

(No Model.)

2 Sheets—Sheet 1.

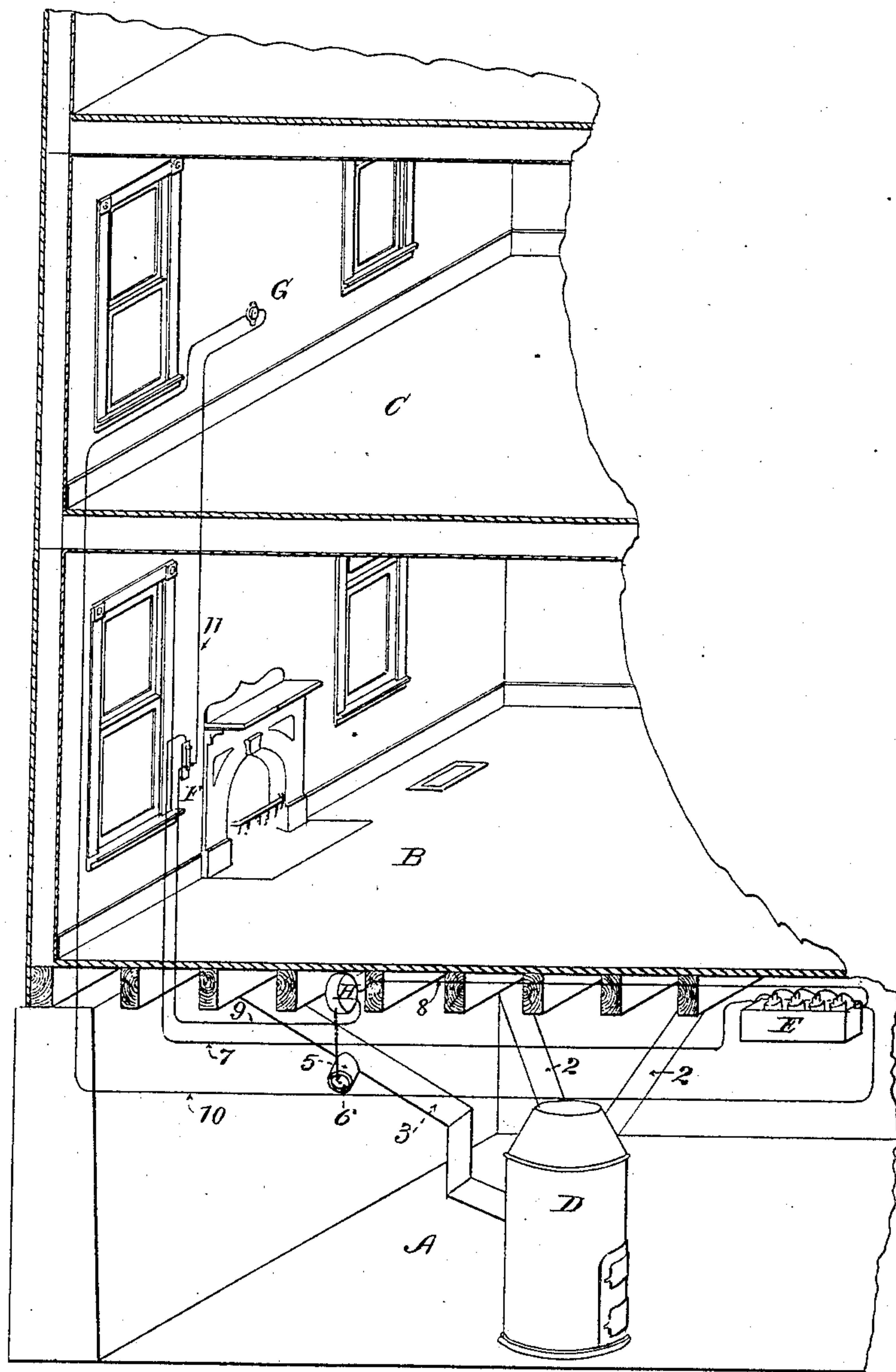
A. M. BUTZ.

