Sept. 27, 1932. A. E. HUDD 1,879,612

TRAIN STOP AND CAB SIGNAL SYSTEM

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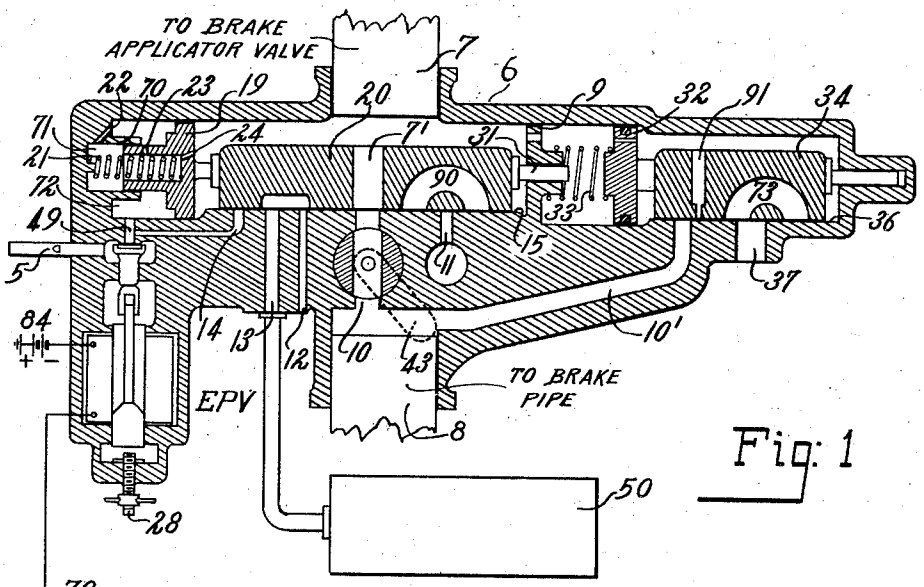
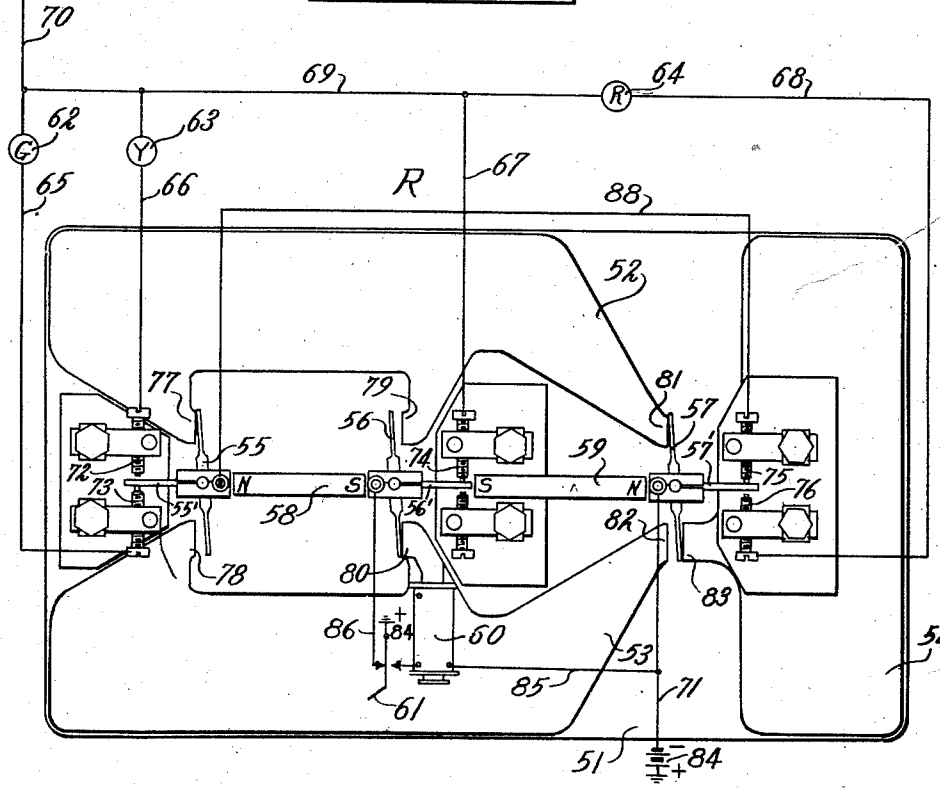


Fig. 1



Inventor
Alfred E. Hudd
Mc Walter Drew Atty.

