

Dec. 23, 1958

F. D. BERGSTEIN
CONTAINERS HAVING STRONG END CLOSURES
AND METHODS OF MAKING THEM

2,865,550

Filed March 8, 1954

4 Sheets-Sheet 1

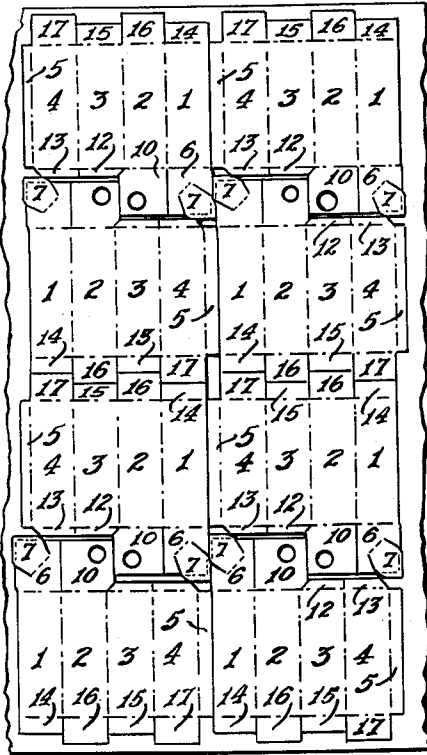


FIG. 10.

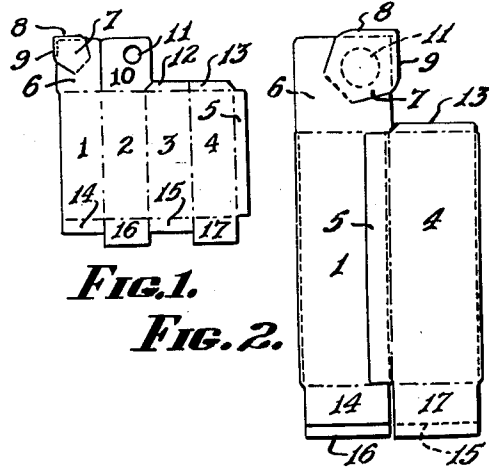


FIG. 1.

FIG. 2.

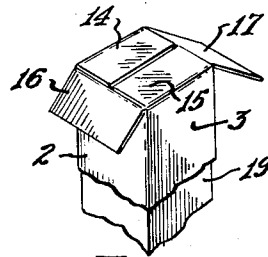


FIG. 3.

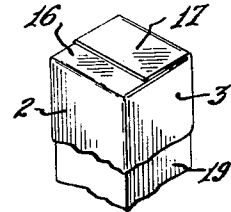


FIG. 4.

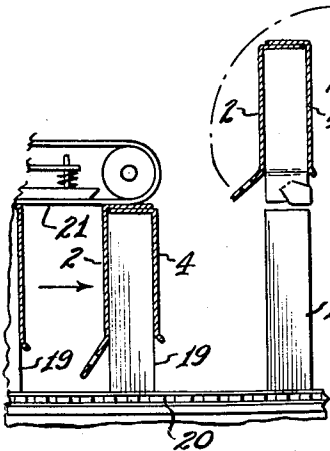


FIG. 5.

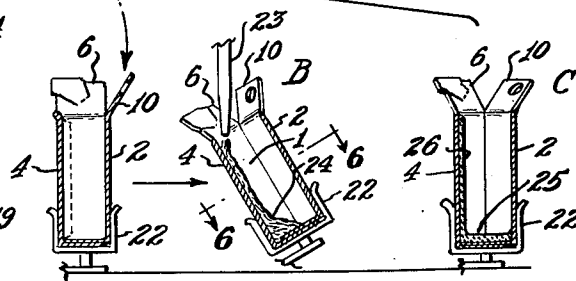


FIG. 6.

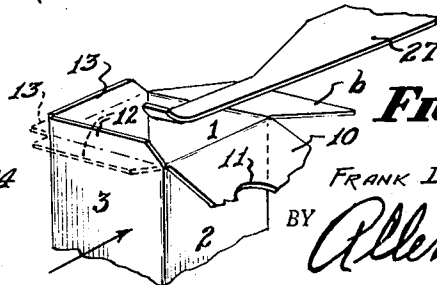


FIG. 7.

INVENTOR.
FRANK D. BERGSTEIN,

BY *Allen & Allen*

ATTORNEYS.

Dec. 23, 1958

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4 Sheets-Sheet 2

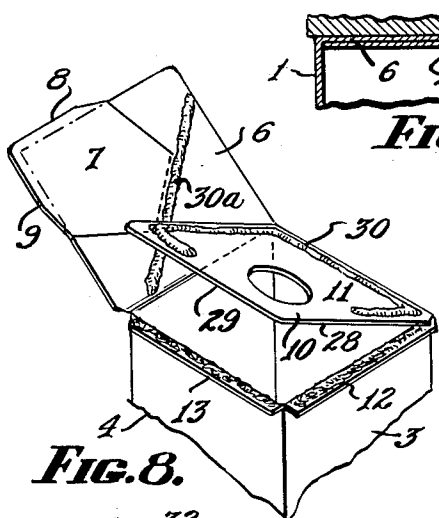


FIG. 8.

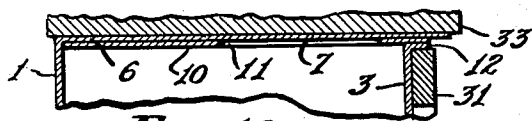


FIG. 10.

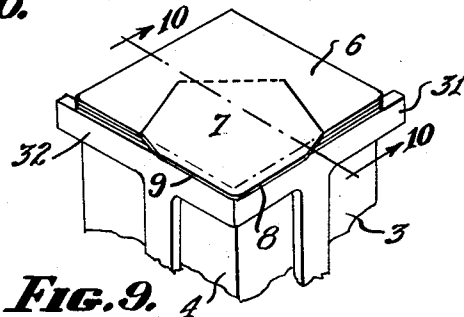


FIG. 9.

