(No Model.)

T. O. PERRY.

TEMPERATURE REGULATOR.

No. 528,736. Patented Nov. 6, 1894.

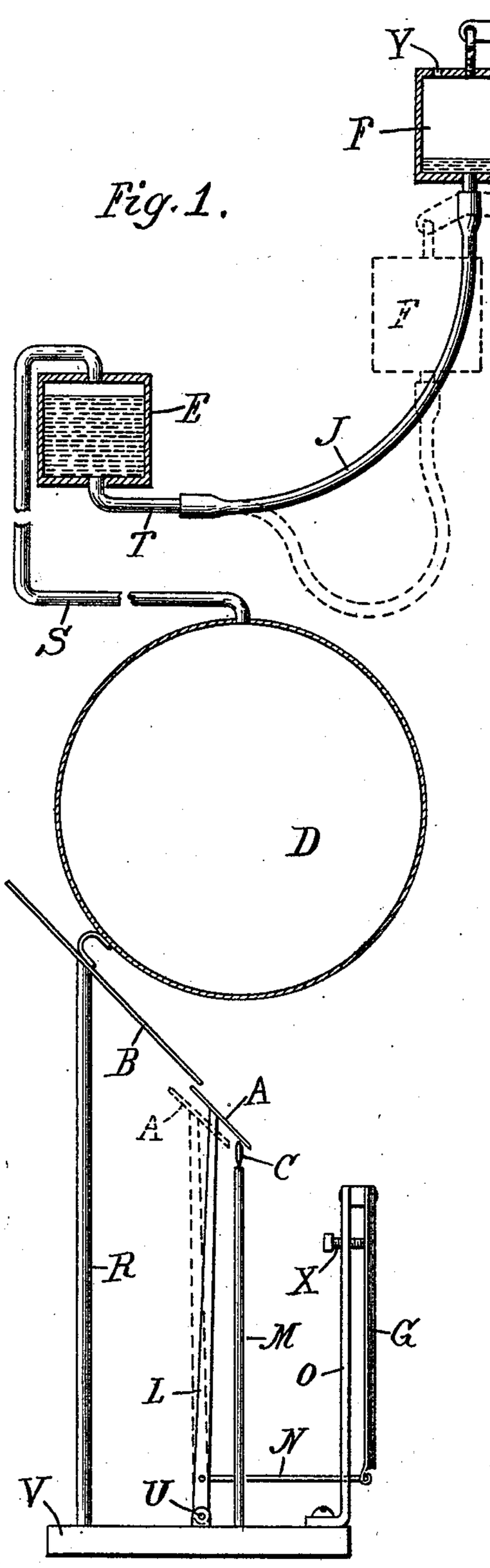

Fig. 1.

