No. 894,471. PATENTED JULY 28, 1908.

J. B. STRUBLE.

RAILWAY SIGNALING.

APPLICATION FILED JULY 13, 1904.

2 SHEETS—SHEET 1.

Fig. 1, A

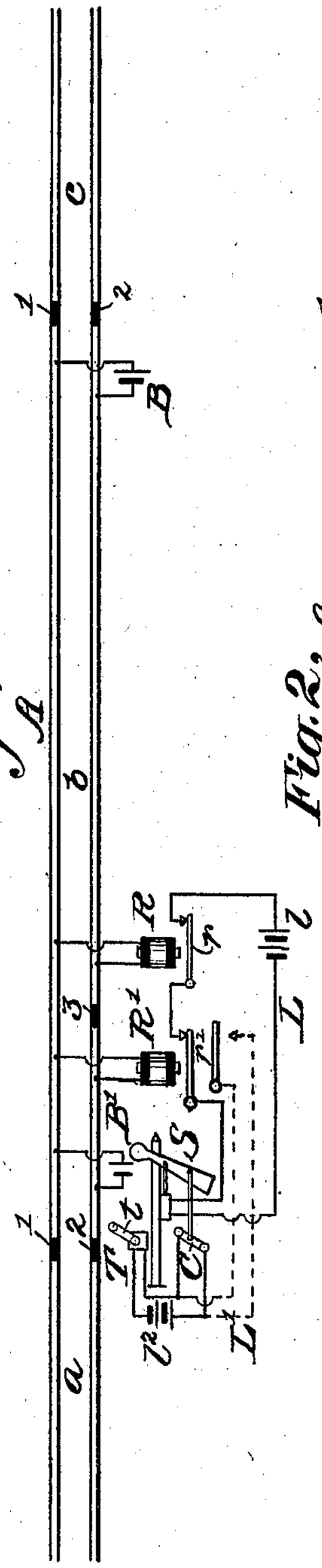


Fig. 2, A

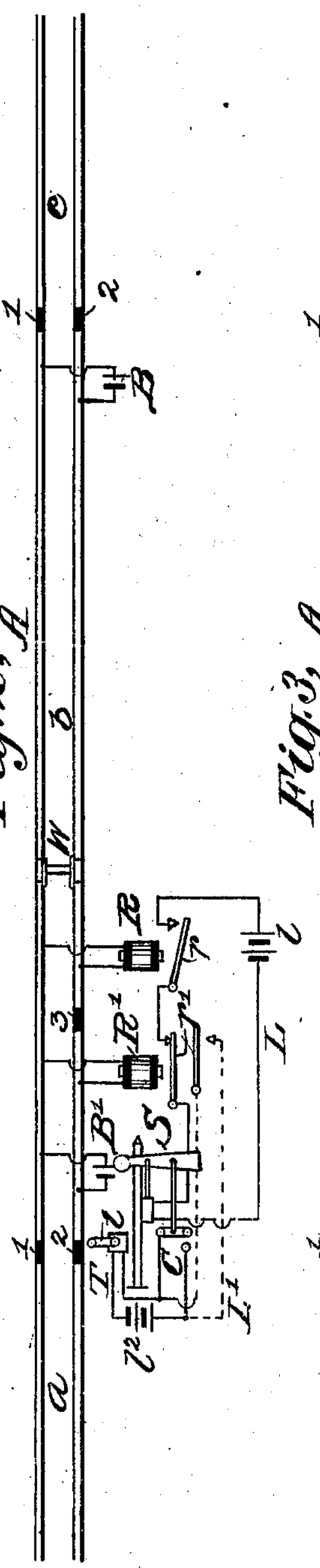
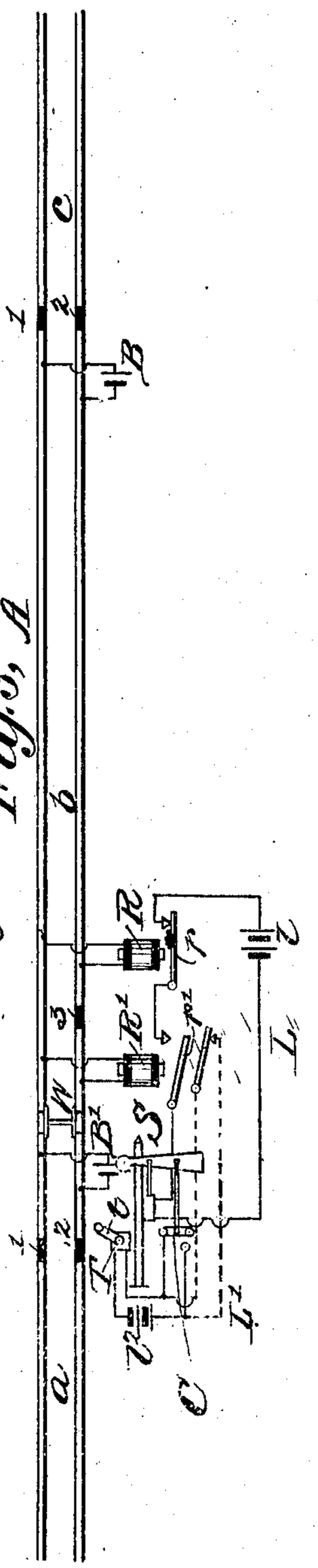


