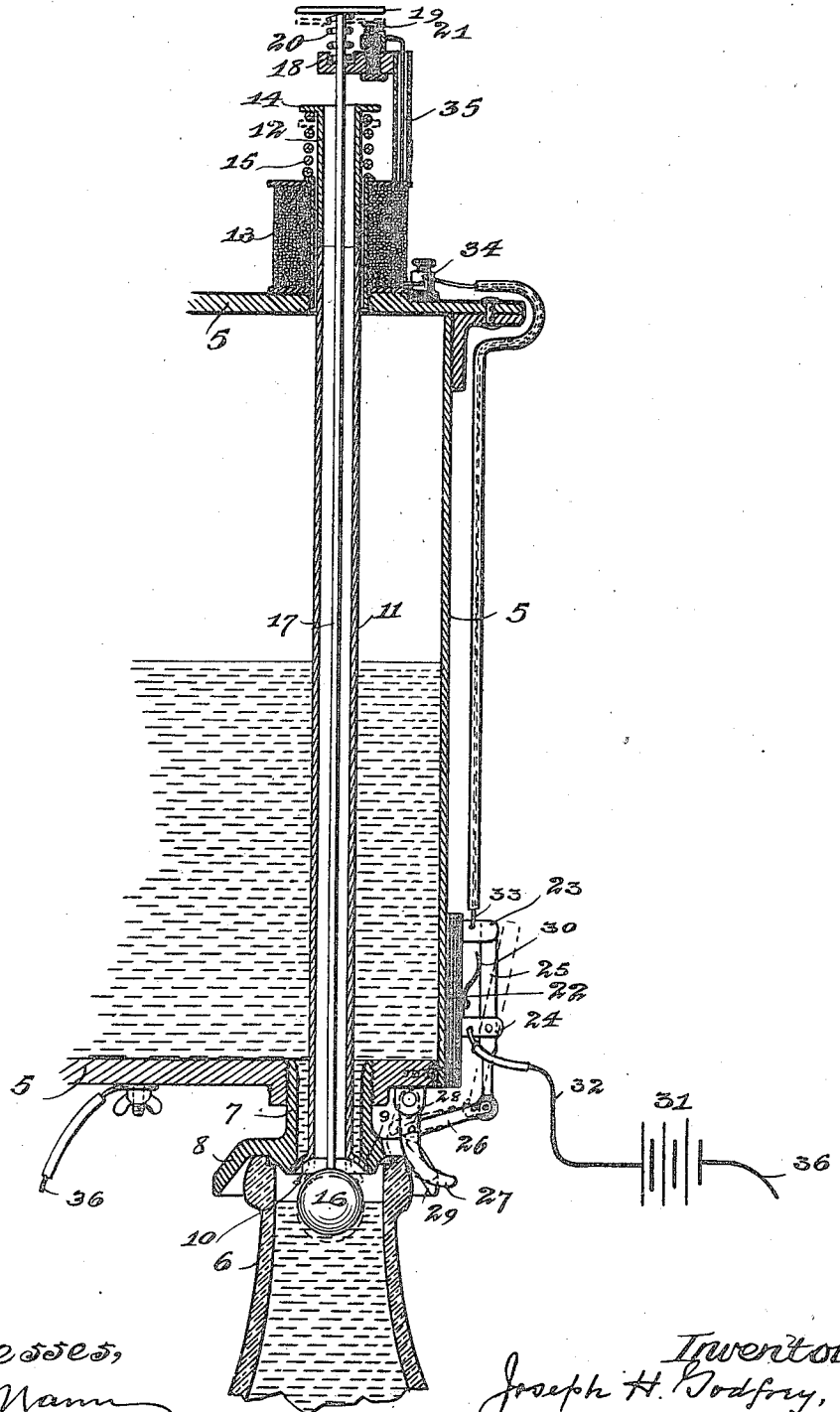
J. H. GODFREY.

BOTTLE FILLING DEVICE.

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1,149,256. Patented Aug. 10, 1915.



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BOTTLE-FILLING DEVICE.

1,149,256. Specification of Letters Patent. Patented Aug. 10, 1915.

Application filed December 15, 1913. Serial No. 806,744.

To all whom it may concern:

Be it known that I, JOSEPH H. GODFREY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Bottle-Filling Devices, of which the following is a specification.

This invention relates to devices for filling bottles and similar receptacles with liquid, and has reference more particularly to that type of filling mechanism wherein a valve controlling the flow of liquid to the bottle is opened through the agency of an electro-magnet when the empty bottle has been suitably positioned relatively to the filling device to receive the liquid, and is subsequently closed by the automatic deënergizing of the magnet to cut off the flow of liquid to the bottle when the latter has been filled to the proper or desired height.

