W. A. HESSE.

CROSSING SIGNAL.

APPLICATION FILED NOV. 1, 1912.

1,067,734.

Patented July 15, 1913.

4 SHEETS—SHEET 1.

Fig. 1.

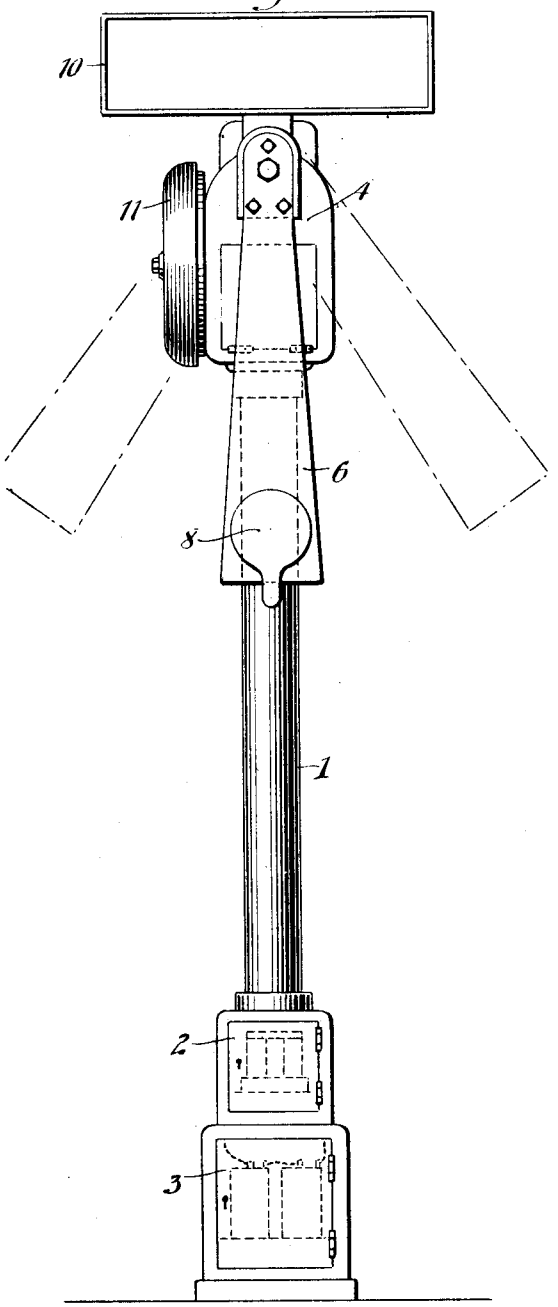
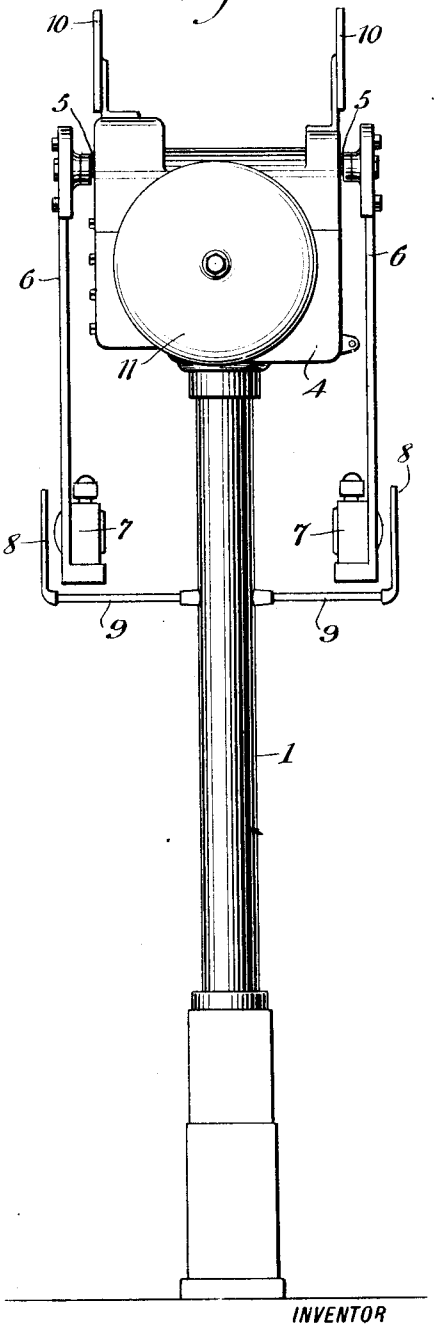