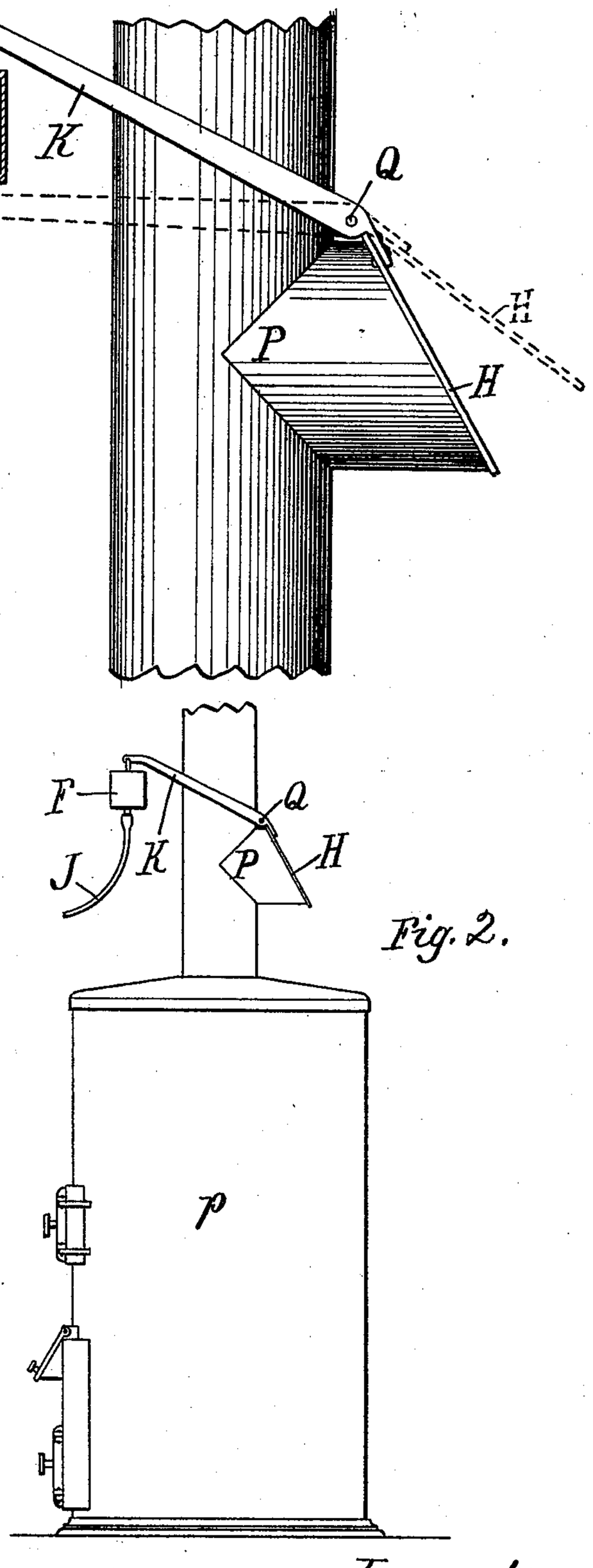

Fig. 2.

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UNITED STATES PATENT OFFICE.

THOMAS O. PERRY, OF CHICAGO, ILLINOIS.

TEMPERATURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 528,736, dated November 6, 1894.

Application filed May 31, 1893. Serial No. 476,160. (No model.)

To all whom it may concern:

Be it known that I, THOMAS O. PERRY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Temperature-Regulator, of which the following is a specification.

The purpose of my invention is to automatically control the temperature of apartments in buildings heated by any usual artificial means, and the invention consists in mechanism for opening and closing dampers, valves or ventilators, said mechanism to be set in operation through the agency of a slight change of temperature of air in the apartment whose temperature is to be controlled.

In the drawings:—Figure 1 is a partly sectional view of my device, connected to a valve or damper in a flue which may be either a ventilating flue from the apartment, or a draft flue of a heater. Certain air and liquid-containing vessels are shown in vertical section. Otherwise, the view is a direct elevation. Fig. 2, is an elevation showing conventionally a heater having the damper controlled by the regulating mechanism, as a check damper in the smoke pipe, the damper and pipe having the same letters applied to them as are applied to the similar parts in Fig. 1, although those parts in Fig. 1 are intended equally to represent a ventilating pipe and its damper.

H is a valve or damper hinged at Q to the flue P, which may be a ventilating flue from the apartment or a draft flue from the heater. A rigid arm K of the damper carries at its free end the vessel F, which is closed, except as to a slight vent aperture Y, at the top.

E is a vessel which is fixed in position and is air-tight except as to certain air and liquid connections hereinafter mentioned.

J is a flexible tube connecting the bottoms of the two vessels E and F.

D is a chamber made of thin copper or other metal, and air tight except as to the communication which is afforded from the top of said chamber to the top of the vessel E by pipe S.

M is a small tube located directly underneath the chamber D, and communicating with a supply of combustible gases or liquid fuel.

C is a small flame constantly maintained, resulting from the combustion of the gaseous fuel issuing from a minute opening in the upper end of the tube M.

A is a small, inclined, rectangular deflector, whose edge only is shown in the drawings.

L is a multiplying arm or lever, pivoted to a suitable base V at its lower end, and carrying at its upper end the deflector A, so that the lower edge of the latter may swing over the flame C.

B is a large, inclined, stationary shield, preferably of rectangular form, about as wide as the diameter of the chamber D. The edge only is shown, representing a shield underneath one side of the chamber D, the lower edge of the shield overlapping the upper edge of the deflector A.

R is a rod projecting upward from the base V to support the shield B.

The chamber D may be supported by the shield, or by the support of the shield, or it may be suspended from the ceiling of the room whose temperature is to be controlled.

G is an ordinary thermostat, made by riveting together two flat strips, one having a high and the other having a low coefficient of expansion and contraction from change of temperature. One may be of sheet brass and the other rubber. Only their edges are shown. The upper end of the thermostat G is fixed to a rigid support O, projecting from the base V. The lower end of the thermostat swings freely to right and left obedient to changes of temperature in the surrounding air.

N is a connecting link between the lower end of the thermostat G and the multiplying arm L, to which said link is pivotally connected at a point a little above the fulcrum U.

The vessel E contains water. The chamber D contains, preferably, air. The vessel F is primarily empty, and not of sufficient weight to open the valve or damper H. When this valve or damper H is a check damper in the draft flue of the heater, the fire burns more vigorously when it is closed. When it is the damper or controlling valve of the ventilating flue of the apartment, the heat is retained in the apartment more completely when the damper is closed. The effect upon the temperature of the room from opening and closing the damper will therefore be the same in character in either case:—that is, the opening of the damper will tend to diminish

the heat, and the closing to increase it or permit it to increase.

