

(No Model.)

2 Sheets—Sheet 1.

J. B. STEWART.
ELECTRIC RAILWAY GRADE CROSSING DEVICE.

No. 499,805.

Patented June 20, 1893.

Fig. 1.

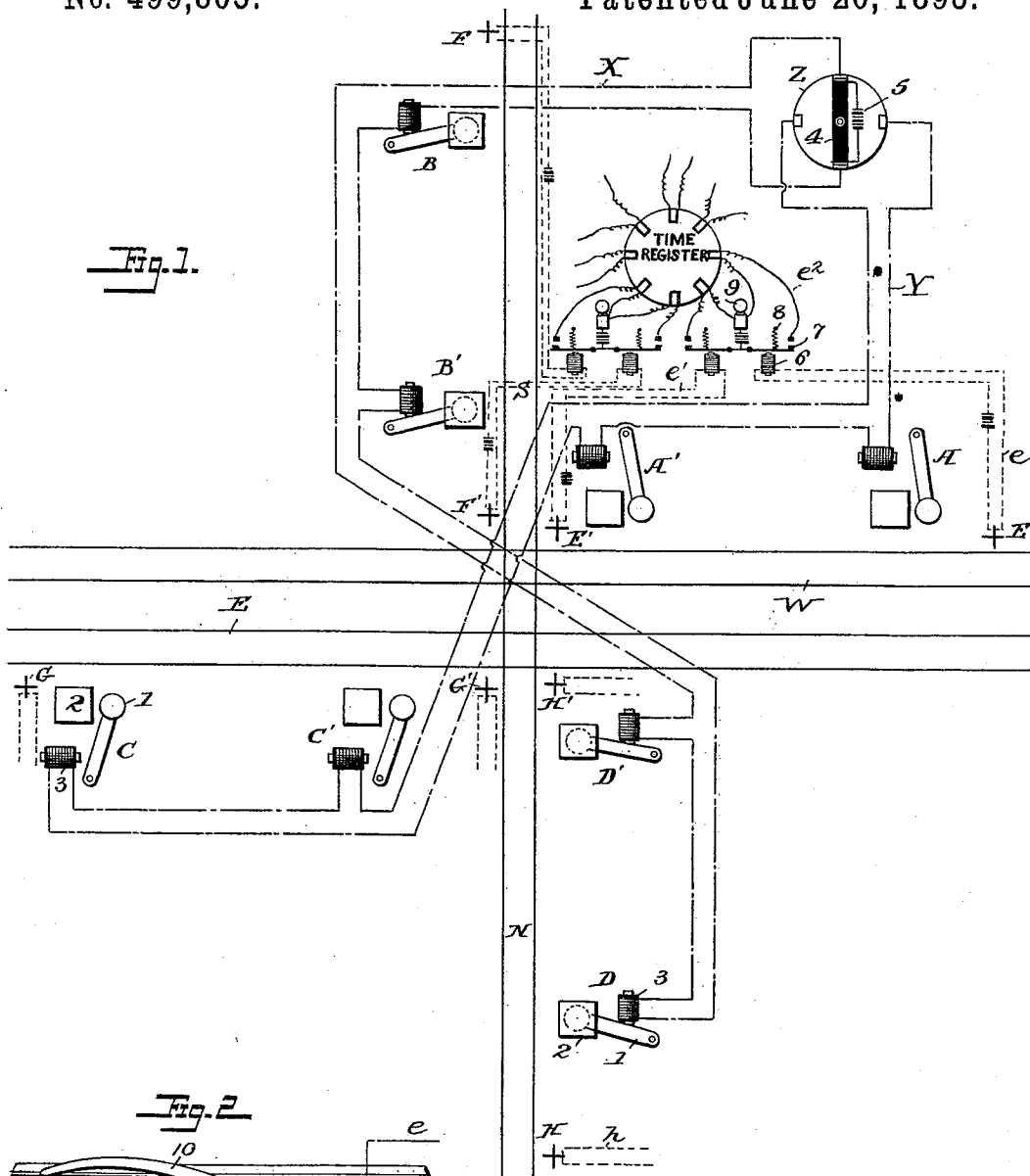
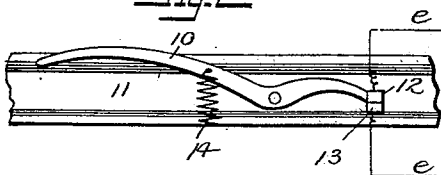


Fig. 2.



