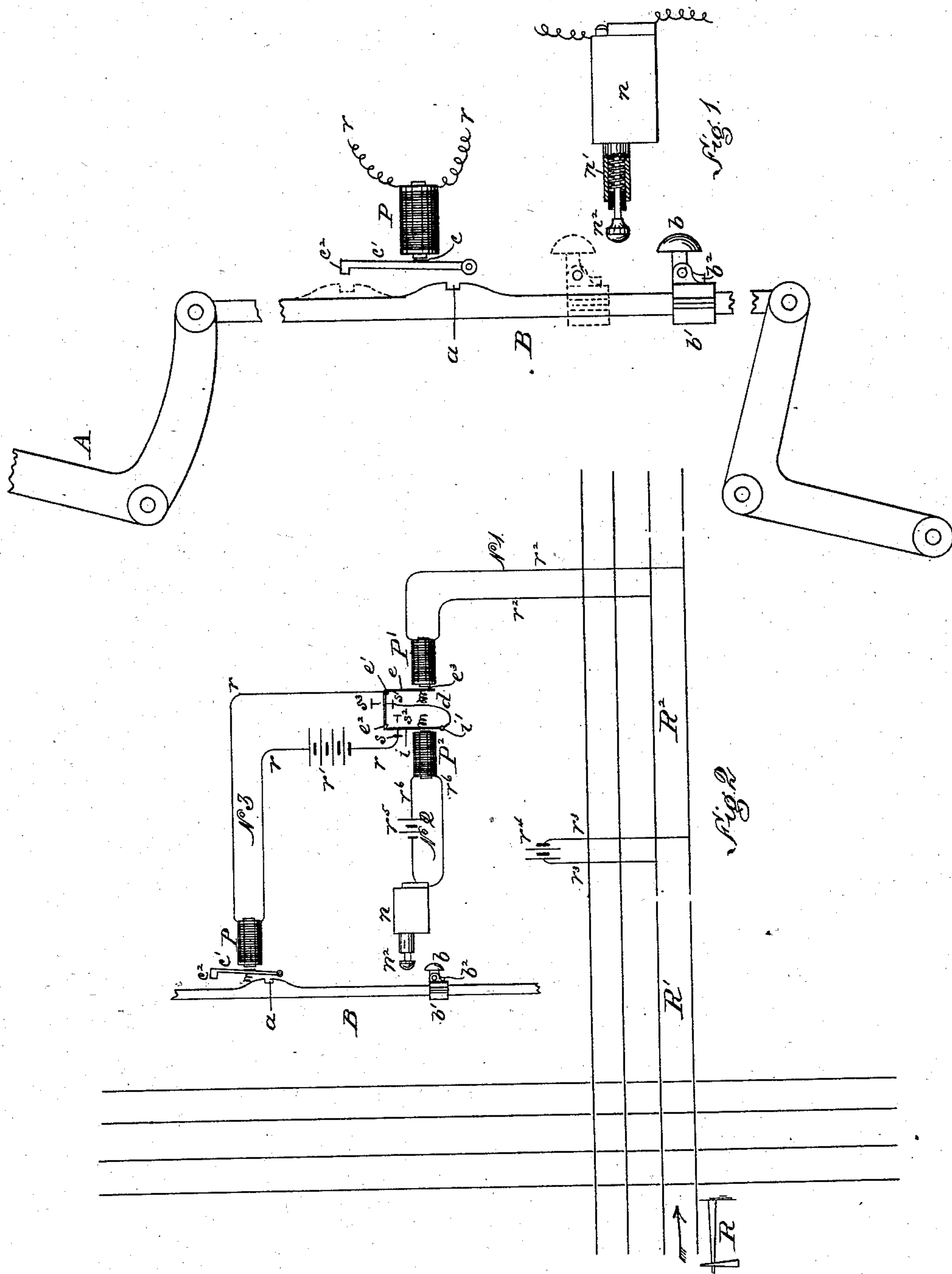


(No Model.)

