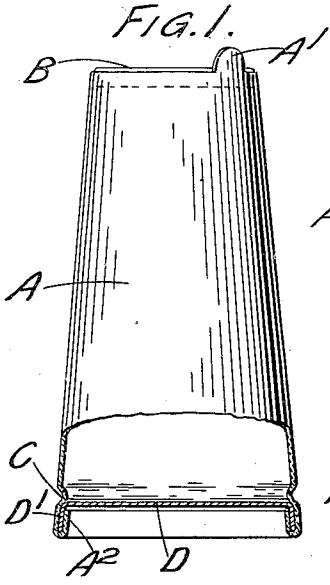
July 5, 1932. J. S. ROYLE ET AL 1,866,488

LIQUID TIGHT CARTON AND METHOD OF CLOSING SAME

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FIG. 1.



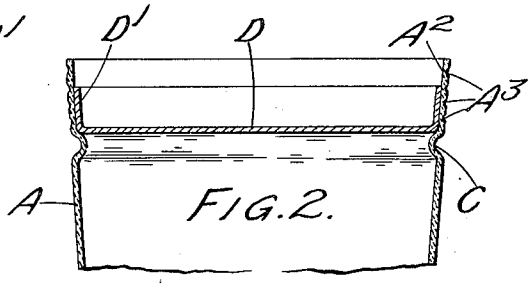


FIG. 2.

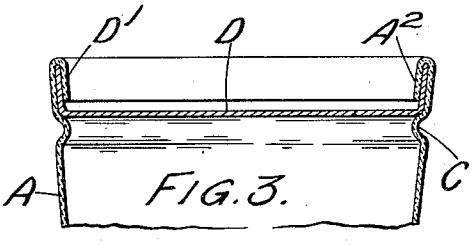


FIG. 3.

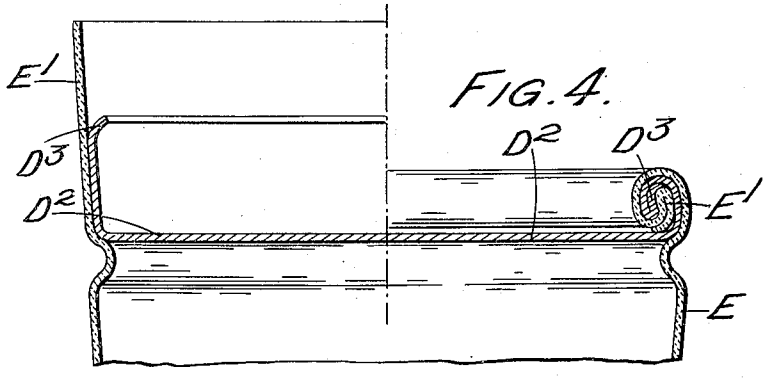


FIG. 4.

FIG. 5.

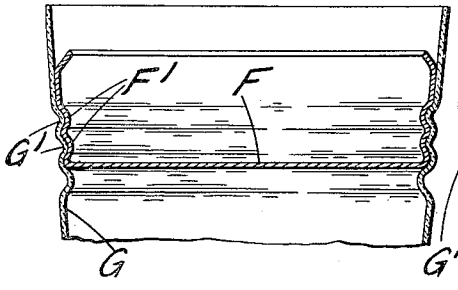
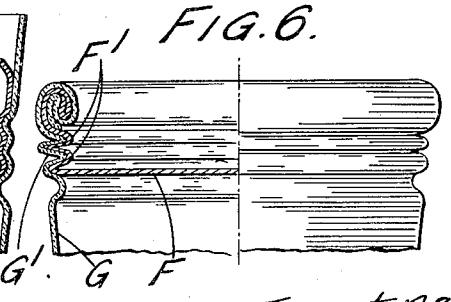


FIG. 6.



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FIG. 7.

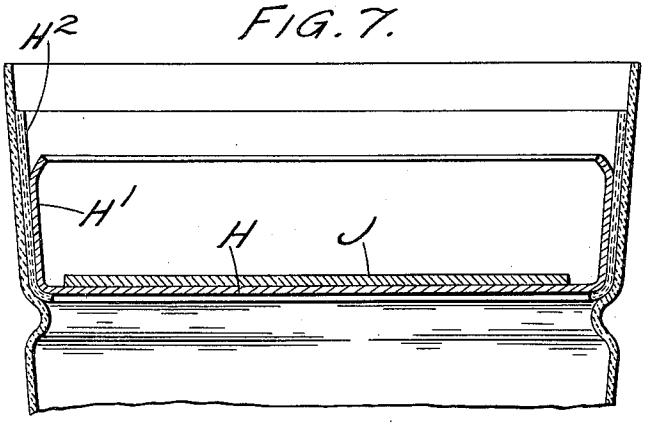


FIG. 8.

