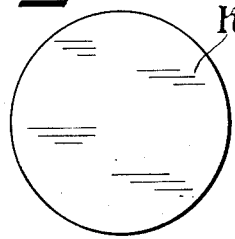
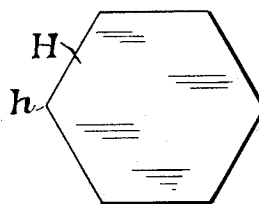
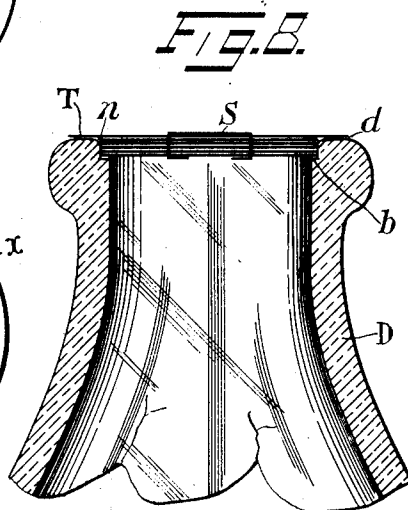
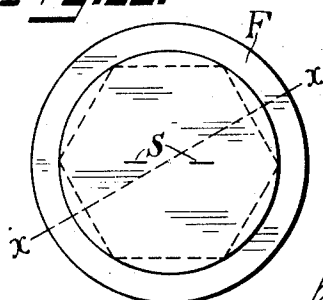
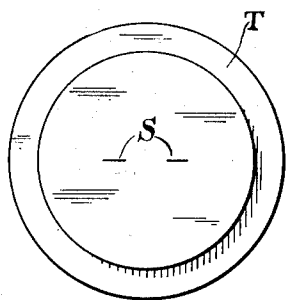
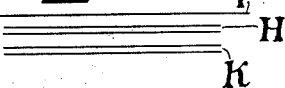
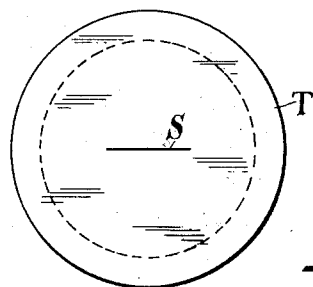
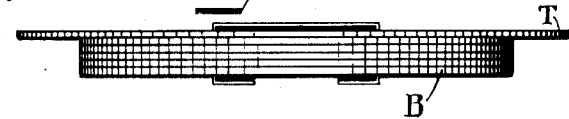
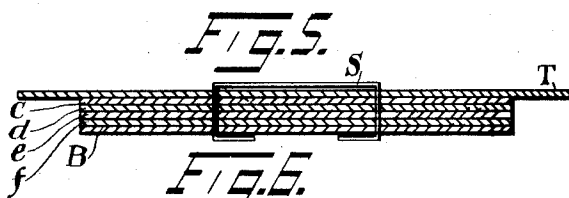
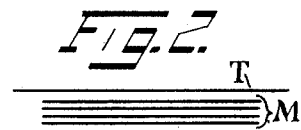


No. 882,840.

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W. H. REID.
BOTTLE CLOSURE.

APPLICATION FILED OCT. 19, 1907.



Witnesses:

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UNITED STATES PATENT OFFICE.

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BOTTLE-CLOSURE.

No. 882,840.

Specification of Letters Patent.

Patented March 24, 1906.

Application filed October 19, 1907. Serial No. 398,231.

To all whom it may concern:

Be it known that I, WILLIAM H. REID, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Bottle-Closures, of which the following is a specification.

This invention relates especially to the closures for bottles used for delivering milk and cream.

The object of the invention is to provide a closure that can be cheaply manufactured by machinery out of material like cardboard or pulp-board; which closure can be easily and efficiently applied to a bottle, especially when the bottle is entirely filled; and which will be securely retained in position and prevent spilling of the contents, and yet can be readily removed by simply pulling on the top member.