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TRAIN STOP AND CAB SIGNAL SYSTEM

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Fig: 2

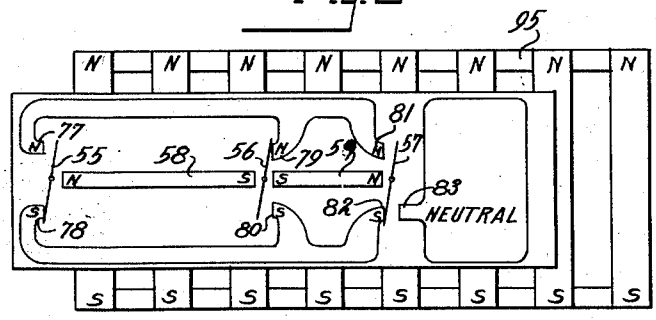


Fig: 3

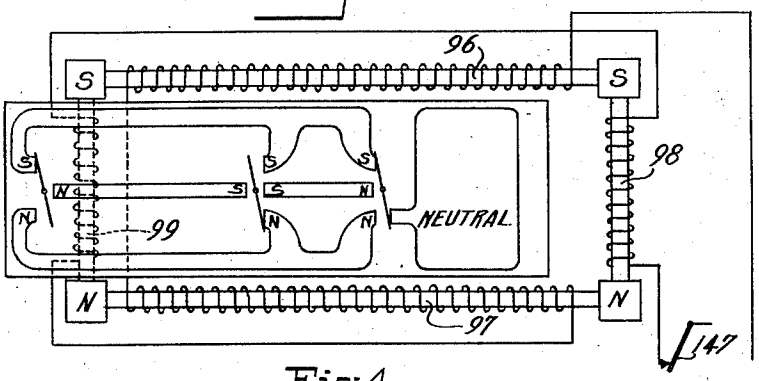
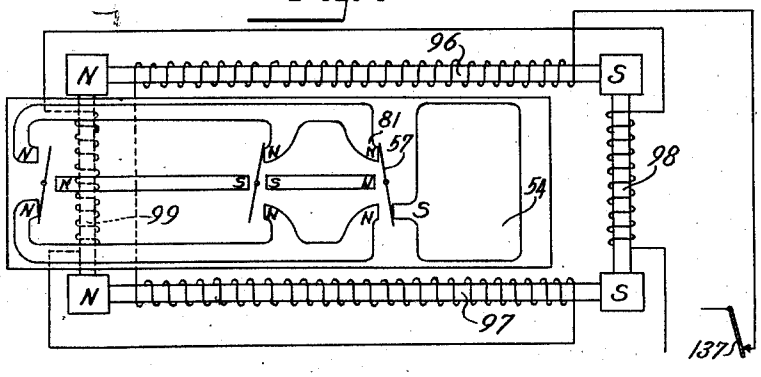


Fig: 4



Inventor
Alfred E. Hudd

Wm. Walter Owen Atty:

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TRAIN STOP AND CAB SIGNAL SYSTEM

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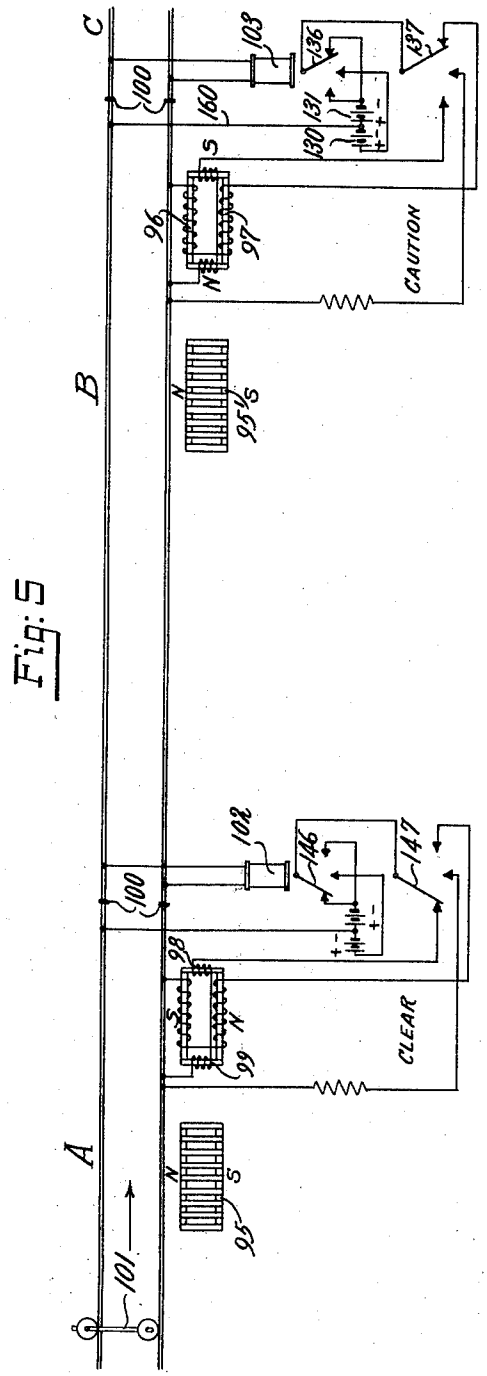