Fig. 2.




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4 SHEETS—SHEET 2.

Fig. 3.

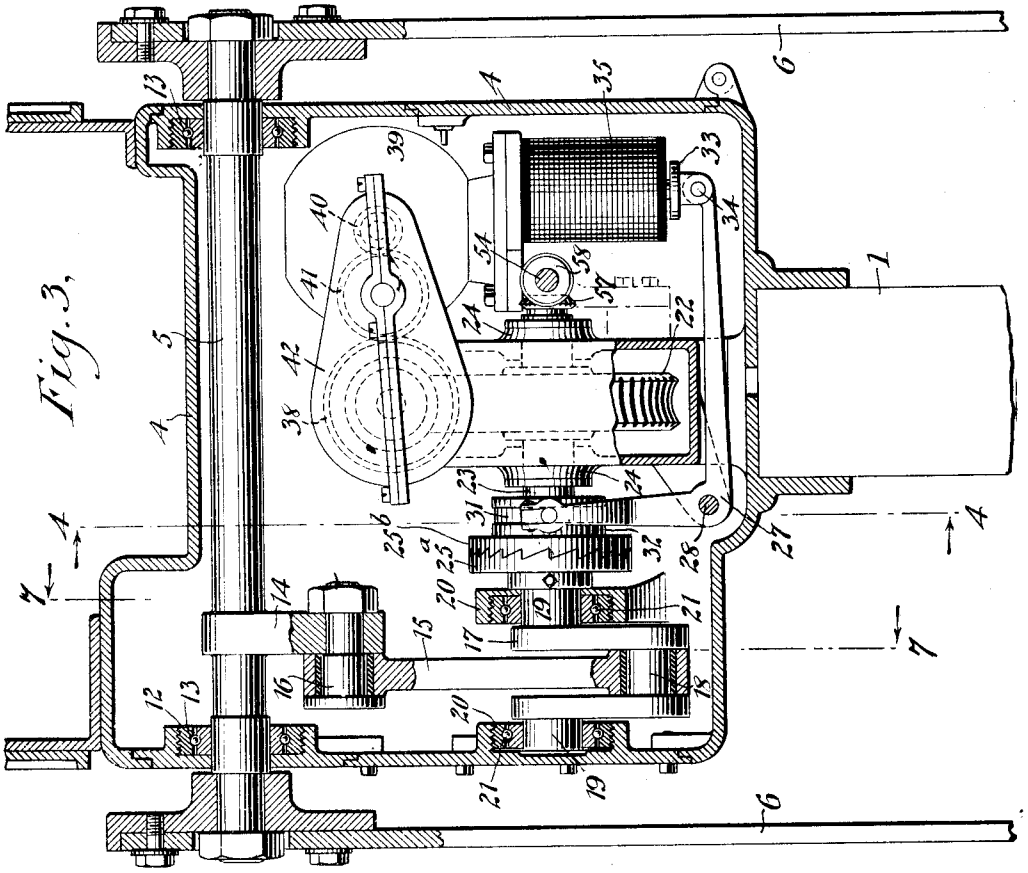
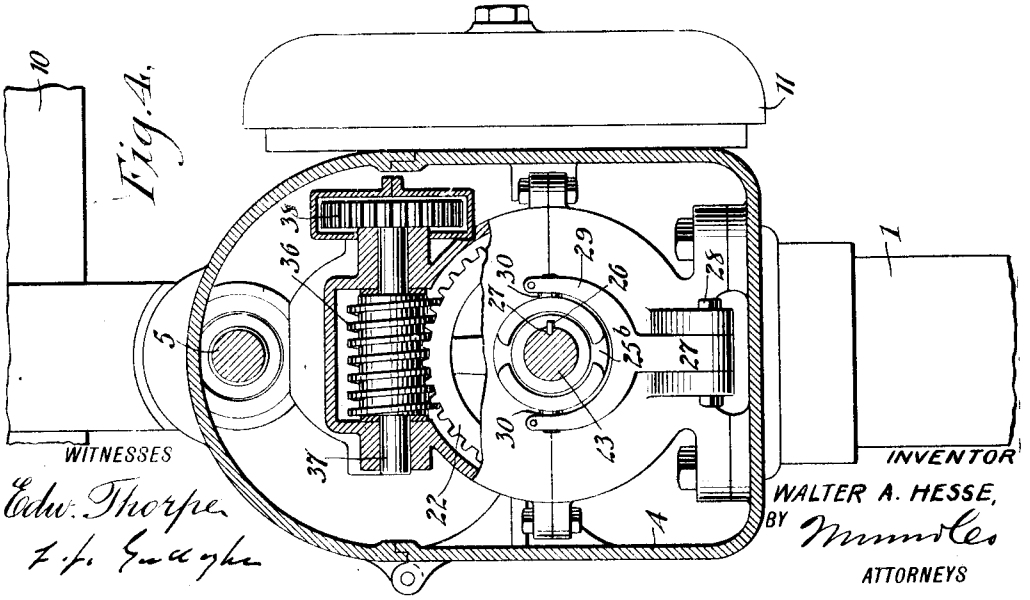


