June 5, 1945. G. A. MOORE 2,377,358

CONTAINER AND METHOD OF FORMING THE SAME

Filed Aug. 4, 1941

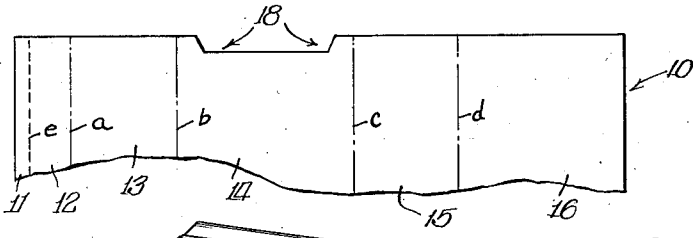



Fig. 1.

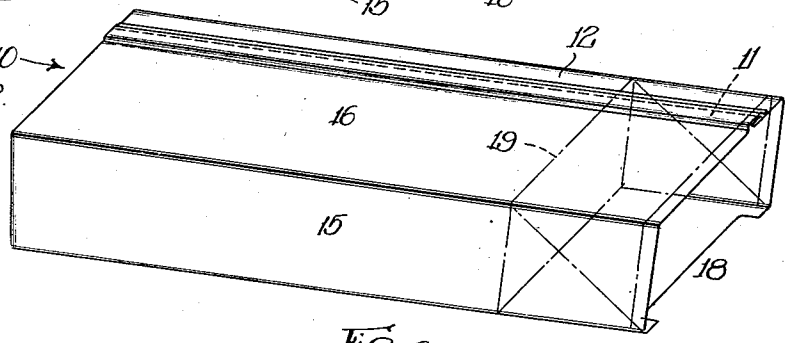



Fig. 2.

Fig. 3

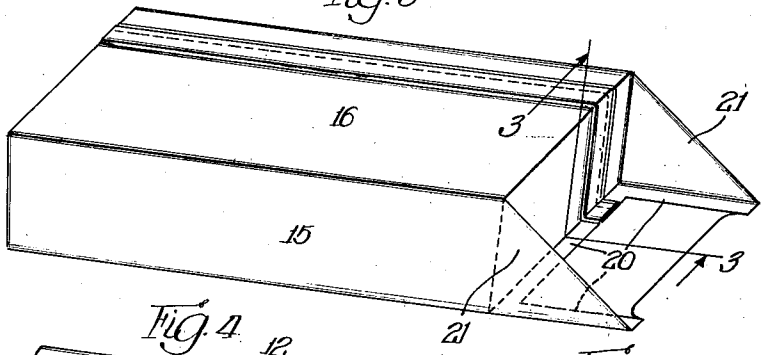



Fig. 4

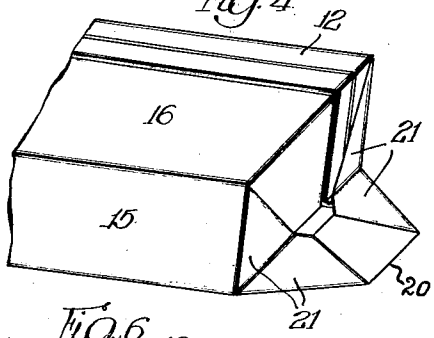



Fig. 5.

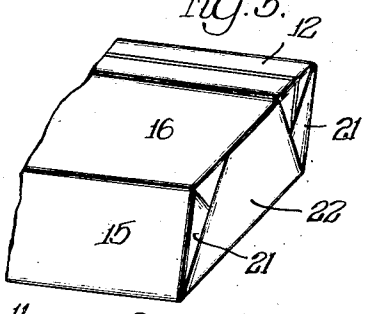



Fig. 6

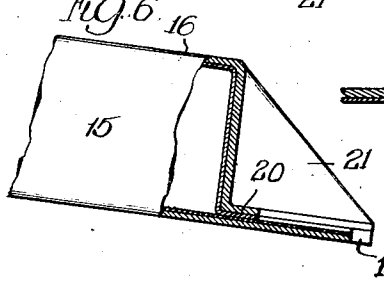






Fig. 7

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# UNITED STATES PATENT OFFICE

2,377,358

## CONTAINER AND METHOD OF FORMING THE SAME

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Application August 4, 1941, Serial No. 405,435

6 Claims. (Cl. 229—3.1)

This invention relates to the manufacture of improved types of containers and, more particularly, it pertains to improvements in hermetically sealed containers and methods of forming the same from a flexible thermoplastic material and an outer sheet of protective material wherein the end closures are developed into an inwardly compressed and sealed fold.