In the accompanying drawing representing embodiments of my invention, Figure 1 shows one form of cap conventionally in section. Fig. 2 is a view of the cap with the several disks slightly separated. Fig. 3 represents a top view and Fig. 4 a bottom view. Fig. 5 shows in section and Fig. 6 in side elevation the same cap on a larger scale. Fig. 7 shows enlarged the position of the disks when flexed. Fig. 8 shows conventionally in section the cap applied to a bottle. Fig. 9 shows conventionally a cap formed of a less number of disks. Fig. 10 is a view of another form of cap with the members slightly separated. Fig. 11 shows the intermediate members of this cap. Fig. 12 shows the bottom members of this cap. Fig. 13 is a bottom plan view of the modification; and Fig. 14 shows conventionally a section on the line $x-x$ of Fig. 13.

The cap comprises a top member or disk T of a size larger than the opening n in the mouth of the bottle D, so that the disk will rest on top of the bottle; and a series of smaller disks M. The bottle is shown as provided with an abutment b , and the distance from this abutment to the plane of the top of the bottle, that is, the plane of the bottom of the disk T, is, in the standard form of milk bottle about $\frac{1}{4}$ of an inch. The series of disks M are relatively very thin compared with their diameters, and are secured to the top disk T, and are of a diameter to snugly fit in the neck of the bottle; being preferably of approximately the same diameter. The

aggregate thickness of these superposed disks is made equal to, or slightly less than the said depth of the neck to the abutment, five of such disks are shown in Figs. 1 to 8. These disks are formed of a flexible fibrous material, such as cardboard or pulp-board. The top member is also preferably formed of similar material, that is preferably of a more tough and tenacious stuff; the other disks being of a poorer grade. These several members are not secured together throughout their entire adjoining area, but at their central portions only, whereby their marginal portions are left free to slide upon each other upon flexure of the disk, such as caused by pressure or draft at the central portion, that will tend to dish the disks or bend them to a concave form.

Any suitable means can be employed to connect the disks whereby their marginal portions can slide upon each other, both in the insertion and removal of the cap; and whereby the marginal portions of the series of disks can separate during the removal that will facilitate the punching of the disks and their assemblage concentrically for the insertion of the fastening means. The disks can be conveniently secured together by means of one or more wire staples S, as such a fastening can be formed and applied by the ordinary wire stitching, and hence form a part of the organized machine that constructs the cap. When such flexure is produced, the marginal portions of the disks will slide upon each other, and produce an effect similar to that illustrated in Fig. 7; such as is produced when a pack of cards are flexed, the edge of each card projecting a very small distance beyond the adjacent cards and giving a somewhat serrated effect.

When the cap is inserted in the bottle, the pressure thereon will cause it to react from the tight engagement with the bottle neck, and the series of disk members will somewhat dish, tending to reduce their diameter and admit them into the neck. In the operation of removing the cap by grasping the top disk at its projecting margin, the disks will flex and will be pulled out by the central connection, so that the disks will tend to separate at their margins. The pulling being at the central portion, that portion will be raised while the marginal portion being held by friction of the bottle neck, and the disks will dish and reduce their diameter, and will

be brought out one at a time with the edges separated; similar to the effect of flexing a pack of cards and passing the thumb over the edge to engage the cards at one end and release them successively. It is also found desirable to form the bottom disk B of a fibrous material that is tough and resilient, compared with the intermediate disks *c*, *d*, *e* and *f*, that are made of a lower grade and consequently cheaper material. This bottom disk being of tougher material and consequently offering more resistance to flexure, will serve to hold the cap more securely in position in the bottle mouth, against blows on the edge of the cap that would tend to dislodge it, or to raise it a short distance. This bottom disk also acts in the nature of a protector for the other disks made of a weaker material, and hence liable to unduly compress or bend upon insertion.

