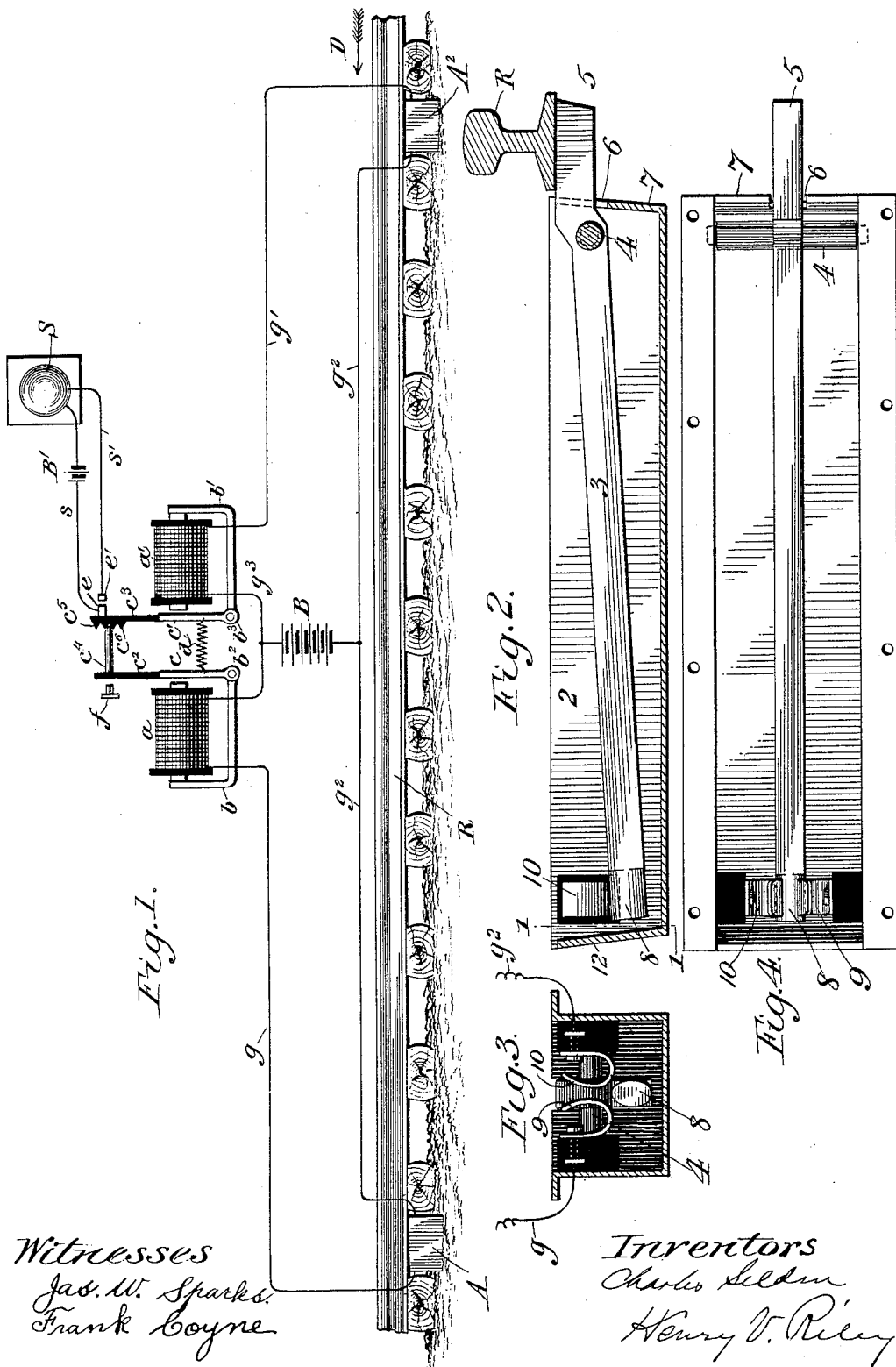


C. SELDEN & H. V. RILEY.
ELECTRIC RAILWAY SIGNAL.

No. 520,710.

Patented May 29, 1894.