THERMO ELECTRIC DAMPER REGULATOR AND ALARM.

No. 341,092.

Patented May 4, 1886.

Fig. 1.



Witnesses
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Fig. 2.

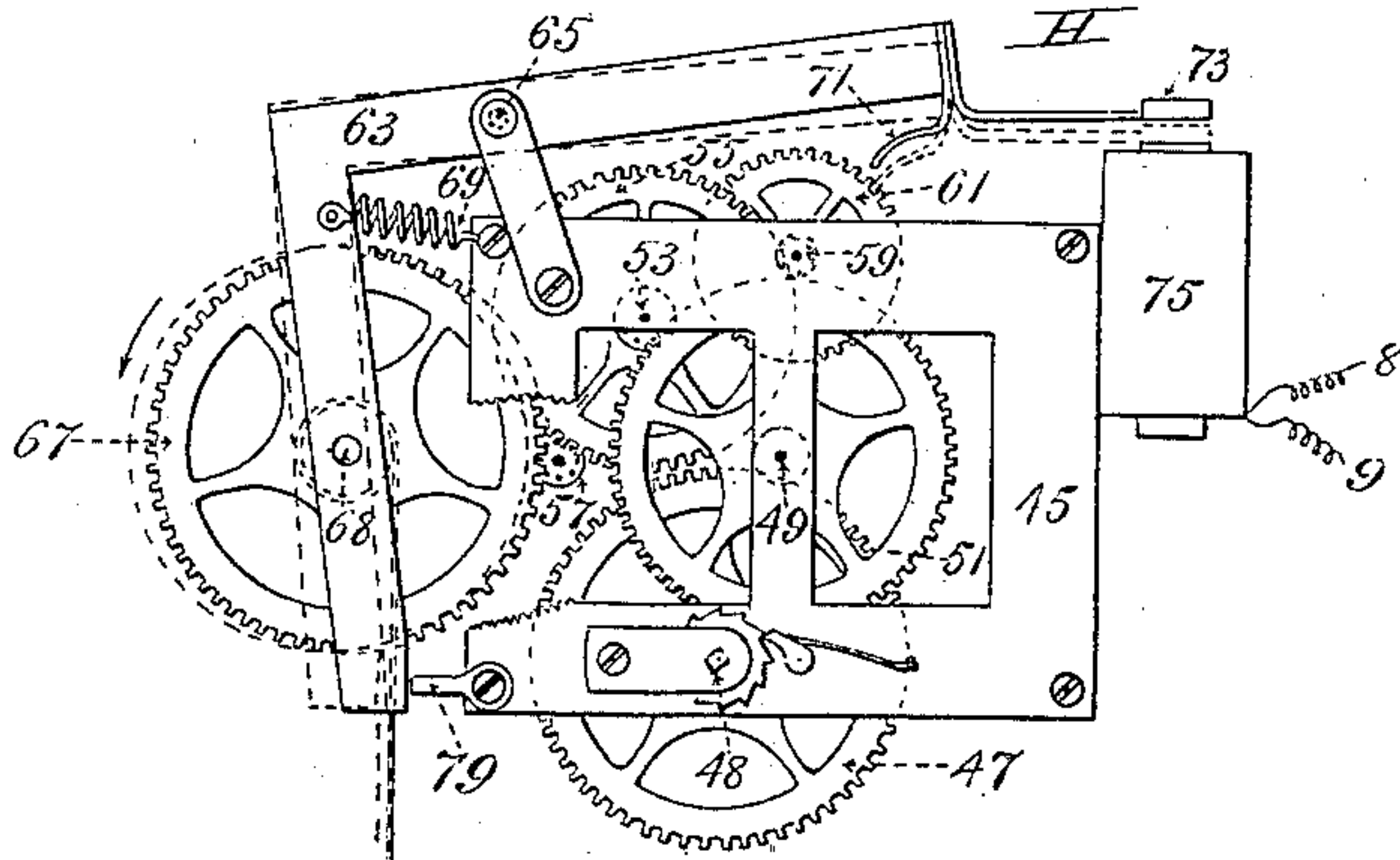


Fig. 5.

