

Feb. 15, 1938.

H. A. STRELOW

2,108,238

CLOSURE

Filed Sept. 26, 1936

2 Sheets-Sheet 1

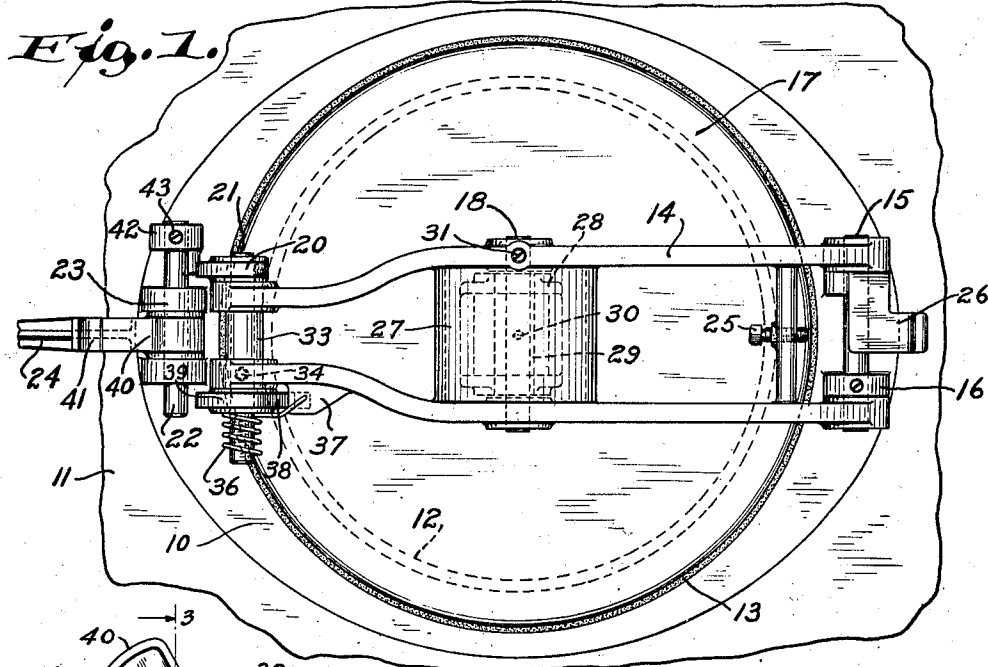
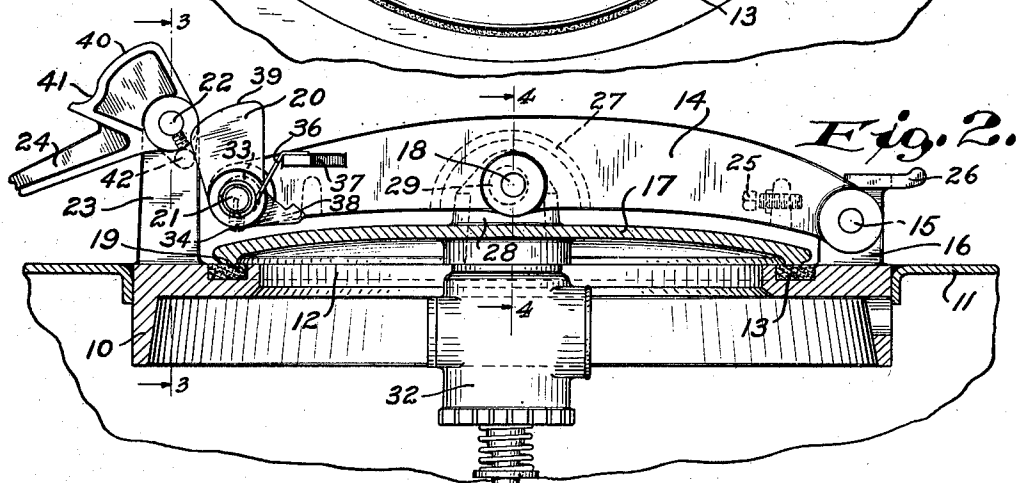
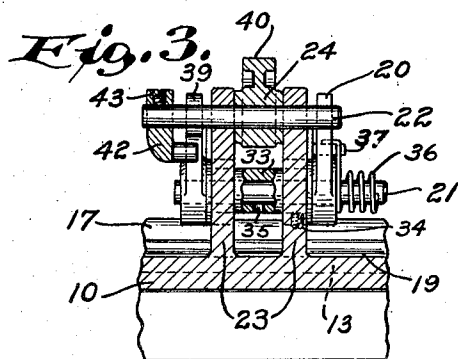
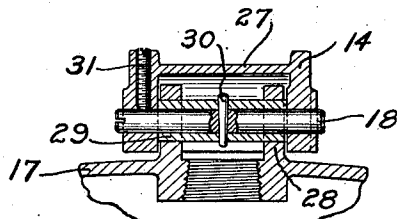


Fig. 4. INVENTOR.
H. A. Strelow
 BY *Morsell, Lieber & Morsell*
 ATTORNEY.

