

Feb. 4, 1947.

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2,415,323

METHOD OF MAKING CONTAINERS

Filed June 20, 1940

3 Sheets-Sheet 1

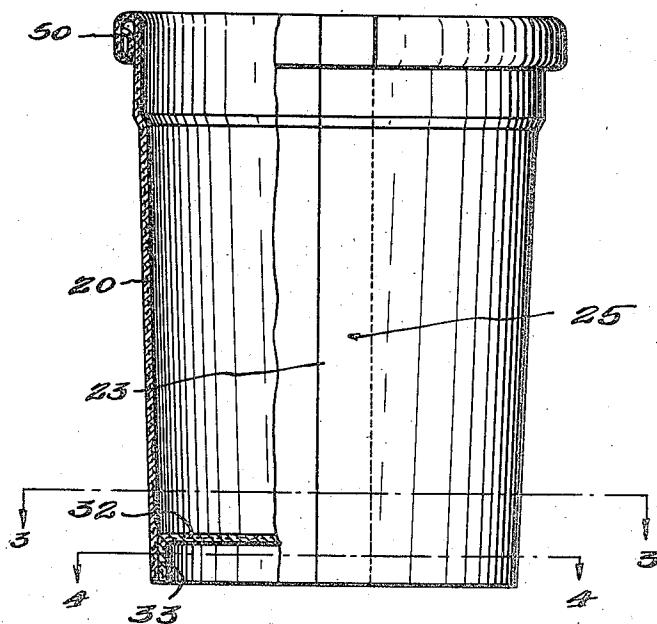


Fig. 1

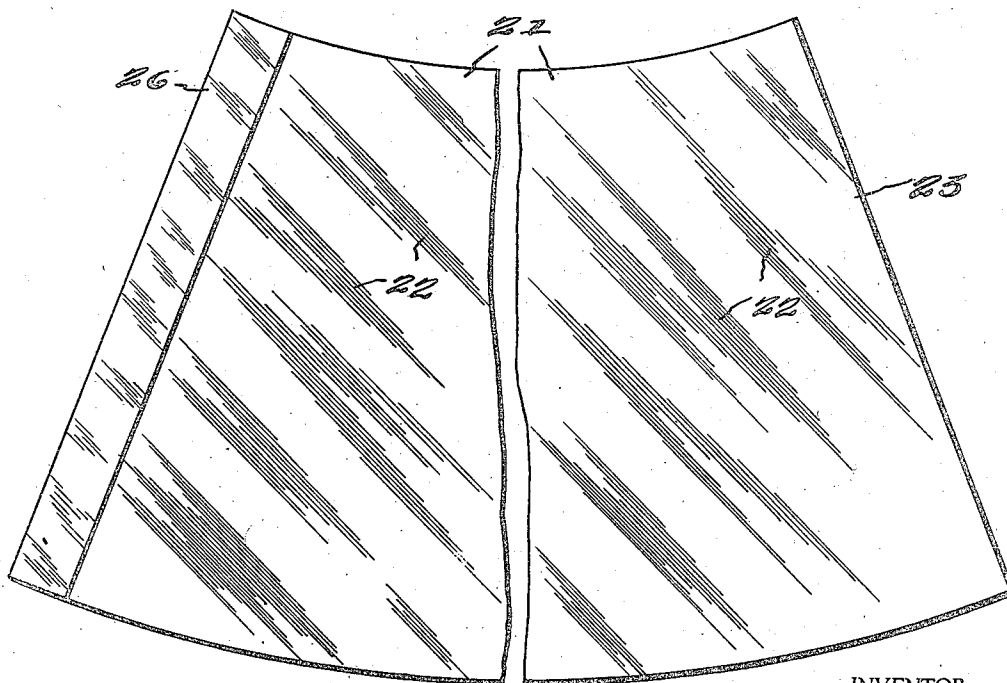


Fig. 2 BY

