W. H. HICKS.

BOTTLE-CLOSING DEVICE.

No. 191,283. Patented May 29, 1877.

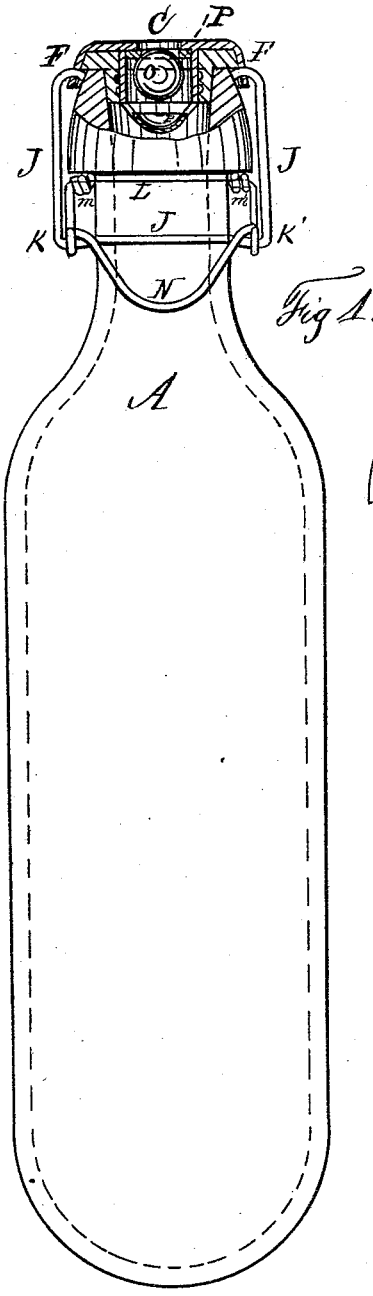

Fig 1.

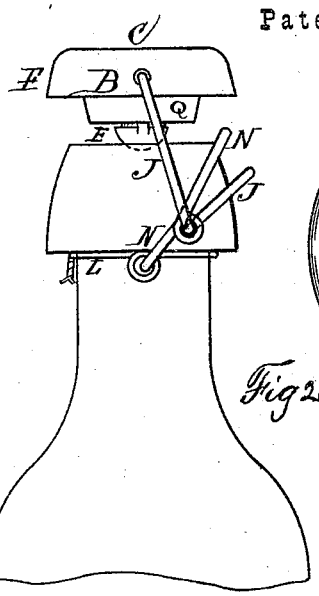

Fig 2.

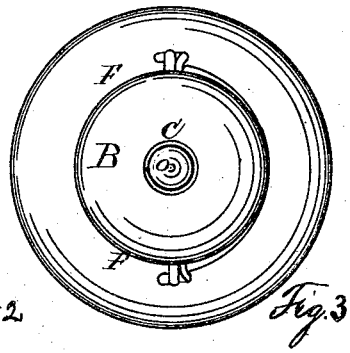

Fig. 3.

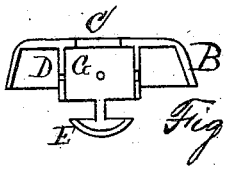

Fig. 4.

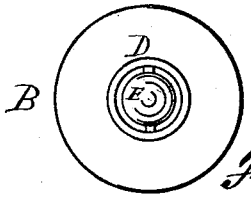

Fig 5

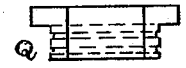

Fig 6.

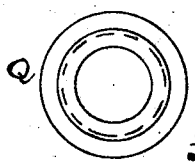

Fig. 7.

Witnesses
James M. Hicks.
William E. Jenkins

Inventor.
W. H. Hicks.

UNITED STATES PATENT OFFICE.

WILLIAM H. HICKS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN BOTTLE-CLOSING DEVICES.

Specification forming part of Letters Patent No. **191,283**, dated May 29, 1877; application filed April 14, 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 Improvements in Bottle-Closing Devices, of which the following is a spscification, reference being had to the drawings, which form part of this specification:

My invention relates to bottle stopping or closing devices, where the pressure from the contents holds the stopper to its seat.

In former devices of this nature the seat for the stopper has been formed in the neck of the bottle, necessitating the construction of the bottle for this special purpose. By my invention bottles not especially constructed for the purpose are arranged to be closed by the pressure of the gaseous contents within the bottle by placing the stopper and its seat within or beneath the cap-piece, which is held over the mouth of the bottle permanently, or capable of being closed down upon it, and lifted away from it by a lifting and closing mechanism.