The device of my present invention is of the same general character as the bottle-filling device disclosed in Letters Patent No. 1,011,184, granted December 12, 1911 to myself and Leslie J. Housel; but embodies some improvements upon the mechanism of said patent in the directions of increased simplicity of construction, an improved construction requiring less head room between the bottom of the liquid tank and the mouths of the bottles, greater reliability and efficiency in operation, and reduced cost of manufacture and maintenance.

With the above stated objects in view, the invention consists in the matters hereinafter described and more particularly pointed out in the claims.

The invention will be readily understood when considered in connection with the accompanying drawing, which illustrates one practical mechanical form in which the same may be embodied, and in which the figure is a vertical section through a liquid tank, a delivery spout and valve, and my improved automatic mechanism for controlling the operation of the valve; it being understood that in practice the tank shown may and usually will have a plurality of delivery spouts and valve-controlling mechanisms which are duplicates of that shown.

My present improvements relate chiefly to automatic means for controlling the flow of the liquid from an over-head tank or reservoir through a valve-controlled delivery opening in the bottom thereof into the open upper end of a bottle; and these improvements are herein illustrated as applied to a machine for filling milk bottles, although it will be understood that the kind or character of the fluid handled by the machine is entirely immaterial to the invention itself.

In the drawing 5 designates a tank or reservoir which may be assumed to contain a body of milk to be delivered into a bottle 6. In the bottom wall of the tank 5 is secured a depending delivery spout 7 terminating in a concave bell or hood 8 which serves as a guide or centering device for the registry of the mouth of the bottle with the lower end of the spout in a manner well understood. The lower end of the spout 7 is beveled to form a valve-seat 9, with which cooperates a valve 10 formed on the lower end of a tubular valve-stem 11 formed of non-magnetic material that extends upwardly entirely through the tank and the top wall of the latter and at its upper end is connected to the tubular armature 12 of an electro-magnet 13. The magnet 13 is mounted directly upon the top wall of the tank 5, and the armature 12 has on its upper end an annular flange 14, between which and the top of the magnet is a coil compression spring 15 by which the valve 10 is normally held to its seat 9. The energizing of the magnet draws the armature 12 downwardly, thereby opening the valve 10, as shown by dotted lines.

Below the valve 10 is a ball-float 16 having a long stem 17 that extends upwardly centrally through the tubular valve-stem 11 and armature 12, and is guided at its upper end by the horizontal arm of an angle-bracket 18 that is mounted on the spool of the magnet 13. On the upper end of the float-stem 17 is a horizontal pin or bar 19 that serves the double function of a circuit-switch and an abutment for the upper end of a light coil spring 20, the lower end of which is stepped on the bracket 18. The spring 20 exerts a limited lifting effect upon the ball-float 16 and its stem 17, and also serves to form a part of an electric circuit between the switch-arm 19 and the bracket 18. This spring, however, is so light that, when the ball-float 16 is wholly unsupported by liquid in the bottle 6, the weight of the ball-float and its stem draws the switch-arm 19 down into engagement with a contact 21 that is mounted upon and insulated from the bracket 18.

Secured to the front wall of the tank near

its lower end through suitable insulation 22 is a contact member 23, and, below the same, a lug 24 to which is pivoted a switch-arm 25 that coöperates with the contact 23. The depending portion of the switch-arm 25 below the pivot lug 24 is pivotally connected by a link 26 (suitably insulated therefrom) with a curved trigger 27, which latter is hung from a pivot lug 28 on the bottom wall of the tank 5 and swings through a radial slot 29 formed in the bell 8. A leaf spring 30 normally separates the switch-arm 25 from the contact 23 and maintains the trigger 27 inwardly of the slot 29 of the bell 8, as shown by dotted lines.

At 31 is indicated a battery or other source of electric current; and the circuit from one pole of the battery comprises a wire 32, lug 24, switch-arm 25, contact 23, a wire 33 connecting contact 23 with a binding post 34 on the top of the tank, the winding of the magnet 13, a wire 35 from the upper end of said winding to the contact member 21, switch-arm 19, spring 20, bracket 18, the spool of the magnet 13, the metal frame of the tank, and a return wire 36 leading to the other pole of the battery 31.

