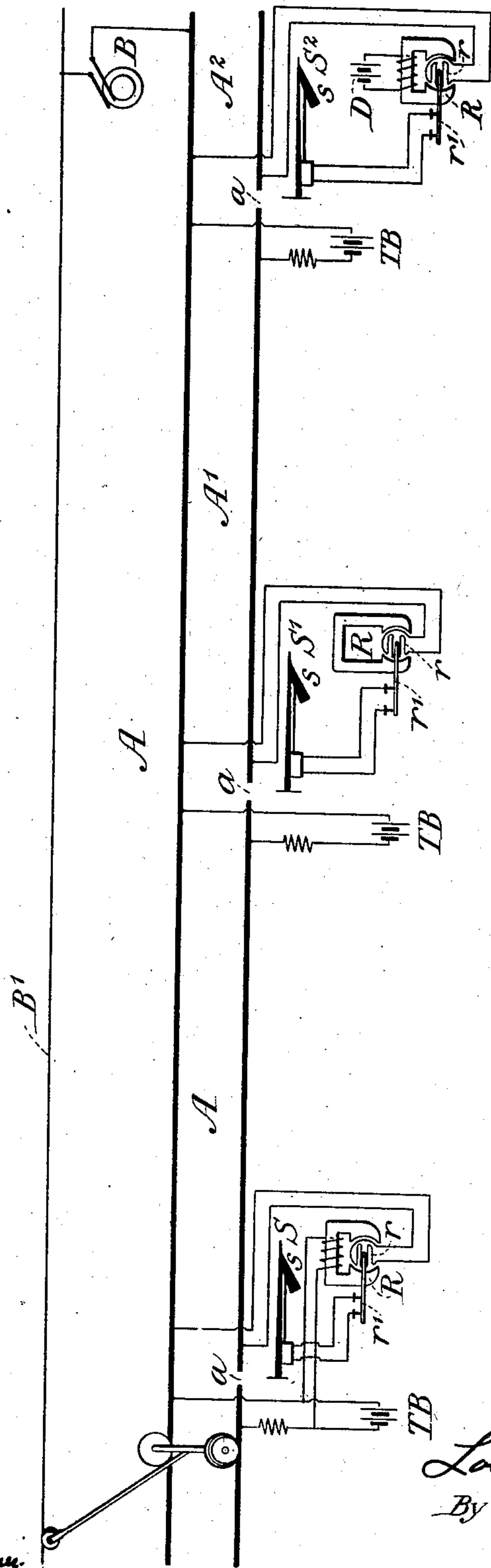


No. 891,303.

PATENTED JUNE 23, 1908.

L. H. THULLEN.
SIGNALING SYSTEM FOR RAILWAYS.
APPLICATION FILED JUNE 9, 1908.



Witnesses:
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UNITED STATES PATENT OFFICE.

LOUIS H. THULLEN, OF EDGEWOOD PARK, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

SIGNALING SYSTEM FOR RAILWAYS.

No. 891,303.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LOUIS H. THULLEN, a citizen of the United States, residing at Edgewood Park, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Signaling Systems for Railways, of which the following is a specification.

My invention relates to signaling systems for railways and especially for electric railways the trackway of which forms part of the return for the alternating current used for propelling motor cars along the railway.

I will describe a signaling system embodying my invention and its application to an electric railway on which alternating current is used for propelling the cars, and then point out the novel features thereof in claims.

The accompanying drawing is a diagrammatical view of a portion of an electric railway the trackway of which is divided to form block sections and forms part of the return path for the alternating propulsion current, and a signaling system applied thereto and embodying my invention.

I have illustrated three block sections and three different forms of relay device, each of which embodies my invention.

Referring now to the drawing, A designates a portion of railway the trackway of which is divided to form block sections. As shown this is accomplished by inserting suitable insulation *a* in one of the track rails. I have shown three block or track sections A, A¹, A².

B designates an alternating current generator, or there may be a plurality of such generators located at different stations.

B¹ designates a trolley or third rail which is connected with one pole of the generator B or generators, and along which travel trolleys or other contacts carried by the cars. The other pole of the generator or generators is connected with one or both of the traffic rails in a manner well understood in the art.

The signaling system illustrated is of a simple type, one railway signal being provided for each block and each railway signal only controlling the passage of cars or trains into and along its block or track section.

S, S¹, S², etc. designate railway signals. Each railway signal comprises a signal device *s*, preferably in the form of a semaphore, and an operating mechanism which is employed to move the signal device from one of its positions of indication (its horizontal po-

sition) to another of its positions of indication (its inclined position). This form of railway signal and its operation is well known in the art and will not be further described. All the description of the operation of this type of railway signal that is necessary to an understanding of this invention is, that when no car or train is in a block or track section, the signal device is held in its inclined position of indication by the operating mechanism, and when a car or train is in a block or track section, an electrically operated device comprised in the operating mechanism is deprived of current, thus permitting the signal device to assume a horizontal or other position of indication preferably under the influence of gravity different from the first mentioned inclined position.

Each block or track section is provided with a closed track circuit, which as well known, includes a source of current and a relay device which is operable by the current from said source. The relay is provided with an armature, which as it is attracted and released by the magnetization and demagnetization of a core by the coil of the relay, opens and closes what is known as a local circuit. This is also well understood in the art.

My present invention is directed more particularly to the relay. It is preferably of a type which is responsive only to direct current to attract its armature. This is particularly necessary in signaling systems on electric roads using alternating current for car propulsion purposes and the trackway as part of the return, as there sometimes arise conditions in the operation of the railway which will produce an alternating current difference of potential across the track rails of a block section, thereby causing an alternating current to flow through the relay which might either destroy or cause an improper operation of the relay.

The track circuit of each block section comprises a source of direct current TB, and a relay R. Each relay comprises a field which may be either a permanent magnet (see relay of block section A¹) or an electro-magnet (see relays of block sections A and A²). In case an electro-magnet is used as the field of the relay current therefor may be supplied from an adjacent track battery TB (see relay of block section A) or a separate battery D (see relay of block section A²).

The armature of the relay comprises a coil of wire r which is suitably arranged between the poles of the field and an arm r^1 which opens and closes one or more contacts in the local circuit of the railway signal. The principle of operation of the relay is the same as that of a dynamometer, although relays operating on other principles and not operated by an alternating current may be employed.

10 With no car or train in a block or track section, current from the battery TB of that block section will flow through the armature coil, and the armature coil will move relatively to the field to bring the arm r^1

15 against the contact or contacts of the local circuit, thereby closing the local circuit with a car or train in a block section, the wheels and axle of the car or train will shunt current from the battery TB of that block section,

20 thus permitting the arm r^1 to move or be moved in a reverse direction.

It will be apparent that as the poles of the field of each relay is fixed, an alternating current which might flow through the armature

25 coil will not move it sufficiently in a direction either to open or close the contacts controlled by the arm r^1 . The arm r^1 will preferably have considerable inertia so as to avoid the

slight vibrations which may be produced by an alternating current flowing through the armature coil.

What I claim as my invention is:

In combination with an electric railway the trackway of which is divided to form block sections and serves as part of the return path for the car propulsion current, of a source of alternating current for the cars, and a signaling system, said system comprising a railway signal for each block section, and a track circuit for each block section and its signal which track circuit includes a source of direct current and a relay comprising a field, the polarity of which is fixed and an armature coil arranged between the poles of the field and connected to the said track circuit, said relay being responsive to the direct current of the track circuit and not to the alternating propulsion current to control a railway signal.

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

LOUIS H. THULLEN.

Witnesses:

J. B. STRUBLE,
W. L. McDANIEL.