

April 23, 1963

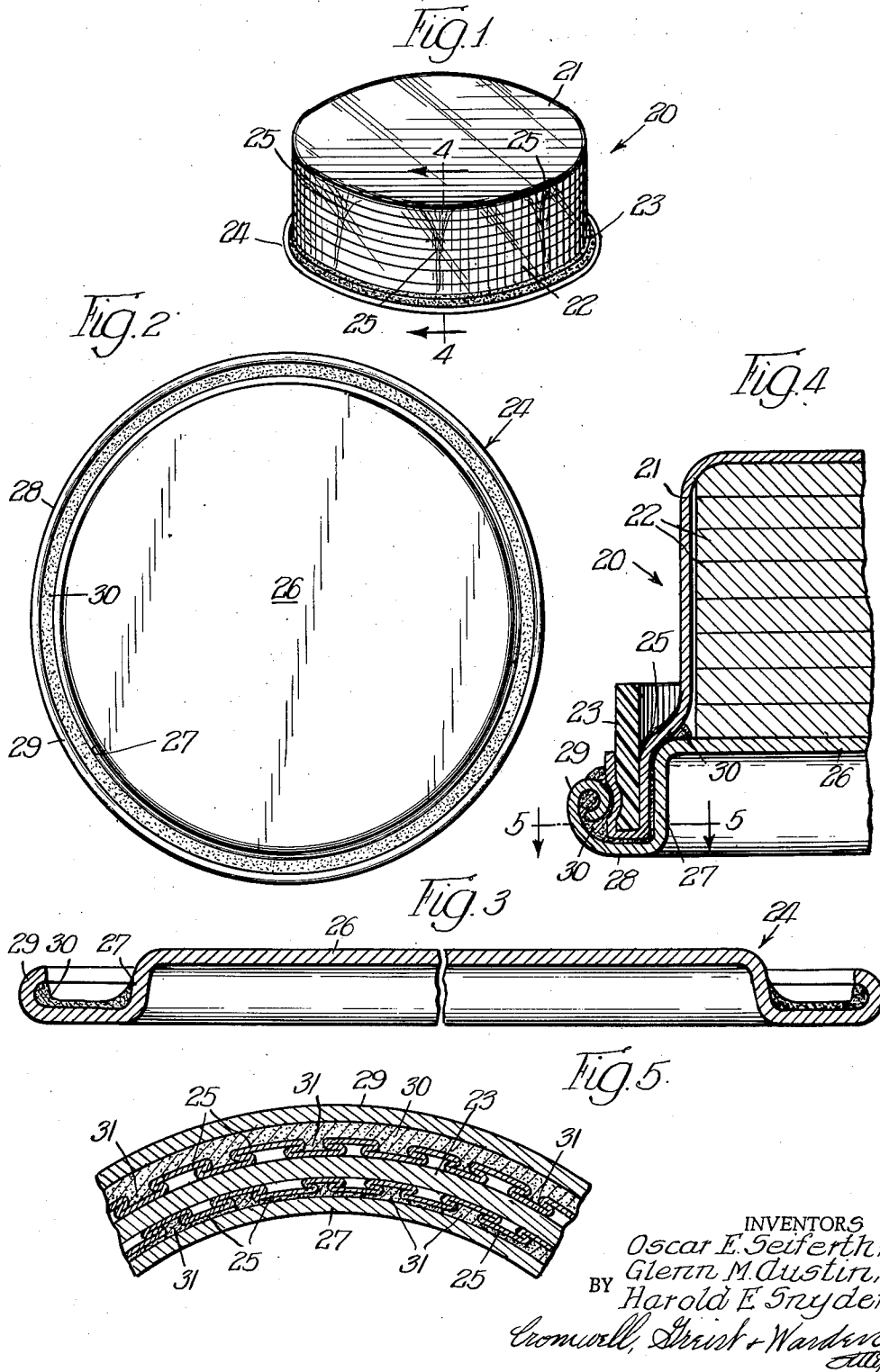
O. E. SEIFERTH ET AL

3,086,869

HERMETICALLY SEALED FOOD PACKAGE

Filed Dec. 1, 1958

3 Sheets-Sheet 1



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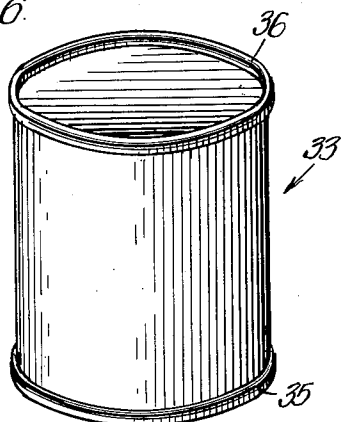
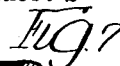