Fig. 4.



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4 SHEETS—SHEET 3.

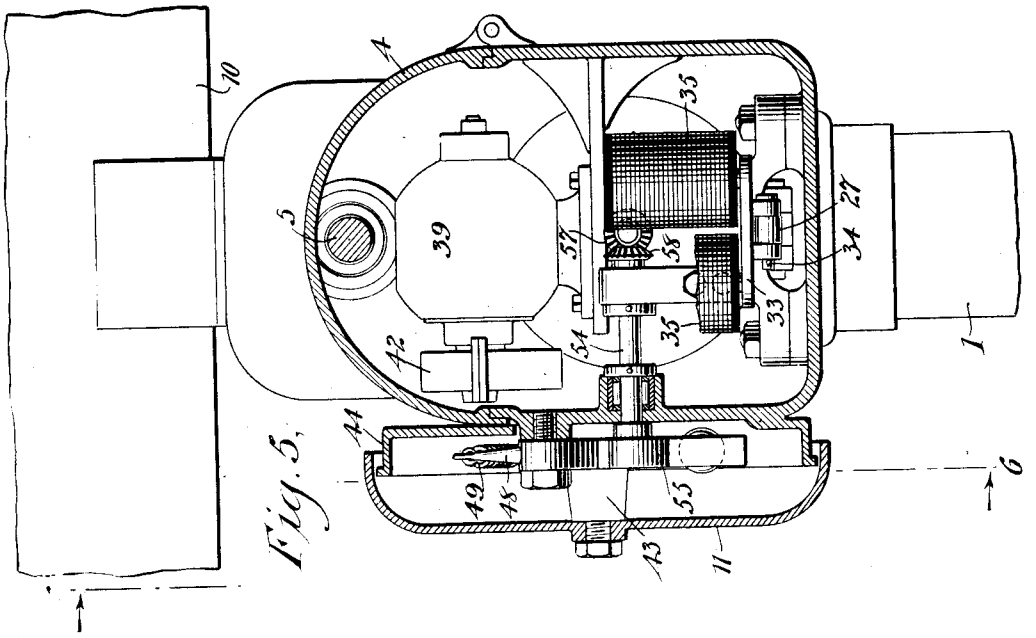



Fig. 5.

