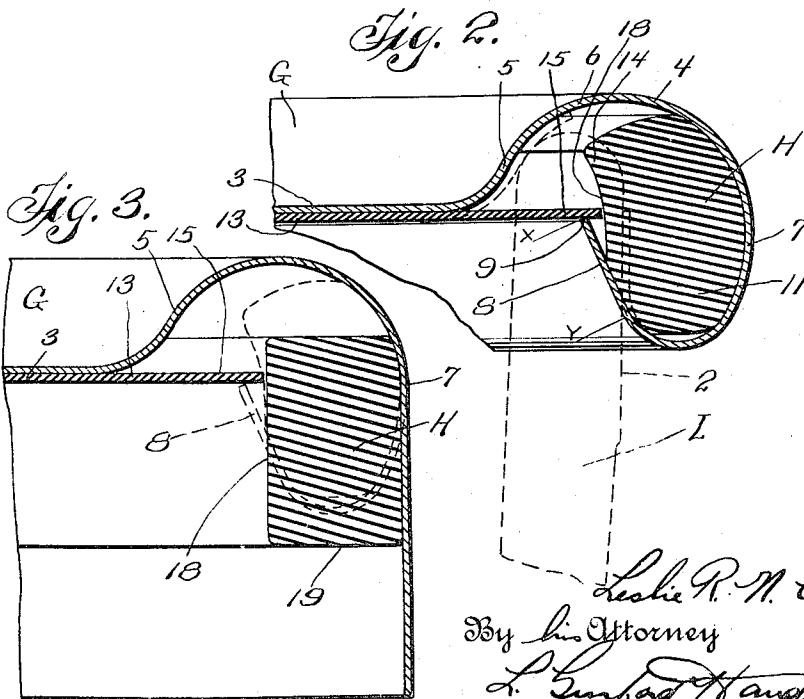


1,413,653.

2 SHEETS--SHEET 1.



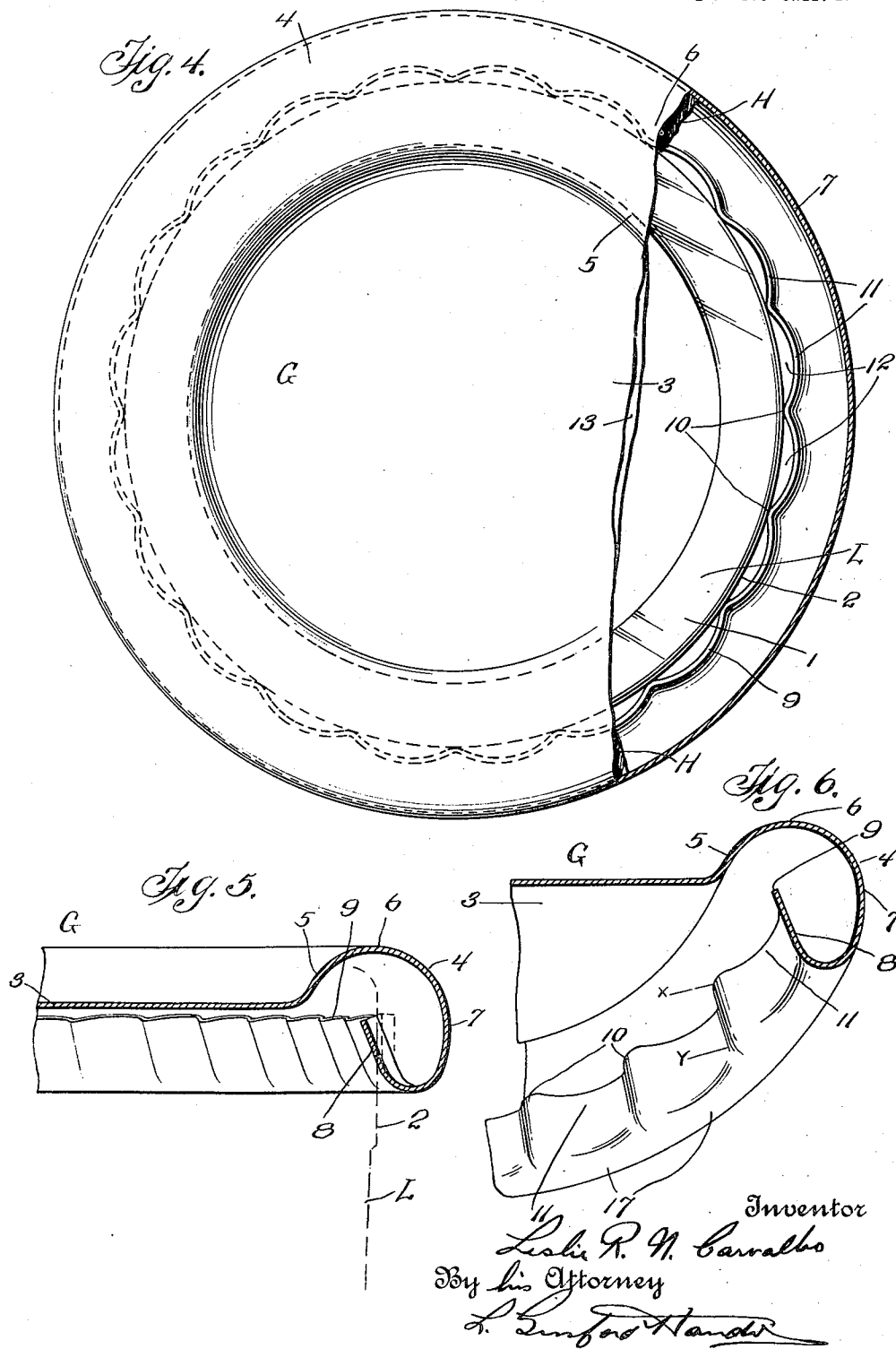
Inventor
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L. R. N. CARVALHO.
 RECEPTACLE CLOSURE.
 APPLICATION FILED SEPT. 29, 1920.

