April 30, 1957 P. B. HULTKRANS 2,790,284

ART OF VACUUM SEALING FLEXIBLE PACKAGES

Filed Jan. 13, 1954

Fig. 1

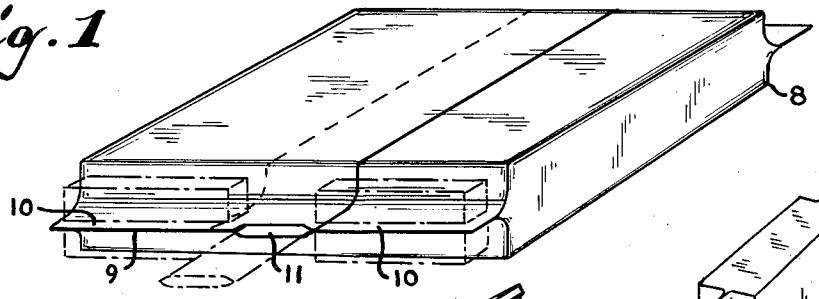


Fig. 3

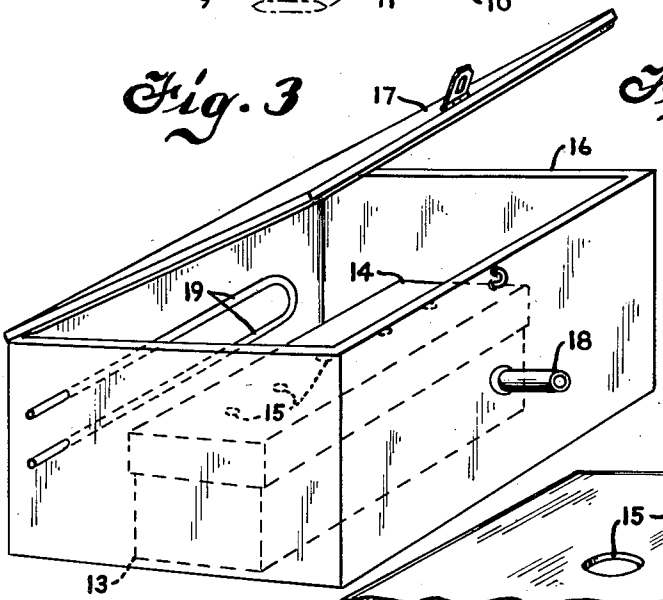


Fig. 4

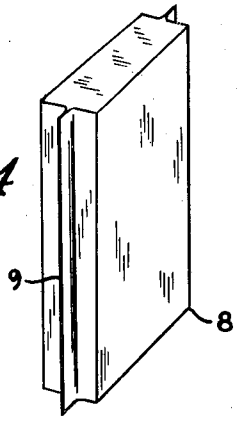
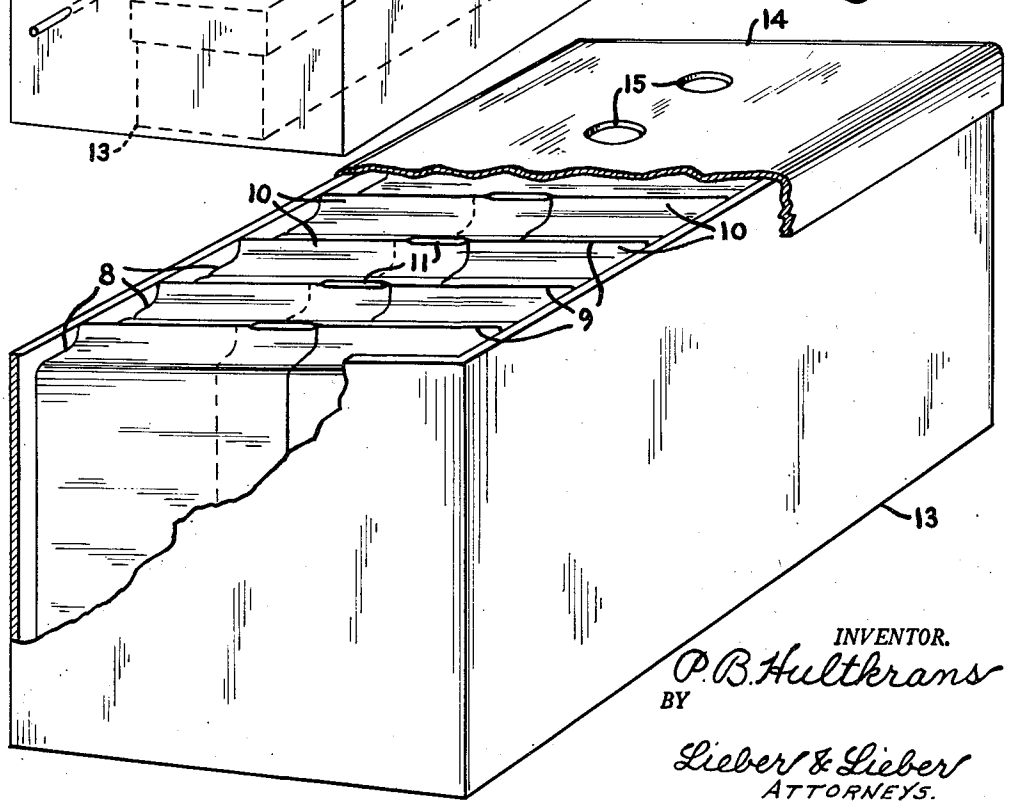


