Dec. 30, 1930. W. L. WRIGHT 1,787,332

TAPERED OR NESTING PAPER CAN

Filed April 29, 1929

Fig. 1.

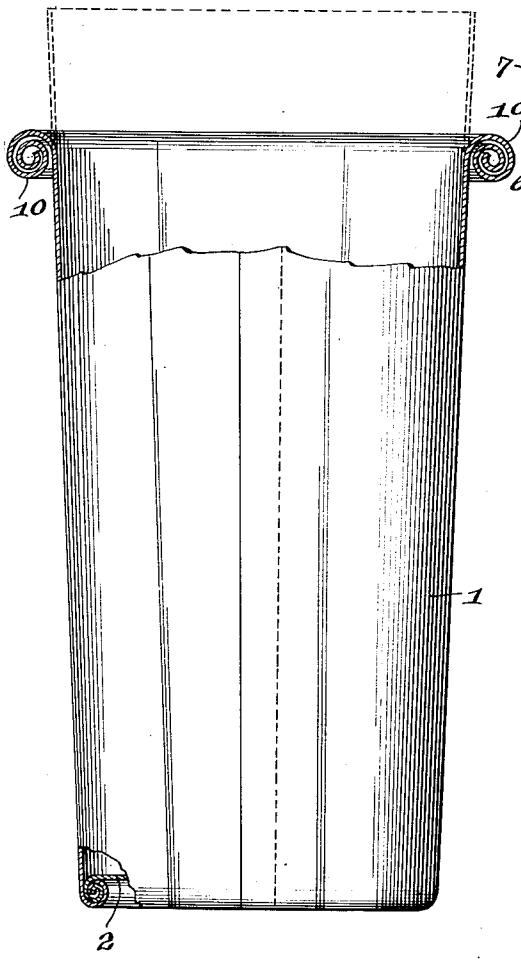


Fig. 2.

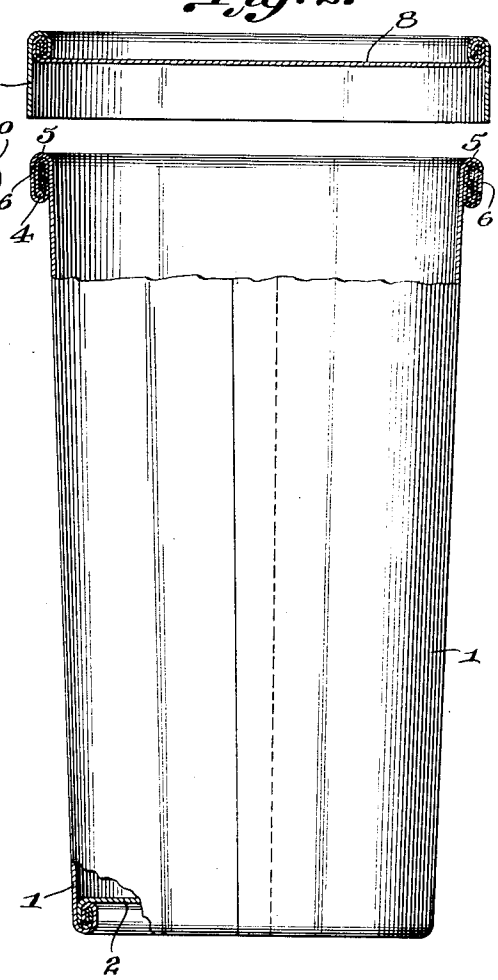
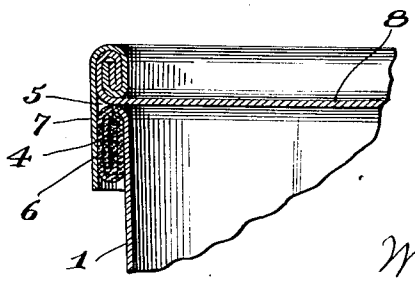


Fig. 3.



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UNITED STATES PATENT OFFICE

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TAPERED OR NESTING PAPER CAN

Application filed April 29, 1929. Serial No. 359,007.

This invention relates to tapered or so-called nesting paper cans; and the objects and nature of the invention will be understood by those skilled in the art in the light of the following explanation of the accompanying drawings that show what I now believe to be the preferred mechanical expression or embodiment of my invention from among other forms and arrangements within the spirit and scope thereof.

