

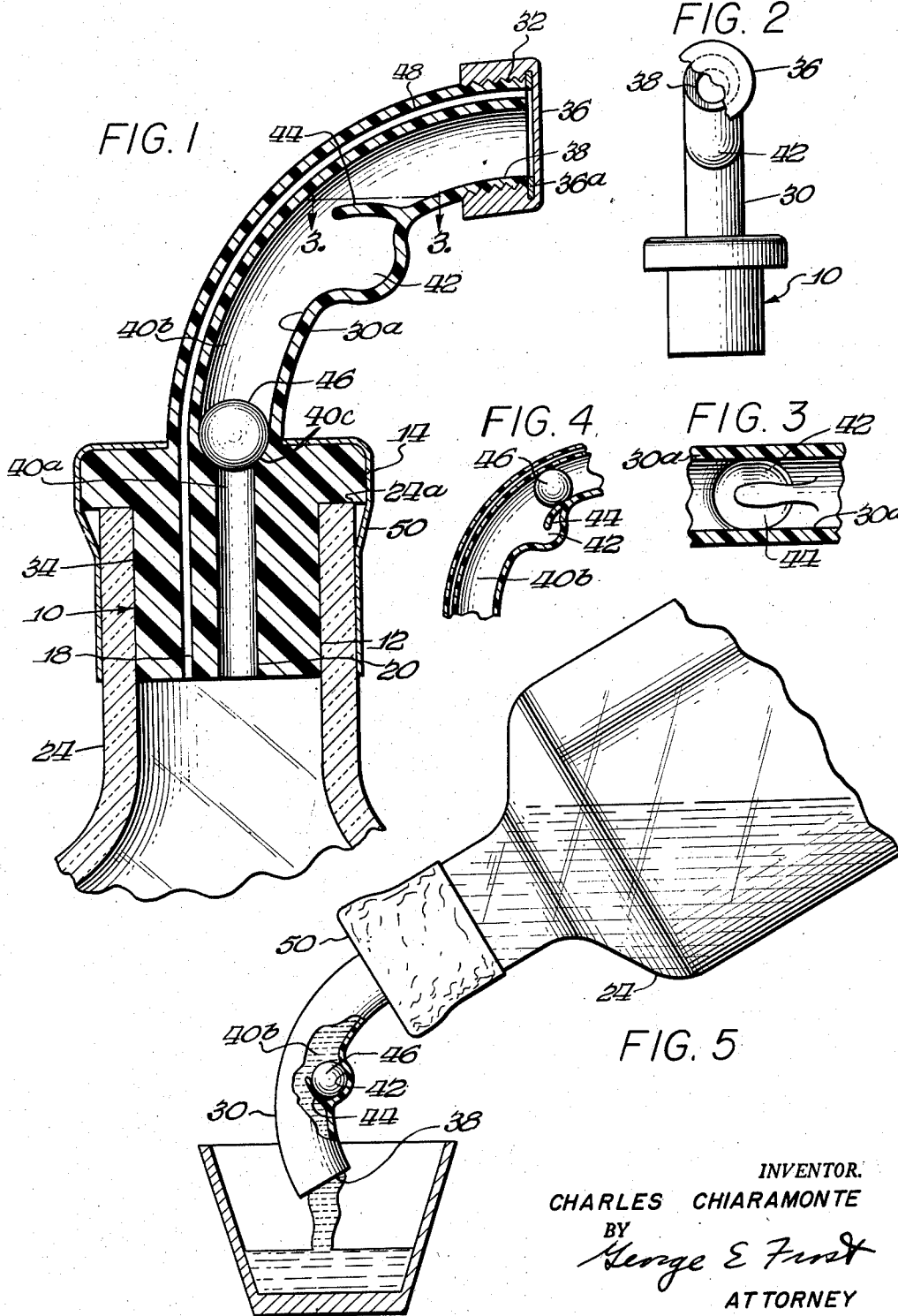
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CLOSURE FOR NON-REFILLABLE CONTAINER

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1

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## CLOSURE FOR NON-REFILLABLE CONTAINER

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5 Claims. (Cl. 222-479)

My invention relates to an improved liquid container closure which may be permanently sealed to the container to prevent dilution or substitution of the contents of the container.