Witnesses

Jas. W. Sparks.
 Frank Coyne

Inventors

Charles Selden
 Henry V. Riley

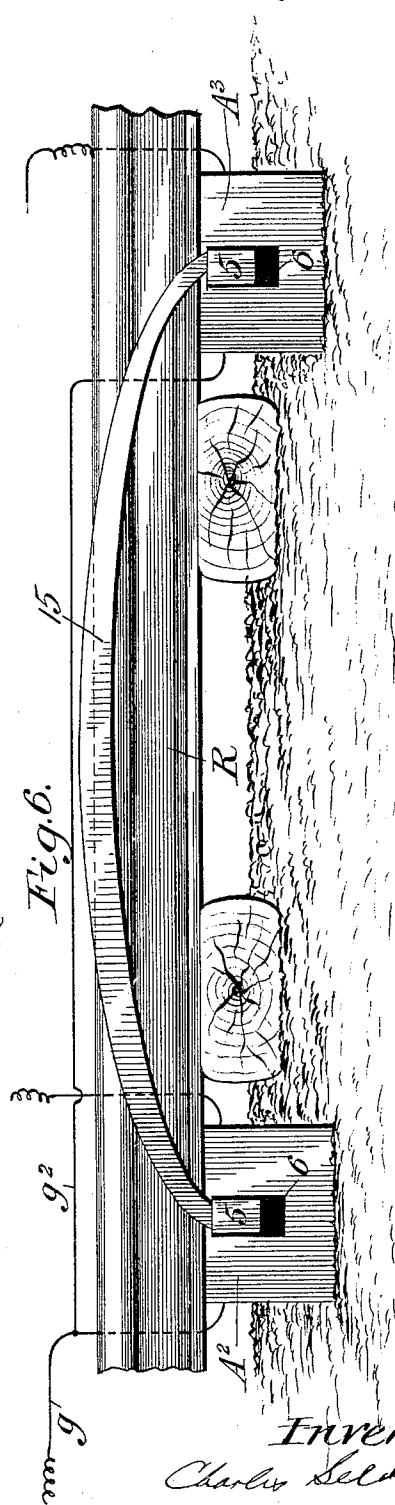
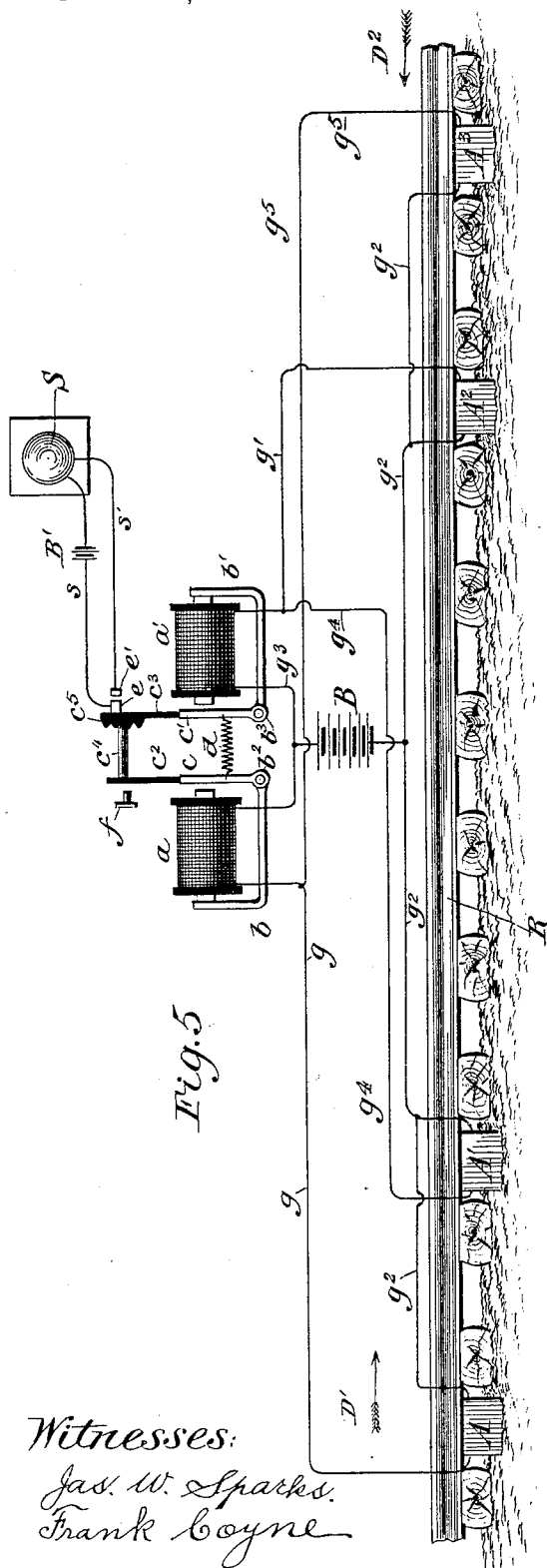
(No Model.)

