the seal forming adhesive material 124 so as to effect a peripheral seal about the base of the body wall 106 and also to shape the flange 117 to its final form as indicated in FIGURE 8. With this arrangement, the closure member 104 provides a satisfactory re-closure member when the seal at 124 is broken and the closure member 104 is released for removal to provide access to the product.

A further modified package is illustrated at 130 in FIGURES 10 and 11. In this form of the package a product 131 is enclosed in a cup-shaped container body 132 and a closure member 134 therefor. The container body 132 is preformed of suitable transparent plastic material, as shown, and may be either round or rectangular as desired. The co-operating closure member 134 is initially a plain sheet of a suitable plastic material, as shown in FIGURE 10, prior to assembly with the container body 132. The container body member 132 is preformed so as to provide a top wall forming panel 135 and a depending side wall formation 136 which terminates at a laterally directed marginal flange 137 extending about the periphery of the open bottom of the member 132. The top wall forming panel 135 is joined at its peripheral edge to the top edge of the side wall 136 by a hinge forming fold 140 which results in an inner groove 141 and an outer bead 142 extending about the periphery of the panel 135. The marginal flange 137 has a heat sealable surface or an adhesive is applied as indicated at 143. The closure member 134 is initially a plain sheet, as shown in FIGURE 11, which, in forming the package, is disposed over the mouth of the container body 132 after the product is assembled in the latter and the assembly is supported in a fixture for closing and sealing as heretofore described. The closure sheet 134 is moved into the position indicated in dot and dash line in FIGURE 10 and inward pressure is applied thereto and also to the panel 135 to compress the product after which heat and pressure are applied to the marginal areas 146 of the closure member 134 to activate the seal forming material and complete the sealing of the package. This member 134 is then removed to form the closure member 134. The product is compressed between the top wall panel 135 and the bottom wall panel 145 which is formed during the compressing and sealing operations, the panel 145 being in an inwardly offset plane relative to the margins 146 of the member 134 in which it remains when the material is removed. The material of the closure member 134 and the activating of the adhesive 143 to effect the marginal seal the package is complete but it may be desirable to further stiffen the package by the addition of a backing board 147 of cardboard or other relatively rigid material, as shown.
backing board 147 may be secured with its margins overlying or underlying the flange 137 and the margins 146 of the closure member 134 by means of an adhesive material indicated at 148. The backing board 147 may, of course, be added to the previously described forms of the package described herein, the package assembly is subjected to vacuum to withdraw air from the product 131 and the container body 132 some means will be provided for gripping the closure member 134 in order to hold it in proper position above the open mouth of the container body 132 while evacuation occurs and to maintain the margins thereof in proper position for the sealing operation. Otherwise, the assembling, closing and sealing operations may be the same as for the previously described forms of the package.

Another form of the package is illustrated at 150 in FIGURES 12 to 15. The package 150 comprises a moldable product 151 enclosed in a container body 152 which is preformed of suitable plastic material, as shown, and a co-operating closure forming member 154 which is wholly or partially preformed of plastic material. The package has the general shape or appearance of the package of FIGURES 6 and 7. The container body 152 is preformed to provide a panel 155 which constitutes the top wall in the upright position of the package. A side wall formation 156 depends from the periphery of the top wall 155 and terminates at a laterally directed flange 157 extending around the periphery of the open bottom of the body 152, with an outer periphery of rectangular shape, in the form thereof illustrated, of the same character as in the previously described forms of the package, with one side accommodating a label etc. The top wall 155 is connected at its periphery to the top edge of the side wall formation 156 by a hinge forming section 160 derived from forming therein an internal peripheral groove 164 and an external peripheral rib 162 which merges at its inner edge into a narrow band section 163, the latter tapering inwardly toward the central axis of the package and in the direction of the bottom thereof so that the end wall panel 155 is initially in a plane offset inwardly of the plane of the top of the container body 152, the angle between the latter and the band section 163 being in the neighborhood of 6 to 10 degrees. This imparts greater flexibility to the panel 155 and enables it to move inwardly or outwardly to a greater extent during closing and sealing operations so as to better accommodate variations in the volume of the product 152 and without adverse effect on an extent to increase permeability. The side wall 156 is formed with spaced circumferential grooves 164 and also spaced, vertically extending grooves 165 which serve to rigidify the side wall and provides for a bellows-like action enabling the container to expand so as to accommodate a larger than normal fill or to contract so as to snugly engage the product when there is a smaller than normal fill. The grooves 164 and 165 also facilitate removal of air during vacuumizing of the package assembly as well as back-flushing with nitrogen if desired. The provision of substantial multi-direction grooving enhances package flexibility to conform to product deformation during package handling, thereby reducing the possibility of film damage. The closure member 154 is initially formed of rigid or semirigid heat formable plastic material with a product engaging panel 166 which is connected by a narrow side wall formation 170 to a normally extending flange 168, the latter being disposed in the lowermost plane of the member 154. The peripheral edge of the bottom wall forming panel 166 is connected to the top edge of the side wall 167 by a hinge forming section 170 which results from a groove 171 extending at the top edge of the side wall and a co-operating hinge 172 which merges at its inner edge into a narrow band 173 extending about the periphery of the panel 166 and normally tapered inwardly toward the vertical axis of the package and in the direction of the inside of the package with the angle between the band 173 and the panel 166 being initially in the neighborhood of 6 to 10 degrees. The hinge section 170 enables the panel 166 to have a limited amount of movement toward and from the inside of the package when the closure member 154 is assembled with the body 162 and pressure is applied to the panel. The hinge or hinge construction 170 may be the same as the hinge section 160 and serves the same purposes, enabling the panel 166 to have a greater range of movement, when the package is formed, than the hinge construction previously described. The side wall 167 is of a size to fit over the edge or mouth of the member 152 and engage the bottom margins of the body side wall 156. The flanges 157 and 168 are sealed by heat and pressure and an adhesive substance, indicated at 174, may be employed.

