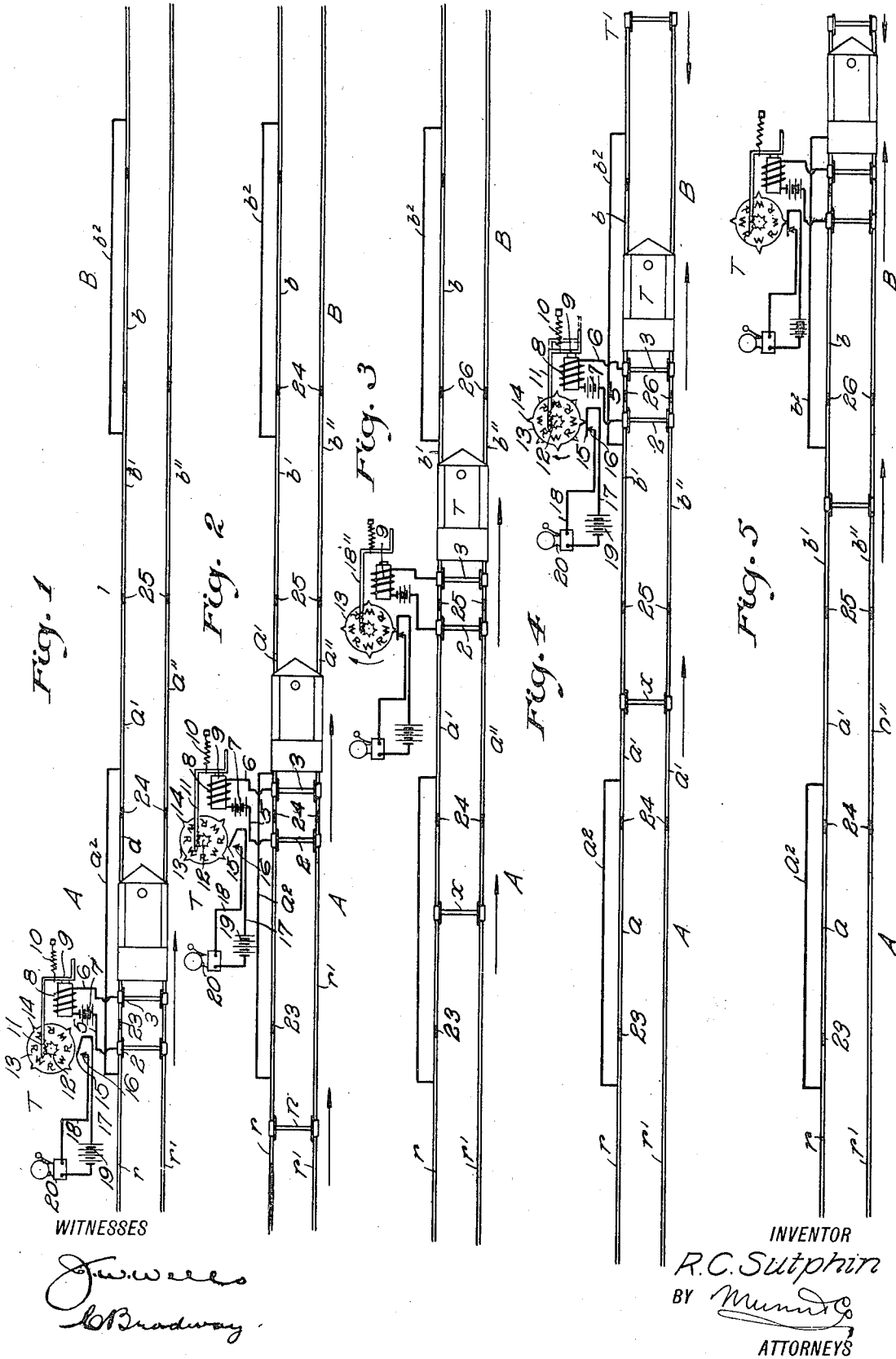


1,195,748.