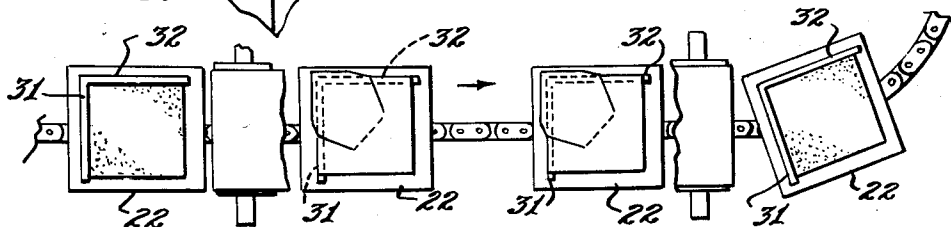


FIG. 11.

FIG. 12.

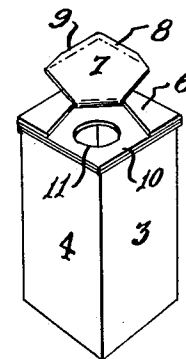
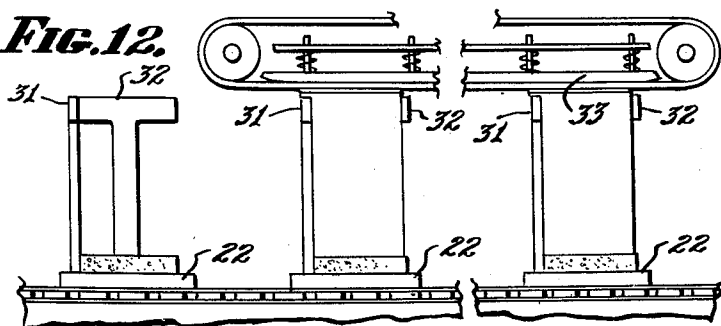


FIG. 13.

FIG. 14.

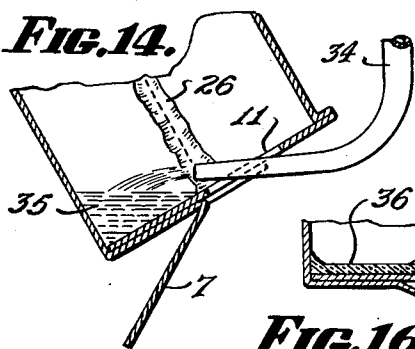


FIG. 15.

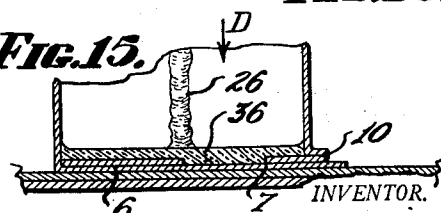
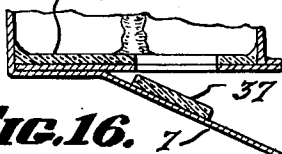


FIG. 16.



INVENTOR.
FRANK D. BERGSTEIN,
BY *Allen & Allen*
ATTORNEYS.

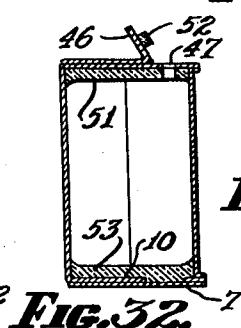
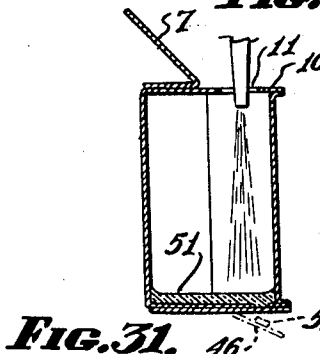
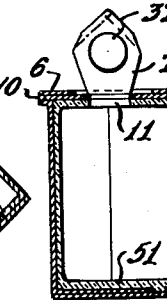
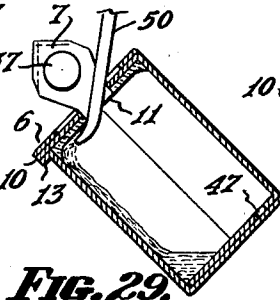
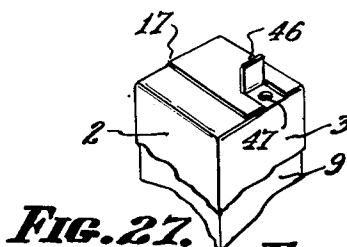
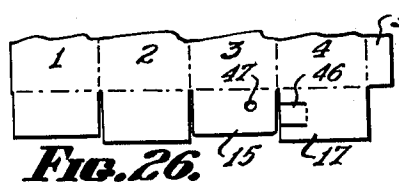
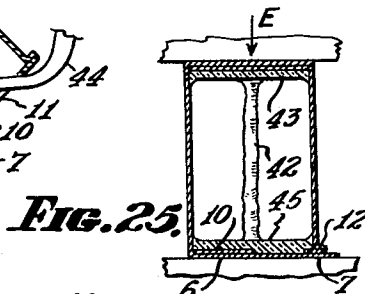
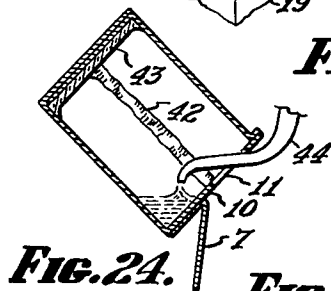
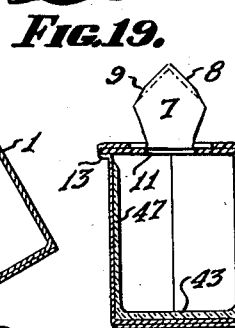
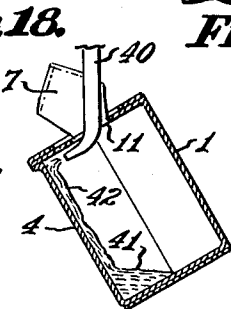
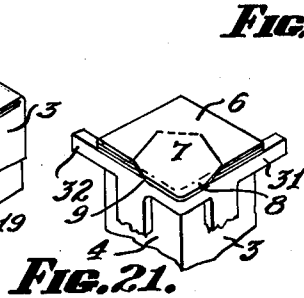
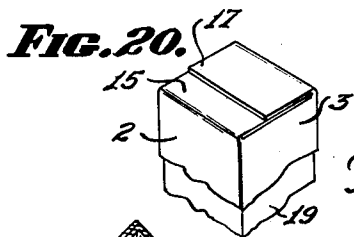
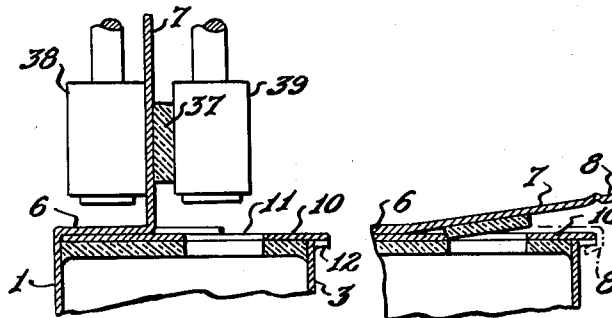
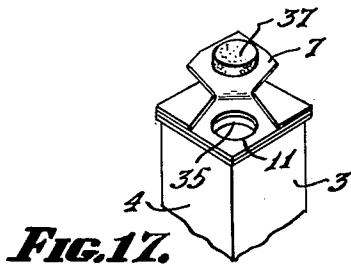
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4 Sheets-Sheet 3



