

(No Model.)

L. SHERMAN.
TEMPERATURE REGULATOR.

No. 412,547.

Patented Oct. 8, 1889.

Fig. 1.

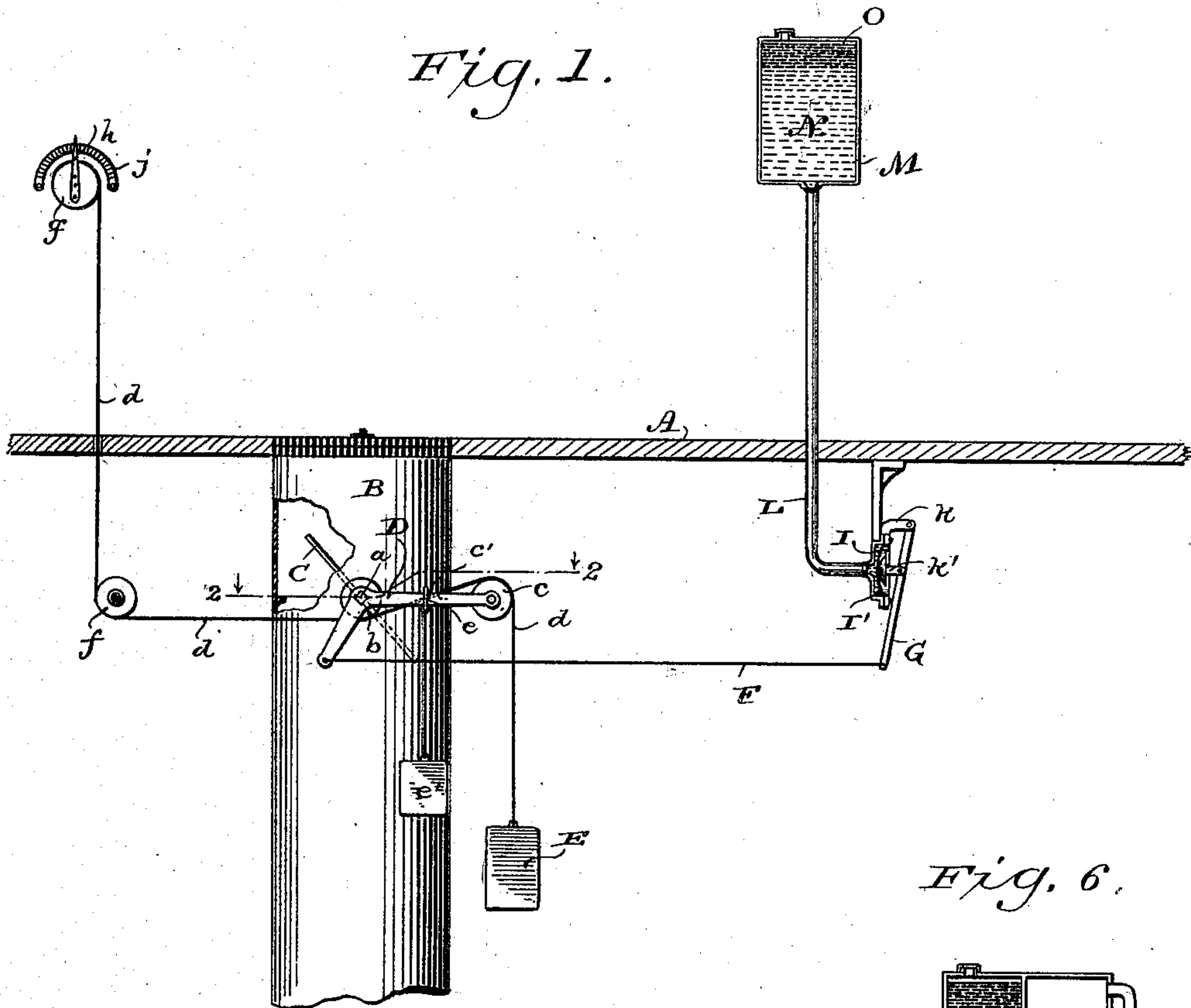


Fig. 6.