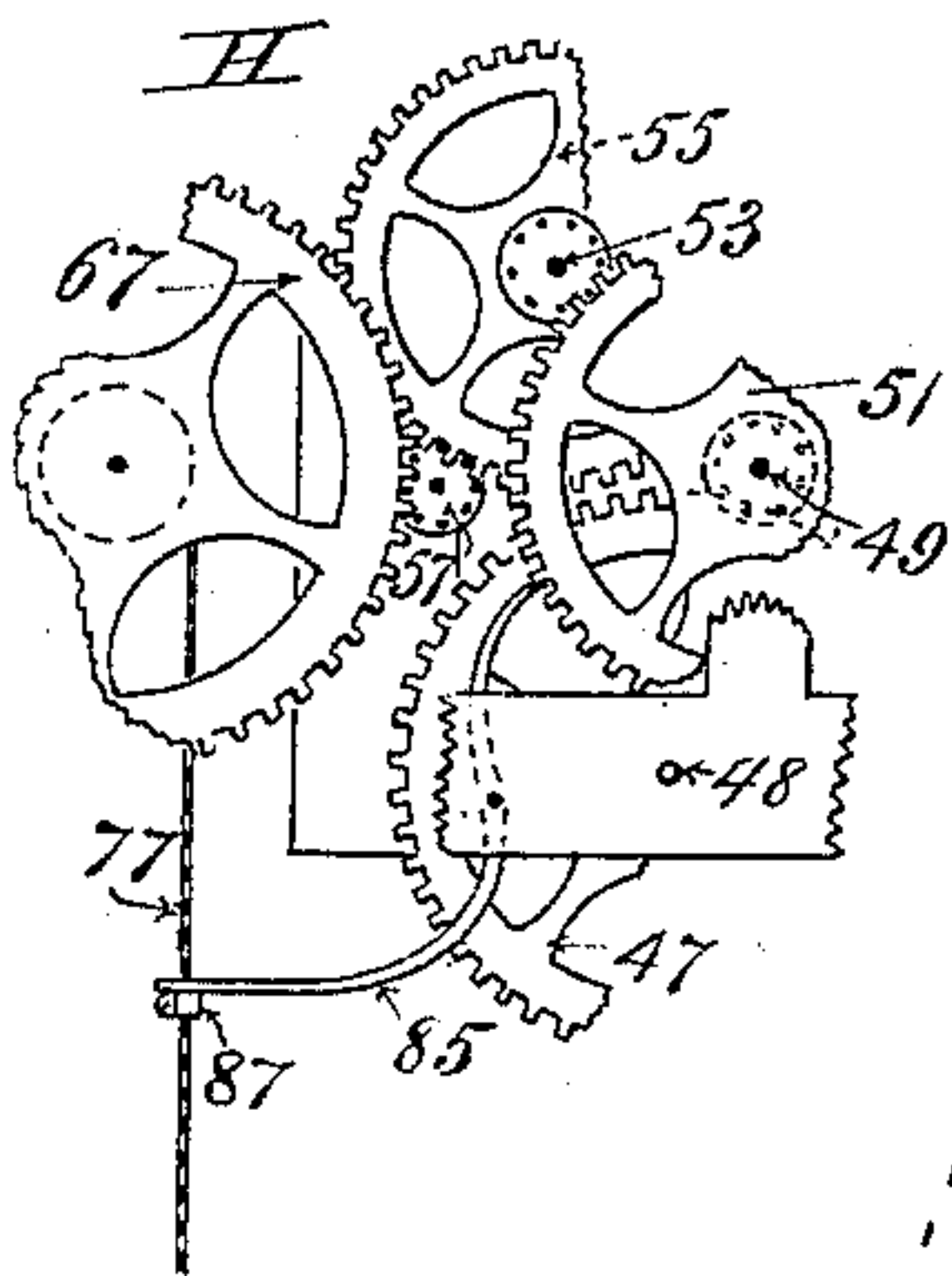


Fig. 4.