To accomplish this my invention consists of certain combinations of the following elements: A cap-piece, provided at its edges or circumference with eyes or pivots to joint to a lifting and closing mechanism, having its upper surface unencumbered, so as to fit uniformly and tightly to the packing of the filling machinery; having an opening through its thickness, surrounded on its under side by an angularly-projecting flange to a distance from the edge of said opening, so as to form a shoulder for a valve-seat between the inner walls of said flange and the edge or circumference of said opening, said flange having at its base a supporting or deflecting plate or piece sustained beneath it; a stopper, preferably ball-shaped; an annular compressible valve-seat; an annular compressible flanged packing-piece; a lifting and closing mechanism; a bottle, having a shoulder on the outside of its neck; a wire or metallic piece, arranged to fasten around the neck of the bottle under its shoulder, and provided with bearings; a continuous wire or metallic piece provided with journals or pivots, and eyes or bearings, curved at its central portion nearly to the shape of the neck of the bottle; a continuous wire or metallic piece curved at its central portion nearly to the shape of the neck of the bottle, provided with journals at the ends of the curved portion, and arranged at its ends to joint to a cap-piece.

To enable persons skilled in the arts to understand, make, and use my invention, I will proceed to describe it, referring to the drawings, in which the same letters refer to like parts wherever they occur.

In the drawings, Figure 1 is a front view of a bottle, closed by a cap-piece, and having a portion of the nose broken away to show the details of the cap-piece in section. Fig. 2 is a side view of the same, showing the cap-piece lifted from the mouth of the bottle, and the lifting mechanism in its extreme upward position. Fig. 3 is a top view of same, showing the hole in the cap-piece, through which the bottle is to be filled, and upper surface smooth or unobstructed by anything which would interfere with the operation of filling the bottle. Figs. 4, 5, 6, 7 are detail views.

In the several figures, A is a bottle, having a shoulder on its neck. B is a cap-piece, having an opening, C, through its thickness, surrounded on the under side by a flange, D, projecting at an angle from it; said flange D having at its base a deflecting or supporting plate or piece, E, to support a stopper when dropped from its seat, and to protect it from the outward force of air, which otherwise would force it to its seat when the bottle is being filled, and having a flange, F, at its edge or circumference, to which the lifting and closing mechanism joints.

G is the chamber formed by the inner walls of the flange D, the under surface of the cap-piece above, and the deflecting-plate below. J is a bail-wire, arranged to joint to the edge or circumference of the cap-piece, having journals K K′ a distance from its ends, and between journals K K′ curved to touch the neck of the bottle on one side when the cap-piece is closed down upon the mouth of the bottle. L is a wire or metallic piece, arranged to fasten around the neck of the bottle under its shoulder, and provided with bearings M M′. N is a wire or continuous metallic piece, having journals at its ends to bear in bearings M M′ in wire L, and, at a distance from said jour-

nals, having eyes or bearings, in which journals K K′ on bail-wire J work. Wire N is curved between its bearings to touch the neck of the bottle on one side when in its extreme lower position. O is a stopper, preferably ball-shaped, contained in chamber G.

P is an annular compressible valve-seat fitting the shoulder formed by the junction of the flange D, with the under side of the cap-piece between said flange and the circumference of opening C. Q is an annular flanged compressible packing-piece, formed to surround flange D, and fitting the under surface of the cap-piece, between the flange D and the edge of the cap-piece, provided with grooves or recesses on its inner surface to receive the pressure from the contents of the bottle to force said packing-piece against the inner walls of the neck of the bottles to assist in forming a tight joint. The flange D has openings or slots through its thickness to admit the pressure to said grooves in the packing-piece.

