

May 22, 1956

G. A. MOORE

2,746,669

SANITARY HERMETIC SEALING CLOSURES FOR CONTAINERS

Filed Oct. 10, 1952

2 Sheets-Sheet 1

FIG. 2

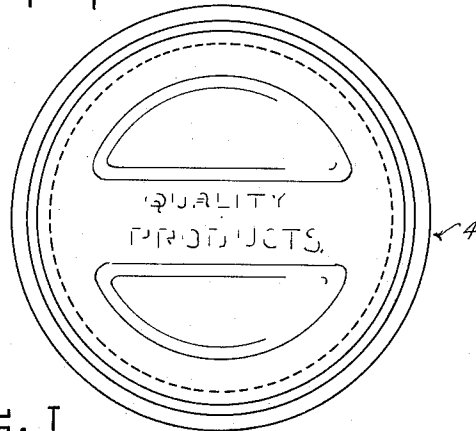


FIG. 1

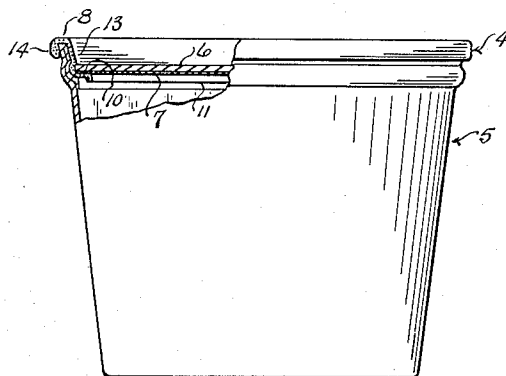
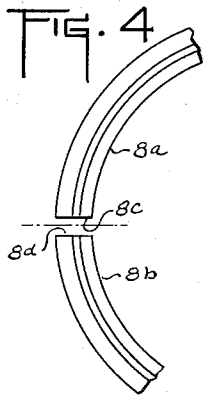


FIG. 6

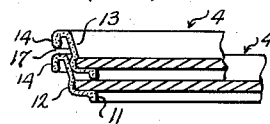


FIG. 3

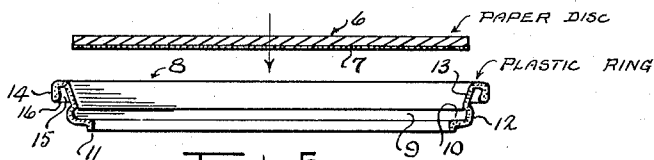


FIG. 5

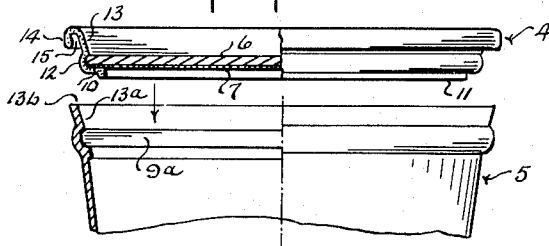


FIG. 7

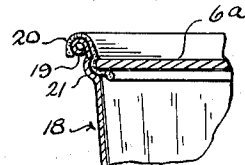
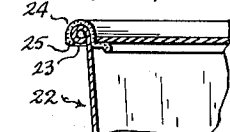