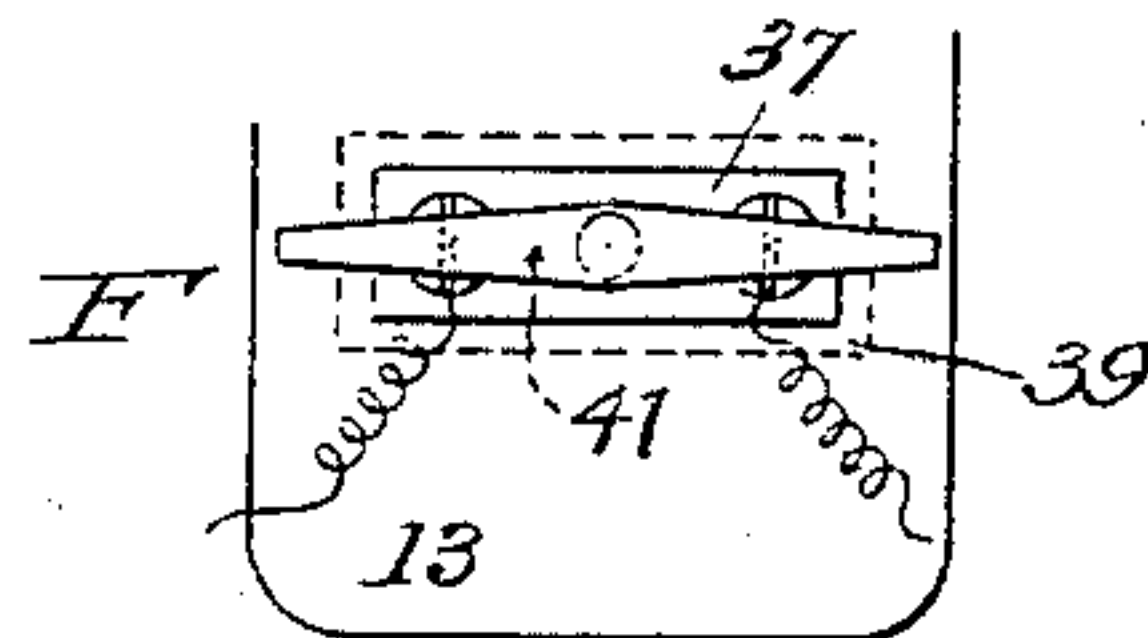
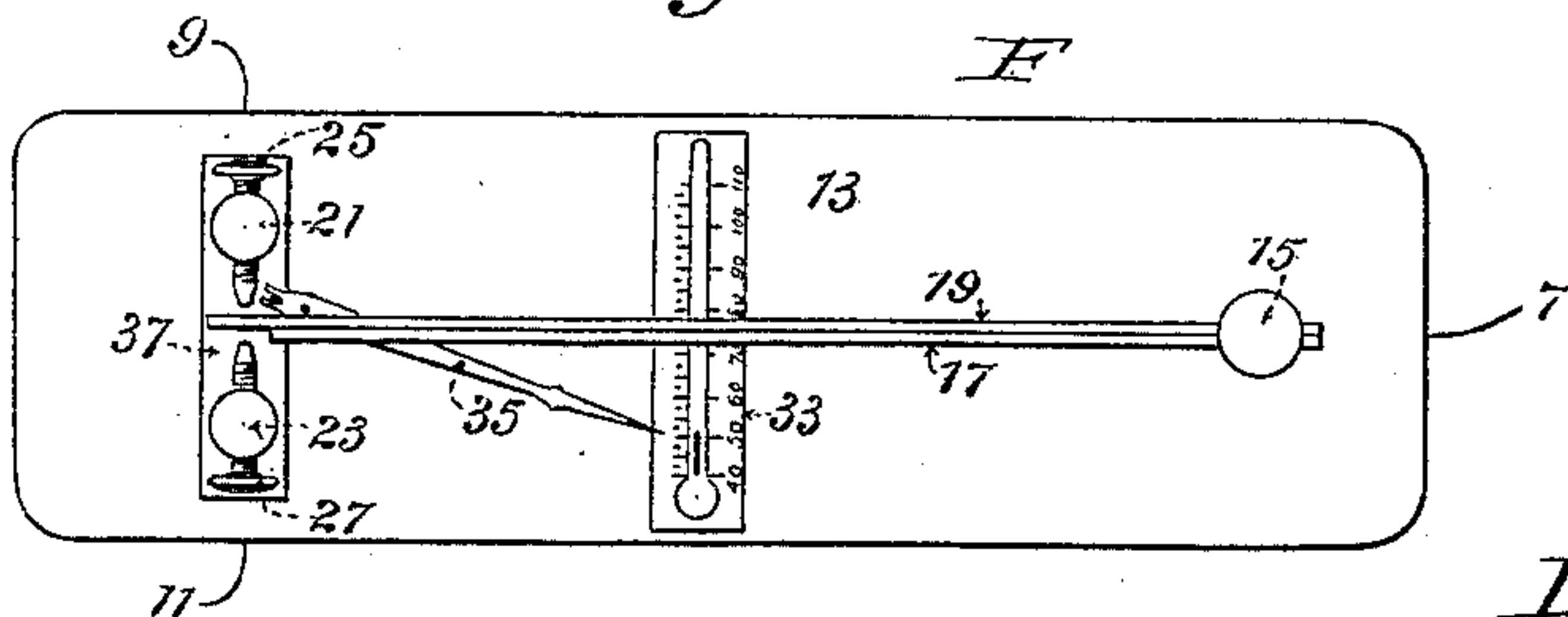