Tapered or so-called nesting paper cans are formed or provided with bottom closures at their small ends while their large diameter ends form the open tops or mouths thereof and are intended for sealing or closing by slip covers. The tapered barrels or bodies of these nesting cans are usually built up from a flat sheet paper blank of the required form folded around a tapered mandrel with the overlapping ends of the blank cemented together so that the tapered body thus produced has a permanent liquid tight longitudinal joint or seam throughout its length. The small end of the tapered body is thereafter provided with a permanent paper material end closure, and the large end of the paper formed to receive a slip cover. However, to prevent collapse or deformation of large or heavy duty nesting paper cans of this type when loaded with liquid and picked up or lifted by hand, without the use of separate added mouth rings or other added stiffening elements and to provide a slip cover flange receiving surface and to preserve the unbroken tapered inner surface of the can body up to the top edge of the body as well as the capacity measurement of the body up to its top edge, all within the range of production cost limits prescribed by competition, present a serious problem.

It is the primary object of this invention to solve the foregoing problem in a simple, economical and efficient manner with the production of an improved nesting paper can.

With the foregoing and other objects in view, my invention consists of a paper can, the body of which tapers longitudinally to its open end or mouth to provide for nesting a series of such cans one within the other, with the large open end or mouth of the tapered body exteriorly surrounded by a compacted stiffening rim that is strong and approximately rigid, arranged entirely at the exterior of and integral with the tapered body, and depending and in fact a continuation of the annular outer downturned portion of the annular top edge of the body that surrounds the mouth of the can and is an unbroken upward and radially outward continuation of the body, the exterior circumferential surface of said exterior rim being vertical or approximately cylindrical to snugly and slidably receive the depending flange of the flat top slip cover of the can; said exterior rim being composed of the exteriorly rolled down overlong large end of the tapered body as originally formed, thereafter compacted under high pressure to the approximately solid stiff permanent final rim form while the interior of the upper end portion of the body is retained and the body wall is maintained unbroken and without circumferential joints or seams and of continuous taper up to said top edge, whereby the body can be completely filled and the capacity measurement of the can extends up to said edge, and the natural strength of the unbroken tapered body wall is retained and cooperates with the compacted stiff rim that depends from said top edge and surrounds said unbroken tapered large end of the body, in stiffening the can against collapse.

Referring to the accompanying drawings, forming a part hereof:—

Fig. 1 is a sectional elevation of a paper can showing the overlong end of the tapered body in dotted lines, exteriorly rolled down to form a loose enlarged exterior roll of more than one convolution, shown by full lines in cross section.

Fig. 2 is a sectional elevation of the completed paper can of my invention, a slip cover therefor being shown in section and separated from the can top.

Fig. 3 is a detail vertical section on an enlarged scale, the slip cover being shown in operative postion closing the can top.

In the drawings, I show a tapered-body or nesting paper can wherein the tapered barrel or body 1, is composed of a flat sheet paper

blank of one or more plies or thicknesses, formed on a mandrel with its overlapping ends secured together to form a longitudinal permanent tight seam or joint as hereinbefore described. The small end of this body 1, is closed preferably liquid tight by a suitable preferably sheet paper material permanent bottom closure 2, preferably providing the can with a stiffening annular bottom rim.

The large diameter end or mouth of the can is formed with an exterior annular surrounding rim 4, of enlarged diameter, that is stiff and approximately hard and solid, forming the preferably rounded surrounding top or mouth edge 5, of the container, down on or against which the flat top wall of the slip cover of the can preferably seats or closes. This rim 4, is formed with a vertically elongated approximately cylindrical outer annular or circumferential surface 6, to receive the depending cylindrical or other annular flange of a removable slip cover and to cooperate therewith in holding the cover in normal closing position and against removal except on the exertion of considerable removing force applied to the cover by means of the hand or fingers.

The hard stiff enlarged rim 4, surrounds the exterior of the tapered body and does not interfere with the interior unbroken taper of said body from the body bottom to the surrounding top mouth edge 5, so that the can is of the desired predetermined full rated or standard capacity up to top edge 5, and is capable of freely nesting with similar cans of like capacity and to the extent desired.

The purpose of the approximately solid compressed enlarged rim 4, is not only to brace and stiffen the large upper end of the paper can against collapse or undue distortion under the grasping or lifting pressure of the hand, when loaded with liquid, but also to provide a vertical circumferential surface of ample vertical length and area to receive the annular depending flange 7, of a removable flat top slip cover 8, and cooperate therewith in retaining said cover against accidental displacement.