Fig. 5

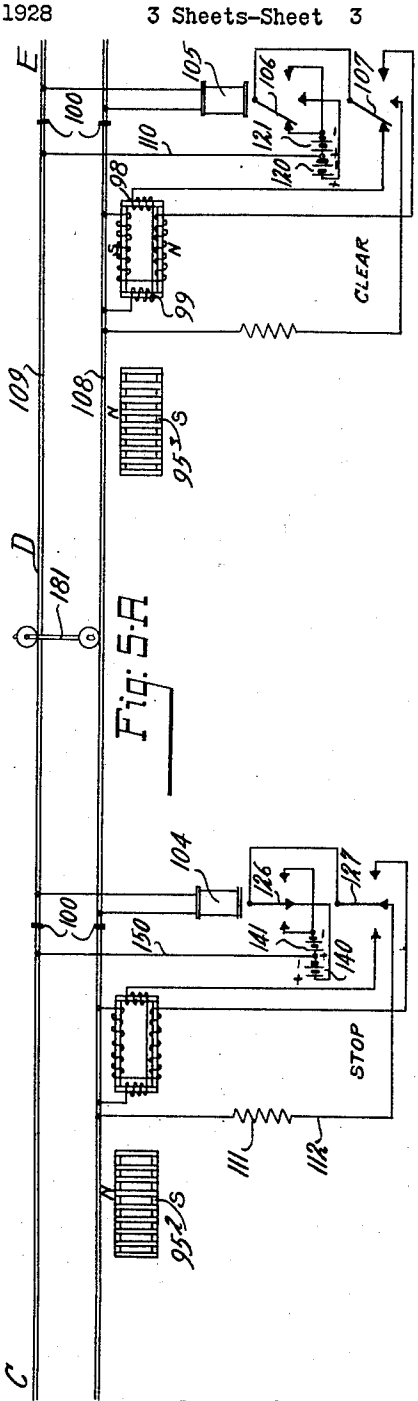


Fig. 5A

Inventor
Alfred E. Hudd
By Watts Quarles Atty.

Patented Sept. 27, 1932

1,879,612

UNITED STATES PATENT OFFICE

ALFRED E. HUDD, OF EVANSTON, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO ASSOCIATED ELECTRIC LABORATORIES, INC., OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

TRAIN STOP AND CAB SIGNAL SYSTEM

Application filed August 1, 1928. Serial No. 296,652.

The present invention relates in general to train stop systems, but is particularly concerned with the provision of a train stop system of the intermittent inductive type and wherein cab signals are provided for indicating the traffic conditions ahead.

Some of the main features of the present invention are: to provide a system of circuits and mechanism on a locomotive for giving three distinct signalling indications in the cab, for indicating as many different traffic conditions ahead and for giving these indications independently of, or in conjunction with, a train stop system; to provide a system of the foregoing character which requires but one receiver relay or impulse receiving unit on the locomotive and only two trackway elements for each block of the trackway; to provide a novel receiver relay having more than two armatures and having a different magnetic circuit for each armature; to provide a track way electromagnet capable of producing, alternatively, either of two magnetic fields at right angles to each other; and in fact, to provide an extremely simple train stop system as hereinafter claimed.

In the accompanying drawings, Fig. 1 diagrammatically discloses the locomotive equipment of the train stop system; Figs. 2, 3, and 4 diagrammatically show permanent and electromagnet trackway elements, respectively, with diagrammatic sketches of the receiver relay, shown in the lower portion of Fig. 1, superimposed thereon to illustrate the influence the trackway elements have upon the receiver under various traffic conditions, while Figs. 5 and 5A illustrate sections of trackway with associated circuits and apparatus for controlling the locomotive equipment of Fig. 1.

The valve structure diagrammatically disclosed in the upper part of Fig. 1 is a somewhat simplified modification of that shown in the co-pending Kelly application, Serial No. 292,996, filed July 16, 1928. This valve, like the one in the former application, is designed for insertion in the brake line in substitution for the double heading cock, a double heading cock being part of the present valve structure. The purpose of this valve is to initiate an automatic service application of the brakes; to prevent the release of an automatic brake application until a predetermined time interval has elapsed, and to permit an emergency application of the brakes at any time.