Fig. 3.



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UNITED STATES PATENT OFFICE.

ALBERT M. BUTZ, OF MINNEAPOLIS, MINNESOTA.

THERMO-ELECTRIC DAMPER-REGULATOR AND ALARM.

SPECIFICATION forming part of Letters Patent No. 341,092, dated May 4, 1886.

Application filed December 14, 1885. Serial No. 185,585. (No model.)

To all whom it may concern:

Be it known that I, ALBERT M. BUTZ, a citizen of the United States, and a resident of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain Improvements in Thermo-Electric Damper-Regulators and Alarms, of which the following is a specification.

My invention relates to improvements in damper-regulators and alarms that are designed to operate the dampers or valves of a furnace or stove as the temperature rises or falls in the rooms whose temperature is to be regulated, and to sound an alarm when the temperature of such rooms has become so reduced as to indicate that a fresh supply of fuel is needed in the stove or furnace, or that it needs to be otherwise attended to.

My invention consists, generally, in a thermostat located between two open circuits, one of which is closed by the thermostat when the temperature of the room where the thermostat is located rises to a certain point, and the other of which is closed when this temperature falls to a certain point, with a spring-motor arranged in one of said circuits and adapted to operate the damper or check-valve of the furnace or stove, and an alarm located in the other circuit, that is sounded when that circuit is closed.

My invention also consists in the construction and combination hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a sectional elevation of a part of a house, showing my devices arranged therein. Fig. 2 is a sectional elevation of the spring-motor and damper or check-valve, the casing of the motor being omitted. Fig. 3 is a plan of the thermostat. Fig. 4 is a detail of the same. Fig. 5 is a detail showing a modification.

A in the drawings represents the furnace-room of a house, in which is located a furnace, D, which has a smoke-pipe, 3, and suitable hot-air pipes, 2 2.

B represents a room whose temperature it is desired to regulate.

C represents a room in which an alarm is located that will indicate when the furnace

needs attention. This alarm I generally locate in a servant's room.

In the smoke-pipe 3 is located a short pipe, 5, provided with a suitable check-valve, 6. This valve is opened by gravity, the end of the pipe being oblique, as shown in Fig. 2.

