

No. 719,388.

PATENTED JAN. 27, 1903.

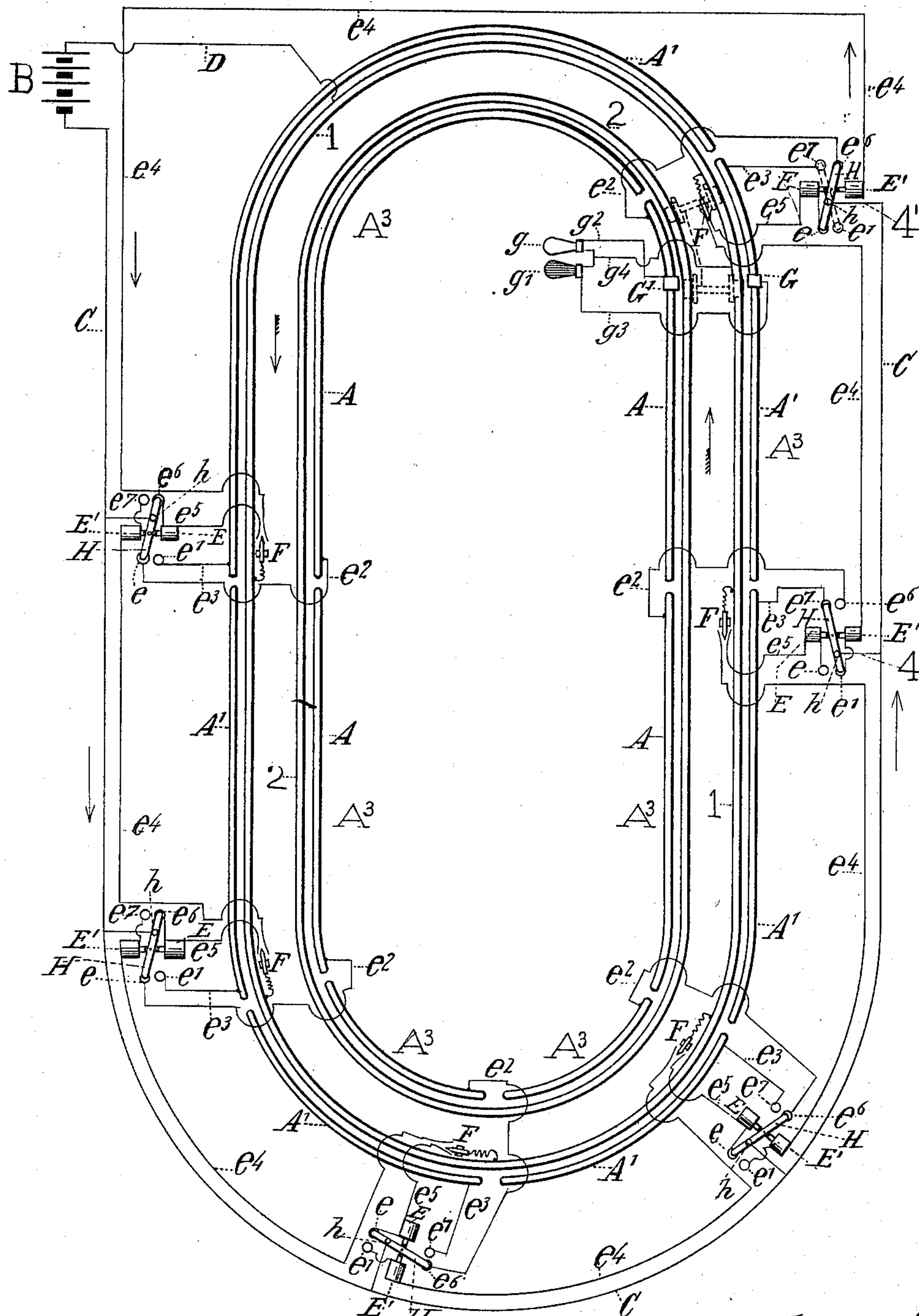
H. F. SPURR, JR.

ELECTRIC DANGER AND SAFETY SIGNAL FOR RAILWAYS.

APPLICATION FILED APR. 24, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:

H. P. Lile

H. E. Remick

Inventor:

Henry Francis Spurr, Jr.

Per H. E. Remick,
his Atty.

