

Dec. 30, 1941.

W. PELZER ET AL

2,267,993

PAPER BOTTLE AND CONTAINER

Filed Dec. 19, 1938

2 Sheets-Sheet 1

Fig. 1

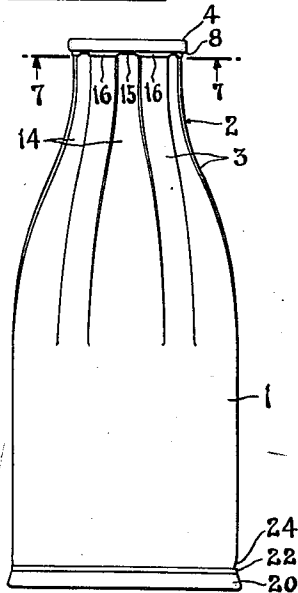


Fig. 2

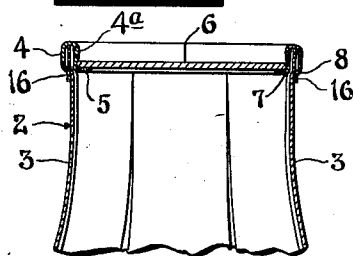


Fig. 3

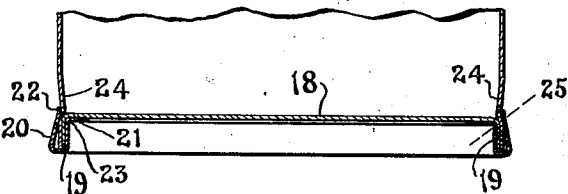


Fig. 4

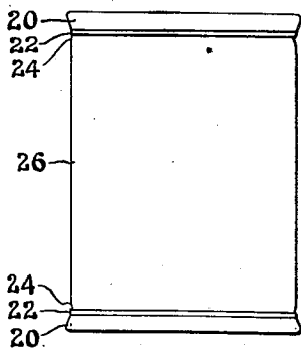


Fig. 5

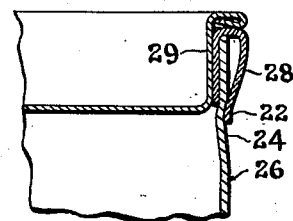


Fig. 6

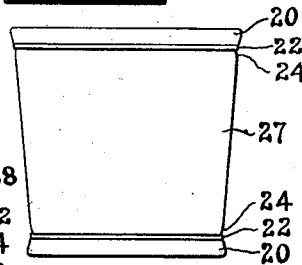
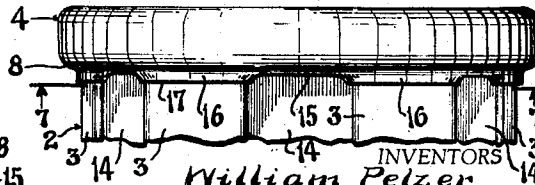
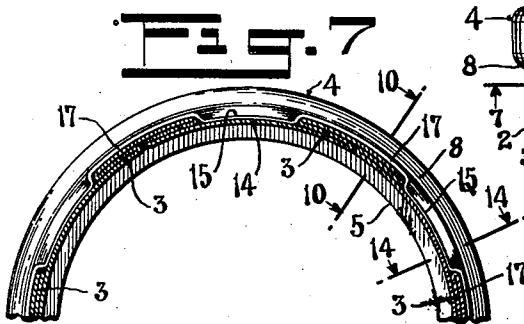
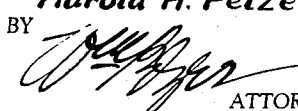