1,413,653.

Patented Apr. 25, 1922.

2 SHEETS—SHEET 2.



Inventor
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UNITED STATES PATENT OFFICE.

LESLIE R. N. CARVALHO, OF BROOKLYN, NEW YORK, ASSIGNOR TO CLOSURE SERVICE CORPORATION, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

RECEPTACLE CLOSURE.

1,413,653.

Specification of Letters Patent. Patented Apr. 25, 1922.

Application filed September 29, 1920. Serial No. 413,649.

To all whom it may concern:

Be it known that I, LESLIE R. N. CARVALHO, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Receptacle Closures, of which the following is a specification.

This invention relates to a receptacle closure, the same embodying certain features of, and being an improvement over, the structures shown and described in my pending applications, Serial No. 300,462, May 28, 1919, and Serial No. 367,061, March 19, 1920.

An object of the present improvement is to provide more efficient means for effecting an air tight engagement between the closure and the receptacle.

A further object is to so shape the sheet metal portions of the closure that they will form a more efficient grip upon the receptacle.

A further object is to so form the closure that it will be capable of forming an efficient seal upon receptacles having a wider variation in size than the closures disclosed in said pending applications.

A further object is to provide a closure in which means is afforded for the escape of portions of the sealing material so that the closure may be capable of movement to full sealing position upon the receptacle.

A further object is to provide means for overcoming the tendency of the gripping flange to unfold when pressure is applied for removing the closure.

A further object is to provide means whereby the operation of "setting" the bend of the metal adjacent the gripping flange when removing the closure may be more easily accomplished than in the closures previously disclosed.

A further object is to so shape the closure that it will provide means for holding a liner against displacement at all times.

A further object is to so design the closure that the gripping flange thereof will be of such character as to enable the closure to form an efficient seal under repeated use.

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

Figure 1 is a side elevational view of a portion of the receptacle illustrating a closure applied thereto, constructed in accordance with this invention, part of the view being broken away and shown in vertical section.