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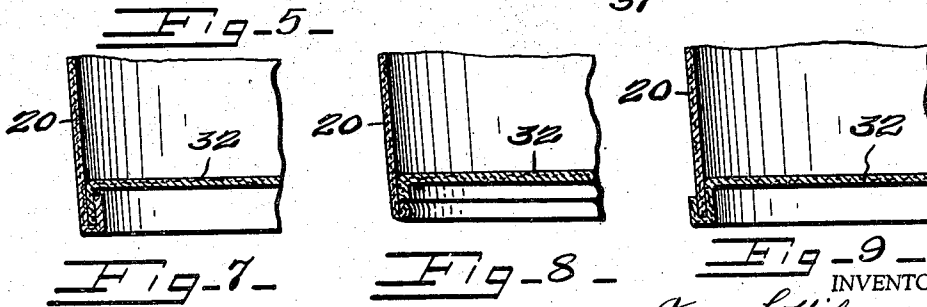
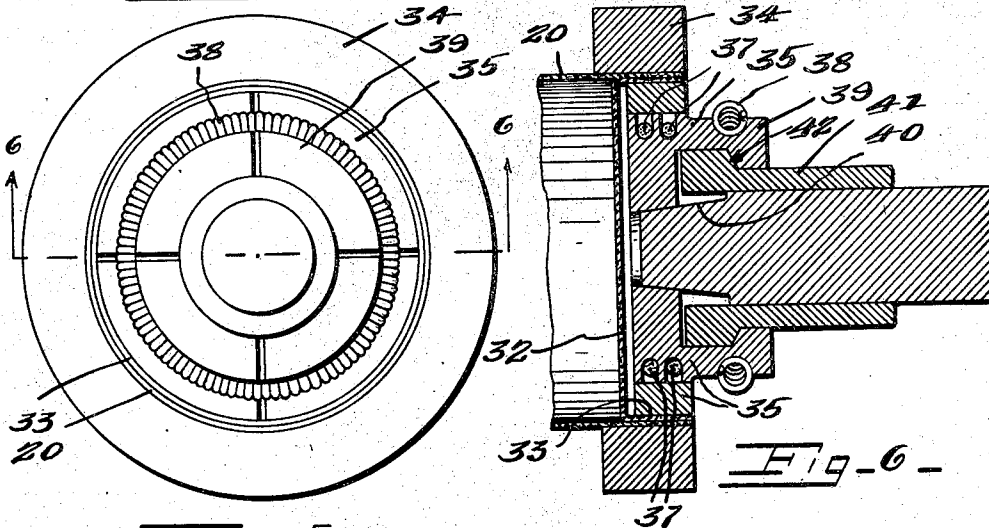
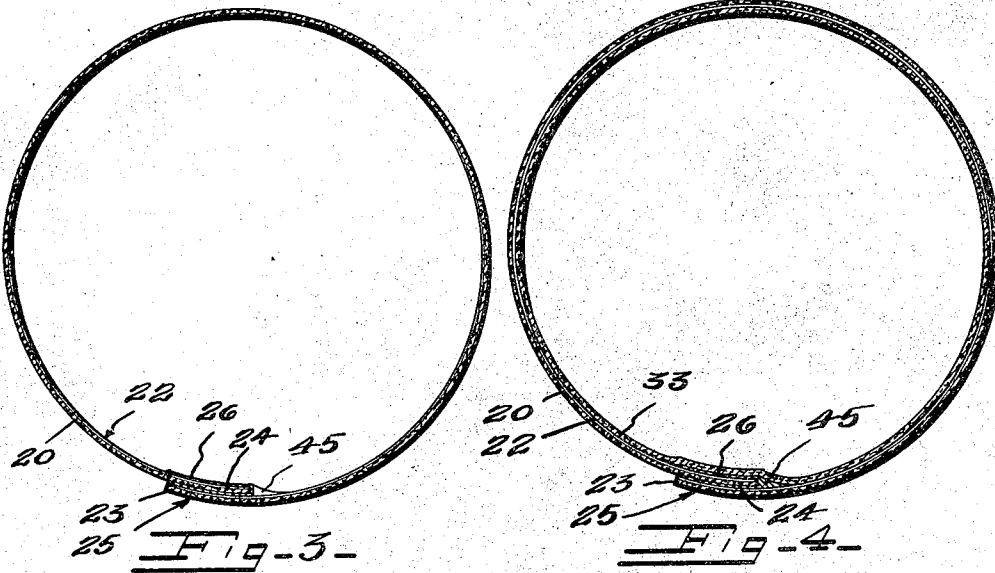
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3 Sheets-Sheet 2



