

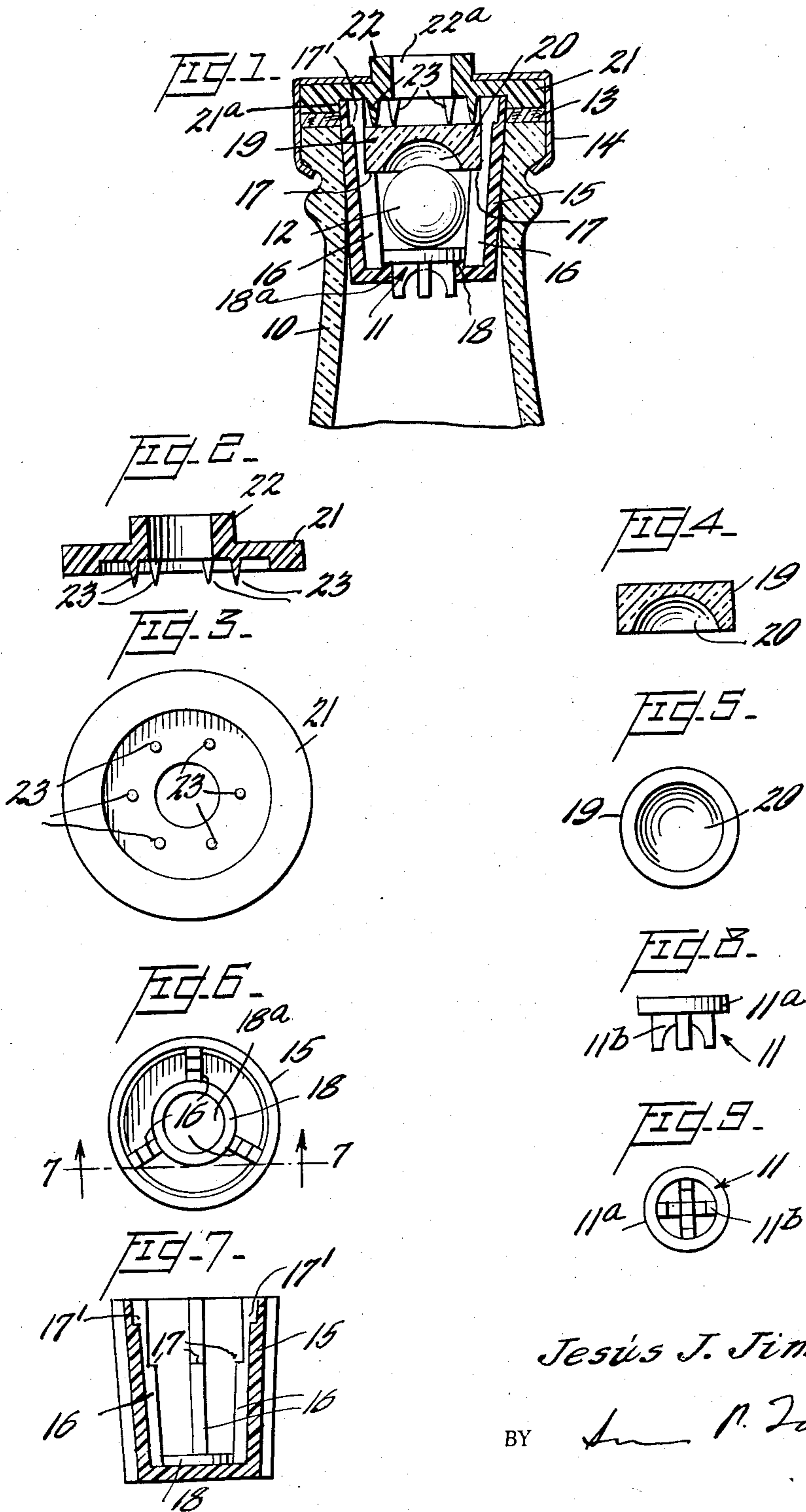
Sept. 20, 1960

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2,953,270

BOTTLE STOPPER

Filed Nov. 12, 1958



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2,953,270

## BOTTLE STOPPER

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Filed Nov. 12, 1958, Ser. No. 773,293

7 Claims. (Cl. 215-22)

The present invention relates to bottle stoppers. More particularly this invention relates to non-refillable bottle stoppers and to the combination of a bottle with said stopper.

According to an aspect of the present invention, there is provided a non-refillable bottle stopper comprising a hollow valve holder having upwardly directed side walls and a bottom wall, the valve holder being dimensioned to fit within the neck of the bottle, the bottom wall of the valve holder having an opening therethrough in which is positioned movable valve means closing the opening when the stopper is in an upright position, a vertically movable counterweight in said valve holder, the counterweight maintaining the valve in the closed position when the stopper is upright, guide means for the counterweight and spaced inwardly directed projecting means on the interior of the side walls. The guide means may be a plate positioned on said projecting means and spaced above the counterweight. The side of the guide means facing the counterweight may have a recess for guiding and receiving the counterweight when the stopper is turned from the upright position. In the preferred construction the counterweight is securely immovably positioned on the projecting means by means of an apertured flange which is fastened to the neck of the bottle by means of a ferrule.

