Aug. 2, 1938. C. W. JOHNSON 2,125,791

NONREFILLABLE STOPPER

Filed Dec. 20, 1935 2 Sheets-Sheet 1

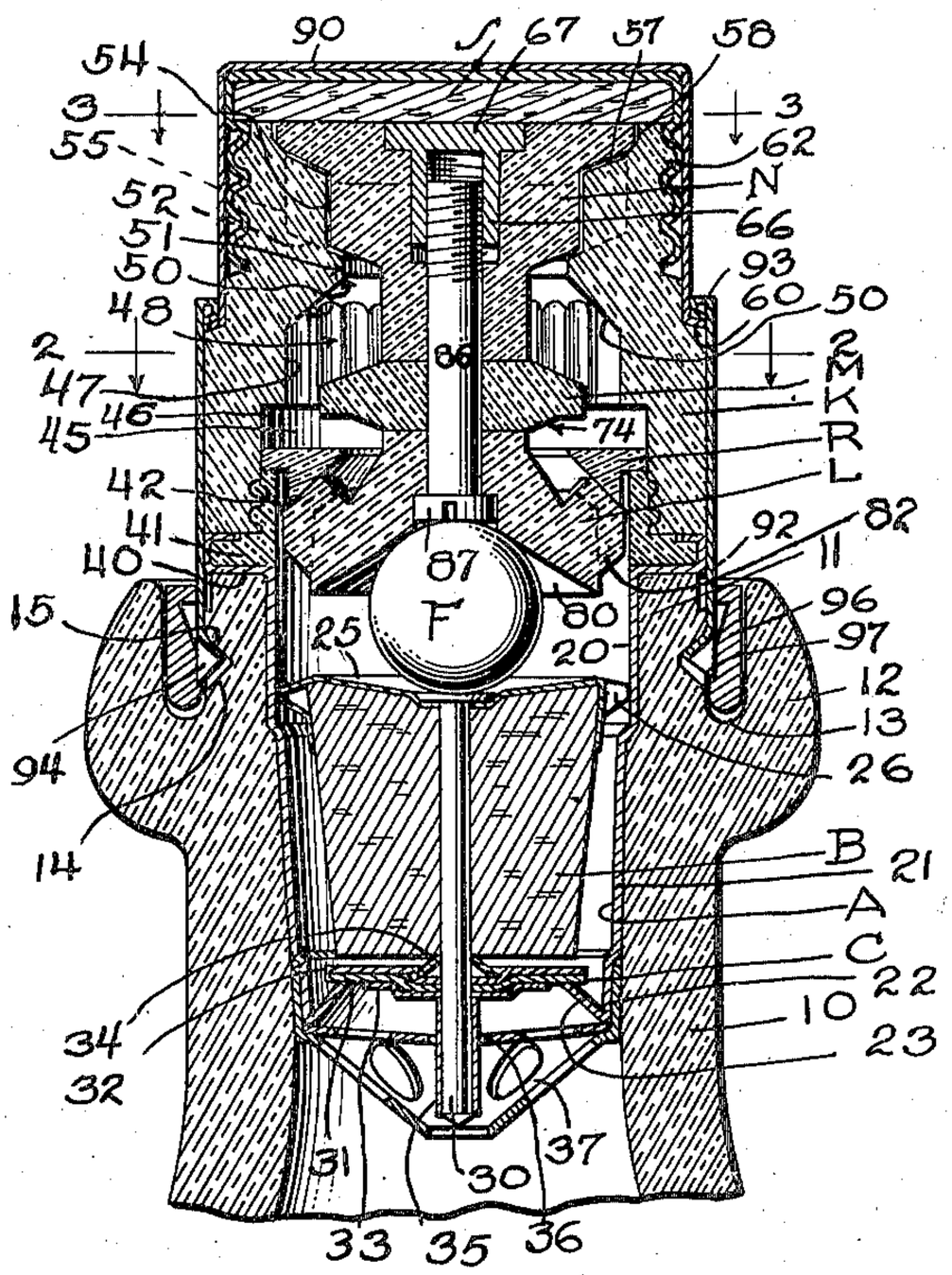


Fig. 1

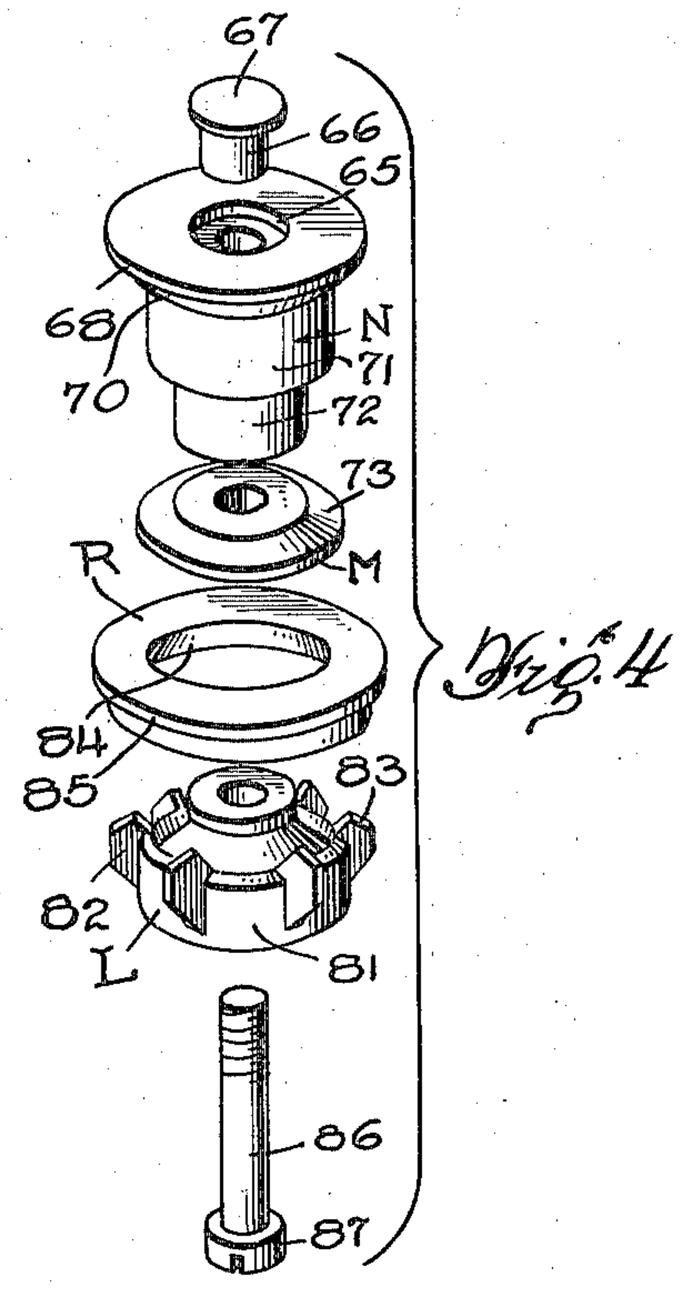