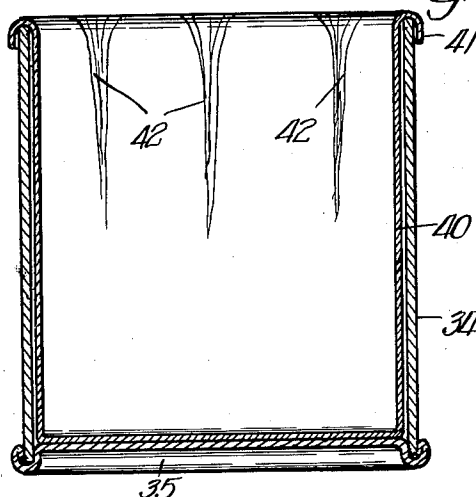
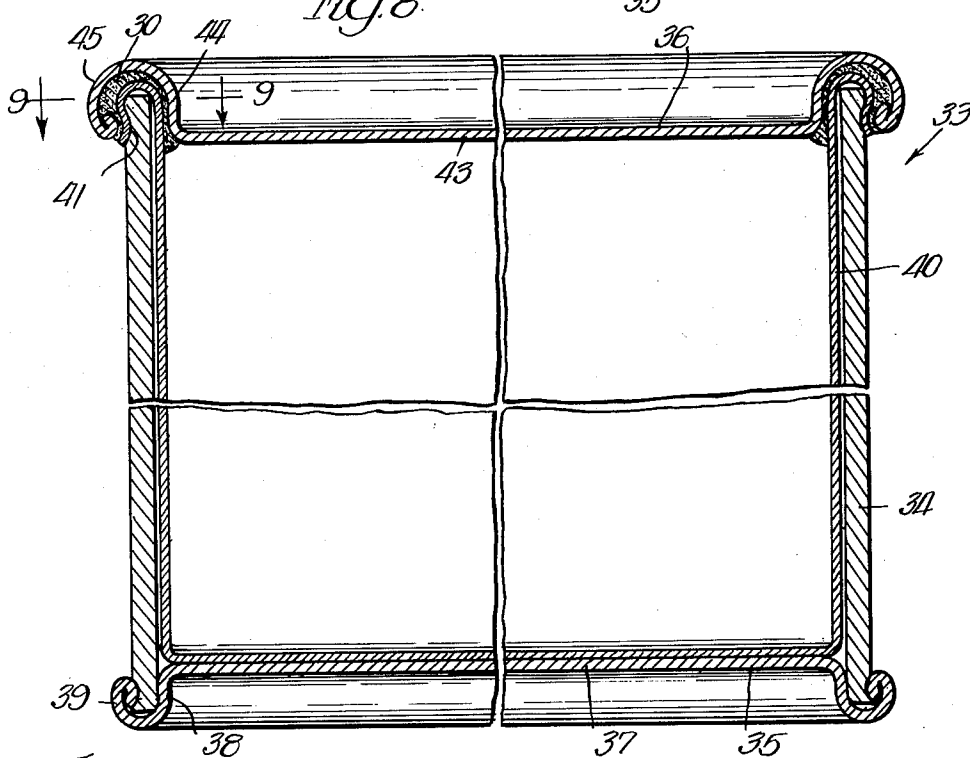
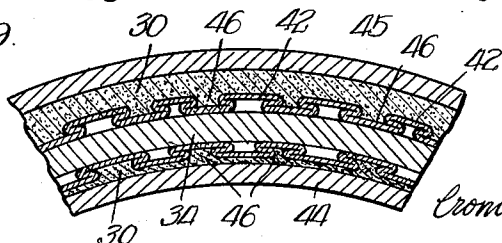
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HERMETICALLY SEALED FOOD PACKAGE

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Fig. 10.