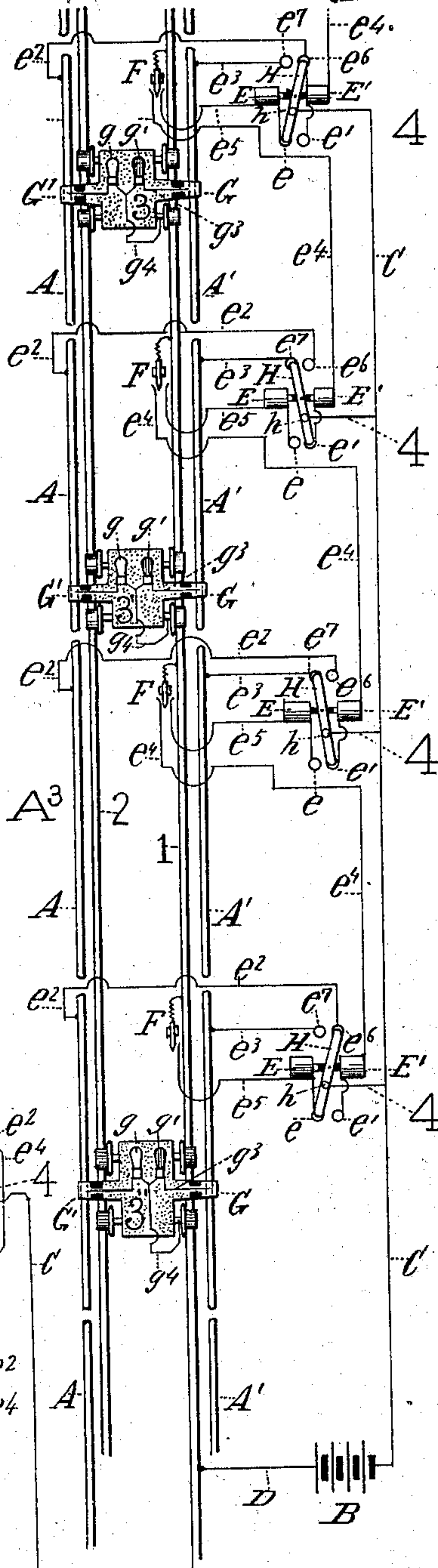
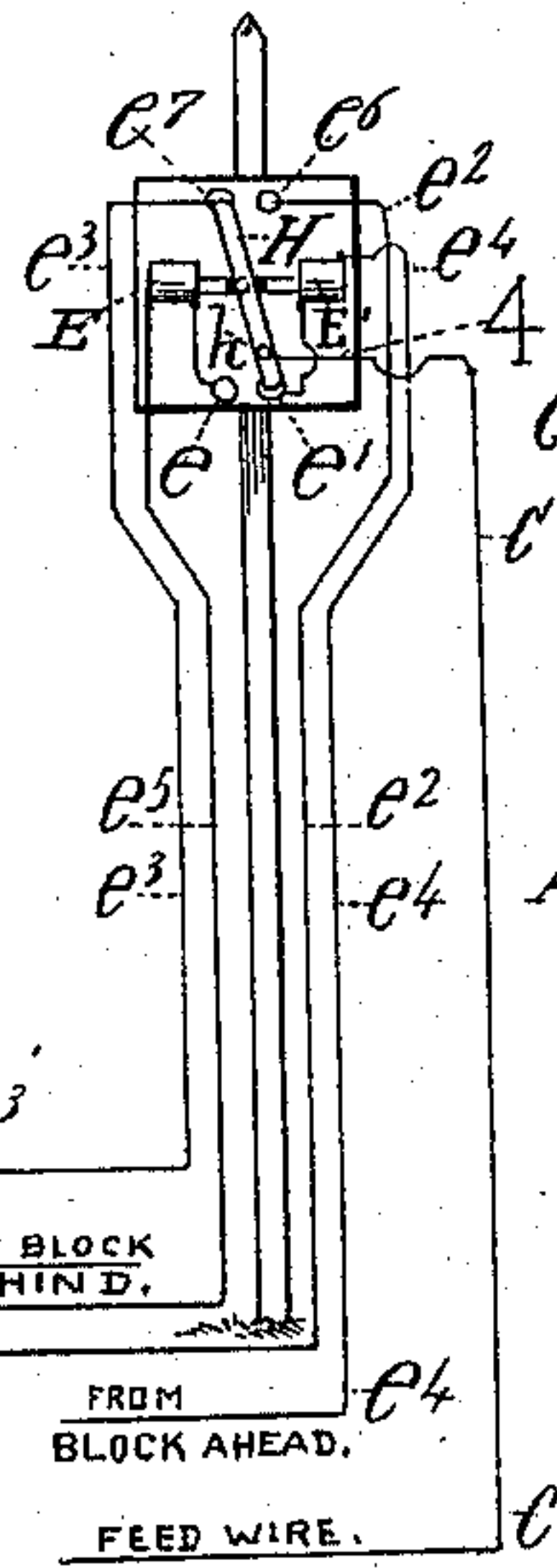
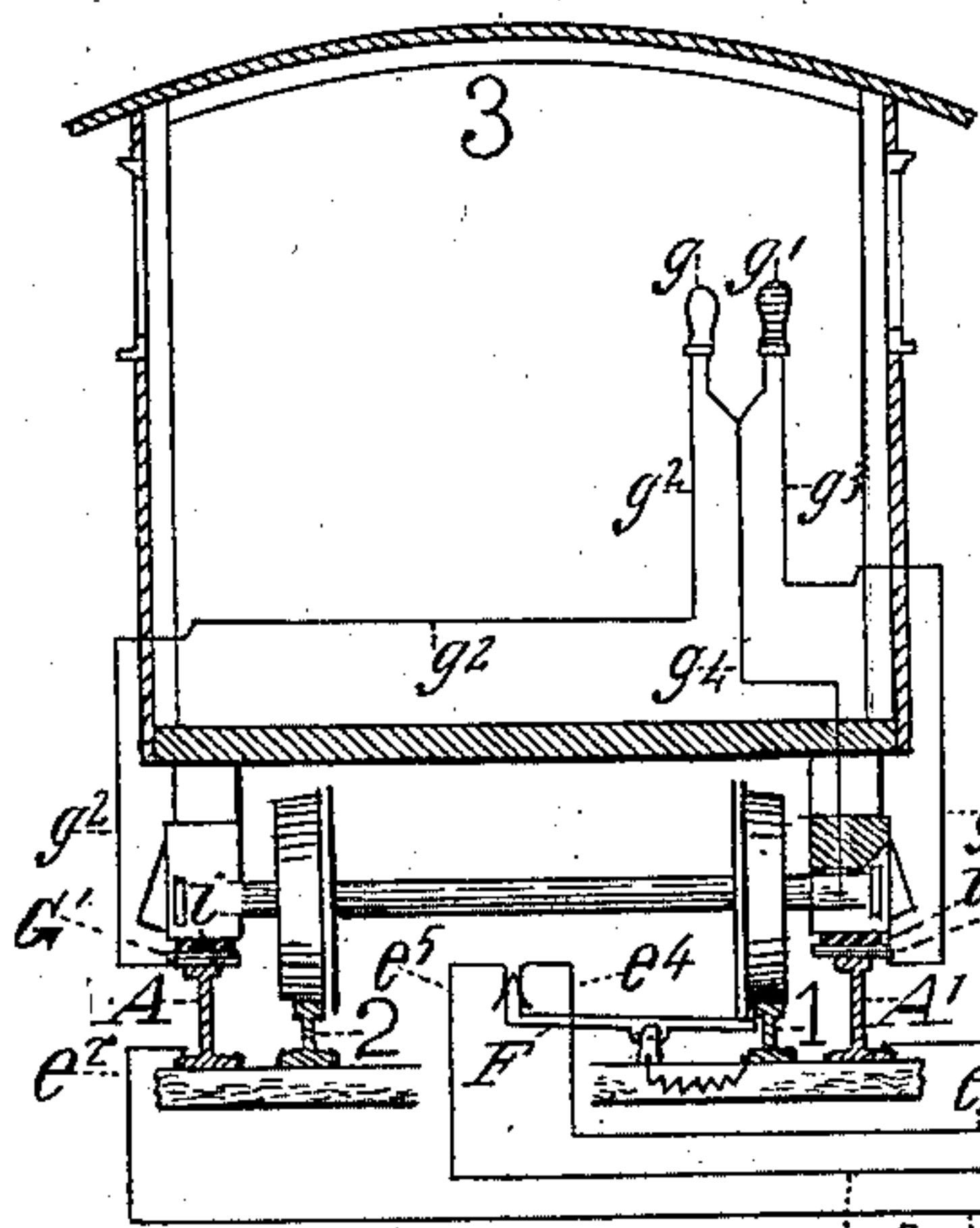
