

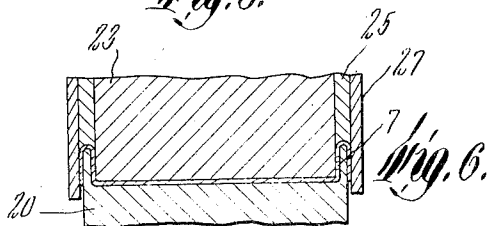
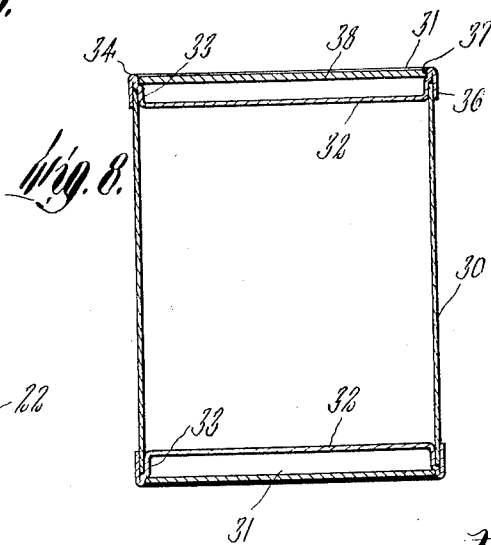
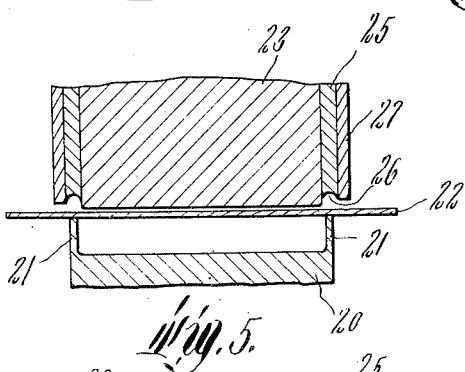
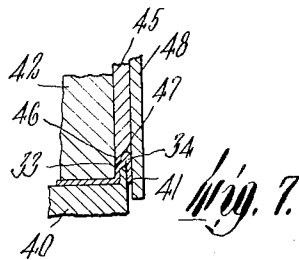
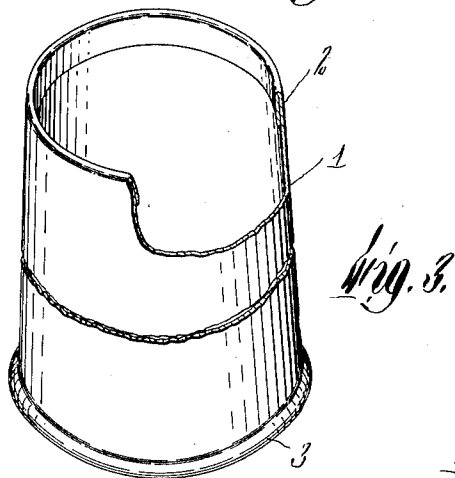
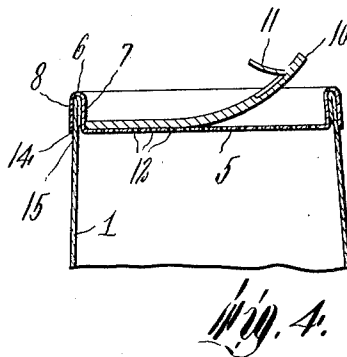
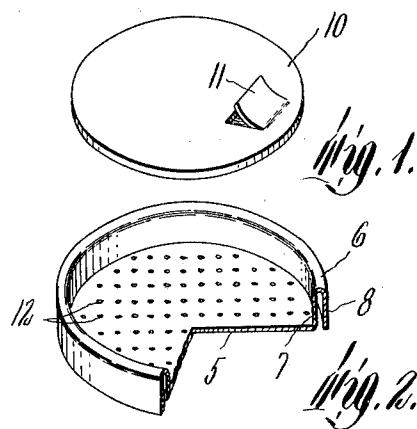
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K. CLARK

2,118,591

PAPER CONTAINER AND COVER THEREFOR

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Inventor
Kempton Clark
by *Wright, Brown, Quincy & May*
Attys.

