

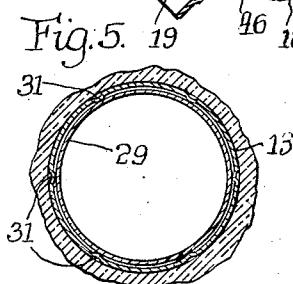
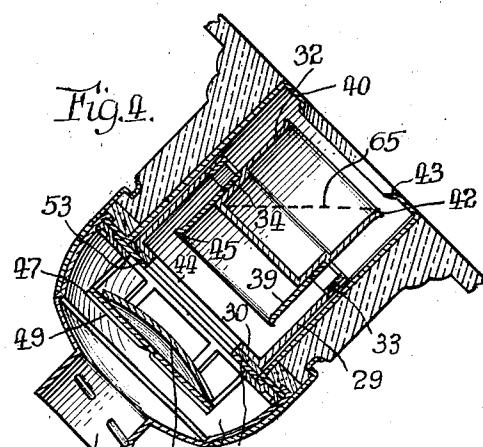
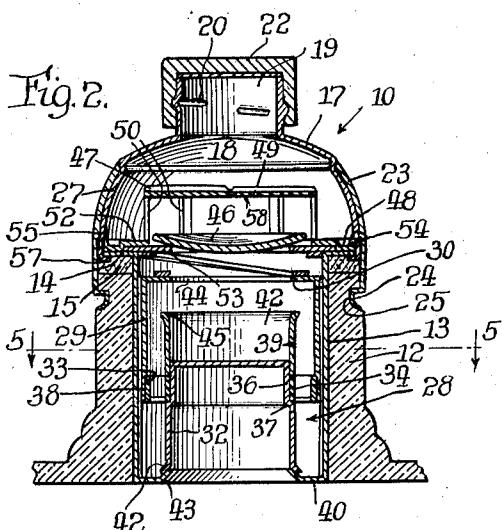
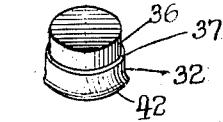
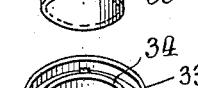
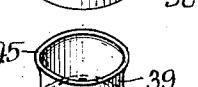
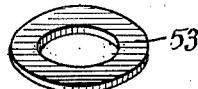
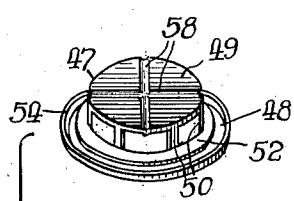
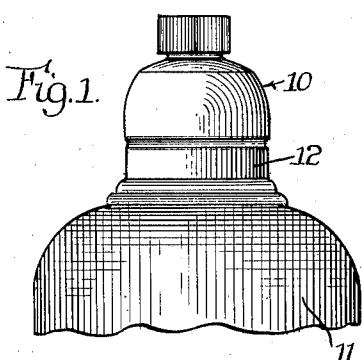
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M. M. KISTNER

2,148,476

NONREFILLABLE BOTTLE

Original Filed Dec. 19, 1934



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UNITED STATES PATENT OFFICE

2,148,476

NONREFILLABLE BOTTLE

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Renewed November 25, 1938

34 Claims. (Cl. 215—25)

This invention relates to a non-refillable bottle and more particularly concerns a bottle embodying novel valve mechanism adapted to permit free discharge of liquid from the bottle but which will effectively discourage attempts to refill the same.

Bottles in which liquids of known characteristics and quality such as fine beverages are dispensed are oftentimes refilled by unscrupulous persons with an inferior liquid and the imitation disposed of as the genuine product. This fraudulent practice is of damaging consequences to the original producer because the user will not be aware of the deception due to the genuine bottle in which the imitation is sold to him, and will thus unjustly attribute the inferiority of the imitation to the original. Attempts have been made in the past to provide means for preventing refilling of bottles but these have met with indifferent success, usually as a result of impracticability due to the unusual shapes of bottles, complicated and expensive structure, the ease with which the sealing parts could be penetrated or removed and replaced without leaving a detectable trace, the ease with which the operation of the valves could be disrupted through the medium of skillfully operated instruments, or similar undesirable characteristics.

The principal object of this invention is to provide a practical non-refillable bottle including a small, freely operating, permanently secured valve unit which embodies a simple, efficient and compact arrangement of standardized parts capable of being easily and quickly assembled into a structure which can be manufactured, sold and installed at a low cost.

Another object is to provide a non-refillable bottle of the foregoing character including a unitary valve device embodying a plurality of coacting return flow preventing means one of which has means associated therewith for the purpose of normally keeping it closed against the return flow of liquid through the device.

Another object resides in the provision of a non-refillable bottle including a valve unit embodying a reciprocable valve having resilient means for urging it into closed position and adapted to allow the valve to open fully only when opposed by the force of a predetermined quantity of liquid after the bottle is tilted for pouring.

Another object is to provide a non-refillable bottle embodying a valve unit having inner and outer valves affording a fluid discharge passage of fixed dimensions providing an undiminished

effective flow area through the unit but operative to prevent the return of any substantial quantity of liquid to the bottle, the outer valve being gravity operated and the inner valve being reciprocably mounted and adapted to be urged to open or sealing positions by the aid of entrapped liquid.

A further object resides in the provision in a device of this character of a valve which is normally seated and has flow directing means associated therewith for effecting an impression on said valve of the force of a predetermined quantity of fluid when pouring whereby the valve is forced open, and for subjecting the valve to the force of incoming fluid when an attempt is made in any manner to introduce fluid into the container, whereby to insure an immediate and positive return of the valve to its normal position.

