

April 30, 1935.

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1,999,358

NONREFILLABLE BOTTLE CLOSURE

Filed Sept. 12, 1934

3 Sheets-Sheet 1

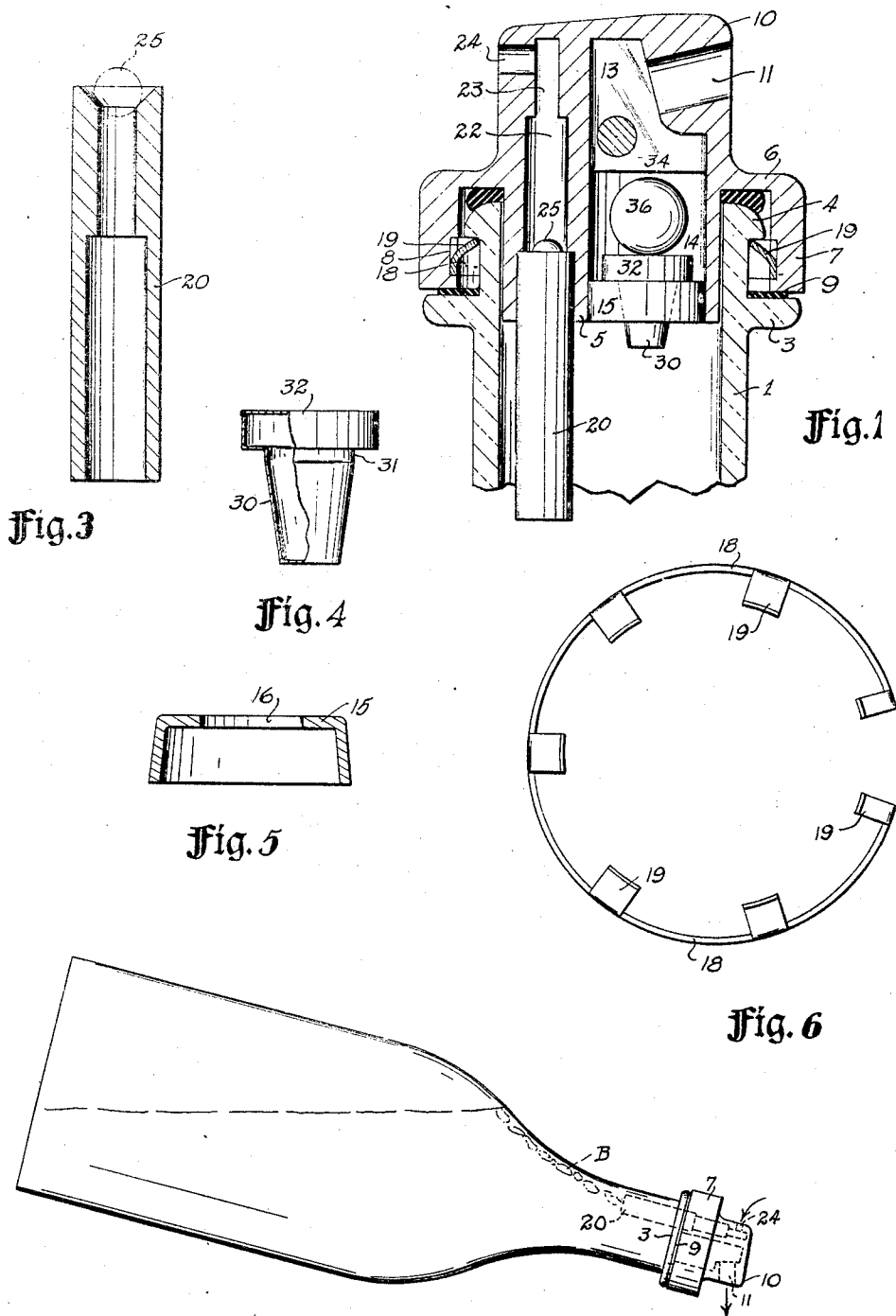


Fig. 2

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3 Sheets-Sheet 2

