

Aug. 19, 1941.

G. A. MOORE

2,252,779

CONTAINER AND METHOD OF MAKING THE SAME

Filed Sept. 18, 1936

3 Sheets-Sheet 1

FIG. 1.

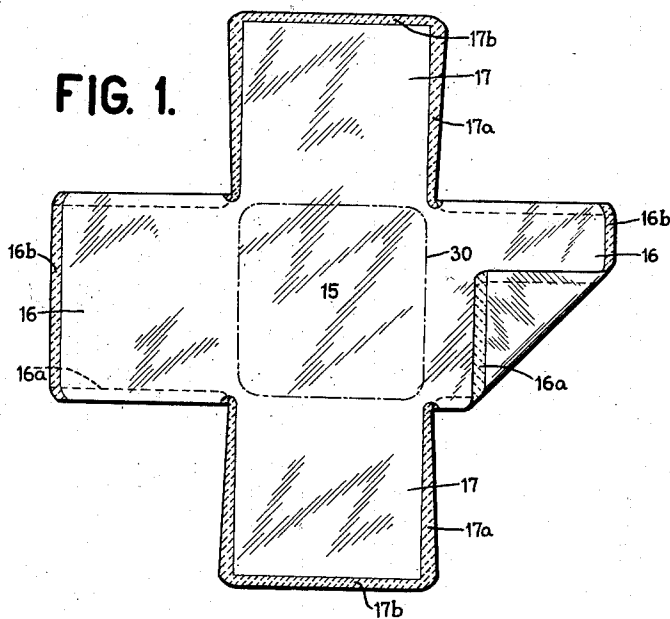


FIG. 2.

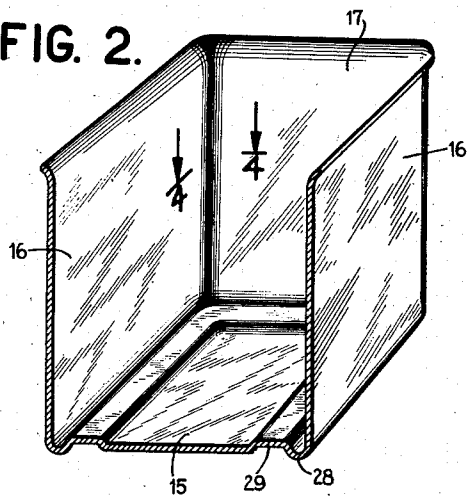


FIG. 3.

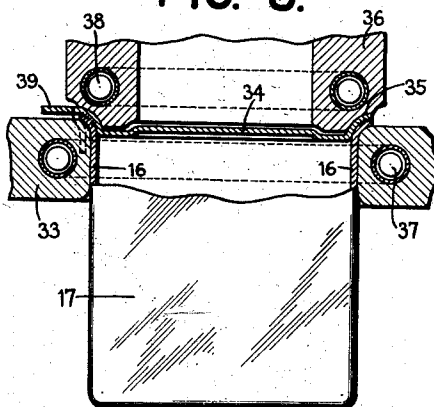
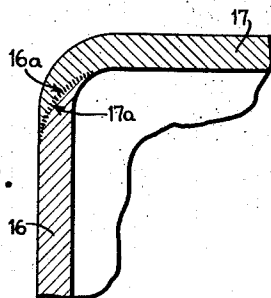


FIG. 4.



