(No Model.)

G. R. WILLIAMS.

THERMOSTAT.

No. 311,933. Patented Feb. 10, 1885.

Fig. 4.

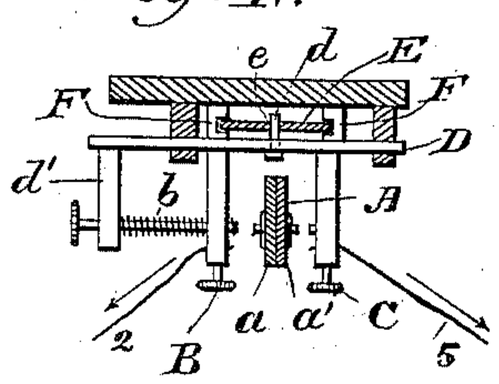


Fig. 1.

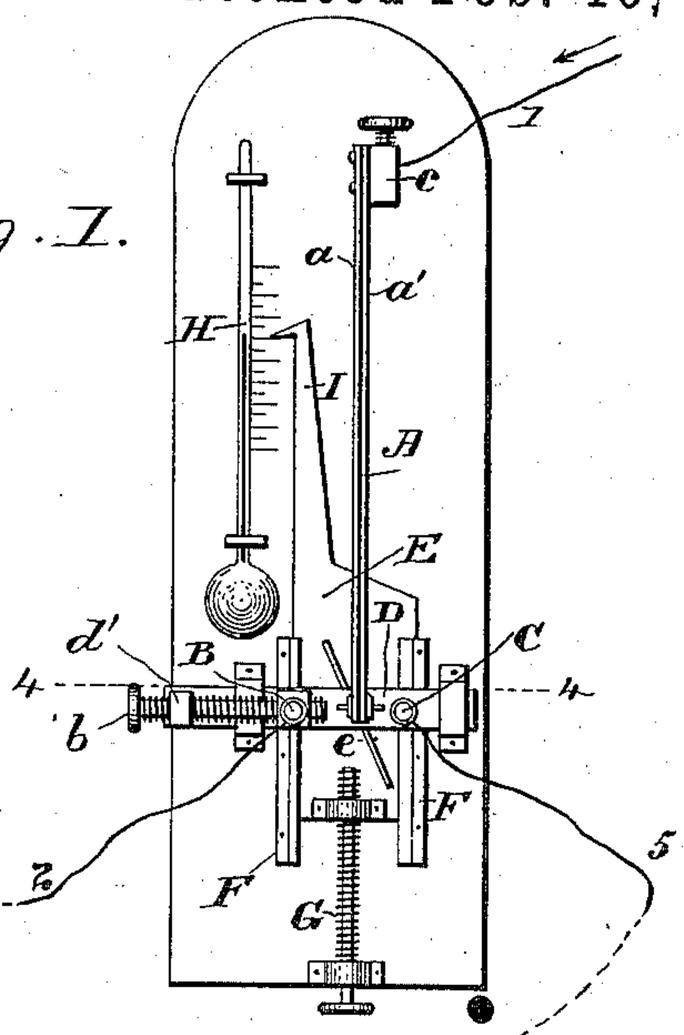


Fig. 3.

