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PATENTED JAN. 15, 1907.

W. L. RUMMEL.
RAILWAY BLOCK SYSTEM.

APPLICATION FILED AUG. 16, 1905.

2 SHEETS—SHEET 1.

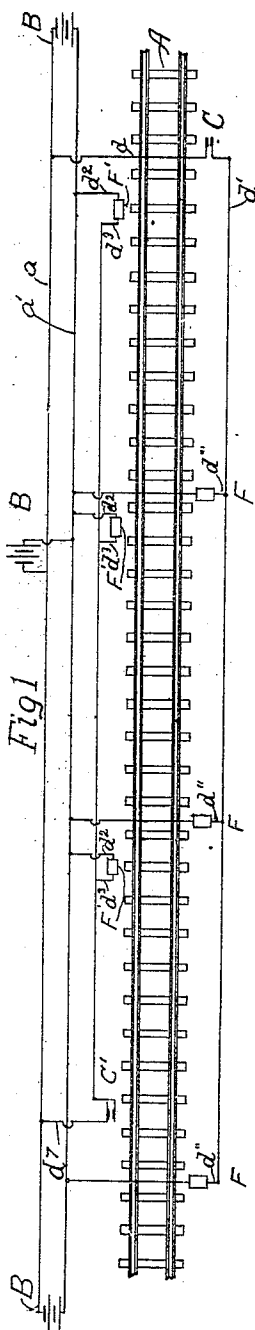


Fig. 1

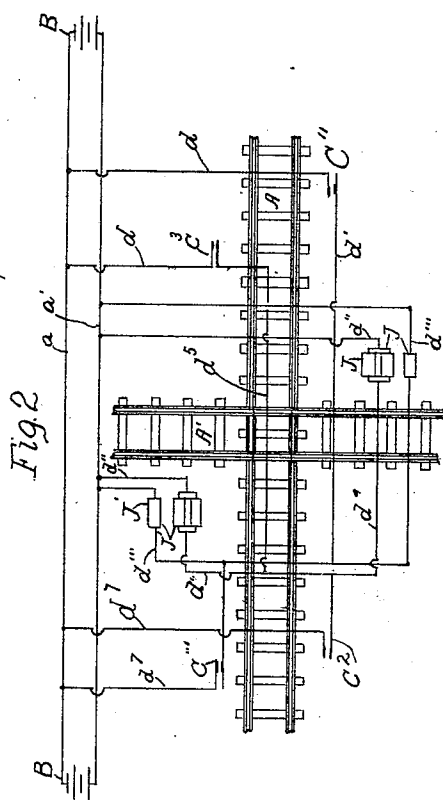


Fig. 2

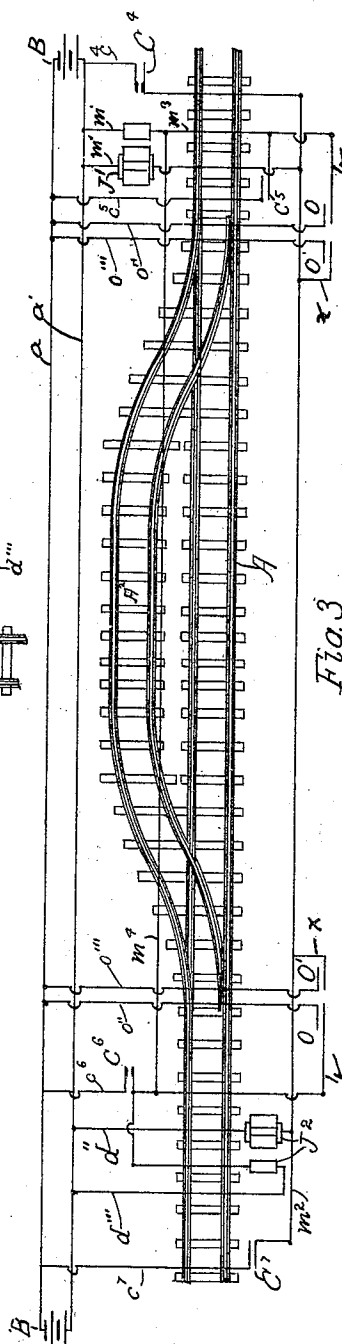


Fig. 3

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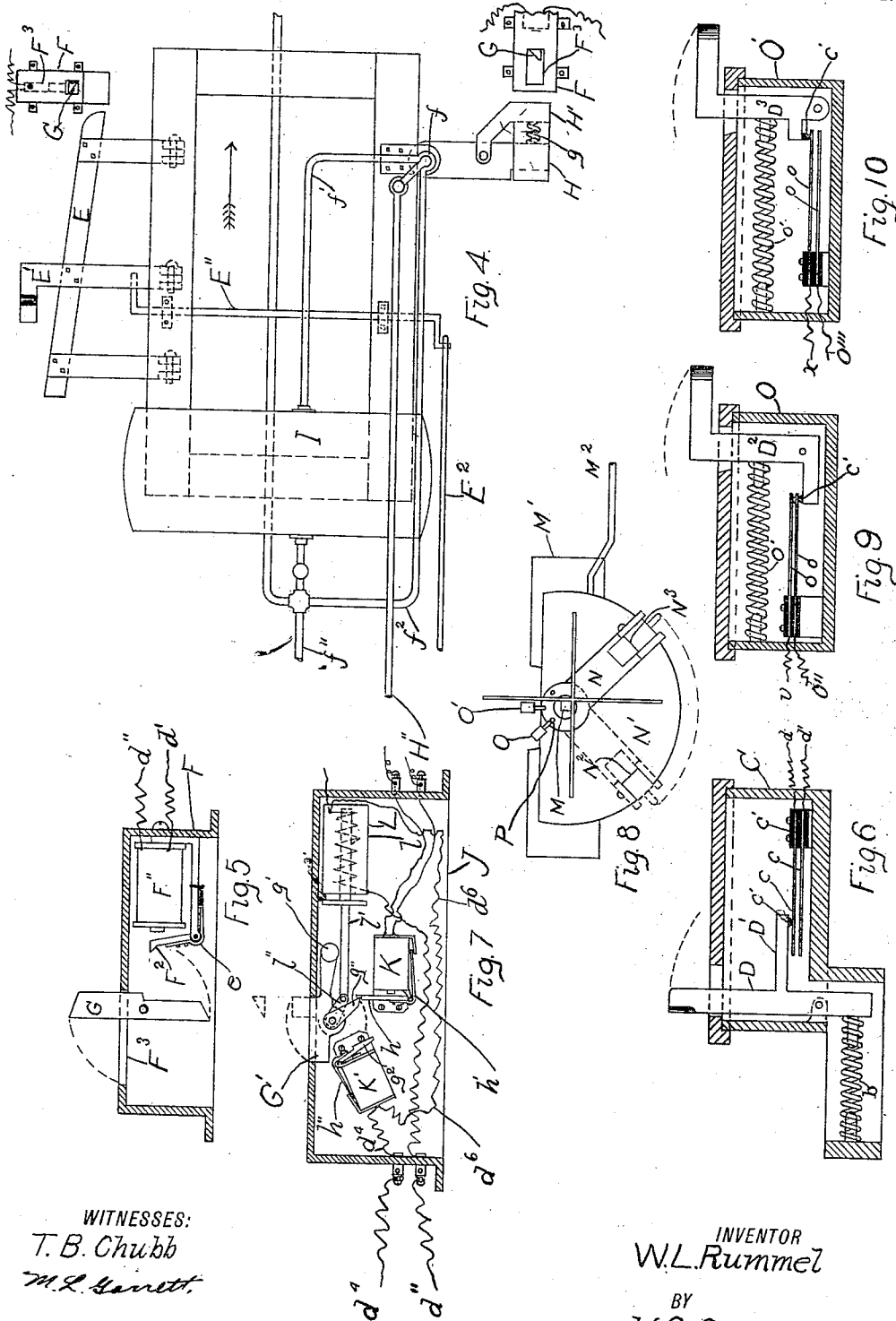
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2 SHEETS—SHEET 2.



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RAILWAY BLOCK SYSTEM.

No. 841,451.

Specification of Letters Patent.

Patented Jan. 15, 1907.

Application filed August 16, 1905. Serial No. 274,466.

To all whom it may concern:

Be it known that I, WILLIAM L. RUMMEL, a citizen of the United States, residing at South Sioux City, in the county of Dakota and State of Nebraska, have invented a new and useful Improvement in Railway Block Systems; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to railway block systems, and particularly to that kind automatically operated by passing trains which set levers or trips by means of electrical connection, the levers when set being adapted to stop the approaching train.