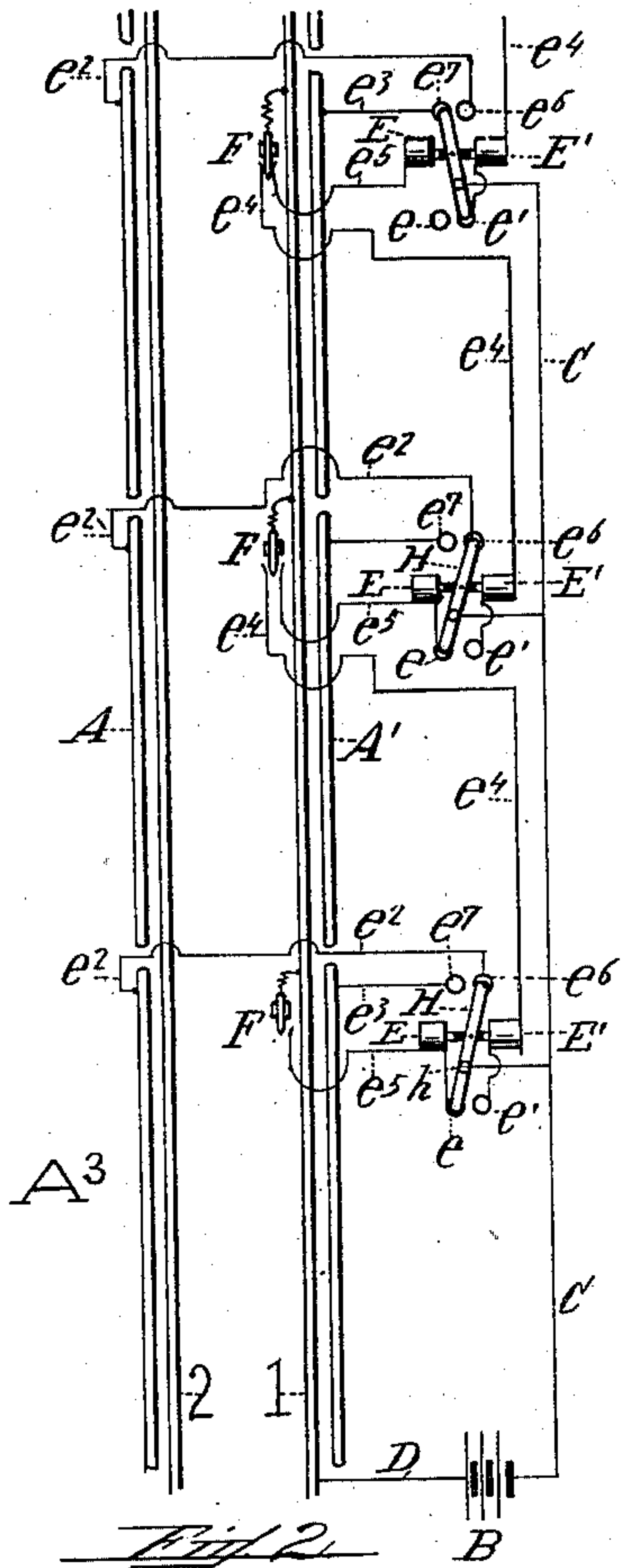
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