INVENTOR.
FRANK D. BERGSTEIN,
BY *Allen & Allen*
ATTORNEYS.

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4 Sheets-Sheet 4

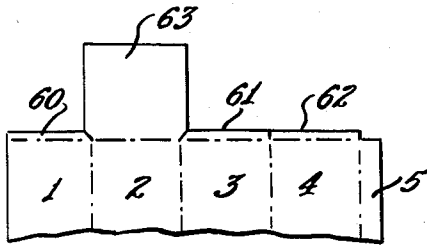


FIG. 34.

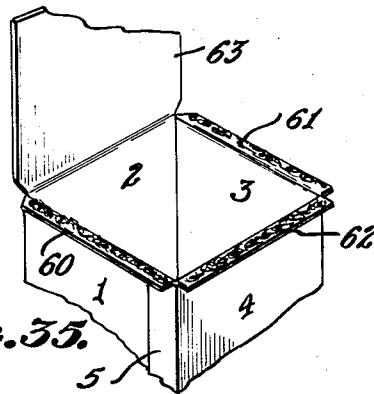


FIG. 35.

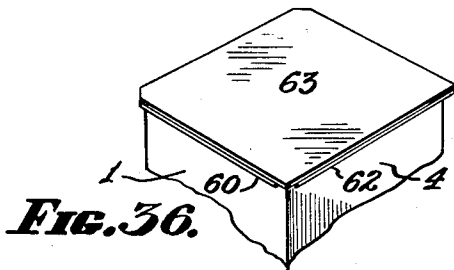


FIG. 36.

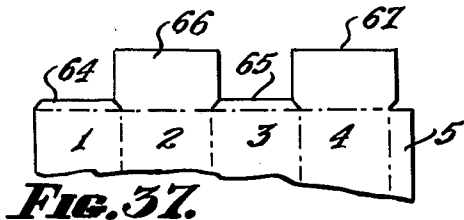


FIG. 37.

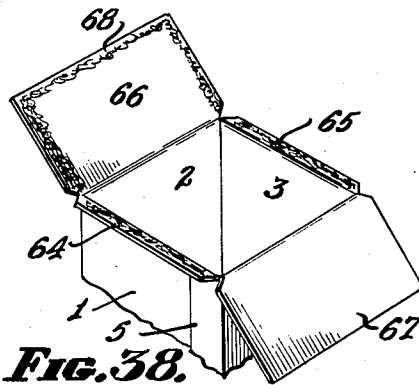


FIG. 38.

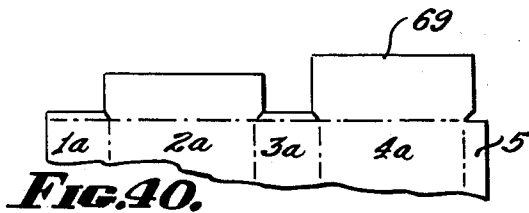


FIG. 40.

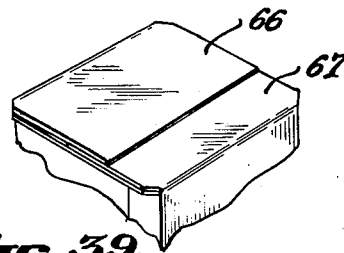


FIG. 39.

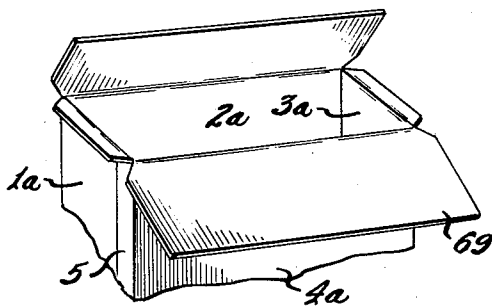


FIG. 41.

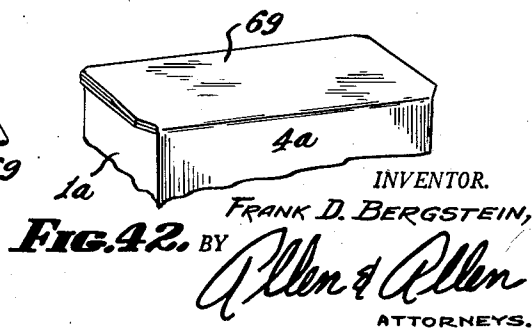


FIG. 42.

INVENTOR.
FRANK D. BERGSTEIN,
BY *Allen & Allen*
ATTORNEYS.

1

2,865,550

CONTAINERS HAVING STRONG END CLOSURES AND METHODS OF MAKING THEM

Frank D. Bergstein, Hamilton, Ohio, assignor to The Bergstein Packaging Trust, a trust composed of Robert M. Bergstein and Frank D. Bergstein, trustees

Application March 8, 1954, Serial No. 414,558

8 Claims. (Cl. 229—17)

My invention relates to paperboard containers and more particularly to containers of the seal-end type in which positive sealing pressure can be applied to both ends of the containers to provide extremely strong and exceptionally tight end closures.