Fig. 2



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ART OF VACUUM SEALING FLEXIBLE PACKAGES

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Application January 13, 1954, Serial No. 403,895

11 Claims. (Cl. 53—9)

The present invention relates generally to improvements in the art of commodity packaging, and relates more particularly to an improved method of vacuum sealing flexible packages.

A primary object of this invention is to provide a novel and improved vacuum packaging method which may be rapidly and effectively commercially exploited with the aid of simple and inexpensive apparatus at minimum cost.

It is, of course, common practice in the food packaging industry to package certain foods in the presence of a vacuum in an effort to evacuate as much of the air as possible from the finally sealed package to thereby reduce the possibility of deterioration and mold growth. Heretofore, it has been customary to effect such air evacuation from the commodity packages by mechanically sealing the same with the aid of special machinery in the presence of a vacuum; and while special packaging and sealing equipment has been developed which has proven quite successful for the intended purpose, such equipment is extremely expensive to install and operate. Furthermore, existent vacuum packaging machines are space-consuming and complicated, thus requiring considerable maintenance and frequent shutdowns and repair, and the applications of such apparatus are also undesirably restricted while the operation thereof is necessarily slow.

It is therefore a more specific object of the present invention to provide an improved method of producing vacuum sealed commodity packages which obviates all of the disadvantages and objections attendant prior methods.

Another specific object of the invention is to provide an improved method of effectively evacuating air from a multiplicity of flexible commodity containing packages while simultaneously sealing the same without need for special mechanical sealing equipment.

Another specific object of my invention is to provide a new and improved method of evacuating air from prefilled flexible containers and for effectively finally sealing such air-evacuated containers automatically with the aid of vacuum and atmospheric pressure only.

Still another specific object of my present invention is to provide an improved method of producing air evacuated and vacuum sealed packages en masse' in an extremely rapid and economical manner after the commodity has been inserted into the container with the aid of ordinary commercially available packaging equipment.

An additional specific object of the present invention is to provide an improved method of sealing commodity-laden flexible pressure-sealable containers by subjecting the same to reduced pressure while unsealed to evacuate the air therefrom and thereafter subjecting the same to atmospheric pressure to cause automatic sealing thereof.

A further specific object of the present invention is to provide an improved method of vacuum sealing commodity laden flexible packages which comprises, substantially enclosing a commodity within a container formed of flexible material having adjacent pressure sealable surfaces, thereafter subjecting the commodity laden container to a vacuum to evacuate the air therefrom, and finally releasing the vacuum to cause the adjacent container surfaces to automatically seal by the action of atmospheric pressure against the exterior of the air evacuated package.

These and other specific objects and advantages of the invention will be apparent from the following detailed description.

