

W. KIRKPATRICK & F. W. VAN TUYL.

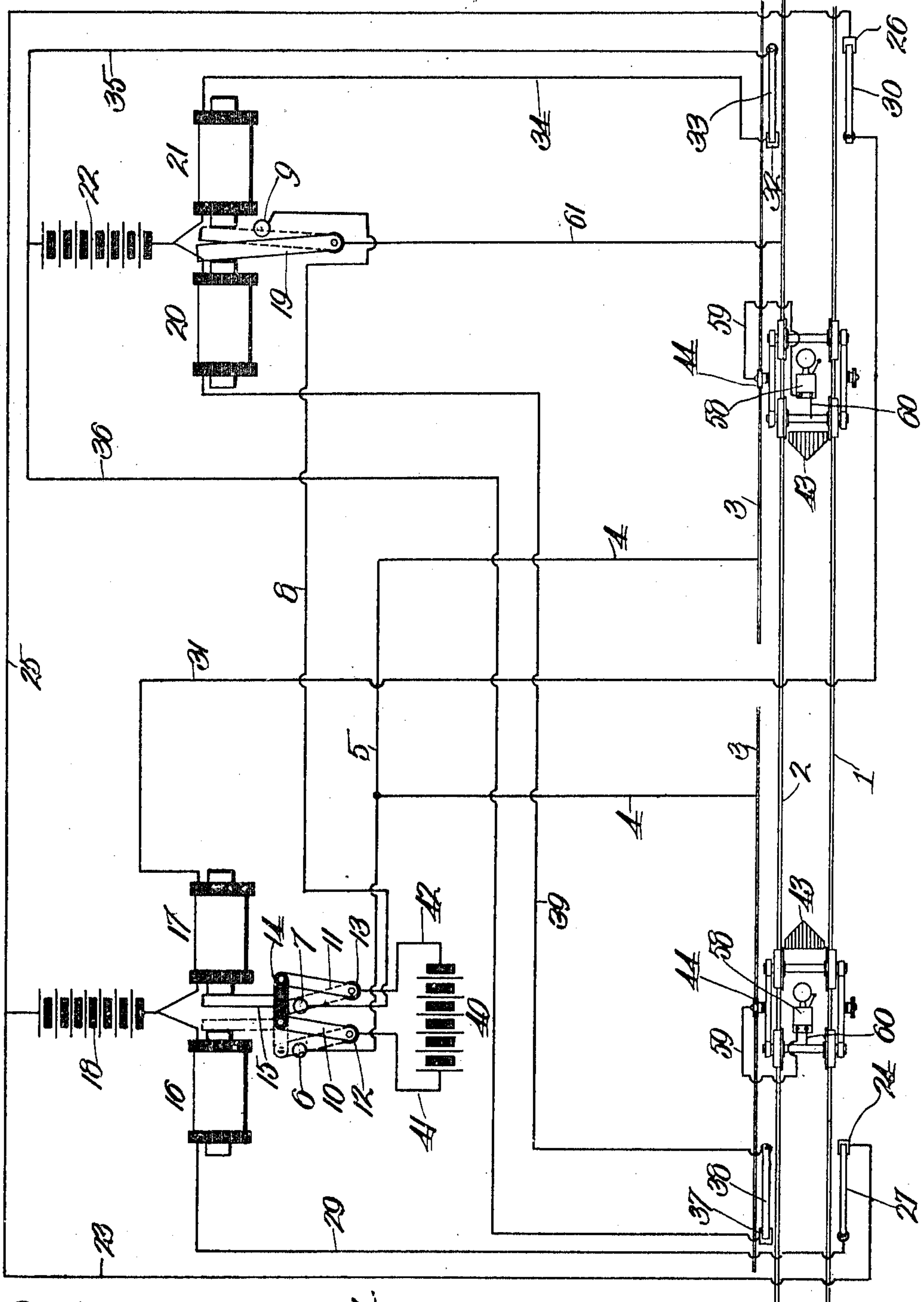
ELECTRIC SIGNAL FOR RAILWAYS.

APPLICATION FILED NOV. 16, 1908.

950,623.

Patented Mar. 1, 1910.

2 SHEETS—SHEET 1.



Witnesses
Frank R. Glon
H. C. Rodgers.

Fig. 1.

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By George G. Horne Atty.

