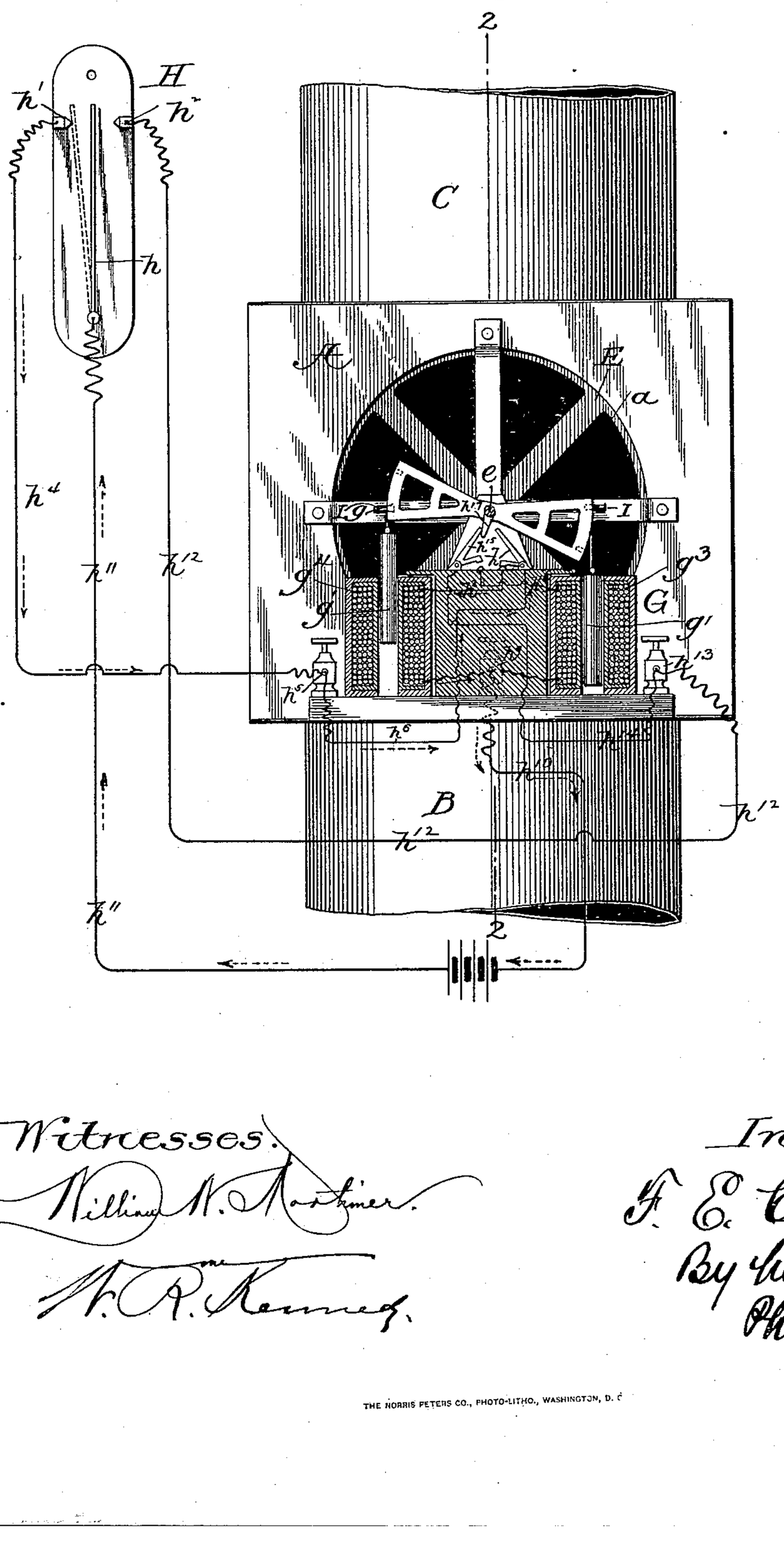
(No Model.) 2 Sheets—Sheet 1.

F. E. CHATARD.

AUTOMATIC DAMPER CONTROLLER.

No. 467,153. Patented Jan. 19, 1892.

Fig. 1.



Witnesses:
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F. P. Kennedy.

Inventor:
F. E. Chatard
By his Atty
Phil T. Dodge

(No Model.) 2 Sheets—Sheet 2.

F. E. CHATARD.

AUTOMATIC DAMPER CONTROLLER.

No. 467,153. Patented Jan. 19, 1892.