Figure 2 is an enlarged detail sectional view similar to a portion of Fig. 1, but illustrating the parts of the closure as they appear before application of the closure to a receptacle, the condition of the parts after application to a receptacle being indicated by dotted lines.

Figure 3 is a view similar to that seen in Fig. 2, but showing the condition of the closure as it appears at one time during its manufacture.

Figure 4 is a top plan view of the closure, a part being broken away and being shown in horizontal section for disclosing the detailed construction, a modification of the gripping flange being indicated in this view.

Figure 5 is a vertical transverse sectional view taken substantially upon the plane of line V of Fig. 4, and

Figure 6 is a fragmentary detail perspective view of a portion of the closure for more clearly illustrating the form of gripping flange appearing in Figs. 4 and 5.

Referring to the drawings for describing in detail the structure which is illustrated therein, the reference character L indicates the receptacle, and the reference character G indicates the closure. The receptacle may be of any desired character, but in the instance illustrated consists simply of an ordinary jelly tumbler. The upper annular edge surface, as 1, of the receptacle is preferably rounded somewhat, as indicated, for facilitating the application of the closure thereover. The outer circumferential surface, as 2, of the receptacle, for engagement by the closure, is preferably smooth and may, if desired, be tapered downwardly and inwardly a slight degree.

The closure consists of a single piece of sheet metal shaped to provide what may be termed a body portion 3 and an annular marginal bead portion 4. The body portion 3 is

adapted to close the upper end of the receptacle while the bead portion comprises means for receiving and gripping the walls of the receptacle.

- 5 The bead 4 consists of an inner upwardly extending wall 5, a top wall 6, an outer downwardly extending wall 7, and an inwardly and upwardly extending wall 8 formed at the lower edge of the wall 7 constituting in effect a wire edge internally of the wall 7.

The wall 5 of the bead is adapted to stand within the open end of the receptacle and to lie adjacent the inner annular surface of the wall of the receptacle approximately as indicated.

The wall 6 of the bead is adapted to overlies the upper annular edge of the receptacle.

- 20 The wall 7 of the bead is adapted to extend downwardly over the outer surface of the wall of the receptacle.

The wall 8 serves to directly engage the receptacle and may be conveniently referred to as the receptacle gripping flange. By reason of its position relative to the other walls, it is rendered resilient, the degree of resiliency being dependent somewhat upon the character and relative position and size of the flange and the wall 7.

- 30 All of the walls are carefully rounded from one to the other so that the exterior of the closure throughout is attractive and substantially unbroken. No parts are present which could in any way injure the hands of an operator attempting to attach or remove the closure. The only raw edge of metal present is that at the upper edge of the gripping flange, as at 9, and this is in such a position that the operator's hands cannot possibly reach it. This edge is also so positioned that it is entirely outside of the receptacle; that is, in a position such that the contents of the receptacle may have no access to it.

- 45 The gripping flange 8 may, like the walls 5, 6 and 7, extend continuously and uninterruptedly throughout the circumference of the closure, as in Figs. 1 and 2, or it may be corrugated, if desired, as seen in Figs. 4 to 6.

- 50 Where the gripping flange is smooth and uninterrupted, as in Figs. 1 and 2, it may be depended upon to some extent as a sealing device for excluding passage of air between the closure and the receptacle, particularly where the inner surface of the flange is coated with a heavy lacquer, or other sealing medium, for instance, as indicated particularly in the pending application, Serial No. 300,462.

- 60 Where the gripping flange is made uneven, or corrugated, as indicated by example in Figs. 4 to 6, a plurality of distinctly defined gripping points 10 is provided for engaging against the surface of the receptacle. The portions, as 11, of the material of the gripping flange intermediate the gripping

points is raised away from the receptacle so that a plurality of unobstructed openings or passageways 12 is provided. Any slight imperfections, or irregularities of surface occurring upon the receptacle may be accommodated within the openings 12, leaving the gripping points 10 unhindered in their office of gripping the receptacle uniformly around its circumference.