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2 Sheets-Sheet 2

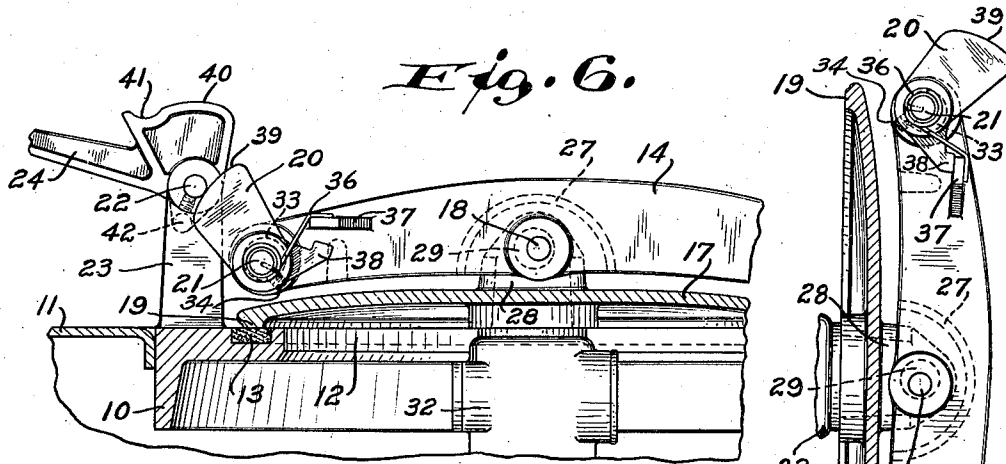
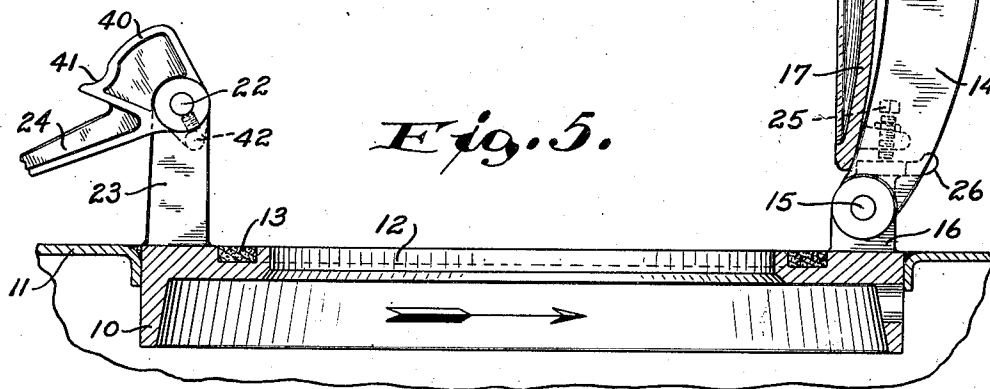
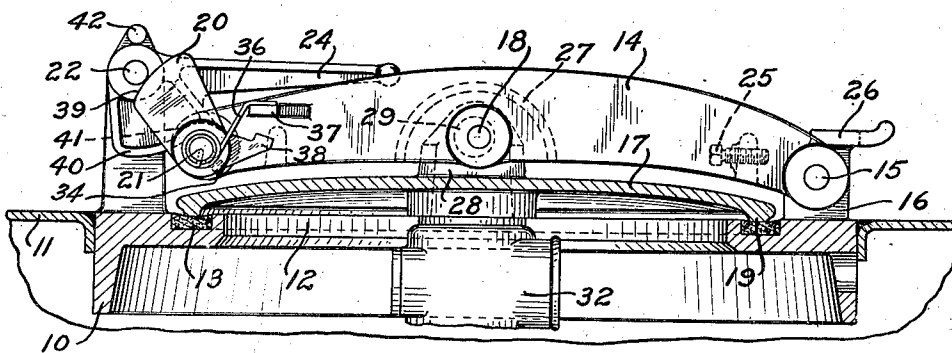


Fig. 7. *H. A. Strelow* INVENTOR.

