

May 13, 1958

P. B. REUMAN  
PACKAGE

2,834,686

Filed Oct. 12, 1954

2 Sheets-Sheet 1

FIG. 1

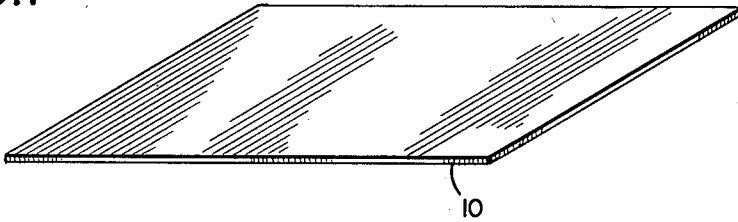


FIG. 2

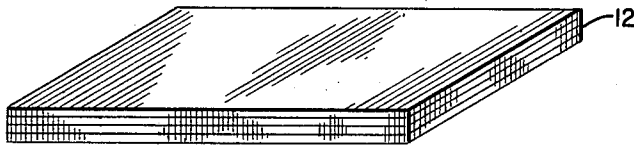


FIG. 3

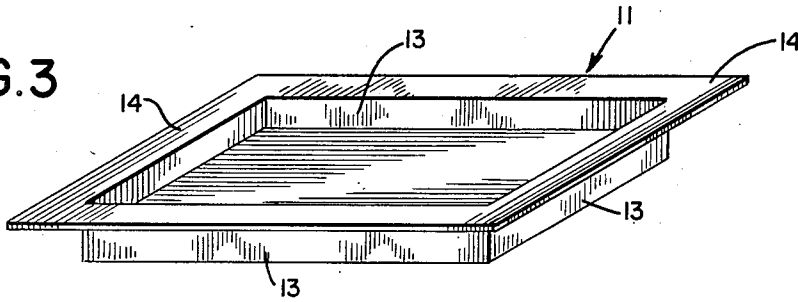
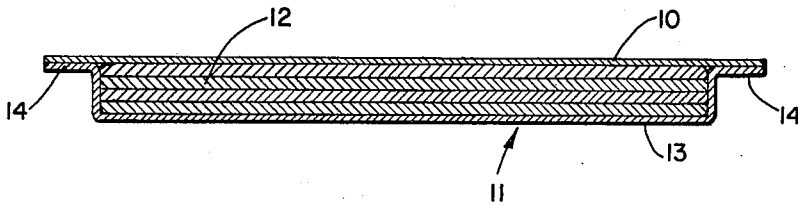


