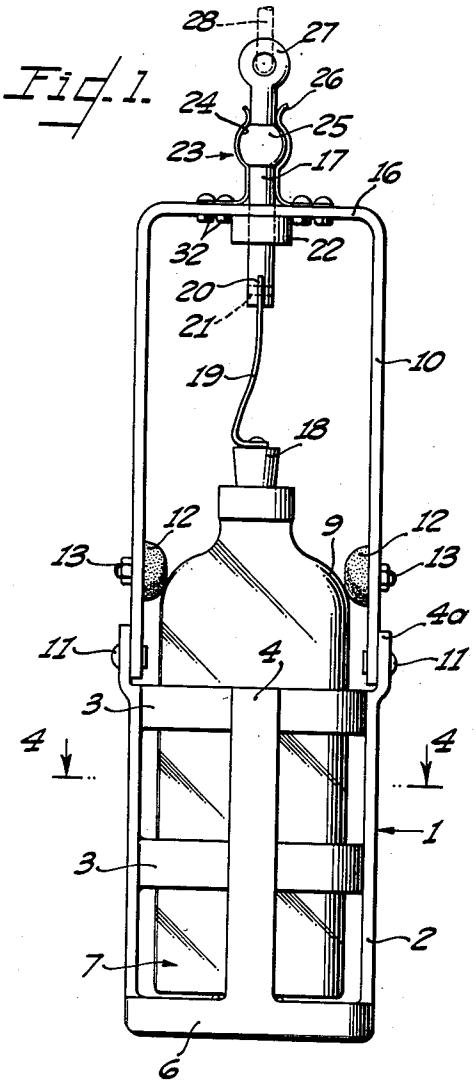
May 27, 1952 F. V. LONG ET AL 2,598,183

SAMPLE TAKING APPARATUS

Filed Oct. 28, 1946

2 SHEETS—SHEET 1

Fig. 1.



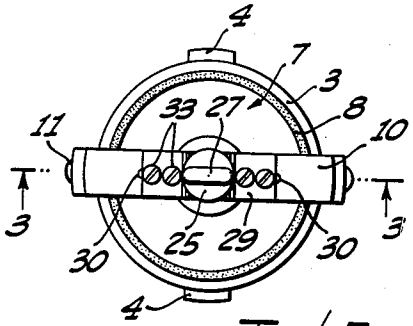


Fig. 2.

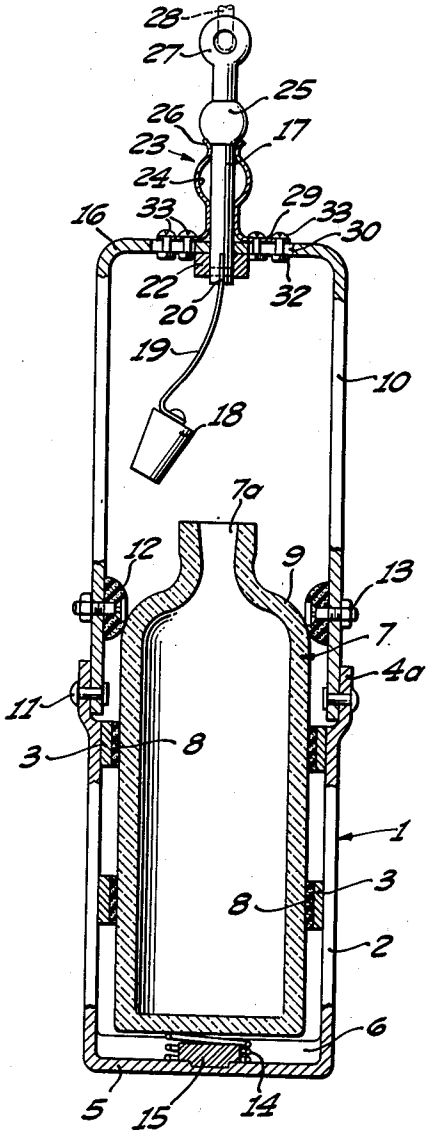


Fig. 3.