In conventional seal-end containers, a strong end closure at one end of the container may be effected by forming the container over a mandrel and sealing the end against an internal support. However, internal supporting means cannot be utilized at the opposite end of the container and consequently sealing pressures applied to the remaining end of the container have, of necessity, been limited to pressures which can be sustained by the walls of the container. Since the closure flaps are not supported internally, extreme difficulty has been encountered since the innermost flaps have a tendency to bow inwardly resulting in an imperfect and usually fragile seal. Thus, in general, the prior art containers may be characterized as having at best one satisfactorily sealed end and one imperfectly sealed end.

In accordance with my invention, I provide a container construction in which both ends may be positively sealed under pressure. I achieve this condition by providing a container construction in which the closure flaps at one end of the container are so constructed that they may be sealed in face-to-face condition beyond the body walls of the container, rather than in the customary overlapped condition characterized above. I am thus able to use pressures to an extreme degree to effect the second end closure by means applied externally of the container body walls.

Containers formed in accordance with my invention possess a high degree of sift-proofness and may be readily utilized without liners or the like for the packaging of powdered, granular and similar siftable materials. The principle of my invention finds utility in the formation of liquid-tight containers and containers incorporating a pouring opening, and is of particular utility in the formation of dispensing cartons for milk and other liquid materials.

It is thus a principal object of my invention to provide a container construction characterized by strong end closures at both ends of the structure, the arrangement of parts being such that positive sealing pressure may be applied to the end closures to effect the positive sealing of the parts thereof.

It is a further object of my invention to provide container constructions particularly suited for the dispensing of liquid materials, the containers being provided with reclosable pouring openings formed integrally with the end closure.

It is yet a further object of my invention to provide improved procedures whereby containers of the character described may be erected, closed and sealed in an economical and facile manner.

These and other objects of my invention which will appear hereinafter or which will be apparent to the skilled worker in the art upon reading these specifications, I accomplish by that construction and arrangement of parts

2

and by those procedures of which I shall now describe certain exemplary embodiments.

Reference is now made to the accompanying drawings wherein:

5 Figure 1 is a plan view of a container blank in accordance with my invention.

Figure 1a is a plan view of a plurality of the container blanks illustrating the manner in which the blanks may be nested.

10 Figure 2 is a plan view of the blank of Figure 1 in tubed condition.

Figure 3 is a perspective view illustrating the closing of the bottom end of the container over a mandrel.

15 Figure 4 is a view similar to Figure 3 illustrating the completed end closure.

Figure 5 is a somewhat diagrammatical representation with parts in section of mechanism for closing the container bottoms and for introducing sealing material therein.

20 Figure 6 is a sectional view taken along the line 6—6 of Figure 5.

Figure 7 is a partial perspective view illustrating the movement of the erected container and the unfolding of certain of the end closure flaps.

25 Figure 8 is a perspective view illustrating the application of adhesive to the top closure flaps.

Figure 9 is a perspective view illustrating the top closure in completely folded condition.

30 Figure 10 is a sectional view taken along the line 10—10 of Figure 9.

Figure 11 is a diagrammatical plan view illustrating mechanism for effecting a tight top closure.

Figure 12 is a partial vertical elevation of the mechanism illustrated in Figure 11.

35 Figure 13 is a perspective view of an erected and closed container with the closure flap in lifted condition.

Figure 14 is a partial vertical sectional view illustrating the manner in which sealing material is introduced into the container through the pouring opening thereof.

40 Figure 15 is a partial vertical section illustrating the condition of the container top subsequent to the introduction of the sealing material.

Figure 16 is a partial vertical sectional view similar to Figure 15 but with the closure flap lifted to expose the pouring opening.

45 Figure 17 is a partial perspective view illustrating the container in completely sealed condition with the pouring opening uncovered.

Figure 18 is a partial vertical sectional view illustrating means effective to slightly enlarge the plug carried by the liftable closure flap.

50 Figure 19 is a partial perspective view similar to Figure 18 but illustrating the liftable flap in partially closed condition.

55 Figure 20 is a partial perspective view of the container bottom formed over a mandrel in accordance with an alternative method of sealing.

Figure 21 is a partial perspective view illustrating the formation of the top closure.

60 Figure 22 is a vertical section illustrating the introduction of sealing material into the opening in the top of the container.

Figure 23 is a vertical sectional view illustrating the container with its bottom end sealed.

65 Figure 24 is a vertical sectional view illustrating the introduction of sealing material for sealing the top end of the container.

Figure 25 is a vertical sectional view illustrating the final step of the sealing of the container.

70 Figure 26 is a partial plan view of the bottom closure for another form of carton blank.

Figure 27 is a partial perspective view illustrating the

formation of the bottom closure from the blank of Figure 26.

Figures 27 through 30 are vertical sectional views illustrating successive steps in the sealing of the container structure formed from the blank of Figure 26.

Figures 31 and 32 illustrate an alternative sealing procedure for the container of Figure 26.

Figure 33 is a partial perspective view illustrating the top of the completed container.

Figure 34 is a partial plan view of a seal-end type of carton formed in accordance with my invention.

Figure 35 is a partial perspective view of the blank of Figure 34 in tubed condition.

Figure 36 is similar to Figure 35 excepting with the end closure flaps in closed and sealed condition.

Figure 37 is a partial plan view of another form of seal-end type carton in accordance with my invention.

Figure 38 is a partial perspective view of the blank of Figure 37 in tubed condition.

Figure 39 is a perspective view of the carton of Figure 38 in closed and sealed condition.

Figure 40 is a partial plan view of a modified blank similar to the blank of Figure 37.

Figure 41 is a partial perspective view which shows the blank of Figure 40 in erected but unclosed condition.

Figure 42 is similar to Figure 41 and shows the carton in closed and sealed condition.

Referring now to Figure 1, I have therein illustrated a preferred contained blank for a pouring spout container comprising body walls 1, 2, 3 and 4 in side-by-side articulation in the order named, the body wall 4 bearing a glue flap 5, whereby the body walls may be tubed. At one end, which constitutes the top of the container, the body wall 1 carries a closure flap 6 provided with a liftable flap portion 7 having extending flanges 8 and 9. The body wall 2 is provided with a closure flap 10 having a pouring opening 11 formed therein. The body walls 3 and 4 are provided with narrow flaps or ledges 12 and 13, respectively. At their bottoms, the body walls 1 and 3 are provided with narrow closure flaps 14 and 15, whereas the body walls 2 and 4 are provided at their bottoms with wider closure flaps 16 and 17. The arrangement of the flaps at both ends of the body walls is such that the top and bottom closure flaps of adjacent blanks may be nested in the manner illustrated in Fig. 1a, thereby effecting a substantial savings in the amount of boxboard employed.