FIG. 8



INVENTOR
GEORGE ARLINGTON MOORE
BY

ATTORNEY

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G. A. MOORE

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FIG. 10

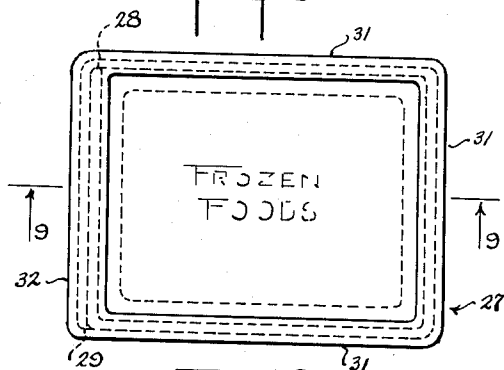


FIG. 9

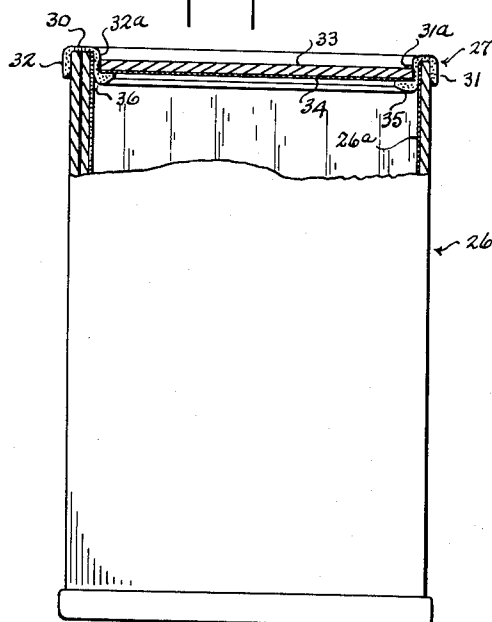


FIG. 11

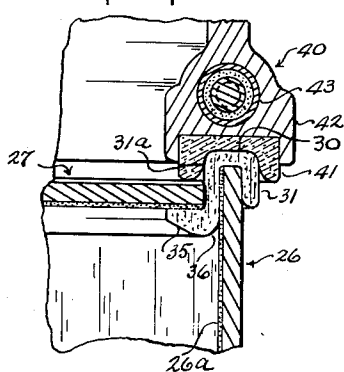
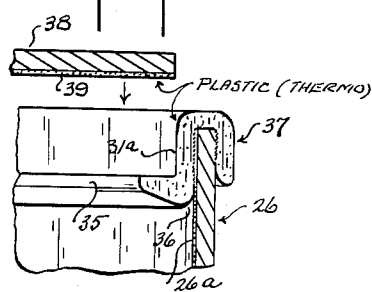


FIG. 12



INVENTOR
GEORGE ARLINGTON MOORE
BY

ATTORNEY

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2,746,669

SANITARY HERMETIC SEALING CLOSURES FOR CONTAINERS

George Arlington Moore, New York, N. Y.

Application October 10, 1952, Serial No. 314,177

1 Claim. (Cl. 229—43)

This invention relates to closures for containers, more particularly sanitary closures for paper containers, the closures being made of composite materials one of which provides a flexible plastic peripheral ring and the other a rigid material adapted to bridge the hole of the plastic ring serving to maintain concentricity thereof and supply the surface for printing decorative color design of brand identification of the product in the container.

While the closures of the instant invention may be made adaptable for use on various types of containers such as round or of rectangular shape, conventional types of conical shaped containers are used as one example to illustrate the said closures. Such conventional paper containers have employed snap-in disc lids with which to close the containers. Such lids are not considered to be sanitary nor are they capable of sealing the containers efficiently thereby limiting the use of such containers. Paper cover-all lids have appeared on the market which are considered more sanitary than the disc type lids, but such paper cover-all lids are cumbersome and do not improve sealing ability of the container over the latter type of lid.

It is an object of this invention to provide containers with an efficient and strictly sanitary self-sealing closure.

It is another object of the instant invention to provide a closure for containers having means with which they may be flexibly and efficiently sealed and yet have rigid bridging strength.

A further object of the present invention is to provide containers with a substantially impervious closure made of composite materials one of which provides for economical printing of brand decoration thereupon.

A still further object of the instant invention is to provide economical closures for containers having a flexible plastic ring collar adapted to engage the peripheral mouth of the container and a fibrous central wall within the collar with which to bridge the said mouth of the container.

Another object of this invention is to provide self-sealing closures for containers that may be engaged therewith by machine, or engaged thereto and disengaged therefrom by hand.

Still another object of the instant invention is to provide a hermetic closure for plastically lined container bodies of round or rectangular shape, the closure having a rigid disc with an extended periphery formed of plastic material adapted to flexibly engage and conform to the plastic lined mouth of the container body and adapted to be heat-sealed thereto.

A further object of this invention is to provide a closure having a transparent disc for display of the contents within the container.

These and other objects will be apparent upon reading the hereinafter descriptive disclosure, read in conjunction with the accompanying illustrated drawings wherein:

Fig. 1 is a front elevation of a paper container with a portion of the side wall broken away showing an adaptation of a part of the closure of the present invention in fragmentary cross-section.

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Fig. 2 is a plan view of the closure.