2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

CHARLES SELDEN AND HENRY V. RILEY, OF BALTIMORE, MARYLAND; SAID
RILEY ASSIGNOR OF ONE-FOURTH TO SAID SELDEN.

ELECTRIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 520,710, dated May 29, 1894.

Application filed February 16, 1894. Serial No. 500,363. (No model.)

To all whom it may concern:

Be it known that we, CHARLES SELDEN and HENRY V. RILEY, residents of the city of Baltimore, State of Maryland, have invented certain new and useful Improvements in Electric Railway-Signals, of which the following, in connection with the accompanying drawings, is a specification.

Our invention relates to that class of signals employed for the purpose of causing a visual or audible signal to be operated by railway trains or cars approaching in either direction on a railroad, and is especially useful as a warning signal at a roadway crossing.

In order to carry out our invention, we have designed a peculiar construction of electro-magnets and armatures, track circuit closers and circuits therefor.

Referring to the drawings, in brief, Figure 1 is a diagrammatic view of the circuits for the track and signal, also the instrument for operating said signal circuit, the whole designed for a double track railway, or where trains ordinarily move in one direction only. Fig. 2 is a longitudinal section of the track circuit closing lever and casing therefor. Fig. 3 is an end view taken on line 1—1 of Fig. 2. Fig. 4 is a plan view of contact springs, lever and casing. Fig. 5 is a diagrammatic view, similar to Fig. 1, but designed for single track railway, or where trains or cars ordinarily move in both directions. Fig. 6 is a modification of the track circuit closing device.

In detail, the magnet instrument consists of two electro-magnets a a' oppositely arranged. The cores b b' thereof are extended, as shown in Figs. 1 and 5, and hinged as shown at b^2 b^3 , forming practically armatures c c' . Secured to the upper end of the armatures are extensions c^2 c^3 , preferably of non-magnetic material; to the extension c^2 , and arranged at right-angles thereto, is a bar c^4 with a tapered end. Arranged upon the upper end of extension c^3 , opposite the bar c^4 , are teeth or projections c^5 adapted to engage the tapered end of bar c^4 . Connecting the armatures c c' is a spiral spring d , in lieu of which a chain or other non-rigid device may be used. On the opposite side from the teeth c^5 on extension c^3 , is a contact point e and opposite contact point

e is another contact point e' . Extending from contact points e e' is a circuit s s' , including a battery B' and a signal S .

Reference letter f represents a back stop for armature extension c^3 .

The arrangement of circuits differs in Fig. 1 from those in Fig. 5. In Fig. 1, running from the magnet a to circuit closing box A is a wire g , and from magnet a' to box A^2 is a wire g' . Connecting the two magnets is a wire g^2 ; the wire g^2 connects the circuit closing boxes A A^2 and the battery B connects the wires g^2 g^3 . The boxes A A^2 hereinafter described are arranged upon either end of a section of road to be protected, and are placed at a suitable distance from a surface grade crossing or other desired point. It will be seen that a train approaching in the direction indicated by the arrow D Fig. 1, closes the circuit through magnet a' , thereby attracting its armature c' . By reason of the action of spiral spring d , armature c would also be drawn toward a' and the beveled end of rod or bar c^4 would fall between the lower set of teeth c^6 , thereby locking said armatures in engagement and bringing together contact points e e' , and closing the circuit s s' and thereby operating the signal S . As the train passes out of the protected section, the circuit is closed in box A , the current then flows through magnet a attracting armature c and by action of spring d armature c' is also drawn toward or caused to follow armature c , causing bar c^4 to ride its end into engagement with the upper pair of teeth or projections c^5 and thereby lock said armatures in a reversed position from that assumed by the energization of magnet a' and also separating contact points e e' and thereby discontinuing the operation of the signal. Our purpose in hinging the armatures to the extended cores of the magnets a a' is for temporarily polarizing said armatures.

