W. J. COOK.

RAILWAY SIGNALING APPARATUS.

APPLICATION FILED AUG. 17, 1908.

940,787.

Patented Nov. 23, 1909.

4 SHEETS—SHEET 1.

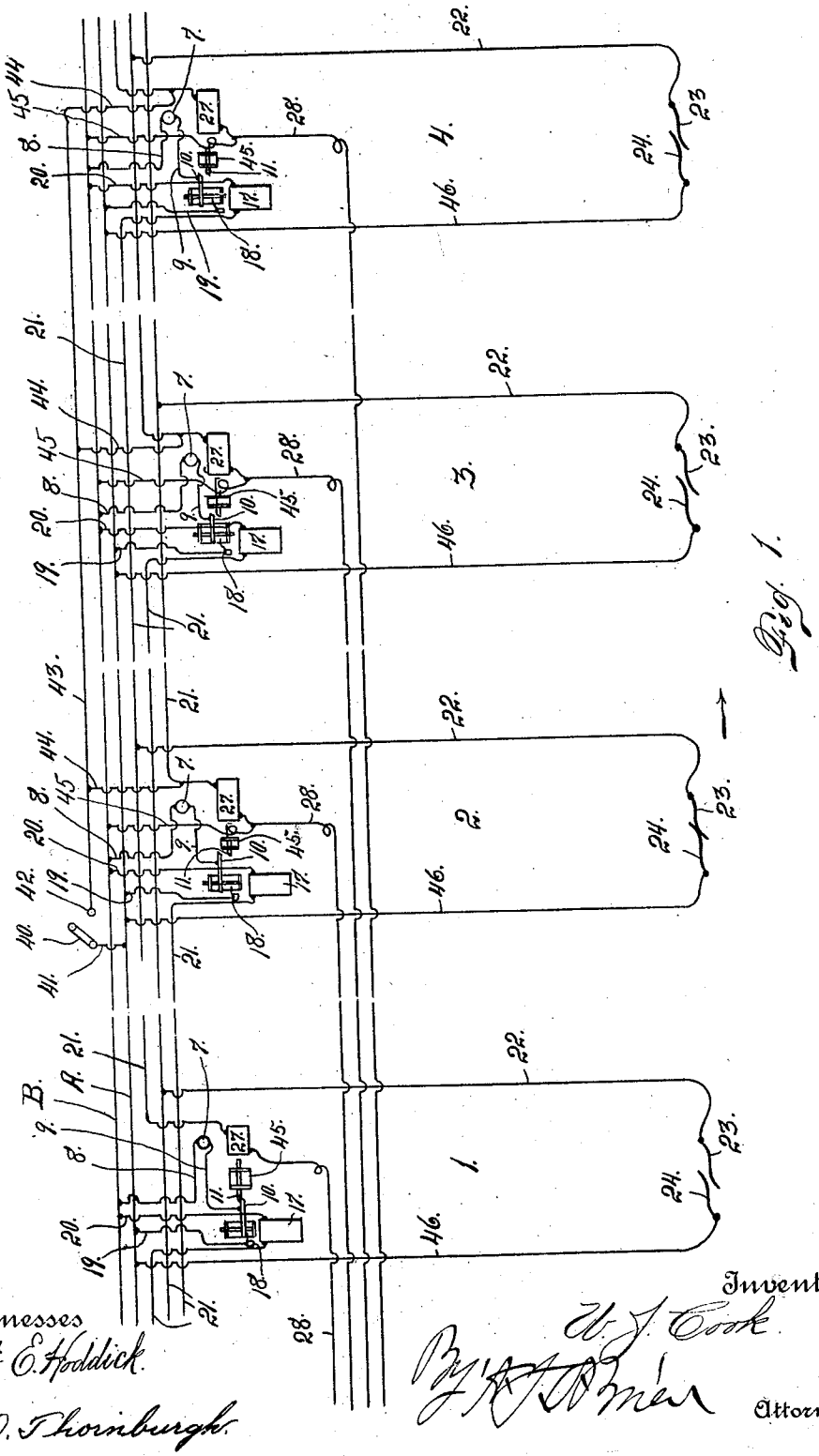

Fig. 1.

