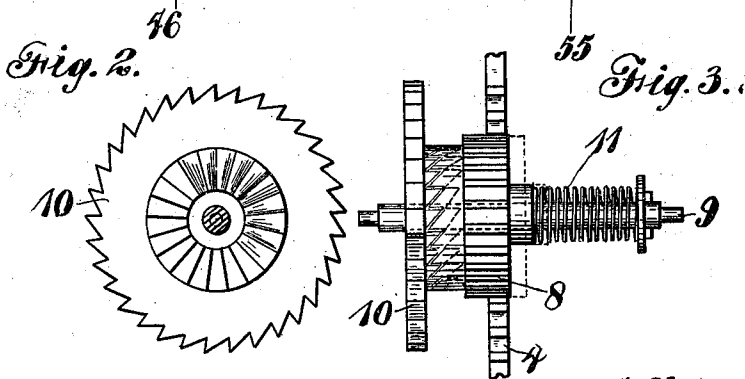
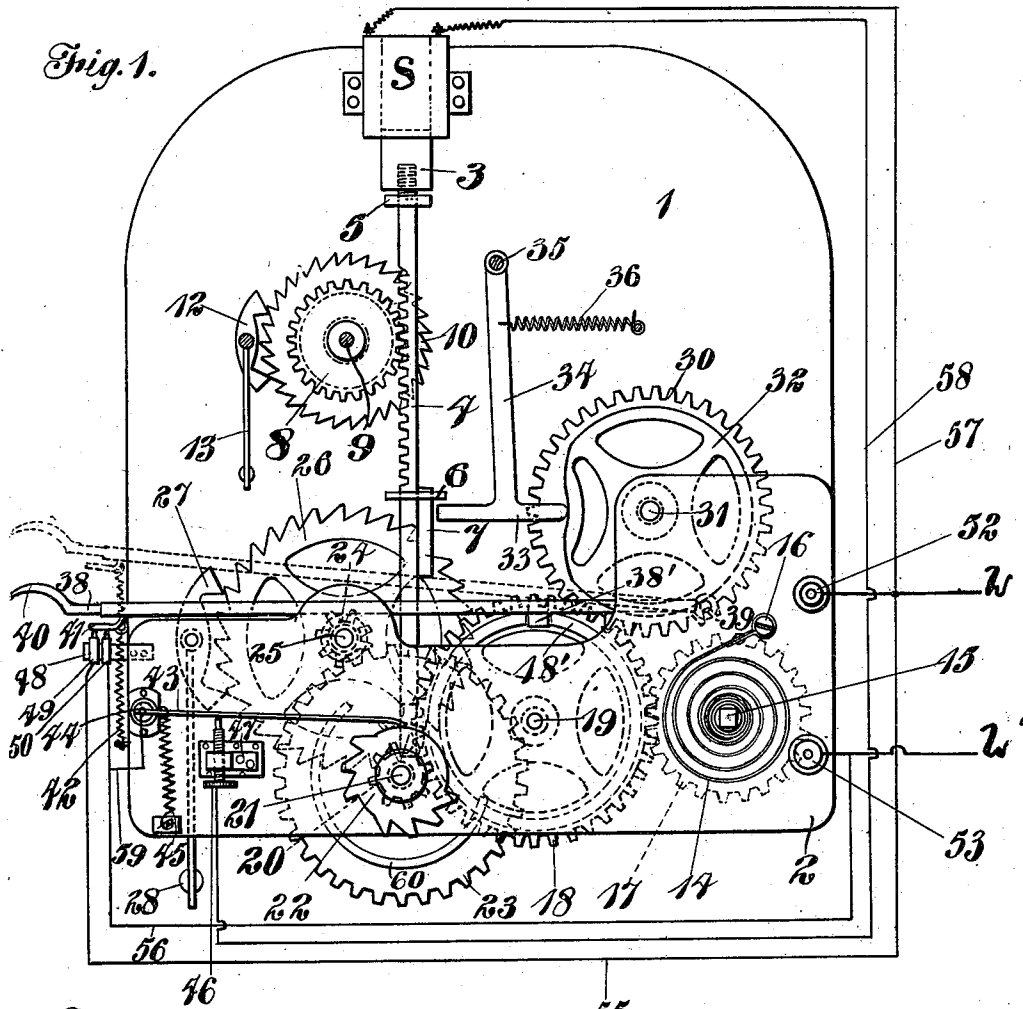


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ELECTRIC SIGNALING BOX.
APPLICATION FILED FEB. 23, 1909.

