

Feb. 15, 1949.

A. N. SPANEL

2,461,703

RECEPTACLE CLOSURE

Filed May 10, 1945

2 Sheets-Sheet 1

Fig. 1.

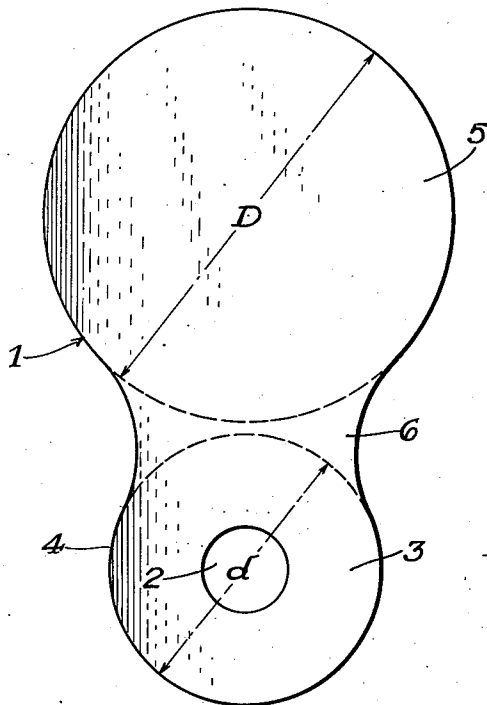


Fig. 5.

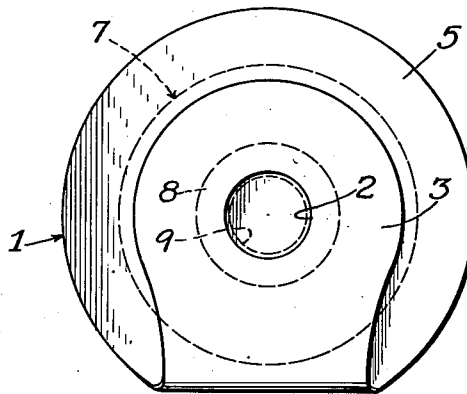


Fig. 6.

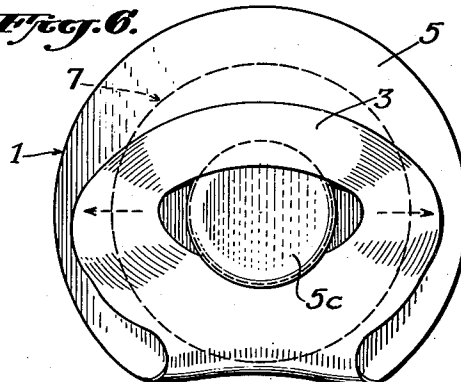


Fig. 2.

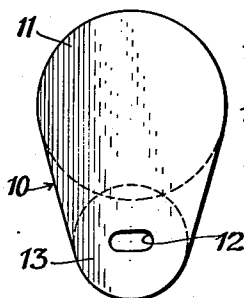


Fig. 3.

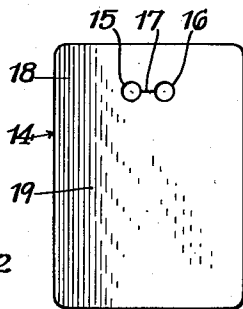


Fig. 7.

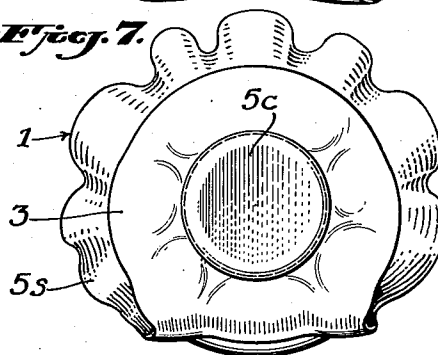
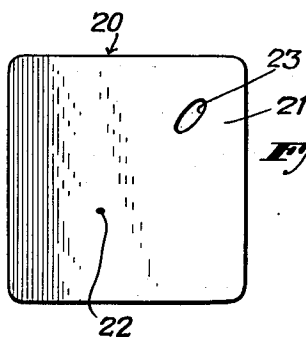


Fig. 4.

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2 Sheets-Sheet 2

Fig. 8.