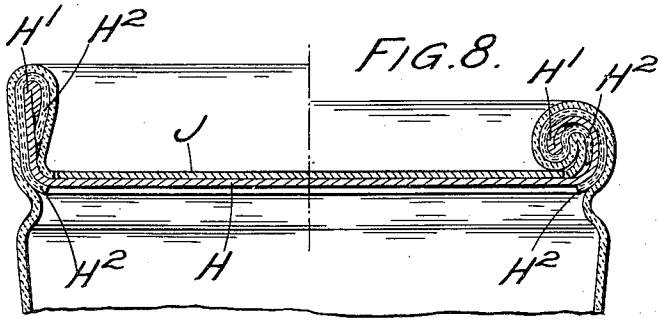


FIG. 9.

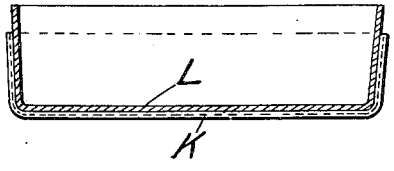
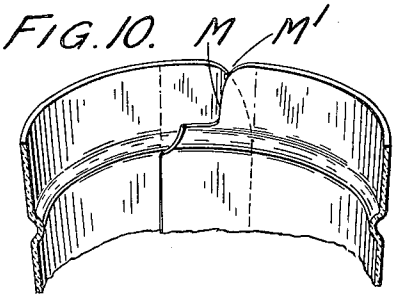


FIG. 10.



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UNITED STATES PATENT OFFICE

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LIQUID-TIGHT CARTON AND METHOD OF CLOSING SAME

Application filed August 26, 1929, Serial No. 388,498, and in Great Britain September 10, 1928.

This invention relates to liquid-tight cartons of the kind comprising a tapered or cylindrical container of treated paper or the like initially open at one end only, and to methods of closing the same after they have been filled.

Hitherto it has been proposed to make a liquid-tight joint in paper containers and the like by folding or interlocking the end of the body portion of an empty paper container, over or with the flange of a cap inserted therein, this folding operation being effected by means of coacting dies or other tools, generally prior to the paper being treated with a waterproofing coating. Such joints, however, were commonly made by means, and under conditions, which could not be used for closing the open end of a filled container, and were in fact not used for closing the container after it had been filled with liquid. Proposals were accordingly made to close the open end of a filled container by springing a plain cardboard disc into the wider open end thereof, but such discs failed in practice to prevent leakage when the container was subsequently reversed so as to stand upon the end through which it was filled.

An object of the present invention is to provide a container having one end permanently closed, with arrangements such that the open end can be effectively sealed by a flanged cap after the container has been filled with a liquid, without the use of an adhesive or other subsequently supplied water-proofing composition, the flange of the cap and the adjacent edge portion of the container being arranged to coact to form a liquid-tight seal, as well as a reinforced rim on which the container can subsequently stand. Other objects of the invention relate to improved modes of construction, and methods of effecting the closure of a container, as will more fully appear hereinafter.

Various constructions of container and cap according to this invention are illustrated by way of example in the accompanying drawings, in which

Figure 1 is a side elevation partly in section showing a container according to this invention having its wider end closed by means of an inserted cap,

Figure 2 is a sectional elevation on an enlarged scale showing the end of the container and the cap inserted therein prior to the sealing or clinching operation,

Figure 3 shows the cap illustrated in Figure 2 after it has been clinched in position,

Figure 4 shows on an enlarged scale a container of which the skirt is first folded over the edge of the cap flange to form a thickened rim, as in Figure 3, which is then folded or rolled over one or more times to form a seam or crimped joint of at least double thickness, as shown on the right-hand side of the figure,

Figure 5 shows an alternative form of cap and skirt having circumferential grooves,

Figure 6 shows such a cap in its sealed position,

Figure 7 shows an alternative form of cap with an additional separate flange portion prior to the folding over operation,

Figure 8 shows the same cap after the sealing has taken place,

Figure 9 shows on a smaller scale a modification of the same cap with the additional flange inserted therein,

Figure 10 is a sectional perspective view of the upper end of the container showing the rounding off of the overlapping edges of the blank.

The carton illustrated in Figure 1 comprises a taper container A permanently closed at its upper end B and furnished with a tag A^1 so as to enable a portion of the end or side wall adjacent to it to be removed when the contents are to be poured out. The wider end of the container is initially open as shown in Figure 2 and is provided with an internal rib or shoulder C which limits the downward movement of the cap comprising a flat or disc-like portion D with an integral circumferential flange D^1. This cap is inserted into the wider end of the container (which occupies a reverse position to that illustrated in Figure 1 during the filling operation) after the vessel has been filled with the liquid. The portion A^2 of the container above the flange C constitutes a skirt which is then

turned over upon the flange D^1 of the cap, as clearly shown in Figure 3, thus forming a reinforced edge of double thickness and effectively sealing the container. Preferably the upper portion of the cap which is turned over is furnished with one or more circumferential grooves or indentations A^3 to facilitate this turning over operation, but these indentations may be omitted if desired.

