

May 23, 1939.

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2,159,304

ALARM DISPATCHING DEVICE AND SYSTEM

Filed July 5, 1935

2 Sheets-Sheet 1

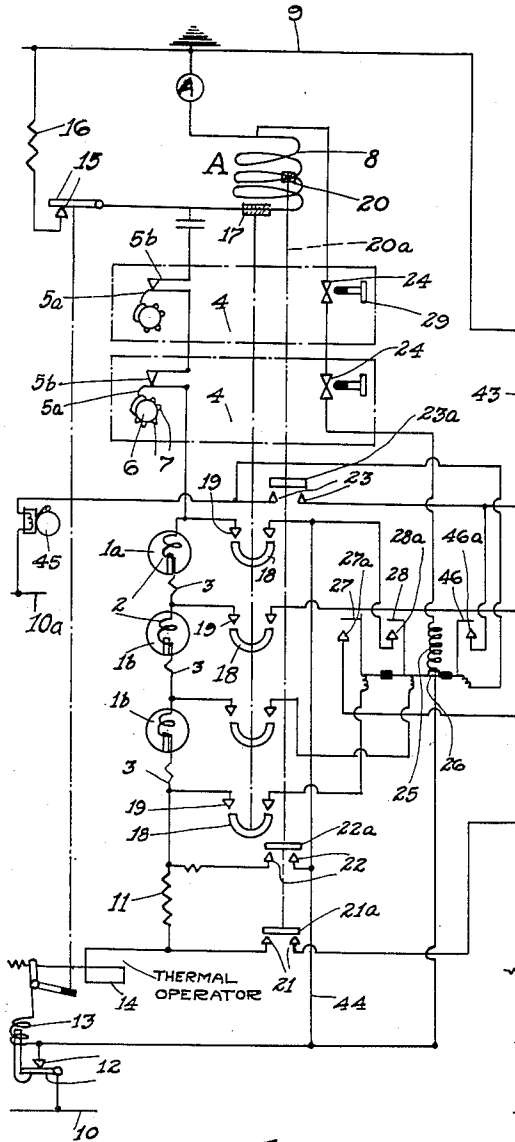


Fig. 1.

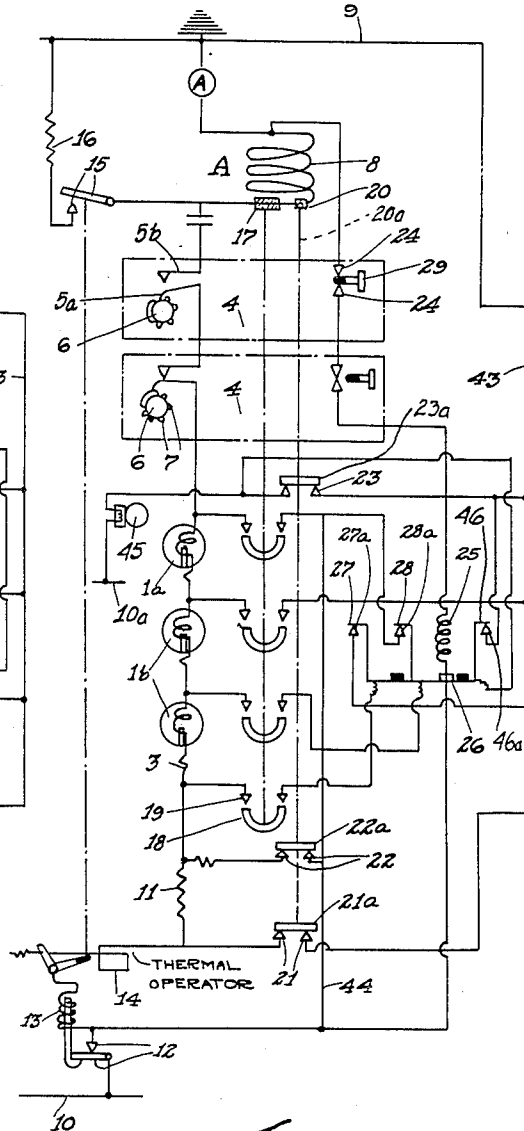


Fig. 2.

