Dec. 9, 1930. F. B. LOVE ET AL 1,784,530

COMBINATION FIRE ALARM AND WATCHMAN'S RECORDING BOX

Filed Feb. 17, 1925 4 Sheets-Sheet 1

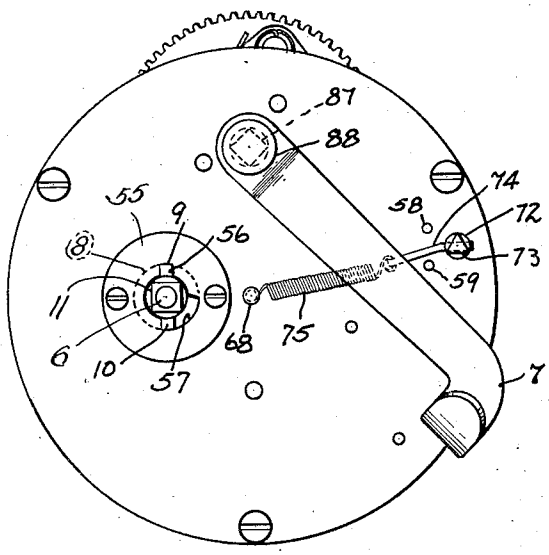

Fig. 1.

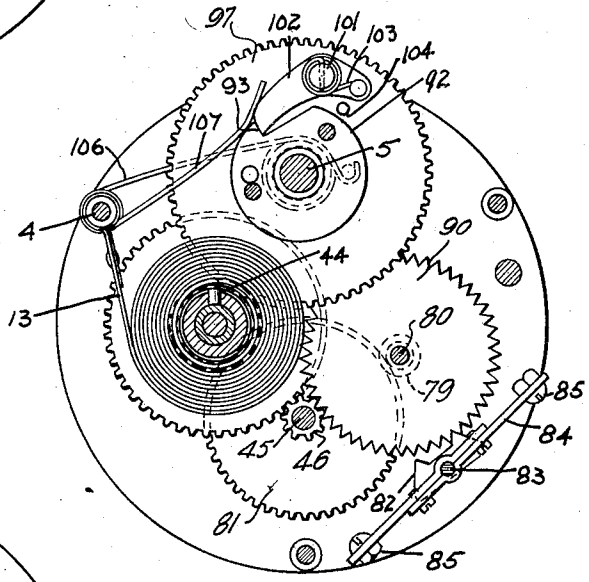

Fig. 2

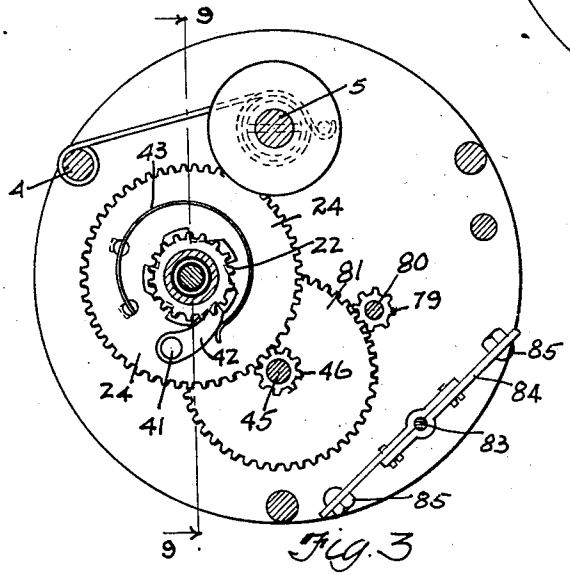

Fig. 3

INVENTORS
Francis B. Love and
Boyd H. Smith.
BY Fay Oberlin & Fay
ATTORNEYS

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Filed Feb. 17, 1925 4 Sheets-Sheet 2

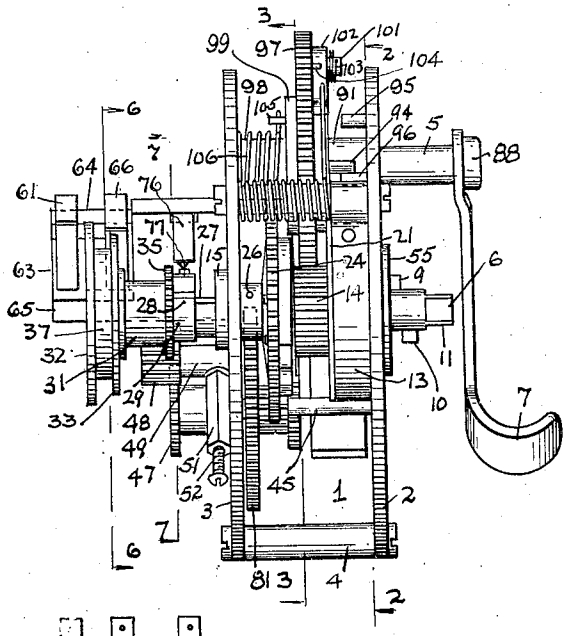

Fig. 4.

