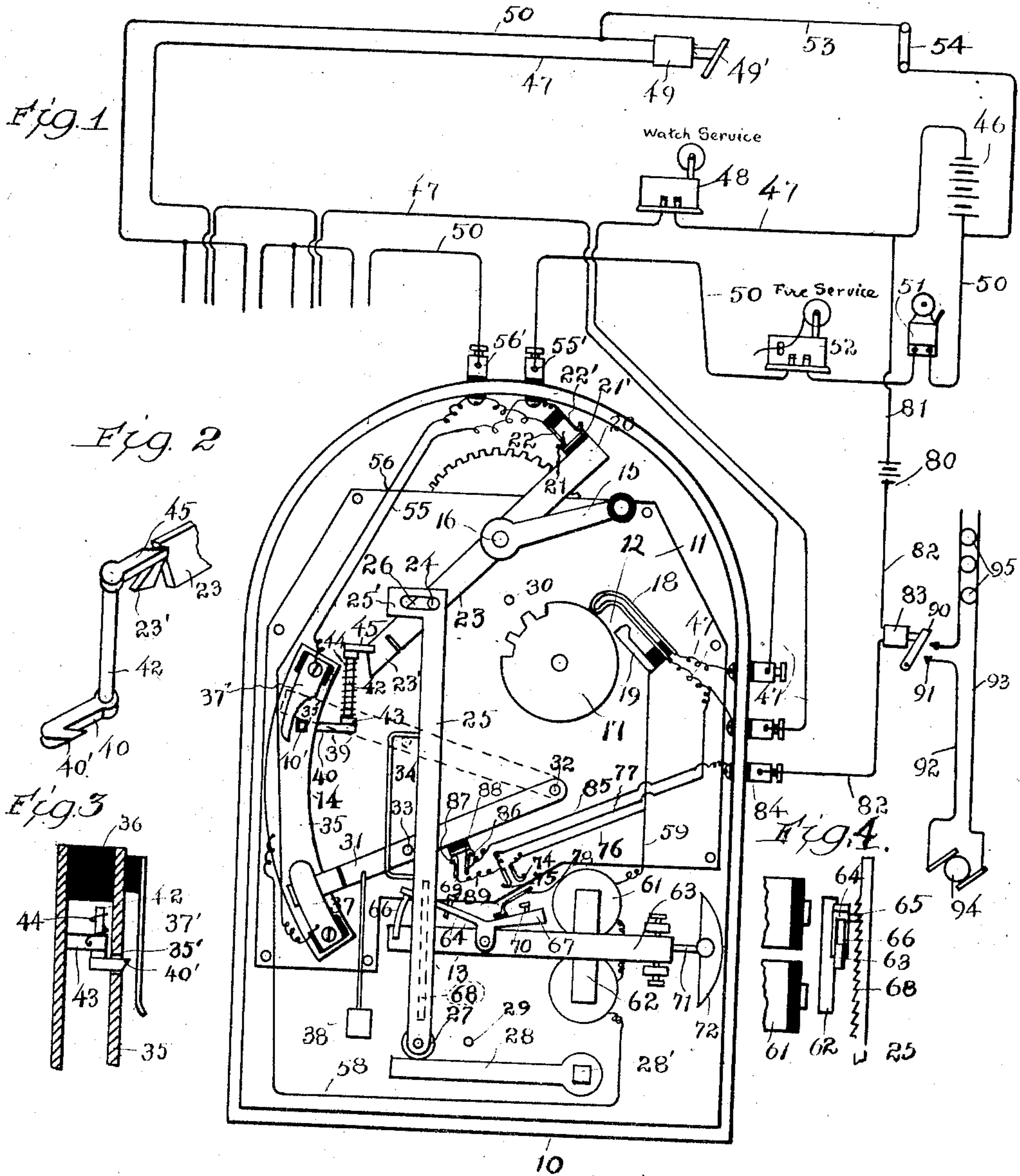


No. 839,873.

PATENTED JAN. 1, 1907.