The blank of Figure 1 will be first tubed in the manner illustrated in Figure 2 wherein the attachment flap 5 is brought into adhesive engagement with the free edge of body wall 1. In accordance with my invention, the attachment flap 5 will lie to the outside of the body wall 1. The tubed body is then erected and placed over a mandrel with the bottom end uppermost for the formation of the bottom closure. I prefer to form the bottom over a mandrel since it provides a strong well-bonded end closure. Preferably, the operation will be performed as a part of a continuous operation, the tubed containers being placed over mandrels 19, as best seen in Figure 5, which may be moved along in a predetermined path of travel as by means of chains 20. Suitable sweep means or similar mechanism will be provided to infold the bottom closure flaps together with means for applying adhesive to the closure flaps. As seen in Figure 3, it is preferred to first infold the closure flaps 14 and 15, whereupon closure flap 16 will be infolded followed by closure flap 17, with the interposition of adhesive between contacting areas of the several flaps. Subsequent to the infolding of the closure flaps, a pressure means, as indicated at 21 in Figure 5, is applied to the ends of the containers to assure a tight bond between the closure flaps.

Following the formation of the bottom end closure, the containers are removed from the mandrels in the manner diagrammatically illustrated at A in Figure 5, the containers being uprighted and placed on moving supports or

cages 22. This operation may be performed automatically by means of gripping members adapted to grip the containers, lift them upwardly from the mandrels and then invert them and position them on the moving supports. Or it may be done by hand, an operator being stationed adjacent the end of the flight of the mandrels 19. It will be understood that the moving support or cages 22 constitute a second machine section in which the containers travel in a predetermined path.

It will be noted that the containers are placed on the moving supports or cages 22 with the body wall 2 facing in the direction of motion of the moving supports, with the body wall 4 rearmost. The support is then turned through an angle of substantially 45° and tilted rearwardly in the manner illustrated at B in Figure 5, so as to place the corner edge of the container between the body walls 1 and 4 rearmost, whereupon a spout or nozzle 23 is inserted into the container adjacent the top of the rearmost edge thereof and a quantity of sealing substance deposited therein, the sealing substance being permitted to run down the corner edge of the container to form a pool in the bottom thereof, as indicated at 24. The container is then uprighted, as seen at C in Figure 5 thereby causing the pool of sealing substance to flow across the end of the container to form an end seal. The carton will be retained in the position illustrated for a time sufficient to permit the sealing substance to set, thereby forming an interior end casting 25. The introduction of the sealing substance adjacent the top edge of the carton results in a longitudinal bead 26 of sealing substance extending along the corner edge of the carton which includes the free edge of body wall 1, thereby completely internally sealing the exposed edge of the body panel 1. This is in accordance with the teachings of my co-pending application Serial No. 331,441, now Patent No. 2,754,044, filed January 15, 1953 and entitled Carton Sealed by Internal End Flooding.

Following the upright of the container to the position illustrated at C in Figure 5, the closure flaps at the top of the container will be outfolded by sweep means or other means suitable for this purpose. In Figure 7, I have illustrated a sweep 27 as exemplary of a means capable of outfolding the narrow flaps 12 and 13, the closure flaps 6 and 10 having been previously outfolded by means not shown. Subsequent to the outfolding of the top closure flaps adhesive will be applied to the exposed upper surfaces of the narrow flaps or ledges 12 and 13 in the manner illustrated in Figure 8, whereupon the closure flap 10 will be infolded to overlies the narrow flaps 12 and 13. To this end, it will be understood that the edges 28 and 29 of closure flap 10 are adapted to extend beyond the body walls 3 and 4 of the container and overlies the outfolded narrow flaps 12 and 13, thereby defining a pouring lip along the edges of the container adjacent the pouring opening 11. Alternatively, adhesive may be applied to the edges 28 and 29 of closure flap 10 rather than to the flaps 12 and 13. Adhesive will also be applied to the upper surface of closure flap 10 in areas thereof free from contact with the liftable flap portion 7 of the closure flap 6, so that upon subsequent infolding of closure flap 6, the closure flap 6 but not the liftable flap portion 7 thereof will be adhered to the intermediate closure flap 10. Preferably, the adhesive will be applied in the form of a marginal stripe 30, as illustrated in Figure 8. In this case, it is desirable to provide a diagonal stripe of adhesive 30a to the undersurface of closure flap 6.

During the infolding and sealing of the top closure flaps, the narrow outfolded flaps 12 and 13 are supported from beneath so that upon infolding of the flaps 10 and 6, positive pressure may be applied to effect a tight seal between the parts. To this end, I provide supporting bars 31 and 32 adapted to support the narrow flaps 12 and 13 from beneath so that sealing pressure may be applied against them, as by means of an overhead pressure plate

33. As best seen in Figure 11, the supporting bars 31 and 32 may be formed as a part of the moving supports or cages 22, and hence the outfolding of the flaps 12 and 13, as illustrated in Figure 7, may be effected over the supporting bars. Alternatively, the supporting bars 31 and 32 may comprise a separate mechanism to which the containers are transferred subsequent to the formation of the bottom seal. In either event, the supporting bars will permit the application of positive sealing pressure between the flaps 12 and 13, and the edges 28 and 29 of closure flap 10 as well as between the edges 28 and 29 and the corresponding edges of flap 6. With two edges of the top closure thus sealed under positive pressure and the remaining edges formed integral with the body walls, an extremely strong top closure is provided.

Following the sealing of the top end of the container, the container will be removed from the support or cage in which it was traveling and the liftable flap portion 7 opened in the manner illustrated in Figure 13, whereupon the container will be inverted to the position illustrated in Figure 14 for proofing.

In my Patent No. 2,543,757, dated March 6, 1951, and entitled Sealed Carton and Method, I have taught the provision of a liquid-tight carton in which the carton ends are sealed by interior end flooding, the carton being provided across its ends with relatively thick castings of sealing substance which bond with the ends of the carton body walls to provide imperforate end closures. Similarly, in accordance with the teachings of my Patent No. 2,549,048, dated April 17, 1951, and entitled Liquid Tight Carton and Method, one of the end closures may be provided with a pouring opening covered externally by a liftable flap member, and the arrangement is such that the lifting of the flap member subsequent to the formation of the interior end casting will result in the fracture of the casting along a line determined by the periphery of the pouring opening, so that a plug-like element of the casting comes away with the lifted flap, thereby providing a plug which may be reinserted in the pouring opening. The sealing principle of these patents provides an excellent proofing medium for the container just described.