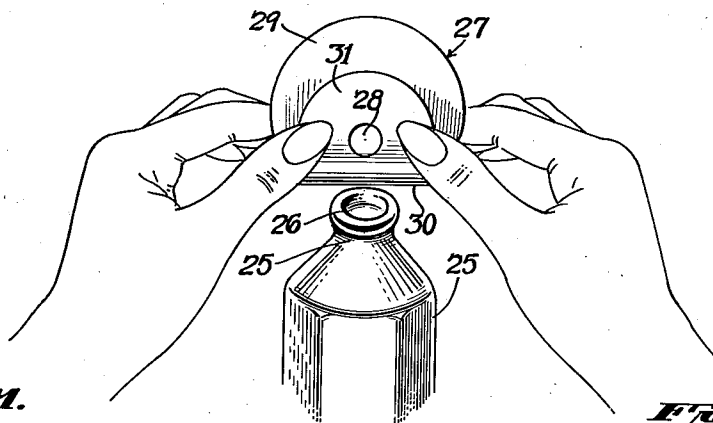


Fig. 11.

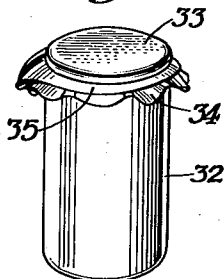


Fig. 9.

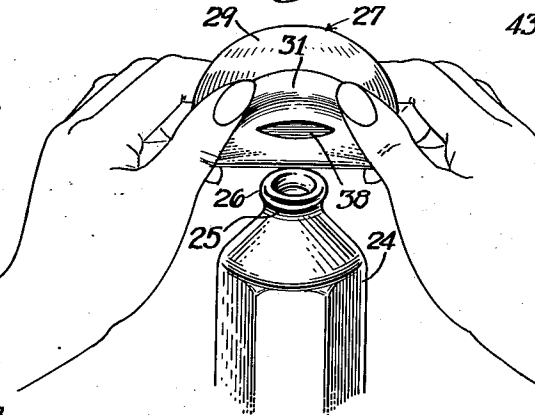


Fig. 13.

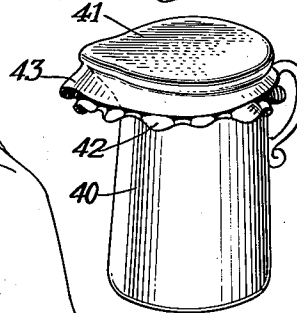


Fig. 12.

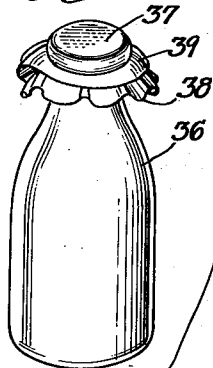


Fig. 10.

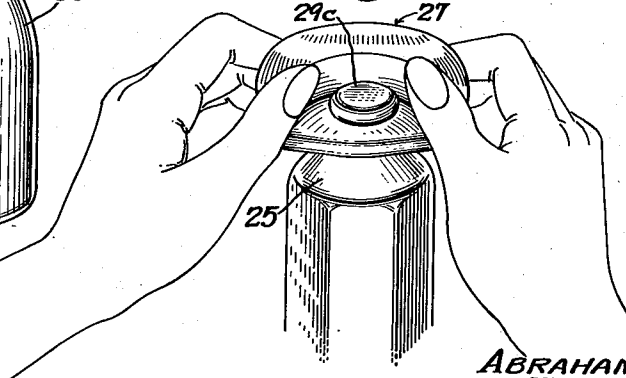
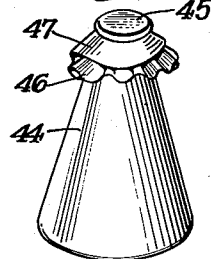


Fig. 14.



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UNITED STATES PATENT OFFICE

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RECEPTACLE CLOSURE

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Application May 10, 1945, Serial No. 593,056

7 Claims. (Cl. 215-41)

1

This invention relates to closures for receptacles, and more particularly to closures which may be applied and removed by hand without the aid of instruments of any kind. The invention is adapted for use with containers serving a variety of uses and of various shapes and sizes, such for example as bottles, jars, flasks, beakers, graduates, pitchers, dishes, bowls and the like; and is adapted to provide a closure seal.

