

Aug. 21, 1945.

C. E. GARDNER

2,382,987

PACKAGING

Original Filed July 27, 1939 2 Sheets-Sheet 1

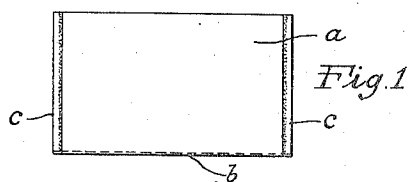


Fig. 1

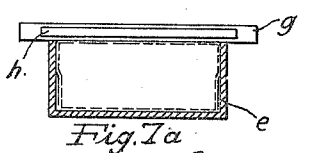


Fig. 7a

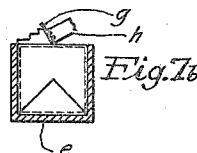


Fig. 7b

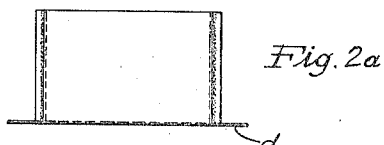


Fig. 2a

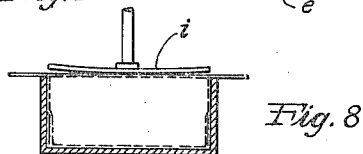


Fig. 8

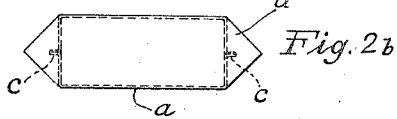


Fig. 2b

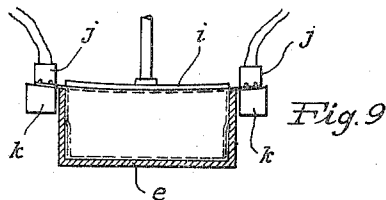


Fig. 9

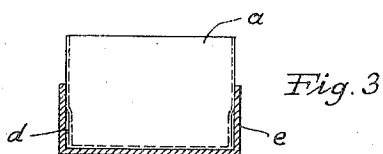


Fig. 3

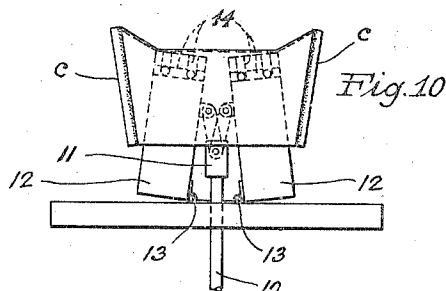


Fig. 10

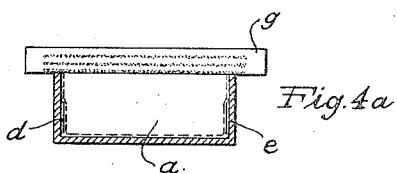


Fig. 4a

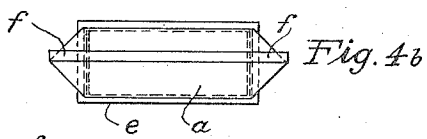


Fig. 4b

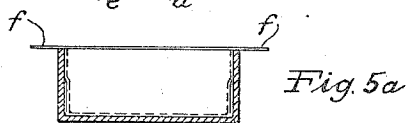


Fig. 5a

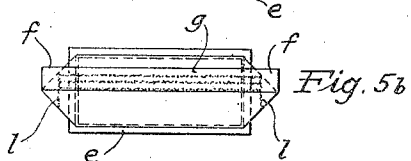


Fig. 5b

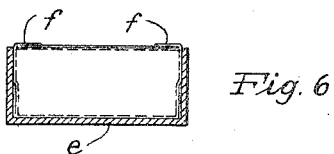


Fig. 6

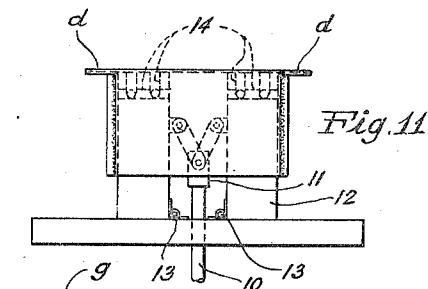


Fig. 11

