J. C. FRANCIS.

SIGNALING SYSTEM.

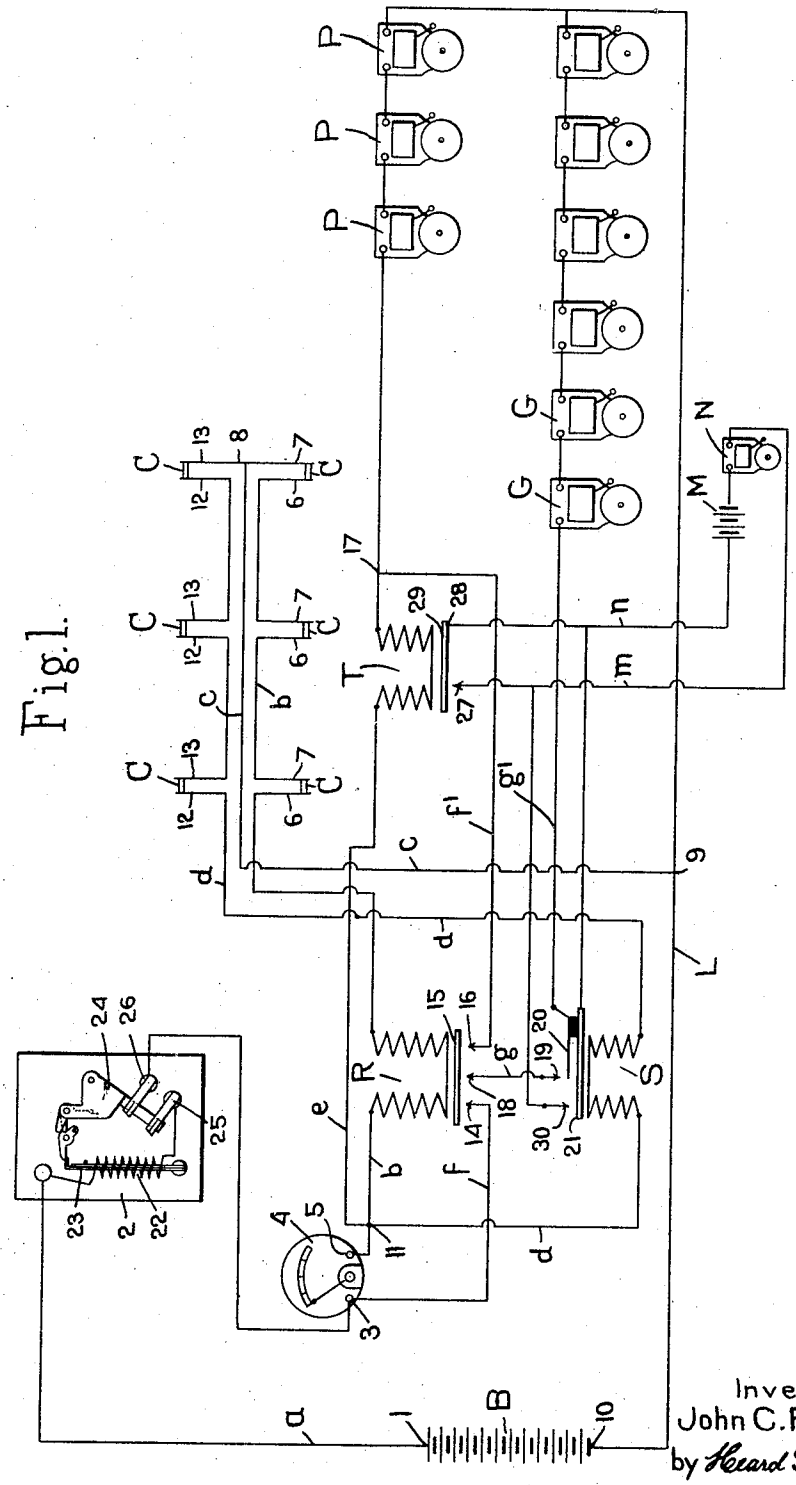
APPLICATION FILED JULY 12, 1916.

1,239,381.

