

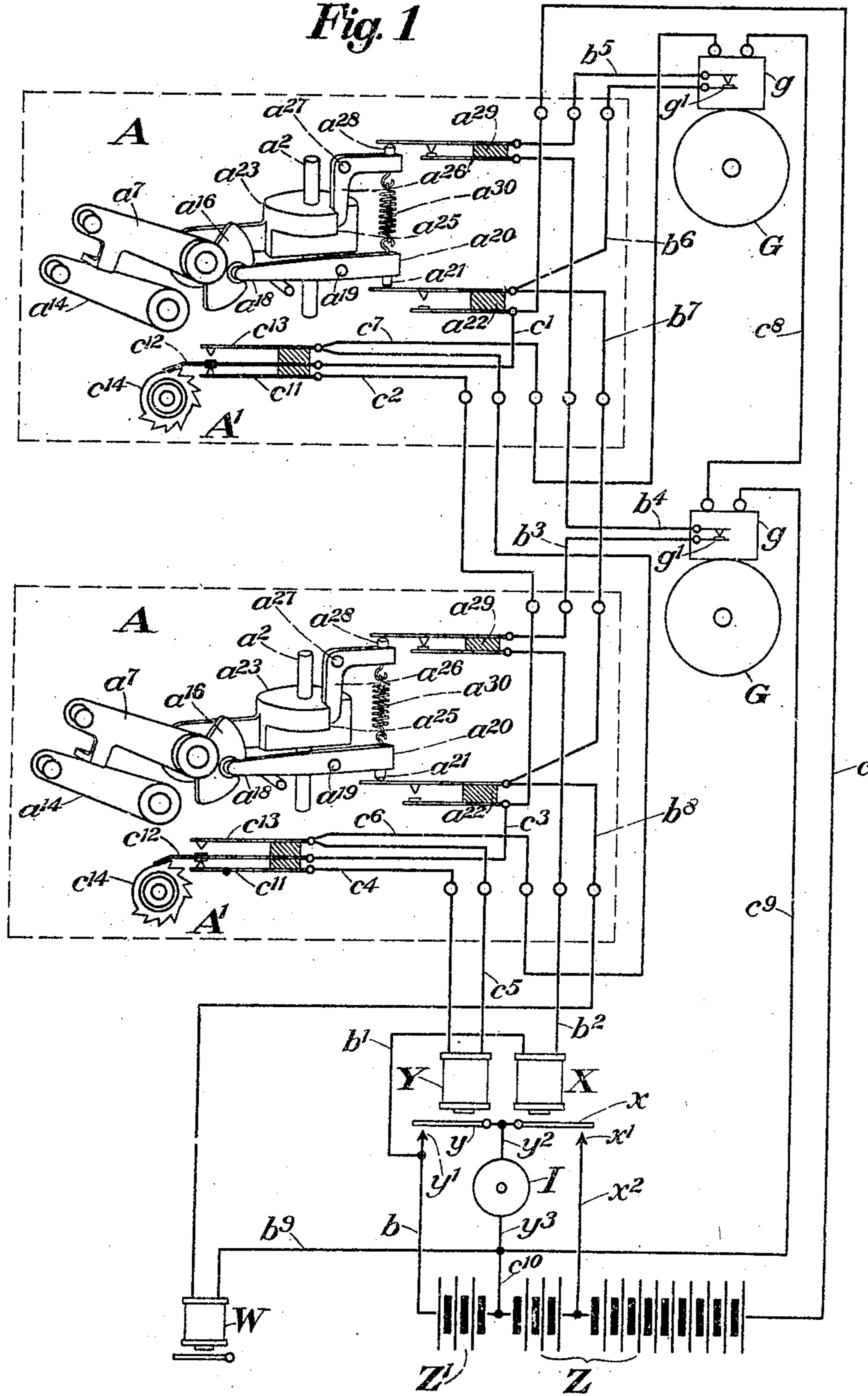
B. B. HATCH.  
FIRE ALARM SIGNAL SYSTEM.  
APPLICATION FILED JULY 15, 1908.

917,061.