The object of the invention is the prevention of accidents and collisions by automatically stopping trains when approaching each other, and the invention by slight modification is equally adapted to straight or cross roads and side tracks.

Reference is had to the accompanying drawings, in which—

Figure 1 is a diagrammatic view of my invention as applied to a straight track. Fig. 2 is a view of the same as applied to cross-roads, and Fig. 3 is a similar view of side track. Fig. 4 is a plan view or diagram of engine, showing the application of my invention thereto. Fig. 5 is a section of trip-box, showing in side elevation the trip-lever and electromagnetic coils, armature, and spring used in connection with the air-brake. Fig. 6 is a similar view of contact-box, lever-plates, and spring used in making the electrical connection. Fig. 7 is a section of a combination-box, showing in side elevation the trip-lever and electrical means for operating the same as applied to cross-roads. Fig. 8 is a plan view of switch-bar, table, and switch-arm, also the contact-boxes used in connection with the switch. Fig. 9 is a section of contact, showing in side elevation the lever, contact-plates, and spring used in electrical connection in the manual operation of the switch. Fig. 10 is a similar view of box used in the same connection.

Referring now to the illustrations, in which like parts are designated by similar letters of reference, A is the straight line of road to which my invention is applied. On one side of the road are the circuit-wires *a a'*, extending the length of the road, supplied at necessary intervals with the electrical batteries B. At any desired places along the

road the contact-boxes C C' are secured in such position that the lever D, pivotally secured within the box and normally held in an upright position by the coil-spring *b*, will be deflected outwardly by contact with the projecting rail or arm E on the left side of the engine. The rail, being set diagonally to the track, gradually presses the lever D outward, which causes the arm D' to press together the two contact-plates *c c*, normally separated by the insulation *c'*, thus closing the circuit. The contact-point of the arm D' is also provided with insulation. The wire *d*, secured to one of the plates in the box C, is connected with the circuit *a* and the wire *d'* with the wire *a'*, completing the electrical circuit. Connected with the wire *d'* by means of the cross-wires *d''* are the trip-boxes F F, and on the opposite side of the track are trip-boxes F' F', of similar construction, connected with the plates in the box C' by means of the wires *d³* and with the circuit by the wires *d²*. The contact-box C' is connected with the circuit by the wire *d¹*.

The trip-boxes F and F' are situated on the side of the track, and the lever pivotally secured therein is adapted for contact with the projecting arm or lever H on the right side of the engine. In each trip-box connected with the wire *d''* is an electromagnetic coil F'' and an armature F², pivoted at the lower end and adapted to support the end of the lever G when the circuit is open, thus holding the lever in a horizontal position. When the circuit is closed, the attraction of the coil draws the armature toward the coils, thus releasing the lever, which assumes an upright position, passing through the slot F³ in the upper surface of the block. A spring *e* restores the armature to its normal position, when the circuit is again open. The arm H on the engine is pivotally connected with a valve *f* in a pipe *f'*, leading from the air-reservoir I in the engine. As the lever H is pushed back by contact with the upright lever G the valve *f* is opened, which permits the air in the reservoir to escape, thus setting the brakes and stopping the train. The pipe *f'* is connected with the train-line *f''* by the pipe *f²*. A lever H'', connected with the valve *f* and extending into the engine-cab, is provided for closing the air-line after being opened in the manner just described.

To understand the operation of the invention on a straight road, we will suppose a train approaching from the right. The rail E will

strike the lever D in the contact-box C, deflecting the arm and closing the circuit. The current will be communicated to the coils F'' in each of the trip-boxes, which will release each of the levers G from its armature F² and cause the levers to assume an upright position. If a train is approaching from the opposite direction, the lever H on its engine will strike one of the levers G, which resting against the edge of the slot F³ is held rigidly in position, pushes back the lever H, setting the brakes and stopping the train. If no train approaches from the left, the passage of the train from the right will restore all the levers to their normal position, the arm E' on the rail E pressing down the levers, where they are held in a horizontal position by the armature F². If the train approaches from the left, the trip-boxes on the opposite side of the road are set by means of the contact-lever in the box C', and the same process as that just described takes place. On the contact side of the arm H is a buffer H', pivotally secured to the arm and separated therefrom by a spring g, which modifies the force of the blow when the arm strikes the lever. The rail is pivoted to the side of the engine and adapted to be raised when desired out of possible contact with the levers by means of the bar E'' and lever E².

