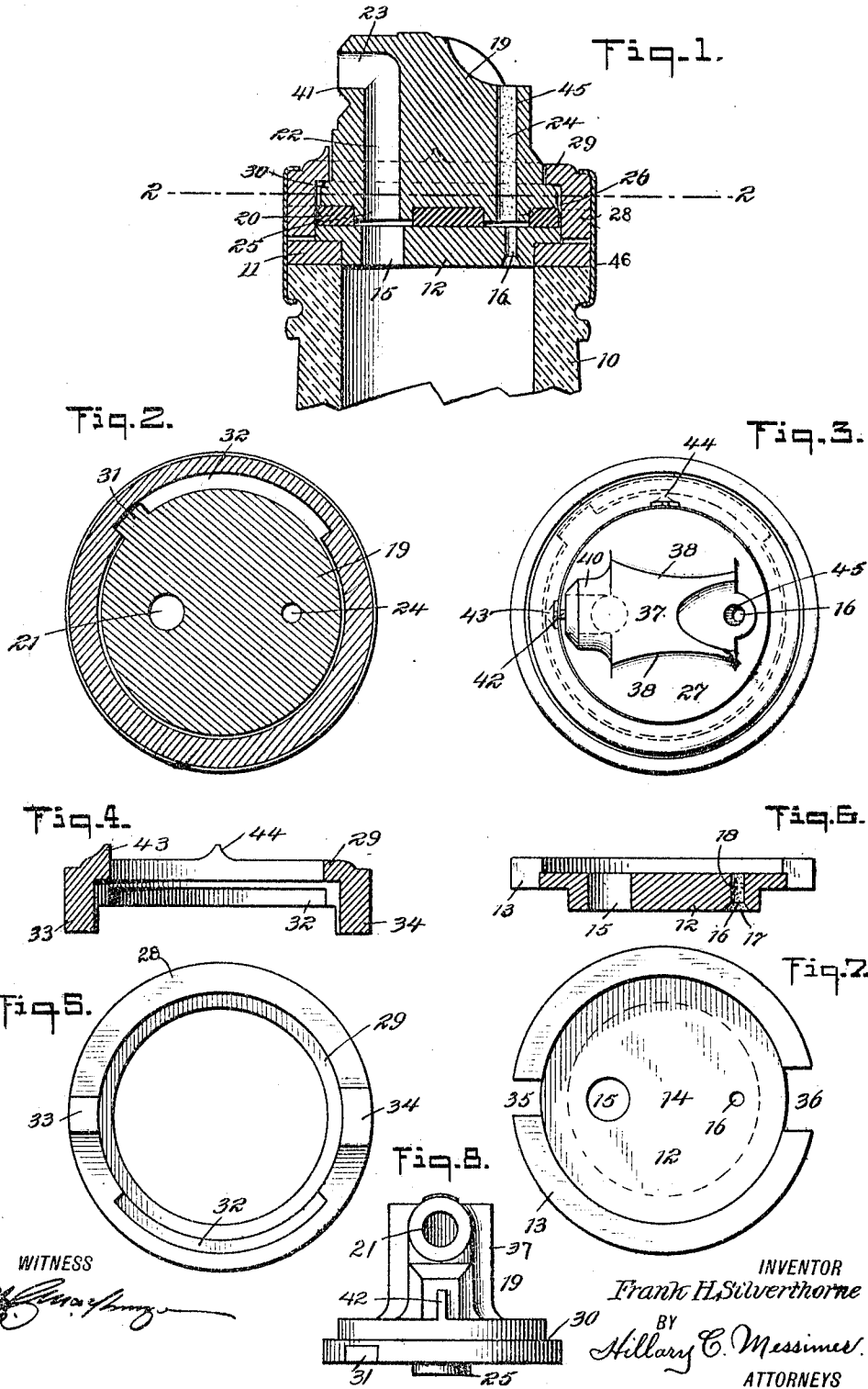


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 INK BOTTLE STOPPER.
 APPLICATION FILED FEB. 9, 1918.

1,314,489.

Patented Aug. 26, 1919.



UNITED STATES PATENT OFFICE.

FRANK H. SILVERTHORNE, OF NEW YORK, N. Y.

INK-BOTTLE STOPPER.

1,314,489.

Specification of Letters Patent.

Patented Aug. 26, 1919.

Application filed February 9, 1918. Serial No. 216,154.

To all whom it may concern:

Be it known that I, FRANK H. SILVERTHORNE, a citizen of the United States, and resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Ink-Bottle Stoppers, of which the following is a specification.