979,769.

Patented Dec. 27, 1910.



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ELECTRIC SIGNALING-BOX.

979,769.

Specification of Letters Patent. Patented Dec. 27, 1910.

Application filed February 23, 1909. Serial No. 479,635.

To all whom it may concern:

Be it known that I, ARTHUR KEMPSTON, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented a new and useful Electric Signaling-Box, of which the following is a specification in such full and clear terms as will enable those skilled in the art to construct and use the same.

This invention relates to a fire alarm box and its especial object is to produce a box which will not interfere with the signal being sent in from any other box, nor will any box sending in a signal interfere with the sending of the signal from that box when the line is clear.

In general the object is accomplished by holding any box in a position such that it will start to send its signal to the main office at a certain time after any other box has completed its round of signaling, and no matter how many boxes may be started at one time one will obtain the line before another and hold all the other boxes that may be started till it gets through with its signal.

In the drawings, which are partly diagrammatic, and in which the same numeral represents the same part throughout, Figure 1 is a front elevation of one form of fire alarm box, the wiring being shown in a diagram, Fig. 2 is a side view of the timing escapement wheel, and Fig. 3 is an edge view of the timing escapement and means for retarding the stop bar, a portion of the latter being shown.

The box is provided with the front and back plates 2 and 1 to which is secured the mechanism for driving the make and break apparatus for sending the signals. The back plate 1 has a solenoid S secured to it at its upper edge within which operates a plunger 3, said plunger having a rack bar 4 secured thereto. The rack bar 4 passes through a pair of guides 5 and 6, the former of which forms the rest for the plunger when the solenoid is out of circuit and the bar has dropped down as low as it can fall. This rack bar is provided with a block 7 on one side thereof for an object to be explained later. The rack is in mesh with the cogs of the wheel 8 on a shaft 9, said wheel having a series of teeth on the side thereof, which mesh with like teeth on the side of

the timing escapement wheel 10, which latter is secured to the shaft 9. The wheel 8 is loosely mounted on the shaft 9, but the light spring 11 holds its side teeth in mesh with the side teeth of the escapement wheel 10. The escapement wheel is caused to rotate slowly by means of the escapement 12 to which is secured the short pendulum 13, said pendulum being of any desired length as will be later explained.

The driving mechanism of the box may be of any of the well known forms, as for example the spring 14 having one end secured to the shaft 15, the other end being secured to the post 16, a wheel 17 being also carried by the shaft 15. The gear 17 is in mesh with a gear 18 on a shaft 19, said gear 18 being in mesh with a gear 20 on the shaft 21 of the character wheel 22. The shaft 21 also carries a gear 23 in mesh with a small gear 24 on the shaft 25, said shaft being secured to the escapement wheel 26. Said escapement wheel is caused to run slowly by means of the escapement 27 to which is secured the pendulum 28.

Secured above the wheel 18 and in mesh therewith is a wheel 30 of the same diameter as 18, said wheel 30 being secured to the shaft 31. This wheel 30 has a cam 32 on its side, said cam being adapted to push the arm 33 on the swinging bar 34 under the block 7. The bar 34 is pivoted to the back plate 1 at 35 and is held in contact with the cam 32 by means of the spring 36.

