

(No Model.)

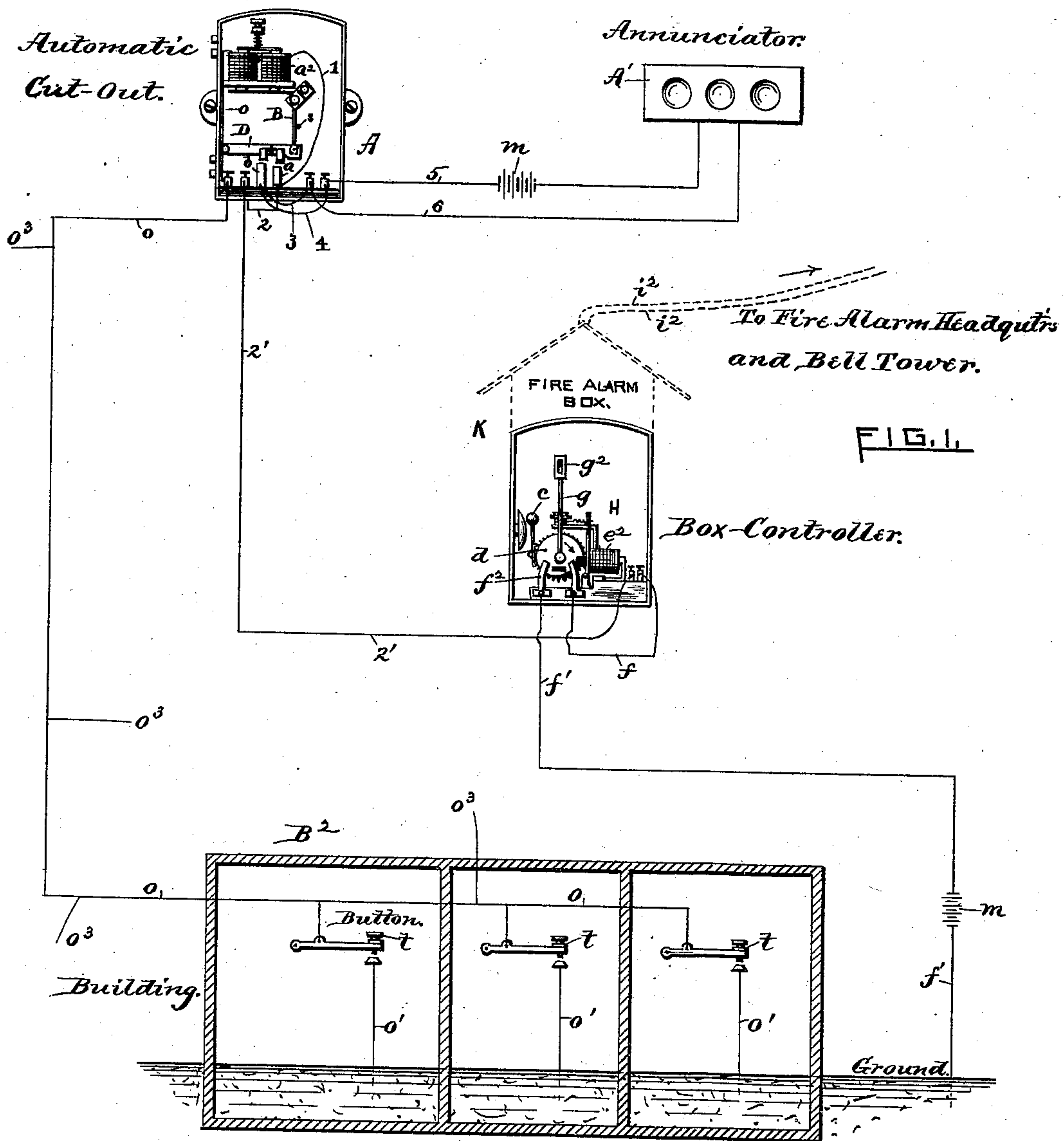
2 Sheets—Sheet 1.