BY
Morrell, Lieber & Morrell
ATTORNEY.

UNITED STATES PATENT OFFICE

2,108,238

CLOSURE

Henry A. Strelow, Milwaukee, Wis., assignor to
The Heli Co., Milwaukee, Wis., a corporation
of Wisconsin

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12 Claims. (Cl. 220—57)

My present invention relates in general to improvements in the art of manufacturing and of sealing receptacles, and relates more specifically to improvements in the construction and operation of closures for the manhole or inspection openings of tanks or the like.

Generally defined, an object of the present invention is to provide an improved closure of simplified construction which will effectively seal the manhole or inspection opening of a vehicular tank or similar receptacle.

Many types of covers have heretofore been utilized in the endeavor to effect sealing of the manholes or inspection of openings of vehicular tanks for transporting and dispensing liquids such as gasoline, oil, and milk; but none of these prior closures are entirely satisfactory. Most of the prior manhole covers that provide effective seals, are too complicated, and the simpler types do not afford tight closing of the openings at all times and under all conditions. These manhole covers are frequently left open by the attendants, and unless they are closed so as to provide for sealing when the transporting vehicle is set in motion, considerable loss of liquid through the manhole results. It is therefore desirable to provide for automatic closing of the covers when the tank truck is starting, and it is also necessary to insure tight sealing at these manholes as the sealing gaskets become worn or compressed due to constant use. Closures of this type should also be adaptable for use in conjunction with streamlined tanks without impairing the streamlined appearance, and should be quickly and conveniently manipulable without endangering the operator. None of the prior manhole cover assemblies are adapted to meet all of these contingencies, and all of them are therefore more or less objectionable.

It is a more specific object of my present invention to provide an improved manhole closure assembly which besides being simple, compact and durable in construction, is also flexible and highly efficient in operation.

Another specific object of this invention is the provision of improved cover structure which will insure automatic closing and sealing of the cover if the same has accidentally been left open, and when the receptacle is set in motion.

A further specific object of the invention is to provide a closure mechanism which is readily adjustable so as to insure tight sealing at all times and under various conditions of use, and wherein the closure cover is adapted to be effectively locked in sealing position.

Still another specific object of my invention is the provision of a new and useful manhole closure assemblage especially adapted for use in conjunction with streamlined vehicular tanks, and which may be manufactured and installed at moderate cost.

These and other specific objects and advantages will be apparent from the following detailed description.

A clear conception of the various features constituting the present improvement, and of the mode of constructing and of utilizing manhole closures built in accordance with the invention, may be had by referring to the drawings accompanying and forming a part of this invention wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a top view of one of the closures showing the same applied to a fragment of a tank, with the automatic latching device and the final latching lever released;

Fig. 2 is a longitudinal vertical section through the closure and tank fragment of Fig. 1, likewise showing the latching devices released preparatory to opening of the cover;

Fig. 3 is a transverse vertical section through the closure latching mechanism, taken along the line 3—3 of Fig. 2;

Fig. 4 is a transverse vertical section through the cover, taken along the line 4—4 of Fig. 3;

Fig. 5 is a longitudinal vertical section through the closure and tank fragment, showing the cover in open position;

Fig. 6 is a similar sectional view showing the cover automatically held in sealing position after having been closed by gravity; and

Fig. 7 is another similar sectional view showing the cover finally locked in sealed position by the manual latching device.

While the improvement has been shown and described herein as being specifically applied to a closure for liquid transporting truck tanks, it is not the intent to thereby unnecessarily restrict the scope of the invention, since some of the novel features of closure assembly may obviously be more generally applied.

Referring to the drawings, the improved closure assemblage comprises in general a manhole ring 10 welded or otherwise rigidly attached to the upper portion of a vehicular tank or receptacle 11 and having a central opening 12 surrounded by an annular upper resilient sealing strip 13; a main lever 14 swingably attached to the front side of the ring 10 by means of a pivot pin 15 coacting with ears 16 formed integral with the

ring 10; a closure plate or cover 17 pivotally suspended from the medial portion of the lever 14 by means of a pivot pin 18 and having a seating lip 19 cooperable with the sealing strip 13 when the cover is closed; a pair of movable cams 20 pivotally attached to the swinging end of the main lever 14 by a pivot pin 21; a latching pin 22 carried by ears 23 formed integral with the rear portion of the manhole ring 10 and cooperable with the cams 20 when the cover 17 is closed by gravity; and a locking and release lever 24 swingably supported by the latch pin 22, and cooperable with the swinging end of the main lever 14 and with the cams 20 to interchangeably lock and release the cover 17.