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METHOD OF MAKING CONTAINERS

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3 Sheets-Sheet 3

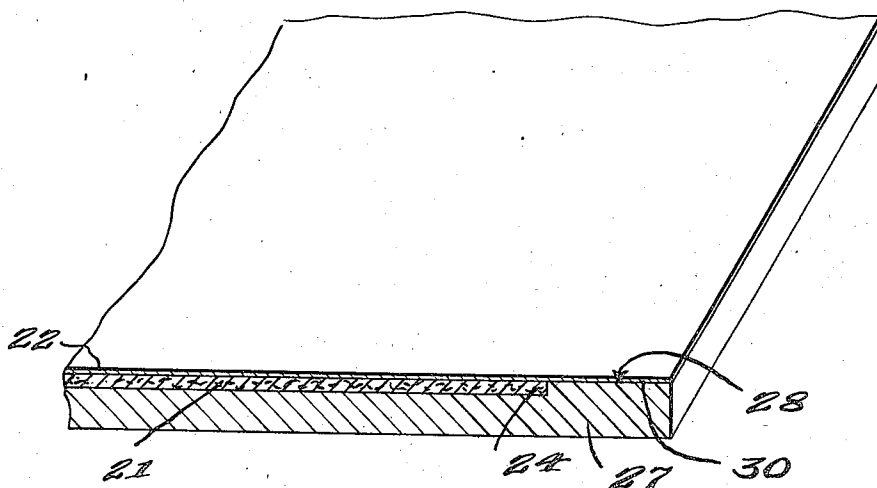


Fig. 10.

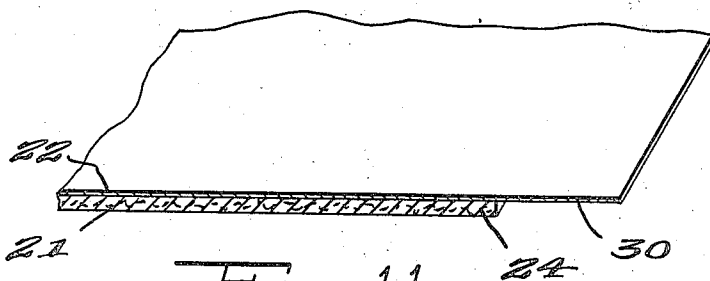


Fig. 11.

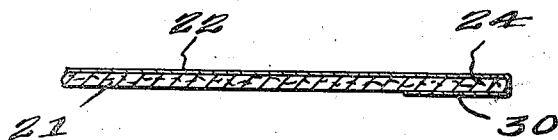


Fig. 12.

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UNITED STATES PATENT OFFICE

2,415,323

METHOD OF MAKING CONTAINERS

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3 Claims. (Cl. 93—39.1)

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This invention relates to a container particularly intended for food products involving a novel construction, and to the method of making the container. In its more limited aspects, this invention has to do with the method of making containers formed of fibrous material, such as paper board, the body of the container being formed from a blank which is bent or shaped to tubular form with the side edges of the blank arranged in overlapping relation, the invention having to do particularly with a method and construction by means of which the container is rendered entirely impervious to water and other liquids.

The invention has as an object a container of the type referred to wherein the entire inner surface of the container is provided with an impervious coating, and a method whereby said coating is applied and the container fabricated in a particularly economical manner.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevational view, partly in section, of a container embodying my invention.

Figure 2 is a top plan view of the coated blank from which the body of the container is formed.

Figure 3 is a view taken on line 3—3, Figure 1.

