

(No Model.)

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ELECTRICALLY CONTROLLED MAGNET AND VALVE FOR PIPE ORGANS.

No. 536,975.

Patented Apr. 2, 1895.

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ELECTRICALLY-CONTROLLED MAGNET AND VALVE FOR PIPE-ORGANS.

SPECIFICATION forming part of Letters Patent No. 536,975, dated April 2, 1895.

Application filed April 7, 1894. Serial No. 506,711. (No model.)

To all whom it may concern:

Be it known that we, EDWIN S. VOTEY and WILLIAM D. WOOD, citizens of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in an Electrical Magnet and Valve Controlled thereby for Pipe-Organs; and we 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, reference being had to the accompanying drawings, which form a part of this specification.

Our invention has for its object an improved electrical magnet and its attendant features for pipe organs, the same being especially designed and adapted for this particular work, and to this end our invention consists of the construction, combination and arrangement hereinafter specified and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a view in diagram and vertical section illustrating our invention. Fig. 2 is a view of the electrical magnet proper, its parts being separated to more clearly distinguish the same. Fig. 3 is a plan view of the magnet.

The special object which we have in view in the construction and arrangement of this electrical magnet is to control the operation of a pneumatically operated valve by controlling the passage to and from the pneumatic, and to accomplish the desired results electrically at any required distance from the key board.

The construction and arrangement of a single magnet operated by a single key to control a single pneumatically operated valve will suffice to illustrate our invention, as it will be readily understood that we contemplate the employment of a series of similar magnets similarly operated to control a series of pneumatically operated valves respectively.

Accordingly A represents a key connected in any ordinary manner with a lever B, said lever being connected by a rod "b" with a spring B', which is in permanent electrical connection with a battery or other electrical source of supply, B², as by means of the conductors "b'."

A' is a block upon which the spring B' is supported. A² is a similar block supporting a spring "b²," normally out of contact with the spring B' and in circuit with a conductor "b³."

C represents our improved electrical magnet.

C' is the core, to the poles of which is fixedly engaged a plate C², preferably perforated as shown at "c" and "c'," for the passage of air therethrough.

C³ represents the windings on the core, consisting of the conductors "b³" and "b⁴," the battery B² intervening between the conductors "b'" and "b⁴."

C⁴ is a metallic armature, made attractable by the poles of the magnet when the magnet is in electrical circuit with the battery. This armature is preferably made solid, so that no air can pass therethrough, and is preferably covered with leather to make its operation noiseless.

C⁵ is a base, preferably cylindrical, and threaded on its exterior, the same being constructed with a lateral passage or channel "c²" and an exhaust passage or channel "c³," which may open vertically through the lower end of the base C⁵, as shown in Fig. 1, although the precise direction of the channels "c²" and "c³" are not vital to our invention. The base C⁵ is constructed to form a seat for the armature C⁴, as shown at "c⁴," upon which the armature normally rests when the circuit is broken closing the exhaust passage "c³" in the base C⁵.

C⁶ is a thimble, threaded at its lower end and having a threaded engagement with the base C⁵ the thimble holding the magnet core and its windings in place, the perforated plate C² extending thereunder as shown in Fig. 1. This thimble is open at its upper end, allowing air to pass therethrough and through the perforations of the plate C².

D denotes a wind chest connected with the air supply in any ordinary way.

D' is the base of the chest, into which the base C⁵ of the electrical magnet is engaged.

"d" is a channel in the base D' communicating through a channel "d'" with a pneumatic E. The channel "d" also communicates with the orifice or channel "c²" in the base C⁵ of the magnet.

F is a wind box communicating with the pipes G, communication being controlled by a valve "f."

H is an air passage communicating through a channel "h" with an air duct I communicating with the wind chest D. The valve "f" is connected with a rod "f'" resting upon a leather J in the air passage H, which is lifted by the admission of air through the air duct I and channel "h."

The special construction of the wind box F and the particular mechanism shown in connection therewith for operating the valve "f," forms no feature of our present invention, as any form of wind box and mechanism to control its communication with the pipes may be employed within the scope of our invention, pneumatically operated by air through the passage I. The passage I communicates with the wind chest D through a passage "i" and exhausts through a passage "i'."

K and K' are valves controlling the passages "i," "i'," said valves connected by a rod K² with the pneumatic E, said pneumatic on its inflation closing the valve K and opening the valve K' and vice versa.

The operation of the device will now be understood.

By pressing the key A the spring B' is lifted into contact with the spring "b²," closing the circuit through the magnet C, by which means the armature plate C⁴ is lifted from its seat, closing the apertures "c," "c'" in the plate C² thereabove, thereby cutting off the inflow of air therethrough from the chest D into the passage "d" and into the pneumatic E. Pressure from within the pneumatic being thus relieved the pneumatic will exhaust by gravity, and the pressure thereupon of the wind in the chest D. A spring L also bears upon the rod K² to hold the valve K' upon its seat. The armature C⁴ being lifted the pneumatic E is permitted to exhaust through the channels D, c² and c³, opening the passage "i" by which wind is allowed to pass from the chest D into the duct I and air chamber or passage H to open the valve "f," causing the pipe to speak. On releasing the key A the spring B' drops to its normal condition, breaking contact with the spring "b²" cutting the magnet out of the circuit. The armature C⁴ then drops to its seat, cutting off the exhaust of air from the pneumatic E and allowing air from the chest D to pass through the perforations in the plate C² to inflate the pneumatic E closing the passage "i," and allowing the duct I to exhaust through the passage "i'."