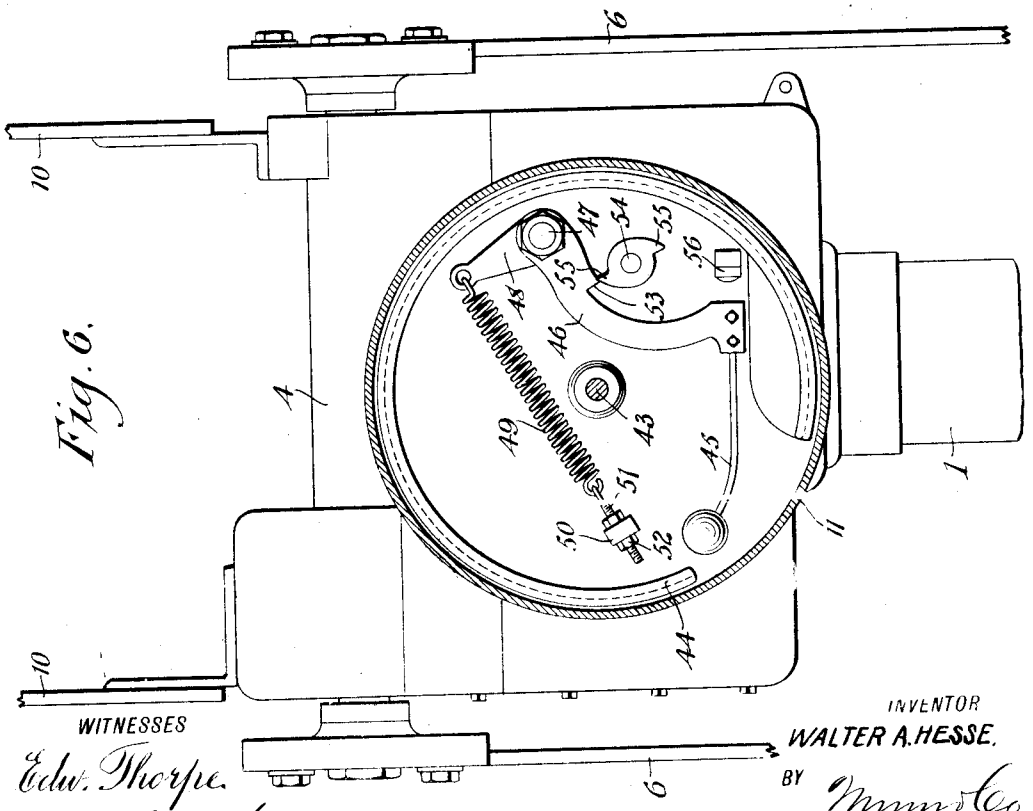



Fig. 6.

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4 SHEETS—SHEET 4.

Fig. 7.