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PAPER CONTAINER AND COVER THEREFOR

Kempton Clark, Little Compton, R. I., assignor
to American Seal-Kap Corporation of Dela-
ware, Wilmington, Del., a corporation of Del-
aware

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This invention relates to containers and more especially to covers for containers, particularly where the containers have relatively thin walls, as when such containers are made up from paper tubes.

One of the objects of this invention is to produce molded paper covers for containers of this type so arranged that the covers shall engage a portion at the opening to be closed on both inner and outer faces of the container. This requires the production of a marginal U-shaped portion for the cover with the side walls of the U very close together, so as to engage on opposite sides of the relatively thin wall container. This in turn necessitates very severe forming operations for the paper cover which require the use of specially made and processed paper.

A further object of this invention is to make possible the production of a double walled paper cover having the general construction hereinbefore specified, the double wall serving with the enclosed air space as a heat insulator of particular utility when the receptacle, which may be a paper tube, is used to hold either hot or cold materials.

For a more complete understanding of this invention, reference may be had to the accompanying drawing in which

Figures 1 and 2 are perspectives, Figure 2 being partly broken away, showing the two parts of a container cap of one form embodying this invention.

Figure 3 is a perspective partly broken away of a container in connection with which the cap of Figures 1 and 2 may be employed.

Figure 4 is a fragmentary section at the top of the container of Figure 3 showing the cap applied.

Figures 5 and 6 are diagrammatic views showing forming operations to make the cap part shown in Figure 2.

Figure 7 is a view similar to Figure 6, but showing a modification.

Figure 8 is a section through a container showing end caps made in accordance with Figure 7.

Referring to Figure 3, at 1 indicates a frusto-conical receptacle which may be made of paper and which may, if desired, have its upper edge folded as at 2, although it may be of a single thickness of the paper stock throughout, if desired. This receptacle is shown as having a base 3 at its large end. Such containers when of heights three or four times their average diameters are commonly used for packaging cream or the like and when of relatively short heights com-

pared to their average diameters, are often used for packaging cheese or the like.

In Figure 2 is shown a paper cover adapted to be used with the container 1. This paper cover is shown as having a central portion 5 of disk shape surrounded by a rim portion 6 substantially entirely at one side of the portion 5 and of substantially U shape in cross section, the sides 7 and 8 of this rim portion being each of a width substantially greater than the spacing between these wall portions, usually at least twice such spacing. As shown this spacing is substantially one-fifth of the width of the walls 7 and 8. If desired the central portion 5 may be provided normally with a reinforcing disk 10 shown detached in Figure 1 and which may engage frictionally within the rim wall 7 and form a reinforcement for the central base portion 5. If desired the disk member 10 may be provided with a tab such as 11 by which it may be removed as shown in Figure 4, and if desired also the portion 5 may be perforated as at 12 so that after the disk 10 has been removed, the member remaining serves as a shaker top for the receptacle. In the normal sealing operation of the cover when initially used, however, it is preferable that the disk 10 be firmly in position so that the cap may be of sufficient strength to stand handling without danger of destructive deformation. With the rim portion constructed as thus described, the walls 7 and 8 being substantially parallel and at right angles to the plane of the portion 5, the cover when placed on the receptacle as shown at 14, firmly engages this receptacle, the parts being so proportioned that the lower edge of the outer wall 8 as at 14 presses firmly against the outer face of the receptacle 1 somewhat beneath its upper edge as at 15, while the top portion of the inner wall 7 engages closely against the inner face of the wall of the receptacle 1 adjacent to its upper edge. By reason of the somewhat resilient material of the cover and of the receptacle, this type of engagement may be made quite secure, so that the cover resists removal from the container.

In order to form a cover as thus described from a sheet of paper, certain characteristics in the paper are of great importance. This is because the molding operation to which the paper must be subjected in order to form a rim having such substantial width and with the side walls of the rim spaced so closely together, imposes very severe molding stresses on the paper. It is important in the first place that the paper sheet from which the molded cover is made shall be substan-

tially without grain and that it shall be of very nearly equal strength both lengthwise and crosswise. Paper as ordinarily made on a paper machine is of substantially greater strength lengthwise than crosswise in view of the preponderating direction in which the paper fibers are laid in the sheet. For formation into covers, such as have been herein described, such paper with a materially greater strength lengthwise and crosswise is not suitable. For best results the paper should have as closely as possible equal strengths in all directions, at least the ratio should not be greater than 1.15 to 1 in any two directions.