C. D. ROGERS.

AUTOMATIC CUT-OUT FOR FIRE ALARM BOX CONTROLLERS.

No. 375,569.

Patented Dec. 27, 1887.



WITNESSES.

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(No Model.)

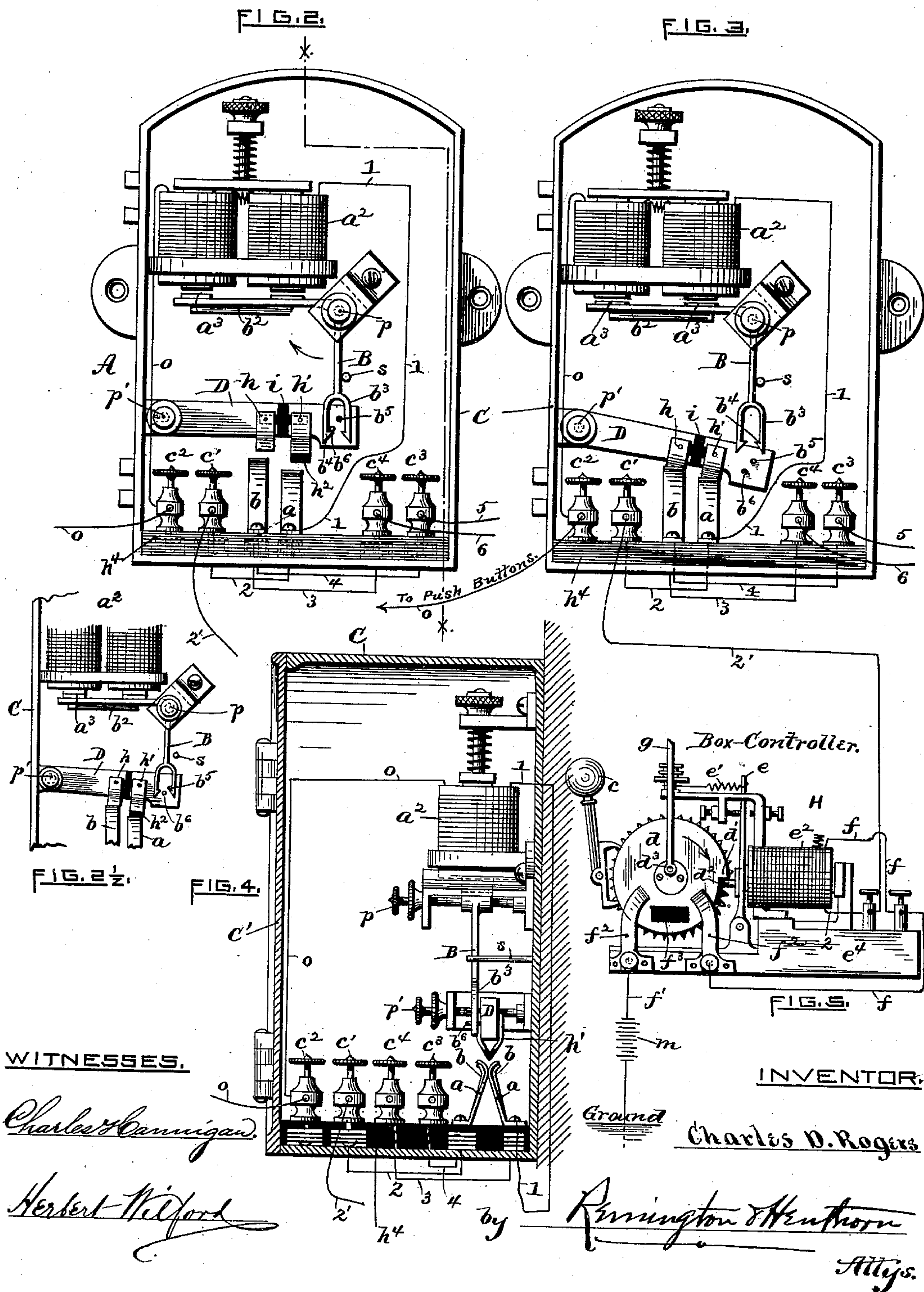
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UNITED STATES PATENT OFFICE.