The system just described requires some modification when applied to a cross-road where the trains to be avoided pass at right angles to each other. The contact-boxes C'' and C''' are the same as just described and are provided with similar wiring connecting them with the circuit and have the same contact-levers and plates for closing the circuits. It is necessary, however, for the train which raises the trip-levers to restore them after passing the crossing. The combination-box shown in Fig. 7 is substituted for the trip-box above described. In this box J there is pivotally secured a lever G', one end of which, g', is weighted, which causes the lever to normally assume an upright position. A pointed catch or ratchet g'' is secured to the lever upon the same axis, the point being adapted to rest upon the notched end of an armature h, which is sustained in an upright position by means of a spring h' and connected with an electromagnetic coil which is connected with the circuit by means of the wire d'', Fig. 2. When the circuit is closed and the current communicated to the coil K, which is connected to the circuit by means of the wires d''', the armature is attracted, the catch g'' is released, and the weighted end of the lever G' causes it to assume an upright position. The catch will then rest in the notch of the armature g², connected with the coil K', which is held in the position shown in Fig. 7 by a spring h'', and the lever held in a rigid upright position. To restore the lever as above indicated, another contact-box and

circuit are required for trains going in both directions on each line of road, making four in all. The extra boxes are shown at C² and C³, Fig. 2, and are connected with the combination-boxes J and J' by means of the wires d⁴ and d⁵. A train passing from right to left sets the trips on the cross-road A' when passing the contact-box C''. As it passes the contact-box C² the circuit is again closed through the wires d⁴ and d⁵ and the coil K', the attraction of which draws the armature g² and releases the catch g''. A wire d⁶ connects the coil K' with a solenoid L, having a movable core l, to which is secured a connecting-rod l', fulcrumed to a short arm l'', secured to the lever G', the solenoid and coil K' being connected in multiple. When the circuit is closed and the solenoid energized, it attracts the connecting-rod l' and restores the lever G' to its former horizontal position. A train coming from the left will set the same trips when it passes the box C''' and will restore the trips on passing the box C³.

In the application of the invention to side tracks it is modified as hereinafter described. The contact-boxes C⁴, C⁵, C⁶, and C⁷ are the same as seen in Fig. 6 and used on the straight and cross roads and are each connected with the circuit-wire a' by the wires c⁴, c⁵, c⁶, and c⁷, respectively. The combination-boxes J' and J² are the same as shown in Fig. 7 and used on cross-roads. The combination-box J' is connected with the contact-box C⁵ by the wire m³ and with the circuit-wire a' by the wires m'. The combination-box J² is connected with the contact-box C⁷ by the wire m² and with the circuit by the wires d'' and d''', the contact-boxes C⁴ and C⁷ being connected in series with the battery by means of the wires c⁴, m², and c⁷ and the contact-boxes C⁵ and C⁶ with the battery by means of the wires c⁵, m³, m⁴, and c⁶. The contact-boxes J' and J² are connected by means of the wires m', a', m², and d''. The side track A² being closed for the main line, as shown in Fig. 3, a train moving from the right will strike the contact-box C⁵, setting the trips in both the combination-boxes J' and J² so as to prevent another train from entering the main line between the switches from either direction until the said train moving from the right passes the contact-box C⁷, which will restore the trips in both the combination-boxes J' and J² to their normal positions, the operation being substantially the same as above described in connection with the operation of the cross-roads.

