

No. 633,494.

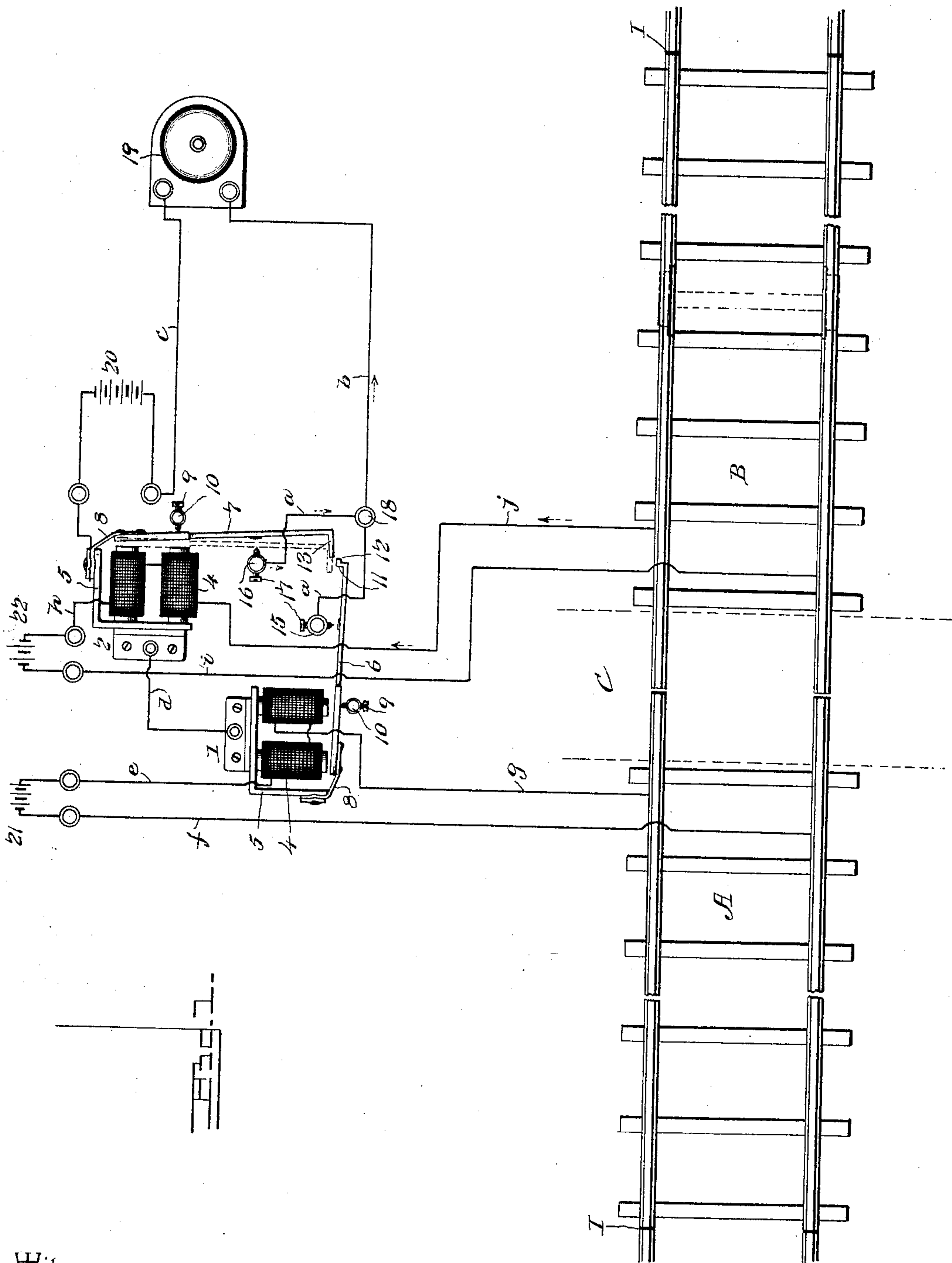
Patented Sept. 19, 1899.

