

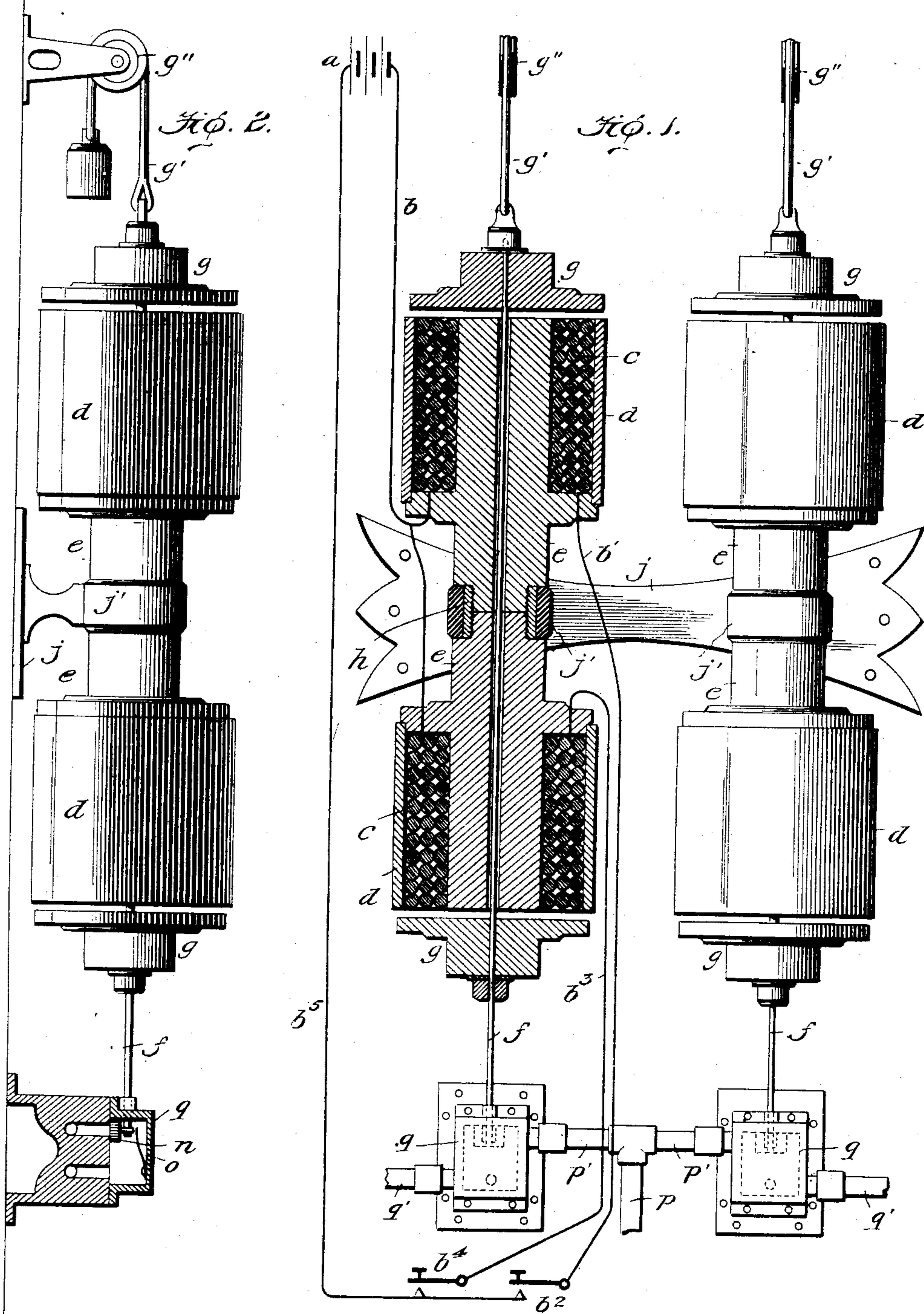
No. 682,007.

Patented Sept. 3. 1901.

I. G. WATERMAN.
ELECTROMAGNETIC APPARATUS.

(Application filed Apr. 19, 1901.)

(No Model.)



Witnesses

"My Dear Shell"
Sarah V. Lockwood.

Inventor
Isaac G. Waterman
by Henry N. Cobb
his Attorney

UNITED STATES PATENT OFFICE.

ISAAC G. WATERMAN, OF SANTA BARBARA, CALIFORNIA.

ELECTROMAGNETIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 682,007, dated September 3, 1901.

Application filed April 19, 1901. Serial No. 56,608. (No model.)

To all whom it may concern:

Be it known that I, ISAAC G. WATERMAN, a citizen of the United States, residing at Santa Barbara, county of Santa Barbara, State of California, have invented certain new and useful Improvements in Electromagnetic Apparatus, of which the following is a specification.

This invention relates to electromagnetic apparatus, and more particularly to an apparatus adapted for the control of a valve to regulate the flow of water or other fluid in a pipe or conduit and as such especially adapted for use in connection with certain improvements relating to the electrical control of the flow of water to basins of washstands or lavatory-bowls set forth in my copending application, filed February 23, 1901, Serial No. 48,425, although susceptible of use in various other connections.

The invention is designed to provide improvements in electromagnetic apparatus employing a hollow core, independent coils thereon, and armature-plates for the pole-pieces of the core, which are connected by an armature-rod extending through the hollow of the core.