More specifically stated, another object is to provide a valve which embodies fluid entrapping cups or the like oppositely arranged to face inwardly and outwardly of the container, and which has associated therewith means for normally urging the valve into its seated position, and flow directing means disposed so that the initial flow past said valve in either direction is into one or the other of said cups to open the valve against the force of the valve urging means during a pouring flow and to effect an instant closing of the valve during a reverse or incoming flow.

Another object resides in the provision of non-refillable valve mechanism of the foregoing character including a pair of coacting valve units each separately fashioned from a plurality of snugly interfitting metal parts designed for simplicity and ease of assembly, these units being operatively enclosed permanently within containing means, thereby forming a complete mechanical unit adapted by a simple operation to be united permanently with a bottle after the latter has been filled.

Another object is to provide in a valve mechanism of the foregoing character a structure embodying a gravity acting valve having a contact face of substantial area enclosed within limiting means of substantial area including means to prevent possible adherence of the valve thereto in open position when functioning normally, and designed to be relatively weak so as to be physically distorted into a position to bind said valve member closed upon the application of any force should tampering be attempted by means of an instrument inserted through the discharge opening.

Other objects and advantages will become ap-

parent in the following description and from the accompanying drawing, in which:

Figure 1 is a fragmentary side elevation of a non-refillable bottle including a valve unit involving the principles of the invention.

Fig. 2 is an enlarged fragmentary sectional elevation showing the arrangement of parts of the valve mechanism when the bottle is in a vertical position.

Fig. 3 is an exploded view showing individually the parts constituting the valves, together with the loading spring operative between the valves.

Fig. 4 is a sectional view similar to Fig. 2 but showing the relationship of movable parts when the bottle is tilted for decanting.

Fig. 5 is a transverse sectional view taken substantially along line 5—5 of Fig. 2.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawing and will herein describe in detail, the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

The term "non-refillable bottle" as used herein to designate the invention is not intended to mean a structure that is entirely proof against refilling. Ingenious ways and means may be known or found by the unscrupulous for overcoming the safeguards provided by the invention, but the device is of such a nature as to prevent direct refilling, and to render commercially impractical expedients that may be adapted for the purpose of returning liquid to the bottle past the valve mechanism. This result is attained primarily by preventing the return of any substantial quantity of liquid to the bottle within a time period of considerable duration.

The features of the present invention are embodied in a simple unitary structure capable of being permanently affixed to the neck of a bottle or similar container. To prevent refilling, the structure includes a pair of cooperating valves successively interposed in the path of flow. One valve is gravity acting and by its design has a closed position except when pouring liquid or when the bottle is tipped below a horizontal position. The other valve is urged by a spring or other suitable means to be closed in all positions of the bottle except when fluid is actually passing from the bottle. Moreover, this valve is preferably so constructed and related to its urging means as to utilize the force of a predetermined quantity of fluid in opening the valve, thereby positively preventing the valve from opening once the bottle is empty, yet producing a valve which under normal conditions opens freely.

With reference to the drawing, the invention is embodied in a practical form in a valve unit generally designated 10 in association with a conventional glass bottle 11 having an annular neck 12 of a simple design.

Within the neck 12 is a snugly fitting, uniformly dimensioned, cup-like cylinder 13 having a laterally extending flange 14 resting over the outer end of the neck, a suitable gasket 15 of liquid proof material being interposed between the flange and neck to form a liquid tight joint. Closure means herein shown as a dome 17 converges arcuately outwardly from the flange periphery and toward the bottle neck axis in a pleasing contour to provide a substantial cham-

ber 18, and thereby to complete an enclosure for the internal mechanism of the valve unit. Near the center, the wall of the dome opens outwardly to form a pouring spout 19 which provides a discharge opening communicating with the interior of the bottle. Means such as mutilated screw threads 20 is formed in the pouring spout for securing a screw cap 22 thereover.

Means for connecting the dome in place is herein shown as consisting of a retaining skirt 23 adapted to embrace the adjacent parts of the dome and bottle neck. This skirt 23 herein is preferably a metallic shell which converges inwardly at its outer end and follows the contour of the dome in snug engagement therewith. At its opposite end the skirt 23 extends substantially beyond the inner edge of the dome about the neck 12 and has its end pressed as by a spinning operation into an annular bead 24 which is snugly received in an annular channel or groove 25 in the bottle neck. In order to prevent removal of the skirt, the groove 25 is fashioned to provide a right angular shoulder forming an impassable impediment to any attempt at forcing the skirt from place. Beyond the shoulder, the groove assumes an arcuate contour and the end of the skirt follows this contour, gradually thinning to a feather edge, and remaining entirely within the curvilinear plane of the bottle neck. Insertion of a tool under the bead in an attempt to spread the same is thus rendered exceedingly difficult and even if successful must result in destruction of the skirt. During the operation of pressing the bead into the groove 25, the skirt 23 is drawn tightly against the dome to force the same solidly against the end of the bottle neck. Preferably the dome wall is offset inwardly between its base and the port defined by the pouring spout 19, as at 27, equal to the thickness of the skirt so as to bring the outer surface of the skirt flush with the exposed dome surface. The outer edge of the skirt 23 preferably engages the shoulder in the dome provided by the offset 27, thereby blending into a smooth contour to provide a pleasing outward appearance.