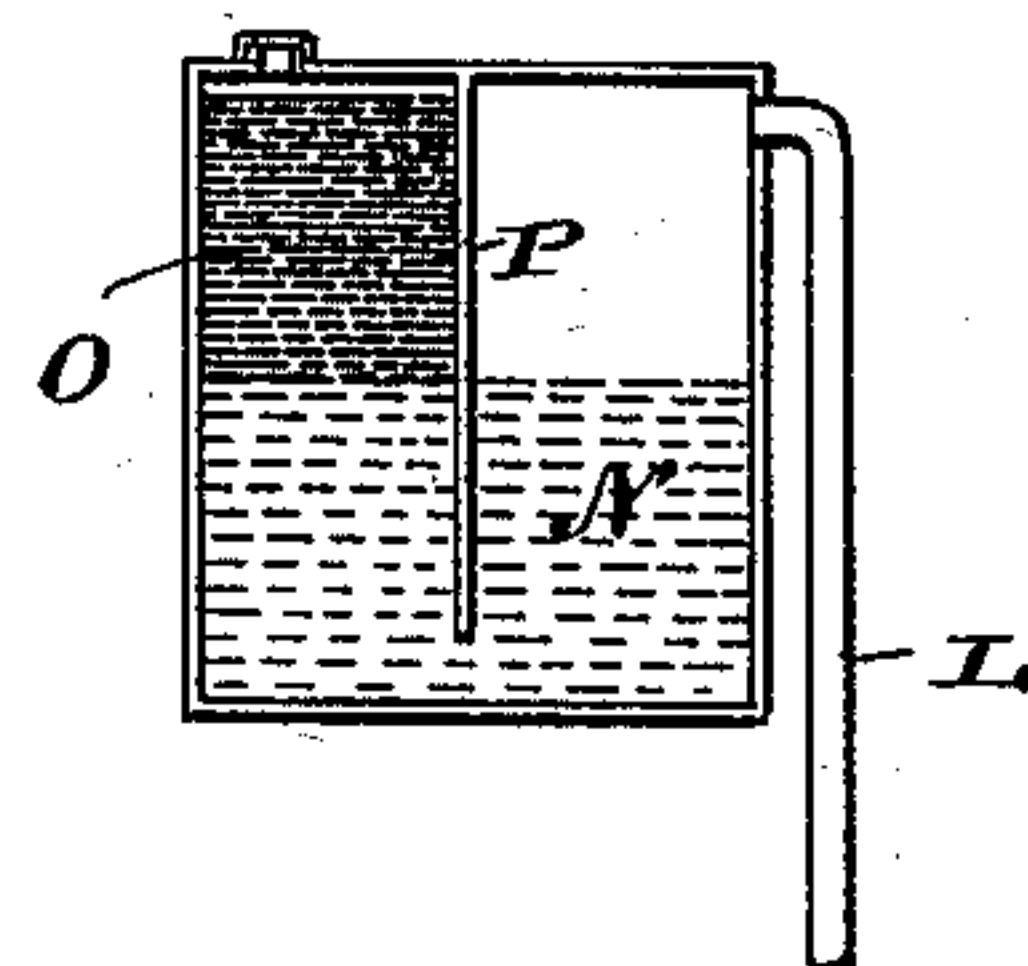


Fig. 4.

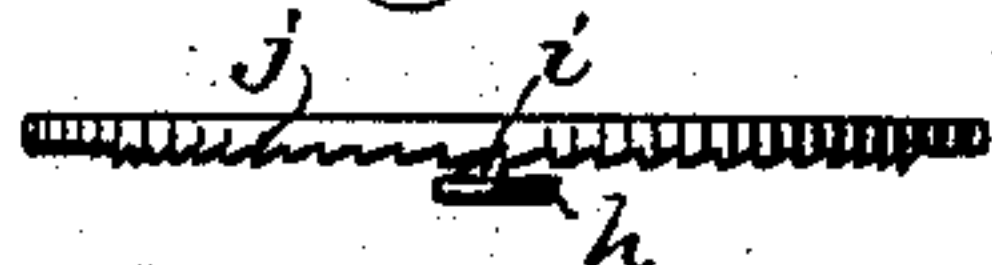


Fig. 5.

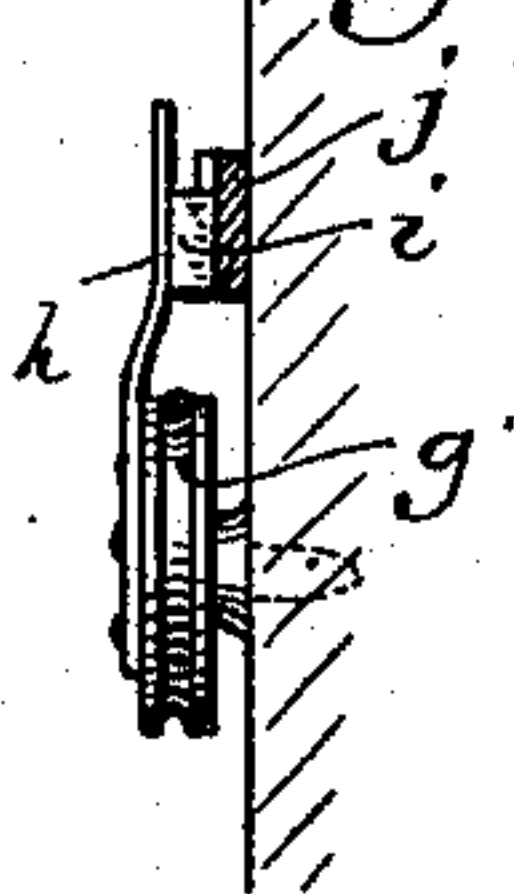


Fig. 2.