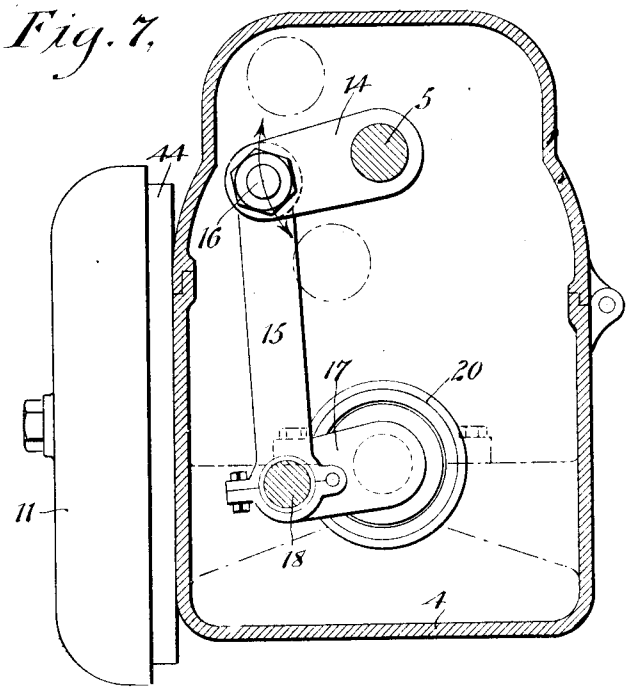
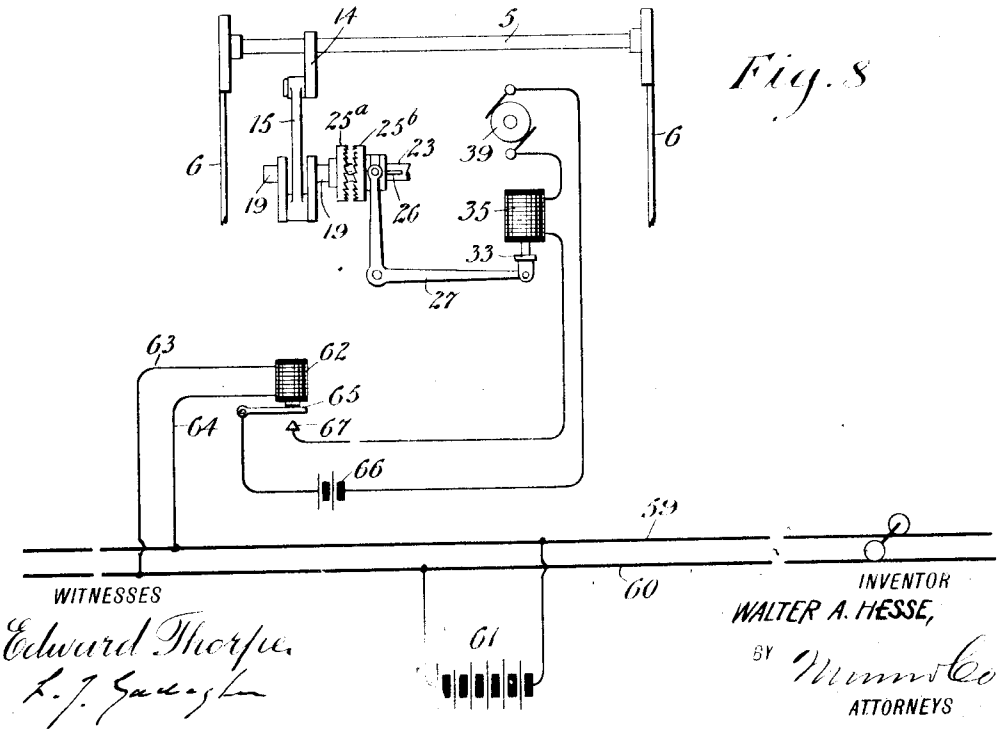



Fig. 8




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# UNITED STATES PATENT OFFICE.

WALTER A. HESSE, OF ALAMEDA, CALIFORNIA.

## CROSSING-SIGNAL.

1,067,734. Specification of Letters Patent. Patented July 15, 1913.

Application filed November 1, 1912. Serial No. 728,968.

*To all whom it may concern:*

Be it known that I, WALTER A. HESSE, a citizen of the United States, and a resident of Alameda, in the county of Alameda and State of California, have invented a new and Improved Crossing-Signal, of which the following is a full, clear, and exact description.

This invention relates to crossing signals, and is particularly directed to mechanism adapted to be actuated by a train approaching the crossing, the control being effected by means of a suitable electric circuit.

The principal object of the invention is to provide a crossing signal adapted to be actuated when a train approaches the crossing in order to give warning to those in the vicinity of the crossing, the construction contemplating a signal characterized by an oscillating arm.

