No. 38,074. PATENTED MAR. 31, 1863.

W. WHITING.

ELECTROMAGNETIC FIRE ALARM.

Fig. 1

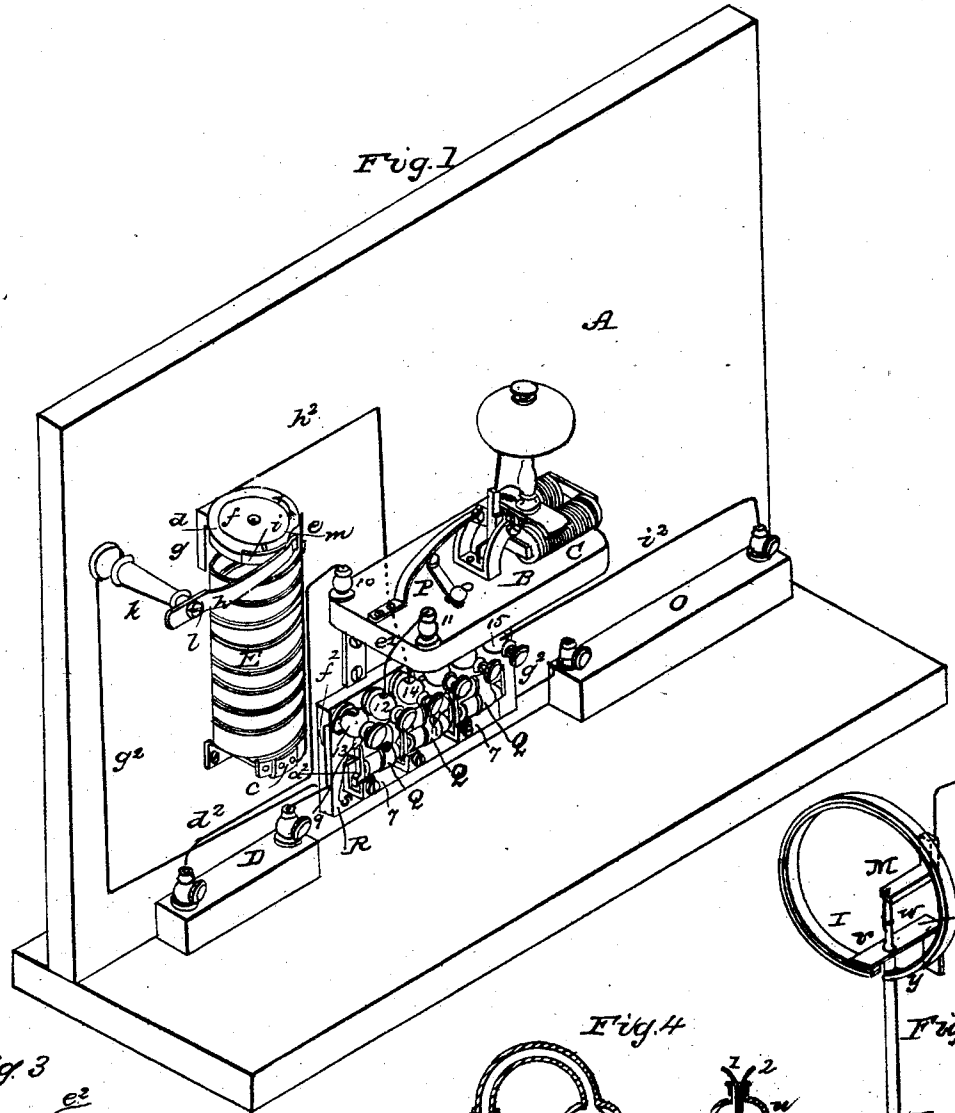


Fig. 2

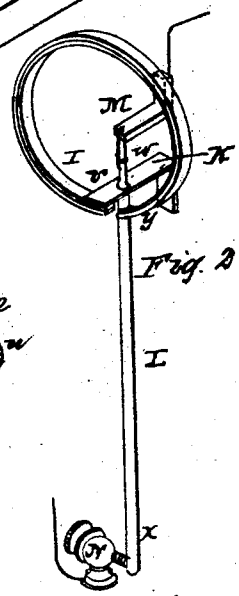


Fig. 3

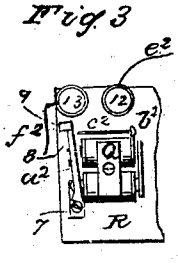


Fig. 4

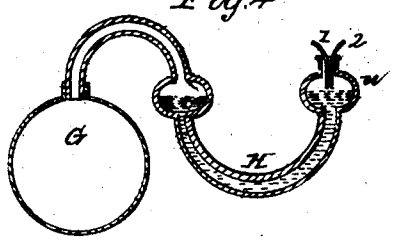


Fig. 5

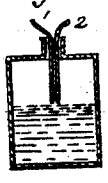
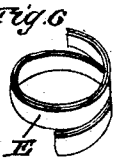


Fig. 6



Witnesses

Inventor

UNITED STATES PATENT OFFICE.

WILLIAM WHITING, OF ROXBURY, MASSACHUSETTS.

IMPROVEMENT IN ELECTRO-MAGNETIC FIRE-ALARMS.

Specification forming part of Letters Patent No. **38,074**, dated March 31, 1863.

To all whom it may concern:

Be it known that I, WILLIAM WHITING, of Roxbury, in the county of Suffolk and State of Massachusetts, have invented a new and useful Apparatus for Telegraphic Fire-Alarm Purposes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view, showing the complete apparatus, with its batteries, pyrometer, and alarm; Fig. 2, a modified form of my pyrometer; Fig. 3, a detached view of one of the magnets of the indicator, and Figs. 4, 5, and 6, details which will be used in illustrating the previous history of this branch of invention.

The attempt has been made to signalize to one part or room of a dwelling-house, factory, or public building the existence of a fire in some other part of the building by means of an open electro-magnetic circuit which was closed by the rise of mercury in a peculiar form of thermometer consequent upon the increase of the heat. In Fig. 4 of the accompanying drawings is represented the thermometer employed for this purpose. G is a bulb filled with air and connected with a bent tube, H, which is partially filled with mercury. The wires 1 and 2 lead the one to one pole of a magnetic battery and the other through an alarm apparatus to the opposite end of the battery. On the occurrence of a fire in the apartment where this thermometer is placed the air, as it expands within the bulb G, will cause the mercury to rise within the small