When liquid is sold in a container from which the closure can be freely removed and replaced without any indication of its removal it is possible for the contents of the container to be substituted without the substitution being apparent. Or it is possible to dilute the contents of the container with inferior liquids without the dilution being readily apparent. This, of course, presents a serious problem to the manufacturer of liquids since it permits the use of his container by another to market spurious and inferior goods. It also permits dilution of the original contents of the container to the detriment of the manufacturer and the ultimate consumer. This problem is particularly acute in the liquor industry where there is a marked difference in the price and quality of the different brands.

Many devices have been proposed to prevent refilling or diluting the contents of a container. It is evident, however, that a device, to effectively solve this problem, must be sufficiently inexpensive to manufacture to make its use economically feasible for the manufacturers of liquids. The device should contain a minimum of individual parts and should be adaptable for mass production. There should be a minimum of hand operations and assembly time required in its manufacture.

In the present invention a closure for a non-refillable liquid container is provided which is of simple construction and easy to manufacture with a minimum of hand operations. In brief, the closure consists of a stopper portion and a curved unitary neck piece. The neck piece is permanently attached to the stopper portion and the stopper portion is permanently sealed in the container by the manufacturer of the liquid. The seal may consist of paper, or metal foil, wrapped around the neck of the container and over the stopper portion. The neck portion is made out of a flexible material and has a liquid outlet opening at its upper end. A passage extends from the liquid outlet opening, through the neck piece and stopper, to the container. The passage has an upper region, which has a larger diameter than the lower region of the passage. In the upper region the passage has a pocket, formed by a bulge in the neck wall, to receive a ball valve. Below the pocket, where the upper and lower regions of the passage meet, a ball valve seat is formed which also receives the ball valve. Immediately above the pocket a finger protrudes from the wall of the neck piece into the passage. In this position the finger serves to prevent the ball valve from escaping from the upper region of the passage. The finger, however, may be flexed to a deflected position along one wall of the passage to permit the ball to pass the finger.

Before use of the closure a ball valve is inserted into the upper region of the passage through the liquid outlet opening. A force applied to the ball valve will deflect the finger to permit the ball to pass the finger. Thus the

2

ball valve is introduced into the unitary neck piece without the necessity of having auxiliary bores for its introduction. Since the neck piece is made of one piece, without seams, and without auxiliary bores, no leakage can develop.

In use, the ball valve seats on the ball valve seat when the container is upright to close the passage. In this position no liquid can flow either in or out of the container. When the container is tipped the ball valve rolls up the passage and is guided into the pocket by the finger. When the ball valve is in the pocket liquid can flow through the liquid passage and out the liquid outlet opening. Although the liquid passage is open when the container is tipped, it is evident no liquid can be introduced into the container while the container is in such position.

As long as the seal around the neck of the container and the stopper portion is intact there is assurance that the contents of the container have neither been substituted nor diluted.

It is therefore an object of the present invention to provide an improved closure for a liquid container which may be sealed to the container to prevent dilution or substitution of the contents of the container.

It is an other object of the present invention to provide an improved closure for a liquid container through which liquid may be poured from but not into the container.

It is more specifically an object of the present invention to provide for a non-refillable liquid container a closure of the ball valve type without auxiliary bores for the introduction of the ball valve into the closure.

It is another object of the present invention to provide a closure of the ball valve type wherein the ball valve may be introduced into the closure through the liquid outlet opening.

It is a further object of the present invention to provide a closure of the ball valve type having a unitary portion containing the ball valve and ball valve seat.

It is still another object of the present invention to provide a unitary closure of the ball valve type.

It is yet another object of the present invention to provide a closure of the ball valve type for a non-refillable liquid container which is of simple design, reliable in operation, and economical to manufacture.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims. My invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, will be best understood by reference to the following description taken in conjunction with the accompanying drawings in which:

Figure 1 is an enlarged cross-sectional view in elevation of the closure of the present invention sealed to a container which is in an upright position;

Figure 2 is an elevational view similar to Figure 1 except that the view is 90 degrees from the view of Figure 1.

