

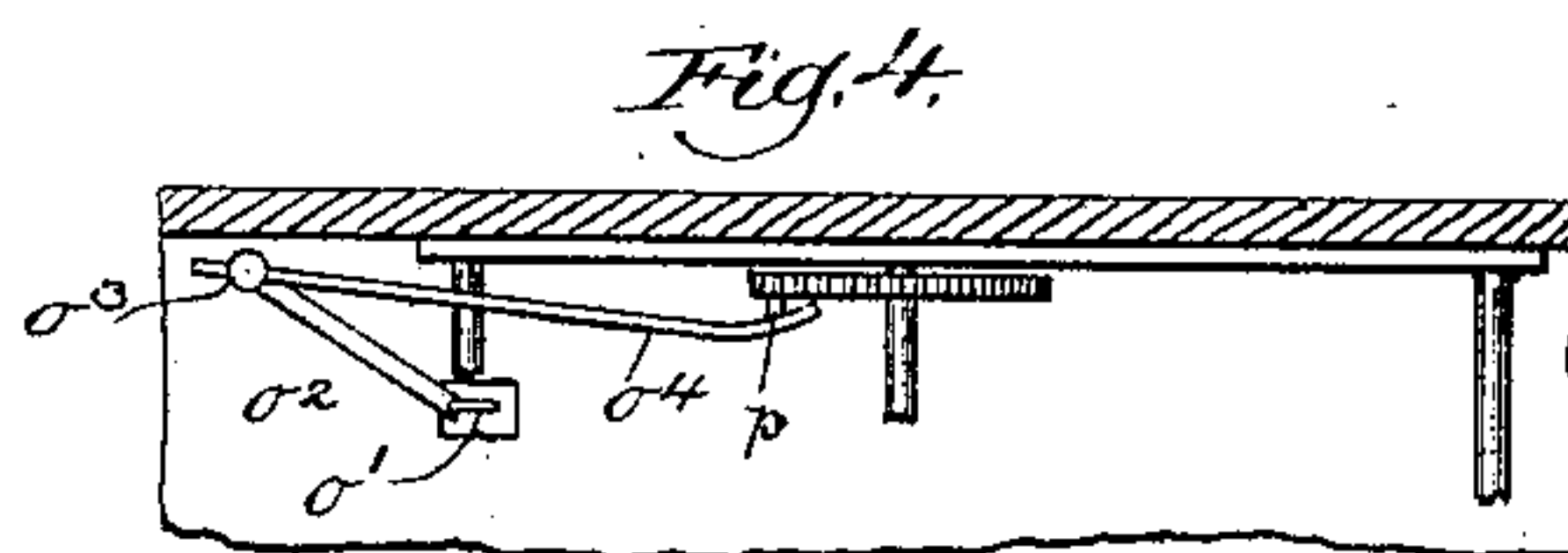
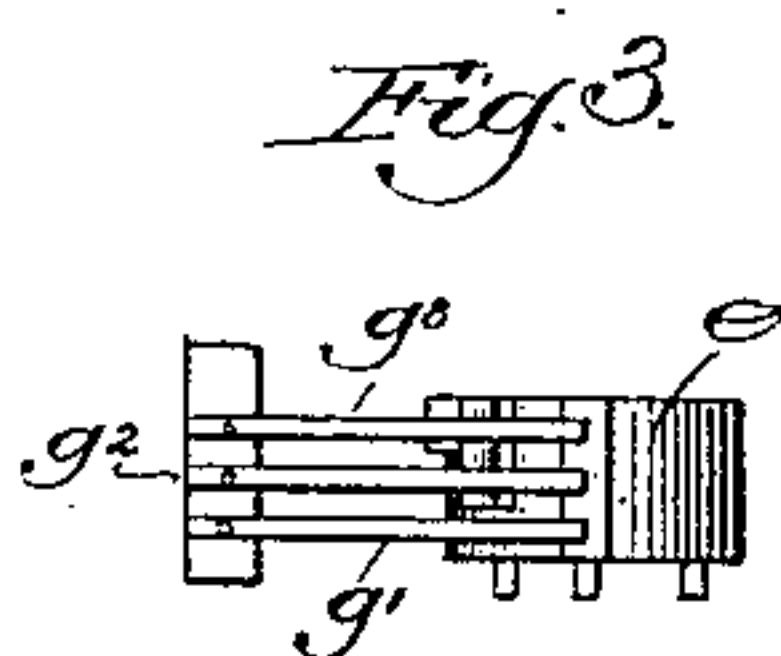