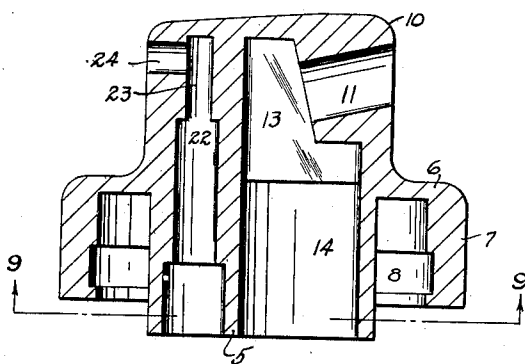


Fig. 7

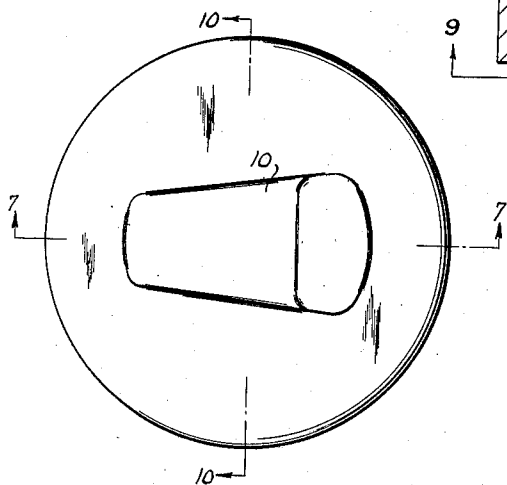


Fig. 8

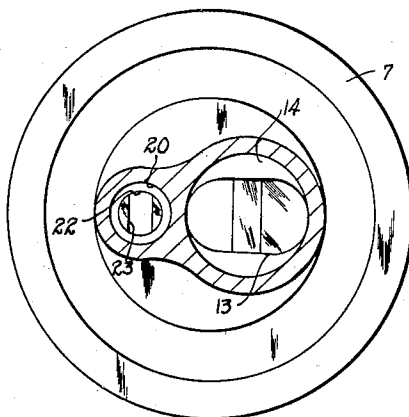


Fig. 9

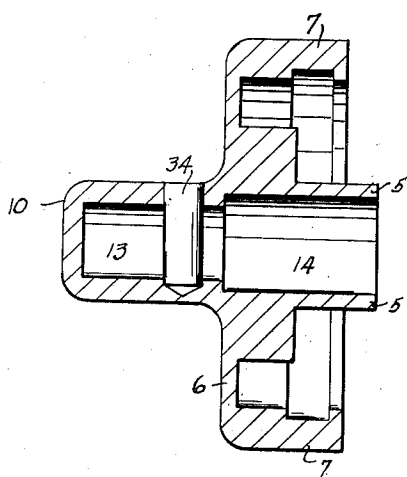


Fig. 10

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NONREFILLABLE BOTTLE CLOSURE

