

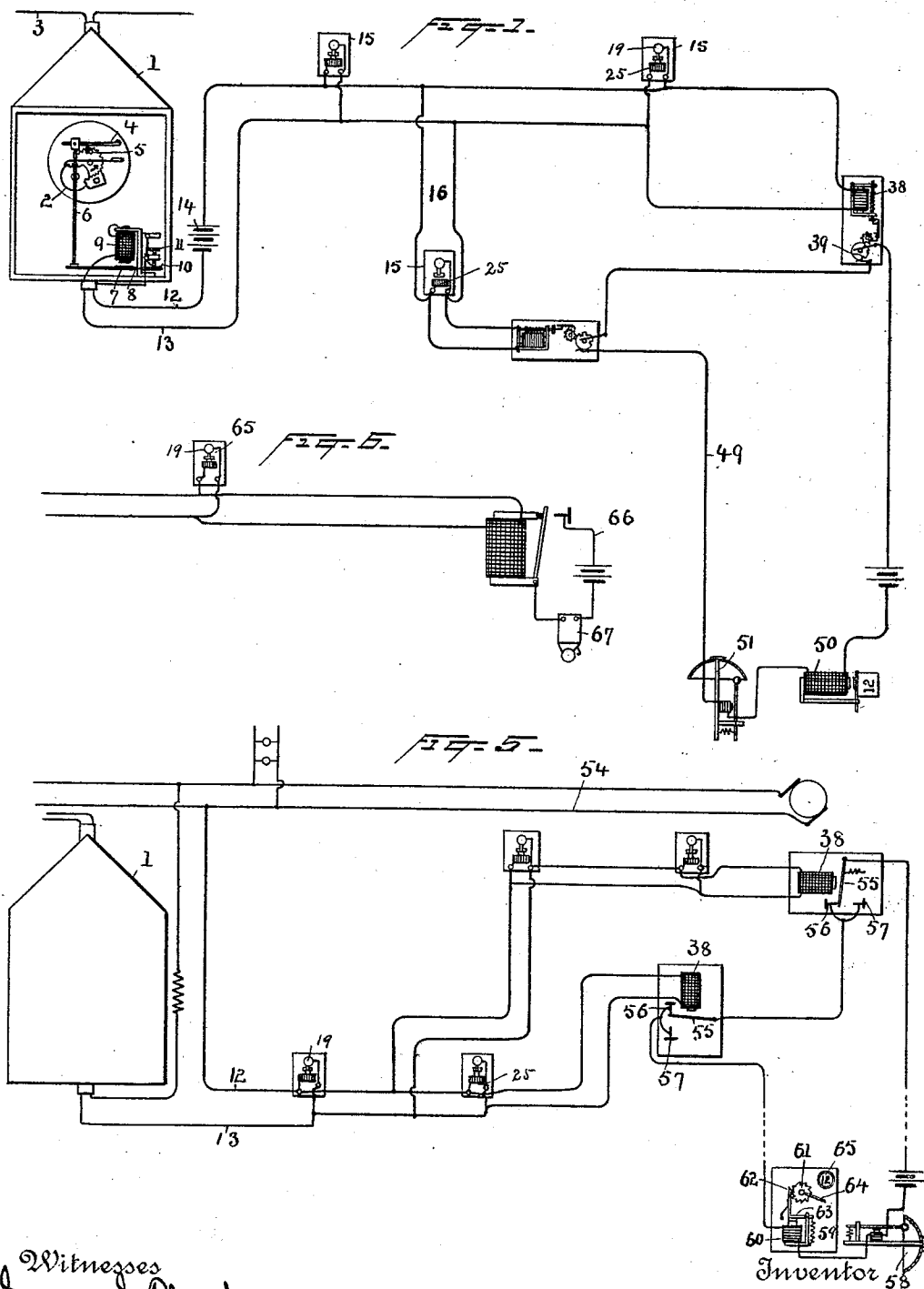
(No Model.)

