

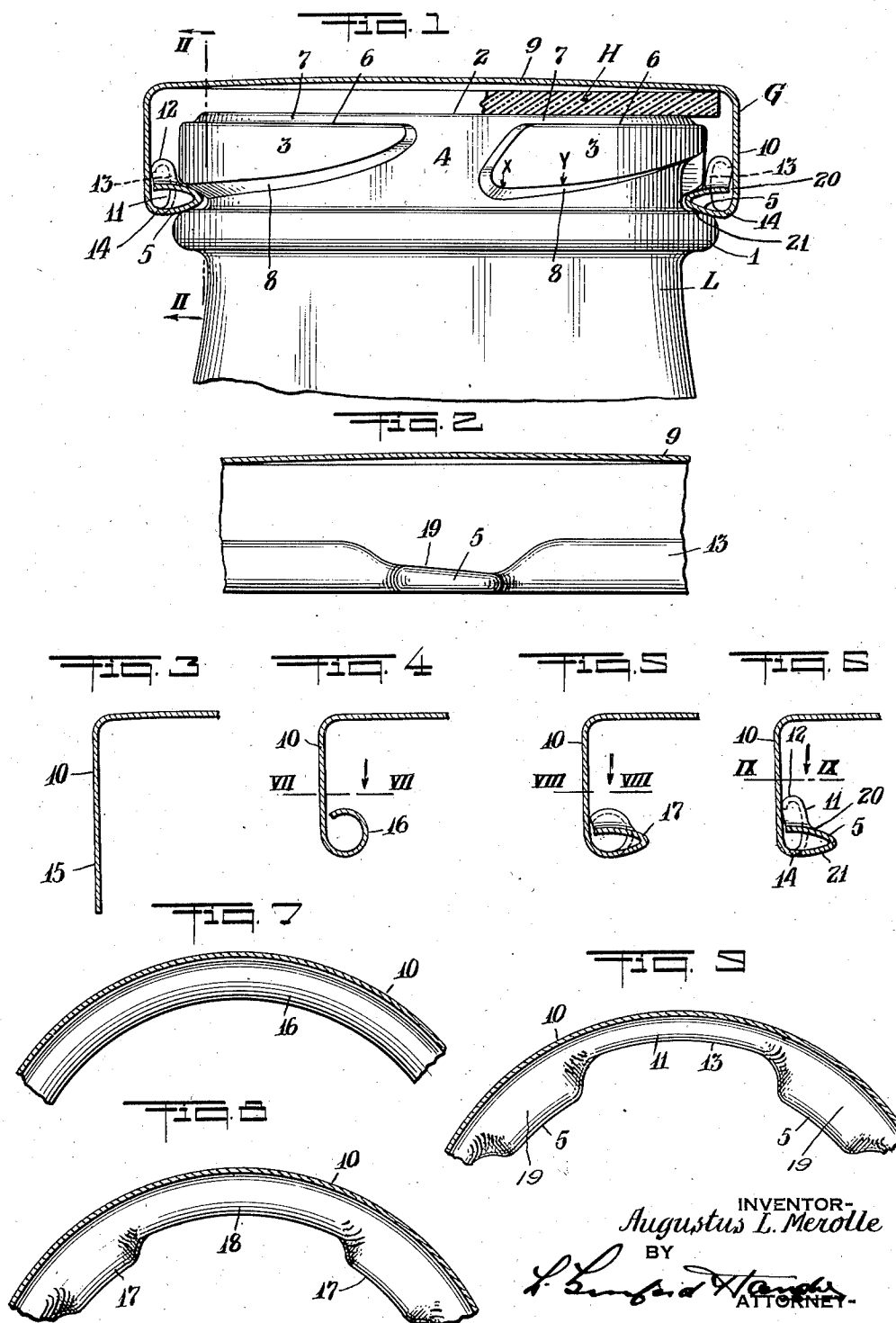
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RECEPTACLE CLOSURE AND METHOD OF MANUFACTURE THEREOF

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RECEPTACLE CLOSURE AND METHOD OF
MANUFACTURE THEREOF

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2 Claims. (Cl. 113—121)

This invention relates to a receptacle closure and method of manufacture thereof, and particularly to the manner in which the closure is constructed to co-operate with parts of the receptacle for retaining the closure in closing position.