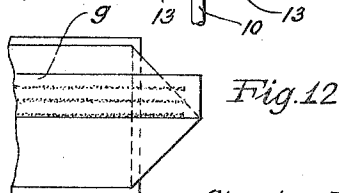


Fig. 12

Inventor  
Charles E. Gardner

By

*[Signature]*

Attorney

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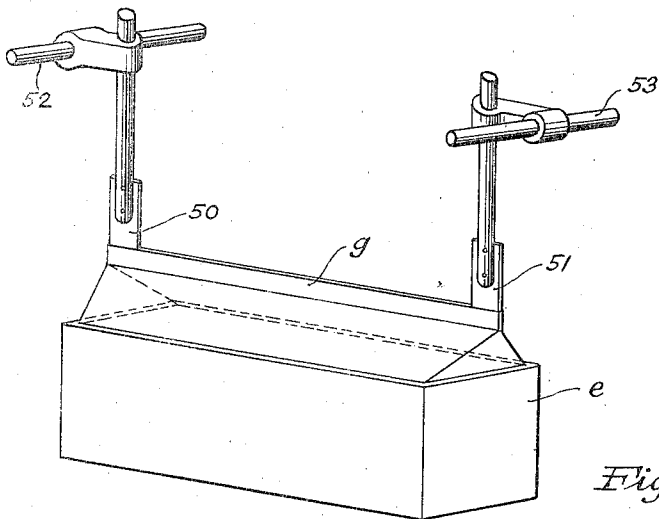


Fig. 13

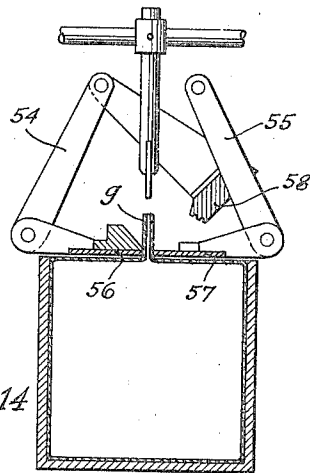


Fig. 14

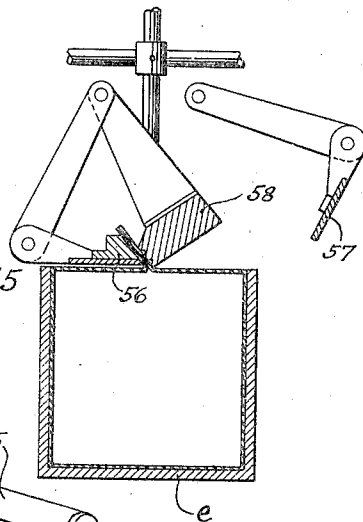


Fig. 15

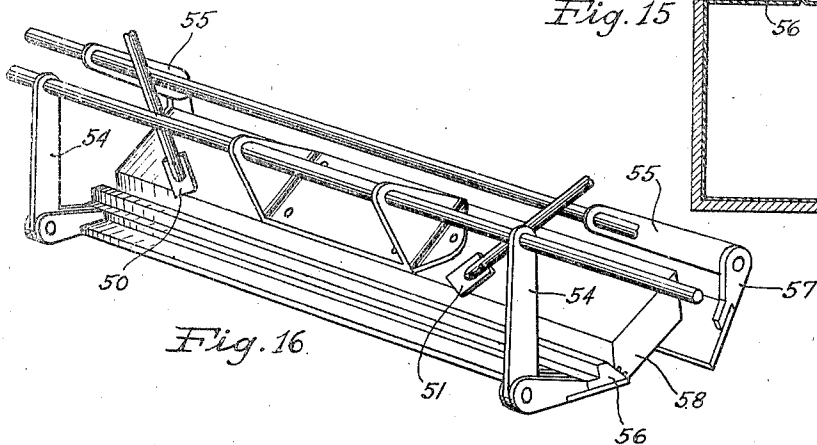


Fig. 16

Inventor  
Charles E. Gardner

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*W. H. Mott*

Attorney

## UNITED STATES PATENT OFFICE

2,382,987

## PACKAGING

Charles E. Gardner, Cuyahoga Falls, Ohio, assignor to Wingfoot Corporation, Wilmington, Del., a corporation of Delaware

Original application July 27, 1939, Serial No. 286,800. Divided and this application April 8, 1942, Serial No. 438,073

## 6 Claims. (Cl. 93—3)

This invention relates to packaging. It comprises the method and apparatus for carrying out the same.

