

No. 835,783.

PATENTED NOV. 13, 1906.
H. A. DAVIS & T. R. STETSON.
BOTTLE STOPPER.
APPLICATION FILED NOV. 28, 1905.

Fig. 1.

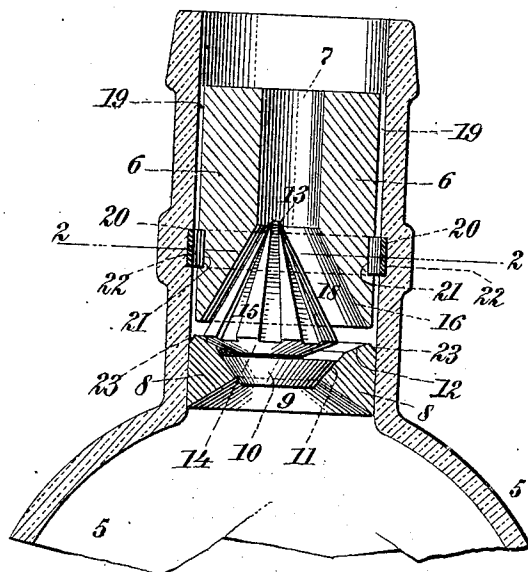


Fig. 3.

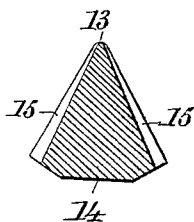


Fig. 2.

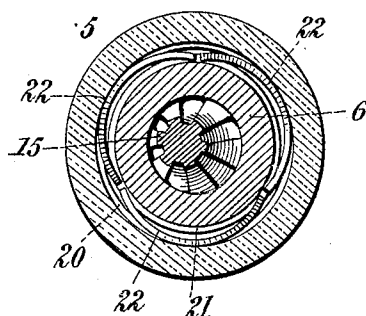
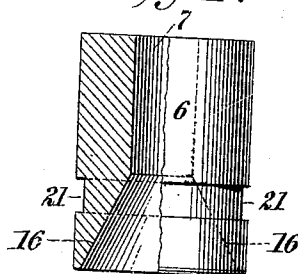


Fig. 4.



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HORACE A. DAVIS AND THOMAS R. STETSON, OF NEW YORK, N. Y.

BOTTLE-STOPPER.

No. 835,783.

Specification of Letters Patent.

Patented Nov. 13, 1906.

Application filed November 28, 1905. Serial No. 289,538.

To all whom it may concern:

Be it known that we, HORACE A. DAVIS and THOMAS RICE STETSON, citizens of the United States, residing at New York, in the State of New York, have invented a new and useful Bottle-Stopper, of which the following is a specification.

Our invention relates to an improvement in bottle-stoppers of the type shown in Letters Patent No. 747,498, issued December 22, 1903, to the above-named Thomas Rice Stetson. Its object is to provide an economical and efficient device to prevent the refilling of bottles, and more specifically to procure a more ample flow of liquids out of the bottle when so stopped.

The bottle-stopper described in said Letters Patent operates satisfactorily in preventing the refilling of the bottle and permits a bottle full of liquid to be emptied gradually; but the flow out of such bottle has been found to be so slow as to be inconvenient for frequent use and to render the stopper of comparatively small commercial value. It is well known that the same difficulty exists in most if not all of the bottle-stoppers heretofore invented which are based on the plan of causing the liquid to flow out through a more or less devious or obstructed passage. It is impossible in such inventions to introduce air rapidly enough through these same passages to replace the outgoing liquid, and the consequence is that the bottle "chokes" completely or gives only a feeble or intermittent flow. Our invention relates to this difficulty of the flow and overcomes it by providing a suitable passage for the intake of the air. In practice it has been found to increase the flow to substantially the full capacity of an ordinary bottle with a neck of the diameter of the opening 7 of our nozzle.

Referring to the accompanying drawings, in which like reference-numerals refer to like parts of the device, Figure 1 is a sectional view of the stopper in place in the normal position of the bottle. Fig. 2 is a plan view of the stopper looking downward on the line 2 2 of Fig. 1. Fig. 3 is a sectional view of the upper weight. Fig. 4 is a view, partly profile partly sectional, of the upper section 6 of the nozzle.

Referring to the drawings in detail, the stopper is shown inserted into a bottle 5, containing liquid. It consists of an upper cylindrical section 6 slightly smaller in diameter than the inside diameter of the neck of the

bottle. This section is provided with the springs 22, consisting of strips of metal or other suitable resilient substance resting in the groove 21 and adapted to engage with the recess 20 in the neck of the bottle and hold the cylinder 6 firmly in place. The cylinder 6 contains an elongated opening 7, leading downward into an enlarged chamber 18. Below it is the lower section 8 of the stopper, consisting of a collar secured rigidly to the neck of the bottle by cement or other suitable substance or blown or pressed out from the neck itself as an integral part of the bottle. The collar 8 continues the enlarged chamber and contains an opening 9, leading downward therefrom into the bottle. Within the enlarged chamber 18 is a lower valve 10, adapted to close the lower opening 9, and an upper weight 13, adapted to close the upper opening 7, except so far as the grooves 15 leave a passage-way for liquids.