A clear conception of the several steps involved in the improved method of vacuum sealing flexible packages, and of typical apparatus which may be employed for effecting commercial exploitation of the novel method, may be had by referring to the drawing accompanying and forming a part of this specification, wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a perspective view of a commodity-laden container showing the same being partially sealed by application of mechanical pressure in accordance with an initial step of my method, the mechanical sealing means being diagrammatically depicted by means of dot-and-dash lines;

Fig. 2 is another perspective view of a plurality of the partially sealed flexible packages stacked within a typical vented rigid container prior to the final sealing thereof, portions of the rigid container being broken away for the sake of clarity;

Fig. 3 is a somewhat reduced perspective view of the vented package-laden rigid container positioned within a suitable vacuum chamber by means of which the final sealing may be effected, the lid of the vacuum chamber being shown partially open for purposes of clarity; and

Fig. 4 is a reduced perspective view of one of the finally sealed commodity laden packages.

While the improved method has been particularly shown and described herein as being especially advantageously applicable to the batch sealing of a plurality of flexible containers of particular construction and laden with commodities such as sliced cheese or meats, it is of course not desired or intended to unnecessarily limit the invention by virtue of such restricted disclosure since the improved method may obviously be utilized to advantage in the vacuum sealing of individual packages of somewhat different construction and containing diverse commodities, and the apparatus utilized for effecting the steps of the method may likewise be modified. It is also contemplated that certain specific descriptive terms used herein shall be given the broadest possible interpretation consistent with the disclosure, and the terms "pressure sensitive" or "pressure sealable" as used herein are intended to include any materials or coatings which are adapted to seal to adjacent surfaces upon application of pressure thereto.

In accordance with my improved method of vacuum sealing commodity laden packages, I initially substantially enclose the commodity such as sliced cheese, meat or the like within a wrapper or bag-like container 8 formed of flexible packaging material and having adjacent free marginal edges extending outwardly beyond the commodity as at 9, at least the adjacent surfaces of the marginal edge or mouth 9 being pressure sealable or pressure sensitive. Next, the extending marginal edges or mouth 9 of the commodity laden container 8 is partially sealed as shown at the areas 10 by application of manual or mechanical pressure with a restricted portion 11 thereof being left open and unsealed to provide restricted access to the interior of the container 8. Thereafter, the commodity laden and partially sealed flexible container 8, either individually or in batches, is subjected to reduced pressure or vacuum to evacuate air therefrom through the restricted opening formed by the un-

sealed portion 11, such air evacuation from within the container 8 causing the flexible walls thereof to be drawn tightly against and into intimate contact with the commodity. Finally, the vacuum is released with the container or containers 8 being again exposed to atmospheric pressure, thereby causing the previously restricted access opening or unsealed portion 11 to automatically close and become sealed, as shown in Fig. 4, by the action of the atmospheric pressure against the exterior of the air evacuated package, the atmospheric pressure on the exterior of the sealed package causing the walls thereof to cling even more intimately to the commodity housed therein.

In the commercial exploitation of the improved method, any suitable flexible packaging material such as regenerated cellulose, rubber hydrochloride film or the like may be utilized in the formation of the container 8, the interior surfaces of the container being rendered pressure sealable or pressure sensitive by a suitable tacky wax coating or the like extending over at least the area to be sealed to enclose the commodity. The commodity may be inserted within the container 8 in any suitable manner as with the aid of commercially available wrapping or filling equipment. Likewise, the areas 10 of the commodity laden container 8 may be initially sealed by any suitable mechanical means as shown in dot-and-dash lines in Fig. 1, with the restricted unsealed portion 11 being positively retained open and unsealed by means of a tongue or spacer as also shown in dot-and-dash lines. Since it is desirable in actual commercial production to simultaneously seal relatively large batches in a single operation, a plurality of the partially sealed containers may be conveniently placed within a relatively large rigid box-like container 13 provided with a series of vents 15 in the cover 14 thereof, the flexible commodity laden and partially unsealed containers 8 being placed within the box-like structure so that the restricted access openings 11 thereof are in close proximity to the vents or perforations 15 in the rigid container. The rigid container 13 is then placed within a suitable vacuum chamber 16 as shown in Fig. 3, the vacuum chamber 16 being provided with an access cover 17 adapted to be tightly secured thereto to seal the same so that the air from within the chamber may be withdrawn by means of suitable equipment through a vacuum line 18, thereby causing evacuation of air from the several flexible containers 8 through the restricted openings 11 thereof and the vents 15 in the rigid container 13. Upon release of the vacuum from within the chamber 16 and exposure of the packages 8 housed within the rigid container 13 to atmospheric pressure, the final sealing of the areas 11 will be automatically effected, and by forming the rigid container 13 and its cover 14 of cardboard or the like, this container may be used as a shipping carton, thereby obviating the necessity for subsequent removal and boxing of the flexible commodity laden packages 8. To augment the sealing of the flexible containers 8 by the action of atmospheric pressure upon release of the vacuum, it is also sometimes desirable to heat the space surrounding the packages so that the adjacent surfaces of the containers 8 with the restricted areas 11 will become more tacky and highly pressure sensitive, thereby assuring positive sealing of these areas upon release of the vacuum and exposure to atmospheric pressure, and this space heating may be effectively performed by providing a heating coil 19 extending into the interior of the chamber 16 in proximity to the packages placed therein.