J. McFELL.
FIRE ALARM AND WATCH SERVICE SYSTEM.
APPLICATION FILED DEC. 12, 1905.



Witnesses:
Ray White.
Harry R. L. White.

Inventor:
Judson McFell,
Goree Bain & May
By *Atty.*

UNITED STATES PATENT OFFICE.

JUDSON McFELL, OF CHICAGO, ILLINOIS.

FIRE-ALARM AND WATCH-SERVICE SYSTEM.

No. 839,873

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed December 12, 1905. Serial No. 291,479.

To all whom it may concern:

Be it known that I, JUDSON McFELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fire-Alarm and Watch-Service Systems, of which the following is a specification.

My invention relates to improvements in fire-alarm and watch-service systems, and has for one of its salient objects to provide a system whereof the transmission-boxes are adapted for use to transmit watch-signals or fire-alarm signals and wherein the signaling or recording devices are so arranged that the fire-alarm signals are received and recorded by apparatus not affected by the transmission of watchmen's signals.

A further object of my invention is to provide such a system wherein the line-circuits are under constant test.

Another object of my invention is to provide in a signal system non-interfering transmitters; and yet another object of my invention is to provide, in conjunction with such non-interfering boxes or transmitters, signaling devices for indicating at any suitable point or points, by the energization of lights, annunciators, or the like, the operation of any box or group of boxes in transmitting a fire-signal.

With a view to attaining these and other objects, which will become apparent to those skilled in the art from the following description, taken in conjunction with the accompanying drawings, my invention consists in the combinations of devices, features of construction, and arrangements of parts hereinafter more particularly pointed out, and specified in the claims.

In the drawings, Figure 1 is an elevation of an alarm-box with its cover removed, showing diagrammatically the circuit connections and the associated parts of a fire-alarm and watch-service system. Figs. 2, 3, and 4 are details of parts of the transmitter mechanism.

Throughout the figures like numerals of reference refer always to like parts.

In the drawings, 10 indicates in general a transmitter-box comprising a motor 11, suitably driven, a circuit-interrupting device 12, driven by said motor, a motor-controlling device 13, and an automatic switch 14, associated with the motor-controlling device for actuation thereby.

The transmitting mechanism proper and motor which I have herein shown may be of the ordinary district-box type, the motor being spring-driven and comprising a suitable gear-train (not shown in detail) arranged to be set for operation by a suitable handle 15, associated with an arbor 16 of the train, the train being arranged when properly conditioned and freed for operation to actuate a signal-wheel 17 of the signaling device 12, with which is associated for control thereby a spring-pen 18 and an anvil 19, the signaling devices herein shown being of the open-circuit type. Preferably the pen 18 is formed of a metal strip bent to form two leaves, the point of the pen being at the angle of the joined leaves.

I preferably connect with the arbor 16 a switch-arm 20, bearing the movable member of a switch 21, shown as a contact-plate, arranged to coact with the separated springs of a line breaking and cut-out switch to establish an electrical connection therebetween when the box is in normal or run-down condition. I also provide, preferably upon the same shaft 16, an arm 23, which may conveniently be made integral with the arm 20 and which constitutes part of the motor-controlling connection with the non-interference mechanism, said arm 23 being provided with a beveled or inclined end portion, constituting part of the motor-controlled switch-releasing means to be described, as may best be seen in Fig. 2.

24 indicates a pin carried by the lever-arm 23 and arranged in a slot 26, made in the head of a vertically-disposed bar 25, the lower end of which is provided with an antifriction-roller 27, bearing upon a lever 28, in the hub of which is provided a key-aperture for the reception of a watchman's key. A limitation-stop 29 is provided for limiting the throw of the lever 28, so that it will be apparent that the watchman by turning the lever 28 with his key may raise the bar 25, and thereby rock the lever-arm 23 through a short arc only, sufficient to condition the transmitter-train to cause the signaling devices 12 to transmit a short signal—say one round of the wheel 17. It will be understood, furthermore, that the handle 15 when pulled down to contact with its limitation-stop, (indicated at 30) conditions the transmitting mechanism to transmit a plurality of rounds of the wheel 17—say five or six rounds.

