E. T. GREENFIELD AND J. G. V. LANG.

MANUFACTURE OF PAPER BOTTLES.

APPLICATION FILED SEPT. 28, 1915.

1,310,117.

Patented July 15, 1919.

Fig. 2.

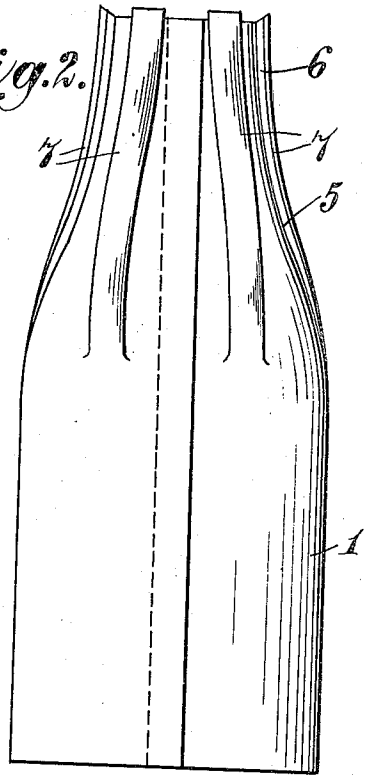


Fig. 1.

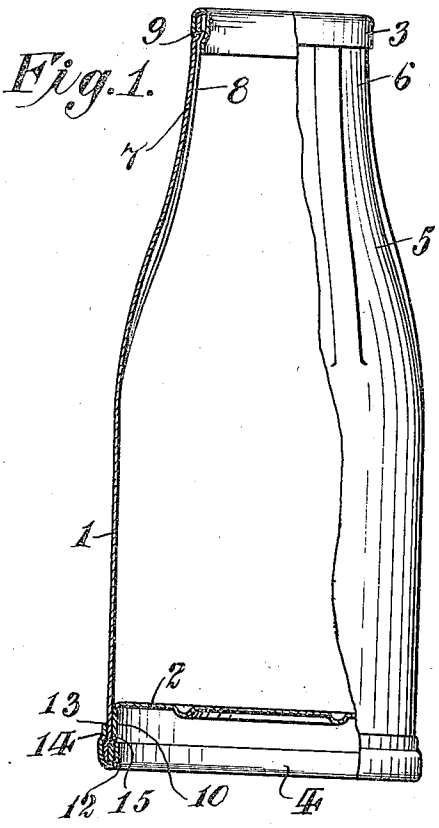


Fig. 3.

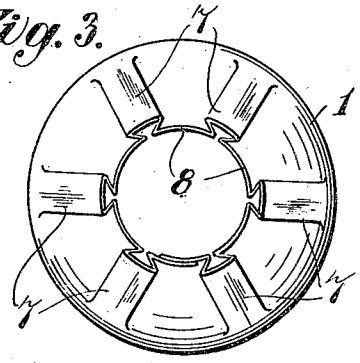


Fig. 4.

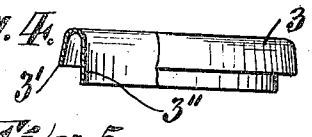


Fig. 5.

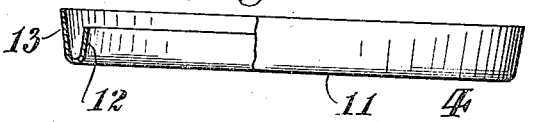


Fig. 7.

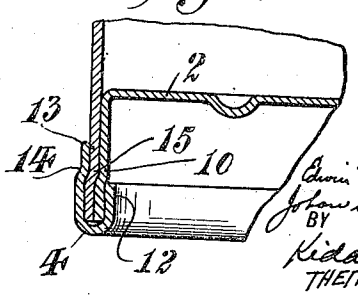
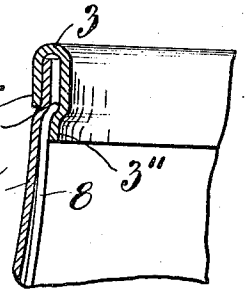


Fig. 6.



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UNITED STATES PATENT OFFICE.

EDWIN T. GREENFIELD, OF KIAMESHA, AND JOHAN GUSTAF V. LANG, OF NEW YORK, N. Y., ASSIGNORS TO GREENFIELD PAPER BOTTLE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

MANUFACTURE OF PAPER BOTTLES.

1,310,117. Specification of Letters Patent. Patented July 15, 1919.

Application filed September 28, 1915. Serial No. 53,085.