Heretofore, containers of such material, after having been formed into a tubular body portion effected a closure at the end extensions of the body portion by bringing them flatly together to provide a continuous interface of the thermoplastic material such as, for example, transparent rubber hydrochloride constituting the inner lining. That is, the wall extension sections were united together under heat and pressure to provide an integral seal with end extensions or ears protruding beyond the end walls and after bending the sealed interface portions over against the end of the body of the container the ears were further bent or stretched down along the end walls and adjacent thereto. While such a structure provides an excellent hermetic seal it sometimes is accompanied by certain disadvantages, one of which is stretching of the particular type of material constituting the inner face of the container. The stretching of such materials may tend to weaken or rupture the structure and cause seepage and leakage of the container.

In accordance with the principles of the present invention which contemplates the use of similar materials, for example "Pliofilm," or other suitable heat sealable material, it should be noted that the material forming the end closure extensions is folded inwardly at all points in compressed formation and then sealed in this position without stretching the material in any way and this is a principal object of the invention.

Another object of the invention is the provision of a container in which the end extensions are folded together with one side wall against the remaining side wall and marginally activating the surplus flange portion into a primary seal.

A further object of the present invention is to effect a fold of the end closure extensions and a side wall extension and marginally activating the surplus flange portion into a preliminary seal and folding the remaining portions of the end closure extensions into a secondary seal against a portion of the remaining side wall closure.

Still another object of the present invention is to effect a fold of the end closure extensions and side wall extensions and marginally activate the surplus flange portions into a preliminary seal, developing the remaining end closure extensions into a secondary fold against a portion of the remaining side wall enclosure and activating the same into sealed relationship therewith and then infolding the remaining side wall closure against the primary and secondary seal and effecting a final seal.

Yet another object of the present invention is the provision of a container and method of forming the same in which all of the end closures are infolded into sealed compressed relationship with respect to each other to form an hermetic seal.

Another object of the present invention is the provision of a container in which the end and side walls remain free of any overlapping or overhanging extension of the end closure portion.

A further object of the invention is to provide a container in which all the end wall closure extensions, together with the side wall closure extensions, are inwardly folded at right angles in compressed relationship and sealed into an hermetically sealed container without the formation of superfluous pockets within the container.

A still further object of the invention is the provision of a container which is economical of manufacture, simple yet sturdy and durable in construction, and which will retain its contents free from injurious effects of the outer atmosphere while retaining the contents in their natural state over long protracted periods of time.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the several steps and the relation of one or more of such steps with respect to each of the others, and a container possessing the features, properties and the relation of elements, which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the present invention reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

Fig. 1 is a partial plan view of a blank of container material having a foreshortened wall por-

tion and illustrating by dotted lines the proposed manner of folding the same;

Fig. 2 is a perspective view of a partially formed container folded into tubular form;

Fig. 3 is a view similar to Fig. 2 illustrating the manner of infolding one side wall and marginally sealing the same against the end closure extension of the other side wall;

Fig. 4 is a fragmentary perspective of the end portion of Fig. 3 showing the development of the inward fold of the end wall closure extension;

Fig. 5 is a perspective view similar to Fig. 4 showing a final inward fold of the remaining side wall end extension closure;

Fig. 6 is a fragmentary side elevation and partly in section of one end of the container shown in Fig. 3 and taken along the line 3—3 looking in the direction of the arrows; and

Fig. 7 is a fragmentary transverse sectional view through the longitudinal seam showing the continuous thermoplastic inner face of the container and the end extension overlap.

Referring more particularly to Fig. 1 of the drawing, there is indicated generally at 10 a blank of laminated material of a thermoplastic nature such as, for example, Pliofilm laminated to a suitable backing material such as paper or the like which has been coated in whole or in part with a suitable thermoplastic lacquer. For convenience in illustration, dotted lines *a*, *b*, *c* and *d* on this blank indicate lines along which the blank is to be folded into tubular formation, for example, around a suitable mandrel as will more fully appear hereinafter, to provide panels 12, 13, 14, 15 and 16. A cut-out, or recessed portion, 18 is provided in the proposed panel 14, the purpose of which will more fully appear hereinafter. The dotted line *e* defines a portion of panel 12 which constitutes part of the longitudinal seam, which also will appear more fully hereinafter.