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2 Sheets-Sheet 2

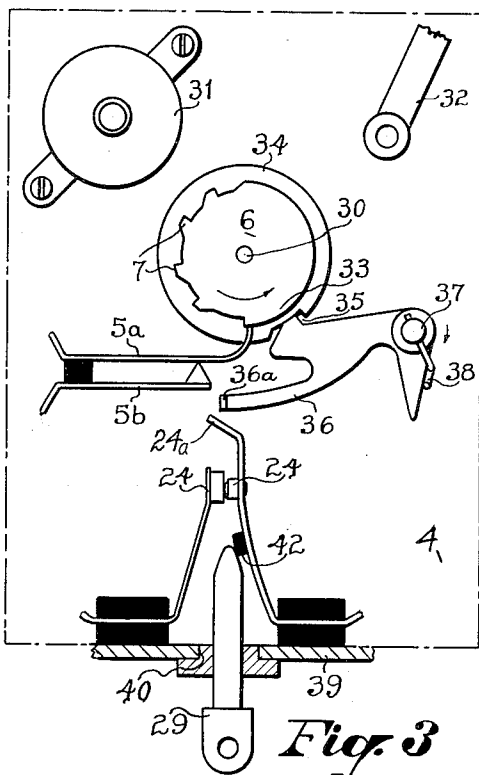


Fig. 3

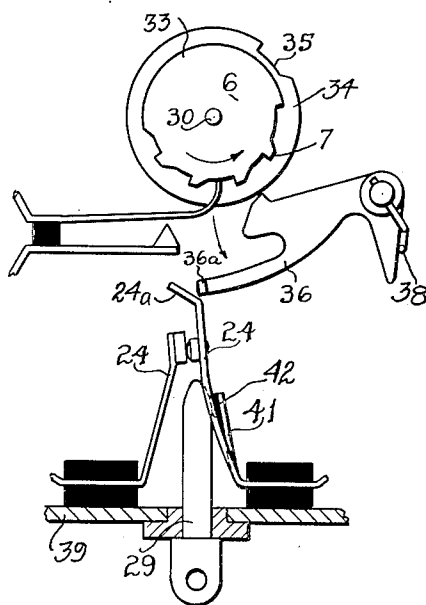


Fig. 4

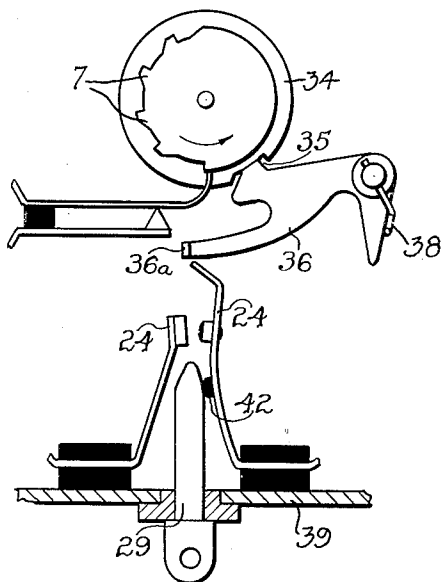


Fig. 5

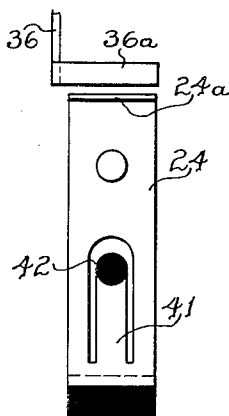


Fig. 6

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UNITED STATES PATENT OFFICE

2,159,304

ALARM DISPATCHING DEVICE AND SYSTEM

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5 Claims. (Cl. 177—361)

The present invention relates to alarm signal systems, particularly fire alarm systems, employing a number of bells or other signals adapted to be sounded, or otherwise operated, in response to the actuation of any one of a number of separate alarm sending stations, such alarm systems being commonly installed in schools, factories, hotels and other large buildings.

In the operation of alarm signal systems of the above indicated character, it has been found desirable, under some conditions to provide for the operation of a limited number of designated pre-signals upon the initial actuation of a sending station, after which all the signals of the system are operated to give a general alarm, only in the event that conditions warrant the transmission of such a general alarm throughout the entire system. As the sending of a general alarm usually requires the manual operation, by a person in authority, of a sending station which has already been placed in operation to sound only the pre-signals in accordance with a code, confusion is liable to result should the general alarm transmit a partial or broken code sequence followed by a full code sequence.