We have above described the system in connection with the double track railroad, Fig. 1.

We will now describe the operation in connection with a single track railroad as shown in Fig. 5. The magnet instrument, armatures, the signal and its circuit in this instance are the same as shown in Fig. 1, but

the circuits between the magnets and track contacts are different. In this case, a train approaching in the direction indicated by arrow D', the circuit in track box A would be closed and the current would flow through the wire g , through magnet a , by wire g^3 through battery B, wire g^2 back to box A. When the train reached box A', the current would flow through wire g^4 , magnet a' , wire g^3 , battery B, wire g^2 , back to box A'. It will thus be seen that the moment the circuit is closed through magnet a the armature c is attracted and the operation of the armatures would be like that described in connection with Fig. 1. At the next moment, the train reaching box A', the circuit is then through magnet a' . At certain intervals during the passage of a train, over both boxes A and A', both magnets would be energized, but by reason of the fact that the armatures have become locked toward magnet a , a mechanical bias has been created in favor of that magnet, and the armatures will remain in that position until the last pair of wheels of the train or car have entirely passed off of box A, when the circuit will then flow through magnet a' only, the armatures then being free from the effects of magnet a , the mechanical bias in itself will not be sufficient to keep the armatures in the former position, and they will therefore be drawn toward a' and locked in this position as described, thereby closing circuit s and operating the signal S. It will readily be seen that the signal will be operated until the train has passed over track boxes A² A³ and the last pair of wheels of the train has passed over box A³ energizing magnet a only thereby throwing the armatures in reverse position, breaking the signal circuit, and by reason of the fact that they are locked, said armatures remain in this position until again attracted by magnet a' . The same operation would take place when a train is passing in the opposite direction indicated by arrow D². If desired, an earth connection may be used for battery and contact points instead of the return wire g^2 .

We prefer to inclose the circuit closing device at each end of the section of road to be protected in an ordinary box or casing "2" and for the purpose of easy operation by the passage of a train or car, we have designed a box adapted to be placed between (and if preferred suspended from) the cross-ties. In this box is a lever 3, fulcrumed at 4, near one end of said casing, projecting through a slot 6, (which is in the end 7 of the casing) is a head or projection 5 adapted to project under and lie against the bottom of the rail R of the road-bed. At the other end of the lever 3 is a beveled metallic extension 8. Near the end 12 of the box or casing 2, arranged upon either side of said casing and suitably insulated therefrom are two contact points or springs 9 and 10. These spring contacts form the terminals of wires as for instance g g^2 in

Fig. 1 and are suitably spaced apart and arranged so that the circuit is completed when in contact with metallic extension 8. The operation is simple: Upon the passage of a car or trains thereover, the impact of this moving weight depresses the rail R, this in turn bears upon the head 5 of lever 3 and causes the end 8 of said lever to rise and establish a metallic circuit through contact springs 9 and 10 and thereby closes the circuit.

In Fig. 6 we have shown a device for the purpose of preserving the same proportionate interval of time that the contacts shall be either in action or otherwise, independent of the speed of the train. It consists of a curved or bow-shaped rod or rail 15 the highest point thereof rising above the rail R. The ends of this bar are connected, respectively, to the heads 5 of the levers in boxes A, A', or A² A³. By the shaping of this bar, being free to rock, different intervals of contact may be made as between the two boxes.

While our invention is shown as applicable to an alarm or warning signal usually placed at a road-crossing, we do not wish to be understood as limiting ourselves to such use as the device may be used effectively in block signaling and for other forms and purposes of signals now in use.