70 A ring, or gasket H of suitably resilient material, such as rubber composition, is positioned within the bead 4, said ring or gasket is indicated in Fig. 3 as it appears in its normal condition; that is, before it is compressed or distorted by the formation of the gripping flange.

In the manufacture of these closures the ring, or gasket H is placed in position within the wall 7, substantially as in Fig. 3, before said wall is turned for forming the gripping flange. A suitable liner, as 13, of paper, or other appropriate material is also placed within the container, being preferably positioned within the gasket, or ring, substantially as indicated in Fig. 3, it being noted, of course, that the liner may be of greater diameter so as to extend over the gasket to or near the wall 7 if desired.

In turning the edge portion of the wall 7 to form the gripping flange, the gasket is forced upwardly toward the wall 6 and is squeezed somewhat substantially as clearly indicated in Figs. 2 and 3 so that an annular portion of the gasket, as 14, is made to project inwardly to a position where it will be positively engaged by the receptacle when the cap is applied to the receptacle.

The position of the gasket prior to formation of the gripping flange is shown by the full lines in Fig. 3, whereas the position after formation of the gripping flange is indicated by dotted lines in said figure and by full lines in Fig. 2.

The operation of forming the gripping flange causes the gasket to be positively held against accidental displacement and the relative location of all of the surrounding walls 5, 6 and 7, serves to protect the gasket against likelihood of accidental injury, or displacement during any handling to which the closure may be subjected before being applied to a receptacle.

115 When the cap is manufactured; that is, before it is applied to a receptacle, the gripping flange inclines inwardly, as in the full lines Fig. 2. In this position the upper end of the flange, comprising the edge surface 9, extends inwardly of the gasket so that the edge surface 9 constitutes a shoulder engaging the marginal portion 15 of the liner 13 to hold said liner against accidental displacement prior to application of the closure to a receptacle.

120 When the closure is forced down over a receptacle, as in Fig. 2, the receptacle engages the

gages against the gripping flange and forces the same outwardly from its full line to its dotted line position. A considerable variation in size of the receptacle is permitted 5 due to the normally inclined position of the flange. Where the liner 13 is present, the continued downward movement of the closure over the receptacle brings the upper edge of the receptacle into engagement with 10 the marginal portion 15 of the liner and lifts said marginal portion away from the edge 9 of the gripping flange and to the position as indicated in Fig. 1.

As the closure is being pressed on to the 15 receptacle, and the gripping flange is pressed outwardly, the upper edge of the receptacle comes into contact with the portion 14 of the gasket. The pressure of the receptacle against the gripping flange has already bent 20 said flange outwardly and the gasket has been compressed and squeezed to some extent between the gripping flange and the wall 7, so that it has been made to spread upwardly to enlarge the portion 14 over the 25 upper edge of the receptacle. By the time the closure has reached its fully attached position the squeezing and compressing of the gasket causes the gasket to substantially fill all of the open space within the bead 30 outside of the receptacle and to exert a tight sealing pressure against the receptacle.

It is also to be noted that the space between the outer surface of the receptacle and the inner surface of the walls 5, 6 and 7, is 35 of ever decreasing dimensions upwardly and over the top of the receptacle so that when the closure has reached its final position upon the receptacle, substantially as in Fig. 1, a comparatively slender fin, as 16, of the 40 gasket material stands in position in the angle formed between the wall 5 and the inwardly rounding surface of the wall of the receptacle. Where the liner 13 is employed the marginal portion 15 thereof stands be- 45 tween the receptacle and the wall 5, and the fin 16 is forced into the angle between these parts. Any extent of vacuum within the receptacle will at this time tend to draw the fin 16 into the apex of this angle so that the 50 greater the degree of vacuum present the stronger will be the pull upon the fin and the tighter the fin will be drawn into sealing engagement with the converging walls.

Here it should be noted that in some in- 55 stances the gasket H may be omitted leaving the marginal portion of the liner to complete the necessary seal. The efficiency of this seal is dependent upon the nature of the material employed for the liner and it 60 has been found, in this connection, that a liner formed of a suitably soft paper coated, or impregnated with such material as paraffin, or other oily substance, is well adapted to the purpose.