The operation will be described as if the pipe and damper pertained to a furnace, which will be the more usual mode of using my invention.

The screw X, which protrudes through the arm O against the thermostat will be set so that the deflector A covers the flame C when the temperture of the room is as desired, and it may therefore be adjusted to any selected temperature. A rise in temperature above that point will swing the lower end of the thermostat G to the left, and cause it, through the multiplying lever L, to withdraw the deflector A from over the flame C, exposing the chamber D to the heat of the flame. The air within the chamber being thus expanded, a portion is driven up through the pipe S into the vessel E, and forces some portion of the water from that vessel up through the flexible pipe J into the vessel F, until the weight of the water thus added to that vessel is enough to open the check damper H. The fire being checked, and the temperature of the room thereby lowered, the thermostat, responding to this reduction of temperature, swings to the right, and causes the deflector A to return to its original position over the flame C, and shield the chamber D from the heat of the flame, causing the products of combustion to be deflected along the under side of the large shield B, so that they do not rise until they have passed beyond the chamber D. This chamber cools as soon as the flame has been withdrawn from beneath it, and the air within it, contracting, permits the water to flow back from the vessel F into the vessel E, until the weight of the damper is again sufficient to overbalance the vessel F, and the damper closes. This operation is repeated with every slight change of temperature in the room and a wide range of temperature is thereby prevented. The chamber D may contain a liquid which a moderate degree of heat will change to vapor, or a liquid from which gas absorbed by the liquid when cold may be disengaged by raising the temperature; but I consider it preferable to have this chamber contain only air, or chiefly air, since air is more promptly responsive to changes in temperature than most other available fluids.

It is obvious that the movement of the deflector which is important with respect to the result sought, is its movement relatively to the flame which, in one position, it overhangs, and in one position it does not overhang; in other words, that it is the change of relative position of the deflector and the flame producing device, and not merely the absolute movement of the deflector, which is necessary. The movable deflector A and the multiplying lever L, as shown, are made very light, so that they may be moved easily by the thermostat.

I claim—

1. In combination, substantially as set forth, a regulating valve or damper; an expanding and contracting element and connections therefrom by which its expansion and contraction operate the damper; a constantly operating heating device other than that which produces the heat to be regulated; a shield adapted to be interposed between such heating device and the expanding and contracting element to protect the latter from the heat of the former; a thermostat exposed to the temperature to be regulated, and connections therefrom adapted to control the relative positions of such heater and shield to cause the latter to be or not to be in interposition between the heater and the expanding and contracting element.

2. In combination, substantially as set forth, the chamber D, containing air or other fluid; a continuously operating heating device to which such chamber is exposed; a shield adapted to be interposed between the heating device and the chamber to protect the latter from the heat; a thermostat, and connections therefrom adapted to control the relative positions of the heating device and the shield, to cause the latter to be or not to be in interposition between the heating device and the chamber; a damper the opening and closing of which affect the temperature of the room in which the thermostat is located, and connections by which the expansion and contraction of the fluid contents of the chamber operate such damper: substantially as set forth.

3. In a temperature regulator, in combination with the chamber D containing air or other fluid, a valve or damper whose opening and closing affect the temperature of the room to be regulated; and connections by which the expansion and contraction of the fluid in the chamber operate the damper; a heating device in position adapted to heat the chamber; and a shield adapted to be interposed between the chamber and the heating device to protect the former; a thermostat located in the room whose temperature is affected by the opening and closing of the damper, and connections therefrom by which it operates the shield to move it into and out of operative position as the thermostat responds to changes in temperature: substantially as set forth.

4. In a temperature regulator, in combination substantially as set forth, a chamber containing air or other fluid; a continuously operating heating device to which such chamber is exposed; a light movable deflector adapted to be interposed between the heating device and the chamber; a thermostat connected with and adapted to move said deflector to uncover the heating device; a large fixed shield or deflector overlapping the movable deflector; a valve or damper, the opening and closing of which affect the temperature of the room in which the thermostat is located; and mechanism by which the expansion and contraction of the fluid contents of

the chamber operate said damper; substantially as set forth.

5. In a temperature regulator, in combination substantially as set forth, a regulating valve or damper; an expanding and contracting element and connections therefrom by which its expansion and contraction operate the damper, a constantly operating heating device other than that which produces heat to be regulated; a shield adapted to be interposed between the heating device and the expanding and contracting element to protect the latter from the heat of the former; a thermostat exposed to the temperature to be regulated, and connections therefrom by which it operates the shield to move it into and out of operative position as the thermostat responds to changes of temperature: substantially as set forth.

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