Fig. 4

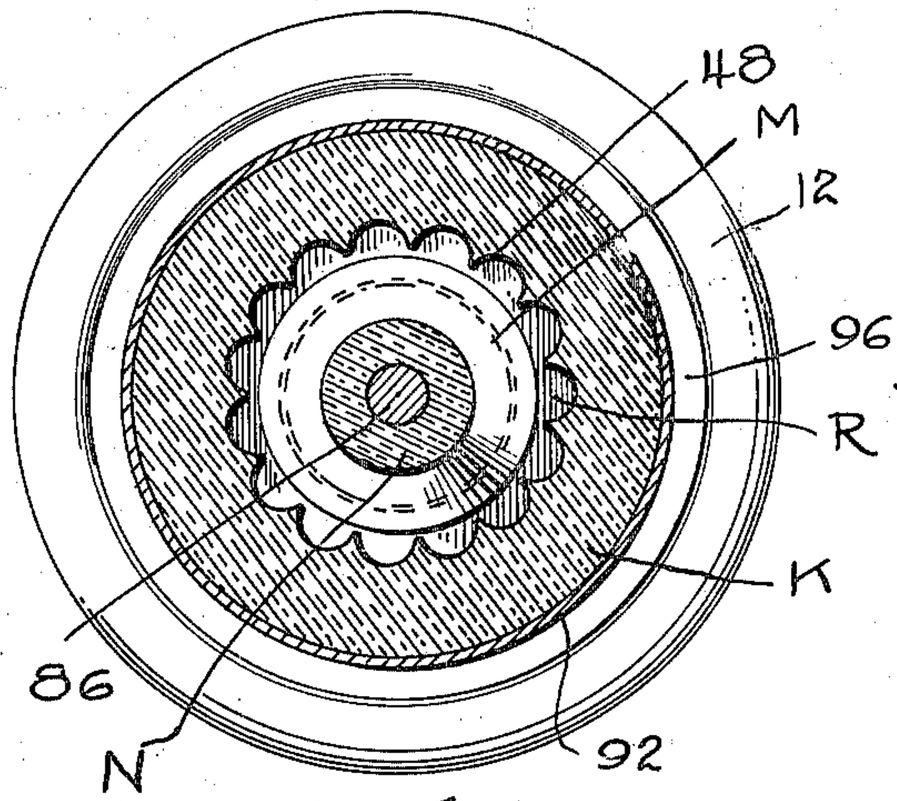


Fig. 2

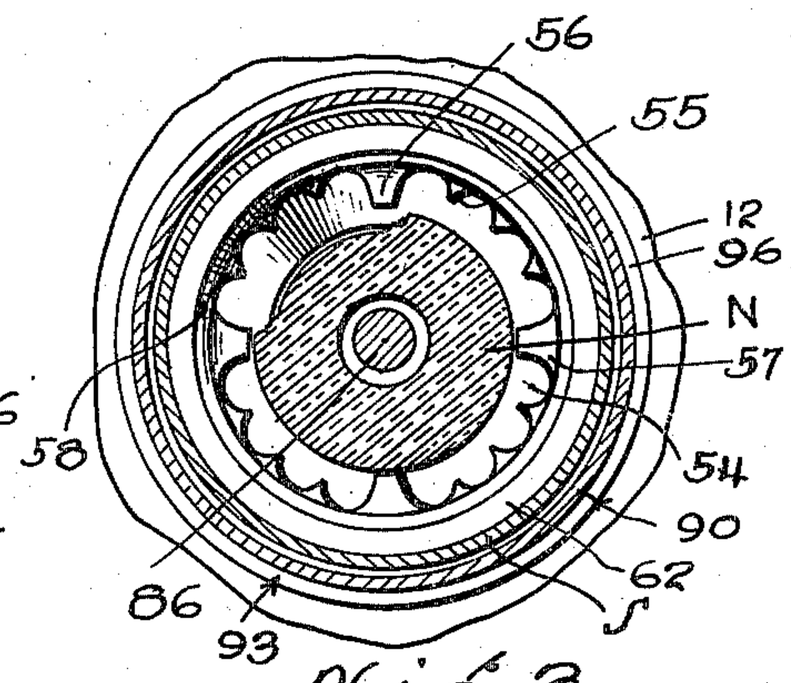


Fig. 3

Inventor

Charles W. Johnson

By Blair Whitemore

Attorneys