The upper weight is made of any suitable substance, as glass, having a specific gravity greater than that of the liquid with which the bottle is intended to be filled. Its upper part is conical and is adapted to fit closely when the bottle is inverted against the upper sides 16 of the enlarged chamber 18, which thus form a seat for the weight 13 and are inclined at a moderate angle, preferably not exceeding fifty degrees. This conical portion of the weight 13 carries passages, preferably in the form of grooves or channels 15, at suitable intervals about its outer surface, through which the liquid may flow when the bottle is inverted and the weight rests in the seat 16. The lower part of the weight is an inverted truncated cone 14, with sides inclined at substantially the same angle as the upper portion 12 of the sides of the lower section of the chamber 18 and with a base smaller in diameter than the top of the lower valve 10. The weight 13 is somewhat smaller in diameter than the chamber 18, so as to allow an upward and downward play, but less than the altitude of the lower valve-seat.

The lower valve 10 is made of any suitable substance, as cork, having a specific gravity less than that of the liquid with which the bottle is intended to be filled. It consists of an inverted truncated cone adapted to fit closely against the lower portion 11 of the sides of the lower section of the chamber 18, which thus forms a valve-seat for the valve 10. Any movement of the lower valve 10 in the direction of the opening 7 toward the mouth

of the bottle removes such valve from contact with its valve-seat 11, and this creates a passage for the flow of liquids out of the bottle; but such movement can be no greater than the upward and downward play of the weight 13, which is less than the altitude of the lower valve-seat 11, and, therefore never permits the lower valve 10 wholly to escape from the limits of the valve-seat 11. The groove 23 cut in the side 12 is adapted to check any wire or other instrument introduced into the stopper from without.

The operation of the device is as follows: After the collar 8 has been secured in its proper place within the neck of the bottle the bottle is filled, the valve 10 is inserted in its valve-seat, the weight 13 set in place above the valve, and the cylinder 6 is then inserted into the neck of the bottle and pushed downward until the springs 22 engage with the recess 20 and hold the cylinder in place. When the bottle is inverted for the purpose of being emptied, the upper weight 13 falls down into its seat 16. The lower valve is forced out of its valve-seat 11 by the weight of the liquid in the bottle and falls down against the base of the weight 13, thus releasing the liquid, which flows around the sides of the valve 10, through the grooves 15 of the weight 13, into the opening 7, and out of the bottle. As the liquid flows out air enters through the opening 19 between the cylinder 6 and the neck of the bottle, thus greatly facilitating the escape of the liquid. When the bottle is returned to its normal position, the weight and valve drop down, the weight 13 pushing the valve 10 back snugly into its valve-seat 11. The shape of the weight, valve, and sides of the chamber 18 is such that the weight is kept pressed against the valve, thereby closing it, except when the bottle is inverted to the angle of pouring, at which angle the valve is adapted to be closed by the buoyant action of any liquid introduced from without through the outer opening of the nozzle, as is more fully set forth in the specification of Letters Patent No. 747,498.

The bottle cannot be refilled by immersion for the reason just stated, nor can it be made fillable by the introduction of a wire or other instrument on account of the conical shape

of the weight 13, which will cause such instrument to be deflected to the side 12 of the chamber 18 and to engage in the groove 23 without harm to any part of the mechanism. The operation of the bottle-stopper invented by us is the same in these respects as that described in said Letters Patent No. 747,498. The opening 19 is too narrow to permit the introduction of any tool by which the mechanism of the stopper could be affected.

What we claim, and desire to secure by Letters Patent, is—

1. In a bottle-stopper, the combination of a nozzle in two sections, the outer section being slightly smaller in diameter than the inside of the neck of the bottle, said nozzle containing an elongated opening with an enlarged central chamber, an upper conical weight of greater specific gravity than the liquid with which the bottle is to be filled, a lower valve of less specific gravity than such liquid, the upper sides of said enlarged chamber forming a seat for said upper weight, and the lower sides thereof forming a seat for said lower valve, and said sides being inclined at such angles respectively that the weight is kept pressed against the valve, thereby closing it, except when the bottle is inverted to the angle of pouring, at which angle the valve is adapted to be closed by the buoyant action of any liquid introduced from without through the outer opening of the nozzle, with means for securing said outer section of the nozzle into the neck of the bottle.

2. A bottle-stopper consisting of a nozzle 6, 8, with an upper opening 7, a lower opening 9, and an enlarged chamber 18 containing the upper weight-seat 16 and the lower valve-seat 11 the upper section 6 of said nozzle being adapted to fit loosely into a bottle-neck; the upper conical, non-floatable weight 13, with passages 15 for the flow of liquids; the lower floatable valve 10; and the springs 22 adapted to engage a recess, as 20, in a bottle-neck, substantially as shown and described.

Signed at New York city this 27th day of November, 1905.

HORACE A. DAVIS.
THOMAS R. STETSON.

In presence of—
ARTHUR DU BOIS,
LOUISE SMITH.