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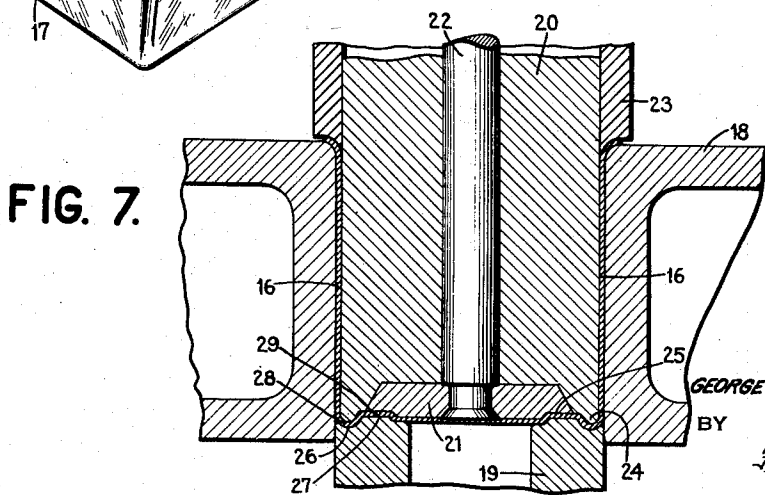
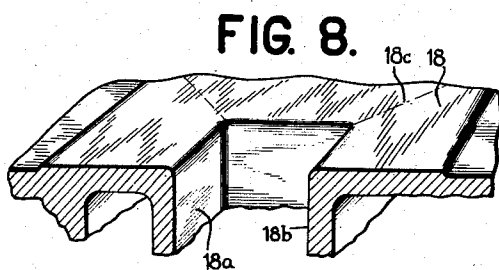
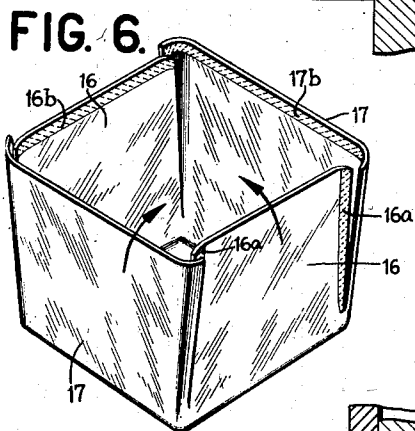
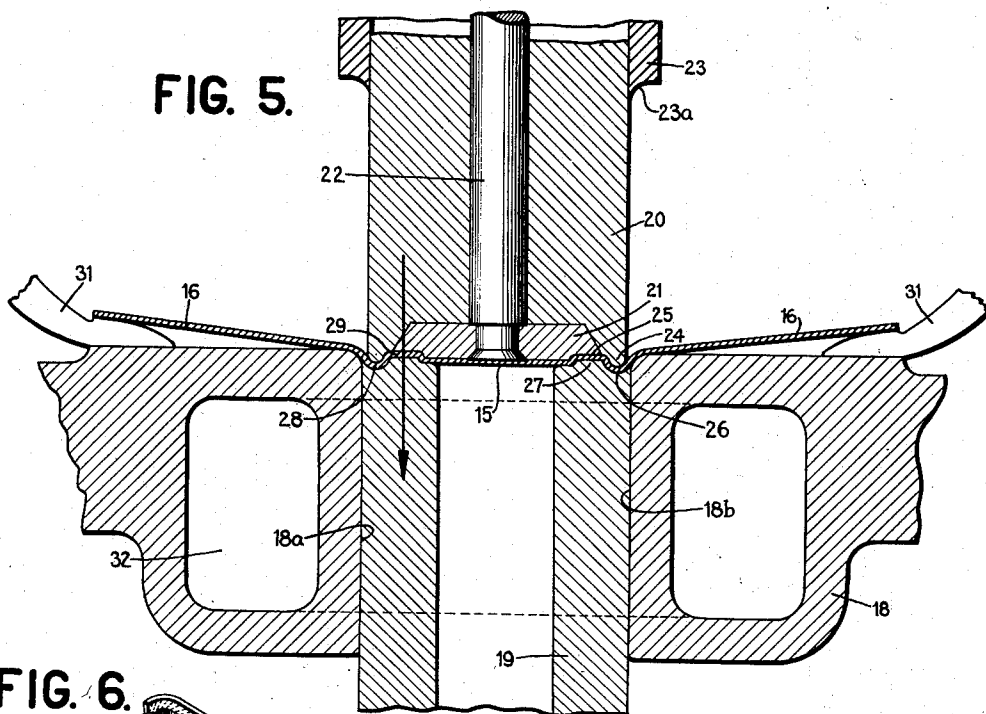
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FIG. 9.

