

May 12, 1936.

K. LE R. HAYDEN

2,040,309

PROTECTIVE SIGNAL SYSTEM

Filed June 2, 1933

3 Sheets-Sheet 1

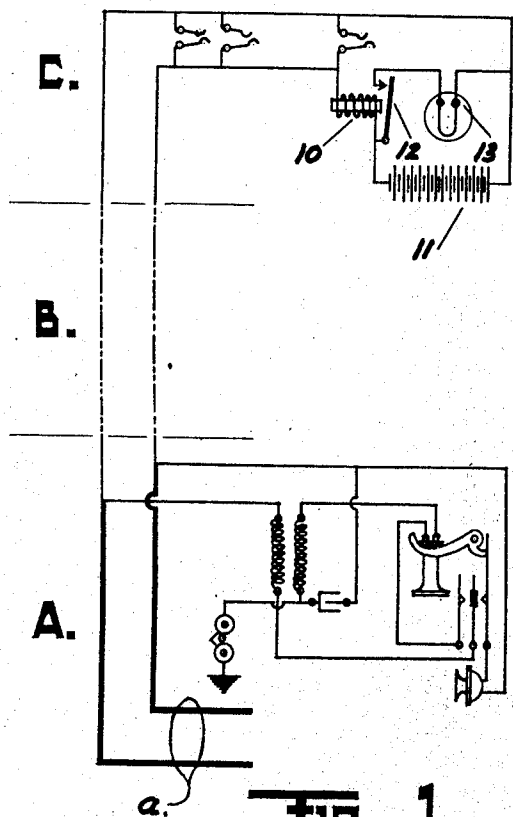


FIG. 1.

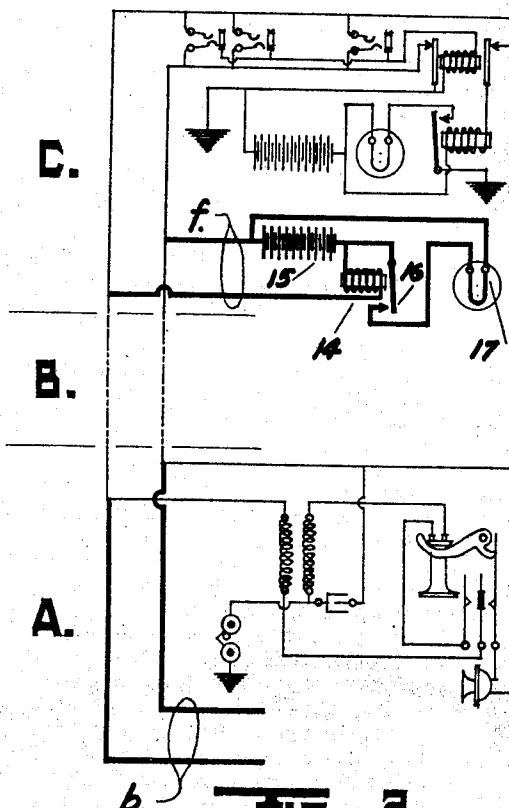


FIG. 2.

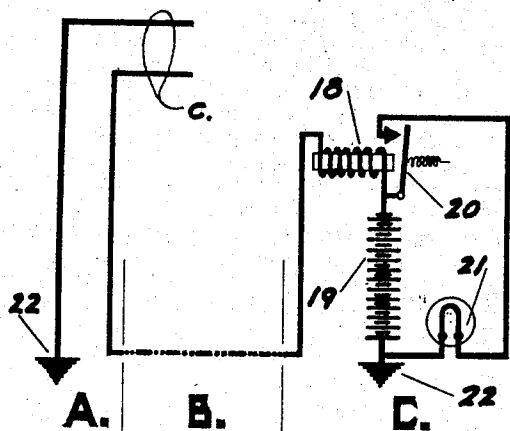


FIG. 3.

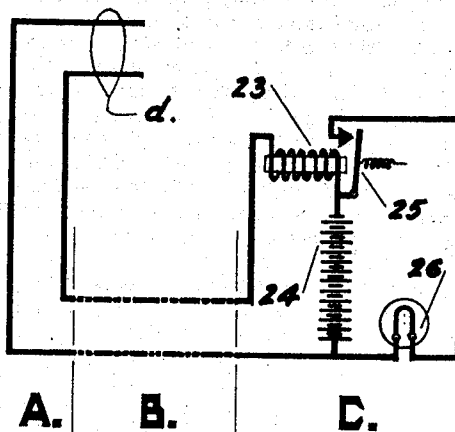


FIG. 4.