According to the present invention, there is provided an improved alarm dispatching device particularly adapted for use in connection with a pre-signal and general alarm system, since it effectively prevents a broken or partial code sequence being sounded by the general alarm signals. In other words, even though the manual operation required for giving a general alarm be performed at the operated box while a code sequence is being sounded by the pre-signals, the general alarm will not be sounded throughout the system until the transmission of a complete code sequence to the pre-signals by the station. The above and other advantageous features of the invention will hereinafter more fully appear from the following description with reference to the accompanying drawings, in which:

Fig. 1 is a schematic view illustrating a system embodying the device of the present invention in its normal inoperative condition, preparatory to sending a pre-signal alarm.

Fig. 2 is a schematic view similar to Fig. 1, illustrating the circuit relations established for sending a general alarm.

Fig. 3 is a view showing on an enlarged scale the construction of the dispatching device shown in Fig. 1.

Figs. 4 and 5 illustrate the operation of the

dispatching device for sending pre-signals followed by a general alarm.

Fig. 6 is a fragmentary view showing on an enlarged scale the construction of one of the general alarm sending contacts.

Like reference characters refer to like parts in the different figures.

Referring to the drawings, the invention is shown for purposes of illustration as being incorporated in an alarm signal system of the type shown and described in my copending application Serial No. 728,812 filed jointly with Frank Scherma on June 4, 1934 and since issued as Patent No. 2,149,200 on February 28, 1939. The aforesaid application discloses among other features a pre-signal and general alarm system, to which the dispatching device of the present invention may be readily applied, although obviously the device may as well be employed in connection with other types of alarm systems.

As best shown in Fig. 1, the system provides a section of signals 1a, hereinafter called pre-signals, and one or more sections of signals 1b, hereinafter called general alarm signals, with the windings 2 of all the signals connected in series with balancing resistors 3 between the sections. The pre-signals 1a are located at various designated points throughout the system, while the general alarm signals 1b are much more widely distributed, and the invention contemplates the operation of the pre-signals only upon the initial actuation of any one of a number of sending stations, generally designated by the reference character 4, followed by operation of the general alarm signals 1b only in the event that conditions warrant the sounding of a general alarm throughout the system.

The sending stations 4 are disposed at various locations throughout the system from where it is desired to send an alarm, and each station 4 provides a pair of relatively movable contacts 5a and 5b, normally closed so long as the station is in an inoperative condition. Each station also provides a contact actuating member 6 in the form of a cam wheel, the function of which when rotated is to open and close the contacts 5a and 5b to successively interrupt and reestablish the circuit through the stations 4 in accordance with the arrangement of the code determining projections 7 on the wheel 6. As hereinafter described with reference to Fig. 3, the cam wheel 6 of each station is adapted to be driven through suitable operating mecha-

nism so as to make a number of revolutions in response to each actuation of the station.

The normally closed station contacts 5a and 5b are connected in series with the signal windings 2 and with one terminal of the energizing winding 8 of a master controller A of the type fully shown and described in the aforesaid Patent No. 2,149,200. The other terminal of the winding 8 is permanently connected to a supply main 9, and the normal supervisory circuit of the system includes the winding 8, the station contacts 5a and 5b, and the signal windings 2, from which current flows to the other supply main 10 through a resistor 11 and the normally closed contacts 12 of a time delay cut-out device comprising an operating winding 13 in circuit with one of the contacts 12.

In passing to the winding 13 the supervisory current also traverses the thermal element 14 of an automatic interruptor which also comprises a pair of normally closed contacts 15 connected in circuit with a resistor 16 between the supply main 9 and the lower terminal of controller winding 8, so as to constitute a shunt around the winding 8. The existence of this shunt circuit permits the flow of only a small supervisory current through the winding 8, and as a result, the winding is not energized sufficiently to pull up its main armature 17 carrying contacts 18 normally separated from stationary contacts 19 connected to the several sections of signals 1a and 1b. The strength of the supervisory current flowing through the controller winding 8 is sufficient, however, to hold up the auxiliary armature 20 and thereby maintain several pairs of contacts 21, 22 and 23 in spaced relation. As shown diagrammatically, the auxiliary armature 20 carries a rod 20a carrying bridging members 21a, 22a and 23a, which are maintained out of engagement with the spaced pairs of contacts 21, 22 and 23, respectively, as long as the armature 20 is held in a raised position.

