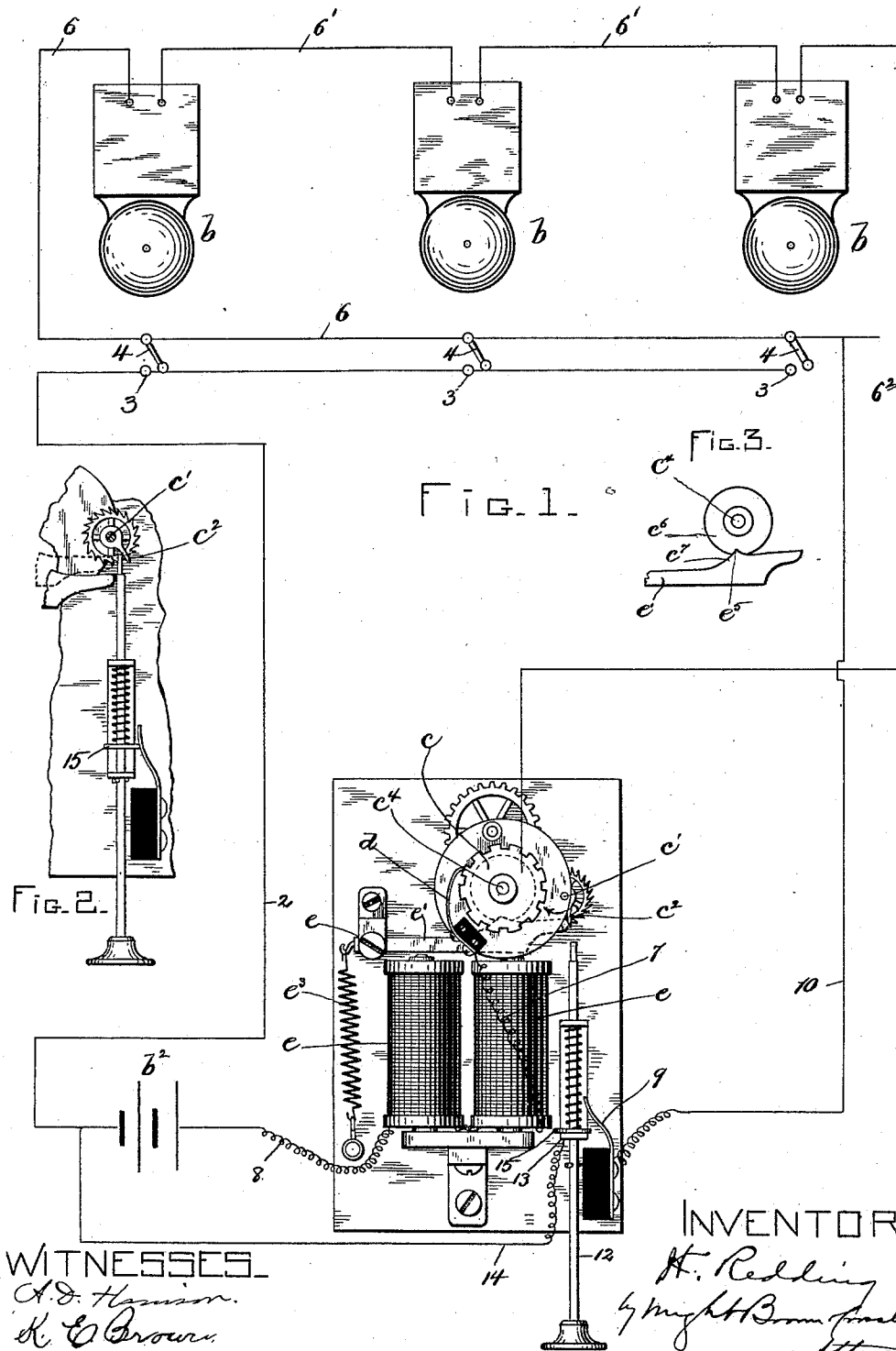


(No Model.)

H. REDDING.
FIRE ALARM SYSTEM.

No. 469,376.

Patented Feb. 23, 1892.



UNITED STATES PATENT OFFICE.

HARVEY REDDING, OF EVERETT, ASSIGNOR TO THE REDDING ELECTRIC COMPANY, OF BOSTON, MASSACHUSETTS.

FIRE-ALARM SYSTEM.

SPECIFICATION forming part of Letters Patent No. 469,376, dated February 23, 1892.

Application filed May 15, 1891. Serial No. 392,902. (No model.)

To all whom it may concern:

Be it known that I, HARVEY REDDING, of Everett, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Fire-Alarm Systems, of which the following is a specification.