Within the shell or container provided by the cylinder 13 and the dome 17, is a plurality of cooperating sealing valves, herein shown as two in number, which are adapted to permit the ready discharge of liquid from the bottle but are cooperative to restrict the reentry of liquid. One of these valves, indicated generally by the numeral 28 and hereinafter termed the inner valve, is a cylindrically shaped device operating with a reciprocating piston-like movement. Its preferred construction comprises a cup-like sleeve 29 dimensioned for snugly fitting within the cylinder 13 and having a base 30. To facilitate free reciprocal movement of the sleeve 29, spaced longitudinal bearings 31 may be formed on the wall of the cylinder 13, these bearings actually protruding only very slightly from the wall, but appearing exaggerated in Fig. 5 for purposes of illustration.

Supported in concentric fashion by the sleeve 29 is an inwardly facing cup 32 forming the valve proper. Preferably, this cup is of a diameter substantially less than that of the sleeve, and means is provided for securing the sleeve 29 and cup in uniform laterally spaced relation. To this end a spacer, comprising a pair of concentric rings 33 and 34 connected by spaced legs 35, and preferably developed from a single piece of stock metal, is seated within the mouth of the sleeve 29.

29. The inner ring 34 fits snugly about the base of the cup, and for convenience in assembly, the cup base is offset as at 36 to provide a locating shoulder 37 against which the ring 34 abuts. A rabbeted groove 38 is preferably formed adjacent the mouth of the sleeve 29 for snugly receiving and locating the outer spacer ring 33.

The offset cup base portion 36 is formed to extend substantially beyond the ring 34 in order 10 to provide connection for a band or sleeve 39 adapted snugly to fit thereabout. The sleeve extends beyond the base of the cup whereby in effect to provide an outwardly facing cup similar to the cup 32, the base of both cups being 15 common.

An inturned flange 40 at the inner end of the cylinder 13 furnishes a seat for the valve cup 32 which is adapted to form a liquid seal over the opening defined by the flange. Thus, in the 20 non-pouring positions of the bottle the valve cup will prevent a return flow of liquid. In order to insure a thorough sealing relationship, the rim of the cup 32 is slightly flared and finished to develop a lip 42 adapted snugly to coact with 25 a complementary protruding lip 43 formed at the inner edge of the flange 40. It will be observed that while the valve cup 32 provides an effective obstacle to the return flow of liquid, it is so arranged that outflowing liquid will first enter the same before passing on toward the discharge spout 19. In this the seat lip 43 serves a funnel-like purpose. Discharging liquid thus acts upon the inner valve in a direction which forces it into open position.

35. When open, the inner valve unit 28 affords a uniform discharge passage of substantial flow area. This is accomplished by the lateral spacing between the parallel cup, cylinder and sleeve walls and by reserving a substantially spaced 40 relation between the sleeve and base 30 and the outer edge of the cup sleeve 39. Flow of liquid from the interior of the inner valve unit is through a centrally formed aperture 44 in the base 30, this aperture being coaxial with and of 45 a diameter preferably slightly less than that of the sleeve 39. Thus, a return flow of liquid will be directed through the aperture 44 first into the outwardly facing cup whereby to impress a force against the cup base tending to 50 move the valve unit back into sealing position. Desirably the cup sleeve edge may be slightly flared as at 45 to facilitate reception of the return-flow liquid. A quantity of this liquid may be entrapped within the outwardly facing cup 55 and by its weight bearing upon the cup 32 will serve to improve the liquid-tight relationship of the sealing lips 42 and 43.

Between the inner valve 28 and the pouring spout 19, is a second valve 46, hereinafter designated the outer valve. The latter is preferably fashioned as a slightly arcuate disk to provide an eccentric weight distribution and is disposed with its convex face toward the inner valve. Means providing a seat for the valve 60 46 and arranged to define within given limits its path of movement away from the seat surrounds the outer valve and is supported upon the cylinder flange 14. In the present instance this means comprises a housing 47 shown as 65 including a rim 48 and a disk 49 connected in spaced parallel relation by a plurality of thin substantially spaced legs 50. The rim 48 is provided with an annular offset 52 adjacent its inner periphery adapted to receive snugly a thin, flat axially apertured retaining disk appearing

as a ring or washer 53 which provides a seat for the valve 46. As will be seen in Fig. 2, the outer edge of the rim 48 is turned up slightly as at 54 to form an annular bearing adapted for engagement with the wall of the dome 11. 5 In order to facilitate assembly, the offset portion 27 of the dome may be fashioned to provide a shoulder 55 defining the assembled position of the rim within the dome. At its edge, the dome wall may be turned over as by a spinning operation to form a clamping flange 57 for permanently securing the cylinder flange 14 tightly 10 against the inner face of the valve seat ring 53, thereby forcing the housing rim bearing 54 into firm engagement with the shoulder 55 and joining the assembly into a complete unit. 15

In diameter the outer valve is preferably such as to maintain only a slight clearance between its edge and the housing legs 50; so that as the bottle is tilted for pouring, the valve disk will 20 shift only slightly on its seat. This slight shifting, however, is sufficient to carry the lower edge of the valve disk forwardly to an extent which together with the eccentric inward disposition of the weight center of the disk mass will cause 25 the valve to retain its seat until the bottle has been tilted to carry the discharge end below a horizontal plane, whereupon the valve will come to rest against the outer housing disk 49. In order to prevent possible adhesion of the outer 30 valve disk against the housing disk, inwardly pressed spacer grooves 58 are formed in the disk 49.

