

Dec. 17, 1957

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PAPER CONTAINERS

2,816,697

Filed July 20, 1954

3 Sheets-Sheet 1

Fig. 1.

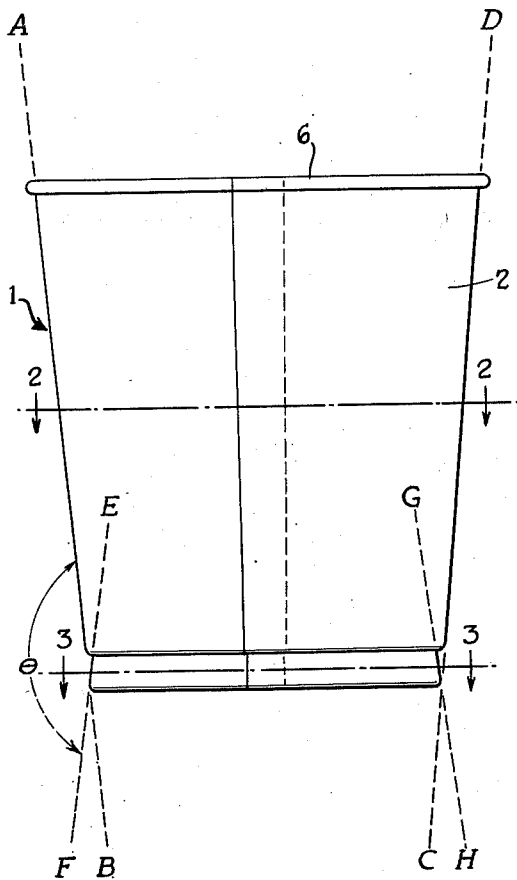


Fig. 2.

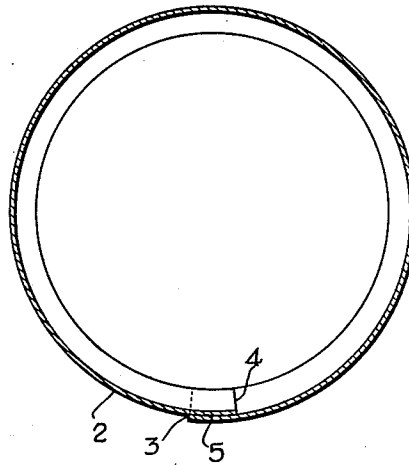
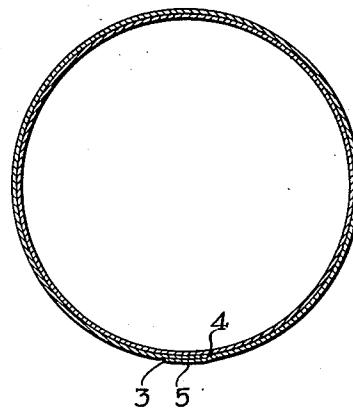


Fig. 3.



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Fig. 4.

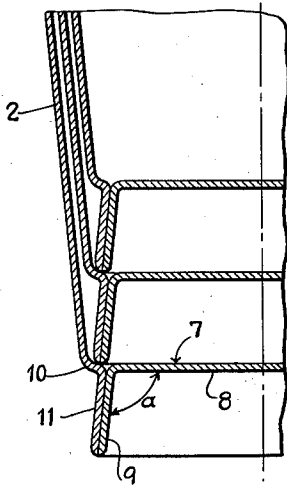


Fig. 5.

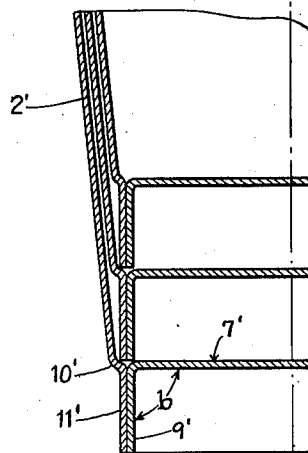


Fig. 6.