WITNESSES

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3 Sheets-Sheet 2

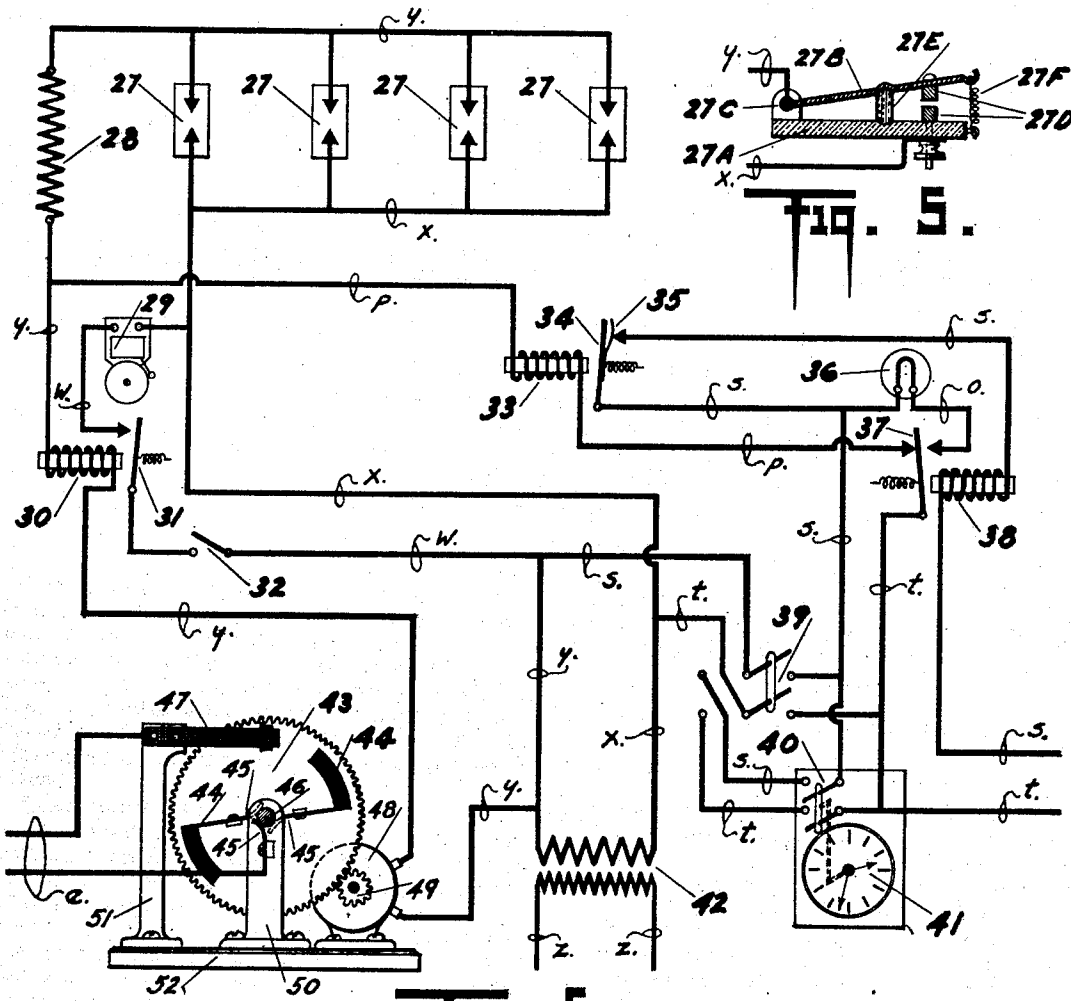


Fig. 6.

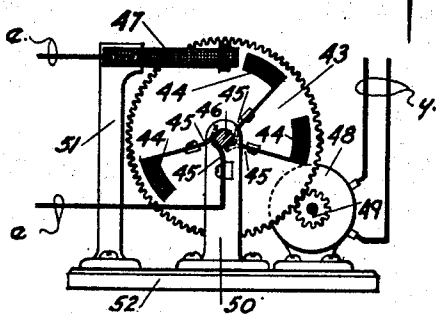


Fig. 7.

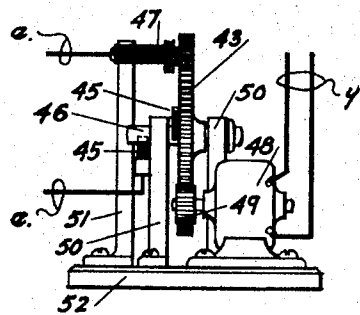


Fig. 8.

WITNESSES

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3 Sheets-Sheet 3

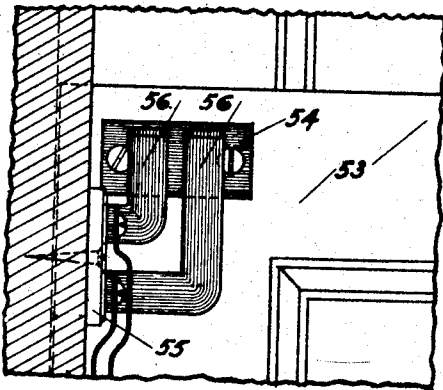


Fig. 9.

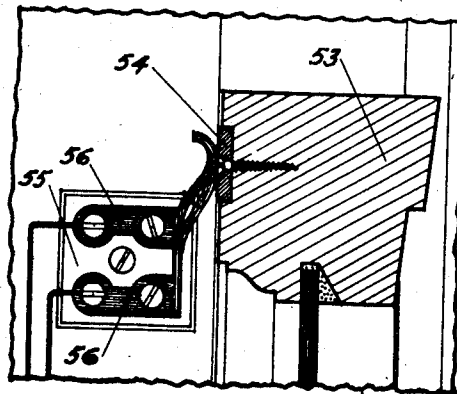


Fig. 10.

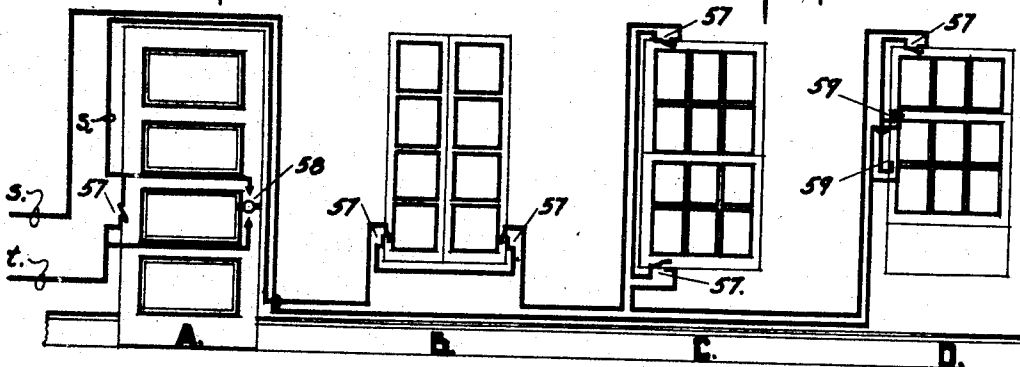


Fig. 11.