This valve has a main body 6, having an opening 7 for connection with the usually provided brake applicator and an opening 8 for connection with the brake pipe line. Inside the valve body, a number of ports 10–14, inclusive, are provided all of which extend from a milled surface, forming a slide valve seat, 15. The port 10 connects with the opening 8 and has a branch 10′ connecting with a second portion of the valve body which will subsequently be described. The port 11 extends downward a short distance from the seat 15 and then connects with atmosphere. The port 12 extends directly downward and connects with atmosphere. The port 13 extends downward parallel to the port 12, but is connected with a timing reservoir 50. The port 14 extends downward a short distance and then extends horizontally into connection with a port 49. The right portion of the valve body has a slide valve seat 36 provided with a large exhaust port 37 and in which seat the other end of the previously mentioned port 10′ terminates.

The left portion of the valve structure is in the form of a cylinder, in which is mounted an automatic brake applying piston 19, having connected to the right thereof, a slide valve member 20, which lies against the valve seat 15 of the valve body. Connected with the left part of the piston 19 is a cuplike member containing a compression spring 21. The cup-like member on the piston 19 telescopes into a second cup-like member 70 forming an air chamber 71 within these cup-like members and a secondary air chamber 72 surrounding these cup-like members. Two orifices, 22 and 23, connect these chambers, while an orifice 24 connects the chamber 71 with the opening 7. Immediately below and forming a part of chamber 72 is an extended portion of the valve body having a port 49 connecting with an exhaust whistle 5. The port 49 is

adapted to be normally maintained closed by an associated electropneumatic valve EPV when energized. A cut-out element 28 is, however, provided which may be turned up to mechanically close the port 49. This cut-out in practice is ordinarily provided with a seal, which must be broken before the same can be turned up to cut out the control by the electropneumatic valve EPV.

Referring now to the right portion of the valve member, a dividing member 9 serves as a bearing for a shaft 31, carrying the valve member 20 and as a stop for an emergency piston return spring 33. Immediately to the right of the spring 33 is an emergency brake applicator piston 32. This piston operates the slide valve member 34 over a slide valve seat 36.

Midway between the opposite ends of port 10, and at right angles thereto is a double heading cock having a handle 43.

With the electropneumatic valve energized, which is its normal condition, the air supply for holding the brakes released passes through the usual brake applicator valve (not shown) into opening 7 of the brake valve structure, through the passage 7′ of the slide valve member, through port 10 and the opening of the double heading cock and thence into the opening 8 and into the brake pipe line. Owing to the orifice 24 in piston 19 and because of the orifices 22 and 23, brake pipe pressure is also built up in chambers 71 and 72. Also because of the orifices in element 9 and piston 32, brake pipe pressure is built up on both sides of the piston 32. The springs 21 and 33 are therefore normally effective to hold the pistons 19 and 32 to the right in the position in which they are shown. If the electropneumatic valve EPV is de-energized, air exhausts through the outlet port 49 and through the whistle 5 at a greater rate than brake pipe air is permitted to enter chamber 72 through the restricted orifices 24, 23, and 22. Consequently, after the pressure in chamber 72 falls to a point where the pressure upon the right hand side of the service application piston 19 is sufficient to overcome the spring 21 in chamber 72 (approximately six seconds, as designed) the service brake application piston 19 will begin to move and will first close orifice 23. When the orifice 23 closes, the air supply to chamber 72 is greatly reduced and the piston 19 with the slide valve member 20 will quickly move to the extreme left.

The piston carries with it the slide valve 20, which, in its operated position, closes the air path formerly existing between openings 7 and 8 and connects the latter opening to atmosphere by way of the port 10, passage 90, and exhaust port 11, to produce an automatic brake application. The slide valve member also disconnects the timing reservoir from connection with atmosphere by way of ports 13 and 12 and instead connects this reservoir with port 14 for a purpose which will subsequently be made clear.

To restore the piston 19 and slide valve member 20 to their initial position, the electropneumatic valve EPV must be again energized to close the port 49. This permits the pressure on the left of the piston 19 to again build up to approximately that on the right of this piston. The capacity of chambers 71 and 72 is very limited and in order to prevent practically immediate automatic release of the brakes following the energization of the valve EPV the timing reservoir 50 was brought into communication with the chambers 72 and 71. Because of the restricted orifice 22 and the capacity of reservoir 50 an appreciable time elapses after reenergization of the electropneumatic valve before the piston 19 and its valve member are returned.