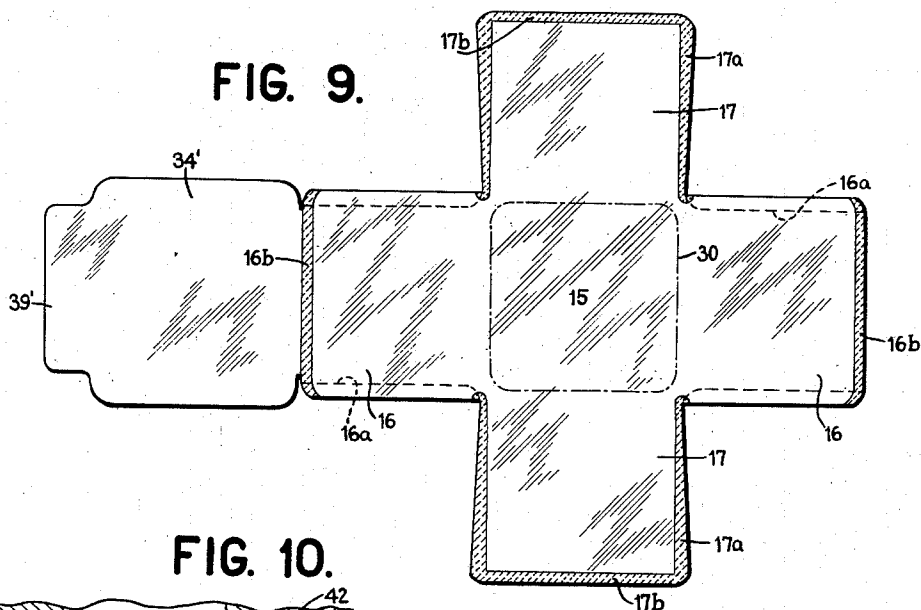


FIG. 10.

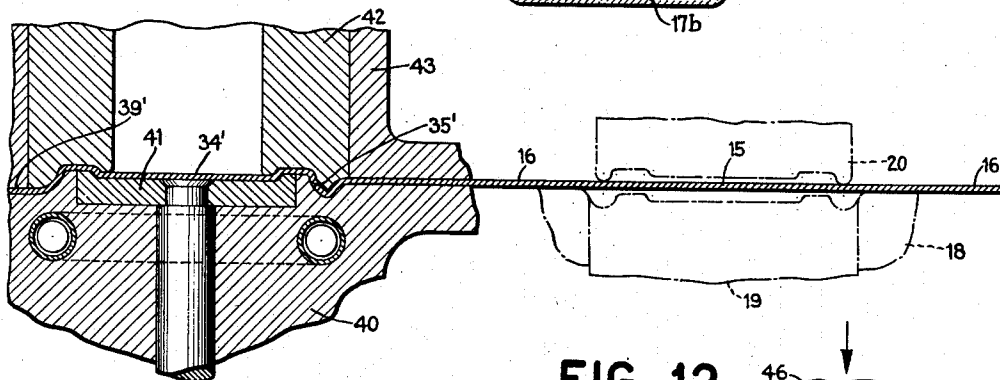


FIG. 11

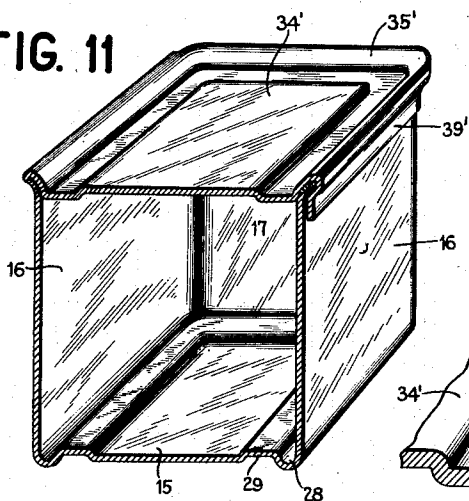


FIG. 12.

