

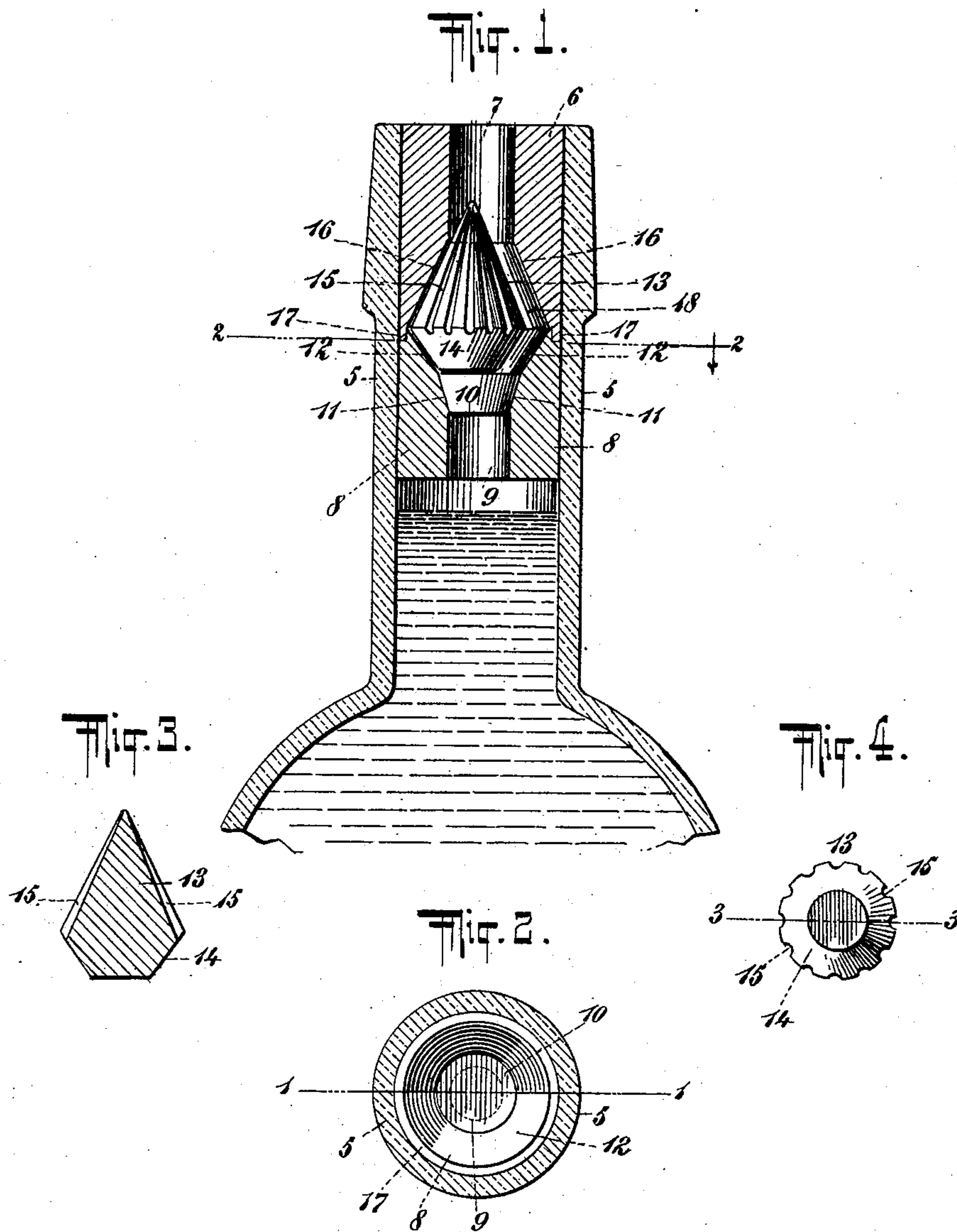
No. 747,498.

PATENTED DEC. 22, 1903.

T. R. STETSON.  
BOTTLE STOPPER.

APPLICATION FILED DEC. 30, 1901.

NO MODEL.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

THOMAS RICE STETSON, OF NEW YORK, N. Y.

## BOTTLE-STOPPER.

SPECIFICATION forming part of Letters Patent No. 747,498, dated December 22, 1903.

Application filed December 30, 1901. Serial No. 87,829. (No model.)

*To all whom it may concern:*

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

My invention relates to an improvement in bottle-stoppers. Its object is to provide an economical and efficient device for preventing the refilling of bottles.