Patented Sept. 4, 1917.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

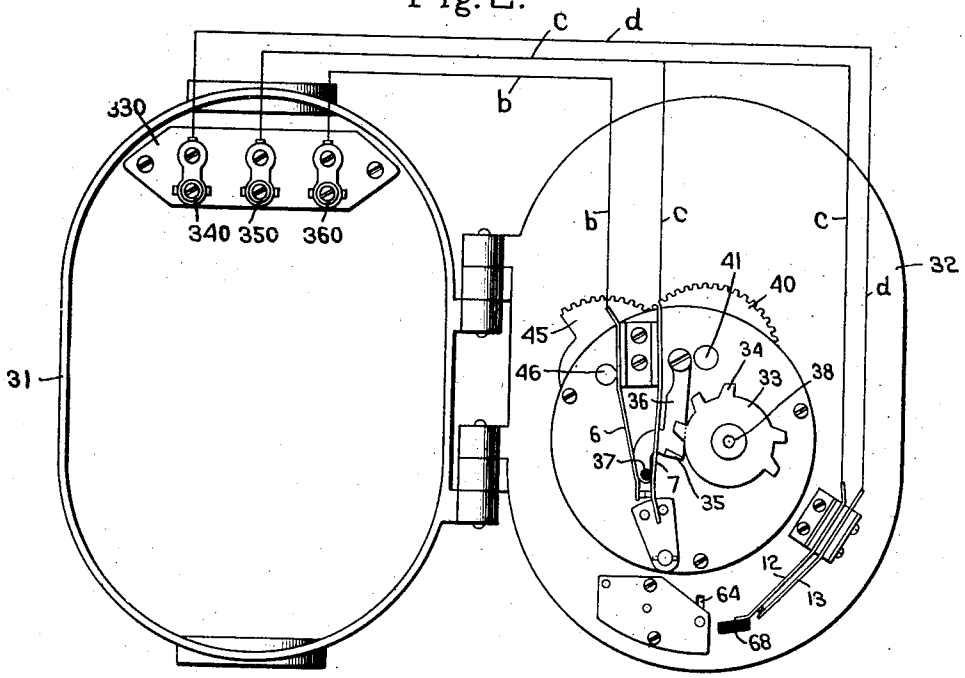
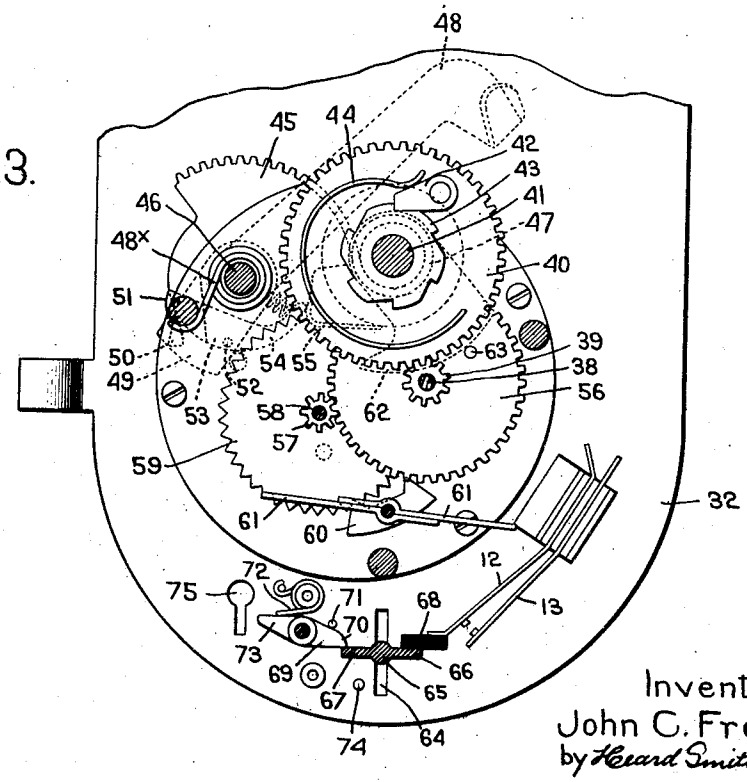


Fig. 3.



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UNITED STATES PATENT OFFICE.

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SIGNALING SYSTEM.

1,239,381. Specification of Letters Patent. **Patented Sept. 4, 1917.**

Application filed July 12, 1916. Serial No. 108,945.

To all whom it may concern:

Be it known that I, JOHN C. FRANCIS, a citizen of the United States, and resident of Canton, county of Norfolk, State of Massachusetts, have invented an Improvement in Signaling Systems, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to improvements in signaling systems such as fire alarm systems and the principal object of the invention is to provide an auxiliary or pre-signaling circuit by means of which a preliminary signal may be sent to certain persons or employees who form a local fire brigade for a public institution, hotel, factory or similar institution where a general alarm of fire might be undesirable or tend to create a panic.