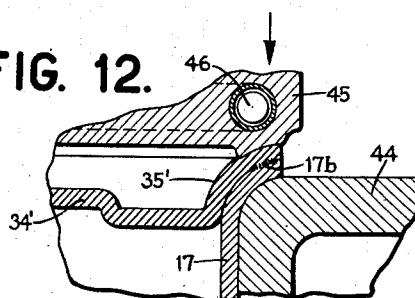
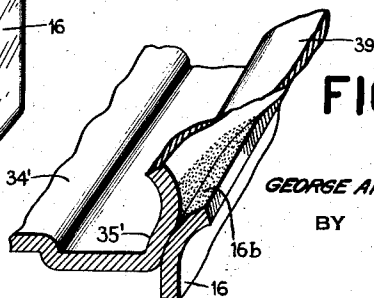


FIG. 13.



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CONTAINER AND METHOD OF MAKING THE SAME

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Application September 18, 1936, Serial No. 101,406

5 Claims. (Cl. 229—30)

This invention relates to containers, and more particularly to containers comprising fibrous materials, and to a method for making the same.

Containers constituted by deformed blanks, having the marginal portions drawn into flanged relation with the central portions thereof to form seamless side walls have been heretofore provided. Containers of this type are more rigid and durable, and may be more readily and inexpensively manufactured than folded containers, but, due to the fact that in the drawing operation the marginal material of the blank must be compressed at the corners of angular containers, for example, and entirely around the periphery of containers having curved walls, and to the fact that the extent of said compression varies directly as the height of the drawn flange or side walls, there is a limit to the height to which a flange can be successfully drawn. Beyond a certain height, depending on the particular material employed, the compression and consequent density of the fibers becomes so great that brittleness and fracture result, or wrinkling and pleating of the material occurs, thereby producing weakness. It will thus be seen that only comparatively shallow containers have been heretofore produced from blanks by subjecting the latter to a drawing operation.

In making deep containers from blanks by folding a plurality of tongues or tabs thereof in various ways known to the art, it is extremely difficult to provide corners at the top and bottom of the container which are leakproof, and it is substantially impossible to provide a container of this type which is impervious to air and moisture.

It is accordingly an object of the present invention to provide a novel container or receptacle which is deeper than containers can be successfully drawn and yet one which possesses the advantages of and is substantially as strong as a container having seamless drawn side walls.

Another object of the invention is to provide a novel container and method of producing the same, the side walls of said container having seams which extend for only a portion of the depth of the same.

A further object is to provide a container having a closure supported thereby and sealed therein in a novel manner.

A still further object is to provide a novel deep container which may be formed from a single blank and which is impervious to air and moisture.

The above and further objects and novel fea-

tures of the invention will more fully appear from the following detailed description, when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only and are not intended to define the limits of the invention, reference being primarily had for this latter purpose to the appended claims.

In the drawings, wherein like reference characters refer to like parts through the several views:

Fig. 1 shows a blank from which one form of container embodying the present invention may be produced;

Fig. 2 is an isometric view, partially in section, of a container formed from said blank;

Fig. 3 is a side elevation, partly in section and with parts broken away, illustrating one means and method of securing a closure in said container;

Fig. 4 is a detailed sectional view on an enlarged scale, the section being taken on line 4—4 of Fig. 2;

Fig. 5 is a side elevation, partly in section and with parts broken away, illustrating the initial step in the formation of the container body;

Fig. 6 is an isometric view showing the container only partially completed;

Fig. 7 is a view similar to Fig. 6, showing the position of the die members at the completion of said body;

Fig. 8 is an isometric view, partly in section and with parts broken away, of a female die which may be employed in forming the container;

Fig. 9 shows a blank which may be employed in forming a second embodiment of the invention;

Fig. 10 is a side elevation, partly in section and with parts broken away, of means for deforming a section of said blank to form the cover of the container;

Fig. 11 is an isometric view, partly in section and with parts broken away, of a completed container;

Fig. 12 is a sectional detailed view, on an enlarged scale, of means for sealing the top closure or cover in the mouth of the container body; and

Fig. 13 is an enlarged detailed view, partly in section and with parts broken away, illustrating the manner in which the container of the present invention may be readily opened.