Patented Aug. 22, 1916.

2 SHEETS—SHEET 1.



R. C. SUTPHIN.

BLOCK SYSTEM.

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1,195,748.

Patented Aug. 22, 1916.

2 SHEETS—SHEET 2.

Fig. 6

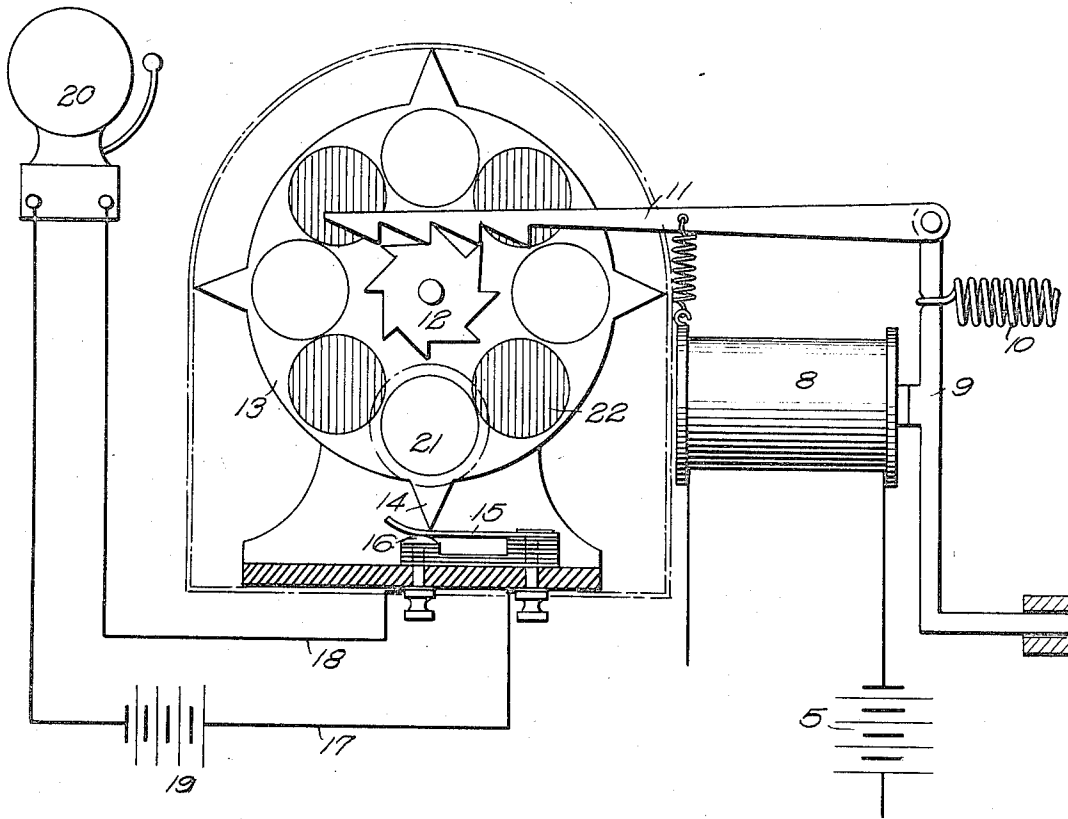
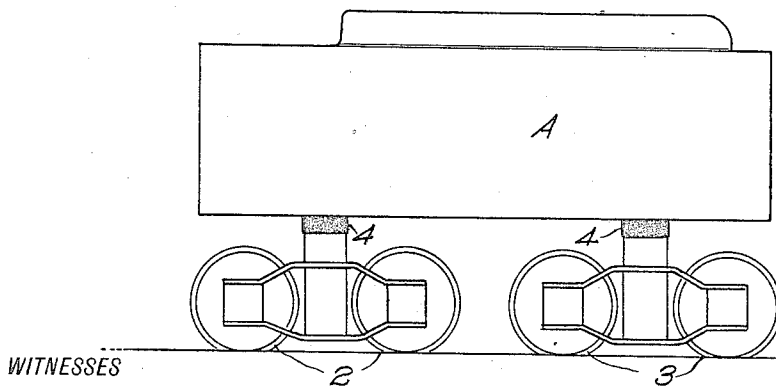


Fig. 7



WITNESSES

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ROBERT CAMM SUTPHIN, OF CORYDON, KENTUCKY.