Fig. 2 illustrates the container folded into tubular form. This operation is preferably performed by folding the blank of material 10 about a hollow mandrel with the thermoplastic material 17 innermost. It will be noted that the portion 11 of the panel 12 is folded back upon itself so that the outer protective covering of paper is in face-to-face relationship, thereby exposing the Pliofilm at this point. The panel 12 and portion 11, together with panel 16, form one side wall, the panels 13 and 15 the end walls, and the panels 14 the other side wall. It will be seen that the longitudinal marginal edge of the side wall 16 overlaps a portion of the remaining panel 12 to complete the entire side wall so that there is effected a seal between the Pliofilm under surface of the wall 16 and that portion 11 of the panel 12 folded back upon itself so that a seal is effected by bringing together a Pliofilm-to-Pliofilm face. The panel 16 extends, therefore, to overlap the portion 11 and is secured to the paper portion of the panel 12. All this is clearly shown in Fig. 7, wherein there is indicated how the inner layer 17, which forms the continuous Pliofilm thermoplastic sheet of material on the inside of the container, is laminated to the backing material on the outside of the container to form a longitudinal seam. This particular feature is more fully set forth and described in my copending application Serial No. 373,458, filed January 7, 1941, for a Container and method of manufacture. This longitudinal seam is formed into an hermetic seal by activating the thermoplastic material by means of heat and pressure.

In Fig. 3 the closure extension of the side wall having the longitudinal seam is folded inwardly about the mandrel at the fold line 19 at right angles to the remaining portion of the tubular formation and in the direction of the opposite side wall closure extension to which it is marginally sealed as indicated at 20. Any suitable manner of forming this seal may be practiced but it is preferred that a specially designed sealing means automatically operated and patterned for this purpose be utilized.

In Fig. 4 there is illustrated the manner in which the remaining portion of the end extension closures 21 of the end walls 13 and 15 are inwardly folded upon the first or primary fold, into which position they are also compressed and heat-sealed in part to another section of the remaining side wall extension to form a secondary seal.

As shown in Fig. 5, the remaining portion of the side wall closure extension 22 is next similarly folded inwardly and heat-sealed in compressed relationship with the remaining seals to form a tertiary or final seal. It will thus be seen that stretching of the Pliofilm material has meticulously been avoided but that, on the contrary the Pliofilm is all compressed inwardly to form a triple hermetic seal.

In Figs. 1, 2 and 3, attention is called to the cut-out portion 18, the function of which is to match the final fold within the dimensional relationship of the package. It should be noted that in order to form the marginal flange for the seal 20 the remaining extended closure flaps 21, 21 must exceed in length the thickness of the package. Therefore, the remaining side wall flap 22 (Figs. 4 and 5) must be shortened a distance equal to the flange, i. e. the cut portion 18 of the panel 14, if it is desired to match the package thickness.

The utility and simplicity of this type of structure lends itself ideally to the use of Pliofilm and other similar materials and enables commodities and articles to be packaged in preformed shape, offering at the same time the facilities of seam structure closure akin to flat envelopes. However, in the envelope type package, or flat package, any such article having thickness, limits severely the several seams from being hermetically formed and this is due to inadequate allowance for displacement of material. In the preformed shapes of containers as illustrated in the present invention this problem is eliminated. Attention is called to the fact that the corners of the flange joints are blended in at 90 degrees and with such material as Pliofilm, or other materials having a heavy coating of thermoplastic lacquer, the seams at these points can adequately be sealed because the extending flange is relatively short and is subjected to considerable pressure. However, if this flange should exceed this minimum length as, for example, when used in a large size container, then these joints or corners can be facilitated by notching to compensate for displacement of material. It is also contemplated that the longitudinal seam may be placed on either side wall which will form into the seam precisely as shown in its present location except that the 90 degree bend from the original plane will be diagonal.

It will be understood of course that after one of the ends of the body portion is formed in the manner described the container is filled with any material suitable for its use whether of a granular or liquid nature and of course the opposite end may be similarly sealed. These ends may

more precisely be referred to as the bottom and top of the container.

It will thus be seen that the objects hereinbefore set forth may readily and efficiently be attained and since certain changes may be made in the above container and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The method of forming a container, which comprises providing a blank consisting of a paper material having a thermoplastic adhesive coating, folding and sealing said blank into tubular formation with the thermoplastic surface innermost, inwardly folding one side wall closure extension and sealing a marginal portion thereof to the base of the other side wall closure extension and at the same time inwardly folding end wall closure extensions and sealing marginal portions thereof angularly with respect to the base seal and also to said same side wall, and inwardly over-folding the remaining closure extensions to form an end closure and hermetically sealing the same by applying heat and pressure thereto to activate the thermoplastic coating to seal the same to the paper material as well as to itself where the same are in contacting relationship.