Each sending station 4 also provides a pair of normally closed contacts 24 connected in series across the supply mains 9 and 10 through a winding 25. An armature 26 under the control of the winding 25 carries contact arms 27 and 28 insulated from each other and maintained out of engagement with stationary contacts 27a and 28a as long as the winding 25 remains energized. With the arms 27 and 28 held out of engagement with the stationary contacts 27a and 28a respectively, the connections between the signal windings and the stationary controller contacts 19 are such that only the pre-signals 1a will be sounded upon the actuation of a sending station 4. However, upon opening of the contacts 24 at the operated station, by means of a manually operable button 29, the resulting deenergization of winding 25 causes engagement of the arms 27 and 28 with contacts 27a and 28a, whereupon the general alarm signals 1b will be sounded in unison with the pre-signals 1a only at the conclusion of a code sequence, due to the functioning of my improved dispatching device which will next be described.

Referring now to Fig. 3, the apparatus at a sending station 4 is indicated diagrammatically within the dot and dash line, and consists of a rotatable shaft 30 carrying the cam or code wheel 6, and the shaft is adapted to be rotated through a predetermined number of revolutions by a spring motor indicated at 31 upon the operation of a handle 32. Since the construction of the spring motor forms no part of the present inven-

tion, and such motors are commonly employed in fire alarm sending stations, it is unnecessary to describe the motor in detail, other than to state that upon operation of the handle 32 for the purpose of sending an alarm, the shaft 30 will be turned through a predetermined number of revolutions and will come to rest with the code wheel 6 in the position shown.

In the normal inoperative position of the station 4, the contacts 5a and 5b are held closed by reason of an extension of the contact 5a bearing on a holding projection 33 of the code wheel. Upon rotation of the code wheel 6 in the direction of the arrow, the contacts 5a and 5b will be separated as the contact 5a leaves the holding projection 33, after which the station contacts will be re-closed and re-opened in accordance with the arrangement of the code determining projections 7 shown herein to give the signal "twenty-three".

The shaft 30 also carries a disk 34 having a depression 35 in its periphery substantially in line with the holding projection 33 on the code wheel 6. With the code wheel 6 at rest, a lever 36 pivoted at 37 is yieldably maintained in engagement with the depression 35 by means of a spring 38, with an extension 36a of the lever 36 terminating just above the contacts 24 that are provided at each station 4 for the purpose of sending a general alarm. Upon rotation of the disk 34 with the code wheel 6, as shown in Fig. 4, the lever 36 rides out of the depression 35, thereby turning the lever in a counterclockwise direction against the pressure of the spring 38 to carry its extension 36a in position to prevent separation of the contacts 24 until the shaft 30 makes one complete revolution, as shown in Fig. 5.

The contacts 24 are shown as being mounted on the lower wall 39 of the station box, each contact being made of resilient material and being bent towards the other so as to normally engage above an opening 40 in the wall 39 through which the general alarm sending button or key 29 may be inserted from outside the station. As best shown in Fig. 6, one of the contacts 24 provides an extension 24a, which normally terminates somewhat below the end of the extension 36a of the lever 36. This same contact 24 also provides a cut-out tongue 41 extending longitudinally thereof, which carries a lug 42 of insulating material. With the contacts 24 in engagement with each other, the lug 42 is disposed in the path of movement of the key 29, so that when the key is inserted in the opening 40, as shown in Fig. 5, the contacts 24 will be separated, provided the lever 36 is at that time received in the depression 35 of the disk 34.