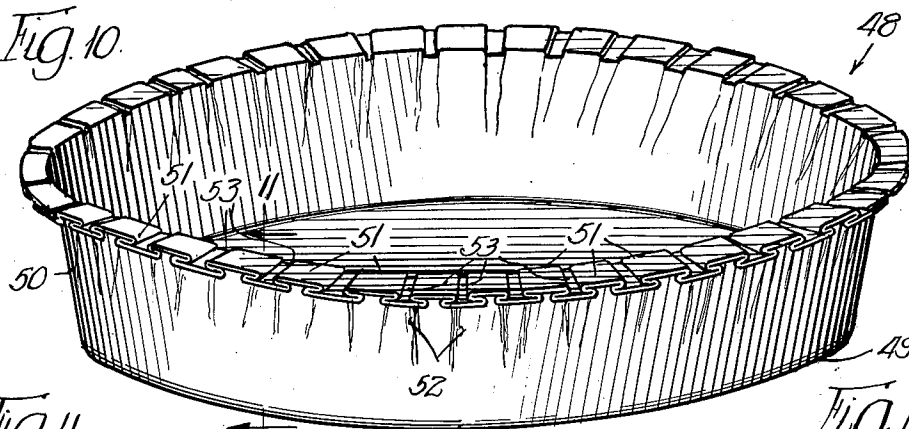


Fig. 11

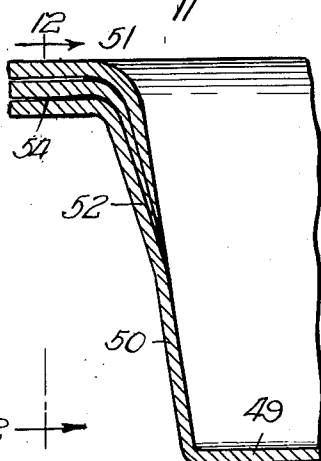


Fig. 12

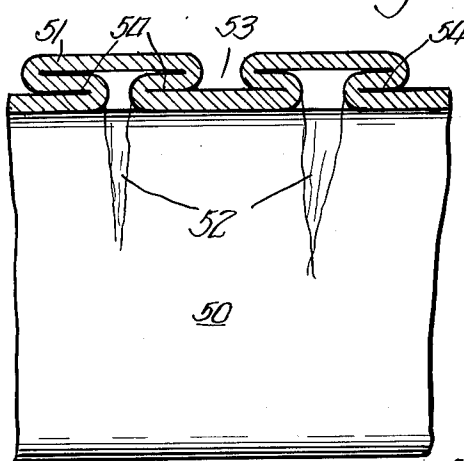
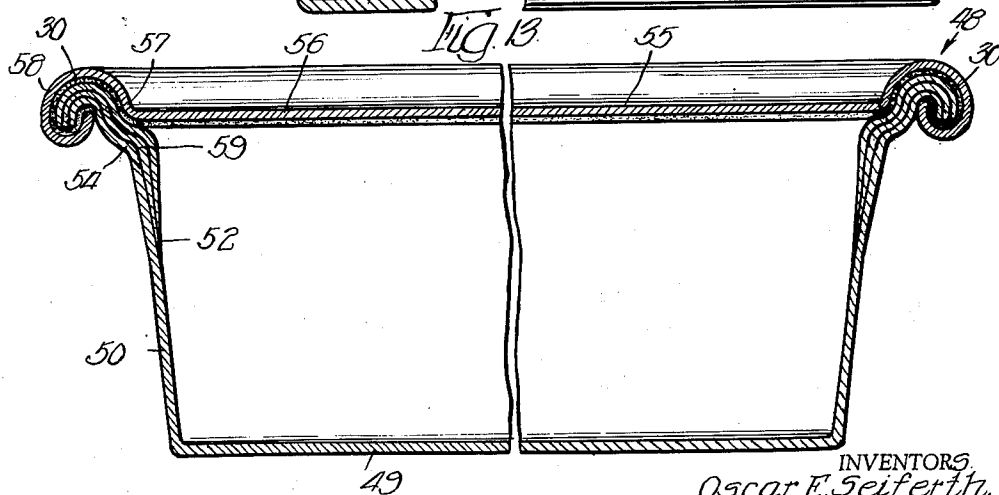