Fig. 3 is a cross-sectional view of one half the diameter of the component parts of the closure prior to the assembly thereof,

Fig. 4 is a fragmentary plan view of two halves of the closure collar rings, prior to the assembly thereof,

Fig. 5 is a front elevation of the closure and a fragmentary part of the container partly in cross-section and in relative position prior to assembly.

Fig. 6 is a fragmentary view in cross-section of the closures in nesting formation,

Fig. 7 is a fragmentary view in cross-section of a modified form of the closure in the mouth of a container,

Fig. 8 is a fragmentary view in cross-section of still another modification of the closure in the mouth of a container,

Fig. 9 is a front elevation of a rectangular shaped container with a part broken away showing the top closure in cross-section taken on line 9—9 of Fig. 10,

Fig. 10 is a plan view of Fig. 9,

Fig. 11 is an enlarged fragmentary view in cross-section taken on a part of line 9—9 of Fig. 10 and showing an engaging part of a sealing die to the closure, and

Fig. 12 is an enlarged fragmentary view in cross-section taken on line 9—9 of Fig. 10 of the component parts of the closure prior to being assembled.

Referring to Fig. 1 of the drawings, the closure 4 is engaged with the container 5. A fibrous board disc 6 of the closure (Fig. 3) being of stiff material provides a bridge over the mouth area of the container (Fig. 2). The disc 6 may be printed economically with color decoration and is preferably coated with a plastic film 7 on the interior bridging surface thereof. A cushion-like plastic ring 8, preferably of polyethylene (Fig. 3) provides a groove 9 and a shoulder 10 having a drop rib reinforcement 11 for the reception of the disc 6, the plastic film 7 engaging the shoulder 10 which provides a seating ledge for plastic to plastic face engagement therewith. The closures may be assembled by the container manufacturer. The disc 6 is inserted into the groove 9 of the plastic ring and adhesively affixed to the shoulder 10. The groove 9 forms an outer peripheral flexible bead 12 adapted to engage the conventional groove 9a (Fig. 5) of the containers. An outwardly flared lip 13 extends upwardly from the groove 9 of the closure and further extends outwardly and downwardly to form a U-shaped flange 14 which provides a recess 15, the said recess being adapted to bite the flared lip 13a of the container 5 when the closure is engaged therewith. The outer wall of flange 20 is joined to the inner wall of said flange by a curved surface 16 which extends into said inner wall to facilitate the easy engagement of the closure to the container.

The plastic ring 8 may be formed in any suitable manner as by conventional methods. With conventional covers molded of plastic material, especially polyethylene, the molding operation is relatively complicated due to the plastic bridging web required to span the area of the structure for support and strength. The thinness of plastic web thickness is limited for molding and therefore requires an expensive amount of plastic material with which to mold the covers as well as retarding productive capacity. The printing of such plastically molded covers is complicated and costly to such degree that for practical large volume production, they are prohibitive in costs.

In accordance with my invention the plastic rings 8 may be molded without such complication inasmuch as the plastic bridging web is eliminated. This feature in the construction of the closure saves a substantial quantity of plastic material per cover and provides for more

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rapid productive capacity in molding the said plastic rings. The rings may be molded in halves (Fig. 4). Gang molds may be filled more rapidly with the plastic material and when cast, two of the said gang molds may be assembled together in such manner that the half rings 8a and 8b (Fig. 4) are welded together at the abutment ends thereof 8c and 8d. Polyethylene is thermoplastic therefore by application of suitable heat, the ends of the half rings may be easily fused together before being removed from the gang molding dies.

The completed closure 4 (Fig. 5) is rigid enough to remain stable and concentric for handling. The substantially rigid disc is coated or otherwise treated and printed from rolls of sheet material prior to being cut or blanked and prior to the assembly thereof in the plastic rings 8. The assembled closures (Fig. 6) will nest each with the other efficiently to facilitate feeding them from a machine magazine to containers. The reinforcing drop flange 11 of the shoulder 10 serves to space the closures apart to provide a gap 17 between the nested outer flanges 14 which is necessary for magazine control in the dispensing of the closures for application to filled containers. The arrangement of nesting the closures thus avoids nesting friction, a necessary feature for efficient handling of the covers in packer plants.