The receiver relay shown in the lower half of Fig. 1 is of the same general character as that shown in the co-pending Hudd application, Serial No. 281,656, filed May 31, 1928. The present relay, however, has somewhat different magnetic circuits and has three armatures instead of two. The relay is built into a non-magnetic casing 51, which is suspended from a vehicle in inductive relation with the track magnets shown in Figs. 2 to 5A, inclusive, and which will be described later. The relay consists of three inductor planes 52, 53, and 54, having pole pieces 77—83, for attracting three armatures 55, 56, and 57. The free ends of armature 55 are of north polarity, being polarized so by a small permanent magnet 58; the free ends of armature 56 are of south polarity, being so polarized by the action of the permanent magnet 58 and a second permanent magnet 59, while the free ends of armature 57 are of north polarity due to the mid-portion of the armature being associated with the north pole of the permanent magnet 59. The inductor planes 52, 53, and 54 are made of soft iron and therefore are normally inert, but since the armatures are polarized by the permanent magnets 58 and 59 these armatures will remain magnetically biased to either associated inductor plane pole piece to which they have been moved. Associated with the pole piece 80 is a winding 60 which is adapted to be energized when a key 61, in the cab of the vehicle is actuated and when energized is effective to overcome the opposing bias produced by magnets 58 and 59 and moves the armature 56 into engagement with the pole piece 80.

Referring now to Figs. 2, 3, and 4, the trackway magnets and their influence on the receiver relay of Fig. 1 will next be described. A permanent magnet trackway unit 95 simply consists of a number of permanent bar magnets arranged to function as one large permanent magnet, with the polarity as indicated on the drawings. This magnet

is very powerful compared to those in the receiver and consequently, if the receiver R of Fig. 1 is passed over the permanent magnet unit the biasing effect produced by magnets 58 and 59 will be overcome and armatures 55, 56, and 57 will be rotated in a clockwise direction into the position in which they are shown in Fig. 2, for the reason that when the receiver unit passes within inductive relation of the field produced by the trackway magnet 95, the pole-piece of the inductor plane 52 becomes of strong north polarity, while the pole-piece of the inductor plane 53 becomes of south polarity. Since the armatures 55 and 57 are polarized north, due to the presence of magnets 58 and 59, a repelling action will occur between these armatures and their associated pole pieces 77 and 81 while an attractive force will be set up for these armatures by pole pieces 78 and 82. The armature 56 is also rotated into association with the pole piece 79 because this armature is of south polarity. The pole piece 80 assists the pole piece 79 by the repelling action it has on the armature 56.

The electromagnet trackway elements shown in Figs. 3 and 4 are alike and consist of rectangular units having the same general outline as the permanent magnet 95. These units have four windings 96–99, inclusive. When the windings 98 and 99 are energized, a magnetic field of the same strength as that of the permanent magnet is set up and is in the opposite direction to that set up by the permanent magnet 95, as indicated in Fig. 3. It will be obvious, therefore, that when the receiver R passes over this trackway element, with the windings 98 and 99 energized, armatures 55, 56, and 57 will be rotated in a counter-clockwise direction into the position in which they are shown in Fig. 1 and as diagrammatically shown in Fig. 3.

If, alternatively, windings 96 and 97 are energized when the receiver R passes over the electromagnet trackway element, as illustrated in Fig. 4, a magnetic field similar to, but at right angles to that set up by windings 98 and 99 is set up and consequently, the pole-piece of the inductor plane 54 becomes of south polarity, while the pole-piece of the inductor planes 52 and 53 become of north polarity. Since the polarity induced in the inductor planes 52 and 53 is the same, the effect produced by them is substantially neutral and therefore the associated armatures 55 and 56 remain in the position to which they were moved by passing over a permanent magnet trackway element. The armature 57, however, is rotated in a counter-clockwise direction due to the attractive influence set up in the pole piece 83 of the inductor plane 54. It should be noted that as the receiver relay R passes out of the inductive field of the electromagnet trackway elements, the inductor planes 52 and 53 will pass through the field of the S poles of the trackway magnets which may induce weak magnetism of south polarity in the pole-pieces of these inductor planes, but without effect since when they are of like polarity they will not tend to operate their armatures at this time.

