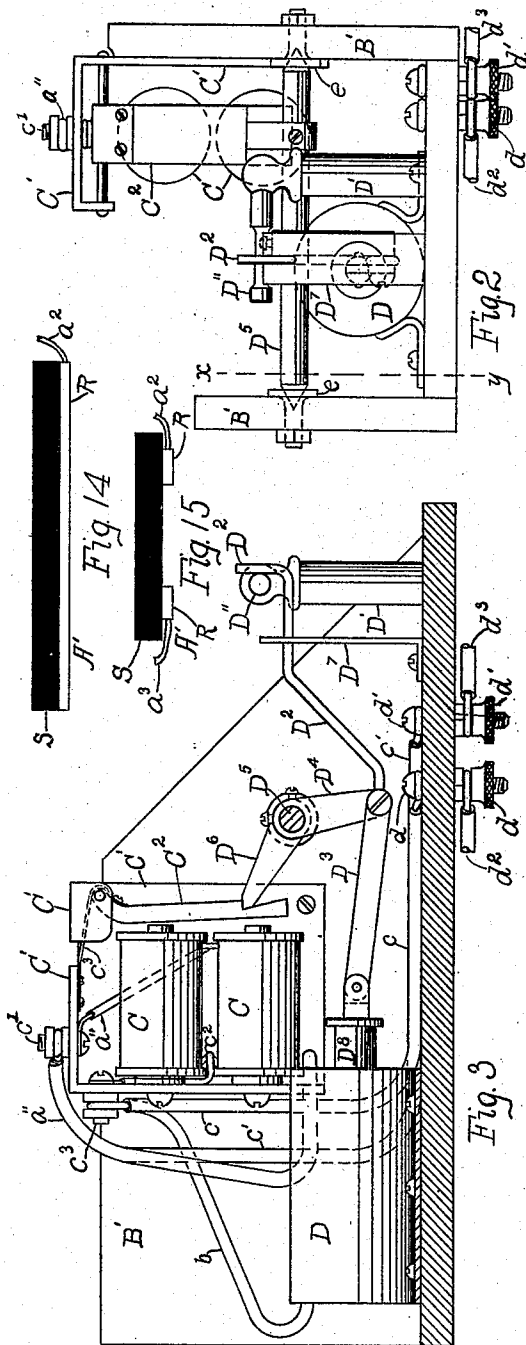


W. L. RUMMEL.
RAILWAY BLOCK SYSTEM.
APPLICATION FILED APR. 11, 1908.

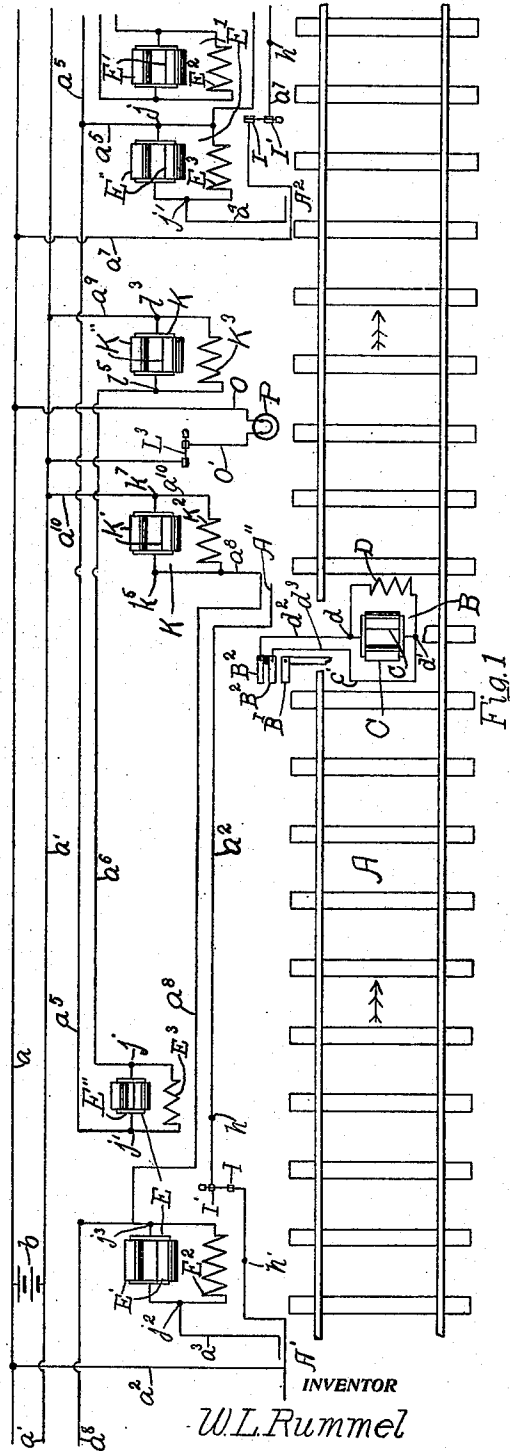
932,582.

