G. DALEN.

SIGNAL LIGHT APPARATUS.

APPLICATION FILED FEB. 18, 1909.

943,300. Patented Dec. 14, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

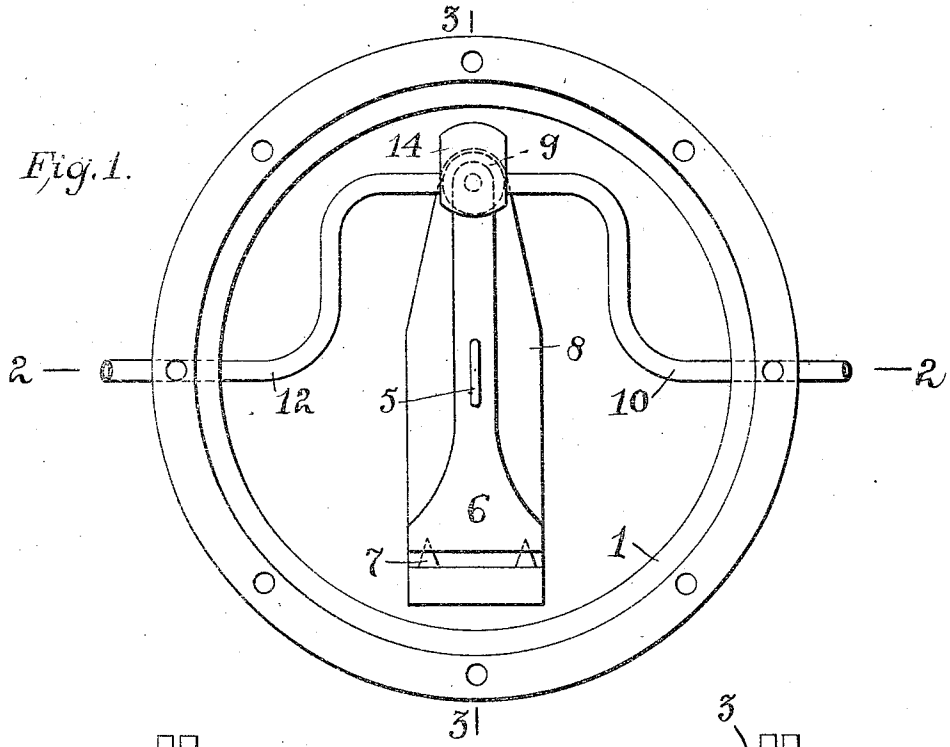


Fig. 2

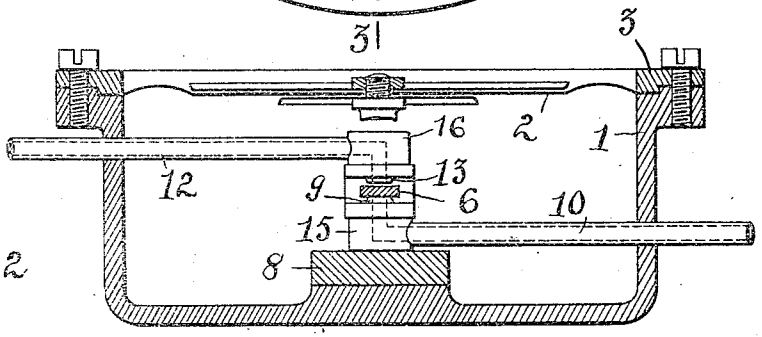
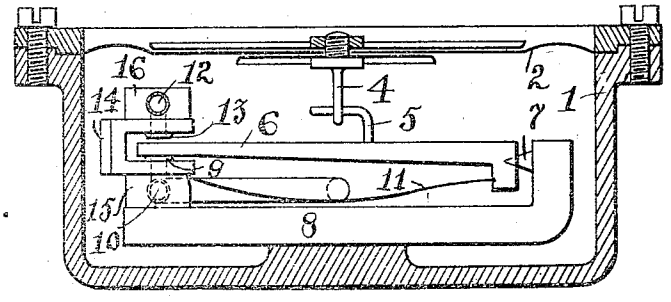