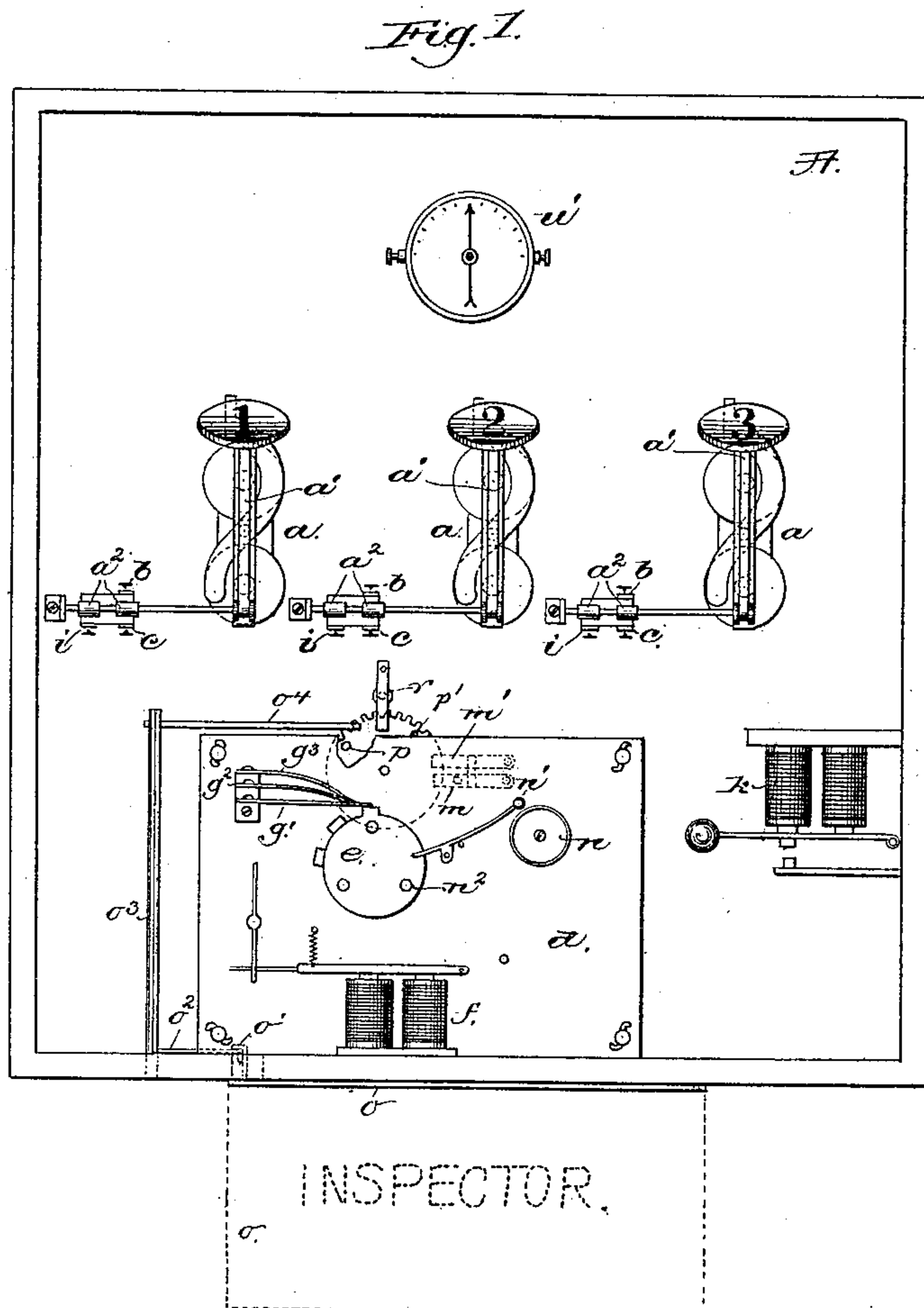
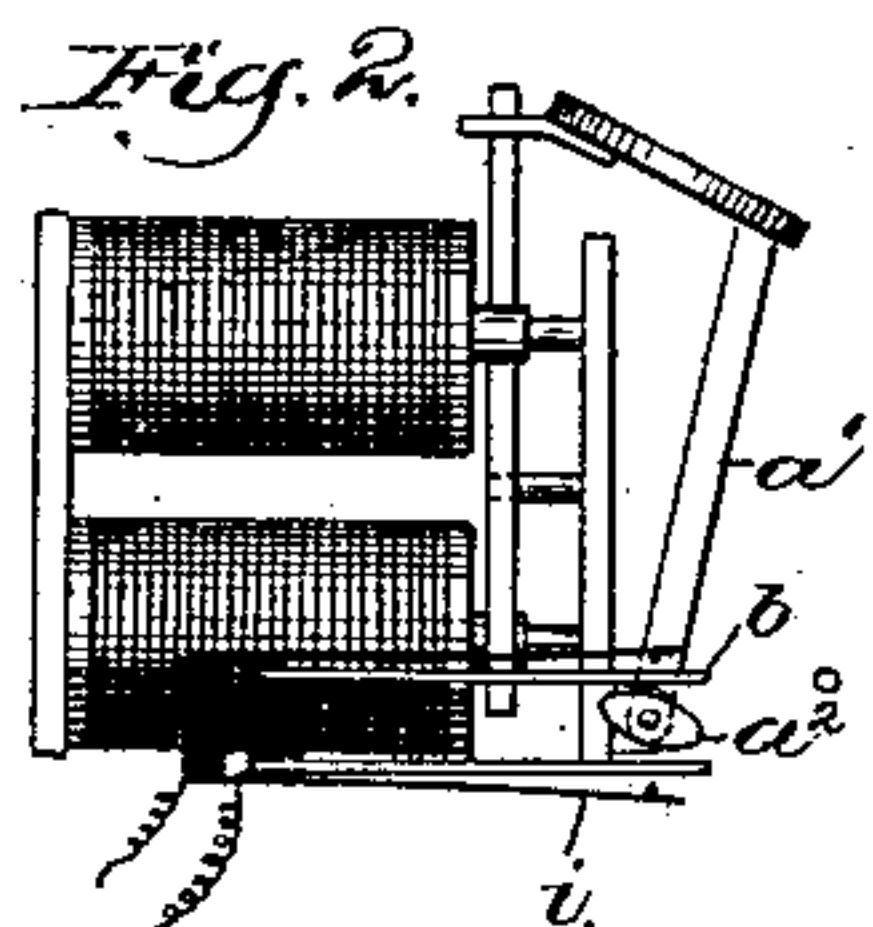