To all whom it may concern:

Be it known that we, EDWIN T. GREENFIELD and JOHAN GUSTAF V. LANG, citizens of the United States, and residents, respectively, of Kiamesha, county of Sullivan, State of New York, and of the borough of Manhattan, city of New York, county and State of New York, have invented certain new and useful Improvements Relating to the Manufacture of Paper Bottles, of which the following is a specification.

The invention relates to receptacles made of paper and particularly to bottles of paper or similar material made out of a tube plaited at one end so as to give the conventional bottle form.

In the manufacture of bottles from a tube suitable plaits are made so as to take up the surplus material resulting from the gradual reduction of the diameter from that of the original tube to that of the neck, and it has been found advisable to employ means for preventing the plaits or folds from opening and also for strengthening the neck so as to insure the proper seal even after the bottles have been handled in the customary way by a grip on the opposite sides of the neck or throat.

One object of my invention is to secure the plaits and give rigidity to the neck in a simple and effective manner thus enabling the use of a cheap and simple machine and unskilled labor.

To accomplish this object we propose to use a ring of metal which is substantially U-shaped in cross section and to make the two legs of the U straddle and clamp the plaited edge of the neck. This ring may be secured to the rest of the bottle by expanding the inside or contracting the outside ring, or by a combined action from the inside and outside.

To insure the retaining of the ring in place it is pressed in such a way as to force a natural bend or set-off in the paper and in the ring. If it is desired to press the ring from the inside the outside of the leg of the U-shaped ring section is made the shortest so that the paper can bend over the edge of this leg when there is caused to be exerted an expanding pressure on the inside leg at a point sufficiently beyond the free edge of the outside leg to give room for the paper, but not more than will put the paper in the bend under compression.

A machine for securing such a ring in place is shown in a companion application filed by us of even date herewith, to wit, an application entitled "Invention relating to the expanding of rings by internal pressure."

If it is desired to make the bend from the outside it would only be necessary to reverse the operation above referred to and make the inside leg shorter than the outside leg.

Another feature of the invention relates to the securing of a bottom in place in a receptacle body such, for example, as the body of a paper bottle. To secure a bottom in such a bottle with its relatively thin and flexible body-wall and to make the joint water-tight or liquid-tight is quite a problem, particularly if it is to be done by a simple machine and unskilled labor.

A further object, therefore, of our invention is to employ a simple and effective way of locking or securing in place the bottom of such a receptacle body so as to make the seal between the bottom and body liquid-tight and thereby impart rigidity to the receptacle itself. To accomplish this object we provide the receptacle, which is preferably a bottle, with a bottom having a depending flange of suitable depth and such a bottom may be referred to as an inverted cup. The outside diameter of the flange just referred to is such as to cause it to hug or fit tightly against the walls of the tube or receptacle body when the latter is pushed down over the bottom, the flange of which at that time extends downwardly. Over the double edge formed by the bottom of the tube and the depending flange there is slipped a metal ring which is substantially U-shape in cross section. Subsequently the two legs of the U are forced together either by expanding the inside leg or contracting the outside one, or by a combined action of the inside and outside. This ring is frequently referred to as a clamping ring. In order to insure the locking of the ring so

that it may not be pulled off we prefer to impart a natural off-set in this ring as well as in the double walls formed by the body and the depending flange of the bottom. This can be accomplished by making one of the legs of the U shorter than the other and by forcing the paper and the longer leg of the U to bend over the edge of the shorter leg.

An apparatus for accomplishing this operation is shown and described in a companion application filed by us of even date herewith, to wit, an application entitled "Invention relating to the contracting of rings by external pressure."

As showing a specific embodiment of the invention reference is made to the drawing forming a part of this specification, in which drawing,

Figure 1 is a vertical view partially in section showing a completed bottle.

Fig. 2 is a vertical view showing a tube which has been pressed so as to conform to the shape of a bottle. In this figure the plaits are shown as they appear at the end of the pressing operation just referred to.

Fig. 3 is a plan view of the pressed tube shown in Fig. 2.

Fig. 4 is a vertical view partially in section of the clamping ring which is utilized at the top of the bottle. This view shows the ring prior to its being pressed to clamping position.

Fig. 5 is a vertical view partially in section of the clamping ring that is used at the base of the bottle prior to said ring being pressed to clamping position.

Fig. 6 is an enlarged vertical sectional view showing the clamping ring and the paper clamped thereby at the end of the operation for pressing the upper clamping ring to clamping position.

Fig. 7 is an enlarged vertical sectional view showing the clamping ring and paper clamped thereby at the end of the operation for pressing the lower clamping ring to clamping position.

