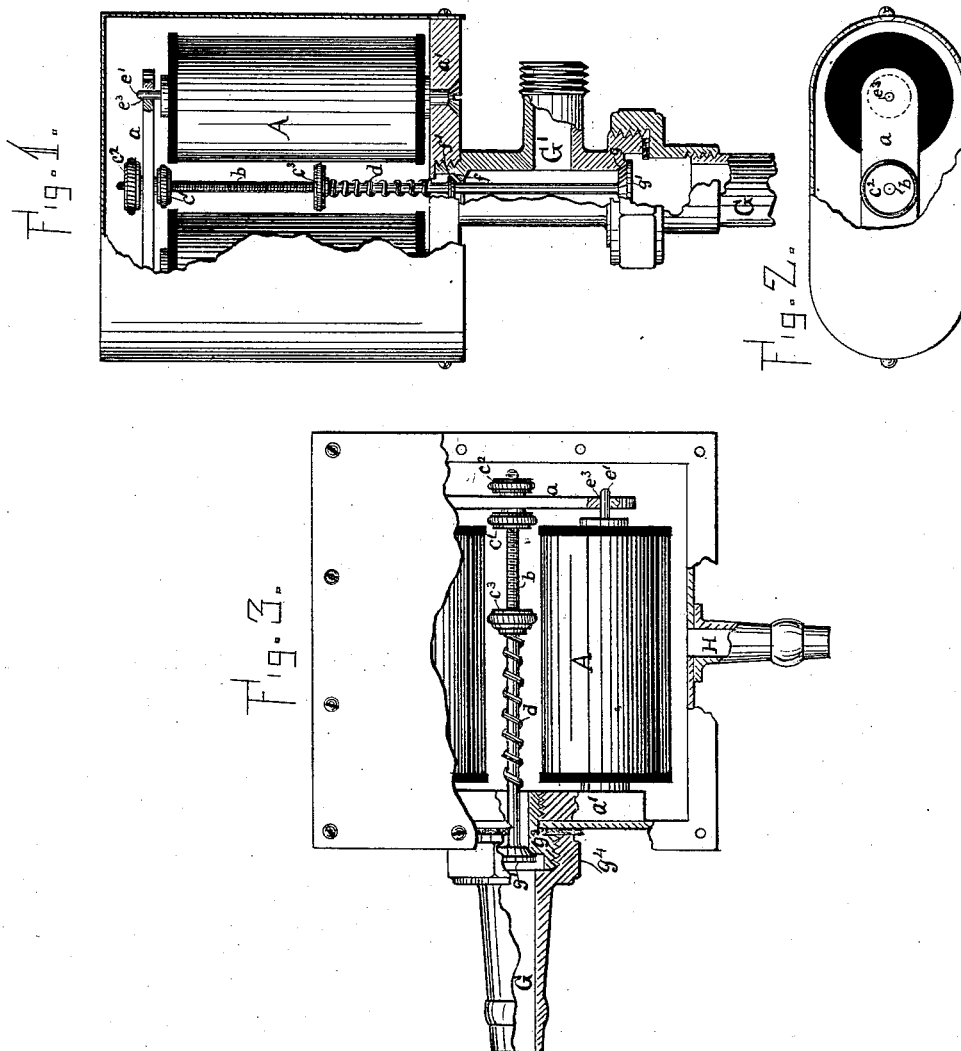


(No Model.)

M. W. GROVESTEEEN.
ELECTRO MAGNETIC VALVE.

No. 347,707.

Patented Aug. 17, 1886.



WITNESSES:

Charles A. Terry.
Caroline E. Davidson.

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UNITED STATES PATENT OFFICE

MILTON W. GROVESTEEEN, OF NEW YORK, N. Y.

ELECTRO-MAGNETIC VALVE.

SPECIFICATION forming part of Letters Patent No. 347,707, dated August 17, 1886.

Application filed December 17, 1885. Serial No. 186,003. (No model.)

To all whom it may concern:

Be it known that I, MILTON W. GROVESTEEEN, a citizen of the United States, residing in the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Electro-Magnetic Valves, of which the following is a specification.

My invention relates to the class of apparatus employed for opening and closing valves through the agency of electricity.

