

(No Model.)

2 Sheets—Sheet 1.

F. E. CHATARD.
AUTOMATIC ELECTRIC VALVE CONTROLLER.

No. 450,927.

Patented Apr. 21, 1891.

Fig. 1.
on line 1-1

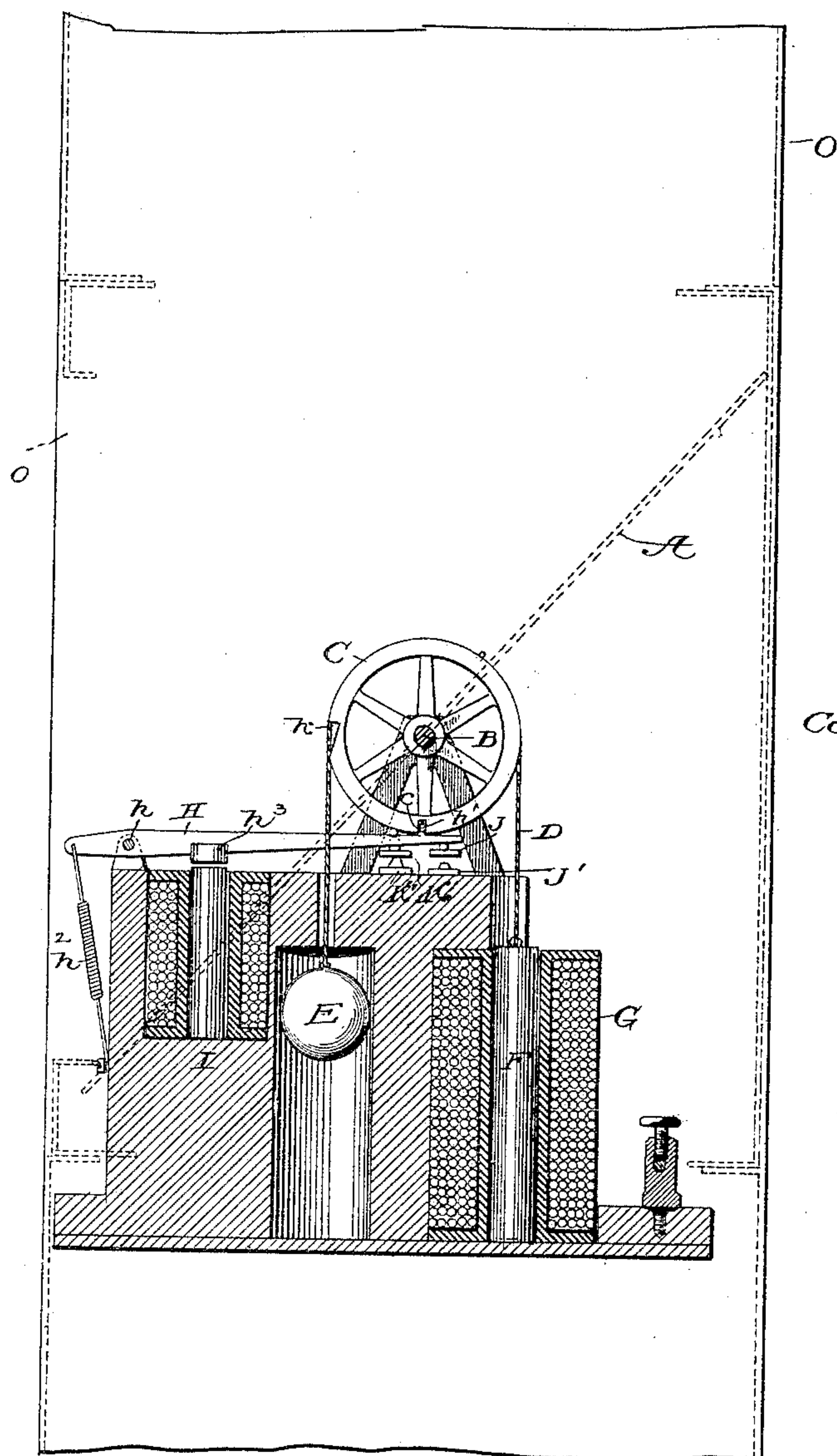
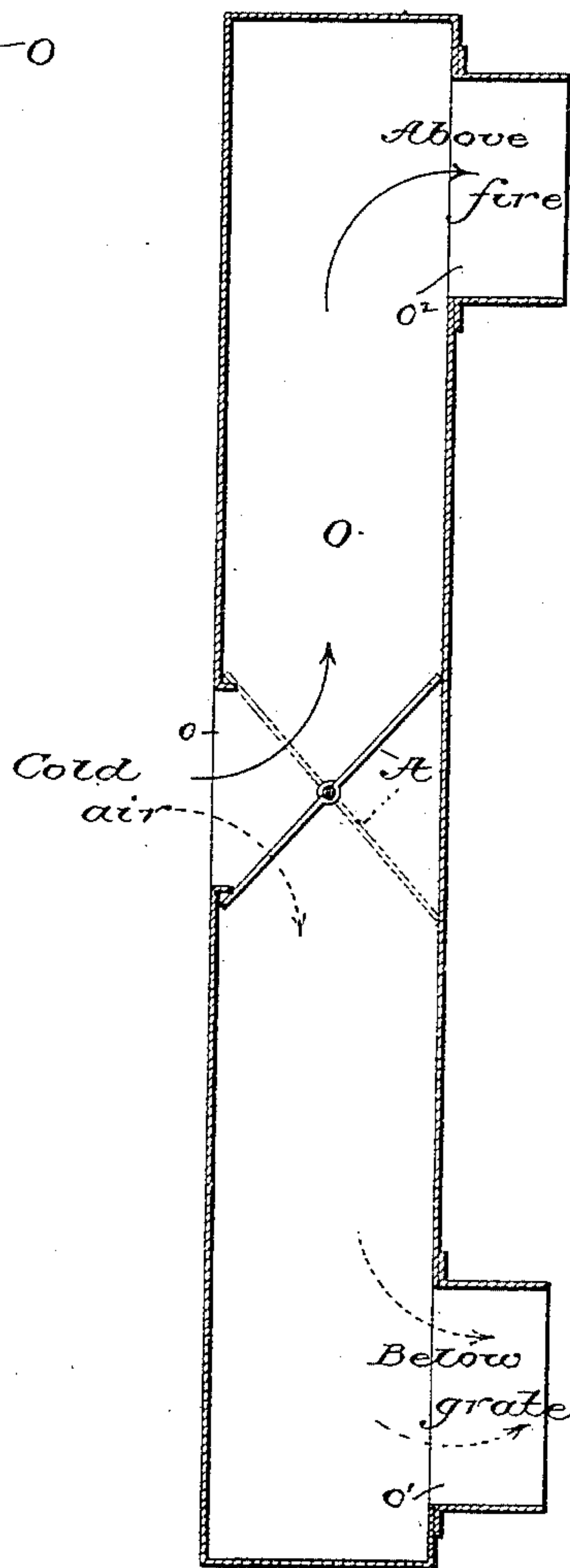