Figure 3 is a fragmentary view through section 3-3 of Figure 1.

Figure 4 is a fragmentary view showing the finger in a deflected position to permit the ball valve to be inserted into the passage from the liquid outlet opening.

Figure 5 is an elevational view of the closure of the present invention, with a part broken away for clarity, sealed in a container which is in a tipped, or pouring, position.

The closure of the present invention consists of a stopper portion, shown generally at 10, and a neck piece 30. The stopper portion has a cylindrical body 12 which is preferably made of plastic. A disc shaped head 14, preferably made of plastic as hereinafter described is on the upper face of the body 12 with its axis aligned with the axis of the body 12. The head 14 has a hole 20 ex-

tending from the bottom surface of the body 12 parallel to its axis. Another hole 18 similarly extends from the bottom surface of body 12 parallel to hole 20.

The body 12 of the stopper portion is snugly received in the neck of container 24. The head 14, which has a larger diameter than the body portion 12, rests on the lip 24a of the container opening.

The neck piece 30 of the closure is curved and has a circular cross section as shown in Figures 1 and 2. The neck piece is made out of a flexible material such as polyethylene. At the upper end the neck piece has external threads 32. The neck piece is preferably formed integral with the head 14 of the stopper portion as is the body portion. At the upper end of the neck 30 a cap 36, having internal threads and a sealing washer 36a, is threadedly engaged with the neck piece.

At the upper end of the neck piece 30 is the liquid outlet opening 38 as shown in Figure 2. A liquid passage, having wall 30a, extends from the liquid outlet opening 38 through the neck 30 to the body 12 of the stopper portion. The lower region of the liquid passage 40a has a diameter similar to the diameter of hole 20 in the stopper body 12 and is aligned with and joins that hole. The upper region of the liquid passage 40b, having a larger diameter, is aligned with, and joins the lower region of the passage 40a. At the juncture of passage 40a and 40b shoulder 40c is formed, and is concavely shaped to form a valve seat for a ball valve.

In the upper region 40b of the liquid passage the wall 30a of the passage has a spherical bulge which forms a pocket 42 connected to the passage. The pocket 42 has a radius not less than the radius of the upper region 40b of the liquid passage.

Immediately above the pocket 42 a finger 44 extends from the inner surface of the wall 30a into the upper region of the liquid passage 40b. The finger is flexible between its normal position extending into the liquid passage 40b (see Figure 1) and a deflected position (see Figure 4) generally parallel to the longitudinal axis of passage 40b.

A hole 48 extends from the upper end of the neck piece 30, through the neck piece 30, and connects with the hole 18 in the body 12 of the stopper portion, to define an air inlet.

A ball valve 46, slightly smaller in diameter than the diameter of the upper region 40b of the liquid passage but larger in diameter than the diameter of the lower region 40a, is contained in the upper region 40b of the passage. When the container is in an upright position (see Figure 1) the ball valve 46 is in a sealing position, seated on the shoulder 40c which defines the valve seat. When the container is tipped (see Figure 5) the ball valve is in the pocket 42.

After the manufacture of the neck piece 30 the ball valve 46 is inserted through the liquid outlet opening 38. When force is applied the ball valve 46 will deflect the finger 44 to the deflected position generally parallel with the longitudinal axis of the liquid passage as shown in Figure 4. This construction eliminates the necessity of making the neck piece in two or more pieces or of having an auxiliary bore in the neck piece for the introduction of the ball valve. The elimination of seams and plugs eliminates the source of troublesome leakage.

After the container has been filled by the manufacturer the closure is inserted in the container and sealed thereto by the paper or foil wrapping 50 which envelops the neck of the container 24 and covers the top surface of the stopper head 14. The sealing wrapper 50 is glued to the container and stopper head so that it can not be removed except by tearing or mutilation. Any attempt to remove the wrapper 50 is readily apparent to the observer. The cap 36 is installed on the upper end of the neck piece 30 only to prevent spilling if the container tips during shipment. When the container is received by the consumer the cap 36 may be discarded.

