(No Model.)

A. H. BRINTNELL.

THERMOSTAT.

No. 474,542. Patented May 10, 1892.

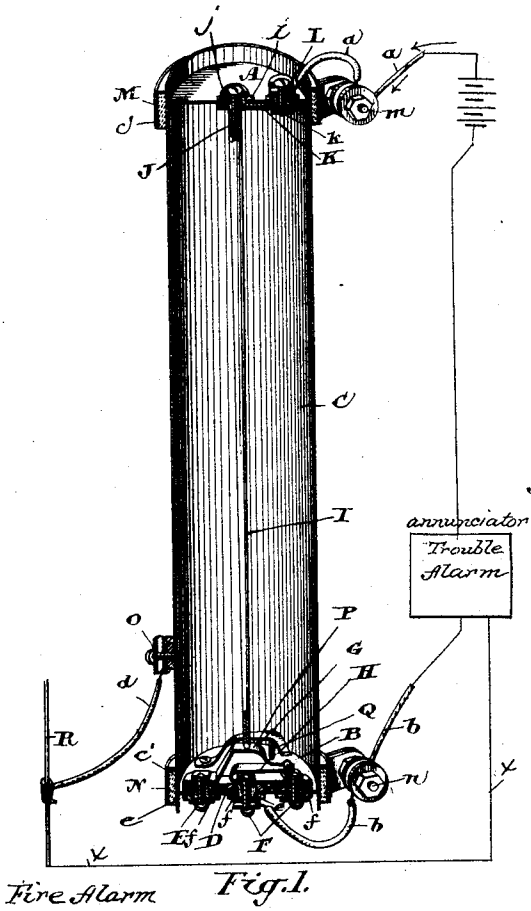

Fig. 1.

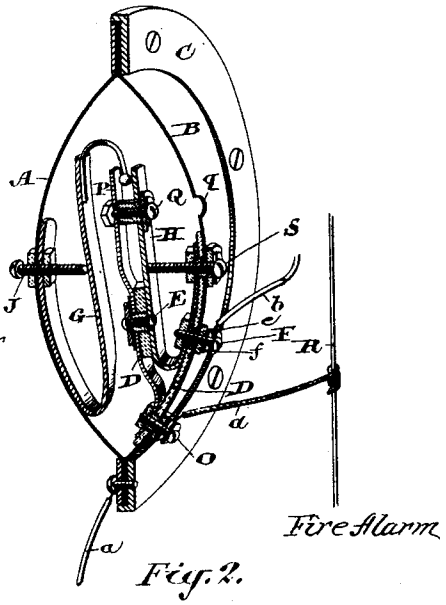

Fig. 2.

Witnesses.

A. B. Monkhouse

Lewis P. Abell.

Inventor.

Archibald H. Brintnell

by

Fetherstonhaugh & Co.

Attys.

UNITED STATES PATENT OFFICE.

ARCHIBALD H. BRINTNELL, OF TORONTO, CANADA.

THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 474,542, dated May 10, 1892.

Application filed April 11, 1891. Serial No. 388,473. (No model.)

To all whom it may concern:

Be it known that I, ARCHIBALD H. BRINTNELL, manufacturer, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Thermostats, of which the following is a specification.

The object of the invention is to design a thermostat which will be actuated with great rapidity to produce either a trouble or warning alarm or a trouble or warning alarm and a fire-alarm, according to the space the diaphragms are caused to recede from each other by the heat; and it consists, essentially, of forming the ends of the body of the thermostat of two diaphragms, which are secured in an outer binding ring or casing, and, furthermore, of securing within the body of the thermostat two spring-arms adjustably held in position by set-screws passing through the diaphragms, one spring-arm having an auxiliary arm, between the end of which and the said arm the end of the other spring-arm interposes, the said arms being suitably insulated from the diaphragms and so arranged with connecting-pieces to the diaphragm that when one or both diaphragms are moved apart by the heat the ends of the spring-arms spring apart sufficiently far to either break the electrical current and form an open circuit over the trouble-alarm wire and so ring it or come in contact with the auxiliary arm, and thus form a closed circuit and permit the electrical current to pass from the battery over the fire-alarm wire and so ring it, the whole being constructed and arranged in detail in the manner hereinafter more particularly explained.