FIG. 4



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FIG. 5

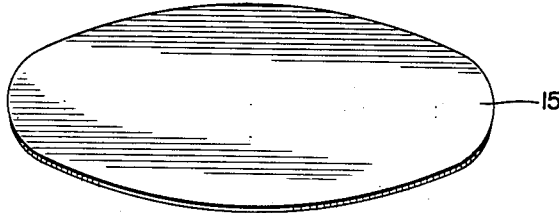


FIG. 6

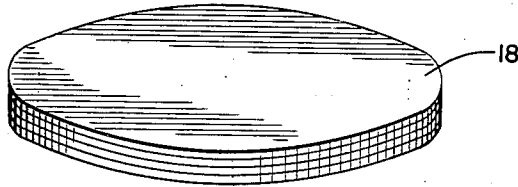


FIG. 7

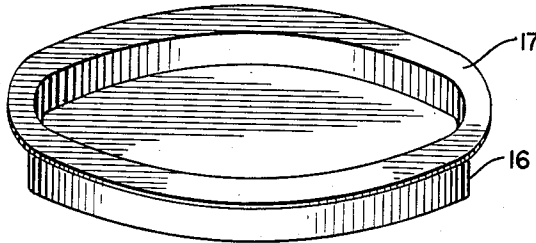


FIG. 8

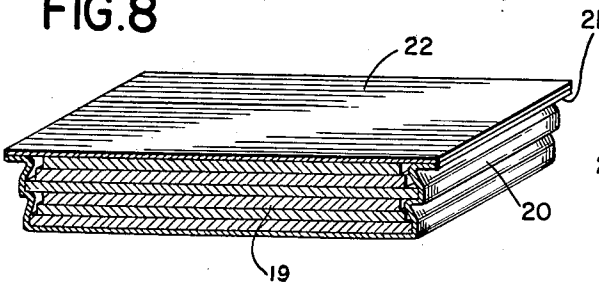


FIG. 9

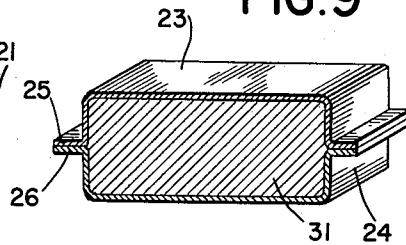


FIG. 10

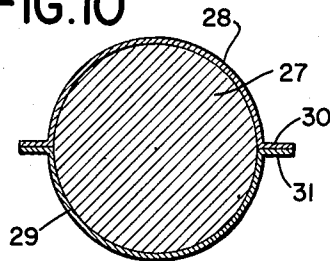
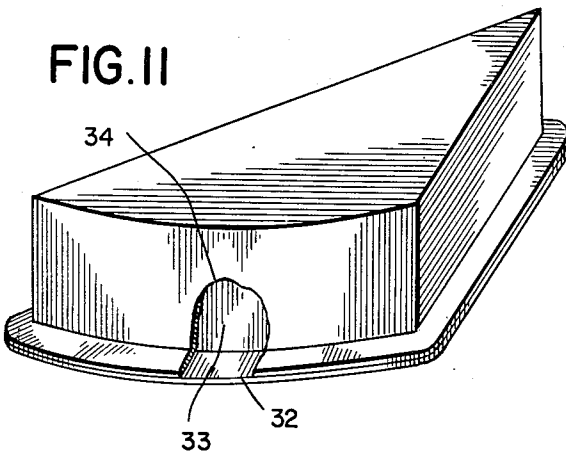


FIG. 11



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## PACKAGE

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7 Claims. (Cl. 99—171)

The present invention relates to the packaging of food products, pharmaceuticals, hardware objects and the like, and more particularly to improvements in evacuated or gas-filled containers which conform substantially to the contours of the article encased therein and which involve a minimal use of packaging material.

In order to preserve foodstuffs in a fresh, sanitary condition and at the same time to enhance the attractiveness and saleability of the product, it is the modern practice to encase the food in a transparent and sealed container made of such flexible materials as Pliofilm or cellophane laminates. Protection and preservation of the contents is effected by total evacuation of the container or by filling the container with an inert or protective gas. In either event, it is essential that the container be made of relatively impermeable material and that the seams thereof be gas-tight. It is known, for example, to form a package of luncheon meats or of sliced cheese by inserting the food stack in a transparent bag having an open mouth, and thereafter evacuating and heat-sealing the mouth portion of the bag to complete the desired package. The transparent bag is conventionally fabricated of synthetic films, such as combinations of cellophane and polyethylene, Saran or Pliofilm.

When sliced meats and cheeses are sold in relatively small, individual packages of flexible material, it may be important from the standpoint of effective display and saleability that the package occupy a substantially horizontal plane so as to provide an attractive, orderly display, to permit ready inspection of the package contents and also to make it possible for a prospective purchaser to read descriptive matter imprinted thereon or on a paper or cardboard slip interposed between the top layer and the food contents. However, the nature of the flexible container heretofore employed for this purpose was such that subsequent to evacuation and heat-sealing, the excess peripheral packing material became distorted in shape. As a consequence, the appearance of the package was adversely affected, and it became difficult if not impossible to maintain orderly, neat displays and to read identifying or advertising matter printed in such peripheral areas.

A further drawback in packages heretofore employed for sliced meats and cheeses is the waste of packaging material, the material involved in the package being substantially in excess of the over-all external area of the food mass encased therein. In one known package for this purpose, a bag for enclosing the food is provided both with a sealed bottom extension and an open-mouth extension. In packaging, the food product is inserted by an operator through the mouth of the bag which is thereafter evacuated and heat-sealed. In order to facilitate the insertion of the food into the bag, as well as to permit heat-sealing of the mouth without affecting the contents of the packages, the bag dimensions are made relatively large with respect to the food mass inserted therein. As a result, the evacuated and sealed bag has a crinkled, unsightly appearance; and while the package may serve to

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preserve the food in a sanitary condition, the wasteful use of packaging material renders it expensive to produce and its unattractive appearance constitutes a merchandising disadvantage.

Where, on the other hand, with a view to reducing the amount of material involved, attempts were made to conform the package wrapper to the contours of the article encased therein, such as by shrinking techniques, it has been found that the evacuated condition of the package is difficult to maintain for more than a relatively brief period; and the printed matter is distorted due to differential effects arising in shrinking.

Accordingly, it is the principal object of the present invention to provide an improved gas-filled or evacuated container which obviates the above-described drawbacks and which maintains a gas-filled or evacuated state for a prolonged period.

More particularly, it is an object of the invention to provide a container constituted by two opposed films or sheets of material, which container conforms substantially to the external contours of the article encased therein, thereby minimizing the use of packaging material.