The assembled closure 4 is adapted to be inserted into the open mouth of container 5 as illustrated in Fig. 5, the annular resilient plastic ring 8 being provided with a wall surface contour shape coincident with the side wall surface contour provided in the open mouth of the container. Upon insertion of the closure into the open mouth of container 5, plastic bead portion 12 of the closure resiliently fits into groove 9a provided in the side wall of the container. The rigid disc 6 of the closure assembly provides a lateral wall closure over the mouth of the container and the corner edge periphery of the disc compressibly engages plastic bead 12 into its engagement with groove 12. Wall portions 13 and 14 of plastic ring 8 of the closure assembly 4 flexibly encloses the inner and top surfaces of the side wall of the container which extends upwardly of the lateral wall portion 6 of the closure. The resilient cushion-like effects of plastic ring 8 in contact with the inner surface portions of the mouth wall of the container and, being augmented by rigid disc 6, seals the container tightly and in a sanitary manner.

Polyethylene plastic material is non-toxic, substantially efficient in moisture-vapor proofing quality, and is substantially impervious to acids, greases, fats and oils. Such plastic material is costly therefore, the closure of my invention minimizes the quantity of plastic material required and substitutes a fibrous substantially rigid material to replace a substantial portion of plastic material and thus provide rigidity to the closure. The rigid material serves means to support eye appeal decoration (printing) to be disposed on the closures in a practical and economical manner.

The closure of the instant invention may be modified in the shape of the ring for adaptation to containers having rolled rims around the mouth of the container (Figs. 7 and 8). The container 18 (Fig. 7) having a rolled rim 19 is provided with the closure having a curved shaped flange 20 which is slightly undershot below the center of the roll 19. The flexibility of the plastic periphery of the closure facilitates the effect of a secondary lock to the rolled rim, cooperating with the closure primary locking means provided by the flexible bead 21 engaging the groove in the wall of the container.

The closure may be made transparent by providing a disc 6a of acetate, etho-cel or other suitable transparent material. The disc 6a may be secured in the plastic ring in much the same manner as hereinbefore described for the closure 4.

The closure may be further modified to accommodate containers having a smooth inner wall mouth and a rolled rim (Fig. 8). The container 22 provides a curled rim 23

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to which a curved flange 24 of the plastic ring of the closure fits in flexible clamping relationship. The flange 24 extends outwardly and downwardly to constitute an annular groove terminating with an outer wall end portion 25 which expands over the rolled rim 23 when engaging the container and when the closure is seated into the mouth of the container, the said outer wall portion contracts inwardly below the center of the rolled rim 23 whereby, clamping action, retains the cover in secure position.

The conventional containers hereinbefore referred to are somewhat limited in the field of distribution of food-stuffs and other commodities. Such containers employ paraffin wax for treating the paper body and lids thereof. The disc lids have rigid porous flat edges in engagement with a curved shaped groove in the mouth of the container of substantially rigid wall material. The closures of my invention invites the extended use of plastic coatings on the interior walls of the containers to render them substantially impervious to more efficiently protect commodity products during the distribution thereof to the consumer. The said closures have the flexibility and resiliency necessary to provide efficiency in the impervious sealing thereof to the said containers. Such portable closure adaptations to containers should produce an increase in such efficiency as to afford means with which to expand their markets in the commodity field of packaging.

The closures of the instant invention may be made in rectangular shape and adapted to form hermetic closures (top and bottom) to rectangular shaped container bodies (Figs. 9 and 10). The container 26 consists of a rectangular shaped body formed of a blank of fibrous sheet material coated with polyethylene film 26a or other suitable thermoplastic film that is compatible with the inner thermoplastic collar of the closure 27. The blank is folded to form four side walls one of which is overlapped to provide a flush wall body seam, the said seam being thermoplastically united. The edge 28 (Fig. 10) of the inner overlapping side wall is disposed in edge to face abutment in sealed relationship with an adjacent side wall. The outer edge 29 is preferably extended to be flush with an adjacent opposite side wall. The interior and exterior walls and edges at the mouth of the container body at each end is thereby rendered uniform except that one side wall is of double thickness. The interior of the body is void of any exposed wicking edge of material.