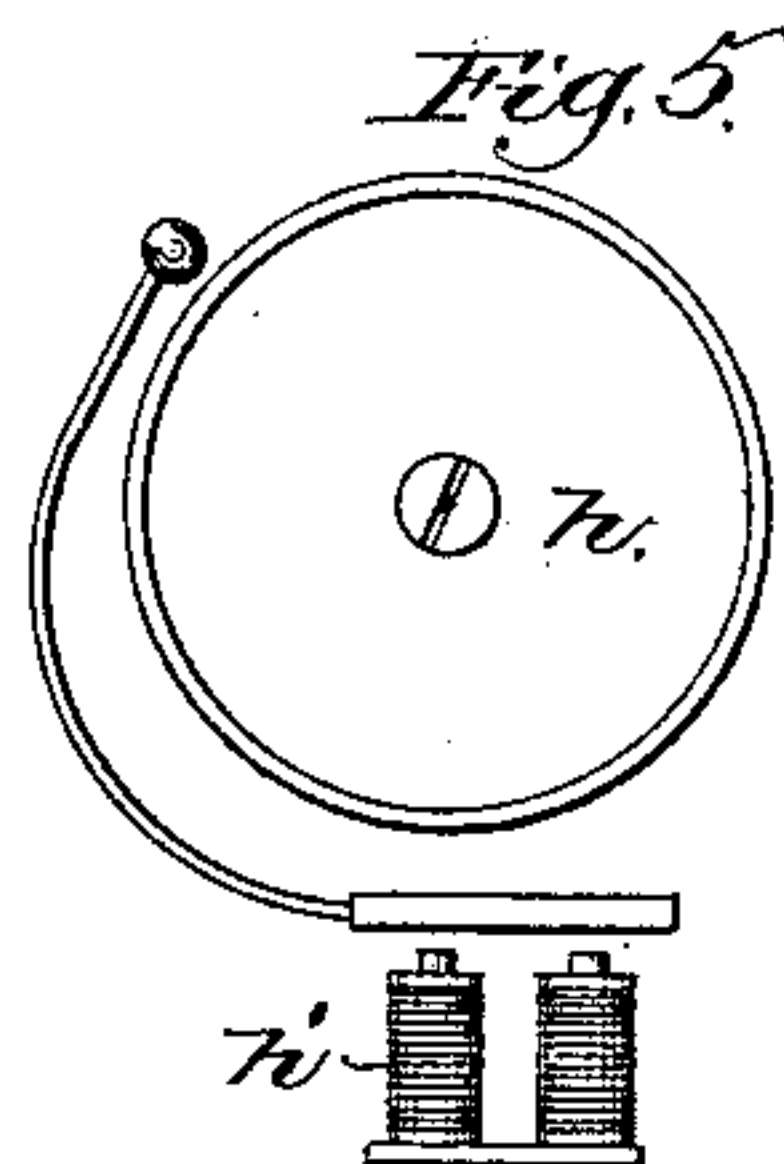
(No Model.)