Fig. 2.
on line 2-2

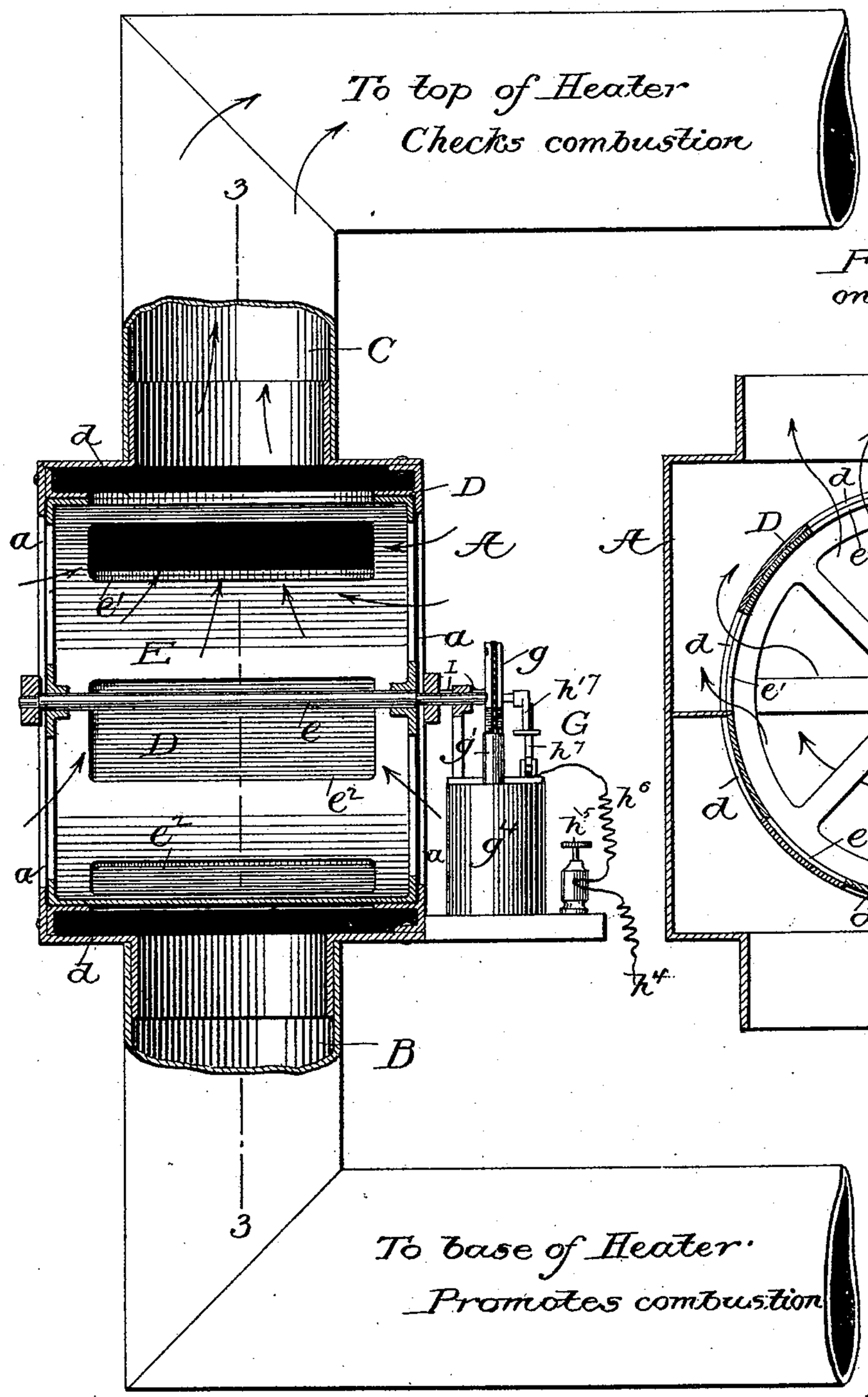
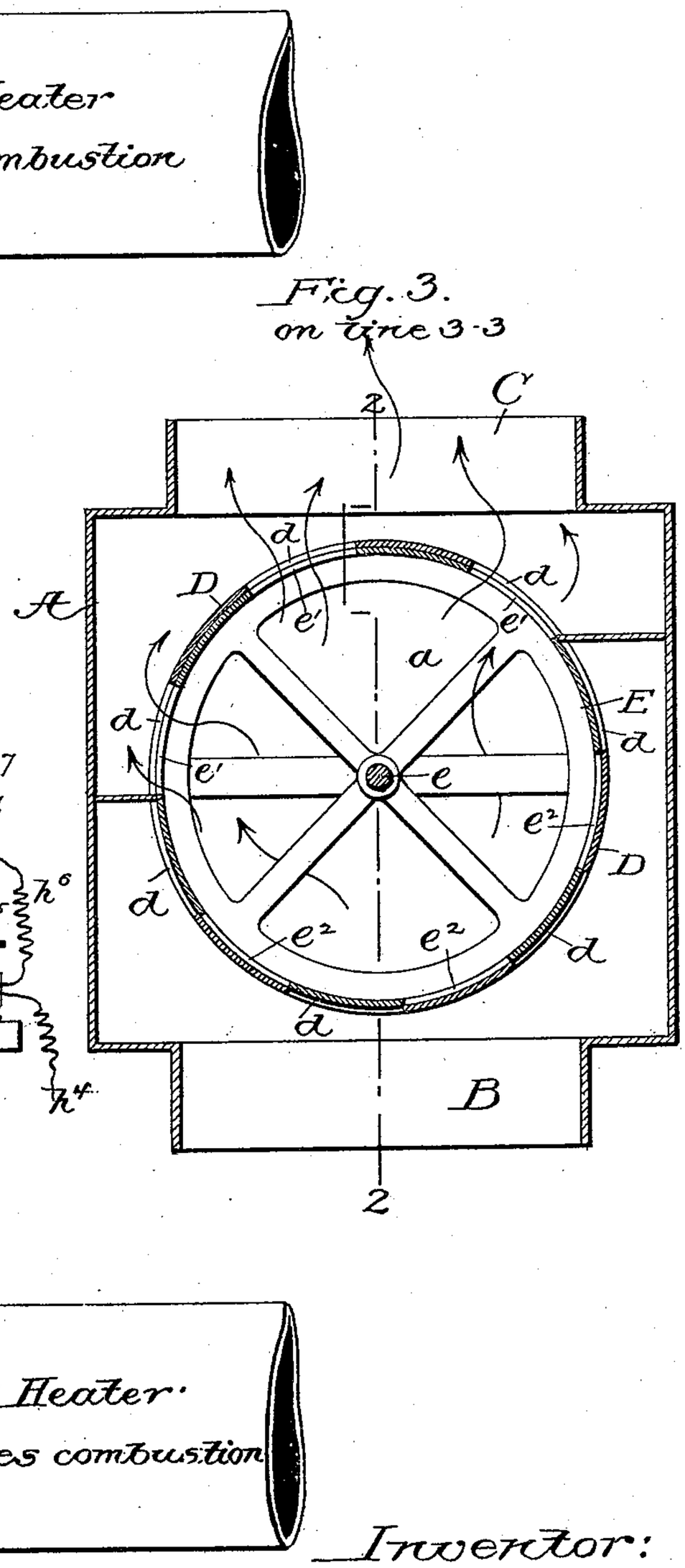