Referring to the accompanying drawings, in which like reference-numerals refer to like parts of the device, Figure 1 is a sectional view across the line 1 1 of Fig. 2 of the stopper in place in the normal position of the bottle. Fig. 2 is a plan view of the lower section of the stopper looking in the direction of the arrow on line 2 2 of Fig. 1. Fig. 3 is a sectional view across the line 3 3 of Fig. 4 of the upper weight. Fig. 4 is a plan view of the same.

Referring to the drawings in detail, the stopper is shown inserted into a bottle 5 containing liquid. It consists of an upper section 6, containing an elongated opening 7, leading downward into an enlarged central chamber 18, and a lower section 8, containing a continuation of the enlarged central chamber, and an elongated opening 9, leading downward therefrom into the bottle. Within the central 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 13 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 central 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 the grooves or channels 15 at suitable intervals about its outer surface, through which 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 in-

clined at substantially the same angle as the upper portion 12 of the sides of the lower section of the central 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 central chamber 18, so as to allow a slight upward and downward play, but less than the altitude of the lower valve-seat 11.

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 central chamber 18, which thus form a valve-seat for the valve 10 and are inclined at a high angle, preferably greater than that of the upper portion 12 of the same sides and not less than sixty-five degrees, being as great as can be used without causing the valve to lock by friction so firmly as not to be displaced by the weight of the liquid when the bottle is inverted. 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 upper section 6 of the stopper has the annular projection 17 fitting over the upper rim of the lower section 8 and enabling the two sections to be firmly fastened together by any suitable adhesive substance or other means before the stopper is put into use.

The operation of the device is as follows: After the bottle has been filled the stopper is inserted and secured firmly within the neck by cement or any other suitable means. When the bottle is inverted for the purpose of being emptied, the upper conical valve 13 falls down into its seat 16, the lower valve is forced out of contact with the 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 lower valve 10 and through the grooves 15 of the weight 13 into the opening 7 and out of the bottle. When the bottle is returned to its normal position, the weight and valve drop down, the weight pushing the valve 10 snugly into its valve-seat 11. It is evident from the conical shape of the weight 13 that it will continue to press against the valve 10 and will keep it closed when the bottle is horizontal and until the bottle is inverted to an angle greater than the complement of the angle of the weight-seat 16—*e. g.*, if the angle of the weight-seat 16 is fifty degrees the bottle must be inverted to an angle of over forty degrees before the weight will move toward the opening 7. At such angle or pouring-point the angle of the buoyant thrust of a liquid entering the chamber 18 from without through the opening 7 upon the lower valve 10 being vertical to the surface of such liquid will always be greater than a right angle to the side 11, against which the valve 10 will be floated, and will therefore by its resultant force push the valve 10 in the direction of the opening 9 until it is seated upon the valve-seat 11.

The bottle cannot be refilled by being immersed in a liquid or by any combination of immersion with shaking or vibration, for inasmuch as the lower valve 10 is always at least partially within the limits of its valve-seat 11 any liquid entering the central chamber 18 will float the valve 10 into its normal position in contact with its valve-seat 11, and thus close the lower opening 9. Any liquid injected into the stopper through the opening 7 will strike the valve 10 and tend to force it into its normal position in contact with its valve-seat 11, inasmuch as the diameter of this valve is greater than that of the base 14 of the weight, and such liquid will also necessarily float the valve 10 into its normal position in contact with its valve-seat 11, for since the bottle must be approximately inverted before the valve 10 is released both the buoyant action and the rush of the liquid passing into the chamber 18 will force the valve 10 back into its normal position in con-

tact with its valve-seat 11. The introduction of a wire or other instrument into the lower valve-seat 11 is prevented by the conical shape of the weight 13, which will cause such instrument to be deflected to the side 12 of the central cavity. The possibility of introducing such instrument may be further guarded against by decreasing the angle of the side 12 to any desirable degree, by cutting longitudinal grooves into the side 12, by introducing one or more curves and angles into the channel 7, or by other similar device.

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

1. A bottle-stopper consisting of a nozzle with an enlarged central chamber, an upper conical weight of greater specific gravity than the liquid with which the bottle is to be filled, and a lower conical valve of less specific gravity than such liquid; the upper sides of said central 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.

2. A bottle-stopper consisting of a nozzle 6, 8 with an upper opening 7, a lower opening 9 and an enlarged central chamber 18 containing the upper weight-seat 16 and the lower valve-seat 11; the upper conical, non-floatable weight 13, with passages 15 for the flow of liquids and with a base 14 of less diameter than the top of the lower valve; and the lower floatable valve 10, substantially as shown and described.

Signed at New York city this 28th day of December, 1901.

THOMAS RICE STETSON.

In presence of—

HORACE A. DAVIS,  
ALFRED G. KILLMER.