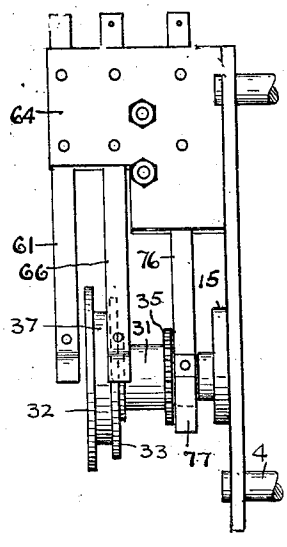

Fig. 8

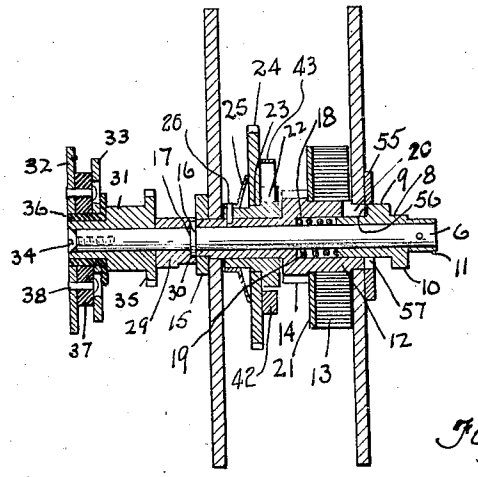

Fig. 9.

INVENTORS
Francis B. Love and
BY Boyd H. Smith.
Fay, Oberlin & Fay
ATTORNEYS

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COMBINATION FIRE ALARM AND WATCHMAN'S RECORDING BOX

Filed Feb. 17, 1925 4 Sheets-Sheet 3

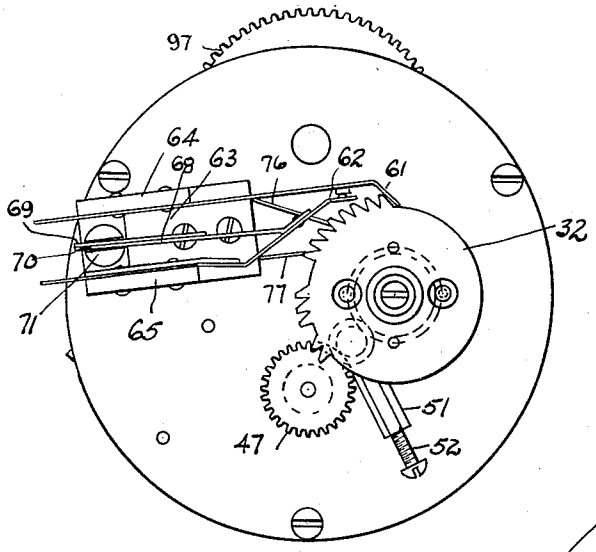

Fig. 5

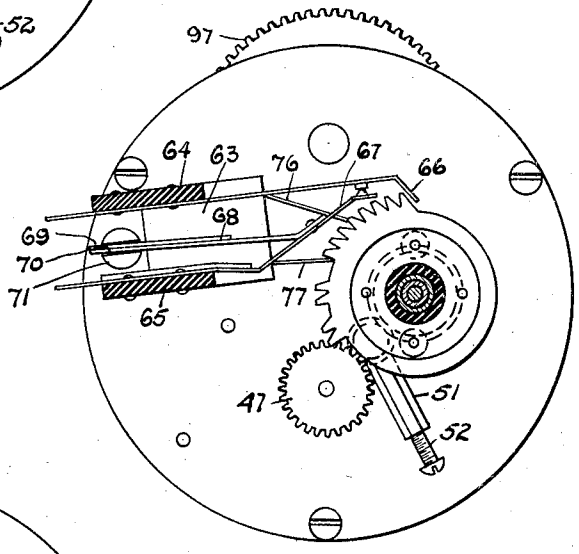

Fig. 6

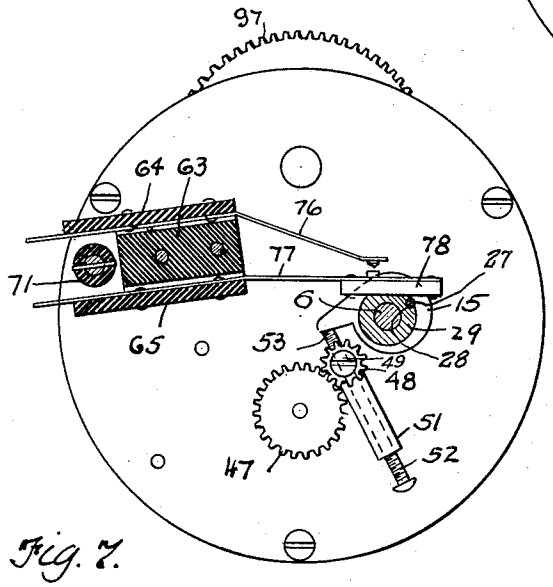

Fig. 7.