Fig. 3.
on line 3-3



Witnesses:
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W. A. Kennedy

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UNITED STATES PATENT OFFICE.

FERDINAND E. CHATARD, OF BALTIMORE, MARYLAND.

AUTOMATIC DAMPER-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 467,153, dated January 19, 1892.

Application filed May 5, 1891. Serial No. 391,680. (No model.)

To all whom it may concern:

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

My invention has in view the controlling of the combustion in a furnace, boiler, or other heater automatically by thermostatic devices in such manner as to maintain a uniform temperature in the apartment in which the thermostat is located. To this end I combine with a thermostatically-controlled motor a valve which admits air to the heater below or above the fire-grate as it is required to increase or diminish the temperature.

The first part of my invention relates to an improved construction of the valve, whereby it is adapted to be operated by slight expenditure of power, and the second to a motor of peculiar construction for operating the same.

In the accompanying drawings, Figure 1 is an elevation of my device, the motor being shown in vertical section. Fig. 2 is a vertical cross-section of the same on the line 2 2 of Figs. 1 and 3. Fig. 3 is a vertical section on the line 3 3 of Fig. 2.

Referring to the drawings, A represents a box or chamber provided at its two sides with air-inlet openings *a* and at its top and bottom with two air-delivery pipes B and C. The two pipes, which are opened and closed alternately, are extended one to the base of the furnace or heater below the fire-grate, in order to supply air to promote combustion, and the other to the top of the furnace above the fire, in order to check combustion, after a manner commonly practiced and generally understood.