According to this invention a bag is blocked on a mandrel, and the bag is fitted into a box or carton and then filled. The bag may be filled with process cheese or other material which is run into the bag. The bag is of the flat envelop type and may be formed of any suitable material but is preferably a material which is closed by heat and pressure. It may be made of paper or Cellophane or the like coated on the interior with a heat-sealable material, such as rubber hydrochloride or a composition of rubber and wax, such as the material marketed as "Parafilm" by the Marathon Paper Company. The preferred material is a film of rubber hydrochloride, such as the Pliofilm marketed by The Goodyear Tire & Rubber Company.

In forming the package the hot process cheese or other material to be packaged is run into the bag. The opposite sides of the mouth of the bag are brought together and partially sealed. After removal of entrapped air from the bag, the seal is completed. Although the invention will be described more particularly in connection with the packaging of process cheese, it is also applicable to the packaging of lard, margarine, peanut butter and foods which are to be frozen, etc.

The invention will be more particularly described in connection with the packaging of cheese in an envelop of rubber hydrochloride film. For the packaging of cheese, a rubber hydrochloride film containing neither plasticizer nor inhibitor, such as hexamethylene tetramine (see U. S. #1,989,632) may be employed. A small amount of plasticizer, such as butyl stearate may be desirable. In packaging other materials plasticizer and inhibitor may be used where they do not affect the taste or other properties of the material being packaged.

The invention is further described in connection with the accompanying drawings in which:

Fig. 1 represents the flat envelop from which the package is formed;

Figs. 2a and 2b are an elevation and bottom view of the blocked envelop;

Fig. 3 shows the envelop in a box;

Figs. 4a and 4b are an elevation and top view of the package with the top of the envelop partially sealed;

Figs. 5a and 5b show an elevation and top view of the package after the sealing has been completed;

Fig. 6 illustrates the completed package ready for closing;

Figs. 7a and 7b show more or less diagrammatically apparatus for partially sealing the envelop;

Fig. 8 shows apparatus which may be employed for removing the air before completing the sealing;

Fig. 9 shows apparatus for completing the sealing;

Figs. 10 and 11 are views of apparatus for blocking the envelop;

Fig. 12 is an enlarged detail of the envelop but partially sealed to permit the escape of air; and

Figs. 13-16 show apparatus used in sealing.

Fig. 1 shows the envelop *a* which may be formed from non-tacky unplasticized unstabilized rubber hydrochloride film having a chlorine content of about 30%. This film is highly flexible and may be creased without decreasing its waterproofness. It may be formed according to Calvert #2,139,647.

The envelop is formed by doubling a flat sheet of the film. The crease formed by doubling is shown at *b*. After doubling, the side edges are united as at *c*. This union is advantageously effected by heat with pressure. A temperature of around 300° F. is satisfactory. Several narrow seals, for example three such parallel seals, give an airtight seam. Figs. 4a and 12 show three such seams.

The bag may be made in any other suitable form. It may be formed of two sheets sealed together. It may have a square bottom. Plicated sides may be used.

This envelop is blocked to form a cube or other right-angled hexahedral package. The bottom of the envelop is advantageously blocked on apparatus, such as that shown in Figs. 10 and 11. In this blocking apparatus the bottom of the envelop is widened out and ears indicated by *d* (Fig. 2b) are formed.

The blocking the envelop, the apparatus is first brought into the position shown in Fig. 10 by lowering the bar 10. This bar is connected through the toggle joint 11 with the blocks 12. By lowering the bar 10 the blocks are tilted on the hinges 13. The envelop is spread and shaped over these blocks and then by raising the bar 10 the blocks are brought to the upright position which blocks out the envelop. Wrinkles and folds in the envelop are smoothed out by hand, and the envelop is pushed down as far as possible over the blocks 12. As the ears formed at the bottom of the envelop are flattened out horizontally the

bottom will have the appearance shown in 2b. As a matter of fact, the usual way for handling the envelop as soon as it has been blocked is to place the box *e* over the top of the envelop while it is still on the blocks 12. This folds the ears *d* up into the box as shown in Fig. 3, and the box will be smoothly lined with the envelop.

The passageways 14 indicated by dotted lines in Figs. 10 and 11 allow for the passage of air into the blocked envelop as it is removed from the blocks 12 and thus prevent the formation of a vacuum which would prevent the lining from lying flat inside the box *e*.

The cheese or other material is then placed in the blocked envelop. Process cheese is preferably packaged while hot and run into the envelop in a hot plastic condition.

The envelop is then sealed. This is done by bringing the two top flaps of the envelop together. This is advantageously done by fingers which are inserted in the top of the package and then spread wide apart, bringing the top edges of the bag together. The walls of the flange *g* thus formed are united by heat and pressure. Ears are formed exactly the opposite of the ears shown in Figs. 2a and 2b. These ears are shown at *f* in Fig. 4b.