In such a system the pre-signaling circuit is provided with one or more gongs or other signals located in the office or offices of those forming the local fire brigade, whereas the general alarm circuit is provided with signals disposed at convenient places throughout the building.

In such case the alarm boxes are provided with means for transmitting the signal to the pre-signaling circuit alone so that the members of the local fire brigade may be notified first and enabled to extinguish the fire without alarming the other occupants of the building. The fire alarm boxes are also provided with means for turning in the general alarm, such means preferably being placed in operative condition by means of a key, a duplicate of which is carried by each member of the fire brigade, so that after the first alarm has been turned in, any member of the brigade may immediately turn in a general alarm if the fire is of such proportion as to render the building unsafe.

Another object of the invention is to provide a signaling system of the character above described with circuits operable from a single source of electrical energy, such circuits being so constructed as to require a minimum amount of wiring.

Another object of the invention is to provide a system of the character described with means for maintaining a supervisory current throughout the essential portions of the system together with means for indicating the interruption or breaking down of the circuits.

Another object of the invention resides in supplying a novel and simplified form of signal transmitting mechanism for the alarm box which having once been set to turn in a general alarm will be retained in position to sound said alarm repeatedly until released by a special key.

Another object of the invention is to provide a system of the character described with means for maintaining a small current constantly in the system and means for impressing selectively upon the pre-signaling circuit and the main circuit a current of sufficient strength to actuate the signals.

Another feature of the invention consists in providing a system of the character last described with a thermostatic time cut out adapted to break the circuit when the signaling current has continued a predetermined length of time or when an overload is thrown upon the circuit, thereby preventing the burning out of the signaling device and the wastage of current.

Other objects of the invention and the nature thereof will more fully appear from the following description and the accompanying drawings and will be pointed out in the annexed claims.

In the drawings;

Figure 1 is a diagrammatic view of a preferred form of signaling system embodying the features above described.

Fig. 2 is a view of a signal transmitting mechanism showing the box containing the same open and illustrating a bottom plan view of the switches and brake wheel for actuating the same, and,

Fig. 3 is a plan view of the signal transmitting mechanism, the top of the frame having been omitted.

The preferred embodiment of my invention diagrammatically illustrated in Fig. 1 comprises two low resistance alarm circuits forming a main or a general alarm circuit and an auxiliary or pre-signaling circuit, and three high resistance circuits, two being controlling circuits for the signal transmitting mechanism adapted selectively to actuate either the signals of the pre-signaling circuit or both the alarms of the pre-signaling circuit and the alarms of the general alarm circuit; the third high resistance circuit being a branch of the pre-signaling cir-

cuit arranged to maintain a supervisory current through the presignaling circuit and adapted to actuated a trouble signal upon the breaking down or interruption of the pre-signaling circuit. Means are also provided to cause the actuating of the trouble signal upon the interruption of the controlling circuit as will hereinafter more fully appear.

As illustrated herein the electrical energy furnished by a battery B or other generator is transmitted from the positive pole 1 of the generator by a trunk line *a* through a protective circuit breaker, preferably a time cut-out 2 of the character disclosed in my co-pending application No. 104,101 filed June 16, 1916, to the terminal 3 of a mil-ammeter 4 where the circuit is divided into the high and low resistance circuits above mentioned.

From the other terminal 5 of the mil-ammeter one branch *b* of the high resistance circuit leads through a main relay R which controls the pre-signaling circuit and thence through the several signal transmitting or call boxes C, each of which is provided with normally closed switch members 6, 7, to a terminal 8 from which the return circuit *c* leads to a terminal 9 in a trunk line L connected to the negative terminal 10 of the generator B.

Another branch *d* of the high resistance circuits leads from the terminal 5 of the mil-ammeter or a connected terminal 11 through a relay S which controls the main or general alarm circuit and thence through switch members 12, 13 of the several signal transmitting or call boxes C to the terminal 8 where it connects with the return conductor *c* through which the current passes to the terminal 9 of the return trunk L and thence to the negative pole 10 of the generator B.