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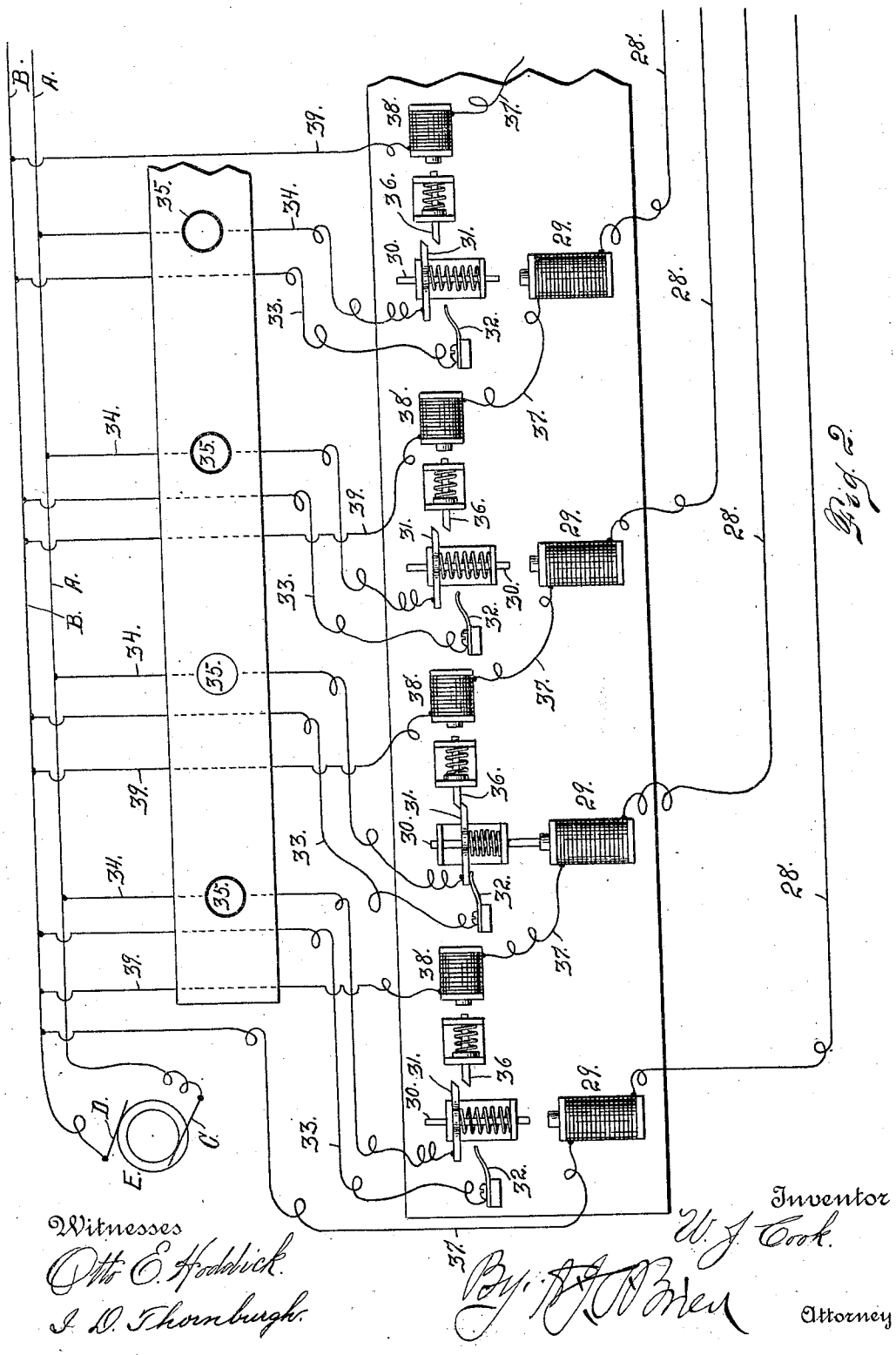