INVENTORS
Francis B. Love and
BY Boyd H. Smith.
Fay, Oberlin & Fay
ATTORNEYS

Dec. 9, 1930. F. B. LOVE ET AL 1,784,530

COMBINATION FIRE ALARM AND WATCHMAN'S RECORDING BOX

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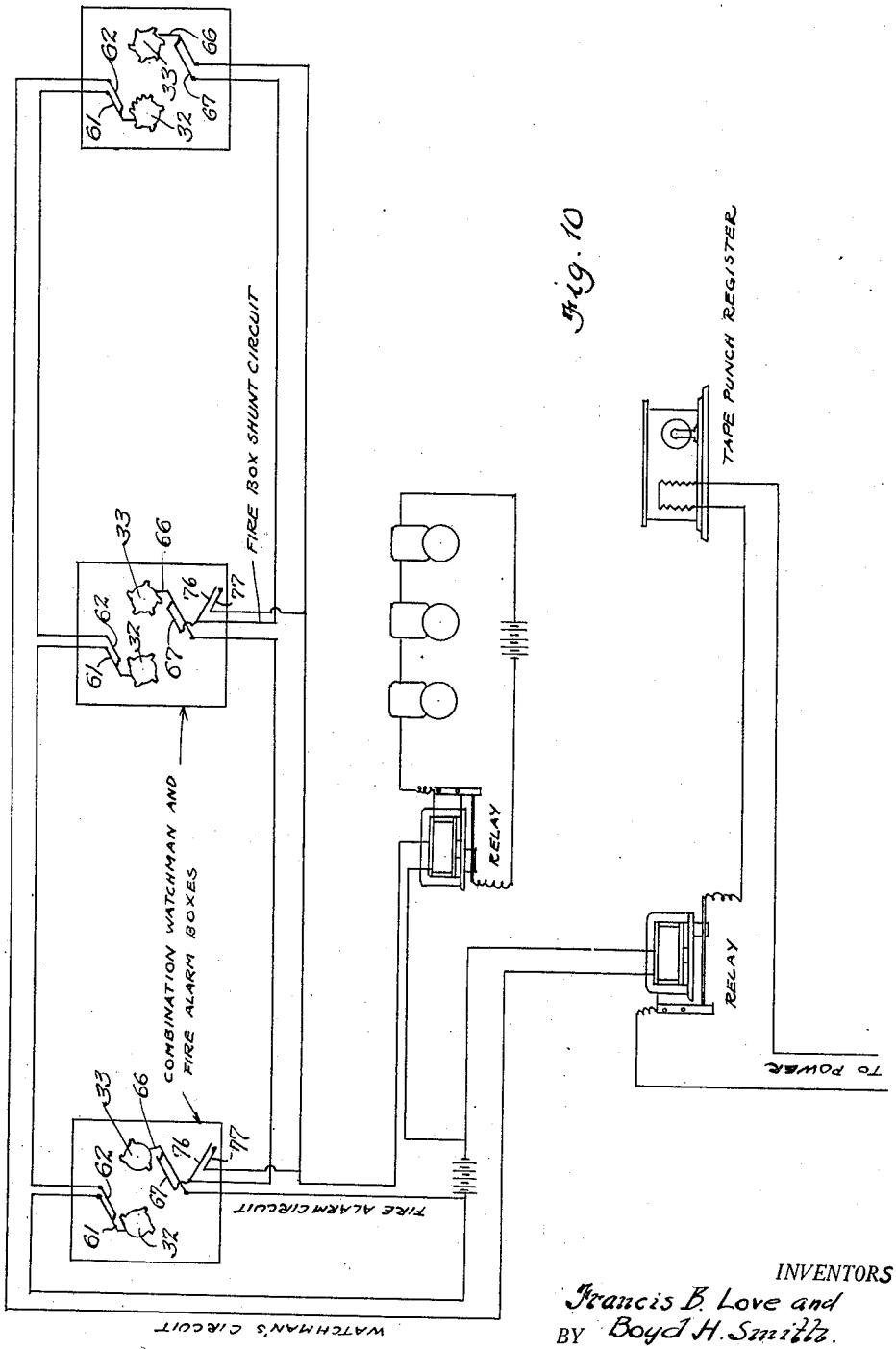

Fig. 10

INVENTORS
Francis B. Love and
BY Boyd H. Smith.
Fay, Oberlin & Fay
ATTORNEYS.

Patented Dec. 9, 1930 1,784,530

UNITED STATES PATENT OFFICE

FRANCIS B. LOVE AND BOYD H. SMITH, OF SHELBY, OHIO, ASSIGNORS TO THE AUTO-CALL COMPANY, OF SHELBY, OHIO, A CORPORATION OF OHIO

COMBINATION FIRE-ALARM AND WATCHMAN'S RECORDING BOX

Application filed February 17, 1925. Serial No. 9,839.

This invention, as indicated, relates to combination fire alarm and watchmen's recording boxes. More particularly it comprises a transmitting mechanism and associated circuits for sending from a single box distinctive signals for watchmen's recording and fire alarm purposes. It has heretofore been proposed to combine a transmitting mechanism for watchmen's signals with fire alarm signals, but in some instances such apparatus was complicated in construction and difficult to maintain in adjustment and repair under conditions of severe service.

The principal object of the present invention is to obviate the disadvantages referred to and to provide an improved combined signal transmitting mechanism of the character described. Another object of the invention is to provide an apparatus of the character mentioned embodying a minimum number of parts and avoiding duplication of operative mechanism to as great an extent as practicable. A further object is to simplify the construction of such apparatus so that economy of manufacture will be promoted and ease of assembly and repair of the same will be facilitated. Further objects of the invention will appear in the course of the following description. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a front elevation of the transmitting mechanism, the portion shown to the left being the lower portion of the mechanism when the same is installed in its case; Fig. 2 is a sectional view of the apparatus shown in Fig. 1, taken along the line 2—2 shown in Fig. 4, looking in the direction of the arrows; Fig. 3 is a view similar to Fig. 2, taken along the line 3—3 shown in Fig. 4, looking in the direction of the arrows; Fig. 4 is a view of the mechanism shown in Fig. 1, as seen from the left-hand side of said figure; Fig. 5 is a rear elevation of the mechanism shown in Fig. 1, the portion shown at the right being the lower portion of said apparatus when installed in the casing; Figs. 6 and 7 are sectional views of the mechanism shown in Fig. 4, taken along the lines 6—6 and 7—7 of Fig. 4, looking in the direction of the arrows; Fig. 8 is a top plan view of the switch contacts and associated supporting members; Fig. 9 is a transverse sectional view taken along the line 9—9 shown in Fig. 3; and Fig. 10 is a diagrammatic view of the circuit connections for the combination fire alarm and watchmen's recording boxes.