2 Sheets—Sheet 1.

M. MARTIN & J. C. WILSON.
AUTOMATIC FIRE ALARM TELEGRAPH.

No. 329,468.

Patented Nov. 3, 1885.



Witnesses.

John F. C. Prentiss
Henry Marsh.

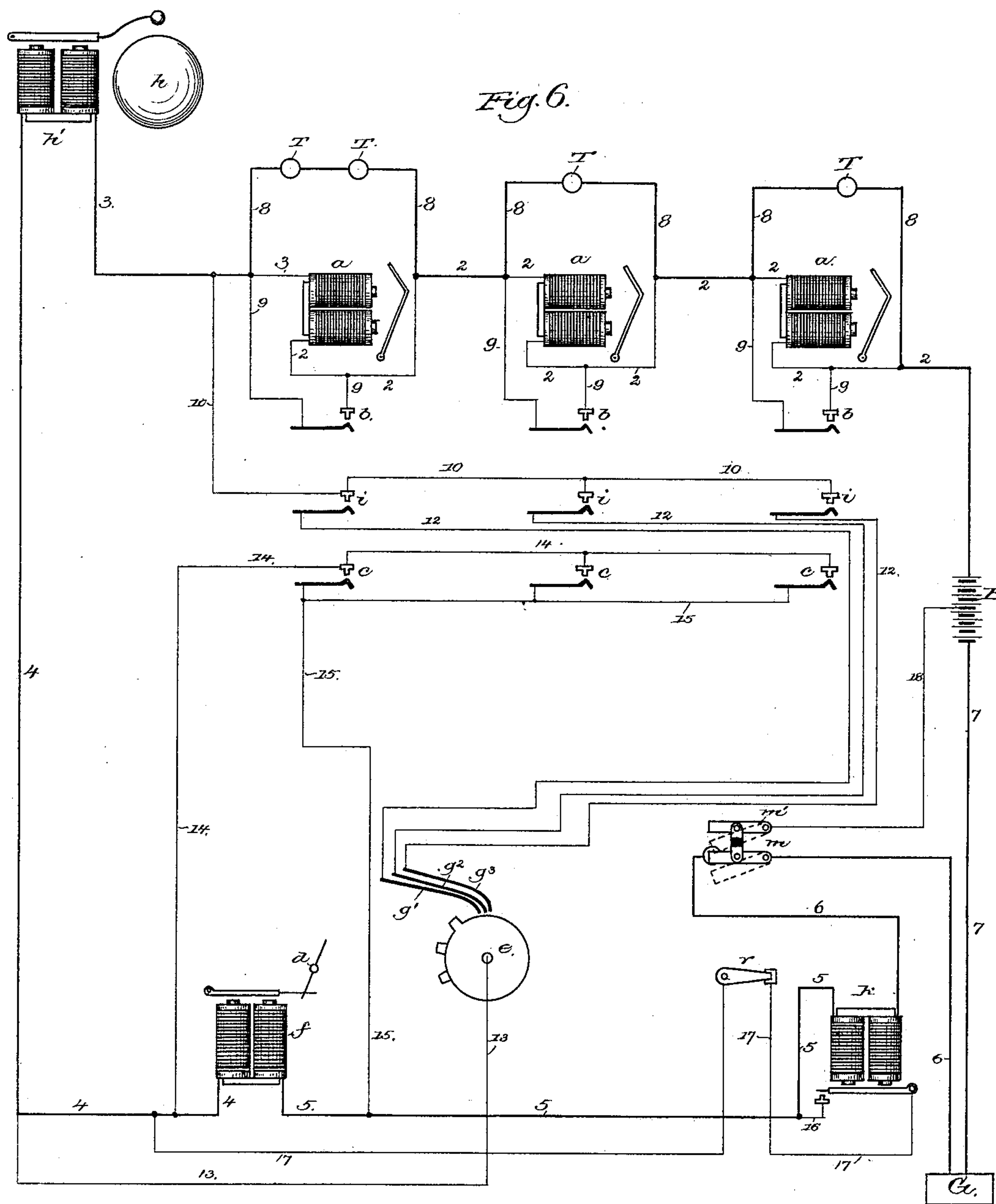
Inventor.

Morris Martin and
John C. Wilson.

by Crosby & Gregory attys.

2 Sheets—Sheet 2.

Patented Nov. 3, 1885.



Inventors,

Morris Martin and
John C. Wilson

By Crosby & Gregory attys.

UNITED STATES PATENT OFFICE.

MORRIS MARTIN, OF MALDEN, AND JOHN CORNELIUS WILSON, OF BOSTON,
MASSACHUSETTS.

AUTOMATIC FIRE-ALARM TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 329,468, dated November 3, 1885.

Application filed April 28, 1884. Serial No. 129,525. (No model.)