If, however, the key 29 should be inserted in the box opening 40 for the purpose of sounding a general alarm at the time a code is being transmitted by the operated station, as shown in Fig. 4, the extension 36a of the lever 36 prevents the contacts 24 from being separated. Under these conditions, the engagement of the end of the key 29 with the lug 42 deflects the resilient tongue 41 out of the plane of the remainder of the contact 24, so that the contact remains under tension as long as the key is in this position. As the shaft 30 approaches the end of a revolution, accompanied by the sending of a complete code sequence by the code wheel 6, the lever 36 again enters the depression 35, as shown in Fig. 5, whereupon the contacts 24 spring open simultaneously with the return of the lever extension 36a to its original position. Therefore, while

the insertion of the key 29 places the general alarm contacts 24 under tension in readiness for sending a general alarm, the transmission of a general alarm by all of the signals cannot take place until the pre-signals have completed the sending of at least one code sequence. This insures that the general alarm signals can only sound a complete code sequence, even though the general alarm key 29 be actually operated in the midst of sounding a code by the pre-signals.

Referring again to Figs. 1 and 2, let it now be assumed that the station bearing the code designation "twenty-two" be operated. Upon the first opening of the station contacts 5a and 5b as the code wheel 6 starts to turn, the complete deenergization of the master controller winding 8 causes the auxiliary armature 20 to drop, thereby closing contacts 21. This throws the thermal element 14 directly across the supply mains, so that by the time the station contacts are reclosed by the first code projection 7, contacts 15 have been opened by expansion of the element 14 to cut the resistor 16 out of circuit with the winding 8. Therefore, upon reclosure of the station contacts 5a and 5b, an increased current flows through the winding 8, due to the removal of the shunt resistor 16 and the previous closure of contacts 22 which have established a direct circuit to the supply main 10 from the last signal circuit resistor 3. The main armature 17 thereupon pulls up to close the several pairs of master controller contacts 18 and 19. When this occurs, the windings 2 of only the pre-signals 1a are energized through conductors 43 and 44 leading from the supply mains 9 and 10 respectively. It is to be noted that these conductors 43 and 44 are connected to the stationary contacts 19 of only the first and second pairs of master controller contacts, so that closure of the remaining master controller contacts does not energize the windings of the general alarm signals 1b. Therefore, the first closure of the main armature 17 results in sounding the first number of the code sequence by the pre-signals 1a only, and obviously the pre-signals will sound the entire code sequence for each revolution of the code wheel 6, the system otherwise functioning in the manner fully described in Patent No. 2,149,200.

Let it now be assumed that a person in authority has reached the operated station in the midst of the sounding of a code sequence by the pre-signals, and immediately inserts the key 29 in the operated box, so that a general alarm will be sounded throughout the system. Since the lever 36 is at that moment riding on the periphery of the disk 34, the general alarm contacts 24 are not separated, but merely placed under tension, as shown in Fig. 4. The pre-signals therefore complete their sounding of a code sequence, but as the shaft 30 completes a revolution and before another sequence can be started, release of the contacts 24 by the lever 36 permits these contacts to open, thereby breaking the circuit through the winding 25, as shown in Fig. 5.

When the contacts 24 at the operated box are opened as described above, the release of armature 26 causes contact arms 27 and 28 to engage stationary contacts 27a and 28a respectively, as shown in Fig. 2. Therefore, when continued rotation of the shaft 30 causes reclosure of station contacts 5a and 5b by the first code projection 7 of a new sequence, the resulting closure of the master controller contacts 18 and 19 causes energization of the general alarm signals 1b in unison with the pre-signals 1a. Energization of the gen-

eral alarm signal windings 2 results from the fact that the conductors 43 and 44 are connected to the contacts 27a and 28a respectively, then engaged by the arms 27 and 28, which are in turn connected to the two lower pairs of master controller contacts 18. As the station continues to operate for one or more revolutions of the code wheel shaft 30, the general alarm signals 1b sound the code sequence in common with the pre-signals, so that the alarm is given throughout the entire system.

After the shaft 30 has completed a predetermined number of revolutions, it comes to rest with the parts occupying the position of Fig. 3, after which the key 29 is withdrawn from the box by the person responsible for sending the general alarm. If, however, it should be desired to repeat the general alarm, the key 29 is left in and the operating handle 32 is turned to initiate another series of signal sequences. Obviously, with the key 29 in at the start of the operation of the station, the circuit through the contacts 24 will remain broken and the general alarm signals 1b will sound the entire series of signal sequences.