Fig. 3, A



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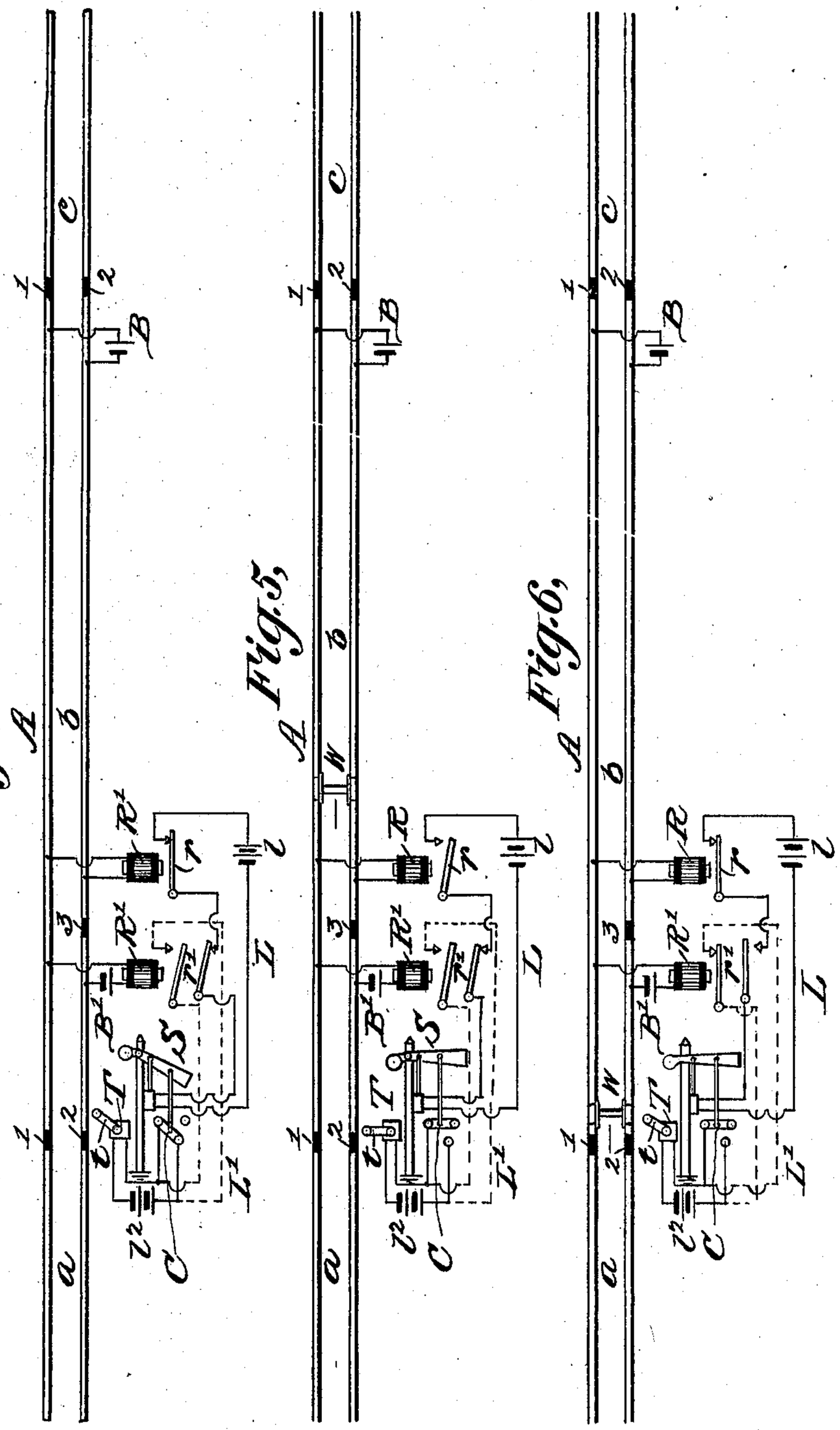
2 SHEETS—SHEET 2