The wheel 18 has a circular cam 18' on its side in a notch of which drops the projection 38' on the pivoted bar 38, said bar being pivoted to the front plate 2 at 39. This bar is provided with a lifting hook 40 at its free end and with a contact spring 41, a spring 42 assisting in pulling the bar down when the wheel 18 has turned one round, the projection 38' stopping the movement of the bar by dropping into the detent of the cam 18'.

The make and break switch 43 is secured to a pivot 44 on the front of the plate 2, a small spring 45 pulling the switch down positively. Under the switch is an adjusting screw 46 in a block 47, said block being insulated from the plate 2. On the back of the plate 2 close under the free end of the bar 38 is a projecting bar of insulating material 48, on which are secured clamps 49 and 50, said clamps having contact points

which the spring 41 is adapted to connect. The line inlets are shown on the front of the plate 2 at 52 and 53.

The wiring, which is shown diagrammatically, consists of the line wire L leading to the inlet block 52 and connected with the wire 55 leading to the contact on the clamp 49, through the spring 41 to the contact clamp 50 along the wire 56 to the line wire L'. This being the normal condition of the box when no alarm has been sent from it.

When an alarm has been sent from the box the bar 38 will be raised to the position shown in dotted lines and the wheel 18 will begin to rotate. The circuit in this case will be as follows: The line wire L will be connected with the solenoid, because of the breaking of the contact at the points on the clamps 49 and 50, through the wire 57, and the current will pass through the solenoid along the wire 58 to the make and break screw 46, along the switch 43 to the wire 59 and back over the wire 56 to the line wire L'.

The result of ringing in an alarm in any box is to start the character wheel to revolving and to energize the solenoid S, but since the rack bar has its motion retarded by the escapement 12 it will travel upwardly very slowly, or should an alarm be in the course of transmission from any other box it will fall back instantly since with every break in the continuity of the current passing over the line the solenoid S will be de-energized, and since the teeth on the side of the escapement wheel 10 will hold in one direction only, the rack bar will fall down on the guide at any break in the current. The bar will again start to rise, but every break will cause it to fall back again, and since it will fall much faster than it can rise it can never clear the cam 60 on the wheel 23, said cam being of the same angular extent as the entire number of character teeth. The rack bar positively stops the sending mechanism when the cam 60 contacts therewith. Should there be no other box sending in an alarm the rack bar will continue to rise as fast as the escapement 12 will permit it to move, and as soon as the bar is high enough to clear the cam 60 the continued sending of a signal from the given box will be assured, since the rack bar can then drop no lower than the stop 7 and arm 33 will permit. In order to insure the continued action of the given box should an interruption come into the line from any cause the cam 32 on the wheel 30 is arranged to push out the bar 34 which will catch the rack bar and prevent it from falling during the time the given box has the line. It will be noted that the character wheel turns four times while the wheels 18 and 30 turn once, it will therefore be evident that the bar 34 will move into the position to support the rack bar when the

character wheel has made about one half a turn, and that it will move away when the character wheel is on its last half turn. The object of this device is to insure the continued movement of this given box before it would be possible for any other box to start into operation, since the time of travel of another rack bar would be much longer than the time of travel of the one supported by the bar 34.

It will be clear that it will be possible to vary the time of travel of the rack bar, as well as to vary the length of the cam 60, and the length of the rack bar in the different boxes in such a manner as to insure their all operating at different times after they have been started, and even if two boxes should be rung at such a time as to drop their rack bars at the same instant they would not again operate in the same manner since the time constant of each box is substantially different from each other, and the length of the cam on the wheel 23 is a variable quantity for each wheel.

It is to be noted that the essential feature of this invention lies in the absolute stoppage of the clockwork mechanism until the line is cleared of signals for such a length of time as will permit the lifting of the rack bar out of contact with the cam 60 on the wheel 23, and also in the stoppage of the box in such a position as to enable it to make its signal in the usual manner as soon as the line is clear of all other signals for the required length of time for the rack bar to clear the cam 60.