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

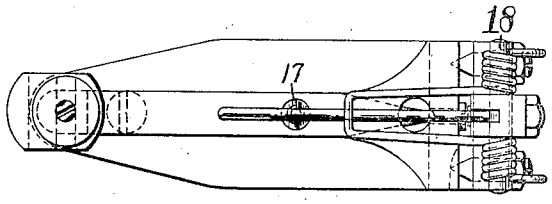
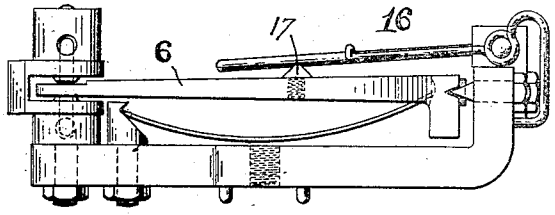


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SIGNAL-LIGHT APPARATUS.

943,300. Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed February 18, 1909. Serial No. 478,666.

To all whom it may concern:

Be it known that I, GUSTAF DALÉN, a subject of the King of Sweden, residing at 62 Kungstensgatan, Stockholm, Sweden, have invented new and useful Improvements in Signal-Light Apparatus, of which the following is a specification.

The present invention is an improvement on the device made the subject of U. S. Patent 857,035. In the Letters Patent referred to, a reservoir or casing received gas from a suitable source of supply, the outlet therefrom being controlled by a valve held to its seat normally by a magnet and forcibly raised from its seat by the increase of pressure acting upon a diaphragm which, in turn, lifted the valve to allow a sufficient discharge of gas to burn a full flame for a short period, the decrease in pressure, aided by a spring bringing the valve within the influence of the magnet, quickly bringing the valve to its seat again. The present improvement aims to control not only the exit port, but the inlet port, as well, and consists broadly of a valve or valves adapted to be held to the seats of the inlet or outlet ports by magnetic attraction, requiring positive force to unseat the valve or valves whether to allow for the inlet or exit of the gas.

Referring to the drawing, Figure 1 represents a plan view of the invention with the diaphragm thereof removed. Fig. 2 is a partial section of Fig. 1 on the line 2, 2, and Fig. 3 is a partial section of Fig. 1 on the line 3—3. Figs. 4 and 5 show a plan and elevation of a modification.

The reservoir comprises a casing 1, having a diaphragm 2, which latter is held in place by the ring 3 bolted to the casing 1. The diaphragm has connected thereto the eye 4, which is in engagement with the hook 5 of the oscillating valve lever 6, fulcrumed on the pivot pins 7 located at one pole of the magnet on the frame 8. The latter frame is fastened to a projection extending up from the bottom of the casing, and supports at one end a block 15 from which extends the discharge pipe 10. The said block supports U shaped pole pieces 14 and the latter supports the block 16, with which is connected the inlet pipe 12. A valve seat 9 is formed with one of the legs of the pole piece 14 and connects with a port in the block 15 communicating with the discharge pipe 10. A valve seat 13 in the other leg of the pole piece 14 communicates with a port in the block 16 leading to the inlet pipe 12. A spring 11 extends from the lower face of the lower leg of the pole piece 14 to the junction of the horizontal and vertical arms of the oscillating valve lever 6, and is below the horizontal plane passing through the axes of the pivots 7.

To use the invention gas is led to the casing 1 by means of the pipe 12. When the gas within the reservoir has reached a predetermined pressure the diaphragm 2 overcomes the pressure of the spring 11 and the magnetic torque of the valve seat 9 on the valve lever 6, which raises and uncovers the valve seat 9. When the valve lever 6 travels farther it comes within the magnetic action of the valve seat 13 which then attracts the valve lever 6 and covers the said valve seat 13. The gas is, in the meantime, escaping through the valve seat 9 to the burner through the pipe 10. When the outflow of the gas to the burner has caused a reduction of pressure to take place in the casing, the diaphragm 2 moves downward induced by the action of the spring 11 which overcomes the magnetism in valve seat 13 and forces the valve lever 6 away from the said valve seat 13. In the further travel of the valve lever 6 the same comes within the magnetic torque of the valve seat 9 which is then closed. The gas from the supply pipe 12 then flows into the reservoir until the pressure is sufficient to repeat the action. The impulsive movements of the valve lever 6 prevent all throttling of the flow of gas in passing the valve seats 9 and 13.