Aug. 2, 1938. C. W. JOHNSON 2,125,791

NONREFILLABLE STOPPER

Filed Dec. 20, 1935 2 Sheets-Sheet 2

Fig. 5

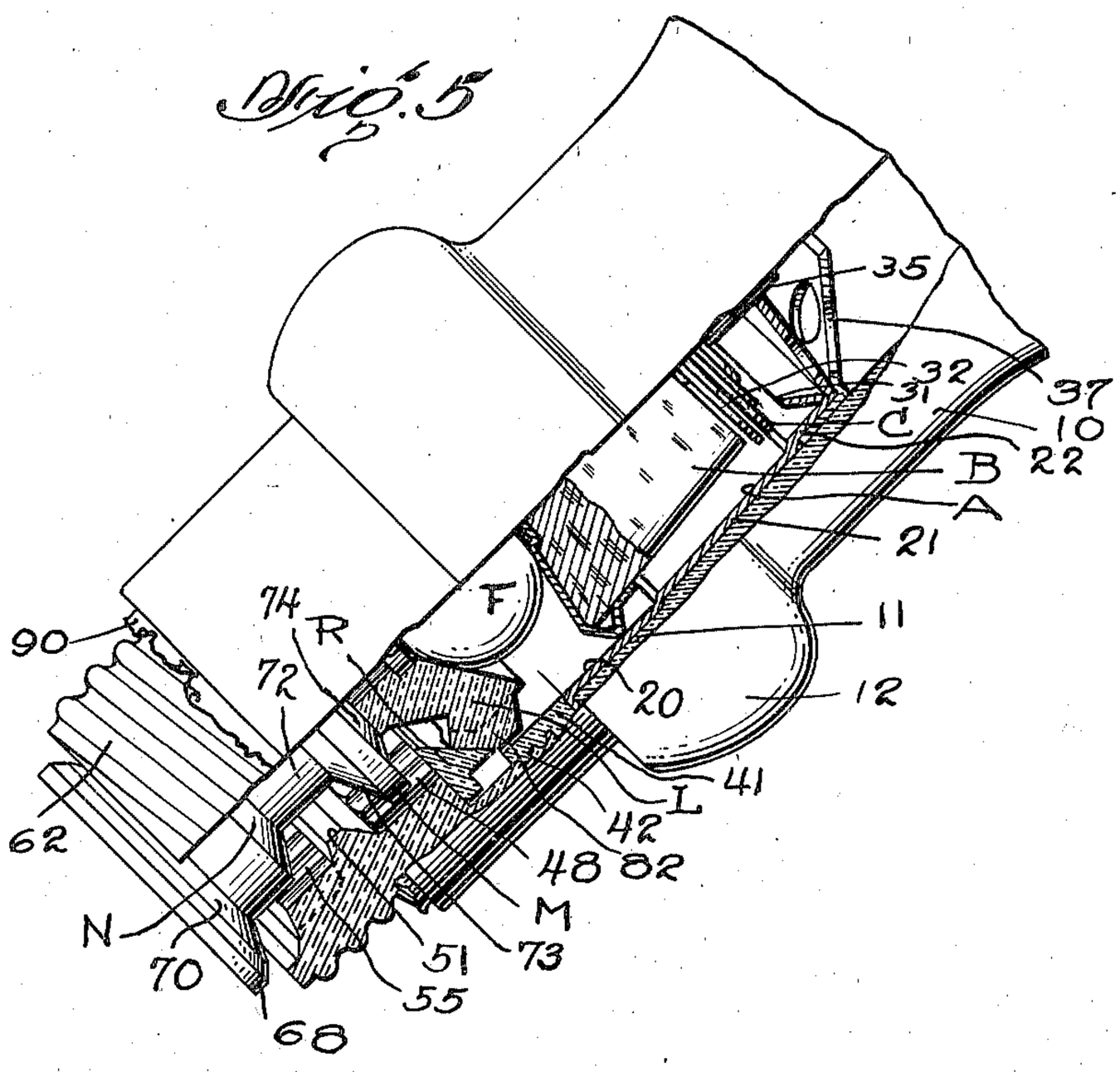
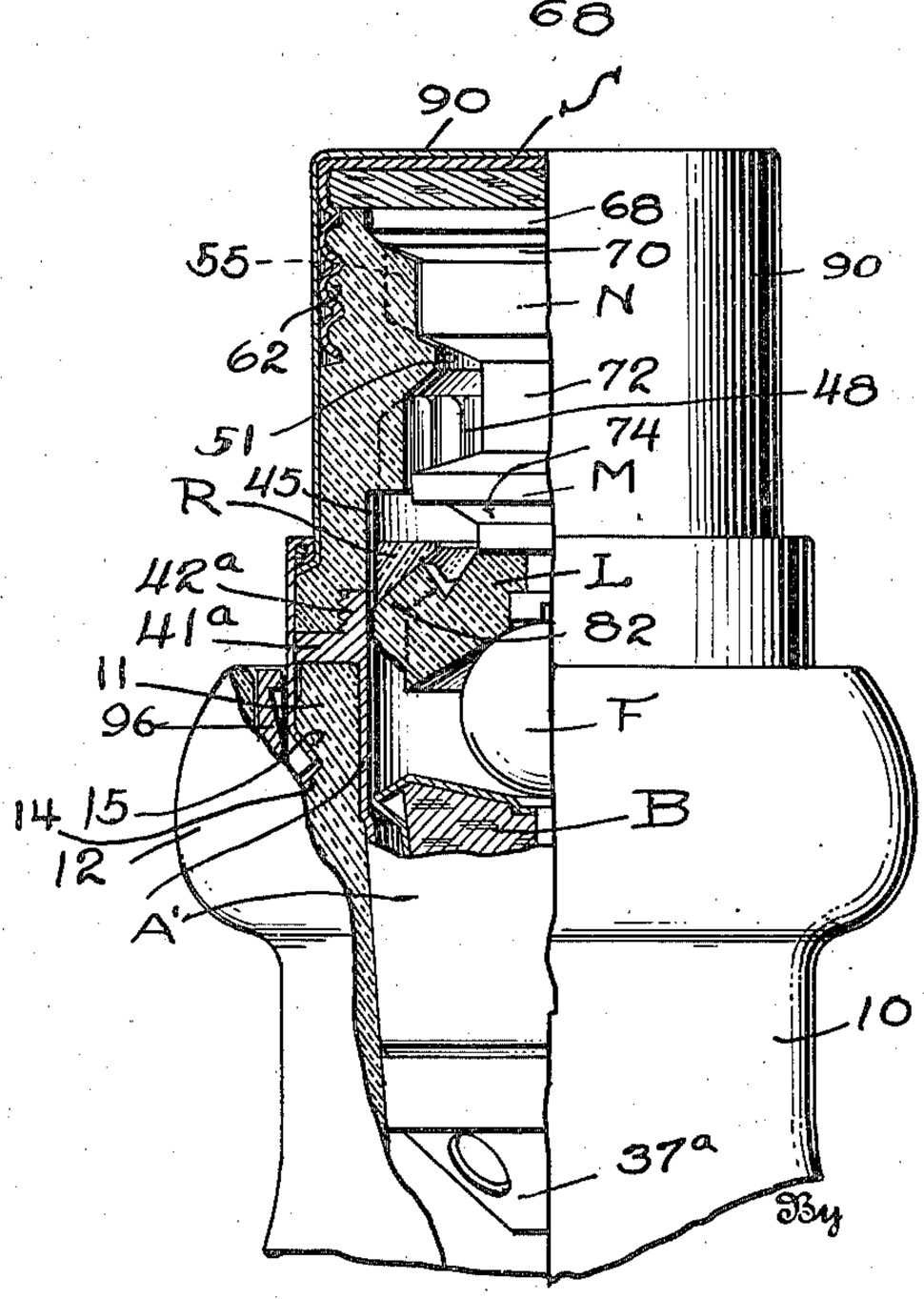


