W. H. HICKS.

BOTTLE-STOPPER.

No. 188,293. Patented March 13, 1877.

Fig. 1.

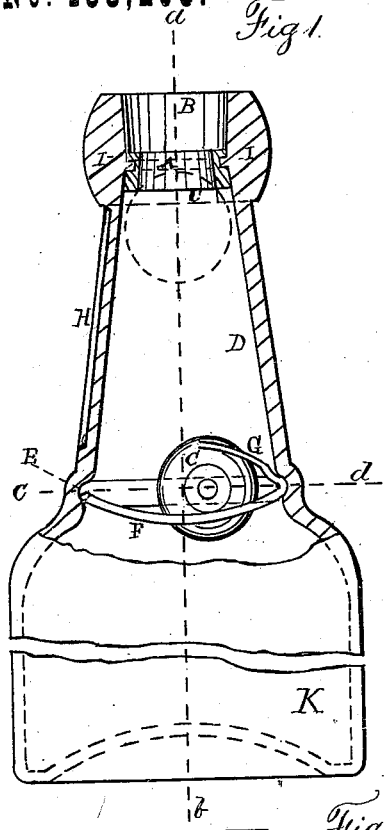

Fig. 2

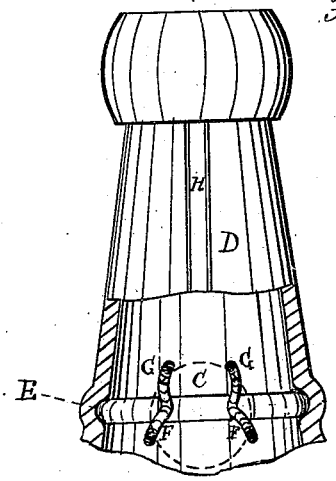

Fig. 3.

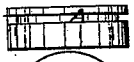

Fig. 4.

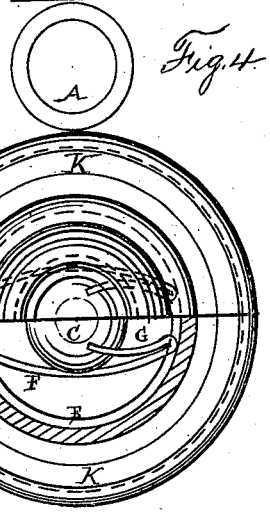

Fig. 5.

Witnesses.

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IMPROVEMENT IN BOTTLE-STOPPERS.

Specification forming part of Letters Patent No. **188,293**, dated March 13, 1877; application filed January 11, 1877.

To all whom it may concern:

Be it known that I, WILLIAM H. HICKS, of Brooklyn, county of Kings, and State of New York, have invented a new Bottle-Closing Device, of which the following is a specification, reference being had to the drawings which form part of this specification.

My invention relates to bottle-closing devices where the closing is effected by internal pressure, and consists of certain combinations of the following parts: an internal projection from the inner walls of the bottle, near its mouth, extending around its circumference, preferably rectangular in cross-section; a compressible seat, grooved in its larger diameter to fit over and cover said projection; a groove formed in the inner walls of the bottle, a distance below said projection; a detachable bridge, extending across the inside of the bottle, supported in said groove or grooves, and of less area than the inner area of the bottle at that point, said bridge being so formed as to sustain a stopper, preferably ball-shaped, and so formed above the lower part as to hold between it and the upper part a stopper, upon one side of the perpendicular center-line of the bottle when the bottle is turned upon that side, and so shaped as to allow the stopper to pass it freely when turned upon its other side; a stopper, preferably ball-shaped, contained within the bottle, between the detachable bridge below and the projection and compressible seat above; a chamber contained between and bounded by the bridge and its groove below and the projection above, and by the inner walls of the bottle on its sides; a designating-mark upon the bottle to indicate the position in which it is to be held while its contents are being discharged; a designating-mark upon the bottle to indicate its proper position while discharging the contents.

In order to enable persons skilled in the art to make and use my invention, I will proceed to describe it, referring to the drawings, in which the same letters wherever they occur refer to similar parts.

In the drawings, Figure 1 is a vertical section of the upper part of a bottle, and an outside view of the lower part, showing in section the projection for the compressible seat, the compressible seat, the groove for holding the detachable bridge, the detachable bridge, and in dotted lines the position of the ball-stopper when in its seat, also its position on the bridge between its lower and upper curved parts when the bottle is turned upon its side to empty its contents, and upon the outside of the bottle, opposite to the claw-shaped part of the controlling-bridge, showing a longitudinal groove or depression, to mark the side to be held uppermost, also in section. Fig. 2 is a vertical section of part of the upper portion of a bottle, and an outside view of the nose of bottle, the section being taken on line *a b* of Fig. 1, showing the groove E for the detachable controlling-bridge in section, the bridge, the lower part in section, and the claw-shaped upper part in end view, with the stopper shown in dotted lines between the upper and lower parts. Fig. 2 also shows designating-mark H in outside front view. Figs. 3 and 4 are plan and sectional views of the compressible seat, which, when in the bottle, covers the projection I, and showing the groove in its larger diameter, nearer the upper than its lower surface. Fig. 5 shows a top view of one-half of a bottle, and a sectional view across the bottle, on the line *c d* of Fig. 1, through the groove E, for sustaining the bridge; also a top view of the bridge in its place in the groove, and the stopper resting on it when in its lowest position.