In Figs. 10 to 14 is shown a modified form of cap, in which the intermediate members between the top and bottom member or members are not circular, but polygonal and of the same size as the bottom disk. The apexes of the polygon lie in the periphery of the series of disks below the top member, and the diameter of the polygon between opposite angles is equal to the diameter of the lower disks. The intermediate disks H are shown in Fig. 11 as hexagonal but may have a greater or less number of sides and angles with the apexes of the angles lying in the periphery of the series of disks. One or more, preferably two lower disks K are circular, corresponding to the lower disk B of the other form of cap, of a size to engage the bottle neck. The apexes *h* of the disk H coincide with the circumference of the disk K, that is, are in vertical alinement therewith, or in the cylindrical surface of the disks K. There are preferably two of the polygon disks H interposed between the top disk F and the two bottom disks K, as indicated in Figs. 10 and 14. The operation of this form of closure when inserted in the bottle is substantially similar to that of the closures above described herein; that is, the marginal portions of the four disks will slide on each other, both in the insertion and in the removal of the closure into and from the bottle. But between each apex of the intermediate disks, there will be a certain marginal space wherein the lower disks project beyond the intermediate disks forming a slight space. This will permit of a slight flexure of the lower disks upward upon insertion and will facilitate the insertion of the closure where the bottle neck is of such a size as to cause a very tight fit of the closure. But the apexes of the intermediate disks extending to the periphery of the closure will cause the engagement of the neck by the intermediate disks as well as by the lower disks, and will result in each of the disks

having an engagement with the wall of the bottle neck to assist in retaining the closure in the neck and resist its easy removal. These apexes will also prevent the bottom disks from being unduly bent upward or dished.

Having thus described my invention, I claim:

1. A bottle closure comprising a disk adapted to engage the top of the bottle, and a series of flexible disks of fibrous material secured to the top disk and fitting into the bottle neck, said series of disks being very thin relative to their diameters and secured at their central portions with the marginal portions free to slide upon each other and also to separate upon flexure.

2. A bottle closure comprising a disk adapted to engage the top of the bottle, a relatively thin bottom disk of tough and resilient fibrous material adapted to fit the bottle neck, and a series of disks of a relatively low grade fibrous material secured between the bottom and top disks and of a size to fit the bottle neck, said series of disks being very thin relative to their diameters and secured at their central portions with the marginal portions free to slide upon each other and also to separate upon flexure.

3. A bottle closure comprising a disk adapted to engage the top of the bottle, and a series of flexible disks of fibrous material secured to the top disk and fitting into the bottle neck, said series of disks being very thin relative to their diameters and secured at their central portions with the marginal portions free to slide upon each other and also to separate upon flexure, the series of disks comprising two or more intermediate disks polygonal in shape with their apexes lying in the periphery of the series of disks and one or more bottom disks that are circular.

4. A bottle closure comprising a disk adapted to engage the top of the bottle, and a series of flexible disks of fibrous material secured to the top disk and fitting into the bottle neck, said series of disks being very thin relative to their diameters and secured at their central portions with the marginal portions free to slide upon each other and also to separate upon flexure, one or more intermediate disks of the series being polygonal in shape with their apexes extending to the periphery of the series.

5. A bottle closure comprising a disk adapted to engage the top of the bottle, and a plurality of relatively thin flexible disks secured to the top disk and of a size to engage the bottle neck.

6. A bottle closure comprising a disk adapted to engage the top of the bottle, and a plurality of relatively thin flexible disks secured to the top disk at their central portions, and of a size to engage the bottle neck.

7. A bottle closure comprising a disk adapted to engage the top of the bottle, and a plurality of relatively thin flexible disks secured to the top disk at their central portions, and of a size to engage the bottle neck, said disks having their marginal portions free to slide upon each other and to separate upon flexure.
8. A bottle closure comprising a disk adapted to engage the top of the bottle, and a plurality of relatively thin flexible disks secured to the top disk and of a size to engage the bottle neck, one or more of the intermediate disks having a polygonal shape.
9. A bottle closure comprising a disk adapted to engage the top of the bottle, and a plurality of relatively thin flexible disks of a size to engage the bottle neck secured to the top disk at their central portions and of a size to engage the bottle neck, said disks having their marginal portions free to slide upon each other and to separate upon flexure, one or more of the intermediate disks having a polygonal shape.
10. A bottle closure comprising a disk adapted to engage the top of the bottle, and a plurality of relatively thin flexible disks secured to the top disk and of a size to engage the bottle neck, said disks having their marginal portions free to slide upon each other and to separate upon flexure, one or more of the intermediate disks having a polygonal shape with their apexes in position to engage the bottle neck.
11. A bottle closure comprising a disk adapted to engage the top of the bottle, and a plurality of relatively thin flexible disks secured to the top disk at their central portions and of a size to engage the bottle neck, said disks having their marginal portions free to slide upon each other and to separate, one or more of the intermediate disks having a polygonal shape with their apexes in position to engage the bottle neck.

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