FRANK V. LONG,
JOSEPH F. LEE,
ALPHONSE F. LEVI,
CHARLES C. KEANE,
INVENTORS

BY Francis D. Cannon

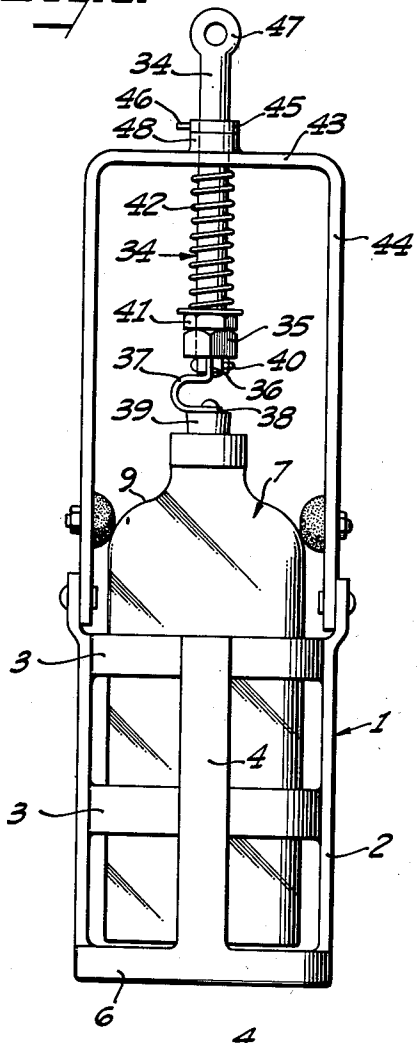
their ATTORNEY.

May 27, 1952 F. V. LONG ET AL 2,598,183

SAMPLE TAKING APPARATUS

Filed Oct. 28, 1946 2 SHEETS—SHEET 2

Fig. 5.



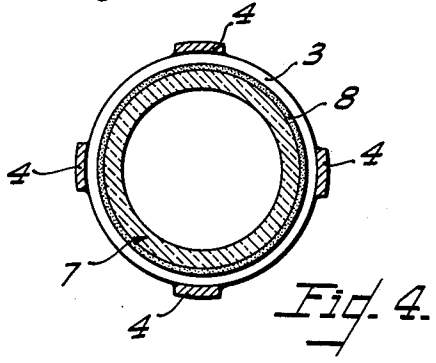


Fig. 4.

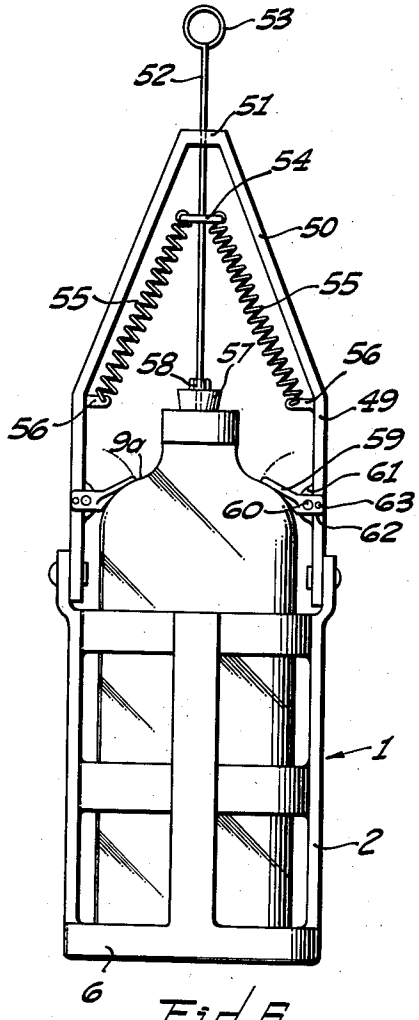


Fig. 6.

FRANK V. LONG,
JOSEPH F. LEE,
ALPHONSE F. LEVI,
CHARLES C. KEANE,
INVENTORS

BY Francis D. Simmen
Their ATTORNEY.

Patented May 27, 1952

2,598,183

UNITED STATES PATENT OFFICE

2,598,183

SAMPLE TAKING APPARATUS

Frank V. Long, Los Angeles, Joseph F. Lee, Lynwood, and Alphonse F. Levi, Hermosa Beach, Calif., and Charles C. Keane, Kansas City, Kans.; said Lee, Levi, and Keane, assignors to said Long, doing business as The Vapor Recovery Systems Company, Compton, Calif.

Application October 28, 1946, Serial No. 706,216

10 Claims. (Cl. 73—425.4)

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This invention relates to apparatus for taking samples of liquid from a tank or the like.