It will be noted that the oscillating valve lever 6 acts as an armature for the permanent magnet and prevents the diffusion of the magnetism thereof when either in its up or down position. The lever 6 alternately constitutes an armature for one pole of the magnet and either one of the legs of the U shaped pole piece 14.

Figs. 4 and 5 show a modification in which, in addition to the spring 11, I utilize a further spring 16 capable of adjustable connection with the valve lever 6 by the screw cap 17, the ends of the spring being wound around the laterally extending pin

18. By this construction any adjustment desired may be secured to control the action of the lever under a predetermined pressure.

What I claim is:—

1. In combination a reservoir, a diaphragm, an inlet pipe and an outlet pipe for gas connected to said reservoir, means actuated by the pressure of the gas within the reservoir, to alternately control the inflow and outflow of gas, and magnetic means to accelerate the action of said means in controlling both the inflow and outflow.

2. The combination of a reservoir, a diaphragm, an oscillating valve lever connected with said diaphragm, a magnet for said lever, valve seats coacting with the oscillating valve lever, an inlet pipe connected with the port extending from one of the said valve seats and an outlet pipe connected with the port formed with the other valve seat, substantially as described.

3. The combination of a reservoir, a diaphragm, a valve lever actuated by said diaphragm, a spring opposing the action of said diaphragm and connected with said valve lever, a permanent magnet for said lever, a pole piece for the magnet, valve seats coacting with said valve lever, and communicating pipes connected with the valve seats, substantially as described.

4. The combination of a reservoir, a diaphragm, a valve actuated by a spring opposing the action of said diaphragm, a permanent magnet for said valve, a pole piece for the magnet, valve seats at opposite sides of said valve and inlet and outlet pipes connected with the valve seats.

5. The combination of a diaphragm, an oscillating valve lever connected with said diaphragm, a spring opposing the action of said diaphragm and connected with the oscillating valve lever, oppositely located valve seats coacting with said oscillating valve lever, a permanent magnet connected with said valve seats and communicating pipes connected to said valve seats.

6. The combination of a reservoir, a diaphragm therefor, an oscillating valve lever connected with said diaphragm, a spring opposing the action of said diaphragm and connected with the oscillating valve lever, a U shaped pole piece for the magnet with the legs thereof straddling the swinging valve lever, valve seats formed on said legs and coacting with the said valve lever.

7. The combination of a reservoir, a diaphragm therefor, a magnetic frame, an oscillating valve lever fulcrumed to said frame, a U shaped pole piece for the magnet with the legs thereof straddling the swinging valve lever, seats formed with the magnet and coacting with the oscillating valve lever, an inlet pipe connected with a port extending from one of said valve seats and an outlet pipe connected with a port formed with the other valve seat.

8. The combination of a reservoir, a magnet, a double legged pole piece for one pole of the magnet, a valve fulcrumed to the other pole of the magnet and enabled to swing between the legs of the pole piece, constituting an armature, substantially as described.

9. In combination with a valve and valve seats controlling outlet and inlet ports, magnetic means adapted to hold the valve to one or the other of said seats, and means for positively separating the valve from its seats against the action of the magnet, substantially as described.

10. In combination an outlet passage, a valve held thereto by magnetic means, an inlet passage with magnetic means for attracting the valve and positive means for breaking the magnetic attraction at one seat and for bringing the valve under the influence of the opposite magnet, substantially as described.

11. The combination of a reservoir, a diaphragm, a valve actuated by a spring opposing the action of said diaphragm, a permanent magnet for said valve, a pole piece for the magnet, valve seats for said valve and inlet and outlet pipes connected with the valve seats.

12. In combination, a reservoir, an inlet pipe and an outlet pipe for gas connected to said reservoir, means actuated by the pressure of the gas in the reservoir to alternately control the inflow and outflow of gas, and magnetic means to accelerate the action of said means in controlling both the inflow and outflow of said gas.

13. In combination with a valve and valve seats for controlling the inlet and outlet ports, the said valve and seats being relatively movable, magnetic means adapted to hold the said valve and one or the other of said seats in contact with each other, and means for separating the said valve and seats against the action of the said magnetic means.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GUSTAF DALÉN.

Witnesses:
WM. WALLACE WHITE,
ELLA L. GILES.