(No Model.)

B. K. DORWART.

BOTTLE STOPPER.

No. 354,106. Patented Dec. 14, 1886.

Fig. 2.

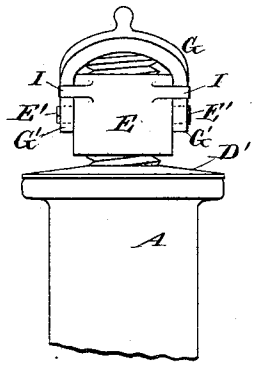


Fig. 1.

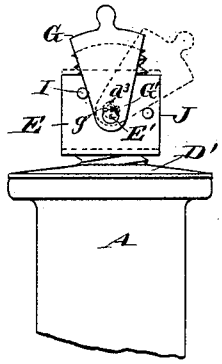


Fig. 3.

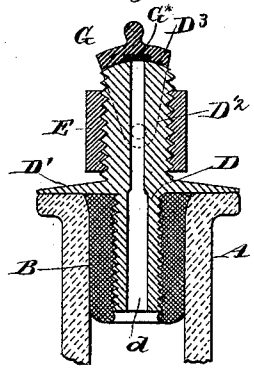


Fig. 6.

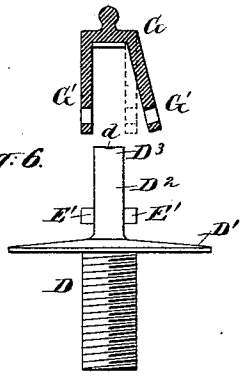


Fig. 5.

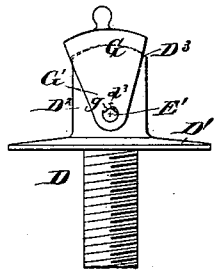


Fig. 7.

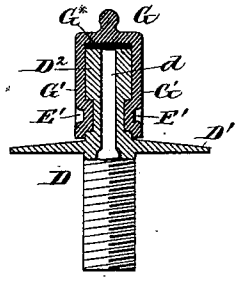
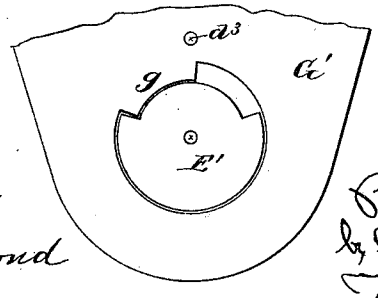


Fig. 4.



Witnesses:
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Inventor:
B. K. Dorwart
by his attorney
Thomas Drew Stetson

N. PETERS. Photo-Lithographer. Washington, D. C.

UNITED STATES PATENT OFFICE.

BENJAMIN K. DORWART, OF LANCASTER, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND MONCKTON W. MICHELL, OF SCOTCH PLAINS, N. J.

BOTTLE-STOPPER.

SPECIFICATION forming part of Letters Patent No. 354,106, dated December 14, 1886.

Application filed June 24, 1886. Serial No. 206,114. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN K. DORWART, of Lancaster, in the county of Lancaster and State of Pennsylvania, have invented a certain new and useful Improvement in Sprinklers and Distributers for Bottles, of which the following is a specification.

The invention may be applied to a removable part adapted to fit in the mouth of an ordinary bottle. I will describe it as so used.

I provide a closing device which is capable of turning on an axis through a sufficient arc to allow a suitable orifice to be covered and uncovered. The bearing-surfaces are curved to allow of the lateral sliding movement. The curvature of the surfaces is slightly eccentric to the axis of motion. For some uses I apply packing material in a recess in the interior of the cap, to insure a tight contact when the device is closed. It is important to insure against the swinging of the cap into the open position by concussion in transportation or other accidental forces. In what I esteem the most complete form of the invention, the eccentricity is so arranged that in moving the cap to the closing end of its motion it moves a little past the tightest point. Further motion in that direction is resisted by a positive stop. Accidental movement in the return direction is resisted by the eccentricity.

The device may be applied to control the discharge of sirups and other semi-fluids and to cocks and faucets for other purposes.

It will serve to some advantage in connection with collapsible tubes, in which case it will be made in one with the tube.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a side elevation; Fig. 2, an elevation at right angles to Fig. 1, and Fig. 3 a central longitudinal section in the position corresponding to Fig. 1. Fig. 4 is an elevation of a part on a larger scale. The remaining figures show modifications in which portions of the invention are applied in simpler forms. Fig. 5 is an elevation showing the novel parts complete ready for application to a stopper. Fig. 6 is a view at right angles to Fig. 5, showing the cap in the act of being applied. Fig. 7 is a vertical section showing another mode of engaging the cap.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to Figs. 1, 2, and 3, A is the mouth of a bottle; B, an annular cork making a close joint therewith; and D, a metallic body, which is tightly and strongly joined to B, and is traversed longitudinally by an aperture, *d*. Certain portions of this body D will be designated, when necessary, by additional marks, as D′ D^2. A flange, D′, extends over the mouth of the bottle and gives an ornamental finish. The main portion D^2 is screw-threaded. The upper surface, D^3, is smoothly finished.

E is a screw-threaded ring matching on the screw-threaded portion D^2. It carries trunnions E′, the axis of which, when the device is down, lies a little below the center d^3 of the spherical surface D^3.