One embodiment of the invention and a method and means for producing the same are illus-

trated in Figs. 1 to 8, inclusive, the container being shown, by way of example, as having a substantially rectangular shape, both in horizontal and in vertical cross section, the corners thereof being preferably slightly arcuate. The blank from which the container is formed may be made of fibrous or other suitable materials, and may be of a single thickness, or laminated and constituted of one or a plurality of suitable materials, such as fiber board and foil or sheet acetate. The blank is first cut to the desired shape and thereafter subjected to the action of cooperating die members, whereby the lower portion of the side walls of the receptacle which is formed are seamless and the upper portions thereof are folded and overlap at the corners, the corner seams of said folded portions being progressively welded by heat and high pressure as the folding operation progresses.

In the form shown in Fig. 1, the blank comprises a substantially rectangular central portion 15, which is preferably of substantially the same length and width as the desired horizontal cross section of the container to be constructed therefrom, a portion of the blank immediately surrounding said central portion and constituting a margin of the latter being adapted to be drawn into flanged relation with said central portion, in a manner to appear hereafter, to form the lower or seamless part of the side walls of a container or receptacle. Integral with and extending laterally from two opposed sides of said rectangular portion 15 are a pair of flaps or sections 16, which are of substantially the same width as the desired receptacle and may be of any desired length, depending upon the depth of the receptacle required. A second pair of flaps or sections 17, also integral with said central portion and extending laterally therefrom, have a slightly greater width than the dimensions of the sides of the receptacle which the same are adapted to form, the width of said sections gradually increasing from the inner to the outer ends of the same.

For a purpose to more fully appear hereafter, the surfaces of the above-described blank may be coated with a thin, dry film of moisture-proof thermoplastic lacquer having potential adhesive qualities or, if desired, said lacquer need be applied only to a marginal strip 17a of the inner surface of flap 17 as indicated in the drawings. Some lacquer is also preferably applied to strips 16a of the outer surface of flaps 16 and to marginal strips 16b and 17b of the inner surfaces of flaps 16 and 17, respectively. Said lacquer film is preferably adapted to be activated or rendered tacky by a solvent, by heat, or both, and thereby rendered effective to bind engaging surfaces of the blank together. If heat alone is used as an activating agent, the lacquer should be of such composition as to be rendered tacky only at temperatures considerably in excess of usual room temperatures, for example, 125° to 140° F.

One suitable lacquer which fulfills the above requirements and which may be readily and quickly applied to the blank in the desired manner is composed of about 65% of such ester solvents as ethyl acetate, butyl acetate, or the like, and such hydro-carbons as toluol, and about 35 per cent of solids which can be readily activated by solvents as well as heat. The solids content is composed of about 25 per cent of low viscosity nitro-cotton, 60 per cent of resins, and about 15 per cent of a plasticizer such as di-

butyl phthalate which may have small quantities of vegetable oils added thereto, if desired. The resins employed may contain some gums, such as ester gum, but usually synthetic resins, which have more definite physical properties than any natural resin, are used. The lacquer thus constituted is free from tack at room temperatures and under normal conditions of humidity, and may be readily and quickly applied to the entire surface or any localized portion of the surface of the blank, the same being adapted to dry quickly after each activation thereof. Contact temperatures for forming seals along the desired lines must accordingly be in excess of about 150° F., the excess being dependent upon the speed of operation and the thermal conductivity of the material constituting the blank. Under normal conditions, the lacquer is firm but sufficiently flexible and elastic so that the same will not crack or flake or become susceptible to penetration by air and moisture when the blank is drawn, folded and sealed in the novel manner to appear hereafter.