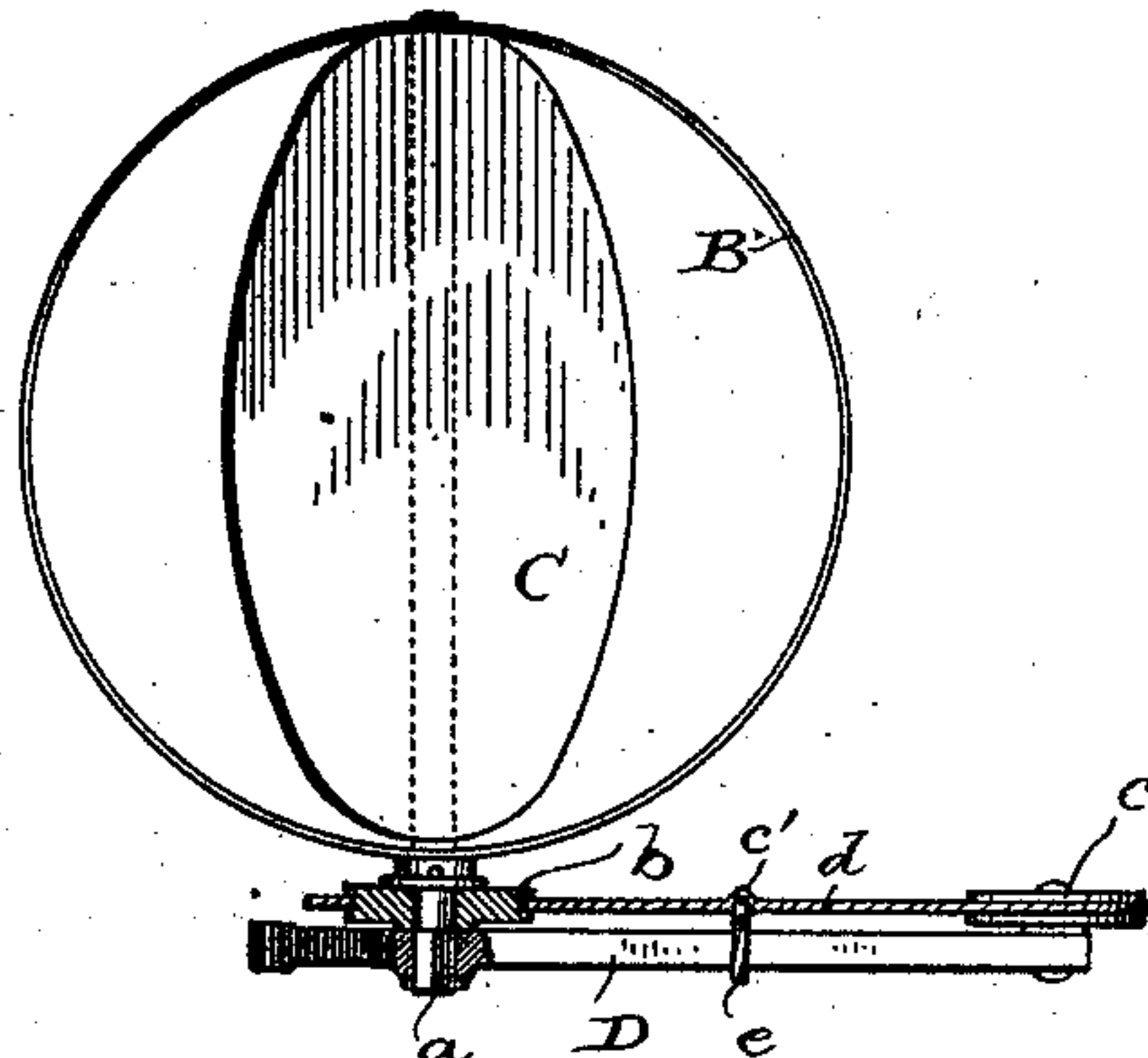


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

LEWIS SHERMAN, OF MILWAUKEE, WISCONSIN.

TEMPERATURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 412,547, dated October 8, 1889.

Application filed May 24, 1888. Serial No. 274,965. (No model.)

To all whom it may concern:

Be it known that I, LEWIS SHERMAN, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Temperature-Regulators; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates particularly to temperature-regulators; and it consists in mechanism for operating a valve or damper by vapor tension, as will be fully described hereinafter.

In the drawings, Figure 1 is an elevation of a regulator embodying my invention. Fig. 2 is a section on line 2 2, Fig. 1. Figs. 3, 4, and 5 are details; and Fig. 6 is a section of a modification of a portion of my invention.