Certain other characteristics are also quite important. Such caps must be impregnated with a suitable waterproofing and rigidifying material to give them sufficient rigidity after formation and in free or unconstrained condition so that moisture will not tend to return the paper toward its unfolded condition, causing the rim portion to more or less flatten and thus fail to hold tenaciously to the container top. In order that such a saturant may be placed in the paper, the paper must have a considerable porosity. For example, when placed in water it should be able to take up sufficient water to increase its weight by from 120% to 200%. Best results have been obtained when this increase of weight is approximately 150%. Various agents may be used for saturating the paper but in order to condition it to the best advantage for the molding operation, an initial fiber softening agent such as a considerable amount of moisture in the saturant when the molding operation is taking place is important. One manner of treating the paper is to pass it first through water and then through a heated wax, such, for example, as paraffin wax and preferably with a small proportion of a hardening wax such as carnauba or montan. The molten wax should be at a temperature higher than the vaporizing temperature of the moisture under the particular conditions to which the material is being subjected, so as to drive off a portion of the moisture, whereupon as the paper is allowed to cool with a more or less molten wax coating thereon, this coating is forced into the interstices by the partial vacuum formed through the condensation of water vapor within the voids as the sheet becomes cooler.

Another suitable material for use as a saturant comprises an aqueous solution or dispersion of a wax or some other material which may ultimately harden, as, for example, a dispersion of a urea condensation product, which ultimately rigidifies. The saturating agent when in its liquid condition acts as a material aid in the molding operation, permitting the fibers of the paper to conform more readily to the configuration of the molding members without disintegration of the sheet.

Another factor of importance is the weight of the paper material. It has been found in practice that such weight should be somewhere between two hundred and two hundred eighty pounds for five hundred sheets 24" x 36" and that approximately two hundred thirty pounds is the most satisfactory weight for the purpose. The Mullen test for such a paper should not be less than seventy pounds per square inch nor more than one hundred fifty pounds and preferably in the neighborhood of one hundred pounds. A tensile strength for a one inch strip should be in the neighborhood of seventy pounds. It should not exceed one hundred pounds nor be

below fifty-five pounds. For an open saturating sheet, the desired strength is exceptionally high, although for a closely woven paper of this weight, this tensile strength would be quite low. It should not be different by more than twenty-five pounds in any direction.

In Figures 5 and 6 have been illustrated the molding operation by which the rim for engagement with the top of the container may be formed. Referring to these figures, at 20 is indicated a die member having an upstanding thin rim 21. The disk of paper as at 22 is placed on the die member over this rim and the mating die members are brought down thereagainst. These mating die members, as shown, comprise a central plunger 23 which is adapted to pass downwardly within the rim 21 and is of sufficiently smaller diameter so that the paper may be extended therebetween to form the wall 7 as shown in Figure 6. A second upper die member is shown as an annular member 25 having a rounded lower face 26 which acts to form the paper over the upper edge of the rim 21. An outer annular member 27 is then adapted to pass down outside of the member 25 and mold the outer margin of the paper down around the rim 21. By employing paper having the characteristics previously described as important, this molding operation may be done successfully and without disrupting or otherwise injuring the paper.

In Figure 8 is shown a construction particularly intended as a container package for ice cream or the like materials where it is desirable to prevent as much as possible the passage of heat through the package walls. As shown in this figure, the container itself consists of a length of paper or cardboard tubing as 30, which is closed off at opposite ends by the caps or covers 31. Each of these covers, as shown, comprises a central disk portion 32 which bridges across the internal diameter of the container 30 and which has at its edge a rim portion 33 of substantially U cross section, and substantially entirely at one side of the central disk portion 32, having at its outer edge an annular extension 34 with its outer face in alinement with the outer face of the outer wall member 36. This extension, together with the outer end portion of the rim 33 forms an annular seat 37 for the reception of a disk 38 which may be pressed into seating engagement therewith, being held in position by friction against the inner walls of the extension. This construction provides an end closure for each end of the tube 30 having fixedly spaced oppositely disposed parts forming a double wall surrounded by the rim portion 33, which thus provides additional protection to the passage of heat through these end caps or covers.