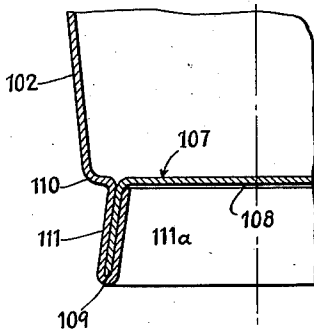


Fig. 7.

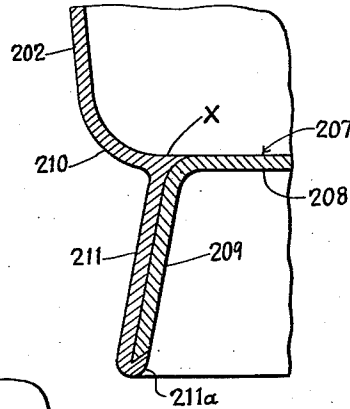
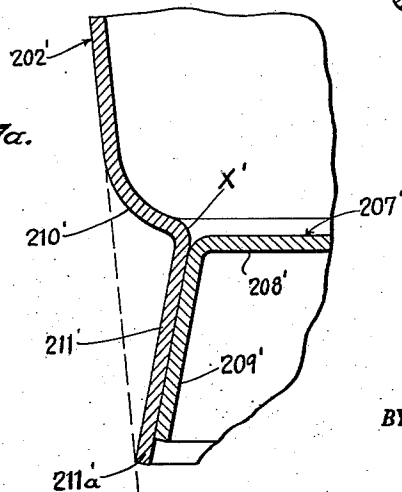


Fig. 7a.



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Fig. 8.

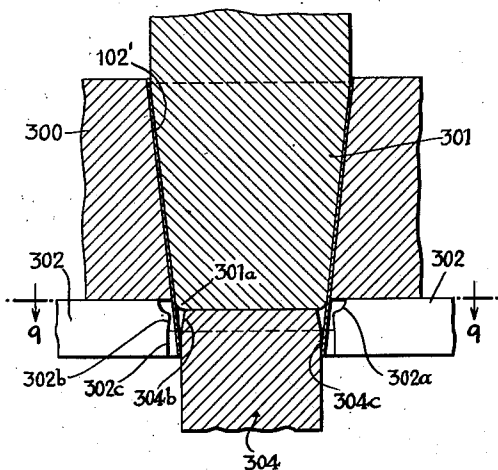


Fig. 10.

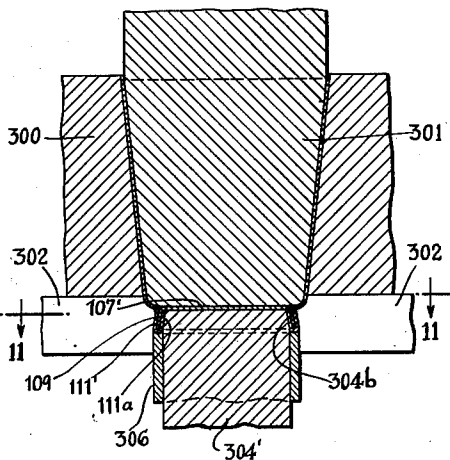


Fig. 9.

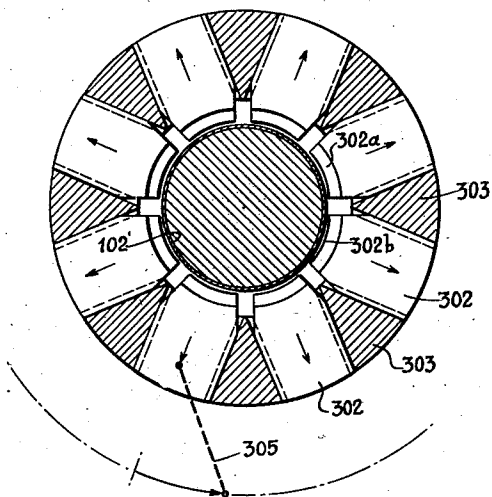
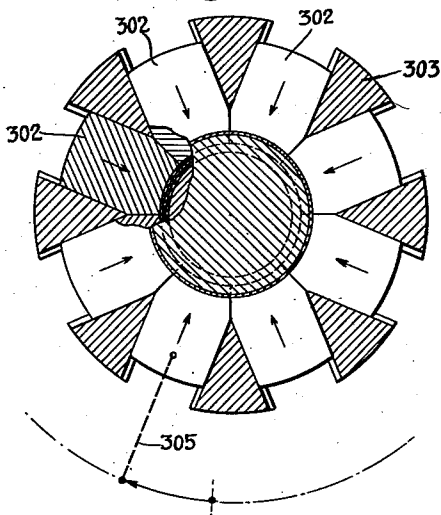