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3 Sheets-Sheet 3

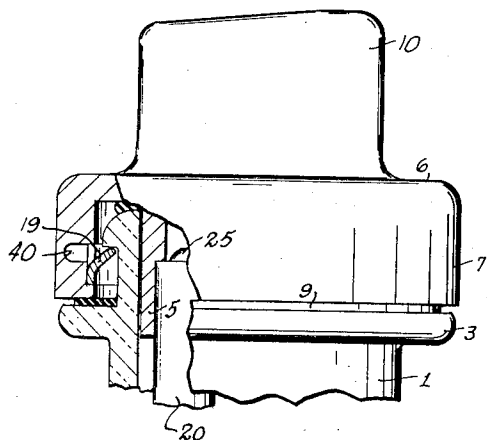


Fig. 11

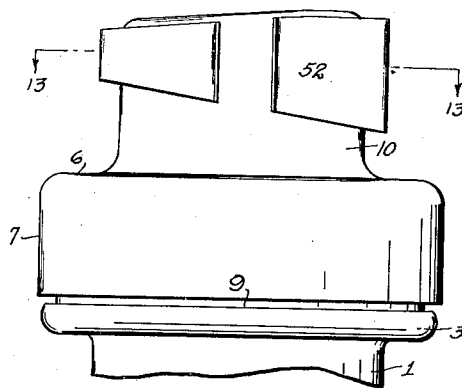


Fig. 12

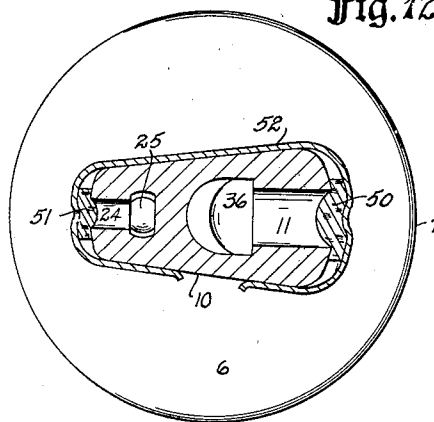


Fig. 13

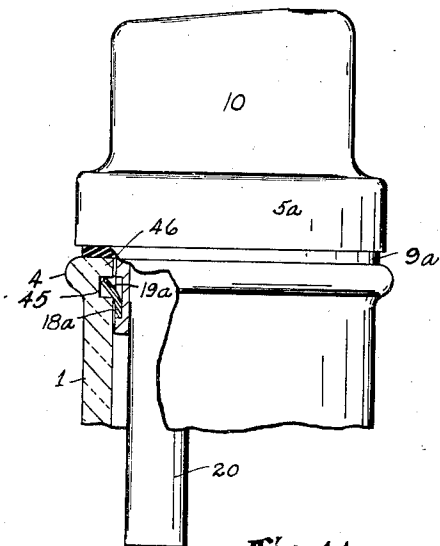


Fig. 14

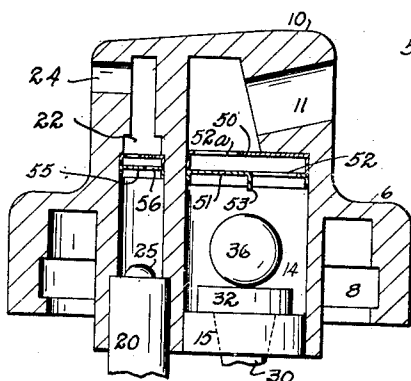


Fig. 16

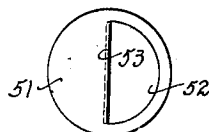


Fig. 17

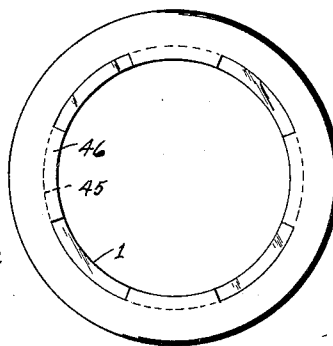


Fig. 15

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UNITED STATES PATENT OFFICE

1,999,358

NONREFILLABLE BOTTLE CLOSURE

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Application September 12, 1934, Serial No. 743,650

9 Claims. (Cl. 215—22)

This invention relates to non-refillable bottles or more specifically to closures for bottles effectively rendering them non-refillable.

The commercial requirements for non-refillable bottles are that the contents must be poured therefrom very quickly and freely, for example, a sixteen ounce bottle is emptied by continuous pouring in about one minute.

The non-refillable characteristics must be such as to prevent refilling by creating a vacuum in the bottle or by agitating while the bottle opening or the entire bottle with a non-refillable closure is immersed in the liquid, the common requirement being that the bottle must not be filled or substantially filled in less than thirty minutes by such agitation while immersing.

The more usual commercial requirements include simplicity, cheapness, neatness of appearance and compactness in size.

The further requirements are that it shall be tamper-proof, for example, any attempts to remove the stopper from the bottle resulting in breaking the stopper or the bottle neck.

Further desirable characteristics are set forth in the following statement of objects of the present invention which embodies many improvements on the non-refillable bottle of my prior application, filed June 12, 1934, Serial No. 730,325.

