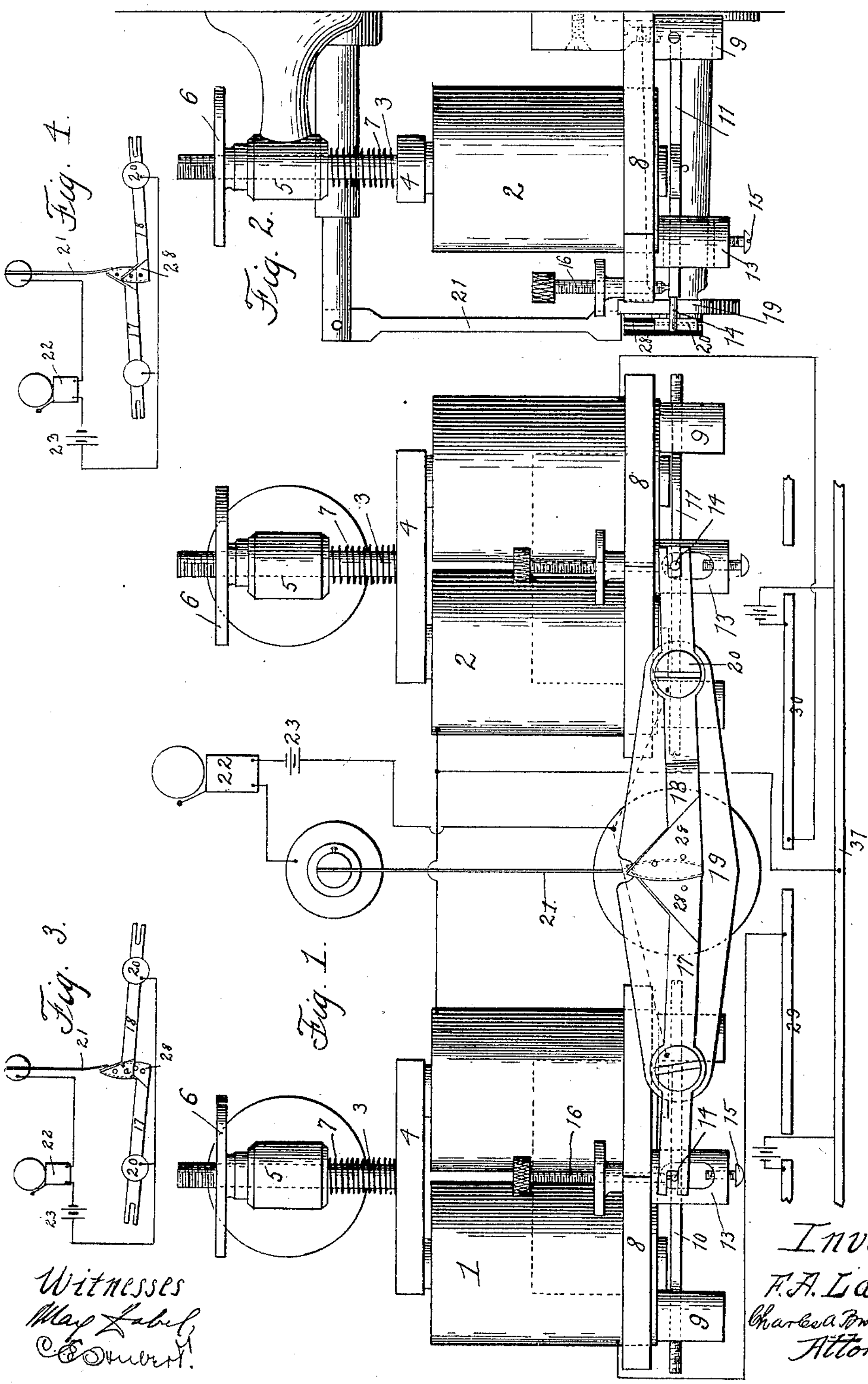
No. 647,570. Patented Apr. 17, 1900.

F. A. LANDEE.

RAILWAY SIGNALING APPARATUS.

(Application filed July 10, 1899.)

(No Model.) 2 Sheets—Sheet 1



Witnesses
May Zabel
C. E. Doubert.