Associated with the reciprocable bar 25 I provide the motor-controlled two-pole switch 14, which I will now describe.

31 indicates a switch-arm pivoted as at 5 32 and provided with a laterally-projecting pin 33, arranged within a yoke 34, carried by the bar 25. The yoke 34 is so arranged that when the arm 31 is in its lowermost position and the bar 25 in normal position the lower 10 extremity of the yoke is out of contact with the pin 33, said lost-motion connection being such that the bar 25 may be lifted to the full extent to which it may be elevated by the watchman's lever 28 without moving the 15 switch-arm 31. The yoke 34 is furthermore of such longitudinal extent that when the switch-arm 31 is in its uppermost position the bar 25 may descend to its lowest position without being stopped by the pin 33.

20 The switch 14 comprises a metallic plate 35, of arcuate form, mounted upon suitable insulating-blocks 36 and bearing in insulated relation thereto two metallic springs 37 37', either of which may be electrically connected 25 with the switch-blade 35 by the interposition of the end of switch-arm 31 between the plate and spring.

38 indicates a weight for normally maintaining the switch-arm 31 in position to effect 30 contact between the spring 37 and plate 35.

39 indicates in general a mechanical latch for maintaining the switch-arm 31 in raised position when elevated by the motor parts into engagement with said latch. Specifically, as best shown in Fig. 2, 40 indicates a 35 latch-lever provided with a nose 40', beveled on one side, carried by a rock-shaft 42, mounted in suitable bearings 43, the latch 40 passing beneath the metallic plates 35 and having its nose arranged to take through an aperture 35' therein. 44 indicates a spring arranged to tend constantly to maintain the latch in position with its nose projecting above the surface of the plate 35. 45 indi- 45 cates a releasing-arm carried by the upper extremity of shaft 42 and arranged for cooperation with the beveled or inclined end 23' of the lever 23. Thus when the lever 23 is in normal position, assumed at the comple- 50 tion of each signaling operation of the box, the trip-arm 45 is moved to rock the shaft 42 and depress the latch 40, so that its nose 40' is below the level of plate 35; but when the lever-arm 23 is moved upwardly, removing its inclined extremity 23' from beneath the 55 trip-arm 45, the tension of spring 42 throws the latch to latching position. It will be apparent now that when the handle 15 of the transmitter is moved to send a true-fire signal the latch 39 is thrown to latching position, 60 and the parts are so proportioned that by the movement of the rod 25, occasioned by the full movement of the handle 15, the switch-arm 31 is lifted to the position shown in 65 dotted lines in Fig. 1, where it is engaged by

the nose 40' of the latch and locked against the return to normal position until the latch is released by the return of lever 23 to its normal position at the end of the signaling operation. 70

While a mechanism like that heretofore described is susceptible of connection in many specific circuits to accomplish the results hereinafter set forth, I have for illustration only shown the box as connected in a 75 circuit such as that described in my prior patent, No. 797,907, dated August 22, 1905.

Specifically, 46 indicates a central source of energy, such as an electric battery, from one side whereof extends a line-wire 47, including 80 a watchman's recorder 48, and thence extending in series through the pens 18 of the successive boxes on the circuit, the wire 47 from the last box being brought back to the central station to a high-resistance magnet 85 49, the armature 49' whereof, normally held in attracted position by the magnet, constitutes an annunciator-drop or part of a telltale system, as described in my prior patent.