In practice, apparatus for this purpose is usually attached to a line and lowered into a tank containing oil or other liquid, to the level at which the sample is to be taken. In this connection, it should be understood that some liquids including petroleum, have a different specific gravity at different levels in the tank. This is particularly noticeable if the liquid has been standing for a considerable time. By taking samples at different levels, a very fair estimate can be made of the character and value of the liquid.

Apparatus for this purpose is illustrated in prior Patent No. 2,274,869, granted to one of the present co-inventors, Frank V. Long, on the 3rd day of March 1942, and Patent No. 2,284,396, granted on the 26th day of May 1942.

Such apparatus usually includes means for enabling the receptacle for the sample to be lowered in a closed condition, and then by jerking on the supporting line the receptacle is opened to permit a quantity of liquid to flow into it.

In many of the devices heretofore used for this purpose, the receptacle that takes the sample, is a fixed part of the apparatus, and the sample taken with it must be poured out into another container.

One of the objects of the present invention is to provide simple apparatus for holding a receptacle or bottle of common form, and provided with a closure at its mouth, which is drawn from the bottle by jerking the line so as to enable the sample to flow in.

It is frequently necessary to take a sample close to the bottom of the tank, and consequently, unless provision is made to prevent it, the stopper or closure might become lodged again in the mouth of the bottle when the apparatus rests on the bottom of the tank, which would of course prevent the inflow of the bottom sample. One of the objects of this invention is to provide simple means for insuring that after the closure has been drawn from the mouth of the bottle, it cannot seat itself in the mouth of the bottle even if the apparatus does rest upon the bottom of the tank after the stopper has been jerked out of the bottle mouth.

Another object of the invention is to provide a holder for a receptacle of this nature, having a simple construction for insuring that the bottle can be readily placed in the holder and secured therein.

In the preferred embodiment of the invention,

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it involves the use of a stem or draw-bar supported above the mouth of the receptacle, or bottle, and which carries the closure or stopper that is seated in the mouth of the receptacle when it is lowered into the tank; and one of the objects of this invention is to provide simple means for insuring that the bottle closure will be maintained in its closed position until it is drawn from the mouth of the receptacle; and also to provide means for thereafter supporting the closure in a laterally disposed position so that it will be out of line with the mouth of the receptacle, so that it cannot accidentally move back into the mouth of the receptacle if the apparatus rests on the bottom of the tank after the bottle closure has been pulled or drawn from it.

In the preferred embodiment of the invention, the holder for the receptacle is constructed with a handle or bail having a joint connecting the same to the body of the holder which receives the receptacle; and one of the objects of the invention is to provide automatic means associated with this bail or handle, operating in such a way that when the handle is swung to its upright position which it assumes after the bottle has been put in the holder, it will engage the bottle in such a way as to hold it securely in the holder.

Another object of the invention is to provide the holder with means for insuring that the receptacle or bottle will be maintained in a substantially upright position while the apparatus is being lowered through the liquid in the tank.

Further objects of the invention will appear hereinafter.

The invention consists in the novel parts and combinations of parts to be described hereinafter, all of which contribute to produce an efficient sample taking apparatus.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

Fig. 1 is a front elevation of the apparatus embodying this invention, and representing the receptacle or bottle held in the holder, and with its closure in place ready to be lowered into the tank.

Fig. 2 is a plan of the apparatus illustrated in Fig. 1.

Fig. 3 is a vertical section through the apparatus shown in Fig. 1, taken on the line 3—3 of Fig. 2. This view shows the apparatus after the line has been jerked to remove, or draw, the closure from the bottle neck; and it also particularly illustrates the means for weighing the ap-

paratus to insure that the receptacle will be maintained in an upright position as it descends through the liquid in the tank; and also illustrates the means carried by the holder for securing the receptacle within it.

Fig. 4 is a horizontal section taken about on the line 4—4 of Fig. 1, and passing through the wall of the receptacle.

Fig. 5 is a view similar to Fig. 1, but illustrating another embodiment of the invention as regards the means for preventing accidental return of the closure to the receptacle.

Fig. 6 is a view similar to Fig. 5, but illustrating still another embodiment of the invention and illustrating non-automatic locking means that may be employed on the holder for securing the bottle or receptacle within it. This embodiment of the invention is simpler than the embodiments illustrated in the other figures, and is intended particularly for taking samples where it is not necessary to take a sample very near the bottom of the tank.