65 When the closure is forced downwardly

on to the receptacle the material of the liner is crushed into a sealing condition between the wall 5 and the receptacle, and the grip of the gripping flange against the outer sur- 70 face of the receptacle serves to hold the parts against any subsequent accidental movement.

Where the gasket H is employed, the same operates to force not only a portion of itself into the seal between the wall 5 and the 75 receptacle, but also to crush into the seal that portion of the margin of the liner which projects outwardly beyond the seal. This marginal portion of the liner is naturally somewhat wrinkled because of having been bent upwardly to fit to the surface of the 80 wall 5. Hence, portions of the fin 16 of the gasket material find their way both above and below the liner material. A perfectly tight seal is thus readily assured while at the same time exposing to the interior of the 85 receptacle only the surface of the properly prepared liner material 13.

Obviously, in order that the fin 16 of the gasket shall efficiently perform its functions referred to, it is necessary that the closure 90 be always forced down until the wall 5, or the underlying portion of the liner, rests in good contact with the receptacle. This is desirable in order to prevent any portion of the gasket from actually moving into the in- 95 terior of the receptacle and thereby relieving the vacuum pull.

It is apparent that in the performance of this result a very great importance is attach- 100 ed to the efficiency of the grip of the gripping flange upon the receptacle. It is a particular object of this invention, therefore, to improve the efficiency of this grip. Hence, the gripping flange is designed so that sub- 105 stantially its entire width; that is, between the points X and Y, as indicated in Figs. 1 and 2, is made straight so that it will rest in engagement with the receptacle.

The normally inclined position of the flange, and the fact that the initial pressure 110 for bending it outwardly is always exerted adjacent its base Y rather than adjacent its edge X, enables the flange to accommodate itself to receptacles of varying sizes while yet maintaining the straight, tight engage- 115 ment of the flange with the receptacle between the points X and Y. A gripping surface is thus assured which is of desirably broad extent capable of holding the closure downwardly upon the receptacle in a posi- 120 tion to maintain the seal between the receptacle and the wall 5, or between the receptacle and the gasket.

By making the gripping flange substan- 125 tially straight between the points X and Y, instead of curved, as in the pending applications, the act of bending the flange backwardly against the gasket serves to spread the gasket material upwardly into sealing 130 engagement with the receptacle rather than

to compress and tend to bite off a portion of the gasket material as before. Greater efficiency and elasticity of operation is thus assured.

5 In some instances, where the gasket is employed, the spreading of the gasket material upwardly by the outward movement of the gripping flange may cause the gasket to be held sufficiently tight against the receptacle so that a positive seal between the wall 10 5 and the receptacle will not be required. In any event, however, a tight grip of the gripping flange upon the receptacle is of great advantage in preventing accidental dis- 15 lodgment of the closure.

It will, of course, be understood that either, or both surfaces of the material forming the closure may be coated with lacquer or the like. Such a lacquer may, if desired, be 20 dependent upon to seal the joint between the receptacle and the closure; that is, between the wall 5 and the receptacle, or between the gripping flange and the receptacle, or both. The lacquer may be depended upon as a 25 kind of cement, if desired, particularly upon the gripping flange, adapted to set after application of the closure to a receptacle, and thus to more efficiently prevent dislodgment of the closure.

30 The resilient character of the wall 7, of course, augments the resiliency of the gripping flange.

When it is desired to remove the closure from the receptacle the grip of the gripping 35 flange may be readily relieved to the required extent by tapping upon the outer surface of the wall 7 with a suitable implement, as for instance, with the back edge of a table knife. The effect of the tapping will be to 40 flatten out the flange toward the wall 7, causing a "set" of the metal at the point where the flange joins the wall 7. The resilient pressure of the flange against the receptacle will thus be relieved so that the closure may 45 be readily lifted off.

