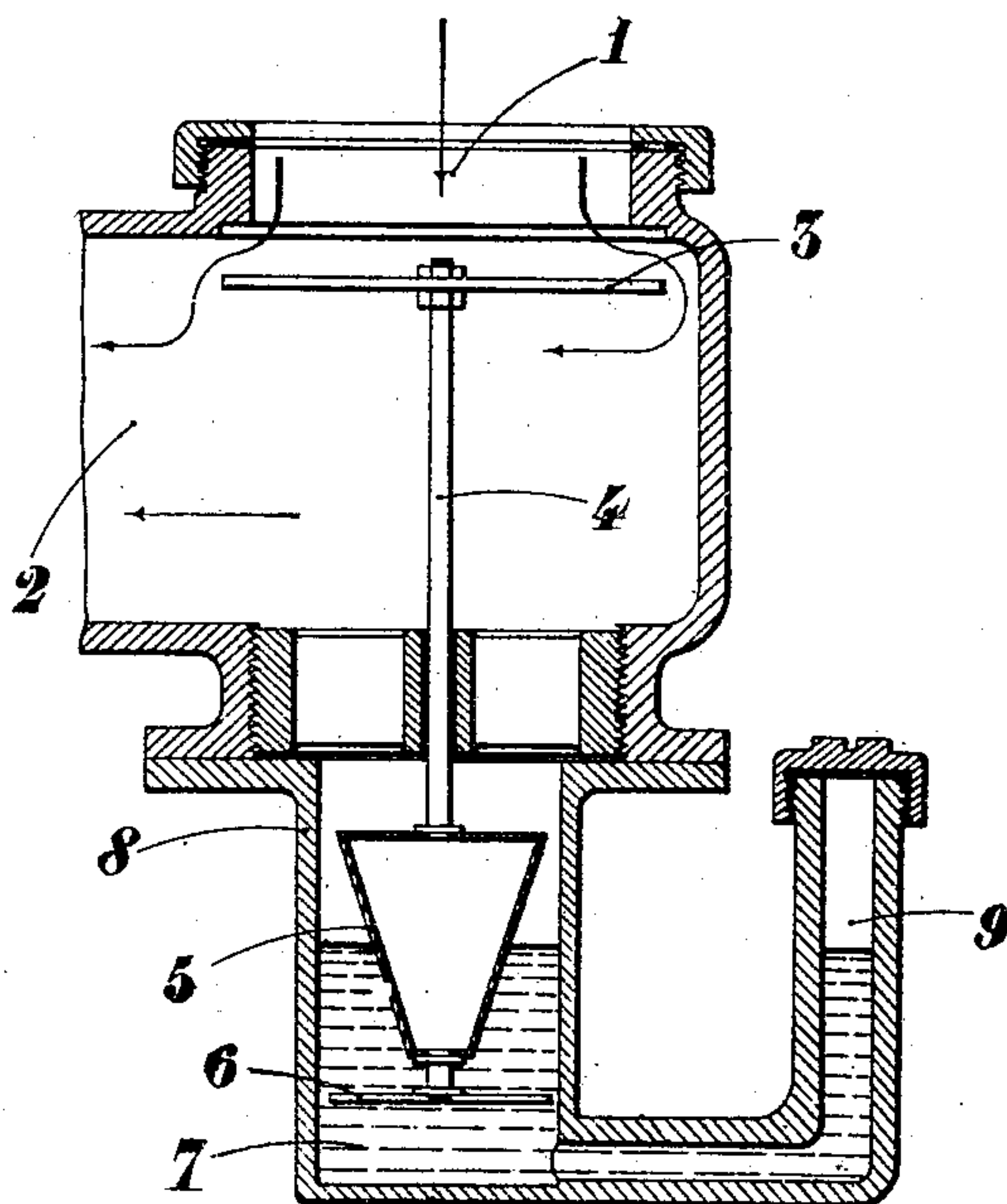


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 AUTOMATIC VALVE.
 APPLICATION FILED JULY 28, 1909.

967,739.

Patented Aug. 16, 1910.



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UNITED STATES PATENT OFFICE.

ALBERT DE DION AND GEORGES BOUTON, OF PUTEAUX, FRANCE.

AUTOMATIC VALVE.

967,739.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, ALBERT DE DION and GEORGES BOUTON, citizens of the French Republic, residing at Puteaux, Department of the Seine, in France, have invented certain new and useful Improvements in and Relating to Automatic Valves; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The springs of automatic valves present serious inconveniences. The molecular condition of the metal becomes modified in time and the spring rapidly deteriorates.

The invention has for its object a device which will obviate these defects while enabling the valve to be regulated in the most perfect manner, that is to say, each of its positions may be determined exactly relatively to the vacuum acting upon one of its faces.

The novel features of the invention will appear clearly from the following description and claims.

The accompanying drawing illustrates by way of example an additional air carbureter valve provided with a counter device in accordance with the present invention.

The air enters the apparatus through the orifice 1, it then passes into the conduit 2 to proceed to the carbureter proper. This conduit may be obturated by a valve 3 mounted on a stem 4. This stem carries at its lower part a float 5 of iron or other metal and a plate 6 likewise of metal arranged beneath the float. At the lower part of the chamber 8 there is arranged a mercury bath 7 into which a part of the float 5 extends. The quantity of mercury in the vessel 8 is such that the valve 3 obturates the orifice when the motor is not running. A pipe 9 serving for filling the chamber 8 enables the level of the mercury in this vessel to be regulated.