Moreover, the housing 47 may be fashioned as one piece through the medium of a spinning 35 operation, and the disk 49 and the legs 50 will thus be relatively thin and fragile so that if it is attempted to drill through the housing disk 49, the legs will collapse upon the application of any amount of pressure, thereby causing the housing 40 to collapse and to lock the valve 46 in place. In the event that a drill should be passed through the disk 49 into engagement with the outer valve disk, the latter will simply rotate under the force of the drill, the contacting faces being smooth 45 and there being no projections to prevent such rotary movement. Furthermore, the housing disk and supporting legs are designed to be physically deranged to prevent opening of the outer valve upon the application of force by tampering 50 instruments of any other nature inserted through the discharge spout. Thus, attempts to by-pass the outer valve by instrumental means in order to return liquid to the bottle will be effectually 55 prevented.

In the present instance, the inner valve 28 is suitably loaded by means adapted to insure a normally sealed relationship of the valve except when pouring liquid from the bottle. To this end the valve is loaded by a spring 60 which is interposed between the sleeve base 30 and the inner face of the retaining ring disk 53. This spring may be formed as a ring seating on the sleeve base and having a plurality of resilient helical fingers 62 bearing against the ring disk 53. In tension the spring is such that the weight of the inner valve 28 is of itself insufficient to compress the spring; and regardless of the position of the bottle, the valve will be maintained 60 seated except when a predetermined quantity of liquid, generally indicated in Fig. 4 by the numeral 65, has been trapped in the cup 32. The weight of this liquid together with the weight of the cup will be sufficient to overcome the tension of 70 75

the spring, compress the same and unseat the valve.

From a practical standpoint, the valve mechanism of this invention lends itself peculiarly well to mass production methods of manufacture. Each component part may be fashioned accurately in quantity according to a standard pattern from metal stock, as by stamping, spinning, or other suitable commercial process. Assembly of the parts into complete compact units ready for affixing to filled bottles may be accomplished with great rapidity and a minimum of operations on an assembly line. Thus, referring to Fig. 3, in assembling the inner valve structure the cup base 36 is fitted into the spacer ring 34, the sleeve 39 slipped over the projecting cup base, and the outer spacer ring then fitted into the rabbeted groove 38 in the reciprocatory sleeve. The assembled inner valve 28 is then dropped into the cylinder 13, and the spring 60 placed on the sleeve base 30. By a simply and speedily executed action the outer valve 46 is placed within the cage housing 47, the disk ring 53 secured in the groove 52 and the housing fitted into the grooved wall of the dome 17. Finally, the dome is placed over the cylinder flange 14, the clamping flange 57 turned in to secure the parts together, and the gasket 15 slipped into place. Thereafter, all that the bottler need do to complete the bottle assembly is to associate the unit with a filled bottle, place the retaining skirt 23 and spin the bead 24.

In pouring liquid from the bottle, it will be tilted until the outer valve 46 is overbalanced and leaves its seat. Simultaneously, the predetermined quantity of liquid 65 will enter the cup 32 until the combined weight of valve and liquid overcomes the tension of the loading spring 60, whereupon the inner valve slides to the open position as shown in Fig. 4. A flow path of undiminished effective flow area thus is opened through the valve assembly, the liquid passing through the aperture defined by the seat 43 past the cup 32, between the rings 33 and 34 of the spacer, between the walls of the sleeve 29 and the sleeve 39, through the concentrically arranged aperture 44 and disk ring 53, and past the outer valve 46 through the housing 47 into the chamber 18 from which the liquid will issue through the pouring spout 19.

As soon as the bottle is returned to a horizontal position, the outer valve 46 will resume its seat, and the liquid 65 will escape from the cup 32 so that the spring 60 will again become effective to force the inner valve into sealing relationship with the seat 43. Movement of the bottle towards the non-pouring position also causes any returning liquid to be directed through the base aperture 44 into the outwardly facing inner valve cup, further aiding in seating the inner valve.

Insertion of an instrument toward the interior of the valve unit for disrupting the proper seating of the valves is prevented by the arrangement of the housing disk 49 relative to the discharge opening afforded by the spout 19. Furthermore, the housing structure 47 is such as to prevent attempts at tampering with instruments. Due to the cooperative relationship of the valves, and the spring loaded characteristics of the inner valve in particular, any attempt to return liquid in quantity by submergence of the bottle will be prevented. Moreover, by reason of the outwardly facing inner valve cup into which an inflowing stream is directed, attempts

to refill the bottle by vacuum or force are frustrated.

It will thus be evident that the invention provides a small, neat, non-refillable valve structure of few and simple parts efficiently and compactly arranged for economical manufacture and assembly; adapted to be formed as a self-contained unit which may be quickly and permanently secured to the bottle; and embodying a plurality of coacting valves one of which is not only loaded to normally maintain the same sealed, except when pouring, but is also adapted to receive functional aid from the liquid passing through the mechanism. Manifestly, once the liquid is exhausted from the bottle, the loaded valve will effectively prevent attempts at refilling.

Reference is made to my copending application Serial No. 23,440, filed June 1, 1938, which contains claims generic to the present case.