Fig. 11.



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PAPER CONTAINERS

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Application July 20, 1954, Serial No. 444,501

7 Claims. (Cl. 229—1.5)

This invention relates to two-piece paper containers and more especially to such containers of the nestable type having a side wall and a bottom with a dependent flange.

The conventional two-piece nestable containers heretofore known comprise a side wall of frustro-conical shape, in which the taper is uniform from the larger open end to the smaller lower end, and a bottom member having an end wall provided with a dependent peripheral flange secured in position within the downwardly and inwardly inclined lower end wall. In some instances the lower end of the said wall and dependent flange of the end members are adhesively secured together; and in others the end member is held in place additionally by an returned end of the side wall which passes around the flange of the bottom member and thence upwardly on the interior thereof.

The inherent characteristics of said prior art structure present difficulties which result in a faulty seal at the peripheral juncture of the side wall and bottom and inhibit facile manufacture, etc. This is because the bottom member as it comes from the forming dies has a flange which flares outwardly from its center, i. e., in its inverted position the flange tapers from a smaller diameter at the end wall to a larger diameter at the lower edge of the flange. This downward and outward taper is opposite to the downward and inward taper of the frustro-conical side wall. Hence in inserting the flanged bottom inside the lower or small end of the formed side wall the oppositely flaring flange must be substantially deformed to the opposite taper of the side wall. This causes creases or wrinkles and because the interior wall of the flange thus inserted is of a smaller diameter at its lower edge it is difficult if not impractical to exert pressure radially so as to cause a close engagement between the bottom member flange and adjacent side wall, especially at the side wall vertical seam where the edges of the side wall blank overlap.

It is an object of this invention to provide a container which is free of the difficulties above noted.

Another object of this invention is to provide a container which requires less paper for a given capacity.

A further object is to provide a container having basic structural features permitting a wide range of variations in the end seal.

Further objects, features and advantages of the invention will more clearly appear from the detailed description given below and taken in conjunction with the accompanying drawings, which illustrate by way of example presently preferred embodiments of the invention, and in which:

Fig. 1 is a side elevational view of a container with reference lines added to better illustrate a basic characteristic of the invention;

Figs. 2 and 3 are somewhat enlarged cross-sectional views taken at lines 2—2 and 3—3 respectively of Fig. 1;

Fig. 4 is a segmental side elevational sectional view of three nested containers such as disclosed in Figs. 1, 2,

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and 3, on a somewhat enlarged scale, showing further details of said containers;

Fig. 5 is a view similar to Fig. 4 but showing a variation;

Fig. 6 is a segmental side elevational sectional view showing a modified form of bottom seal; and

Fig. 7 is a view similar to Fig. 6 showing a further modification of the bottom seal.

Fig. 7a is a view similar to Fig. 7, showing the identical parts before the final forming;

Fig. 8 is a longitudinal sectional view showing suitable dies illustrating the manner of gathering in and forming the lower end of the side wall for use in a container such as illustrated in Fig. 6;

Fig. 9 is a cross-sectional view taken on line 9—9 of Fig. 8;

Fig. 10 is a view similar to Fig. 8, showing similar mechanism for performing the final step of forcing the side wall skirt plies in contact with the bottom flange and completing the bottom seam; and

Fig. 11 is a cross-sectional view taken on line 11—11 of Fig. 10.