The cap D^2 and container E illustrated in Figure 4 differ from the construction last described in that both the skirt E^1 and the flange D^3 of the cap D^2 are of slightly greater depth. When the skirt E^1 is folded inwards, the upper edge of the flange is also folded over, and the thickened rim so formed is then rolled over again upon itself so as to form a seam or crimped joint of at least double thickness, as shown on the right-hand side of Figure 4. In this case the upper edge of the cap D^2 is initially inclined inwards as shown on the left of the figure so as to facilitate both the insertion of the cap and the folding over operation.

In the alternative construction illustrated in Figure 5, the flange of the cap F is provided with circumferential corrugations F^1 to engage corresponding corrugations G^1 in the skirt of the container G. When the vessel is sealed by folding the edge of the skirt one or more times with or upon the flange, it is simultaneously subjected to pressure in the longitudinal direction which causes the corrugations to interlock as shown in Figure 6 to form a labyrinthal joint and thus further prevent risk of leakage occurring.

In the further modification shown in Figures 7 and 8, the cap H not only has an integral flange H^1 but an additional deeper flange H^2 the upper edge of which projects above the edge of the shallower integral flange H^1. This projecting portion H^2 is folded over as shown on the left of Figure 8 prior to the further folding over of the thickened rim so formed to make the sealed joint seen on the right-hand side of Figure 8. In this case an additional reinforcing disc J of cardboard is shown which is kept in place by the thickened rim.

A further modification of cap illustrated in Figure 9 differs from that last described in that it comprises two flanged caps K, L placed one within the other, the flange of the outer cap K being shallower than that of the inner cap L.

To prevent buckling of the skirt which occurs if the blank has sharp corners or, if the edge of the overlapping joint is parallel to the axis of the container, the corners of the wider end of the blank are inclined, rounded or cut away as shown at M in Figure 10, in some cases, if desired, leaving a small gap M^1 instead of the two sharp corners which will exist on the inner or outer walls of the container if the edges of the blank follow the dotted lines shown instead of being cut away. This facilitates the folding over of the skirt and prevents leakage which otherwise occurs. The corners at the wider end of the blank may be cut away or shaped in any other manner to give the desired result.

It will be appreciated that although the container according to this invention is particularly adapted to hold milk or some fluid which can be readily poured, the invention is not limited to such use and that the term "paper" includes all materials such as wood pulp, cellulosic materials and the like rendered waterproof in any suitable manner.

It will be further understood that the corrugations in the cap and skirt by which a labyrinthal joint is secured may be used with each of the constructions illustrated in Figures 1–10, and that although the tool or mechanism by which the skirt is folded over and clinched in itself forms no part of this invention, this folding or clinching operation is preferably effected by means of a tool which subjects the skirt and cap flange to pressure in a radial as well as a downward direction whilst relative rotation occurs between the tool and the container.

What we claim as our invention and desire to secure by Letters Patent is:—

1. A carton comprising an elongated container of curved cross-section, of waterproof paper material, having a permanent closure at one end, said container being formed with an internally projecting annular rib adjacent to its open end, with an integral skirt portion extending from said rib to the edge of the open end a sufficient distance to enable the same to be folded over the flange of a flanged cap when the latter is seated within said skirt portion upon said rib, said container being formed of a wound blank having a lap joint, with the overlapping edges of the blank in the skirt portion cut away so as to enable the skirt portion to be folded or crimped over the cap flange, after filling, without buckling, to form a liquid-tight seal.

2. A cylindrical carton of waterproof material having a permanent closure at one end, an inwardly extending circumferential rib near the other end, an unindented flanged cap adapted to be inserted within the open end of the container after filling, and to coact before sealing with the rib to seat at the desired distance from the open edge, said open edge extending beyond the flange a distance less than the height of said flange whereby when first crimped over the flange it will be out of contact with the body of the cap, thus permitting a second crimping to form a leak-proof seal, the outer surface of the open end of said container being provided with circumferential indentations to facilitate subsequent turning of the open end of the container over the flange of the cap.

3. A carton comprising an elongated con-

tainer of curved cross-section, of waterproof paper material, having a permanent closure at one end, and a flanged cap adapted to be inserted within the open end of the container after filling, and to coact with the container to seat at a desired distance from the edge of the open end, said container being formed of a wound blank having a lap joint, with the overlapping edges of the blank in the skirt portion cut away so as to enable the skirt portion to be folded or crimped over the cap flange after filling, without buckling, to form a liquid-tight seal.

4. A carton comprising an elongated container of curved cross-section, of waterproof paper material, having a permanent closure at one end, and an unindented flanged cap adapted to be inserted within the open end of the container, after filling, and to coact with the container before sealing to seat at a desired distance from the edge of the open end, the open end portion of the container extending above the flange of the cap a distance less than the height of said flange, when the latter is mounted in position, and being adapted and arranged to be crimped or folded over the flange, to form a liquid-tight joint and a reinforced rim, said end portion of the container being provided with circumferential indentations to facilitate subsequent turning of the projecting skirt over the flange of the cap.

In testimony whereof we have signed our names to this specification.

JOHN SANDERSON ROYLE.
JOHN MELLOR.