To all whom it may concern:

Be it known that we, MORRIS MARTIN, of Malden, Middlesex county, and JOHN C. WILSON, of Boston, Suffolk county, State of Massachusetts, have invented an Improvement in Automatic Fire-Alarm Telegraphs, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Our invention is embodied in a local fire-alarm apparatus, or one located in a building or collection of buildings or apartments; and the object of the invention is to provide for the announcement at any given point, within or without the building, of the locality in which a fire has broken out, and also to announce by a distinct signal any derangement of the circuit over which the signals are transmitted.

The apparatus is composed, mainly, of the following elements: first, a series of separate signaling-instruments, which may be of the kind known as "annunciator-drops," one being controlled from each apartment or portion of the building or group of buildings from which it is intended to send a distinct signal, the said drops of themselves constituting visual signals; second, a transmitting-instrument consisting of a clock-work or motor, the operation of which is controlled by the said drops, and which is adapted to transmit a series of different signals, one corresponding to each drop, the selection of the said signals, as well as the operation of the transmitter, being controlled by the said drops, so that when a drop falls the transmitter begins to operate, and will continue to produce repeatedly an audible signal corresponding to that of the drop that has fallen, the said drops being, for example, distinguished by numbers, and the audible signal being a gong which will indicate the same number by taps, as in the well-known fire-alarm telegraph-signals. The motor of the transmitter is also controlled by the same circuit as the annunciators, but independently thereof, in such a manner that the breaking or grounding of the circuit or the weakening of the current will cause the said motor to operate, and it will in thus operating

produce a signal distinct from the fire-alarm signals, to indicate that the circuits or battery require inspection. Other devices are also employed, which will be more fully described, by which in the event of the weakening of the battery or grounding of the circuit the transmitter will still be enabled to transmit a signal upon the breaking out of a fire. Automatic fire-alarm apparatus has been devised in which a number of independent circuits controlled or affected by changes in temperature have included visual signals or annunciators that indicate which circuit has been affected, and the said circuits have also controlled a transmitter common to all of them, for sending a signal to a remote station; but in such apparatus the visual signals and the transmitter were wholly independent of one another in their operation, and the transmitted signal does not depend, either for its character or its operation, upon the visual signals.

Figure 1 is a front elevation of the visual signals and transmitter for audible signals; Fig. 2, a side elevation of one of the visual signals or annunciator-drops; Figs. 3 and 4, details to be referred to; Fig. 5, a front elevation of the audible signal, and Fig. 6 a diagram of the circuits.

The main portion of the signaling apparatus is shown as inclosed in a box or case, A, located at some place or room where some person will always be in attendance. The visual signals *a* are shown as annunciator-drops of usual construction, having their coils in a normally-closed electric circuit, but the said coils being normally shunted by a circuit of low resistance, so that their magnets are normally demagnetized and their armatures unattracted, they then holding the drop or signal concealed. The visual signals or indicating-instruments are shown, in this instance, as composed of an electro-magnet and S-shaped armature pivoted between the poles of the magnet, and normally, when unattracted, engaging a latch on the movable indicator, which consists of a plate or disk provided with a distinguishing character—such, for instance, as a number or letter supported on a pivoted lever, *a'*, which is held, when engaged by the

latch, in position to keep the characterized plate concealed. When the magnet is energized, the attraction of its poles, acting on opposite sides of the armature above and below its pivot, turns the said armature on its pivot a sufficient distance to disengage the latch, when the characterized plate will fall by gravity, turning the arm a' on its pivot, and coming into proper position to be seen through a suitable opening in the inclosing-case. It is obvious, however, that any other kind of indicating-instrument might be employed, the invention not depending on the mechanical construction of the said instrument, the form shown being merely selected as one well adapted to co-operate with the other parts of the apparatus.

The shunt-circuit from each instrument a passes to the apartment or locality for which the said instrument is to indicate—one, for instance, passing through each floor of a building, and containing any desired number of circuit-breakers, T , which are preferably of the class known as "thermostatic," they being operated by an increase or rise in temperature, such as would be produced by the breaking out of a fire. By the breaking of one of the shunt-circuits the whole current is caused to pass through the corresponding instrument a , energizing its magnet and causing the drop-signal to fall in the usual manner, indicating by the character thereon which shunt-circuit has been broken, and thus showing the locality in which the fire has broken out.