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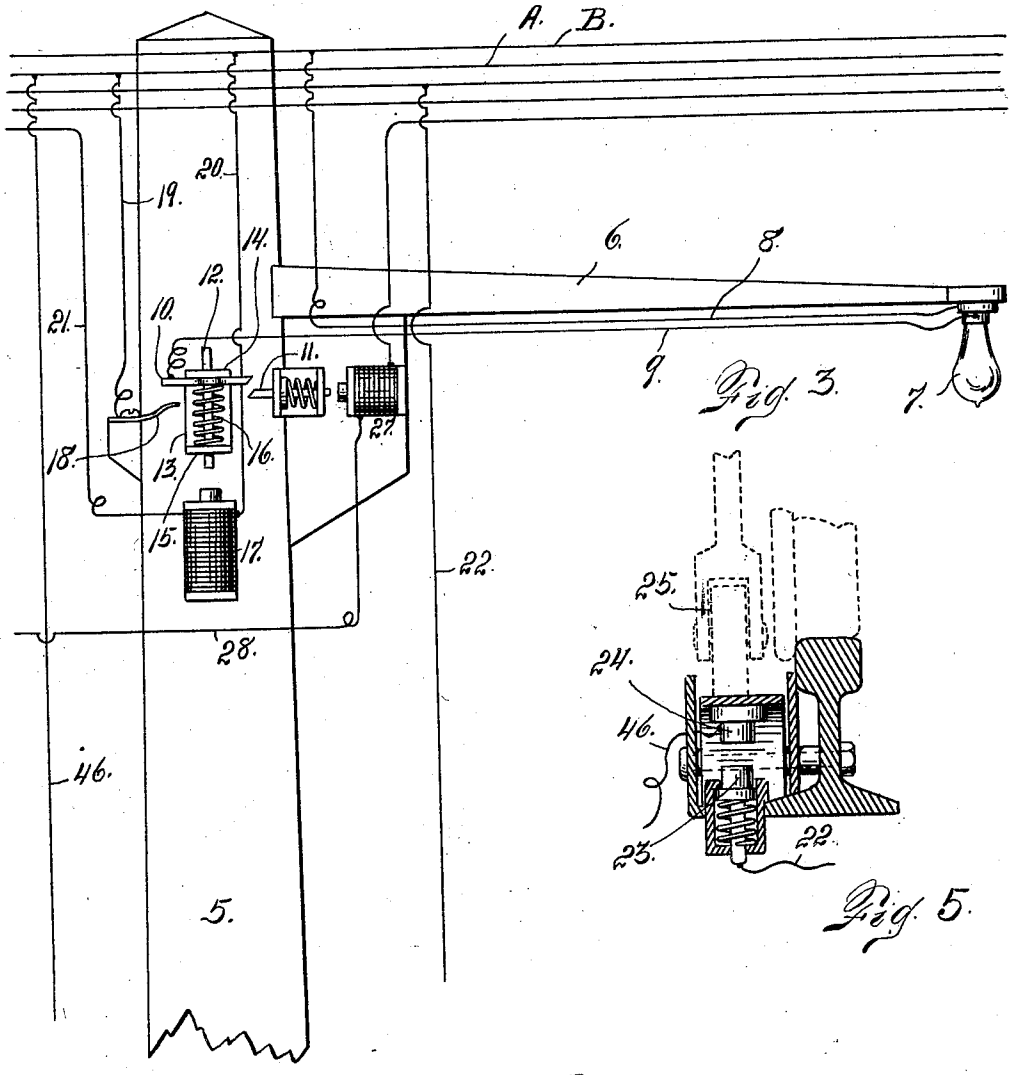

Fig. 3.

Fig. 5.

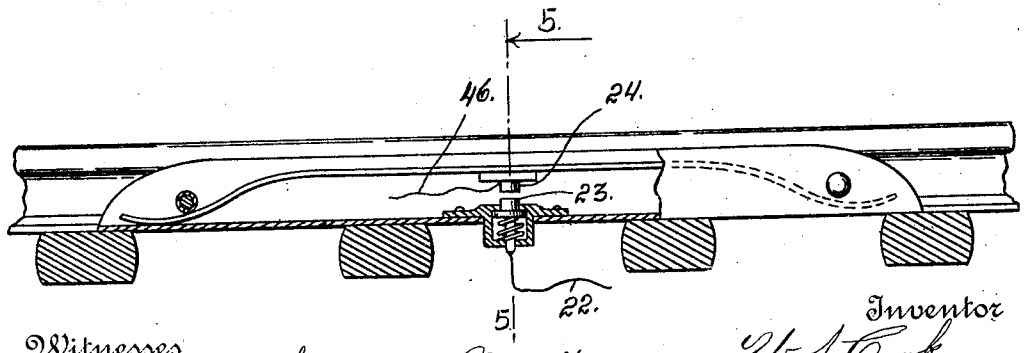

Fig. 4.

