June 9, 1931. W. L. WRIGHT ET AL 1,809,006

METHOD OF BOTTOMING PAPER CONTAINERS

Original Filed Feb. 15, 1927

Fig. 1.

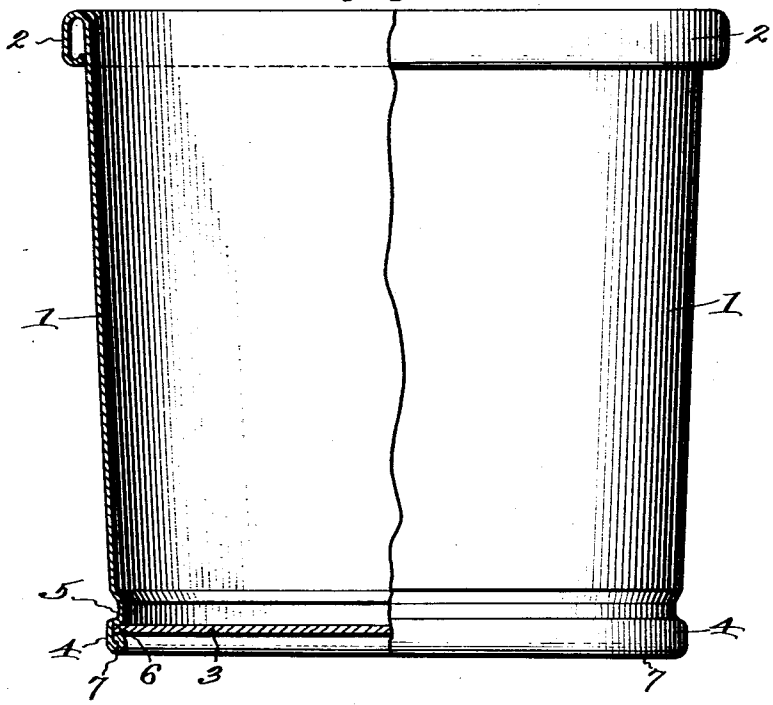



Fig. 2.

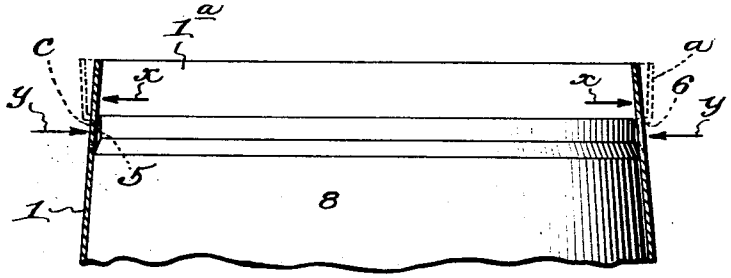
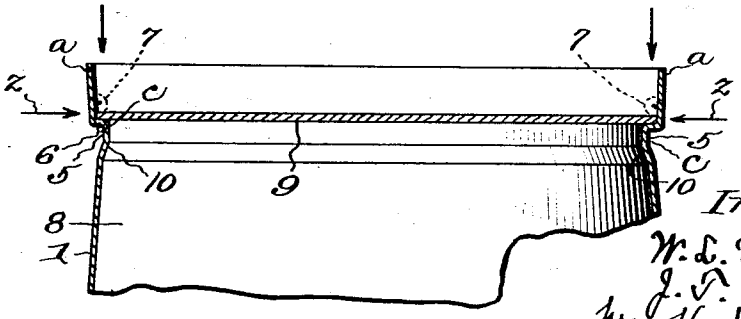



Fig. 3.




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# UNITED STATES PATENT OFFICE

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## METHOD OF BOTTOMING PAPER CONTAINERS

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The particular object of this invention is to employ methods of producing containers composed of sheet paper material with particular reference to the production thereof with permanently tight bottoms, and from the specific standpoint to the production of a paper container having its body tapered longitudinally and bottomed according to an improved method, and the nature and further objects of the invention will be apparent to those skilled in the art from the following description of the accompanying drawings and the steps followed in carrying out our method to produce the product from among other forms, constructions and arrangements that might be produced according to our method.

With the above and other objects in view the invention consists in certain novel steps in the production of bottomed paper containers, as more fully and particularly set forth and specified hereinafter.

Referring to the accompanying drawings forming part hereof:—

Fig. 1 is a sectional elevation of a paper container produced according to our invention.

Fig. 2 shows in vertical section an overlong longitudinally tapered paper container body on and projecting up from a mandrel, dotted lines illustrating the form to which the body end is to be compressed and expanded in the method of bottoming said body.

Fig. 3 is a vertical section of the shaped paper body on the mandrel with the bottom disk in place, dotted lines showing the final permanent disk locking and sealing formation of the extended end of the body.