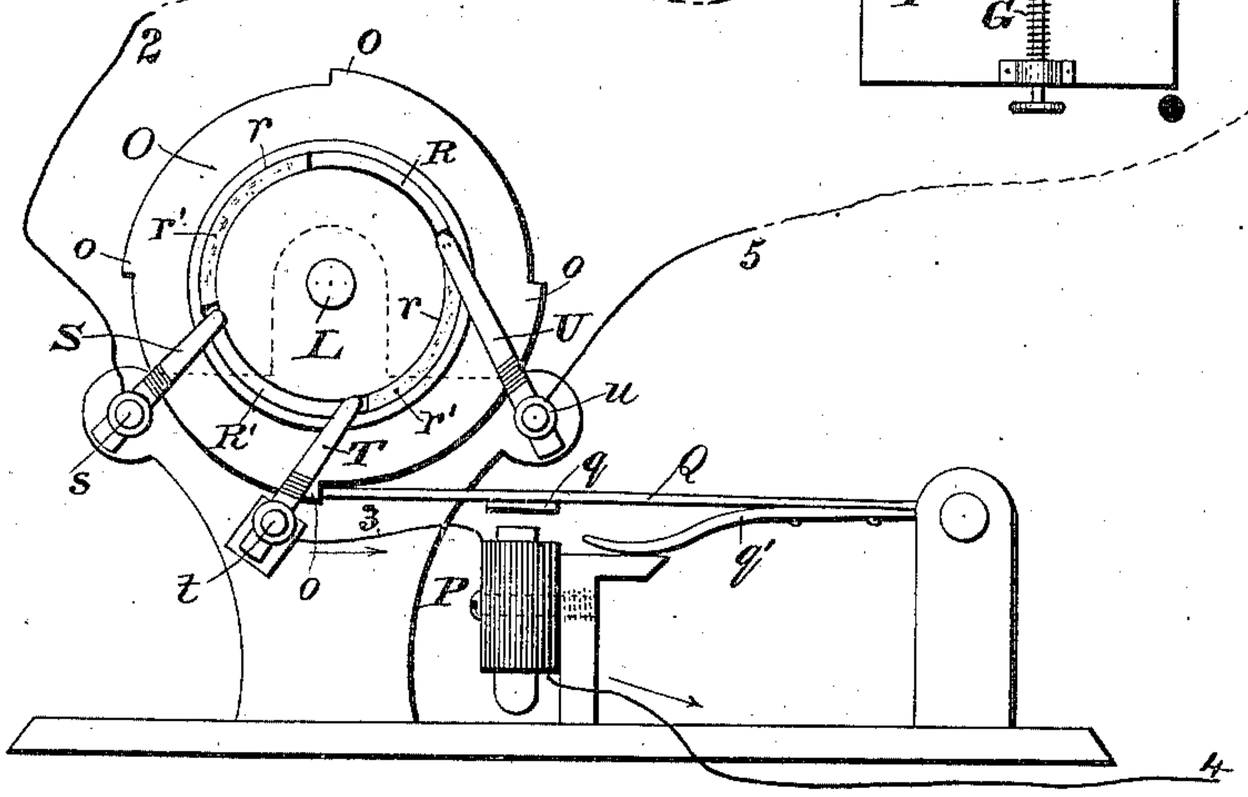
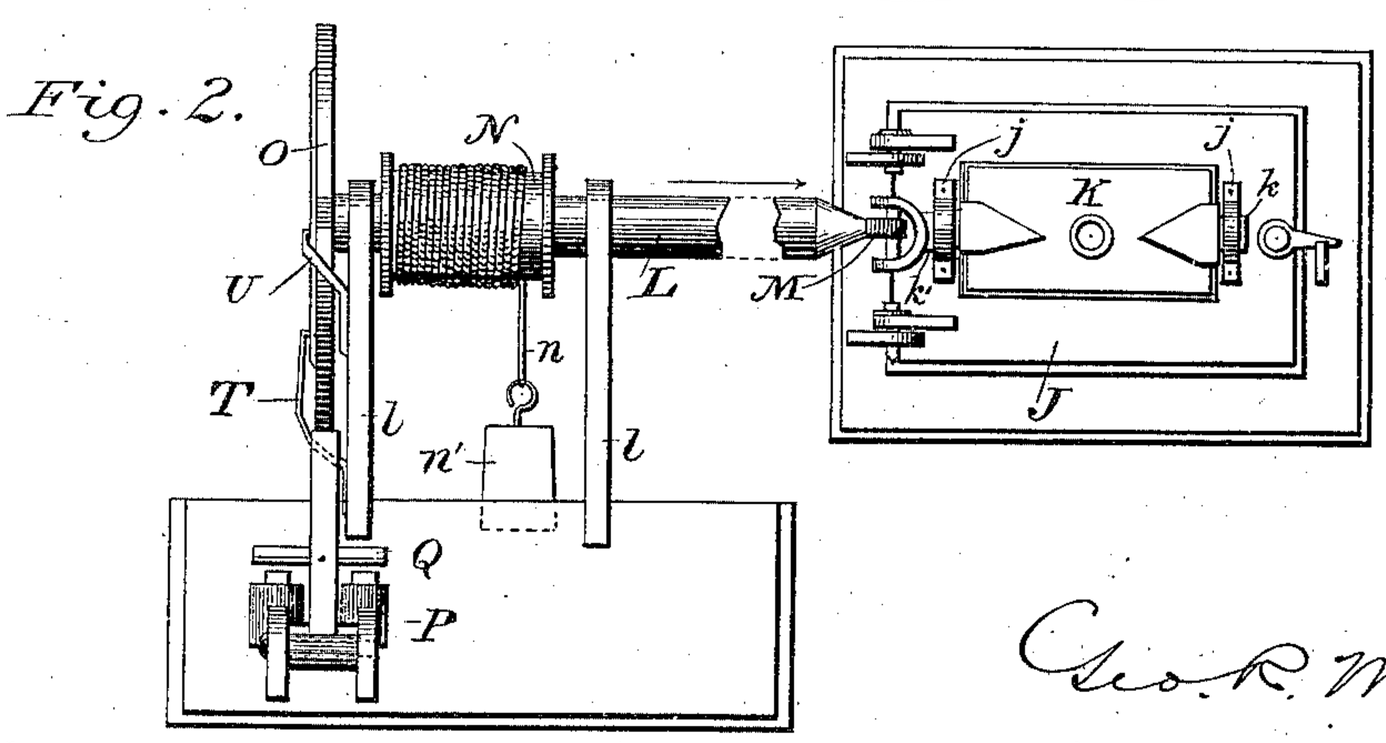