Patented Aug. 31, 1909.

3 SHEETS—SHEET 1.



WITNESSES:
Thor. Bluhdt
Apel Smith



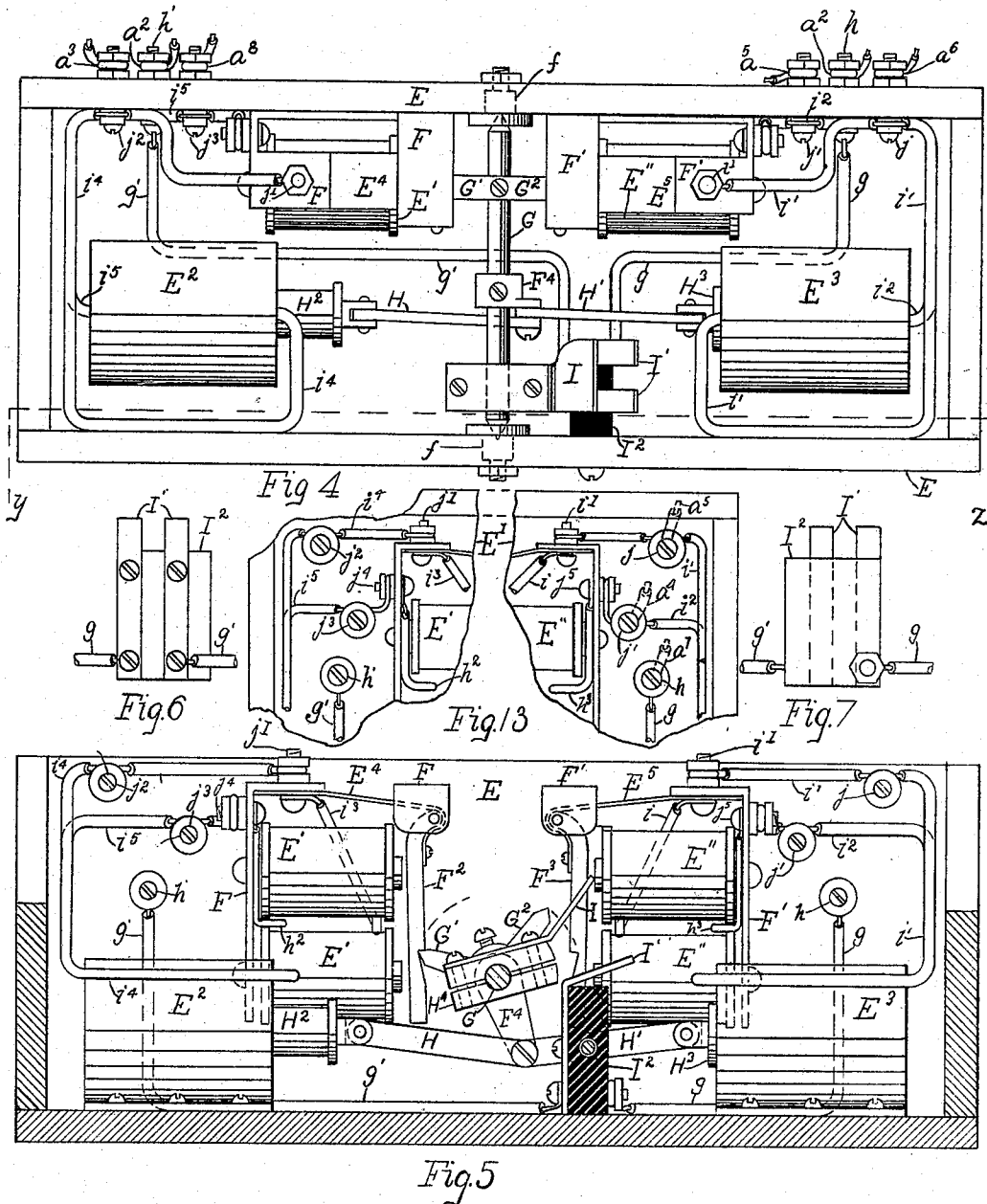
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