My invention relates to a valvular pour-out bottle closure of the type which serves not only as a means for sealing the bottle when not in use, but also serves to constitute a means for delivering a stream of liquid from the bottle while permitting a free flow of air into the bottle to take the place of the displaced liquid. The invention in the form selected for illustration relates to such a pour-out closure for use particularly on ink bottles and other receptacles in which it is desired to shut off the air inlet when not in pouring position and which can be readily manipulated to move the same into position to insure the quiet flow of a small stream therefrom.

In such devices it is essential, for reasons of economy, that such closures be designed so that they may be constructed by simple molding operations in large quantities with a minimum amount of labor and material and so that they may be assembled with the least expenditure of manual labor.

Accordingly one object of the invention is to provide a construction peculiarly susceptible to have its parts constructed of molded material and designed so that the manufacturing steps may be simple straight-line die operations.

It is also necessary that the parts be constructed in such a way that there will be a hermetically sealed closure when the movable valve element of the device is in closed position and which, at the same time, will permit a free and easy operated actuation of the movable valve element.

It is quite usual where a number of ink wells are filled each morning for the operator to become somewhat careless in directing the stream and even where care is exercised, drops collect on the pouring spout and eventually run down the side of the bottle.

Accordingly the invention further contemplates a construction of pour out device in which the stream is delivered into the receiving receptacle in the form of a smoothly moving pencil of liquid and in a perpendicular line directed downward into the re-

ceiving receptacle thereby to minimize spilling which is usual with the old curved stream pour outs when they are carelessly tipped into pouring position over the receiving receptacle.

A further object of the invention is to provide a simple form of construction designed so that when the bottle is reverted into upright position the stream will be promptly, positively and sharply cut off and which will automatically suck back into the bottle any drip from the cut off stream.

Various other objects and advantages of the invention will be in part obvious from an inspection of the accompanying drawings and in part will be more fully set forth in the following particular description of one form of mechanism embodying my invention, and the invention also consists in certain new and novel features of construction and combination of parts hereinafter set forth and claimed.

In the accompanying drawings:—

Figure 1 is a vertical sectional view taken axially through a preferred embodiment of my invention shown attached to the upper portion of a bottle neck;

Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a plan view looking down upon the device shown in Fig. 1;

Figs. 4 and 5 are respectively a vertical sectional view and a plan view of the underside of the retaining ring shown in Fig. 1;

Figs. 6 and 7 are respectively a vertical sectional view and a plan view of the nozzle seat; and

Fig. 8 is a front view of the nozzle shown in Fig. 1 and detached from its coördinated parts.

The closure constituting the subject-matter of this invention is designed as an article of manufacture for attachment to any kind of a bottle or other receptacle of suitable size, and is arranged to be placed on top of the bottle and fastened thereto by any conventional ferrule fastening device. The upper portion of such a bottle is shown at 10 in Fig. 1, positioned on top of which is a cork ring washer 11 constituting a cushioning device between the attachment and the bottle to prevent breakage when the parts are assembled in a capping machine. The washer is designed to be placed under sufficient pressure to form a tight seal between the attachment and the bottle. A flat relatively

thin disk 12 hereinafter identified as nozzle seat (Figs. 6 and 7) is fitted within the ring washer 11 and is provided with an upstanding rim 13 positioned on top of the washer to form an angled joint with the washer. The top of the nozzle seat within the inclosing rim is flat so as to provide a smooth bearing surface 14. The nozzle seat is provided with a circular liquid outlet opening 15 adjacent one side thereof and with a relatively small air inlet opening 16 positioned diametrically across the surface from the opening 15, as shown in Fig. 7. The underside of the air opening 16 is countersunk to provide a relatively short wide spreading funnel shaped opening 17 designed to provide a free clearance to the air as it enters the bottle. The portion of the air inlet directly above the funnel shaped opening is of relatively small diameter and constitutes a choked passageway 18 for the air just before it enters the bottle.

Revolubly positioned on the nozzle seat is a nozzle unit comprising a nozzle 19 and a flat disk gasket 20 positioned between the underside of the nozzle and the bearing surface 14 of the nozzle seat. The nozzle is provided with an inverted L-shaped liquid passage way 21 designed in one position of the nozzle to aline with the opening 15 to provide a liquid conduit from the interior to the exterior of the bottle.