chamber *u* into contact with the wires 1 and 2, by which means the circuit through these wires will be closed. The flow of electricity thus produced charged a magnet by which an index-hand in the office of the watchman, or in the sleeping apartment of the master of the house, was caused to point to the word "fire."

In Fig. 5 is represented a modification of the thermometer, in which the expansion of the mercury itself is caused to complete the circuit through the wires 1 and 2. Such apparatus was, however, rendered impractical and useless by the oxidation and evaporation of the mercury, which was necessarily exposed to the air at the point where the circuit-wires entered the thermometer. Independent of this defect, however, the contrivance was of very limited utility, even while the thermometer continued in working order, as it could only indicate the existence of a fire without giving any information of its whereabouts.

My present invention consists, first, in the employment of a peculiar pyrometer of novel construction, which I call a differential pyrometer, and in which a circle or spiral composed of two different metals is caused to twist or change its form by the different expansibilities of the two metals.

The second part of my invention consists in the employment of a series of these differential pyrometers, (one in each apartment to be protected,) in connection with a magnetic battery, an indicator, a series of magnetic circuits, and an alarm apparatus, by which combination not only the occurrence of a fire in any room of the house will be made known, but the exact locality of the fire will at the same time be pointed out.

That others skilled in the art may understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the drawings, A represents the wall of a room, to which is attached by suitable brackets a shelf, B, supporting the alarm apparatus. This apparatus consists of a bell, which is rung by the electro-magnet C whenever the circuit of its battery is completed.