When a bottle stopper having the above construction is positioned in the neck of a bottle and secured thereto, the contents of the bottle may be removed by inverting the bottle causing the counterweight to move away from the valve means and thereby release the valve means to permit the flow of fluid out of the bottle. When the bottle is returned to the upright position, the counterweight closes the valve means and thereby prevents introduction of liquid into the bottle.

An object of the present invention is to provide a bottle stopper having a minimum of moving parts which permits the removal of the contents of the bottle but prevents filling of the bottle.

It is another object of the present invention to provide a bottle having a valve means which automatically opens when the bottle is inverted.

These and further objects of the invention will be readily apparent from the following description together with the accompanying drawing.

In the drawings:

Fig. 1 is a vertical transverse section through the stopper of the present invention showing the stopper inserted in and secured to the neck of a bottle;

Fig. 2 is a transverse section of the upper flanged member;

Fig. 3 is a bottom plan view of the flanged member of Fig. 2;

Fig. 4 is a vertical section of the guide for the counterweight of the stopper;

Fig. 5 is a plan view of the bottom of the guide of Fig. 4;

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Fig. 6 is a plan view of the valve holder;

Fig. 7 is a vertical section of the valve holder taken along the line 7-7 of Fig. 6;

Fig. 8 is a side view of the valve; and

Fig. 9 is a bottom plan view of the valve of Fig. 8.

According to the present invention, there is provided a stopper having a hollow valve holder 15, said valve holder being generally cup-shaped, that is, it has upwardly directed side walls and a bottom wall. The valve holder is preferably frusto-conical or downwardly tapering in order to snugly be received within the neck 10 of the bottle. The walls of the valve holder are preferably sufficiently long to normally extend above the upper extremity of the neck of the bottle to provide a space for the annular sealing gasket which may be made of cork or similar material.

The bottom of the valve holder is provided with an opening 18a therethrough which communicates with the interior of the bottle and the interior of the valve holder. Around the periphery of the opening is an upwardly directed flange 18 which provides a seat for the movable valve means 11 which is slidably mounted in the opening 18a. The valve comprises an upper annular portion 11a and a downwardly depending portion 11b of smaller diameter, the downwardly depending portion 11b being received within the opening. The periphery of the lower face of the annular portion 11a abuts the seat 18 to seal the opening when the stopper is in the upright position.

Above the valve 11 there is positioned within the valve holder 15 a counterweight 12 which is preferably ball-shaped. The counterweight 12 is preferably made of ceramic material, such as porcelain or glass, or any other suitable material.

The interior walls of the valve holder 15 are provided with a plurality of spaced inwardly directed projecting means or longitudinal ribs 16 which may be two, three, or more in number. Between the ends of the ribs there are provided notches 17 which define a shoulder for reception of the guide 19 for the counterweight.

The guide 19 for the counterweight rests on notches 17 as shown in Fig. 1. In order to maintain the guide 19 immovably secured to the valve holder, there is provided an annular sealing member or flange 21 of substantially the same diameter as the upper extremity of the neck of the bottle. This sealing member or flange 21 is provided with a centrally positioned upwardly extending cylindrical portion 22 of reduced diameter, the latter having a central opening 22a therethrough. The lower face of flange 21 has a plurality of downwardly depending teeth 23 which may, for example, be six in number.

The guide or disk 19 has in its lower face a recess 20 to provide a space which permits movement of the counterweight 12. The guide 21 is of a smaller diameter than the interior diameter of the valve holder 15 to provide a free space 17' which defines a passageway for the passage of liquid from the interior of the valve holder to the opening 22a.

In order to assemble the stopper of the present invention, the valve 11 is placed in position in opening 18a in the bottom of the valve holder and the counterweight 12 is then inserted in the valve holder. The guide 19 is then seated on the shoulder defined by notches 17 and the flange 21 is positioned thereover with the ends of the teeth 23 forcing the guide 19 in secure abutment with the shoulder. The abutting edges of the lower portion of the flange 21 and the upper edge of the side walls of the valve holder may be secured to each other by means of adhesive or by heat sealing. The valve holder and the flange are preferably made of plastic material. The teeth 23 are dimensioned so that they immobilize the guide 19 against notches 17.