H represents a spring-motor that is connected to the valve 6.

E is a suitable battery, that may be located in the furnace-room or at any other convenient point.

F represents a thermostat located in the room B, and G an alarm located in the room C. A conducting-wire, 7, extends from one end of the thermostat directly to the battery E. A wire, 8 9, extends from the opposite pole of the battery to one side of the thermostat at its other end, and a wire, 10 11, extends from the same pole of the battery to the opposite side of the same end of the thermostat. The motor H is located on the wires 8 9, and the alarm G on the wires 10 11. By this means two open circuits are created, in one of which the motor is located, while the alarm is located in the other, and both of which may be closed by the thermostat.

The thermostat that I prefer to employ is shown in detail in Figs. 3 and 4. This thermostat consists of a suitable base-plate, 13, of wood or other suitable material, having a metallic post, 15, mounted on one end, to which the wire 7 is connected. A compound bar consisting of a metal strip, 19, and a gutta-percha or rubber strip, 17, or consisting of two bars of metal of unequal expansion, is mounted in the post 15, and extends over the base-plate.

21 is a post to which the wire 9 is connected. It is provided with a screw or pin, 25, whose end comes opposite the metal strip 19. The wire 11 is connected to a similar post, 23, upon the opposite side of the plate. This post has the screw or pin 27. These screws may be set so that when the temperature of the room in which the thermostat is placed rises to a predetermined point the expansion of the rubber will cause the metal strip to come in contact with the screw 25, and when the temperature falls to a certain degree the strip will come in contact with the opposite

pin or screw, 27. When the metal strip is in contact with the screw 25, the circuit through the damper-regulator will be closed. When it is in contact with the screw 27, the circuit through the alarm will be closed.

The thermostat may, if preferred, be provided with a thermometer and scale, so that the screws may be readily set to the desired temperature. I have shown in Figs. 3 and 4 a device for this purpose. 33 represents a thermometer, that is mounted on the plate 13. A pointer, 35, is pivoted on the plate and connected by a slot and pin with an insulating-plate, 37, in which the posts 21 and 23 are mounted. This plate is free to slide across the base-plate. In the construction shown an opening, 39, Fig. 4, is cut through the base-plate 13. A spring, 41, is secured to the plate 37, and bears on the under side of the plate 13. The plate 37 may be moved so as to bring the pointer opposite the degree on the scale at which it is desired to close the circuit. The damper or check-valve is arranged so as to open by gravity, as indicated by dotted lines in Fig. 2. A suitable spring or weight might be used to secure the same result. When the circuit through the motor is open, the valve is closed by the motor. When this circuit is closed, the valve is released and drops to the position indicated by dotted lines in Fig. 2. In this figure, 45 represents a suitable frame, in which the gearing is mounted. 48 represents a spring-operated shaft having a ratchet and pawl and adapted to be wound up in the ordinary manner. This shaft is provided with a gear, 47, which meshes with a pinion on a shaft, 49, which is also provided with a suitable gear-wheel, 51, that drives a pinion on a shaft, 53. This shaft is provided with a gear-wheel, 55, that drives a pinion on a shaft, 59, having a gear, 61, and also drives a pinion, 57. A suitable frame or lever, 63, is pivoted at 65, and carries a gear, 67, that is adapted to mesh with the pinion 57, and to be driven thereby. A stop-pawl, 71, is provided on the opposite side of the pivot, that is adapted to drop into the notches on the gear 61 and stop the train. A spring, 69, tends to hold the gear 67 in mesh with the pinion 57. An armature, 73, is mounted on the pivoted frame 63, and is arranged to be operated by an electro-magnet, 75, which may be of ordinary form, connected with the wires 8 9. A suitable cord, 77, is attached to the check-valve 6 and to the shaft 68.