As is clearly shown in the drawing, the apparatus comprises a supporting frame 1 (see Fig. 4), having a front and back plate 2, 3, secured to each other by means of spacing bars 4. A pair of spindles 5, 6, are mounted in said frame and have their forward ends projecting from the front plate. One of these spindles 5 has secured to its outer end a pull lever 7 and when actuated is adapted to set the mechanism for sending in a fire alarm. The other spindle 6 has pinned to its outer end a sleeve 8, (see also Figs. 1 and 9), carrying a pair of lugs 9, 10, and having a squared end 11, which is adapted to be engaged by a watchman's key, and, through the rotation of the spindle, place the mechanism under tension to send in the watchman's signal. The fire alarm is designed to repeat the signal a number of times, in the apparatus shown, the signal being repeated four times, while the watchman's signal is intended to be sent but once.

The spindle 6, as is shown in Fig. 9, is journaled in a spring shaft 12, said shaft carrying a spring 13 and being formed with gear teeth 14, and the outer end of the tubular spring shaft is formed with a slot 20 on its upper side to receive the lug 9 of the sleeve 8 pinned to the outer end of said spindle 6.

The inner end of the spring shaft projects through the back plate and has keyed thereto a movement stop 15 (see also Fig. 7). The rearward face 16 of the spring shaft abuts a

collar 17 formed at an intermediate point on the spindle 6.

The outer portion of the spring shaft is journaled in the front plate 2 and is provided with an enlarged bore 18 which, at its outer end receives the inner end of the sleeve 8, and inwardly thereof provides a housing for a coil spring 19. Said spring abuts the rear wall of said housing and at its forward end bears against the inner end of the sleeve 8, and normally forces the lug 9 forwardly out of engagement with the slot 20 on the spring shaft.

A washer 21 abuts a shoulder adjacent the gear 14 and serves to position the spring 13 against the rearward face of the front plate. A sleeve, provided with a ratchet 22, is pinned to the spring shaft with the ratchet abutting the rearward face of the gear 14. Adjacent the ratchet the sleeve is provided with a cylindrical bearing 23 for a large gear 24, which is held in position by means of a collar 25. The same pin 26 which secures the sleeve to the spring shaft also holds the collar in position.

The movement stop 15 (see Figs. 4 and 7) is provided with a rearwardly extending pin 27 which lies within a groove 28 extending across the shunt circuit cam 29 which is positioned adjacent to the movement stop on the opposite side of the collar 17 of the spindle 6 and has a reduced forward portion 30 of cylindrical shape. Rearwardly of the shunt circuit cam, the hub 31 of the code wheels 32, 33, is rotatably supported upon the spindle 6 and is held against the end of the shunt circuit cam by means of a set screw 34 in the end of said spindle. The hub is provided with a driving gear 35 at its forward end, and at its rearward end has a reduced portion upon which an insulating collar 36 is mounted, said insulating collar serving as the hub for the code wheels, which are spaced from each other by a disc 37 of insulating material. Each code wheel is secured to the spacing disc by means of screws or escutcheon pins 38, which extend through said disc in opposite directions alternately adjacent the circumferential portion of said insulating disc.

The large gear 24 (see Fig. 3) is provided with a stud 41, upon which is mounted a pawl 42 pressed by means of a spring 43 into engagement with the teeth of the ratchet 22 whereby the rotation of said large gear in a clockwise direction is effected whenever the clock spring is placed under tension through the use either of the watchman's key or of the pull lever. The spring 13 is of the clock spring type and has its inner end engaged with a spring pin 44 formed on the spring shaft. Its outer end is looped about the adjacent spacing bar 4 of the frame.

Immediately below the spindle 6 a transverse shaft 45 is provided which carries gears 46, 47, forming part of the train for actuating the code wheels through the medium of an idler gear 48 supported upon a pin 49 in engagement with the teeth of the gear 35 on the code wheel hub. The idler gear is of sufficient width to engage the teeth of said gear 35 irrespective of its transverse adjustment, when the watchman's code wheel is shifted beneath the innermost pair of contact fingers, which will be hereinafter described. The pin 49 supporting the idler gear is transversely tapped to receive an adjustment screw 52 upon which a sleeve or elongated lock nut 51 is screw-threadedly engaged. The end of the adjustment screw serves as an abutment for the projecting face 53 of the movement stop 15.

Thus, through the adjustment of the screw 52, the stopping position of the slot 20 in the spring shaft 12 with relation to the lug 9 may be regulated. At the point where the spring shaft 12 projects through the front plate, an annular plate 55 is provided, said plate being formed with a notch 56 in alignment with the lug 9 and a segmental recess 57 opposite thereto. As is shown in Fig. 9, the lug 9 is normally in engagement with said notch in the plate 55 and the spindle 6 is prevented from being rotated. When, however, through the use of the watchman's key the spindle 6 is pressed inwardly, the lug 9 is moved into the slot 20, and the lug 10 is brought into alignment with the segmental recess 57 and the spindle may be turned in one direction until the lug 10 abuts the end opposite the end of the segmental recess with which it was first in contact. During such motion of the spindle the forward edge of the lug 9 will be engaged behind the edge of the annular plate 55 and will hold the spindle inwardly and engaged with the spring shaft 12 until the lug 9 once more is moved into alignment with the notch 56, when the coil spring 19 will force the same outwardly to its original position. The amount of movement thus permitted is just sufficient to rotate the code wheel one revolution and thereby transmit the watchman's code signal one time.