2 Sheets—Sheet 1.

C. A. SCOTT.
RAILWAY ELECTRIC SIGNALING APPARATUS.
No. 282,230. Patented July 31, 1883.



Witnesses.
R. H. Whittier
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Inventor, Charles A. Scott,
By Attorney, George H. Christy.

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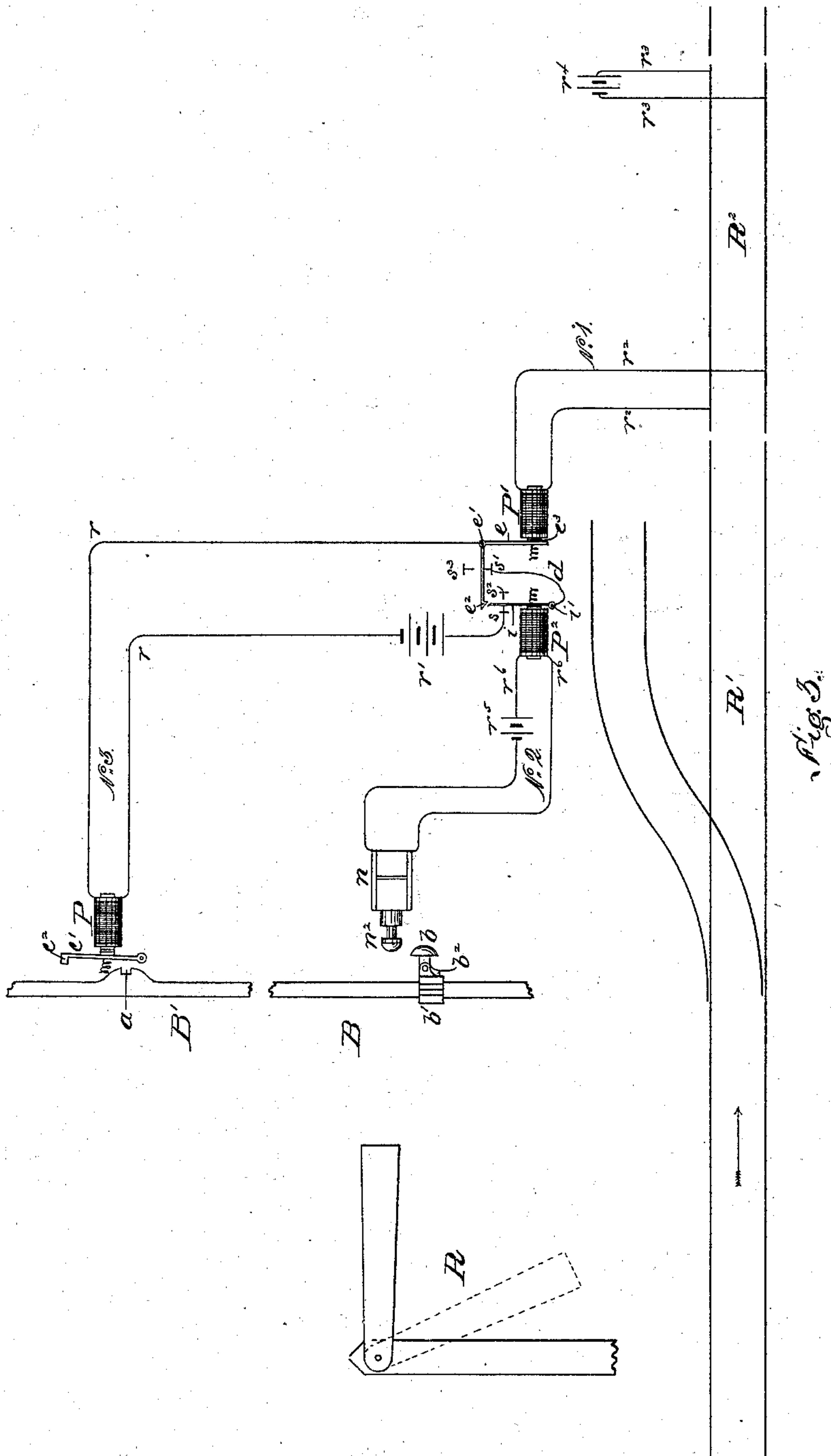
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UNITED STATES PATENT OFFICE.