I claim as my invention:

1. In combination in a non-refillable bottle having a neck, a unitary valve structure including a discharge passage of undiminished effective flow area from the interior of the bottle outwardly including a cup-shaped cylinder adapted to fit within said neck and providing a valve seat; a reciprocable inner valve within said cylinder including a member slidably engaging the cylinder wall and rigidly supporting oppositely facing cups of a diameter designed to permit unimpeded liquid flow through said member, one of said cups facing toward the interior of the bottle and adapted for sealing engagement with said valve seat, whereby liquid will be entrapped in said cup when the bottle is moved into pouring position, the other cup being adapted to entrap liquid returning along said flow passage; an outstanding lateral flange on the outer end of said cylinder adapted to overlie the end of said neck; means providing a valve housing having a portion in engagement with said flange and including a valve seat and spaced protective disk; an outer valve within said housing having an eccentric center of mass movable by gravity to a closed position when the bottle is tilted with the neck above a horizontal level; a closure dome surrounding said housing and lateral flange and adapted for connecting the mechanism into a unit; means for connecting said unit to said neck; and resilient means disposed for normally urging said inner valve toward sealing position and exerting a force which resists the weight of the valve alone but is overcome by the added weight of a predetermined quantity of liquid entrapped in said one cup.

2. In combination in a non-refillable bottle valve mechanism adapted to be assembled as a unit and then permanently united with a bottle, a cup-shaped cylinder having a lateral annular flange, a closure dome fitting around said cylinder flange and having a pouring spout, an inner reciprocable valve within said cylinder, a gravity actuated outer valve, means within said dome providing a housing for said outer valve and abutting said cylinder flange, an inturned clamping flange on the edge of said dome adapted to clamp said cylinder flange against said housing whereby to secure the parts into a permanent unit, and means for uniting the unit with a bottle.

3. A non-refillable bottle comprising, in combination, a unitary valve structure embodying a discharge opening, an outer valve, support means for said outer valve to position the latter adja-

cent to said discharge opening, a reciprocable inner valve including a cup-shaped member with the open face thereof directed inwardly, means forming a part of the structure including a valve seat and supporting said inner valve for reciprocal movement, and spring means for normally urging said inner valve against its seat, said spring means having a tension adapted to be overcome by the combined weight of said inner valve and the weight of a predetermined quantity of liquid entrapped in said cup-shaped member for opening said inner valve when pouring liquid from the bottle,

4. A non-refillable bottle closure comprising, in combination, a valve structure embodying a reciprocable valve including a sleeve providing a liquid passage, means including a valve seat for supporting said valve in the upright position of the bottle, means within said sleeve forming a receptacle for a limited quantity of liquid for urging said valve to open position when the bottle is tilted for decanting, and resilient means cooperative with said sleeve for positively urging the valve into sealing relation with said seat in the non-pouring positions of the bottle.

5. In combination in a non-refillable bottle, a unitary valve structure including a discharge opening and providing a discharge passage of undiminished effective flow area from the interior of the bottle outwardly, said valve structure including a reciprocable valve in said passage embodying a pair of receptacles one of which is adapted to receive a predetermined quantity of liquid when the bottle is tilted for pouring whereby the combined weight of the valve augmented by the liquid mass will move said valve from sealing to open position, the other receptacle being adapted to receive the force of liquid returning along said discharge passage whereby said valve is returned positively to sealing position, and means providing a seat for said valve.

6. In combination in a non-refillable bottle valve mechanism, cylindrical means providing a valve seat, a reciprocable valve within said cylindrical means comprising a part slidably engaging said means, a pair of interfitting elements providing oppositely facing cups, one of said cups engaging said valve seat in sealing relation and spacing means rigidly connecting said elements in substantially spaced relation with said part thus forming a permanent liquid passage between the said part and elements.

7. In combination with a non-refillable bottle, unitary valve mechanism including a discharge opening and providing a valve controlled discharge passage for liquid, a reciprocable valve structure forming part of said mechanism and including a cup-shaped inwardly facing member having a liquid passage therethrough, a liquid flow-impression element secured in spaced relation to the wall of said member near its mouth but arranged to permit unrestricted discharge liquid flow through said passage, and means for directing flowing liquid against said element, whereby the force of said liquid will act to cause movement of said valve structure in the direction of liquid flow.

8. In combination in a non-refillable bottle valve mechanism, means providing an enclosure adapted for permanent connection with a bottle, an annular centrally apertured member having a rim in fixed engagement with said enclosure and including a disk concentrically arranged in outwardly offset relation to said rim, integrally fashioned spaced legs connecting said rim and

disk to form a housing, an eccentric mass valve of a diameter allowing a slight clearance between the valve edge and said legs adapting the valve for free reciprocal movement within said housing, and a disk ring interfitting with said rim providing a seat for said valve.

9. In combination in a non-refillable bottle valve mechanism, an enclosure providing a discharge opening, a valve structure adjacent said opening including a valve member proper, and a metallic housing for said valve member embodying a liquid flow passageway and means between said valve member and said opening designed to prevent the insertion of tampering instruments toward said valve member, said means being of a relatively fragile character so as to move inwardly into engagement with the valve member to prevent opening of said valve member upon the application of instrumental force.

10. In combination in a non-refillable bottle valve mechanism including an enclosure providing a discharge opening, a movable valve member adjacent said opening, and a housing surrounding said valve member providing a valve seat and means including a thin imperforate element and relatively weak supporting means laterally adjacent the valve member and capable of being physically distorted into a position to bind said valve member closed upon the application of force through the medium of a tampering instrument inserted through said opening.