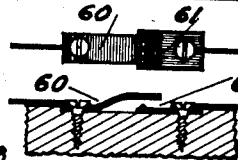


Fig. 12a

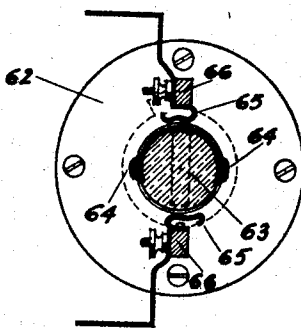


Fig. 13.

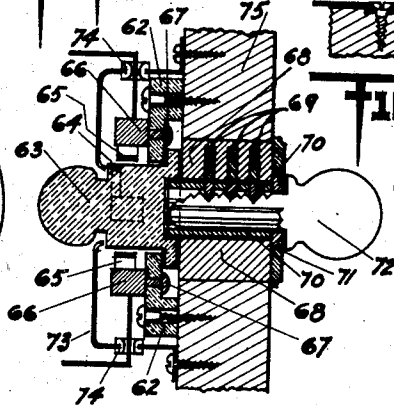


Fig. 14.

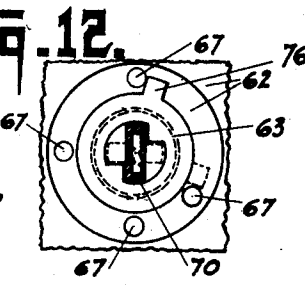


Fig. 15.

WITNESSES

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2,040,309

PROTECTIVE SIGNAL SYSTEM

Kenneth Le Roy Hayden, Winthrop, Mass.

Application June 2, 1933, Serial No. 674,005

8 Claims. (Cl. 179-5)

An object of the invention is to provide a fire alarm signal system operative continuously.

Another object of the invention is to provide a burglar alarm signal system operative at definite fixed intervals of time, by automatic or manual means, at the discretion of the subscriber.

Still other objects of the invention are to provide a means for actuating the telephone installation of the subscriber, this means operating a central office switch-board signal lamp of a local telephone company, by interrupting said telephone subscriber's circuit, exciting definite series of signal impulses therein, one series of said signal impulses being of a certain predetermined frequency, to enable the telephone company switch-board operator to recognize it as a burglar alarm warning when this system operates, and another series of said signal impulses, at a substantially different predetermined frequency, to enable the telephone company switch-board operator to recognize it as a fire alarm warning when this system operates.

Additional objects of the invention are to operate, in addition to the telephone actuated system, an alarm gong at the subscriber's location, when either the fire alarm system, or the burglar alarm system operates, as a local warning signal.

Other objects of the invention are to provide, in lieu of utilizing the local telephone company lines, as a medium for the transmission of the fire alarm and burglar alarm signals, and the local telephone company as the operating agency, for the further transmission of these warning signals by vocal telephone means to the local fire department, or police department, means for a separate line installation with a separate central office switch-board signal device installation, for independent operation.

Additional objects of the invention are to provide a protective signal system in combination with a telephone system, or an independently operated street line and central office system, with means to permit a number of subscribers to utilize a single circuit, by means to vary the series of signal impulses transmitted, to distinguish each subscriber's signal.

Other objects of the invention are to provide a burglar alarm signal system, operating warning signals, when the protective circuit is broken by unauthorized entrance, and means to continue the operation of the warning signals, irrespective of the later contact of the protective devices, until system is made inoperative by either the owner, or the operating agency.

Still other objects of the invention are to provide means to lock the burglar alarm signal system in an operative position, during the prolonged absence of the owner.

Other objects of the invention are to provide a burglar alarm signal system, with means to permit protected windows to remain open for necessary ventilation, but still be protected against unauthorized entrance.

Additional objects of the invention will appear in the following specification, in which the preferred form of the invention is described.

In the drawings similar reference characters refer to similar parts in all of the views, of which

Figure 1 illustrates the connection of the invention to the usual typical telephone system.

Figure 2 illustrates the connection of the invention to a signal cut-out relay telephone system, with an additional circuit indicated at the telephone central office, for a separate signal-board installation when required.

Figure 3 illustrates the connection of the invention to a single wire (ground return) independently operated system.

Figure 4 illustrates the connection of the invention to a double wire independently operated system.

Figure 5 illustrates a sectional detail view of the fire protective devices.

Figure 6 illustrates a front view of the distributor for transmitting signal impulses, also the fire alarm and alarm gong circuits, and the operative portions of the burglar alarm circuits.

Figure 7 illustrates a front view of an alternate distributor for transmitting signal impulses.

Figure 8 illustrates a side view of the distributor for transmitting signal impulses, showing the relationship between the various parts.

Figure 9 illustrates a fragmentary front detail view of a typical double-hung window meeting rail with one type of burglar protective device installed, and

Figure 10 illustrates a fragmentary sectional detail view of the same, showing the relationship between the various parts.

Figure 11 illustrates the connections, installations, etc. of the various burglar protective devices, to meet various requirements.

Figure 12 illustrates a top detail view of a different type of burglar protective device, and Figure 12A illustrates a sectional detail view of same.

Figure 13 illustrates a detail interior front view of the burglar protective locking device, with the dust cap removed.

Figure 14 illustrates a detail vertical sectional

view at right angles to Figure 13 on the center line of the burglar protective locking device.

Figure 15 illustrates another detail sectional view at right angles to Figure 14 on the interior side at the door line, of the burglar protective locking device.

By referring to the drawings it will be seen that Figure 1 (section A) is the usual telephone subscriber's station, with the circuit (a) connecting the subscriber's lines to the circuit (e) Figure 6 of the invention. Section B represents the street lines to (section C), the sub-station line circuit at the usual telephone central office multiple switch-board, where 10 is the line lamp re-
lay operated by the central office battery 11 actuating the armature 12 to close the line lamp signal circuit, lighting the line lamp signal 13 when telephone sub-station circuit is closed by the operation of the protective signal system, producing signal impulses at the telephone central office multiple switch-board.