BLOCK SYSTEM.

1,195,748.

Specification of Letters Patent.

Patented Aug. 22, 1916.

Application filed August 25, 1915. Serial No. 47,213.

To all whom it may concern:

Be it known that I, ROBERT C. SUTPHIN, a citizen of the United States, and a resident of Corydon, in the county of Henderson and State of Kentucky, have invented a new and Improved Block System, of which the following is a full, clear, and exact description.

This invention relates to block systems of that type in which a signal is energized when a train enters a block, and the condition of the entered block is determined by the continuance or discontinuance of the signal.

The invention has for its general objects to improve and simplify the construction of systems of the character referred to, so as to be reliable and efficient in use, comparatively simple and inexpensive to install, and so designed as to be entirely automatic in operation.

A more specific object of the invention is the installation on the locomotive, car or train, of a signal circuit and a relay controlling the opening and closing of the circuit, such relay being itself included in a circuit with two insulated wheels and axles of the locomotive tender, car or train, so that by a novel arrangement of insulated rail sections of the track the signal circuit will be closed as soon as the car or train enters a block; will remain closed for a short interval of time if the entered block be clear, and will remain closed a longer length of time if there is a train, car or locomotive already in the entered block, the length of the interval of time during which the signal is energized serving to warn the engineer as to the condition of the block being entered.

With such objects in view, and others which will appear as the description proceeds, the invention comprises various novel features of construction and arrangement of parts which will be set forth with particularity in the following description and claims appended hereto.

In the accompanying drawings, which illustrate one embodiment of the invention and wherein similar characters of reference indicate corresponding parts in all the views, Figures 1 to 5 inclusive are diagrammatic views of the adjacent ends of two blocks of a track with the train shown successively in progressive positions in leaving one block and entering the next; Fig. 6 is a detail view of the audible signal, visual indicator, and relay controlling the same; and Fig. 7 is a

side view of a locomotive tender with the trucks insulated from each other.

Referring to the drawings, A and B designate the adjacent ends of two contiguous blocks, the line of separation of one block from the other being at the point 1, where the track rails are insulated. One of the rails has insulated rail sections a , a' , b' , b , and the other rail has insulated rail sections a'' , b'' , which lie respectively opposite the rail sections a' and b' . The rail sections a and b are bridged by conductors a^2 and b^2 which connect respectively the sections a' and b' with the main sections of the track rail. A track constructed in this manner is suitable for traffic on which trains travel in either direction.

The signal apparatus and the source of electric current will be carried by the locomotive, car or train, and in the operation of the system it is essential that two sets of wheels and axles 2 and 3 of the car, train or locomotive T be insulated from each other. The tender t of the locomotive, Fig. 7, may have its front axles and wheels insulated from the rear axles and wheels by insulating the trucks at the points 4 from the body of the tender. Any car of a train or any self-propelled car may have its axles insulated in the manner indicated.

The axles 2 and 3 are connected with wires 5 and 6, respectively, which lead to a source of current 7, and an electro-magnet 8, which latter are connected in series. As long as a train or car is in the main part of a block, current flows from the battery 7 through the magnet 8, wire 6, axle 3, track rails r and r' , axle 2, wire 5, and battery 7, but the condition of this circuit will change as a train or car leaves one block and enters another, these changes being explained hereinafter. The electro-magnet operates on an armature 9 which is pulled away from the electro-magnet by a spring 10, and connected with the armature is a ratchet pawl 11 that engages a ratchet wheel 12 which is connected with an indicator disk or circuit closer actuator 13. On this disk are projections 14 which are adapted to engage and disengage a spring or movable contact 15 which is adapted to engage a fixed contact 16 of a signal circuit, such signal circuit including wires 17 and 18, a source of current 19, and a bell or equivalent signal 20. On the disk or wheel 13 are alternate white and red spots 21 and 22 which are exposed to the

engineer so that he can see at any time the condition of the circuit. This wheel will be arranged in a suitable casing, as indicated by dotted lines, which casing has an opening
 5 for exposing one of the indicator spots 21 or 22 at a time.