In order to form a receptacle or container from the above-described blank, the latter is subjected to the action of cooperating male and female die members, one suitable form of which is illustrated in Figs. 5, 7, and 8 as comprising a female die 18, a yieldingly supported buffer die 19 which is operable in a substantially rectangular opening 18a in said female die, and a reciprocable male die assembly which includes a drawing die member 20 that is adapted to be reciprocated in female die 18 by any suitable or well-known means (not shown) and is formed to cooperate with buffer die 19 in a manner to appear hereafter. Said male die assembly also includes a die member 21 which fits into a recess in the lower face of die member 20 and is carried by a movable rod 22 on which member 20 is mounted to slide. Die member 21 is thus adapted to be moved relative to die 20 and constitutes a stripper for removing formed container bodies from the latter die. Surrounding die 20 and movable relative thereto is a third die member 23, the lower face 23a of which curves upwardly and outwardly from the outer walls of die 20 and is adapted to coact with rounded corners 18b at the upper end of opening 18a in female die 18 for forming the flared mouth of the container and a seat for a closure member therefor. Die member 23 may also cooperate with die 21 for stripping the formed container body from die 20. The dimensions of dies 20 and 19 in horizontal cross section are substantially equal to the corresponding inner and outer dimensions, respectively, of the receptacle or container which it is desired to form. If desired, female die 18 may be constituted by a plurality of segments, whereby said die might be slightly expanded after the formation of body 16, 17, construction lines 18c (Fig. 8) denoting the surface junctures of said segments.

Preferably, the lower face of male die 20, 21 is provided with a peripheral bead 24 and a groove 25 which extends around the face of the die inside of said bead. The latter and groove 25 are adapted to cooperate with a complementary peripheral groove 26 and a rib 27, respectively, provided on the upper face of buffer die 19 for the purpose of embossing the central portion 15 of the above-described blank to thereby form a groove 28 and a rib 29 therein, said central embossed portion constituting the bottom

of the container. Embossing the blank in this manner enhances the rigidity of the container and strengthens the bottom thereof to obviate bulging or bowing of the same.

In the formation of a container by the coaction of the above-described die members, the blank is placed on the upper surface of female die 18 with central portion 15 thereof centered over opening 18 and, hence, over the upper face of buffer die 19 which is normally held by suitable means, such as by a spring or cam (not shown), in substantially the position illustrated in Fig. 5. Male die 20, 21 is then moved downwardly into contact with said blank by any suitable power means (not shown). Power means suitable for this purpose are old and well known in the art and it is accordingly believed to be unnecessary to illustrate and describe the same in detail herein, such means, per se, constituting no part of the present invention. Further downward movement of male die 20, 21 is yieldingly resisted by die 19 with sufficient pressure to permit the irregular faces of said dies to mesh with each other and hence cause an external peripheral bead 29 and an internal rib 29 to be embossed in central portion 15 of the blank, thereby forming the bottom of the container.

After the blank is thus embossed, buffer die 19 yields to continue movement of die 20, 21 and moves downwardly in response to the pressure exerted by the latter, thereby causing the margin of central portion 15 of the blank, i. e., a strip surrounding that portion of the blank enclosed by construction line 30, to be drawn into flanged relation with said central portion to form a smooth, seamless peripheral flange which constitutes the lower part of the side walls of the receptacle or container. The entire lower edge of the container is thus rendered strong and absolutely leak-proof, particularly at the corners. Furthermore, the corners will not be made subject to leakage by deformations resulting from handling, such as when the container is dropped, as will the corners which are formed on prior containers by merely folding a blank into container form.

As soon as this drawing operation is completed, or at any time during said drawing operation, side flaps 16 are folded up into engagement or near engagement with the sides of die 20 by a pair of arms or fingers 21. Thus, as die 20, 21 moves downwardly and draws flaps 16 and 17 into female die 18, the tapered lacquer-coated margins 17a of flaps 17 are caused, by the rounded corners of dies 18 and 20, to progressively curl or bend around the corners of the latter die and overlap the marginal strips 16a of flaps 16 which may also be lacquer coated. Margins 16a and 17a are thus drawn into die 18 and progressively pressed into intimate contact with each other substantially as shown in Fig. 4.