Witnesses

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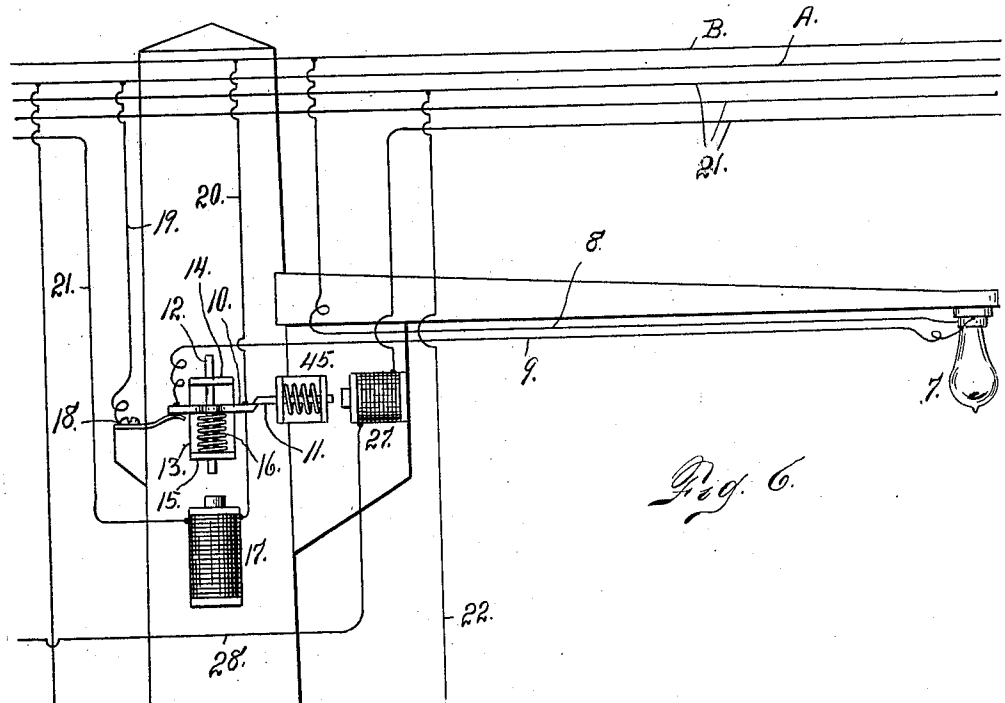

Fig. 6.