To this end, the container will be tilted in the manner illustrated in Figure 14 so that the curved nozzle 34 inserted through pouring opening 11 may deposit an increment of sealing material 35 on the interior end of the container below the pouring opening. The nozzle 34 is then withdrawn and the liftable flap portion 7 closed so as to cover the pouring opening, whereupon the container is uprighted to the position illustrated in Figure 15, thereby causing the increment of sealing material 35 to flow across the container end to form a casting 36. It will be apparent that the sealing material will flow into the pouring opening 11 and bond to the exposed under surface of the liftable flap portion 7. It is also preferable to apply pressure, as indicated by the arrow D in Figure 15, to the uppermost, bottom end of the carton to assure tight juxtaposition of the liftable flap portion 7 to the underlying closure flap 10, thereby preventing the sealing material from flowing outwardly from the pouring opening between the closure flap 10 and the underlying liftable flap portion 7. After the sealing material has set or hardened to form the casting 36, the liftable flap portion 7 may be lifted, as illustrated in Figure 16, to form the closure plug 37, the casting 36 being severed about the periphery of the pouring opening 11 for this purpose in the manner taught in my said last mentioned co-pending application. The completed carton with the liftable flap portion 7 raised to expose the closure plug, is illustrated in Figure 17.

I have also found it advantageous to apply pressure to the closure plug 37 to expand it slightly so that it will make a tight fit with the pouring opening on re-closure of the liftable flap portion. To this end, a roller 39 may be provided to support the flap portion 7 and a

roller 39 provided for contact with the closure plug 37. The roller 39 will be preferably covered with Teflon or similar material to which the sealing substance from which the plug is formed will not adhere. The pressure applied to the plug by the roller 39 will be relatively light so as to not distort the plug but simply to expand it slightly so that it will fit tightly into the pouring opening upon re-closure of the liftable flap portion in the manner illustrated in Figure 19.

It will also be evident from Figure 19 that upon filling of the container and re-closure of the liftable flap portion, the extending flanges 8 and 9 will be folded about the extending edge portions or lips defined by the narrow closure flaps 12 and 13 and the extending edges 28 and 29 of overlying closure flap 10. There is thus provided a pouring lip extending along the edges of the container adjacent the pouring opening made up of two plies of board bonded together by glue; and this construction provides an extremely strong pouring lip about which the flanges 8 and 9 may be folded to provide a sanitary cover for the pouring opening and the lip portions over which the contents of the container will flow.

The sealing substance employed to proof the interior end of the container does not constitute a limitation on my invention; and there are a large number of materials which may be employed. The sealing substance should, however, be one which bonds readily with the carton walls, and it is preferably one which can be rendered highly fluid by solvent or heat. It should, in itself, possess the desired qualities of proofness when set. Non-brittle waxes like the micro-crystalline waxes are satisfactory alone or in admixture with paraffin; and excellent results may be obtained by adding resinous substances such, for example, as polybutenes, chlorinated terphenyls, and others to impart toughness and resilience. I am not, however, restricted to this class of sealing substance, but may, by way of further example, employ solvent solutions of cellulosic substances and the like.

In Figures 20 through 25 of the drawings, I have illustrated an alternative method of sealing a container in accordance with my invention, and it will be understood that this method may be carried out employing mechanism similar to that described in connection with the procedures set forth hereinbefore. In this instance, the bottom end of the container is first sealed over a mandrel, in the manner illustrated in Figure 20, whereupon the carton is inverted and the top closure flaps adhesively secured together employing the supporting bars 31 and 32, thereby providing a very strong bond between the parts of the top closure without having to go inside the container. Thereafter, the liftable flap portion 7 is raised and the carton tilted in the manner illustrated in Figure 22, whereupon a curved nozzle 40 is inserted through the pouring opening 11 and filling material introduced into the carton, the sealing material flowing down the inclined corner edge thereof to form a pool 41 and a longitudinal bead of sealing substance 42. The carton is then uprighted to the position illustrated in Figure 23 so as to permit the pool of sealing substance to spread across the bottom of the container where it will set or harden to form the interior end casting 43. The carton is then inverted to the inclined position illustrated in Figure 24 and adhesive introduced through nozzle 44 into the corner of the container adjacent the pouring opening, and this is followed by closing the liftable flap portion 7 and uprighting the container to the position illustrated in Figure 25, whereupon pressure, indicated by the arrow E is applied to the upper or bottom end of the container, thereby maintaining the liftable closure flap 7 in tight contact with the underlying closure flap 10 and permitting the formation of the end casting 45. This procedure, as will be evident, differs from the first described procedure in that here both increments of filling material, i. e., both the top and bottom end cast-

ings, are introduced into the closed container through the pouring opening 11.

In Figure 26, I have illustrated a container blank similar to that illustrated in Figure 1 excepting here the bottom closure flap 17 is provided with a liftable tab portion 45 and closure flap 15 is provided with an opening 47 adapted, when the closure flaps are juxtaposed, to underlie the liftable tab 46, thereby providing an access opening to the interior of the container through the bottom closure thereof.

Where this container construction is employed, the container bottom is first sealed, in the manner illustrated in Figure 27, a mandrel being employed for this purpose as in the preceding embodiments. However, care is taken to avoid adhesive attachment of the liftable tab 46 to the underlying closure flap. Following the formation of the bottom end closure, the carton will be inverted and the top closure flaps adhesively secured together in the manner already described, whereupon the carton is inverted, i. e., placed with the top closure extending downwardly, and sealing material is introduced into the container by means of a nozzle 48 inserted through the opening 47 in the bottom closure, thereby forming an interior end casting 49 extending across the top of the container. The container is then inverted, the liftable flap portion 7 raised to expose the closure plug 37 and a curved nozzle 50 inserted into the container through the pouring opening 11, the container being tilted to the position illustrated in Figure 29, whereby the sealing material introduced through the nozzle 50 will flow down the lowermost side edge of the container to form a pool adjacent the bottom thereof. The container is then erected to the position illustrated in Figure 30 to form the end casting 51, which, it will be noted, also covers and seals the opening 47. It will be obvious that the liftable tab portion 46 will be closed prior to the introduction of sealing material into the container by means of the nozzle 50.