The main frame or ring 10 may be formed by casting or otherwise and is preferably welded to an inwardly directed flange of the receptacle 11 as shown, in order to avoid outward projection of the ring beyond the contour of the tank; and while the exterior of the ring 10 may be elliptical in shape, the opening 12 is ordinarily circular. The annular sealing strip 13 is confined within a recess in the ring 10, and may be formed of any suitable sealing material such as cork or rubber composition. The upstanding ears 16, 23 at the front and rear ends of the ring 10 are preferably either formed integral therewith or rigidly attached thereto, and the normal forward direction of transportation of the tank or receptacle 11 is indicated by the arrow in Fig. 5.

The main cover suspension lever 14 which is swingably attached to the frame ring 10 by means of the pivot pin 15, is of strong and durable construction; and has means such as an adjustable set screw 25 cooperable with a lug 26 projecting laterally from one of the fixed ears 16, for limiting the extent of the opening movement of the lever 14. The suspension pin 18 for the closure cover 17 is guarded against damage by a shield 27 formed integral with the lever 14, and the pivot pin 18 is rotatably adjustable in the opposite sides of the lever 14 and coacts with ears 28 on the closure 17 through an eccentric sleeve 29 which is secured to the pin 18 by a dowel pin 30. The pivot pin 18 is adapted to be locked in adjusted position relative to the lever 14 by means of a set screw 31, and is rotatable to angularly adjust the sleeve 29 by means of a screw driver or a blade applied to the slotted end of the pin 18. The cover or closure 17 may thus be shifted relative to the lever 14 so as to insure proper coaction of the lip 19 with the sealing strip 13 when the lever 14 is in clamping position. The closure 17 is of circular formation and is provided with a central vent 32, the outlet opening of which is also guarded by the shield 27.

The automatic latching cams 20 are rigidly attached to their pivot and supporting pin 21, and this pivot pin is rotatably journaled in an eccentric sleeve 33 which coacts with transverse aligned bores in the swinging end of the main lever 14. The sleeve 33 snugly fits these bores and is adapted to be locked in adjusted position by means of a set screw 34 as shown in Fig. 3, and the sleeve 33 is provided with a hole 35 within which a lever pin may be inserted to effect angular adjustment of the sleeve when the locking screw 34 is released. One end of the cam supporting pin 21 is provided with a coil spring 36 which coacts with the pin and with one face of a lug 37 formed integral with the main lever 14, in such manner that the pin 21 and cams 20 are constantly caused to swing in a counter-clockwise direction as viewed in Figs. 2, 5, 6 and

7, until an arm 38 formed integral with one of the cams 20 engages the opposite face of the lug 37 as illustrated in Fig. 5. The cams 20 are thus adapted to engage the stationary latching pin 22 whenever the lever 14 is swung toward closing position about its pivot pin 15, and during such closing movement the cams 20 are thrown forwardly by the pin 22 until they clear this pin, after which the spring 36 quickly becomes effective to snap the cam surface 39 beneath the pin 22 into latching position. The eccentric sleeve 33 obviously permits adjustment of the pin 21 and cams 20 so as to insure most effective coaction between the cam surfaces 39 and the latching pin 22 at all times, and especially when the sealing strip 13 becomes compressed through continued use.

The locking and release lever 24 which is swingably supported by the normally fixed latching pin 22 between the ears 23, is rigidly attached to the pin 22 and has an integral locking cam 40 provided with a notch 41, the former of which is adapted to ride over the sleeve 33 and the latter of which is formed to finally engage this sleeve so as to hold the main lever 14 in closure sealing position. As the lever 24 is swung about the axis of the pin 22, the pin is rotated in the ears 23, and one end of the pin 22 carries a cam release arm 42 which is adapted to engage the rear edge of one of the cams 20 so as to swing these cams and their pivot pin 21 in a clockwise direction to the position shown in Fig. 2 in order to permit free upward swinging of the main lever 14 and closure 17. The arm 42 is rigidly but adjustably secured to the end of the latching pin 22 by means of a set screw 43, and when the closure cover 17 and the lever 14 are lowered by gravity, the adjacent cam 20 will engage the arm 42 so as to swing the same out of the way sufficiently to permit the cam surfaces 39 to engage the latch pin 22.