Before proceeding to a detailed description of the invention, it should be stated that in Figures 1 to 5, we illustrate embodiments of the invention in which it is practically impossible for the receptacle closure to return to its closed position in the bottle neck after the supporting line has been jerked to draw the closure from the bottle.

Referring to the embodiment of the invention illustrated in Figs. 1 and 2, the apparatus includes a holder 1 having a body 2 preferably of cage-form, open above, and including a plurality of rings 3, the outer sides of which are integral or secured to, upright bars 4 which, in the present instance, are four in number.

The side bars 4 are preferably formed integrally with a circular bottom 5 for the holder, which has an upwardly extending flange 6 that integrally connects to the side bars 4.

The receptacle 7 is preferably in the form of a bottle which is most conveniently composed of glass, and in order to protect the wall of glass from injury by coming in contact with the face of the metal rings 3, these rings are preferably provided with annular liners 8 of rubber, neoprene, or similar material.

A receptacle or bottle is introduced from above through the upper opening of the holder. On account of the buoyancy of the receptacle when it is closed, it is necessary to provide means for resisting the buoyancy of the receptacle and preventing it from floating up in the holder when the holder and the receptacle are being lowered through the liquid in the tank.

In order to accomplish this the receptacle preferably has the form of a bottle with a shoulder 9 at its upper end, which cooperates with a movable part on the holder to secure the receptacle or bottle against rising by its own buoyancy, and hold it against the bottom 5 of the holder. This locking means for the bottle may be automatic, or non-automatic. In Figs. 1 and 2 it is automatic, and this automatic locking is accomplished by providing the holder with a handle portion or bifurcated bail 10, which is hingedly connected to the body 2 of the holder. In order to accomplish this, we provide two of the diametrically opposite bars 4 with outwardly offset extensions 4a, and on the inner sides of these extensions the lower ends of the forks of the bail 10, are attached on pivot bolts or rivets 11. And on the inner faces of the forks of this bail 10, two "buttons" 12 of soft material are secured by means of two small bolts 13. These buttons project inwardly and have convex or rounded surfaces that engage against the shoulder 9 at two diametrically opposite points. However, the bottom of the bottle does not seat against the unyielding bottom 5 of the holder body. As a precaution, and to accommodate variations in bottle sizes, we prefer to support the bottom of the bottle on a coil spring 14, which spring rests upon the bottom 5 and is centered around a weight 15 of lead or similar heavy metal, the function of which is to insure that this equipment will maintain itself in a substantially upright position when descending through, or hanging in, the liquid in a tank. The cross bar 16 of the bail 10 operates as a guide for the movable member or draw-bar 17, the movement of which effects opening of the receptacle or bottle 7. In the present instance, the bottle 7 has a mouth 7a in which is received a closure 18 in the form of a tapered stopper of suitable compressible material such as neoprene, although any other suitable material may be used for this purpose. This closure is connected to the lower end of the stem or draw-bar 17 by means of a resilient part or carrier 19 which, in the present instance, is in the form of a flat piece of spring metal, the upper end of which is received in a slot 20 in the lower end of the stem 17, in which it is secured by one or more rivets indicated by the dotted lines 21 in Fig. 1. The cross bar 16 of the bail, if desired, may be provided with an integral boss 22 on its under side, which provides an efficient guide for the draw bar 17. The spring connector 19 tends to assume a curved form such as indicated in Fig. 3, and a slight amount of force must be employed to swing the closure 18 into line with the mouth 7a of the bottle before the stopper is forced down into the mouth. When forced down in this way, it will be held against coming out by means associated with the draw bar 17. In the present instance, this is accomplished by providing a pair of resilient jaws 23 located on opposite sides of the draw bar, and these two jaws extend upward in the direction in which the draw bar extends up from a cross bar 16, and are formed into two concavo-convex recesses or sockets 24 which cooperate with an enlarged or "ball" neck 25. This ball neck is of substantially cylindrical form, and is made as an integral part of the draw bar or stem 17. Above the sockets 24 the jaws 23 have outwardly projecting or diverging lips 26 which assist in spreading the spring jaws 23 apart when the stem is inserted between the same from above. The stem is inserted in this way of course, before attaching the leaf spring 19 to its lower end by means of rivets shown at 21.