The bottle comprises the body 1, the bottom 2, the upper clamping ring 3, and the lower clamping ring 4. The throat and neck portions 5 and 6 are formed by pressing a tube, from which the bottle body is made, so as to cause the resulting pressed tube to conform to or assume the shape of an ordinary milk bottle. As the throat 5 and the neck 6 merge into each other they will hereafter be referred to merely as the throat and the latter is to be broadly construed.

The tube from which the body portion is made is preferably pressed so that the extra material therein will be formed into folds or plaits on the outside of the bottle body. When they are thus formed the ring which is U-shape in cross section and clearly shown in Fig. 4 is assembled over the folds and pressed so as to assume the form as shown in Fig. 1. This ring is designated by the reference character 3 and has an outer depending leg 3′ and an inner depending leg 3″, the latter of which is preferably the longer. When the ring 3 is in place on the upper end of the bottle pressure can be applied to it in any suitable manner whereby it will be caused to assume the shape shown in Fig. 1—that is with the lower end of the inner leg extending toward or past the lower end of the outer leg. Sufficient pressure is applied to cause the fold 7 and the portion 8 to be secured or clamped between the legs and the paper thus clamped is caused to assume the natural bend or set indicated at 9. This construction provides a very rigid structure at the upper portion of the bottle and the ring firmly holds the folds in place against the rest of the paper, indicated by 8, which is in the throat of the bottle.

As previously indicated, however, the outer leg of the ring 3 could be made longer than the inner leg and the ring could be secured in place by reversing the operations above set forth. It will also be observed that the outer portion of the leg 3′ is substantially flush with the outer portion of the folds 7.

A clamping ring similar to that just described is also preferably employed at the lower end of the bottle. The bottom 2 has a depending flange 10 and the outside diameter of the bottom is such that it closely fits the interior of the bottle body. In making the bottle the body is slipped over the bottom until the lower edges of the bottom and body are in the position shown in Figs. 1 and 7; then the ring 11, shown in Fig. 5, is slipped over said edges and pressure is applied to the ring so that it will assume the shape shown in said Figs. 1 and 7. This ring has an outstanding inner leg 12 and an outer leg 13, the latter of which is longer than the former. This ring is applied by contracting the outside so that the upper end of the outer leg is forced toward or over the upper free end of the inner leg and a natural bend or set is imparted to the outer leg at the point indicated at 14. The lower end of the body and the lower end of the depending flange 10 is securely clamped between the legs of this lower ring and a natural bend is imparted to the paper, as at 15. The result is a comparatively rigid base construction with a liquid-tight joint between the bottom member and the body of the bottle.

Machines whereby these clamping rings can be clamped into place, either by internal or by external pressure as previously indicated, are clearly shown and described in companion applications filed by us of even date herewith.

It will be manifest, however, that the invention described in this application may

be embodied in various forms and modifications without departing from the spirit and scope of the invention.

What is claimed is:

1. A bottle of the character herein described, comprising a body member formed from a tube of substantially uniform diameter and having one end formed into a neck or throat by plaiting the tube, a bottom member inserted in the opposite end of the tube and rigidly secured thereto by a metallic binding member, and a two-part metallic ring member encircling the inner and outer walls of the mouth of the bottle, said two-part ring being applied thereto under pressure whereby the neck plaits are compressed between the ring elements, and one edge of one of the ring elements having a bend imparted thereto forming a shoulder, and whereby the plaited bottle neck has a corresponding bend and consequent change in diameter imparted thereto and forming a shoulder therein which projects over the other ring element and producing an interlocking union with said two-part ring member.

2. A bottle of the character herein described, comprising a body member formed from a tube of substantially uniform diameter and having one end formed into a neck or throat by plaiting the tube, a bottom member inserted in the opposite end of the tube and rigidly secured thereto by a metallic binding member, and a U-shape metallic ring member encircling the inner and outer walls of the mouth of the bottle, said ring being applied thereto under pressure whereby the neck plaits are compressed between the ring walls, and the edge of one of the ring walls having a bend imparted thereto forming a shoulder, and whereby the plaited bottle neck has a corresponding bend and consequent change in diameter imparted thereto and forming a shoulder therein which projects over the other ring wall and producing an interlocking union with said U-shape ring member.