Where the gripping flange is rough, or corrugated, as indicated in Figs. 4 to 6, the so-called gripping points 10 thereof are substantially straight so that they constitute 50 ribs extending across the width of the flange between the points X and Y. These ribs produce several important results, principally among which are: first, that they provide the positively defined gripping points, 55 or surfaces, admirably adapted to engage with great force against the flat surface of the receptacle; second, that they are adapted to efficiently engage the receptacle while leaving spaces between them to accommodate any slight protuberances, or any irregularities of surface occurring on the receptacle, thus assuring a uniform grip of the 60 flange throughout the circumference of the receptacle; third, that they reinforce and 65 strengthen the flange so that the flange will

bend or spread outwardly without detrimental distortion when applied to a receptacle, thus assuring engagement of the full surface X and Y with the receptacle. And further, that they prevent to a proper de- 70 gree any tendency of the flange to unfold without loosening its grip upon the receptacle when pressure is applied beneath the bead to lift the closure from the receptacle.

The connecting material, as 11, of the 75 flange between the ribs is naturally resilient so that the ribs themselves are made resilient relative to each other. A flange thus constructed is more resilient as a whole than an uncorrugated flange and is, there- 80 fore, capable of being successfully operated in association with receptacles where the sizes of the receptacles vary to an appreciable extent.

Use of this flange, therefore, renders it 85 unnecessary to maintain any very great degree of accuracy in the manufacture of the receptacles.

A closure of this construction possesses such resiliency that it is capable of repeated 90 use, always providing a sufficiently tight seal for ordinary purposes.

The corrugations of the flange also produce a further and marked advantage in that in the intervals between the corrugations, or 95 ribs thereof, the material of the flange, in the bend connecting the flange with the wall 7, is, as at the points 17, bent quite abruptly so that by tapping upon the outer surface of the wall 7 a "set" of the metal at the bend 100 between the flange and the wall 7 is more easily accomplished, thus rendering the closure less difficult to remove.

The openings, or passageways 12 provided between the receptacle and the raised portions 105 11 of the flange perform an important office in that they permit egress of portions of the gasket material after a certain degree of pressure has been reached. A sort of safety valve is thus afforded preventing any such 110 excessive pressure of the gasket material as might detrimentally effect the efficient operation of the closure.

The closure, as described, consists of three concentric annular walls 5, 7 and 8. The 115 wall, or flange 8 occupies the intermediate position between the walls 5 and 7, and is resilient so that it is capable of movement toward or away from each of said walls 5 and 7. It is directly supported by the wall 120 7 which is also resilient although to a less degree than the wall 8. The receptacle is held between the walls 5 and 8, and the wall 5, in addition to its function, of affording a seal with the receptacle, serves as an abut- 125 ment assisting the receptacle in resisting the pressure of the wall 8 and the gasket. The gasket is held between the walls 7 and 8 with its upper portion projecting into the space to be occupied by the receptacle. The 130

wall 8, provides a hard metallic surfaces along which the receptacle moves before engaging the gasket. This wall, by its downwardly diverging form, also constitutes directing means for directing the receptacle into proper association with the closure. During the operation of applying the closure, the receptacle is first brought into engagement with the inner side surface, as 18, of the gasket rather than with the lower edge surface 19, and thus the entering movement of the receptacle is made smooth and of uniform character at all times. Objectionable and non-uniform crowding of the gasket is entirely avoided.

While the illustrations forming part of this application indicate the corrugations of the gripping flange to be of a regular and uniform character, yet it will be understood that in practice the corrugations may, if desired, be non-uniform for it has been found that in manufacturing this closure appropriately shaped non-corrugated dies operate to produce such corrugations of the gripping flange as to be suitable for all ordinary purposes in accordance with the principles above set forth.

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 drawings, 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. A pre-formed receptacle closure having a marginal portion adapted to overlie an exterior portion of a receptacle, said marginal portion having a receptacle gripping flange formed thereon bent inwardly and upwardly therefrom, and said gripping flange being substantially straight across its width from its upper edge downwardly and being resilient and being normally inclined downwardly and outwardly from its upper edge.