One object of the invention is the provision of a novel form of electromagnet, armature, and coöperating features, whereby the armature will be maintained wherever positioned by the electromagnetic action.

Another object of the invention is the provision of a novel duplex and coöperative arrangement of electromagnets and armatures, having particular reference to the use to which the device is to be subjected.

Having the foregoing and other not specifically-mentioned objects in view the invention consists of certain improved features of construction and novel combinations of parts more fully set forth hereinafter and recited in the appended claims.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of the magnets, showing their application to slide-valves interposed in a pipe system, the latter parts being in full and dotted lines; and Fig. 2, a side elevation of one pair of magnets, showing the valve-box in section.

The letter *p* represents a pipe which can lead to any point where a supply of water

is desired. In my copending application above referred to this pipe leads to a lavatory-bowl; but it is obvious that the invention can be used in other connections. The pipe *p* is provided with branches *p'*, leading into valve-boxes *q*, which have the pipes *q'* opening thereinto. One of these pipes *q'* can be run to a source of cold-water supply and the other to a source of hot-water supply, whereby through the agency of my improved electrical controlling devices either hot or cold water or both can be supplied.

There are two electromagnetic devices for the separate control of the hot and cold water, and as they are duplicates and their electrical connections and operations are identical only one set will be described.

A bracket *j*, suitably secured to the wall, is provided, the same having collars *j'*, in which are fitted the reduced ends of upper and lower hollow electromagnet-cores *ee*, connected by a collar *h*. On the magnets are coils *c*, incased by shells *d*. Above the upper and below the lower magnet pole-pieces are armature-plates *g*, and these are connected by a rod *f*, extending through the hollow magnet-cores *e*, which is of appreciably smaller diameter than the hollow interior of the cores and extends loosely therethrough and being normally out of contact therewith, by which is meant that said rod normally does not touch the core, although it may do so at times, a counterbalancing-weight and cord *g'* passing over a pulley *g''*, being connected to the upper armature-plate and adapted to maintain the armature-plates and parts carried thereby wherever positioned by the action of the magnets. On the lower end of the rod *f* is a slide-valve *n*, located in the box *q* and adapted to cover and uncover the port leading to pipe *p'*, and said valve is held or balanced on its seat by the water-pressure assisted by a spring *o*.

An electric battery of a suitable number of cells is shown at *a*, from which the circuits can run as follows: *b* to upper and lower coils *c*, *b'* to circuit-closer *b²*, and *b³* from lower coil *c* to circuit-closer *b⁴*. A battery-wire *b⁵* constitutes the return branch of the circuit from the circuit-closers *b²* and *b⁴*.

The operation is as follows: On completing the circuit through the upper coil *c* by clos-

ing the circuit-closer b^2 the coil contacts the upper armature-plate g , thus moving the valve n from the port leading to p' and allowing the water to flow from pipe q' into pipes p' and p and to the point to be supplied. As the armature-plates and rod are balanced by the counterpoise or weight they will remain where positioned, and hence the valve will remain open. To check the flow, the circuit through the lower coil c can be completed by closing circuit-closer b^4 , whereupon the core will draw the lower armature-plate g and close the valve, and the valve will remain closed after the electrical current has been stopped by reason of the counterbalancing action of the weight, but can be opened again by completing the circuit through the upper coil.

The second set of electromagnetic apparatus and valve, of which the electrical connections are not shown, may be conveniently employed for controlling the supply of hot water, its circuits and operation being in all respects the same as heretofore described, but entirely independent thereof.

While I have illustrated my electromagnetic apparatus in connection with valve mechanism, this has been done to illustrate the action, and I do not, therefore, limit myself to this specific use, as I am aware that the invention could be employed in a great many other connections.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an electromagnetic apparatus, the combination with a hollow electromagnetic core disposed with its longitudinal axis in substantially vertical position, of independent magnetic coils thereon in independent circuits and adapted for independent energization, an armature-rod of appreciably smaller diameter than the hollow interior of the core and extending loosely therethrough, longitudinally thereof and normally out of contact with the interior walls of the core, armature-

plates connected to said rod which are located adjacent the respective pole-pieces of the core and at sufficient distance therefrom to insure suitable play for said plates and rod so that either plate may move in response to the magnetic attraction incident to the energization of the coil adjacent thereto, and an independent counterbalancing device coacting with the armature-rod to neutralize the natural gravitation thereof, which insures the retention of the armature rod and plates in position where drawn by the magnetic attraction.

2. In an electromagnetic apparatus, the combination with a hollow electromagnetic core disposed with its longitudinal axis in substantially vertical position, of independent magnetic coils thereon in independent circuits and adapted for independent energization, an armature-rod of appreciably smaller diameter than the hollow interior of the core and extending loosely therethrough, longitudinally thereof, and normally out of contact with the interior walls of the core, armature-plates connected to said rod which are located adjacent the respective pole-pieces of the core and at sufficient distance therefrom to insure suitable play for said plates and rod so that either plate may move in response to the magnetic attraction incident to the energization of the coil adjacent thereto, a cord connected to the armature-rod, a pulley over which said cord runs and a weight on the depending end of the cord, said cord and weight constituting a counterbalancing device for the armature rod and plates to neutralize the natural gravitation thereof, which insures the retention of the armature rod and plates in position where drawn by the magnetic attraction.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

ISAAC G. WATERMAN.

Witnesses:

FRANK E. NEWTON,
GEO. N. HAMLIN.