CHARLES D. ROGERS, OF PROVIDENCE, RHODE ISLAND.

AUTOMATIC CUT-OUT FOR FIRE-ALARM-BOX CONTROLLERS.

SPECIFICATION forming part of Letters Patent No. 375,569, dated December 27, 1887.

Application filed May 11, 1887. Serial No. 237,825. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. ROGERS, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Automatic Cut-Outs for Fire-Alarm-Box Controllers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as 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 or figures of reference marked thereon, which form a part of this specification.

My present invention relates to fire-alarm systems, more particularly, however, to the class which includes a "district-box" or "fire-alarm" station electrically connected with a main signal or alarm station. District boxes of this type are sometimes provided with auxiliary mechanism termed "box-controllers," which also are electrically connected and form a part of a local or sub-circuit system. By means of the box-controller a person at a distance may send in an alarm by pressing an electrically-connected key or push-button, thereby causing the box-controller to actuate the releasing mechanism of the district-box; the action of the box-controller being in effect the same as in the case of a person standing at the box itself and manipulating the hand-lever thereof. After the alarm has been sounded the mechanism within the box automatically resumes its normal position—i. e., in condition for another alarm. An apparatus of this character is very clearly set forth and claimed in my United States Patent No. 340,618, of April 27, 1886.

It is obvious, in the event of there being quite a number of sub-stations or contact-points located in one local circuit, and all connecting with the same box-controller, that possible confusion may be caused by unnecessarily-repeated alarms being sent in from different quarters, but all announcing the same fire.

The object of my invention herewith is to provide a "cut-out" for each box-controller, the latter being so connected therewith that the action of the box-controller, as in releasing the box mechanism to send out an alarm, au-

tomatically switches off or breaks the local-line current, thereby preventing another alarm from being sent in until the cut-out mechanism is reset or again returned to its normal position; also, by means of the action of the cut-out mechanism, a local-alarm gong, or annunciator electrically connected therewith, is adapted to indicate the source of the alarm.

To produce an automatically-operating cut-out the present invention consists, essentially, in the combination, with the box-controller having an electrically-connected circuit-breaking device, of a cut-out box carrying electromagnets, a pivoted lever carrying the armature of said magnets, mechanism adapted to be released by the action of the armature-lever, and connections electrically uniting the box-controller, local circuit, and cut-out box.

The invention further consists in the combination of a locally-connected box-controller, mechanism adapted to automatically cut out or break the electric circuit therefrom, and a local alarm or annunciator electrically connected with the cut-out box, all as will be more fully hereinafter set forth and claimed.

In the accompanying two sheets of drawings, Figure 1, Sheet 1, represents a general view of the system complete, the same embodying a fire-alarm box provided with a box-controller electrically connected with an automatically-operating cut-out, which in turn is electrically connected with a series of local or sub stations. As drawn, the several figures represent an "open ground-circuit." Fig. 2, Sheet 2, is a front view of my improved cut-out, (the cover being removed,) showing the several parts in their normal positions, ready to transmit a current of electricity through the several conducting-wires, &c., as in sending out an alarm. Fig. 2¹ is a similar view, reduced, showing the position of the armature-carrying lever, &c., during the time in which a current is passing through the magnets, as in sounding an alarm through the medium of the box-controller. Fig. 3 is a similar view of the cut-out after the current has ceased, the weight of the armature, &c., returning the lever to its normal position, thereby at the same time fully releasing the switch or current-breaking lever and allowing it to fall to its limit. Fig. 4 is a vertical transverse sec-

tional view taken through the line $x x$ of Fig. 1; and Fig. 5 is a detached view, in elevation, of a box-controller adapted to be mounted in a fire-alarm box, and also shown connected with the cut-out, Fig 3.