Fig. 6



Inventor
Charles W. Johnson
Blair & Thorpe
Attorneys

Patented Aug. 2, 1938 2,125,791

UNITED STATES PATENT OFFICE

2,125,791

NONREFILLABLE STOPPER

Charles W. Johnson, Uniontown, Pa.

Application December 20, 1935, Serial No. 55,461

16 Claims. (Cl. 215—25)

This invention relates to non-refillable stoppers for bottle and like containers, and more particularly to an improved non-refillable stopper unit for use in a non-refillable bottle assembly such as is disclosed and claimed in my copending application Serial No. 40,137, filed September 11, 1935.

Among the objects of my invention may be noted the provision of an improved stopper unit for association with a bottle for the purpose of rendering the bottle non-refillable; the provision of a stopper of the above described character which permits free flow of liquid therefrom; the provision of an improved non-refillable stopper unit which, when properly related to a bottle and with the bottle capped for shipping, is closed to liquid contained in the bottle, regardless of the position of the bottle; the provision of an improved non-refillable stopper unit which, in ordinary use of the bottle, is automatically closable whereby to prevent evaporation of the liquid contained in the bottle, as well as to prevent the insertion and/or passage of improper matter through the pouring opening of the stopper; the provision of a non-refillable stopper unit having improved features of design and construction; and the provision of an improved bottle, stopper and seal assembly which renders impossible the refilling of the bottle, with the seal preventing reuse of the bottle, thus to insure the originality of the contents of the bottle.

Other objects will be in part obvious from the annexed drawings and in part hereinafter indicated in connection therewith by the following analysis of the invention.

In the drawings:

Fig. 1 is a vertical section through the improved stopper of the present invention operatively related to a bottle, and sealed and capped thereon;

Fig. 2 is a transverse section along lines 2—2 of Fig. 1;

Fig. 3 is a transverse section along lines 3—3 of Fig. 1;

Fig. 4 is a separated view of the automatic closing means associated with the stopper as illustrated in Fig. 1;

Fig. 5 is a view showing the bottle and stopper disposed in pouring position;

Fig. 6 is a view similar to Fig. 1 of a stopper having modified constructional details.

In the following description, the non-refillable stopper unit of the present invention will be described in relation to its use with bottles such as are used to merchandise spiritous liquors, wines, and like goods of the class where it is desirable to insure that the purchaser receive the original contents intended to be purchased. However, the stopper unit has application as a stoppering device for other types of containers such as jars and the like, and all such applications and adaptations are intended to be included within the scope of the present invention.