It is desirable that automatic devices acting as crossing signals approach as nearly as possible the warning signal given by a flagman; that is, that the signal device calling attention to the on-coming train be oscillated after the manner of swinging a lantern by one employed for that purpose.

The signal herein described and claimed serves to convey to those in the vicinity by audible as well as visual means the approach of a train, the structure which operates the parts in order to bring about the warnings being such that they may be conveniently carried in a suitable support, thereby providing for ready accessibility.

Reference is to be had to the accompanying drawings forming a part of this specification, in which like characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a side view of the signal structure; Fig. 2 is an end view; Fig. 3 is a vertical sectional view through the operating mechanism; Fig. 4 is a sectional view on the line 4—4 of Fig. 3; Fig. 5 is a sectional view similar to Fig. 4, but looking in the opposite direction; Fig. 6 is a sectional view on the line 6—6 of Fig. 5; Fig. 7 is a sectional view on the line 7—7 of Fig. 3; while Fig. 8 is a diagrammatic view showing the relation of the electrical circuits and the operating mechanism.

It is, of course, clear that the signal set forth is capable of many variations in size and shape, as well as in the manners in which the different parts may be mounted, without involving a departure from the inventive idea, the purpose of the invention being the provision of a signal which is adapted for use in different localities and under widely different conditions.

Referring particularly to Figs. 1 and 2, the signal structure comprises a suitable standard or support 1, preferably provided with a number of swinging doors 2—3 adjacent its lower end, whereby access to the interior is had, the interior affording a convenient container for the battery and other parts used in the operation of the device.

Adjacent the top of the standard is a casing 4 in which the moving parts of the outfit are positioned, whereby they are protected from the action of the elements; extending through this casing, and in operative relation with the mechanism therein, is a shaft 5, to the ends of which signal arms 6 are secured, the lower ends of which are adapted to carry lanterns 7 of the electric or oil type, the signal arms or lanterns moving when the said shaft 5 is turned. The normal position of the signal arms is as shown in full lines in Fig. 1; that is, hanging in a substantially vertical plane, the lanterns 7 being preferably covered by means of shields 8, preferably fixed to the standard 1 and in any suitable manner, as by means of arms 9; in such position of the signal arms the lanterns, especially at night, are hidden from view, so that in the event of displaying a red light when the signal arm is operating such light will not be exposed when the signal is inoperative.

Fixed to the top of the signal, and preferably on the casing 4, are a number of panels 10, preferably facing in opposite directions, on which suitable warnings may be displayed, being visible from both sides of the track. The signal set forth contemplates the use of a gong 11, preferably fixed to one side of the structure and adapted to be

sounded when the signal arms 6 are oscillated. Within the casing 4 is the actuating mechanism for the shaft 5, which extends therethrough, being preferably mounted in suitable bearings 12 provided with balls 13 whereby the friction present is materially reduced when the shaft turns.

Fixed to the shaft is an arm 14 in pivotal engagement with one end of a pitman 15 in any suitable manner, as by means of a pin and bolt 16, the lower end of the pitman being in pivotal engagement with a crank 17 by means of a pin 18, the stub shafts 19 being preferably mounted in bearings 20 provided with balls 21 in order to necessitate as little operating power as is possible. It will be obvious now that if the shafts 19 are rotated in the bearings 20, the crank 17 turning therewith will cause the pitman 15 to oscillate the shaft 5 and the arms 6 through a certain angle, this swinging movement of the arms 6 being maintained as long as power is applied to the said shafts 19.