When the container 24 is in an upright position and the

ball valve 46 is seated on the shoulders 40c (see Figure 1) the liquid passage is closed. The container is sealed from the air and evaporation is prevented. But more important, the container is effectively sealed to prevent the addition of any spurious liquid. When liquid is to be poured from the container the container 24 is tipped to the pouring position of Figure 5. The ball valve 46 rolls up the liquid passage and, guided by the finger 44, rolls into the pocket 42. With the ball valve 46 in the pocket the liquid can pour out the liquid outlet opening 38. The finger 44 prevents the ball valve 46 from rolling out the opening 38.

It should be noted that the sealing wrapper 50 remains on the container permanently. As long as the wrapper 50 is intact there is assurance that the contents of the container have not been tampered with and that the original liquid, without dilution or substitutions, remains in the container.

While I have shown and described a specific embodiment of the present invention, it will be understood that numerous modifications and alternative constructions may be made without departing from its true spirit and scope. I therefore intend by the appended claims to cover all such modifications and alternative constructions as fall within their true spirit and scope.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A closure for use with a liquid container, the closure having one end adapted to be permanently connected to the container, comprising in combination: means defining an air inlet; means defining a passage through the end of the closure connected to the container; means at the opposite end of the closure to define a liquid outlet opening; means defining a passage larger than said first passage connecting the liquid outlet opening and the first passage, said passage having a pocket; means defining a valve seat at the juncture of the first and second passage; a ball valve within the larger passage adapted to seat on the valve seat to close the first passage when the closure is in an upright position and to roll into the pocket to permit the flow of liquid through the closure when the closure is in a tipped position; and a flexible finger extending, in its normal position into the larger passage between the liquid outlet opening and the pocket to prevent escape of the ball valve out the liquid outlet opening during operation, said finger being flexible to a deflected position to permit introduction of the ball valve into the larger passage through the liquid outlet opening before operation.

2. In a closure for a non-refillable container, the closure having a liquid passage with a longitudinal axis extending from the container to a liquid outlet opening in the closure, the liquid passage having a pocket and carrying a ball valve to close and open the liquid passage as the container is in the upright position and the tipped position, respectively, the improvement comprising: a finger extending, in its normal position, into the liquid passage from the wall of the passage between the pocket and the liquid outlet opening to prevent the escape of the ball valve from the passage out the liquid outlet opening, the finger being flexible to a deflected position generally parallel to the longitudinal axis of the liquid passage to permit the ball valve to pass from the liquid outlet opening into the passage.

3. A closure for use with a liquid container comprising in combination: a stopper having a passage therethrough to be received in and sealed to the container; a unitary neck piece secured at its lower end to the stopper, the neck piece having a liquid outlet opening at its upper end, a liquid passage of varying diameter from the liquid outlet opening to the stopper connecting to the passage in the stopper, a valve seat in the neck piece liquid passage adjacent the stopper, a pocket above the valve seat, and a flexible finger protruding, in its normal position, into the liquid passage above the pocket; a ball valve receivable into the unitary neck piece through the liquid outlet opening when the flexible finger is in deflected position; and means defining an air inlet.

4. A unitary closure of flexible material for perma-

5

nently sealing a liquid container by means of a ball valve contained therein, the closure having a stopper section adaptable to be received in and sealed to the container and a neck piece with a liquid outlet opening at its upper end, the stopper section and neck piece having an air inlet and a liquid passage therethrough of varying diameter, with a pocket, a valve seat below the pocket, and a finger protruding from a wall of the liquid passage above the pocket.

5. A closure for use with a liquid container, the closure having one end adapted to be received in and sealed to the container, comprising in combination: an air inlet; a liquid outlet opening; a liquid passage through the closure connecting the container to the liquid outlet opening; a valve within the closure movable between a position to close the

6

liquid passage when the container is in a generally upright position and a position to permit liquid to flow through the liquid passage when the container is in a generally tipped position; and means flexible between a normal position to hold the valve within the closure and a deflected position to permit the introduction of the valve into the closure.

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