

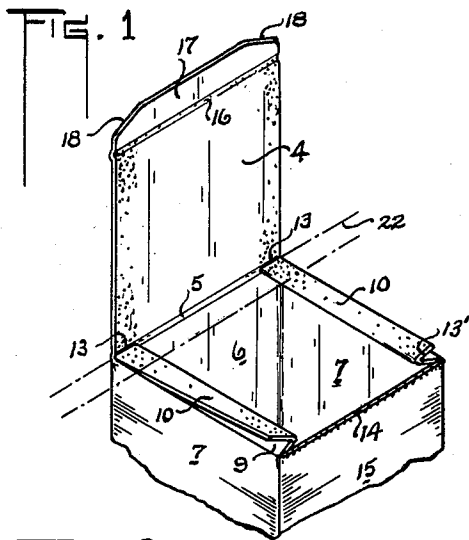
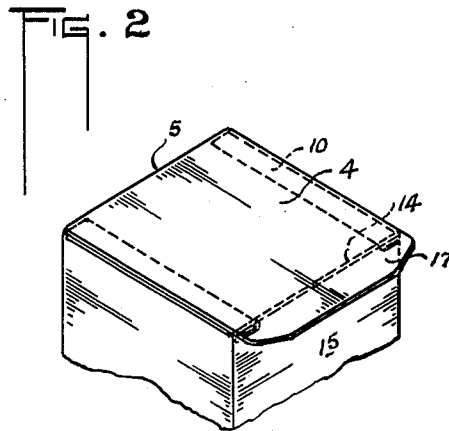
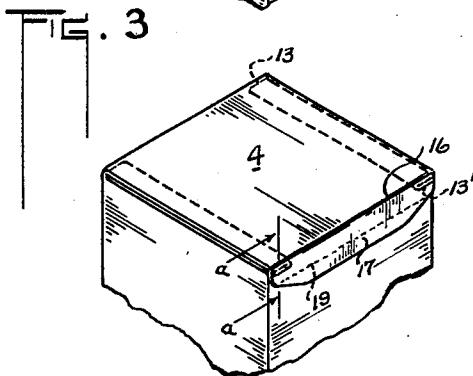
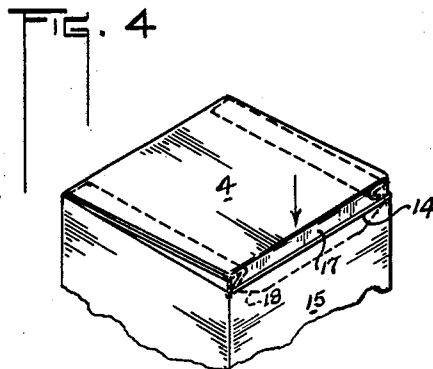
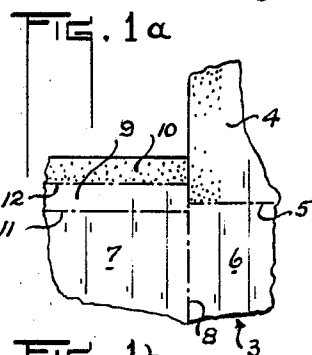
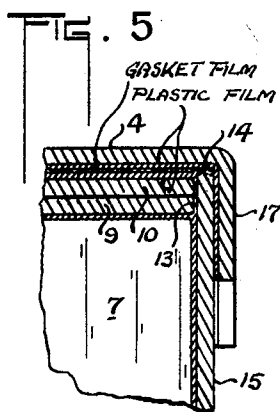
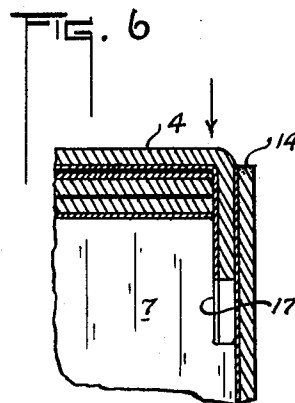
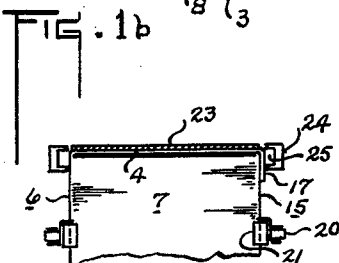
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CLOSURE CONSTRUCTION FOR CONTAINERS

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CLOSURE CONSTRUCTION FOR CONTAINERS

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1 Claim. (Cl. 229—37)

This invention relates to an improved end closure construction for containers made of foldable material, and more particularly to novel means and methods for closing and sealing an end of the particular container air and liquid tight, and of providing the closure forming elements thereof with novel surface treated seam forming areas that will facilitate finger opening of the sealed closure for container dispensing purposes and avoid any damaging effects to the opened elements, after which, these opened elements may be again utilized to reclose the container in a novel manner and provide an efficient protective reclosure thereof.