Referring more particularly to Figs. 1 and 2, the container is designated in its entirety as 1 having a side wall member 2 which is formed from strip of paper or other suitable sheet material bent into body form and having its adjacent edges 3 and 4 secured together as by an overlap seam 5. The upper end corresponding to the lip of the cup is shown as having a beaded or rolled edge 6. The container (Fig. 4) has a bottom member 7 comprising an end wall 8 and a dependent peripheral flange 9.

The side wall or body 2 tapers downwardly and inwardly from adjacent its larger open end to adjacent the zone of the end wall 8, being of generally frustro-conical shape coinciding with a conical configuration represented in elevation by the lines A—B and C—D (Fig. 1). Adjacent the end wall zone the body 2 is offset inwardly from the conical shape and follows a curved path 10 terminating adjacent the end wall 8 in the plane of said end wall and thence extending downwardly to provide a skirt portion 11 substantially coextensive with the flange 9. The skirt 11 and flange 9 taper downwardly and outwardly following a conical configuration represented in elevation by the lines E—F and G—H (Fig. 1) tapered oppositely from the conical configuration A—B and C—D. In this embodiment the flange 9 and skirt 11 are adhesively secured together and the resultant laminated portion is disposed within the conical configuration A—B and C—D so as to permit nesting (Fig. 4).

This construction provides numerous advantages. For example, the bottom member 7 may be readily seated in position free of undue cramping and wrinkling of the flange 9 and said flange may be radially forced into intimate and closely conforming fit with the interior surface of the body skirt 11. These portions may be highly compressed, thus making it possible to effect a good seal even at the overlapped side wall joint 3—4—5 (Fig. 3). In view of the unique construction solid die structures may be employed to exert great laminating pressure to closely knit the laminae. This is in contrast to the far less satisfactory expedients heretofore resorted to, such for example as rubber or other expandable plungers (see Pat. No. 1,608,617, Figs. 7 and 8).

The structure provided by this invention makes possible a saving of about 10 percent of the material required for the bottom member, as compared with a prior art container of equal capacity.

In order to take full advantage of this feature the angle α (Fig. 4) between the end wall 8 and lamination 8—11 should be greater than 90° and preferably such as to provide a substantial taper. However, with an angle β (Fig. 5) of at least 90° a solid die structure may also

be employed, with a slightly tapered die plug, and with the offset skirt portion 11' conforming to the flange 9' the lamination will follow a cylindrical configuration and will still be disposed within the conical configuration defined by the downwardly and inwardly tapered side wall or body member 2'. While not as desirable as the structure of Fig. 1 this is nevertheless a great improvement over the prior art structures.

In Fig. 1 it will be noted that the exterior angle θ between the tapered side wall 2 and the oppositely tapered laminated skirt and bottom flange is substantially less than 180° . The corresponding angle of the modification shown in Fig. 5 will also be less than 180° but not as small an angle as in Fig. 1.

Modification (Fig. 6)

In Fig. 6 a further modification is shown. Except as otherwise described below this container is in all respects identical with that above described with reference to Figs. 1-4. In the embodiment of Fig. 6 parts identical to or corresponding to the parts of Figs. 1-4 will be identified by the same reference characters with the addition of the hundred prefix. The skirt 111 instead of extending only to the lower edge of the flange 109, as in Fig. 4, passes inwardly thereover and thence upwardly interiorly of the flange 109 and extends to adjacent the lower surface of the end wall 108.

In view of the unique feature providing for the application of great pressure, as above explained, this three ply lamination may be compressed to the degree required and thus provide a tight seal even without adhesive. This form of structure is also applicable to a structure having the angular variation shown in Fig. 5. In the embodiment of Fig. 6 the lower edge of the lamination also falls within the conical configuration corresponding to the frustro-conical side wall 102.