This invention relates to fire-alarm systems for use in hotels and other large buildings to give an alarm at several parts of the building at the same time, said system including a series of gongs located at different parts of the building, an electric circuit including said gongs and provided with a series of circuit breaking and closing switches located at various points, either of which is adapted to close the circuit, and a circuit breaking and closing wheel driven by a motor and included in the circuit, said wheel being arrested by the armature of an electro-magnet when the circuit is broken and released by the closure of the circuit and caused to make a predetermined rotation, during which it closes and breaks the circuit a given number of times, thus causing the gongs to give an alarm by striking a corresponding number of blows.

The invention has for its object to enable the circuit to be closed and the gongs briefly operated for the purpose of testing the operativeness of the system without giving the full alarm.

To this end the invention consists in the improvements which I will now proceed to describe and claim.

In the accompanying drawings, Figure 1 represents a diagrammatic view of a fire-alarm system having my improvement. Fig. 2 represents a view of a portion of the apparatus under different conditions from those shown in Fig. 1. Fig. 3 represents a detail view of the disk behind the wheel *c*, said wheel being removed.

The same letters and numerals of reference indicate the same parts in all the figures.

In the drawings, *b b b* represent a series of electric gongs, which are preferably of such construction that the hammer of each will be retracted when the circuit in which the gongs are included is closed and released and caused to strike a blow when the circuit is broken. Electric gongs constructed to operate in this manner are well-known. Hence a detailed de-

scription and illustration of the gong are deemed unnecessary.

*b*² represents a battery or other source of electricity, one pole of which is connected by wire 2 with a series of contact points or anvils supposed to be in different parts of the building.

4 4 4 represent a series of switches electrically connected with wire 6, which is connected with the series of gongs, it being here shown as directly connected with the gong at one end of the series and through wires 6' with the other gongs, the last gong of the series being connected by wire 6² with a circuit breaking and closing wheel *c*. Said wheel is attached to a shaft *c*¹, adapted to be impelled by a spring through a suitable train of gearing, said train having a shaft *c*¹, provided with an escape-wheel *c*², with which a suitable escapement co-operates in regulating the movement of the train. The wheel *c* has a number of notches or recesses in its periphery, so that it alternately makes contact with and is separated from a metallic contact-spring *d*, the free end of which is arranged to bear on the periphery of the wheel *c*. The spring *d* is connected by wire 7 with one pole of an electro-magnet *e e*, the other pole of said magnet being connected by wire 8 with battery *b*². The armature *e'* of the electro-magnet, pivoted to a fixed support at *e*², is arranged so that when retracted by its retracting-spring *e*³ its swinging end will stand in position to arrest an arm *c*², affixed to the shaft *c*¹, as shown in Fig. 1, and thus lock the train and prevent the rotation of the wheel *c*. When the electro-magnet is energized, the armature *e'* is attracted, and its swinging end is thus moved sufficiently to release the arm *c*², whereupon the wheel *c* commences to rotate. A disk *c*³ is affixed to the shaft *c*¹, said disk having a notch *c*⁴, Fig. 3, which when the disk is in a given position receives a projection *e*⁵ on the armature *e'*. When the armature is attracted by the electro-magnet, the projection *e*⁵ is withdrawn from the recess *c*⁴, and the periphery of the disk then becomes a stop to prevent the armature from being retracted to arrest the arm *c*² until the disk *c*³, shaft *c*¹, and wheel *c* have made a complete rotation. Hence the armature does not resume its train-

arresting position until the wheel *c* has accomplished its predetermined rotation, after which the armature is retracted and arrests the arm *c*². The electro-magnet *ee* is energized by the contact of one of the switches 4 with the corresponding contact-point, thus completing the circuit from the battery through wire 2, the connected switch 4, wires 6 6', the gong, wire 6², wheel *c*, spring *d*, wire 7, electro-magnet *ee*, and wire 8, the arrangement being such that when the wheel *c* is arrested its periphery stands in contact with the spring *d*. On the release of the wheel *c* it commences to rotate, and its interrupted periphery alternately makes and breaks contact with the spring *d*, thus alternately closing and breaking the circuit through the gongs and causing as many operations of each gong as there are projections or contact-surfaces on the periphery of the wheel *c*, the gongs being preferably constructed as above indicated, so that the hammer of each is retracted by each closure of the circuit and caused to strike by each break or opening of the circuit.