The essential objects of the present invention are to provide an effective bottle stopper which may be easily manufactured and which may be easily and quickly applied; and which shall allow free and uninterrupted pouring of the liquid contents, and which shall not be capable of being refilled or even of being partially refilled by immersing, inverting, agitating, etc., and of course it shall resist ordinary refilling by any attempted tampering with the valve means.

More specific objects of the invention include making the stopper of such construction that it may be readily applied and remain tightly sealed on the bottle during original shipment and under subsequent condition, and which may be conveniently corked at its pouring and breather or vent openings.

Another characteristic object is to so arrange the vent or breather passage that there is no tendency for the liquid to flow therefrom and the incoming air is delivered into the liquid or inside the bottle at a point materially above the pouring opening, so that there is a marked difference in the hydrostatic head between these openings.

A further characteristic object is to so design the closure device that it may be molded by

commercially practical thermoplastic molding methods with the minimum amount of subsequent treatment or machine work. In attaining this object I prefer using a material commercially widely known as Plascon and which has characteristics of being resistant to various forms of acids as well as to alcohol, and which when in contact with liquids having alcoholic content will not discolor or dissolve.

A further characteristic and important object is to require only a minimum change in the standard form of bottle neck to which my non-refillable closure is to be applied and only slight change of the usual bottle making machines, and without materially increasing the weight of glass and with unappreciable added expense.

A further characteristic object includes the provision of a special resilient locking means or attaching device effectively interlocking the closure body to the bottle neck, which shall be inaccessible when in position and yet which may be easily applied.

In carrying out my invention I effectively so arrange the locking means as to be inaccessible, and I also provide that if an attempt is made to remove the cap it will result in destruction of at least a portion of the glass or material of the bottle neck, or of the closure itself. To this end I make a portion of the closure somewhat weakened so that it may be more frangible than other parts, which will result in causing a breaking of the cap such that the re-use is impossible and evidence of tampering is very obvious.

Still further objects are to provide valve and closure arrangements for both the breather or vent passage the pouring passage of a construction capable of being cheaply manufactured and assembled, and very effective in resisting refilling by any known practical method; and yet which shall have freedom of operation and be capable of convenient assembling.

Various other objects will become apparent in the following description which relates to the accompanying drawings. The essential characteristics of the present invention are summarized in the claims. In the drawings are shown two forms of my invention, the one embracing the exterior of the bottle neck, having the advantage of minimum change in formation of the bottle neck and without departing from present methods of manufacture. The other has an advantage in that the bottle stopper body may be of smaller diameter, because its locking means is inside of the bottle neck and by slight change in the bottle making machine is entirely practical.

In the drawings—

Fig. 1 is a vertical transverse sectional view through my non-refillable bottle closure showing it in position on the bottle neck.

Fig. 2 illustrates the same in the pouring position.

Fig. 3 is an enlarged sectional view of the breather or vent tube.

Fig. 4 is an enlarged elevation of the pouring valve.

Fig. 5 is an enlarged section of the pouring valve ring.

Fig. 6 is a plan slightly enlarged of the one form of interlocking means.

Fig. 7 is a section through the stopper body with the working parts removed.

Fig. 8 is a plan of the stopper body.

Fig. 9 is a bottom sectional plan taken on a plane indicated by the line 9—9 of Fig. 7.

Fig. 10 is a section taken on the plane at right angles to the plane of Fig. 7.

Fig. 11 is a partial sectional view of the bottle and closure assembly showing a slight modification of the locking skirt of the closure body.

Fig. 12 is an elevation showing an illustrated means for corking or closing both the pouring and vent openings.

Fig. 13 is a sectional plan view taken along the line 13—13 of Fig. 12.

Fig. 14 is an elevation partially in section showing the modified form in which the locking means is within the bottle neck.

Fig. 15 is a plan of the bottle neck showing the locking flange formation formed in the glass or other material for this alternative arrangement.

Figs. 16 and 17 are detailed views showing modified forms of the means for preventing tampering with the valves.