In the drawings wherein reference characters designate like parts throughout the several views, reference character 10 designates the neck portion of a bottle adapted to deliver its contents through bottle mouth 11. As more fully described and claimed in my copending application Serial No. 737,281, filed July 27, 1934, and in my copending application above referred to, the bottle adjacent its neck 10 is provided with an annular guard flange 12 which extends outwardly from the neck and then upwardly in spaced relation to the exterior neck surface, the flange preferably terminating short of the mouth edge of the bottle. The flange 12 thus forms with the exterior neck surface of the bottle an annular sealing pocket or cup 13 which opens upwardly. In the outer neck surface of the bottle and within the pocket 13 is a circular groove or indentation 14, one face of which forms an undercut shoulder 15 for the purpose to be hereinafter described.

The improved stopper unit of the present invention is adapted for insertion into the bottle neck whereupon it may be sealed against removal therefrom. Such sealing means are disclosed and claimed more fully in my copending applications referred to above, but will be briefly referred to in the following analysis of the present invention.

Referring to the non-refillable stopper unit, such preferably includes a lower cup or casing element A having a bottom inlet passage thereto, the main portion extending into the bottle neck; a float element B operating in the cup A and carrying a valve assembly C in controlling relation to the inlet passage to the cup, a ball or equivalent float weighting device F, a head or top element K, and a combined closure and guard assembly constituted as by a ball track L, a guard disc M, and an automatic top closure element N. The said unit is operatively positioned in the head K as by a retaining ring R.

Referring to the cup element A, such may be fabricated of metal or composition, and has a cylindrical part 20 disposed in the substantially cylindrical mouth portion of the bottle, and a depending tapering portion 21 which extends for

a substantial distance into the bottle neck. The lower portion of the cup element **20** is formed cylindrical as at **22** and is of slightly reduced diameter, the edge portion of the cup being bent inwardly and upwardly as at **23** to form a seating edge about the inlet passage to the cup, and against which the valve assembly C may seat.

The float element B which may be comprised by a mass of cork or like buoyant material is of appreciably lesser diameter than the interior diameter of the cup portion **20** and has its top surface slightly concave and sheathed by a cap **25**, the edge of which is of slightly lesser diameter than the cup portion **20** whereby the float may move freely within the cup, yet is guided therein. The cap **25** along its peripheral edge is suitably cut away or rolled as at **26** to provide serrations so that liquid may flow past the float cap when the bottle is tipped to its pouring position as illustrated in Fig. 5. The float B further carries a stem designated **30** upon which the valve assembly C is carried. As will be understood from my copending application Serial No. 40,137, the valve assembly C is comprised by a rubber valve disc **31** disposed intermediate cupped discs **32** and **33**, respectively, the said discs being rockably related to the stem through the provision of a conical washer **34** and located with respect to the stem by means of a lower holding sleeve **35**. The stem **30** and the sleeve **35** extend through a central opening in an apertured disc **36**, which latter is held to the cup element A by means of an apertured ferrule **37**, the circular flange portion of which extends about the circular reduced end **22** of said cup. The lower portion of the ferrule **37** is in the shape of a truncated cone and extends downwardly about the stem **30** and the sleeve **35** whereby to protect the same during handling of the stopper unit prior to its relation on the bottle, or following removal of the stopper unit from the bottle as by breaking the guard flange **12** thereof. It will be understood that the apertures in the disc **36** and ferrule **37** permit passage of liquid to the main inlet opening to cup A, with the valve disc **31** of the valve assembly C being controllably related to such opening.

The cylindrical portion **20** of the cup terminates in a radial flange or shoulder **40**, which flange is spun or otherwise turned over a meeting flange **41** formed on a collar **42**, the inner diameter of the collar being substantially that of the cylindrical cup portion **20**. As will be apparent from Fig. 1, the exterior surface of the body portion of collar **42** is threaded to engage with interior threads formed in the head K. I propose to make these threads of the "triple" type whereby head K may be assembled on cup A with a simple relative turning operation between such parts.

The head K, formed preferably of porcelain, is provided with a through opening comprised by a bottom cavity **45** of relatively large diameter, the cavity being defined at its upper portion by an abrupt shoulder **46**. Cavity **45** communicates with an upper passage **47**, the wall of which is serrated or otherwise channeled as at **48** to provide fluid passages along said wall. The inner wall surface of the head K thereupon merges inwardly as at **50** to provide a relatively restricted cylindrical opening **51**, from whence the passage wall merges outwardly as at **52** into an upper cavity **54** whose wall is channeled as at **55** to provide fluid passages along said wall. By reference to Fig. 3, spaced, inwardly directed ribs **56** are provided, the relatively inner surfaces of which provide guide surfaces for the closure N to be described. The upper cavity walls adjacent the pouring opening are suitably inclined as at **57** and merge into a cylindrical mouth portion **58**, the surfaces **57** and **58** forming seating surfaces for the closure element N.

Considering the exterior wall surface of the head K, such extends cylindrically from its bottom edge to approximately its mid portion, such cylindrical portion terminating in a shoulder **60**, above which the head is formed cylindrical for a short distance whereupon the remaining upper exterior surface is reduced in diameter and threaded as at **62**.