In Fig. 1 the train T is moving to the right out of the block A, and into block B. The electro-magnet 8 remains energized
 10 while the train passes over the rail sections a, a', a'' . When the train is in the position shown in Fig. 1 the current flows through the magnet circuit from the battery 7, magnet 8, wire 6, axle 3, track rail r' , axle 2,
 15 wire 5 and battery 7. As soon as the axle 2 passes the insulated joint 23, the current will flow through the same circuit and through the rail r in addition. When the axles 2 and 3 are at the insulated joints 24
 20 of the rails, as shown in Fig. 2, the electro-magnet 8 is energized by current flowing from the battery 7, magnet 8, wire 6, axle 3, bridging wire a^2 , rail r , axle x of the rear car, rail r' , axle 2, wire 5 and battery 7. As
 25 the train progresses the circuit is changed but the current continues to flow through the electro-magnet 8 from the battery 5, magnet 8, wire 6, axle 3, rail sections a' and a'' , axle 2 and wire 5, but when the train
 30 begins to enter the block B, the magnet or rail 8 is deenergized by the axles 2 and 3 when they are at opposite sides of the insulated joint 25, Fig. 3. This deenergizing of the electro-magnet 8 permits the arma-
 35 ture to move to the right, and through the pawl and ratchet device 11 and 12 the indicator wheel 13 is turned one step, thereby closing the signal circuit so that the bell or signal 20 will be energized. As the wheels
 40 and axles 2 and 3 travel along the rail sections b' and b'' , the electro-magnet 8 will be again energized and attract the armature 9, but movement of the pawl 11 to the left has no rotative effect on the indicator wheel
 45 13, so that it will remain in position to maintain the signal circuit closed. When, however, the axle 3 passes the insulated rail joints at 26, the signal circuit will be opened if the block B be clear, or will remain closed
 50 if there is a train in such block, as indicated at T', Fig. 4. If no train occupies block B, the electro-magnet 8 would be deenergized and the armature 9 and wheel 13 would move to the dotted line position, Fig. 4,
 55 whereby the signal circuit will be opened, and as soon as the insulation 26 is passed by the axle 2, the electro-magnet 8 is energized so as to restore the armature and pawl without, however, moving the wheel 13.
 60 When, however, a train occupies the block B, the engineer of the entering train is notified of this fact by the signal 20 continuing its ringing. This is due to the fact that the electro-magnet 8 is kept energized by cur-
 65 rent flowing from the battery 7, magnet 8,

wire 6, axle 3, rail section b , bridging wire b^2 , rail section b' , axle 2, wire 5, and battery 7, and even after the axle 2 passes the insulation 26, the magnet 8 will remain energized, so that there is no chance of the
 70 wheel 13 turning and the signal circuit opening at the contacts 15 and 16. If the train T continues to move along block A at a reduced speed, the signal will continue to ring until the train T' moves out of the
 75 block if it does not have the right of way.

From the foregoing description taken in connection with the accompanying drawings, the advantages of the construction and method of operation will be readily under-
 80 stood by those skilled in the art to which the invention appertains, and while I have described the principle of operation, together with the apparatus which I now consider to be the best embodiment thereof, I desire to
 85 have it understood that the apparatus shown is merely illustrative and that such changes may be made when desired as fall within the scope of the appended claims.