Equipment for spreading the mouth of the bag and effecting the seal is shown in Figs. 13-16 and will be explained in detail in connection with the discussion of those figures.

The seal may be formed by pressing the flange between a heated platen and a base plate as shown in Figs. 7a and 7b. It is noted that the platen *h* is not as long as the flange *g*. It is not the intention to form a full-length seal at this stage of the process. A partial seal only is formed. Thereafter any air contained in the package is removed, and the seal is then completed.

The air is preferably removed by a plunger of the type indicated at *i* in Fig. 8. It is noted that the plunger is convex so that it first makes contact near the center of the top of the package and as it is further lowered the line of contact gradually moves to each edge. The head of the plunger is advantageously made of some cushion material, such as sponge rubber. This forces the air out through the unsealed portions of the ears of the package as shown in Fig. 12.

After the plunger has removed the air from the package the ears *f* are sealed tight. This may be done by folding the flange to the body of the package and then applying pressure with heat in lines perpendicular to the main seam. Such a cross seal may be effected by the heating platens *j* (Fig. 9) which press against the supports *k*. They form a cross seal, such as indicated by the line *l* shown in Fig. 5b. This seal unites the flange *g* with the ears *f* as well as closing the ears so that air can neither enter nor leave the package. Such a package is air-tight and prevents the entrance of air. It is also air-free. There is no opportunity for mold to form on processed cheese which is packaged in this way.

Instead of partially sealing and then further sealing at each ear the flange *g* may be sealed all the way from one end to a position near the other end. In this case a single cross seal is all that is required. Instead of a cross seal any other suitable seal for closing the openings in the ears may be used.

After completing the seal the ears *f* are folded onto the top of the package and as shown in Fig.

6 the package is ready for further closing. If the box *e* is wooden the top may be nailed onto it. If it is a cardboard carton a similar carton of somewhat larger size may be inverted and slipped over it.

Although the process has been particularly devised for the packaging of cheese and other material in bags made of rubber hydrochloride or similar heat-sealable material, such as a paper bag coated on the interior with rubber hydrochloride, the method is not limited to the closing of bags by heat. Adhesives may be used. Where a non-heat-sealable packaging material, such as paper coated on the interior only with rubber hydrochloride is employed it is not possible to heat-seal the flange to the ears as shown in Fig. 5b when the flange is laid over. Laying the flange over and applying heat as shown in Fig. 5b will seal off the ends of the flange and the ears without uniting the flange to the ears.

Details of mechanism for accomplishing the first stage of the sealing operation are shown in Figs. 13-16. Fig. 13 shows the bag in the box *e*. The spreading fingers 50 and 51 are pivoted on the shafts 52 and 53 and are so arranged as to swing down into the open mouth of the bag shown in Fig. 3 and extend the mouth to form the flange *g* as shown in Figs. 4a and 4b.

Fig. 16 is a top view in perspective of the mechanism shown in Figs. 13, 14 and 15. After the top edges of the bag have been brought together by spreading the top with the fingers 50 and 51, these fingers are withdrawn to the position shown in Fig. 16, and the sweeping arms 54 and 55 are brought down and the sweeps 56 and 57 pinch the flange *g* at its base. It is important that the seal be formed as close to the top of the cheese in the package as possible to prevent the entrapment of air which will cause the cheese to mold. The sweeps 56 and 57 force most of the air out of the top of the package through the flange *g* and pinch the flange at its base.

The sealing unit is indicated by the block 58. This is preferably heated by electricity. It may have a flat sealing face or is preferably ridged, and three ridges may be employed to produce three separate narrow seals. Such seals are shown by the shading of the flange in Figs. 4a and 12. A tight seal is insured by using separate lines of sealing in this manner. The heat-sealing block 58 is now swung down on the flange and bears against the beveled face of the sweep 56. This is shown in Fig. 15. The sweep 57 is then raised.

The seal formed by the sealing block 58 does not extend the full width of the flange. By sealing only a part of the flange and leaving the ends open as shown clearly in Fig. 4a and in detail in Fig. 12 it is possible in the next stage of the sealing process to remove entrapped air from the package and then complete the sealing. The removal of trapped air is accomplished by lowering of the plunger *i* shown in Fig. 8. The ends are then sealed by suitable apparatus, such as shown in Fig. 9.