When the improved closure assemblage has been properly constructed and assembled as above described, and the set screw 25 and eccentric sleeves 29, 33 have been properly adjusted and locked in position, the closure is adapted for normal use. With the assemblage positioned as shown in Figs. 1 and 2, the locking and release lever 24 has been positioned so as to bring the arm 43 into engagement with the adjacent cam 20 and to compress the spring 36 sufficiently so that the rear ends of the cams 20 will clear the latching pin 22. The main lever 14 and closure 17 may then be swung into open position as clearly shown in Fig. 5, without obstruction, whereupon the set screw 25 will engage the lug 26 and will retain the lever 14 and closure 17 in open position. At such time, the arm 38 of the latching cam 20 will engage the adjacent face of the lug 37 by virtue of the action of the coil spring 36.

If it becomes desirable to close the manhole cover, or if the vehicle is set in forward motion, the main lever 14 will swing about its supporting pivot 15 sufficiently to bring the center of gravity of the lever and cover assemblage beyond the axis of the pin 15, whereupon the swingable assemblage will drop by gravity toward closing position. As the cam 30 passes the adjacent release arm 42, the lever 24 will be swung upwardly a slight amount, and the cam surfaces 39 will thereafter be swung beneath the latching pin 22 by the coil spring 36 which is slightly compressed when the cams 20 initially pass the pin 22. The spring 36 thereafter immediately becomes effective to swing the cam surfaces 39 beneath the pin 22 as shown

in Fig. 6, thus forcing the lip 19 of the closure 17 into intimate engagement with the sealing strip 13. The closure 17 is thus initially latched into closed position, by the automatic action of the cams 20 and of the spring 36. In order to finally lock the closure 17 into sealed position as shown in Fig. 7, it is only necessary to swing the lever 24 forwardly. During the initial forward motion the arm 42 is retracted from the cams 20 and the outer surface of the cam 40 engages the eccentric sleeve 33, and when the lever 24 is brought into final sealing position, the notch 41 engages the sleeve 33 and positively locks the lever 14 in closing position. In order to bring the mechanism into the position shown in Fig. 2 so as to permit opening of the closure 17, it is only necessary to swing the lever 24 rearwardly about the axis of the latch pin 22, whereupon the arm 42 again becomes effective as above described.

In order to insure tight sealing of the closure 17, it is necessary to properly locate the closure 17 relative to the main lever 14, and to also properly locate the cams 20 relative to the latch pin 22. The sleeve 23 may obviously be readily adjusted upon release of the set screw 31, and the pin 18 and sleeve 29 may be thereafter angularly adjusted so as to insure proper positioning of the closure 17 relative to the lever 14. The cams 20 may likewise be properly positioned by merely releasing the set screw 34 and by subsequently applying an adjusting rod to the hole 35 in the sleeve 33. The extent of opening movement of the closure 17 may also be varied by adjustment of the set screw 25, but it is preferable to limit this opening movement if closing of the cover is to be effected by inertia when the tank 11 is displaced forwardly.

From the foregoing description it will be apparent that the present invention provides an extremely simple mechanism for automatically closing and latching a cover in closed position. The invention furthermore provides simple means for positively locking the cover in sealed position, and also provides simple mechanism for effecting adjustment so as to insure tight sealing under all conditions of operation. The improved mechanism is extremely compact and is well adapted to augment, rather than to detract from, the streamlined appearance of a vehicular tank to which it may be applied, and the assemblage is extremely durable in construction, in spite of its being relatively light in structure. The improved closure mechanism is highly effective in operation, and can be manufactured and installed at relatively moderate cost.

It should be understood that it is not desired to limit the present invention to the exact details of construction and to the precise mode of use herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

I claim:

1. In combination, a receptacle having an opening, a closure pivotally attached to said receptacle and swingable toward and away from said opening, automatically functioning means for holding said closure in sealing contact with said receptacle when said closure is swung toward said opening, and other means for subsequently finally locking said closure in sealing position, said other means being movable to release said automatic holding means.

2. In combination, a receptacle having an opening, a closure pivotally attached to said receptacle and swingable toward and away from

said opening, automatically functioning means for holding said closure in sealing contact with said receptacle when said closure is swung toward said opening, and manually operable means for subsequently locking said closure in sealing position, said manually operable means being manipulable to release said automatic holding means.