During the operation just described, wherein the spindle 6 is held in its inward position, the watchman's code wheel 32 will be moved away from the frame and brought beneath a pair of contact fingers 61, 62, forming the terminals of the separate circuit for sending the watchman's code signal. The terminals referred to are mounted (see Figs. 5 to 7) upon an insulating support comprising an intermediate block 63 secured to the back plate and an upper and lower insulating plate 64, 65, projecting rearwardly therefrom. In addition to the spring fingers 61, 62, which co-act with the watchman's code wheel, said plates 64, 65, carry, respectively, the spring fingers 66, 67, which co-act with the code

wheel for sending the fire alarm signal. The lower contact 67 has secured thereto a test lever 69 engaged at its free end within a notch 70 formed transversely of a terminal member 71 of insulating material which is mounted upon a test key shaft 72 (see Fig. 1) which projects through the front plate of the frame. The outer end 73 of the test key shaft is adapted to be engaged by a key and is preferably formed of triangular shape, as shown in Fig. 1 of the drawing. The test key shaft is provided with a laterally extending pin 74, to the end of which a coil spring 75 is secured. The opposite end of the coil spring is anchored to a pin 68 set in the forward face of the front plate at approximately the center thereof, and two guard pins 58, 59, are positioned adjacent the test key shaft, one on either side thereof, to limit the movement of the test shaft through contact of the lateral pin with one or the other of said guard pins. When turned in one direction the test shaft is thus adapted to open the contacts above the fire alarm code wheel at any time when it is desired to test the circuit. And when turned in the other direction, the test shaft occasions the lifting of the contacts clear of the code wheel, after which the box mechanism may be tested without disturbing the circuit. On removing the key from the test shaft, spring 75 returns the test shaft to neutral position.

The insulating block 63 directly supports the upper and lower shunt circuit contacts 76, 77. The lower of said contacts carries a shoe 78 of insulating material which is adapted to ride upon the cam 29 heretofore described. The transmitting of the fire alarm signal rotates the cam to close the shunt circuit. This prevents interference with the sending of fire alarm signals from alarm boxes further removed from the central station when a box nearer thereto is operating.

Upon the shaft 45 (see Figs. 2 and 3) a large gear 81 is mounted which, through the gear 79 on the shaft 80 drives the escapement wheel 90. A pallet 82 engages the teeth of the escapement wheel in the usual manner and retards the operation of the mechanism. The pallet shaft 83 has a sectional vane 84, having weights 85 at the outer ends.

The apparatus thus far described will serve to actuate the watchman's signal. The mechanism for actuating the fire alarm signal comprises mechanism placed in advance of the mechanism heretofore described.

It comprises the spindle 5 adapted to be actuated by the hook lever 7 which is secured to its squared forward end 87 by means of a retaining screw 88. A sleeve 91, provided with a ratchet wheel 92 having a single tooth 93, is pinned to the spindle 5. From the forward face of the ratchet a pin 94 projects, said pin being adapted to contact with a pair of pins 95, 96, set into the inner face of the front plate, which thus define the arc of movement of the spindle 5.

Immediately behind the ratchet wheel a large gear 97 is mounted, being journaled upon a bearing shoulder formed on the ratchet sleeve 91. A collar 98 is engaged over the rearward portion of said sleeve and is provided with a flange 99 which bears against the gear, said collar being pinned to the sleeve and spindle. The gear carries on its forward side a pin 101 upon which a pawl 102 is mounted. The end of the pin is notched to receive a pawl spring 103, which tends normally to throw the lower end of the pawl out of engagement with the ratchet. A pin 104, projecting from the face of the gear slightly below the upper end of the pawl, serves to limit the upward movement of the pawl to a degree just sufficient to clear the ratchet tooth.

Projecting rearwardly from the flange 99, a pin 105 is provided, against which one end of the hook lever return spring 106 bears. The body of said spring is coiled about the collar between the flange and the back plate, and thence extends about the spacing bar 4, upon which the end of the clock spring is looped, as heretofore described. The free end 107 of said spring is positioned above the lower end of the pawl.

The ratchet and pawl will thus be engaged when the pull lever is actuated. Said lever, however, bodily moves the ratchet wheel 92 and gear wheel 97 and thus moves the pawl from beneath the end 107 of the spring, the pressure on the pull lever thereafter maintaining the engagement of the pawl and ratchet. When the pull lever is released, the pawl spring 103 raises the lower end of the pawl. Further actuation of the pull lever thereafter will be ineffective to retard or in any way interfere with sending of the fire alarm code the full number of times for which the mechanism is arranged, inasmuch as the pawl will be held clear of the ratchet until its nose rides under the spring 107 as the movement rotates, which resets the pawl in engagement with the ratchet.

To send a watchman's signal, the watchman's key is engaged over the squared end 11 of the sleeve 8 which is pinned to the spindle 6. The sleeve and spindle are then pressed toward the back plate which clears the lug 9 from the locking notch 56, and forces it into the slot 20 of the spring shaft 12, and moves the lug 10 within the segmental recess 57. The watchman's key is then turned in a counter-clockwise direction which moves the spring shaft 12 in the same direction and brings the outer face of the lug 9 behind the annular plate 55, thus retaining the sleeve and spindle in the inward position. The spindle is rotated until the lug 10 abuts the opposite end of the segmental recess to that with which

it was first in contact, and the movement is released to send the signal through the gear train connecting with the drive gear 35 on the code wheel hub 31.