Referring particularly to Figs 3 and 4 it will be noted that a gear 22 is fixed on the shaft 23 mounted in suitable bearings 24, which shaft is substantially in line with the stub shafts 19, the adjacent ends of the shafts 19 and 23 being provided with two elements $25^a$—$25^b$, which collectively form a clutch. The element $25^a$ is preferably fixed on the shaft 19, while the element $25^b$ is slidable longitudinally of the shaft 23 but turns therewith by reason of the engagement between a key 26 fixed to the element and a slot 27 in the said shaft 23. In order to provide for movement of this element $25^b$ longitudinally of the shaft 23 a bell crank lever 27 is used, pivotally mounted at 28, one end of one of the arms being bifurcated, thereby forming a yoke 29 the sides of which are provided with pins 30 engaging in the slot 31 in the outer side of the shoulder 32 on the said clutch element $25^b$. The end of the other arm of the bell crank lever 27 is pivotally secured to an armature 33 in any desirable manner, as by means of a pin 34, this armature being movable under the influence of the field set up by the solenoids or electro-magnets 35. The normal relation of the elements $25^a$ and $25^b$ of the clutch brings them out of engagement with each other so that the mass of the arms 6 at the outer ends of the shaft 5 will bring such arms to the normal vertically extending position when the signal has become inoperative and the said clutch elements have been separated; this is desirable in order that the lanterns 7 may be unexposed when the signal is not operating, as shown particularly in Figs. 1 and 2.

The gear 22 is actuated by means of a worm 36 mounted on a suitable shaft 37, to the other end of which a pinion 38 is mounted, whereby this shaft and worm may be turned; mounted in position within the casing 4, and on a suitable support, is a motor 39, the shaft of which is provided with a spur gear 40 adapted to drive the beforementioned pinion 38 through the medium of an intermediate pinion 41, these parts being preferably inclosed in a suitable case 42. From the description given the closing of the circuit, which includes the motor, will cause the same to turn the shaft 23 through the medium of the gears 22, 38, 40 and 41; if now a circuit including the solenoids or electro-magnets 35 is closed the two elements $25^a$ and $25^b$ of the clutch will be brought into engagement, and the turning will be transmitted to the shaft 5 and the arms 6.

The gong 11 is intended to be sounded simultaneously with the swinging of the signal arms 6, and to this end the following structure is preferably provided:—The gong is preferably mounted on a boss 43 whereby it is suitably spaced from the casing 4, the casing being preferably provided with a substantially circular rib 44 extending closely adjacent the open side of the gong, whereby the entrance of rain or snow and foreign matter to the interior is prevented; closely adjacent the inside of the gong is a hammer 45 secured to one end of one arm 46 of a bell crank pivotally mounted in position at 47, the other arm 48 at its outer end being in engagement with one end of a helical spring 49 which is secured to a lug 50 by means of a threaded bolt 51 and nuts 52. One side of the arm 46 is preferably provided with a shoulder 53, and extending from within the casing is a shaft 54 having at its outer end a plurality of shoulders 55 adapted to come into engagement with the under side of the said arm 46 as the shaft is turned, the abrupt disengagement of the shoulders 55 successively with the shoulder 53 on the arm permitting the spring 49 to bring the hammer or striker 45 against the gong, thereby sounding the same; in order to limit the downward movement of the hammer a stop 56 is preferably provided which may be resilient in its nature, and with which the said arm 46 is adapted to engage.

In order to bring about rotation of the shaft 54 which actuates the gong-striking mechanism it will be noted (Figs. 3 and 5) that the inner end of the shaft 23 is provided with a beveled gear 57 meshing with a second beveled gear 58 secured to the inner end of the said shaft 54; the result attained is that as the shaft 23 is turned the gong-striking mechanism is actuated, as is also the arm-swinging mechanism, whereby

the visible and audible signals are conveyed to those in the neighborhood.