Patented Apr. 6, 1909.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses

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*H. C. Bowser*

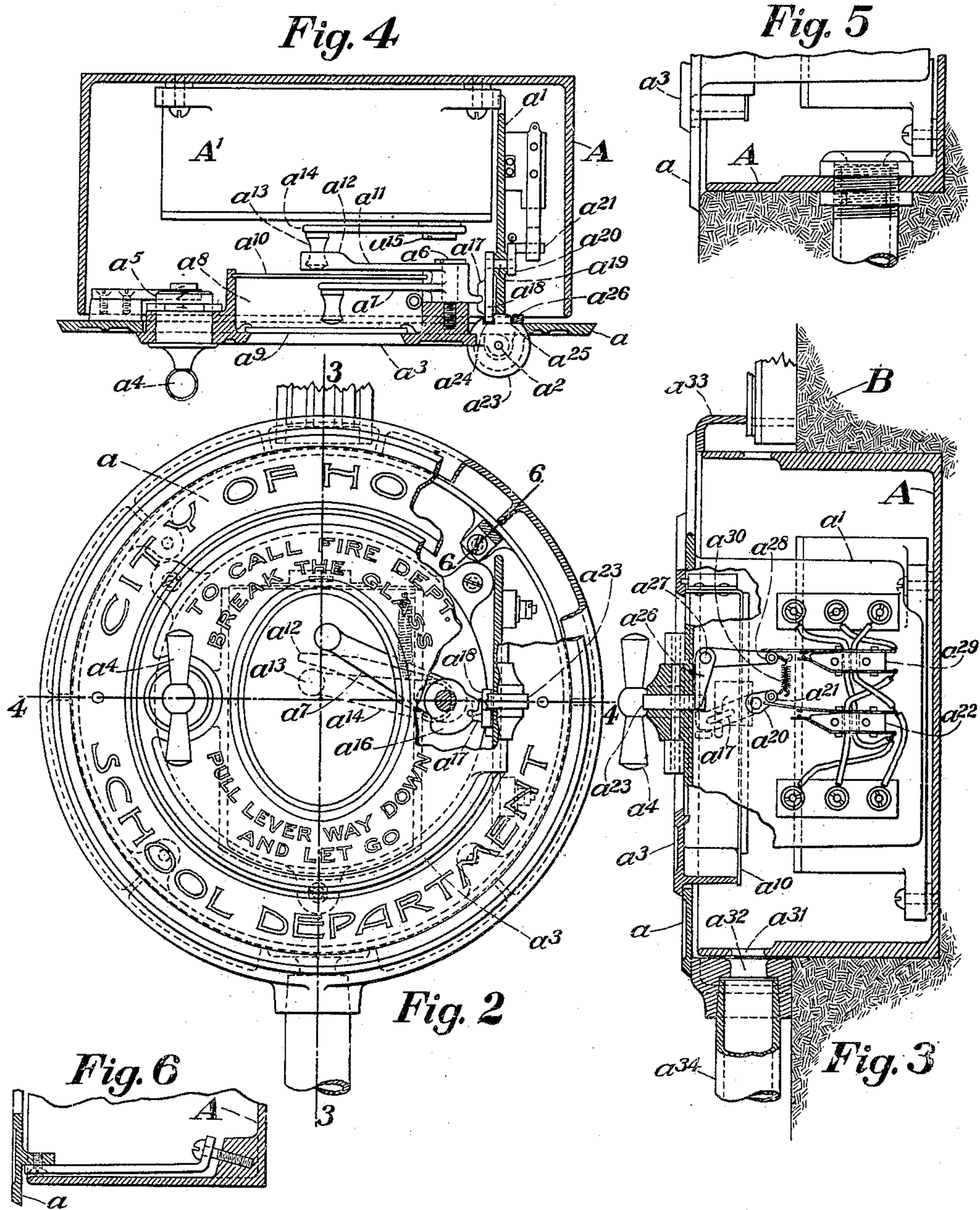
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# UNITED STATES PATENT OFFICE.

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## FIRE-ALARM SIGNAL SYSTEM.

No. 917,061.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed July 15, 1908. Serial No. 443,729.

*To all whom it may concern:*

Be it known that I, BENJAMIN B. HATCH, a citizen of the United States, and resident of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Fire-Alarm Signal System, of which the following is a specification.

My invention relates to a system of electric fire alarm signaling for school buildings, public institutions, factories, etc.

My objects are to provide a system combining in one apparatus means by which an alarm of fire can be transmitted to the town or city fire alarm system or by direct connection to the central office or fire station, and means by which a local alarm of fire can be sounded in or about the premises where the apparatus is located for the purpose of fire drill or quick exit from the premises, the system being such that it is impossible to transmit an alarm of fire without operating the local system but so arranged that the local alarm system may be operated without causing an alarm to be sent to the fire department. The system is also so arranged that when the apparatus is being used to give a local alarm or drill signal that portion relating to the town or city fire alarm system is made proof against accidental or malicious interference.