The passageway 21 is of substantially equal cross-section throughout its length and includes a relatively long liquid receiving portion 22, vertically disposed when the bottle is in upstanding position and a relatively short liquid discharging portion 23, normally disposed in horizontal position but which, when the bottle is tipped into pouring position, will extend vertically so as to discharge the stream into the ink-well or other receptacle for receiving the discharged liquid. The nozzle is also provided with a straight, air inlet passageway 24 designed, when the passageway 21 is alined with the opening 15, to aline with the air inlet opening 16. In this way when the nozzle is in position permitting the discharge of the liquid through the open conduit, an open air intake is provided by the passageway 24 alining with the opening 16. The passageway 24 has a cross-sectional area substantially twice that of the corresponding cross-sectional area of the opening 16, so that a large volume of air is maintained in the air passageway up to a point relatively close to the point of entrance of the air into the throttle.

The lower ends of the passageways 21 and 24 are contained in lugs 25 and 26 which project below the bottom of the lower enlarged body portion 27 of the nozzle and are snugly fitted within openings in the gasket 20. This construction holds the gasket

to the nozzle so that the gasket rotates with the nozzle about the bearing surface 14 of the nozzle seat. The nozzle seat, gasket and the lower body portion 27 of the nozzle is confined within a retaining ring 28 (Figs. 4 and 5), the upper side of which is provided with an inwardly projected flange 29. The flange engages a shoulder 30 formed on the body portion 27 and acts to hold the nozzle in rotary position relative to the nozzle seat. The rotation of the nozzle to and from its open position is limited by means of a lug 31 projecting beyond the outline of the body portion and engaging in an arcuate recess 32 formed on the underside of the retaining ring. The retaining ring is located in position relative to the nozzle seat and held against rotary movement by means of a pair of squared lugs 33 and 34 depending therefrom as shown in Fig. 4, and designed to seat in recesses 35 and 36 formed in diametrically opposite portions of the rim 13. The lug 34 is of greater width circumferentially than the lug 33 so as to insure the proper registry of the parts when assembled.

The depth of the retaining ring is proportioned so that it will engage the cork washer 11 when the gasket 20 has been compressed over a definite distance from its normal thickness. In one embodiment of the invention the gasket 20 is formed of cork and the parts are so assembled that when fixed in position on the bottle, the cork is compressed about 1/64 of an inch. In this way sufficient tension is provided between the cork and the bearing surface to insure an air and liquid tight joint at this surface and at the same time permit a free rotary movement of the nozzle when it is desired to move the same to and from its open position.

In order to facilitate this rotation of the nozzle, the upper portion is reduced in width to form a finger piece 37 (Fig. 3) with opposite sides concaved as shown at 38 to provide finger gripping surfaces. The front portion of the finger piece is reduced as shown at Fig. 3 to form a pointed pouring mouth 40. The front side of the mouth is undercut to form a sharp edge pouring lip 41, and to form an air pocket immediately below the pouring lip. This air pocket tends to prevent the movement of any drip into the same.

The front portion of the nozzle is provided with a pointer 42 (Fig. 8) designed to coact with a pair of ridges 43 and 44 (Figs. 3 and 4) projecting upwardly from the retaining ring to indicate the open and closed positions of the nozzle.

The air passageway 24 and the air inlet opening 16 are coated with a layer of lubricating substance which has but relatively small affinity for the liquid in the

bottle. For instance, when the device is used as an ink bottle the air passageway is coated with a thin coating of grease.

The device as thus described constitutes a single unit usually sold with a metal ferrule 46 by means of which the attachment can be affixed to the bottle as is usual with such devices. In assembling the parts, the nozzle with the gasket forced into position on the lugs 25 and 26 is dropped through the retaining ring until the shoulder 30 engages the flange of the ring. The lug 31 is set in the recess 32 and then the nozzle seat with the recesses 35 and 36 correctly disposed are forced into position engaging the gasket. After this the cork washer 11 is inserted in place and the whole assemblage positioned in the ferrule or the frictional engagement of the parts can be relied upon to temporarily hold the parts in position suitable for packing and shipping. The device is affixed to the bottle by any of the suitable capping machines but in assembling these devices extreme care need not be exercised, for any excessive pressure on the retaining ring will merely act to compress the cork washer and will have no binding effect on the gasket after it has been compressed to its desired prefixed thickness.

With the nozzle rotated into its closed position, that is, with the passageways in the nozzle disaligned from the openings through the nozzle seat, the bottle will be effectively sealed and no liquid can pass therefrom or air pass into the receptacle thus closed.