Fig. 13



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3,086,869

HERMETICALLY SEALED FOOD PACKAGE

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4 Claims. (Cl. 99—171)

The present invention relates to a new and improved gasket-type sealing material for use in hermetically sealing areas between the folds of pleated packaging material. Additionally, the invention is directed to new and improved hermetically sealed packages wherein the product containing portions of these packages are provided with a free edge in sealing engagement with a panel-type closure member with the free edge including at least one fold-like pleat, the closure member carrying the new and improved sealing material of the present invention, which material is capable of establishing and maintaining a hermetic seal in the areas between the folds of the free edge of the product containing portion.

In the packaging field, particularly in connection with the packaging of food products, a problem exists in establishing and maintaining a hermetic seal along sealing terminal edge portions of the packaging material, which edge portions are provided with fold-like overlaps which broadly may be referred to as "pleats." To establish and maintain a complete seal in the folded areas of the packaging material, use of a pliable sealing material has been made in an attempt to close off the areas between the folds. Known types of pliable and ready deformable gasketing materials have not been found entirely adequate as such materials are not compounded or designed to flow to the extent necessary to completely fill the fold areas.

As disclosed in U.S. Patent No. 2,787,552, a commercially usable sealing arrangement for one type of pleated package includes the use of a continuous thin coating of sealing oil between piles of flexible packaging film as well as a second continuous coating of the sealing oil along the inner surface of the laminated film. The free edge of the laminated and coated packaging film when pleated and clamped in defining a continuous sealing area establishes and maintains a hermetic seal by reason of the coats of sealing oil readily filling all areas between the folds through which leakage would be most apt to occur. This packaging procedure and the package formed thereby constitutes a commercially acceptable answer to the problem, but it has been considered desirable to eliminate the use of two plies of packaging film and further eliminate the use of the sealing oil as well as the necessary coating steps by which the oil is applied to the film during formation of the package. Elimination of these features in the package would result in a material reduction in the total cost of manufacturing such packages. Furthermore, the use of a sealing oil coating has not been found to be readily applicable to other types of pleated packages not necessarily making use of flexible packaging film.

It is an object of the present invention to provide a new and improved gasket-type sealing material and hermetically sealed package utilizing the same wherein the gasketing material is capable under the application of pressure to fill and entirely close off minute open areas between pressure engaged portions of the packaging material.

A further object is to provide a new and improved gasket-type sealing material for use in hermetically sealing areas between the folds of pleated packaging material, the sealing material comprising a base substance which is self-sustaining and compressible, the base substance containing therein in its non-compressed condition a flowable sealing substance which is readily exuded from the base substance upon compression thereof.

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Still a further object is to provide new and improved forms of hermetically sealed packages utilizing the improved gasket-type sealing material of the present invention to hermetically seal engaged sealing area defining portions of the material of the packages which portions include fold-like overlaps.

An additional object is to provide new and improved hermetically sealed packages of the type described in the foregoing objects, which packages may be readily fabricated at minimal cost by use of the improved gasket-type sealing material of the present invention.