Figures 31 and 32 illustrates yet another variation in the sealing procedure wherein, as seen in Figure 31, the bottom end seal 51 is effected through the pouring opening 11, whereupon the liftable tab 46 is raised to expose the opening 47 and sealing material thereafter introduced into the container through the opening 47 to seal the remaining or top end of the container, providing an end casting 53. Following the introduction of sealing material through the opening 47, the liftable tab portion 46 carrying plug 52 will be reclosed to complete the closure. It will be understood that upon re-closure of the liftable tab 46, heat may be applied to the carton end to fuse the plug 52 to the casting 51.

It will be apparent that each of the procedures described results in a container construction in which the ends are rendered liquid-tight by means of the castings of sealing substance extending thereacross and bonding to the ends of the carton body walls. The body walls will, of course, be formed from material which is inherently proofed or which has been proofed as to its interior surfaces at least with a suitable proofing material. The structure is exceedingly sturdy in that the parts of both the top and bottom end closures are positively sealed together under pressure, thereby assuring a tight bond between the parts.

Thus far I have described my invention as it would apply to a reclosable container construction wherein the outfolded flanges serve the dual purpose of providing a strong end closure as well as a pouring lip for the opening in the container top. In Figure 34 I have illustrated a blank for an ordinary tubular container incorporating the out-turned ledge construction. As before, I provide body walls 1, 2, 3 and 4 in articulation and a glue flap 5. In this instance, the body walls 1, 3 and 4 are provided with narrow flaps or ledges 60, 61 and 62, respectively, and the body wall 2 is provided with an enlarged closure flap 63. The closure flap 63 is of a

size to cover the end of the carton body with its edge portions overlying the out-turned ledges 60, 61 and 62. Upon erection of the carton body, the ledges will be turned outwardly, as best seen in Figure 35, and adhesive will be applied to the out-turned ledges, whereupon the closure flap 63 will be folded to overlie the out-turned ledges and secured thereto under pressure, the container thus assuming the condition illustrated in Figure 36. It will be understood that supporting bars such as those illustrated at 31 and 32 in Figure 9 will be provided to support the out-turned ledges from beneath for positive sealing.

It will be apparent that the construction just described provides an exceedingly strong end closure, and such construction may be employed at one or both ends of the container body. While the embodiment just described employs a single full width flap and three narrow out-turned flaps, it will be understood that other arrangements may be employed. For example, in Figure 37 I have illustrated a construction wherein opposed body walls 1 and 3 of a conventional tubular carton carry narrow flaps 64 and 65, whereas body walls 2 and 4 carry overlapping flaps 66 and 67. The flaps 66 and 67 will be of a width greater than the width of the container so as to overlie the opposed narrow flaps 64 and 65. In sealing the end closure, adhesive will be applied to the out-turned narrow flaps 64 and 65 and to marginal edge portions of flaps 66, as indicated at 68.

Figures 40 through 42 illustrate the application of the teachings of my invention to a rectangular carton having narrow body walls 1a and 3a and relatively wide body walls 2a and 4a. In this instance the closure flap 69 may be of a width sufficient to extend completely across the top of the carton.

From the foregoing description, it will be apparent that my construction not only provides end closures which may be sealed under positive pressure, the construction is one which is formed by simple folding operations not dependent upon special machinery for crimping or rolling of the parts. Yet the structure is such that a face-to-face seal is achieved, thereby assuring a positive closure. In addition, where a reclosable pouring opening is provided, the extending flanges provide a convenient, reinforced pouring lip which also serves as an excellent rim about which the flanges on the liftable cover may be folded to secure them in the closed condition.

Modifications may, of course, be made in my invention without departing from the spirit of it.

Having, however, described my invention in certain exemplary embodiments, what I desire to secure and protect by Letters Patent is:

1. A one-piece paperboard container having walls defining an open ended tubular body, each wall at one of said open ends having a flap hingedly connected to the end edge of said wall, said flaps forming an end closure for said tubular body, the flaps on two of the walls which are in edge contacting relation being narrow and folded outwardly at substantially right angles to the last named walls, the flap hinged to a third wall opposite one of said last named walls being enlarged to completely cover the open end of said tubular body with two of its edges coinciding with the outer edges of the said narrow flaps and secured thereto, the flap hinged to the fourth wall of the container also being enlarged and of a size to cover the third named flap, said fourth flap having extensions projecting beyond the edges of said narrow flaps, said extensions defining the edges of a liftable tab formed in the fourth named flap, said fourth named flap being secured to said third named flap excepting for the liftable tab formed therein, and a pouring opening in said third named flap underlying the said liftable tab, the extensions of said liftable tab being foldable about the underlying edges of said third named flap and said narrow flaps when said end closure is in sealed condition, the

last named edges of said third named flap defining a pouring lip for said container.

2. The structure claimed in claim 1 including an interior end casting of solidified sealing substance covering the interior surfaces of said end closure and bonded to adjoining marginal end portions of the container walls, said casting projecting through said pouring opening and bonded to the undersurface of said liftable tab, whereby when said liftable tab is raised, said casting will fracture along a line substantially determined by the periphery of said pouring opening to form a plug-like element adapted to fit into the resultant opening in said casting upon the reclosing of said liftable tab.

3. A process of sealing containers which comprises providing a knock-down container having a tubular body and end closure means, the closure means at the bottom end of the container comprising a plurality of flaps adapted to be folded into superposed position, and at the top end comprising a pair of narrow flaps adapted to be folded outwardly to define extending ledges, a third flap containing a pouring opening and having portions adapted to overlie said narrow flaps, and a fourth flap adapted to overlie said third flap and having a liftable flap portion for covering the pouring opening, erecting said container and closing the bottom closure flaps over a mandrel, removing the container from the mandrel and positioning it with the closed bottom end lowermost, introducing into the container a quantity of sealing substance sufficient to cover the closed bottom end interiorly with a casting of the sealing substance bonded to end portions of the tubular body, folding the flaps at the top end of the container including the step of supporting the narrow outfolded flaps from beneath and applying pressure to the third and fourth flaps to cause them to be pressed into tight contact with each other and with said narrow flaps, inverting the container to place the top end lowermost and tilting it toward a corner edge thereof with the liftable portion of the fourth flap raised, introducing molten sealing substance into the tilted corner edge of the container through the pouring opening, closing the said liftable flap portion and up-righting the container, whereby to permit the molten sealing substance to flow across the interior surface of the top closure.

