



# UNITED STATES PATENT OFFICE.

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## STOPPER.

SPECIFICATION forming part of Letters Patent No. 665,869, dated January 15, 1901.

Application filed April 30, 1900. Serial No. 14,894. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES N. BRISCO, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Stoppers, of which the following is a specification.

My present invention is in the nature of an improvement on the stopper described in my United States Patent No. 623,304, dated April 18, 1899. The stopper described in said patent was devised particularly for use with bottles of common construction to render them proof against refilling, and there is employed in connection therewith a disintegrable tablet (or its equivalent) which when acted upon by liquid commonly releases a valve-closing spring.

The primary object of the present invention is to provide means for sealing securely when the stopper is closed the mutable or unstable body employed at the connection between valve and stem, whereby vapor from any liquid remaining above the valve after pouring and vapor from the air itself in countries where there is high humidity are prevented from affecting said body.

In the accompanying drawings, Figure 1 represents a vertical section of a fragment of a bottle-neck equipped with my improved stopper in preferred form; Fig. 2, a bottom plan view of a valve-guard employed, showing cams thereon for engaging lugs on a valve-stem passing therethrough; Fig. 3, a plan view of a loose valve-section employed; Fig. 4, a view in side elevation of a valve-closing spring, a disintegrable tablet, and a holder therefor; Figs. 5 and 6, sections at the corresponding lines of Fig. 1; Fig. 7, a vertical sectional view illustrating the connecting means between the lower end of the valve-stem and a portion of a telescoping casing; Fig. 8, a view in side elevation of the valve-stem and the operating-handle therefor; and Fig. 9, a section similar to Fig. 1, showing a modification.

A represents a portion of a bottle-neck; B, a valve-guard provided with a central valve-stem-receiving perforation  $a$ , a lower bottle-neck-receiving flange  $a'$ , an upper flange  $a^2$ , affording a circular recess or depression  $a^3$ , a central annular flange  $a^4$ , projecting into the cavity  $a^3$ , and liquid-discharge perforations

or orifices  $a^5$ ; B', a supplemental valve-guard provided with a central perforation  $b$ , a lower surface recess  $b'$ , receiving the flange  $a^4$ , and peripheral half-circular perforations  $b^2$ ; C, a valve-stem provided at its upper end with a ribbed enlargement  $c$ , fitting within the recess  $a^3$ , above said enlargement  $c$  with an operating disk or handle  $c'$ , below said enlargement  $c$  with half-circular cams  $c^2$ , and at its lower extremity with lugs  $c^3$ ; D, a valve-stem extension provided with a vertical flange  $d$ , having recesses  $d'$ , a horizontal flange  $d^2$ , having perforations  $d^3$ , and a depending flange  $d^4$ , provided internally with a lug  $d^5$  and externally with lugs  $d^6$ ; D', a movable sleeve-section rigidly fixed or cemented at its lower end to the flange  $d^4$ , which it receives; D<sup>2</sup>, a non-movable sleeve-section securely cemented to a flange  $e$  on the lower surface of the valve-guard B and projecting into the sleeve-section D'; E, a valve-section provided on its upper surface with a recess  $f$ , a flange  $f'$ , projecting into the flange  $d^4$  of the valve-stem extension D, and a circumferential shoulder  $f^2$ , receiving a gasket  $f^3$  and provided on its lower surface with a lug or key  $f^4$  of angular cross-section; E', a valve-section provided on its upper surface with a recess  $g$  of proper cross-section to receive the key  $f^4$  and provided on its lower surface with a valve-seat-contacting projection  $g'$ ; G, a valve-seat, of cork or other suitable material, provided with a central perforation  $h$ , and H a spring-metal valve-spring retainer connecting the valve-section E to the valve-stem extension D.