In Figs. 8, 9, and 10 is shown a device used in the operation of the switches on the side track A². The upright switch-bar M, by which the switch is moved, is supported in the base M'. M² is the switch-rod, and N the operating-lever by which the said switch-bar is turned. This operating-lever N is secured to the switch-bar at the inner end and turns

with it upon a stationary semicircular table N', which has two notches N² and N³, in the first of which the operating-lever is secured when the switch on the right is open to the side track and in the latter when closed. At the edge of the table, near the inner end of the switch-arm, two contact-boxes O and O' are secured, connected with the circuit by the wires o'' o'''. The box O is provided with a crooked lever D², pivotally secured therein, the upper end of which extends through a slot in the box and is adapted for contact with a pin P in the operating-lever. The contact-plates o o in the opposite end of the box are normally held in contact by the pressure of the spring o' against the lever. The box O is connected with the combination-box J' by the wire v and the box O' by means of the wire x to the common wire m². The box O' has a similar lever D³ with spring and contact-plates; but the spring normally prevents contact of the plates. The projecting ends of the levers are rounded and adapted to freely pass the pin P, which is so situated in the switch-arm as to normally be in contact with the lever D² when the arm is in the notch N³ and to be free of the lever D³ when the arm is in the notch N². The switch-box O acts the same as the contact-box C⁵, the switch-box O' acting the same as the contact-box C⁴. For illustration, if the right-hand switch is open to the side track the pin P in the switch-arm normally pressing the lever D² prevents contact of the plates in the box O and closing of the circuit. When the switch is closed for the side track and the arm moved to the notch N², the contact-plates in the box O will be closed, the pin will have pressed in passing against the end of the lever D³, bringing the plates in the box O' in contact, closing the electrical circuit, and restoring the trip in the combination-boxes J' and J². When the switch is closed for the side track, the plates in the box O being in contact, a train passing from the right will close the circuit through the box C⁵, which is in series with the box O, and set both the trips in both combination-boxes. A train on the main line will thus be protected against possible collision with a train which has passed onto the side track. When the switch is closed for the main line, the trips will be restored in moving the arm N, the pin having passed the lever D³ and again normally pressing the lever D². Boxes similar to O and O' are situated on the switch-table at the left end of the side track and connected with the combination-boxes and circuit by similar wiring as described for the right end.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a railway block system, the combination of an electrical circuit along the line of road, electric batteries in said circuit,

switches or circuit-closers at intervals on one side of the road having electric connection with the circuit and adapted to close and open the circuit, an arm on one side of the engines of the road adapted for contact with said switch whereby the electrical circuit is closed, trips at intervals on the other side of the road adapted for contact with a lever connected with a valve in the air-line of the engine when the train is moving in one direction and adapted to be thrown out of contact with said lever by a train going in the opposite direction, electric connection between said trips and the circuit whereby when the circuit is closed the levers are set for contact, a lever on the side of the engine connected with a valve in the air-line of the engine and adapted for contact with said trips whereby when said lever is turned the air is permitted to escape, and means under control of the engineer for closing the valve in the air-line, substantially as described.

2. In a railway block system, the combination with an electrical circuit along the line of road, electric batteries in said circuit, boxes C, having levers D, contact-plates c e, and springs b, for closing and opening the circuit, metallic connection between said contact-plates and the circuit, an arm on one side of the engines of the road adapted for contact with said levers D, whereby the plates are brought in contact and the circuit closed, trips having levers G, electromagnetic coils E'' and armatures F² thereon on the other side of the road, metallic connection between said coils and the circuit whereby when the circuit is closed the levers G are set for contact, a lever on one side of the engine connected with a valve in the air-line of the engine and adapted for contact with the lever G when the train is going in one direction whereby when the lever is turned and the valve opened the air is permitted to escape and the train stopped, substantially as described.

3. In a railway block system, the combination of an electric circuit along the line of road, electric batteries in said circuit, switches or contacts at intervals on one side of the road having electric connection with the circuit and adapted to close the circuit, an arm or rail on one side of the engines of the road adapted for contact with said switches whereby the electric circuit is closed, trips at intervals on the other side of the road adapted for contact with a lever or arm connected with the air-line of the engine when the train is going in one direction, electric connection between said trips and the circuit whereby when the circuit is closed the levers are set for contact, a lever or arm on the side of the engine connected with a valve in the air-line of the engine and adapted for contact with said trips whereby when said lever is turned and the valve opened the

air is permitted to escape, levers for the operation of switches on side tracks of the road, electric connection between said switches and said trips by which the circuit through
5 the trips is closed and opened and said trips restored after being set for contact, by manual operation of the switch-levers when the switch is opened or closed, and means
10 connected with said switch-levers for opening and closing the circuit through said elec-

trical connection in the manual operation of the switch, substantially as described.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

WILLIAM L. RUMMEL.

Witnesses:

FRED WEGNER,
H. C. GARDINER.