Referring now to Figs. 5 and 5A, the track circuits and arrangements of the trackway magnets will be described. In Fig. 5 a portion of block A, a block B, and a portion of a block C are shown; while in Fig. 5A a continuation of the block C, a block D, and a portion of a block E are shown. These blocks are divided by track insulation 100. The presence of vehicles in blocks A and block D is indicated. At the exit of each block, it will be noted, a permanent magnet trackway element is placed alongside the track. In advance of each of these permanent magnet trackway elements is placed an electromagnetic trackway element. Each of these magnets is so spaced that slightly more than six seconds will be consumed by a train traveling at any speed above a very low speed in traversing the distance between them. At the entrance of each bock, a three position polarized relay is connected across the trackway rails for controlling the current supply to the trackway element, located at the exit end of the adjacent block and to also supply current to a similar polarized trackway relay at the entrance end of the adjacent block. In the track circuits illustrated it is assumed that the block E and the next block in advance thereof are both unoccupied. Under these circumstances, as will readily appear hereinafter, the current supplied to the rails of block E and the polarized track relay 105 will be in such a direction as to cause the armatures 106 and 107 of this relay to be rotated into engagement with their left contacts. With the armatures 106 and 107 in this position an operating circuit for the polarized relay 104, at the entrance end of the block D, may be traced from the negative terminal of battery 121, through the left contact and armature 106 of the relay 105, the armature 107 and its left contact, through the windings 98 and 99 of the electromagnetic trackway elements, the rail 108, the winding of the polarized relay 104, to rail 109, conductor 110, and to the positive terminal of the battery 121. The current flow to the relay 104 is in the appropriate direction to cause it to move its armatures 126 and 127 into engagement with their left contacts, so that current supplied over the block C to the polarized relay 103 will be in the appropriate direction to cause it to move its armatures 136 and 137 into engagement with their left contacts. However, in the present illustration, owing to the presence of a vehicle 181 in block D, the polarized relay 104 receives no current and consequently its armatures 126 and 127 drop to their neutral or mid

position. With the armatures 126 and 127 in this position, a circuit for the polarized relay 103 is completed which extends from the positive terminal of the trackway battery 140, through the mid contact and armature 126, armature 127 and its mid contact, the conductor 112, the resistance 111, the lower rail of block C, through the winding of relay 103, the upper rail of block C, and the conductor 150 to the negative terminal of the battery 140. The current flow to the polarized relay 103, it will be noted, is in the opposite direction to that supplied to the relay 104 and therefore the polarized relay 103 rotates its armatures 136 and 137 into engagement with their right contacts. With the armatures 136 and 137 in this position, current for operating the polarized relay 102 at the entrance of block D is supplied from the negative terminal of battery 131, through the right contact and armature 136 of the polarized relay 103, armature 137 and its right contact, through the windings 97 and 96 of the associated trackway electromagnet, the lower rail of block B, the winding of the polarized relay 102, the upper rail of block B, and the conductor 160 to the positive terminal of battery 131. The current flow to the polarized relay 102 is therefore in the same direction as that supplied to relays 104 and 105 and consequently the armatures 146 and 147 of the relay 102 will be rotated into engagement with their left contacts, thereby completing circuits for feeding battery to the track relay of the block A in the same direction as it is being fed to the track relay 102.

I will now consider the circuits and apparatus under control of the armatures 55, 56, and 57 of the receiver. These armatures as shown in Fig. 1 are in the positions they assume while the vehicle is passing through a block which was entered under clear traffic conditions. Under these circumstances, a circuit for the green lamp 62 extends from the negative terminal of the battery 84, over conductor 71, the armature 57 and its contact member 57′, contact 75, through the conductor 88, the armature 55 and its contact member 55′, the contact 73, conductor 65, the lamp 62, conductor 69, conductor 67, contact 74, contact member 56′ and the associated armature 56, conductor 86 and through the contact and acknowledging key 61 to the positive terminal of the battery 84. The green lamp 62 is therefore glowing and serves to indicate to the engineman that the train is traveling under clear traffic conditions. A branch of the traced circuit extends over the conductor 70 to and through the winding of an electro-pneumatic valve EPV which is built into and forms a part of the brake valve structure. This valve when energized, as previously explained, prevents the escape of air from the chambers 71 and 72.

In order to explain the operation of the system as a whole, it will be assumed that the equipment of Fig. 1 is on the vehicle 101 of block A, Fig. 5 and that the vehicle is traveling in the direction indicated by the arrow. As the receiver R passes over and within the influence of the permanent magnet trackway element 95 its armatures 55, 56, and 57 are rotated into the position in which they are shown in Fig. 2. Armature 55, at its contact member 55′, breaks a point in the traced circuit through contact 73 for the green lamp 62, thereby extinguishing the green lamp and at its contact 72 prepares a point in a circuit for the yellow lamp 63; at its armature 56 the traced circuit through contact member 56′ and contact 73 through which ground was formerly supplied to the green lamp and to the electropneumatic valve EPV is broken and consequently, the electropneumatic valve EPV drops its stem, thereby permitting air to exhaust from the chamber 72 through the port 49 and the whistle 5, which audibly warns the engineman to be on the alert for a possible change of signal indication; at armature 57 and its associated contact member 57′ and contact 75, a third point in the traced circuit for the green lamp 62 is interrupted, and at the associated contact 76 a point in a circuit for the red lamp 64 is prepared.