When the spindle is pressed inwardly, the watchman's code wheel 32 will likewise be moved inwardly and be brought from an idle position to a position beneath the contact fingers 61, 62. The fire alarm code wheel 63 by the same movement will be brought out of alignment with its spring contact fingers 66, 67. When the watchman's code wheel has been driven a full revolution, the lug 9 will have moved back to its original position in alignment with the notch 56 and the coil spring 19 will then force the lug and its associated parts outwardly, disengaging the lug 9 from the slot 20 of the spring shaft 12, and locking the lug in the notch 56.

To send the fire alarm signal, the pull lever 7 is moved in a clockwise direction, which turns the spindle 5 with its sleeve 91, carrying a ratchet wheel 92 pinned to the spindle. The arc of movement of the spindle 5 is defined by means of the pins 95, 96 set into the inner face of the front plate which are contacted with by means of a pin 94 set into the forward face of the ratchet. The ratchet through its single tooth 93 engages the free end of the pawl 102 which is pressed downwardly by the spring 107 when the parts are in their normal position. The pawl 102 is carried on the large gear 97 which is rotated by the downward movement of the pull lever and through the engagement of the teeth on its circumference it serves to rotate the spring shaft 12 through the gear 14 storing sufficient tension in the spring 13 to drive the fire alarm indicator code wheel four complete revolutions through the pawl 42, gear 24, the teeth of the ratchet 22 and the intermediate train of gears, identical with the gear train driving the watchman's code wheel through the hub 31 and driving gear 35. The fire alarm code wheel 33 is normally positioned beneath the contact fingers 66, 67 while the watchman's code wheel 32 is normally out of alignment with its contact fingers 61, 62. Thus the fire alarm signal may be sent without laterally moving the spindle 6 and its associated mechanism. After the pull lever is moved to tension spring 13, the watchman's signal cannot be sent for the reason that the slot 20 is moved out of alignment with the lug 9 and prevents the spindle 6 from being forced inwardly into operative relations with the spring shaft 12. After the fire alarm signal has been transmitted four times, the parts will be restored to their original position.

When the watchman's key is inserted and is operated to rotate the sleeve 11 to wind the spring 13, engagement of the teeth 14 on said sleeve with the teeth on the gear 97 causes rotation of said gear in a clockwise direction. Such rotation, of course, moves the pawl 102 out of contact with the retaining spring 107 and permits the pawl spring 103 to rotate said pawl in a clockwise direction about its pivot, thus moving the pawl end out of the path of the single tooth 93 of the ratchet wheel 92. Consequently, operation of the fire lever 7 after actuation of the mechanism by the watchman's key and before the watchman's code has been completed will have no effect upon the mechanism.

In Fig. 10 there are shown three combination watchmen's and fire alarm boxes, the code wheels being indicated diagrammatically. The watchman's circuit, as indicated, connects with the spring contact fingers above each of the watchman's code wheels and said contacts are normally closed, such code wheels thus being in series connection. There is included in the watchman's circuit a relay, and an auxiliary line to a tape punch register. The tape punch register is operated by connection with the power line and the relay is operated by a battery. The fire alarm code wheels, as indicated, are likewise in series connection with the fire alarm circuit through spring contact arms which are normally closed adjacent each of said wheels. The shunt circuit connection for each fire box is also shown diagrammatically. The fire alarm circuit is operated by a battery to a relay and a series of three gongs are shown in an auxiliary circuit operated through said relay from a battery. As indicated, the fire alarm and watchman's circuits are entirely separate. While the watchman's code wheel is mounted upon the same shaft with the fire alarm code wheel, said devices are never in operation at the same time and the mechanism prevents the sending of the watchman's signal when the fire alarm signal is being transmitted. This is provided for through the arrangement that the slot 20 in the spring shaft 12 will be out of alignment with the lug 9 of the sleeve 8 when the fire alarm signal is being transmitted. The watchman's code wheel is spaced closely adjacent the fire alarm code wheel and normally lies between the two pairs of contacts and out of alignment with the watchman's circuit terminals. When, however, the spindle 6 is pressed rearwardly through the engagement of the watchman's key with the end of the spindle, the watchman's code wheel is brought into alignment with said terminals and the fire alarm code wheel is moved to an intermediate position out of contact with the fire alarm circuit terminals.

The circuit contacts are normally closed. When, however, through the pull lever or the watchman's key the mechanism is set for operation, the appropriate code wheel will be placed in alignment with the proper circuit terminals and the teeth on the periphery thereof will successively separate the contacts, thereby sending in the alarm. The

shunt contacts are normally open. However, when the fire alarm transmitting mechanism is in operation the shunt circuit will be closed through the action of the cam 29, which will prevent signals being transmitted over the fire alarm circuit from a box further removed from the central station. The watchman's circuit has no shunt circuit, and when the watchman's code wheel is in transmitting position the reduced portion 30 of the cam sleeve will be brought beneath the shunt circuit shoe 78 and no shunt circuit closing action will take place. It is obvious, however, that if desired a separate shunt circuit for the watchmen's circuit could be provided.

It is possible to employ the same code wheel for actuating the contacts of each circuit where the signals to be sent are identical in character. The reception of such signals, however, would be upon separate indicating devices and thus no confusion would result as to the character of the signal.