A is the floor of a room. B is a flue leading into it.

C is a damper, the shaft *a* of which is journaled in the sides of the flue B. A sheave *b* is loosely arranged on this shaft, and a lever D is keyed or squared onto this end of the shaft, which lever D carries another sheave *c* on the end of its long arm. A band or cord *d*, having a weight E secured to its lower end, is passed over sheave *c* and is tied at *c'* to a ring *e*, that slides loosely on lever D, and is then passed under sheave *b* and another sheave *f*, that is secured to the wall of the building, and up over another sheave *g*, to which it is secured, and this last-named sheave carries a pointer *h*, from which a dog *i* projects into engagement with the teeth of a quadrant *j*. A weight *e'* is suspended from ring *e*. The short arm of lever D is connected by a cord F with one end of a lever G, which is pivoted to a bracket *k* at its other end and carries a plunger *k'*, the head of which is opposed to the diaphragm I' of an expansion-chamber I, and this chamber is connected by a pipe L with a tank M, which contains a practically non-volatile fluid N (that fills the pipe L also) and a volatile fluid O, that is supported by the non-volatile fluid. These two fluids must be of such a nature that they will not mix, and in practice I propose to use chloride of ethyl for the volatile and water for the non-volatile fluid.

The operation of my device is as follows: The regulator is set for operation at a given

temperature by drawing upon or letting out cord *d* to adjust the weight *e'* on the lever D to give the lever the desired resistance, according to the degree of temperature desired. Now, when the temperature rises to the point at which the regulator is set to operate, the volatilization of fluid O will produce a pressure on fluid N that will cause it to expand the diaphragm I' of chamber I and cause the long arm of lever G to draw upon the short arm of lever D, and thus turn shaft *a* and cause it to partly close the damper, so as to reduce the flow of hot air into the room, and then as the temperature falls the damper will be opened wider by the weights *e'* and E as the vapor of fluid O condenses and permits the diaphragm I' to collapse. Of course in case of a very great rise in temperature—say one of ten degrees—the damper would be closed tightly, as it would be opened in its fullest extent by a corresponding fall of temperature; but in practice the damper is very seldom fully opened or closed. The teeth of the quadrant *j* correspond to the marks on the face of a thermostat, and the point of suspension of the weight *e'* on lever D is changed by turning the pointer *h* to the right or left, so as to let out or wind on sheave *g* the cord *d*, which will permit the weight E to draw the ring *e* farther from the fulcrum or will draw the ring *e* nearer said fulcrum, thus giving a greater or less resistance to the lever D, according to the temperature desired, for if the point of suspension of weight *e'* is near the outer end of lever D it will require a greater amount of vaporization of the fluid O to overcome the resistance of the weights to close the damper than would be required if the point of suspension were nearer the fulcrum of said lever D.

In the device just described the fluid N in pipe L acts as a piston to operate the diaphragm; but in the modification, Fig. 6, I use a chamber for the fluids, in which is a partition P, that extends nearly to the bottom of the chamber. On one side of the partition the volatile fluid is superimposed upon the fluid N, while on the other side the fluid N, by rising as the fluid O volatilizes, acts upon the air between it and the diaphragm to press it out and cause it to operate the lever G.

Though I have described the tank M and

expansion-chamber I as separate compartments, it will be readily seen that they form practically a single chamber having a movable wall or wall-section, which I call a "diaphragm," I'.

It is obvious that my device may be applied to valves, cocks, or other analogous devices without departing from the spirit of my invention.

10 Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a temperature-regulator, the combination, with a damper, of a tank containing a
15 non-volatile fluid and a superimposed volatile fluid, a diaphragm and a fluid-piston leading from the tank, and means connecting the diaphragm with the damper, whereby the damper is operated by the vaporization and
20 condensation of the volatile fluid.

2. The combination, with a suitable receptacle containing a volatile fluid and a practically non-volatile fluid supporting the first-named fluid, of an expansion-chamber and a
25 tube connecting said receptacle and chamber, a lever operated by said expansion-chamber, and a valve-operating mechanism operated by said lever, substantially as described.

3. The combination, with the tank and its fluids, of an expansion-chamber and its lever
30 operated thereby, a valve and its lever, two weights, one of which is adapted to slide on the valve-lever, and a cord operated in one direction by the other weight and in the other
35 direction by hand to adjust the first-named weight, substantially as set forth.

4. The combination, with a valve and poised lever, of an expansion-chamber connected with said lever, said expansion-chamber containing a non-volatile fluid and a volatile
40 fluid superimposed on the non-volatile fluid, substantially as described, the whole being so arranged that the poised lever will tend to open the valve, while the vapor tension of the volatile fluid will tend to close it, as set forth.
45

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

LEWIS SHERMAN.

Witnesses:

S. S. STOUT,
WILLIAM KLUG.