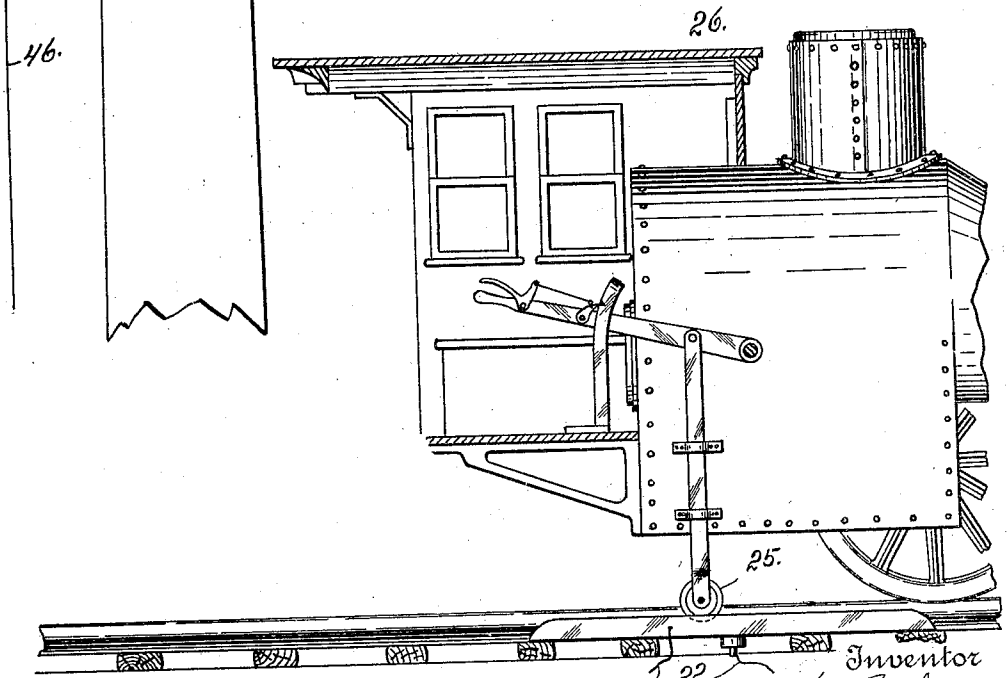

Fig. 7.

Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM J. COOK, OF DENVER, COLORADO.

RAILWAY SIGNALING APPARATUS.

940,787. Specification of Letters Patent. Patented Nov. 23, 1909.

Application filed August 17, 1908. Serial No. 448,980.

To all whom it may concern:

Be it known that I, WILLIAM J. COOK, a citizen of the United States, residing at the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Railway Signaling Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in railway signaling apparatus, my object being to provide a block system whereby the signals are given by lighting lamps along the track, these lights being maintained at a suitable distance, in front and in the rear of the train whereby either an approaching or a following train will be notified of its proximity to another train.

By virtue of my improved construction, provision is made for an electrical circuit whereby a lamp, for instance, is lighted two miles ahead of the train, and left lighted until the train has left the lamp a mile in the rear, when a magnet circuit will be automatically closed, and whereby the magnet will serve to break the light circuit and extinguish the lamp. In my improved construction, these lighting stations are arranged at suitable intervals, say a mile apart. Every time a station is reached, two circuits are closed, one to light a lamp two stations ahead, and the other to extinguish the light of the station in the rear. Of course, any other desired arrangement might be made, so far as distance is concerned. Provision is also made for indicating in the train despatcher's office the lighting and extinguishing of lamps along the line so that the train despatcher will know the exact location of the train.

Having briefly outlined my improved construction I will proceed to describe the same in detail, reference being made to the accompanying drawing, in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a diagrammatic view illustrating the arrangement of the lighting stations along the track, together with the means for making and breaking the circuits. Fig. 2 is a detail view illustrating the means for lighting and extinguishing lamps in the train despatcher's office to indicate the location of the train. Fig. 3 is a view illustrating in detail the lighting mechanism at each lighting station. Fig. 4 is a detail view illustrating the means arranged along a rail of the track, whereby as the train passes, the circuit is momentarily closed. Fig. 5 is a section taken on the line 5—5, Fig. 4. Fig. 6 is a view similar to Fig. 3, but showing the lighting circuit closed, while in Fig. 3 the same circuit is open. Fig. 7 is a detail view illustrating the manner of depressing the spring contact along the track for closing the circuits.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate one of a series of posts arranged along the track at suitable intervals. These posts may be termed lighting stations. To each post is secured an arm 6 carrying an incandescent lamp 7. One of the conductors 8 leading to these lamps, is connected with a feed wire B, while the other conductor 9 leads to a contact 10 fast on a rod 12 slidably mounted in a bracket 13 having upper and lower stops 14 and 15. A coil spring 16 normally holds the contact 10 at its upward limit of movement and in engagement with the upper stop 14 of the bracket 13. Below this rod is located an electro-magnet 17 which, when energized, acts to draw the rod 12 downwardly sufficiently to bring the contact 10 into engagement with the contact 18, also mounted upon the post. At the same time the contact 10 passes beneath a spring-actuated latch 11 which serves to lock the contact in the depressed position or in the position whereby the lighting circuit is closed (see Fig. 6). The contact 18 is connected with a feed wire A by a conductor 19. One terminal of the coil of the magnet 17 is connected with the feed wire B by a conductor 20, while the other terminal is connected by a conductor 21, and a conductor 22 with a spring contact 23, coöperating with a contact 24 acted upon by a roller 25 carried by the engine 26 to close the lighting circuit. These contacts 23 and 24 are located any desired distance in the rear of the lamp to be lighted. The bringing of the contacts 23 and 24 into engagement with each other not only energizes the magnet 17 whereby a lamp 7 is lighted at a suitable distance ahead of the train, but also closes the circuit through a magnet