In Figure 2 an alternate circuit arrangement is provided for those telephone central offices using a line lamp cut-out relay system, or the automatic switch-board system, showing the subscriber's station (section A) with the circuit (b) connecting the subscriber's lines to the circuit (e) Figure 6 of the invention, where (section B) represents the street lines to (section C) the line circuit at the telephone central office multiple switch-board, where the additional relay circuit (f) is connected to and in front of the switch-board installation, with relay 14 operated by battery 15 actuating the armature 16 to close circuit lighting signal lamp 17, when the telephone sub-station circuit is closed by the operation of the protective signal system, producing signal impulses at a separate central office protective signal-board installation, for the reception of the protective signals of the invention hereinafter described. A battery source of power common to the central office switch-board and central office signal-board may be substituted for battery 15 in the circuit (f).

The single wire (ground return) system illustrated in Figure 3 anticipates an independently operated system with the circuit (c) connecting the subscriber's lines to the circuit (e) Figure 6 of the invention, where (section A) is the subscriber's station, (section B) is the street lines to (section C) the independently operated central office signal-board installation, where the relay 18 and the battery 19 actuate the armature 20 to close the lamp signal circuit, lighting the lamp signal 21, by use of a common ground return 22, when circuit (c) is closed by the operation of the protective signal system, producing signal impulses at the independently operated central office signal-board.

The double wire system illustrated in Figure 4 anticipates an independently operated system using polarized relays to permit a greater number of subscribers to utilize a single circuit, than that permitted in the single wire (ground return) system, with the circuit (d) connecting the subscribers' lines to the circuit (e) of the invention Figure 6, where (section A) is the subscriber's station (section B) is the street lines to (section C) the independently operated central office signal-board installation, where the relay 23 and the battery 24 actuate the armature 25 to close the lamp signal circuit, lighting the lamp signal 26, when circuit (d) is closed by the operation of the protective signal system, producing signal

impulses at the independently operated central office signal-board.

This invention anticipates utilizing a number of subscribers' stations on a single circuit, either with telephone operation, or independent operation, by means to vary the series of signal impulses transmitted, but has illustrated but one subscriber's installation for each of the systems shown in Figures 1, 2, 3, and 4, to clarify these views. Additional subscribers' stations may be connected to the street lines (section B) in all four views, as may be required.

As there are many variations and applications of the telephone systems, and independently operated systems illustrated, it is understood that this description is given by way of example only, and that various modifications and other applications will readily occur to those skilled in the art.

In Figure 5 is shown a detail sectional view of one type of fire protective devices, which are a part of the fire alarm circuit of the invention, reference character 27 in Figure 6, and illustrates an insulation support 27A, with the metal contact bar 27B supported thereon by a hinged connection 27C, which connects to one side of the fire alarm circuit (x-y). Supported upon this contact bar 27B and on the insulation support 27A are the two contact points 27D, one point connecting to each side of the circuit (x-y) Figure 6, and held apart by the fusible plug 27E, which is composed of a low melting-point metal alloy or composition, melting at a predetermined temperature. Fastened at the end of the contact bar 27B, and the insulation support 27A is a metal coil spring in tension 27F, so arranged that when a predetermined temperature is applied to the fire protective device 27, the fusible plug 27E will melt and allow the tension spring 27F to contract, and force the contact points 27D together, to close the fire alarm circuit (x-y), operating the signal distributor described in Figure 6.

A front view of the distributor or interrupter for transmitting signal impulses over circuit (e), and a schematic diagram of the various protective circuits, is shown in Figure 6, where a round insulated disc rotor 43 with gear teeth cut along its edge, and with two metal inserts 44 imbedded thereon, and connected to collector brushes 45 contacting supporting shaft 46 to one side of circuit (e), the whole mounted on supports 50 with a brush support 51 connected to the opposite side of circuit (e), with a flexible metal contact brush 47 contacting the metal inserts 44 on rotor 43, as rotor 43 revolves, when the electric motor 48, with gear tooth drive 49 engaging rotor 43 revolves. Figure 6 also illustrates the fire alarm circuit (x-y), the local warning gong circuit (w), and the actuating portions of the burglar alarm circuit (s-t), (p), and (o), where (z-z) is the primary circuit of a step-down transformer 42 excited by the usual 110-volt house current supply, exciting a low voltage current supply in the secondary circuit (x-y), one side of the line (x) connected to fire protective devices 27, and the other side of the line (y) connected in series thru the operating motor 48 to and thru relay 30 to fixed resistance 28, thru fixed resistance 28 to the opposite side of fire protective devices 27, forming the fire alarm circuit. Introduced across this fire alarm circuit (x-y) is the local alarm gong circuit (w) where the alarm gong 29 is connected to the (x) side of the lines, and by the armature 31 of the relay 30, when relay 30

is excited by the closing of circuit (x-y) by the protective devices 27, closes the alarm gong circuit (w), thru a single pole single throw cut-out switch 32, operating the alarm gong 29, to serve as a local warning signal. Fire protective devices 27 are connected in parallel across fire alarm circuit (x-y), and may be of any number required for adequate fire protection. The resistance 28 introduced in series in the circuit (x-y) on the (y) side of the circuit, is for the purpose of reducing materially the speed of the operating motor 48, when fire alarm circuit operates, thereby materially reducing the speed, for fire alarm signals, of signal distributing rotor 43, and transmitting less impulses over circuit (e), at a materially reduced frequency from that used when the burglar alarm circuit is operating said signal distributor. It will be noted that the fire alarm circuit (x-y) is an open circuit, and becomes operative when actuated by the closing of the fire protective devices 27, and is responsive to said actuation continually irrespective of the conditions of the other circuits connected to the distributor for transmitting signal impulses.