CHARLES A. SCOTT, OF BOSTON, MASSACHUSETTS.

RAILWAY ELECTRIC SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 282,230, dated July 31, 1883.

Application filed April 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. SCOTT, a citizen of the United States, residing at Boston, county of Suffolk, State of Massachusetts, have invented or discovered a new and useful Improvement in Railway Electric Signaling Apparatus; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1, Sheet 1, is a side view or view in elevation of so much of a Saxby and Farmer lever as is necessary to illustrate the manner of employing the same in connection with the present invention, and also illustrating the arrangement with reference thereto of the devices acting in immediate connection therewith. Fig. 2 illustrates by diagram the system of apparatus as applied to a railway-track; and Fig. 3, Sheet 2, illustrates a modification thereof.

My present invention relates in a general way to apparatus for the proper protection of grade or street-railway crossings, switches, &c. In its preferred manner of use it constitutes a part of or addition to a system of manual interlocking levers such as are employed in the Saxby and Farmer system, and it is employed in such system to electrically lock and unlock the signal-lever which gives a right of way to an approaching or expected train, it being understood that such lever, when moved to put its signal to "safety," locks with signals at "danger" those levers whose signals govern the movements of conflicting trains. Hence the present invention relates chiefly to locking the signal that gives the right of way, and so locking the other signals of the system; but it may be applied to the locking of other levers than the one thus designated, and any such use of my invention is hereby included herein.

Referring first to Sheet 1, A may represent the lever to be locked, and for purposes of description I will assume it to be the lever which by actuating a signal—say at R—gives the right of way to a train approaching a crossing from the left on the track R'. The vertically-moving rod B of this lever has in connection therewith an electrically-actuated locking mechanism of any desired construction, the one shown consisting of an electro-magnet, P, an armature,

c, an armature-lever, c', and a catch, c², adapted to engage a shoulder, notch, or recess, a, on the rod B; but I use this form or construction of lock only for illustration, as others may be used, and they may be applied to the lever itself or to any device moving therewith, or to the catch-rod itself, as in Jackson's patent, No. 255,998.

The electro-magnet P is included in a circuit which I will call "No. 3," the wires *rr* of which, going through a battery, *r'*, terminate, one in a bent armature-lever, *e*, and the other in a contact-stop, *s*. The armature-lever *e* is pivoted at *e'*, has a hook or catch, *e²*, at its free end, and an armature, *e³*, at its other end, which armature is within the influence of an electro-magnet, *P'*, and the latter is arranged in a circuit, No. 1, the wires *r²* of which go to the opposite rails of a short insulated section of track, *R²*, and other wires, *r³*, leading from such rails through a battery, *r⁴*, complete the circuit. Another circuit (marked No. 2) extends from the battery *r⁵* by wires *r⁶* through electro-magnet *P²*, and to make-and-break mechanism *n* of any desired construction, such as may be actuated to break the circuit in the manner presently to be described, but will be self-closing under the action of a spring, *n'*. Fig. 1. This device has substantially the construction and operation shown and described in the Gassett and Fisher patent, No. 232,344; but other suitable form may be used, such as is adapted to make and break an electric circuit.

The electro-magnet *P²* of this No. 2 circuit is arranged in suitable position to operate an armature-lever, *i*, which latter, pivoted at *i'*, is so constructed and arranged that when retracted its free end may be engaged by the hook or catch *e²*. It is connected by wire *d* with a contact-stop, *s'*. Dead-stops *s² s³* are to be added.

In order to actuate the circuit-breaker *n*, I arrange it with its plunger-head *n²* in the path of the movement of a knob, *b*, which is pivoted to a clip, *b'*, of the rod B, and the shank *b³* of which is of a bent-lever form, so that it shall be free to turn upward on its pivot; but its depending leg shall prevent its turning downward below a working position. The knob *b* and plunger-head *n²* are rounded or beveled, so that the knob may, while sliding past the plunger-

head on its upward stroke, push the plunger back far enough to break the circuit. On the downward stroke the knob will be turned up by the plunger-head and pass without actuating it, and then drop down again into position.