Fig. 7



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Fig. 9

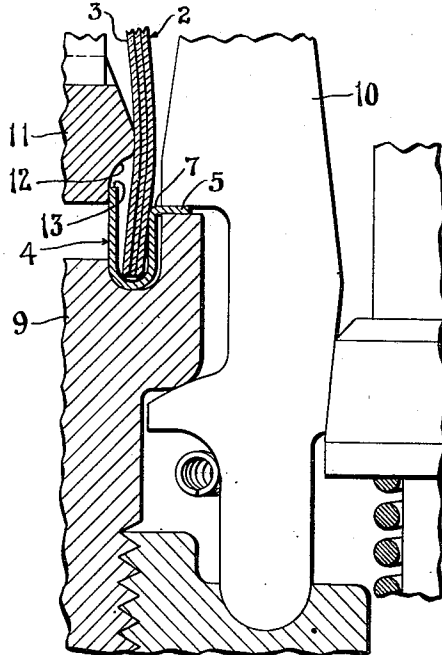


Fig. 10

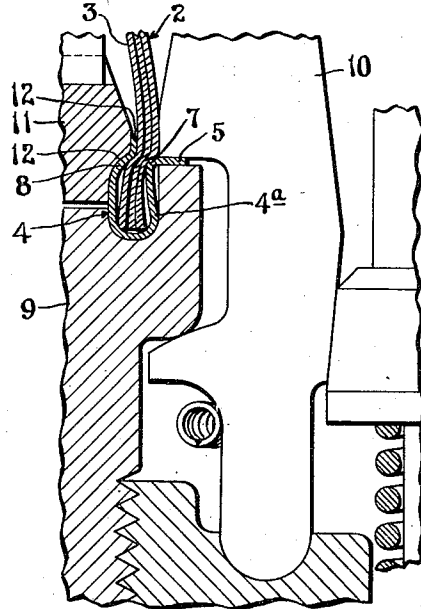


Fig. 11

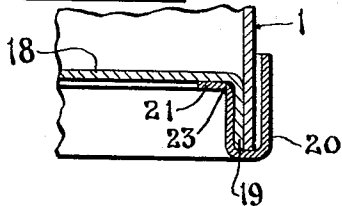


Fig. 12

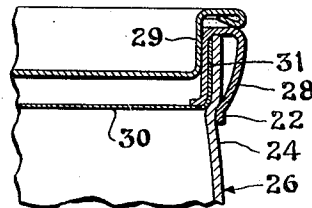


Fig. 13

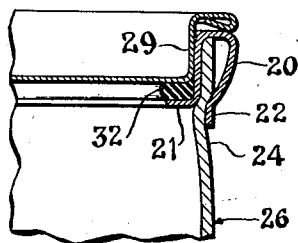
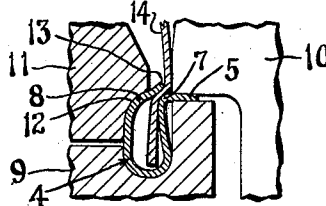
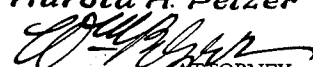


Fig. 14



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# UNITED STATES PATENT OFFICE

2,267,993

## PAPER BOTTLE AND CONTAINER

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Application December 19, 1938, Serial No. 246,606

5 Claims. (Cl. 229—5.5)

This invention relates to paper bottles of the type shown in Letters Patent of the United States No. 1,310,117 having a body formed from a paper tube plaited at one end to form the neck and mouth, the plaits being clinched by a metal ring, and the opposite end being closed by a paper disk having a flange clinched to the body end by a metal ring. In this type of bottle the neck ring is U-shaped in cross-section, with the inner flange deeper than the outer flange and is clinched in position by expanding the internal flange against the inner wall of the neck to expand the plaiting and form an inward shoulder to lock the ring to the bottle neck. The bottom ring has its outer flange deeper than the inner flange and the ring is clinched in position by contracting the outer flange, compressing the body and bottom flange, and forming an outward shoulder to lock the bottom in place. While these rings and method of clinching provided a secure fastening for the neck and bottom, several disadvantages developed in practice. In expanding the inner flange of the neck ring, the plaits would be compressed against the inner wall of the outer flange, but the neck sections between the plaits being single-ply as compared to triple-ply at the plaits would leave gaps under the ring, and unless these gaps were filled with paraffin with which the bottle is waterproofed, would create leaks. The outer flange of the neck ring formed a smooth surface with the plaits and provided no outer bead or shoulder for grasping the bottle in use and no bead or shoulder over which a closing cap could be secured, and provided no seat for the closing disk commonly employed with glass bottles. Furthermore, it was found necessary to employ annealed rings to avoid splitting of the inner flange in expanding same to effect the clinching. The bottom ring in this type bottle proved satisfactory so far as clinching the paper was concerned, but care had to be exercised to prevent the inner flange from embedding too deeply into the flange of the paper bottom, and frequently the paper bottom due to the weight of the contents of the bottle would sag and cause the flange to pull away from the bottle body, and in both instances, there was a tendency of the inner flange of the ring to cut the flange of the paper bottom and cause leaks.