Fig. 2.



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THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 311,933, dated February 10, 1885.

Application filed February 21, 1884. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. WILLIAMS, a citizen of the United States, residing at Ithaca, in the county of Tompkins and State of New York, have invented an Improvement in Thermostats, of which the following is a description.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which Figure 1 is a front view of the thermal-bar support. Fig. 2 is an end view of my machine (for governing the electric current) connected to a furnace-door. Fig. 3 is a side elevation of the machine. Fig. 4 is a horizontal section of the thermal-bar support on the line 4 4, Fig. 1.

The thermal bar A consists of a strip of hard rubber, *a*, fastened to a strip of metal, *a'*, making together a flat bar which will turn from a straight line in one or other direction as affected by heat or cold, on account of different rates of expansion in these two materials. This form of thermal bar I do not claim as new. The bar is secured to a post or arm, *c'*, at one end, to which is attached a battery-wire, 1. The other end of the bar is free and extends between two adjustable contact-points, B C, mounted on a slide, D, adapted to be moved to the right or left transversely of the bar by means of an adjustable indicator-slide, E, having a diagonal slot, *e*, through which a pin, *d*, on the slide D is inserted, the indicator-slide being confined to a straight path by means of grooved plates or guides F, and moved vertically by a screw, G, so that any desired adjustment can be readily accomplished. The contact-point's slide has an arm, *d'*, through which and the contact-point B a screw, *b*, is passed to adjust the point and permit the narrowing or widening of the limit of variation between the points and bar. For convenience, an ordinary thermometer, H, is placed parallel with the thermal bar, the indicator-slide E being provided with a pointer, I, at the top to indicate on the thermometer the heat limit at which contact of the bar with a point will be made.

In Figs. 2 and 3 I show my machine for operating the damper or ventilator. In Fig. 2 I show the machine connected to the door of a stove or furnace.

J is the usual door for feeding the stove or furnace. K is a damper having journals *k k'*, by which it has bearings in lugs *j*, so as to revolve on the door.