3 Sheets—Sheet 1.

J. SACHS.
FIRE ALARM SYSTEM.

No. 498,448.

Patented May 30, 1893.



Witnesses
Norris A. Clark.
W. F. Clark

By his Attorneys J. Sachs
Syert Seely.

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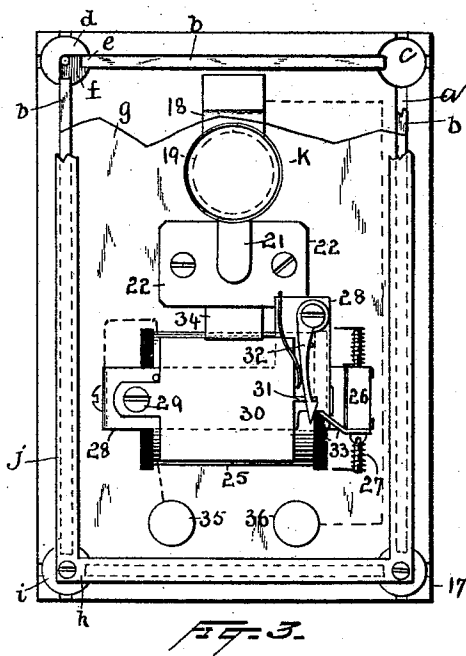
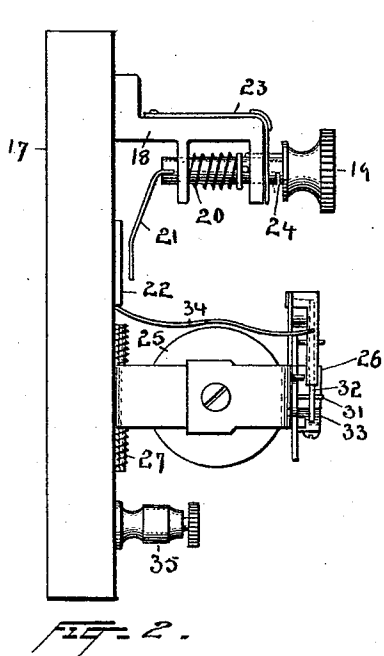


Fig. 4

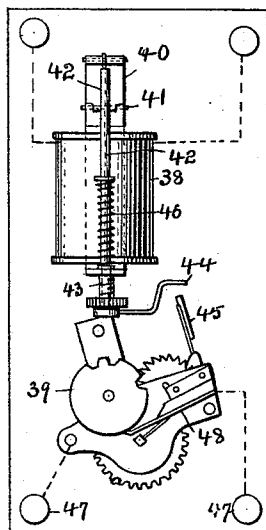
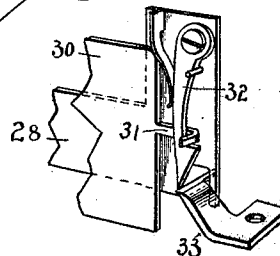