The third branch *e* of the high resistance circuit leads from the terminal 5 of the mil-ammeter, or more conveniently from the terminal 11, through a trouble relay T and thence through the signals P of the pre-signaling circuit, returning through the trunk L to the negative terminal 10 of the generator B. A supervising current is normaly maintained in all these high resistance circuits at all times, which will indicate in the mil-ammeter that the lines are in properly operable condition, and will be sufficient to energize the relays R and S which control respectively the pre-signaling and general alarm circuits and also the relay T of the trouble circuit. The resistance in the circuit *e* is such as to permit the flow of a small supervising current through the pre-signaling circuit but insufficient to actuate the signals P which preferably are single stroke gongs.

A heavy signaling current is supplied to the signals or gongs of the auxiliary or pre-signaling and to the main or general alarm circuits through low resistance lines which are normally maintained open by the relays R and S but are closed by the armatures of said relays when the coils of said relays are deënergized by the interruption of the controlling circuits as when a "call" is turned in at one of the alarm or call boxes.

The low resistance branch of the pre-signaling circuit leads from the terminal 3 of the trunk line *a* and of the mil-ammeter through the line *f* to the terminal 14 of the relay R, thence through the armature 15 of the relay, when closed, to the terminal 16; thence through the line *f'* to the terminal 17, where it joins the high resistance branch *e*, thence through the pre-signal gongs P and the return trunk L to the negative pole 10 of the generator.

The low resistance main or general alarm circuit also leads from the terminal 3 of the trunk line *a* through the line *f* to the terminal 14 of the relay R thence through the armature 15 of said relay to the terminal 18 thence to a terminal 19 adapted to coöperate with an arm 20 carried by the armature 21 of the relay S and when the relay is deenergized, through the line *g'* containing the main signaling gongs G, returning through the trunk L to the negative terminal 10 of the generator B.

It will be obvious that under normal conditions the supervisory current will energize the coils of the relays R and S and will maintain open the low resistance signaling circuits *f* and *g*, and that the heavy current required to actuate the signals will be employed only when the controlling circuits are interrupted by turning in a call from one of the alarm or call boxes so as to deenergize the coils of the relays R or S, or both and permit the armatures of either or both of said relays to complete the signaling circuit or circuits.

The alarm or call boxes C in the controlling circuits are distributed throughout the building and are provided with different "code" wheels which are rotated several times when the lever of the box is pulled, each rotation of the code wheel serving to separate a predetermined number of times and at predetermined intervals, the switch members 6—7 of the high resistance circuit which controls the pre-signaling circuit, thus breaking said circuit and by deënergizing the relay R permitting the armature 15 to complete the low resistance circuit *f*—*f'* and supplying a heavy current to actuate the pre-signal gongs P to sound the number of the box "pulled." The members of the local fire brigade are thus notified of the location of the fire and if the fire is of little consequence may extinguish the same without disturbing the other occupants of the building.

If however the fire is of a dangerous char-

acter, one of the local fire brigade may insert his key in the box and separate the switch members 12, 13 and then by pulling the lever sound the general alarm.

In such case the separation of the switch members 12—13 interrupts the line *d* and deenergizes the relay S permitting the arm 20 of its armature to engage the terminal 19. Thereupon the transmission of a signal by the code wheel upon pulling the lever in the call box as above described not only actuates the signals or gongs of the pre-signaling circuit but also actuates the general alarm signals G. In such case the course of the current is as follows: from the positive terminal 1 of the generator through the trunk line *a* and time cut out 2 to the terminal 3 thence through the low resistance line *f'* to the relay terminal 14. Then, as the armature 15, which is actuated by the "call" in the controlling circuit coöperates with both the terminals 18 and 16 the current is divided, one part going from terminal 16 through the line *f* and actuating the pre-signaling gongs P, and the other part going from terminal 18 through the line *g* to terminal 19 thence through the arm 20 of the armature and line *g'* to the general alarm gongs G, both portions of the signaling current returning through the return trunk L to the negative terminal 10 of the generator B.

The signals preferably are single stroke gongs which are actuated only upon each pulsation of the signaling current, and therefore do not repeat if the current flows continuously through their coils. It is therefore desirable to provide a protective device which will be operated to break the circuit through them if by the sticking of the relay armatures or for any other reason the heavy signaling current continues unnecessarily. Such protection may conveniently be provided by introducing a time cut out, preferably of the character disclosed in my prior application Serial Number 104,101 in the trunk line *a* or in the low resistance branches *f*, *f'* and *g*, *g'* leading to the gongs.