Since the associated electromagnet trackway element of block A has its windings 98 and 99 energized the polarity of this electromagnet is opposite to that of the permanent magnet 95 and consequently, as the receiver passes over this electromagnet trackway element the armatures 55, 56, and 57 are rotated back into the position in which they are shown in Figs. 1 and 3. The formerly traced circuits for lighting the green lamp 62 and for energizing the electropneumatic valve EPV are therefore immediately reestablished and the actuation of the whistle 5 ceases. These signal changes serve to indicate to the engineman that they have entered a block under favorable traffic conditions, and therefore no action on the part of the engineman is required. When the vehicle 101 reaches the exit portion of block B, the receiver R passes over the permanent magnet trackway element 95′, which causes the armatures of the relay R to be operated to bring about the same circuit changes as when the receiver passed over the trackway magnet 95. Since, however, the block D is occupied the trackway circuits at the entrance to block C are such that the caution windings 96 and 97 of the electromagnet trackway element, positioned a short distance in advance of the permanent magnet trackway element 95′, are energized. Consequently, the magnetic field set up by this trackway electromagnet is at right angles to that set up by the permanent magnet trackway element 95′. When the receiver R passes over this trackway electromagnet only the arma-

ture 57 is restored, as illustrated in Fig. 4. Since the circuit for the green lamp 62 remains interrupted at contact 73 and contact member 55′ and also at contact member 56′ and contact 74, the green lamp remains extinguished. Also, since the circuit for the electropneumatic valve EPV must also pass through contact member 56′ and contact 74, the electropneumatic valve remains deenergized and the whistle 5 continues to sound and serves to audibly warn the engineman of adverse traffic conditions ahead. Ordinarily, the engineman will heed the warning given by the whistle 5 and will proceed to forestall an automatic brake application by operating the acknowledging key 61 momentarily. When this key is operated a circuit is completed for the armature restoring winding 60, via conductors 85 and 71, and the armature 56 is thereby restored to its initial position in which it is shown in Fig. 1. The formerly traced circuit for the electropneumatic valve EPV is therefore re-established through contact 74 and contact member 56′ as soon as the acknowledging key 61 is returned to its normal position. This results in the port 49 being again closed and in the whistle ceasing operation. The armature 57 in operating, at its contact member 57′ and contact 75 closed a point in the circuit of the yellow lamp 63 which is completed following the acknowledging action from the negative terminal of the battery 84, through conductor 71, armature 57 and its contact member 57′, the contact 75, conductor 88, armature 55, its contact member 55′, contact 72, conductor 66, the yellow lamp 63, conductor 69, conductor 67, contact 74, contact member 56′, conductor 86 and through the normal contacts of the acknowledging key 61 to the positive terminal of the battery 84. The yellow lamp 63 is therefore lighted as the vehicle 101 progresses through block C and until the next signal change occurs as the vehicle passes over the permanent trackway magnet 95^2.

When the receiver R passes over the trackway magnet 95^2 the armatures 56 and 57 are again rotated into the position in which they are shown in Fig. 2 and consequently, the effect of having passed over the electromagnet trackway element at the exit of block C is entirely wiped out. Since the block D is occupied by a vehicle 181, causing the armatures 126 and 127 of the polarized relay 104 to assume their neutral or mid position, the circuits through all windings of the electromagnet trackway element immediately in advance of the permanent magnet trackway element 95^2 are open. The circuit conditions which were set up by the receiver R in passing over the trackway magnet 95^2 therefore remains and since the whistle 5 continues to sound the enginemen are audibly informed that acknowledgment is again necessary.

Responsive to the acknowledging action, as in the case when acknowledgement was made at the exit of block C, armature 56 is rotated in a counterclockwise direction, while the armatures 55 and 57 remain in attracted relations with respect to the pole pieces 78 and 82, respectively. The formerly traced circuit for the electropneumatic valve EPV is therefore again established and the whistle 5 silenced. A circuit is also completed for the red lamp 64. This circuit extends from the negative pole of the battery 84, through conductor 71, the contact member 57′, contact 76, conductor 68, red lamp 64, the conductor 67, contact 74, contact member 56′, and over the conductor 86 and the acknowledging key 61 to the positive terminal of the battery 84. The lighting of the red lamp serves to warn the enginemen that they are entering a block which is already occupied and that they must proceed with extreme caution.