HENRY FRANCIS SPURR, JR., OF BOSTON, MASSACHUSETTS.

ELECTRIC DANGER AND SAFETY SIGNAL FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 719,388, dated January 27, 1903.

Application filed April 24, 1902. Serial No. 104,497. (No model.)

To all whom it may concern:

Be it known that I, HENRY FRANCIS SPURR, Jr., of Boston, in the county of Suffolk, State of Massachusetts, have invented a new and Improved Invention in an Electric Danger and Safety Signal for Railways, of which the following is a specification.

This invention relates to railway-signals electrically operated; and the objects of my improvement are to place in front of the engineer in the engine-cab the usual signal-colors commonly employed—viz., “danger” and “safety”—in such a manner that he is always apprised whether he is running with a safety or a danger signal to govern himself; further, to divide the railway into electrical units or blocks, each unit being electrically arranged to give a safety-light or a danger-light in the engine-cab, which, if the former, signifies that no train is on the unit ahead and if the latter that a train is on the unit ahead. I attain these objects in the following manner, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatic view of a railway with one engine situated to connect the circuit to operate the magnets and change the signals. Fig. 2 similarly illustrates the unit-circuit after said connections have become established and the change of signals has been accomplished. Fig. 3 illustrates in like manner a number of engines on the railway, with the electrical signal relation of each to the other. Fig. 4 is a transverse section of the engine-cab, exhibiting the electrical appliances therewith connected.

Corresponding characters of reference indicate similar features throughout the several views, referring to which—

1 and 2 represent the traffic-rails, which are continuous throughout the system.