Fig. 5



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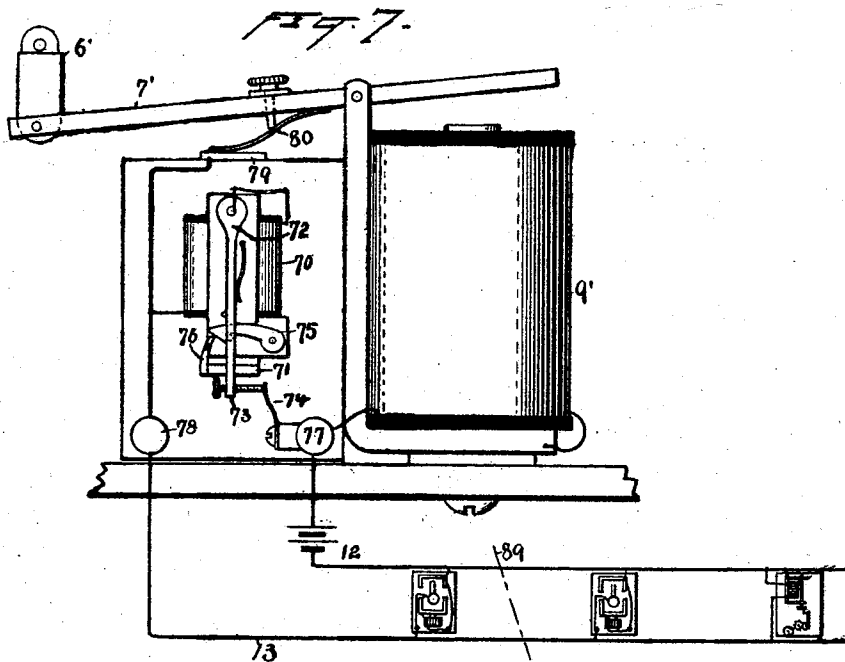
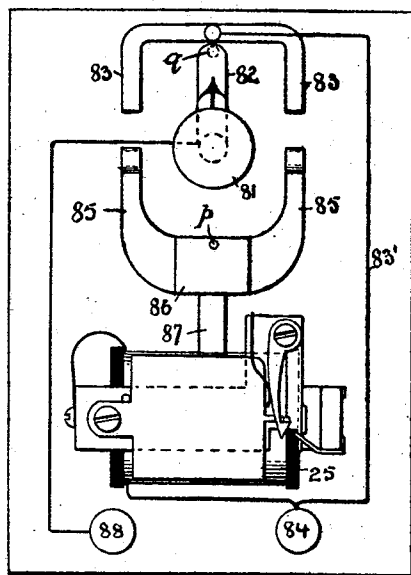


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOSEPH SACHS, OF NEW YORK, N. Y.

FIRE-ALARM SYSTEM.

SPECIFICATION forming part of Letters Patent No. 498,448, dated May 30, 1893.

Application filed June 24, 1892. Serial No. 437,814. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH SACHS, a citizen of the United States, residing at New York city, county and State of New York, have invented a certain new and useful Improvement in Fire-Alarm and Similar Systems, of which the following is a specification.

The present invention relates especially to fire alarm systems, particularly of that class in which a street or public fire alarm or signal box can be operated from a distance by means of one or more local circuits. Such systems have, prior to my inventions, been used, but have been found somewhat unreliable. In my patent No. 481,590, dated August 30, 1892, is described a system of this general character, in which the local circuits include sending boxes having circuit-controllers and return-calls adapted to inform persons using either of the boxes that the magnet in the local circuit at the alarm box has properly operated to send the alarm from that box to the fire-engine station.

The main object of this invention is to improve said system and the apparatus employed therein.

The invention consists, first, in a system of the character indicated, the local circuits of which are provided with sending boxes having improved circuit-controllers and return-calls, and in said circuit-controller and return-call *per se*, said device having means for preventing accidental sending of several calls from the same point, and automatic means for breaking the circuit after the circuit-controller has been operated showing proper operation of the apparatus, and leaving the circuit in condition to be operated on at any other sending box or circuit-controller.

The invention consists, second, in a system of the general character indicated, with a tell-tale, signal or test device controlled by each local circuit for giving notice when a signal is sent, and when any accident happens to the operating circuit; and the invention consists, finally, in several other combinations hereinafter described and set forth in the claims.

In the accompanying drawings, illustrating the invention, Figure 1 is a general view of a fire alarm box with a local or auxiliary circuit for operating the box, to which are con-

nected the devices embodying a part of the present improvement. Fig. 2 is a side view of one of my combined circuit-controllers and return-calls, the inclosing cover being removed. Fig. 3 is a front view of the same, with the inclosing cover or box in place, a part of the latter being broken away at the top to show the construction more clearly. Fig. 3^a is a modification to be referred to. Fig. 4 is a front view of one form of tell-tale device. Fig. 5 is a view of a slightly modified arrangement of circuits and devices. Fig. 6 illustrates a further modification. Fig. 7 illustrates modified devices at the street box; and Fig. 8 illustrates the circuit-controller and return-call preferably used in connection with the system of this last figure.