From the foregoing detailed description, it is believed apparent that the present invention provides an improved method of effectively vacuum sealing flexible packages in an extremely simple and economical manner. In exploiting the improved method, there is no need for special packaging and sealing equipment, and a plurality of packages may be operated on en massé with maximum speed and minimum equipment and space. In addition, the final vacuum sealing steps may be performed upon a plurality of packages placed in shipping containers with no need for thereafter removing the same for repackaging or reboxing. The equipment used in the present method is all of simple and inexpensive construction, and the various steps may be performed with utmost speed and efficiency by a novice without requiring large investment in packaging machinery by the producers of the commodities. The equipment shown herein for performing the various steps of the method may, of course, be modified so as to handle larger or smaller quanities of packages if desired, and although we have indicated that the container may be rendered pressure sealable by means of a suitable wax coating, other materials may obviously be used with equal success.

It should be understood that it is not desired or intended to limit this invention to the exact steps of the method herein shown and described or to the precise details of the apparatus utilized in commercially exploiting the method, since various modifications within the scope of the appended claims may occur to persons skilled in the art to which this invention pertains.

I claim:

1. The method of vacuum sealing commodity laden packages, which comprises, enclosing the commodity within a container formed of flexible material and having adjacent pressure sealable surfaces, partially sealing the adjacent surfaces of the commodity laden container by application of pressure while leaving a restricted portion thereof unsealed, placing the commodity laden and partially sealed container in a vented rigid container, thereafter subjecting the vented container to a vacuum to evacuate air from the commodity laden flexible container through the unsealed portion thereof, and finally releasing the vacuum to cause the unsealed portion of the flexible container to automatically seal by the action of atmospheric pressure entering the rigid container through the vents thereof and acting against the exterior of the air evacuated package.

2. The method of vacuum sealing commodity laden packages, which comprises, enclosing the commodity within a flexible pressure sealable container having adjacent extending marginal edges, partially sealing the marginal edges of the commodity laden container by application of pressure while leaving a restricted portion thereof open and unsealed, placing a batch of the commodity laden and partially sealed containers in a vented rigid container with the unsealed portions thereof in proximity to the vents of the rigid container, thereafter subjecting the rigid vented container to a vacuum to evacuate air from all of the commodity laden flexible containers through the unsealed portions thereof, and finally releasing the vacuum and exposing the vented rigid container to atmospheric pressure to cause the unsealed portions of the flexible containers to automatically seal by the action of the atmospheric pressure entering through the vents of the rigid container and acting against the exteriors of the air evacuated packages.

3. The method of vacuum sealing commodity laden packages, which comprises, enclosing the commodity within a container formed of flexible material and having adjacent sealable surfaces, placing the commodity laden container in an air pervious rigid container, thereafter subjecting the pervious container to a vacuum to evacuate air from the commodity laden flexible container, and finally releasing the vacuum to cause the adjacent sealable surfaces of the flexible container to automatically seal by the action of atmospheric pressure permeating the rigid container and acting against the exterior of the air evacuated package.

4. The method of vacuum sealing commodity laden packages, which comprises, enclosing the commodity within a container formed of flexible material and having adjacent sealable surfaces, partially sealing the adjacent

surfaces of the commodity laden container while leaving a restricted portion thereof unsealed, placing the commodity laden and partially sealed container in a vented rigid container, thereafter subjecting the vented container to a vacuum to evacuate air from the commodity laden flexible container through the unsealed portion thereof, and finally releasing the vacuum to cause the unsealed portion of the flexible container to automatically seal by the action of atmospheric pressure entering the rigid container through the vents thereof and acting against the exterior of the air evacuated package.