An object of the invention is to provide a closure which may be constructed of a single piece of sheet material bent into a suitable shape for giving it great strength against undesirable distortion and for providing interiorly extending lugs of great strength co-operative thread-like with lugs of a receptacle to hold the closure in closing position upon the receptacle.

A further object is to so construct the closure that the inwardly projecting thread lugs thereof while possessing great strength will yet be sufficiently resilient to enable them to yield resiliently for better accommodating themselves to the thread lugs of the receptacle and for increasing the frictional engagement between themselves and the thread lugs of the receptacle incident to the continued application of force rotating the closure into closing position upon the receptacle.

A further object is to provide an improved method for the manufacture of a receptacle closure having thread lugs of the construction contemplated.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of the elements, combinations, arrangements of parts and applications of principles constituting the invention; and the scope of protection contemplated will be indicated in the appended claims.

In the accompanying drawing which is to be taken as a part of this specification, and in which I have shown merely a preferred form of embodiment of the invention:—

Fig. 1 is a transverse vertical sectional view through a closure constructed in accordance with this invention and showing the same as it appears in closing position upon a receptacle.

Fig. 2 is a fragmentary vertical sectional view taken substantially upon the plane of line II—II of Fig. 1 and illustrating one of the thread lugs of the closure as it appears from within the closure.

Figs. 3, 4, 5 and 6 are fragmentary sectional views illustrating the steps followed in the production of the closure having the thread lugs illustrated in Figs. 1 and 2, and

Figs. 7, 8 and 9 are horizontal sectional views taken respectively upon the planes of line VII—

VII, VIII—VIII and IX—IX of Figs. 4, 5 and 6 for additionally illustrating the steps of procedure shown in Figs. 4, 5 and 6.

Referring to the drawing for describing in detail the structure which is illustrated therein, the reference character L indicates the receptacle, while the reference character G indicates the closure within which may, if desired, be positioned a suitable liner or gasket element H in the usual position for resting over the upper open end of the receptacle.

The receptacle may be made of glass or other suitable material and is formed with a smooth rounded annular bead as 1 exteriorly thereof spaced downwardly from the upper end surface 2, and a suitable number of thread lugs as 3—3 also exteriorly in the space above the bead 1.

The thread lugs 3—3 are suitably spaced, as at 4, to provide for the entrance between them of the thread lug portions as 5—5 which are provided upon the closure projecting interiorly thereof.

The upper surfaces as 6—6 of the thread lugs 3 are preferably spaced downwardly as at 7 a slight distance from the surface 2 of the receptacle so that said surface 2 is sufficiently prominent to receive sealing pressure from the liner or gasket H if desired.

The under-surfaces as 8—8 of the thread lugs 3 are inclined thread-like in the general manner as common to receptacles and closures of this type, the surfaces 8 of the thread lugs respectively being each adapted to be slidably engaged by one of the lugs 5 of the closure so as to cause the closure to be moved into a full closing position usually by something less than a one-quarter rotation of the closure.

In the present instance the under-surface 8 of the thread lugs 3—3 extend downwardly into such close proximity with the upper surface of the bead 1 that when the closure is being rotated to closing position the thread lugs 5 will become wedged in opposing surface contact between said under-surfaces 8 and the adjacent upper surface portions of the bead, the arrangement in this regard being similar to what is more fully shown and described in connection with my co-pending application Serial No. 635,585.

The lower end portions of each of the surfaces 8, that is approximately between the points indicated X and Y Fig. 1 of the drawing, is almost, but not quite, parallel rotatively with the upper surface of the bead 1, the degree of inclination of said portions X—Y being considerably less than the degree of inclination of the surfaces 8 up-

wardly from the point Y. The purpose of this construction is that during initial rotary movement of the closure onto the receptacle the thread lugs 5 of the closure will move rapidly in a downward direction but that as the thread lugs approach and pass the point Y the speed of downward movement per unit of rotary movement will be reduced and the power of the downward pull per unit of power applied to rotate the closure will be correspondingly increased due to the increasing cam power incident to the almost horizontal relationship of the portions X and Y.