The paper container is shown in the drawings without its usual top exterior slip cover. The container that we show as an example of one that can be produced by our present invention, has a body 1, that is tapered longitudinally from its small diameter bottomed lower end to its large diameter upper end or mouth, to provide a so-called nesting container, whereby a number of such containers without their exterior covers, can be telescoped or nested together for economy of space in packing and shipping. The barrel or body 1, is preferably composed of a flat sheet of paper material, such as paper board, folded on a suitable mandrel into overlong truncated cone form with the ends of the sheet overlapping and secured together to form a preferably permanent liquid tight joint extending longitudinally throughout the length of the barrel.

The overlong upper large end of this sheet paper barrel 1, is preferably upset and doubled outwardly downwardly and inwardly to form the container with an exterior rim-forming annular roll 2, surrounding the container mouth to stiffen the container body and to form an exterior slip cover flange receiving vertical wall surface, although we do not so wish to limit our present invention which is applicable to tapered paper containers of other forms than that shown by the example illustrated.

The lower or bottomed end of the sheet paper material barrel is closed by a comparatively stiff thick strong flat circular disk 3, preferably composed of paper or like felted fibrous material. This disk 3, is inset in the lower end of the tapered body a distance above the body end and is therein permanently secured to cooperate with the body to form the container with a preferably liquid tight bottom closure. The external diameter of the circular disk 3, exceeds the normal internal diameter of the originally tapered portion of the body in which the disk is fixed. The peripheral edge of the disk 3 fits and is in effect compressed into the inner annular surface of a radial annular outward enlargement or bulge 4, of the lower end of the container body 1, and this outward annular enlargement 4 is exteriorly substantially vertically cylindrical.

The tapered wall or barrel 1, of the container is annularly and radially compressed or crushed inwardly at 5, immediately above the annular outward enlargement 4, and immediately over the circumferential portion of the top face of disk 3, to form abrupt annular downwardly facing internal ledge or shoulder 6, fitting the flat top face of the disk and against which the disk tightly seats. The disk is held tightly to said shoulder 6, and the barrel and

disk are held tightly compressed together at the annular edge portions of the top and bottom faces of the disk and at the peripheral edge of the disk, to form a liquid tight joint and to hold the disk in a permanently fixed position longitudinally of the container body, by the depending annular base forming rim 7, of the container, formed by the permanent compressed inwardly and upwardly rolled or upset lower projecting end of the container barrel 1. This rim is compressed tightly upwardly against the bottom face of the disk 3 directly under or opposite the ledge 6, and the formation of said rim-forming roll 7, tightly draws and compresses the paper wall of the body forming outward enlargement 4, radially inwardly against the peripheral edge of disk 3.

The formation is such that the radial vertical or cylindrical enlargement 4, continues down and surrounds the upset roll 7, and thus includes the base rim 7, of the container but also forms the container with bottom rim of enlarged diameter which serves as a bottom stop to prevent complete telescoping of the containers when nested and hence prevents tendency of nested containers to stick together where their tapered surfaces directly contact throughout extensive areas.

A serious problem is involved in forming a permanent liquid tight container bottom closure by inserting a flat bottom disk in the small end of a tapered container barrel and attempting to secure the same by merely crimping the barrel end upwardly against the disk, even where an oversize disk is used, because of the constant tendency of the disk to slide upwardly and loosen owing to the increasing upward diameter of the tapered barrel. The slightest looseness of the disk destroys the liquid tightness of the disk bottom and permits downward liquid seepage between the disk edge and the contacting inner surface of the container barrel. Our formation maintains the disk permanently in liquid tight fixed position with respect to the container barrel in sealing engagement at its flat top and bottom faces with ledge 6, and base rim 7, and with its cylindrical vertical peripheral edge in tight merging or swaging engagement with the inner vertical wall of the barrel enlargement 4.

The peculiarities of this structure and formation are emphasized by an explanation of our method of producing the same which will be explained as follows with reference to Figs. 2 and 3.

The open end container barrel 1, is inserted, large end foremost, on an upwardly tapered mandrel 8, having a flat end die face 9. The upper end of this mandrel is annularly rabbeted or reduced in diameter, at 10, around and for a short distance below the horizontal top die face 9, to produce a cylindrical upper end. The overlong tapered small end 1*a*, of the body projects upwardly from the mandrel to an elevation a distance above the die face 9, so that the diameter of the upper extremity of the body end 1*a*, is usually less than or even about the same as the diameter of the circular die face 9, while the tapered portion of the body that surrounds the reduced upper end 10 of the mandrel is of greater diameter than said end 10.