An object of the invention is to provide a simple unitary closure adaptable for use as a closure seal conformable to various shapes of receptacle openings; and especially useful as a temporary closure.

Another object of the invention is to provide a closure which may be readily sterilized and easily kept clean.

Another object of the invention is to provide a closure which occupies little space in use or when unattached to a receptacle.

A further object of the invention is to provide a closure which may be readily and economically made.

Other and further objects, features and advantages of the invention will be understood from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a plan view of a preferred embodiment of the invention;

Figs. 2, 3 and 4 are plan views illustrating modified forms of the invention;

Figs. 5, 6 and 7 are plan views showing one manner of applying the closure, illustrated in Fig. 1, to a receptacle, and in position on the receptacle;

Figs. 8, 9 and 10 are perspective views illustrating another mode of applying a closure of the form illustrated in Fig. 1 to a receptacle, such as a nursing bottle; and

Figs. 11, 12, 13 and 14 are perspective views illustrating embodiments of the invention as utilized on various other types and shapes of receptacles.

Referring more particularly to Fig. 1: A closure embodying a preferred form of the invention is designated as 1 and is shown in its normal or flat condition. The closure 1 is in sheet-like form, consisting of a thin flat sheet of suitable elastic material, such for example as sheet rubber. By way of example, I have obtained excellent results with vulcanized sheet rubber (both natural rubber and synthetic rubber) having a thickness of the order of .008". The thickness may vary from .001" to about .025" in accordance with the size and character of the receptacle for which the

2

closure is intended and the particular material employed.

The particular outer contour of the closure 1 is preferable for the sake of economy of material and ease of manipulation in applying it to a receptacle, but is not critical. Adjacent one end the closure is provided with a hole 2 which in the present embodiment is circular. This shape of hole is preferred both because of the uniform distribution of the lines of stress when the material is distended, and because this shape facilitates proper use of the closure. The portion surrounding the hole 2 provides, in effect, an elastic ring or band designated 3 which serves as the retaining means to hold the closure in position on a receptacle. Accordingly, the hole is substantially smaller than the exterior of the neck, lip or other wall portion forming the receptacle mouth or opening to be closed or sealed; and the width of the portion 3, measured radially from the hole 2 must be at least sufficient to provide sufficient strength, but in view of the thinness of the sheet and in order to facilitate manipulation this width is preferably somewhat wider than required for strength. For instance, the portion 3 may be considered as lying between the hole 2 and marginal edge 4 defined by the circle whose diameter is indicated as d . A second portion 5, also preferably defined by a circle whose diameter is D , provides the cover portion of the closure seal; and the size of this portion must be substantially greater than the size of the hole 2 and greater than the receptacle opening to be closed or sealed. Because of the elastic nature of the thin sheet both the size and shape of the portions 3 and 5 may be stretched to conform to the size and shape of the receptacle neck or opening within limits determined by the factors to be more fully pointed out hereinafter. In general, the size of the portion 5 must be sufficient to provide a continuous imperforate central area which in use is larger than the opening to be covered and must provide sufficient material around this central area to provide a skirt extending around the neck or wall forming the receptacle opening. In order to accomplish this to advantage the portion 5 should be offset to one side of the hole 2; and in order to facilitate manipulation and provide for better conformity to the receptacle the diameters d and D are spaced apart and the offset includes a reduced portion or neck 6. The effective circles designated by the diameters D and d may be taken as defining the respective portions useful in providing the closure cap portion 5 and the retaining portion 2 for retaining the cap portion

3

5 in place on the receptacle, as more fully pointed out hereinafter. It is obvious that in view of the pliant nature of the portions 3 and 5 the marginal edges may extend beyond the respective circular contours shown as the preferred form for use on round neck receptacles such as bottles and the like. In view of the easily conformable nature of the closure, especially when made of highly resilient material, such as rubber, it is the relative size of the hole 2 and extent of the area of the portion 5 when stretched within their elastic limits, as well as the initial size, which controls; and for the same reason the relative perimeters of the hole 2 and portion 5 is important.