For convenience I shall first describe in detail the form shown particularly in Figs. 1 to 10, using like reference numerals to designate like parts. I designates a bottle of any suitable form or shape having the usual neck portion on which may be formed an outwardly projecting flange 3 spaced slightly below the usual neck bead 4. The closure comprises a substantially cylindrical body 5 shown as being integral with the outwardly extending flange portion 6 and a cylindrical flange 7 extending downwardly therefrom, embracing the bottle neck outside of the bead 4 and normally tightly fitted against a gasket or washer 9 which is positioned between it and the shoulder 3 on the bottle, forming a seal between the closure and the bottle.

Extending upwardly is a narrowed extension of the body 10 which in effect forms a pouring spout having therein a pouring passage 11 to which leads a somewhat narrowed passage 13 connected with the valve chamber 14 opening inwardly to the bottle. Fitting into the lower end of the valve chamber 14, which is shown as cylindrical, is a valve seat 15 shown in detail in Fig. 5 and it will be hereinafter referred to more in detail.

The cylindrical flange 7 as shown in Fig. 1 has a channel 8 formed on the inside thereof and into which may be seated the locking spring ring 18 (Figs. 1 to 6) having inwardly projecting segments or spring fingers 19. The spring fingers 19 tightly engage the lower edge of the bead 4 and are of such length that they are capable of springing beneath the bead 4 when the cap is forced down over the top of the neck of the bottle and to yieldingly urge the flange downwardly against the gasket 9 so that the gasket is compressed between the lower edge of the flange 7 and the flange

3 on the neck of the bottle to effect a seal therebetween. The spring ring 18 is shown as substantially circular and normally slightly larger in diameter than the chamber or seat so that it may be resiliently held in position by its own tendency to expand prior to the application of the closure to the bottle, and inasmuch as the locking elements 19 project inwardly, the body of the spring ring may fit tightly into the channel permitting the forcible application of the closure to the bottle without likelihood of displacing this locking means.

As stated, the body 5 without the neck may be cylindrical but inasmuch as the seal at 9 is found to be sufficient I may save material by cutting away the body to form merely thin walls for the channel 14 and the breather passage and pipe or wire socket as shown in Fig. 9.

The breather tube referred to is designated 20 and fits into an opening or socket connecting with the passage 22, the upper portion of which is in the nature of an elongated or oblong cross section passage indicated at 23 to which leads the inlet or air vent opening 24. A ball 25 is positioned in the passage 22 and a seat for the ball is formed in the flared upper end of the breather tube 20 which is shown as having a small passage adjacent the seat while its passage is enlarged below this point. Thus a convenient valve seat arrangement is made and the breather tube is strengthened at the point where it is forcibly fitted into the body.

As stated the material of which the closure is formed is preferably thermoplastic, but, of course, it may be formed of glass, metal or other material. I prefer thermoplastic for the widest use is that of Plaston which while being very tough, is nevertheless somewhat frangible, and to avoid breaking the body while thinning it as shown in Fig. 9, I prefer to so construct the valve seat 15 so that it may be a pressed fit while not endangering the walls. To this end I make the seat somewhat cup-shaped, having its wall flared slightly as shown in Fig. 5 while the valve seat is formed on the upper side, and the valve opening 16 receiving a portion 30 of the main pouring valve member which in turn has a short cylindrical portion 31 beneath its enlarged head 32. The shape of this head is such that while preserving a tight seal it is less likely to be tampered with or capable of being lifted from its seat by any wire or other instrument pressed into the pouring passage and whereby refilling might be accomplished.

To prevent inserting such a wire or other instrument for the purpose of lifting the valve from its seat and filling I am making the valve passage more tortuous. I am interposing a baffle such as indicated at 34, which may be in the nature of a form inserted in the molding operation, or may be in the nature of a bar projecting through an opening in one wall of the body, the opening being formed during the molding or later by drilling, rendering such tampering extremely difficult. The ball 36 which engages the valve member 30 and holds it in place on the seat 15 does not shut off the flow during pouring by reason of the fact that the portion 13 of the pouring passage is oblong, as is seen in Fig. 9, while the diameter of the ball is slightly larger than the smallest dimension of this portion of the passage.