J. SHOECRAFT.  
ELECTRICAL RAILWAY SIGNAL.

(Application filed Nov. 21, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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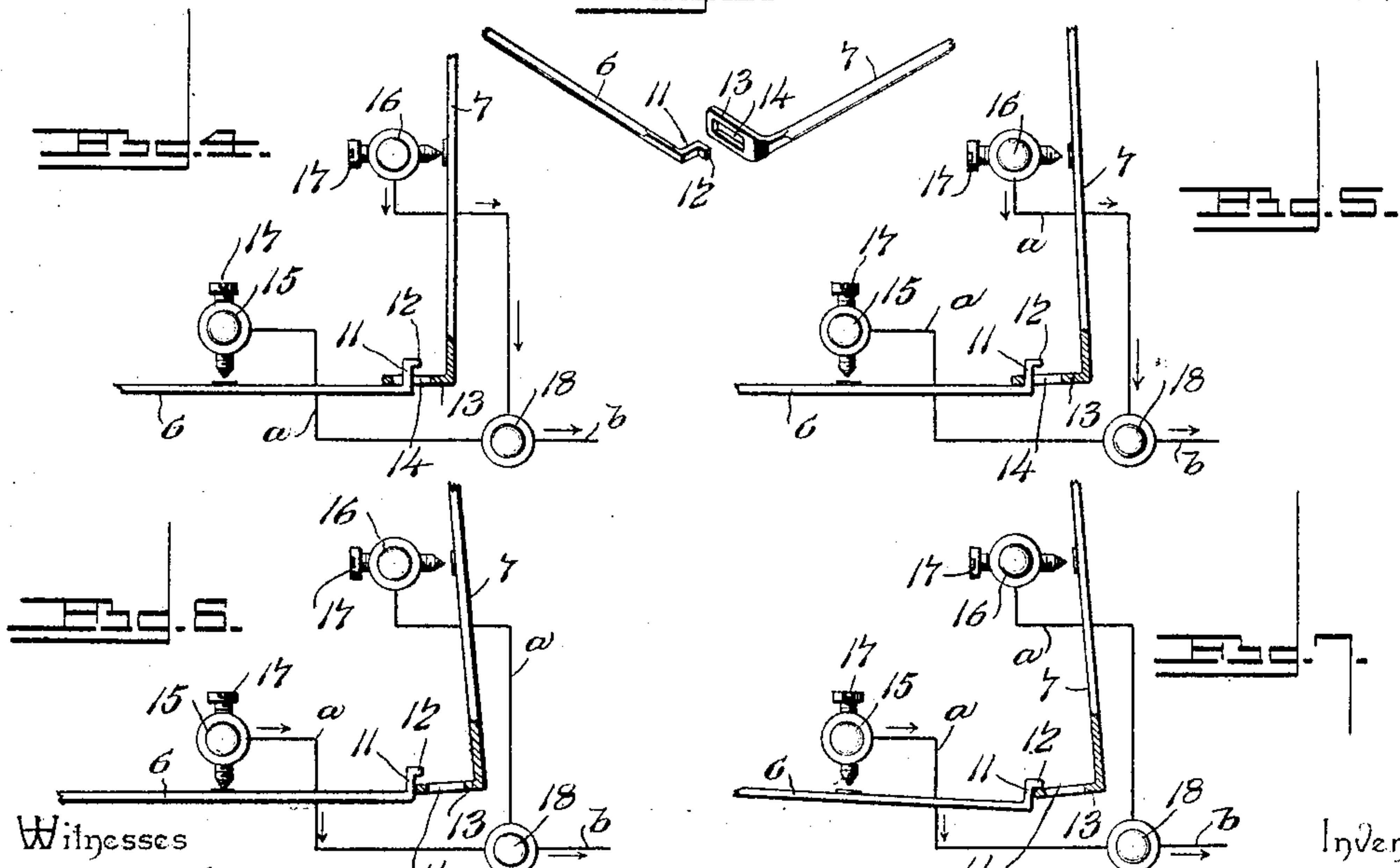
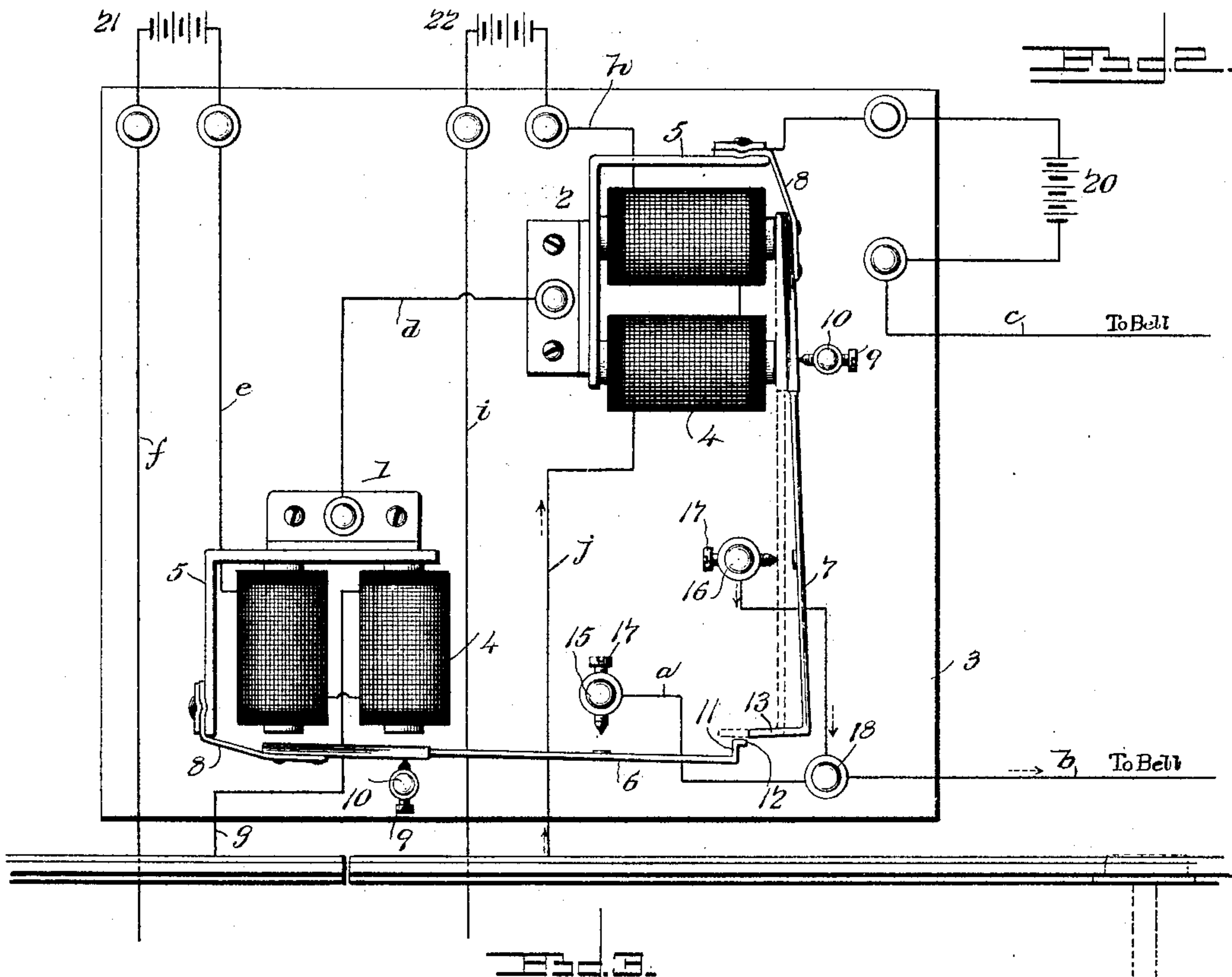
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# UNITED STATES PATENT OFFICE.