Considering now the combined closure and guard unit, the top valve or closure element N of porcelain or equivalent material, as more clearly illustrated in Fig. 4, is suitably bored longitudinally and is countersunk as at **65** for the reception of a female nut **66** provided with an enlarged head **67**. The closure is provided with cylindrical and inclined surfaces **68** and **70**, respectively, generally complementary to the surfaces **57** and **58** of the head K and with a cylindrical body portion **71** of diameter such as to clear the guide tongues **56** of the head K while permitting fluid to pass between its cylindrical surface and the channels **55** of the head cavity **54**. The lower portion **72** of the stopper is of reduced diameter and formed cylindrical, with its end surface bearing against the guard disc M, also of porcelain, provided with a through bore. The relatively upper and lower surfaces of the body portion of said disc are formed horizontal and may converge towards each other as at **73**, **74**, the overall diameter of the disc being substantially less than the diameter of the channeled cavity **47** of the head K.

The ball track L, preferably of porcelain, is arranged below the guard disc M and is provided with a conical or inclined under track surface **80** on which the ball or weight F may roll when the bottle is tilted to a position as indicated in Fig. 5. By reference to Fig. 4, the body portion **81** of said track element is cylindrical and is provided with radially projecting teeth **82**, the overall diameter of which is slightly less than the interior diameter of the collar **42** whereby the track element is guided in its relatively axial movement. The relatively top surfaces of the teeth **82** are inclined as at **83**, the inclination being complemental to an inclined under surface **84** of the retaining ring R which is loosely mounted in the cavity **45** of the head K within the limits as defined by the top edge of the collar **42** and the cavity shoulder **46**. The said collar is provided with a through opening and with a rim portion **85**, the under surface of which rests on the top edge of the collar **42** with the bottle in upright position as indicated in Fig. 1.

A holding bolt **86** extends through the central opening of the closure N, the guard disc M, and track element L, and operates to secure such parts together so that they move as a unit, the bolt being provided with a head **87** engaging in a suitable recess formed in the under portion of the track element, the upper threaded end of the bolt engaging in the female nut **67**.

To assemble the stopper parts aforesaid, the float B and valve C carried thereby are first operatively disposed within the cup A. The next operation is to position the guard disc M and retaining ring R within their respective cavities of the head K, whereupon track element L is inserted into the

bottom of the head and the closure element N into the top thereof. Upon proper alignment of the parts, the bolt 86 is projected through openings thereof and screwed into the nut 66 sufficiently so that proper securement is obtained. With the closure and guard assembly so related, it will be seen that the said parts in effect depend as a unit from the inclined surface 57 of the head K with the head in its upright position. The head K is then screwed down on the cup element A, and the stopper thus assembled as a unit. When the stopper is tilted or inverted (see Fig. 5), the closure and guard assembly is suspended from the retaining ring R which engages against cavity shoulder 46. The function of the disc M of the stopper unit is to provide a tortuous path to the stopper interior, and the disc is at all times clear of the interior wall surfaces of head K, so that liquid may flow past said disc.

According to the present invention, I propose to dimension the overall depth of the combined closure and guard assembly in such manner that when the closure N is in its seated relation with respect to the head K as indicated in Fig. 1, such unit, through the medium of the ball F and float B, will operate to seat also the valve disc 31 of the valve assembly C against its seat formed by portion 23 of the cup member. With the parts so related, flow of liquid from the bottle to the interior of the stopper assembly when the bottles are upright is positively prevented. In order to maintain the parts in the aforesaid relation during such times when the bottles are laid in horizontal position, as for example during shipping, I provide a screw cap element S adapted to be threaded on to the head K through the medium of threads 62 previously described. This cap element when screwed home functions to hold the closure N seated, and thus seats the valve C, thereby preventing a charge of liquid from being retained within the stopper prior to its first opening.

Considering now the means for associating the stopper unit above described to a bottle in such manner as to prevent unauthorized removal of the stopper from the bottle, I propose to seal the stopper unit to the bottle by the sealing means and practices described and claimed in my copending applications above referred to, and such will be briefly described.

With the stopper unit inserted into the mouth and neck of the bottle, as illustrated in Fig. 1, and the screw cap S threaded on the head K thereof so as to seat the valve disc 31 of the valve assembly C, whereby to prevent flow of liquid contained in the bottle to the interior of cup or casing A, I place over the so related screw cap and stopper head a foil hood or cap 90 which is formed as to be readily placeable thereover. The depth of the hood 90 is such that its lower edge or skirt portion extends onto the exterior shoulder 60 of the head K. Thereupon a sealing ring or sleeve 92 of inner diameter as to clear the cylindrical portion of the head K is threaded over the stopper head and related foil hood 90. The upper edge of the ring 92 is rolled or beaded inwardly as at 93 to form an inwardly directed shoulder or abutment, and such may be suitably reinforced as by the provision of a strengthening ring within the bead 93. Said ring 92 is of sufficient depth that when the bead 93 bears against shoulder 60 of head K to clamp the edge portion of the foil hood 90 thereagainst, the lower or skirt portion of the ring extends into the sealing pocket 13 of the bottle. The lower edge of the skirt portion is provided with a series of normally outwardly directed edge crimps 94 which extend adjacent the groove 14 within the sealing pocket.

With the parts so related, a locking ring 96 is threaded over the stopper, the inner diameter of which is such as to clear the body portion of the sealing ring 92 and the outer diameter being such as to clear the inner wall surface of the guard flange 12. The said locking ring is now forced into the pocket and, in so doing, engages the edge crimps 94 of the sealing ring to force them inwardly and crimp them permanently beneath the shoulder 15 of the bottle neck surface. The locking ring is provided with an inwardly directed locking bead 97 near its bottom edge and, when such bead clears the edges of the crimps 94, the inherent resiliency of the metal of the crimps causes portions of the crimps to expand or spring outwardly over the bead, thus to lock permanently the locking ring 96 within the pocket.