4. A process of sealing containers which comprises providing a knock-down container having a tubular body and end closure means, the closure means at the bottom end of the container comprising a plurality of flaps adapted to be folded into superposed position, and at the top end comprising a pair of narrow flaps adapted to be folded outwardly to define extending ledges, a third flap containing a pouring opening and having portions adapted to overlie said narrow flaps, and a fourth flap adapted to overlie said third flap and having a liftable flap portion for covering the pouring opening, erecting said container and closing the bottom end closure flaps over a mandrel, removing the container from the mandrel, folding the closure flaps at the top end of the container including the step of supporting the narrow outfolded flaps from beneath and applying pressure to the third and fourth flaps to cause them to be pressed into tight contact with each other and with said narrow flaps, positioning the container with the bottom end lowermost and introducing into the container through the pouring opening in the top end thereof a quantity of sealing substance sufficient to cover the closed bottom end interiorly with a casting of sealing substance bonded to end portions of the tubular body, inverting the container to place the top end lowermost and tilting it toward a corner edge thereof with the liftable flap portion of the fourth flap raised, introducing molten sealing substance into the tilted corner edge of the container through the pouring opening, closing the said liftable flap portion and up-righting the container, whereby to permit the molten

sealing substance to flow across the interior surface of the top closure of the container.

5. A process of sealing containers which comprises providing a knock-down container having a tubular body and end closure means, the closure means at the bottom end of the container comprising a plurality of closure flaps adapted to be folded into superposed position, an inner one of said flaps having a perforation therein closed by a liftable tab in an overlying closure flap, the closure means at the top end of the container comprising a pair of narrow flaps adapted to be folded outwardly to define extending ledges, a third flap containing a pouring opening and having portions adapted to overlie said narrow flaps, and a fourth flap adapted to overlie the third flap and having a liftable flap portion covering the pouring opening, erecting the container and closing the bottom closure flaps over a mandrel with the liftable tab portion free from attachment to the underlying perforated closure flap, removing the container from the mandrel and folding the flaps at the top end thereof, including the step of supporting the narrow outfolded flaps from beneath and applying pressure to the third and fourth flaps to cause them to be adhered to each other and to said narrow flaps, positioning the container with the top end lowermost, lifting the tab in said bottom closure to uncover the perforation therein and introducing through the perforation a quantity of sealing substance sufficient to cover the top closure interiorly with a casting of the sealing substance bonded to end portions of the tubular body, inverting the carton to position the top end closure uppermost and lifting the liftable flap portion, whereby to effect an opening through the end casting exposing said pouring opening, and thereafter introducing through the said pouring opening a quantity of sealing substance sufficient to cover the bottom closure of the carton interiorly with a casting of sealing substance bonded to end portions of the tubular body.

6. A process of sealing containers which comprises providing a knock-down container having a tubular body and end closure means, the closure means at the bottom end of the container comprising a plurality of closure flaps adapted to be folded in superposed position, an underlying one of said flaps having a perforation therein covered by a liftable flap in an overlying one of said closure flaps, the closure means at the top end of the container comprising a pair of narrow flaps adapted to be folded outwardly to define extending ledges, a third flap containing a pouring opening and having portions adapted to overlie said narrow flaps, and a fourth flap adapted to overlie said third flap and having a liftable flap portion covering the said pouring opening, erecting the container and closing the bottom closure flaps over a mandrel with the liftable tab free from attachment to the underlying closure flap containing the perforation, removing the container from the mandrel and folding the closure flaps at the top end of the container, including the step of supporting the narrow outfolded flaps from beneath and applying pressure to the third and fourth flaps to cause them to be adhered to each other and to the narrow flaps, positioning the container with the bottom closure lowermost and introducing into the container through the pouring opening in the top closure a quantity of sealing substance sufficient to cover the bottom closure interiorly with a casting of sealing substance bonded to end portions of the tubular body, inverting the container to place the bottom closure uppermost and lifting the liftable tab therein, whereby to effect an opening through the interior end casting at the bottom of the container, and thereafter sealing the top end of the container by introducing into the container through the last named opening a quantity of sealing substance sufficient to form an interior end casting extending across the top end closure and bonding to end portions of the tubular body.

11

7. A process of sealing containers which comprises providing a knock-down container having a tubular body and end closure means, the closure means at one end of the container comprising a pair of narrow flaps adapted to be folded outwardly to define extending ledges, a third flap containing a pouring opening and having edge portions adapted to overlie said narrow flaps, and a fourth flap adapted to overlie said third flap and having a liftable portion for covering the pouring opening, erecting the container, folding the flaps at the end just described including the step of supporting the narrow outfolded flaps from beneath, applying pressure to the third and fourth flaps to cause them to be pressed into tight contact with each other and with said narrow flaps, introducing sealing substance into the container to form a casting extending across the closed end thereof interiorly of the container, thereafter lifting the liftable flap portion of the fourth flap to effect an opening through the said casting exposing the pouring opening and providing a plug a sealing substance secured to said liftable flap portion, and applying pressure to said plug to cause it to be slightly expanded, whereby upon reclosing of said liftable flap portion, said plug will be tightly received in the said opening.

8. In a process of sealing a container by means of an interior end casting, the steps of providing a carton having a tubular body and an end closure including a closure flap having a pouring opening therein and a liftable flap member covering said pouring opening, positioning said container with the said end closure lowermost and tilting the container toward a corner edge

12

thereof with said liftable flap member open, introducing liquified sealing substance into the tilted corner of the container through the pouring opening, closing said liftable flap member and uprighting the container, whereby to permit the liquified sealing substance to flow across the interior end of said end closure including the portion of the liftable flap exposed by the pouring opening, and permitting the sealing substance to solidify to provide an end casting bonded to the inner surface of the said end closure, the exposed portion of the liftable flap, and marginal edge portions of the container body walls immediately adjacent said end closure.

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