In the several figures of the drawings, A represents the grooved compressible seat. B represents the mouth of the bottle. D represents the chamber formed by the inner walls of the bottle, between the projection I and its compressible seat A for its upper boundary, and the detachable controlling-bridge F and its groove E for its lower boundary. E represents the groove in the inner walls of the bottle for supporting the bridge. F represents the lower part of the detachable supporting-bridge. G represents the upper curved or claw-shaped portion of the supporting and controlling detachable bridge, in its position in groove E. C represents a ball-shaped stopper or closing piece between the upper and lower parts of the bridge, as in Fig. 1, and in its different positions in the other figures. H represents a designating-mark on the outside of the bottle. I represents the projec-

tion on the inner walls of the bottle, extending around the circumference, to hold the compressible seat A. K represents the lower portion of the bottle, below the chamber D.

The operation of my device is as follows: The seat having been placed, by means of a suitable tool, over projection I, the bridge having been placed in its groove E, with its upper claw-shaped part opposite the designating-mark H, the ball-stopper having been placed in the chamber D, the bottle is then filled to a point below the bridge, in any manner suitable for the purpose. The stopper, when the bottle is turned upside down, falls to its seat, or against the compressible seat on projection I, and is held in its place by the pressure from the gases of the contents, or by internal pressure upward, thus sealing the bottle against leak. When it is desired to empty the contents, the stopper is to be pressed away from its seat, and, the internal pressure released, the stopper falls by its gravity to the bridge below, and is held by it from descending lower. The bottle is then turned upon its side, so that the ball rolls to the side opposite the designating-mark, and into the space between the lower and upper parts of the controlling-bridge, which prevents it from rolling to its seat and obstructing the flow of the liquid out from the bottle. When the contents are discharged the bottle may be held upright, and the stopper returns to the lower part of the bridge below, where it may rest, until the bottle is to be again filled for use.

The claw-shaped upper part of the controlling-bridge is so formed as to hold the stopper upon one side of the perpendicular center-line of the bottle, and to offer no hinderance to its free passage back and forth from its seat to the supporting-bridge upon the other side of said bottle. The bridge performs two offices—that of supporting the stopper above the line of the contents, and of holding or controlling it when the bottle is turned on one side.

The bridge is inserted in the bottle and placed in its supporting-groove by a suitable tool, by passing it down through the mouth of the bottle, below the groove, and drawing it back again into the groove. As the lower edge of the groove, when made in the tapering neck of the bottle, is of larger diameter than the upper edge, it is easier to insert the bridge in this manner. The bridge is formed with elliptical curves, in order that it may be easier to compress it through the neck of the bottle. After passing it into the bottle it returns to its shape, the elasticity holding it in the groove with greater firmness than it would if there were no elasticity in it.

The designating-mark may be of any convenient form in or on the bottle. The stopper may be made of glass or of wood, suitably prepared to resist the action of the contents of the bottle, and made of proper specific gravity to answer the end desired.

The compressible seat is made of elastic material, preferably, that it may hold more tightly onto the projection which holds it and return again to its former shape after compression. The groove on its outer surface is made nearer its upper than its lower surface, so that the pressure of the stopper may have less leverage to force it off its projection, and that the pressure may crowd the material at a sharper angle into the lower corner of the projection, formed by its junction with the walls of the chamber D. The leverage to force the seat off the projection is increased or diminished as the lower corner of the seat A is placed nearer or farther from the lower corner of the projection which holds it.

Having now described my invention and its mode of operation, I claim—

1. The combination, within a bottle, of a raised projection on its inner walls extending around its circumference, with a compressible seat, recessed in its larger diameter to fit over said projection, substantially as and for the purposes set forth.

2. The combination, within a bottle, of a raised projection extending around its inner walls, a compressible seat grooved in its outer diameter to fit and cover said projection, with a ball-stopper or otherwise, contained within the bottle below said projection and seat, substantially as and for the purposes set forth.

3. The combination, within a bottle, of a groove or recess formed in its inner walls, with a bridge of less area than the area of the bottle at that point, supported in said groove upon opposite sides and extending across the bottle, substantially as and for the purposes set forth.

4. A detachable bridge placed across the inner walls of a bottle, substantially as and for the purposes set forth.

5. A detachable controlling-bridge, of less area than the area of the bottle at that point, placed across the inner walls of a bottle to support a stopper or closing-piece, and on one side of the perpendicular center-line of the bottle, formed to control the stopper from falling to its seat when the bottle is turned upon one side, and so formed as to allow the stopper to pass it freely on the other side of said center-line, substantially as and for the purposes set forth.

6. A compressible seat having a groove in its outer surface to fit over a corresponding projection on the inner walls of a bottle, having the groove nearer its upper surface than its lower, and having an opening in it or through it for the passage of the fluids or contents of the bottle, substantially as and for the purposes set forth.

7. A bridge, constructed as described, with an upper curved or claw-shaped portion for controlling the position of a stopper for a bottle, substantially as and for the purposes set forth.

8. A chamber formed by the inner walls of a bottle, between an internal projection on its

inner walls, covered by a compressible seat, and a groove or recess in its inner walls, holding a detachable bridge, substantially as and for the purposes set forth.

9. The combination, within a bottle, of a raised projection on its inner walls, a compressible seat fitting over said projection, a groove in its inner walls below said projection, a detachable bridge supported in said groove, a stopper contained between said projection and seat, and the groove and bridge below, with said bottle, substantially as and for the purposes set forth.

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Witnesses:
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