If a gasket, as H, be employed between the closure and the upper surface of the receptacle said gasket may be easily crushed into sealing engagement with the receptacle by the application of only a slight degree of force during its last stages of movement to sealing position.

The nearly parallel relationship between the portions X—Y and the upper surface of the bead 1 produces acute wedge shaped pockets between said portions and the adjacent upper surface portions of the bead into which the thread lugs 5 of the closure may be forced and wedged to provide suitable frictional engagement between upper and lower surface portions of the lugs on one hand and the surfaces X—Y and the bead on the other to efficiently hold the closure in full closing position.

The closure G is made up of a single piece of sheet material, usually thin sheet metal, such as commercial tin or the like, stamped, pressed or otherwise formed into its completed shape. It consists of a top wall portion 9 and a marginal flange portion 10 bent downwardly from the margin of the top wall 9. At the lower annular edge of the side wall or flange 10 the material thereof is turned inwardly upon itself to form an inturned wire edge as at 11, said wire edge being preferably closed on its upper side within the closure as at 12 so that the raw edge of the metal is concealed and protected within said wire edge, that is to say that the portion of the material as 13 which is turned upwardly within the closure is spaced away from the inner wall surface of the closure and constitutes an inner wall part of appreciable dimensions and strength inwardly of the main wall 10 and connected therewith by the curved bottom portion 14 continuously throughout the circumference of the closure, said wall portions 12, 13 and 14 adding great strength and stiffness to the lower edge portion of the wall 10 and to the closure in general.

The wire edge structure 11 is preferably of a cross section relatively higher than wide so that the wall portion 11 thereof extends substantially vertically within the closure a relatively greater distance than the distance between itself and the outer wall 10. As a result of this arrangement the top and bottom wall portions 12 and 14 are given great strength even though the material employed in the manufacture of the closure may be of unusual thinness. At the same time this form of the wire edge of course enables a reduction in the over-all outside measurements of the closure for a given size of receptacle.

At spaced intervals circumferentially of the closure the wire edge structure is bent or shaped to constitute the lugs 5 projecting inwardly of the wall portion 13 for engaging the under-surface portions 8 of the thread lugs and the upper surface of the bead 1 of the receptacle as hereinabove referred to.

The circle defined within the closure by the inner surface of the wall portion 13 is of a diam-

eter approximately corresponding with the diameter of the circle defined by the outer annular surfaces of the thread lugs 3 of the receptacle, or slightly larger so as to just fit loosely about said thread lugs 3 when the closure is being moved onto or off of the receptacle.

The method of procedure proposed herein for producing the lugs 5 from said wire edge structure is clearly indicated in the drawing Figs. 3 to 9, and consists essentially of the following steps:

First, the lower annular edge portion as 15 of the side wall 10 is curled or bent inwardly, upwardly and outwardly from the straight vertical condition illustrated in Fig. 3 to the circular wire edge form indicated 16 in Figs. 4 and 7, the wire edge at this time being of substantially uniform circular cross section throughout the entire circumference of the closure.

Second, pressure is applied vertically against portions of the circular wire edge 16 at spaced points circumferentially of the closure where the lugs 5 are desired, said pressure operating to mash said portions of the circular wire edge vertically inwardly from its circular form to a somewhat elliptical form in which parts of the inner annular wall surface of the bead are caused to buckle and protrude inwardly of the normal contour of the circular wire edge, as clearly indicated at 17 Figs. 5 and 8, and

Third, pressure is applied in a horizontal direction against the portions 18 of the circular wire edge 16 lying in the spaces between the vertically pressed portions 17, this application of pressure operating to mash said portions 18 of the circular wire edge horizontally out of its circular form to a somewhat elliptical form in which the inner annular wall portions of the bead stand radially further outwardly from the innermost ends of the portions 17 than before, thereby enlarging the circle defined collectively by said portions 18 and at the same time increasing the prominence of the lugs 5, as clearly indicated in Figs. 6 and 9.