By the above described arrangement, the stopper unit is not only secured to the bottle but is so sealed to the bottle that it can be removed from the bottle only by breaking the guard flange 12, or by rupturing or destroying sealing ring or sleeve 92, both of said forms of removal being readily discernible. It will be further understood that the bottom edge of the foil hood or cap 90 is also permanently clamped between the ring bead 93 and the shoulder 60 of the stopper head, whereby, upon rupturing or tearing away the main body of the foil hood, the edge thereof remains as in Fig. 5. The arrangement is of course such that once the original foil hood has been removed, the substitution of another hood is impossible.

Referring now to Fig. 5, wherein a bottle and stopper in accordance with the present invention is shown disposed at a pouring angle, the foil hood has been torn away, as illustrated, and the screw cap S has been removed to permit normal use of the bottle. The bottom valve assembly may now function in response to the weight of ball F with the bottle in upright or substantially upright position, or in response to the float B when the bottle is tilted as in Fig. 5. When the bottle is so tilted, it will be seen that the top closure or valve N and associated parts have moved axially of and relatively out of the bottle. Such movement is limited by the ring R which now moves to engage against shoulder 46 of the stopper bead K. The ring R upon being engaged by the teeth surfaces 83 of the track element L thus functions to retain the closure and guard unit in its proper pouring position. In addition to gravity acting on said parts, the weight of ball F also functions to move the closure and guard unit to its pouring position. Thus the float may now move in response to flow of liquid entering the cup or casing A to fully open valve C whereupon the liquid flows past float B, through the passages in track L formed between the teeth 82 and the cylindrical body portion 81 thereof, thence past the disc M through channels 48, thence through the restricted opening 51 of the head, and finally past the seating surfaces 57, 58 to emerge from the stopper opening.

The relation of parts forming the non-refillable stopper unit and their design is such that refilling of the bottle to which the unit is applied is impossible. Liquid cannot be forced under pressure into the bottle through the stopper because such liquid under pressure functions to close valve C through float B. The arrangement of

guard disc and the tortuous paths of liquid flow are such that no instrument, such as a wire or the like, could be forced into the stopper assembly to hold valve C open for forced or other forms of refilling. If drilling through the stopper were attempted, such, if possible, automatically destroys the stopper parts and renders them useless, or renders the attempt so discernible as to be impracticable.

Further, the stopper unit is quick pouring and pours at a lesser angle than previously known stoppers of the non-refillable type. I attribute these characteristics to the fact that the stopper opens with a "rush" when the bottle is brought to its pouring angle and causes the liquid to flow with an initial high velocity, thus breaking any possible vacuum and overcoming the effects of surface or capillary attraction. With the liquid flowing, its flow continues at a relatively high rate due to the unique arrangement of fluid passages of substantial area through the stopper.

Referring to Fig. 5 wherein is shown a stopper and bottle assembly generally similar to that above described, a one-piece cup and collar element A' for use in place of the metal cup element A and the separate collar **42** screwed thereon, as in Figs. 1–5 construction, while the modified cup element may be formed from metal, it is preferably molded from a plastic composition of such nature that it will not be attacked or affected by the contents of the bottle. It will be seen that the collar portions **41***a*, **42***a* of the cup are integral with the cup portion proper, the collar portion being provided with molded exterior threads for engagement with interior threads of the stopper K. The ferrule **37***a* associated with the composition cup A' may also be fabricated from plastic material, although a metal ferrule can also be used.

The above described arrangements are capable of further modification, and it will be understood that all such modifications and their adaptation which fall within the scope of the appended claims are intended to be embraced within the scope of the present invention.

I claim:

1. A non-refillable stopper unit for a bottle or like container, the stopper having an inlet and an outlet, float controlled means operatively related to said inlet for controlling admission of liquid to the stopper from the bottle, a gravity responsive assembly for controlling said stopper outlet, said assembly having a lower end portion whose transverse dimension is greater than that of the intermediate portion thereof, and means carried by said stopper and adapted to engage against the lower end portion of the assembly whereby to limit movement thereof in one direction.

2. A non-refillable stopper unit for a bottle or like container, the stopper having an inlet and an outlet, and a passage between said inlet and outlet, float controlled means operatively related to said inlet for controlling the flow of liquid to the stopper from said bottle, a gravity responsive assembly for controlling said stopper outlet, said assembly having a lower end portion whose transverse dimension is greater than that of the intermediate portion thereof, and means carried by said stopper against which the lower end portion of the assembly is adapted to engage, whereby to limit movement of the assembly in one direction.

3. A non-refillable stopper unit for a bottle or like container, the stopper having an inlet and an outlet, means providing a tortuous passage between said inlet and outlet, float controlled means within the stopper for controlling admission of liquid from the bottle to said passage, and gravity responsive means contained in the stopper for controlling said stopper outlet, said first means including a movable retaining element for said last means.

4. A non-refillable stopper unit for a bottle or like container, the stopper having an inlet and an outlet and a passage extending therebetween, a float contained within the stopper, a valve carried by said float and disposed in controlling relation to said inlet, weighting means coacting with said float and operative normally to actuate said valve into inlet closing position, means normally operative in response to gravity to close said stopper outlet, and means carried by said last means and cooperating with the wall of said passage to prevent access to the float and valve carried thereby.