Figure 4 is a sectional view taken on line 4—4, Figure 1.

Figure 5 is a top plan view of one form of tooling which may be employed in the fabrication of the container.

Figure 6 is a sectional view taken on line 6—6, Figure 5 and including a contiguous portion of the container.

Figures 7, 8 and 9 are fragmentary sectional views of the bottom portion of the container illustrating different end closure structures.

Figure 10 is a fragmentary perspective view illustrating one method by which the coating may be applied to the body blank.

Figure 11 is a fragmentary perspective view of the body blank to which the coating has been applied on one side after the manner shown in Figure 10.

Figure 12 is a view, similar to Figure 11, illustrating the coating folded over one side edge of the blank.

At the present time containers formed of fibrous or absorbent material, such as paper board

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and commonly referred to as paper containers, are coated on at least the interior surface with a substance tending to make the container impervious to liquids, such as water and milk. It has been universal practice to obtain this coating by dipping or submerging the completed containers in a bath of molten wax, such as paraffin. These containers have, after a manner, served for the packaging of milk and other liquid products not containing any alcohol, acid, alkali, or other substances which might act as a solvent for the wax. However, such containers have not been satisfactory due to the fact that paraffin does not make an impervious coating, but rather a coating consisting of a myriad of microscopic apertures or, in other words, is to a considerable degree porous. Also, the paraffin softens at comparatively low temperatures not exceeding normal temperatures during the summer months, and the cost of chemically pure paraffin, suitable as a coating for food containers, is relatively expensive.

The inherent disadvantages of the paraffin coated container have been, to a large extent, overcome by using certain relatively new thermoplastics, many of which are insoluble in alcohols and alkalies, and which remain entirely impervious and hard up to relatively high temperatures. The thermoplastic coating may be applied to the blank from which the container is made. However, when the blank is shaped to tubular form to form the body of the container, the side edge of the blank arranged inwardly is uncoated, or raw, with the result that even though the coating on the inner surface of the blank, or container body, is entirely coated with the composition, the liquid content of the container will be absorbed by this raw and unprotected edge and this absorption is very serious in the case of certain substances such as for example any unctuous liquid or product.

Heretofore, it has been attempted to solve the problem of the raw or uncoated edge of the blank by applying a coating or fillet of coating material in a viscous state. This method results in blocking off the raw edge of the blank. First, the fillet is applied by moving a suitable nozzle into the formed container in register with the side seam thereof. The nozzle is employed to direct a stream of thermoplastic composition along the side seam of the container. The thermoplastic is rendered flowable, or in a viscous state, by maintaining the composition at an elevated temperature, or thinning the composition with a suitable solvent. This method of block-

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ing off the edge of the side wall seam has several disadvantages. First, it is necessary to incorporate considerable additional mechanism in the machine for accurately indexing the side wall seam of the formed body with the nozzle and in moving the nozzle in proper timed relation to deposit the composition on the seam. Second, considerable time is consumed in depositing the fillet on the seam materially reducing the production of the containers. Third, the additional mechanism for maintaining the composition at the proper elevated temperature where it is rendered flowable by temperature rise and fourth, in the event the composition is thinned, or cut, with a solvent, which is the preferred way to render the composition flowable, additional time is consumed in evaporating the solvent from the fillet and regardless of the length of time allowed for this operation a strong odor of the solvent will remain in the container which renders it objectionable as a package for food products.

This invention has to do in particular with the method of forming a container body from a blank, the inner overlapping edge of which is completely coated prior to the shaping of the blank into container body form, as will be hereinafter explained.