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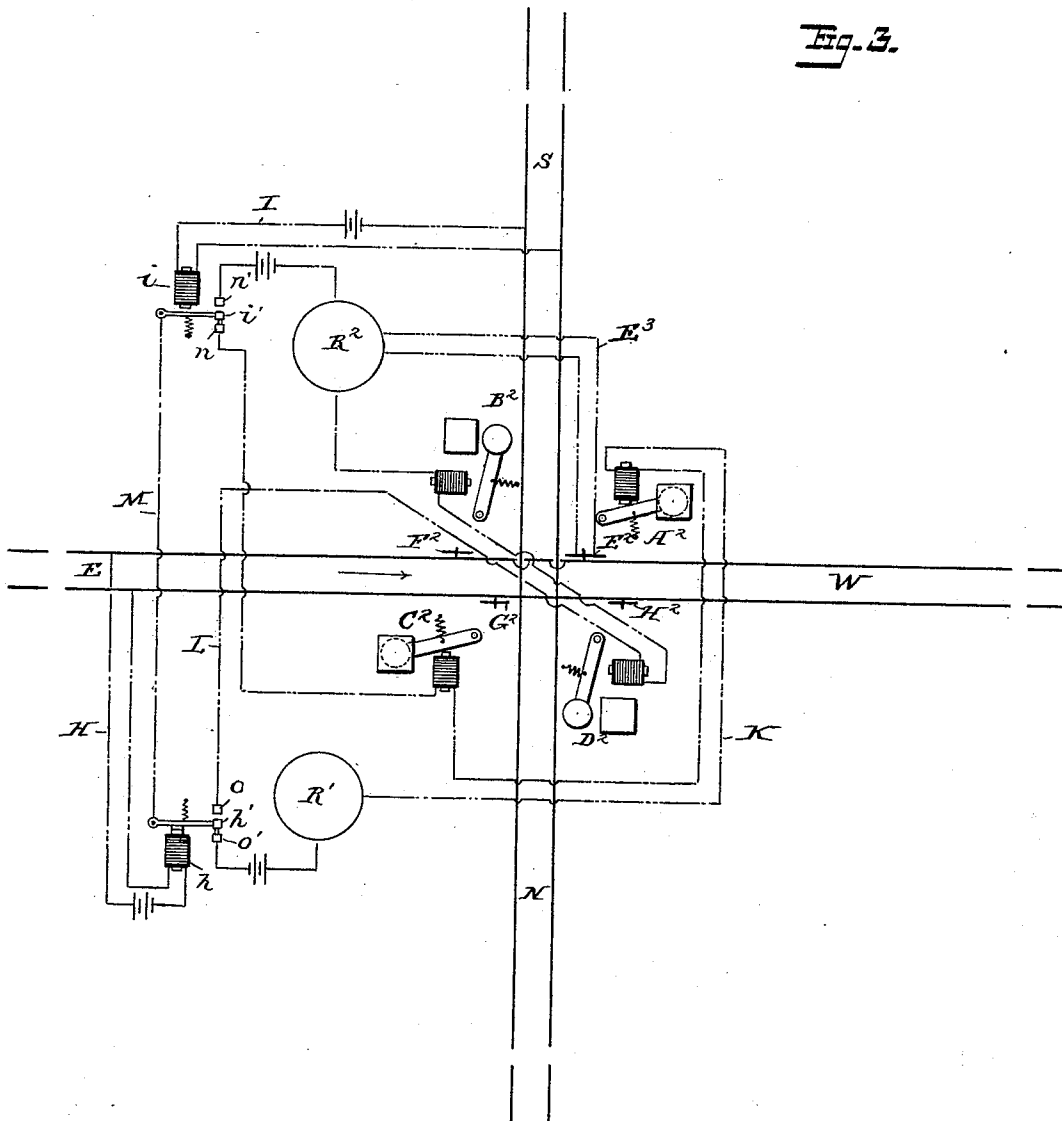
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ELECTRIC RAILWAY GRADE CROSSING DEVICE.

No. 499,805.

Patented June 20, 1893.



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UNITED STATES PATENT OFFICE.

JOSEPH B. STEWART, OF HAVERSTRAW, ASSIGNOR OF ONE-THIRD TO
JOSEPH P. BRADFIELD, OF SYRACUSE, NEW YORK.

ELECTRIC-RAILWAY GRADE-CROSSING DEVICE.

SPECIFICATION forming part of Letters Patent No. 499,805, dated June 20, 1893.

Application filed August 26, 1892. Serial No. 444,218. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH B. STEWART, a citizen of the United States, residing in Haverstraw, Rockland county, State of New York, have invented certain new and useful Improvements in Electric-Railway Grade-Crossing Devices, of which the following is a specification.

