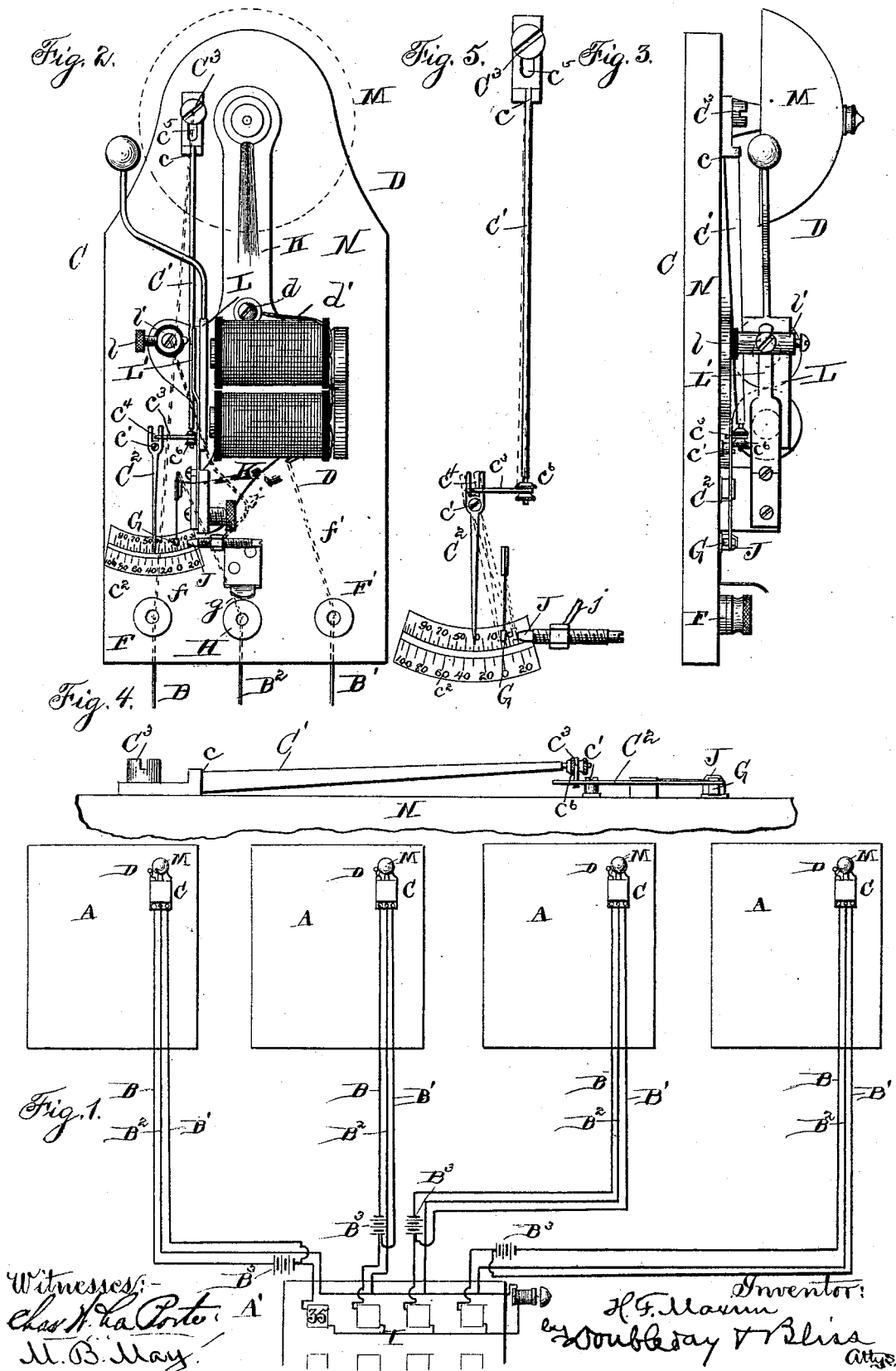


(No Model.)

H. F. MAXIM.
THERMAL ALARM.

No. 522,022.

Patented June 26, 1894.



UNITED STATES PATENT OFFICE.

HOSEA F. MAXIM, OF NORFOLK, VIRGINIA.

THERMAL ALARM.

SPECIFICATION forming part of Letters Patent No. 522,022, dated June 26, 1894.

Application filed August 31, 1893. Serial No. 484,476. (No model.)

To all whom it may concern:

Be it known that I, HOSEA F. MAXIM, a citizen of the United States, residing at Norfolk, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Thermal Alarms, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of this invention is to provide a simple compact device which can be utilized to indicate visibly or audibly, preferably the latter, when the heat in an apartment reaches either or both of at least two predetermined points.