From the opposite side of the battery a 90 wire 50 extends through the fire-signal-receiving devices, illustrated as a bell 51 and a register 52, and thence extends to binding-post 55' of the first box, to which is connected the contact-spring 22' heretofore described. The 95 opposite contact-spring 22 is connected to the binding-post 56', whence the wire 50 extends to the next box and in like manner through the entire series, said wire 50 being run back to the central station and being connected to 100 the opposite extremity of the coil of electromagnet 50. It will now be apparent that whenever the box is operated the line-circuit is broken between the binding-posts 55' and 56' of the then operating box by the removal 105 of the plate 21' of switch 21 from contact with the springs 22 22' and that the watch-signal recorder and the fire-signal gong are respectively connected in the line or opposite sides of said break—that is to say, one be- 110 tween the break in the line and one side of the battery and the other between the break in the line and the opposite side of the battery.

For watch service I provide a connection paralleling the wire 50 from a point beyond 115 the box most remote from central to a point between the battery and the fire-signal-receiving devices, such connection being illustrated at 53 and preferably including a switch 54, which may, if desired, be an auto- 120 matic time-switch arranged to close during the periods when the watch reports are due. Binding-post 55' has connection by wire 55 to upper contact-spring 37' of the switch 14, while the binding-post 56' is connected by 125 wire 56 with the spring 37. The arcuate contact-plate 35 is connected by wire 58, through a magnet-coil to be described, with wire 59, which extends to the anvil 19 of the circuit-interrupting devices. It will be apparent 130

now that as the transmitter stands in normal condition with the pen 18 and anvil 19 in separated relation and the lever 20 in the position shown a closed circuit is established from the battery through the fire-signal-receiving devices, the series of cut-out switches 21 in the signal-boxes, the high-resistance magnet 50, and back through the wire 49 and the watch-signal-receiving device 48 to the opposite side of battery 46.

It will be seen that the circuit just described includes the magnet 49, which is of such high resistance that the current-flow through the circuit is insufficient to actuate the registers or other signal-receiving instruments. The parts are so constructed, however, that if the magnet 49 be short-circuited by the establishment of a bridge of lower resistance between wires 47 and 50 the signal-receiving devices are caused to commence operation. When now a watchman actuates the box by the control-lever 28, as heretofore described, the signal-wheel 17 is caused to make one revolution or round, and the line-circuit is automatically broken by the switch 21.

Assuming the switch 54 to be closed, it will be seen that whenever the pen 18 drops into a notch in the signal-wheel and makes contact with its anvil 19 a circuit is established, as follows: from battery 46 by wire 47 through the recorder 48 to the pen 18, thence through anvil 19 and wires 59 58 to the contact-plate 35 and the switch-arm 31 to spring 37, thence by wire 56 to the binding-post 56' and back over the line-wire 50, to shunt-wire 53, and through the last said connection to the opposite side of the battery. It will be seen that in this circuit the fire-signaling apparatus is not included and the high-resistance magnet is also cut out, so that the record of the watchman's report is received only by the instrument 48. By this arrangement I am enabled to place fire-alarm apparatus at any desired points throughout the area to be protected for the purpose of alarming occupants and notifying those in authority of the existence of fire, with the assurance that such instruments will not be actuated by the use of the transmitters for watch-service purposes, and at the same time I am able to receive the watch-signals at any desired point or station. When, however, the transmitter is set by the operation of the handle 15 to send its full or fire signal, the lost-motion switch-controlling mechanism automatically throws the switch-arm 31 to uppermost or dotted-line position, where, as heretofore described, it is automatically latched and held until the return of the motor parts to normal or run-down position. In the interval before the restoration of the switch the signal-wheel 17 makes its predetermined number of revolutions or rounds, and each time the pen 18 drops into a notch of a wheel a circuit is established, as follows: from the

battery 46, by wire 47 through the receiving apparatus 48 to the pen 18, thence to the anvil 19 and through wires 59 and 58 to the switch-plate 35, through the switch-arm 31 to the spring 37', and thence by wire 55 and binding-post 55' to the side of wire 50, extending back through the signaling instruments 52 and 51 to the opposite side of the battery. It will thus be seen that a fire-signal is invariably received by the fire-signal registers and gong, and in the specific embodiment shown by the watch-signal recorder 48 as well. If it be desired to receive nothing but watch-reports on the recorder 48, it may obviously be included in the wire 53 instead of wire 47 to be out of the fire-alarm signaling-circuit.