JUDSON SHOECRAFT, OF TOPEKA, KANSAS, ASSIGNOR OF ONE-HALF TO  
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## ELECTRICAL RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 633,494, dated September 19, 1899.

Application filed November 21, 1898. Serial No. 697,054. (No model.)

*To all whom it may concern:*

Be it known that I, JUDSON SHOECRAFT, a citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented a new and useful Electrical Railway-Signal, of which the following is a specification.

This invention relates to electrical railway-signals of the type which are specially designed for use in connection with a railway-crossing, so as to automatically give a signal or sound an alarm upon the approach of a train from either direction.

To this end the invention contemplates an improved signaling apparatus having suitable circuit-wire connections with the separate track-sections, respectively, at opposite sides of the crossing or other alarm-point, whereby a train approaching the crossing in either direction of the track will automatically sound an alarm at the crossing, and in carrying out this object the invention also provides for an organization and construction of the different parts of the apparatus whereby as soon as the train shall have passed the crossing the alarm or signal will be locked out of operation, except by a following train, and will not be restored to its normal condition until the outgoing train shall have passed the track-section on the outgoing side of the crossing or other alarm-point.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a diagrammatic plan view of an electrical railway-crossing signal embodying the improvements contemplated by the present invention and showing all of the circuit-wire connections. Fig. 2 is an enlarged detail plan view of the relays and their interlocking armature-levers. Fig. 3 is a detail in perspective, showing the contiguous interlocking ends of the separate armature-levers. Figs. 4 to 7, inclusive, are detail views showing the different relative positions assumed by the interlocking armatures during the operation of the apparatus.

Referring to the drawings, the letters A and

B, respectively, designate the separate portions of a railway-track at opposite sides of a crossing C or other point at which an audible alarm is desired, and said separate track-sections A and B have their contiguous portions at the crossing separated or insulated from each other, whereby each of said track-sections may remain on a separate and independent circuit. It will of course be understood that the separate track-sections A and B, respectively, upon opposite sides of the crossing are of a sufficient length to insure the giving of an alarm by a train approaching from either direction so long as an alarm is desired for protective purposes, and at the ends of the track-sections A and B remote from the crossing C said sections are insulated, as at I, from the remainder of the track by the usual insulation.

In carrying out the present invention the signal-controlling mechanism is located at any convenient point adjacent to the track, and this controlling mechanism essentially consists of a pair of relays 1 and 2, respectively, which are preferably mounted upon the same base or support 3, which is made of suitable insulating material, so as not to interfere with the circuits of the relays. Each relay 1 and 2 is of the usual construction and consists of a pair of electromagnets 4, supported by a metallic frame 5, rigidly secured on the base or support 3, and each of said relays 1 and 2 is also provided with an armature-lever, which subserves the usual function of a relay-armature to close a separate local circuit, as will be hereinafter more fully explained, the separate local circuit in the present case being the bell or alarm circuit.

The armature-lever of the relay 1 is designated by the numeral 6, and the armature-lever of the relay 2 is designated by the numeral 7, and both of these armature-levers are connected at one end to their respective supporting-frames 5 by means of the usual spring-straps 8, which serve to normally press the armature-levers in an outward direction away from the adjacent core ends of the electromagnets and against the adjustable stop-screws 9, adjustably mounted in the screw-posts 10, said stop-screws 9 serving their usual functions of adjusting the armature-levers to



a proper working position, while at the same time limiting the outward movement thereof under the influence of the spring-straps 8, which straps, it will be observed, also provide a metallic connection between the armature-levers and their respective supporting-frames 5.

