W. G. DAY.

Electric Signaling Apparatus.

No. 219,805. Patented Sept. 23, 1879.

Fig. 1.

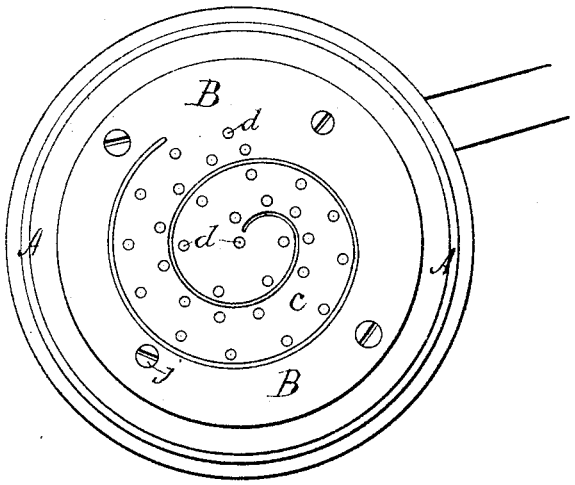


Fig. 2.

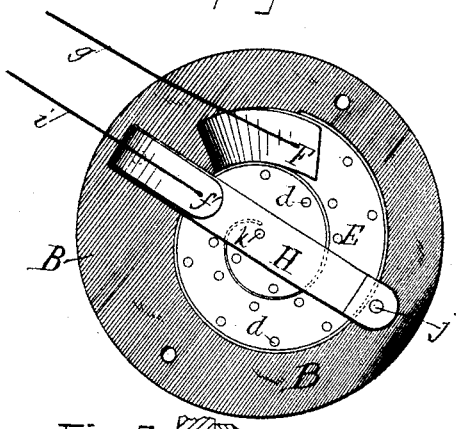
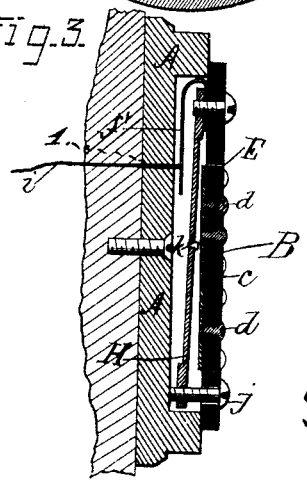


Fig. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLARD G. DAY, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN ELECTRIC SIGNALING APPARATUS.

Specification forming part of Letters Patent No. **219,805**, dated September 23, 1879; application filed July 23, 1878.

To all whom it may concern:

Be it known that I, WILLARD GIBSON DAY, of Baltimore, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Fire-Alarm Electric Bells, whereby the same instrument shall also serve the purpose of a call-bell for servants and of an automatic heat-indicator or alarm; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention consists in an apparatus which, by means of the same devices, serves the treble purposes of a call-bell for annunciator for dwellings, hotels, &c., an automatic heat-indicator, and an automatic fire-alarm, and which may, therefore, be properly designated as a "combined call-bell and automatic fire-alarm."

Heretofore, as is well known, electric bells have been rung by simply pushing a small button called the "push-button," and which act of pushing serves to establish or complete the electrical circuit; and that is the whole object of the pushing and the single and only function performed by such push-button or pin.

Other but widely-different mechanism has also been devised for an electrical automatic heat-regulator and alarm, as shown in Day's United States Patent No. 164,815, and in which was utilized the differential flexion due to the unequal expansion or contraction by heat of two straight bars of different materials united into a compound bar; but such apparatus, although useful for the intended object, was not adapted for use as a mere bell-ringer, to be operated by the voluntary pushing of a button or pin.

The object, therefore, of my present invention, is to furnish a simple, single, and cheap apparatus adapted to perform each and all of the above-named uses—that is to say, that of a call-bell at the will and by the act of the person, that of an automatic indicator of any predetermined degree of heat in a room or apartment, and that of an automatic fire-alarm, which may be adjusted to give the alarm at the early stages of a fire, and before it has gained any headway more than enough to increase to a given degree the temperature of the room.

Figure 1 is a front or face view of an appatus embodying my invention; Fig. 2, an under-side view of the parts detached from the bed-piece; Fig. 3, a central cross-section.

A is a block or bed-piece for supporting my novel devices, and by means of which the whole may be applied to any convenient part of a wall, door-frame, casing, or other part of a house where it is desired to connect with the wires leading from an electric bell. This bed-piece is preferably circular, and of a size or sizes about corresponding with those having the usual electric push-button or pin, so that my improved apparatus may be readily substituted for the same in any apartment where such buttons are now used.

B is a circular plate or disk, the larger and central portion of which is cut, sawed, or formed into a spiral, thus constituting a flat spiral bar, *c*, as shown, and this plate-bar is preferably made of hard rubber, which, as is well known, is highly sensitive to the most delicate changes of temperature, and readily expands and contracts under such changes. To the back of this spiral portion is securely riveted by a series of rivets, *d*, or otherwise fastened, a corresponding but thinner flat spiral, E, of metal, as, for instance, tinned iron or steel, but having a different capacity for thermal expansion or contraction. These united parts B and E form the compound bar, and which differs from any others known to me in the particular that, instead of being straight and having its operative part or extremity at the farthest from the fixed part of the bar, as is customary, it is in a coiled form, though flat, and is brought into a very small compact compass, and with the operative part at the center.