Fig. 3.



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Inventor:
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By P. Y. Dodge
Att.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

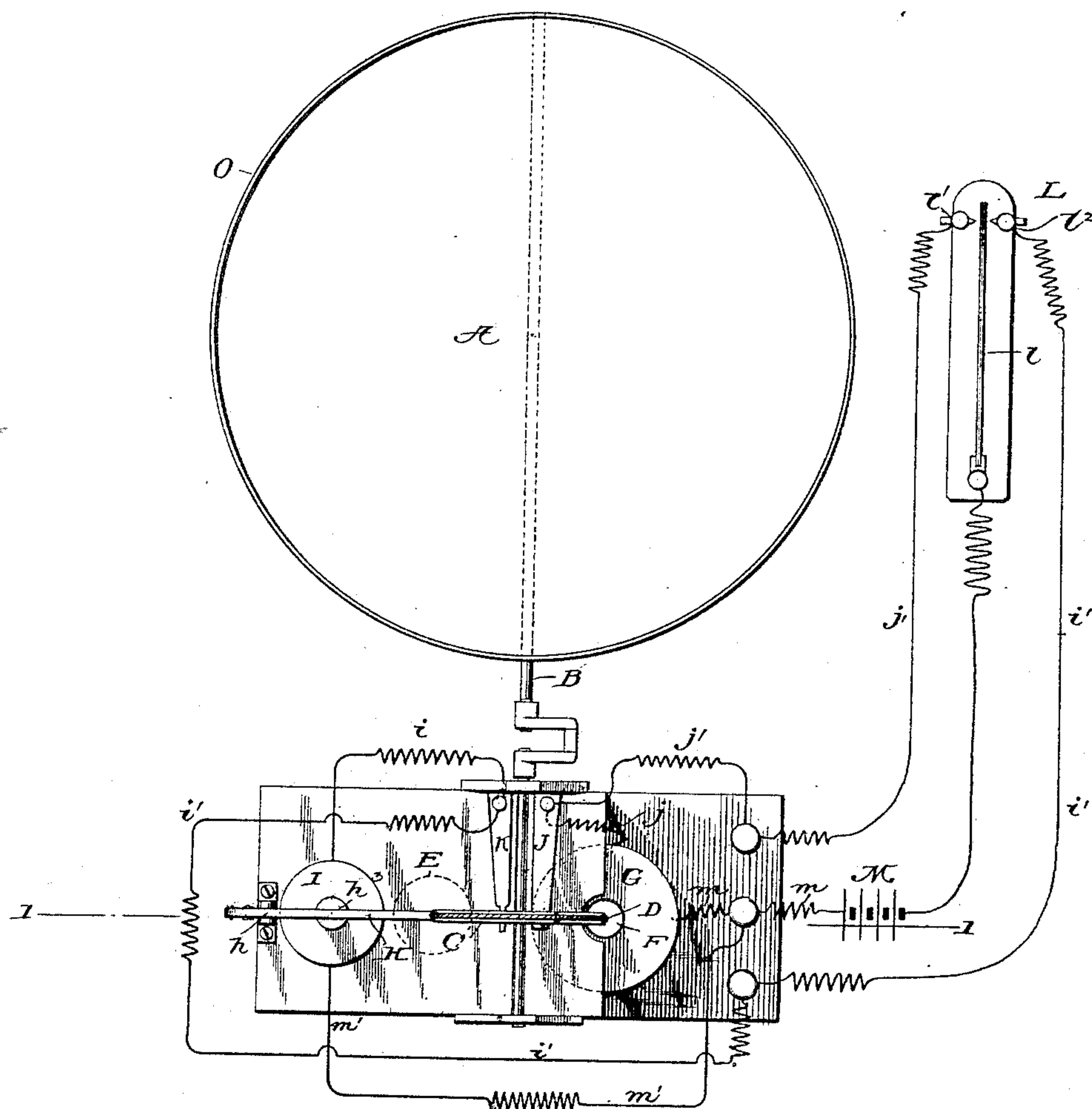
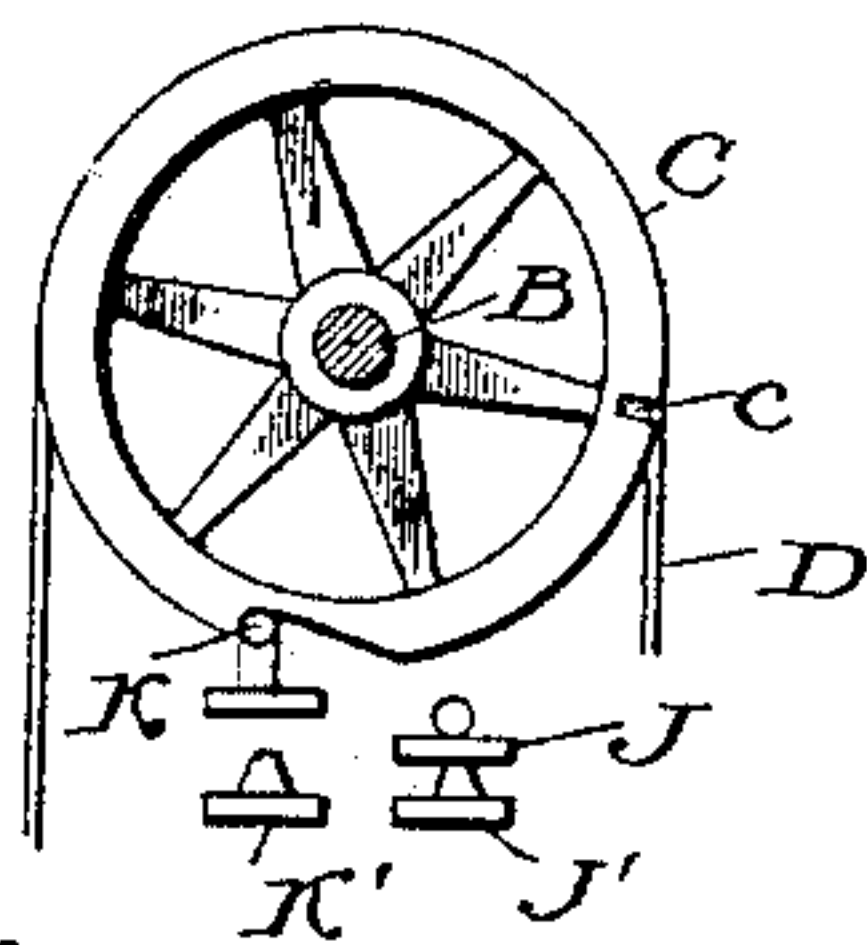