One method of applying the closure to a receptacle will now be described with reference to Figs. 5, 6 and 7, which illustrate by way of example the embodiment of the invention illustrated in Fig. 1 as applied to a receptacle which is designated in general as 7 and comprises a mouth or lip portion designated as 8 and defining the mouth or opening 9 of the receptacle. The cover portion 5 is placed over the opening 9 and is approximately centered thereover. The portion 3 of the closure 1 is then folded up over the portion 5 with the hole 2 approximately centered over the opening 9; the portion 3 is then forced over the lip 8 and the overlying cover portion 5, in the manner generally indicated in Fig. 6, until the portion 3 has passed completely over the lip portion 8, which in the present embodiment is in the form of the usual beaded edge common in bottle structures; and upon releasing the portion 3 the parts assume the position illustrated in Fig. 7. It will be noted that in this method of applying the closure the cover portion 5 may or may not be stretched in taut condition over the wall portion 8 of the receptacle, depending upon the manner in which the elastic ring-like portion 3 is manipulated. It is also noted that in this mode of application the ring-like portion 3 may be either snapped over the lip and overlying cover portion 5 with a single movement or may be progressively inserted thereover as indicated in Fig. 6. In any event the closure is positioned in sealed relation on the receptacle, as illustrated in Fig. 7, from which it will be seen that a central area of the portion 5, such as 5c, is disposed over the receptacle opening and a surrounding marginal portion is disposed downwardly and around the wall portion in the general form of a skirt 5s; the ring-like portion 3 surrounding the waist portion of the skirt and serving to firmly hold it against the enclosed wall of the receptacle to thereby securely seal the closure in position on the receptacle.

In Figs. 2, 3 and 4, I have shown other forms of the invention by way of illustration. In Fig. 2 the closure is designated in its entirety as 10, the cover portion as 11, the hole as 12 and the retaining portion surrounding the hole as 13. In this embodiment the portions 11 and 13 are not spaced apart as widely as in the embodiment shown in Fig. 1, this relationship being indicated by the broken lines in Fig. 2; and the hole opening 12 is elongated in a transverse direction, being defined at its transversely opposite ends by semi-circles which are connected by transversely extending tangential lines so as to provide a receptacle which provides smooth stress lines permitting the portion 13 to be stressed without tearing. In Fig. 3 the closure is designated as 14 and in general outline is in the form of a rectangle. The hole is defined by two circular openings 15 and 16 interconnected by centrally dis-

4

posed lateral extending slit 17 which in practice provides an opening quite similar to the opening 12 in Fig. 2, because when the sheet material comprising the portion 18 is stretched transversely the edges adjacent the slit 17 fold outwardly from the plane of the sheet so that the lines of stress are substantially parallel thereto and tangential to the circular holes 15 and 16. The cover portion of the closure in this embodiment is designated as 19. In Fig. 4 the closure is designated in its entirety as 20, which is in the general form of a square and comprises a retaining portion 21 and a closure portion 22. The hole or opening which is disposed in the portion 21 is designated as 23 and takes the general form of the hole 12 shown in Fig. 2, except that the opposite longitudinal sides are in the form of curved lines which are tangential to the smaller curved ends of the hole; and the hole is shown as having its longest axis lying along a diagonal of said square.

In Figs. 8, 9 and 10, I have shown an alternative method of applying the closure to a receptacle, which is illustrated as a bottle 24 having a neck 25 provided with a beaded lip 26. The closure is designated in its entirety as 27 and is in the form shown in Fig. 2 but provided with a substantially circular hole as shown in Fig. 1. The closure 27 is first folded, as shown in Fig. 8, preferably with the hole 28 disposed between the center of the cover portion 29 and the fold line 30. With the cover portion 29 and the superimposed retaining portion 31 positioned as shown the operator stretches both portions in a lateral direction, as illustrated in Fig. 9, thereby simultaneously stretching the portions 27 and 31 and enlarging the hole 28. The closure is then placed on the receptacle in the manner illustrated in Fig. 10 so that the central area 29c of the cover portion 29 is disposed over the receptacle opening and the surrounding area is folded downwardly and around the neck 25 to provide a skirt portion which assumes the general form of that indicated in Fig. 7 as 5s. This mode of application insures that the closure cover portion will be tautly disposed and held on the mouth of the receptacle and that the closure will be held in intimate sealed relationship relative to the receptacle.