The various operations illustrated are advantageously carried out at two separate stages along a conveyor which conveys the package from the filling mechanism through the final sealing step. At the first stage the equipment shown in Fig. 16 is located, and the package is partially sealed. The package is then passed on to the next stage where the plunger *i* is lowered to remove the air, and the seal is completed. Any suitable con-

veyor belt may be provided for carrying the package from one stage to the other.

The drawings illustrate a method of sealing across the middle of the package, removing the entrapped air and then completing the seal. This method may be carried out when the material being packaged is inserted through a pipe located at the center of the package. With a different type of filling device, it may be desirable to seal the package at both ends in the initial stage, and then after removing entrapped air, sealing the middle of the package.

This application is a division of my application Serial No. 286,800 filed July 27, 1939.

What I claim is:

1. The method of fluid-tight packaging which comprises providing a collapsed envelop fluid-tight on at least the inner surface thereof and having only two layers of flexible sheet material in face to face position including the seams, erecting said envelop on a mandrel, combining said erected envelop with a carton, filling said envelop with contents, bringing the mouth portions of said filled envelop into flattened face to face position, and then sealing said flattened mouth portions thereby to obtain a package completely free from reentrant folds and layers of increased thickness in the sealed regions.

2. The method of fluid-tight packaging which comprises providing a flat envelop formed from fluid-tight flexible material with sealed regions in the longitudinal marginal portions thereof and having only two layers of said material in face to face position including said sealed regions, erecting said envelop on a mandrel, converting said sealed regions of the envelop into flattened lateral fins, inserting said erected envelop into a carton, filling said envelop with contents, bringing the mouth portions of said filled envelop into flattened face to face position, and then applying a flat top seal to said mouth portions thereby to obtain a package completely free from reentrant folds and intervening layers and from similar danger points of leakage.

3. The method of fluid-tight packaging which comprises providing a flat bag with a continuous fluid-tight and fusible inner surface and parallel sealed regions in two longitudinal marginal portions thereof and having only two layers of flexible material in face to face position including said sealed regions, erecting said bag on a mandrel, flattening said longitudinal sealed regions into fins, introducing said bag into a carton, filling said bag with contents, bringing said mouth portions into flattened face to face relation, applying a flat transverse seal to said folded and flattened mouth portions, and then infolding the resulting tabs and closing the carton thereabout thereby to obtain a substantially hermetically

sealed package having uniform thickness and number of layers incorporated into its seams.

4. The method of fluid-tight packaging which comprises providing a flat bag integrally formed of a sheet presenting a continuous fluid-tight and fusible inner surface and having an L-shaped heat sealed region extending along two adjacent marginal strips thereof including only two layers of material in face to face position, erecting said bag on a mandrel, flattening said sealed region into longitudinal and transverse fins, slipping said erected bag into a carton, filling said bag with contents, folding the mouth portions of said bag into face to face position, applying heat and pressure along a transverse marginal strip of said folded and flattened mouth portions to hermetically seal said bag with flat two-layer seams, and then folding the resulting tabs of the bag into the carton and closing the carton thereabout.

5. The method of fluid-tight packaging which comprises providing a flat bag integrally formed of a sheet presenting a continuous fluid-tight and fusible inner surface and having at least one longitudinal seam with two layers of the bag material in face to face position, squaring-up said bag on a mandrel, flattening said longitudinal seam into a fin, introducing said squared-up bag into a carton and withdrawing said mandrel therefrom, filling said bag with contents, horizontally folding the mouth portions of said bag, folding up the top marginal strip of said mouth portions into face to face heat-sealing position, applying heat and pressure to said marginal strip to hermetically seal said bag with a two-layer transverse seam whereby the seam regions of the bag are constituted of only two layers of material in face to face position, and then folding the resulting tabs of the bag into the carton and closing the carton thereabout.

6. The method of packaging which comprises providing a flat bag fluid tight and fusible on at least the inner surface thereof and having at least one longitudinal seam including only two layers of the bag material in face-to-face position, erecting said bag on a mandrel and flattening said seam into a longitudinal fin, inserting said bag into a carton, filling said bag with contents, folding the marginal portions of the mouth of said bag into flattened face-to-face position throughout an area spaced from the top wall of the carton, flattening the intermediate portions of the side walls of the bag into a plane parallel with the bottom wall of said bag, sealing said flattened marginal portions to form a transverse top seam forming a continuation of said longitudinal seam and then closing said carton thereabout.

CHARLES E. GARDNER.