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RAILWAY SIGNALING.

No. 894,471. Specification of Letters Patent. Patented July 28, 1908.

Application filed July 13, 1904. Serial No. 216,333.

To all whom it may concern:

Be it known that I, JACOB B. STRUBLE, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Railway Signaling, of which the following is a specification.

My invention relates to railway signaling.

My invention more particularly relates to that class of railway signaling wherein automatically operated or controlled tripping devices are located along the railway which in their set position operate a lever, arm, or other device carried by the moving train, which lever is embodied in the braking system for the train, or in the control for the motive power, or in both the braking system and the control for the motive power of the moving train.

I will describe an application of my invention to a railway and then point out the novel features thereof in claims.

In the accompanying drawing Figure 1 is a diagrammatic view of a portion of a railway, a railway signal, an automatic tripping device and an arrangement of circuits all embodying my invention. Fig. 2 is a view similar to Fig. 1, but showing a different condition of circuits, due to the presence of a train. Fig. 3 is a view similar to Fig. 1, but showing a different condition of circuits due to the presence of a train. Fig. 4 is a view similar to Fig. 1, but showing a different arrangement of circuits and embodying my invention. Fig. 5 is a view similar to Fig. 4, but showing a different condition of the circuits due to the presence of a train. Fig. 6 is a view similar to Fig. 4, but showing a different condition of the circuits due to the presence of a train.

Similar letters of reference designate corresponding parts in all of the figures.

Referring now to Fig. 1, A designates a portion of a railway, and *a*, *b*, *c*, designate what are generally termed "block sections." These block sections are generally formed by insulating one or both of the opposite line of rails. That portion of the railway track between insulated points is generally termed a block section. In the drawings both lines of rails are shown as being insulated as designated at 1, 2. Each block section is provided with a railway signal S, or there may be a plurality of such signals. A railway signal of the automatic type is preferred, which as is well understood, comprises a semaphore and an operating mechanism suitably connected with the semaphore. Each block section is provided with a track circuit which, as is well known, comprises a source of current B, suitably connected with the track rails of the block section at one end of the block section and a translating device or relay R at the other end of the block section, having its energizing coil in circuit with the track rails. The source of current supply B may be any desired. That is, it may supply a direct current, an intermittent or pulsating current, or alternating current, and the translating device or relay R may be of any desired construction which will respond to the current from the source of supply intended for its operation. The movable member or armature *r* of the relay controls a local circuit L, which as usual, includes a source of current *l* and a controlling device comprised in the operating mechanism of the railway signal. Ordinarily when no train is in the block section, current from the source of supply B affects the translating device R to have its movable member *r* in such position as to close the local circuit. With the local circuit closed the semaphore of the railway signal will be held in a position to indicate "safety" or "clear". As soon as a train enters a block section, the wheels and axles thereof short-circuit or shunt the current from the source of supply B from the translating device R, which becoming deënergized responds with its movable-member under the influence of gravity or otherwise, to open the local circuit L and permit of the semaphore of the railway signal moving or being moved to the danger position of indication.