By suitable expanding dies and shaping dies or other means, we radially and annularly expand, stretch and mold the portion 1*a*, of the paper barrel, above the level of die face 9, in the direction of arrows *x*, to the expanded form *a*, shown by dotted lines Fig. 2, and full lines Fig. 3, and simultaneously inwardly radially and annularly compress or upset and mold (in the direction of arrows *y*) the portion of the tapered body that surrounds mandrel end portion 10, to the reduced form *b*, shown by dotted lines Fig. 2, and full lines Fig. 3, and thereby form the enlarged diameter annular horizontal ledge *c*, of the container barrel at its top face level with the die face 9, joining and forming the junction between expanded barrel end *a*, and contracted barrel portion *b*. With the paper barrel thus formed as shown by full lines Fig. 3, and while still on mandrel 8, we introduce into the upwardly enlarging expanded barrel end *a*, the relatively large diameter comparatively thick stiff circular bottom disk 3, and force the same down in said expanded barrel end onto and parallel with the die face 9, and onto and parallel with the annular horizontal ledge *c*, surrounding and level with said die face, and by a suitable pressure die and crimping, rolling or upsetting head, or other suitable means, draw the barrel end *a*, radially inwardly while upsetting, curling, or rolling the same longitudinally downwardly to the permanent tight bottom rim form 7, which is compressed tightly onto the then top face of disk 3, while disk 3, is being compressed by and flattened against die face 9, by said descending pressure die or other means, not shown, which also exteriorly compresses the paper barrel inwardly and annularly radially against the cylindrical edge of disk 3, and irons the formation inwardly in the direction of arrow *z*, to the approximately vertical cylindrical exterior form of annular enlargement 4, that encloses and in part forms the depending or base rim 7. It will be noted that the paper barrel end portion is compressed annularly inwardly below ledge 6, and is expanded annularly and outwardly above ledge 6, to form said ledge.

Our application filed April 20, 1927, Ser. No. 185,295 (Patent No. 1,706,910, dated March 26, 1929) discloses apparatus that can

be employed in carrying out the method of our instant application.

What we claim is:—

1. In the method of bottoming tapered body paper containers, those steps which comprise radially compressing inwardly an annular portion of the end portion of the body and simultaneously radially expanding the remaining end portion of the body to thereby form an intervening annular ledge, then inserting an oversize bottom disk in said expanded portion and against the internal annular ledge at the junction between the compressed and expanded portions, and then compressing and curling the end of the body inwardly and upwardly against the bottom face of the disk.

2. In the method of bottoming the small end of the tapered barrel of a paper container while projecting upwardly from a tapered supporting mandrel, those steps which comprise forming an internal annular outwardly facing ledge by radially pressing an annular portion of the tapered barrel inwardly and radially expanding the remainder of the barrel end beyond the ledge while the paper barrel is supported by contact of its side wall below the pressed portion with the mandrel, forcing a flat bottom disk onto said ledge through said expanded barrel end, and then rolling said barrel end inwardly and longitudinally into permanent form tightly against the outer side of said disk.

3. In the method of bottoming the barrels of paper containers, those steps which consist in placing the barrel on a mandrel having a top die face with the barrel end projecting upwardly above said die face, then radially and annularly expanding the projecting upper end of the barrel while annularly and inwardly holding the annular portion of the barrel surrounding the upper end of the mandrel against expansion by exteriorly applied inward pressure to produce the barrel end of enlarged approximately cylindrical form with an annular internal ledge approximately level with said die face; then forcing a flat closure disk onto said die face and ledge through said expanded barrel end, and turning said barrel end inwardly and longitudinally to an annular permanent rim form pressed against the outer face of said disk and exteriorly and inwardly pressing the barrel against the disk edge and to approximate cylindrical form.

4. In the method of providing tapered paper material container bodies with permanent end closures, those steps which include radially expanding an end of the paper body to an enlarged diameter while simultaneously applying diameter-contracting pressure to an adjoining annular portion of said body to thereby form said body with an internal outwardly-facing annular ledge joining said expanded end to the remainder of the body, forcing an oversize paper material bottom disk into the body through said expanded end and to and pressing the same against said ledge to form a tight joint between its side face and the ledge and between its peripheral edge and the surrounding contacting inner surface of the expanded body end, and contracting the enlarged end of the body to secure the disk.

5. In the manufacture of paper containers, those steps which include expanding an end of a paper container body to an enlarged diameter while applying exterior surrounding radially contracting pressure to an annular portion of the body to form the body with an internal annular ledge; forcing an imperforate oversize paper disk through said enlarged diameter expanded end and seating the same against said ledge, and crimping the expanded projecting end of the paper body inwardly and longitudinally to form the container with an annular end rim and to tighten and secure the disk within the body.

6. In the manufacture of paper containers, those steps which include supporting a longitudinally tapering paper container body by a correspondingly tapered mandrel with an end of said body projecting beyond the mandrel; forming an annular internal outwardly facing ledge in said body by radially and annularly expanding the projecting body end to enlarge the diameter thereof while simultaneously applying radial surrounding contracting pressure to an adjoining portion of the body while supporting the paper body against collapse by contact of its side walls with the mandrel below said ledge; forcing a flat paper bottom disk of enlarged diameter through said expanded body end and onto said ledge; and curling and crimping said projecting expanded body end inwardly and longitudinally of the body to form the container with an annular enlarged end rim and to lock the disk against the ledge and tighten the surrounding body wall against the peripheral edge of the disk.

Signed at Fulton, county of Oswego, State of New York, this 11th day of February, 1927.

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