3. In combination, a receptacle having an opening surrounded by a seal, a closure pivotally attached to said receptacle and being swingable by gravity toward said seal, automatically functioning cam means for frictionally clamping said closure in contact with said seal when said closure is swung by gravity toward said opening, and a manually operable lever for subsequently finally clamping and locking said closure against said seal, said manually operable means being movable to release said cam means.

4. In combination, a receptacle having an opening and a compressible seal adjacent said opening, a lever pivotally attached to said receptacle and swingable over said opening, a closure pivotally suspended from the medial portion of said lever, an adjusting eccentric interposed between said closure and said lever, a latching cam pivotally suspended from the swinging end of said lever, and an adjusting eccentric interposed between said cam and said lever.

5. In combination, a receptacle having an opening and a compressible seal adjacent said opening, a lever pivotally attached to said receptacle and swingable over said opening, a closure pivotally suspended from the medial portion of said lever, an adjusting eccentric interposed between said closure and said lever, a latching cam pivotally suspended from the swinging end of said lever, an adjusting eccentric interposed between said cam and said lever, and a latch pin attached to said receptacle and cooperable with said cam to hold said closure in contact with said seal.

6. In combination, a receptacle having an opening and a seal adjacent said opening, a main lever swingable over said opening, a closure adjustably suspended from the medial portion of said lever and cooperable with said seal, a cam pivotally suspended from the swinging end of said lever, a latch pin carried by said receptacle and cooperable with said cam to temporarily hold said closure in contact with said seal, and a locking lever carried by said latch pin and cooperable with said main lever to positively lock said closure in sealed position.

7. In combination, a receptacle having an opening and a seal adjacent said opening, a main lever swingable over said opening, a closure suspended from the medial portion of said lever and cooperable with said seal, a cam pivotally suspended from the swinging end of said lever, a latch pin rotatably mounted upon said receptacle and engageable with said cam to temporarily hold said closure against said seal, and a locking cam secured to said latch pin and cooperable with said main lever to finally lock said closure in sealed position.

8. In combination, a receptacle having an opening and a seal adjacent said opening, a main lever swingable across said opening, a closure suspended from said lever and cooperable with said seal, a cam pivotally suspended from the swinging end of said lever, an adjustable eccentric adjacent said cam, a latch pin rotatably mounted upon said receptacle and adapted to be engaged by said cam to temporarily hold said closure

against said seal, and a locking cam carried by said latch pin and cooperable with said eccentric to finally lock said closure in sealed position.

9. In combination, a receptacle having an opening, a main lever swingable by gravity across said opening, a closure for said opening suspended from said lever, a pair of cams pivotally suspended from the swinging end of said lever, an adjustable eccentric carried by said lever between said cams, a latch pin adapted to be engaged by said cams to temporarily confine said closure over said opening, and a locking cam cooperable with said eccentric to positively lock said closure in sealed position.

10. In combination, a receptacle having an opening, a main lever pivotally suspended from said receptacle and swingable over said opening, a closure adjustably suspended from the medial portion of said lever and cooperable with said opening, a pair of spaced cams pivotally suspended from the swinging end of said lever, an adjustable eccentric carried by said lever between said cams, a latch member carried by said receptacle and cooperable with said cams to temporarily hold said closure in contact with said receptacle adjacent said opening, and a locking cam carried by said receptacle and cooperable with said eccentric to positively lock said closure in sealed position.

11. In combination, a receptacle having an opening, a lever swingable across said opening, a

closure adjustably suspended from said lever and cooperable with said opening, a pair of cams pivotally suspended from said lever, resilient means for urging said cams in one direction, a latch member cooperable with said cams to automatically hold said closure in sealing position relative to said opening, and a locking member cooperable with said lever between said cams for finally positively locking said closure in sealed position.

12. In combination, a receptacle having an opening and a seal adjacent said opening, a main lever pivotally suspended from said receptacle on one side of said opening and swingable thereover, a closure adjustably suspended from the medial portion of said lever and cooperable with said seal, a pair of cams pivotally suspended from the swinging end of said lever, resilient means for urging said cams in one direction about their pivotal axis, an adjustable eccentric supported by said lever between said cams, a latch pin carried by said receptacle and cooperable with said cams to automatically retain said closure in contact with said seal, a locking cam carried by said latch pin and cooperable with said eccentric to positively lock said closure in sealed position, and a releasing arm carried by said latch pin and cooperable with said automatic holding cams to release the same from holding position.

HENRY A. STRELOW.