The arm a of each of the annunciator-instruments a operates a series of circuit-changers, the object of which will be hereinafter explained, the said circuit-changers consisting, in this instance, of spring-contact pieces operated by a cam-like projection, a^2 , on the arbor of the arm a' , although it is obvious that the movement of the characterized plate or other part of the indicating-instrument might change a circuit by other means, the invention not being limited to the particular mechanical construction shown. One of the said circuit-changers, as b , closes a shunt around the corresponding drop-magnet, thereby removing its resistance from the circuit immediately after it has been operated to release the drop. Another of the said circuit-changers, as c , controls the transmitting-instrument d , consisting of a clock-work or motor actuating a break-wheel or signaling-surface, e , of peculiar construction, the said clock-work being normally arrested or held inoperative by an electro-magnet, f , which may be called the "controlling-magnet," and is shown as included in the main circuit and normally magnetized, the circuit-changers c being each adapted, when operated by the fall of a drop, to close a shunt around the said controlling-magnet, thereby demagnetizing it and causing it to release the instrument d , setting the wheel e in continuous rotation. The armature-lever of the magnet f engages the oscillating fan or pendulum d' of the motor d . The wheel e is made long enough

in the direction of its axis of rotation to co-operate with a series of contact-springs, $g' g^2 g^3$, one corresponding with each of the instruments a . The teeth or projecting portions of the wheel that touch the springs or pens g' , &c., do not all extend across its entire width, but only one of the said teeth extends wholly across the drum, it co-operating with all the springs, and being the only tooth that co-operates with the spring g' . As shown in this instance, two teeth have sufficient extent to co-operate with the spring g^2 , and three teeth with the spring g^3 . (See Fig. 3.) The wheel e and springs $g' g^2$, &c., constitute a multiple-signal-transmitting device, or one which is capable of transmitting any desired one of a series of different determinate signals, each of the said springs and the portion of the break-wheel co-operating with it constituting a signal-transmitting device controlling the circuit of a signaling-instrument, (shown, in this instance, as a gong, h ,) which, when the apparatus is used in connection with a building in a city, may be placed outside the building in the street, and will sound an alarm that may be heard throughout the entire neighborhood. The circuit from the springs $g' g^2 g^3$ passes in independent branches through the circuit-closers i , controlled by the instruments a , so that it is only when one of the said circuit-closers is closed by the fall of the corresponding drop that the corresponding spring will co-operate with a wheel to give a signal. The magnet h' of the signal h is preferably also included in the main circuit, and the wheel e operates to close a shunt, and thus demagnetize the magnet of the said signal, breaking and closing the shunt as each tooth passes under the spring. The circuit-closer i at the drop-instrument a numbered one, indicating, for instance, that the fire is in the first floor of the building, connects the spring g' in circuit with the signal-magnet h' , and as but one tooth of the wheel e reaches the said spring the said signal will give a single tap, repeated at each rotation of the wheel, also indicating that the fire is on the first floor. In a similar manner the drop-instrument numbered two, for the second floor, connects the spring g^2 in circuit with the signal h , and the said spring, being acted upon by two teeth of the wheel e , will strike two taps, repeated at each rotation of the wheel, and so on, the audible signal corresponding in each case to the visual signal, and indicating by number a particular apartment or floor of a building or a particular building of a group of buildings, as in a large manufacturing establishment. The circuits are shown in full in Fig. 6, in which the circuit over which the current normally flows is shown in heavier lines than the branches or derived circuits. The circuit-wire 2 from one pole of the battery B passes to and through the magnets of the signal-instrument a , and thence is continued by wire 3 to the magnet h' , thence by wire 4 to the controlling-magnet f of the transmitting-instrument, thence by wire 5 to an

indicating-magnet, *k*, for indicating the weakening or grounding of the circuit, as hereinafter explained, and thence by wire 6 to the ground, the other pole of the battery B being connected by wire 7 with the ground, and thus completing the circuit. The coils of the magnets *a* are normally shunted by branch circuits 8, of low resistance, each containing one or more circuit-breakers, T, of any suitable character. The circuit-closers *b* control shunts 9 for the magnets of the instrument *a*, the said shunts being closed by the falling of the drop or operation of the signal caused by the breaking of the corresponding shunt 8, as before described, and thus removing the resistance of the magnet from the circuit immediately after it has been energized to operate the signal. The wire 3 at one side of the magnet *h'* of the audible signal is connected by wire 10 with one member of each of the circuit-closers *i*, the other members of which are respectively connected by wires 12 with the springs *g' g''*, &c., co-operating with the break-wheel *e*, which is itself connected by wire 13 with the wire 4 at the other side of the magnet *h*, so that when any one of the circuit-closers *i* has been closed by the operation of the corresponding drop the shunt 10 12 13 of the magnet *h'* will be closed whenever a projection of the wheel passes under the corresponding springs, *g' g''*, &c., the circuit of which is closed at *i*, thus demagnetizing the said magnet *h'*, and causing it to be subsequently magnetized when the projection of the wheel passes the spring, so that a series of blows will be struck on the magnet *h* at each rotation of the wheel *e*, corresponding to the number of projections of the said wheel that co-operate with the particular springs *g' g''*, &c., of which the circuit is closed at *i*. The entire current normally passes through the magnet *f*, the armature of which is thus held attracted and bears on the fly or pendulum *d'* of the wheel-work of the transmitter, preventing the said wheel-work from moving. The wires 4 5, at either side of the said magnet *f*, are connected by wires 14 15 with the opposite members of the circuit-closers *c*, so that when any one of the said circuit-closers is operated by the fall of one of the drops the shunt 14 15 of the magnet *f* is closed, demagnetizing the said magnet, and causing its armature to release the train of the wheel-work. Thus in the normal operation of the apparatus the breaking of one of the shunts 8 causes the entire current to pass through the magnet of the corresponding drop-instrument *a*, causing its drop to fall, and the latter in turn closing the corresponding circuit-closers *b i c*, the former of which, *b*, again shunts the drop-magnet, the second of which, *i*, completes the shunt of the magnet *h'* as far as one of the springs of the break-wheel, and the latter, *c*, shunts the magnet *f*, thus permitting the said break-wheel to be set in motion to transmit the signal to the gong *h*, which signal corresponds with the drop that has fallen. The remaining appliances are for indicating a defect in the circuit, and for remedying such de-