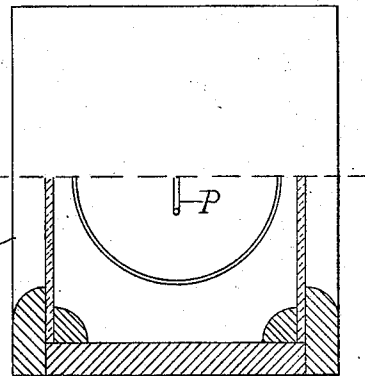


Fig.11

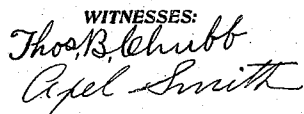


Fig. 9

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UNITED STATES PATENT OFFICE.

WILLIAM L. RUMMEL, OF SIOUX CITY, IOWA.

RAILWAY BLOCK SYSTEM.

932,582.

Specification of Letters Patent. Patented Aug. 31, 1909.

Application filed April 11, 1908. Serial No. 426,421.

To all whom it may concern:

Be it known that I, WILLIAM L. RUMMEL, a citizen of the United States, residing at Sioux City, in the county of Woodbury and State of Iowa, have invented new and useful Improvements in Railway Block Systems, of which the following is a specification.

My invention has relation to railway block systems and is intended as an improvement on my invention for which Letters Patent of the United States, Number 841,451, were issued to me on January 15, 1907.

The object of my invention is to improve and perfect the device therein described to the end that trains may be more easily and readily controlled and accidents by collision averted.

I have illustrated my invention in the accompanying drawing in which—

Figure 1 is a diagrammatic view of a section or block of railway track showing the electric circuits operating the block. Fig. 2 is an end view of box showing the electro-magnetic coils, solenoid and levers for control of the air brakes. Fig. 3 is a longitudinal section on line $x-y$, Fig. 2, the coils and solenoid being shown in side elevation. Fig. 4 is a plan view of contact box showing the electro-magnetic coils, solenoid, and levers used in opening and closing the circuits at the end of each block. Fig. 5 is a longitudinal section on line $y-z$, Fig. 4. Fig. 6 is a detail view of switch in one of the contact boxes. Fig. 7 is an inverted view of Fig. 6. Fig. 8 is a plan view of semaphore box showing the electro-magnetic coils, and levers used in operating the signals. Fig. 9 is a longitudinal sectional view on line $z-w$, Fig. 8. Fig. 10 is a detail view of semaphore and light signals in side elevation. Fig. 11 is a section of semaphore light on line $w-x$, Fig. 10. Fig. 12 is a detail view of switch shown in Figs. 8 and 9. Fig. 13 is a side elevation of a section of the interior of the contact box at right of block. Fig. 14 is an enlarged detail view of one of contact slides showing the same in side elevation. Fig. 15 is an end elevation of the same.