In the circuit diagram shown in Fig. 10 the fire alarm circuit serves to actuate a series of gongs through the operation of a relay, while the watchman's circuit is connected with a relay which actuates a tape punch register. The particular signaling or recording means employed at the central station forms no part of the present invention and it is obvious that any desired signaling device may be utilized.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

We therefore particularly point out and distinctly claim as our invention:—

1. In a device of the class described, a set of contact elements connected in a first circuit, a set of contact elements connected in a second circuit, and mechanism for actuating said respective sets of contacts to transmit distinctive signals over said circuits, comprising an axially shiftable shaft, coding mechanism carried by said shaft and normally disposed in cooperable relation with said first set of contacts only, a motor for driving said contact mechanism, means for energizing said motor, separate means for energizing said motor and for simultaneously shifting said shaft to move said coding mechanism into cooperate relation with said second set of contacts only, and means for holding said shaft in shifted position throughout a complete operative cycle of the device.

2. In a device of the class described, a set of contact elements connected in a first circuit, a set of contact elements connected in a second circuit, and mechanism for actuating said respective sets of contacts to transmit distinctive signals over said circuits, comprising an axially shiftable shaft, coding mechanism carried by said shaft and normally disposed in cooperable relation with said first set of contacts only, a motor for driving said contact mechanism, means for energizing said motor, separate means for energizing said motor and for simultaneously shifting said shaft to move said coding mechanism into cooperable relation with said second set of contacts only, and means cooperable with said last-named means for holding said shaft in shifted position throughout a complete operative cycle of the device.

3. In a device of the class described, a set of contact elements connected in a first circuit, a set of contact elements connected in a second circuit, and mechanism for actuating said respective sets of contacts to transmit distinctive signals over said circuits, comprising an axially shiftable shaft, coding mechanism carried by said shaft and normally disposed in cooperable relation with said first set of contacts only, a motor for driving said contact mechanism, means for energizing said motor, separate means for energizing said motor and for simultaneously shifting said shaft to move said coding mechanism into cooperable relation with said second set of contacts only, and means cooperable with said last-named means for holding said shaft in shifted position throughout a complete operative cycle of the device, and automatic means for returning said shaft to normal position upon completion of such cycle.

4. In a device of the class described, a set of contact points connected in a first circuit, a set of contact points connected in a second circuit, and mechanism for actuating said respective sets of contacts to transmit distinctive signals over said circuits, comprising coding mechanism cooperable with said first set of contacts, coding mechanism cooperable with said second set of contacts, means for operating said coding mechanisms, and a plurality of means selectively operable to energize said operating means, one of said last-named means being rigidly connected to said coding mechanisms and being shiftable to determine the alignment of said coding mechanisms with said respective contacts.

5. In a device of the class described, a set of contact elements connected in a first circuit, a set of contact elements connected in a second circuit, and mechanism for actuating said respective sets of contacts, to transmit distinctive signals over said circuits, comprising coding mechanism normally in cooperable relation with said first set of contacts, coding mechanism normally out of cooperable relation with said second set of contacts, means for operating said coding mechanism, and a plurality of means selectively operable to energize said operating means, one of said last-named means carrying said second coding

mechanism being shiftable to move the same into cooperable relation with said second set of contacts.

6. In a device of the class described, a set of contact elements connected in an alarm circuit, a set of contact elements connected in a second circuit, a terminal of a shunt circuit mounted adjacent said contacts, and mechanism for actuating said respective sets of contacts to transmit distinctive signals over said circuits, comprising coding mechanism normally in cooperable relation with said alarm contacts, coding mechanism normally out of cooperable relation with said second set of contacts, means for operating said coding mechanisms, a plurality of means selectively operable to energize said operating means, one of said energizing means having a rigid connection with said second coding mechanism and being operable to move the same into cooperable relation with said said second set of contacts, and means associated with said coding mechanism establishing said shunt circuit only when the other of said energizing means is operated.

7. In a device of the class described, a first set of contact points, and a second set of contact points, coding mechanism normally in cooperable relation with said first set of contacts, a second coding mechanism normally out of cooperable relation with said second set of contacts, a terminal comprising a portion of a shunt circuit carried adjacent said coding mechanisms, contact means associated with said coding mechanisms, and cooperable with said shunt contact for establishing said shunt circuit, and means for shifting said second coding mechanism into cooperable relation with said second set of contacts and simultaneously rendering said shunt contact means ineffective.

8. In a device of the character described, a first set of contacts, a second set of contacts, a motor, a longitudinally shiftable shaft, coding mechanism carried by said shaft, and normally in cooperable relation with said first set of contacts only, means connecting said motor to drive said coding mechanism, a contact member connected in a shunt circuit, another contact member connected in such shunt circuit and a cam carried by said shaft and cooperable with one of said shunt contact members, at times, to establish such shunt circuit, means for energizing said motor, and means for shifting said shaft longitudinally to move said coding mechanism into cooperable relation with said second set of contacts only and to render such cam ineffective to establish said shunt circuit.

9. In a device of the character described, a first set of contacts, a second set of contacts, a motor, a longitudinally shiftable shaft, coding mechanism carried by said shaft, and normally in cooperable relation with said first set of contacts only, means connecting said motor to drive said coding mechanism, a contact member connected in a shunt circuit, another contact member connected in such shunt circuit and a cam carried by said shaft and cooperable with one of said shunt contact members, at times, to establish such shunt circuit, means for energizing said motor, means for shifting said shaft longitudinally to move said coding mechanism into cooperable relation with said second set of contacts only and to render said cam ineffective to establish such shunt circuit, and means for holding said shaft in shifted position throughout a complete operative cycle of the device.