fect as far as can be done automatically. The indicating-magnet *k* is included in the normally-closed circuit, and the retractor of its armature is so adjusted that it will fall away when the current approaches a state of weakness that might interfere with the proper operation of the remaining apparatus, but while it is still strong enough to operate the other instruments. The said magnet *k* is placed in the circuit between all the other instruments and the ground, so that if the line is grounded at any point the magnet *k* will be short-circuited, and thus release its armature which controls a shunt, 16 17, for the magnet *f* short-circuiting the said magnet, and thus releasing the motor of the transmitting-instrument. It will be seen that the breaking of the main circuit will also cause the demagnetization of the magnet *f*, and consequently the release of the motor *d*; but when the said motor is released otherwise than by the fall of one of the drops the shunts 10 12 13 for the magnet *h'* will remain open at *i*, so that no signal will be transmitted to the gong *h*, although the break-wheel continues to revolve. The said break-wheel or some part of the motor *d* is adapted, when released, to operate a local alarm-signal, shown in Fig. 1 as consisting of a bell, *n*, the hammer *n'* of which is operated by a series of pins, *n''*, on the break-wheel *e*, thus producing a continuous series of taps on the bell *n* whenever the said motor is set in operation, and calling attention to a defect in the circuit or weakening of the current when the said signal operates without the previous or accompanying operation of one of the signals *a* or the signal *h*. The motor *d* is also adapted to operate a visual signal, shown as a drop or hinged plate, *o*, at the under side of the box A, it being provided with a hook or projection, *o'*, (see Figs. 1 and 4,) engaged by an arm, *o''*, extending from a rock-shaft, *o'''*, provided with an arm, *o''''*, in position to be engaged and operated by a projection, *p*, from one of the slow-moving wheels of the train of wheel-work in the instrument *d*. Thus, when the said instrument is released and runs for a short length of time, the projection *p* will strike the arm *o''''*, (shown in plan view, Fig. 4,) turning the rock-shaft *o'''* and the arm *o''* sufficiently to disengage the latter from the hook *o'*, permitting the said signal *o* to drop and be displayed at the outside of the case A, as shown in dotted lines, Fig. 1, affording a further indication of the derangement of the circuit.

In order that the train may be stopped while the spring or actuator has sufficient power to transmit a signal in case a fire should subsequently occur, the shunt 16 17, controlled by the magnet *k* is provided with a switch, *r*, operated by the projection *p* or some other part of the train of wheel-work to open the said shunt, and thus permit the magnet *f* to be again magnetized, stopping the train while its actuating weight or spring is still in condition to move it farther in case a fire-alarm is to be given. Just before the switch *r* is

opened the clock-work operates, by a projection, p' , or otherwise, a pair of switches, $m m'$, mechanically connected together, but insulated from one another, the former of which opens
 5 the ground-wire 6, removing the ground from the extremity of the line remote from the battery, and the latter, m' , connects the wire 18 from an intermediate point in the battery with the said terminal or extremity of the line, thus
 10 dividing the battery into two parts, so that in case the main line has been grounded at any point it will now constitute two independent grounded circuits, one or the other of which will operate the instruments in case a fire-alarm is to be transmitted. One of the said
 15 circuits would include the portion of the battery between the wires 7 and 18, passing from the ground G over wire 7 through the said portion of the battery, and thence by wires
 20 18 6 5, and so forth over the main circuit previously traced to the grounded point on the said circuit, while the remainder of the main circuit beyond the grounded point would include the portion of the battery between the
 25 wires 2 and 18, or it would contain the entire battery in case the main circuit between the grounded point and the wire 18 should be broken. After the transmitter has been operated, either to produce an alarm or owing
 30 to a derangement of the circuit, it will be again wound up by the inspector, who will set it in proper position, and will restore the signal o and switches $r m m'$ to their normal condition. The circuit will preferably contain a galvanometer, u , for indicating the strength of the
 35 current.