For purposes of illustration, an ordinary Gamewell fire alarm or signal box, 1, is indicated, but it should be understood that any suitable form of signal box may be substituted, although it is preferable to use boxes which are kept normally wound and are operated by tripping merely, since this requires less power in sending a signal than to wind the box for each signal, as might be done.

The construction of signal boxes being well understood, it is unnecessary to describe the same in detail.

2 is a signal wheel adapted to vary the circuit 3, which is the fire-alarm circuit extending to any suitable engine house or other place, a definite number of times to indicate the box number.

4 is a detent arm which normally holds the motor of the signal box from operation in any suitable way, for example, by engaging the pin 5 on one of the wheels of the driving train. With this lever engages a rod link, or similar device, 6, extending to the armature 7, which is pivoted at 8 to the Z-shaped arm carrying the working magnet 9, that is, in this case, the magnet that releases the signal box. Above the short end of the lever 7 is a spring 10, against which presses an adjustable screw 11. One terminal of the magnet coil is connected to the Z-shaped yoke and thence to the armature lever 7, to the spring 10 of a circuit-controller or breaker, and to wire 12 of the local or auxiliary signal releasing circuit. The second terminal of the magnet coil is connected to the wire 13 of said

circuit. Said local circuit is provided with a suitable source of current, such as the battery 14, and one or more sending boxes 15, having circuit-controllers and return-calls. The local circuits are normally closed, and the circuit-controllers are so connected that when operated they short-circuit the resistance offered by the tell-tale magnets, thus allowing sufficient current to pass to energize the working magnet. In Fig. 1, two such sending boxes 15 are shown directly in the local circuit, and one in a branch 16, but the number of these may be changed as desired. For example, if a fire-alarm or street box, 1, is in a fire district including a hotel, and the devices 15 for operating the box from a distance are in said hotel, there would ordinarily be one or more for each floor. The preferred construction of the device just referred to is shown in Figs. 2 and 3.

On the insulating base 17, is mounted a standard 18, which carries a push-button 19, normally pressed up by a spring 20 and having a contact spring or arm 21, which, when the button is pushed in, makes contact with the plate 22.

23 is a spring connected to the standard and tending to move away from the same, (that is, in the position shown, to move up,) and having an opening through which the shank of the push-button extends, so that when the button is pushed in the spring will catch in the notch 24 and will hold the push-button down. This prevents danger of a second call from the same point when the button has once been operated, since to send a second call it is necessary to press in the spring 23, allowing spring 20 to raise the push-button and then to press in the latter. This locking of the circuit-closer also insures the circuit being held closed for a sufficient time to allow the magnets therein to operate; it also prevents operation of the return-call by a mere removal of the finger from the push-button, as might happen with the arrangement described in my other application. Evidently the push-button form of circuit-closer is not essential, but other forms may be substituted. Below the circuit-closer is placed a magnet 25, having an armature 26, pivoted at its lower end and pressed away from the magnet by the spring 27 on said pivot. Across the outer side of the magnet extends a plate 28, to which is pivoted at 29 an annunciator drop 30, having a small hook 31, with which the pawl 32 normally engages to hold said drop, the pawl being pressed forward by a spring. At the outer or front end of the armature is secured an arm 33, which, as the armature moves forward, strikes the pawl 32, moving it back and allowing the annunciator to drop until the arm or hook 31 rests on the arm 33, but not far enough to expose the signal, or to break the circuit at spring 34. When the magnet is de-energized by breaking of the circuit at spring 10 at the street box and the armature moves back to its original position,

arm 33 is carried out from under arm 31, and the latter falls.