I prefer that in the system described the transmitter be non-interfering, and to this end I provide, in conjunction with the motor-controlling devices of the box, a disabling mechanism for automatically preventing the box from operating whenever some other transmitter nearer the central station is transmitting its signal or for stopping any transmitter and withholding the untransmitted portion of its signal whenever any transmitter nearer the central station is started in operation while the more remote transmitter is sending its signal. To this end I provide in the signaling-circuit of each box an electroresponsive device and arrange a motor stopping or disabling device to be controlled thereby, said motor-stopping device being timed in its motor-stopping operation, so that when conditioned by the electroresponsive device to stop the motor it delays its function during a predetermined period.

Specifically, 61 indicates an electromagnet included between the wires 59 and 58 of the signaling-circuit of the transmitter, said magnet being provided with an armature 62, carried by a lever 63, arranged to move toward and from the bar 25 at right angles to said bar. Pivotaly mounted upon the lever 63 for movement therewith into or out of operative relation to the bar 25 and for limited movement thereon in a plane parallel to bar 25 is a pawl 64, provided with a nose 65, and preferably having arms 66 straddling the extremity of lever 63, said pawl being maintained, as by a weight 67, out of contact with the lever-arm 63.

68 indicates a rack carried by the under side of the bar 25, with which the pawl is adapted to cooperate, as shown in Fig. 4, to prevent downward movement of the bar beyond the point where the pivoted pawl is brought into close contact with its supporting-arm 63. Adjusting-screws 69 and 70 are provided in the pawl 64 and weight 67, respectively, to vary the throw of the pawl in both directions. It will be understood that the parts are so arranged that when the armature 62 is attracted by the magnet 61 the

nose 65 of the pawl is thrown entirely out of the path of the rack 68, so that the bar 25 may move unobstructedly in either direction, but that when the armature 62 is released by its magnet and spring retracted the pawl is thrown into operative engagement with the rack 68, the free extremity of the pawl, if the rack be descending, being moved by said rack downward until the adjusting-screw 69 strikes the surface of the arm 63, thereby stopping the movement of the pawl and through its immovability stopping the operation of the motor through the instrumentality of the controlling-rod 25 and lever 23. It will be understood, furthermore, that the time that it takes to move the pawl 64 to motor-stopping position from the position it occupies when it first engages the rack is greater than the interval during which the transmitting instrumentalities open the signaling-circuit in transmitting any signal—that is to say, the interval is longer than that which the signaling-wheel occupies in making the longest space required between characters in its signaling operation. If desired, the lever 63 may also be provided with a bell-clapper 71, cooperating with any suitable gong 72, supported in operative relation thereto, so that the gong may be struck every time the lever-arm 63 rises.

In conjunction with the parts described I provide means for short-circuiting the pen and anvil 18 19 each time the motor is stopped by the operation of the pawl 64, and to this end I provide springs 74 and 75, connected, respectively, by wires 76 and 77 to the wires 59 and 47, respectively, and arranged upon the weight-arm 67 a metallic spring 78, adapted to be elevated by the pawl 64 to make contact with and connection between springs 74 and 75.

Under normal conditions it will be observed the locking or disabling device stands in position for engagement with the rack of the bar 25, and as soon as the box is set in motion for an ordinary signaling operation the depression of the pawl 64 commences. The period of time necessary to depress the pawl into contact with its carrying-arm 63 being longer than the longest interval between the notches of the signaling-wheel, however, the motor is not stopped when the first notch in the wheel comes opposite pen 18. Instantly, therefore, when the pen 18 drops into the notch the electromagnet 61 in the signaling-circuit is energized, attracting its armature and throwing the disabling-pawl 65 out of engagement with the rack 68. As soon as the circuit is again broken the pawl reengages the rack, and this operation continues as long as the box is transmitting its signal. It will be apparent, however, that if some box nearer the central station on the line the box under consideration