The following is a detailed description of the invention, including the manner of its operation:

A, referring to the drawings, designates the cut-out box as a whole, C being a box or housing adapted to be secured to a building or other location, as may be deemed most desirable. The front of the box is provided with a door, as C'. Within the box is mounted a pair of electro-magnets, a^2 , having the armature a^3 thereof secured to an arm, b^2 , of a counter-weighted bell-crank lever, B, which is pivoted at p to the box. The other or vertical arm of the armature-carrying lever is forked at its lower end, b^3 , and terminates in the oppositely-arranged beveled hooks b^4 , a stop, s , serving to limit the rearward movement of the lever, all as clearly shown. A current-breaking lever, D, is pivoted at p' to the side of the box C, the free end of said lever D being provided with pins $b^5 b^6$, the latter pin serving, when resting upon the adjacent hook b^4 , to retain the lever in its normal suspended position. The current-breaking lever consists of two pieces of metal made somewhat heavy, so as to readily drop when released, a piece of insulating material, i , as vulcanite, uniting the two portions thereof.

Immediately adjacent to the vulcanite are secured to the lever the two downwardly-extending V-shaped metallic pieces $h h'$, the latter being tipped with non-conducting material, as h^2 . Below said pieces $h h'$ are secured to the insulated base h^4 of the box the two sets of spring metal electric connections $a b$, the same being separated at their lower ends, (see Fig. 4,) the upper or free ends of each set being oppositely bent or curved in an outward direction, so as to readily receive each its respective V-piece when the lever D is released from the armature-lever. The first or outer set of connections, a , are adjusted so that their upper adjacent faces are always in contact with each other while in the normal position, the outer or second set, b , on the contrary, being normally separated. To the said insulated base h^4 are mounted the four binding-posts $c' c^2 c^3 c^4$.

H indicates the box-controller or local-circuit motor, as a whole, the same, as drawn, being substantially as described and claimed in my said Patent No. 340,618, hereinbefore referred to, d being a stop-disk adapted to be actuated by means of a spring mounted on its arbor. The disk is provided with a notch, d' , which abuts against a stud or pin, d^2 , mounted upon an armature-lever, e , which in turn is kept normally locked by a tension-spring, e' , the vibrating ball-escapement c , &c., serving to limit or govern the speed of the arbor and its connections when free to rotate. The stop-disk is further provided with a crank-pin, d^3 ,

to which the link g is connected, the upper end of the link being elongated and connected with the free end of the releasing or spring lever g^2 , Fig. 1, of the alarm-box K, the latter being, say, of the "Gamewell" type, the action of the whole being controlled by the electro-magnets e^2 , the coils of which are connected with the circuit-wires $2'$ and f , as will be hereinafter described. Metallic brushes f^2 , secured to the base e^4 of the box-controller, serve, in connection with the respective conducting-wires $f f'$, leading thereto, to electrify the metallic disk d , a piece of non-conducting material—as rubber f^3 —mounted in the face of the disk (see Fig. 5) serving to break the current during a revolution thereof. The electric connections, as drawn, are adapted to form an open ground-circuit corresponding to the arrangement shown in Fig. 1.

I would state in passing that in order to avoid possible confusion in tracing out the several connections I have purposely widely separated the devices.

B² indicates (sectionally) a building in which are mounted three circuit-keys, t , or contact-points adapted to be "grounded" by the wires o' , the helices of the electro-magnets a^2 of the cut-out being connected with said keys by a circuit-wire, o , and the interposed binding-post c^2 . Leading from the said magnets a^2 is a wire, 1, which connects with the rear half of the switch a , (see Fig. 4,) the front half of the switch being connected with the binding-post c' by means of the wire 2. Leading from the latter binding-post is a wire, $2'$, which is conducted to and connected with the coils of the electro-magnets e^2 of the box-controller, and from which a wire, f , electrically connects the stop-disk d through the medium of a spring clip or brush, f^2 , the circuit being completed by a return-brush, f^2 , battery m , and ground-connections f' . The other switch or connection, b , is united, rear and front, with the binding-posts $c^4 c^3$ by the wires 3 and 4, respectively. Leading from said latter posts wires 6 and 5 and battery m electrically connect an alarm or annunciator, as A'. (See also Fig. 1.)