The specific material employed in the container body and the co-operating closure member of each form of the package will be determined largely by the nature of the product. Another material which is particularly suitable for a food package, especially meat products which are subject to rapid deterioration in the presence of oxygen, is vinylidine chloride in a supercooled state as described in Sloan et al. Patent No. 3,083,106, dated Mar. 26, 1963 and Goller et al. Patent No. 3,131,069, dated Apr. 28, 1964.

While an adhesive is described in connection with the formation of the seal between the flanges of the body and closure members in the several forms of the package, any other suitable seal formation may be employed. With some materials heat sealing will provide a satisfactory seal.

The package is suitable for a variety of products. It is particularly adapted for packaging food products which are subject to spoilage or deterioration in the presence of oxygen. It is useful in packaging any product which it is desired to maintain in a moist condition or which must be kept from drying out such as clay, putty, caulking compounds and similar non-food items.

We claim:
1. A method of forming a vacuumized, hermetically sealed package which is characterized by a predetermined quantity of a product which is deformable and which is arranged in the form of an upright mass on a raised panel portion of a semi-rigid base, which base has peripherally extending flanged margins sealed to corresponding flanged margins of a cup-shaped member of semi-rigid preformed plastic, said body member having a top panel for engaging the upper end of said product and depending side walls for engaging the side walls of said product, said top panel being joined to said side walls by a hinge forming portion, and the bottom edges of said body side walls being in telescoping relation with portions of said base at the peripheral edges of said raised panel portion, said method comprising supporting said preformed body member in inverted position with the flanged margins thereof seated on the edge portions of a rigid, upwardly opening hollow form, placing a sufficient quantity of said product in said body member to substantially fill said body member when the package is completed, positioning said base on the mouth of said body member with said product engaging panel disposed so as to telescope into said body member and engage with said product and with the flanged margins of said base overlying the corresponding margins of said body member, applying mechanical pressure inwardly of the outside surface of said raised panel portion and within the area defined by the bottom edges of said body side walls sufficient to force said product into close contact with the interior surfaces of said base and body members so as to shape said product to conform to the shape of said interior surfaces and to substantially completely fill the space available between the same with the product while vacuumizing the assembly, and hermetically sealing the packing.
2. A method of forming a package which is characterized by a predetermined quantity of a product which is deformable to at least a limited degree and enclosed in a preformed cup-shaped container body of deformable semi-rigid plastic material in combination with a closure member of deformable material, said cup-shaped body having a top wall forming panel joined to the top edges of the side wall by hinge forming portions, said closure member having portions overlying the mouth of said container body and being adapted for sealing said cup-shaped body in intimate pressure engagement with said product to the extent that said cup-shaped body is not initially filled by said product and with said product being in at least substantially equal pressure engagement with said cup-shaped body and closure member, said method comprising supporting said preformed cup-shaped container body, placing a predetermined quantity of said product in said container body, placing said closure member on said container body with portions overlying the mouth thereof, applying sufficient mechanical pressure to the portions of said closure member overlying the mouth of said container body and within the confines of the bottom edges of the side wall of said container body to force the same into intimate engagement with said product in said container body and shape said product, container body and closure member portion so that said product is in at least substantially equal pressure engagement with said container body and closure member, so as to form therewith a rigid unitary package, and sealing margins of said container body and closure member.

3. A method of forming a package as recited in claim 2 wherein said product is placed in said container body so that there is space between the side wall of said product and said container body, and portion thereof applied to said closure member on the outside surface thereof so that there is an initial application of pressure between the center portion of the top wall forming panel of said container body and said product which pushes any air present outwardly thereof for subsequent escape along the space between the side wall of said product and said container side wall and a final application of pressure sufficient to force said product into close contact with the interior surfaces of said closure and body members so as to shape said product to conform to the shape of said interior surfaces and to completely fill the space available between the same with said product while vacuumizing the assembly and sealing margins of said container body and closure member so as to hermetically seal the package.

4. A method of forming a package which is characterized by a predetermined quantity of a product which is deformable to at least a limited degree and enclosed in a preformed cup-shaped container body of deformable semi-rigid plastic material in combination with a closure member of deformable material, at least one of said container body and closure members having a hinged panel portion to permit variation in internal package volume in response to external mechanical pressure, said closure member having portions overlying the mouth of said container body and being adapted for sealing said cup-shaped body in intimate pressure engagement with said product to the extent that said cup-shaped body is not initially filled by said product and with said product being in at least substantially equal pressure engagement with said cup-shaped body and closure member, said method comprising supporting said preformed cup-shaped container body, placing a predetermined quantity of said product

References Cited

UNITED STATES PATENTS

3,020,686 2/1962 Rueckert et al. 53-22
3,070,446 12/1962 Sciffrith et al. 99-171
3,087,823 4/1963 Hein et al. 99-174
3,172,768 3/1965 Joosten et al. 99-171
3,214,074 10/1965 Schechter 99-171 X

RAYMOND N. JONES, Primary Examiner
U.S. Cl. X.R.
99-171, 174; 206-46, 78.