(which to avoid confusion I may term "box 1") be transmitting a signal, either a watch-service or a fire-alarm signal, the line is broken between said box No. 1 and the central station, so that no current passes through the pens 18 19 of box 1 when the first notch of the signal-wheel passes beneath pen 18. Consequently the disabling-pawl is not released by the electromagnet, but shortly thereafter stops the operation of the motor. When the pawl 64 reaches motor-disabling position, however, the short circuit across the pens is completed through wires 76 77 and spring 78, so that as soon as the then transmitting-box (which I may call "box 2") has completed its signaling operation and the continuity of the line between the box 1 and the central station is restored, the said box 1 received current through its coil 61, through the short circuit around the pens last described, even though the wheel 17 has stopped in position to separate contacts 18 and 19, so that the magnet attracts its armature and instantly releases the motor mechanism for further operation. It will thus be apparent that at whatever condition of its signaling operation a box may be it will be stopped or disabled before it has completed a round, when any box nearer the central station commences to transmit its signal, while any box remote from the central station, pulled after a nearer box has commenced its signal, is not permitted to start its signal until after the box nearer central station has completed its signaling operations. In this way it is assured that in whatever order the boxes may be pulled or actuated a substantially complete signal is certain to be received from each box, although the signal from any box remote from central station may be temporarily interrupted to permit the transmission of a complete signal from a box closer to central station.

I also prefer to provide, in conjunction with a system such as that described, means for indicating visually, as by lamps or annunciators, at suitable supervisory stations the box or section of boxes whence a fire-signal is transmitted. This is particularly desirable in conjunction with the watch system, as by placing a battery of lamps corresponding to the various sections of the building or other district to be protected, adjacent the station of each watchman, the section whence an alarm is turned in, or the particular box, if desired, may be instantly shown to the watchman by the action of the corresponding light or annunciator without the delay incident to the transmission of a complete signal and without the installation of a recorder at each watch-station. To this end I provide, preferably, a separate battery 80, connected on the one side, as by a wire 81, with the wire 47, and on the other side connected by wire 82, including a high-resistance coil 83 with a

binding-post 84 of the box to be supervised, whence extends a wire 85 to a spring 86, constituting one of a pair arranged to be electrically connected by a plate 88, carried by the switch-arm 31, the remaining spring 87 being connected by wire 89 with the wire 77, which, it will be remembered, is connected to the wire 47, so that a complete circuit is established through the wires in the order described, as long as the switch-arm 31 is depressed.

The high-resistance magnet has associated therewith an armature 90, adapted, when released by the magnet, to close contact between two contact-points 91, 91, included in one line-wire 92 of an incandescent-light circuit, whereof 93 is the opposite line-wire, 94 the source of power, and 95, 95 the bridged lights. Obviously the lights 95 may be located at the different watchman's stations or at other suitable points to indicate at any number of places the operation of the box whenever the switch-arm 31 is moved. If more than one box be arranged in a section and it be desired to indicate only the section and not the particular box whence the signal emanates, it is obvious that the springs 87, 88 of the remaining boxes will be looped in the wire 82 in series.

While I have herein described in some detail specific devices and arrangements of parts adapted for the practice of my invention, I do not desire to be understood as limiting my invention in its broader aspect to the particular construction shown and described further than as specified in the claims, as it will be apparent that numerous modifications might be made in the specific construction and arrangement of parts without departure from the spirit and scope of my invention, and it will be apparent that the specific character and arrangement of the circuits might readily be changed without departure from the spirit of my invention.

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

1. In a fire-alarm watch-service system, a plurality of signal-receiving instruments, a transmitter adapted and arranged to transmit a watch-signal and to transmit a different signal for fire-alarms, and means for automatically connecting said transmitter with one signal-receiving instrument when transmitting a watch-signal, and with another signal-receiving instrument when transmitting a fire-signal.