The upper end of the stem 17 is formed with an eye 27 to which a cord or line indicated by the dotted lines 28 is attached, for lowering the apparatus into the tank. This line may be in the form of a light cable marked off into foot lengths, so that the operator of the apparatus will know to what depth he has lowered the bottle before he jerks the cable to take the sample. Or, if desired, a marked steel tape may be used as the line for supporting the device, but if the tape available is not sufficiently strong to withstand the repeated jerking of the line when taking a succession of samples, a light weight tape can be lowered down with a wire cable, and the jerking can be accomplished on the cable without imparting any shock to the tape.

The socket springs 23 are preferably made ad-

justable, for which purpose they are formed with integral feet 29 resting on the upper side of the cross bar 16 of the bail, and these feet rest directly over slots 30 extending longitudinally in the cross bar, and the feet 29 have bolts with nuts 32 below the bar; and have screwdriver heads 33 for tightening them up from above.

The embodiment of the invention illustrated in Fig. 5, is substantially the same as that illustrated in Fig. 1, as regards the construction of the holder, but differs as regards the construction of its draw bar or stem 34. In this instance, the draw bar 34 is a straight stem of uniform diameter, the lower end of which is threaded to receive a bottom nut 35. Below this bottom nut 35 the stem 34 is slotted to receive the bent shank 36 of a leaf spring 37. This leaf spring is in the form of a bow terminating below in an extension or ear 38 that is secured to the upper end of the closure or stopper 39, which is similar to the closure 18 already described. The shank 36 of the leaf spring 37 is secured in place by a small through bolt 40.

Above the nut 35 an adjusting nut 41 is provided, that may be screwed up or down on the threads of the stem 34, so as to adjust the force exerted by a coil spring 42 that encircles the stem 34 and which thrusts at its upper end against the under side of the cross bar 43 of the bail 44. The collar 45 secured on the stem 35 by a set screw 46, limits the downward movement of the stem 34 when the stopper 39 is being put in place. In doing this, of course a slight load should be placed on the spring 37. With this construction, when a line attached to the eye 47 is jerked, the stem 34 will slide upwardly in the guide boss 48 formed for it on the upper side of the cross bar 43, and the spring 42 will be compressed. The upward movement will be sufficient to dislodge the stopper 39 from the mouth of the bottle 7, and as soon as this occurs, the bow of the leaf spring 37 will open up slightly and move the stopper 39 over to one side in the manner indicated in Fig. 2, thereby throwing the stopper out of line with the bottle neck, and preventing any possibility that the stopper 39 could return to the mouth of the bottle, even if the holder is let down onto the bottom of the tank.

If, in constructiong this apparatus, it is not necessary to provide means for drawing the stopper out of line with the bottle neck when it has been jerked, the construction illustrated in Fig. 6 may be employed. This construction, as will be noted, is somewhat simpler and avoids the necessity for providing a draw bar involving any substantial amount of mechanical work to finish it. In this instance, the upper end of the bail 49 may be in the form of two converging bars 50 connected by a short cross bar 51, which operates as a guide for a heavy wire draw bar or stem 52. This stem at its upper end is bent around to form an eye 53 for the attachment of a supporting line. Below the cross bar 51 a collar or cross head 54 is carried on the stem 52, and this cross head is connected by two diverging springs 55 to anchors or lugs 56 on the inner side of the forks of the bail 49. If desired, these anchors 56 can of course be in the form of small bolts, or eye bolts, mounted in the side bars of the bail. The lower end of the stem 2 is threaded into the stopper 57 and may be provided with a small check nut 58 that can be tightened up against the upper face of the stopper.

In this construction, also if desired, the automatic locking buttons 12 shown in Figs. 1 and 2, can be dispensed with, and in this case two latches 59 are provided, the bodies of which assume an inclined position when resting against the shoulder 9a of the bottle, and these latches are mounted to swing on pivot pins 60 carried in two lugs 61 that project in from the inner faces of the side bars of the bail 49. These pivot pins 60 are applied through flat plate-like forks 62 located on each side of the forks of the bail, and provided with dimples or projections 63 pressed inwardly and adapted to be received in two small sockets (not illustrated) that are sunk into the adjacent sides of the forks of the bail 49. With this construction illustrated in Fig. 6, it will be evident that when the supporting line is jerked, the stem 52 will slide upwardly and pull out the stopper 57 so that the samples of liquid can flow into the neck of the bottle.