As illustrated herein the time cut-out comprises a heating coil 22 in the trunk line *a* having a thermostatically operable core 23 formed of metals having different co-efficients which by expanding unequally under the influence of heat will bend the core 23.

The core 23 forms a latch adapted to control a spring actuated switch 24 normally connecting contacts or terminals 25, 26 in the line *a*.

If a heavy signaling current continues longer than a predetermined time or if an overload is thrown upon the circuit the heating of the coil 22 will cause a deflection of the core or latch 23 thereby releasing the spring actuated switch member 24 and breaking the circuit. Inasmuch as the preferred form of time cut out is fully described in my co-pending application above mentioned, no detailed description is necessary in the present application.

In order to insure more effectively the operative condition of the principal circuits of the system a local or trouble circuit is provided which will actuate a suitable signal upon the failure or interruption of the current in either or all of the high resistance circuits in which a current should normally be maintained.

An illustrative form of "trouble" circuit is shown herein which comprises a battery M or other generator adapted to actuate a continuously ringing bell N. The positive and negative lines *m* and *n* of this circuit are connected to terminals 27, 28 adapted to coöperate with the armature 29 of the trouble relay T in the high resistance branch *e* of the pre-signaling circuit. If the supervisory current in said branch fails or is interrupted the relay T will be deënergized and will permit the armature 29 to drop and close the local circuit *m*, *n* through the continuously ringing bell N thus signaling to the attendant that the system is defective.

The trouble circuit *m*, *n*, may also be provided with branches leading respectively to the armature 21 of the relay S which controls the general alarm circuit and to a terminal 30 adapted to be engaged thereby when the relay S is deënergized. Any interruption of the controlling circuit *d* for the general alarm signals therefore, will deenergize the relay S and thereby permit the armature 21 to complete the trouble bell circuit and ring its bell.

By reason of the construction above described all parts of the system are doubly protected since, first the mil-ammeter indicates continuously whether a proper current is present in the high resistance lines, and second, any break which may occur in any of the lines will be announced by the trouble bell, for if a break occurs in the pre-signaling circuit the armature of the trouble relay T will be deënergized permitting its armature to close the trouble circuit; if the break should occur in the general alarm circuit the relay S will be deënergized and the armature 21 permitted to close the trouble circuit through the terminal 30, and if the break should occur in the controlling or alarm box circuit the relay R will be deenergized, permitting the armature 15 to complete the low resistance circuit through the pre-signal gongs P thereby short circuiting the trouble relay T, releasing its armature 29 and thereby completing the trouble circuit *m*, *n*, and ringing the trouble bell.

A preferred form of signal transmitting mechanism or alarm box is illustrated in Figs. 2 and 3 of the drawing, this mechanism comprises a hollow casing 31 preferably elliptical in cross section, having an

inner cover 32 hinged thereto, supporting the clock work for rotating the code wheel and also the switches of the branches in the controller circuit. An outer cover may also be pivoted upon the same hinge and adapted to cover the operating lever, as is usual in such constructions.

The casing 31 is provided with a shelf 330 having binding posts 340, 350 and 360 for the lines *b*, *c* and *d* forming the divided controlling circuit.

The line *b* terminates in the spring contact 6 of the switch which controls the pre-signaling circuit. The line *c* is divided into branches which connect respectively with the member 7 of the switch which controls the pre-signaling circuit and the member 12 of the switch which controls the general alarm circuit and the line *d* connects with the switch member 13 of the main signaling circuit as is diagrammatically illustrated in Fig. 1.

The signals are transmitted by interrupting the controlling circuits in the manner above described by means of a break wheel or code wheel of the usual construction, different for each box, which will cause the proper character of interruption. The code wheel in such case is actuated by clock mechanism to rotate such number of times as it is desired to repeat the signal.

As illustrated herein the code wheel 33 is provided with teeth 34 adapted upon rotation to engage the shoulder 35 upon the lever 36 which has an insulated pin 37 extending between the switch members 6 and 7 and which is adapted to separate said members as the teeth 34 of the code wheel successively actuate the lever 36.

The code wheel 33 is carried by a spindle 38 which is rotated through a pinion 39 by a gear 40 loosely mounted upon a spring actuated shaft 41, said gear 40 being connected to said spindle by a pawl 42 pivotally mounted upon said gear and engaging a ratchet 43 secured to the spring actuated shaft 41.