10. In a device of the character described, a first set of contacts, a second set of contacts, a motor, a longitudinally shiftable shaft, a code wheel carried by said shaft and normally in cooperative relation with said first set of contacts, a second code wheel carried by said shaft and normally out of cooperative relation with said second set of contacts, means connecting said motor to drive said code wheels, a contact member connected in a shunt circuit, a second contact member connected in such shunt circuit and a cam carried by said shaft and cooperable with one of said contact members, at times, to establish said shunt circuit, means for energizing said motor, and means for shifting said shaft longitudinally to move said second code wheel into cooperable relation with said second set of contacts and to render said cam member ineffective to establish said shunt circuit.

11. In a device of the character described, a first set of contacts, a second set of contacts, a motor, a longitudinally shiftable shaft, a code wheel carried by said shaft and normally in cooperative relation with said first set of contacts, a second code wheel carried by said shaft and normally out of cooperative relation with said second set of contacts, means connecting said motor to drive said code wheels, a contact member connected in a shunt circuit, a second contact member connected in such shunt circuit and a cam carried by said shaft and cooperable with one of said contact members, at times, to establish said shunt circuit, means for energizing said motor, means for shifting said shaft longitudinally to move said second code wheel into cooperable relation with said second set of contacts and to render said cam member ineffective to establish said shunt circuit, and means for holding said shaft in shifted position throughout a complete operative cycle of the device.

12. An apparatus of the character described, having in combination, terminals of a plurality of circuits, a longitudinally shiftable shaft, coding mechanism carried by said shaft and normally in cooperable relation with one set of said terminals only, said shaft being shiftable to move said coding mecha-

nism into cooperable relation with another set of said terminals only, a motor, means connecting said motor to drive said coding mechanism including a sleeve rotatably mounted on said shaft, said sleeve being geared to said motor, and means on said shaft adapted when said shaft is shifted, to cause said shaft and sleeve to rotate together.

13. An apparatus of the character described, having in combination, terminals of a plurality of circuits, a longitudinally shiftable shaft, coding mechanism carried by said shaft and normally in cooperable relation with one set of said terminals only, said shaft being shiftable to move said coding mechanism into cooperable relation with another set of said terminals only, a motor, means connecting said motor to drive said coding mechanism including a sleeve rotatably mounted on said shaft and geared to said motor, means on said shaft adapted when said shaft is shifted, to cause said shaft and sleeve to rotate together, and means cooperable with said last-named means when said shaft has been shifted to hold said shaft in shifted position throughout a complete operative cycle of said apparatus.

14. An apparatus of the character described, having in combination, terminals of a plurality of circuits, a longitudinally shiftable shaft, coding mechanism carried by said shaft and normally in cooperable relation with one set of said terminals only, said shaft being shiftable to move said coding mechanism into cooperable relation with another set of said terminals only, a motor, means connecting said motor to drive said coding mechanism including a sleeve rotatably mounted on said shaft and geared to said motor, means on said shaft adapted when said shaft is shifted, to cause said shaft and sleeve to rotate together, means cooperable with said last-named means when said shaft has been shifted to hold said shaft in shifted position throughout a complete operative cycle of said apparatus, and means for returning said shaft to normal position upon completion of the cycle.

15. An apparatus of the character described having in combination, terminals of a plurality of circuits, a longitudinally shiftable shaft, a pair of code wheels carried by said shaft, said code wheels being spaced apart by a distance differing from the space between said respective sets of terminals, a motor, means connecting said motor to drive said code wheels including a sleeve rotatable with respect to said shaft, said sleeve being provided with a notch at its one end, a collar pinned to said shaft, a lug on said collar, adapted, in one relative position of said collar and sleeve, to enter said notch, and means to prevent removal of said lug from said notch except in one position of said lug with respect to said last named means.

16. An apparatus of the character described, having in combination a tubular shaft, a second shaft reciprocably mounted in said tubular shaft, said tubular shaft being rotatable with respect to said second shaft, a plurality of code wheels pinned to said second shaft, a plurality of spring fingers projecting over said second shaft, means for moving said second shaft axially to bring one of said code wheels beneath a selected spring finger, a separate electric circuit adapted to be connected and disconnected through each of said spring fingers, means engaging said tubular shaft for driving said code wheels, and single means for energizing said driving means and controlling the alignment of one of said code wheels with respect to one of said spring fingers.

17. An apparatus of the character described, having in combination a tubular shaft, a second shaft reciprocably mounted in said tubular shaft, said tubular shaft being rotatable with respect to said second shaft, a plurality of code wheels pinned to said second shaft, a plurality of spring fingers projecting over said second shaft, means for moving said second shaft axially to bring one of said code wheels beneath a selected spring finger, a separate electric circuit adapted to be connected and disconnected through each of said spring fingers, means engaging said tubular shaft for driving said code wheels, single means for energizing said driving means and controlling the alignment of one of said code wheels with respect to one of said spring fingers, and means preventing operation of said last-named means to energize said driving means without aligning said one code wheel with its respective spring fingers.

18. An apparatus of the character described, having in combination terminals of a plurality of electric circuits, automatically operated means selectively operable for intermittently opening and closing said respective circuits at said terminals, a spring motor for operating said means, means for energizing said motor to a predetermined degree for actuating one of said automatically operated means, means for energizing said motor to a predetermined and different degree for actuating another of said automatically operated means, and separate means for rendering each of said energizing means inoperative for energizing said motor during such automatic operation after energization of said motor by any one of said energizing means.

Signed by us, this 14 day of Feb., 1925.

FRANCIS B. LOVE.
BOYD H. SMITH.