The line (s) connected to the (y) side of the circuit (x-y) and the line (t) connected to the (x) side of the circuit (x-y) form the burglar alarm circuit, where a double-pole double-throw circuit switch 39, is introduced for manual operation on one side of the switch, and for automatic operation on the opposite side of the switch, where a subsidiary switch 40, operated by a mechanical or electrical time clock-work mechanism 41, that has been adequately disclosed in numerous prior patents, and is common practice, or other means, opens or closes the circuit (s-t) at definite fixed periods of time as pre-arranged by the subscriber or the operating agency, the line (s) continuing to the armature 34 with the flexible spring contact 35 of the auxiliary relay 33 and thru contact 35 to the supervisory relay 38, thru relay 38 to the burglar protective devices 57, 57, and 58, (Figure 11) these burglar protective devices connected as shown, terminating in the return line (t), to armature 37 of the supervisory relay 38, and to the switches 39 and 40. Also connected to the (t) side of the circuit (s-t) is the auxiliary circuit (p) contacting the front contact of armature 37 of supervisory relay 38, continuing to and thru the auxiliary relay 33 to (y) side of the circuit (x-y) as shown in Figure 6. Also introduced across the circuit (s-t) contacting the back contact of armature 37, when armature 37 is attracted by supervisory relay 38, upon excitation of said relay 38, is the circuit (o) with the pilot lamp 36, energizing upon closure of circuit (s-t), to indicate to the subscriber, that the burglar alarm system is in an operative condition. The flexible contact 35 in the armature 34 of the auxiliary relay 33 is provided, to allow a lapse in the movement of said contact 35 to prevent breaking contact of the line (s) with said contact 35 of said armature 34, so that supervisory relay 38 becoming excited at the instant that auxiliary relay 33 does, upon closure of said circuits by either switch 39 or switch 40, will attract its armature 37 before flexible contact 35 of armature 34 has broken contact with the line (s), this action of armature 37 breaking contact with auxiliary circuit (p), thereby de-energizing the auxiliary relay 33.

When the burglar alarm circuit (s-t) is opened by the breaking contact of any of the burglar protective devices, 57, or 58, supervisory relay 38 becomes de-energized, releasing back contact of armature 37, opening the circuit (o) and de-

energizing the pilot lamp 36, contacting the front contact of armature 37 and energizing the auxiliary circuit (p), and energizing the auxiliary relay 33 to attract its armature 34 with its flexible contact 35, breaking contact to the (s) side of the circuit (s-t), and rendering said circuit (s-t) inoperative, irrespective of whether the burglar protective devices 57, or 58, are immediately contacted again, in the attempt to close the circuit (s-t), auxiliary circuit (p) continuing to the (y) side of the circuit (x-y), and energizing said circuit. This movement of armature 37 of the supervisory relay 38 also energizing the alarm relay 30 in circuit (y) to attract its armature 31, contacting back contact thereof, with the local alarm gong circuit (w) and actuating alarm gong 29, when switch 32 is in a closed position, the circuit (x-y), effective upon aforesaid energization, operates the motor 48 at its normal speed, rotating the distributor for transmitting signal impulses over the circuit (e) to the various central office signal-boards illustrated in Figures 1, 2, 3, or 4. It will be noted that the burglar alarm circuit (s-t) is a closed and excited circuit when in use, and becomes operative when the circuit (s-t) is opened by the releasing contact of any of the various burglar protective devices, 57, or 58. A local battery source of current, to excite these protective circuits, may be substituted for the step-down transformer 42, when there are no local electric power lines available for use.

A front view of an alternate distributor or interrupter for transmitting signal impulses, is illustrated in Figure 7, where a different arrangement of the metal inserts 44 spaced at different intervals on the rotor 43, than that shown on the rotor in Figure 6, allows this rotor to transmit a different series of signal impulses over the common circuit (e), for the purpose of transmitting series of signal impulses distinctive to each subscriber when a number of subscribers are connected to a single circuit. There may be various combinations possible, allowing the various rotors, each transmitting an individual series of signal impulses, to use a common circuit for actuating the central office signal-board.

A view taken at right angles to the view shown in Figure 7 is shown in Figure 8, where the relationship between the motor 48, the gear tooth drive 49, the insulated rotor 43 with its supports 50, together with the collector brushes 45, the contact brush support 51 and its contact brush 47, are all mounted upon the insulated base 52 as illustrated in the drawings.

A means for permitting windows to remain open, for necessary ventilation, but to still be protected against unauthorized entrance, is shown in Figures 9 and 10, where the burglar protective device 59, Figure 11D is installed in a predetermined position on the interior side of a double-hung window jamb, and illustrates an insulation support 55, upon which is mounted two flexible, metal, spring prong contacts 56, said combination fastened to the window jamb by screws, and connected to the circuit (s-t) as shown in Figure 11D. Installed on the meeting rail 53 of the window, is the contact bar 54. Said metal plate contact bar 54, when contacting the flexible spring prong contacts 56, closes the burglar alarm circuit, but any movement of the window meeting rail in either direction, releases contact thereof, and opens the burglar alarm circuit (s-t), operating the burglar alarm signal system. An additional protective device 59 is installed at the junction of the window meeting rails, when window is

closed, to provide protection against opening window when ventilation is not required, as shown in Figure 11D.