The object of this invention is to overcome the defects above pointed out and generally to improve this type of bottle, and in carrying the invention into effect we employ U-shaped metal neck and bottom rings having the outer flanges deeper than the inner flanges, and the inner

flanges having narrow lateral flanges to provide seats for the sealing disk and bottom. The neck ring is clinched on the bottle neck by contracting the outer flange. This is done by forcing the ring into the female member of a die, the male member serving as an anvil on which the ring is seated and having means for clamping the ring in the seat through the sealing disk flange. The female die member in contracting the outer flange of the ring causes this flange to curve inward and engage the bottle neck causing it to contract and decrease in diameter under the lateral flange of the ring and compress the plaits and the entire neck upon the shoulder of the lateral flange, and the edge of the outer flange during this contraction continuing to curve inward between the plaits while the sections of the flange which contact the plaits curve downward parallel with the plaits forming a series of loops over the plaits.

In contracting the neck ring in this manner the paper near the mouth of the neck, including both the single-ply and the triple-ply sections, is forced under the slightly curved shoulder of the sealing disk flange and is pressed against it to form a seal, and the paper above this point within the walls of the ring spreads and fills the space between the walls, and this spreading of the paper plus the shoulder formed in the neck by forcing it under the sealing seat, secures the ring firmly in position. Also the contraction of the outer flange in the manner indicated forms the outer flange into a bead which serves as a means for grasping the bottle and as an anchorage for an overall cap when used in addition to the sealing disk.

The bottom ring is similar to the neck ring in cross-section except that it is deeper. The lateral flange of the inner flange forms a seat for the flanged bottom disk, the depth of the bottom flange being such as to permit seating of the bottom disk on the lateral seating flange. This ring is clinched in position by a tool having a contracting ring shaped to draw the outer flange inward at an angle to form a conic section, and at a point above the shoulder of the inner and lateral flanges the outer flange of the ring is contracted into a narrow and approximately cylindrical section, and the shoulder formed in this manner on the outer flange pinches the paper of the bottle body and the shoulder of the bottom disk against the curved shoulder of the seating flange, thereby forming a seal at the junction of the bottle body and bottom disk and causing the paper of the body section and bottom flange

within the ring to spread and fill the space between the walls of the ring. This form of ring may also be employed to secure flanged paper heads similar to the bottle bottom into cylindrical or tapering containers, and may be used in containers having removable squeeze or push covers, in which case the ring may be employed either with or without the lateral seating flange.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of a paper bottle having a plaited neck formation and flanged paper bottom and the neck plaits and paper bottom secured by metal rings.

Figure 2 an enlarged central vertical section of the bottle neck and neck ring.

Figure 3 is an enlarged central vertical section of the bottle bottom and bottom ring.

Figure 4 an elevation of a cylindrical container having flanged top and bottom heads secured by metal rings similar to the bottom ring of Figure 3.

Figure 5 an elevation of a tapered container having flanged top and bottom heads similar to Figure 4.

Figure 6 an enlarged view of the bottle neck ring showing the inwardly curved contraction at the single-ply neck sections of the bottle and the inwardly curved and looped formations at the triple-ply plait sections.

Figure 7 an enlarged cross-section on the line 7—7 of Figures 1 and 6 showing the inwardly curved contraction at the single-ply neck sections and the inwardly curved and looped formations at the triple-ply plait sections.

Figure 8 an enlarged vertical section of part of a container to illustrate the application of a squeeze or push cover.

Figure 9 an enlarged cross-section representing the neck ring before contracting the outer flange and showing the thicknesses of paper within the ring and parts of the die members for contracting the ring.

Figure 10 an enlarged cross-section representing the neck ring after contraction of the outer flange and showing the shoulder formation of the ring and paper and the squeeze of the paper upon the inner ring shoulder, the section of bottle neck being taken on the line 10—10 of Figure 7.

Figure 11 an enlarged view showing the bottom ring, bottle body and flanged bottom before squeezing.

Figure 12 an enlarged cross-section of a modified arrangement of the squeeze or push cover shown in Figure 8.

Figure 13 a view similar to Figure 12 showing the ring with the inner lateral flange for seating a sealing gasket, and

Figure 14 an enlarged sectional view illustrating the squeeze of the single-ply sections of the bottle neck upon the inner shoulder of the neck ring, the section of the bottle neck being taken on the line 14—14 of Figure 7.