My system in its best form is a closed circuit system with an alarm bell or signal so arranged that failure of battery, broken or crossed wires or disarrangement of signaling mechanism will cause a disarrangement signal or indicator to be operated. At present in apparatus for giving both alarms simultaneously or the local alarm separately the various parts of the apparatus pertaining to both the local and main signal operating members are exposed so that when being used for local alarm or drill purposes it is easily possible through accident or otherwise to send in a needless alarm to the fire department. This, my invention, absolutely prevents as the opening of the cover or door of the local box giving access to the local fire signal renders that portion of the apparatus connecting with the fire department inoperative.

A feature of my invention is the means for automatically indicating that the battery or

batteries of the system are out of normal condition.

Other features will be pointed out below.

In the drawings Figure 1 is a diagram of my fire alarm system; Fig. 2 is a front elevation partly broken away of one of the boxes hereinafter described; Fig. 3 is a side view of the box shown in Fig. 2 partly in section on the line 3—3 of Fig. 2; Fig. 4 is a partial section on the line 4—4 of Fig. 2; and Fig. 5 is a detail of a modification. Fig. 6 is a section on line 6—6 of Fig. 2.

Box A set in a recess in the wall B of the building has fastened to it and forming part of its front wall a ring  $a$  from which a shelf  $a'$  projects back into the box. Pivoted at  $a^2$  to the ring  $a$  is the cover or door  $a^3$  in which is rotatably mounted the handle  $a^4$  carrying at its inner end a wing  $a^5$  which engages the inner side of the ring  $a$  to hold the door in its closed position. By rotating the handle and moving the wing  $a^5$  toward the middle of the door the latter can be freed and opened. Pivotaly mounted at  $a^6$  to the door  $a^3$  is an arm  $a^7$  projecting into a compartment  $a^8$  formed in the door  $a^3$ . The front wall  $a^9$  of this compartment is a pane of glass. The arm  $a^7$  constitutes the main signal circuit operating member. Preferably the compartment  $a^8$  is closed at its rear by a partition or wall  $a^{10}$  which shuts off from view the interior of box A so that only the arm  $a^7$  is visible from the front of the box when the door or cover is closed. Back of the partition  $a^{10}$  is an arm  $a^{11}$  which is integral with the hub of arm  $a^7$  so that it constitutes a part of the main signal circuit operating member. This arm  $a^7$  is made near its extremity and upon its rear side with a lip  $a^{12}$  into the path of which a stud  $a^{13}$  on an arm  $a^{14}$  normally projects. The arm  $a^{14}$  is the local signal circuit operating member and forms part of the usual local signal circuit operating box A', said arm being fixed to the shaft  $a^{15}$  of the box A'. When an alarm of fire is to be given the pane of glass is broken out and the member  $a^7$  is depressed and then released. The downward movement of the arm  $a^{11}$  occasioned by the depression of the member  $a^7$  carries the member  $a^{14}$  with it thereby setting the local signal box A' in operation,

the usual spring within the box A' serving to restore the members  $a^{14}$  and  $a^7$  to normal position again. The hub of the member  $a^7$  is made with a pair of lugs  $a^{16}$  which embrace a lip  $a^{17}$  on an arm  $a^{18}$  fixed to a shaft  $a^{19}$  that is journaled in the shelf  $a'$ . The other end of the shaft  $a^{19}$  carries an arm  $a^{20}$  provided with a stud  $a^{21}$  cooperating with one of the contacts of a switch  $a^{22}$ . The switch  $a^{22}$  is in the main signal circuit so that when member  $a^7$  is depressed as above described the lugs  $a^{16}$  acting through arm  $a^{18}$ , shaft  $a^{19}$ , arm  $a^{20}$  and stud  $a^{21}$  serve to close the switch  $a^{22}$  and thereby operate the main signal circuit. It will thus be seen that when the member  $a^7$  is operated with the cover  $a^3$  in its closed position the member  $a^{14}$  is also operated and therefore both the main signal circuit and the local signal circuit are operated. The pintle  $a^2$  on which the door  $a^3$  is hinged and which turns with said door has fixed to it a bolt in the form of a disk  $a^{23}$  made with a notch  $a^{24}$  which is in the path of arm  $a^{18}$  so long as the door  $a^3$  is closed so that the arm  $a^{18}$  is then free to be operated by the lugs  $a^{16}$  on the hub of member  $a^7$ . Whenever, however, the door  $a^3$  is opened or not entirely closed the notch  $a^{24}$  is not in the path of the arm  $a^{18}$  and therefore the disk  $a^{23}$  locks the arm  $a^{18}$  against operation. It will also be seen that when the door is swung open on pintle  $a^2$  the lugs  $a^{16}$  are carried out of cooperative relation with the lip  $a^{17}$  so that movement of the member  $a^7$  will not tend to operate the arm  $a^{18}$ . The disk  $a^{23}$  is also made with a notch  $a^{25}$  cooperating with an arm of a bell crank  $a^{26}$  pivoted at  $a^{27}$  to the shelf  $a'$ . The other arm of the bell crank  $a^{26}$  carries a stud  $a^{28}$  cooperating with one of the spring members of a switch  $a^{29}$ . When the door  $a^3$  is in its closed position the notch  $a^{25}$  permits a spring  $a^{30}$  to hold the bell crank  $a^{26}$  in such position that the switch  $a^{29}$  is closed but when the door  $a^3$  is open and the notch  $a^{25}$  is shifted away from the arm of the bell crank  $a^{26}$  the disk  $a^{23}$  acts as a cam to operate bell crank  $a^{26}$  and thereby open the switch  $a^{29}$ . The switch  $a^{29}$  is in the disarrangement signal or indicator circuit and it will therefore be seen that when the door is opened this indicator circuit will be operated.