11. In combination in a non-refillable bottle valve mechanism adapted to be assembled as a unit and thereafter permanently united with a bottle; a cylinder adapted to fit within a bottle neck and having an annular lateral flange arranged to lie adjacent the outer edge of said neck after the device has been united with the bottle; an inner valve mounted in said cylinder for reciprocating movement; said cylinder having an apertured base providing a seat for said inner valve; an outer valve assembly adapted to be secured in overlying relation to said lateral flange of the cylinder, said assembly including a centrally apertured disk providing a valve seat; a gravity actuated valve cooperative with said seat; a valve confining cage in fixed position over said gravity valve for limiting lateral and outward movement of the valve relative to its seat; an outer closure having spaced shoulders defining an inwardly facing channel to bindingly receive the marginal portions of said annular flange and said outer valve assembly and thereby provide a fixed permanently assembled unit; and means adapted to encircle the end of the bottle neck for attaching the valve assembly unit to said neck; the whole mechanism forming a self-contained, compact unit that may be affixed to the bottle by a simple operation after the bottle has been filled.

12. A closure for a bottle or like container comprising an assembly adapted to be associated with the neck of the container and to be permanently affixed thereto, said assembly comprising a sectional casing including an inner section having a lateral flange adapted to overlie the outer edge of the neck and an outer section including a part extending circumferentially about said flange, said part being spun to provide opposed shoulders between which the margins of said flange are bound into fixed engagement with said part to unite said sections permanently in operative relation, and means engageable with an exterior part of the container for permanently affixing the closure to the container.

13. In combination in a device providing a closure for a bottle having a neck, a non-refillable valve unit adapted to fill the mouth of said neck and to be rigidly secured thereto, comprising a cup-shaped member having a laterally extending rim overlying the outer edge of said neck, a valve, means providing a seat for said valve and including a part for overlying abutment with said rim, a slideable valve within said cup-shaped member, a wall on the inner end of said cup-shaped member having an aperture providing a seat for said last mentioned valve, a dome enclosure about said first mentioned valve including a base of substantially the same diameter as said neck and providing an axial pouring spout of reduced diameter with a wall of the enclosure converging uniformly toward the spout, and a retaining skirt including an inwardly extending rim of substantial width in engagement with said dome between the base and spout and having a downwardly extending portion in securing engagement with said bottle neck to anchor said unit to said neck, said inwardly extending rim bearing with uniform pressure upon said dome to force the same toward the mouth of said neck.

14. In combination in a non-refillable closure assembly for a bottle or the like, a cylindrical member having an apertured base on its inner end providing a valve seat, a laterally extending flange about the outer end of said member adapted to overlie a bottle neck, an annular member having a rim in engagement with said flange and being maintained in position by such engagement, a sheet metal enclosure over said annular member and providing a pouring spout, said enclosure having an outwardly protruding annular portion comprising a shouldered groove which in the assembly of the device is permanently and inseparably secured in engagement with said rim and flange to unite the assembly into an inseparable unit, and means for securing said enclosure to the bottle neck including a metallic part extending from said enclosure and adapted to be pressed inwardly into the curvilinear plane of the neck to provide a permanent attachment.

15. In a non-refillable bottle valve mechanism, the combination of a cylindrical container adapted to fit within a bottle neck and having a base wall at its inner end, means providing an enclosure having a pouring spout and adapted to extend beyond the bottle neck, means for connecting said enclosure to said container, and valve means including a reciprocal valve within said cylinder, said reciprocal valve comprising an inwardly facing cup-shaped member having its edge slightly flared and finished to provide a lip, and said container having an aperture in its base wall provided with a complementary protruding lip defining said aperture and interfitting closely with said flared lip, said valve being movable to separate said lips upon the discharge of liquid and at all other times maintaining a liquid sealing relationship between said lips to prevent a return flow of liquid into the bottle.

16. A non-refillable bottle valve mechanism, comprising, in combination, a cylindrical container including a transverse inner wall having an aperture, the margin of said wall defining said aperture being flared outwardly and providing a lip, a reciprocal valve embodying means coacting slidably with the inner wall of said container and having an inwardly opening cup-shaped member dimensioned to coact in liquid sealing relation with said lip to prevent liquid from flowing past said valve and through said aperture and

being adapted to receive a predetermined quantity of liquid flowing outwardly through said aperture, resilient means in engagement with an outer part of said valve for positively maintaining said cup-shaped member in sealing relation until opposed by the weight of said predetermined quantity of liquid in the cup-shaped member, and means near the outer end of the container providing a fixed abutment for said resilient means so that the latter will at all times bear against the valve with uniform force.

17. In a self-contained valve mechanism for a non-refillable bottle providing a discharge passage of undiminished effective flow area from the interior of the bottle outwardly, in combination, a reciprocal valve including a supporting part and a pair of interfitting elements secured to said part and providing oppositely facing cups having a common base, said base being formed integrally with one element, and the other element being formed as a cylindrical band encircling said base and extending substantially beyond said base, said one element being adapted to receive the force of liquid flow in one direction through the valve mechanism and the cup formed by said other element being adapted to receive liquid flow passing in the opposite direction through said mechanism.

18. A non-refillable closure for a bottle or like container adapted to be associated with the neck of the bottle and arranged to permit a discharge of liquid from the bottle but to prevent refilling thereof, comprising a sectional casing dimensioned for association with the neck of the bottle and including an outer section having a pouring spout therein and a tubular inner section arranged to fit relatively snugly in the neck of the bottle, an outer valve supported adjacent the outer end of said neck and adapted to be displaced by gravity when said bottle is tilted, said inner section having an apertured inner end wall defining a valve port, and an inner valve member including a tubular part having a closely interfitting slideable relation with the inner wall of said tubular section and carrying an outwardly opening cup-shaped part in spaced relation thereto providing a fluid passage therebetween and adapted for seating relation with said apertured inner end wall to prevent a return flow of liquid therethrough, said tubular part including an outer wall having an aperture defining a liquid discharge passage from the valve member and being adapted to direct a return flow of liquid into said cup-shaped part for urging the latter into seating relation with said inner end wall.