The dog 42 is maintained in engagement with the ratchet by a spring 44 having one end fixed to the gear 40 and its other end resting upon the dog 42. The spring actuated shaft 41 is rotated to wind up the spring by a segmental gear 45 loosely mounted upon a spindle 46 engaging a pinion 47 fixedly secured to the spindle 41. The segmental gear is actuated through a lever 48 pivoted upon said spindle 46 and having an extension 49 provided with a lug 50 adapted to engage a detent 51 which is mounted upon a pivot 52 in a plate 53 which is secured to the spindle 46. The detent 51 is provided with a curved tail 54 which engages a cam 55 rigidly secured to the clockwork frame so that upon the oscillation of the lever to cause the segmental gear to wind up the actuating spring the detent will be removed from the path of the lug 50 during the actuation of the clockwork mechanism under the influence of the spring and additional actuations of the lever 48 will have no effect upon the ringing in of the alarm. The lever 48 is normally maintained in elevated position by a helical spring 48× coiled about the spindle 46 and attached at one end to the lever and at its other end to a stationary post on the frame.

The code wheel spindle 38 is also provided with a gear 56 which meshes with a pinion 57 on a spindle 58 which carries an escapement wheel 59 adapted to coöperate with the usual escapement 60 provided with dampering vanes 61 adapted to control the speed of the clockwork mechanism.

Rotation of the clockwork conveniently may be stopped by a cam faced member 62 connected to the hub of the winding pinion 47 and adapted to be engaged by a stud 63 upon the gear 56 of the code wheel spindle.

In the operation of the device a single pull upon the lever causes the teeth of the code wheel successively to actuate the lever 36 and thereby to cause the separation of the spring contact members 6, 7 of the pre-signaling controlling circuit, thus deënergizing the relay R and sending the current through the pre-signaling gongs P in the manner heretofore described.

It will be noted in the mechanism illustrated in Fig. 2 that the controlling branch for the main signaling or general alarm circuit in which the spring contacts 12 and 13 are located is normally maintained closed, so that the relay S is energized and maintains the main signaling circuit open notwithstanding the turning in of the alarm on the pre-signaling circuit. When however, the contact members 12 and 13 are separated the relay S becomes deënergized so that upon the making and breaking of the controlling circuit by the code wheel the current is permitted to flow through the main signaling gongs G in the manner heretofore described.

Any suitable means may be provided for separating the spring contacts 12, 13 when it is desired to turn in a general alarm. A preferred means which is illustrated herein comprises a key which when once inserted and turned to separate said members will be retained so that the spring contacts 12, 13 cannot come together again until the key is released by separate means such as another or different form of key, the object being to enable the person who turns in the general alarm to set the mechanism so that the alarm may be repeated as often as desired without the delay of again setting the general alarm mechanism.

As illustrated herein the interior cover plate 32 is provided with a key hole 64 pref-

erably adapted to receive a key 65 having two oppositely disposed bits 66, 67 which of course may be of any suitable configuration to prevent tampering with the box. One of the bits 66 is adapted to engage an insulated block 68 carried by the spring contact member 12 so that when the key is turned the said contact member will be separated from its companion member 13. The opposite bit 67 of the key preferably engages a dog 69 having a curved end 70 and when turned passes beneath the same. The dog 69 is normally maintained in contact with the stationary pin 71 by a spring 72 pressing against the opposite end 73 of said dog. When, therefore, the key 65 is inserted and rotated a half revolution the spring contacts 12 and 13 will be separated and the key locked against reverse rotation by the dog 69 so that contacts 12, 13 will remain open until the dog 69 is released from its engagement with the bit 67 of the key.

In order to prevent the key from withdrawal by further rotation in contact separating direction a stud 74 is provided in the path of the bit 67.

Consequently the key can only be withdrawn by releasing the dog 69 from its engagement with the bit 67 of the key. This may conveniently be accomplished by providing an additional key hole 75 which will permit the insertion of a suitable key to engage the arm 73 of the dog 67 and by rotating said dog against the action of the spring release the key 65 so that the contacts 12, 13 will again be closed and the withdrawal of the key 65 permitted. The signaling box thus described constitutes a very effective and safe fire alarm box since the pulling of the box will first only notify the members of the local brigade and will not disturb the other occupants of the building, so that protection is afforded against panics due to false alarms.

When the fire is of serious proportions the authorized members of the brigade can turn in a general alarm and when once the box is set for the turning in of a general alarm, any person may repeat the alarm as many times as desired by merely pulling the lever in the box since the mechanism is maintained in condition to sound a general alarm until released by the special key required to release the dog 73.