Modification (Fig. 7)

The basic structural features of the invention make it possible to provide further variations of the bottom seal structure. For example, in Fig. 7 I have shown a segment of a receptacle in all respects identical with that of Figs. 1-4 except as more particularly described below, and corresponding or identical parts will be indicated by the same reference numerals to which will be added the two hundred prefix. In this embodiment (Fig. 7) instead of the small annular crevice or valley at the juncture between the inner extremity of the curved side wall portion 10 and the adjacent periphery of the upper edge of the bottom member 7 (Fig. 4), the curved side wall portion 210 merges smoothly into the plane of the upper surface of the end wall 207 and the side wall stock is deformed inwardly, as at x, so as to bridge or fill the valley otherwise present, as in Fig. 4. Also in the Fig. 7 embodiment the skirt portion 211 is deformed and compressed, as at 211a, so as to overlap more or less, the lower end of the flange 209. In view of these deformed portions, at x and 211a, and the degree of pressure possible with the unique structural features of this invention this embodiment does not require any adhesive to provide a tight seal and in fact the contiguous portions of the side wall member 202 and bottom member 207 are formed into practically one homogeneous mass.

In Fig. 7a there is shown the side wall and bottom members as these parts appear prior to the completion of the container shown in Fig. 7. The side wall is designated 202' and the bottom 207'. The inwardly curved portion 210' terminated in a reverse curve of small radius to provide a shoulder X' disposed above the horizontal plane of the upper face of the end wall 208' and the skirt 211' extends downwardly below the lower end of the bottom flange 209'. This disposition of the parts facilitates the deformation of stock inwardly at X (Fig. 7) and upwardly and inwardly so as to overlap the lower end of the bottom flange at 211a.

It will be obvious to those skilled in the art how to practice the invention above described; but for illustrative purposes I have shown in Figs. 8-11 inclusive, suitable dies for drawing and forming the lower end of the body or side wall and for pressing the end or bottom seam of the embodiment shown in Fig. 6. Referring more particularly to Figs. 8 and 9: The side wall of a container is designated as 102' and is shown firmly held between a ring die 300 and a plug die 301 whose lower end is rounded at 301a; so as to conform to the rounded path 110 (Fig. 6); and the lower end of the side wall 102' extends downwardly beyond the end of the plug 301. A plurality (in the present embodiment eight) radially movable drawing die segments such as 302 surround the downwardly extending lower end of the side wall 102'. The segments 302 are movable in a radial direction relative to the central axis of the conical side wall 102' by suitable means somewhat diagrammatically illustrated as 305, and are held in register as by the guide portions 303 which are fixed against movement in a radial direction. The inner faces of the die segments 302 are recessed as at 302a complementary to the rounded end 301a of the plug die 301, and are tapered downwardly and outwardly, in the form of conical segments 302b, corresponding to the taper of the skirt portion 111 of Fig. 6, and thence downwardly as cylindrical segments 302c. A plug die 304 is disposed coaxially with the die member 301 and in abutting engagement therewith. The upper end of the plug die 304 is provided with a taper 304b complementary to that of the conical segments 302b and with a cylindrical portion 304c complementary to that of the cylindrical segments 302c.

It will be understood from the foregoing that by contracting the segment dies 302, the lower end of the side wall will be formed to the general configuration defined by the lower end of die plug 301 and the upper end of die plug 304. Of course, if desired, the die segments assembly could be rotated a few degrees between intermittent drawing operations to prevent small wrinkles between the die segments, or a like rotary movement of said die segments could be made after the drawing operation and prior to the final pressing operation now to be described with reference to Figs. 10 and 11.

After the end of the body is thus formed, the plug 304 is withdrawn and while the body is still held between the dies 300 and 301 (Fig. 10) and with the segments 304 closed a flanged bottom 107' is inserted. By suitable means, such as the curling sleeve 306 operable in combination with a plug 304' while the plug is partially retracted, the lower end 111a' of the skirt portion is turned upwardly interiorly of the flange 109' of the bottom 107'. The plug 304' is similar to the plug 304 but of smaller diameter and as it is moved upwardly to the position shown, its tapered upper end 304b' forces the outer skirt portion 111' and inner skirt portion 111a' in intimate engagement with the intervening flange 109' of the bottom 107'. This also performs the final squeeze of the interior and exterior skirt portions of the finished container. The assembled side wall and bottom may be removed by opening the segment die and separating the die members 300 and 301; and a lip or bead, such as 6 (Fig. 1) may then be formed in the usual manner.