The manner in which the ringing is performed by the magnet forms no part of my present invention, and need not be further described. In lieu of this, a bell-ringing apparatus may be employed which is operated by a weight or spring, and which is allowed to ring by moving a detent by magnetic power.

The improved apparatus which I employ for completing the electric circuit through the magnet C, and thus giving the alarm, I term a "pyrometer," and will now be described.

E, Fig. 1, is a spiral coil of sheet metal, one end of which is secured at *c* to a bracket attached to the wall of the room, or other convenient place. The other end of this coil is fastened at *e* to a ring, *d*, of non-conducting material, which surrounds a disk of metal, *f*. This disk is supported and revolves on a vertical spindle passing through its center, which

rises from a metal bracket, *g*, secured to the wall.

The strip of which the coil E is made (a part of which is shown detached in Fig. 6) is composed of two metals of different expansive powers, as iron or brass, which may be soldered together. The coil is so wound that the metal which expands the most with an increase of temperature shall be on the outside. Thus, as the temperature of the air is raised in the vicinity of the coil, and the strip of metal expands in length, it will revolve the disk *f* and ring *d* in the direction of the arrow, and, as the coil again contracts by cooling, the disk and ring will be revolved in the opposite direction. These revolutions of the ring *d* are made to complete and break the circuit of the battery O in the following manner:

A piece of metal, *i*, is inserted in the edge of the ring *d*, and is connected with the disk *f*. A spring, *h*, is secured by a screw and slot, *l*, to the end of a metal post, *k*, projecting from the wall A.

A notch, *m*, is cut in the edge of the ring *d* near the piece *i*. When the coil is in its normal position the outer end of the spring *h* rests in this notch without being in contact with the ring *d*; but when the ring *d* is revolved in the direction of its arrow, as before explained, the spring *h* is brought into contact with the piece *i*, and the circuit is completed.

The spring *h* is regulated in its position by the screw and slot at *l*, so that the ring *d* must revolve a greater or less distance before the end of the spring is brought into contact with the piece *i*, and thus the apparatus may be so adjusted that when the coil E is subjected to a certain increase of temperature, the amount of which may be definitely fixed, the electric circuit shall be completed.

By the arrangement of the notch *m* the ring *d* is freed from the friction which would occur if the spring *h* rested against it, and the ring is thus free to be revolved by the slightest elongation of the metal of the coil E.

Where the bell is to be rung by a mechanical bell-ringing apparatus a detent may be set free by the revolution of the ring *d*. In Fig. 2 is shown a view of another pyrometer for this purpose. A hoop, I, composed, like the coil E, of two different metals, is secured at one end, at *v*, to a bracket, K. A metal rod, L, is hung, like the pendulum of a clock, by a spring, *w*, to a metal bracket, M, from which is led one of the wires of the circuit, while another wire of the same circuit is attached to a cup, N, placed near the lower end of the rod L. A screw, *x*, passes through this cup and projects on one side, so as to be nearly in contact with the lower end of the rod L. This rod passes through a hole or slot in the bracket K large enough to allow it to swing a short distance. The free end of the hoop I, at *y*, is brought round nearly into contact with the rod L. Thus, as the hoop is acted on by an increase of temperature, its ends approach each other, and the end *y*, pressing against the rod L, swings its lower end against the screw *x* in the cup N, and completes the circuit.

The screw *x* may be adjusted so that the rod L will require to be swung a greater or less distance before its end strikes the screw, and a light spring may be placed on one side of the rod L to keep it out of contact with the screw *x* until pressed up to it by the expansion of the hoop I.

A switch, P, on the shaft B serves to throw the alarm apparatus into or out of operation.

Two galvanic batteries, D and O, of the ordinary construction, are placed in any convenient and secure positions.