3 denotes an engine-cab.

A represents the safety-circuit block-rail, and A' the danger-circuit block-rail, both of which are continuous throughout each block.

A² denotes an electric unit throughout the system, each unit being electrically provided and arranged as the other.

B represents the batteries, and C the feed-wire.

D is the return-wire, which is in circuit

with the traffic-rail 1, that acts as the other portion of the return-circuit.

A two-point switch, the circuit-lever H of which is shipped by two magnets E E', in independent electric circuit from each other in a manner that the current will only pass through one of the magnets at a time.

e e⁶ represent the safety contact-points of the switch, and e' e⁷ the danger contact-points. The switch-circuit lever H, pivoted at h, through which pivot the current enters, is insulated from all parts of the switch except to connect and break the circuit in relation with the contact-points and is in circuit with the feed-wire C, as shown.

F denotes a circuit breaking and closing device that is in circuit with the circuit-return rail 1 and which is positioned on the railway-track, so as to make the engine or train moving over it to close the unit-circuit on which the train is moving, as illustrated in Fig. 4. When once the train connects the circuit, any further breaking or connecting of said circuit has no effect thereupon, because the first electrical contact operates the switches in such a manner that the circuit which caused the magnet to operate the switch becomes broken by reason of the opposite position of said switch, which will be more fully understood herein-after.

e² represents the safety block-rail circuit-wire, and e³ is the danger block-rail circuit-wire.

e⁴ denotes the safety block-rail magnet-wire, and e⁵ is the danger block-rail magnet-wire.

G represents the danger block-rail circuit-brush or shoe, and G' the safety block-rail circuit-brush, both of which are properly insulated, as at i, Fig. 4, from the engine or car to which they are positioned and are adapted to contact their respective block-rails to attain an electric circuit through the engine-cab.

g denotes the safety incandescent lamp, and g' the danger-lamp. These lamps are respectively in circuit with their brushes G G', the safety-lamp with the safety-brush G' and the danger-lamp with the danger-brush G.

g² represents the safety-lamp-feed wire, and g³ the danger-lamp-feed wire, while g⁴ is the return-wire that directs the current through

the engine to the return-rail. This return-circuit wire acts as the return-circuit for both the danger and safety lamp circuits, as will be clearly seen by the drawings.

5 The following is a description of the accomplishments of this invention: In Fig. 1 there is represented to be one engine on the entire railway for the purpose of showing that there is only one electric unit that would signal
10 "danger" to another engine should there be one on the railway and that such danger-signal would be given by the immediate preceding electrical unit from the one that the train is moving on and that all the other units or
15 blocks would give the safety-signal. In this drawing the engine is just in the act of connecting the circuit to operate the magnets and change the signals—viz., the "danger" into "safety" and the "safety," upon which it
20 was running, into "danger." It will be seen that the engineer in this manner is informed of the nature of the signal his engine is leaving behind for the unit just traversed, while at the next moment he receives a change of
25 signal (that of "safety") upon entering on the new unit, provided the track is clear, as illustrated in said drawings, and is attained as follows: The circuit being connected, the current passes through the switch of the danger
30 unit at 4, through the lever H, and the safety-magnet E', which instantly draws the lever in contact with the switch safety contact-points e^6 , the current passing along the safety block-rail magnet-wire e^4 to and
35 through the circuit breaking and closing device F, and then to the rail 1 and return-circuit D to the batteries B. Simultaneously the current passes at 4' to the switch-circuit lever H of the unit upon which the train
40 moves, through said lever H, and the danger block-rail magnet E, which immediately draws the lever H to contact with the switch danger contact-points e^7 , as represented by the dotted lines, Fig. 1, then along the danger
45 block-rail magnet-wire e^5 to the circuit breaking and closing device F, and then to the current-return railway-rail 1 and return-circuit D to the battery B.

The following will show how the engineer
50 receives his desired information: The signal in the engine-cab is the safety-signal or green light g , as will be seen by following the circuit, as follows: The current enters the switch at 4', passes along the lever H to the safety
55 contact-point e^6 , along the safety block-rail circuit-wire e^2 to the safety block-rail A. It then passes through the safety block-rail brush G', secured to the engine, along the safety incandescent lamp feed wire g^2 through
60 the lamp g , illuminating the same, and out along the lamp return-wire g^4 through the engine 3 to the rail 1, which forms the return-circuit, as before mentioned. The current cannot light the danger-lamp g' , because the
65 circuit is broken at the switch danger contact-point e^7 , as will appear by the drawings. When the unit-circuit is connected by the

train, the change is that represented in Fig. 2, the "safety" becomes "danger" and the "danger" is changed to "safety." In Fig. 70 1 the preceding unit shows the switch-lever H on the danger contact-point e^7 , thus causing the current to be in the danger block-rail A', which would instantly pass through the danger-lamp g' , illuminating it should 75 an engine enter upon that unit, as the engine 3 would have connected that circuit in the similar manner as explained with regard to the safety lamp-circuit.