Other objects not specifically set forth will become apparent from the following detailed description of the present invention made in conjunction with the drawings wherein:

FIG. 1 is a perspective of one type of package particularly adapted for improvement by use of the sealing material of the present invention;

FIG. 2 is an enlarged plan view of a relatively rigid end panel or closure member used in forming the package of FIG. 1, this view illustrating placement of the sealing material;

FIG. 3 is an enlarged fragmentary transverse section of the end panel of FIG. 2;

FIG. 4 is an enlarged fragmentary vertical section of the package of FIG. 1 taken generally along line 4—4 therein and illustrating the type of hermetic seal obtained;

FIG. 5 is a fragmentary plan section of a hermetically sealed portion of the package taken generally along line 5—5 in FIG. 4 and further illustrating the functional use of the sealing material of the present invention;

FIG. 6 is a perspective of another form of package with which the sealing material of the present invention is particularly adapted for use;

FIG. 7 is an enlarged transverse vertical section of the body container portion of the package of FIG. 6 prior to application thereto of a closure member;

FIG. 8 is an enlarged fragmentary, transverse vertical section of the package of FIG. 6 illustrating in detail the functioning of the sealing material of the present invention;

FIG. 9 is an enlarged fragmentary plan section of the sealed area of the package of FIG. 6, this view being taken generally along line 9—9 in FIG. 8;

FIG. 10 is a perspective of the body container portion of still another form of package with which the sealing material of the present invention is particularly adapted for use, the container portion being illustrated prior to application of the closure member and sealing material thereto;

FIG. 11 is an enlarged fragmentary section of a sealing edge portion of the body container portion of FIG. 10, this view being taken generally along line 11—11 in FIG. 10;

FIG. 12 is a fragmentary, partly sectioned view taken generally along line 12—12 in FIG. 11; and

FIG. 13 is a fragmentary transverse section of the completed package illustrating operative use of the sealing material of the present invention therein.

The sealing material of the present invention includes two important ingredients. The first ingredient consists of a deformable, self-sustaining, solid-like base material which is preferably a wax such as microcrystalline wax. The remaining ingredient consists of a flowable sealing substance of an oily nature which is dispersed within the base material. It is surmised that the base material functions, in effect, as a carrier for the flowable sealing substance. A suitable wax base material itself, such as microcrystalline wax, may contain an adequate oil content, but it will be understood that a wax and oil may be mixed to form a highly effective sealing material. The

oil-wax dispersion is used as a gasketing material and is applied in the same relative position as standard gasketing compounds for the purpose of functioning in the seam area of a package in forming and maintaining a hermetic seal. Upon compressive deformation of this type of gasket when the packaging materials of the seam area are brought into tight engagement by crimping or any other suitable means, the wax base material is compressed and deformed, and the oily sealing material is forced or exuded therefrom to establish a continuous oily film or coating which readily fills any voids or openings in the packaging material defining the seam area.

With the use of this type of sealing material, application and effectiveness of the void filling oily substance is instantaneous with the application of package sealing pressure. Application of the oily substance occurs only in the area in which it is effective and the deformed waxy base material functions to back-up the continuous film of oily substance and thus provide for continuous sealing effectiveness of the oily substance. Furthermore, the deformable solid-like waxy substance upon deformation and spreading thereof transmits adequate spreading pressure to the oily substance exuded therefrom to force the same into very minute areas (such as pin holes) through which slow but deleterious leakage can occur and build up within the package over a period of time. By reason of this phenomenon, an improved seal actually results while practicing package forming procedures under reduced cost conditions.

To better understand the important advantages arising from the use of the sealing material of the present invention, reference is now made to different forms of hermetically sealed packages of the type with which the sealing material is particularly adapted for use. FIG. 1 illustrates a package 20 including an inverted bag-type product containing portion 21 which is formed from gas-impermeable packaging film such as Saran (copolymer of vinylidene chloride and vinyl chloride). The bag 21 covers a product 22 and the mouth of the bag or terminal edge thereof is pressed and crimped between a ring-like band 23 and the peripheral portion of a relatively rigid, metallic end panel or closure member 24. The package 20 is used as a food package with the product 22 constituting a plurality of stacked slices of meat product such as bologna. The bag 21 completely covers the top and sides of the stacked product 22 and is provided with a plurality of circumferentially spaced pleated areas 25 to shape the same in cylindrical form to conform to the disk-shape of the end panel 24.