3. A bottle of the character herein described, comprising a body member formed from a tube of substantially uniform diameter and having one end formed into a neck or throat by plaiting the tube, a bottom member inserted in the opposite end of the tube and rigidly secured thereto by a metallic binding member, and a two-part metallic ring member having one part wider than the other encircling the inner and outer walls of the mouth of the bottle, said two-part ring being applied thereto under pressure whereby the neck plaits are compressed between the ring elements, and one edge of the wider ring element having a bend imparted thereto, and whereby the plaited bottle neck has a corresponding bend and change in diameter imparted thereto to cause the wall of the neck to project over the other ring element to form an interlocking union with said two-part ring member.

4. A bottle of the character herein described, comprising a body member formed from a tube of substantially uniform diameter and having one end formed into a neck or throat by plaiting the tube, a bottom member inserted in the opposite end of the tube and rigidly secured thereto by a metallic binding member, and a U-shape metallic ring member having one wall wider than the other encircling the inner and outer walls of the mouth of the bottle, said ring being applied thereto under pressure whereby the neck plaits are compressed between the ring walls, and the edge of the wider ring wall having a bend imparted thereto forming a shoulder and whereby the plaited bottle neck has a corresponding bend and consequent change in diameter imparted thereto and forming a shoulder therein which projects over the other ring wall and producing an interlocking union with said U-shape ring member.

5. A bottle of the character herein described, comprising a body member formed from a tube of substantially uniform diameter and having one end formed into a neck or throat by plaiting the tube, a ring member for securing the plaits in position, a flanged bottom member inserted in the opposite end of the tube, and a two-part metallic ring member encircling the lower outer end of the tube member and bottom flange, said two-part ring being applied thereto under pressure whereby the tube and bottom flange are compressed between the ring elements, and one edge of one of the ring elements having a bend imparted thereto forming a shoulder and whereby the lower end of the body and bottom flange have corresponding bends and consequent change in diameters imparted thereto forming a shoulder therein which projects over the edge of the other ring element and producing an interlocking union with said two-part ring member.

6. A bottle of the character herein described, comprising a body member formed from a tube of substantially uniform diameter and having one end formed into a neck or throat by plaiting the tube, a ring member for securing the plaits in position, a flanged bottom member inserted in the opposite end of the tube, and a U-shape metallic ring member encirling the lower outer end of the tube member and bottom flange, said ring being applied thereto under pressure whereby the tube and bottom flange are compressed between the ring walls, and the edge of one of the ring walls having a bend imparted thereto, forming a shoulder and whereby the lower end of the body and bottom flange have corresponding bends and

consequent change in diameters imparted thereto forming a shoulder therein which projects over the other ring element and producing an interlocking union with said U-shape ring member.

7. A bottle of the character herein described, comprising a body member formed from a tube of substantially uniform diameter and having one end formed into a neck or throat by plaiting the tube, a ring member for securing the plaits in position, a flanged bottom member inserted in the opposite end of the tube, and a two-part metallic ring member having one part wider than the other encircling the lower outer end of the tube member and bottom flange, said two-part ring being applied thereto under pressure whereby the tube and bottom flange are compressed between the ring elements, and one edge of the wider ring element having a bend imparted thereto forming a shoulder and whereby the lower end of the body and bottom flange have corresponding bends and consequent change in diameters imparted thereto forming a shoulder therein which projects over the other ring element and producing an interlocking union with said two-part ring member.

8. A bottle of the character herein described, comprising a body member formed from a tube of substantially uniform diameter and having one end formed into a neck or throat by plaiting the tube, a ring member for securing the plaits in position, a flanged bottom member inserted in the opposite end of the tube, and a U-shape metallic ring member having one wall wider than the other encircling the lower outer end of the tube member and bottom flange, said ring being applied thereto under pressure whereby the tube and bottom flange are compressed between the ring walls, and the edge of the wider ring wall having a bend imparted thereto forming a shoulder and whereby the lower end of the body and bottom flange have corresponding bends and consequent change in diameters imparted thereto forming a shoulder therein which projects over the other ring element and producing an interlocking union with said U-shape ring member.

9. In combination a body member formed from a tube, a flanged member inserted in one end of said tube, a two-part metallic ring member encircling the end of the tube and the flanged member, said two-part ring being applied thereto under pressure whereby the tube and flange are compressed between the ring elements, one edge of one of the ring elements having a bend imparted thereto forming a shoulder, and whereby the lower end of the tube and the flange of the flanged member have corresponding bends and consequent change in diameters imparted thereto forming a shoulder therein which projects over the edge of the other ring element and producing an interlocking union with said two part ring member.

This specification signed and witnessed this 21st day of September, A. D. 1915.

EDWIN T. GREENFIELD.
JOHAN GUSTAF V. LANG.

Signed in the presence of—
G. McGRANN,
M. F. KEATING.