Referring to the drawings, 1 indicates the body of a paper bottle having a neck 2 formed by contracting one end of the tube into loops which are flattened to form plaits 3. The plaits are secured by a metal neck ring 4 which forms the mouth of the bottle. This ring is U-shaped in cross-section, the outer flange of which is deeper than the inner flange, and the inner flange having a narrow lateral flange 5 to form a seat for the usual sealing disk 6, Figure 2. Ring 4 before contraction and the plaited neck 75

are shown in enlarged cross-section in Figure 9 and after contraction in Figures 10 and 14. In Figure 10 a plait 3 is shown squeezed against the slightly rounded shoulder 7 of the flange 5 by the shoulder 8 formed on the outer flange of the ring in its contraction, and the spread of the paper within the ring, and in Figure 14 is shown the squeeze at the single-ply sections of the bottle neck. This ring is contracted by a die having a male member 9 in which the ring is seated, an anvil member 10 which enters the ring and holds the flange 5 seated on the male member, and a female member 11 having a curved shoulder 12 by means of which the edge 13, Figure 9, of ring 4 is curved inward to contract the ring as it is driven into the member 11 by member 9. In contracting the ring, the outer flange curves inward and compresses the paper at the ring shoulder 7 and contracts the bottle neck slightly over the shoulder and flange 5, Figure 10. In this operation the edge 13 of the ring 4 at the bottle neck sections 14, Figure 6, between the plaits 3, curves inward and contacts the paper sections 14 and plaits 3. The resistance to the inward curvature of the ring as the paper is compressed against the shoulder 7 causes the edge 13 of the ring to curve upward parallel to the paper as seen in Figure 10, while the ring sections adjacent the bottle neck sections 14 continue to curve inward, and the final squeeze of the ring between the die members results in the formation of flanges 15 and 16, as seen in the enlarged view Figure 6, the flange 15 being of less depth than flange 16 owing to the difference in paper thickness of plaits 3 and neck sections 14, and therefore the edge 13 extends further inward at the neck sections 14. The contraction of the ring beyond the plaits results in the formation of loops 17 and the deep flanges 16 over the plaits as seen in Figure 7. The final squeeze of the ring between the die members imparts definite form to the outer ring shoulder 8 and firmly presses flanges 15—16 against the neck sections 14 and plaits 3 and the contracted part of the neck upon the ring shoulder 7. Also the final squeeze of the ring forms the outer flange into a bead for the mouth of the bottle by which the bottle may be grasped and which bead serves as an anchorage for securing an overall cap when such cap is employed in addition to the usual sealing disk 6. This method of applying the metal ring to the mouth of the bottle effects a dense packing of the paper between the shoulders 7 and 8, the spreading of the paper within the ring to fill the space between the walls of the ring, and a substantial shoulder to the paper of the bottle neck which prevents the neck ring being pulled off. Another important feature of the neck ring applied in this manner is that in imparting the final squeeze in the die, the pressure of the die members on the ring between shoulder 8 and the curved seat in the male member causes the curve of the ring to spread slightly in the ring seat of die member 9 (for which purpose the groove in the die member 9 forming the ring seat is made wider than the ring to provide a slight clearance at the inner circumference of the ring as seen in Figure 9) and this spreading decreases the inner diameter of the ring at the outer edge as seen in Figures 2 and 10, thereby providing a slight bead or taper 4a to the inner surface of the ring which serves to hold the sealing disk 6 firmly to its seat on flange 5, Figure 2.

The paper bottom 18 has a flange 19 which fits

closely within the bottle body 1, Figures 3 and 11, and closely over the inner flange of the U-shaped metal bottom ring 20. This ring has an internal lateral flange 21 and the depth of bottom flange 19 is such that the bottom disk 18 seats closely upon flange 21 as seen in Figures 3 and 11. The outer flange of ring 20 is deeper than the inner flange and the ring before contraction to clinch the bottom in position is similar in cross-section to the neck ring. This ring is contracted by a tool having a contractible spring ring which draws the ring 20 into conical form with a narrow and approximately cylindrical flange 22 to an internal diameter, above the shoulder 23, smaller than the external diameter of the bottle body, or approximately equal to the internal diameter of the body and the external diameter of bottom flange 19, and thereby drawing the body slightly inward as seen at 24, Figures 1 and 3, pressing the paper of the body and bottom disk upon the shoulder 23 and effecting a tight joint at the circumference of the disk by pinching the paper at an angle to the shoulder 23 as indicated by the dotted line 25, Figure 3, and this pinching of the paper at that point causes the paper within the ring to spread below the pinch. As a result of the contraction of the bottle body as indicated at 24, the spread of the paper within the ring, and the formation of a shoulder in the bottle body under the ring section 22, the body and bottom are firmly locked within the ring, and due to the flange 21 and seating of the bottom over the curved shoulder 23 cutting of the bottom disk or its flange is prevented and possible leaks avoided.

In Figures 4 and 5 are shown two forms of containers as distinguished from bottles. In this form a plain cylindrical tube 26 or conical tube 27 are provided with a bottom like the bottom 18 in Figure 3 and secured by a like ring 20. The top or head is formed with a flanged paper disk like bottom 18 and is secured by a ring 20 after the container is filled. The clinching of the ring to lock the bottom and head in position is performed in the same manner as clinching the bottom ring of the bottle and the joiner of the parts will be as seen in Figure 3.