The end panel 24 as shown in FIGS. 2 and 3 is formed with a raised central portion 26 on which the product 22 is stacked, a peripheral shoulder 27, a peripheral flange portion 28 and an upwardly and inwardly curled lip 29. The shoulder 27, flange 28 and lip 29 define a peripheral groove-like area in which the sealing material 30 of the present invention is carried. The sealing material 30 is circumferentially continuously applied within the peripheral groove of the end panel 24 by any suitable means and during application the material is flowed inwardly under the lip 29 and substantially upwardly along the outer surface of the shoulder 27.

Referring particularly to FIG. 4, the package 20 is formed by placing a predetermined quantity of product 22 within the packaging film 21 which has been preformed into bag shape by being introduced into a suitable cylindrical holder forming a part of the package forming apparatus. The sealing band 23 is received about the bag 21 with the terminal edge portion thereof being folded outwardly and across the bottom edge of the band. The end panel 24 is positioned to receive the pleated edge of the bag 21 and the bottom portion of the band 23 within the peripheral groove defined by the shoulder 27, flange 28 and lip 29. The terminal edge of the bag 21, the band 23 and end panel 24 are thereafter crimp sealed or seamed by a suitable seal forming mechanism of known

type, such as a sealer used in the canning industry, with the crimp seal being formed while the assembled package is in the vacuum chamber which forms a part of the sealer. After the sealing operation any projecting terminal edge marginal portions of the bag 21 are removed by trimming. For clarity of understanding, the foregoing package forming procedure is carried out with the package of FIG. 4 in the inverted position although the package is merchandised in the position shown in FIG. 1.

During pressure application for seam forming purposes, the sealing material 30 is deformed and spread throughout the seam area. This is particularly illustrated in FIG. 4 wherein it will be noted that the sealing material 30 is compressed throughout the entire area of engagement between the band 23, bag 21 and end panel 24. The lip 29 of the end panel 24 is crimped or folded inwardly to tightly hold the band 23 between the same and the shoulder 27 with the terminal edge of the bag 21 being interleaved between the surfaces of these elements and in direct contact with the sealing material 30. The band 23 is preferably formed of semi-rigid plastic material capable of providing adequate rigidity for sealing purposes while permitting a limited degree of compression to provide for efficient crimping of the lip 29 for the establishment of a tight seal.

The pleated areas 25 extend to the terminal edge of the bag 21 and are compressed between the band 23 and the seal defining portions of the end panel 24. FIG. 5 illustrates the pleated areas which are included in the sealed defining portions of the package. The pleats 25 are in the form of overlapping folds of packaging film and open areas 31 exist between these folds. The only open areas 31 of importance are those which are adjacent and face the lip 29 and the shoulder 27 by reason of the fact that these areas constitute potential paths of leakage into the interior of the vacuumized package. However, as shown in FIG. 5, the sealing material 30 is deformed into the open areas 31 and the oily substance exudes from the waxy base to completely fill the areas 31 and to be forced between the overlapped faces of the film defining the plurality of pleats. Thus a complete seal is automatically established during the package sealing operation with the deformed waxy base material backing up the exuded oil substance to force and hold the same in between the folds of the film material and completely seal off these areas. Complete fold area sealing occurs simultaneous with the package sealing operation and during vacuumization of the package.

The effective functioning of the sealing material described above has been substantiated by tests. The dispersion of wax and oil has been dyed with a suitable aniline dye and upon disassembly of the package following complete sealing thereof as described above, it has been found that the dyed oily substance completely penetrates the folds to provide a continuous seal of oil along the seam area. The use of a dyed sealing material formed from a pressure deformable, normally self-sustaining wax having substantially no oil content shows that the folds are not completely penetrated and that the sealing material is not adequately effective. Still further, the use of a dyed soft wax (high oil content) has shown that effective penetration is not obtained. Without sufficient hardness in the wax base material, the oily substance is not adequately backed-up to provide for controlled penetration and proper maintenance of the film of penetration between the folds of the package material. Furthermore, without adequate oil content, the wax base is too hard and not adequately flowable or compressible to provide sufficient oil to seal off the tiny openings.

