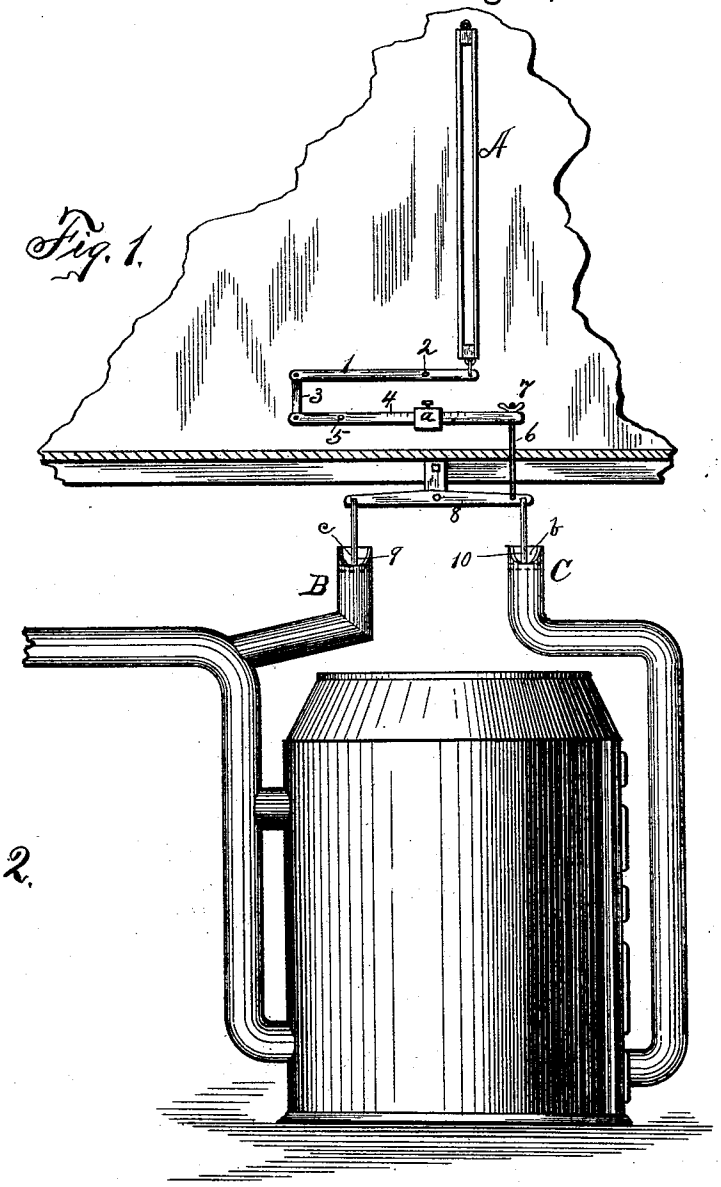
(No Model.)

C. D. HOWARD.

AUTOMATIC DAMPER.

No. 480,263. Patented Aug. 9, 1892.

Fig. 1.



A Fig. 2.

Witnesses
C. B. Kinnie
H. A. Carhart

Charles D. Howard Inventor

By his Attorneys
Smith & Denison

UNITED STATES PATENT OFFICE.

CHARLES D. HOWARD, OF SYRACUSE, NEW YORK, ASSIGNOR TO THE HOWARD THERMOSTAT COMPANY.

AUTOMATIC DAMPER.

SPECIFICATION forming part of Letters Patent No. 480,263, dated August 9, 1892.

Application filed February 5, 1891. Serial No. 380,323. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. HOWARD, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Automatic Dampers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to the construction and operation of automatic draft-regulating dampers, and particularly to the thermostatic bar, which operates the draft by means of intermediate levers.

My object is to produce an automatic draft-regulating damper operated by a thermostatic bar located in a room desired to be heated, and which depends upon longitudinal expansion and contraction of the thermostatic bar.

My invention consists in the several novel features of construction and operation hereinafter described, and which are specifically set forth in the claim hereunto annexed. It is constructed as follows, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved thermostatic bar attached by intermediate levers to the draft and check damper of a furnace. Fig. 2 is another form of the thermostatic bar.

I have found by experiment and observation that by taking material having highly-expansible properties—such as zinc, for instance—and suspending it in a room which I desire to heat that the longitudinal expansion and contraction thereof is sufficient when connected to the draft and check pipes of the furnace by a system of levers, either simple or compound, to automatically open and close the said dampers with varying temperature of the room. I have also found that by grouping two or more pieces of such material together, so that the atmosphere may circulate freely on all sides thereof, I obtain greater power to operate the levers which are connected to the dampers of the furnace. I may also make a tube of such material, either perforated or slotting it, or both, as shown in Fig. 2, and by this device I am enabled to construct a much cheaper and stronger thermostatic bar, but do not get quite as much power as where the pieces are grouped together, as shown in Fig. 1.

A is the thermostatic bar, consisting either of a tube of the expansible metal and perforated and slotted, or a single piece or two or more pieces grouped together, the lower and free end of which is secured to one end of a horizontal upper lever 1, which is mounted or pivoted at 2, the opposite end being connected by a vertical link or bar 3 to the horizontal lower lever 4, which is pivoted at 5.

6 is an adjustable vertical rod having a thumb-nut 7 upon its upper end and connecting horizontal or balance lever 4 with a centrally-pivoted lever 8. From the respective ends of the balance or horizontal lever I suspend vertical rods, provided with pistons 9 10, to the check and draft pipes, respectively.

a is a weight adapted to be moved upon the lever 4 for the purpose of balancing the system of levers between the thermostatic bar A and the pistons in the vertical pipes B and C. It will be observed that by adjusting this weight the action of the pistons in the pipes B and C may readily respond to the most sensitive action of the thermostatic bar. It will also be observed that when the temperature in the room becomes cooler the contraction of the thermostatic bar raises the piston 10 in the pipe C and admits the draft through the opening *b*, and on the other hand when the temperature in the room increases the thermostatic bar A expands and by an intermediate system of levers closes draft-piston and allows the air to pass into the check-pipe B at *c*.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of a suspended thermostatic bar A, the horizontal upper lever 1, having a fixed pivot 2 and connected at its outer end to the lower end of the thermostatic bar, the horizontal lower lever 4, having a fixed pivot 5, the vertical link 3, pivoted to said lever, the adjustable weight *a* on the lower lever, the adjustable vertical rod 6, nut 7, by

means of which the rod is raised or lowered on the outer end of the lower lever, the balance-lever 8, having a fixed pivot and connected to the rod at one end, the rods suspended from the ends of the balance-lever, having pistons 9 10, and the vertical check and draft pipes within which the pistons play, substantially as described and shown.

In witness whereof I have hereunto set my hand this 28th day of January, 1891.

CHAS. D. HOWARD.

In presence of—
HOWARD P. DENISON,
C. W. SMITH.