To the inner spiral, E, is attached a spring piece of metal, F, for making connection by pressure contact with one of the wires, *g*, of any appropriate electric alarm or bell; and to the rubber or outer disk or spiral, B, is attached another metallic piece, H, having a yielding or spring piece, *f'*, for connection with the other wire, *i*, of such alarm or bell, these wires passing, as shown, through small holes in the wooden or non-conducting bed-piece A, as shown in Fig. 3.

The piece H extends across the spirally-cut

disk B on its under side and reaches beyond the spiral part, and at one end it is secured or fastened firmly to such disk near its outer edge, and at its other end is provided a headed set-screw, *j*, which passes by its shank loosely through the rubber disk, and its threaded part enters a threaded hole in the free end of the piece H, the latter being so applied as to be slightly deflected or curved away from the face of the compound spiral, and the screw serving to adjust it nearer to or farther from such bar, as may be desired.

In the center of this metal bar H is a metallic point, *k*, which, in its normal position, does not come in contact with the metallic part E of the compound spiral, and consequently it prevents the completion or closing of the circuit; but when such point, from any cause, is brought into contact with such part E, the circuit is at once closed and the alarm sounded. The instrument being set to operate under any desired and predetermined degree of temperature of the room, an increase of heat causes the more sensitive or rubber spiral to draw inward at its center, and to bring such center nearer and nearer to the contracting-point *k* until such desired degree shall have been reached, when the alarm is given at once, and may be continued until the contact is again broken.

The connection is constant between the bar H and its wire, and also between the part E and its wire.

To complete the circuit it is only necessary to bring E and H together, which is done by the inequality or difference in expansion between the parts E and B. No connection can be made through the rubber, because the rubber insulates.

The rubber, in my construction, has a double use and function, however—viz., as an expander and also as an insulator. As an insulator it permits both wires to be firmly connected with it without completing the electric current; but as an expander it bends and finally pushes the inner metallic spiral bar, E, against the straight metallic bar H, and thus completes the connection.

The wood bed-piece is a convenient but not an essential part of the apparatus.

The rubber part B can be so shaped or molded (say, saucer-shaped, or otherwise) as to dispense with any bed-piece whatever.

It will now be readily seen that when used as a mere call-bell the pressing of the spiral inwardly by the hand or finger will also complete the circuit, regardless of heat or temperature, and that my improved apparatus can, therefore, because of its size, form, and character, be substituted for any push-button device or any electric-bell apparatus now in use by simply passing the wires from the battery through appropriate holes in the back piece A, one of such holes being indicated at 1 in Fig. 3.

When used as a push-bell or call-bell the circuit-closing will be but momentary, and the bell-ringing or other produced noise will be brief. When, however, the apparatus is actuated automatically by heat the ringing may continue until the heat diminishes enough to break the circuit by the receding of the metallic spiral E from the point *k*.

All the mechanism is housed and protected within an appropriate chamber or cavity in the back piece A.

It will be observed that the sensitiveness is enhanced in my construction by reason of the large body of rubber in excess of its central spiral portion, the whole of the disk being homogeneous and integral, and the shape permitting its central or acting part to have a movement proportioned to the size of the disk.

Any or all of the rooms of a house, hotel, public institution, &c., may be supplied or connected with my improved apparatus; and thus where there is any danger that a fire may ever break out the particular bell rung will at once indicate not only the room or locality, but will give timely notice as soon as the temperature has risen beyond a predetermined degree, and long before the fire could make much headway.

The use of the apparatus as a call-bell continually tests it, and assures of its being in order in the emergency of a fire, and this greatly enhances its value as an automatic fire-alarm.

I claim—

1. An automatic fire-alarm having a rubber disk, serving both as an expander and as a means of support or attachment for one of the conductors, and adapted to be employed as a push-button.

2. An electric push-button having a portion of rubber, serving as a means of support for one of the conductors, and applied substantially as described, whereby it may act as an expander under the influence of heat and at the same time as an insulator between the poles of an electric battery, the apparatus acting as an automatic fire-alarm.

3. The compound bar described, composed of a disk or plate, B, a portion of which is formed into a spiral, terminating at its center, and a flat spiral piece, F, of different material, firmly secured thereto, substantially as shown and described.

4. In combination, the parts B and E and the metallic pieces F and H, the latter being adjustable, and carrying a contacting pin or point, *k*, substantially as shown and described.

5. In combination, the parts B and E, the pieces F and H, and a back or bed piece, A, provided with perforations to admit the wires from a battery, substantially as shown and described.

WILLARD GIBSON DAY.

Witnesses:
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MRS. O. R. PLOUGH.