Still another object of the invention is to provide a container formed by two opposed films of material, wherein at least one of said films is moulded to conform to the shape of the article to be packaged and to define an outwardly-extending, continuous, planar flange, the other of said films being marginally adhere to said flange to form a gas-tight seal therewith.

It is also an object of the invention to provide a package constituted by a film which is pre-moulded to form a trough for accommodating the article to be packaged and having an outwardly-extending planar flange surrounding the open end thereof, and a second and transparent planar top panel whose edges are heat-sealed to said flange to enclose said trough.

Yet another object of the invention is to provide a package for disced, spherical, rectangular or odd-shaped articles, said package being constituted by a pair of complementary films or membranes each of which is moulded to conform to one-half of the article and is provided with a continuous planar flange, the flanges of said films being adhered together to form an equatorial seal.

It is a still further object of the invention to provide a package for an article having flat top and bottom surfaces and irregular sides, said package being constituted by a first membrane moulded to form a trough for said article which conforms substantially to the sides thereof, said trough having a continuous planar flange surrounding the open end thereof, and a second flat membrane marginally-sealed to the flange on said first membrane.

It is also an object of the invention to provide packages of the above-described type presenting an attractive, compact appearance and which may be quickly and inexpensively manufactured.

For a better understanding of the invention as well as other objects and further features thereof, reference is had to the following description to be read in conjunction with the attached drawing, wherein:

Fig. 1 is a perspective view of the top film of a rectangular package in accordance with the invention.

Fig. 2 is a perspective view of the food article to be encased in said package.

Fig. 3 is a perspective view of the pre-moulded bottom film of said package.

Fig. 4 is a section taken longitudinally through said package.

Fig. 5 is a perspective view of the top film of a cylindrical package in accordance with the invention.

Fig. 6 is a perspective view of the article to be encased in said cylindrical package.

Fig. 7 is a perspective view of the bottom film of said cylindrical package.

Fig. 8 is a perspective view, partly in section, of an irregularly-shaped package in accordance with the invention.

Fig. 9 is a perspective view, partly in section, of a second embodiment of a rectangular package in accordance with the invention.

Fig. 10 is a sectional view of a spherical package in accordance with the invention.

Fig. 11 is a perspective view of a wedge-shaped package in accordance with the invention, the top film being partly cut away to expose the contents.

Referring now to the drawing and more particularly to Figs. 1 to 4, a package, in accordance with the invention comprises a top sheet 10, a bottom sheet 11 and an article 12 enclosed between said sheets. Article 12 may take the form of a stack of sliced luncheon meats or a slab of cheese having a rectangular configuration, although it is to be understood that the invention is not limited to such foodstuffs or to articles of rectangular shape.

Bottom sheet 11 is pre-moulded or indented by vacuum moulding or other known techniques to define a rectangular trough 13 adapted to nest article 12. The trough 13 is provided with an outwardly-extending, uniformly-flat or planar flange 14 surrounding the open end thereof, whereby the flange assumes the form of a rectangular frame. Sheet 11 is fabricated of a film material permitting a relatively high degree of permanent deformation, the film being flexible and relatively gas-impermeable. Films capable of being drawn are known in the metallurgical and plastic arts and can be formed to receive the product, while at the same time providing a continuous edge or flange in a single plane adapted to heat-sealability without wrinkle formation. The absence of wrinkles in the flange is an important feature of the invention, for otherwise an effective gas-tight seal cannot be maintained.

A thermoplastic material preferred for this purpose is that known as "Mylar," a highly transparent polyester film made from polyethylene terephthalate—the polymer formed by the condensation reaction between ethylene glycol and terephthalic acid. "Mylar" films have excellent mechanical properties, the tensile strength at "break" being two to three times that of cellophane and having a far greater resistance to flexing failure. "Mylar" is useful at temperatures of 150 to 175° C. and is resistant to all solvents with the exception of phenols and cresols. "Mylar" in combination with polyethylene provides strength, low moisture and gas transmission rates, and facilitates and insures thermal sealability. Other forms of heat-softenable plastics suitable for this purpose are acetate, polyethylene, Pliofilm, Saran, vinyl and vinyl copolymers or combinations of these materials.

One known plastics-processing technique for pre-moulding the thermoplastic bottom sheet is by vacuum-forming wherein male or female moulds are produced from a full-scale model of the desired end product. These are placed on the platen of the machine. The plastic sheet is clamped about its edges above the female mould; it is softened by the application of heat and sucked into the mould when a vacuum is created. In the case of male moulds, the sheet after being heat-softened is draped over the moulds and assumes the form thereof as the vacuum is created. After rapid cooling, the formed sheet is separated from the moulds, the clamped edges providing the desired planar flanges. The gauge of the sheet must be such that when drawn into the desired shape, the resultant wall has sufficient thickness to withstand handling stresses entailed in packaged goods. It will be noted that the planar flange characterizing the packages affords a wrinkle-free, heat-sealing surface which makes possible a gas-tight seam for evacuation or gas-filling of the package.