Conventional containers made of folded material such as paperboard when closed and sealed, upon being opened the material will as a rule tear and split apart thereby damaging the further efficiency of the container. The damaging effects is further aggravated when the container forming material is combined with plastic film having thermoplastic properties utilized for sealing the closure of such containers. The plastic seams will not separate and hence the film material will be torn from its base paperboard material in an erratic manner.

One of the prime objects of the present invention is to provide novel arrangements in the seam forming areas of the closure forming elements of the container for efficiently sealing the constructed closure to be air and liquid tight and in a manner that will permit the sealed closure to be opened without inflicting any damaging effects to the material of the closure formed elements.

Another object of the invention is to provide a novel arrangement of end closing elements for the container adapted for forming seams in the constructed closure having differential bonded strength which will facilitate the opening of the sealed closure.

A further object of the invention is to provide the closure forming elements with novel means to be utilized for effecting an efficient reclosure of the container after being opened for dispensing purposes.

Other objects and novel features of the invention will appear more fully hereinafter from the following detailed description when considered in connection with the accompanying drawings. It is to be understood, however, that the drawings are utilized for the purpose of illustration only, and are not to be taken as a definition of the limits of the invention, reference being had for this purpose to the appended claim.

In the drawings, wherein similar reference characters refer to similar parts throughout the several views;

FIG. 1 is a partial perspective view of a container that is embodied with the closure forming elements and showing portions thereof folded in a stage of closing the container, and further showing the prepared seam forming surfaces on the elements as arranged;

FIG. 1a is a fragmentary portion of a container forming blank embodied with fragments of the closure forming elements and showing treated areas on the plastic surface side of the blank;

FIG. 1b is a fragmentary view of the closed container in side elevation as engaged in the closure sealing conveyor apparatus, a part of which is shown in cross section;

FIG. 2 is a partial perspective view of the container and showing a further stage in forming the closure thereof;

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FIG. 3 is a partial perspective view of the container and showing the completed structure of the closure thereof;

FIG. 4 is a partial perspective view of the container after having been opened for dispensing purposes and showing the elements refolded in a stage of restoring the closure of the container;

FIG. 5 is an enlarged fragmentary cross sectional view of the sealed closure showing its construction as taken along the line $a-a$ in FIG. 3, and

FIG. 6 is a similar view in enlarged cross section to show the relationship of the refolded elements in restoring the closure of the opened container.

The present invention is directed to a means and method of providing a container made of foldable material with closure forming elements faced with suitable thermoplastic film material, and the seam forming surface areas of the elements being selectively treated with a wax-like film forming material upon the thermoplastic film. Such wax-like film is provided to constitute a soft gasket like medium to be disposed inbetween opposing surfaces of the thermoplastic film on certain areas of the closure seams when formed by folding the elements to construct the closure. When heat is applied to these seam formed areas the wax-like film is melted and thereby blends with the surfaces of the activated thermoplastic film, and upon cooling the activated seams the wax hardens in adhered relationship with the thermoplastic film and forms in a manner to constitute the soft gasket-like medium disposed in the seams. Other seams are formed transversely of the gasket formed seams that keeps them stable in seam forming relationship. By virtue of the soft gasket-like medium employed selectively in the seam structure of the closure, it can be opened without damaging the closure forming elements thus making them useful for efficiently effecting a reclosure of the opened container.

Referring more particularly to FIG. 1a of the drawings, the blank for forming the container indicated by the fragment portion 3 thereof, can be provided with the closure forming elements shown in FIG. 1. In FIG. 1a the lid panel 4 is defined with the creased hinge line 5 disposed transversely of the creased line 8 that separates the side wall 6 from the side wall 7 of the container forming walls. Each of two opposed side walls 7 is provided with end segments having a base folding line 11 spaced inwardly of the panel hinge line 5 and the segment having an additional folding line 12 that divides the segment into two equal marginal portions 9 and 10. The cut side edge of the panel 4 terminates at the hinge line 5 defining the separation of the segments from the panel. The side wall 15 (FIG. 1) not shown on the blank 3 is provided with a straight cut end edge. The interior surface of the blank is covered with suitable thermoplastic film material and the marginal surfaces 10 of the pair of end segments are coated with a wax-like film forming material. Marginal border sides of the panel surface may also be like coated if desired. The end edge 14 (FIG. 1) is also coated with the same film forming material. The coated surface areas are indicated by the stippling shown in FIGS. 1 and 1a.