For best results it has been found that the sealing material of the present invention preferably consists of a base wax having an oil content ranging from about 15% to 50%. By way of example only, a microcrystalline wax having an oil content of 2% and petrolatum having an

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oil content of 30% can be admixed in equal amounts to obtain a highly efficient gasketing material.

As compared to the type of package disclosed in the aforementioned U.S. Patent No. 2,787,552, the bag 21 of the package 20 may be formed from a single Saran film of lighter gauge which not only provides for a lower rate of oxygen transmission but also saves substantially on the total amount of Saran film utilized. Regardless of the irregularity, location or direction of the folds, pleats or wrinkles in the sealed edge portion of the bag 21, the oily substance will establish and be maintained as an unbroken protective film which provides a barrier against the transfer of gas or moisture through the seam area of the package. In addition, the oily substance exuded from the wax base material will act as a lubricant for the film and adjacent package elements during the crimping and sealing operation.

FIG. 6 illustrates a container-type package 33 having a body portion formed from a cylindrical tube-like shell 34 closed at the bottom by an end closure 35 and closed at the top by an end panel closure member 36 which is generally similar in structural features to the end panel 24 previously described. The tube 34 may be formed from any suitable material such as paper, metal, plastic, etc., and the closure 35 as shown in FIGS. 7 and 8 is of conventional design being provided with a raised central portion 37, a peripheral shoulder 38 and a rolled lip 39 which is crimped in tight sealing engagement with the outer surface of the bottom end of the tube 34 which end is received between the shoulder 38 and the rolled flange 39.

As shown in FIG. 7, following application of the bottom closure 35 and prior to application of the top closure 36, a plastic bag 40 is formed within the tube 34 and shaped to conform with the interior thereof with the top terminal edge of the bag 40 being folded in a cuff 41 over the top edge of the tube 34. The forming of the cuff 41 in addition to the shaping of the bag 40 from a film sheet results in pleating of the bag 40 to provide a plurality of fold areas 42.

Referring to FIG. 8, the top closure 36 includes a central panel portion 43 peripherally defined by a shoulder 44 which merges into a rolled flange 45, the tip of the rolled flange 45 being spaced from the shoulder 44 to define a circumferentially continuous groove-like recess into which the terminal edge of the tube 34 with the overlapping cuff 41 is received. The top closure 36 is applied to the tube and the flange 45 thereof is rolled into crimped engagement with the terminal edge of the cuff 41 and the top end portion of the tube 34 by use of standard equipment and machinery.

Received within the groove-like recess area between the shoulder 44 and the tip of the flange 45 is a circumferentially continuous, relatively thick coating of the sealing material 30 previously described. Closure application pressure results in deformation of the sealing material 30 and exuding of the oily substance from the wax base material into the fold areas of the pleats 42. Hermetic sealing in these areas occurs in the same manner as explained in connection with the package 20 and FIG. 9 illustrates the open areas 46 between the folds 42 as being filled with the sealing material, it being understood that the oily substance thereof flows into and is retained within the minute spaces between the overlapping folds of the bag 40. It will be noted that the sealing material 30 comes into contact with the outer surfaces of the pleats of the cuff 41, which surfaces correspond to the inner surface of the bag 40 so as to establish and maintain a complete hermetic seal between the bag 40 and the top closure 36. With respect to the structural features of the package 33, it will be understood that the top closure arrangement described in connection with the use of the sealing material 30 may also be used on the bottom end of the tube 34 where a continuous, cylindrical open ended sleeve of film 40 is used.