Fig. 3 illustrates a number of trains on the 80 railway and the electrical signal relation of each to the other, which will appear as follows: With regard to the top or first engine the switch-lever H being in contact with the safety block-rail switch contact-points e^6 the cur- 85 rent is in the safety block-rail A, thus illuminating the safety-lamp g , signifying that the block ahead is safe and clear, while on the preceding block the engineer on the second engine 3' has received the danger-light 90 g' and is represented as being at a standstill, because the first engine caused the switch-lever to be in contact with the danger block-rail switch contact-points e^7 , thus placing the current in the danger block-rails A'. Further, 95 it will be seen that the second engine 3' has passed one block clear and the signal g' left behind is that of "danger," while the next block preceding the danger-block gives the safety-signal g , upon which the third engine 100 3'' is running. The third engine has a clear road until it enters the new block ahead, when the engineer gets the danger-signal g' , and consequently stops his train, as with the second train. When the first train has cleared 105 the block upon which it is running, it immediately changes the signals for the second train, giving it the safety-signal g to start, while the second train keeps the third train a block clear from it, as with the first train 110 with the second, in this way establishing a safe running relation of one train with another, and above all placing the signals in front of the engineer, where no obstacles can deprive him of necessary information upon 115 which he runs his train.

The block-rails A are so laid that they will not ground the circuit, and the amount of electric energy necessary to be used need be that only requisite to illuminate the signal- 120 lamps.

It is obvious without illustration that these signals may be operated manually in connection with switches in yards, crossovers, draw-bridges, &c., where it would also be possible 125 to give trains a cautionary signal by illuminating both signal-lamps simultaneously. It is also possible where a train on a safety-block is protected by a danger-block to place the cautionary signal in the danger-block by 130 placing the safety-rails of both blocks in electrical circuit with each other.

I would add there may be other modifications structurally departing from the man-

ner illustrated. Therefore I desire not to be held to the strict interpretation herein disclosed, but may use such equivalents therefor as would come within the fair scope and spirit of my invention.

Having described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In electric signals for railways, two traffic-rails continuous throughout the system, the railway divided into block-sections each of which is equipped with two electric rails continuous throughout each block, in combination with a source or sources of electric energy and conductors supplying the said block-rails and one of the traffic-rails therefrom, automatic switches and their switch-levers and connections to the rails arranged to shift the current from one block-rail to the other, or back again, to permit "danger" or "safety" to be signaled; brushes carried by the trains and making contact with said block-rails, a pair of electric lamps, of diverse colors arranged in the engineer's cab, conductors from said lamps through the brushes to said rails, and conductors completing the circuit from said lamps through the body of the engine to the traffic-rails of the railway, the danger-signal being given to the engineer when a train is on the next block ahead, two engines never being in the same circuit, all substantially as set forth.

2. In electric signals for railways, the combination of a pair of electric lamps of different

colors designed to signal "safety" and "danger" in the cab of each engine with the traffic-rails of the railway, a pair of additional rails arranged in each block of the track for signaling "danger" and "safety" respectively, a generator or generators of electricity and conducting-wires supplying these latter rails and one of the traffic-rails therefrom, a pair of switch-operating magnets for each block provided with conductors so arranged that only one of them will be in circuit at a time; a circuit breaking and closing device F for each block in electrical connection with the return traffic-rails of the railway operating to complete the circuits between said conductors, magnets and the return-rails, said connection including one of the adjacent switch-magnets and a distant switch-magnet, a two-point switch operated by said magnets alternately, conductors from said switch to said danger and safety rails, brushes carried by each train for contact with the latter rails, and conductors making circuit from said brushes through the said lamps and engine-frame to the main or traffic rails again, substantially in the manner and for the purpose herein specified.

In testimony whereof I have hereunto set my hand to this application this 26th day of March, 1902.

HENRY FRANCIS SPURR, JR.

Witnesses:

HENRY W. B. COTTON,
THOS. WILLIAM HOBDAV.