In Figure 8 is shown a section of a container top having a ring 28 similar to ring 20 except that the lateral flange 21 is omitted and the container is closed by a dished squeeze or push cover 29 which may be of heavy paper or metal.

In Figure 12 is shown another form of container top which may be employed. In this form a head 30 which may be of paper or metal foil having a flange 31 is clinched to the body 26 by ring 28, similar to the ring in Figure 8, and above the head 30 is inserted a dished push cover 29.

In Figure 13 is shown another form of container top in which a ring 20 like ring 20 of the bottle bottom having the flange 21 is employed to seat a sealing gasket 32 to be used in conjunction with a push cover 29.

The bottles and containers made in accordance with our invention are treated or coated with a waterproofing material, preferably paraffin, for milk and food products.

The steps of the method and the machine for attaching the neck rings to bottles, and the machine for attaching the bottom rings to bottles and containers form no part of the present invention, and therefore are not shown in detail and will be embodied and described in detail in separate applications for patents.

What we claim is:

1. In a container of the class described, the

combination of a body member, a flanged bottom member fitting into the body member, and a metal ring member for clinching the bottom to the body, said ring before clinching being U-shaped in cross-section and the outer flange deeper than the inner flange and the inner flange having a rounded shoulder upon which the bottom member rests, and the outer flange contracted to form a conic section opposite the inner flange and an approximately cylindrical section above the inner flange forming an inward shoulder on the outer flange which presses the body member inward over the bottom member and both together upon the rounded shoulder of the inner flange of the ring.

2. In a bottle shaped container, the combination of a paper body member formed from a tube one end of which is shaped into a neck by forming loops which are flattened into plaits, a bottom member secured within said body member, and a metal ring member clinching the plaits and forming the bottle mouth, said ring before clinching being U-shaped in cross-section and the outer flange deeper than the inner flange and the inner flange having an inwardly projecting rounded shoulder, and the outer flange being contracted below said shoulder to form loops over the plaits and contracting the bottle neck under and compressing the paper upon the rounded part of said shoulder and said ring contraction transforming the outer flange into an outward circumferential bead.

3. In a bottle shaped container, the combination of a paper body member formed from a tube one end of which is shaped into a neck by forming loops which are flattened into plaits, a bottom member secured within said body member, and a metal ring member clinching the plaits and forming the bottle mouth, said ring before clinching being U-shaped in cross-section and the outer flange deeper than the inner flange and the inner flange having a closure seating flange and rounded shoulder, and the outer flange being contracted below said shoulder of the inner lateral flange of the ring to form an inward shoulder on the outer flange and loops over the plaits and contracting the bottle neck under and compressing the paper upon said rounded shoulder, and said inward shoulder formation of the outer flange transforming same into an outward circumferential bead, and the clinching pressure on the ring effecting a reduction of the internal diameter of the ring above the seating flange for holding a closure disk to the seat.

4. In a bottle shaped container, the combination of a paper body member formed from a tube one end of which is shaped into a neck by forming loops which are flattened into plaits, a flanged bottom member fitting into the body, a metal ring member for clinching the bottom to the body, said ring before clinching being U-shaped in cross-section and the outer flange deeper than the inner flange and the inner flange having a closure seating flange and rounded shoulder upon which the bottom member rests, and the outer flange when clinched being contracted to form a conic section opposite the inner flange and an approximately cylindrical section above the inner flange forming an inward shoulder on the outer flange which presses the body member inward over the bottom member and both together upon the rounded shoulder of the inner flange of the ring, and a metal ring member clinching the plaits and forming the bottle mouth, said ring before clinching being U-shaped in cross-section

and the outer flange deeper than the inner flange and the inner flange having a closure seating flange and rounded shoulder, and the outer flange being contracted below said shoulder to form loops over the plaits and contracting the bottle neck under and compressing the paper upon said rounded shoulder, and such ring contraction transforming the outer flange into an outward circumferential bead.

5. In a container of the class described, the combination of a round body member, a closure member at one end thereof, and a metal binding and stiffening ring member clinched on said body

member, such ring member before clinching upon the body member being U-shaped in cross-section and the outer flange thereof deeper than the inner flange and the inner flange having an inwardly projecting rounded seating shoulder, and the outer flange for clinching upon the body member being contracted to reduce its diameter where it extends beyond said rounded shoulder to form an inwardly projecting shoulder which presses the body member inward upon the rounded edge of the seating shoulder.

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