Inventor:
F. A. Landee by
Charles A. Brown and Cragg
Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

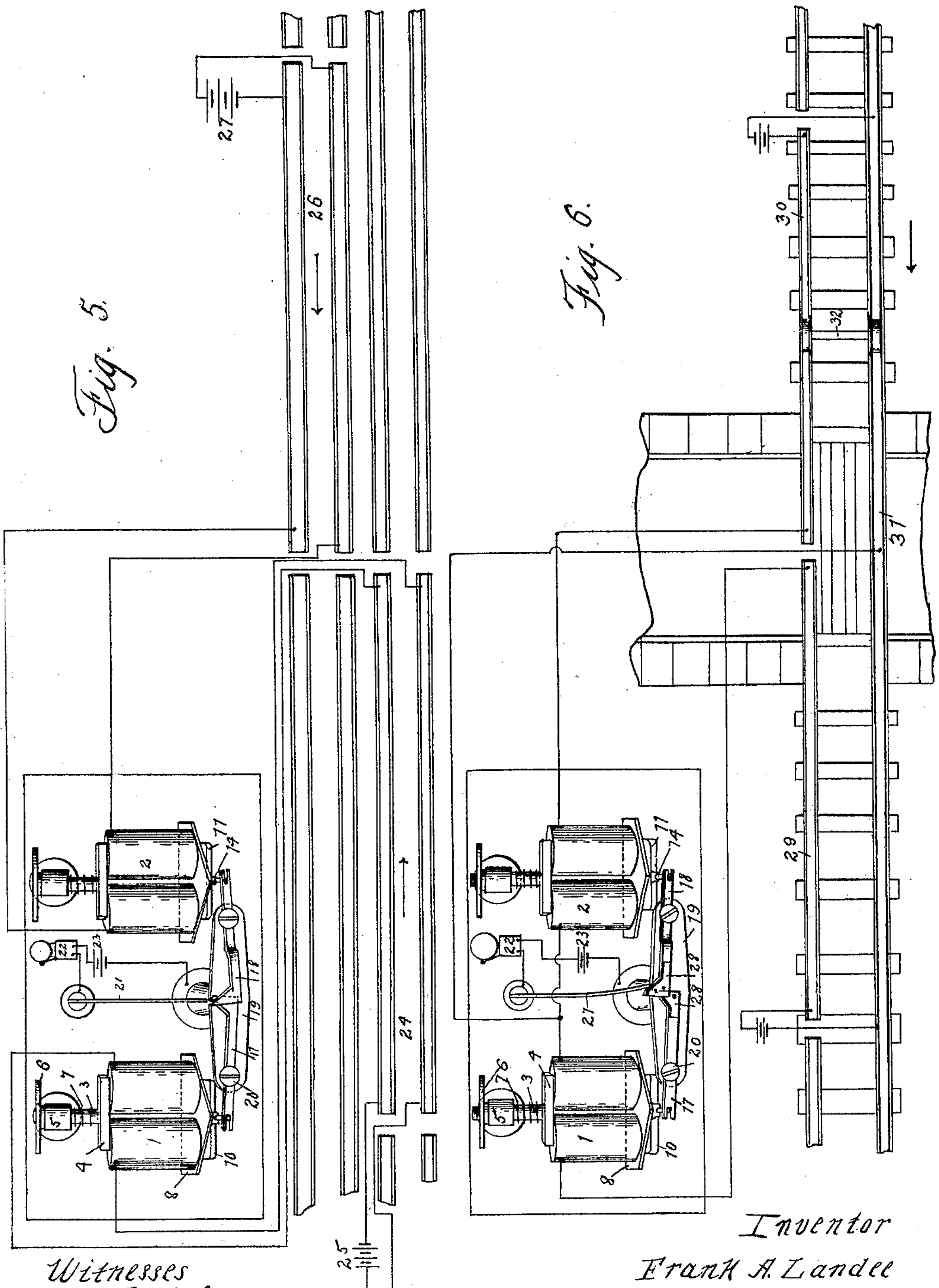
No. 647,570. Patented Apr. 17, 1900.

F. A. LANDEE.

RAILWAY SIGNALING APPARATUS.

(Application filed July 10, 1899.)

(No Model.) 2 Sheets—Sheet 2.



Witnesses

Max Zabel

[illegible]

Inventor

Frank A. Landee

By Charles A. Brown and Cragg

Attorneys.