Figs. 11-14, inclusive, show closure seals of the character heretofore described as used in combination with receptacles of various forms and sizes. Fig. 11 shows a jar 32 to which is attached a closure seal 33, the skirt portion of which is designated as 34 and whose retaining portion is designated as 35. Fig. 12 shows a milk bottle 36 to which is attached a closure 37, the skirt portion of which is designated as 38 and whose retaining portion is designated as 39. Fig. 13 shows a pitcher 40 to which is attached a closure 41, the skirt portion of which is designated as 42 and whose retaining portion is designated as 43. Fig. 14 shows a flask 44 to which is attached a closure 45, the skirt portion of which is designated as 46 and whose retaining portion is designated as 47.

From the foregoing it will be understood by those skilled in the art that the relatively thin sheet-like material may be made of plastic having elastic properties. By way of example, I have obtained useful results with closure devices, made in accordance with the present invention, comprising sheets of polyvinyl chloride having a thickness of the order of .004"- .008"; and such thickness may vary, for example, from .001"- .010". Other suitable plastic material having

75 suitable properties will readily occur to those

5

skilled in the art, after understanding my invention.

Having thus described my invention with particularity with reference to several embodiments of the same, and having described and referred to certain modifications thereof, it will be obvious to those skilled in the art, after understanding my invention, that various changes and other modifications may be made therein without departing from the spirit and scope of my invention, and I aim in the appended claims to cover such changes and modifications as are within the scope of the invention.

What I claim is:

1. As an article of manufacture for use as a closure for receptacles, a readily foldable sheet not exceeding .025" thickness having elastic properties and having a hole therethrough to provide a surrounding elastic portion, said sheet also having a continuous area offset to one side of said hole and having a perimeter greater than the perimeter of said hole.

2. As an article of manufacture for use as a closure for receptacles, a readily foldable rubber sheet not exceeding .025" thickness having a hole therethrough to provide a surrounding elastic portion, said sheet also having a continuous area offset to one side of said hole and having a perimeter greater than the perimeter of said hole.

3. As an article of manufacture for use as a closure for receptacles, a readily foldable sheet of plastic material not exceeding .010" thickness having elastic properties and having a hole therethrough to provide a surrounding elastic portion, said sheet also having a continuous area offset to one side of said hole and having a perimeter greater than the perimeter of said hole.

4. As an article of manufacture for use as a closure for receptacles, a thin sheet having elastic properties and having a hole therethrough whose outline is such as to permit substantial enlargement thereof without tearing said sheet when the material surrounding said hole is stretched to enlarge said opening, said sheet providing a continuous area offset to one side of said hole to permit positioning said hole over said continuous area by folding said sheet, said area being of such thickness as to be readily stretchable and foldable and of such size that when stretched to but not exceeding its elastic limit it is substantially larger than the size of said hole when the material surrounding said hole is stretched to but not exceeding its elastic limit.

5. As an article of manufacture, a closure for receptacles comprising a sheet of elastic material of a thickness not exceeding .025" having a curvilinear hole therein providing an elastic sur-

6

rounding portion and a continuous area adjacent thereto and offset to one side of said hole to provide an elastic area over which said hole may be positioned, said continuous area having a substantially greater perimeter than the perimeter of said hole, whereby said elastic area may be stretched over the lip or rim of a receptacle mouth or opening with its marginal edges disposed in folded condition thereabout and said elastic portion surrounding said hole may be disposed about said marginal edges to secure the closure in sealed position on said receptacle.

6. As a new article of manufacture, a pliant sheet for closing receptacles, said sheet comprising a first zone having an opening therein surrounded by an elastic marginal portion to provide for enlargement of said opening upon stretching said marginal portion, and an adjoining second zone having an area larger than the opening in said first zone and providing a cover portion for the receptacle to be closed and a surrounding portion readily foldable over the wall surrounding the opening of the receptacle to be closed to provide a skirt, whereby when said cover portion is placed in position on a receptacle the elastic marginal portion of said first zone may be positioned about said skirt to hold it against the receptacle wall and maintain the cover portion in closed position.

7. As an article of manufacture, a sheet-like closure for receptacles comprising a readily stretchable and foldable portion adapted to provide a cap for a receptacle, said portion having an imperforate area corresponding to the top of said cap and a pliant surrounding portion corresponding to the skirt of said cap, and an adjoining elastic portion provided with an opening offset relative to said area and of substantially smaller perimeter than the perimeter of said area to provide an elastic ring portion for securing said cap portion on said receptacle.

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