My invention relates to railroad crossing signals and it consists in various electrical and mechanical devices whereby the train signals are operated, the signals of the intersecting tracks being interlocked so that only one set of safety signals can be displayed at a time, and whereby the time at which the train arrives within a certain distance of a crossing and the time at which it arrives at the crossing are automatically registered.

The object of my invention is to provide a safe signaling system for crossings and to avoid all disputes as to which train arrived at the crossing first and had the right of way by registering the times of such arrivals automatically.

In the accompanying drawings in which like reference signs refer to similar parts throughout the several views, Figure 1, is a diagram of a railroad crossing provided with my improved signal system. Fig. 2 is a side view of a track instrument, and Fig. 3 is a modification.

In Fig. 1 of the drawings I have illustrated my invention applied to a railroad crossing in which a double track line is crossed by a single track line. It will be understood, however, that the invention applies equally well to other crossings irrespective of the number of tracks going in either direction. The single track line is lettered N, S, the portion N, being that upon which a train approaches the crossing when going north, and the portion S, being that occupied by a train going south. Similarly a train going west approaches the crossing upon the track W, and the train going east upon the track E. Each of the approaches to the crossing is provided with a suitable distance signal, as A, B, C, D, and a home signal as A', B', C', D'. These signals, as shown each consists of a target 1, usually red, a housing 2, and a magnet 3, adapted to draw the signal within the housing. The

magnets of the signals upon the north and south tracks are included in a circuit X, and those upon the east and west tracks in a circuit Y, and both of the circuits X, Y, are controlled by a switch device Z, arranged to close one of said circuits only at a time, the other circuit remaining open. As shown, the switch lever 4, has its ends insulated from each other and connected to the opposite poles of a battery 5, and the switch is turned so that the circuit X, through the signals on the north and south track is closed, said signals being thus set at "safety." The signals on the east and west tracks are therefore necessarily set at "danger" and these tracks are blocked. I have shown but one signal circuit for the north and south tracks and one for the east and west tracks because it is possible to operate the crossing with two such circuits. It will be evident that a separate circuit may be used to signal the trains going in each direction if desired. Thus, for instance, the signals B, B', may be included in one circuit and the signals D, D', in another circuit, it being only necessary to increase the number of terminals at the switch device Z. As the train approaches the crossing from either direction it opens or closes a circuit the effect of which is to ring a bell to notify the crossing watchman or operator and simultaneously it registers the time of its approach upon an ordinary time register. If the train is permitted to cross, it registers the time of crossing and again rings the bell.

As shown in Fig. 1, track instruments E, F, G, H, are arranged at stations beyond the distance signals and at equal distances from the crossing and other track instruments E', F', G', H', are arranged at stations near the crossing. The track instruments E, E', are arranged to open circuits e, e' , upon the passing of a train. The normally closed circuit e , includes a magnet 6, the armature 7 of which forms part of a normally open register circuit e^2 . The latter circuit is normally open at the armature 7, and when the circuit e , is broken by a passing train the armature 7, is released momentarily and the circuit e^2 , closed by means of a spring 8, thus operating the time register. At the same time the electric bell 9, is struck. Similar circuits and connections

are formed between each of the track instruments and the time register, a single bell and battery sufficing for each pair of register circuits.

5 In Fig. 3, I have shown an arrangement of circuits and signals which are entirely automatic in their action. In this arrangement the rails of the north and south tracks for a given distance from the crossing are insulated
10 from the remainder of the track, so are also the rails of the east and west track. The insulated portion of the east and west track forms part of a circuit H, which includes a magnet *h*, and the insulated portions of the
15 north and south track form part of the circuit I, which includes a magnet *i*. These circuits are closed through the wheels and axles so long as any portion of the train occupies the insulated blocks. The outer ends of the
20 insulated portions form stations corresponding with the stations at which the track instruments E, F, G, H, are located in Fig. 1. The signals A², B², C², D², are similar to those described in connection with Fig. 1, that is,
25 they are normally at danger and are only held at safety while their controlling magnets are energized by the circuits K and L. The signals A², C², of the east and west track are shown included in the same circuit K, while
30 the signals B², D², of the other track are in the circuit L. The armatures *h'*, *i'*, of the magnets *h*, *i*, are connected by a branch M, which is common to the circuits K, L, being alternately part of either. The free end of the
35 armature *i'*, vibrates between terminals *n*, *n'*, of the circuits K, L, respectively, it being held normally against the terminal *n*, by a spring. Similarly the free end of the armature *h'*, vibrates between the terminal *o*,
40 of the circuit L, and *o'*, of the circuit K, and is held normally against the former terminal by a spring. The circuits K and L include time registers R¹, R². Track instruments E², F², G², H², are also connected to the time registers by open circuits E³, &c., so as to register
45 the exact arrival of the train at the crossing.