Referring to the illustration, A is a section of track constituting a block to which my invention is applied. In the middle of the block is indicated an engine B, headed toward the right as indicated by the arrows and equipped with the device shown in Figs.

2 and 3 for the operation of the air. On one side of the road are the circuit wires a , a' , supplied at required intervals with electric batteries, b . The cab of the engine is provided with electro-magnetic coils C, C, and the solenoid D, inclosed in a suitable box B'. The coils are secured to a metallic frame C', and are connected electrically with each other by the wire c^2 and with opposite ends of the solenoid by the wires a'' through the binding post c' , and b' , the latter being connected with the wire c^2 through binding post c^3 . Feed wires c and c' lead to the binding posts d and d' , respectively, the wire c' being tapped into the wire a'' , and the wire c being connected to binding post C³, the coils and solenoid being connected in multiple. From the binding posts d and d' lead wires d^2 and d^3 to the contact brushes B² projecting from the left side of the engine separated from each other by insulation.

When the contact brushes close the circuit, the coils C and solenoid D are charged, attracting the armature C², connected with the frame C' and spring c^3 , and normally held away from the coils by the spring. At one end of the box B' facing the coils is an upright lever D' pivoted to the floor of the box and controlling the air supply of the train. The lever has a lateral arm D'' behind which rests a bent lever D² pivotally connected with a link D³ of the solenoid and supported by a guide D⁴. At the junction of the lever and link and pivoted between them is an upright arm D⁴, the upper end of which is secured to a longitudinal shaft D⁵, pivotally supported at each end in conical bearings e , e . Secured to said shaft is a catch D⁶, the free end of which is adapted to enter a notch near the lower end of the armature C², which normally holds the catch in the position shown in the drawing. When the circuit is made through the engine by the contact of the brushes B², with the wires a^2 and a^3 , the former being connected with the circuit wire a and the latter through the box K and wire a^{10} to the circuit wire a' , at the slide contact A'', the armature is attracted to the coils which releases the catch and permits the solenoid through its movable core D⁸ to close the link, and by means of the lever D² and arm D'', turn the air lever D' and open the air, thus stopping the train. The air lever is restored by hand,

when the armature and piston are restored to their normal positions by the movement of the lever D².

The operation just described takes place in the center of the block opposite the semaphore and light signals where the train is required to stop, provided the signals set by the train in entering the block are not followed. The means employed for setting the signals will now be described. At the entrance to the block are contact boxes E and E¹, shown respectively at the left and right of the block in the diagram and also in Figs. 4, 5 and 13. They are exactly alike except for the electrical connection with the circuit, and for convenience they will be given the same description except as to said connection. They are each provided with double electro-magnetic coils E' and E'' and solenoids E² and E³, the coils and solenoids being connected in multiple. They are constructed and operated mechanically and electrically in substantially the same manner as those previously described, except that being double the coils E' and solenoid E² in the box E operate to set the signals as the train enters the block at the left, while those opposite act to restore them as the train makes connection with the box E¹ at the right and passes out of the block. The coils E' and E'' are respectively secured to metallic frames F and F' which are respectively connected to the armatures F² and F³ by the springs E⁴ and E⁵ which hold the armatures normally away from the coils. To the sides of the box a shaft G is pivoted in conical bearings f, midway between the sets of coils. Near to one end of the shaft, between the coils, are secured the upwardly extending catches G' and G², adapted to alternately engage the notches in the respective armatures F² and F³. Near the middle of the shaft is secured a downwardly extending arm F⁴ to whose lower end are pivotally connected the links H and H' pivotally connected to the respective movable cores H² and H³ of the solenoids E² and E³. At the end of the shaft farthest from the coils is secured a block insulation H⁴ which supports the switch blade I. The contact points of the switch, I', are secured to the insulation I² which is secured to the side of the box. Wires g and g' connect the opposite sides of the contact points with the respective binding posts h and h' on the sides of the box. The coils E' are electrically connected in multiple by the wire h², and the coils E'', by the wire h³. The coils E' are connected with one end of the solenoid E² by the wires i⁵ and h² through the binding posts j³ and j⁴ and with the other end by the wires i³ and i⁴, through the binding posts j' and j². On the opposite side the coils E'' are connected with one end of the solenoid E³ by the wires i and i' through the

binding posts i' and j, and with the other end of the solenoid by the wires i² and h³, through the binding posts j' and j⁵.