Connected with plate 22 is a spring 34, normally pressing on the upper edge of the shutter 30 and maintaining the spring and shutter in contact until the latter falls.

35, 36 are the terminals or binding-posts of this device, the former being connected to one terminal of the magnet, thence to the yoke of the magnet, to spring 34, and, when the circuit is closed, to the standard 18, thence to binding-post 37. The wires 12, 13 of the local circuit are connected to these binding-posts, as shown in Fig. 1.

I have designed a special form of box or cover for the mechanism of the circuit-controller and return-call. In the base 17 near the four edges are formed grooves *a*, of sufficient width to receive glass plates *b*. At the intersection of the grooves, I bore holes *c*, partly through the base, into which posts *d* can be set, being secured in place by screws from the rear of the board; said posts are provided with longitudinal grooves *e* at two points, ninety degrees apart, as shown. The quadrant of the top of each post between these grooves is preferably cut away, as indicated at *f*, to a depth equal to the thickness of the top glass plate *g*, so that when the plates *b* are slipped down into their grooves, the top plate *g* may be laid onto them, and onto the four corner posts, and the upper surface of the plate *g* will be on a level with the main portion of the ends of the posts. The corners of the plate *g* may be broken away, if desired, as indicated at *h*, to accommodate the screws *i*, which pass through a suitable metal frame *j*, over the glass into the posts and secure the glass in place. This construction gives a very simple and ornamental box, and one well adapted for the apparatus described. Over the push-button, the plate *g* is provided with an opening, preferably covered by a piece of paper *k*, pasted onto the under side of the said plate, and which must be broken in order to operate the device.

At the outer end of the closed local circuit, and at the end of each branch, is placed a magnet 38, preferably of such resistance that it will prevent undue waste of current, but will normally be sufficiently energized to retain its armature attracted, and the armature is so mounted as to hold the motor of a signal device 39 from operation. The magnet and devices just referred to constitute what is termed a tell-tale or test device, and this is shown more fully in Fig. 4, in which 38 is the magnet, 40 the armature thereof, pivoted at its rear end at 41, and connected at its forward end to the rod 42, adapted to slide through the adjustable bushing 43, and carrying at its lower end an arm 44, which when in its lower position is behind the fan or regulating device 45 of the signal motor, thus holding it from movement. On the rod 42 is a spring 46, which tends to hold the armature in its retracted position, as shown in Fig. 4.

47 are binding-posts, one of which is connected to the metal frame of the signal device 39, and the other of which is connected to the insulated spring 48, so that when each notch of the signal wheel passes the spring 48, the line connected to the posts 47 will be opened. This signal wheel is shown with one notch, a space, and then two notches, thus being adapted to give the signal 12. The particular construction of this tell-tale device is not important, although the form described is preferred, but the combination with the local circuits of a tell-tale or signal is one of the important features of this invention.

49 is a tell-tale or trouble circuit extending from each tell-tale, or from several tell-tales in the same building or district, to any suitable office having the supervision of the local or auxiliary circuit and of the building or district to which it extends, for example, to an engine house or to an office of the operating company. At said office is provided, preferably, both a visual indicator, such as an annunciator 50, the drop of which is normally held by its magnet, and an audible signal, such as an electrical or electro-mechanical bell, 51. If either of the tell-tales is operated, the annunciator will drop and the number 12 (or whatever number the tell-tale is adapted to send) will be sounded by the bell 51, the full number of times for which the tell-tale signal wheel is set to turn, but if the line 49 is accidentally broken, the annunciator will drop and said bell will sound once only. Further, if the number 12 is sounded once only it indicates a break in line 49 after a tell-tale has been operated, since a normal operation should repeat the number two or more times.