Having thus described my invention, I
 90 claim as new and desire to secure by Letters Patent:

1. In a signal system of the class described, a track divided into blocks, both
 95 rails of the track having insulated breaks opposite each other at the juncture of adjacent blocks, and both rails of a block except at the ends being continuous conductors of current, one rail at the entrance end of each
 100 block having a section insulated from the main portion of the rail, the other rail having at its entrance end an end section opposite to and of the same length as the first-mentioned section, and also having an inner
 105 section insulated at its ends from said end section and the main portion of the rail, and a conductor bridging said inner section and connecting the end section with the main portion of the rail.

2. In a signal system of the class described, a track divided into blocks, both
 110 rails of the track having insulated breaks opposite each other at the juncture of adjacent blocks and both rails of a block except at the ends being continuous conductors of
 115 current, one rail at the entrance end of each block having a section insulated from the main portion of the rail, the other rail having at its entrance end an end section opposite to and of the same length as the first-
 120 mentioned section, and also having an inner section insulated at its ends from said end section and the main portion of the rail, and a conductor bridging said inner section and connecting the end section with the main
 125 portion of the rail, with a vehicle having a pair of elements insulated from each other and adapted to run on the track rails, a circuit connected with the elements and including a source of current and an electrical
 130

device, and signal means controlled by the said electrical device.

3. In a signal system of the class described, a track divided into blocks, both
5 rails of the track having insulated breaks opposite each other at the juncture of adjacent blocks, and both rails of a block except at the ends being continuous conductors of current, one rail at the entrance end of each
10 block having a section insulated from the main portion of the rail, the other rail having at its entrance end an end section opposite to and of the same length as the first-mentioned section, and also having an inner
15 section insulated at its ends from said end section and the main portion of the rail, and a conductor bridging said inner section and connecting the end section with the main portion of the rail, with a vehicle having
20 a pair of elements insulated from each other and arranged to run on the track rails, a circuit connected with the elements and including a source of current and an electro-magnet, a normally open signal circuit, and
25 means controlled by the electro-magnet for closing the signal circuit.

4. In a signal system of the class described, a track divided into blocks, both rails of the track having insulated breaks opposite each
30 other at the juncture of adjacent blocks, and both rails of a block except at the ends being continuous conductors of current, one rail at the entrance end of each block having a section insulated from the main portion of
35 the rail, the other rail having at its entrance end an end section opposite to and of the same length as the first-mentioned section, and also having an inner section insulated at its ends from said end section and the
40 main portion of the rail, and a conductor bridging said inner section and connecting the end section with the main portion of the rail, with a vehicle having elements insulated from each other and adapted to run on
45 the track rails, a circuit connected with the elements and including a source of current, and a current responsive means, said circuit being closed while the train passes through a block, and opened when the elements are
50 respectively at the entrance and leaving ends

of adjacent blocks, and a signal means controlled by the electrical means, whereby a signal is given when a train enters a block and remains operative for a short period if the entered block be clear and for a longer
55 period if the entered block be occupied by another train.

5. In a signal system of the class described, a track divided into blocks, both rails of the track having insulated breaks opposite each
60 other at the juncture of adjacent blocks, and both rails of a block except at the ends being continuous conductors of current, one rail at the entrance end of each block having a section insulated from the main portion
65 of the rail, the other rail having at its entrance end an end section opposite to and of the same length as the first-mentioned section, and also having an inner section insulated at its ends from said end section and
70 the main portion of the rail, and a conductor bridging said inner section and connecting the end section with the main portion of the rail, with a vehicle having elements insulated from each other and adapted to
75 run on the track rails, a circuit connected with the elements and including a source of current, and a current responsive means, said circuit being closed while the train passes through a block, and opened when
80 the elements are respectively at the entrance and leaving ends of adjacent blocks, and a signal means controlled by the electrical means, whereby a signal is given when a train enters a block and remains operative
85 for a short period if the entered block be clear and for a longer period if the entered block be occupied by another train, said signal means comprising a signal, a normally open circuit for the signal, and a mechanical
90 device operated by the electrical means for opening and closing the signal circuit.

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

ROBERT CAMM SUTPHIN.

Witnesses:

J. T. ANDERSON,
LUCILLE ANDERSON.