The valve for controlling the passage of air to the pipes consists of two concentric sheet-metal cylinders D and E, the former fixed in position across the interior of the chamber, so that its ends encircle the air-inlets, and the latter mounted on a horizontal axis *e*, so as to turn freely within the other. The outer cylinder is provided with top and bottom openings or ports *d*, through which the air entering through the center passes to the upper or the lower pipe, as the case may be. The inner cylinder or valve proper is also provided with top and bottom openings or ports e' e^2, through which the air passes to the openings of the outer cylinder. As the power available for operating the valve is very limited in amount and as the valve must move with great ease, the mounting of the inner or rotary member on its central axis so that it may turn easily and without frictional contact with the surrounding cylinder or casing is of great advantage. When the inner valve stands in the position shown in Fig. 3, its upper ports will register with those in the outer cylinder and allow the air to ascend through pipe C to deaden the fire, the lower open ports of the valve standing at this time over the solid portion of the external cylinder, so that the passage of air to the lower pipe is prevented. If, however, the valve be given a slight motion on its axis, the upper ports will be closed and the lower ports opened, so as to admit air to the fire. It will be observed that the valve may be accurately balanced on its axis to turn easily, that the air-pressure does not affect its action, and that by opening a series of ports at one time it provides by a slight movement openings of great area for the passage of the air.

For the purpose of operating the valve I provide the electro-magnetic motor G, controlled by a thermostat H, located in the apartment the temperature of which is to be controlled. The motor consists of a lever or walking-beam *g*, fixed on the valve-spindle and provided at its two ends with pendent soft-iron armatures g', arranged to rise and fall within the stationary solenoids g^3 and g^4, through which a current is passed alternately, thus causing the armatures to descend one at a time and thus rock the valve to and fro. The thermostat is composed of a compound conducting-bar *h*, arranged to vibrate between two contact-points h' and h^2, so adjusted that it meets one or the other, according as the temperature reaches the maximum or minimum limit. The minimum contact h' is connected through conductor h^4 to binding-post h^5, thence through conductor h^6 to gravitating finger h^7, thence through conductor h^8 and solenoid g^4 to binding-post h^9, thence through conductor h^{10} to battery, and conductor h^{11} to thermostatic bar. The maximum contact h^2 is connected through conductor h^{12} to binding-post h^{13}, thence through conductor h^{14} to gravitating finger h^{15}, thence through con-

ductor h^{16} and solenoid g^3 to binding-post h^9, thence through conductor h^{10} to battery, and through conductor h^{11} to thermostatic bar. The walking-beam carries a finger h^{17}, which acts to raise the fingers h^7 h^{15} alternately, so that whenever a circuit is closed to excite one of the solenoids and move the valve the circuit is immediately opened again to prevent wastage of the current, the circuits being both in an open condition, except at the instant when the valve is being moved. This will be more clearly understood by considering the action in detail. Assume that the valve stands open, as in Fig. 3, and that the temperature falls until the thermostatic bar contacts on the left. The effect will be to complete the circuit through solenoid g^4 and cause its armature to descend and turn the valve until it is closed at the top and opened at the bottom. As this action is completed the finger h^{17} lifts the finger h^7 and breaks the circuit, at the same time lowering the finger h^{15} of the other circuit, so that it may be completed in its turn when the thermostat contacts on the maximum side, so as to reverse the motion of the valve.

If desired, spring-catches I or other suitable devices may be provided to engage the beam, as shown, and hold the valve from moving accidentally.

What I claim as my invention is—

1. In combination with a thermostat and an electric motor controlled thereby, a valve operated by the motor and consisting of the fixed cylinder provided with ports and the internal rotary cylinder sustained by a central axis and having ports arranged to register at the top and bottom alternately with the ports of the outer cylinder.

2. In a heat-regulating apparatus, the damper to control the action of the heater, consisting of the rotating and the non-rotating cylinders provided each with a series of ports arranged to register on the two sides alternately, in combination with a central shaft sustaining the rotary cylinder and pipes leading from opposite sides to deliver air to the top or bottom of the heater, as demanded.

3. In combination with the cylindrical rotary valve, its lever, the electrodes attached thereto, the solenoids, two thermostatically-controlled circuits, including the respective solenoids, the gravitating circuit-controlling fingers h^7 and h^{15}, and the finger h^{17} on the lever, whereby these conducting-fingers are alternately out of action.

In testimony whereof I hereunto set my hand, this 6th day of April, 1891, in the presence of two attesting witnesses.

FERDINAND E. CHATARD.

Witnesses:
PHILIP T. DODGE,
FABIUS S. ELMORE.