In operation, the operator engages the finger piece by rotating the nozzle from the indicated closed to the indicated open position, the passageways are moved into alignment with the openings in the nozzle seat and the bottle can then be tipped into pouring position. Instead of gradually and cautiously tipping the bottle, it can be quickly turned fully into a horizontal position without fear of misdirecting the direction of flow of the stream for it will then be straight down from the pouring mouth. The liquid will pass without obstruction directly through the liquid conduit and will issue from the discharge portion thereof in the form of an easily moving pencil of liquid which will fall vertically and without the outward curve characterizing similar pouring devices now known. During this flow air can freely enter the air conducting passageway and will pass into the bottle scouring the passageway or the opening of any particle of liquid or other obstacle which may have collected in the air conduit.

As the bottle is moved back into its vertical position, the sharp pouring lip will promptly and positively cut off the stream without any resulting drip to trickle down the front of the bottle. The movement of the liquid remaining in the long liquid re-

ceiving passageway, appears to exert a suction effect upon the relatively small body of liquid in the discharge passageway, drawing the same back from the pouring lip and returning the surplus liquid back into the bottle. The nozzle can then be rotated into closed position and the closure will then be free of any liquid adhering to the rim.

Coating the air inlet passageway with a substance which has little adherence to the liquid will prevent the liquid adhering to the material of which the closure may be constructed, thus eliminating those obstructions at this place which are apt to characterize devices where the air inlets are of relatively small cross-section.

The nozzle, its seat and the retaining ring are made of a hard rubber composition which can be readily molded to shape and which, when finished, will insure a close inter-fitting of the several parts.

While I have shown and described, and have pointed out in the annexed claims, certain novel features of my invention, it will be understood that various omissions, substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention.

Having thus described my invention, I claim:

1. A closure for a bottle including a retaining ring provided with an internal peripheral shoulder, a ferrule for fastening said ring to the bottle, a rotary valvular construction for controlling the flow from the bottle, said construction including a nozzle seat held in place by said ring and provided with a fluid outlet opening and an air inlet opening extending therethrough, a pouring nozzle rotatably mounted within the inner periphery of said ring and held in place by said shoulder, said nozzle provided with a pour-out passageway having a discharge portion positioned above the retaining ring.

2. A valvular closure for a bottle including a nozzle seat provided with an opening therethrough and with a rim adapted to engage the bottle, said rim provided with a locating recess, a retaining ring positioned on said rim and provided with a lug depending therefrom and fitted in said recess to prevent relative rotary movement, said ring provided with a peripheral flange and a nozzle rotatably mounted in said ring, held in place engaging said flange and provided with a passageway adapted to coact with the opening in the nozzle seat to provide a conduit through the closure.

3. A valvular closure for a bottle including a nozzle seat provided with an opening therethrough, and with a rim adapted to engage the bottle, said rim provided with

a locating recess, a retaining ring positioned on said rim and provided with a lug fitted in said recess, said ring provided with a peripheral shoulder and a nozzle rotatably mounted in said ring, held in place engaging said shoulder and provided with a passageway adapted to coact with the opening in the nozzle seat to provide a conduit through the closure, a gasket of compressible material positioned between the nozzle seat and the nozzle and means for securing the gasket to the nozzle so as to turn therewith on the nozzle seat.

4. In a closure for bottles, the combination of a valvular control including a nozzle seat, a nozzle mounted for rotary movement relative to said seat and a retaining ring having a peripheral flange overlapping a portion of said nozzle to hold the same in place, the inner periphery of said ring provided with an inwardly facing recess extending for a limited distance about the ring and said nozzle provided with a radially extending stop lug positioned to move in said recess, the walls defining the ends of said recess constituting stops and coacting with said lug to limit the rotary movements in both directions of said nozzle and means for securing the ring in place on the bottle.

5. In a closure for bottles, the combination of a valvular control including a nozzle seat provided with a recess in an edge thereof, a gasket carried by said seat, a nozzle mounted for rotary movement on said gasket, a retaining ring surrounding said gasket and constituting the means for mounting the nozzle, provided with a flange engaging a part of said nozzle to hold the same in place and provided with a lug fitted in said recess in the seat.