It is to be understood that the embodiment of the invention disclosed herein is illustrative merely and that various changes in the mechanism may be provided within the spirit and scope of the following claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A signaling system comprising a general alarm circuit, an auxiliary signaling circuit and a controlling circuit, means for supplying electrical energy to said circuits directly from a common source of energy and means in said controlling circuit operable either to supply a signaling current to the auxiliary circuit alone or to both the general alarm and auxiliary signaling circuits.

2. A signaling system comprising a general alarm circuit, an auxiliary signaling circuit and a controlling circuit having branches containing relays operable to control respectively the auxiliary and general alarm circuits, a common source of energy for said circuits, operable means in said controlling circuit for actuating said relays to supply a signaling current either to the auxiliary circuit or to both the auxiliary and main circuits.

3. A fire alarm system comprising a general alarm circuit and an auxiliary signaling circuit having high and low resistance branches, a controlling circuit connected in said high resistance branch having relays operable to control the current supply to the main and auxiliary signaling circuits and selectively operable means in said controlling circuit for actuating either the relay controlling the auxiliary circuit or both of the relays controlling the general alarm and auxiliary circuits.

4. A fire alarm system comprising a general alarm circuit and an auxiliary signaling circuit having high and low resistance branches, means for maintaining a supervisory current in said high resistance branch, a controlling circuit connected to said high resistance branch having means respectively to maintain the low resistance branch of the auxiliary circuit and the general alarm circuit normally open and means in said controlling circuit selectively operable to close the low resistance branch of the auxiliary circuit and the general alarm circuit, whereby either the auxiliary signaling circuit or both the auxiliary and general alarm circuits may be energized to give an alarm.

5. A fire alarm system comprising a general alarm circuit and a pre-signaling circuit having high and low resistance branches, a controlling circuit connected in parallelism with said high resistance branch, means for maintaining a supervisory current in said pre-signaling circuit branch and in said controlling circuit and means normally operable by said supervisory current to maintain open the general alarm circuit and the low resistance branch of the pre-signaling circuit and means in said controlling circuit selectively operable to cause the closing either of the pre-signaling circuit or of the pre-signaling circuit and the general alarm circuit.

6. A fire alarm system comprising a general alarm circuit and a pre-signaling circuit having high and low resistance branches, a

controlling circuit connected in parallelism with said high resistance branch, means for maintaining a supervisory current in said high resistance branch and said controlling circuit, means normally operable by said supervisory current thereby to maintain open the general alarm circuit and the pre-signaling circuit and means in said controlling circuit selectively operable to cause the closing either of the pre-signaling circuit or of the pre-signaling circuit and the general alarm circuit, a relay in said high resistance branch, a circuit having a trouble signal connected to said relay and operable thereby upon the interruption of the pre-signaling circuit to actuate the trouble signal.

7. A signaling system comprising a general alarm circuit and a pre-signaling circuit having high and low resistance branches, a controlling circuit having branches provided with relays adapted respectively to maintain open the general alarm circuit and the low resistance branch of the pre-signaling circuit, a trouble signaling circuit having an independent source of energy and means in said general alarm circuit operable to actuate the trouble signal upon the interruption of the branch of the controlling circuit containing the relay for controlling the general alarm circuit.

8. A fire alarm system comprising a general alarm circuit and a pre-signaling circuit having high and low resistance branches, a relay in said high resistance branch, a controlling circuit connected in parallel with said high resistance branch and having relays adapted respectively to maintain the general alarm circuit and the low resistance branch of the pre-signaling circuit open, a trouble circuit having a signal operable by an independent source of energy, a controlling relay therefor in said low resistance branch of the pre-signaling circuit and a controlling relay therefor also connected to the general alarm circuit,said controlling relays being adapted to be actuated to give a trouble signal upon the interruption of the supervisory current either in the auxiliary circuit or the controlling circuit.

9. A signaling system comprising a general alarm signaling circuit and an auxiliary signaling circuit arranged in parallel, a controlling circuit of high resistance arranged in shunt with said general alarm and auxiliary signaling circuits and provided with relays normally operating to maintain open the general alarm circuit and the auxiliary signaling circuit, means in said controlling circuit selectively operable to actuate the relay of the auxiliary circuit to supply a signaling current thereto or to supply a signaling current both to the general alarm circuit and the auxiliary signaling circuit, a thermostatic time cut-out in said signaling circuits adapted to break both the general alarm and auxiliary signaling circuits upon continuance of the current through either of said circuits a predetermined time.