T designates an automatically operated tripping device having an arm or lever *t*, which when in a certain position will be struck or engaged by a lever or arm carried by a train, which lever or arm carried by the train is included in or controls the braking system of a car or train, or the control of the motive power for the motors of the car or train. The mechanism of the automatic tripping device is preferably such that under certain conditions it will move the arm *t* to one position and under other conditions will permit of the arm being moved by gravity or otherwise, to what is termed its set position.

Its inoperative position is diagrammatically illustrated in Figs. 1, 3, 4 and 6, and its operative position diagrammatically illustrated in Figs. 2 and 5. Preferably the mechanism of the automatic device includes an electrically operated device, the circuit of which is either under the control of a translating device or relay, or a railway signal. Ordinarily, these automatic devices are located at or adjacent a railway signal and the arm *t* thereof corresponds in its position with the position of the semaphore of the railway signal, except under conditions hereinafter explained. That is, when the semaphore is in a position to indicate "safety", the arm *t* will be in such position as to not be engaged by the arm or lever carried by the car or train, and when the semaphore is in a position indicating danger, the arm *t* will be in such position as to be engaged by the lever or arm carried by the train, except when the train is actually passing the arm *t*, during which time the said arm will be held in its inoperative position.

I have not shown any specific form of tripping device *t* or its operating mechanism as it forms no part of my invention, and as it is so well known in the art as to require no illustration or detailed description. I preferably employ a mechanism which holds the arm *t* in an inoperative position by the expenditure of energy and an electrically operated device to control the supply of energy to the mechanism. The electrically operated device so long as energized by current permits the supply of energy to the mechanism, and when deprived of current or deënergized, shuts off the supply of energy and permits the arm *t* to be moved or move under the influence of gravity to its operative position.

My present invention relates more particularly to the control of the electrically operated device and therefore the arm *t*.

An object of my invention is to prevent the operation of the automatic device to move the arm *t* to its set position until after the rear of the train has moved into the block section.

Another object of my invention is to have the semaphore move or be moved to the danger position immediately upon the entrance of a train to the block section for the reason that the movement of the semaphore may be employed to control the position of other semaphores or their devices, and to prevent the movement of the arm *t* to its set position until the rear of the train has passed into the block section. As shown in Fig. 1, this may be accomplished by inserting insulation 3 in one of the rails of the block section, for example, block section *b*, and providing a source of electrical energy B^1 and a translating device or relay R^1 intermediate the insulation points 1 and 3. The translating device R^1 is provided with a movable member r^1 controlling two contact points, one of which is included in the local circuit L, and the other of which is included in a circuit L^1, which includes a source of energy l^2, and the electrically controlled device comprised in the mechanism of the automatic device T. The circuit L^1 is also controlled by a circuit controller C, which is operated from the railway signal S. When the semaphore of the railway signal is in a position to indicate "safety", the circuit controller C is in such position as to close the circuit L^1 at that point, while the translating device R^1 has opened the circuit.

The operation of the circuits illustrated in Fig. 1, is as follows: With no train in the block section *b* the apparatus and circuits will be in the condition shown in Fig. 1. As soon as a train enters the block section *b* the first pair of wheels and axles thereof will short-circuit the battery B^1 from the translating device or relay R^1 and the movable member or armature r^1 drops onto its back contact (see Fig. 3). In doing this the local circuit L will be opened and the mechanism of the railway signal will move or permit of the semaphore being moved to the danger position. The movement of the semaphore to the danger position permits the circuit controller C to open the circuit L^1 at that point, but this opening of the circuit L^1 will not cause the automatic device T to set the arm *t* to its set position because the circuit L^1 has previously been closed by the movable member r^1 of the relay R^1 moving on to its back contact. The action of the translating device is quicker than the movement of the semaphore so that there will be no momentary operation of the automatic tripping device T. This condition of the circuits will prevail until the last pair of wheels and axle of the car or train moves beyond the insulation point 3 at which time current from the source of energy B^1 will again energize the translating device R^1 to have it operate its movable member r^1 to close the circuit L and to open the circuit L^1 at that point. (See Fig. 2.) The opening of the circuit L^1 permits of the automatic device T operating to move the arm *t* to its set position. The closing of the circuit L by the translating device R^1 when the car or train has moved beyond the insulation point 3 does not permit of the operating mechanism of the railway signal moving the semaphore to safety position for the reason that the circuit L will be opened by the translating device R as soon as the first pair of the wheels and axle of the car or train has passed the insulation point 3. W designates an arbitrary representation of a car or train.