An apparatus, R, which I term an "indicator," is secured to the wall of the room, A. It consists of a board, to which are secured a series of magnets, Q, (one of which is detached in Fig. 3,) which are connected one with the circuit of each room to be protected. Each magnet has an armature, a^2, pivoted at 7, which, when the magnet is not made, drops back into the position shown in Fig. 3, against a pin or stop, 8; or a light spring may be used to throw it back from the magnet. In this position a shield, 9, on the end of the armature covers an indicating-letter, A, B, C, &c.; but when the armature is drawn up by the magnet Q (when the magnetic current is passed through the coil) the shield discloses the letter belonging to that circuit and indicates the room in which the fire has occured. Over each magnet Q is a pin, b^2, from which a rod, c^2, extends so far that when the armature a^2 is drawn up by the magnet it will be in contact with the rod c^2.

Suitable screw-cups are placed in convenient positions to receive the various wires, which are insulated in the customary manner.

The battery D is embraced in the alarm-circuit, the wires of which are shown in blue. A wire, d^2, leads from one pole of this battery to a cup, 10, then under the shelf B, to the coil C'. From the other end of this coil a wire leads to cup 11 on the shelf, thence wire e^2 leads to cup 12 on the indicator-board. This is connected by a wire behind the board with the pin b^2. A wire, f^2, leads from the opposite pole of this battery to cup 13 on the indicator-board, which is connected by a wire behind the board with the metal block in which the armature a^2 is pivoted.

The armatures a^2 of all the magnets Q are in electric connection by means of wires passing to the blocks to which they are pivoted, and the pins b^2 are also connected by a wire passing from one to the other. Thus, whenever any one of the magnets Q is made and its armature a^2 is drawn up, the alarm or bell-circuit will be closed, the alarm will be given, and the letter will be disclosed which indicates the circuit that has been completed by the occurrence of a fire.

The battery O is in what I term the "indicating-circuit," the wires of which are shown

in red. The pyrometer E is also in this circuit. A wire, g^2, leads from one pole of the battery O to the metal post k, to which the spring h is attached. Another wire, h^2, leads from the metal bracket g, with which the disk f is in connection, to a cup, 14, on the indicator-board; thence a wire leads to the magnet Q, which belongs to this circuit. From the other end of this magnetic coil a wire leads to the cup 15, from which a wire, i^2, leads to the opposite pole of this battery. On the occurrence of a fire in the room protected by this circuit, or in which the pyrometer E is placed, or whenever the temperature of the room is raised beyond a predetermined degree, this circuit will be closed by the revolution of the disk f, as before explained, and the magnet Q will be made. The course of the current will be from battery O, through wire g^2, post k, spring h, piece i, disk f, to bracket g; thence by wire h^2 to magnet Q, and by wire i^2 back to the battery. When this magnet is made as before stated the alarm will be given. A pyrometer will be required in each room to be thus protected, and an electric circuit, in which is embraced the magnet Q representing said room. With a building thus protected the proprietor or guardian would be immediately informed of the occurrence of a fire, and by looking at the indicator R he could inform himself of its precise locality, as the letter representing the room in which it might chance to originate would be disclosed by the drawing up of the armature belonging to the magnet Q in that circuit. The largest public buildings, or a whole row of stores, may thus be placed under the guardianship of one person, who, while remaining quietly in his room, can know when and where a fire commences more promptly than if he were going the rounds. Factories, ships' holds, and other places where spontaneous combustion is liable to take place could be thus rendered secure.

This same apparatus may be employed to assist in regulating the warming of rooms, public buildings, &c., by giving notice to the person having the matter in charge when the heat has reached a predetermined point.

It is evident that if a closed circuit is employed, and the alarm is to be given by breaking the circuit, the pyrometer may be as readily employed to effect this end.

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

The within-described combination and arrangement of an indicator to designate the room from whence the alarm proceeds, a series of pyrometers, a magnetic battery, a series of circuit-wires, and an alarm apparatus whereby the occurrence and locality of a fire in any part of the building is made known, as set forth.

WILLIAM WHITING.

Witnesses:
THOS. R. ROACH,
THOS. L. GLOVER.