2. The method of forming a container, which comprises providing a blank of laminated material composed of paper and rubber hydrochloride, folding and sealing said blank into tubular formation with the rubber hydrochloride surface innermost, inwardly folding one side wall closure extension and sealing a marginal portion thereof to the base of the other side wall closure extension and similarly folding end wall closure extensions and sealing marginal portions thereof to said same side wall closure extension at each end of the base seal and perpendicular thereto, folding the remaining end wall extensions inwardly toward each other and over-folding the remaining closure extension over the infolded end wall closures already formed and forming an end closure, and hermetically sealing the same by the application of heat and pressure to activate the rubber hydrochloride to seal the same to the paper surface and to itself where the same are in contacting relationship.

3. The method of making a container, which comprises providing a blank of laminated material composed of a layer of paper and a layer of rubber hydrochloride, folding a longitudinal marginal edge back upon itself so that the paper surface along said marginally folded portion is in face-to-face contact exposing a marginal edge of rubber hydrochloride, forming the remainder of said blank in tubular formation with the rubber hydrochloride surface on the inside and with the opposite longitudinal marginal edge overlying said first named longitudinal marginal edge in rubber hydrochloride face-to-face relationship and extending therebeyond with the rubber hydrochloride in contact with the paper layer, heat-sealing said overlying portions to form a longitudinal seam, inwardly folding an extending portion of a side wall together with extending portions of adjacent end walls so that remaining portions of said end walls are in rubber hydrochloride face-to-face contact and marginal portions of end wall extensions together with marginal portions of said side wall extensions are in rubber hydrochloride face-to-face relationship with said remaining side wall extension leaving exposed substantially all of the rubber hydrochloride surface of the latter side wall extension, heat-sealing said contacting portions, infolding the remaining end wall extensions against a portion of said exposed rubber hydrochloride surface of said last named side wall extension and against the infolded paper surface of said first named side wall extension and end wall extensions, folding the remaining extension inwardly to form an end closure, and applying heat and pressure hermetically to seal said end closure where said rubber hydrocloride is in face-to-face relationship with itself and paper surfaces.

4. A container, which comprises a blank consisting of a paper material having a thermoplastic adhesive coating, said blank being folded and sealed into tubular formation with the thermoplastic surface innermost, end extensions of one side wall being inwardly folded and marginally sealed to the base of the other side wall extensions and marginal portions of end walls being sealed to said other side wall extensions, the remaining closure portions being inwardly folded and forming end closures, said end closures being hermetically sealed together at points where the thermoplastic surface is in face-to-face contact with itself and with said paper surfaces on said underlying end closure portions.

5. A container, which comprises a blank of laminated material composed of paper and rubber hydrochloride, said blank being folded and sealed into tubular formation with the rubber hydrochloride surface innermost, one side wall closure extension being inwardly folded and marginally sealed to the base of the remaining side wall closure extension and marginal portions of end wall closure extensions also being marginally sealed to said remaining side wall closure extension, the remaining end wall extensions being folded inwardly toward each other and the remaining side wall extension being folded over the infolded end wall closure extensions forming an end closure, said end closure being hermetically sealed at points where the rubber hydrochloride is in face-to-face contact with itself and with a paper surface.

6. A container, which comprises a blank of laminated material composed of a layer of paper and a layer of rubber hydrochloride, a longitudinal marginal edge thereof being folded back upon itself so that the paper surface along said marginally folded portion is in face-to-face contact having an outwardly directed marginal edge of rubber hydrochloride, the remaining portion of said blank being folded into tubular formation with the rubber hydrochloride surface on the inside and with an opposite longitudinal marginal edge overlying said first named longitudinal marginal edge in rubber hydrochloride face-to-face relationship and extending therebeyond with the rubber hydrochloride in contact with the paper layer adjacent thereto, said overlying portions being heat-sealed to form a longitudinal seam, and extending portion of a side wall of said tubular formation being inwardly folded together with extending portions of adjacent end walls so that said extending portions of said end walls are in

rubber hydrochloride face-to-face contact and marginal areas thereof together with marginal areas of said side wall extension being in rubber hydrochloride face-to-face relationship with said remaining side wall extension and being heat-sealed thereto at said points of contact, said extending portions of said end walls being folded against a portion of said last named side wall extension and in contact with its rubber hydrochloride surface and the remainder of said end wall extensions overlying the paper surface of the first named side wall, the remaining side wall extension being inwardly folded in overlying relationship to form an end closure and being hermetically sealed where said rubber hydrochloride is in face-to-face relationship with itself and paper surfaces.

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