Our invention is not limited to the employment of our improved electrical magnet in connection with the other particular features of the pipe organ with which it is shown and described in this present application, but we contemplate broadly the use of our improved electrical magnet herewith shown to any purpose to which it may be found adapted.

In another application filed simultaneously herewith, for example, Serial No. 506,715, essentially the same electrical magnet is shown in other connections, in some of which it is not always requisite that the plate C² should be perforated.

It will be observed that the base C⁵ with the thimble C⁶ constitutes the case of the magnet valve. We prefer to make all parts of the electrical magnet of metal. The base and thimble constituting the case may be made of brass. The base C⁵ of the case, it will be seen, is formed with a flange or seat Q, upon which the plate C² rests, the thimble when screwed into engagement with the top of the base binding said plate firmly upon said flange. Being made of metal, it will be evident, that all the parts are accurately related one to the other, and that there is no liability whatever of the parts getting out of their proper relation to each other, as this construction avoids all swelling and shrinkage which might occur if the valve case were made of wood, in which event the valve of the magnet might become inoperative. The parts are made in duplicate, all the different elements being the counterparts one of another. No adjustment whatever is required after the parts are put together. Atmosphere does not affect it, and yet the parts may easily be separated if desired for cleaning or other purposes.

What we claim as our invention is—

1. An electrical magnet having in combination a metal base provided with inlet and exhaust orifices communicable with each other, an armature to control said communication, a core and its windings to operate said armature, and a thimble having a threaded engagement with the base, to hold said core and its windings in connection therewith, substantially as described.

2. An electrical magnet having in combination a metal base provided with inlet and outlet orifices communicable with each other, an electrically controlled armature to govern said communication, a core and its windings to operate said armature, a perforated plate uniting the terminals of the core, and a thimble located over said plate having a screw threaded engagement with said base, said thimble open at the top to allow air to pass through said plate, substantially as described.

3. An electrical magnet having in combination a metal base provided with communicable inlet and exhaust orifices, a core and its windings, a perforated plate uniting the terminals of the core communicable with the inlet orifices, an armature operated by said core and its windings to control said communications, and a thimble uniting the core and its windings with said base, substantially as set forth.

4. An electrical magnet having in combination a metal base provided with communicable inlet and exhaust orifices, an armature to control said communication, a core and its windings, a perforated plate uniting the ter-

minals of the core through the perforations of which air may pass through the inlet orifices, and a metal thimble C⁶ engaged with said base, substantially as described.

5 5. In combination an electrical magnet constructed with a metal base provided with an inlet and an outlet channel, an armature to control the passage through said channels, a core and its windings to actuate said armature, a thimble uniting said core and its windings with said base, and means connected with the key board for throwing said magnet into and out of electrical circuit, substantially as described.

15 6. In combination a wind box F, a wind chest communicable therewith, valves controlling said communication, a pneumatic to operate said valves, a channel communicating with the pneumatic and with said wind chest, and an electrical magnet through which said pneumatic communicates with the interior of the wind chest and through which the pneumatic exhausts, said magnet provided with a metal base having inlet and exhaust orifices 25 communicable with each other, an armature to control said communication, a core and its windings to operate said armature, and a thimble having a threaded engagement with the base to hold said core and its windings in connection therewith, said thimble being open to allow the air from the wind chest to pass therethrough to the pneumatic, substantially as described.

35 7. An electrical magnet having in combination a metal base provided with inlet and outlet orifices communicable with each other, an armature to control said communication, a core and its windings, a plate provided with orifices uniting the terminals of the core, said 40 armature seating normally upon the base, and

seating against said plate when the magnet is in electrical circuit, the inlet orifice opening into the base above the normally seated armature, and the outlet orifice opening into said base below the normally seated armature, 45 the armature when normally seated upon the base opening the inlet orifice and closing the outlet orifice and when seated upon said plate opening the outlet orifice, substantially as set forth.

50 8. An electrical magnet having in combination a metal base channeled to admit the passage of air therethrough and provided with a flange or seat Q, an armature governing communication through the channel, a plate located upon the flange or seat Q, a metal thimble engaged with said base and holding said plate upon said seat, and means to attract said armature, substantially as described.

60 9. An electrical magnet having in combination, a metal base provided with inlet and outlet orifices communicable one with another and constructed with a seat or flange Q at its upper end, an armature governing said communication, a plate located upon said flange or seat Q, a metal thimble having a screw threaded engagement with said base and holding said plate upon said seat, and a core and its windings engaged with said plate to attract said armature when the magnet is in electrical circuit, said base screw threaded on its exterior, 70 substantially as described.

In testimony whereof we sign this specification in the presence of two witnesses.

EDWIN S. VOTEY.
WILLIAM D. WOOD.

Witnesses:

CALVIN W. GIBBS,
N. S. WRIGHT.