In hotels, factories, large business and other buildings, it is desirable to have means which will operate automatically to indicate, first the instant at which a degree of heat is attained in any of several apartments, which degree is within the safety limit, but is undesirable from the standpoint of economy of fuel, and second, a still higher degree at or beyond the limit of danger of fire.

Several forms of apparatus have been devised involving the presence of the mercury bulbs and tubes, such as are commonly used in making thermometers.

One of the objects of the present invention is to dispense with mercury and the fragile and expensive vessels or receptacles used for holding it, and to provide a device which shall have a few, simply constructed and reliably operating parts adapted to be primarily actuated by the mere expansion or contraction of solid materials, and to avoid the necessity of the ordinary thermometer fluids.

Figure 1 is a diagrammatic view of an apparatus embodying my invention. Fig. 2 is a face view of the thermostat and adjacent parts. Fig. 3 is an edge view of the same. Fig. 4 shows a side view of the thermostat bar and adjacent parts enlarged; and Fig. 5 shows the same in plan.

In the drawings, A, A, indicate apartments and A' an office or central apartment in a building. The apartment A, and the office A' are connected by one or more electric circuits B, B', B², with a battery, or batteries at any suitable place, as shown at B³.

The apparatus in each apartment comprises the following: C represents as a whole a me-

chanical thermostat, that is to say one composed of parts of solid material, one or more of which are in whole or in part movable under a variation in temperature. D indicates as a whole an electro-magnetic bell, whose parts and relation will be more fully described. Preferably the thermostat and the bell with attachments are all supported upon a small common base or bed piece N of suitable material as wood, by which they can be readily attached to and detached from any desired support. There are a vast number of electro-magnetic bells now upon the market or in use and one of the purposes of the present invention is to provide a simple thermal alarm which can be applied directly to the said bells. One of these is shown in the drawings, the only parts supplemental thereto being the thermostat and two contacts. The thermostat, as shown, comprises the readily expansible bar C'. It is secured at c to the back plate and is formed preferably of two metals differing as to their expansibility, such as brass and steel.

C² is an index consisting of a needle or finger pivoted at c', and having its end arranged to move along a dial c³ having characters indicating degrees of temperature. The arm C' is connected by a finger c³ with the index finger C², there being an aperture or slot c⁴ in the heel of the latter to receive said finger c³, the point of engagement being comparatively close to the pivot c'. When the arm C' swings in either direction, as it does when subjected to variations in temperature, it causes the pointer C² to move correspondingly over the index or scale. To adjust or set the pointer to any predetermined position I provide adjusting screws C³. And to regulate the length of the arc over which the pointer should normally move, by variation of temperature of a given number of degrees, I provide such an adjustment of the parts that the arm c³ can engage the pointer C² at one or another of several points in its heel, that is nearer to or farther from the pivot c'. This can be accomplished by slotting arm C' as at c⁵, so that it can be moved bodily to change the position of the finger c³. To provide for a still more delicate adjustment of the pointer, for any desired purpose, I make the finger c³ movable relatively to arm C', it,

as shown, being threaded and having jam nuts c^6 for clamping it in either of several positions. The terminals of the aforesaid circuit B, B', are secured to the binding posts 5 F, F'. From post F' wire f runs to pivot screw C³ and arm C', and when current enters at said post, it will pass through said wire, screw and arm to pointer C². If the pointer be moved far enough, it will strike the contact G. From this contact a wire g extends 10 to a supplemental post H, and from this a third main wire B² extends to the office or central apartment A' where it is connected to one of the terminals of an alarm apparatus 15 I, the wire B' being connected to the other terminal. It will be seen that when pointer C² touches the contact G, circuit is closed through B, B² and that the alarm I is sounded the current passing from wire B through 20 binding post F, wire f , screw C³, bar C', finger c^3 , pointer C², contact G, wire g , and binding post H to wire B², thence to the office where the bell and the battery are located. But the contact G is not rigid in position. It can 25 yield sufficiently to provide for forming electric connection between pointer C², and a second contact or terminal J. The latter is connected by wires j , with the metallic frame of the magnet, and the post F' of wire B² is connected by wire f' with the coils of magnet D' 30 and the latter are connected at d to the metal frame—that is to say, the current now passes from wire B through post F, wire f , screw C³, bar C', finger c^3 , pointer C², contact G, contact J, wire j , post F', screw l , spring L', armature L, frame K, wire d' , armature coils, wire f' and post F' to wire B and the battery, thereby intermittently energizing the bell magnet, and sounding the alarm. And when 40 the apparatus is arranged as shown the pointer C² can be in contact with both the terminals G and J simultaneously and consequently both the alarms (that at I in the office and that at D in the apartment) will 45 sound.