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While the two different packages previously described make use of flexible gas-impermeable film, such as Saran, it will be understood that the sealing material of the present invention is readily adapted for use with any type of packaging material wherein folded pleats are present along the seam area. Exemplary of another type of package is the pie pan 48 of FIG. 10 which is in the form of a dish-shaped container made from self-sustaining deformable material, such as aluminum, and including integrally formed bottom wall 49, upstanding side wall 50, and radially outwardly directed flange 51 located along the top edge of the side wall 50 and constituting the free edge of the product containing portion of the package. In drawing the pie pan from an aluminum blank, a plurality of pleated areas 52 are formed in the side wall 50 and extend into the flange 51. The resulting pleats in the flange 51 create open areas 53 (see FIG. 12) which extend downwardly along the inner face of the side wall 50. To hermetically seal these open areas 53 as well as the small spaces 54 occurring within the metallic folds, the sealing material of the present invention is readily adapted for efficient use.

FIG. 13 illustrates the container 48 hermetically sealed by application of a closure member 55 thereto which closure member carries the sealing material 30 of the present invention. The closure member 55 is of conventional type including a central panel 56 defined by a peripheral shoulder portion 57 formed integral with a rolled sealing flange 58. The groove-like recess defined by the rolled flange 58 and the shoulder 57 carries the sealing material 30 previously described. During the sealing operation the upper portion of the side wall 50 of the product containing portion of the package has a shoulder 59 formed therein to impart greater strength to the pie pan to withstand the capping and seaming pressures. Compression of the sealing material 30 carried by the closure member 55 results in the exuding of the oily substance thereof inwardly of the pleat or fold openings 53 and into the small spaces 54 between the folds of the metal of the flange. Presence of the oily substance within these areas and the continual backing up of this substance by the compressed wax base material results in the establishing and maintaining of a complete hermetic seal.

The package 48 is a good example of the variable usefulness of the sealing material of the present invention. With the package 48 it will be particularly noted that a hermetic seal may be established and maintained between metallic parts without the use of packaging films such as Saran. It will be understood, however, that where top closure transparency for product viewing is desired, a sheet of film may be applied over the top of the product in the package 48 and hermetically sealed along the flange 51 by application of the sealing material 30 on both sides of the film. The top closure 55 may be centrally apertured for product viewing purposes through the film layer.

While certain specific forms of packages have been described, it will be understood that other forms of packages may be greatly improved by use of the sealing material of the present invention. The oil-wax mixture may be formulated to withstand extreme temperatures during shipment of the packages to eliminate the possibility of the wax losing its compressive action on the oil exuded therefrom into the fold areas due to excessive softness or hardness.

Obviously, certain modifications and variations of the invention as hereinbefore set forth may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

We claim:

1. A hermetically sealed food package comprising an open mouth product containing portion having a continuous terminal edge in clamped sealing engagement with a continuous peripheral portion of a relatively rigid panel-

type closure member, a food product in said product containing portion, the terminal edge of said product containing portion including a plurality of peripherally arranged fold-like pleats formed from the material thereof to conform said terminal edge to the configuration of said closure member for sealing confinement thereby, the peripheral portion of said closure member being smooth and unpleated and carrying a peripherally continuous gasket formed from a deformable self-sustaining wax having a uniformly dispersed oil content ranging from about 15% to 50% prior to the sealing of said package, the sealing engagement between said terminal edge and said peripheral portion having compressively deformed said wax and forced and spread the oil therefrom into the fold areas of said pleats to hermetically seal said areas.

2. The package of claim 1 wherein said product containing portion is a sheet of gas-impermeable flexible film formed into inverted cup-like shape, the mouth of said sheet constituting said terminal edge and shaped to the configuration of the peripheral portion of said closure member by peripheral pleated areas crimped between said peripheral portion of said closure member and a band of at least semi-rigid material fitting said peripheral portion.

3. The package of claim 1 wherein said product containing portion is a bag formed of gas-impermeable flexible film received in a rigid container, the mouth of said bag constituting said terminal edge and being folded outwardly over the top edge of said container with peripheral pleated areas formed therein, said mouth being

crimped between said peripheral portion of said closure member and said top edge.

4. The package of claim 1 wherein said package containing portion is a dish-shaped container of self-sustaining deformable material provided with an integrally formed radially outwardly directed flange along the top edge thereof constituting said terminal edge with peripheral pleated areas formed therein, said peripheral portion of said closure member being rolled about said flange in sealing engagement therewith.

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