While the operation of this system has been partially indicated in describing the apparatus, it may be briefly set forth as follows: A person desiring to send a fire alarm, presses on the button 19 of one of the sending-boxes 15, closing the circuit across from wire 12 to 13 at plate 22, (the push button being locked in its new position,) energizing magnet 9, attracting its armature and releasing the signal mechanism and opening the circuit at the spring 10. The first closure of the circuit also energizes magnet 25, causing it to attract its armature, moving back the detent 32. Said closure of the circuit also, by short-circuiting the tell-tale magnet, de-energizes the same, releasing the tell-tale signal. The movement of lever 7 at the signal-box and consequent breaking of the circuit, de-energizes the magnet of the return-call, allowing its armature to drop back, thereby releasing the return-call drop, giving a sure indication that the signal-box was properly operated. The falling of the drop of the return-call opens the circuit by leaving spring 34, thus insuring that the signal-box stops after it has sent in its proper alarm and saving the battery, and also leaving the system in condition to be operated from any other sending box. It will be seen that any change in the system, acci-

dental or otherwise, which cuts off the proper current from the tell-tale magnet operates the tell-tale signal.

In Fig. 5 is shown a system in which the local or auxiliary circuit 12, 13 is supplied by current from an electric light or power system 54. The circuit-controller and return-call devices and signal box devices are the same as in Fig. 1. Instead of the form of tell-tale shown in said figure, a simplified form is shown. The tell-tale magnets 38 have armatures 55, normally held against the front stops 56, but adapted to move against the back stops 57 when the local or auxiliary circuit is changed so as to de-energize said magnets. The front and back stops are connected, and the several tell-tale devices are connected in series when more than one is used. At the office is a trouble signal, preferably a bell 58 and an indicator 59, the latter being so constructed that to operate it requires a break, and then a make, of the circuit including the operating magnet 60. 61 is a ratchet engaged by the pawl 62 carried by the pivoted armature 63. When the trouble circuit is broken by one of the armatures 55 moving away from its back stop, armature 63 is raised, causing the pawl to engage a tooth of the ratchet. When said circuit is again closed, by the armature 55 coming against its back stop, magnet 60 is energized, attracting its armature, turning the ratchet and carrying the pointer 64 up to the signal disk 65. If the bell rings and the indicator is operated as described, the person in charge knows that the tell-tale magnet has been affected by one of the circuit-controller and return-call devices. If the bell rings and the indicator is not operated, the person in charge knows that the trouble or tell-tale circuit is accidentally broken, and he can take suitable steps to remedy the defect. The street box can be operated by hand in the usual way if desired, but such operation would at once operate the tell-tale by opening the circuit at spring 10, notifying the attendant of trouble.

In Fig. 6 an arrangement is shown with a single tell-tale magnet, provided with an independent tell-tale or alarm circuit 66 including the bell 67 which may be at any desired place. When the circuit controller and return alarm device 15 is operated, the armature of the tell-tale magnet drops against its back stop and closes the circuit 66, sounding the alarm, the current being supplied from any suitable source. In this case, the alarm is the same, whether the device 15 is operated or whether there is an accidental break in the circuit 12, 13. Hence this arrangement is not as perfect as that above described.

With the arrangement of circuits and devices shown in Figs. 1 and 5, an accidental short circuit between the lines 12, 13, as well as a short circuit caused by operating the circuit-controlling device 15, will release the street or fire alarm box and send a signal over the circuit 3. To prevent this, I may insert