With the apparatus in the position shown in Fig. 2, that being normal position, all three circuits are closed and the signal is at "danger." The operator, having set his other signals properly, locks them in position by shifting lever A through the agency of the usual interlocking mechanism. In doing so he also by suitable interposed connections shifts the signal R to "safety," and the upward thrust or movement of the rod B, effected at the same time, brings knob *b* against plunger-head *n*² and breaks circuit No. 2. The armature-lever *i*, under the influence of its retractile spring, then goes to dead-stop *s*², passes under the hook *e*², and is locked thereby as against the attractive influence of its electro-magnet P². As soon as the armature-lever *i* leaves the contact-stop *s*, circuit No. 3 is broken at that point, and the hook or catch *c*² of the armature-lever *c*² then engages the recess *a*, and the lever A is locked and remains locked until the train passes the crossing, and by making connection between the opposite rails of insulated track-section R² short-circuits the battery *n*¹ of circuit No. 1. As a result of this, armature-lever *e* is free to turn under the action of its retractile spring to its dead-stop *s*³. As circuit No. 2 has already been closed by the action of the spring *n*¹, the magnet P² will draw its armature-lever *i*, now unlocked, over to contact-stop *s*, and as soon as the tail of the train shall have left the section R² the magnet P¹, being again in circuit, will bring its armature-lever *e* over to contact-stop *s*¹, and circuit No. 3 will again be closed. Electro-magnet P will then draw its armature-lever *c*¹ so that the hook *c*¹ will clear the recess *a* and the signal-lever will be unlocked.

In Fig. 3 I have shown the same system of apparatus as organized for use with a switch instead of a grade crossing. In this organization I only change the locking mechanism from the signal-lever A or its rod B to the switch-lever or the vertically-moving connecting-rod B' of such a lever. In this organization the switch will first be set, and this will bring the recess *a* opposite to the nib or hook *c*². Then by moving the signal-lever to clear the signal, and in the same manner as above described, circuit No. 2 will be broken, which will break circuit No. 3 and lock it open, and thereby lock the switch-lever. The

train in passing track-section R² will first short-circuit its battery, and in leaving will restore the circuit No. 1, so as to again close circuits Nos. 2 and 3 after the switch has been passed.

Any suitable track-instrument capable of breaking circuit No. 1 and restoring it after the train has passed may be substituted for the insulated section R², and for convenience I use the term "track-instrument" in the claims as meaning the insulated section R² or its described substitute.

The knob *b* is, in effect, a tappet-arm, and such device, when pivoted so as when moving one way to operate a make-and-break mechanism, and when moving the other way not to operate it, I believe to be new with myself.

Other arrangements for interlocking armature-levers may be employed, provided the described operation is substantially preserved, and as regards all the devices referred to I include herein their mechanical equivalents.

I claim herein as my invention—

1. The combination of circuit No. 1, governed as to its electrical condition by a track-instrument, circuit No. 2, governed as to its electrical condition by a make-and-break mechanism operated by or from a hand-lever, and a locking-circuit, No. 3, for operating a lever locking mechanism, substantially as set forth.

2. A hinged tappet-arm arranged on the connecting-rod of a lever mechanism, in combination with the movable plunger of a circuit make-and-break mechanism, substantially as set forth.

3. In combination with a system of hand-levers for operating corresponding movable appliances on or along a line of railway-track, an electric circuit opened or closed by or from a hand-lever, an armature-lever actuated thereby, a hand-lever locking-circuit broken by the movement of such armature-lever, an armature-lever operated by a circuit from a track-instrument to lock such locking-circuit in a broken condition, and a circuit through a train-actuated track-instrument for unlocking the locked armature-lever and unlocking the locked hand-lever, substantially as set forth.

In testimony whereof I have hereunto set my hand.

CHARLES A. SCOTT.

Witnesses:

JOHN V. YOUNG,
STEPHEN W. TROWBRIDGE.