19. A non-refillable closure for a bottle or like container adapted to be associated with the neck of the bottle and arranged to permit a discharge of liquid from the bottle but to prevent refilling thereof, comprising a sectional sheet metal casing dimensioned for association with the neck of the bottle and including an outer section having a pouring spout therein and a tubular inner section arranged to fit relatively snugly in the neck of the bottle, an outer valve supported adjacent the outer end of said neck and adapted to be displaced by gravity when said bottle is tilted, said inner section having an apertured inner end wall defining a valve port, and an inner valve member including a tubular part having a closely interfitting slideable relation with the inner wall of said tubular section and carrying an outwardly facing impression receiving means in spaced relation to the wall thereof to permit liquid flow therebetween and adapted for seating relation with said apertured inner end wall to prevent a return flow

of liquid therethrough, said tubular part including an outer wall having an aperture defining a liquid discharge passage from the valve member and being adapted to direct a return flow of liquid 5 against said impression receiving means for urging the inner valve into seating relation with said inner end wall, each of said parts being made of sheet metal similarly as said casing so as to maintain the same within close limits of tolerance.

10 20. In a self-contained valve mechanism for a non-refillable liquid container, the combination of a cylindrical container adapted to fit closely within the discharge opening of the liquid container and having an apertured wall closing its 15 inner end affording a discharge flow passage, means for securing said cylindrical container permanently in position, a reciprocal valve assembly including a cylindrical element slidably engaging the walls of said cylindrical container 20 with ample clearance for free movement but insufficient for liquid flow therebetween, and an annular member fixedly supported by said cylindrical element adapted to coact with said apertured container wall in the non-pouring position 25 of the container for preventing a return flow of liquid, said annular member being dimensioned relative to said cylindrical element to provide a flow passage through the latter of an area at least as large as the discharge flow passage 30 through said apertured wall.

35 21. The combination in a non-refillable closure for a bottle or the like including a neck providing a discharge opening, of a valve unit embodying inner and outer valve members cooperative for restraining the flow of liquid into the bottle but permitting free discharge of liquid therefrom, the inner of said valve members including a cylindrical part substantially closed at its outer end and having a central aperture, a seating valve 40 portion supported within the confines of said cylindrical part in such spaced relation that liquid may flow unimpeded between the same from the interior of the bottle toward said outer valve member, said valve members together affording passageways of fixed dimensional relationships adapted to direct the liquid in a path toward and away from the axis of the unit and providing an undiminished effective flow area 45 through the unit from the inner end outwardly.

50 22. In combustion in a non-refillable bottle valve mechanism adapted to fit within a bottle neck embodying a cylinder having means forming a valve seat and providing a passage for liquid through said neck, means including a reciprocal 55 valve fitting said seat and having a cylindrical surface in slidable relation to the inner surface of said cylinder, and elongated narrow portions on one of said surfaces adapted to maintain a spaced relationship between said surfaces insufficient to allow fluid to flow therebetween but ample to prevent frictional binding or liquid-adhesion between the parts.

55 23. In a device to be secured over the outlet of a container for insuring the originality of the contents, the combination of an assembly including a tubular guide member, a tubular valve element reciprocal in said member, said element being of substantially the same diameter as the internal diameter of said member but having its 60 outer surface in slidable relation to the inner surface of said member, and spacers at intervals on one of said surfaces adapted to maintain a spaced relation between said surfaces insufficient to allow fluid to flow therebetween but ample to prevent frictional binding or liquid-adhe-

sion between the parts, whereby the free relative slidability of said member and element is assured.

24. In combination in a non-refillable bottle valve mechanism, an assembly including a tubular guide member, a tubular valve element reciprocable in said member and providing a flow passage therethrough, said element being of substantially the same exterior diameter as the internal diameter of said member but providing a slight clearance therebetween insufficient to 10 allow fluid to flow therebetween whereby to cause flow through said member, and spacers at intervals on the internal wall of said member adapted to maintain the spaced relation of the member and element to prevent frictional binding or 15 liquid adhesion therebetween.

25. A device permanently attachable over the discharge opening of a container for assuring to the ultimate purchaser the original and unadulterated character of the contents of the container comprising, in combination, an inner metallic shell having engageable means on its outer end to extend radially substantially beyond said discharge opening and overlie the portion of the container defining said opening, an outer metallic 25 shell having a discharge opening at one end, means permanently and inseparably interconnecting said engageable means and the said outer shell at a point remote from said discharge opening to secure said shells into a unit transportable 30 and manipulable after assembly and before attachment to the container, and means engageable with the container for permanently and inseparably attaching the unit to the container.

35 26. In an attachment for preserving the purity and originality of the contents of a container, the combination of a cup-shaped member adapted to fit within the discharge opening of the container and having a lateral flange, means partially enclosing the mouth of said member and including 40 a part coacting with said flange, an outer shell surrounding said flange and having a portion of the wall thereof deformed out of the normal plane of the shell and in permanent engagement with said flange and said part and uniting the 45 entire assembly into a unit all elements of which are inseparable, and means for securing the unit in operative relation upon the container.