For the purpose of progressively securing the overlapped portions of flaps 16 and 17 together as the same are drawn into die 18, the latter die is heated by any suitable means, such as by electric heating coils or by circulating steam through a passage 32 in the die. Heat from the walls of die 18 is conducted through the material of the blank to the lacquer films on margins 16a and 17a and said films are thus activated and rendered sufficiently tacky to be pressed, by the pressure of the dies, into the interstices of the fibrous material to thereby substantially weld the engaging surfaces together. Strong moisture-proof joints are thus provided at the corners to com-

plete the upper portion of the walls of the container, said walls being of substantially uniform thickness throughout. It will thus be apparent that a container of substantially any depth and having the lower wall portions thereof continuous or seamless may be readily and quickly formed from a blank comprising less material than has been heretofore used in making a container of similar size and capacity.

Preferably, die 20 is moved downwardly until all but the upper margins of flaps 16 and 17 have been drawn into female die 18. The movement of die 20 is then stopped while die 23 continues its downward movement, the knife-like lower edge of the face 23a of said latter die being adapted to move between said flaps and the walls of die 20 and, hence, to press the lacquer coated margins 16b and 17b outwardly into contact with rounded corners 18b of the opening in die 18. Said margins are thus flared outwardly to form a curved peripheral flange about the mouth of the container.

Arcuate flange 16b, 17b not only increases the strength and rigidity of the container but it also serves as a seat for a closure member whereby the latter may be novelly secured in the container body to render the container impervious to air and moisture and yet be readily removable therefrom without in any way damaging the container walls. In securing the cover or closure in place, body 16, 17 is inserted in a female die 33 (Fig. 3) wherein said body may be supported by the engagement of flange 16b, 17b with the upper rounded corners of the die. A cover 34, embossed and formed from a blank by coacting die members of substantially the same character as those shown in Fig. 10 and to be hereinafter described is then inserted in the flared mouth of body 17, 17, the arcuate marginal portion 35 of the closure engaging lacquer coated flange 16b, 17b. Pressure is then applied to the engaging portions of the body and cover by a suitably shaped die member 36 and heat is simultaneously supplied to said engaging portions by electric heating elements 37 and 38 provided in dies 33 and 36, respectively, whereby the lacquer film applied to strips 16b and 17b is activated and pressed into the interstices of the engaging surfaces. Cover 34 is thus substantially welded to the container body, the joint formed therebetween being impervious to both air and moisture.

Cover 34 is preferably provided with a tab 39 on one side thereof for use in opening the container. When tab 39 is pulled back toward the center of the container, closure 34 will be severed from the walls of body 16, 17 at the joint formed therebetween, in the manner above described, without danger of injury to the walls of the body itself (Fig. 13).

In the embodiment of the invention illustrated in Figs. 9 to 12, inclusive, the blank employed is identical with that of Fig. 1, except that a flap 34', 39', from which the container cover may be formed, is integral with and constitutes an extension of one of the flaps 16. Prior to the drawing, folding, and sealing, of the container body from portions 15, 16, and 17 of the blank in the same manner as above described, flap 34', 39' is subjected to the action of die members 40, 41 and 42, 43, (Fig. 10) the latter of which are adapted to be moved toward and away from the former by any suitable means (not shown). The faces of said die members have complementary ribs and grooves therein for forming a strengthening rib in the closure and the peripheral arcu-

ate margin 35' thereof. Die 43 is preferably yieldingly held against the blank during the embossing operation and portion 41 of die 40, 41 is adapted to be moved upwardly, when dies 42, 43 are withdrawn, for the purpose of stripping the cover thus formed from stationary die 40.