The spring-retainer H is preferably of sheet metal, comprising a bottom  $k$ , upward-projecting supporting-arms  $k'$ , and valve-engaging arms  $k^2$ . The arms  $k'$  are bent, as shown, to afford retaining-shoulders  $l$  and enlargements  $l'$  for receiving a disintegrable tablet  $l^2$  and a coil-spring  $l^3$ . The tablet  $l^2$  holds the arms  $k$  expanded, so that the shoulders  $l$  will engage internal shoulders  $m$  on the sleeve  $d$ . The spring  $l^3$  surrounds the lower portion of the retainer H, being held in place and normally out of action by shoulders thereon, as indicated. When the tablet  $l^2$  dissolves or is removed, the spring is freed, the shoulders  $l$  are freed from engagement with the shoulders  $m$ , and the spring, expanding, forces the valve-section E down out of the valve-stem exten-

sion D, thereby causing the valve-section E' to be firmly pressed to its seat.

Flanking the perforation  $a$  of the valve-guard B are upper cams  $n$ , which coact with the cams  $c^2$  of the valve-stem to cause the valve to rise when the stem is rotated to the left. Directly beneath the cams  $n$  and on the valve-guard B are lower cams  $n'$ , with which the lugs  $d^6$  on the valve-stem extension engage, whereby the valve-stem is lowered when rotated to the right. Flanking the perforations  $a$  and dividing the members on each set of cams from each other are slots  $n^2$ , which serve to permit the introduction of the valve-stem from above.

The bottle-neck is of sufficient size to afford an annular channel  $p$ , leading to an annular recess  $p'$  in the valve-guard and in communication with the perforations  $a^5$ . Thus when the valve is raised, by turning the valve-stem to the left a passage for liquid to the perforations  $a^5$  is afforded. The outer margin of the lower surface of the supplemental valve-guard B' is raised above the bottom of the recess  $a^3$ , whereby passage is afforded from the openings  $a^5$  to the half-circular perforations  $b^2$ , from whence the liquid is free to pass the vertical ribs on the enlargement  $c$  of the valve-stem C. The upper surface of the supplemental guard B' slopes downwardly and outwardly from the central valve-stem perforation, whereby any liquid caught by the flange  $a^2$  in turning the bottle to vertical position after pouring is directed back to the perforations  $a^5$ . A gasket  $q$  is provided between the enlargement or shoulder  $c$  and the adjacent surface of the supplemental guard B'. The valve-stem C tapers from top to bottom, whereby when the valve is in its elevated position a central passage is provided from the recess  $a^3$  to the interior of the extensible housing afforded by the sleeve-sections D' and D<sup>2</sup>. The supplemental guard B' is securely cemented to the guard B, and when the valve-stem is in its lowest position this central passage is closed and the extensible casing for the mutable body is hermetically sealed. In the operation of pouring no liquid can pass through this central opening, nor can liquid enter the central opening when the bottle is brought to an upright position after pouring. Should the valve-stem be raised and an effort made to refill the bottle, the recess  $a^3$  will be filled above the supplemental guard B' and liquid will pour into the extensible housing through the passage described and pass through the perforation  $d^2$  into the tablet-chamber. Upon contacting with liquid the tablet is quickly dissolved, the valve-spring being thereby released and allowed to operate to force the valve to its seat.

The construction shown in Fig. 9 is similar to the construction described, the tablet  $l^2$ , spring  $l^3$ , and spring-retainer H being replaced, however, by a body I of compressed sponge or other material of a nature to be affected by liquid. In this construction the

valve-stem extension D receives the upper portion of the body I directly, while the recess  $f$  of the valve-section E receives the lower end thereof directly. When the body I is dry and comparatively firm, it serves to lock the valve-section E to the stem extension D; but when the unstable body is affected by moisture its hold is released upon the interior surface with which it contacts, and the valve is thereby disconnected from the stem. The operation in this case differs from the operation in the former case in that the valve after detachment from the stem is not held firmly to its seat, the looseness of the valve-section E serving to expose the fact that the stopper has been tampered with.