A similar treatment of the passages 22 and 23 as mentioned permits the ball 25 to move downwardly when in the pouring position (upwardly of Fig. 1), without stopping the free inlet of air to replace the outwardly flowing liquid. This ball

may be of chromium plated steel or other metal, and the ball being thus subject to magnetic attraction, the main valve 30 is constructed of a non-magnetic material so that lifting of the ball does not interfere with tight closure of the valve as the valve member 30 is not lifted. The ball 25 may be of non-magnetic material such as copper or ceramic material.

It will be seen that with the cap tightly in position attempts to dislodge the locking means 18 and 19 would result in breaking the flange 6, or if this was avoided, the thin portion of the flange 6 of the closure body, being relatively the weakest zone, will be caused to crack or break, rendering the closure useless or making it very apparent that tampering has occurred. The channel on the cap may be put in by a machine operation in which case a deep groove 40 may be formed, allowing the shape of the flange to be changed, that is, thickened if desired, while still providing an easily breakable part or portion.

In the pouring from such closures I have found that the greater the length of the air inlet passage, the more freely the liquid leaves the pouring opening. For practical purposes the extension of this passage by the tube 20 to approximately the length shown is sufficient. In Fig. 2 it will be noted that the bubbles represent air passing inwardly and these leave the tube at a point materially above the pouring opening; thus the difference in hydrostatic head or pressure on the two openings is much greater than where the openings of the inlet and outlet are on the same plane across the bottle neck.

In a slightly modified form shown in Fig. 11 the flange 6 may be somewhat thickened and the breakable zone may be created by cutting outwardly to form a groove, making a thin wall at 40. This may be done at the same time that the channel is cut for the reception of the spring band. Various other means may be used for making a portion of the device weaker or more frangible than the remaining parts, assuring that the cap cannot be surreptitiously removed without damaging beyond the point of re-use.

Any suitable corks or seals for the openings 11 and 24 may be used, for example, if desired a means whereby both may be opened at the same time may be used. As an illustration of such a means, which may be any of many forms, I have shown a spring clip in the nature of a band 52 carrying the cork members 50 and 51 for closing the openings 11 and 24 respectively. It will be seen that by a single movement this bar could be removed and might be replaced if desired. Upon removal of both corks the liquid, of course, may be poured. It may be observed that the corks do not need to be replaced, due to the construction described in that the valve members 25 and 32 are normally closed when the bottle is standing at home or at the bar. This feature coupled with freedom and accuracy of pouring makes entirely practical using this this non-refillable device for serving drinks at the bar from the original containers.

Where it is desired that the closure shall be of smaller diameter, say approximately the diameter of the outside of the usual bottle neck, I may form an inside flange or undercut recess in the bottle neck and with which suitable locking means may cooperate to securely lock the closure into the bottle. This general idea is illustrated in my prior application above referred to. However, I find a practical method of making such an overhang or recess on the inside of the bottle

neck has been developed and is shown, described and claimed in the application of Frederick W. Hoeter, filed June 12, 1934, Serial No. 730,325 showing a method and apparatus for this purpose, and by which recesses as at 45 are formed beneath segmental sections of flange or lip members 46 on the bottle neck 1, as shown in Fig. 15. A locking means, such as heretofore described, may be used, in which case the spring band 18a has its fingers 19a engaging beneath the members 46 on the bottle, urging the closure body inwardly tightly gripping the seal or gasket 3a between the body portion 5a and the top of the bottle neck.

To prevent passing a flexible wire down through the pouring opening to dislodge, or hold, the valve in its unseated position, I may use the plug 34 shown, or I may place a flanged disc member similar to the valve seat 15 above the ball 35, and the inwardly extending flange will effectively prevent passing a probe or like instrument passing alongside of the ball 36 to engage the valve 32. The opening through it may be in the form of a screen or may be non-circular so that the ball cannot seat against it to stop outward flow.

In Fig. 16 it will be seen that metallic walls or baffles may be conveniently inserted in both the pouring and inlet or breather passages, the general shape of a preferred form of such walls or baffles being that of disc-like members 50 and 51, as illustrated in plan in Fig. 17. Each of these is shown as having a semi-circular opening as at 52. These openings are formed by punching a portion of the metal from the body of the disc as at 53, and the lower one of these discs leaves a downwardly projecting lip against which the ball 36 may impinge to prevent its closing the opening. On the upper disc the metal of the opening 52a is entirely removed. Thus it will be seen that any attempt to pass a wire through these offset openings and disturb the valve 30 will be very difficult indeed.