2. In a fire-alarm and watch-service system, a plurality of signal-receiving instruments, a transmitter adapted and arranged for actuation to transmit a watch-signal and to transmit a different signal for fire-alarms, connections for establishing a circuit including the transmitter and certain of the signal-receiving instruments and excluding other

signal-receiving instruments for watch-signaling purposes, and means for automatically varying the connections to include said excluded receiving instrument in a signaling-circuit with the transmitter when the transmitter is actuated to transmit a fire-alarm signal.

3. In a fire-alarm watch-service system, a plurality of signal-receiving instruments, a transmitter adapted to be actuated to transmit a watch-signal or a different fire-alarm signal, connection for establishing a normal circuit including said transmitter and excluding certain signal-receiving instruments, and means controlled by the transmitter for automatically varying the circuit connections to include said excluded signal-receiving instrument in a signal-circuit with the transmitter.

4. In a fire-alarm and watch-service system, a transmitter, signal-receiving instruments, a switch, and connections normally established by said switch including receiving instruments in signaling relation to the transmitter, open connections controlled by said switch, for connecting certain other signal-receiving instruments in signaling relation to the transmitter, means controlled by the transmitter for operating said switch.

5. In a fire-alarm and watch-service system, a signal-transmitter, a double-throw switch connected therewith for actuation thereby, a signal-receiving instrument arranged and adapted for connection in signaling-circuit relation with the transmitter when the switch is in normal position, and another signal-receiving instrument arranged and adapted for connection in signaling-circuit with the transmitter when the switch is thrown to opposite position by the actuation of the transmitter.

6. In a fire-alarm and watch-service system, a transmitter involving a motor, signaling devices, means for conditioning the motor for a certain amount of movement to transmit a short watch-signal, signaling devices for conditioning the motor for a greater amount of movement to transmit a long fire-alarm signal, a two-throw switch arranged to be functionally unaffected by the shorter movement of the motor, and to be functionally operated by the longer movement of the motor, two signal-receiving instruments, one normally having connection through the switch for signaling relation with the transmitter, and the other being arranged for signaling connection with the transmitter when the switch is actuated by the longer movement of the motor.

7. In a fire-alarm and watch-service system, a transmitter involving a motor, a means for conditioning the transmitter to transmit a watch-signal; another means for conditioning the transmitter to transmit a fire-alarm signal, two signal-receiving instru-

ments, a switch for normally establishing signaling-circuit connections between the transmitter and one signal-receiving device, operable to establish circuit connections including the excluded signal-receiving device in signaling relation to the transmitter, and switch-controlling means operably associated with the means for conditioning the transmitter to transmit a fire-alarm signal, arranged to be functionally unaffected by the operation of the means for conditioning the transmitter to transmit a watch-signal.

8. In a fire-alarm and watch-service system, a signal-transmitter involving a motor, a switch-lever having lost-motion connection with the transmitter-motor, two signal-receiving devices one having normal circuit connections with the switch, when the switch is in normal position, for connection in a signaling-circuit with the transmitter, and the other having circuit connections with the normally open contacts of said switch, adapted to be closed by movement of said switch to establish a signaling-circuit including the last said signal-receiving instrument and the transmitter, means for conditioning the transmitter to transmit one signal without moving the motor and switch connection beyond the limits of the lost motion permitted therein, and means for conditioning the box to transmit another signal arranged to move the switch-lever to functionally operate the switch to vary the circuit connections.

9. In a fire-alarm and watch-service system, a central source of current-supply, line-wires extending from opposite sides thereof, a signal-transmitter providing means for automatically breaking one side of the line when active, said transmitter involving also a coacting pen and anvil, one connected with the unbroken side of the line, and the other adapted and arranged for connection through a suitable switch with the broken side of the line on either side of the break made in the transmitter, the switch, a signal-receiving instrument in the side of the line to be broken by the transmitter-switch, connections for shunting the break and said signaling-receiving instrument, whereby when the transmitter-switch is thrown to connect its signaling pen or anvil with the side of the broken line remote from the source of current-supply, a circuit may be established through the unbroken line the transmitter pen and contact, the switch and said shunt connection, to the exclusion of the said signal-receiving instrument, and a second signal-responsive instrument included in the signaling-circuit last described.