To the binding post h' of the box E is attached the wire a² leading to the circuit, and to the binding post j² is attached the wire a³, which leads from the coils and solenoid and to the semaphore box K, through the wire a⁸, secured to binding post k⁵ in said box K and by the wire a¹⁰ connected to binding post k' in the box K to the circuit. As the contact brush B¹ of the engine closes the circuit by connecting the wires a² and a³ at the contact slide A', the coils E' and solenoid E² in the box E are energized which attracts the armature F², releasing the catch G' and connecting the switch I and I'. The wire a⁸ leading from the binding post j³ of the contact box E connects the coils E' and solenoid E² of the box E with the semaphore box K, Figs. 8 and 9, where is shown the direct means for operating the semaphore and light. The box K is the same as those at each end of the block. It is mounted on a post J and is provided with double sets of coils K' and K'' and solenoids K² and K³. The armatures k and k' are the same as those described and are connected with a similar frame by the springs k² and k³ in the same manner. The central shaft L is the same as the shaft G and has similar catches l and l'. Connection is made between the shaft and the solenoids as heretofore by the links L' and L'' and arm L². The switch L³ is also the same, the blade being the same and the contact points being secured to insulation L, and is operated in the same manner. The only mechanical difference between the construction of these boxes and those just described is the addition of a lateral arm M to the shaft L which is pivotally secured to a pendent rod M', the lower end of which is hooked into a semaphore N pivoted to the post J. As the shaft is turned by the operation of the coils and solenoid, the semaphore signal is raised and lowered as will be presently described. The electrical connection with the line or circuit, however, is somewhat different from that of the contact boxes. The coils K' and K'' are electrically connected in the same manner as those in the contact boxes by the respective wires k'' and k'''. The coils K' are connected with one end of the solenoid K² by the wire k⁴ through the binding posts k¹ and k⁵, and with the opposite end of the solenoid by the wires k'' and k⁶ through the binding posts k' and k⁸. The coils k⁷ are connected with one end of the solenoid k³ by the wire l² through the binding posts l¹ and l³, and with the opposite end of the solenoid by the wires k''' and l⁴ through the binding posts l⁵ and l⁶. One of the contact points of the switch L³ is connected with the binding post M² on the side of the box by the wire M³

and the other contact point to the post M^4 by the wire M^5 .

As the current from wire a^3 attached to binding post h^5 of the semaphore box enters the box K, and the coils K' and solenoid K^2 are energized, the armature h is attracted, releasing the catch l . The solenoid K^2 pulls the link L' and closes the switch L^3 , at the same time raising the semaphore and closing the light circuit through wires O and O' , attached to binding posts M^2 and M^4 in the signal box K and connected with the circuit, turning on the light P in the globe box P' . The circuits are closed at the three places of contact by the contact of the brushes in passing under the plates R, R, connected by insulation S, all the three contacts being the same. The brush B^1 shortens the current in the wires attached to the plates R in the slide contacts A' and A^2 , while the brushes B^2 , being separated by insulation, lead the current through the engine as previously described.

If, as already stated, the signals are not followed and the train stopped before reaching the slide contact A'' , the closing of the circuit at this point in the engine will operate the air. As the train passes out of the block the contact plates of the engine close the circuit at the slide contact A^2 , which reverses the process, releasing the semaphore and putting out the light and restoring the contact box E.