In general, similar die mechanism may be employed for making the embodiments of the invention shown in Figs. 4, 5 and 7 with such modifications as are indicated by the respective embodiments.

Having thus described my invention with particularity, with reference to the preferred embodiment of the same, and having referred to certain modifications thereof, it will be obvious to those skilled in the art, after understanding my invention, that other changes and modifications may be made therein without departing from the spirit or scope of the invention and I aim in the appended claims to cover such changes and modifications as are within the scope of the invention.

What I claim is:

1. A two piece paper container of the nestable type comprising a side wall member and a bottom member secured together in liquid tight engagement, said side wall being of frusto-conical shape from adjacent its larger diameter open end to an end wall zone inwardly offset and spaced upwardly from its lower end and providing a flange engaging skirt, said bottom member having an end wall and depending peripheral flange disposed within the side wall skirt, said flange and side wall skirt being laminated in a conical configuration tapered oppositely from and disposed within the conical configuration defined by said frusto-conical side wall.

2. A two piece paper container of the nestable type comprising a side wall member and a bottom member secured together in liquid tight engagement, said side wall being tapered downwardly and inwardly from adjacent its larger diameter open end to an end wall zone inwardly offset and spaced upwardly from its lower end providing a flange engaging skirt, said bottom member having an end wall and a depending peripheral flange disposed within the side wall skirt, said bottom member flange and side wall skirt being laminated in a configuration defined by a surface of rotation making an exterior angle of substantially less than 180° with the configuration defined by said tapered side wall, said lamination being disposed within the configuration defined by the said side wall taper.

3. A two piece paper container of the nestable type comprising a side wall member, and a bottom member providing an end wall and a dependent flange surrounded by said side wall member, said side wall member being tapered downwardly and inwardly from adjacent the open end of said container to adjacent said end wall where it is offset inwardly and thence is tapered downwardly and outwardly below said end wall for substantially the extent of said bottom flange, and said flange and adjacent side wall portion being secured together in liquid tight sealing engagement and terminating within the space defined by the downward extension of said downwardly and inwardly tapered side wall portion.

4. A two piece paper container of the nestable type comprising a side wall member, and a bottom member providing an end wall and a dependent flange surrounded by said side wall member, said side wall member being tapered downwardly and inwardly from adjacent the open end of said container to adjacent said end wall where it extends inwardly along a curved path terminating ad-

jacent said end wall and providing a rounded annular portion extending between the tapered side wall and the bottom member, said side wall member then extending downwardly and outwardly below said end wall for substantially the extent of said bottom flange, and said flange and adjacent side wall portion being secured together in liquid tight sealing engagement and terminating within the space defined by the downward extension of said downwardly and inwardly tapered side wall portion.

5. A paper container as set forth in claim 4 in which the inwardly curved portion of the side wall terminates substantially in the plane of said end wall and provides a rounded interior surface smoothly connecting said side wall and end wall.

6. A paper container as set forth in claim 4 in which the lower end of said side wall passes around the lower edge of said dependent bottom flange and thence upwardly along its interior surface and said liquid tight seal is provided solely by the intimate engagement between said bottom flange and enveloping side wall portion.

7. A two piece paper container of the nestable type comprising a side wall member and a bottom member, said side wall member being frusto-conical tapering downwardly from a larger diameter adjacent its upper open end to a smaller diameter adjacent a bottom end wall zone where it is constricted inwardly and thence extends downwardly providing a skirt directed outwardly and downwardly relative to the direction of taper of said side wall, said bottom member comprising an end wall provided with a dependent flange intimately engaged within said skirt for substantially the full extent of said flange and providing therewith a bottom rim, the lower edge of said bottom rim being of a diameter less than the internal diameter of said container at said bottom end wall zone.

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