10. In a signaling system comprising a general alarm circuit and a pre-signaling circuit and means for supplying electrical energy to both said circuits, a controlling circuit having branches containing relays adapted normally to maintain said signaling circuits open, a controller having switches normally closed to maintain a current in said branches, an interrupter operable to break the circuit in the branch controlling the pre-signaling circuit and thereby to cause the relay in said branch to close the pre-signaling circuit without deënergizing the relay controlling the general alarm circuit.

11. In a signaling system comprising a general alarm circuit and a pre-signaling circuit and means for supplying electrical energy to both said circuits, a controlling circuit having branches containing relays adapted normally to maintain said signaling circuits open, a controller having switches normally closed to maintain a current in said branches, an interrupter operable to break the circuit in the branch controlling the pre-signaling mechanism and thereby to cause the relay in said branch to close the pre-signaling circuit without deënergizing the relay controlling the general alarm circuit, and a separately operable means for opening the switch of the branch leading to the relay controlling the general alarm circuit, whereby the interruption of the current in the general alarm circuit will deënergize both the relay of the presignaling circuit and the relay of the general alarm circuit.

12. In a signaling system comprising a main signaling circuit and an auxiliary signaling circuit, a controlling circuit having branches containing means adapted normally to maintain open the main and auxiliary circuits, normally closed switches in said branches of the controlling circuit, means for separating the members of the switch controlling the auxiliary circuit without interrupting the branch which controls the main signaling circuit and independent means for separating the members of the switch controlling the main circuit.

13. In a signaling system comprising a main signaling circuit and an auxiliary signaling circuit, a controlling circuit having branches containing means adapted normally to maintain open the main and auxiliary circuits, normally closed switches in said branches of the controlling circuit, a series of alarm transmitting boxes each having means including a spring actuated code wheel for separating the members of its switch controlling the auxiliary circuit without interrupting the branch which controls the main signaling circuit and independent means for breaking the switch which con-

trols the main signaling circuit whereby the breaking of the switch in the auxiliary circuit by the action of the code wheel will also transmit the signals to the main circuit.

14. In a signaling system comprising a main signaling circuit and an auxiliary signaling circuit, a controlling circuit having branches containing means adapted normally to maintain open the main and auxiliary circuits, normally closed switches in said branches of the controlling circuit, means for separating the members of the switch controlling the auxiliary circuit to cause the transmission of a signal through said auxiliary circuit alone without interrupting the branch which controls the main signaling circuit, means adapted to be operated by a key for breaking the switch which controls the main signaling circuit whereby the breaking of the switch in the auxiliary circuit by the action of the code wheel will also transmit the signals through the main circuit.

15. In a signaling system comprising a main signaling circuit and an auxiliary signaling circuit, a controlling circuit having branches adapted normally to maintain open the main and auxiliary circuits, normally closed switches in said branches of the controlling circuit, means including a spring actuated code wheel for separating the members of the switch controlling the auxiliary circuit to cause the transmission of a signal through said auxiliary circuit alone without interrupting the branch which controls the main signaling circuit, means adapted to be operated by a key for breaking the switch which controls the main signaling circuit whereby the breaking of the switch in the auxiliary circuit by the action of the code wheel will also transmit the signals through the main circuit and means for locking the key to retain open the switch in the branch which controls the main circuit whereby successive actuations of the code wheel will cause the actuation of the alarms of both the auxiliary and main signaling circuits.

16. In a signaling system comprising a main signaling circuit and an auxiliary signaling circuit, a controlling circuit having branches adapted normally to maintain open the main and auxiliary circuits, normally closed switches in said branches of the controlling circuit, means including a spring actuated code wheel for separating the members of the switch controlling the auxiliary circuit to cause the transmission of a signal through said auxiliary circuit alone without interrupting the branch which controls the main signaling circuit, means adapted to be operated by a key for breaking the switch which controls the main signaling circuit whereby the breaking of the switch in the auxiliary circuit by the action of the code wheel will also transmit the signals through the main circuit, a spring actuated dog for locking the key to maintain open the branch which controls the main signaling circuit whereby a succession of alarms may be turned in upon both the auxiliary and main circuits, said dog being provided with means adapted to be engaged by a key to release said switch breaking key.

In testimony whereof, I have signed my name to this specification.

JOHN C. FRANCIS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."