The two relays 1 and 2 are arranged apart and disposed in planes substantially at right angles to each other, whereby the armature-levers 6 and 7 thereof will also be disposed in a similar relation, whereby the free ends of the two armature-levers will be disposed contiguous to each other, so as to interlock, in a manner to be presently explained. To provide for this interlocking connection between the contiguous ends of the right-angularly-arranged armature-levers 6 and 7; the armature-lever 6 is provided at its free end with a short right-angularly-disposed locking-arm 11, having a lateral hook projection 12 at its terminal, and the adjacent end of the armature-lever 7 is also provided with a short right-angularly-disposed locking-arm 13, arranged in substantial parallelism to the lever 6, and having formed therein an elongated eye 14, adapted to receive the hook-terminal of the lever 6.

In explanation of the circuit-wire connections it will be observed that a pair of contact-posts 15 and 16, respectively, are arranged within the angle between the contiguous terminals of the levers 6 and 7, the contact-posts being mounted on the base or support 3 and each carrying an adjustable contact-screw 17. The contact-post 15 supports the screw thereof adjacent to and at one side of the armature-lever 6, while the contact-post 16 supports its screw at one side of and adjacent to the armature-lever 7, while both of said contact-posts have branch wire connections *a* with a single binding-post 18, with which connects one terminal of the bell-circuit wire *b*, the other terminal of which connects with one terminal of the electric bell or alarm 19. The other terminal of the electric bell or alarm 19 has connected thereto the other bell-circuit wire *c*, which is included in circuit with a local battery 20 and the metallic frame 5 of the relay 2, and to complete the local bell or alarm circuit a short circuit-wire *d* connects the metallic frames 5 of the two relays 1 and 2. Each relay is on a separate and independent local circuit, respectively, in connection with the separate track-sections A and B. One terminal of the electromagnets 4 of the relay 1 is connected with one of the battery-wires *e*, which wire has a connection with one pole of the battery 21, the other pole of which battery has a wire connection *f* with one of the rails of the track-section A, while the other rail of this track-section has a wire connection *g* with the remaining terminal of said magnets of the relay 1. The relay 2 has corresponding wire connections with the other track-section B. One terminal of the electromagnets 4 of said

relay 2 is connected with one of the battery-wires *h*, which wire has a connection with one pole of the battery 22, the other pole of which battery has a wire connection *i* with one of the rails of the track-section B, while the other rail of this track-section has a wire connection *j* with the remaining terminal of said magnets of the relay 2, thus completing all of the wire connections of the signaling apparatus.

Assuming a train to enter upon the track-section A, the car-wheels close the circuit of the battery 21, which includes the magnets 4 of the relay 1, thereby energizing the said relay 1 and causing the armature-lever 6 thereof to be drawn in contact with the screw of the contact-post 15. This closes the bell-circuit through the contact-post 15, branch wire *a*, wire *b*, bell 19, wire *c*, battery 20, frames 5 of both relays, and armature-lever 6. As the local circuit for the relay 1 remains closed as long as the train is upon the track-section A, the signal-bell will continue to sound an alarm until the train passes the crossing C and enters on the track-section B. When this occurs, the local circuit for the relay 2 will be completed by the car-wheels through the wire *i*, battery 22, wire *h*, magnets 4 of the relay 2, and the wire *j*. The separate local circuits for the two relays 1 and 2 will thus be closed at the same time; but as the magnets of the relay 2 attract the armature-lever 7 the locking-arm 13 of this lever moves against the hook-locking arm 11 of the armature-lever 6. This position of the two levers is shown in Fig. 6 of the drawings, and it will be observed that said engagement of the locking-arm 13 against the locking-arm 11 and at one side of the hook-terminal 12 thereof prevents the armature-lever 7 from making contact with the screw of the contact-post 16, and thus causing the bell-circuit to be closed while the train is on the track-section B, which is of course not necessary, as the train has then passed the crossing. While the engagement of the locking-arms of the levers in the position shown in Fig. 6 of the drawings prevents contact of the lever 7 with the contact-post 16, still said lever 7 serves to hold the armature-lever 6 as long as the relay No. 2 is energized, or, in other words, while the train is on the track-section B; but the locking-arm 11 is of such a length as to leave sufficient play between the ends thereof to permit the locking-lever 6 to spring out of contact with the contact-post 15 immediately upon the demagnetization of the relay 1 or after the last car of the train has left the track-section A. The two armature-levers will then both be out of contact with their respective contact-posts, as shown in Fig. 7 of the drawings, and will remain interlocked in this position until the train has left the track-section B; but during this interlocked position of the two armature-levers it will be obvious that a "following train" entering upon the track-section A will cause the armature 6