Fig. 4.



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UNITED STATES PATENT OFFICE.

FERDINAND E. CHATARD, OF BALTIMORE, MARYLAND.

AUTOMATIC ELECTRIC VALVE-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 450,927, dated April 21, 1891.

Application filed January 15, 1891. Serial No. 377,867. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND E. CHATARD, of the city of Baltimore and State of Maryland, have invented certain Improvements in Automatic Temperature-Regulators, of which the following is a specification.

The aim of my invention is to provide a simple and compact apparatus for controlling the temperature of buildings or apartments, which may be applied to existing heating apparatus and used for long periods of time without demanding any care or attention whatever.

My apparatus consists of a magnetic mechanism of peculiar construction to operate the heat-controlling valve and a thermostat situated in the apartment to be heated and controlling electric circuits through which the valve mechanism is actuated.

My mechanism may be applied in connection with the valve or valves controlling the draft of the furnace-boiler or other heater, or in connection with the valve controlling the delivery of hot-air, steam, or other heating medium to the apartment.

For the purposes of illustration I have shown the improvement applied to a single valve controlling the upper and lower draft-openings of a heating-furnace.

In the accompanying drawings, Figure 1 is a vertical section on the line 1 1, Fig. 2, showing the apparatus attached to the valve. Fig. 2 is a top plan view of the same. Fig. 3 is a sectional elevation showing the valve and its casing or draft-tube for attachment to an ordinary heater. Fig. 4 is a view of a detail.

Referring to the drawings, A represents the valve, of the ordinary butterfly or balanced type, mounted on a horizontal shaft B, the outer end of which carries a pulley C, coupled thereto or fixed thereon. A cord D, passed over and fixed to the pulley, is provided at one end with a preponderating weight E, and attached at the other end to a soft-iron armature F, arranged to move upward and downward within a stationary solenoid G. When an electric current is passed through the solenoid, the armature is drawn down therein and the cord caused to turn the valve to the position shown in full lines in Fig. 3; but when the current ceases, so that the armature is released, the weight acts, unless the

parts are locked, to give the valve a quarter-turn to the reversed position indicated by dotted lines in the same figure.

An armature-lever H, pivoted at h , is provided at one end with a lip h' and at the opposite end with a spring h^2 , which causes the lip to enter a notch c in the pulley and lock the valve, as shown in Fig. 1, as soon as it is moved by the armature F.

An electro-magnet I, fixed in position, serves when excited to attract the armature h^3 of the latching-lever H, and disengages the same from the pulley when the valve is to be reversed by the weight. Below the lever H are mounted two insulated spring-conducting fingers J J', which are forced into contact when the lever is depressed to unlock the pulley. Near the fingers just named are two insulated conducting-fingers K K', held normally in contact by the periphery of the pulley, but permitted to separate by a notch k therein when the pulley and valve turn to the position shown in dotted lines.