UNITED STATES PATENT OFFICE.

FRANK A. LANDEE, OF MOLINE, ILLINOIS.

RAILWAY SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 647,570, dated April 17, 1900.

Application filed July 10, 1899. Serial No. 723,366. (No model.)

To all whom it may concern:

Be it known that I, FRANK A. LANDEE, a citizen of the United States, residing at Moline, in the county of Rock Island and State of Illinois, have invented a certain new and useful Improvement in Railway Signaling Apparatus, (Case No. 1,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to railway systems, and has for its object the provision of an improved alarm system to be employed at railway-crossings, it being the main object of my invention to provide an improved system which employs electromagnets normally included in closed circuit, with closed-circuit batteries normally to open a circuit including an alarm-bell or other apparatus. The magnets when short-circuited by the wheels of passing trains will complete the circuit, including the signaling device, to give the necessary alarm.

The system of my invention is adapted for use either in connection with single or double track railroads, and by means thereof I am enabled to cause the operation of the signal when a train reaches a predetermined distance from the crossing and to cause the operation of the signal to cease just after the train has passed the crossing, so that the signal is not needlessly operated.

In practicing my invention I employ an improved form of contact making and breaking mechanism, a plurality of electromagnets being employed to operate a plurality of contact-arms having permanent connection with one terminal of the alarm-circuit and adapted to have temporary connection with the other terminal of the alarm-circuit. One electromagnet is designed to be operated to effect the closing of the alarm-circuit when a train is passing in one direction, and the other electromagnet is designed to be operated when a train is passing in an opposite direction. Where these magnets are employed in connection with a single-track system, it is obvious that they are both operated upon the passage of a train over a crossing, and in order to prevent that magnet which is operated by the train after the crossing is passed from effecting a signal I so interrelate the contact-arms controlled by the electromagnets and so dispose said contact-arms with relation to the free terminal of the alarm-circuit that the second electromagnet to be operated will not effect a signal. In accordance with my invention I cause the free terminal of the alarm-circuit to be thrust to one side by the contact-arm engaging the same, so that the free terminal of the alarm-circuit is removed from the path of the second contact-arm to be operated. To this end my invention consists in improving the construction and arrangement of the alarm apparatus.

I am aware that it is old in the art to employ a revoluble free contact-terminal of an alarm-circuit; but such construction is faulty in that it is difficult to adjust a revoluble terminal and difficult to maintain any adjustment that may be secured.

I will explain my invention more fully by reference to the accompanying drawings, illustrating two applications thereof, in which—

Figure 1 is a front elevation of my improved apparatus, the circuit connections thereof being indicated diagrammatically. Fig. 2 is a side elevation of the apparatus shown in Fig. 1. Figs. 3 and 4 indicate diagrammatically the different positions of the contact-arms. Fig. 5 shows the application of my improved apparatus to a double-track system, and Fig. 6 illustrates the application of my invention to a single-track system.

Like parts are indicated by similar characters of reference throughout the different figures.

In the preferred embodiment of the invention I employ two sets of vertically-disposed electromagnets 1 and 2, which may be located at any suitable place and suitably protected from the weather. These electromagnets are mounted to be adjustable vertically by means of rods 3, which are fastened to the yokes or heel-pieces 4 of the electromagnets. These rods pass through vertical bores in the supports 5 and have threaded engagement with adjusting-nuts 6, which serve to support the magnets in place, springs 7, surrounding the rods, serving to keep the nuts seated upon their supports, thereby to maintain the magnets in their proper adjusted positions. Supporting or base plates 8 are provided for car-

rying certain contact parts, to be hereinafter set forth, through which the lower ends of the electromagnets pass. Pivot-supports 9 project from beneath the base-plates and serve rotatably to support the armatures 10 and 11, the armatures thus being pivoted in place at the rear of the apparatus. The armatures are confined to one path of travel by means of guide-posts 13, provided with guide-openings through which arms 14 upon the armatures are passed. Screws 15 16 project into the guide-openings in the posts 13, which are adjusted to limit the travel of the armatures. Contact-arms 17 and 18 are mounted to rotate in vertical and parallel planes, the outer ends of the contact-arms being grooved to receive the armature projections 14, while the inner ends of the contact-arms overlap. These arms are permanently connected with one terminal of the alarm or signal circuit, as indicated. A suitably-mounted metallic plate 19 is provided, upon which the contact-arms are pivoted at 20 and with which one terminal of the circuit containing the apparatus to be operated may be permanently connected. The free terminal 21 is preferably made of a thin strip of spring metal.