The connections, installations, etc., of the various burglar protective devices 57, 58, and 59, is illustrated in Figure 11, showing the installation for doors required to be protected, Figure 11A, the installation for protection of casement windows, Figure 11B, and also for double-hung windows, Figure 11C, and an additional installation for double-hung windows required to remain open for the necessary ventilation desired, but to still be protected against unauthorized entrance, Figure 11D. Casement windows required to remain open for ventilation, would require installed a protective device 57, mounted horizontal at the base of the inside roll screen, and contacting by the pressure exerted by the screen, similar to the sill protection of the normal double-hung window, as illustrated in Figure 11C. There may be as many of these various installations as will be required to adequately protect the subscriber at all times. Protective device 58 is connected across the leads to protective device 57, Figure 11A, to permit authorized entrance or exit thru the protected doors, when protective device 58 is closed and the burglar alarm system is in an excited condition, by means of a key lock switch on the door, manually operated on the inside and operated by key means on the outside, this means locking the protective device 58 in an open position from the outside when required, permitting the releasing contact of the protective device 57 for operating the burglar alarm system upon unauthorized entrance through said protected doors.

The burglar protective devices 57 are illustrated in detail in Figure 12, by a sectional view, and in Figure 12A by a top view, where a flexible, metal, spring contact 60, extending over and contacting another metal contact 61, when pressure is applied, and is installed at the interior sill and head sections of double-hung windows, and at the interior jamb sections of casement windows and door openings, said devices releasing contact and opening the burglar alarm circuit (s-t), upon release of said pressure when windows or doors are opened. When window and door openings are closed, the jambs or side rails of said doors, or said windows apply pressure to the contacts 60, contacting contacts 61, closing them, and completing the burglar alarm circuit (s-t) thereby.

A means for locking the burglar alarm circuit (s-t) to prevent unauthorized entrance, but allowing authorized entrance by the subscriber is illustrated in Figure 13 by an interior front view of the installation of burglar protective device 58, Figure 11A, and in Figure 14 by a sectional view of this protective device 58, showing the relationship between the various parts, and in Figure 15 by a sectional view taken at right angles to the view shown in Figure 14, at the inside door line, to show the back of this device and its connection with its lock mechanism, where the insulated rotor switch 63, with the metal contacts 64 imbedded thereon, and connected together, make and break contact with the spring contacts 65, on the binding posts 66 connected to the burglar alarm circuit (s-t) as shown in Figure 11A. The insulated rotor 63 has a projecting knob for manually opening and closing this switch from the interior side of the door 75. The binding posts 66 with the spring contacts 65, contacting the rotor contacts 64, when switch is closed, are supported on a fixed insulated plate 62, this plate holding the key switch assembly together by

means of the studs 67, and fastened to the door 75 by wood screws as shown in the drawings. The rotor 63 has an extended prong 76, acting as a stop against the studs 67, permitting a one quarter revolution of the switch only. Inserted thru the door 75 is the usual tumbler type key lock 68, and the exterior key plate 71, with the tumbler barrel 70 and the tumblers 69, and the key 72 to lift and align the tumblers, except that tumbler barrel 70 has its inside end shaped as shown in Figure 15, to engage the insulated rotor 63, as shown in Figure 14, permitting a one-quarter revolution of the tumbler barrel 70, before revolving the insulated rotor 63, this action permitting the insertion and withdrawal of key 72 from tumbler barrel 70, irrespective of the position of insulated rotor 63. The complete mechanism is enclosed in a dust cap 73, with the insulation thimbles 74 to permit inserting circuit leads to the binding posts 66 for connection to the burglar alarm circuit.

The fire alarm system operating

The fire protective devices 27 are installed at various locations thru-out the building to be protected, for example, there may be a fire protective device 27 installed at each end of the basement, one installed at each end of the first floor, one installed at each end of the second floor, and one installed at each end of the attic floor, and in such other locations as are needed where increased fire hazards may occur. Upon a fire breaking out, for instance in the basement of the building, the temperature therein will rise, until it has reached a point sufficient to melt the fusible plug 27E of the fire protective device 27 nearest the source of the heat, closing the contacts 27D, closing said fire alarm circuit thereby, energizing alarm relay 30, closing the local alarm gong circuit thereby and actuating the local alarm gong 29, also operating the motor 40 of the signal distributor at a predetermined reduced speed, by reason of the resistance 28 introduced in the circuit, the operation of the signal distributor in turn closing and opening the external line circuit (e) to the line signal lamp at the central office signal-board of the operating agency, flashing signal impulses on and off at a predetermined frequency and sequence at this signal-board. The signal-board operator on duty at the operating agency, identifying the type of signals by the reduced speed received (for fire alarms) and identifying the location of the signals by their sequence, notifies, by vocal telephone means, or other means, the local fire department of the fire alarm warning, and its exact location.

The burglar alarm system operating

The clock mechanism 41 closing the switch 40 and thereby closing the burglar alarm circuit, excites said circuit for a predetermined time, until another predetermined time, when it actuates said switch 40 to open said circuit, permits said burglar alarm circuit to be in an operative condition during those hours when burglary is most apt to occur. When clock actuated switch 40 closes, it energizes the supervisory relay 38 to attract its armature 37, de-energizing the auxiliary relay 33, as previously described, lighting the pilot lamp 36, indicating to the subscriber that the burglar alarm system is in an operative condition, making a closed and excited circuit of that circuit to which the burglar protective devices 57, 58, and 59, are connected. When un-

authorized entrance, or burglary occurs, either thru window openings, or door openings, of the protected building, burglar protective devices 57, or 59 break contact, opening the burglar alarm circuit ($s-t$), de-energizing the supervisory relay 38, and releasing the armature 37, to contact and energize the auxiliary circuit (p), energizing auxiliary relay 33, attracting its armature 34, thereby, and rendering said burglar alarm circuit inoperative, irrespective of the later contact of the protective devices, in an attempt to close that circuit ($s-t$), also energizing the alarm relay 30, closing the local alarm gong circuit (w), actuating the local alarm gong 29, and energizing the motor 48 of the signal distributor at its predetermined normal speed, the operation of the signal distributor in turn closing and opening the external line circuit (e) to the line signal lamp at the central office signal-board of the operating agency, flashing signal impulses on and off at a predetermined frequency and sequence at this signal-board. The signal-board operator on duty at the operating agency, identifying the type of signals by the normal speed received (for burglar alarms) and identifying the location of the signals by their sequence, notifies, by vocal telephone means, or other means, the local police department of the burglar alarm warning, and its exact location. By operating the manual switch 39, to cut out the clock-actuated switch 40, the burglar alarm system may be placed in an operative condition continuously, during the prolonged absence of the subscriber, by lock-switch means, as previously described in the specification.