We claim as our invention—

1. In an electric signal for railways electro magnets oppositely arranged and connected in circuits common to a single battery, the cores thereof being extended and returned parallel with said magnets, the end thereof projecting slightly beyond the pole piece, armatures hinged to said projections, a spiral spring or other yielding connection connecting said armatures near their base, a horizontal bar with a beveled or tapering end projecting from the upper end of one armature, teeth or a corrugated surface arranged at the upper end of the other armature and opposite said bar and adapted to engage with said beveled end, whereby upon the energization of either of the magnets said armatures are polarized and locked in rigid position, substantially as described.

2. In an electric signal for railways, two electro magnets oppositely arranged, the winding of one magnet being a continuation of the winding of the other, two armatures arranged between the pole pieces of said magnets, said armatures being connected to move in unison, a device for mechanically locking and rigidly holding the armatures in the position assumed when attracted by either of said magnets, substantially as described.

3. In an electric signal for railways, two electro magnets oppositely arranged, two armatures therebetween, a spring connecting said armatures near the base thereof, a bar projecting at right angles from the upper end of one of said armatures, a series of lugs or teeth near the upper end of the other arma-

ture and adapted to be engaged by the end of said bar whereby the armatures are locked in engagement substantially as described.

5 4. In an electric signal for railways, two electro magnets oppositely arranged and in the same circuit, the armatures of which are polarized during the flow of a current two mechanically connected armatures adapted to simultaneously vibrate therebetween and means for locking said armatures in either position assumed by the attraction of said magnets and a signal circuit adapted to be opened or closed by the vibration of said armatures, substantially as described.

15 5. In an electric signal for railways, two electro magnets oppositely arranged, said magnets in two independent circuits common to a single battery, the rear of the core of said magnets being extended forward and adapted to conform to each other, armatures hinged to said forward extensions and adapted to vibrate between the pole pieces of said oppositely arranged magnets whereby during the flow of a current said armatures are polarized, means for simultaneously moving and locking said armatures in either position assumed by the energization of said magnets as set forth.

30 6. In an electric signal for railways, an electric circuit, track circuit closers arranged at each end of a section of railway to be protected, said circuit closers consisting of a box or casing, spring contacts arranged therein, a lever pivoted in said casing, a head on said lever projecting from said casing and adapted to be depressed by the passage of a moving weight or train, a metallic contact on the opposite end of said lever whereby upon the depression of said head the metallic contact is caused to engage the spring contacts and thereby close said electric circuit, electro magnets oppositely arranged and included in said circuits, two armatures adapted to vibrate between said magnets and become polarized during the energization of the same, a spring connecting said armatures near the base there-

of and means consisting of a tapering bar on one and a corrugated surface on the other of said armatures whereby they are locked in rigid position substantially as described. 50

7. In an electric railway signal, electro magnets oppositely arranged and included in two circuits common to a single battery, armatures that are polarized during the flow of a current, and the said armatures adapted to vibrate in unison therebetween and be rigidly locked, track circuit closers arranged at each end of a section of railway to be protected and electric circuits connecting said circuit closers and magnets, a signal circuit adapted to be opened and closed by the vibrations of said armatures, whereby upon the passage of a train or moving weight over the track circuit closers a distant signal is displayed substantially as described. 65

8. In an electric railway signal, electro-magnets oppositely arranged and included in two circuits common to a single battery, armatures arranged between the pole pieces of said magnets and adapted to be polarized during the flow of current through said magnets, said armatures also adapted to move in unison and be rigidly locked together in either position assumed by the attraction thereof of said magnets, a signal circuit controlled by the vibrations thereof, two electrically connected track circuit closing instruments arranged at each end of a section of railway to be protected and suitable electric circuits connecting said circuit closing instruments and electro-magnets, whereby, upon the passage of a train or moving weight in either direction over the protected section of railway the magnets are energized, the armatures are polarized and the signal circuit opened or closed thereby operating a signal substantially as described. 85

CHARLES SELDEN. [L. S.]
HENRY V. RILEY. [L. S.]

Witnesses:

W. L. BROWN,
W. B. FARINGER.