We claim—

1. The combination of a series of visual indicating signal-instruments, each of which,
 40 when operated, shows that a change has been made in an electric circuit extending from said instruments to a locality corresponding to the said instrument, and a multiple-signal-transmitting apparatus, and means governed by the
 45 indicating-instruments controlling the operation of the said transmitting apparatus, which is caused to transmit or produce a different audible signal for each visual instrument corresponding to the indication of the said instrument, substantially as and for the purpose
 50 described.

2. The combination, with a visual indicating signaling-instrument, which, when operated, shows that a change has been made in an electric circuit connected therewith, of a signal-transmitting instrument comprising a motor and break-circuit device actuated thereby, and a signaling-instrument and normally open or inoperative circuit connecting it with the
 60 transmitting-instrument, and a circuit-closer in the latter circuit, operated by the visual-signaling instrument, which renders the said circuit operative when the visual instrument is operated, substantially as described.

65 3. The combination of a visual indicating signal with a transmitting-instrument consisting of a motor and controlling electro-magnet,

and a normally-open branch circuit or shunt around the said magnet and circuit-closer therein, controlled by the said visual indicating-signal, whereby the said transmitting-instrument is set in operation when the visual
 70 signal is operated, substantially as described.

4. The combination of a series of visual indicating-instruments having controlling-magnets in a normally-closed electric circuit and shunts of low resistance around said magnets, combined with a transmitting-instrument and circuit-controlling instruments operated by the visual instruments controlling both the
 75 operation of the transmitting-instrument and the circuit over which it transmits its signal, substantially as described.

5. A signal-transmitting instrument comprising a mechanical motor and controlling
 85 electro-magnet therefor, included in a normally-closed main circuit, having a normally-open shunt-circuit, combined with a visual signal operated by the said motor, which is set in operation by the breaking of the main circuit or closing of the shunt, substantially as
 90 described.

6. A signal-transmitting instrument operated by a mechanical motor, and provided with a releasing electro-magnet in a closed electric
 95 circuit, the said electro-magnet having a controlling-shunt, 16 17, around its coils, the said shunt containing two circuit-controllers, one of which is normally closed and is mechanically opened by engagement with the said
 100 mechanical motor, and the other of which is normally open and is closed by the release of the armature of an electro-magnet forming a component part of one of the said circuit-controllers, substantially as described.
 105

7. In an automatic fire-alarm apparatus, a signal-transmitting instrument and electro-magnet controlling the operation thereof, and a normally-closed electric circuit including the said controlling electro-magnet, and a normally-opened shunt for the said controlling-magnet, combined with an indicating electro-magnet included in the said circuit, adjusted to be operated by a predetermined weakening of the circuit, and a circuit-closer operated
 110 thereby for the shunt of the transmitter-controlling magnet, substantially as and for the purpose described.

8. A series of signaling-instruments and a normally-closed ground electric circuit controlling the operation thereof, combined with an indicating electro-magnet included in circuit between the said instruments and the ground, and an electric switch and actuating mechanism therefor controlled by the said
 115 indicating-magnet, by which the line-wire is disengaged from the ground, substantially as described.

9. A transmitting-instrument comprising a motor and break-wheel or contact-surfaces,
 120 actuated thereby, and a series of contact-springs co-operating with different portions of the said contact-surfaces, combined with a series of visual signals, each operated by a
 125

change in an electric circuit connected therewith, and each controlling the circuit of one of the said contact-springs, substantially as described.

5 10. In a signal apparatus, a motor and controlling electro-magnet therefor, combined with an audible signaling device mechanically actuated by the said motor, a visual signal device normally concealed, and releasing
10 mechanism therefor operated by the said motor, which releases the said visual signal, permitting it to be displayed at the end of a period of operation of the motor, substantially as described.

15 11. A metallic electric circuit or loop including a battery and an indicating electro-magnet, the said circuit being normally connected with the ground at a point between one of the poles of the battery and one of the
20 terminals of the coils of the said electro-magnet, and the said battery having a normally-open earth-branch connected at or near its center, combined with an electric switch

adapted to be engaged by a motor mechanism and operated thereby to break the said normal
25 connection of the circuit with the ground, and to close the said normally-disconnected ground-branch, substantially as described.

12. A normally closed and grounded electric circuit including signal-transmitting in-
30 struments, and having a battery in the said circuit in proximity to one of its terminals, and an indicating electro-magnet in the same circuit in proximity to its other terminal, combined with a motor mechanism and re-
35 leasing electro-magnet therefor controlled by the armature of the said indicating electro-magnet, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of
40 two subscribing witnesses.

MORRIS MARTIN.

JOHN CORNELIUS WILSON.

Witnesses:

JOS. P. LIVERMORE,

B. J. NOYES.