The wall of the box A is made with an opening  $a^{31}$  which registers with an opening  $a^{32}$  in the bolster ring  $a^{33}$  arranged between the outer projecting edge of the ring  $a$  which forms part of the front of box A and the wall B of the building. The opening  $a^{32}$  is tapped to receive the end of a pipe  $a^{34}$  through which and openings  $a^{31}$  and  $a^{32}$  wires of the system are led to the interior of box A to be connected with the switches  $a^{22}$

and  $a^{29}$  as well as to the switches of the local box A'.

As herein shown the system when in normal condition includes two normally closed disarrangement circuits each having a separate battery of its own; and automatic means is provided through which an indicator or signal is operated by the battery of either one of those circuits when the battery of the other circuit is depleted or when the other circuit is not in normal condition. One of these circuits is traced as follows:—From one pole of the main battery Z through wires  $c$ , and  $c'$  to one of the usual pair contacts  $c^{11}$   $c^{12}$  in box A' at one of the stations of the building, from the contact  $c^{11}$  through wires  $c^2$  and  $c^3$  to the contact  $c^{12}$  of the box A' of the next station. From the box A' of the last station through wire  $c^4$ ; a magnet Y, and wire  $c^5$ , to a contact  $c^{13}$  that cooperates with the contact  $c^{12}$  of the last station, from contact  $c^{13}$  of the last station through wire  $c^6$  to the contact  $c^{13}$  of the next to the last station. From the first station this circuit continues through wire  $c^7$  to the usual releasing magnet  $g$  of the signal or gong G of the first station and thence through wire  $c^8$  to the releasing magnet  $g$  of the next station, and from the releasing magnet  $g$  of the last station through wires  $c^9$  and  $c^{10}$  back to the other pole of battery Z. The magnet Y normally holds its armature  $y$  out of engagement with a contact  $y'$  but as will now be clear, if the circuit just traced is opened at any point or if the battery Z becomes exhausted then the armature  $y$  will drop into engagement with contact  $y'$  thereby closing an indicator circuit which is traced as follows:—From one pole of a supplemental battery Z' through a wire  $b$  to contact  $y'$ , through armature  $y$ , wire  $y^2$ ; an indicator or signal I, and wires  $y^3$  and  $c^{10}$  back to battery Z'. The other normally closed disarrangement circuit is traced as follows:—From battery Z' through wires  $b$  and  $b'$  to a magnet X; through wire  $b^2$ , switch  $a^{29}$ , and wire  $b^3$  to the usual detector switch  $g'$  of the last station, said switch being controlled according to the condition of the operating spring of the gong of that station as usual. From this switch  $g'$  the circuit continues through wire  $b^4$ , switch  $a^{29}$ , and wire  $b^5$  to the detector switch  $g'$  of the next station and so on to the switch  $g'$  of the first station. The switch  $g'$  of the first station is connected by a wire  $b^6$  with one of the contacts of the switch  $a^{22}$  of said station whereof the other contact, as described above, is connected with wires  $c$  and  $c'$ . From switch  $a^{22}$  the circuit continues through wire  $b^7$  to one of the contacts of the switch  $a^{22}$  of the next station whereof the other contact is connected with wires  $c^2$  and  $c^3$ . The switch  $a^{22}$

of the last station is connected by a wire  $b^8$  with one end of the coil of the usual trip magnet W which controls the mechanism, not shown, through which the alarm signal is transmitted to the fire department. The other end of the coil of magnet W is connected by a wire  $b^9$  with the wire  $c^{10}$  leading back to battery Z'. The magnet X is, as will now be clear, normally energized and therefore holds its armature  $x$  out of engagement with a contact  $x'$ . When, however, the circuit just traced is opened at any point magnet X is deenergized and drops its armature on to contact  $x'$  thereby closing a circuit that is traced as follows:—From an intermediate portion of battery Z through a wire  $x^2$ , armature  $x$ , wire  $y^2$ , indicator I, and wires  $y^3$  and  $c^{10}$  back to battery Z.