As there are numerous variations and modifications of the invention described, it is understood that the description given, is of the preferred form of the invention. I therefore, do not wish to be limited to the construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

What is claimed is:

1. A protective signal system comprising a burglar alarm circuit including a plurality of normally closed contacts, and means associated therewith for causing the release of any said contacts for opening said circuit, one or more of said contacts including lock actuated means effective upon key manipulation, for holding said circuit closed, upon release of said contact associated therewith, sources of electrical energy, an auxiliary circuit including an alarm device associated therewith, clock actuated switch means connecting to one of said sources and said burglar alarm circuit and effective at predetermined time intervals, for exciting said circuit, means in circuit therewith, effective upon opening of said circuit for energizing said auxiliary circuit, means associated with said auxiliary circuit, effective upon energization thereof, for rendering said burglar alarm circuit inoperative, means in said auxiliary circuit, effective upon energization thereof, for actuating said alarm device, a motor, an interrupter mechanically associated therewith, and a signal circuit including another said source, said motor connecting to said auxiliary circuit, and effective upon energization thereof, for actuating said interrupter, said interrupter in circuit with said signal circuit, and effective upon said actuation for exciting series of signal impulses in said signal circuit, a line relay and a signal device associated with said signal circuit,

effective upon closure thereof, for visually reproducing said signal impulses.

2. In a protective signal system, a plurality of burglar alarm circuits, and a signal circuit, each of said burglar alarm circuits comprising a plurality of normally closed contacts, and means associated therewith for causing the release of any said contacts, for opening said circuit; a source of electrical energy, an auxiliary circuit including an alarm device associated therewith, clock actuated switch means connecting to said source and said burglar alarm circuit and effective at predetermined time intervals, for exciting said circuit, means in circuit therewith, effective upon opening of said circuit for energizing said auxiliary circuit, means associated with said auxiliary circuit and effective upon energization thereof, for rendering said burglar alarm circuit inoperative, means in said auxiliary circuit effective upon energization thereof for actuating said alarm device, a motor, and an interrupter mechanically associated therewith, said motor connecting to said auxiliary circuit and effective upon energization thereof, for actuating said interrupter, said interrupter of each aforesaid combination arranged to be of a different characteristic, each said interrupter connecting to said signal circuit, supplied by another source of electrical energy connecting thereto, each said interrupter effective upon actuation thereof, for exciting its characteristic series of signal impulses in said signal circuit, and a line relay and a signal device associated with said signal circuit, effective upon closure thereof, for visually reproducing any of said series of signal impulses.

3. A protective signal system comprising a fire alarm circuit including a source of electrical energy, a plurality of normally open, thermally actuated circuit closers connecting thereto, and a resistance in circuit therewith, said circuit to be energized upon closure of any said circuit closers, and a burglar alarm circuit including a plurality of normally closed contacts, and means associated therewith for causing the release of any said contacts, for opening said circuit, switch means connecting to aforesaid source and said burglar alarm circuit and effective at will for exciting said circuit, means in circuit therewith, effective upon opening of said circuit for energizing an auxiliary circuit connecting thereto, means associated with said auxiliary circuit effective upon energization thereof, for rendering said burglar alarm circuit inoperative, a motor, and means mechanically associated therewith, said motor connecting to said resistance in said fire alarm circuit, and effective upon energization thereof for actuating said means at a predetermined velocity, said motor connecting to said auxiliary circuit, and effective upon energization thereof for actuating said means at another predetermined velocity, the said means connecting to a subscriber's line circuit of a telephone system, and effective upon either said actuation, for interrupting said subscriber's line circuit, and means associated with said subscriber's line circuit, effective upon closure thereof, for reproducing said interruptions.

4. A protective signal system comprising a fire alarm circuit including a source of electrical energy, a plurality of normally open thermally actuated circuit closers connecting thereto, and a resistance in circuit therewith, said circuit to be energized upon closure of any said circuit closers, and a burglar alarm circuit including a plurality of normally closed contacts, and means

associated therewith for causing the release of any said contacts, for opening said circuit, switch means connecting to aforesaid source and said burglar alarm circuit and effective at will for exciting said circuit, means in circuit therewith, effective upon opening of said circuit for energizing an auxiliary circuit connecting thereto, means associated with said auxiliary circuit effective upon energization thereof, for rendering said burglar alarm circuit inoperative, a motor, and means mechanically associated therewith, a signal circuit including another source of electrical energy, said motor connecting to said resistance in said fire alarm circuit, and effective upon energization of said circuit for actuating said means at a predetermined velocity, said motor connecting to said auxiliary circuit, and effective upon energization thereof for actuating said means at another predetermined velocity, said means connecting to said signal circuit, and effective upon either said actuation, for exciting series of signal impulses in said signal circuit, and means associated with said signal circuit, effective upon said excitation thereby, for producing said series of signal impulses.