Referring now to FIG. 1, the container body with the closure forming elements is shown as formed of the blank 3. It will be noted that the lid panel 4 is provided with an end flange 17 defined by the folding line 16. The end of the flange portion is provided with a pair of opposed inwardly and outwardly sloped edge portions 18 for a purpose hereinafter to be described. It will be further noted that the overcoated film formed material on the surface of the panel 4 terminates at the folding line 16 of the flange 17. A thin line deposit of the wax-like film forming material may be applied upon the exterior surface of the side wall 15 adjacent the end

edge 14 instead of making the application upon the edge as heretofore mentioned. To form the closure the pair of opposed end segments of the side walls 7 are first folded so that the margins 9 and 10 thereof are superimposed so that the overcoated film surface of the margins 10 are brought up-face to meet the plastic face of the panel 4 when folded. These superimposed margins 9 and 10 are constituted to have a constant tendency to spring upwardly and therefore they are flattened downwardly so that their respective end edges 13 are brought in line with the fold line of the panel 4 by a thin blade instrumentality as indicated by the dot and dash lines 22 disposed upon the surface portions of the margins 10, the blade being close and parallel with the hinge line 5 of the lid panel. The end edges 13 are brought into abutment against the plastic inner surface of the opposing side wall 6 of the container. The panel 4 is then folded inwardly and downwardly upon the blade 22 and superimposed margins including the end edge 14 of the side wall 15. The blade is now disengaged from the margins as downward pressure is applied upon the folded panel which compresses the superimposed panel seating margins so that the engaged surfaces 10 thereof are brought into coplanar surface relationship with the end edge 14. The pressure applied upon the panel brings the opposite end edges 13' of the compressed margins into abutment against the inner plastic surface of the side wall 15 of the container. While the panel is under pressure the flange 17 thereof is folded downwardly and inwardly against a corresponding portion of the exterior surface of the side wall 15. Heat is augmented with the pressure upon the panel and being further applied upon the folded flange and to the upper part of the opposing side wall 6 whereby the thermoplastic film on the flange and face of the abutments inside of the container becomes activated thereby sealing the flange and abutments in seam forming relationship. At the same time the wax-like film disposed between the thermoplastic surfaces of the panel 4 and its seated margins 10 including the end edge 14 is melted to blend with the activated surfaces of the thermoplastic film material in seam forming relationship. Before releasing the pressure upon the constructed closure the seams are subjected to chilling which hardens the wax to form a soft gasket-like medium within the seams formed with the panel. It is to be noted that the folded panel was pressed downwardly upon the end edge 14 thereby compressing the superimposed margins prior to the folding of the flange 17. Therefore, upon folding the flange the side wall 15 and its end edge 14 is prevented from bowing inwardly and is maintained rigid to oppose the contact of the folded flange and thereby insure its firmly bonded seam formed therewith. The flange being disposed transversely of the panel seams provides means to keep the lid panel in compression seam formed relationship with the superimposed seating ledges thereby maintaining the cohesion of these particular seams. In addition thereto the resilient activity of the panel seating ledges effective between their respective sealed abutted ends renders these panel seams shock-proof against rupture.

Conveyor apparatus may be employed to form the closure as above described and partly illustrated in FIG. 1b wherein the containers are entrained in sequence on a bottom belt (not shown) which is augmented by a pair of opposed chains 20 suitably driven to synchronize with the travel of the belt. Cleat attachments are on the chains suitably spaced longitudinally and which may be of roller form 21 that contact the corner edges of the container side walls that keeps the container in square position as it is conveyed. The pair of segment margins 9 and 10 are folded as hereinbefore described and by any suitable means that will flatten them and be directed to slide under the thin blade 22 as described. The lid panel may be folded by a plough as the container progresses away from the blade 22. When the panel compresses the pair of ledges it passes under a preheated