50 27. In a device adapted to be associated with a container for insuring the genuine character of the contents, the combination of a casing including a discharge opening and providing a discharge passage for liquid, unitary valve mechanism in said passage, a reciprocal valve structure forming part of said mechanism and including a member having a liquid passage therethrough, a liquid flow-responsive element secured in spaced relation to the wall of said member near its mouth but arranged to permit unrestricted discharge liquid flow through said liquid 60 passage, and means for directing flowing liquid against said element, whereby the force of said liquid will act to cause movement of said valve structure in the direction of liquid flow.

65 28. In a device adapted to be attached to the outlet of a container for preventing reentry of material into the container, a cylindrical cup-shaped member including an inner wall having an aperture and arranged to be secured in sealing relation to said outlet so as to require discharge of material from the container through said aperture, an apertured annular element secured over the mouth of said member through which material passing from the container into said member must pass toward exit from the 70 75

device, valve means including a part in slidable engagement with the inner wall of said member and an annular valve element coacting with said aperture to prevent return flow of material 5 through said aperture into the container, said valve element being carried by said part and being dimensioned to provide substantial passage for material therewith through said valve means, and resilient means coacting with said 10 valve means and said annular element to maintain said valve element normally in sealing relation to said aperture and being operable to permit unseating of said valve element only when opposed by material passing through said aperture 15 and bearing outwardly against said valve element.

29. A device of the character described comprising, in combination, a cup-shaped member adapted to fit within the outlet of a container and to be secured in sealing relation to the container, said member including a wall across its inner end having an axial aperture therein, a tubular element slidably engaging the inner wall of said member and having a flow-responsive element secured in spaced relation to the walls 20 of said tubular element near its mouth and arranged to permit unrestricted discharge of material through said tubular element but coacting with said aperture to prevent return of material into the container, an axially apertured abutment 25 member fixedly secured across the mouth of said cup-shaped member, and an annular spring element coacting with said tubular element for normally maintaining said valve in sealing relation to said aperture and abutting said abutment 30 member adjacent the periphery of said aperture, said spring element permitting free passage of material therethrough from said container through said aperture toward exit from the device.

40. 30. In a valve mechanism for a non-refillable liquid container, the combination of a cylindrical container adapted to fit closely within the discharge opening of the liquid container and having an apertured wall closing its inner end after 45 forming a discharge flow passage and means providing an outlet at its opposite end, means for securing said cylindrical container permanently in position, a reciprocal valve assembly including a cylindrical element slidably engaging the wall 50 of said cylindrical container with ample clearance for free movement but insufficient for liquid flow therebetween, an annular member fixedly supported by said cylindrical element adapted to coact with said apertured container wall in the 55 non-pouring position of the container for preventing a return flow of liquid, said annular member being dimensioned relative to said cylindrical element to provide a flow passage through the latter of an area at least as large as the discharge flow passage through said apertured wall, fixed means spaced from said apertured wall 60 serving to limit outward movement of said cylindrical element, and means interposed between said fixed means and said outlet to prevent the 65 passage of a tampering instrumentality to said cylindrical element.

31. In combination in closure means for a liquid container, valve mechanism adapted to be secured in liquid sealing relation to the discharge 70 opening of the container and including an outlet,

a transversely arranged and axially apertured valve seat between the interior of the container and said outlet, a valve member having axially spaced inner and outer walls and means for maintaining said walls in spaced relation including a surrounding cylindrical part, the outer of said walls having an axial opening and the inner of said walls having an imperforate portion of sufficient diameter to enter into sealing relation with the aperture in said valve seat but providing a passage for liquid longitudinally outwardly through the interior of said cylindrical part and through said axial opening when said imperforate portion is moved out of the sealing relation with said valve seat by movement of the valve mechanism into liquid discharging position, and means interposed between the valve mechanism and said outlet to prevent access through the latter to the mechanism.

32. In a non-return device of the character described, described, in combination, means providing a flow passage, axially ported means within said enclosure providing a valve seat, a reciprocable flow controlling valve structure coactive with said valve seat to permit flow through said ported means in one direction only, said valve structure including a ported-base cup-shaped cylindrical guide element facing toward said valve seat and a valve member fixedly carried by said guide element to coact with said seat, said valve member being proportioned to provide passage thereby for the flow of material through said guide element and the ported base thereof, and means for limiting the range of movement of said valve structure relative to said valve seat.

33. In combination in a bottle valve structure of the character described, internally cylindrically surfaced means having an inner axially apertured wall arranged to compel outflowing liquid to pass therethrough, means for permitting outflow only through said wall including an annular valve member coactive sealingly with the apertured portion of said wall, a guide sleeve of greater diameter than said valve member slidably coactive with the internal wall of said cylindrically surfaced means for axial movement therein, means for connecting said valve member to said sleeve providing passage thereby for material-flow through said sleeve, ported means limiting unseating movement of said sleeve and valve, means providing a discharge opening outwardly beyond said ported means, and flow controlling means between said discharge opening and said ported means.

34. A closure device for the outlet of a container comprising, in combination, a thin metallic casing having a base of a diameter to encircle said outlet and a discharge port substantially beyond said base and with the body of the casing converging from the base toward the port, a part of the casing being offset inwardly between said base and said port and providing an exterior shoulder, and a metallic shell having one end arranged to be secured permanently to the container and at its opposite end converging toward and coacting with the offset part of the casing in engagement with said shoulder for locating the parts in the permanent assembled relationship thereof.

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