It is evident that a number of local circuits may be connected, as at o^3 , with the wire o , all, however, leading to the same cut-out and box-controller.

The action of the devices, as in sending in an alarm, is substantially as follows: A circuit-closing key, t , is first depressed into engagement with a grounded wire, o' , thereby exciting the magnets a^2 , the electric current passing therefrom through the conductor 1 and switch a of the cut-out, and thence through the conductors $2 2'$ to the box-controller, thereby at the same time exciting the magnets e^2 and withdrawing the stop d^2 (against the tension of the spring e') from the notch d' of the spring-restrained stop-disk, thus permitting the latter to complete one revolution, which movement depresses the free end of the hand-lever g^2 of the fire-alarm box, thereby releasing the mechanism so as to send out an alarm

therefrom through the conductors i^2 to a suitably-connected headquarters station and bell-tower. As the stop-disk d commences to revolve, the insulated portion f^3 thereof engages the outer brush, f^2 , thereby, through the medium of the ground-wire f' and battery m , breaking the current and permitting the spring e' to return the armature and stop d^2 to their normal position and preventing the disk from further axial movement at the end of its revolution. At the same time the ball-escapement c is adapted to announce a local alarm at the fire-alarm box. (See Fig. 1.) During the foregoing passage of the electric current the automatic cut-out operates substantially as follows: The magnets a^2 attract the armature a^3 , thereby vibrating the lever B to its limit, which movement releases the switch-lever D. The latter, now, in falling is arrested by the pin b^5 , which engages the outer hook, b^4 , of the armature-lever. (See Fig. 2.) At the instant the current becomes broken by means of the revolution of the stop-disk just described the armature-lever B automatically (by gravity) returns to its normal position, resting against the stops. (See Fig. 3.) During this latter movement of the lever the suspended switch-lever D is released, which in falling to its limit forces the V-shaped pieces h' thereof into engagement with the connections a b , respectively, as shown in Fig. 3. The lever D in falling forces the insulated tip h^2 of the V-piece h' between the adjacent faces of the connection a , thereby breaking the continuity of the circuit and preventing another alarm from being transmitted to the box-controller through the medium of the cut-out until the switch-lever D thereof is reset. While the said lever D is depressed, as shown in Fig. 3, the other V-piece, h , (separated from its fellow, h' , by the non-conducting material i ,) serves to make a temporary metallic connection by reason of its engagement with the two parts of the normally-separated pieces b . It will be noticed that wires 3 and 4 connect the pieces b , which in turn connect with binding-posts c^4 c^3 , having respectively conducting-wires 6 and 5 leading therefrom to a suitable annunciator and battery, and forming a secondary electric circuit which is adapted to be closed by the V-piece h , as just described. This arrangement is employed to cause an annunciator, as A' , Fig. 1, to indicate, by a gong or other suitable device connected therewith, the source of the fire-alarm, the gong, while the circuit is closed, being continuously sounded until the lever D is reset, the latter operation being preferably performed by a person whose duty it is to look after the several apparatuses in his district.

While the lever D is performing its main function—i. e., in causing the V-pieces to engage the upper ends of the spring-switches a b —it is evident that another alarm cannot be sent out from the fire alarm box K through the medium of the same electrically-connected cut-out, although in no wise preventing the

lever g^2 from being operated at the box itself for the purpose by hand, as usual.

Having thus described my invention, what I claim, and desire to secure by United States Letters Patent, is—

1. The combination of a signal-box, an electrically-connected box controller or motor, and an automatically-operating cut-out located in a circuit provided with means for breaking the electric current flowing to (or from) the box-controller, and sub-stations or keys, as t , electrically connected with said cut-out, substantially as hereinbefore described, and for the purpose specified.