The electrical connections may be the same as those shown in an application filed by me in the United States Patent Office April 11, 1891, Serial No. 388,472, and it is not thought necessary to show them in detail herein.

Figure 1 is an enlarged sectional perspective view showing the construction of my thermostat. Fig. 2 is a view of an alternative form.

In the drawings like letters of reference indicate corresponding parts.

A and B are the diaphragms, and C the binding casing or ring, which together form the body of the thermostat. The diaphragms A and B are made of zinc or any other suitable material.

In Fig. 1, D is an insulating-plate, secured to the diaphragm B by the binding-screws E and F, which are insulated from the plate B by the insulating-tubes *e* and washers *f*. The binding-screws E and F serve, also, to hold the spring-arms G and H in position.

I is a hollow spindle hinged at its lower end to the spring-arm G and held in position at its upper end by the screw J. The spindle I and screw J are insulated from the diaphragm A by the insulating-tube *i* and washer *j*.

K is a metal plate insulated from the diaphragm A by the insulating-plate *k*, and L is a binding-screw securing the plates K and *k* in position and forming a terminal for the wire *a*, which comes from the battery.

P is a spring-arm secured to the diaphragm B. The adjusting-screw J is used to adjust the spring-arm G, the end of which interposes between the arms P and H.

Q is an adjusting-screw, which is designed to bring the arms P and H closer together or farther apart, as may be desired.

M and N are rings surrounding the binding-casing C and insulated from it by the rings *c* and *c'*. To the upper ring M, I secure the binding-post *m*, to which the wire *a*, which comes from the battery, is secured, and to the ring N, I secure the binding-post *n*, to which the trouble-alarm wire *b* is secured and which extends to the binding-screw F.

O is the binding-screw, which forms the terminal of the supplemental wire *d*, which is connected, as indicated, to the fire-alarm wire R.

On reference to Fig. 2, which exhibits an alternative form, it will be seen that I utilize the same essential elements throughout, although I slightly vary the construction, so as to suit the shape adopted in this form.

The spring-arms P and H are insulated from one another by the plate or plates D. I insulate the spring-arm P from the diaphragm B instead of fastening it directly on the plate, as shown in Fig. 1. I also connect the spring-arm G directly to the diaphragm A, instead of insulating it from the diaphragm B by the plate D. I still adjust the arm G by the adjusting-screw J, although I dispense with the

hollow spindle I. In this figure it will be seen that I make a small hole *q* in the diaphragm B, so as to allow the set-screw Q to be gotten at. I also provide an adjusting-screw S to adjust the combined arms P and H, and I insulate the binding-screw O. It will be noticed that the end of the spring-arm G is bent so as to interpose between the ends of the arms H and P and in its normal position rests against the end of the spring-arm H.

In placing my thermostats and wires in position it will of course be understood that the fire-alarm wire R will be directly connected to the thermostat farthest away from the annunciator, in which is located the fire-alarm bell it is intended to ring. In each thermostat, however, intervening between it and the annunciator the fire-alarm wire R is connected to the thermostat by the supplemental wire *d*, as shown. The circuit that starts from the battery in giving a fire-alarm is completed over wire *a*, the thermostat, wires *d*, R, and *x* to the annunciator, and then to the battery. The battery-wire *a* extends from the annunciator to and through each thermostat, as hereinafter described, back to the battery again, forming a complete circuit. When, however, the circuit is broken in any thermostat, the electrical current ceases to pass from that thermostat and the wire between it and the annunciator is freed from the current, and thus an open circuit is formed, which is arranged so as to co-operate in a suitable manner with a local-battery wire and magnet to ring a trouble-alarm bell in the annunciator.

Having now described the principal parts involved in my invention and the system of wiring preferably adopted by me, I shall now describe the operation of my thermostat.