Smaller discs may be fitted into the passage 22 as indicated at 55. These are also arranged so that their openings 56 are offset to prevent passing a wire or probe downwardly to disturb the valve 25 from its seat. The use of these discs instead of the pin 34 or other means for preventing tampering with the valve is of course optional, and other devices for this purpose may be used providing they are effective and capable of being cheaply manufactured and assembled.

In connection with Figs. 12 and 13 I have shown one form of corking means holding two small discs in position to close the passages 11 and 24. I find that for some uses such cork or like closures may be securely held by a broad rubber band which obviously uncovers both openings upon its removal.

I have spoken of the valve 30 as being lighter than the specific gravity of alcoholic liquid. I prefer to make it materially lighter than commercial alcohol so that if the bottle be inverted in a body of liquid the valve will float quickly to its seat, preventing inward passage of liquid, even though subjected to devices such as those which are producing alternate suction and pressure upon the opening at the passages 24 and 11 respectively. A convenient and economical construction of such valve is illustrated in Fig. 4 in which its walls are formed of thin copper material for example.

An advantage of the ball 36, in addition to normally adding its weight to the valve, is that in attempts to refill by agitation, shaking of the

bottle results in transference of the kinetic energy, as for example, when one object hits another, such as when one billiard ball impinges another, and that if the valve is seated, shaking movement of the bottle is started, carrying the valve toward the ball, the ball may move but the valve remains seated. By the same action the ball acts quickly to bounce back on its return and hit the valve, driving it to its seat. Experience has demonstrated that refilling by agitation is greatly prolonged or rendered entirely impractical to accomplish, by the use of a ball heavier than the liquid and a valve lighter than the liquid, assembled as described.

From the foregoing, it will be seen that I have provided a non-refillable closure which will pour freely and which will be entirely practical and avoids the objections such as above mentioned. It will be seen that many variations may be made in the form of a spring locking device between the bottle and closure member, and that these may be effected both inside and outside of the bottle neck. By the latter a closure of small external diameter may be made which has advantages in that small flasks may be appropriately equipped with my closure, and further, in any event, a saving of material is effected by the construction resulting in the smaller diameter.

By making a body on the closure of thermoplastic material, it may be manufactured commercially in large quantities and at such low costs that protection against adulterating may be commercially cheaply attained.

A particular arrangement of valves for the breather, air inlet passage and the pouring passage are simple and effective and not subject to tampering either magnetically or by the insertion of wires or by means of probing instruments.

Various tests of attempts to refill the bottle with liquid when my closure is in position have proven unsuccessful. For example, agitation while the bottle was immersed in liquid and by movements effected mechanically over a period of as long as thirty hours resulted in admitting only a few ounces of liquid into a one quart bottle.

It is to be understood that various modifications may be made and various materials may be used without departing from the spirit of my invention as defined by the appended claims.

I claim:

1. In a non-refillable bottle closure, the combination with a bottle neck, having a shoulder at its upper perimeter, a shoulder spaced a considerable distance therefrom below said first-mentioned shoulder, and extending outwardly substantially at right angles to the bottle neck, the closure having a portion extending into the bottle neck and a portion extending outwardly therefrom, a flange extending outwardly over the first-mentioned shoulder and a cylindrical portion integral therewith embracing the bottle neck and having a shoulder opposed to the right-angled shoulder on the bottle neck, a locking means within the cylindrical portion engaging the first-mentioned shoulder on the bottle neck, a sealing ring between the closure and the bottle neck, said closure having the pouring passage and an air inlet passage and valve means closing each of said passages upon movement of fluid inwardly.