In applying pressure vertically to crush the wire edge as in Figs. 5 and 8 the tools employed therefor are preferably so shaped that the upper surface portion as 19 of the completed lug, as illustrated in Fig. 2, will be inclined to correspond approximately with the inclination of the portions X—Y of the thread lugs of the receptacle.

It will be observed that the completed thread lugs 5 formed as herein shown and described each consist of an upper wall part 20 and a lower wall part 21 so connected together that they are capable of resilient movement with respect to each other in use. The upper wall part 20 merges into and is strongly bonded with the inner wall portion 11 and the top wall portion 12 of the wire edge so that said portion 20 is re-inforced and the resilient movement thereof is prevented from being too soft or easy even though extremely thin sheet metal be employed in the manufacture of the closure. And the bottom wall part 21 merges into and is strongly bonded with the bottom wall 14 and the outer wall 10 of the wire edge so that said portion 21 is also re-inforced and the resilient movement thereof is prevented from being too soft or easy even though extremely thin sheet metal be employed in the manufacture of the closure.

Nevertheless the wall portions 20 and 21 are not too stiff to preclude a yielding movement of either or both thereof when forced into engagement with the thread lugs of the receptacle or with the bead 1 of the receptacle, or with both, as the case may be.

And it is noteworthy further that since the thread lugs are directly connected with the main wall 10 of the closure only by the roundly curving resilient bottom wall portion 14 the thread lugs 5 in their entirety are capable of a yielding movement with respect to the wall 10. Downward pressure of the surfaces 3 of the receptacle against the upper surface portion 20 of the lug 5 of the closure may be sufficient to flex the wall portion 14 of the closure a slight degree, thereby enabling the several thread lugs of the closure each to assume a proper gripping engagement with its respective co-operative portion of the receptacle.

As many changes could be made in this construction without departing from the scope of the invention as defined in the following claims, it is intended that all matter contained in the above description, or shown in the accompanying drawing, shall be interpreted as illustrative only and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In combination with a receptacle having an outstanding bead formed exteriorly thereon spaced downwardly from its open upper end and having a series of thread lugs exteriorly in the space between said bead and said upper end said thread lugs having relatively under-surface parts for thread-like engagement by a corresponding number of thread lugs of a closure for said receptacle, said under-surface parts being in opposition to the upper surface of said bead but inclining circumferentially of the receptacle downwardly toward said bead, of a closure for said receptacle having thread lugs to engage said under-surface parts of the receptacle and said thread lugs of the closure each comprising top and bottom wall parts resiliently bendably con-

nected together to yield resiliently toward each other, said top wall parts being adapted to engage said under-surface parts of the receptacle and said bottom wall parts being adapted to engage the upper surface of said bead, and said thread lugs being adapted to be wedged between said under surface parts and said bead to thereby flex said top and bottom wall parts toward each other.

2. The herein described method of producing a receptacle closure having thread lugs projecting inwardly thereof, which method consists in first providing a piece of sheet material having a downwardly projecting marginal flange thereon, bending up the lower edge portion of said flange interiorly of the closure to form an inturned wire edge upon said flange said wire edge being of substantially circular contour in cross section, applying pressure against the top and bottom wall portions of said wire edge in a generally vertical direction at intervals circumferentially of the closure to cause portions of said wire edge to be crushed vertically toward each other and provide a projection protruding inwardly beyond the normal circular plane of the inner annular wall portion of said wire edge, and applying pressure against the radially inner and outer wall portions of said wire edge throughout the circular length of the spaces intermediate said projections in a generally horizontal direction to cause the inner wall portion of said intermediate parts of the wire edge to be bent radially outwardly toward the outer wall portion of said wire edge without materially altering the position of said projections with respect to said outer wall portion of said wire edge but thereby causing said projections to extend relatively further inwardly of the inner wall portion of said wire edge in the completed closure.

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