L is the shaft of the machine, mounted on suitable standards *l*, and connected to the journal *k'* of the damper by means of a universal joint, M, in line with the door-hinge, so that mechanism for regulating the damper shall not in the least interfere with the free use of the door.

N is a drum on the shaft, having a cord, *n*, and weight *n'*, which give power to the shaft to keep the damper in place against any counter-draft, or to move it promptly, when desired.

O is a ratchet-wheel on the shaft L, having four equidistant teeth, *o*.

P is an electro-magnet so placed in relation to this wheel that the vibrating arm Q, upon which its armature *q* is placed, shall act as a pawl to engage the teeth, and shall be held firmly against the wheel by a spring, *q'*, except when drawn away by the magnet. Upon the face of the wheel are segments of metal R R', opposite each other, and each extending a little more than a quarter-circle and equidistant from the center of the wheel. The spaces *r* of the circle between these segments are filled with glass or other non-conductor of electricity, *r'*. The wheel is shown in position for holding the damper closed. S is a slight spring making electric connection from the binding-post *s* of the wire 2 from the heat side or contact-point B and one of the segments R', the other end of this segment being in contact with another slight spring, T, secured to binding-post *t* of magnet-wire 3. The magnet is connected to the battery by wire 4. The electric current is ready to flow through the contact-point so soon as the movement of the free end of the bar makes contact with either point. When an electric current passes through the magnet, the pawl Q is drawn away, and wheel O, with the axle L, revolves, turning the damper until the current stops, when pawl Q

at once comes to position against the wheel, stopping the revolution at the first tooth. So soon as the thermometer shows the desired limit of heat the contact is made as before described. The current at once gives power to the magnet to draw pawl Q out of the tooth, where it has rested, and the wheel, shaft, and damper begin to turn; but early in the movement the spring S leaves and passes beyond its segment R′, the current is broken, pawl Q springs into place to catch the coming tooth, and only a quarter-revolution is accomplished, so the damper is left open, and the segment in contact with another slight spring, U, secured to a binding-post, *u*, and its opposite end still in contact with the spring T. The spring U is connected by the wire 5 to the contact-point C on the cool side of the thermal bar, so that the current from this point can promptly do its work, when the cooling should be stopped, another quarter-turn closing the damper to start anew the warming process.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a thermostat, the combination, with a thermal bar, of a slide carrying contact-points on opposite sides of the bar, and devices for adjusting the slide and the points thereon transversely of the bar, as set forth.

2. In a thermostat, the combination, with a thermal bar, of a slide carrying contact-points, an indicator-slide by which the contact-point's slide is adjusted transversely of the bar, a pointer to the indicator-slide, and a thermometer by which the adjustment of the slides is regulated, as set forth.

3. In a thermostat, the combination, with a thermal bar, of the slide D, having contact-points B and C, an arm, *d′*, and adjustable screw *b*, passed through the arm and contact-point next to the arm, as set forth.

4. In a thermostat, the combination, with a thermal bar, of the slide D, having contact-points B and C, and a pin, *d*, the indicator-slide E, having a diagonal slot, *e*, to receive the pin on the contact-point's slide, and a pointer, I, and a thermometer in connection with the pointer, as set forth.

5. In a thermostat, the combination, with a thermal bar, contact-points, a shaft, and means to rotate the shaft, of a toothed wheel O, metal segments R R′ on the face of the wheel, electro-magnet P, vibrating arm Q, to engage the teeth, slight springs S, T, and U, to bear on the segments and connect the magnet through the arm with the contact-points until one of the springs leaves a segment, as set forth.

6. In a thermostat, the combination of a thermal bar, contact-points, shaft, means to rotate the shaft, a pawl to retain shaft from movement, an electro-magnet to release the pawl from the shaft, a hinged door, a damper journaled to the hinged door, and a universal joint connecting the shaft with the damper, the joint permitting the door to be opened and closed at will, as set forth.

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