The object of the invention is to provide convenient and efficient means for automatically opening and closing valves, and to construct the same in such manner that they will be especially adapted to the automatic controlling of varying fluid-pressures; but the invention is also applicable to various other conditions where it is desirable to operate valves from distant points.

The general construction which I prefer to adopt is as follows: Between the two coils or arms of an electro-magnet there extends a movable rod, which is attached to the valve.

A spring normally holds the armature away from the poles of the magnet; but when the latter is vitalized, the tension of the spring is overcome, and the rod moving with the armature carries the valve away from its seat. For special classes of valves, such as require that an outlet shall be opened immediately after the operation of the valve, I provide a second valve and valve-seat. This second valve is carried upon the same rod with the first-named valve, and is so placed that when the latter is closed the former is opened, and vice versa.

In the accompanying drawings, Figure 1 is a side view of a valve and its operating-magnet embodying the features of the invention, and Fig. 2 is a detailed view of the same. Fig. 3 illustrates a modified form.

Referring to the figures, A represents an electro-magnet of any suitable construction, and *a* its armature. The back piece, *a'*, is preferably heavier than is usual in electro-magnets, for the purpose of affording a suitable support for the valve-seat. This construction, however, is not in all cases essential. Attached to the armature *a* there is a rod, *b*, which is adjustable by means of two set-screws, *c'* and *c''*. A spring, *d*, presses at one end against the back piece, *a'*, of the electro-mag-

net, and at the other end against an adjustable screw, *c''*, upon the rod *b*. This spring tends to hold the armature away from the poles of the magnet. When, however, the electro-magnet is vitalized, the armature is drawn forward against the tension of the spring. The latter is rendered adjustable for the purpose of modifying the amount of magnetism necessary to move the armature.

For the purpose of retaining the armature in its proper position relative to the poles of the magnet, there are preferably provided two non-magnetic pins, *e'* and *e''*, (not shown,) extending through corresponding holes, *e'* and *e''*, in the armature. These permit a movement of the armature toward and away from the poles of the magnet, but prevent it from turning axially away from the poles.

A valve-seat, *f*, is secured to the back piece, *a'*, of the electro-magnet, and in this there rests a valve, *f'*, which is carried upon the rod *b*. When the armature *a* is away from the poles of its magnet, the valve *f'* is lifted from its seat; but when the electro-magnet is vitalized, the valve is drawn downward against the seat. A second valve, *g'*, is also carried upon the rod *b*, and this is provided with a seat, *g*. This valve is intended to normally close against its seat, and thereby prevent the flow of air, gas, water, or other fluid from a supply pipe or chamber, G, into a receiving tube or chamber, G'. When, however, the valve *g'* is opened by the movement of the armature *a*, an escape is afforded from the supply G into the chamber G'. At the same time the opening, which at other times is provided from the chamber G' through the valve *f'*, is closed. When the electro-magnet is demagnetized, then the valve *g'* is closed and the valve *f'* is opened. This form of valve is especially desirable in instances where a momentary increase or change of a pressure is required—such, for instance, as relief-valves. It is evident that by causing the circuit through the magnet to be completed when a pressure is too great an immediate relief may be afforded by the movement of the armature.

In some instances it is not necessary to provide the additional escape-valve, *f'*, with its seat *f*. In such cases the rod *b* might work through a stuffing-box in the back piece of the electro-magnet, the opening forming the

seat *f* being closed. Preferably, however, the form shown in Fig. 3 is adopted. This is of essentially the same construction relative to the electro-magnet and its connected parts; but the valve-seat *g*³ preferably consists of a metallic bed-piece set into the back plate and surrounded by a cap or inclosing-cup, *g*⁴, connected with the pressure-supply.

The entire device is inclosed in an air-tight chamber, from which a pipe, *H*, leads to any suitable point to which the flow from the source *G* is designed to be extended.

I claim as my invention—

The combination, with an electro-magnet, its armature, a valve, and a valve-rod connected directly with the armature, of an air-tight chamber inclosing said electro-magnet, and a connection with said chamber through said valve.

In testimony whereof I have hereunto subscribed my name, this 1st day of December, A. D. 1885.

MILTON W. GROVESTEE.

Witnesses:

CAROLINE E. DAVIDSON,

CHARLES A. TERRY.