2. A pre-formed receptacle closure having a marginal portion adapted to overlie an exterior portion of a receptacle, said marginal portion having a receptacle gripping flange formed thereon bent inwardly and upwardly therefrom to provide an annular pocket between said gripping flange and said marginal portion, a gasket arranged within said pocket having an annular receptacle engaging part projecting above the upper edge of the gripping flange, said gripping flange being bendable and being adapted when applied to a receptacle to be bent by contact with the receptacle for partially closing said pocket and for thereby squeezing the gasket upwardly against the

receptacle, and said gripping flange being substantially straight across its width from its upper edge downwardly and being normally inclined downwardly and outwardly from said upper edge so that said pocket normally spreads upwardly largest at its upper end.

3. A receptacle closure having a marginal portion adapted to overlie an exterior portion of a receptacle, said marginal portion having a receptacle gripping flange formed thereon bent inwardly and upwardly therefrom, said gripping flange being substantially straight across its width from its upper edge downwardly and being resilient and being normally inclined downwardly and outwardly from its upper edge, and said gripping flange being corrugated with corrugations extending in a direction across the width thereof.

4. A receptacle closure having a marginal portion adapted to overlie an exterior portion of a receptacle, said marginal portion having a receptacle gripping flange formed thereon bent inwardly and upwardly therefrom, and said gripping flange being formed with a plurality of relatively raised parts for engaging the receptacle at spaced points around the receptacle.

5. A receptacle closure having a marginal portion adapted to overlie an exterior portion of a receptacle, said marginal portion having a receptacle gripping flange formed thereon bent inwardly and upwardly therefrom, a gasket arranged within said marginal portion being held against displacement by said gripping flange, and said gripping flange being bent to provide a passage between itself and the receptacle through which an undesirable portion of the gasket may move when the closure is applied to a receptacle.

6. A receptacle closure having a marginal portion adapted to overlie an exterior portion of a receptacle, said marginal portion having a receptacle gripping flange formed thereon bent inwardly and upwardly therefrom, and said gripping flange being bent so that the portion thereof connecting with said marginal portion of the closure is bent more abruptly in one locality than in another.

7. A receptacle closure having a marginal portion adapted to overlie an exterior portion of a receptacle, said marginal portion having a receptacle gripping flange formed thereon bent inwardly and upwardly therefrom, and said gripping flange being shaped to provide first, a plurality of spaced extending portions for gripping against the receptacle, second, a plurality of spaced depressed portions defining passageways between the receptacle and the gripping flange, and third, a more abrupt bending of the metal forming the connection between the gripping flange and said marginal portion

of the closure in some localities than in others.

8. A receptacle closure having a marginal portion adapted to overlies an exterior portion of a receptacle, said marginal portion having a receptacle gripping flange formed thereon bent inwardly and upwardly therefrom, a gasket arranged within said marginal portion being held against displacement by said gripping flange, a liner arranged within said closure comprising a disc of suitable material the marginal portion of which extends to adjacent said gasket, and said gripping flange being shaped to extend beyond said gasket to engage the marginal portion of said liner for retaining the liner against displacement.

9. A receptacle closure having a marginal portion adapted to overlies an exterior portion of a receptacle, a gasket within said marginal portion for engaging the receptacle, a liner arranged within the closure comprising a disc of suitable material having its marginal portion extending into proximity with said gasket, the liner being arranged to be gripped for forming a seal between the receptacle and a part of the

closure when the closure is applied to the receptacle, and the closure comprising another part operable when the closure is being applied to the receptacle to squeeze a portion of said gasket against the marginal portion of said liner and into and around the seal formed by said liner between the receptacle and the closure.

10. A receptacle closure having a marginal portion adapted to overlies an exterior portion of a receptacle, said marginal portion having a receptacle gripping flange formed thereon bent inwardly and upwardly therefrom, and said gripping flange being corrugated by corrugations extending straight across its width from its upper edge to its point of connection with said marginal portion of the closure so as to prevent unfolding of said flange, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

LESLIE R. N. CARVALHO.

Witnesses:

WM. G. SKUTCH,
FRANK M. DALRYMPLE.