(No Model.)

L. B. FIRMAN.

POLICE AND FIRE ALARM SIGNALING APPARATUS.

No. 470,666. Patented Mar. 15, 1892.

Fig 1

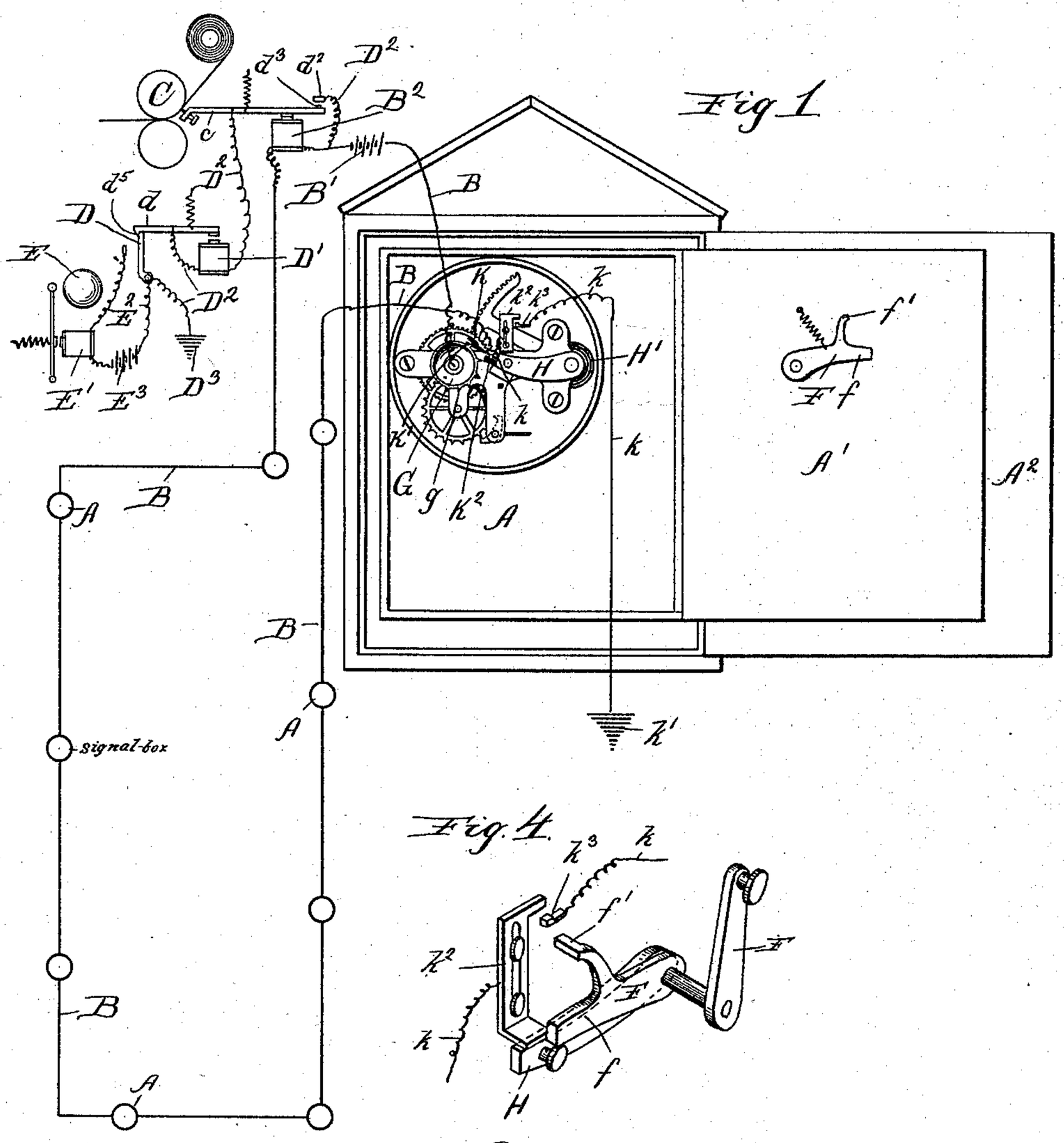


Fig. 4.

Fig. 2.