10. In a system of the character described, a source of current-supply, line-wires, a circuit-breaking switch, a signal-transmitter controlling said switch, said transmitter comprising a motor, make-and-break devices, connection between one side of the

make-and-break devices and the wire connection between the other part of the make devices and the pole of a double-throw switch, said switch, operating connections between the arm of said switch and the transmitter-motor, connection between the opposite contacts of the said switch and opposite terminals of the line-breaking switch, a signal-receiving instrument in the side of the line adapted to be broken by the line-breaking switch, a shunt around the line-breaking switch and the signal-receiving instrument, and a second signal-receiving instrument, in a suitable part of the circuit established through said shunt.

11. In a system of the character described, a transmitter involving a motor, a double-throw switch, and lost-motion connections between a suitable part of the motor mechanism and the switch-lever, substantially as described.

12. In a system of the character described, a transmitter involving a motor, a double-throw switch comprising a switch-arm arranged to be moved by a motor part from normal to abnormal position, means for latching the switch-lever in said abnormal position, and means, controlled by the motor, for releasing said latching means.

13. In a system of the character described, a transmitter comprising a motor, a lever associated with the motor part, a double-throw switch comprising a switch-lever, lost-motion connection between the switch-lever and lever, a latch for latching the switch-lever in abnormal position, said latch being associated with one of the systems of parts movable with the lever, to automatically release the switch-lever when lever stands in normal position.

14. In a signaling system, a transmitter comprising circuit-interrupting devices and a motor therefor, a signaling-circuit, an electroresponsive device in the signaling-circuit, motor-stopping means for stopping and maintaining the motor against movement when otherwise conditioned for operation, said means being definitely timed in relation to the operation of the circuit-interrupting device, and movable to operative or inoperative position, and said means being controlled by the electroresponsive device.

15. In a signaling system a transmitter comprising circuit-interrupting devices, and a motor therefor, a signaling-circuit, means for maintaining the motor against movement when otherwise conditioned for operation, timed in relation to the circuit-interrupting devices to operate and stop the motor after a definite movement of the motor part, and an electroresponsive device in the signaling-circuit controlling said motor-stopping means.

16. In a signaling system, a transmitter having a make-and-break device and a motor therefor, a signaling-circuit, electrorespon-

sive means in said signaling-circuit, means associated with said electroresponsive device for preventing the running of the motor, said means being arranged to operate to prevent movement of the motor only after the maintenance of certain conditions in the electromagnet for a predetermined interval timed in relation to the operation of the motor.

17. In a signal system, a transmitter comprising a motor and circuit-interrupting devices, a signaling-circuit, an electromagnet in said circuit, a pawl carried by said electromagnet arranged when the armature is in one position for engagement with a part movable with the motor, said pawl being arranged for a limited degree of movement with the coacting moving member before stopping the motor.

18. In a system of the character described, a transmitter comprising a motor, circuit-interrupting devices, a signaling-circuit, an electromagnet in said circuit, a pawl associated with said armature for bodily movement thereby, arranged for limited movement in another plane, and a rack-rod arranged to

be moved by the motor disposed for coaction with the pawl when the latter is bodily moved to one position by the armature of the electromagnet.

19. In a signal-transmitter a motor, a number-wheel driven thereby, make-and-break devices comprising an anvil, and a pen, said pen being composed of two leaves electrically continuous, and a normally charged circuit including the leaves of said pen in series therewith.

20. In a system of the character described, a primary circuit, signal-transmitters therein, a normally closed circuit including a high-resistance magnet, a switch controlled by the transmitter for opening said normally closed circuit, and a normally open annunciator-circuit controlled by the armature of said high-resistance magnet.

In testimony whereof I hereunto set my hand in the presence of two witnesses.

JUDSON McFELL.

In presence of—

GEO. T. MAY, Jr.,
MARY F. ALLEN.