2. The combination with a bottle having a neck with an outwardly projecting flange at its outer end, with a shoulder at substantially right angles to the bottle neck of a closure member extending into the bottle neck and outwardly therefrom

having an annular portion embracing the outer end of the bottle neck and having a channel therein, a locking ring in said channel having inward projections adapted to engage the underside of right angle shoulder and exert constant tension thereagainst, a sealing ring at the outer end of the bottle neck, a pouring passage through said closure and a check valve means therein closing inwardly, an air inlet passage and a valve means therein adapted to open when the bottle is in pouring position.

3. The combination with a bottle of a closure having a body portion some of which extends outwardly from the outer end of the neck of the bottle and having a flange extending outwardly over the end of the neck of the bottle and having an annular portion embracing the outer end of the neck of the bottle, locking means carried in said annular portion, sealing means between said closure and the bottle neck and said flange being thinner than the annular portion, whereby attempted removal shall cause fracture of said flange, and a pouring passage and an air inlet passage with valve means normally closing inwardly thereof, the air inlet valve means being adapted to open when the bottle is in pouring position.

4. The combination with a bottle of a non-refillable closure having a body portion and a flange extending outwardly therefrom, an extension on said flange embracing the neck of the bottle and having a channel in the perimeter thereof, a locking spring in said channel having projections extending inwardly therefrom, a shoulder on the bottle neck at substantially right angles thereto engaged by said projections, and a sealing ring between said flange and the bottle placed under compression by the resilient action of said projections, said closure having a pouring passage therethrough and an air inlet passage, valve means in said passages adapted to be closed by inward movement of liquid, the valve means in the air inlet passage being adapted to open when the bottle is in pouring position.

5. In a device of the character described, the combination of a bottle and a non-refillable closure member fitted to the neck thereof, said bottle having a shoulder at the neck formed at substantially right angles to the axis of the neck and having a second shoulder also formed at substantially right angles to the axis of the neck, said closure having an annular portion embracing the bottle neck with a shoulder opposite the second-named shoulder on the bottle neck, locking means in said embracing position engaging the first-named shoulder, pouring and inlet passages through said closure with inwardly closing valve means in each of said passages.

6. A non-refillable closure for a bottle comprising a body member, fitted to the neck of the bottle, locking means for securing said closure to the bottle neck, a pouring passage through said closure larger at the interior than at its exit opening, the outer portion of the passage being turned at an angle to the inner portion, said inner portion being substantially parallel with the bottle neck, inwardly closing valve means in the inner end portion and a transverse guard seated in the enlarged inner portion having an opening therethrough, a valve element adapted to close inwardly, said guard having means preventing the valve closing the opening on outward flow of liquid, an air inlet passage opposite the pouring passage at its outer end and having

its inner end opening into the interior of the bottle.

7. A non-refillable closure for a bottle having bottle neck embracing means and means securing it to the bottle neck and having a body portion with passage for pouring liquid therethrough and for admitting air into the bottle, each of said passages being smaller at the outer end than at the inner end whereby, in molding the tools forming the passages may be withdrawn inwardly, valve seat and closure means in the pouring passage mounted in the larger inner portion of said passage, a tubular extension for the inlet passage fitted into the inner end of the air inlet passage and a valve element seating against the end of said tubular element normally closing inwardly being adapted to open when the bottle is in pouring position.

8. A closure for a bottle having the pouring opening therethrough and an air inlet passage therethrough adapted to be fitted to a bottle neck, locking means for securing it to the bottle neck, a portion of said closure extending into the bottle neck and a portion extending outwardly from

the end of the bottle neck, the latter portion being oblong with the pouring opening in one of its narrow sides and the inlet opening being in its other narrow side, said openings being at angles to the axis of the bottle neck at their outer portions and parallel with the axis of the bottle neck at their inner portions, valve seats in each of said passages, valve elements closing inwardly on each of said seats, guard means for preventing entry of a probe to the valve elements, and said closure having a position adapted to fracture upon attempted removal.

9. A non-refillable bottle closure means for securing the same to a bottle neck, a reduced extension projecting outwardly from the bottle neck, a pouring passage through the closure and an air inlet passage through the closure, said passages opening on opposite sides of said extension, means embracing said projection for closing the outer ends of each of said passages, said means comprising a single element adapted when removed to open each of the outer ends of said passages.

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