2. The combination of an electrically-connected fire alarm box provided with an electrically-connected box-controller which embodies mechanism and electro-magnets for operating the fire-alarm box, as in sending out an alarm, a suitably-located and electrically-connected cut-out embodying electro-magnets, and mechanism for breaking the electric current flowing to the electro-magnets of the box-controller, and one or more sub-stations or contact-points, as t , adapted in their operation to excite the cut-out magnets, &c., substantially as hereinbefore described, and for the purpose specified.

3. The combination of an electrically-connected fire-alarm box provided with means for operating it by hand, an electrically-connected box-controller mounted within said fire-alarm box and connected with the operating-lever thereof, one or more local electric circuits provided with contact-points, as t , a cut-out located intermediate of said box-controller and contact-points and electrically connected with the same, the cut-out being constructed whereby, in exciting the electro-magnet thereof, the action of the armature after the current has released the box-controller mechanism releases a switch-bar, thereby automatically breaking the continuity of the current flowing to the box-controller and preventing another alarm from being sent out from a sub-station until the switch-bar has been reset, substantially as hereinbefore described.

4. The combination, with an electrically-connected box controller or motor adapted to release a signal-box mechanism, of an automatically-operating cut-out consisting of electro-magnets connected with sub-stations, a loosely-mounted current-breaking lever, an armature normally supporting said lever, and a spring-connection, as a , electrically connected with and actuated by said box-controller, whereby the action of the latter, as in transmitting an alarm, also releases the cut-out mechanism, thereby breaking the continuity of the electric current and preventing another alarm from being transmitted until the cut-out is reset, substantially as described.

5. The combination of an electrically-connected fire-alarm box, an electrically-connected box-controller mounted therein, adapted to mechanically release the fire-alarm mech-

anism, a cut-out electrically connected with the box-controller, and local or sub stations, as *t*, connected with the cut-out, all arranged and operating substantially as hereinbefore described, and for the purpose specified.

6. The combination, with a fire-alarm box having a box controller or motor mounted therein, of the cut-out, substantially as hereinbefore described, having a mounted switch-lever, electro-magnets connected with sub-stations, an armature-carrying lever, and metallic connections, as *a*, adapted to electrically unite said magnets and box-controller, for the purpose specified.

7. The cut-out hereinbefore described, consisting of the combination of electro-magnets, an armature-carrying lever, spring-connections, as *a*, a pivoted switch-lever normally suspended by the armature-carrying lever, and having an insulated wedge-piece adapted in falling to break the continuity of the current, and wires for conducting an electric current from a sub-station to the electro-magnets, thence to the said spring-connections, and, finally, to a box-controller located in the circuit, substantially as described, and for the purpose specified.

8. The combination of an electrically-connected cut-out provided with spring-connections *a b*, a pivoted switch-lever adapted to engage said spring-connections, a pivoted armature-carrying lever having means for suspending the free end of the switch-lever, a

fire-alarm box provided with a box-controller electrically connected with said cut-out, adapted to release the alarm mechanism, and also adapted in its action to release the switch-lever, thereby breaking the continuity of the current, and an annunciator located in an independent circuit adapted to indicate or sound the alarm by means of the engagement of the switch-lever with the spring-connection *b*, substantially as hereinbefore described.

9. The combination, with a mounted and electrically-connected box-controller provided with mechanism for releasing the operating-lever, as *g*², of a fire-alarm box, and a current-breaking device, of an automatic cut-out having electro-magnets electrically connected with local or sub stations and the said box-controller, and having a switch-lever connected with the armature, whereby the latter, as in closing the circuit, partly releases the switch-lever, which is subsequently fully released by the action of said circuit-breaking device, thereby causing the lever to fall and preventing the repetition of an alarm being sent in through the medium of the cut-out until the switch-lever is reset.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES D. ROGERS.

Witnesses:

CHARLES HANNIGAN,
GEO. H. REMINGTON.