The container illustrated is formed of paper board and consists of a tubular body 20 formed from a suitable blank 21. The body shown is of tapered formation and the blank is initially of the shape shown in Figure 2. The blank 21 is coated over the entire surface on one side thereof, the coating being illustrated in Figure 2 by the shade lines 22. This coating may consist of one of several thermoplastic compositions, such as for example copolymer of vinyl chloride and acetate. The blank 21 is bent or folded into tubular form with the side edges 23, 24 arranged in overlapping relation, as illustrated in Figures 3 and 4. The coating 22 extends over the side edge 24 and preferably overlies the marginal surface adjacent said edge on the opposite side of the blank. With this construction, the coating 22 may be employed to secure the overlapping side edges 23, 24 together to form a permanent side wall seam 25, Figure 1. The coating 22 may be applied to the blank 21 in any suitable manner as by spraying the coating composition thereon, and the coating may be continued over the side edge 24 of the blank in various manners as for example, the side edge 24 may be dipped into the coating composition in liquid form, or, the coating on the edge 24 may be applied in the nature of a tape 26 of the coating composition in sheet form, the tape being united to the coated side of the blank folded over the edge 24 and overlapping the adjacent marginal surface on the opposite side of the blank. The coating may be also extended over the edge of the blank after the manner illustrated in Figures 10 to 12. In this manner, the blank 21 is placed upon a metallic plate 27, the major portion of the top surface of which is recessed, or otherwise formed, to provide a ledge 28. The blank 21 is placed upon the plate 27 with one side edge abutting against the shoulder of the ledge 28. At least the top surface of the ledge 28 is rendered in a smooth polished condition, as for example by plating this surface with chromium, and the coating composition is then sprayed or applied over the top surface of the ledge 28. When the coating has become set or hardened, the blank is removed from the plate 27 and that portion of the coating ex-

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tending over the ledge 28 is stripped therefrom. The blank, as stripped from the plate 27, is illustrated in Figure 11 with the coating extending beyond the edge 24 of the blank, as indicated at 30. This extended portion 30 of the coating is then folded over the edge 24, as illustrated in Figure 12.

At the present writing, I prefer to extend the coating over the edge 24 by applying the same in the nature of the tape 26, this preference being based on the fact that this manner of applying the coating to the edge 24 is particularly economical in connection with the manufacture of the containers in volume production.

The blank is coated and the solvent completely evaporated from the coating. The edge 24 of the blank is thereafter preheated and the tape 26 applied thereto in folded form so as to extend over the edge 24 and over the adjacent inner and outer surfaces of the blank. Inasmuch as the composition or coating is initially applied to the blank when in flat form, all traces of the solvent can be conveniently and completely evaporated. Accordingly, when the blank is folded to tubular shape there will be no odor of the solvent within the container.

The container is usually provided with at least one end closure, such as a bottom member 32. The bottom member and the manner in which it is secured in the body 20 may involve one of a number of different constructions, examples being illustrated in Figures 1, 7, 8 and 9. In any event, regardless of the construction of the bottom member, the fact remains that because of the overlapping formation of the side wall seam 25, there is an interstice between the peripheral edge of the bottom member and the inner wall of the container. This aperture, while relatively small, has always been a great source of annoyance in the manufacture of containers of this type inasmuch as there existed the possibility that the application of the paraffin, or other coating, would not be sufficient to fill this opening, and in the great majority of instances where paper containers leaked, it was through this interstice.

This invention also has to do with a construction and method for completely filling the interstice referred to.

In Figures 1, 3 and 4, the bottom member 32 is shown as consisting of a discoidal portion having an integral annular flange 33. This bottom member is formed by being drawn from a blank of sheet material and the drawn bottom member inserted in the end of the body with the flange 33 engaging the inner surface of the body member. It will be understood that at least the surface of the blank, from which the bottom member is drawn, is coated with a substance similar to the blank 21, and with the coating arranged toward the interior of the container. The flange 33 of the bottom member and the contiguous portion of the body 20 are compressed under pressure and heat is applied thereto.