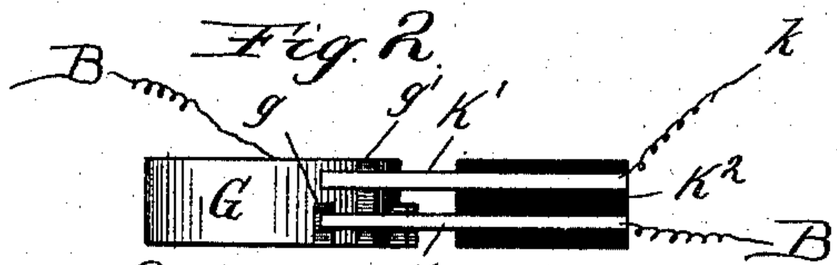
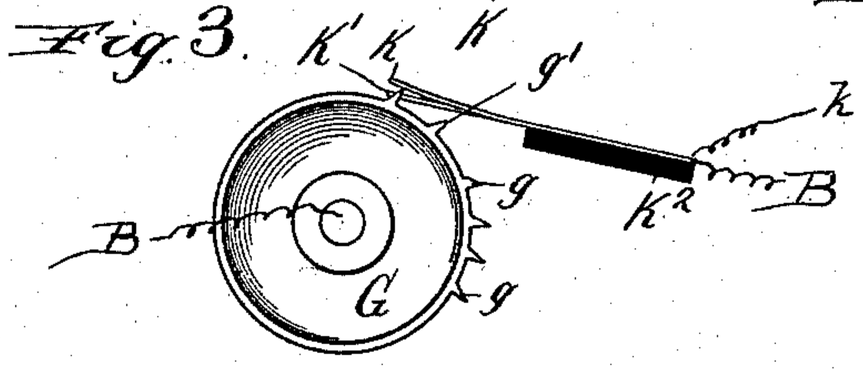


Fig. 3.



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UNITED STATES PATENT OFFICE.

LEROY B. FIRMAN, OF CHICAGO, ILLINOIS.

POLICE AND FIRE-ALARM SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 470,666, dated March 15, 1892.

Application filed April 1, 1889. Serial No. 305,571. (No model.)

To all whom it may concern:

Be it known that I, LEROY B. FIRMAN, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Police and Fire-Alarm Signaling Apparatus, of which the following is a specification.

My invention relates to multiple signal-boxes designed to send warning or emergency signals, and also the usual or customary police-signals.

The state of the art to which my invention relates is indicated by the system or apparatus shown and described in the patent to Watkins, No. 172,219, dated January 11, 1876.

The object of my invention is to provide a signal-box and central-office apparatus of a simple and efficient character, entirely automatic in its operation, and which will always operate with certainty to send warning or emergency signals, each box momentarily making its own earth connection at the instant of sending the warning or emergency signal, such earth connection being immediately thereafter broken or removed, so that the use of any signal-boxes in the circuit will not be interfered with. It will be understood that it is of the utmost importance to the efficient working of any police signaling system or apparatus that there be little or no uncertainty, that the emergency signal should be properly transmitted and received, and that the apparatus provides against every contingency for the failure of such signals in the hands of unskilled persons.

My invention consists, essentially, in a police electric signaling system having the usual metallic circuit, including a battery and transmitting and receiving instruments, in combination with an earth-branch circuit at the signal-box or transmitting-instrument, which is adapted to be connected with the metallic circuit by the operation of the transmitting-instrument in sending the special or warning signal and then immediately disconnected, there being also another or second earth-branch circuit at the central office, which is connected with the metallic circuit by the operation of a relay or magnet included in such metallic circuit whenever the latter is interrupted. This second earth-branch circuit, or the one at the central office, is furnished with an electro-magnet device—such as an annunciator-drop, for example—which operates when energized electrically to immediately open or disconnect this second earth-branch circuit. By this means each signal-box or transmitting-instrument operates momentarily to make its own earth connection at the instant of sending the special or warning signal, the same being at once broken thereafter and the earth connection at the central office being also broken or disconnected the instant the alarm-bell or signal apparatus is set in operation, so that the metallic circuit and signaling apparatus are instantly restored and left in their normal condition free from earth connections immediately after the emergency signal is transmitted and received and before the signal-wheel begins to give the box-number or other signal.

It also consists in the novel devices and novel combinations of parts and devices herein shown and described, and more particularly pointed out in the claims.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 shows a side elevation of a signal box and apparatus or system of circuits embodying my invention. Fig. 2 is a detail plan view of the circuit or signaling wheel. Fig. 3 is a side elevation of the same. Fig. 4 is a detail perspective view of the device for making the ground connection at the signal-box when the signal is being sent and breaking it thereafter.

In the drawings, A represents a signal-box or transmitting-instrument of any ordinary or usual construction, which, with other like boxes or instruments, is connected in the main circuit B in the usual way.

C represents the receiving or registering instrument at the central station for receiving and registering the different signals.