Referring now to Fig. 4 precisely the same arrangement of parts is shown with the exception that the translating device R^1 is on open circuit, whereas in Fig. 1, it is on closed

circuit. When the translating device R^1 is in an open circuit, the circuit L^1 is completed by reason of the movable member or armature r^1 engaging its front contact. The circuit L^1 is completed upon the energization of the translating device R^1 which will be the case when a pair of wheels and axle bridges the track rails of block section *b* (see Fig. 6) between the insulation points 1 and 3. Precisely the same operation takes place with the form of invention illustrated with Figs. 4, 5 and 6, as described in connection with Figs. 1, 2 and 3, the several conditions of the circuits due to the different positions of the car or train being illustrated in Figs. 5 and 6. The local circuit L of the railway signal is closed at the translating device R^1 by its armature being on its back contact. Instead of dividing any single block by insulation 3 as illustrated, independent block sections may be employed.

My invention is applicable to steam or electric railroads and any form of track circuit and circuit controlling device may be employed.

In its broadest sense my invention contemplates the employment of circuit controlling devices operated by the passage of a train along the railway track to control the position of a railway signal and an automatic tripping device in the order of first setting the signal to a danger position immediately the train enters a block section and the setting of a trip device to operative position immediately after the last pair of wheels and axle of a car or train has passed into the block section. In the specific embodiment of my invention the circuit controlling devices are included in track circuits either closed or open track circuits.

What I claim as my invention and desire to secure by Letters Patent is:

1. The combination with a railway signal for a block section of a railway, of a circuit controller operated by the passage of a train for controlling the position thereof, a tripping device adjacent the railway signal, and a circuit controller operated by the passage of a train, the arrangement of the circuit controllers being such that the railway signal will first move to danger position by the action of a train, and after the train has completely entered the block section the tripping device will be operated to set position.

2. The combination with a railway signal controlling a block section of a railway, a track circuit including a translating device for controlling the operation of the railway signal, a tripping device adjacent the railway signal, a track circuit and translating device for controlling the tripping device, and a circuit controller operated by the railway signal for controlling the tripping device.

3. The combination with a railway signal controlling a block section of a railway, a track circuit including a translating device for controlling the operation of the railway signal, a tripping device adjacent the railway signal, a track circuit and translating device for controlling the tripping device and said last mentioned translating device also controlling the railway signal, and a circuit controller operated by the railway signal for controlling the tripping device.

4. The combination with a railway signal controlling a block section of a railway, a track circuit for said block section including a translating device for controlling the railway signal, a tripping device, a track circuit and translating device for controlling the tripping device and said last mentioned translating device also controlling the railway signal.

5. The combination with a block section of a railway, a signal device therefor, a tripping device therefor, train controlled means for governing the position of the signal device and two circuits for the tripping device, one of which is controlled by the passage of a train and the other of which is controlled by the signal device.

6. The combination with a block section of a railway, signal devices along the railway, one being provided for the block section, train controlled means for controlling the position of the signal device, a tripping device for the block section, and two circuits for controlling the position of the tripping device for holding the tripping device in inoperative position, one of said circuits being controlled by the passage of a train along the block section and the other of which is controlled by a signal device along the railway.

7. The combination with a block section of a railway, a trip device for said block section, and train controlled means for controlling the operation of the trip device, their operation being such that the trip will be set to its operative position only when the end or rear of the train shall have entered the block section.

8. The combination with a block section of a railway, a signal device therefor, a trip device for said block section, and means for controlling the operation of said signal device and trip device, said means being arranged and operated first to set the signal device to danger position and the trip device to its operative position after the train shall have completely entered the block section.

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

JACOB B. STRUBLE.

Witnesses:
A. HERMAN WEGNER,
C. W. VAN NOSTRAND.