When the door  $a^3$  of any one of the boxes A is opened the bell crank  $a^{26}$  opens switch  $a^{29}$  of that box and thereby operates indicator I. If the member  $a^7$  of any one of the boxes A, is operated say for example the member  $a^7$  of the station shown at the top of Fig. 1, then a circuit is closed through the trip magnet W which is traced as follows:—From battery Z through wire  $c$  to the lower contact of switch  $a^{22}$  of said station and from that contact through the upper contact of said switch, wires  $b^7$  and  $b^8$ , magnet W, and wires  $b^9$  and  $c^{10}$  back to battery Z. The lifting of the armature of magnet W acts as usual to release the mechanism, not shown, which transmits the fire alarm signal to the fire department. As explained above, if  $a^7$  is operated while the door of the box is closed, it operates the member  $a^{14}$  and thereby sets the box A' in operation. This box is constructed as usual with a spring driven wheel  $c^{14}$  which operates the contact  $c^{12}$  to make and break connection between  $c^{12}$  and  $c^{13}$  and thereby operate the local signal circuit, or in other words the circuit of the gongs G. This circuit is traced as follows:—From the battery Z through wires  $c$  and  $c'$  to contact  $c^{12}$ , contact  $c^{13}$ , wire  $c^7$ , the magnet  $g$  of the gong of the first station, wire  $c^8$ , the magnet  $g$  of the gong of the next station. At the last station the circuit continues from the magnet  $g$  through wires  $c^9$  and  $c^{10}$  back to battery Z. Thus it will be seen that when the door  $a^3$  of one of the boxes is opened and the member  $a^{14}$  of that box operated the indicator I gives a continuous signal and gongs G are operated, and also that when the door is not opened and the pane  $a^{71}$  is broken and the member  $a^7$  operated then the indicator I is operated intermittently to give a fire alarm as well as the gongs G.

What I claim is:

1. A fire alarm signal system comprising a main signal circuit; a local signal circuit;

an operating member for the main signal circuit; an operating member for the local signal circuit; a box within which the operating member for the local signal circuit is arranged; a movable cover for said box normally rendering the local signal circuit member inaccessible; and means to prevent operation of the main signal circuit when the cover is opened.

2. A fire alarm signal system comprising a main signal circuit; a local signal circuit; an operating member for the main signal circuit; an operating member for the local signal circuit; a box within which the operating member for the local signal circuit is arranged; a movable cover for said box normally rendering the local signal circuit member inaccessible; means to prevent operation of the main signal circuit when the cover is opened; a local indicator circuit; and means for operating the indicator circuit when the cover is opened.

3. In a fire alarm box of the character described in combination with a movable cover; a main signal circuit switch; and means controlled by the cover to prevent the operation of said switch when the cover is opened.

4. In a fire alarm box of the character described the combination of a cover; a main signal circuit operating member on the cover; a switch operating member within the box with which the main signal circuit operating member coöperates when the cover is closed, said main signal circuit operating member being shifted out of operative relation to said switch operating member when the cover is opened; and means to lock the switch operating member in normal position when the cover is opened.

5. In a fire alarm box of the character described the combination of a cover for the box made with a compartment closed at its front by a destructible panel; a main signal circuit operating member mounted within said compartment; a switch operating member within the box with which the main signal circuit operating member coöperates when the cover is closed, said main signal circuit operating member being shifted out of operative relation to said switch operating member when the cover is opened.

6. In a fire alarm box of the character described the combination of a cover hinged to the box; a switch operating member; and a bolt carried by the cover for locking said switch member against operation when the cover is opened.

7. In a fire alarm box of the character described the combination of a cover hinged to the box; a switch operating member; a bolt carried by the cover for locking said switch member against operation when the

cover is opened; and an indicator circuit switch operating member operated by said bolt.

8. In a system of the character described  
5 the combination of a main signal circuit; a battery in that circuit; an indicator; means controlled by but having a source of power independent of, the main signal circuit battery for operating the indicator when the

condition of said circuit is changed from normal; and means to operate the indicator controlled by said independent source of power but operated by the battery of said main signal circuit.

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Witnesses:

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