When the stopper is to be secured to the bottle, the bottle is first filled with liquid, the gasket 13 is positioned on the edge of the bottle and the stopper assembly is inserted into the neck of the bottle. A ferrule 14 is crimped around the stopper and the upper end of the neck of the bottle to prevent removal of the stopper. If desired, there may be provided an additional stopper (not shown) to close opening 22a when the bottle is not in use. When it is desired to obtain liquid from the bottle, it is merely necessary to tilt the bottle from the upright position permitting the counterweight and the valve to move away from the bottom of the valve holder, thereby providing communication between the interior of the bottle, opening 18a, the interior of the valve holder, passageway 17', and opening 22a. This permits the liquid in the bottle to flow therefrom. When the bottle is returned to the upright position, the counterweight 12 urges the valve 11 against valve seat 18 to close the stopper. It is evident from the above description that the valve is only opened when the bottle is significantly tilted from the upright position. Since the valve is closed when the bottle is in the upright position, the bottle cannot be refilled by any normal procedure.

The guide 19 is preferably made from ceramic material, such as glass or porcelain, in order that it be impenetrable by sharp instruments which may be inserted through opening 22a. The lower face of the flange 21 preferably has an annular recess 21a having a diameter substantially equal to the external diameter of the upper edge of the valve holder. This provides greater contact surface between the flange and the valve holder when they are secured to each other by adhesive or heat sealing.

It is evident that the free space in the valve holder between the upper part of the recess 20 and the top of the valve 11 must be dimensioned relative to the size of the counterweight 12 in such a manner that the lower portion 11b is not completely removed from the opening 18a when the stopper is inverted. In other words, the free vertical play of the counterweight must not exceed the height of lower portion 11b of the valve.

The ribs 16 in addition to providing shoulder means for reception of the guide 19 also serve to maintain the counterweight 12 out of contact from the interior walls of the valve holder. This construction is desirable since it prevents the counterweight from impeding the flow when liquid is being poured out of the bottle. When the ribs 16 are to be used to serve this function, they should be at least three in number.

What is claimed is:

1. A non-refillable bottle stopper comprising a hollow valve holder having upwardly directed side walls and a bottom wall, said valve holder being dimensioned to fit within the neck of a bottle, said bottom wall having an opening therethrough, movable valve means closing said opening when the stopper is in an upright position, a vertically movable counterweight in said valve holder, inwardly projecting circumferentially spaced longitudinal ribs on the interior of said side walls, said ribs providing shoulder means for a guide plate for said counterweight, and a guide plate separate from said ribs positioned on said shoulder means and means for securing said guide plate in position on said shoulder means, the bottom of said plate having a recess therein to provide free space for movement of the counterweight.

2. A stopper as recited in claim 1 where there is provided a flange means secured to the upper end of said valve holder, said flange means securing said guide plate in position on said shoulder said flange means having a central opening therethrough to permit passage of fluid from the interior of said valve holder.

3. A stopper as recited in claim 2 wherein said flange means has downwardly depending teeth which abut the upper face of said guide plate for maintaining said plate in position.

4. The stopper as recited in claim 1 wherein said guide plate is made from a ceramic material and said valve holder is made from plastic.

5. A non-refillable bottle stopper comprising a hollow valve holder having upwardly directed side walls and a bottom wall, said valve holder being dimensioned to fit within the neck of a bottle, said bottom wall having an opening therethrough, movable valve means closing said opening when the stopper is in an upright position, a movable counterweight in said valve holder above said valve means, the weight of said counterweight biasing said valve means to the closed position when the stopper is in an upright position, inwardly projecting circumferentially spaced longitudinal ribs on the interior of said side walls, said rib extending upwardly from said bottom wall, each of said ribs having a notch intermediate its ends, an annular guide plate separate from said ribs and immovably positioned against said notches, the bottom of said guide plate having a recess therein to provide free space for the movement of the counterweight, flange means secured to the upward end of said valve holder, said flange means having an upwardly extending portion, said portion having an opening therethrough communicating with the interior of said valve holder, downwardly depending teeth on said flange means, said teeth abutting the upper face of said guide plate to immovably position said guide plate against said notches, the diameter of said guide plate being less than the diameter of the interior of said valve holder to provide a passageway for passage of fluid.

6. In combination, a bottle having liquid therein and a stopper secured to the neck of the bottle, said stopper preventing insertion of fluids into said bottle when the bottle is in the upright position but permitting discharge of fluid from said bottle when said bottle is turned from said upright position, said stopper comprising a hollow valve holder having upwardly directed side walls and a bottom wall, said valve holder being snugly fitted within the neck of said bottle, said bottom wall having an opening therethrough, movable valve means closing said opening when the stopper is in an upright position, a vertically movable counterweight in said valve holder, inwardly projecting circumferentially spaced longitudinal ribs on the interior of said side walls, said ribs providing shoulder means for a guide plate for said counterweight, a guide plate separate from said ribs positioned on said shoulder means and means securing said guide plate in position on said shoulder means.

7. The combination recited in claim 6 wherein said stopper is provided with flange means secured to the upper end of said valve holder, said flange means immovably securing said guide means on said shoulder means, said stopper being secured to said bottle by a ferrule surrounding said flange means and the upper extremity of the neck of the bottle, said flange means having a central opening therethrough to permit passage of fluid from the interior of said valve holder.

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