G is a cap adapted to match on the spherical surface D^3, and provided with arms G′, engaging the trunnions E′. The cap may turn on these trunnions as an axis. In one position it uncovers the orifice *d* and allows the perfumery or other contents of the bottle to be discharged. In another position its smooth interior matches tightly against the spherical surface D^3 and closes the orifice.

G* is a piece of fine cork or analogous yielding and elastic material. It is fitted in a recess in the cap G and presents a smooth face on the inner side of the cap. This packing makes a close joint with the spherical surface of the body and compensates for imperfections in workmanship or of adjustment, so as to maintain an absolutely tight joint when the device is closed.

The eccentricity or want of coincidence of the trunnions E′ with the center of curvature d^3 of the face of the body causes the cap to be drawn very tightly upon the body in one position and to gradually relax its contact in being turned away from that position in either direction. In one direction it is allowed to be moved sufficiently to completely open the orifice *d*. In the other direction it is allowed to move a little past the point of tightest contact and is then arrested. The cap is prevented from being moved too far in either direction.

Two projections, I and J, formed on the ring E, serve as stops to arrest the motion of the cap in the opened and closed positions. A similar end is attained by the form of the trunnions E′ and the adjacent portions of the cap. Each of the latter is formed with an internal projection, *g*, which, as the cap swings, traverses to one side and the other of a broad notch formed in the trunnions.

In the manufacture I employ by preference the white metal known as "Britannia." It is strong, and so nearly destitute of elasticity that the cap being completed in shape, except the final bending, may be applied in the correct position and permanently secured thereon by simply bending the cap inward by suitable dies or otherwise.

The construction allows the force with which the inner face of the cap presses against the upper surface of the body to be varied by turning the ring E and its attachments around on the screw-threaded body. The spherical form allows this without interfering with the action. Supposing the cap to have been previously moved to one side and the passage *d* open, the act of tightly closing consists in first swinging the cap so as to cover the passage *d* and afterward turning the ring E and its connections around until the cap is pressed tightly down upon the spherical surface of the top of the body. It will remain in this condition for any period. When it is to be opened again, the operation should be commenced by first turning the ring E and its connections around to lift the cap clear of the body, after which it may be swung with ease to one side.

The stop I allows the cap to be moved somewhat past the tightest closed position, but not so much as to materially impair the tightness of the contact. The stop J arrests the opening motion after the orifice *d* is entirely uncovered.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. The threaded ring E may be adjusted in a position which gives a just sufficiently forcible pressure of the cap upon the body when in the closed position, and allowed to remain in that position, omitting the turning to tighten and the turning in the opposite direction to relax the force. The turning ring may be set fast—or, in other words, the trunnions may be formed on the body—care being taken to adjust the parts so that there will be a sufficiently forcible contact while still allowing motion. Figs. 4 and 5 represent such a construction.

Instead of producing trunnions E′, projecting out from the body and engaging in holes in the cap, I can, if preferred, produce a cap with internal projections and provide the body with holes to receive them. Fig. 6 shows such modification. The top of the body is not necessarily spherical. When the turning ring E is omitted and the cap is mounted directly on the body, the rubbing-surface of the body at the top may be a portion of a cylinder, care being taken to give a corresponding form to the cap. The elastic material G* may be omitted and the close fit of the cap obtained by letting the efficient surfaces of the metal apply directly together. Other metal than Britannia may be used.

The projections E′ and the corresponding but wider notches in the trunnions may serve alone as the stops to limit swinging movement of the cap, the stops I and J being omitted; or the latter stops may be employed and plain cylindrical trunnions may serve. It is only essential that the proper amount of motion be allowed with provisions for preventing a mischievous excess.

The location of the devices which arrest the cap in the closed position may be varied, so as to stop it in the position of tightest contact, instead of allowing it to move a little past. I prefer, however, to let the cap swing a little past the most tightly-fitting position, so that the elasticity of the parts shall aid to hold the cap in the closed position, thus affording increased security against possible opening by accidental forces.

I propose in some cases to make the body D of glass, casting the trunnions in one with the body. The cap will be of metal, applied as described. The lower portion of the body may be ground to a fit in the neck of the bottle in the usual manner.

I claim as my invention—

1. The body D, having an aperture, *d*, and a curved surface, D^3, arranged to be rigidly held in a bottle or the like, in combination with a swinging cap, G, turning on an axis eccentric to said curved surface, and arranged for joint operation, substantially as herein specified.

2. The removable body D, having a curved surface, D^3, adjacent to the aperture *d*, arranged to serve with a separate vessel or tube, A, in combination with a swinging cap, G, and with stops adapted to arrest the motion, as herein specified.

3. The threaded ring E, in combination with the correspondingly-threaded body, and with a swinging cap, G, pivoted to the said ring, the cap and body having curved bearing surfaces presented toward each other, all arranged for joint operation, as herein specified.

4. The cap G and packing G*, in combination with each other, and with the body D, having a perforation, *d*, and curved surface D^3, and with means, as the trunnions E′, pivoting the cap to the body at a point below the center of the curvature of the body, as herein specified.

In testimony whereof I have hereunto set my hand, at New York city, New York, this 22d day of June, 1886, in the presence of two subscribing witnesses.

BENJAMIN K. DORWART.

Witnesses:
CHARLES R. SEARLE,
M. F. BOYLE.