It will now be assumed that the enginemen fail to acknowledge within the six seconds of time interval allowed after passing the trackway magnet 95^2. Under these circumstances, at the end of the six-second interval, sufficient air has been exhausted from the chamber 72 out through the whistle 5 to permit the air pressure on the right side of the piston 19 to become effective to move it and the valve member 20 to the left. The movement of the valve member closes the normally open passage extending between openings 7 and 8 via port 7′, port 10, and the double heading cock, thereby preventing the brake pipe from being recharged while the slide valve member 20 is in its operated position. The movement of the slide valve member 20 also connects the port 10 to the service exhaust port 11 via by-pass 90, thereby causing a brake pipe pressure reduction sufficient to cause a service brake application.

To release the brakes, after an automatic application, the engineman must first operate the acknowledging key 61 which, in a manner already described, is effective to energize the electropneumatic valve EPV and to complete the circuit for the yellow or red lamp, depending on the condition of the receiver R. The energization of the electropneumatic valve EPV, as previously explained, stops the actuation of the whistle 5 and the exhaust of air from chamber 72. The air pressure in chambers 71 and 72 therefore again arises at a rate determined by the port 22 and the capacity of the reservoir 50. As soon as the pressure rises to a point where it approximates that on the right side of the piston 19, the spring 21 will return the piston 19 and the valve member 20 to their normal positions, in which they are shown, thus closing the passage 14 and again opening the reservoir 50 to atmosphere through the by-pass in valve member 20 and the exhaust port 12. The slide valve member 20 in returning to its normal position also again blankets the

exhaust port 11 and again connects the opening 7 of the valve member with the brake pipe opening 8. This permits the brake pipe to be again recharged in the usual manner from the usually provided main reservoir through the brake applicator valve (not shown) and the automatic brake valve structure.

If, after receiving an automatic brake application, the engineman desires to amplify the application he can do so by moving the handle of the brake applicator valve to the emergency position. This causes an instantaneous exhaust of air to occur through the emergency port of the brake applicator valve and results in a very quick reduction in pressure being made in the air pressure on the left side of the emergency application piston 32. This permits the air on the right side of the piston 32 to rapidly expand and move the emergency application piston 32 to the left. As soon as this piston has moved a slight distance, its continued movement is assisted by air supplied to the right of the piston from the brake pipe via the port 10′ and the port 91. The movement of the piston 32 to the extreme left connects the port 10′, via by-pass 73 to the large emergency exhaust port 37. This quick reduction in the brake line results in an emergency application of the brakes.

It has been proposed that installations of cab signalling be made without the provision of any train stop equipment. The present system is ideal for an installation of this kind. In an installation of this kind, the electropneumatic valve EPV and whistle 5 or their equivalent will be connected directly with the main reservoir; the visual and audible signal control equipment will function in the same manner as when used in conjunction with the brake applicator valve; and the enginemen will be required to acknowledge as in the train stop system.

From the foregoing it will be appreciated that applicant has succeeded in developing train control and the cab signalling equipment which is very simple and will operate in an absolutely reliable manner.

What is claimed is:

1. In a relay operable by magnetic induction, an inductor plane having three poles, a second inductor plane also having three poles and a third inductor plane having but one pole, an armature associated with one pole of each of the first inductor planes, a second armature associated with another pole of each of the first two inductor planes and a third armature associated with the third poles of the first two inductor planes and with the pole of the third inductor plane.

2. In a relay which has three armatures operable by inductive action, a plurality of pole pieces, certain of said pole pieces being effective when the relay is placed in one character of inductive field to cause the actuation of all of said armatures in one direction and effective when placed in an inductive field of an opposite character to restore said armatures and another of said pole pieces being effective when the relay is placed in a magnetic field of a third character to actuate only one of said armatures to the exclusion of the others.

3. In a relay operable by magnetic induction, a plurality of armatures, a magnetic flux collecting plate individual to one of said armatures, other magnetic flux collecting plates common to a plurality of said armatures, all of said flux collecting plates being selectively magnetically influenceable to actuate one or a plurality of said armatures.

4. In a relay, three armatures, and a plurality of magnetic flux collecting plates each having pole-pieces for influencing all of said armatures.

5. In a relay, three armatures, a plurality of magnetic flux collecting plates each having pole-pieces for influencing all of said armatures, and a third collector plate having influence over one of said armatures only.

6. In a relay, a plurality of armatures, a pair of like means arranged adjacent said armatures providing efficient magnetic operating paths through said armatures in parallel, and other means also associated with one of said armatures including said first means and providing an efficient magnetic operating path for such armature at right angles to the parallel paths provided by said first means.

In witness whereof, I hereunto subscribe my name this 27th day of July, A. D. 1928.

ALFRED E. HUDD.