belt that is driven to synchronize with the travel of the conveyed container. This belt 23 is shown in cross section in FIG. 1b and is utilized to heat and press the panel while the container is in motion. Alternatively, however, the closure forming elements may be preheated prior to being folded as by radiant heat employed for activating the seam forming surface areas as hereinbefore described. In such case the belt 23 need not be preheated. The flange 17 of the pressed panel is folded as hereinbefore described and by plough folding means. The container is then engaged between a pair of preheated rails 24 and each rail may be provided with a suitable type of chain 25 running in the rail and bearing upon the exterior surface of the folded flange and upon the upper marginal portion adjacent the corner end of the opposite side wall 6 of the container. The heat and pressure thus applied seals the container in the manner hereinbefore described. The co-acting effects of the closure seams formed is illustrated in FIG. 5. It will be seen that the firmly bonded seam of the flange 17 and sealed end abutments 13 and 13' of the panel seated ledges are constructed in transverse relationship to the flat plane of the lid panel 4. Therefore the wax-like film treated seams of the panel are maintained under constant seam bearing compression produced by the effects of the panel compressed ledges which keeps these weaker bonded seams tightly adhered in their respective seam formed relationship.

To open the container for dispensing purposes the flange 17 of the sealed closure is pulled outwardly to release it from the side wall 15 and then upwardly which orderly releases the lid panel 4 from the end edge 14 and ledge margins 10. This orderly release is made possible by the clean separation made of these particular seams formed with the relatively soft gasket-like film medium employed that parts from the opposing thermoplastic film material. Otherwise this latter film rather than separate from itself would tear and split its supporting paperboard material apart in order to effect the opening of the closure. The orderly release does not cause any damage to the closure formed elements thus leaving them useful for effective reclosing of the container after dispensing.

The reclosure is accomplished by inserting the flange 17 of the opened lid panel inwardly of the side wall 15 of the container as illustrated in FIG. 4. Then by pushing downwardly on the top corner end of the inserted flange causes its sloped edges 18 to shear the end abutments 13' of the pair of ledges loose from the inner face of the side wall 15 in order to allow the inserted member to be pushed home as illustrated in FIG. 6. This shearing release causes the superimposed ledges to spring upwardly and meet the lid panel while the flange becomes wedged by friction between the end edges 13' and inner plastic face of the side wall 15 as shown in FIG. 6. Accordingly, the up-springing ledges are again compressed downwardly in opposition to the lid panel which effectively seals the container between its dispensing periods. The friction grip of the flange into the side walls keeps the lid panel tightly engaged upon the upper margins 10 of the ledges. Therefore the product remaining in the container is afforded good protection against extraneous contaminating influences. The wax-like medium film on the margins 10 constitutes a gasket disposed non-adhered between the surfaces engaged as above described.

What is claimed is:

A container filled with a product, said container being formed of foldable sheet material coated on at least one side with a film of thermoplastic material, said container having four side walls and an end wall bearing said film on their inner faces, a closure for the end of said container opposite said end wall, said closure comprising a reversely folded element integral with each of two opposed side walls of the container, said element being folded along the upper edge of its respective side wall

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into a plane transverse to said side wall, the upper face of said element bearing said thermoplastic coating and the opposite end edges of said folded element abutting the thermoplastic coated inner faces of the opposed third and fourth side walls of the container, the thermoplastic coating serving as a result of the application thereto of heat and pressure to bond said opposite end edges of said elements to said third and fourth side walls respectively, a cover panel integral with said third side wall of said container and bearing said thermoplastic film on its inner face, said cover panel being folded along the upper edge of said third side wall into superposed relationship with said folded elements and the upper edge of said fourth side wall, a gasket-like layer of wax-like material between (a) the upper face of each of said folded elements and the upper edge of said fourth side wall and (b) the inner face of said cover panel, said wax-like material being blended cohesively as a result of the application thereto of heat and pressure with the surface of the thermoplastic film carried by said elements and said cover panel to form an air-tight seam between (a) said elements and fourth side wall and (b) said cover panel,

and a flange integral with and folded along the free edge of said cover panel into overlying relationship with the wax-free outer face of said fourth side wall, said flange bearing said thermoplastic film on its inner face, said thermoplastic film serving as a result of the application thereto of heat and pressure to securely bond said flange to the outer face of said fourth side wall in order to maintain said gasket-like seam intact, said seam affording a ready separation of (a) said element and fourth side wall and (b) said cover panel after the bond between said flange and fourth side wall is severed.

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