D is an annunciator-drop or its equivalent, and E an alarm bell or device to give the warning or emergency signal at the central station. The box A has the usual inner door A′, which may be opened by the policeman with the key provided for the purpose, upon which door is journaled or mounted the usual operating-lever or crank-shaft F, by which the signal-

wheel G of the transmitting-instrument may be operated by a citizen to send special or warning signal without opening this inner door. The box is also furnished with the customary starting-lever or crank-shaft H inside the door A′, which is designed to be operated solely by the officers or persons authorized to open this inner door A′, and who are furnished with keys for the purpose. When the operating-lever or crank-shaft F is moved to send a special or warning signal, its inner arm *f* engages the starting-lever H, and thus turns the signal-wheel G of the transmitting-instrument.

B′ represents the battery for the main circuit B; B^2, the relay or magnet for operating the pencil or registering-lever *c* of the registering apparatus C, and by which, also, the earth branch D^2 at the central station is closed when the metallic circuit B is interrupted.

D′ is the magnet for operating the annunciator-drop lever *d*, the same being included in the earth-branch circuit D^2 at the central office, and E′ is the magnet in the local circuit E^2, operated by the local battery E^3 for operating the alarm-bell E when the circuit E^2 is closed by the annunciator-drop D. The earth branch D^2 is closed at $d^2\,d^3$ by the movement of the armature-lever *c* whenever the metallic circuit B is interrupted—that is to say, opened or closed—opened if it is arranged normally closed, or closed if it is arranged normally open. The signal-wheel of the transmitting-instrument is furnished with a series of signaling-teeth *g*, constructed in the usual way to transmit any signals desired. The signal-wheel G is also furnished with one tooth or cog *g′*, which is longer or wider than the others and extends, preferably, the full width of the signal-wheel, as is clearly indicated in Fig. 2.

K K′ are two contact pieces or springs secured to an insulating-support K^2, one of which K forms part of the main circuit B. The contact finger or spring K′ forms part of an earth-branch circuit *k* at the signal-box or transmitting-instrument and leading to the earth at *k′* through the movable contact-piece k^2 and fixed contact k^3. The movable contact-piece k^2 is mounted to move or slide on the signal-box A or on the frame-work of the signaling apparatus, and it is adapted to be operated by an arm *f′*, connected with the operating lever or hook F, which is pulled down to send the special or warning signal. The movement of the operating-lever or crank-shaft F rotates the signal-wheel and at the same time actuates the sliding contact-piece k^2 to close the earth-branch circuit *k*, and thus connect the box with the earth, so that when the signal-wheel G is rotated sufficiently to bring its long signal-tooth *g′* under the contact-springs K K′ the signal-box will be connected with the registering mechanism and annunciator-drop magnet at the central station. As the signal-wheel G revolves, the spring-contact K′ of course breaks connection with the long tooth *g′* and thus cuts out the earth branch *k* almost at the very instant that it is made. The movable contact-piece k^2 is also returned to place by the backward movement of the starting-lever H, which is returned by the main spring H′ of the transmitting-instrument, so that the earth connection is here broken to prevent the repetition of the emergency signal and to prevent the earth connection interfering with other signals on the line when the signal-wheel is revolved from the inner lever H. It will be understood that to send the emergency signal through the main circuit B and annunciator-branch circuit D^2 only a momentary closing of the circuit is required, as a single impulse given to the annunciator-drop lever *d* will release the drop D, close the alarm-circuit E^2, and set the alarm-bell to ringing. The annunciator branch circuit D^2 has a ground connection at D^3, and when the ground branch *k* is connected with the main circuit B by the movable contact k^2 and by the long tooth *g′* and spring contact-piece K′ it will be observed that the box is connected in a closed circuit with the annunciator-drop magnet D^2, and the moment the annunciator-drop is released this earth circuit is broken at d^5 and the alarm-circuit E^2 closed by the movement of the drop D. The ground branch *k* at the transmitting-instrument or signal-box, and also the ground branch D^2 at the central office, it will be observed, are by my invention both broken before the signal-wheel G begins to send the signals by the passage of the signaling-teeth *g* under the contact-spring K. As the ground connection, which is employed for certainty in sending the emergency signal, is instantly broken or removed the moment the emergency signal is transmitted, this instantaneous ground connection will not interfere with the simultaneous operation of other like boxes on the main circuit. The annunciator-drop branch D^2 is preferably arranged normally open at $d^2\,d^3$, the movement of the registering-lever *c* closing this branch at $d^2\,d^3$ when the main circuit B is first opened or broken by the rotation of the signaling-wheel. The closing of the annunciator-drop branch may, however, be effected by the closing, instead of the breaking, of the main or metallic circuit B, according as such circuit is normally open or closed.