27 in the rear of the train, which acts upon the latch 19 to move the latter to a position to release the spring-actuated, light-circuit-closing contact 10, whereby the lamp 7 is extinguished a suitable distance in the rear of the train. The wire 21 leads to one terminal of the magnet 27. From the opposite terminal of this magnet a wire 28 leads to a magnet 29 in the train despatcher's office (see Fig. 2), which acts upon a magnetic part 30 to move a spring-actuated contact 31 into engagement with a contact 32 connected with the feed wire B by a conductor 33. The contact 31 is connected with the feed wire A by a conductor 34; hence, as the contacts 31 and 32 are brought into engagement, a lamp 35 is lighted in the despatcher's office. When the contact 31 is depressed to bring it into engagement with the contact 32, it is locked in that position by a spring-actuated latch 36. The conductor 28 leads to one terminal of the magnet 29, while a conductor 37 leads from the opposite terminal to one terminal of a magnet 38 from whose opposite terminal leads a conductor 39 to a feed wire B, thus completing the circuit through the magnet 38 which acts upon the spring-actuated latch 36 to release the contact 31, whereby another lamp 35 in the train despatcher's office is extinguished. Hence, by properly designating the lamps in the train despatcher's office to harmonize with those along the track, the despatcher is kept posted with reference to the lighting and extinguishing of the signal lamps along the track, and the location of the train.

Wherever a side track is located, I prefer to employ a switch arm 40 connected by means of a conductor 41 with the feed wire A. A contact 42 located adjacent to the switch arm is connected by means of a conductor 43 and branch conductors 44, with the conductor 21 leading to the magnets 27 of a number of stations in the vicinity of the switch. From the feed wire B, conductors 55 lead to the conductor 28. Now, if it becomes necessary for a train to go upon the side track, it will be desirable to indicate a clear track by extinguishing the signal lights both in front and rear of the train. This may be done by moving the switch arm into engagement with the contact 42, whereby the magnets 27 corresponding with the lamps controlled by the train upon the side track, will all be energized and will act upon the latch 19 to release the contacts 10 to break the light circuits.

As illustrated in the drawing, feed wires A and B are connected with the opposite poles C and D of an electrical generator E, suitably located.

In describing the operation of my improved signaling system, reference will be had more particularly to Fig. 1 of the drawing, upon which four stations are indicated, these stations being designated from left to right as 1, 2, 3 and 4 respectively. I will assume that the train at station No. 2 has brought the contacts 23 and 24 into engagement. In this event, the current will pass from the feed wire A through a conductor 46 at station No. 2 to the contact 24, and thence to the contact 23, thence through a conductor 22 to a conductor 21, leading to one terminal of the magnet 17 of station No. 4, whereby the said magnet is energized and acts upon the contact 10 of the said station, to bring the latter into engagement with the contact 18 of the said station, whereby the circuit is closed through the lamp 7 of that station, the contact 10 being locked in the circuit-closing position by the latch 19 of station No. 4. Simultaneously with the lighting of the lamp 7 at station No. 4, the current also passes in the rear of the train, from the contact 21, to the magnet 27 of station No. 1, thus energizing said magnet which acts upon the latch 11 of that station, to release the spring-actuated contact 10, whereby it is separated from the contact 18, thus breaking the circuit of the lamp 7 at station No. 1. It will thus be observed that the lamp of the station in the rear is extinguished, and the lamp at the station in advance is lighted every time the train reaches any station along the track. If it is desired that trains going in both directions shall control the signal lights, there will be a distinct set of signal lights and their necessary apparatus on each side of the track, the one set being controlled by trains going in one direction, while the other set is controlled by trains going in the opposite direction. These sets of signaling apparatus will be duplicates.