The structure described is especially adapted for use in combination with an electrical circuit which is normally closed, the arrangement being shown particularly in Fig. 8. The rails of the track are provided with insulated sections 59—60 of suitable length, depending on the period of time during which it is desired to have the signal working as the trains approach; any source of power, such as a battery 61, is connected to these insulated rail sections 59—60, the said rail sections being also connected to a relay 62 through the wires 63—64; a closed circuit is provided by this arrangement, current from the source of power traversing one of the rail sections and one of the wires, thence through the relay back to the other rail section, and returning to the battery. This circuit is then normally a closed one so that the pivoted armature 65 controlled by the relay 62 will normally occupy the position shown in Fig. 8; the solenoid 35 is preferably connected in series with the electric motor 39, these elements being also in series with a second source of current 66, this circuit being normally open and including the said armature 65 which in its lowermost position is adapted to engage with the fixed contact 67 in this said normally open circuit. As a train approaches from the right or left and enters the insulated rail sections the battery 61 is short circuited, the greater portion of the current passing through the car wheels and axle, the result being that the relay 62 is deënergized with the consequent dropping of the armature 65 adjacent the contact 67, thereby closing the circuit which was previously opened and actuating the solenoids and motor as described. Of course, after the train passes out of the insulated rail sections the battery current again flows through the relay 62, and the armature 65 is brought to the position shown in Fig. 8, after which the signal arms return to their normal vertical position and the structure is again inoperative.

The mechanism described makes use of parts which may be easily assembled, and the structure as a whole presents no complicated relation of the elements; the predominating feature of the invention, that is, the constantly swinging or oscillating arm, affords a more reliable and trustworthy means of calling attention to danger conditions at railway crossings.

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

1. A crossing signal comprising an upright support, a signal shaft journaled therethrough, signal arms mounted on the shaft and adapted to normally assume vertical positions under the influence of their weight, signal lights carried by the ends of the arms, fixed shields mounted on the support so as to cover the said signal lights when the arms are in their normal positions, a crank shaft journaled in the support and having connection with said signal shaft whereby to oscillate the same and swing the signal arms to both sides of the said shields, a driven shaft, a motor having connection with the driven shaft, complementary clutch members carried by the said crank and driven shafts and one of which is movable toward and away from the other, and means whereby to shift the movable clutch member when the motor is started and stopped, whereby the signal arms may be free to assume a normal vertical position when their operation is finished.

2. A crossing signal comprising an upright support, a signal shaft journaled therethrough, signal arms mounted on the shaft, a crank shaft journaled in the support and having connection with said signal shaft whereby to oscillate the same and swing the signal arms, a driven shaft, a motor having connection with the driven shaft, complementary clutch members carried by said crank and driven shaft and one of which is movable toward and away from the other, a member for actuating the movable clutch member, and means forming a circuit for the motor and including an electro-magnet having its armature connected to said clutch actuating member.

3. A crossing signal comprising an upright support, a signal shaft journaled therethrough, signal arms mounted on the shaft, a crank shaft journaled in the support and having connection with said signal shaft whereby to oscillate the same and swing the signal arms, a driven shaft alined with the said crank shaft, complementary clutch members carried by the contiguous ends of the crank and driven shafts and one of which is movable toward and away from the other, a motor having connection with the driven shaft, a bell crank lever mounted in the support, one arm of which is provided with a yoke in connection with one of the said clutch members, and means forming a circuit for the motor and including an electro-magnet having its armature connected to the other arm of the said bell crank lever.

4. A crossing signal comprising an upright support, a signal shaft journaled therethrough, arms mounted on the shaft and constituting a visual signal, an audible signal consisting of a bell mounted at one side of the support, a crank shaft journaled in the support and having connection with the

said signal shaft, a driven shaft alined with the said crank shaft, a clutch connecting the contiguous ends of the crank and driven shafts, a motor having connection with the driven shaft, a shaft having connection with the opposite end of the driven shaft and extending at right angles thereto, connections between the said transverse shaft and the bell for sounding an alarm when the motor is actuated, and means forming a circuit for the motor and including an element having connection with, and adapted to control, the said connecting clutch.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WALTER A. HESSE.

Witnesses:

WILLIAM S. BURGESS,

DONALD ELLIOT.