The operation of the apparatus is as follows. When the motor is running the vacuum produced in the conduit 2 during the suction stroke depresses the valve 3 and allows air to enter through the orifice 1. When the valve opens the float 5 enters the mercury to an extent increasing with the vigor of the suction of the motor. A given position of equilibrium of the float 5 and the valve 3 corresponds to every value of the vacuum and consequently of the speed of

the motor this position depending absolutely upon the form given to the shell of the float.

In the example described above the float 5 presents a form approaching that of a frustum of a cone. This form is such that the thrust exerted by the mercury upon the float increases very speedily with the depth of immersion and that the sensitiveness of the apparatus which is very great at the beginning of the lift decreases considerably in proportion as the lift increases.

It will be noted that in the embodiment shown the float of the valve is not wholly submerged in the motive fluid but is only partially immersed therein, and that the valve is normally held closed by the excess of pressure created by the greater than normal immersion of the float, over the atmospheric pressure acting on the upper surface of the valve. When the motor is running, however, a vacuum is produced in the conduit 2 during the suction stroke, as before indicated, whereby the pressure on the under surface of the valve is greatly diminished, so that the atmospheric pressure on the upper surface of said valve will force the valve open and cause the float to be submerged in the liquid to a still greater extent. When the suction is relieved the rising of the float will be permitted, thereby raising the valve again into its normal, closed position. The float therefore keeps the valve closed under normal conditions, acting under atmospheric pressure, and the opening of the valve is effected by a submergence of the float due to a partial vacuum acting on the valve. So far as the broader aspects of the invention are concerned, it is not necessary that the float be only partially immersed in the body of liquid, it merely being contemplated that the thrust of the liquid on the float must be so exerted that it will be sufficient to hold the valve seated under normal conditions, viz., when the pressure on opposite faces of the valve is substantially equal and in particular when such pressure is that of the atmosphere. It is apparent, of course, that when the suction in said conduit is interrupted the pressure there is substantially that of the atmosphere.

The diameter of the plate 6 is slightly less than the internal diameter of the chamber 8; it forms an obstacle to the passage of the mercury and deadens the too sudden or too frequent oscillations of the valve.

It will of course be understood that the

employment of the apparatus is not restricted to the special case indicated above. It may be utilized for automatic valves of all kinds. It will be apparent, also, that we have not attempted to describe the numerous modifications of the construction that may be adopted within the scope of the invention.

We claim:

1. The combination with a passage or conduit having a valve seat, of a valve coacting with said seat and provided with a float, and a body of liquid of relatively constant volume, normally acting on the float to hold the valve against its seat under atmospheric pressure.

2. The combination with a passage or conduit having a valve seat, of a valve coacting with said seat and subjected at one face to a constant pressure and at the opposite face to a varying pressure, and a body of liquid of relatively constant volume acting on said valve to hold it seated when the varying pressure is sufficiently high.

3. The combination with a passage or conduit subjected to suction, of a valve in said conduit having an outer face subjected to atmospheric pressure and an inner face subjected to the pressure in the conduit, and a body of liquid acting on the valve to hold it seated when the pressures on the opposite valve faces bear a predetermined ratio to each other.

4. The combination with a passage or conduit having a valve seat, of a valve coacting with said seat and having one face subjected constantly to atmospheric pressure, the opposite valve face being subjected to the pressure in the conduit, and a body of liquid normally holding the valve seated when the pressure in the conduit is substantially equal to that of the atmosphere, but permitting the valve to open when the pressure in the conduit is decreased.

5. The combination with a conduit in which a suction is created, of a valve in said conduit operative to close the latter, a float depending from said valve, and a body of liquid normally floating the valve at such a level that it is held seated, the float being sunk deeper in the liquid by a suction in said conduit opening the valve.

6. The combination with a conduit subjected to suction and having a valve seat, of a valve in said conduit coacting with said seat and having a depending stem, a float carried by said stem below the valve, and a

body of liquid having a relatively fixed level and in which the float is only partially immersed, said body of liquid normally holding the valve closed.

7. In a device such as described, the combination with a conduit subjected to suction and having a valve seat, a valve coacting with said seat and carrying a depending float, a body of liquid in which said float is partially immersed and normally holding the valve seated, and a regulating or retarding disk carried by the valve below the float and submerged in the liquid.

8. The combination with a conduit having a valve seat, of a valve slidable vertically into engagement with said seat and having a stem depending therefrom, a float carried by the lower portion of said stem, and a body of liquid having a relatively fixed level and in which said float is partially immersed, such liquid normally holding the valve up against its seat under atmospheric pressure, the valve being more nearly immersed in the liquid by suction in the conduit beneath said valve.

9. The combination with a conduit having a valve seat, of a valve slidable vertically into engagement with said seat and having a depending stem, a float carried by said stem, a body of liquid of relatively constant volume in which said float is partially immersed, and normally holding said valve up against its seat under atmospheric pressure, the valve being opened by a partial vacuum created in the conduit beneath the same, and a regulating or retarding disk carried by the valve beneath the float and submerged in the body of liquid.

10. The combination with a conduit subjected to suction and having a valve-seat, of a valve coacting with said seat, a body of liquid associated with the valve, and a float on the valve partially immersed in the liquid and normally holding the valve closed, said float being tapered in a downward direction to increase the thrust of the liquid rapidly as the float is further immersed by suction on the valve.

In testimony whereof we affix our signatures, in presence of two witnesses.

ALBERT DE DION.
GEORGES BOUTON.

Witnesses:

H. C. COXE,
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