The apparatus thus far described, excepting the recessed disk *c*⁶, is well known and in itself does not constitute my present invention. It will be observed that whenever the circuit is closed by a switch 4 (said switch being located in different parts of a hotel or other building, so that the circuit can be closed at various localities or parts of the building) the wheel *c* is given a complete rotation, so that each closure of the circuit will cause the gong-hammers to strike the number of blows for which the wheel *c* is intended. It is necessary, however, to close the circuit at comparatively frequent intervals for the purpose of testing the system, and it is very desirable to prevent the gongs from operating to give the full number of blows constituting the alarm-signal when the apparatus is being tested. This result I secure by my improvements, which I will next describe, said improvements providing for the striking of one blow of each gong when the circuit is closed for testing purposes and preventing the full complement of blows.

In carrying out my invention I provide a contact-spring 9, which is connected by wire 10 with the wire 6 of the electric circuit above described, and a rod 12, which is mounted to slide in a metallic guide or bracket 13, connected by wire 14 with circuit-wire 2. When the rod 12 is in the retracted position shown in Fig. 1, it is inoperative; but when said rod is pushed in, as shown in Fig. 2, a collar 15, affixed to it, makes contact with the spring 9 and completes a circuit, which includes the wire 14, battery *b*², wire 8, electro-magnet *ee*, wire 7, spring *d*, wheel *c*, wire 6², the series of gongs, wire 10, and spring 9.

When it is desired to test the apparatus, the operator pushes the rod 12 to the position shown in Fig. 2, thus closing the circuit, as last described, and causing the movement of armature *e*', which releases the arm *c*². This

movement of the rod causes the inner end thereof to stand in position to arrest the arm *c*², when the latter, revolving in the direction indicated by the arrow in Fig. 1, has passed from its starting position to the position shown in Fig. 2, the wheel *c* being thus arrested before it has rotated sufficiently to break the contact of its periphery with the spring *d*. It should be remembered that whenever the wheel *c* is arrested by the engagement of the arm *c*² with the armature *e*', as shown in Fig. 1, one of the faces or projections of the wheel is always in contact with the spring *d*, and that the movement of the wheel permitted by the brief operation of the impelling-train while the arm *c*² is passing from the Fig. 1 to the Fig. 2 position is not sufficient to separate the said face or projection from the spring *d*. Hence the gongs are not operated by the described movement of the rod 12, the only result of said movement being to energize the magnets of the gongs and retract their hammers to prepare them for operation, so that when the circuit is broken they will strike the gongs. After the operator has held the rod 12 in its projected and circuit-closing position long enough to cause it to arrest the arm *c*², as above described, he withdraws the rod to its original inoperative position, thus breaking the circuit and releasing the hammers of the gongs, so that each strikes one blow on the accompanying gong. The arm *c*² is released by the same movement of the rod 12, and the train rotates until the recess of the disk *c*⁶ permits the outward movement of the armature, so that the latter again arrests the arm *c*² when it reaches the position shown in Fig. 1, the wheel *c* being thus arrested and held in readiness for the next operation. The rotation of the wheel *c* after the withdrawal of the rod 12 has no effect on the gongs, because the circuit is then broken.

It will be seen from the foregoing that while the rod 12 is retracted, as in Fig. 1, the system is in condition to be operated in the usual manner by the closing of one of the switches 4 to effect a series of closures and breaks of the circuit, and thus give the full complement of blows on the gongs; but when the rod is projected, as in Fig. 2, the circuit can be closed and broken, so that there will be but one blow on each gong.

I claim—

1. In a fire-alarm system, substantially as hereinbefore described, the combination, with the alarm-circuit, including a series of gongs, switches, a circuit breaking and closing wheel, a train to rotate said wheel, and an electro-magnet to release and arrest said train, of a branch or loop connected with the said circuit and having a circuit closing and breaking device, the latter including a movable rod or slide, which when in one position breaks the continuity of the said branch, leaving the system operative in the usual way, and when in another position closes the circuit and lim-

its the movement of the wheel, whereby the gong may be tested by closing and breaking the circuit without giving the usual alarm, as set forth.

- 5 2. In a fire-alarm system, substantially as hereinbefore described, the combination, with the alarm-circuit, including a series of gongs, switches, a circuit breaking and closing wheel, a train to rotate said wheel, said train having
10 on one of its shafts an arm c^2 , and an electro-magnet to release and arrest said train, the armature of said magnet being arranged to lock the train by arresting said arm when said armature is retracted, of a branch or
15 loop connected with the said circuit and having a circuit closing and breaking device, the latter including a movable rod or slide, which

when in one position breaks the continuity of the said branch, leaving the system operative in the usual way, and when in another 20 position closes the circuit and enters the path of the arm c^2 and arrests the movement thereof at a point in advance of the point at which said arm is arrested by the armature, as set forth. 25

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 9th day of May, A. D. 1891.

HARVEY REDDING.

Witnesses:

C. F. BROWN,

A. D. HARRISON.