5. A non-refillable stopper unit for a bottle or like container, the stopper having an inlet and an outlet and a passage extending therebetween, a float contained within the stopper, a valve carried by said float and disposed in controlling relation to said inlet, weighting means coacting with said float and operative normally to actuate said valve into inlet closing position, a closure element for said stopper outlet, said closure element being so constructed and arranged as to effect, in one of its positions, the actuation of said valve means to inlet closing position through said float and weighting means.

6. A non-refillable stopper unit for a bottle or like container, the stopper having an inlet and an outlet, means providing a tortuous passage therebetween, a float contained within the stopper, a valve carried by said float and disposed in controlling relation to said inlet, weighting means coacting with said float and operative normally to actuate said valve into inlet closing position, a closure element normally operative by its weight to close said stopper outlet, and means carried by said closure element and cooperating with the wall of said passage to prevent access to the float and valve carried thereby.

7. A non-refillable stopper unit comprising, in combination, a cup element having a passage therethrough, valve means operatively arranged at one end of said element for controlling the passage inlet, a head secured at one end to the other end of said cup and having a through passage communicating with said first passage, and automatic closing means operatively related to the other end of said head for controlling the outlet of said passage through said head, said automatic closing means being also operable to assist normal actuation of said valve means.

8. A non-refillable stopper unit comprising, in combination, a cup element having an inlet thereto, a float disposed in said cup, a valve carried by said float and disposed in controlling relation to the said inlet, a head connected at the outlet side of said cup and having an outlet opening, the cup and the head having a communicating passage extending between said inlet and outlet opening, automatic closing means normally operative to close said outlet opening, and means carried by said closing means and cooperating with said passage wall to prevent access to said float and valve carried thereby through the head.

9. A non-refillable stopper unit comprising, in combination, a cup element having an inlet thereto, a float disposed in said cup, a valve carried by said float and disposed in controlling relation to said inlet, means coacting with said float to

urge said valve to a position to close said inlet passage, a head connected to the outlet side of said cup and having an outlet opening, automatic closing means operative normally to close said outlet opening, and cooperating means carried by said head and said closing means providing a tortuous path of liquid flow.

10. A non-refillable stopper unit comprising, in combination, a cup element having an inlet thereto, a float disposed in said cup, a valve carried by said float and disposed in controlling relation to said inlet, a ball coacting with said float to normally urge said valve to a position to close said inlet, a head connected to the outlet side of said cup and having an outlet opening, the cup and head having a passage extending between the inlet and outlet opening, and automatic closing means operative normally to close said outlet opening, said last-named means including a surface against which said ball engages and provisions cooperating with the wall of said passage and providing a tortuous path of fluid flow.

11. A non-refillable stopper unit comprising, in combination, a cup element having an inlet thereto, a float disposed in said cup, a valve carried by said float and disposed in controlling relation to said inlet passage, a ball coacting with said float to normally urge said valve to a position to close said inlet passage, a head connected to the outlet side of said cup and having an outlet opening, a closure and ball track assembly carried by said head and operative normally to close said outlet opening, and movable retaining means for said assembly carried by said head.

12. A non-refillable stopper unit comprising, in combination, a cup element having an inlet thereto, a float disposed in said cup, a valve carried by said float and disposed in controlling relation to said inlet passage, a ball coacting with said float to normally urge said valve to a position to close said inlet passage, a head connected to the outlet side of said cup and having an outlet opening, and a movable closure, guard disc and ball track assembly carried by said head, with the closure being operative normally to close said outlet opening.

13. In a non-refillable bottle or like container, the combination of a bottle, a non-refillable stopper unit, means securing the stopper to the bottle, the stopper unit having a through passage and an inlet thereto and an outlet therefrom, valve means disposed in said stopper in controlling relation to the stopper inlet, a closure disposed in said stopper in controlling relation to said stopper outlet, and means operative through said closure to maintain said valve means in inlet closing relation with respect to said inlet whereby to prevent flow of the contents of the bottle into the stopper passage.

14. In a non-refillable bottle or like container, the combination of a bottle, a non-refillable stopper unit, means securing the stopper to the bottle, the stopper unit having a through passage and an inlet thereto and an outlet therefrom, valve means disposed in said stopper in controlling relation to the stopper inlet, a closure disposed in said stopper in controlling relation to said stopper outlet, said closure and said valve means being cooperated in such manner that said valve means closes said inlet upon said closure closing said outlet, and means carried by said stopper for maintaining said closure in outlet closing relation whereby to prevent flow of the contents of the bottle into the stopper passage.

15. In a non-refillable bottle or like container, the combination of a bottle, a non-refillable stopper unit operatively related to said bottle, said stopper unit having a through passage and an inlet thereto and an outlet therefrom, valve means disposed in said stopper in controlling relation to said stopper inlet, a closure disposed in said stopper outlet, said closure and said valve means being cooperated in such manner that said valve means closes said stopper inlet upon said closure closing said stopper outlet, means carried by said stopper for maintaining said closure in outlet closing relation whereby to prevent flow of the contents of the bottle into the stopper passage, and means for sealing said last-named means to the stopper and for sealing said stopper to the bottle.

16. A non-refillable stopper unit comprising, in combination, a stopper body having a through passage with an inlet thereto and an outlet therefrom, valve means operatively related to said passage inlet, a movable ring element arranged in said passage, and automatic closure means operatively related to said passage outlet, said ring being arranged about an intermediate portion of said closure means and coacting therewith to limit movement of the closure means in outlet-opening direction, said ring and closure means further cooperating to provide a tortuous path of liquid flow through the stopper means.

CHARLES W. JOHNSON.