The wires connecting the contact box E^1 with the circuit for releasing are as follows: The wire a^4 is connected to the binding post j' in the contact box E^1 and is attached to binding post j in said box E^1 and leads to the contact box E where wire a^2 is attached to the post j' in said box. Wire a^6 leads from binding post j in the box E to the semaphore box K where it is attached to binding post l^5 , the binding post l^3 being connected with the circuit by the wire a^5 . When the contact brushes B^1 of the engine connects with the slide A^2 it forms a circuit from wire a^7 leading to the line wire to wire a^4 , and the current follows the wires just described. The coils E'' and solenoid E^3 in the box E, the coils K'' and solenoid K^3 in the semaphore box K are thus energized, which attracts the respective armatures F^3 and h' in these boxes, releasing the catches and causing the mechanism to assume the positions shown in Figs. 5 and 9. The semaphore signal is lowered, the light extinguished and the whole apparatus of the contact and signal boxes assumes its normal position. The coils E' and solenoid E^2 in the box E^1 are not shown as having any connection with the circuit wires, as they are a part of the mechanism of the adjacent block, it being the object to here describe only the operation of one block. However, the other blocks are operated by the same mechanism and the

electrical connection is merely a continuation of the same system. Thus, to binding post h of the box E^1 is secured the continuation of the wire a^7 leading to the next block at the right, and to the binding post h' of the box E is secured the continuation of the wire a^2 leading to the next block to the left.

It will be observed that the positions of the coils and solenoids in the box E^1 are shown reversed in the diagram, Fig. 1, but this is merely for convenience of electrical connection in the single block shown, the construction and arrangement of the contact boxes all being the same.

By slight adaptations this system may be applied to double tracks and switches and for the prevention of rear end collisions, although these illustrations are for a single track only. If applied to but one track the engines should be supplied with contact brushes extending from both sides.

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 electric circuit along the line of road, electric batteries in the circuit, contact slides at intervals in the circuit whereby the circuit may be closed, plates extending from the engine to connect the contacts and close the circuit, semaphore and light signals connected at intervals with the circuit, solenoids with movable cores for operating the signals, electro-magnetic coils and armatures adapted to be attracted thereby for the operation of the solenoids, metallic connection between the coils and solenoids, between the coils and slides, and between the coils and the circuit, whereby the coils and solenoids are energized and the signals operated, substantially as described.

2. In a railway block system, the combination of an electric circuit along the line of road, electric batteries in the circuit, semaphore and light signals connected at intervals with the circuit, solenoids with movable cores for operating and restoring the signals, electro-magnetic coils and armatures adapted to be attracted thereby for the operation of the solenoids, metallic connection between the coils and solenoids, between the coils and the circuit and between the coils and the signals, contact slides in the circuit having metallic connection with the coils and solenoids whereby the circuit may be closed through the coils and solenoids and the coils and solenoids energized and the signals operated and restored, and circuit closers extending from the engine to make the contacts and close the circuit, substantially as described.

3. In a railway block system, the combination with the semaphore and light signals of a railway line, an electric circuit along said line, electric batteries in the circuit and metallic connection between the signals and

the circuit, of double electro-magnetic coils, armatures adapted to be attracted thereby and solenoids with movable cores for operating and restoring the signals, metallic connection between the coils and solenoids, a switch adapted to be opened and closed by the solenoids having metallic connection with the circuit whereby the signals are operated when one set of coils and solenoids is energized, and restored when the other set is energized, means connecting the armatures with the switch for maintaining the signals in position until operated or restored, metallic connection between each set of coils and solenoids and the circuit, and means connected with the engines of the road for applying and withdrawing the current from the coils and solenoids, substantially as described.

4. In a railway block system, the combination with the semaphore and light signals of a railway line, an electric circuit along the

line, electric batteries in the circuit, metallic connection between the signals and the circuit, of electro-magnetic coils, an armature adapted to be attracted thereby and a solenoid with movable core for operating the signals, metallic connection between the coils and solenoid, and between the coils and solenoid and the circuit, means connecting the armature with the signals for normally holding the signals in the position placed, and means connected with the engines for applying and withdrawing the current from the coils and solenoid, substantially as described.

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

WILLIAM L. RUMMEL.

Witnesses:

AXEL SMITH,
H. C. GARDINER.