6. A closure for a bottle including a rotary valve for controlling the flow from the bottle, said valve including a nozzle seat provided with a fluid outlet opening and with an air inlet opening having its outer portion relatively small in cross-section relative to the outlet opening and with its inner portion enlarged from the small portion, said inlet opening being relatively short in its length, and a nozzle mounted for rotary movement relative to the nozzle seat, said nozzle provided with a pour-out passageway and with an air conducting passageway, adapted when the nozzle is in open position to aline respectively with the fluid outlet opening and with the air inlet opening, said air conducting passageway being straight, of uniform cross-sectional area and having an air conducting capacity relatively great compared to the conducting capacity of the air inlet opening thereby to provide a large volume of air up to a choking point adjacent the point of entrance of the air into the bottle.

7. In a device of the class described, the combination of a bottle and a closure therefor, said closure including a valve for controlling the flow from the bottle, said valve including a conduit for admitting air to the bottle, said conduit being constricted adjacent the end thereof opening into the bottle and being enlarged to the outside of said constricted part and the end of the conduit opening into the bottle being slightly countersunk.

8. A closure for a bottle provided with an air conducting inlet conduit, said conduit being constricted adjacent the end designed to open into the bottle and the portion of the conduit to the outside of said construction having a relatively large air conducting capacity thereby to supply a large volume of air up to a short distance of the point where it is admitted into the bottle and said constricted portion being gradually reduced in cross-section toward the point of greatest constriction and the part of the conduit at said point of greatest constriction being of a size sufficiently small to be choked by liquid moving into the same from the bottle.

9. A bottle closure provided with a pour out conduit for the liquid and provided with an air conducting passageway for admitting air to the bottle, said passageway being coated with a lubricant adapted to permit the air easily to force from the passageway any liquid which might lodge therein.

10. A bottle closure provided with an air passageway extending therethrough and a coating of grease lining said passageway.

11. A bottle adapted to contain a liquid, a closure for said bottle, said closure provided with a fluid passageway opening into the bottle, and a lining for said passageway, said lining providing a surface for reducing the adhesion between the liquid and the material of which the closure is constricted.

12. A closure for a bottle including a washer of compressible material adapted to be positioned on top of the bottle, a nozzle seat fitted within said washer and having its outer edge resting on the same, a gasket of compressible material positioned on said seat, a nozzle positioned on said gasket, and spaced thereby from the seat, said nozzle provided with an exterior peripheral shoulder, a retaining ring encircling said seat and overlapping said shoulder, said ring being proportioned so that its lower edge will be spaced from the washer before the ring is fastened to the bottle, and a ferrule for fastening the ring to the bottle and adapted to engage said ring to force the lower edge therefore toward the washer.

13. A valvular closure for a bottle including a nozzle seat, a nozzle mounted for rotary movement relative to said seat and

spaced from the seat, a gasket of compressible material positioned between said nozzle and its seat, a ferrule for fastening the closure to a bottle and for compressing said gasket between the nozzle and its seat, and means engaging the outer periphery of said nozzle for limiting the distance to which said gasket may be compressed by said ferrule thereby to prevent excessive binding between the nozzle and its seat.

14. A valvular closure for a bottle including a nozzle seat, a nozzle mounted for rotary movement relative to said seat, a gasket of compressible material positioned between the nozzle and its seat, means for compressing the gasket between the nozzle and its seat and means for limiting said compression thereby to prevent excessive resistance to the rotary motion of the nozzle.

15. A closure for a bottle provided with an inverted L-shaped liquid conducting passageway, with a relatively long liquid receiving portion extending vertically when the closure is affixed to a bottle in normal upstanding position, and with a relatively short discharging portion extending substantially at right angles to the long liquid receiving portion, and adapted to be moved into a vertically extending position when the bottle is turned to a pouring position, the portion of the closure forming the underside of the discharging passageway be-

ing undercut sharply back from the pouring edge to form a sharp edge pouring lip and to form an air pocket below the pouring lip.

16. A closure for a bottle including a member provided with a liquid discharging passageway horizontally disposed when in normal upright position and adapted to be vertically disposed when moved into pouring position, the portion of said member beneath the passageway being undercut to form a sharp pouring edge with an air pocket therebelow thereby to prevent drippings forming on the portion of the member below the discharge end of said passageway.

17. An attachment designed to be affixed to a bottle and including a retaining ring, a valve seat fitted within said ring, a valve mounted for rotary movement on said seat, said valve including a base part rotatably mounted within said ring and held to the seat thereby and an upper part extending above said ring, said upper part constituting a finger piece for rotating the valve, said valve provided with a liquid discharging passageway opening therefrom through the finger piece.

Signed at New York city in the county of New York and State of New York, this 29th day of January, A. D. 1918.

FRANK H. SILVERTHORNE.