The plastic collar frame 30 of the closure 27 is molded in shape to conform to the side wall single and double thicknesses of the container body. The walls 31 and 31a of the U-shaped flange clamps three marginal sides of single thickness, and the walls 32 and 32a clamps a like margin of the remaining wall of double thickness. The space between the U-shaped flanges 31 and 32 is provided with a minus tolerance sufficient to insure a tight engagement over the inner and outer marginal areas of the side walls. The flexibility of the plastic rim of the closure provides efficient means with which to plant the closure with a friction clamping action on the side walls of the container. The disc 33 is provided with a thermoplastic film 34 to face the interior of the container. The said disc is secured to a reinforced plastic shoulder 35 having a substantial radius 36 with which to facilitate the planting of the closure into the mouth of the container body. The plastic film 34 on the disc 33 is adhesively affixed to the plastic shoulder 35. The peripheral edges of the disc clamps the inner wall 31a and 32a of the U-shaped flange 31 and 32 to the inner plastic face 26a of the side walls of the container in plastic to plastic face engagement. No edges of moisture wicking material are disposed within the interior of the container after closing.

The bodies of the containers may be formed on conventional carton folding machines, for example the "Crusader Royal" folding machine. The body seam may be formed by pre-heating the plastic film of the overlapping side wall to activating temperature just prior

to the folding and pressing thereof to the engaging wall. The folded bodies may in this manner of forming, be shipped to packer plants in flatly collapsed shape. The folded bodies are opened and placed over a suitable expandable form to shape the container body to receive the bottom closure. The container is then withdrawn from the contracting form and brought into position for filling after which, the top closure is applied with which to seal the container.

An alternative method for application of the closures to the container bodies is illustrated in Fig. 12. When shipping costs of empty containers does not require consideration; the container bodies 26 may receive application of the molded plastic frame 37 to constitute a saddle on the rim of the container by the container manufacturer and be thermally united to the container body walls before shipping. The plastically attached saddle 37 may then be pre-heated to suitable plastic activating temperature for the reception of the plastic film coating 39 on the disc 38 which is then inserted therein to close and thermally seal the container. The bottom closure disc is first applied followed by the top closure disc after filling the container. This alternative method above described simplifies the closing of the containers in packer plants.

The plastic frame of the assembled closure 27 (Fig. 11) may be thermally sealed to the walls of the container by contacting the plastic surfaces 30, 31, 31a, 32 and 32a of the frame with a heating die 40 which consists of a non-fouling "Teflon" shoe 41 supported by a housing 42 equipped with electrical heating cartridges or calrods 43.

The pre-heating of the plastic, if preferred, may be accomplished efficiently with a gas flame timing contact with the exterior surfaces of the plastic with which to elevate the desired temperature of the plastic to activating heat in rapid sequence of operation.

The closures and their simplified application to containers as hereinbefore described constitutes utility improvement in containers, especially those made of paper with plastic interior walls that will provide packers of certain food-stuffs and other commodities with more efficient and economical containers than those employed, made of tin and glass.

The flexible heat-sealable plastic material constituting the major element of the closures of the instant invention, solves an heretofore substantially unsolved problem in dealing with closures for paper containers, such containers cannot be any more efficient than their closures. The flexible resiliency of the closures hereinbefore described are adapted to fit and conform to

the mouth of containers in gasket sealing and hermetic sealing relationship.

The principle of the closures of this invention provides a solution for the problem of sealing corners in rectangular shape container bodies, and also solves the compensating problem to deal with shrinking and expanding dimensional variations in mouth wall areas characteristic of paper containers.

In view of the teaching of this invention in the use of plastic and paper combinations of materials in forming the closures of the instant invention by way of the examples of application of closures to certain types of containers given herein, it is to be understood that the said teaching is not limited to the details of the description or the physical details illustrated in the drawings, reliance being had upon the interpretation of the appended claim.

I claim:

A portable resilient closure formed of an assembly of two dissimilar materials, which materials are shaped to form said closure to be coincident with the open mouth wall surface structure of a paper container to be closed and resiliently sealed by engagement with said closure, said resilient closure comprising a pre-formed flexible plastic ring having an inwardly extending lateral marginal wall portion and an upwardly and outwardly sloping wall portion which terminates in an inverted U-shape contour, the lower portion of said sloping wall portion adjacent said inwardly extending portion being formed into an outwardly extended bead and a corresponding inwardly facing groove, said plastic ring being provided with an assembled substantially rigid disc of paper board material, said disc being treated to render same moisture or grease resistant, said disc being disposed in said groove and forming the bottom portion of the closure, said closure being adapted to be inserted into the open mouth of said container with the flexible plastic ring in sealing but non-adhering engagement with the walls thereof.

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