a safety device in a shunt around the working or operating magnet 9' in the street box. Said safety device is similar in construction, preferably, to the return-call already described, and consists of a magnet 70, an armature 71, an arm 72, pivoted in a manner similar to the annunciator drop and having an end 73 extending far enough to bear against the contact spring 74. 75 is a pawl, adapted to engage a pin on the arm 72, to hold it against said contact. 76 is an arm on the armature, which, as the armature moves forward when attracted, strikes the inner end of the pawl 75, moving it back and releasing the arm 72, allowing it to fall back slightly, against said arm 76 but not far enough to break the circuit between the posts 77 and 78, but when the armature falls back to its normal position, arm 72 is released by arm 76 and opens said circuit. The post 77 is connected to one terminal of the magnet 9', and the post 78 to contact 79, thence to spring 80, to the yoke of the magnet, and to the opposite terminal of said magnet. In this modification, the lever 7', by means of which the rod 6' for releasing the signal box is moved, is pivoted above the magnet instead of below, as in Fig. 1, and the adjusting screw and contact spring are carried by said lever 7', instead of being mounted on a stationary arm as in Fig. 1. The local or auxiliary circuit 12, 13, is also connected to these binding-posts 77, 78. With this arrangement of devices, I prefer to use the form of circuit-controller and return-call shown in Fig. 8, in which 81 is an insulating handle, by means of which the switch arm 82 can be moved toward the right or toward the left. In either case, said arm will make contact with the switch-plate 83, connected by a wire to the binding-post 84. As said arm is further moved, it will leave the plate 83, opening the circuit momentarily, and will then make contact with one of the arms 85, connected to the plate 86 and spring 87, which normally rests on the shutter of the return-call, as already described, and will become locked in position by engagement between a pin *p*, on the plate 86, and a dent *q*, on the under side of arm 82. The spindle of the switch device is connected to the binding-post 88, and from the post 84 a branch extends to the magnet of the return-call, through the same to the spring 87. When the switch is first operated, bringing the arm 82 in contact with plate 83, a low resistance short-circuit 83' is closed between the lines 12, 13, cutting out the high resistance tell-tale magnet, and the armature of the magnet 70 is at once attracted, and as the switch arm passes the break between 83, 85, the armature drops back, opening the safety-circuit at the point 74. Then, as the switch arm makes contact with one of the arms 85, the magnet 9' and return-call magnet 25 are energized, releasing the street box and giving the return-call, as already described. With this arrangement, suppose a short-circuit occurs accidentally, as by a cross conductor at

89, the magnet 70 would be energized, and the armature attracted, but the circuit would not be again opened. Hence the armature would not move back to release the circuit-controlling lever 73, and no signal would be sent from the box. Such short-circuit, however, would operate the tell-tale, as already indicated, calling the attendant to correct the defect. It will be seen that it requires a make, break and a second make of the local circuit to operate the street alarm box, and that it is practically impossible for this to happen accidentally, that is, without the operation of the circuit-controller and return-call, thereby insuring against false alarms being sent from the street box.

I do not wish to limit myself to the use of the devices described in any single form of system, nor to the details of the several devices. Any tell-tale or signal device, for example, operated in substantially the manner described, by change in the local or auxiliary circuit controlling the signal-box, would be within my invention, and the particular construction of devices at the signal-box, for releasing or operating it, is comparatively unimportant.

What I claim is—

1. The combination of an alarm or signal box, a magnetic device through the agency of which signals may be sent from said box, a releasing circuit including the said magnetic device, one or more circuit closers connected to said circuit for operating the magnetic device to send signals, means for maintaining the releasing circuit-controller closed when it is operated, and separate means for opening the releasing circuit on operation of the signal box, substantially as described.

2. The combination of a fire alarm or signal box, a circuit including a magnet with an armature through the agency of which a signal may be sent from said box, a circuit breaker operated by said magnet, one or more circuit-controllers adapted to connect the wires of said circuit to energize said magnet, means for holding the same closed when it is operated, one or more return-calls connected to said circuit and constructed to give a signal on the breaking of the circuit at said circuit breaker, and automatic circuit breakers operated by a return call substantially as described.

3. The combination of an alarm or signal box, a magnet and means operated thereby for sending a signal from said box, a circuit including said magnet, one or more circuit-controllers and return-calls in said local circuit, said circuit-controllers having means for connecting conductors of the circuit to energize the magnet at the signal box, a lock or detent for the circuit-controller, and said return-calls having means for opening the circuits closed by said circuit-controllers, substantially as described.