The manner of using the apparatus is as follows: The index or scale at C² is constructed so that the contact G shall lie at the zero point. Then by means of the adjusting device, the arm C is moved so as to bring the 50 pointer to that point on the scale where is indicated the degree of temperature which is to be the limit for ordinary heating purposes. For instance if it is desired to maintain in a 55 given apartment a temperature of about 70° Fahrenheit and to have an alarm sounded if it should rise to 80° Fahrenheit the parts of the above described thermostat are so set that the pointer lies at 10° from zero. And 60 if at the same time it is desired to have another alarm sounded, in the apartment itself, in case the temperature should rise to a considerably higher degree, say 100°, the contact J is adjusted so as to lie at a point 20° beyond the contact G. After these adjustments 65 have been made the following results will occur. If the temperature should rise to 80°,

the arm C' will be affected sufficiently to move the pointer to terminal G, and thereupon the above described circuit through B 70 and B² will be closed, and the office alarm will sound. And thus an alarm is given in pursuance of which steps can be taken to reduce the heat of the stove, furnace, steam pipes, water pipes, or other means used for normally heating 75 the apartment. But if an exceedingly high heat should be produced, as for instance by the breaking out of a fire, the pointer will speedily reach contact G and also the contact J, whereupon the alarm circuits will be closed, 80 not only through B' and B² to bell at I, but also through B and B' to the apartment alarm D.

What I claim is—

1. In a thermal alarm the combination of 85 the electro-magnetic alarm D, the electro-magnetic alarm I remote from said alarm D, a thermostat bar, a contact G, a contact J and two electric circuits, one circuit comprising said alarm I, said thermostat bar and said 90 contact G, and the other of said circuits comprising said alarm D, said thermostat bar, and said contact J, both said contacts J and G lying in the path of the bar when moving 95 in one direction whereby said electric circuits may be closed at the same time, substantially as and for the purposes set forth.

2. The combination of the electro-magnetic alarm D, the thermostat C having the expandible bar C', the contact movable thereby, 100 the two electric circuits, the adjustable contact J, and the contact G movable relatively to said contact J, and adapted to be moved by means of the expandible bar C' substantially as described. 105

3. The combination of the electro-magnetic alarm D, the thermostat C, having an expandible bar or arm, the contact movable by said arm, the movable contact G, in the path of the aforesaid contact and adapted to be moved 110 thereby, and the stationary but adjustable contact J, substantially as described.

4. The combination of the electro-magnetic alarm D, the thermostat having an expandible bar C', a stationary contact, and an independently mounted contact interposed between said bar and said stationary contact 115 and adapted to be moved by said bar into engagement with said stationary contact, substantially as set forth. 120

5. The combination of the thermostat having the bar C', the index having a zero point intermediate of its ends, and subdivisions marked on either side thereof, a movable contact lying normally at said zero point, a contact 125 on one side thereof, and a pointer or contact on the outer side thereof connected to said bar C', the last two said contacts being adjustable toward and from the said zero point on said index, substantially as and for 130 the purposes set forth.

6. The combination of the electro-magnetic alarm, the contact G, the index c^2 , the pivoted pointer or contact C², adapted to engage or

contact with said contact G, the expansible thermostat bar C', and an adjustable connection between said bar and said pointer C², to regulate the movement of the latter, substantially as described.

7. The combination of the electro-magnetic alarm D, the contact G, the pivoted pointer or contact C², the longitudinally adjustable thermostat bar C', and the electric circuit connected to said bar, said pointer and to said contact G, substantially as described.

8. The combination of the base piece or support N, the expansible thermostat bar C' secured thereto, the vibrating contact C², the contact G, the contact J, the electro-magnetic alarm D, the binding posts or connections F, F' and H, the electric circuit connecting said posts respectively with the contacts C², J and G, one of said circuits passing through the magnetic alarm, substantially as described.

9. The combination with the index, the pivoted pointer, the thermostat bar connected at its free end to, and actuating said pointer, and an adjustable connection between said bar and said pointer, whereby said pointer may be rendered more sensitive to delicate variations in temperature, substantially as set forth.

10. The combination of the index, the pivoted pointer having a slotted heel, the thermostat bar actuating said pointer, and a bar adjustable on said thermostat bar, and having a projection lying in said slot, substantially as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HOSEA F. MAXIM.

Witnesses:

M. N. JENKINS,
E. E. FUQUA.