The operation of my invention is as follows: The wire, provided with bearings, is fastened around the neck of an ordinary bottle under its shoulder. The pivoted ends of the lifting-lever are placed in the bearings in the neck-wire, the bail-wire having been previously jointed in the bearings in the lifting-lever. The hinge ends are jointed to the cap-piece, which has been provided with its packing-piece, valve-seat, and stopper. The lifting-lever is now in its extreme upward position, and the cap-piece raised over the mouth of the bottle, as shown in Fig. 2. The lever is then thrown down to its lowest position. This brings the cap-piece to the mouth of the bottle tightly, the curved parts of the bail and lifting or lever wires touching the neck of the bottle, and the eyes or bearings in the lever-wire and the journals on the bail-wire are thrown past the perpendicular center line drawn through the bearings in the neck-wire and hinge-joint on the circumference of the cap-piece. The elasticity of the packing-piece in the cap now draws up on the lifting mechanism, and prevents any backward motion of the lower hinged joint in the lever-wire, and the curved part of the lever and bail wire by touching the neck of the bottle prevents the lifting mechanism from any further forward motion.

It will be seen that the whole arrangement is substantial and held firmly. It will also be seen that the bail-wire and the lever-wire both touch the neck of the bottle in their lowest position. Thus additional safety is insured, as should one of them become bent out of shape the other one performs this office. The two wires are formed together before being placed in position to act their parts in the combination.

The stopper at this point in the operation is on the supporting-piece at the base of the flange, below which it is situated. The bottle is then filled through the opening in the cap-piece, in any of the usual ways. When the air in the bottle escapes it tends to throw the stopper to its seat in other kinds of bottles, but in mine the deflecting plate beneath the stopper prevents this action, and the stopper cannot go to its seat until the bottle is inverted, and it is allowed to fall to it by gravitation. When this is done the pressure from the fluids within the bottle holds the stopper in its place, and the bottle will be tightly closed. The holes through the flange admits the pressure to the grooves on the inside of the packing-piece, which presses the packing against the inner walls of the neck of the bottle, and insures a tight joint.

The upper surface of the cap-piece is made smooth and unobstructed by anything which would interfere with making a uniformly-tight joint with the packing of the filling machinery.

When the bottle is to be discharged the lifting-lever is thrown up to its extreme upward position, which lifts the cap-piece off the mouth of the bottle, and the full area of the neck of the bottle is opened for the discharge, unobstructed by any valve or seat in the neck.

When the valve and its seat are in the neck of the bottle either the neck must be enlarged in making to keep the right amount of area, or a less area must be submitted to. It is important to be able to use bottles which are not made especially for the purpose. This my invention does, by the addition of the cap-piece, with its lifting mechanism and stopper arranged in it in a cheap and substantial manner.

The lifting and bail wires are made in one continuous piece to give stiffness and uniform action to both sides of the lever mechanism, as also to limit the motion by its contact with bottle at its extreme movements.

Having now described my invention, what I claim as my invention, and desire to secure by Letters Patent, is—

1. A cap-piece, substantially as hereinbefore described, plain upon its upper surface, but having an opening through it, having on its under side a chamber, the bottom of which is nearly covered by a deflecting plate or shield, and provided with means, substantially as described, to connect to a closing leverage, all arranged substantially in the manner and for the purposes forth.

2. In a bottle-closing mechanism the combination, substantially as hereinbefore described, of a cap-piece, plain on its upper surface, but having an opening through it, having on its under side an angularly-projecting flange surrounding said opening, an annular packing-piece surrounding said flange within the walls of said flange, having an annular valve-seat surrounding said opening, and a stopper or valve contained in the chamber formed by the inner walls of said flange above a deflecting and supporting shield, with a lifting and closing mechanism, substantially

as described, all arranged to operate substantially in the manner and for the purposes set forth.

3. The combination, substantially as hereinbefore described, of annular packing-piece grooved or recessed on its inner walls, with a flanged cap-piece, which it surrounds, having or provided with openings through its thickness to communicate with said grooves or recesses, all arranged to operate substantially as and for the purposes set forth.

4. In a bottle-closing device a deflecting plate or shield placed beneath a chamber on the under side of a cap-piece, to close, or nearly close, said chamber at its bottom, but leaving an opening to said chamber at its lower circumference, substantially as and for the purposes set forth.

5. The combination, substantially as hereinbefore described, of a lever-wire or metallic piece, curved or bent at its central portion, having bearings or eyes about equidistant from its center, and at its ends arranged to joint to or in bearings attached to a bottle, with a wire or metallic piece bent or curved at its central portion, pivoting in bearings in said lever-wire, and arranged to be attached to a cap-piece of a bottle, all arranged to operate substantially as and for the purposes set forth.

W. H. HICKS.

Witnesses:
JAMES M. HICKS,
THOS. P. HOW.