As previously indicated, deenergization of the winding 8 permits the auxiliary armature 20 to fall and cause bridging of the contacts 23 by member 23a, as shown in Fig. 2. When this occurs, an energizing circuit is established for a trouble signal 45, since one contact 23 is connected to the main 9, while one terminal of the signal 45 is connected to a main 10a. The trouble signal 45 is thus adapted to indicate the occurrence of any fault which results in deenergization of the main controller winding 8.

The trouble signal 45 is also responsive to the maintenance of the normally closed circuit, including the auxiliary station contacts 24 and the winding 25. For this purpose, the armature 26 carries a contact arm 46 that is normally maintained out of engagement with a stationary contact 46a, while the winding 25 remains energized. The arm 46 and contacts 46a are connected in parallel across the trouble signal contacts 23, so that the occurrence of a fault in the normally closed circuit of contacts 24 and winding 25, will result in energization of the trouble signal 45.

From the foregoing, it is apparent that by the present invention there is provided an improved alarm dispatching device for use with pre-signal and general alarm systems, whereby a code sending station that is already in operation for transmitting a series of code sequences to the pre-signals can be actuated at any time during such operation to cause the transmission of only complete code sequences to the general alarm signals. In this way, sending of an incomplete code sequence by the general alarm signals is rendered impossible.

I claim:

1. In an alarm signal system, the combination with a code dispatching station, pre-signals and associated circuits energizable upon actuation of said station to send one or more complete code sequences, general alarm signals and associated circuits and means at said station to cause said general alarm signals and circuits to be energized in unison with said pre-signals and circuits, of additional means at said station, operable upon initial actuation of the station in advance of any operation of said general alarm signal energizing means, to prevent the operation of said general

alarm signals until said pre-signals have sent one or more complete code sequences.

2. In an alarm signal system, the combination with a code dispatching station, pre-signals and
5 associated circuits energizable upon actuation of said station to send one or more complete code sequences, general alarm signals and associated circuits and means at said station to cause said
10 general alarm signals and circuits to be energized in unison with said pre-signals and circuits, of additional means at said station, operable upon initial actuation of the station in advance of any operation of said general alarm signal energizing means, to prevent the energization of said
15 general alarm signals and circuits while the sending of a complete code sequence by said pre-signals is in progress.

3. In an alarm signal system, the combination with a code dispatching station, pre-signals and
20 associated circuits energizable upon actuation of said station to send one or more complete code sequences, general alarm signals and associated circuits and means at said station to cause said general alarm signals and circuits to be energized in unison with said pre-signals and circuits,
25 of additional means at said station, operable upon initial actuation of the station in advance of any operation of said general alarm signal energizing means to render said first-named means ineffective to cause operation of the general alarm
30 signals in unison with said pre-signals, while the sending of a complete code sequence by said pre-signals is in progress.

4. In an alarm signal system providing pre-
35 signals and general alarm signals, a station providing relatively movable contacts, means for op-

erating said contacts to normally send a series of impulses in accordance with a code sequence to said pre-signals only, additional contacts at said station normally closed during the send of code impulses to said pre-signals, means under the
5 control of said additional contacts to prevent said first-named contacts from sending code impulses to the general alarm signals while said second-named contacts remain closed, means for opening
10 said second-named contacts to permit said first-named contacts to simultaneously send code impulses to the general alarm signals and means for preventing the opening of said second-named contacts during the transmission of a code sequence by said pre-signals.
15

5. In an alarm signal system providing pre-signals and general alarm signals, a station providing relatively movable contacts, means for operating said contacts to normally send a series of impulses in accordance with a code sequence
20 to said pre-signals only, additional contacts at said station normally closed during the sending of code impulses to said pre-signals, means under the control of said additional contacts to prevent said first-named contacts from sending code
25 impulses to the general alarm signals while said second-named contacts remain closed, and means for opening said second-named contacts to permit said first named contacts to simultaneously send code impulses to the general alarm signals, said
30 means for opening the second-named contacts being effective only at the beginning of the sending of a complete code sequence to the pre-signals by said first-named contacts.
35

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