In Figure 7 is shown somewhat diagrammatically a manner of and dies for molding the U shape rim with its extension 34. In many cases it may be found desirable to effect this molding operation after an initial molding by the dies, such as shown in Figures 5 and 6, has been effected. Referring to Figure 7, the base mold 40 is provided with an upstanding rim 41 of less height than the rim 21 shown in Figures 5 and 6. A central plunger 42 quite similar to the plunger 23 of Figures 5 and 6 is employed with the member 40 to form the inner face of the inner rim wall 33. An annular member 45 provided with a downwardly extending annular lip 46 at its inner margin and a recessed portion 47 adjacent to its outer margin shapes over the outer face of the

rim and the outer and inner faces of the extension 34, while an annular member 48 shapes down the outer margin of the paper similar to the molding member 37 in Figures 5 and 6.

From the foregoing description of certain embodiments of this invention, it should be evident to those skilled in the art that various changes and modifications might be made without departing from the spirit or scope of this invention as defined by the appended claims.

I claim:

1. In combination with a frusto-conical receptacle, of a cap for said receptacle having a rim substantially U shape in cross section and with the side walls thereof parallel and substantially non-tapering, the inner of said side walls, when the cover is closed, engaging firmly against the inner face of said receptacle wall adjacent to its upper edge and the outer of said walls at its lower edge engaging firmly on the outer face of said receptacle wall below its upper edge, said cap being retained in position on said receptacle through its frictional engagement therewith.

2. An article of manufacture comprising a receptacle cover formed of an originally flat sheet of paper said cover having a marginal rim generally U shape in cross section to receive the upper edge of a receptacle to be closed by said cover, the opposite walls of said rim in unconstrained condition being parallel and of a width substantially five times the spacing of said walls from each other.

3. A receptacle cover of sheeted paper having a marginal rim substantially U shape in cross section and with an annular extension at its outer edge, said rim and extension being substantially entirely at one side of the central portion of said cover within said rim, said rim being shaped to receive the edge portion of a receptacle, and a disk seated within said extension on said rim spaced from said central portion and forming with said central portion and rim a double end wall enclosure.

4. In combination, a receptacle comprising a paper tube, and closures for opposite ends of said tube, each closure having portions engageable with both inner and outer side walls of said tube and provided with fixedly spaced oppositely disposed end walls.

5. A molded sheet paper cover for a container, said cover having a marginal portion of substantially U shape in cross section for engagement about the edge of the container, said paper having a strength ratio lengthwise to crosswise of the paper sheet not greater than 1.15 to 1 and having a Mullen test strength of from 70 pounds to 150 pounds and with differences in tensile strength in different directions less than 25 pounds per

square inch, said paper being of a weight of from 200 to 280 pounds for 500 sheets 24" x 36".

6. A molded sheet paper cover for a container, said cover having a marginal portion of substantially U shape in cross section for engagement about the edge of the container, said paper having a strength ratio lengthwise to crosswise of the paper sheet not greater than 1.15 to 1 and of Mullen test strength of approximately 100 pounds and a weight of about 230 pounds for 500 sheets 24" x 36".

7. A molded sheet paper base cover for containers, said cover having a marginal portion substantially U shape in cross section for engagement about the top of the container, said paper being absorbent to gain in weight when immersed in water from 120% to 200% and having a strength ratio lengthwise to crosswise of the sheet not greater than 1.15 to 1.

8. A molded sheet paper base cover for containers, said cover having a marginal portion substantially U shape in cross section for engagement about the top of the containers, said paper being absorbent to gain in weight when immersed in water approximately 150% and having a strength ratio lengthwise to crosswise of the sheet not greater than 1.15 to 1.

9. A molded sheet paper cover for a container, said cover having a marginal portion of substantially U shape in cross section the side portions of said U being of substantially greater length than the spacing therebetween, said sheet paper having a basis weight of approximately 230 pounds for 500 sheets 24" x 36", a tensile strength of about 100 pounds per square inch in any direction, and a porosity such that it will gain about 150% in weight when immersed in water, said cover containing a waterproofing and stiffening saturant.

10. A molded sheet paper cover for a container, said cover having a marginal portion of substantially U shape in cross section and of a depth substantially greater than its width, said sheet paper having substantially equal strengths in all directions and containing a saturant of initially fiber softening and of an ultimately stiffening nature.

11. A molded sheet paper cover for a container, said cover having a marginal portion of substantially U shape in cross section and of a depth substantially greater than its width, said cover being stiffened with a resin condensation product.

12. A molded sheet paper cover for a container, said cover having a marginal portion of substantially U shape in cross section and of a depth substantially greater than its width, said cover being stiffened with a urea resin condensation product.

KEMPTON CLARK.