The operation is as follows: Opening the outer door A^2 of box A discloses the hook or pull F, which when pulled down engages with the starting-lever H and sliding ground-plate k^2 inside of the inner door A′, and thus rotates the circuit-wheel G, Fig. 2, thereby opening the circuit B at K before the tooth *g′* comes in contact with both fingers K K′, and thus connecting the earth branch D^2 at $d^2\,d^3$ with the metallic circuit B by releasing the armature-lever *c*. It will readily be seen that thus opening the circuit B for an instant and releasing the armature-lever *c* of the register C in the central office connects the earth

branch D^2 to earth through the contacts d^2 d^3 and annunciator-drop D, which earth branch D^2 is disconnected by the movement of the drop D the instant the circuit is established through the earth-branch k by the fingers K K′ in the box A coming in contact with the tooth g' on the signal-wheel G, and thus establishing the other earth connection through the branch k, which is now closed at k^2 k^3. The earth branch k is in turn disconnected by the rotation of the wheel G, leaving the line in its normal condition free from earth connection before starting to give the box-number, and when the arm H returns it opens the branch k at k^2 k^3.

I claim—

1. In a police electric signaling system, the combination, with a metallic circuit, including a battery and transmitting and receiving instruments, of an earth-branch circuit, said transmitting-instrument being provided with mechanism for connecting and immediately disconnecting said branch with said metallic circuit by the operation of said transmitting-instrument prior to its sending the number-signal, a relay in the metallic circuit operating whenever said metallic circuit is interrupted to connect said metallic circuit with a second earth branch at the central office, said second earth branch including an electro-magnetic device which, when energized electrically, operates to open said earth-branch circuit at the central office, substantially as specified.

2. In a police electrical signaling system, the combination, with a metallic circuit having included therein a battery, a receiving or registering instrument, and a signal-box or transmitting-instrument, of an earth-branch circuit at the signal-box or transmitting-instrument, a movable contact-piece included in said earth branch, means for operating said movable contact-piece to close said earth branch by the movement of the operating lever or hook of the signal-box, and a contact finger or spring operating, in conjunction with the signaling-wheel of the box, to connect and immediately disconnect said earth branch with said metallic circuit before the sending of the signal, so that said earth-branch connection may not interfere with the transmission of signals over the line by reason of said main line being connected with the ground, substantially as specified.

3. In a police electric signaling system, the combination, with a metallic circuit, including a battery and transmitting and receiving instruments, of a relay in the metallic circuit, operating whenever the current in said circuit is interrupted to connect said metallic circuit to earth through a branch, including an electro-magnetic annunciator-drop device, which, when energized electrically, operates to open the circuit of the said branch, substantially as and for the purpose described.

4. In a police electrical signaling system, the combination, with a metallic circuit having included therein a battery, a receiving or registering instrument, and a signal-box or transmitting-instrument, of an earth-branch circuit at the signal-box or transmitting-instrument, a movable contact-piece included in said earth branch, means for operating said movable contact-piece to close said earth branch by the movement of the operating lever or hook of the signal-box, and a contact finger or spring operating, in conjunction with the signaling-wheel of the box, to connect and disconnect said earth branch with said metallic circuit, a second earth branch at the central office or receiving-instrument having included therein an annunciator-drop, said second earth branch being closed by a relay operating when the current is interrupted in said metallic circuit and then immediately broken or disconnected by the drop, substantially as specified.

5. In a police signaling system, the combination of metallic circuit B, having magnet B′, battery B^2, and signaling-wheel G, furnished with signal-teeth g and long tooth g' included therein, contact fingers or springs K K′, earth-branch circuit k, having contact-piece k^3 and movable contact-piece k^2 included therein, starting-lever H, operating-lever F, having arm f engaging said lever H, and arm f' engaging said movable contact-plate k^2, earth branch D^2, having annunciator-drop D and magnet D′ included therein, and armature-lever c, operating to close said earth branch D^2 at d^2 d^3, substantially as specified.

6. In a police electric signaling system, the combination, with a metallic circuit having included therein a battery, a receiving-instrument, and a signal-box or transmitting-instrument, of a ground branch at the signal-box, mechanism for connecting and immediately disconnecting said ground branch with said metallic circuit by the operation of said transmitting-instrument prior to the transmission of the signal, and a second ground branch at the central office or receiving-instrument having included therein an electro-magnetic annunciator-drop device for opening or disconnecting such ground branch the instant the same is electrically energized, the armature-lever of said receiving-instrument at the first impulse thereof closing said ground branch at the central office, substantially as specified.

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Witnesses:
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