The function of the valve-section E' is to prevent liquid from being poured or forced into the bottle while the latter is at an angle. The key  $f^4$  serves when the valve-stem is rotated to loosen the valve-stem E' from its seat.

It will be understood that the guard B is to be welded or cemented firmly to the bottle-neck, cement  $r$  being shown for the purpose. The form of the guard may be variously modified.

The improved means for protecting the unstable body from liquid or vapor contact except under the conditions specified is claimed wherever applicable.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a stopper, the combination of a valve-guard, a valve-stem, a valve, a mutable body forming a connecting portion between valve and stem, and an extensible housing inclosing and protecting said body and operated by said valve-stem, substantially as and for the purpose set forth.

2. In a stopper, the combination of a valve-guard provided with a central perforation, a valve-stem extending through said perforation, a valve, a mutable body forming a connecting portion between valve and stem, and a housing inclosing said body from liquid contact, except by way of said central perforation, substantially as and for the purpose set forth.

3. In a bottle-stopper, the combination of a valve-guard having a central perforation, a valve-stem extending therethrough, a valve, a mutable body forming a connecting portion between valve and stem, a sleeve-section carried by said stem and inclosing said body, and a sleeve-section depending from the valve-guard and telescoping with said first-named sleeve, substantially as and for the purpose set forth.

4. In a bottle-stopper, the combination of a valve-guard having a central perforation, a valve-stem extending therethrough, a valve provided on its upper side with a recess, a valve-stem extension provided on its lower side with a recess, a mutable body supported in said recesses and forming a connecting portion between valve-stem extension and valve, and an extensible housing for said

body having liquid-tight joint with said valve, substantially as and for the purpose set forth.

5 In a bottle-stopper, the combination of a valve-guard, a valve-stem working there-  
through, a valve-stem extension provided  
thereto from above, a detachable valve, a  
mutable body supported from said recess and  
10 forming a connection between valve-stem ex-  
tension and valve, and an extensible housing  
having liquid-tight connections with valve  
and valve-guard and inclosing said valve-  
stem extension, substantially as and for the  
15 purpose set forth.

6. In a bottle-stopper, the combination of  
a valve-guard having an upper surface recess,  
a central perforation and flanking pouring-  
orifices, a supplemental guard in said recess  
20 and having a central perforation registering  
with said first-named central perforation and  
provided with a sloping surface, a valve-stem,  
a packing-ring surrounding said stem and  
bearing on said supplemental guard, means  
25 for raising and lowering the guard, a valve,  
a mutable body connecting valve and valve-  
stem, and an extensible housing inclosing  
said body and having liquid-tight connec-  
tions with valve-guard and valve, substan-  
30 tially as and for the purpose set forth.

7. The combination with a bottle-neck, of  
a valve-seat therein, a valve-section seated  
thereon having an angular recess on its up-

per surface, a valve-guard, a valve-stem work-  
ing therethrough, and a valve-section sup- 35  
ported by said stem and having an angular  
projection engaging the recess of said first-  
named section, substantially as and for the  
purpose set forth.

8. The combination of a valve-guard, a 40  
valve-stem extending through the same, up-  
per and lower cams on said guard, cams on  
said stem engaging the upper cams of the  
guard and serving to raise the stem when the  
latter is rotated in one direction, lugs on said 45  
stem engaging the lower cam and serving to  
lower the stem when the latter is rotated in  
the opposite direction, and a detachable valve  
carried by said stem, substantially as and for  
the purpose set forth. 50

9. The combination of a valve-guard, a  
valve-stem working therethrough, a valve-  
stem extension provided with a recess, a  
spring-retainer provided with one set of arms  
engaging the walls of one of said recesses and 55  
with another set of arms engaging the walls  
of the other recess, a mutable body serving  
to hold one set of arms expanded, a valve-  
spring normally held against action by said  
retainer, and a housing, substantially as and 60  
for the purpose set forth.

CHARLES N. BRISCO.

In presence of—

D. W. LEE,  
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