I have illustrated, in Figures 5 and 6, one form of tooling which may be employed for this purpose. This tooling consists of an outer annular member 34 into which the bottom end of the container is inserted. The tooling further consists of an annular series of arcuate shaped members 35 in which are arranged electric heating elements 37. The members 35 are normally held in contracted condition by a coil spring 38 encircling the hub portion 39 of said members. The inner arcuate surface of the members 35 is formed

on an angle to receive a complemental tapered plunger 40. The hub portions 39 are recessed to receive the enlarged end of a sleeve 41, and the confronting surfaces of the members 35 and sleeve 41 are provided with complemental cam surfaces 42. The sleeve 41 is fixedly secured to a stationary portion of the container fabricating machine and means, not shown, is provided for effecting axial movement of the plunger 40 toward the container. Upon this movement, due to the tapered inner end of the plunger 40 and the cam surfaces 42, the arcuate members 35 are caused to expand radially outwardly and compress the lower end of the container and the flange 33 against the ring 34 with considerable pressure, and due to the fact that the periphery of the arcuate members 35 is heated, both heat and pressure are applied to the contiguous portions of the container. This application of heat causes the coating extending over the edge 24 to become moldable and to flow filling and sealing the interstice between the side wall of the body and the flange 33, as illustrated at 45 in Figure 4.

If the sheet material, from which the blank 21 is formed, is relatively thin, a continuation of the coating 22 in uniform thickness, as illustrated in Figures 10 to 12, is sufficient to provide the seal 45. However, if the material of the blank is relatively thick and accordingly, the interstice of greater dimension, I find that it is more reliable to employ an additional or thickened coating of the composition material to the edge 24 as by dipping the edge, or applying the composition in the form of the tape 26 as heretofore explained.

The top edge of the blank is rolled or folded outwardly as at 50 to form a yieldable flange for the reception of a slip cover if desired. Inasmuch as the inner surface of the container is folded outwardly, the flange 50 is entirely covered by the coating 22, whereby the coating is available to adhesively secure the slip cover to the container if desired, and the coated flange provides a non-wetting edge over which the contents of the container may be poured.

It will be observed that with the construction and method of my invention, the presence or trace of any solvent within the completed container is avoided, and particularly the additional time necessarily consumed in applying a fillet to the side seam after the container has been completed is also avoidable.

The mechanism, or machine, for fabricating containers in accordance with this invention is relatively simple, and the containers can be manufactured in great volume with assurance that all of the containers will be provided with an inner surface entirely impervious to liquids and that the containers will not leak.

What I claim is:

1. In the art of making containers, those steps including coating one side of a container blank with an impervious heat sealing plastic substance, applying a tape of similar substance along the margin of the blank adjacent one edge thereof, continuing said tape over said edge and over the marginal surface adjacent said edge on the opposite side of the blank, heat sealing said tape to the blank, shaping said blank into tubu-

lar form with the coated side and taped edge of the blank arranged inwardly with the side edges overlapping, heat sealing said overlapping portions together by said tape to form a permanent body seam, and securing an end closure to one end of said tubular form.

2. In the art of making containers, those steps including coating one side of a container blank with an impervious heat sealing plastic substance, applying a tape of similar substance along the margin of the blank adjacent one edge thereof, continuing said tape over said edge and over the marginal surface adjacent said edge on the opposite side of the blank, heat sealing said tape to the blank, shaping said blank into tubular form with the coated side and taped edge of the blank arranged inwardly with the side edges overlapping, heat sealing said overlapping portions together by said tape to form a permanent body seam, inserting a flanged end closure coated with like material in one end of the tubular form and subjecting the end of the tubular form and the flange of said closure to heat and pressure sufficient to cause said tape to flow into and fill the interstice between the flange and the body at said body seam.

3. In the art of making containers, those steps including coating a container body blank with an impervious heat sealing plastic substance, evaporating all solvents from said coating, heating one side edge of the blank, applying a tape of similar plastic substance of substantial thickness to said heated edge with the tape overlapping the marginal surfaces on both sides of the blank adjacent said edge, shaping said coated blank into tubular formation with the coated side and the taped edge of the blank arranged inwardly and with the side edges overlapping, heat sealing said overlapping edges together by said tape to form a permanent body seam, and subsequently applying a flanged bottom member in one end of said tubular formation, and subjecting said end of the tubular formation and the flange of said closure to heat and pressure sufficient to cause said tape to flow into and fill the interstice between the flange and the body at said body seam.

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