The top sheet 10 has dimensions corresponding to that of flange 14. After article 12 is inserted in trough 13, the corresponding margins of top sheet 10 are heat-sealed to at least three sides of flange 14 so that an opening remains to permit evacuation or gas-filling of the package. Heat-sealing may be effected, for example, by dielectric heating techniques, heated bars or "impulse" sealing. Subsequent to evacuation or gas-filling, the remaining portion of the margin and of flange 14 is heat-sealed. Alternatively, the heat-sealing of all edges may be carried out in a vacuum chamber containing heat-sealing bars which are impressed on the flanges after the chamber has been evacuated or after the air therein has been replaced with an inert gas. As a result of ambient air-pressure, top sheet 10 is caused to press down on article 12 to present a uniformly-smooth surface in the horizontal plane. The top sheet may have identifying matter printed thereon, which matter may be read without difficulty on the finished package. In addition, the bottom wall of trough 13 may also carry printed material.

Top sheet 10 may be constituted by a flexible sheet of cellophane laminate or similar material which is not readily deformed, or by the same material as that of the bottom sheet 11. A top panel may also be formed by a rigid cardboard having a film lamination which is adhered to flange 14.

Referring now to Figs. 5 to 7, there is shown a package construction similar to that in Figs. 1 to 4, save that the package has a cylindrical form. The package comprises a disc-shaped top panel 15, and a bottom sheet pre-moulded to form a trough 16 having a planar outwardly extending flange 17 surrounding the open end thereof.

Received with the trough is a cylindrical stack of food 18 which may be a sliced sausage meat. The shape of the trough 16 conforms to that of the meat stack to provide a compact package. The circular edge of panel 15 is heat-sealed to flange 17 to provide a gas-tight package. The materials used in the package may correspond to those described in connection with Figs. 1 to 4. To facilitate the opening of the package, the heat-sealing operation may be accompanied by pressure scoring of the sealed surfaces to permit easy tearing thereof along the upper rim of the trough 16.

In the package shown in Fig. 8, the article 19 to be packed has a configuration wherein the sides thereof are irregular, while the top and bottom surfaces are flat and substantially parallel to each other. For example, a stack formed by slices of natural Swiss cheese will assume this form. To package this article, the bottom sheet 20 is moulded as a trough conforming substantially to the irregular contour of the article and to provide a planar flange 21 surrounding the open end thereof. This may be accomplished by using the article as a male mould and draping the sheet material thereabout, the edges of the sheet being firmly clamped to form the desired flange. The package is completed by a flat top panel 22 whose edges are heat-sealed to flange 21. As in the case of the previously disclosed packages, the material is gas-impermeable and flexible.

In the embodiment shown in Fig. 9, the article 31 to be packaged has a rectangular or cubic configuration, while the opposed films forming the package are constituted by a complementary pair of sheets 23 and 24, each moulded to encase one-half of the article and having planar flanges 25 and 26, respectively. Thus, after heat-sealing of the flanges, an equatorial seam is formed about the package. The sheets may be pre-moulded or moulded by draping or shrinkage on the article to be encased.

The package shown in Fig. 10 is similar in construction to that in Fig. 9, save that the article 27 is spherical in shape and the opposed sheets 28 and 29 are constituted by hemispheres having flanges 30 and 31, respectively, to form an equatorial seam.

It is to be understood that the invention is applicable

also to articles having an irregular or odd shape and in a variety of sizes, as for example wedge-shaped cheeses, hardware objects such as be rings, dies, tools, etc. In the case of metallic objects, the package is preferably in the form of a rust-inhibiting gas envelope. Where the article to be encased is endowed with an odd or irregular shape, the packaging techniques preferably are as follows:

Let us assume that the article to be packaged is a cheese wedge. The bottom film is drawn either by vacuum, mechanical, or air-pressure means to form a wedge-shaped receptacle approximating the cheese to be placed therein. The cheese wedge is then nested in the receptacle so formed. Alternatively, the cheese in a molten state may be poured into the receptacle. The receptacle is, of course, provided with a planar flange surrounding the open end thereof, as described hereinabove in connection with the other embodiments of the invention. The second film is then superimposed over the receptacle. The evacuation or gas-filling of this receptacle and the subsequent sealing thereof may be carried out in the manner described herein with respect to Figs. 1 to 4.