I have shown a signal-bell 22 included in circuit with an open-circuit battery 23, the said free terminal 21, and the contact-arms 17 and 18. The free end of terminal 21 projects into a notch in the plate 19. The opposed free ends of the arms 17 and 18 overlap, as indicated, these ends preferably being triangular in shape and projecting slightly beyond the terminal 21, so that when either arm is actuated upon the release of an armature of the corresponding electromagnet the free end of the terminal 21 is engaged by the opposed slanting surface of the free end of the said arm, as indicated, for example, in Fig. 3.

Referring now particularly to Fig. 5, wherein I have shown my invention applied to a double-track system, the opposed ends of the contact-arms are free of all insulating material, as but one contact-arm is actuated upon the passage of a train. The magnet 1, associated with the section of track 24, is connected, preferably, with the ends of the rails of the said track-section at the crossing upon one side of which the said section is placed, the other ends of the electrically-connected rails of the said section being connected by a bridge containing a closed-circuit battery 25, whereby a breakage of the rails of the said track-section will be followed by an alarm. The section of track 26 upon the other side of the crossing from section 24 similarly has the ends of its rails at the crossing connected with the magnet 2, while the other ends of the electrically-connected rails of the said section are electrically united by a bridge, including a closed-circuit battery 27. The trains passing over sections 24 and 26 travel in the direction indicated by the arrows. When the train is upon section 24, the battery 25 is short-circuited and the magnet 1 deënergized, the inner end of arm 17, controlled by this magnet, being elevated by the armature in falling away from the magnet, whereby the said arm and the terminal 21 of the signal-circuit are brought into contact, the signal thereupon being operated to give notice that the train is approaching the crossing. When a train is upon section 26, the battery 27 is likewise short-circuited, the magnet 2, included in circuit with the same, being deënergized, whereupon the arm 18 is brought into engagement with the terminal arm 21 to close circuit through the alarm 22 to give notice that the train upon the said track-section is approaching the crossing. Thus in a double-track system one contact-arm is controlled by the trains passing upon one track, while the other contact-arm is controlled by the trains passing in an opposite direction upon the other track. In a single-track system, however, where the trains pass upon the same track in opposite directions, both arms are actuated upon each passage of a train over a crossing, in which case, if the precise apparatus shown in Fig. 5 were employed, the alarm would be given not only when trains approach the crossing, but after they have passed beyond the same. My invention in this respect comprises means whereby the arm last to be operated is prevented from closing the signaling-circuit. I fasten the overlapping ends of the contact-arms with insulating plates or blocks 28, which project slightly beyond these ends of the arms.

Referring now more particularly to Figs. 1, 3, 4, and 6, electrically-continuous rail-sections 29 and 30 are provided, respectively, upon the left and right of the crossing, while an electrically-continuous rail 31 extends on both sides of the crossing over the same. This latter rail-section is connected with one terminal of each of the electromagnets 1 and 2. The other terminal of magnet 1 is connected with the rail-section 29, while the other terminal of the magnet 2 is connected with the rail-section 30, the batteries 25 and 27 being included in circuit with said magnets, respectively, through the agency of the track-sections and their connections. Assuming the train to be traveling in the direction indicated by the arrow, for example, magnet 2 is first deënergized, causing the inner end of the arm 18 to be lifted into engagement with the terminal 21, as indicated in Figs. 3 and 6, to give the alarming-signal. A pair of car-wheels upon an axle 32 are shown upon rails 30 31 to illustrate the manner of operation of the system. When the train is at the crossing, the inner ends of both arms will be lifted; but the first alone will remain in contact with the terminal 21, the said terminal being swung by the arm 18 out of the path of the arm 17. When the train has cleared the crossing, the inner end of arm 18 will be dropped, the magnet controlling the same again being energized, while the inner end of arm 17 will continue to remain ele-

vated; but the spring-terminal 21 instead of coming in contact with the metallic part of the same engages the projecting portion of the insulation carried thereby, whereby the operation of the signal is prevented immediately after the train has passed the crossing. After the train has cleared the sections upon both sides of the crossing the parts are restored to the normal position indicated in Fig. 1.