5. A protective signal system comprising a fire alarm circuit including a source of electrical energy, a plurality of normally open thermally actuated circuit closers connecting thereto, and a resistance in circuit therewith, said circuit to be energized upon closure of any said circuit closers, a burglar alarm circuit including a plurality of normally closed contacts, means associated therewith for causing the release of any said contacts for opening said circuit, one or more of said contacts including lock actuated means effective at will for holding said circuit closed upon release of said contact associated therewith, clock actuated switch means connecting to aforesaid source and said burglar alarm circuit and effective at predetermined time intervals for exciting said circuit, means in circuit therewith effective upon said excitation for energizing a circuit indicator associated thereto, said means effective upon opening of said circuit for energizing an auxiliary circuit associated with said circuit, means in said auxiliary circuit effective upon energization thereof, for rendering said burglar alarm circuit inoperative, an alarm device connecting to said fire alarm circuit and said burglar alarm circuit, means associated with said circuits effective upon energization of either said circuit, for actuating said alarm device, a motor, a signal distributor mechanically associated therewith, said motor connecting to said resistance in said fire alarm circuit, and effective upon energization thereof, for actuating said signal distributor at a predetermined velocity, said motor connecting to said auxiliary circuit and effective upon energization thereof for actuating said signal distributor at another predetermined velocity, said signal distributor connecting to a subscriber's line circuit of a telephone system, and effective upon either said actuation, for interrupting said subscriber's line circuit, and a line relay, and a signal device associated with said subscriber's line circuit, said relay effective upon closure thereof, for operating said signal device.

6. A protective signal system comprising a fire alarm circuit including a source of electrical energy, a plurality of normally open thermally actuated circuit closers connecting thereto, and a resistance in circuit therewith, said circuit to be energized upon closure of any said circuit closers, a burglar alarm circuit including a plurality of

normally closed contacts, and means associated therewith for causing the release of any said contacts for opening said circuit, one or more of said contacts including lock actuated means effective at will for holding said circuit closed upon release of said contact associated therewith, clock actuated switch means connecting to aforesaid source and said burglar alarm circuit and effective at predetermined time intervals for exciting said circuit, means in circuit therewith effective upon said excitation for energizing a circuit indicator associated thereto, said means effective upon opening of said circuit for energizing an auxiliary circuit associated with said circuit, means in said auxiliary circuit effective upon energization thereof for rendering said burglar alarm circuit inoperative, an alarm device connecting to said fire alarm circuit and said burglar alarm circuit, means associated with said circuits effective upon energization of either said circuit for actuating said alarm device, a motor, a signal distributor mechanically associated therewith, and a signal circuit including another source of electrical energy, said motor connecting to said resistance in said fire alarm circuit and effective upon energization thereof for actuating said signal distributor at a predetermined velocity, said motor connecting to said auxiliary circuit and effective upon energization thereof for actuating said signal distributor at another predetermined velocity, said signal distributor connecting to said signal circuit and effective upon either said actuation for exciting series of signal impulses in said signal circuit, and a line relay and signal device associated with said signal circuit, said relay effective upon excitation thereof, for operating said signal device.

7. A protective signal system comprising a fire alarm circuit including a source of electrical energy, a plurality of normally open thermally actuated circuit closers connecting thereto, and a resistance in circuit therewith, said circuit to be energized upon closure of any said circuit closers, a burglar alarm circuit including a plurality of normally closed contacts, means associated therewith for causing the release of any said contacts for opening said circuit, one or more of said contacts including lock actuated switch means effective upon key manipulation for holding said circuit closed upon release of said contact associated therewith, clock actuated switch means connecting to aforesaid source and said burglar alarm circuit and effective at predetermined time intervals for exciting said circuit, a supervisory relay in circuit therewith effective upon said excitation for energizing a pilot lamp associated thereto, said relay effective upon opening of said circuit for energizing an auxiliary circuit associated with said circuit, an auxiliary relay in said auxiliary circuit effective upon energization thereof for rendering said burglar alarm circuit inoperative, an electrically actuated alarm gong connecting to said fire alarm circuit and said burglar alarm circuit, an alarm relay associated with said circuits effective upon energization of either said circuit for actuating said alarm gong, a motor, a signal distributor mechanically associated therewith, said motor connecting to said resistance in said fire alarm circuit and effective upon energization thereof for actuating said signal distributor at a predetermined velocity, said motor connecting to said auxiliary circuit and effective upon energization thereof for actuating said signal distributor at another predetermined velocity, the said signal distributor connecting to a

- subscriber's line circuit of a telephone system, and effective upon either said actuation for interrupting said subscriber's line circuit, and a line relay and signal lamp, including another source of electrical energy therewith, at the central bureau of said telephone system, and associated with said subscriber's line circuit, said relay effective upon closure thereof, for operating said signal lamp.
8. A protective signal system comprising a fire alarm circuit including a source of electrical energy, a plurality of normally open thermally actuated circuit closers connecting thereto, and a resistance in circuit therewith, said circuit to be energized upon closure of any said circuit closers, a burglar alarm circuit including a plurality of normally closed contacts, means associated therewith for causing the release of any said contacts for opening said circuit, one or more of said contacts including lock actuated switch means effective upon key manipulation for holding said circuit closed upon release of said contact associated therewith, clock actuated switch means connecting to aforesaid source and said burglar alarm circuit and effective at predetermined time intervals for exciting said circuit, a supervisory relay in circuit therewith effective upon said excitation for energizing a pilot lamp associated thereto, said relay effective upon opening of said circuit for energizing an auxiliary circuit associated with said circuit, an auxiliary relay in said auxiliary circuit effective upon energization thereof for rendering said burglar alarm circuit inoperative, an electrically actuated alarm gong connecting to said fire alarm circuit and said burglar alarm circuit, an alarm relay associated with said circuits effective upon energization of either said circuit for actuating said alarm gong, a motor, a signal distributor mechanically associated therewith, and a signal circuit including another source of electrical energy, said motor connecting to said resistance in said fire alarm circuit and effective upon energization thereof, for actuating said signal distributor at a predetermined velocity, said motor connecting to said auxiliary circuit and effective upon energization thereof, for actuating said signal distributor at another predetermined velocity, the said signal distributor connecting to said signal circuit and effective upon either said actuation, for exciting series of signal impulses in said signal circuit, and a line relay and signal lamp associated with said signal circuit, said relay effective upon said excitation, for operating said signal lamp.

KENNETH LE ROY HAYDEN.