The operation of the device is as follows: The valve being closed and the parts in the position shown by the full lines in Fig. 2, when the circuit through the wires 8 9 is closed by the thermostat F the armature 73 will be drawn against the poles of the electro-magnet 75, the frame 63 will turn on the pivot 65, the gear 67 will be thrown out of mesh with the pinion 57, and the weight of the valve 6 causes it to open, unwinding the cord 77 from the shaft 68. When the circuit is broken at the thermostat, the spring 39 causes the dog

71 to be raised from the gear 61. The train is thereby released and set in motion. The gear 67 is thrown into engagement with the pinion 57, and thereby rotated. The cord 77 is wound upon the shaft 68, and the valve is closed. The train of gears runs until stopped by the closing of the valve. When the circuit is again closed, the gear 67 is released, and the damper again opens.

The number and arrangement of the gears forming the motor and the construction and arrangement of the check-valve may be varied without departing from my invention.

The device may be applied to any kind of furnace or stove, and may be connected to other kinds of valves than that shown. The thermostat may be arranged in any preferred manner in the room to be regulated.

In Fig. 5 I have shown a stop that is adapted to be operated by the cord 77, to stop the motor when the check-valve has been closed or partially closed. This device consists of a suitable pivoted dog, 85, that is adapted to engage the teeth of one of the gears, and to be thrown into engagement therewith by a knot or collar, 87, on the cord 77. This knot or collar may be adjusted to stop the motor when the valve is only partially closed. The gear 67 is by this means relieved of the tension of the train, and a weaker current may be used to move the frame 63. When the valve is released, the stop falls out of engagement with the gear.

79, Fig. 2, is a spring on the frame 45, to act as a buffer to the pivoted frame.

I claim as my invention—

1. The combination, with a stove or furnace provided with a regulating-valve, of two open electric circuits, a thermostat located in and adapted to close each of said circuits, an alarm located in one of said circuits, and a valve-controlling motor in the other, whereby when one circuit is closed by the thermostat the motor is set in motion, and when the other circuit is closed the alarm is sounded, all substantially as and for the purpose set forth.

2. The combination, with a stove or furnace, D, provided with the check-valve 6, of a thermostat, F, a valve-operating motor, H, a battery, E, an alarm, G, and the circuit-wires 7, 8, 9, 10, and 11, all substantially as described, and for the purpose set forth.

3. The combination, with the furnace and regulating-valve 6, of the thermostat, the battery, electro-magnet 75 and connecting-wires, the train of gears, the pivoted frame carrying the armature 73, stop 71, shaft 68, provided with the gear 67, and means connecting said shaft with the valve 6, all substantially as and for the purpose set forth.

4. In a damper-regulator, the motor H, having the pinion 57 and gear 61, and a train of gearing adapted to drive said pinion and said gear, in combination with the pivoted frame 63, carrying the stop 71, adapted to engage the gear 63, and carrying the shaft 68, provided with the gear 67, adapted to engage the pin-

ion 57, the check-valve 6, and a cord connecting said valve with the shaft 68, all substantially as and for the purpose set forth.

5 The combination, with the furnace having the regulating-valve, of the valve-operating motor, the battery, the alarm, the connecting-wires, and the thermostat having the post 15, connected with the wire 7, the compound bar 17 19, mounted in said post, the posts 21 23, connected with wires 9 and 11, and the contact pins
10 or screws 25 27, all substantially as and for the purpose set forth.

6. In a draft-regulator, and in combination with a battery, valve-motor, and circuit-wires,
15 the thermostat F, having the compound bar, the sliding plate carrying the contact point or

points, the thermometer 33, and the pivoted pointer 35, all substantially as and for the purpose set forth.

7. In a draft-regulator, the combination, 20 with the spring-motor, of the pivoted frame carrying the stop 71, armature 73, and shaft 68, having the gear 67, the dog 85, the valve 6, cord 77, and means on said cord for operating said dog, all substantially as and for the purpose 25 set forth.

In testimony whereof I have hereunto set my hand this 8th day of December, 1885.

ALBERT M. BUTZ.

In presence of—

A. C. PAUL,

R. H. SANFORD.