In the apartment to be heated I locate any ordinary or suitable thermostat L, adapted to close a circuit whenever the temperature reaches the maximum or minimum point decided on. In the form shown this consists of a compound thermostatic flexion-bar l , adapted to vibrate between and make contact with the conductors $l' l^2$, alternately. The bar, in part of metal, that it may serve as a conductor, is connected at one end with a battery M, and thence through conductors $m m'$ with the solenoid G and magnet I, respectively. The solenoid is connected by wire j with the under finger J', and the upper finger J connected by wire j' with thermostatic contact l' on the maximum side of the thermostat. The magnet I is connected by wire i with the under finger K', and the upper finger K connected by wire i' with the contact on the minimum side of the thermostat. In the normal condition of the parts the circuits are both interrupted at the thermostat. If the heat in the apartment is up to the required limit, the valve and other parts stand as in Fig. 1, locked by lever H. As soon, however, as the temperature falls below the desired point, the thermostat closes the circuit on its minimum side through the magnet I, which unlocks the lever from the pulley and allows

the weight to reverse the valve. As the valve completes its movement the pulley releases finger K, and thereby interrupts the circuit just used. At the same time the lever de-
 5 presses and holds the fingers J J' of the other circuit together, so that when the increasing temperature causes the thermostat to make connection at its maximum side the circuit is thereby completed through the solenoid and
 10 the valve pulled back to its first position. The lever H, rising to lock the parts, releases finger J and opens the circuit last employed at the same time that the pulley again unites the fingers K K' for use when the thermostat
 15 again reverses its position. It will be observed that under this arrangement the circuits are closed momentarily only, and thus wastage of the battery avoided.

In Fig. 3 I have illustrated a simple mode
 20 of applying the valve operated as above to control a furnace. The valve is located in the middle of an upright tube or trunk O opposite an air-inlet o, so that as it is turned to and fro it will direct the inflowing air into
 25 the upper or the lower end of the tube, and at the same time close the communication to the opposite end. At the bottom of the tube there is an air-delivery opening o' for admitting air into the base of the heater below the
 30 grate to increase the combustion and development of heat, and at the top of the tube there is an opening o² to admit air through the top of the heater to check the combustion.

35 While I have represented and prefer to use the solenoid and armature for the reason that I am thus enabled to effect a long and easy motion of the armature, it will be obvious that an ordinary electro-magnet may be used,
 40 but in such case, owing to the shortness of its movement, the connection would require to be made near the axis of the valve in order to give it the necessary motion.

The essence of the invention consists in
 45 combining with the valve magnetic devices and a weight to move it in opposite directions and a magnetically-actuated latch or lock,

and it will be understood by the skilled mechanic that the form and arrangement of the parts may be modified, provided their mode
 50 of action is not materially changed, without departing from the limits of my invention.

In the drawings I have represented the pulley as mounted on an independent shaft in bearings on the controlling apparatus. Al-
 55 though this is not necessary, it is preferred, for the reason that it admits of the apparatus being applied to existing valves and without the necessity of exact alignment of the parts.

Having thus described my invention, what
 60 I claim is—

1. The valve and its operating-pulley, in combination with the cord, the armature and solenoid to move the valve in one direction, the weight to move the same in the opposite
 65 direction, the latch to hold the valve, and the magnet to actuate the latch.

2. In a valve-controlling mechanism, the valve-actuating pulley, the armature and solenoid to move the same in one direction, the
 70 weight to move the same in the opposite direction, the latching-lever and its controlling-magnet, electric circuits including the solenoid and magnet, respectively, and the circuit-controlling devices actuated by the pulley to
 75 open the circuits alternately.

3. In combination with the valve, the weight, and the electro-magnetic devices to move the valve in reverse directions, the magnetically-actuated latch to hold the valve
 80 against the influence of the weight, the battery and the thermostat with contacts at maximum and minimum temperature points, and circuit-connections from the respective points through the valve-actuating and valve lock-
 85 ing devices.

In testimony whereof I hereunto set my hand, this 9th day of January, 1891, in the presence of two attesting witnesses.

FERDINAND E. CHATARD.

Witnesses:

PHIL. T. DODGE,

FABIUS STANLY ELMORE.