The slip cover can be of the sheet paper construction such as commonly employed on the cylindrical paper cans of commerce, or any other preferably sheet paper material cover, having a cylindrical depending flange of substantial length to slidably, snugly and frictionally fit and surround the vertical circumference of rim 4, and an imperforate flat top disk or wall to cover the mouth of the can and seat against the rim top edge 5.

The approximately solid rigid rim 4, is a part of and made from the large over long end of the tapered body in its original form. In other words, a flat sheet paper blank very substantially wider than the desired length of the completed can, is formed as hereinbefore described to provide a tapered can body or barrel that is substantially overlong at its large end. The large end of this tapered body while held and supported against collapse or deformation in a hollow tapered mandrel, with its overlong large end projecting beyond the mandrel or upwardly through and beyond an annular ring die surrounding the mandrel end, is then by a proper and suitably operated and manipulated tool curled and rolled outwardly, downwardly, inwardly and upwardly until the extended end is reduced to an exterior annular roll 10, surrounding the tubular body and composed of more than one enclosing loose spiral convolutions.

The tubular tapered body is, by this spinning, crimping or curling of the overlong end thereof, longitudinally reduced to the final length of the paper can to be produced without bending or changing the shape of the final contents retaining body of the can and with the continuous or unbroken internal taper of the body preserved and retained to the top of the loose surrounding exterior roll which is of enlarged diameter or thickness radially of the body compared to the hard rim of the finished can, and contains or includes a sufficient mass or volume of approximately broken down paper material to supply the body of the reduced hard rim of the finished can.

At least the loose paper roll 10, of the large end of the paper container body, is preferably impregnated with a suitable liquid binder that has been fused or melted by heat, and that will render the roll soft and moldable before the binder sets, and that is capable of quickly setting or cooling at atmospheric temperatures to render the impregnated or binder carrying paper hard or stiff and water and grease resistant.

Various substances and compositions are suitable for my purpose as a binder; and among such substances I include sulphur and various quick setting and high melting point waxes such as carnauba, and compositions that include say sulphur and/or carnauba or other waxes and the like.

While the binder impregnated loose enlarged exterior roll of the large end of the container is still hot, soft and moldable, suitable annular pressing and forming dies are applied thereto and the necessary heavy compressing and shaping pressure is applied thereto to shape and compress the roll radially and vertically or longitudinally to an approximately solid mass and to maintain the desired taper of the inner surface of the can body and to produce the desired rounded shape of the annular top edge 5, of the body and to produce the desired shape of the annular exterior bottom edge of the approximately solid compacted exterior rim and to provide the vertical or cylindrical circumferential surface of said rim of ample area or vertical length and of the required over all

diameter to receive slip covers of approximately uniform internal diameters. The annular pressing and forming die or dies hold the rim and adjacent surfaces compressed and to the desired form, until the paper has cooled and set to rigid final form condition.

While the exterior rim is being shaped and mashed and compacted to its final form (whether or not the paper is then impregnated with the hot liquid binder), a suitable tapered mandrel or other form is located within the can body to serve as an anvil or backing for the rim forming pressure, and to maintain the smooth unbroken final tapered form of the body and the full capacity of the container, up to the rounded top edge 5, against distortion, so that the exterior rim will be compacted against the exterior of the tapered upper portion of the body with the rim depending from and integral with the top edge 5, and, in effect supported thereby, whereby I am enabled to employ a slip cover having a flat top and depending flange, and whereby the stresses applied to the rim longitudinally thereof in forcing the slip cover onto the can and in pulling the same therefrom, do not tend to open seams or fissures within the contents-receiving inner surface of the can body and do not tend to so rock or move the rim as to tend to distort, open or loosen the same.

My invention is not limited to the use of a suitable binder, as the paper, as hereinbefore described, can be mashed and crushed or compacted under high pressure to shape the approximately solid rim to the desired final permanent stiff form, without being first impregnated with a hot liquid wax or other binder.

The term "exterior rim" as employed herein and in the claims, means a rim composed of the crushed or compacted exteriorly rolled down overlong end of the tapered paper body, which rolled end exteriorly surrounds the unbroken continuously tapered large upper end of the barrel against the exterior of which said exterior large rolled end is compacted and shaped to rim form, as distinguished from a tapered body end interiorly rolled down within the body which in the formation of a rim necessitates expanding the surrounding exterior body wall to form the outer wall of the rim with a resulting annularly broken and seamed inner surface within the body.