Many other embodiments of the invention may be resorted to without departing from the spirit of the invention.

We claim as our invention:

1. In apparatus for taking a sample of liquid from a tank, the combination of a holder having a body to receive a receptacle for the sample, and including a bail hinged to said body, a stem guided through said bail and connected to the closure for the receptacle, and resilient means exerting a downward pull on the stem to hold the closure in its closing position.

2. In apparatus for taking a sample of liquid from a tank, or the like, the combination of a holder open above to enable a receptacle to be inserted into the same from above, and having a bottom, said holder also having a transverse upper bar, a removable receptacle insertable into said holder from above seating on said bottom, and having an orifice in its upper portion below said bar, a movable part, a supporting line attached to said movable part, a closure for the orifice connected to said movable part, means associated with said transverse bar for guiding said movable part, and for yieldingly resisting the upward movement of the same; and operating to hold the movable part in a position to maintain the closure in the orifice when the apparatus is being lowered down into the tank, means associated with said holder for resisting the buoyancy of the receptacle and securing it in the holder, all of said parts cooperating when the line is jerked, to withdraw the closure and permit the receptacle to fill.

3. Apparatus for taking a sample of liquid from a tank, or the like, according to claim 2, including means on said holder for engaging the upper side of the receptacle to secure the same in the holder.

4. Apparatus for taking a sample of liquid from a tank, or the like, according to claim 2, in which the said holder includes a bail pivotally supported thereon and in which the said transverse upper bar constitutes the handle portion of said bail, said bail capable of assuming an upright position in which the transverse bar is located above the orifice of the receptacle, and means on the bail for engaging the receptacle in the upright position of the bail to hold the receptacle on said bottom.

5. In apparatus for taking a sample of liquid from a tank, or the like, the combination of a holder having a body with a bottom, a bottle-form receptacle seating on said bottom and having a neck at its upper end with an orifice therein through which the receptacle can fill, said re-

ceptacle having a shoulder below said neck, a bifurcated bail having a pair of forks pivotally attached adjacent their lower ends to the body of said holder, said bail having a transverse bar disposed above the orifice when the holder and receptacle are descending through the liquid, a draw-bar guided through said transverse bar, a closure connected to said draw-bar, means for yieldingly holding said draw-bar in a depressed position with the closure disposed in the orifice, a supporting line attached to the upper portion of said draw-bar for lowering the holder and bottle into the tank, and operating when the line is jerked, to withdraw the closure from the orifice, to permit the receptacle to fill, said bail having means in its normal upright position for engaging the receptacle to hold the same on the bottom of the holder when the holder and the bottle are being lowered into the tank.

6. Apparatus for taking a sample of a liquid from a tank or the like according to claim 5, including resilient means on said bottom for exerting a yielding upward thrust on the receptacle, cooperating with the means for engaging the receptacle, to hold the same on said bottom when the apparatus is being lowered into the liquid.

7. In apparatus for taking samples of liquid from a tank, or the like, the combination of a receptacle for the liquid, a holder for the receptacle, a member guided on the holder, a closure with means connecting the same to said member for drawing the closure from the receptacle, said connecting means including a bent resilient part operating so that after the closure is drawn, it will move the closure out of line with the receptacle.

8. Apparatus according to claim 7 in which the holder includes a body portion with a bail jointed thereto, said bail having means for securing the receptacle in the holder.

9. In apparatus to be submerged in a liquid for taking a sample of the same, a holder for the receptacle including a body for carrying the receptacle with the mouth of the receptacle disposed uppermost, said holder having guiding means above the level of the receptacle, a member guided in said guiding means and having means for carrying a closure for the said mouth of the receptacle, said guiding means including means for yieldingly resisting a steady force pulling on the same, and operating to release said member when the same is jerked to draw the closure from the receptacle, a bail pivoted on said body; and means on the bail for engaging the receptacle when the bail is in its upright position, to prevent the receptacle from floating up out of the holder when the holder is being submerged.

10. Apparatus according to claim 9, including yielding means on the bottom of the holder to engage the bottom of the receptacle and cooperating with the said means on the bail for holding the receptacle in position.

FRANK V. LONG.
JOSEPH F. LEE.
ALPHONSE F. LEVI.
CHARLES C. KEANE.

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