It is to be noted that a possible interruption of the current might take place during the period of passage of the character wheel cam 60 on the lower side of the shaft carrying said wheel, but that in any box sending in a signal the bar can drop no farther than the stop on the arm 34. It will be also noted that no matter how many boxes may be rung at the same instant, one will obtain the line first, or if they are rung at such a time as to drop their bars at the same instant, that the following movement of the rack bars will be in such an interval of time as to give one box the line before the other in which case the box obtaining the line will continue sending its signal without interruption from the other boxes on the line, and all other boxes will be in the ready position as soon as the line is clear of signals for the required time interval. Now it is to be noted that the rack bar is of such a length as to reach the cam 60, and stop the wheel 23 whenever a signal is sent over the line during the period that the cam is on its lower turn. If there are no other signals being sent on the line the plugger will not drop and the character wheel will continue its operation, but should the operator in charge of the central office, or at any station

desire to telegraph a message he may do so. The reason of this lies in the fact that he can interrupt the circuit as often as he wishes, and can interrupt the circuit during the time the cam 60 is on the lower side of its shaft, when the bar will drop and stop the box having the line, then since the time interval in sending telegraphic signals by hand is very short between the several impulses sent along the line the box having the line cannot get its rack bar clear to continue sending its signal till the person desiring the use of the line for telegraphic purposes is through. As soon as he stops the use of the line for a short time interval the box will raise its rack bar to the clear and will continue the sending of its signal to the end of its complete set of signals. It is also to be noted that in this art it is common to have the character wheel repeat its signal four times, this being accomplished in the box shown by having the wheel 18 four times as large as the wheel 20 which is driven by it.

Although particular reference has been made in this specification to my device as a fire alarm box, I wish it understood that I do not confine its operation to fire alarm circuits, nor my claims to fire alarm boxes, but desire to include electric signaling boxes in general.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. In an electric signaling box, an electric circuit, a signaling mechanism, means to drive said mechanism, a solenoid, a plunger operated by said solenoid and having a projection adapted to obstruct the motion of the signaling mechanism if the line is in use, means to permit the free action of the plunger in one direction, and means to cause its slow operation in the opposite direction.

2. In an electric signaling box, an electric circuit, a signaling mechanism, means to drive said mechanism, a slowly movable plunger adapted to obstruct the motion of the signaling mechanism if the line is in use, a solenoid for moving said plunger in one direction, means to permit the instant return of said plunger in the opposite direc-

tion if the line comes into use during its slow movement, and means to cut the solenoid out of circuit during the time the box is not in use.

3. In an electric signaling box, an electric circuit, a signaling mechanism, means to drive said mechanism, a slowly movable plunger adapted to obstruct the motion of the signaling mechanism if a signal is being sent over the line, a solenoid for moving said plunger in one direction, means to permit the instant return of the plunger if the line comes into use during its slow movement, means to stop the movement of the signaling mechanism at the end of a predetermined number of signals, and means to cut the solenoid out of the circuit at the end of the signaling period.

4. In an electric signaling box, an electric circuit, a signaling mechanism, means to drive said mechanism, a slowly movable plunger adapted to hold the signaling mechanism in a position ready to send a signal at the first moment the line is clear of other signals, means to return the plunger to its initial position instantly if the line is operated during the period of initial movement of the plunger and before the signal has been started from that box, means to stop the mechanism, a solenoid for moving said plunger, and means to cut the solenoid out of circuit at the end of the set of signals.

5. In an electric signaling box, an electric circuit, a signaling mechanism, means to drive said mechanism, means to prevent the sending of the signal for a period of time after the ringing in of the signal, means to stop the box in said period if other signals are passing over the line, means to permit the use of the line for sending other signals during the period of signaling from the given box, and means whereby the box will complete its set of signals when the line is free from outside signals.

In testimony whereof I have set my hand this 13th day of February A. D. 1909, in the presence of the two subscribed witnesses.

ARTHUR KEMPSTON.

Witnesses:

W. T. HESS,
C. P. GRIFFIN.