The operation is as follows: A train entering upon the track marked E, closes the circuit H, and draws the armature *h'*, against the terminal *o'*, thus closing the circuit K, and setting
50 the signals A², C², to safety and at the same time registering its time upon the register R¹. These signals remain at safety while the train is on the insulated portion of the
55 track and until the last portion of it has passed off of the insulated track. Should a train approach toward the crossing from the north or south while the signal on the east or west track is set at safety, it will be impossible for the
60 train upon the former track to obtain a clear signal because the circuit L, which controls said track will be broken at *o*. Similarly if the train is on the north or south track at the crossing it will be impossible for an east or
65 west train to get a clear signal. Thus the crossing is always protected by at least one set of danger signals. In case two trains approach

the crossing at the same time, neither would obtain a clear signal for the reason that each train would, through the track circuit and
70 magnets *h*, *i*, break the circuit of the signals for the other track. The time registers, as in the case of the arrangement shown in Fig. 1, indicate the time of the arrival of the train at the outer ends of the insulated sections and also the time of arrival at the crossing,
75 so that there can be no dispute as to which train arrived first. Of course a train arriving second under the automatic arrangement could not obtain a clear track signal until the
80 first train had left the crossing.

Where track instruments are used they may be of any desired construction. In Fig. 2, I have shown an instrument consisting of a
85 curved lever 10, pivoted to the rail 11, the curved portion projecting above the rail. At its opposite end the lever carries an insulated contact 12, which is normally pressed against the fixed contact 13, by a spring 14. As the
90 train passes, the wheels or a tappet carried by the engine or one of the cars, strikes the lever 10, and forces it downward, thus opening the circuit *e*, and operating the bell and register.

What I claim is—

95 1. In a railroad crossing signal system, the combination with the intersecting tracks, of signals controlling the approaches to the crossing, said signals being normally at danger, electric circuits for said signals, time
100 registers in said circuits, devices in said circuits for preventing the signals of intersecting tracks from being set at safety simultaneously, and means whereby a train approaching the crossing sets signals on its own track
105 at safety provided there are no trains on intersecting tracks, substantially as described.

2. In a railroad crossing signal system, the combination with intersecting tracks, each
110 track being insulated between stations on opposite sides of the crossing, of two track circuits arranged to be controlled by approaching trains, signals controlling the approaches to the crossing, a circuit for the signals of each track, and a make and break
115 device in each signal circuit controlled by the track circuit of the intersecting track or tracks, whereby safety signals may be displayed for tracks running in one direction only at the same time, substantially as described.
120

3. In a railroad crossing signal system, the combination with the intersecting tracks, each track being insulated between stations
125 at equal distances on opposite sides of the crossing, electrically operated signals for controlling the approaches to the crossing, normally open signal circuits arranged to be closed by relays in the track circuits, and
130 track circuits normally open at the insulated tracks, each signal circuit being arranged to set safety signals for its corresponding track when the track circuit is closed by a train upon said track, substantially as described.

4. In a railroad crossing signal system, the combination with the intersecting tracks, each track being insulated between stations at equal distances on opposite sides of the crossing, track circuits for each of said tracks which are normally open and adapted to be closed by passing trains, and normally open signal circuits for the signals of each track, the signal circuits being adapted to be closed by the closing of the corresponding track circuits, substantially as described.

5. In a railroad crossing signal system, the combination with the intersecting tracks, each track being insulated between stations at equal distances on opposite sides of the crossing, of a track circuit connected with each of the insulated tracks, a set of signals for each of said tracks, a time register for each of said tracks, a circuit for each of said tracks including its signals and time register, the signal and register circuit of each track being normally open and adapted to be closed

by the closing of the track circuit of said track, substantially as described.

6. In a railroad crossing signal system, the combination with the intersecting tracks, each track being insulated between stations at equal distances on opposite sides of the crossing, of track circuits H, I, including magnets *h*, *i*, signals, and signal controlling circuits K, L, having a common branch M, and vibrating armatures *h'*, *i'* controlled by the magnets *h*, *i*, said armatures being adapted to close the circuits K, L, when their respective track circuits are closed substantially as described.

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

JOSEPH B. STEWART.

Witnesses:

JAS. S. McCULLOH,
A. KETCHUM.