What I claim is:—

1. A paper can having a tapered body provided with a bottom closure at its small diameter end and at its large diameter end having a rigid compacted exterior enlarged annular rim formed by an exterior roll of the body, said rim having a vertical exterior circumferential surface to slidably receive and frictionally retain the annular flange of a flat top slip cover.

2. A paper can having a longitudinally tapered sheet paper material body with its large diameter end stiffened by an enlarged annular exterior slip-cover-receiving-and-retaining rigid rim having an approximately cylindrical circumferential surface, said rim composed of the compacted and formed exteriorly rolled down extended end of the body.

3. A sheet paper material can body tapered and unbroken from its bottomed end to the annular surrounding edge of its large diameter mouth, said mouth end surrounded by an enlarged exterior annular solidified rim merging upwardly into said edge and formed by the exteriorly rolled down paper of said body compacted and shaped to provide an annular circumferential surface of substantial vertical length to slidably receive and frictionally hold the annular depending flange of the removable slip can cover, said solidified rim stiffening the large end portion of the body against collapse when the liquid filled container is grasped for lifting.

4. A paper can embodying a sheet paper material body having one end exteriorly rolled down to form a loose multi-convolution exterior enlarged roll, said roll being solidified and shaped to form said body with a solidified rigid exterior stiffening rim having an annular approximately vertical circumferential surface to slidably and frictionally receive the annular depending flange of the can removable slip cover.

5. A paper can having a sheet paper body of uniform taper to the top edge around its mouth and formed with a stiff approximately solid exterior annular molded rim integral with and stiffening the body against collapse and depending from said top edge and surrounding and radially compacted against the upper end of the tapered wall of the body to receive a flat top slip cover having a depending cylindrical annular flange adapted to slidably and frictionally slip onto and from said circumferential surface and to be frictionally movably retained thereby closing the can.

6. A paper can embodying a longitudinally tapered sheet paper material body reduced in length at its large end by a set-binder-carrying annular external compacted rigid roll forming a body stiffening rim the circumference of which provides an annular vertical surface to slidably receive the annular depending flange of the can's slip cover.

7. In the method of producing a paper can having a longitudinally tapered sheet paper material body, those steps which include reducing the length of the body by outwardly, downwardly and inwardly rolling down the large end of the body to form an annular loose roll exteriorly surrounding the tapered upper end of the body, and then compacting

and shaping said roll against the non-rolled tapered portion of the body surrounded thereby while backing said tapered portion, to form the large end of the body with a stiff approximately solid permanent surrounding exterior rim having its circumferential surface formed to slidably receive a removable slip cover for the large end of the can.

8. A paper can having its body embodying an overlong flat sheet paper material blank folded to overlong truncated cone form with its overlapping ends secured together to form a tight seam throughout the length of the overlong tapered body, said truncated cone being of smooth uniform taper from end to end, the large diameter end of said tapered body having a solid stiff exterior rim with an approximately cylindrical vertically-elongated slip cover receiving and retaining surface, said rim being composed of the outwardly flaring overlong end of said truncated cone rolled outwardly and downwardly and radially compressed and solidified and radially and longitudinally molded, the interior surface of the body sheet within said rim being smooth and without longitudinal breaks or seams and continuous upwardly to a rounded top edge merging outwardly and downwardly into said vertically elongated exterior surface of said rim.

9. In the production of paper cans the bodies of which are tapered for nesting; those steps which include preparing a sheet paper can body of truncated cone form overlong at its outwardly flaring large diameter end; rolling said flaring overlong end outwardly and downwardly to loose roll form exteriorly surrounding the large end of the body; and radially compacting and compressing said exterior roll by exteriorly applied inward radial pressure while the inner annular wall of said end is internally backed to maintain the original form and smooth surface thereof and radially and longitudinally molding said exterior roll to solid stiff longitudinally elongated exterior rim form having an approximately cylindrical vertically elongated surface to longitudinally receive and hold the flange of a slip cover, and with the original smooth inner surface of said end merging upwardly into the rounded top edge of the can which merges outwardly and downwardly into said depending vertically elongated exterior surface of said rim.

In testimony whereof I have hereunto set my hand at Fulton, New York, this 10th day of April, 1929.

WILBUR L. WRIGHT.