Another preferred technique of particular value in the packaging of cheese involves the use of carrier web on which the cheese wedge is first placed. As shown in Fig. 11, the web 32 is formed of gas-impervious material, either rigid or flexible and having a heat-sealable surface which may be constituted by a lamination. The web rests on a foraminated-formed table of the type well known in the vacuum-forming art and adapted to draw a vacuum through the pores in the table. Over the cheese wedge 33 is placed a film 34 of drawable material, such as a lamination of polyethylene and polyester, the film being supported in a suitable frame. Heating apparatus, such as a bank of infra-red lamps, is disposed above the film to heat same to a drawing and draping point. At this point, the frame is lowered to cause the heated film to drape about the cheese wedge. As the frame is lowered, a vacuum is applied to the space surrounding the cheese wedge and the film upon which it rests—whereby the film is drawn downwardly to conform to the contours of the cheese wedge, while at the same time the thermoplastic edge surface of the film engages the corresponding edge surface of the web to form a planar flange hermetically sealed at less than atmospheric pressure to constitute an evacuated envelope. It is to be noted that the heated film acts to draw to the surface of the cheese wedge the natural oils contained therein, whereby an oil sheath is formed on the wedge and mould growth is inhibited thereby.

While there has been shown what are at present considered to be preferred embodiments of the invention, it is obvious that many changes and modifications be made therein without departing from the essential spirit of the invention. It is intended, therefore, in the appended claims to cover all such changes and modifications as fall within the spirit of the invention.

I claim:

1. A sealed package for an article having a predetermined configuration comprising a first sheet moulded on the article to form a trough for nesting at least a portion of the article to be packed, said trough conforming substantially to the contours of said nested portion of said article and having a continuous outwardly-extending planar wrinkle-free flange surrounding the open end thereof, and a second sheet enclosing said article in said trough and having its margins secured to said flange to form a gas-tight seam, at least the first sheet being constituted by a polyester film made from polyethylene terephthalate.

2. A package as set forth in claim 1 wherein said polyester film is provided with a polyethylene laminate.

3. A sealed package for an article in the form of a solid food stack having a generally rectangular configura-

tion comprising a first sheet moulded on the article to form a conforming rectangular trough for nesting said article and having a continuous outwardly-extending planar wrinkle-free flange surrounding the open end thereof, and a second rectangular sheet having dimensions corresponding to said flange, said second sheet enclosing said article in said trough and having its margin secured to said flange to form a gas-tight seam, said first and second sheets being constituted by a polyester film made from polyethylene terephthalate.

4. A package for an article having a generally cylindrical configuration, comprising a first thermoplastic sheet constituted by a permanently-deformable, gas-impermeable material moulded on the article to form a cylindrical trough for nesting said article and having a circular, outwardly-extending planar wrinkle-free flange surrounding the open end thereof, and a second disc-shaped sheet enclosing said article in said trough and having its margins heat-sealed to said flange to form a gas-tight seam, said first sheet being constituted by polyethylene terephthalate.

5. A sealed package for an article having a generally cylindrical configuration, comprising a first thermoplastic sheet constituted by a permanently-deformable, gas-impermeable material moulded on the article to form a cylindrical trough for nesting said article and having a circular, outwardly-extending planar wrinkle-free flange surrounding the open end thereof, and a second disc-shaped sheet enclosing said article in said trough and having its margins heat-sealed to said flange to form a gas-tight seam, said first sheet being constituted by a polyester film made from polyethylene terephthalate, said second sheet being constituted by cellophane, said sheets having bonded thereto a heat-sealable laminate.

6. A sealed package for an article having flat parallel top and bottom surfaces and irregular side surfaces, comprising a first thermoplastic sheet constituted by a permanently-deformable, gas-impermeable material moulded on the article to form a trough conforming substantially to the shape of said article and having a continuous outwardly-extending planar wrinkle-free flange surrounding the open end thereof, and a second sheet enclosing said article in said trough and sealed at its edges to said flange to form a gas-tight seam, said first sheet being constituted by polyethylene terephthalate.

7. A sealed package for an article having flat parallel top and bottom surfaces and irregular side surfaces, comprising a first thermoplastic sheet material moulded on the article to form a trough conforming substantially to the shape of said article and having a continuous outwardly-extending planar wrinkle-free flange surrounding the open end thereof, and a second thermoplastic sheet enclosing said article in said trough and sealed at its edges to said flange to form a gas-tight seam, said sheets being formed of a polyester film made from polyethylene terephthalate and a heat-sealable laminate.

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