to make its contact with the post 15 and sound the alarm.

From the foregoing it will be understood that either locking engagement of the armature-levers holds the parts adjusted, so that the alarm for a signal is not sounded after a train has passed the crossing. When a train approaches from the opposite direction to that described or when it enters upon the track-section B, the local circuit for the relay 2 will be closed, thereby energizing the magnets 4 of said relay 2, thus causing the armature-lever 7 to be drawn against the screw of the contact-post 16 and close the bell-circuit through said post 16, branch wire *a*, wire *b*, bell 19, wire *c*, battery 20, and armature-lever 7. As the local circuit for the relay 2 remains closed as long as the train is upon the track-section B, the signal-bell will continue to sound an alarm until the train enters on the track-section A on the opposite side of the crossing. When this occurs, the local circuit for the relay 1 will be closed, thus causing the armature-lever 6 to move toward its contact-post 15, and in this movement the locking-arm 11 of said armature-lever will pass through the elongated eye 14 in the locking-arm of the other armature-lever 7. This position of the two levers is shown in Fig. 4 of the drawings, and it will be observed that the engagement of the hook-locking arm 11 within the eye 14 of the armature-lever 7 prevents the armature-lever 6 from making contact with the screw of the contact-post 15. While this engagement of the locking-levers, as shown in Fig. 4 of the drawings, prevents contact of the lever 6 with the contact-post 15, still said lever 6 serves to hold the armature-lever 7 as long as the relay 1 is energized, or, in other words, while the train is on the track-section A; but the elongated eye 14 is of such a length as to leave sufficient play for the armature-lever 7, so that the same will spring out of contact with the contact-post 16 immediately upon the demagnetization of the relay 2 or after the last car of the train has left the track-section A. This position of the two levers is shown in Fig. 5 of the drawings, and the same will remain thus interlocked until the train has left the track-section A, when the parts resume their normal positions.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described crossing-signal will be readily apparent to those skilled in the art without further description, and it will be understood that changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In an electric railway-signal, the combination with separate track-sections, of a pair of relays having the free ends of their armature disposed in proximal relation, the free end of one armature being provided with a terminal hook, and the free end of the other armature being provided therein with an elongated eye, having a separable interlocking engagement with said terminal hook, a fixed contact for each of said armatures, a bell or alarm circuit including therein both of the contacts and both armatures, and separate local circuits for the relays respectively including the rails of the separate track-sections, substantially as set forth.

2. In an electrical railway-signal, the combination with separate track-sections, of a pair of relays having the free ends of their armatures disposed in proximal relation, the free end of one armature being provided with a right-angularly-disposed locking-arm having a lateral hook projection at its terminal, and the free end of the other armature having a right-angularly-disposed locking-arm provided therein with an elongated eye, a fixed contact for each of said armatures, a bell or alarm circuit including therein both of the contacts and both armatures, and separate local circuits for the relays respectively including the rails of the separate track-sections.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JUDSON SHOE-CRAFT.

Witnesses:

M. WORLEY,  
W. TRIESLER.