Attention is called to the fact that if we assume that the contacts 23 and 24 are brought into engagement at station No. 2, that the current, after passing through the magnet 27 of station No. 1, will pass through a conductor 28 to a magnet 29 in the train despatcher's office, whereby a contact 31 of one set of instruments is brought into engagement with a contact 32, thus closing the circuit through the lamp 35 next to that farthest to the left in Fig. 2. At the same time the current will pass from the magnet 29 through a conductor 37 to the releasing magnet 38 of the train despatcher's office, whereby the contact 36 of another set of instruments is actuated to release the contact 31 of a corresponding set of instruments, whereby the last named contact is allowed to separate from its corresponding contact 32, thus extinguishing the lamp 35 farthest to the left in Fig. 2.

By properly designating the lamps which are lighted and extinguished every time a train reaches a station along the track, the

train despatcher will be kept thoroughly posted as to the signals which are given along the track by the various trains. In this connection it may be stated that the train despatcher's office should be supplied with a suitable representation of the railway lines covering his division, and upon which the stations are suitably indicated. Electric lamps may be placed upon this map or representation of the railway lines at any desired number of stations, and so connected in the circuit which is opened and closed by the action of the train, that the lamps located upon the map, so to speak, at the various stations, will be lighted simultaneously with the arrival of the train at these stations. By virtue of this arrangement, the exact location of all trains anywhere within the despatcher's division may be known to him.

Having thus described my invention, what I claim is:

1. In railway signaling apparatus the combination of lighting stations arranged along the track, each station having a lamp, contacts located in the lamp circuit and normally separated, an electro-magnet which, when energized, brings the said contacts into engagement to close the lamp circuit, means for automatically locking the said contacts in the circuit-closing position, and an electro-magnet for releasing the locking means, circuit make-and-break devices arranged along the track and acted upon by a passing train, to momentarily place the said devices in the circuit-closing position, and connections between the circuit make-and-break devices and the electro-magnets at the lighting stations, whereby as the track make-and-break devices are closed, the first named magnet is energized in one direction from the train and the lock releasing magnet energized in the opposite direction from the train, substantially as described.

2. Railway signaling apparatus, comprising lighting stations arranged along the track, each station including an electric lamp, electro-magnetic means for closing the lamp circuit, means for automatically locking the lamp circuit in the closed position, electro-magnetic means for releasing the locking mechanism, circuit make-and-break devices arranged along the track and adapted to be momentarily placed in the closed position by a passing train, and circuit connections between the track make-and-break devices and the electro-magnetic means of the lighting stations, whereby when any track circuit make-and-break device is closed, the electro-magnetic means for closing the lamp circuit is energized in one direction from the train, while the lock-releasing electro-magnetic means is energized in the opposite direction from any train, substantially as described.

3. Railway signaling apparatus comprising stations arranged along the track at suitable intervals, each station including an electric lamp, electromagnetic means for closing the lamp circuit, means for locking the lamp circuit in the closed position, electromagnetic means for releasing the locking mechanism, circuit make-and-break devices arranged along the track, each circuit make-and-break device being connected with the electric apparatus of two stations, whereby as the track circuit make-and-break device is closed the electromagnetic means for closing the lamp circuit is energized at one station, and the electromagnetic means for releasing the locking mechanism is energized at the other station, electric lamps lighted in the train despatcher's office, corresponding with the lamps lighted and extinguished at the stations along the track, and suitable circuit connections between the track circuit make-and-break device and the lamps in the despatcher's office, whereby as the lamps are lighted or extinguished at the stations, corresponding lamps in the train despatcher's office are also lighted and extinguished.

4. Railway signaling apparatus, comprising signal stations arranged along the track, each station including an electric signal, electro-magnetic means for closing the signal circuit, means for automatically locking the signal circuit in the closed position, electro-magnetic means for releasing the locking mechanism, circuit make-and-break devices arranged along the track and adapted to be momentarily placed in the closed position by a passing train, and circuit connections between the track make-and-break devices and the electromagnetic means of the signal stations, whereby when any track circuit make-and-break device is closed, the electro-magnetic means for closing the signal circuit is energized in one direction from the train, while the lock releasing electro-magnetic means is energized in the opposite direction from any train, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM J. COOK.

Witnesses:
A. J. O'BRIEN,
P. J. EDWIN ROBINSON.