When there is but a usual temperature in the room in which the thermostat is situated, the diaphragms A and B remain in their normal position, and the electrical current passes from the battery-wire *a* through the binding-screw L, connecting-piece K, adjusting rod or screw J, the free end of the arm G, over the spring-arm H, out through the binding-screw F, and onto the wire *b*, which is connected to and forms a complete circuit to the battery. When the diaphragms A and B move apart, the ends of the spring-arms G and H fly apart and the circuit above described is broken, thus leaving the wire *b* freed from the current. An open circuit is thus formed between the thermostat and the annunciator, which open circuit is arranged so as to co-operate in a suitable manner with a local-battery wire and magnet to ring a trouble-alarm bell in the annunciator. This open circuit would take place in the case of an incipient heat; but should the heat be so great as to expand the diaphragm still farther and allow the interposed end of the spring-arm G to come against the spring-arm P, the electrical current would still pass from the battery-wire *a* through the binding-post L, connecting-piece K, set-screw J′, the free end of the spring-arm G, but would then pass over the spring-arm P, binding-screw O, and out onto the supplemental wire *d*, which is connected to the fire-alarm wire R, as indicated.

From this description it will be seen that my thermostat is one which is entirely dust-proof and one which will be actuated by the heat with great rapidity to form an open or closed circuit, for the purpose hereinbefore set forth.

I wish it also to be understood that I claim as a perfectly new feature in thermostats the location of the diaphragms opposite to each other with the interposed spring-arms, in order to permit them to move apart very rapidly, and thus throw into connection the spring-arms designed to communicate a trouble-alarm or a trouble-alarm and a fire-alarm, which feature I shall more particularly point out in the claims of this specification.

Among the advantages which my thermostat possesses is that on account of its peculiar form it may be used in places where other thermostats would not be adapted—as, for instance, to open and close a damper in a furnace, to regulate the temperature of a room, or it can be placed in the bins of a grain elevator, and thus communicate an alarm if the grain should get heated.

What I claim as my invention is—

1. In combination, the opposing spring contact-arms, the means for movably supporting said arms, consisting of the two opposing diaphragms, each of which is movable toward and from the other, the ring for holding the diaphragms together, and the adjusting means for said spring-contacts carried by and movable with the said diaphragms and bearing against the said springs to retain them in adjusted position, substantially as described.

2. In combination, the opposing contact-arms, the means for inclosing and movably supporting each of said arms, consisting of the two opposing diaphragms, each of which is movable toward and from the other, and the means for holding the two diaphragms together and exposing both of them, consisting of the binding-ring engaging the edges of the diaphragms and retaining them against separating movement.

3. The spring-arms H and P, connected to and insulated from the diaphragm B, in combination with the interposed arm G, connected to and supported from the diaphragm A, substantially as and for the purpose specified.

4. The spring-arms H and P, connected to the diaphragm B by the binding-screws F and O, which form terminals for the trouble-alarm and fire-alarm wires *b* and *d*, respectively, in combination with the interposed arm G, connected to and supported from the diaphragm A, and the binding-screw L, which forms the terminal for the battery-wire *a*, as specified.

5. The spring-arms H and P, connected to the diaphragm B by the binding-screws F

and O and insulated from the diaphragm by the plates D, and the set-screw Q for adjusting the arms H and P, in combination with the interposed arm G, connected to and supported from the diaphragm A, substantially as specified.

6. The arms H and P, connected to the diaphragm B by the binding-screws F and O and insulated from the diaphragm by the plate D, in combination with the interposed arm G, connected to and supported from the diaphragm A and adjusted by the set-screw J, substantially as specified.

7. The arms H and P, connected to the diaphragm B by the binding-screws F and O and insulated from the diaphragm by the plate D, and the set-screws Q and S for adjusting the arms H and P, in combination with the interposed arm G, connected to and supported from the diaphragm A and adjusted by the set-screw J, substantially as specified.

8. The arms H and P, connected to the diaphragm B by the binding-screws F and O and insulated from the diaphragm by the plate D, and the set-screw Q for adjusting the arms H and P, in combination with the interposed arm G, connected by the hollow rod I to the adjusting-screw J, and the plate K, insulated from the diaphragm A and extending from the rod I to the binding-screw L, as specified.

ARCHIBALD H. BRINTNELL.

Witnesses:
A. B. MONKHOUSE,
LEWIS P. ABELL.