Body 17, 17 is then formed by coating die members of the character shown in Fig. 5 and in the same manner above described, and cover 34' is thereafter folded to the position seen in Fig. 11, the arcuate marginal portion 35' thereof being adapted to engage the lacquer coated margin 16b, 17b at the mouth of the container body. That portion of the blank which connects flap 16 and flap 34' serves as a hinge for pivoting said cover. Thereafter, the cover or closure is sealed in place in the same manner above pointed out in connection with the application of cover 34, or dies 44 and 45 (Fig. 12) which are similar to dies 33 and 36 may be employed in a like manner. In the form shown, die 44 may be steam heated and die 45 may be heated by means of an electrical heating element 46 for the purpose of activating the adhesive coating between the engaging surfaces of the closure and the container body. It will be readily seen from Figs. 3 and 12 that by supporting container body 16, 17 externally in the manner illustrated a comparatively great pressure may be exerted by dies 36 and 45 for the purpose of insuring an impervious joint between the closure and said body without the slightest danger of crushing the container or the contents thereof. Although the joint thus formed is impervious, the same may be readily severed, in the manner shown in Fig. 13, by proper manipulation of tab 39'.

There is thus provided a novel container which has a portion of the wall thereof drawn and seamless while the remainder of the wall is constituted by flaps that are folded and drawn into position and imperviously sealed at the corners of the container in a novel manner. A container which is deeper than containers can be successfully drawn with smooth walls and which has substantially the same advantageous features as drawn containers that are free from weakening pleats and gathers of material is accordingly provided. It will be noted that any desirable printed matter, such as advertising and information, may be printed on the blank before the formation of the container. Additionally, a novel method of fabricating and imperviously sealing a container is comprehended by the invention.

Although only two embodiments of the invention are illustrated and described in detail, it is to be expressly understood that the same is not limited thereto. For example, it will be understood that covers 34 and 34' may be coated with a moisture-resistant lacquer in the same manner that the body portion may be coated therewith and no lacquer need be provided on strips 16b and 17b (Fig. 2) if it is not desired to secure a closure in the body. Various other changes may be made in the size, shape, and design of the containers shown, as well as in the materials employed, without departing from the spirit and

scope of the invention, as will now be apparent to those skilled in the art. For a definition of the limits of the invention, reference will be had primarily to the appended claims.

What is claimed is:

1. A container constituted by a blank comprising fibrous materials and having a central portion, a marginal strip surrounding the latter being drawn to form a seamless flange about said central portion, and laterally extending flaps integral with said flange and turned upwardly to bring the margins of adjacent edges thereof into overlapping relation, said overlapping margins being joined together by an adhesive to complete the side walls of the container.

2. A fibrous container having one end thereof open, the same being constituted by a blank having a central portion, a marginal strip surrounding said portion being drawn into flanged relation with the center thereof, and flaps integral with said margin, said flaps being folded upwardly and having the adjacent edges thereof joined by an adhesive, and the upper margins of said flaps being turned outwardly to form a seat for a closure member.

3. A container constituted by a blank including a rectangular-like central portion, a side flap extending from each side of said central portion, said side flaps being folded into flanged relation with said central portion and having the overlapping side margins thereof adhesively secured and the upper margins thereof flared outwardly, and a formed cover flap integral with one of said side flaps and folded into engagement with said outwardly turned margins of said side flaps, the engaging surfaces of said cover and side flaps being adhesively secured to form a closed container.

4. A container constituted by a blank having a substantially rectangular central portion and portions extending laterally from the sides of said central portion, a margin of said central portion and said laterally extending portions being drawn into flanged relation with the remainder of said central portion, the margins of two of said laterally extending portions overlapping adjacent edges of the other two of said laterally extending portions and adhesively secured thereto and the upper margins of said laterally extending portions being turned outwardly, and a closure having a portions contoured to engage said outwardly turned margin and adhesively secured thereto.

5. A container constituted by a blank including a substantially rectangular central portion, a side flap extending at right angles from each side of said central portion, the margin of said central portion and said side flaps being drawn into flanged relation with the center of said central portion, the side margins of adjacent flaps being adhesively secured together, and a cover flap integral with one of said side flaps and hinged into engagement with the upper margins of said side flaps, said cover flap being adhesively secured to said side flaps entirely around the mouth of the container.

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