In the idle position of the parts, the valve 10 is, of course, closed, the float 16 is in the lower or dotted line position indicated in the drawing, the switch 19 is in the closed dotted line position, the switch 25 is in the open dotted line position, and the trigger 27 is in the dotted line position wherein it extends inwardly of the slot 29 of the bell 8. When an empty bottle is brought into registry with the bell 8, as shown, the mouth of the bottle strikes the trigger 27 and forces the same outwardly, thereby closing the switch 25 and completing the circuit through the magnet 13. This at once draws the armature 12 and valve 10 downwardly to the dotted line positions indicated, and the liquid flows into the bottle and fills the same to a point at which it raises the float 16 to an extent sufficient to open the circuit at 19, 21. The magnet 13 is thereupon deenergized, and the spring 15 at once closes the valve 10 shutting off further flow of the liquid to the bottle. Upon the removal of the bottle, the spring 30 opens the switch 25 slightly before the switch 19 drops into engagement with the contact 21, so that the circuit is instantly interrupted upon the withdrawal of the filled bottle and remains open until the next empty bottle is presented.

I claim—

1. In a bottle-filling device, the combination with a tank having a delivery opening, of a normally closed valve controlling said opening and having a tubular stem extending through said tank, a valve-opening electro-magnet above said tank having its armature connected to said valve-stem, a float having a stem extending through said tubular valve-stem, and a circuit including said magnet, said circuit also including a normally closed switch opened by said float-stem when the bottle is filled and a normally open switch closed by a bottle when brought into registry with said delivery opening.

2. In a bottle-filling device, the combination with a tank, and a delivery spout depending therefrom and formed with a valve-seat, of a valve having a tubular stem extending through said delivery spout and tank, a spring normally urging said valve to closed position, a valve-opening electro-magnet above said tank having its armature connected to said valve-stem, a float having a stem extending through said tubular valve-stem, and a circuit including said magnet, said circuit also including a normally closed switch opened by said float-stem when the bottle is filled and a normally open switch closed by a bottle when brought into registry with said delivery spout.

3. In a bottle-filling device, the combination with a tank, and a delivery spout depending therefrom and formed with a valve-seat, of a valve having a tubular stem extending through said delivery spout and tank, a spring normally urging said valve to closed position, a valve-opening electro-magnet mounted on said tank and having an armature connected to and forming an extension of said valve-stem, a float having a stem extending through said tubular valve-stem and armature, and a circuit including said magnet, said circuit also including a normally closed switch actuated by the float-stem and a normally open switch closed by a bottle when brought into registry with said delivery spout.

4. In a bottle-filling device, the combination with a tank, and a delivery spout depending therefrom and formed with a valve-seat, of a valve having a tubular stem extending through said delivery spout and tank, a valve-opening electro-magnet mounted on said tank and having a tubular armature connected to and forming an extension of said valve-stem, a valve-closing spring surrounding said armature and confined endwise between the upper end of the latter and said magnet, a float having a stem extending through said tubular valve-stem and armature and carrying a normally closed circuit switch adapted to be opened by said float on its rising movement, and a circuit including said magnet and a normally open switch adapted to be closed by a bottle when brought into registry with said delivery spout.

5. In a bottle-filling device, the combination with a tank, and a delivery spout de-

pending therefrom and formed with a valve-seat and with a radially slotted bell surrounding said valve-seat, of a valve having a tubular stem extending through said delivery spout and tank, a valve-opening electro-magnet mounted on said tank and having a tubular armature connected to and forming an extension of said valve-stem, a valve-closing spring, a float having a stem extending through said tubular valve-stem and armature and carrying a normally closed circuit switch adapted to be opened by said float on its rising movement, a circuit including said magnet, a second switch, a spring normally holding said second switch in open position, and a trigger for closing said last named switch extending through the radial slot of said bell and adapted to be engaged by the neck of a bottle when brought into registry with said bell.

6. In a bottle-filling device, the combination of a supply tank provided with a delivery opening, a valve adapted to close said opening and provided with a tubular stem extending upwardly through the fluid in said tank, electrically operated means for opening said valve, electrical connections for said means operable by placing a bottle in register with said opening, and a float-operated mechanical connection extending through said tube and adapted to disable said electrical means.

7. In a bottle-filling device, the combination of a supply tank provided with a delivery opening, a valve adapted to close said opening operating against the pressure of fluid in said tank and provided with a tubular stem extending upwardly through said tank, electrically operated means for opening said valve, electrical connections for said means operable by placing a bottle in register with said opening, a disabling contact for said electrical valve-opening means, and a float-controlled connection extending through said tube for operating said disabling contact.

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