I have herein shown one particular use for the apparatus of my invention and have shown an alarm-bell as constituting a signal to be controlled by the electromagnets; but I do not wish to be limited to the precise use to which the apparatus of my invention may be put nor to the precise nature of the signal or apparatus whose operation is to be controlled thereby.

Changes may be made in the embodiment of my invention herein shown and particularly described, and I do not therefore desire to be limited to the precise construction shown; but

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

1. The combination with two electromagnets, of contact-arms controlled thereby, ends of the said arms overlapping, a contact-terminal located at the said overlapping ends and adapted to be electrically engaged by either of the aforesaid arms, and pieces of insulation carried upon the overlapping ends of the contact-arms to prevent one of the said arms from making connection with the said terminal after connection has been effected between the terminal and the other contact-arm, substantially as described.

2. The combination with two electromagnets, of intermediately-pivoted contact-arms controlled thereby, ends of said arms overlapping, a contact-terminal located at the said overlapping ends and adapted to be electrically engaged by either of the aforesaid arms, and pieces of insulation carried upon the overlapping ends of the contact-arms to prevent one of the said arms from making connection with the said terminal after connection has been effected between the terminal and the other contact-arm, substantially as described.

3. The combination with contact-arms, each provided with an inclined end portion, the said end portions being opposed and overlapping, of a contact-strip having a free end opposed to the said inclined end portions and adapted for engagement with either, either end portion being adapted to remove said contact-strip from the path of the opposed end portion of the other contact-arm, and electromagnetic means for actuating said contact-arms, substantially as described.

4. The combination with contact-arms, each provided with an inclined end portion, the said end portions being opposed and overlapping, of a contact-strip having a free end opposed to the said inclined end portions and adapted for engagement with either, either end portion being adapted to remove said contact-strip from the path of the opposed end portion of the other contact-arm, and insulating portions carried by the said ends to prevent electrical contact between said strip and one arm after electrical contact has been effected between said strip and the other arm, substantially as described.

5. The combination with a suitably-mounted spring-contact member, of contact-arms adapted alternatively to make contact with said spring-contact member, insulating portions carried by the said arms to prevent electrical contact between either of the said arms and the said contact member after electrical contact has been effected between the said contact member and the other contact-arm, substantially as described.

6. The combination with a suitably-mounted spring-contact member, of contact-arms adapted alternatively to make contact with said spring-contact member, each arm being adapted when actuated to thrust the spring-contact member out of the path of the other arm and electromagnets for effecting the actuation of the said arms, substantially as described.

7. In a signaling system for railways, the combination with two electromagnets, of two sections of track, each normally included in a closed circuit with one of said electromagnets, contact-arms controlled by said electromagnets and connected with one terminal of the signaling-circuit, a spring-contact member connected with the other end of the signaling-circuit, each contact-arm being adapted to thrust the said spring-contact member out of the path of the other contact-arm, substantially as described.

8. In a signaling system for railways, the combination with two electromagnets, of two sections of track, each normally included in a closed circuit with one of said electromagnets, contact-arms controlled by said electromagnets, and connected with one terminal of the signaling-circuit, ends of the said contact-arms overlapping, a spring-contact strip connected with the other end of the signaling-circuit and having a free end opposed to the overlapping ends of the contact-arms, each of the first aforesaid contact-arms being adapted to force the spring-contact strip out of the path of the other contact-arm, substantially as described.

9. In a signaling system for railways, the combination with two electromagnets, of two sections of track, each normally included in a closed circuit with one of said electromagnets, contact-arms controlled by said electromagnets, and connected with one terminal of the signaling-circuit, ends of the said contact-arms overlapping, a spring-contact strip connected with the other end of the signaling-circuit and having a free end opposed to the

overlapping ends of the contact-arms, each of the first aforesaid contact-arms being adapted to force the spring-contact strip out of the path of the other contact-arm, each of the said overlapping ends of the contact-arms being provided with a piece of insulation, substantially as described.

In witness whereof I hereunto subscribe my name this 7th day of July, A. D. 1899.

FRANK A. LANDEE.

Witnesses:
GEORGE L. CRAGG,
CHARLES E. HUBERT.