5. The method of vacuum sealing commodity laden packages, which comprises, enclosing the commodity within a container formed of flexible material and having adjacent sealable surfaces, partially sealing the adjacent surfaces of the commodity laden container while leaving a restricted portion thereof unsealed, placing a batch of the commodity laden and partially sealed containers in a vented rigid container with the unsealed portions thereof in proximity to the vents of the rigid container, thereafter subjecting the vented container to a vacuum to evacuate air from all of the commodity laden flexible containers through the unsealed portions thereof, and finally releasing the vacuum to cause the unsealed portions of the flexible containers to automatically seal by the action of atmospheric pressure entering the rigid container through the vents thereof and acting against the exteriors of the air evacuated packages.

6. The method of vacuum sealing commodity laden packages, which comprises, enclosing the commodity within a container formed of flexible material and having adjacent heat and pressure sealable surfaces, placing the commodity laden container in an air pervious rigid container, thereafter subjecting the pervious container to a vacuum to evacuate air from the commodity laden flexible container through an unsealed portion thereof, and finally releasing the vacuum in the presence of heat to cause the unsealed portion of the flexible container to automatically seal by the action of heat and atmospheric pressure permeating the rigid container and acting against the exterior of the air evacuated package.

7. The method of vacuum sealing commodity laden packages, which comprises, enclosing the commodity within a container formed of flexible material and having adjacent heat and pressure sealable surfaces, partially sealing the adjacent surfaces of the commodity laden container while leaving a restricted portion thereof unsealed, placing the commodity laden and partially sealed container in a vented rigid container, thereafter subjecting the vented container to a vacuum to evacuate air from the commodity laden flexible container through the unsealed portion thereof, and finally releasing the vacuum in the presence of heat to cause the unsealed portion of the flexible container to automatically seal by the combined action of heat and atmospheric pressure entering the rigid container through the vents thereof and acting against the exterior of the air evacuated package.

8. The method of vacuum sealing commodity laden packages, which comprises, enclosing the commodity within a container formed of flexible thermo-plastic material and having adjacent extending marginal surfaces, partially sealing the adjacent surfaces of the commodity laden container while leaving a restricted portion thereof unsealed, placing a batch of the commodity laden and partially sealed containers in a vented rigid container, thereafter subjecting the vented container to a vacuum to evacuated air from all of the commodity laden flexible containers through the unsealed portions thereof, heating the area around the commodity laden containers, and finally releasing the vacuum in the presence of heat to cause the unsealed portions of the flexible containers to simultaneously automatically seal by the combined action of heat and atmospheric pressure entering the rigid container through the vents theerof and acting against the exteriors of the air evacuated packages.

9. The method of vacuum sealing commodity laden packages, which comprises, enclosing the commodity within a container formed of flexible material and having adjacent sealable surfaces, placing the commodity laden container in a portable rigid container having air communication means to its interior, thereafter subjecting the portable container to a vacuum to evacuate air from the commodity laden flexible container, and finally releasing the vacuum to cause the adjacent sealable surfaces of the flexible container to automatically seal by the action of atmospheric pressure permeating the rigid container and acting against the exterior of the air evacuated package.

10. The method of vacuum sealing commodity laden packages, which comprises, enclosing the commodity within a container formed of flexible material and having adjacent sealable surfaces, placing the commodity laden container in a portable rigid container having air communication means to its interior, thereafter subjecting the portable rigid container to a vacuum to evacuate air from the commodity laden flexible container, and finally releasing the vacuum and simultaneously sealing the flexible container in the presence of atmospheric pressure permeating the rigid container and acting against the exterior of the air evacuated commodity laden package.

11. The method of vacuum sealing commodity laden packages, which comprises, enclosing the commodity within containers formed of flexible material and having adjacent sealable surfaces, placing a plurality of the commodity laden containers in a portable rigid container having air communication means to its interior, thereafter subjecting the portable rigid container to a vacuum to evacuate air from the commodity laden flexible containers, and finally releasing the vacuum and simultaneously sealing the flexible containers in the presence of atmospheric pressure permeating the rigid container and acting against the exteriors of the air evacuated commodity laden packages.

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