4. The combination of a working magnet, an armature, a circuit including said magnet,

a circuit-controller and return-call in said circuit, said circuit-controller having means for connecting wires of the circuit for energizing the working magnet, and a lock or detent for holding said means to prevent a second movement, and said return-call having means for disconnecting said wires, substantially as described.

5. The combination, in a circuit-controller and return-call, connected or adapted to be connected to a circuit, of a circuit-closer and means for locking it when in one position, and the return-call connected to said circuit-closer by a suitable circuit-closing spring or device, and means operated by the return-call for breaking the circuit at said spring or device, substantially as described.

6. The combination of a circuit-closer, a lock for holding it when it is pushed in, a return-call magnet, armature and shutter, the latter being in connection with a spring or device connected to said circuit-closer, a detent engaging the shutter but adapted to be disengaged by movement of the armature, and a stop for the shutter moved by the armature, substantially as described.

7. The combination of an alarm or signal box, a magnetic device at said box for operating it to send the signal, a normally closed releasing circuit including said device and the working generator or source of current adapted to operate said magnetic device and having suitable circuit-controllers, a tell-tale or signal magnet also connected to said circuit, and a trouble signal controlled thereby, substantially as described.

8. The combination of an alarm or signal box, a magnetic device at said box for releasing or operating it to send the signal, a circuit including said device and having suitable circuit-controllers, a tell-tale or signal magnet in said circuit, and a trouble signal in a separate circuit and constructed to indicate the district where trouble exists, substantially as described.

9. The combination of a working magnet and armature, a single circuit including said magnet, and having a working generator permanently furnishing current thereto a high resistance magnet in the same circuit, means for changing the circuit to energize the first magnet, and a signal in an independent circuit operated through the medium of said high resistance magnet by said change, substantially as described.

10. The combination of a closed circuit, a working magnet and a tell-tale or signal magnet included therein, the latter being normally sufficiently energized to hold its armature, a circuit-controller between the latter magnet and the source of current for said circuit, adapted to short-circuit said tell-tale magnet, whereby when said circuit-controller

is operated, the working magnet is energized and said signal or tell-tale magnet is de-energized, substantially as described.

11. The combination of a normally closed circuit, including a working magnet normally not sufficiently energized to operate, and a second magnet normally receiving sufficient current to hold its armature, a circuit-controller between the source of current and the latter magnet, and a signal controlled by said latter magnet, substantially as described.

12. The combination of a circuit, a working magnet therein, a normally closed short-circuiting or shunting device around the working magnet, said device requiring more than a single energization of the magnet—for example, an energization and then a de-energization—to open the short-circuit, substantially as described.

13. The combination with a working magnet, of a short-circuiting device therefor having a magnet and armature, a circuit-closing arm or device, a holding device therefor, means operated by the armature when moving in one direction for disengaging said holding device but retaining the short-circuit closed, said means releasing the circuit closing arm or device on the return movement of the armature, substantially as described.

14. The combination with a working magnet, of a circuit including the same, a circuit-controller and return-call device connected to said circuit, said circuit-controller being constructed to make three changes of the circuit, and a safety device for said working magnet, said safety device being first operated and then the working magnet being operated by the changes in the circuit, substantially as described.

15. The combination, in a circuit-controller and return-call device, of the return-call magnet and armature, the circuit breaker controlled thereby, a switch so constructed and connected as to short-circuit said magnet, then to open the circuit between the terminals of the device and finally to close the circuit through said return-call magnet, substantially as described.

16. The combination of a switch having contact devices 83, 85 and co-operating switch-arm, the former contact being connected to one terminal of the device and the switch-arm being connected to the other terminal thereof, the return-call magnet, armature and drop, and the spring or arm for connecting said drop with the contact 85, substantially as described.

This specification signed and witnessed this 21st day of June, 1892.

JOSEPH SACHS.

Witnesses:

CHARLES M. CATLIN,
GEORGE B. BUCHANAN.