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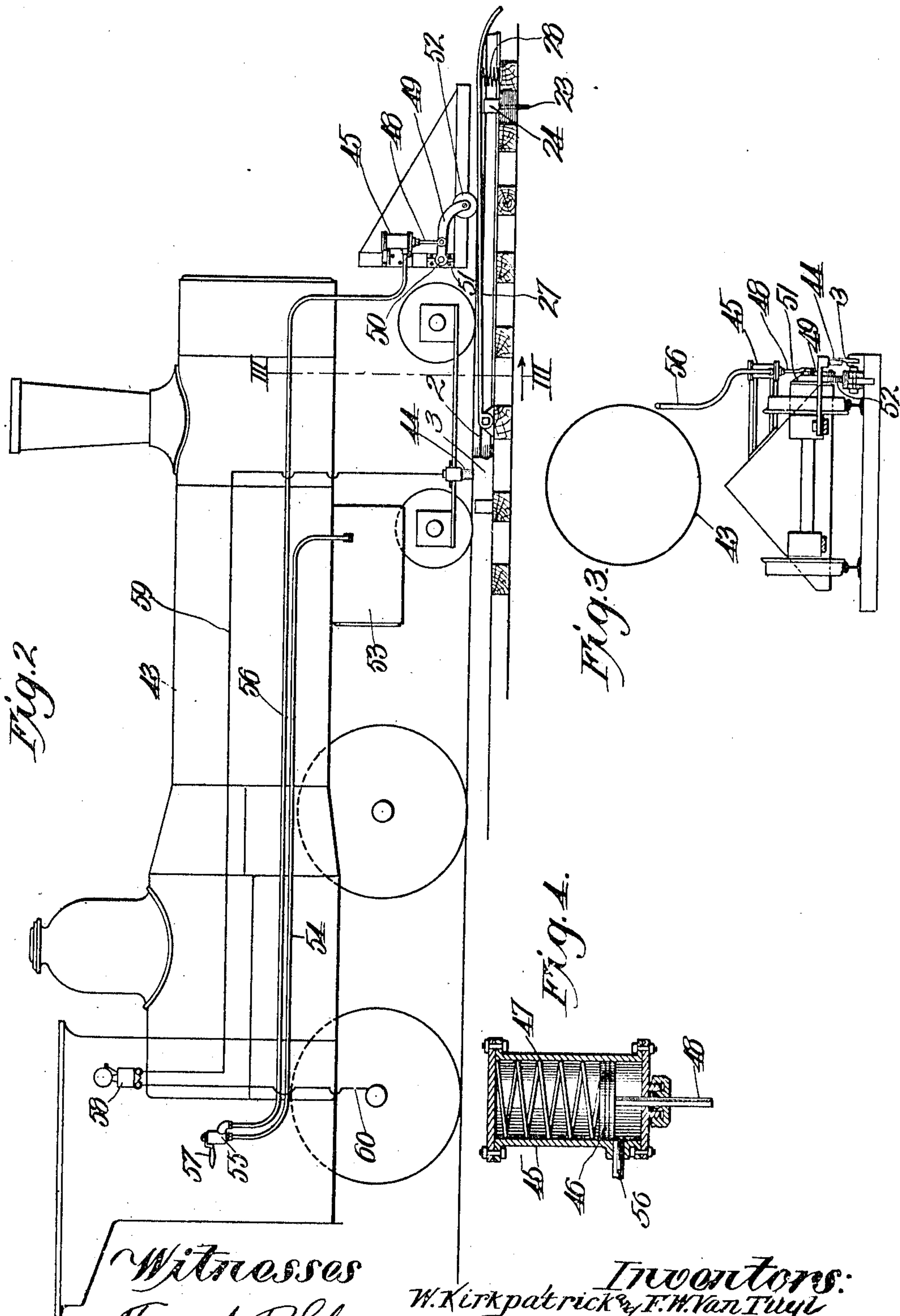
ELECTRIC SIGNAL FOR RAILWAYS.

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2 SHEETS—SHEET 2.



Witnesses
Frank R. Gore
H. Rodgers

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By George E. Choate Atty.

UNITED STATES PATENT OFFICE.

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ELECTRIC SIGNAL FOR RAILWAYS.

950,623.

Specification of Letters Patent.

Patented Mar. 1, 1910.

Application filed November 16, 1908. Serial No. 462,884.

To all whom it may concern:

Be it known that we, WILLARD KIRKPATRICK and FRANK W. VAN TUYL, citizens of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Electric Signals for Railways, of which the following is a specification.

10 This invention relates to electric signals for railways, and has for its object to produce means whereby the signals of two trains traveling in opposite directions on the same track within a predetermined section or block thereof shall be automatically operated to warn the engineers of impending danger.

15 A further object is to produce mechanism of such character that a plurality of trains may travel in the same direction on the same section or block of track without operation of the signals.

20 With these and other objects in view as hereinafter appear, the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed, and in order that it may be fully understood reference is to be had to the accompanying drawings, in which—

25 Figure 1, is a diagrammatic plan view of a signal mechanism embodying the invention and also showing the electric connections between two trains traveling in opposite directions in a protected section or block of track. Fig. 2, is a side view of a locomotive equipped for use in connection with the signal mechanism and also showing parts of the trackway and certain circuit making and breaking elements. Fig. 3, is a section on the line III—III of Fig. 2. Fig. 4, is an enlarged section of a cylinder and certain connections forming a part of the invention.

30 In the said drawing 1 and 2 are the rails of a trackway, Fig. 1, showing that part of the trackway within a protected section or block which may be of any desired length, for instance from one station to another.

35 3 indicates a third rail which by preference is at one side of the trackway and parallel therewith and which is shown as broken at the center to accommodate a cross track not shown or a highway intersection, the sections of the third rail being electrically connected by conductors 4 to the

conductor 5 leading to a double-pole switch terminal 6, the other terminal 7 being connected by conductor 8 to a single-pole switch terminal 9.

60 10 and 11 indicate the arms of the double-pole switch for engagement respectively with poles 6 and 7 and said arms are pivoted at 12 and 13 respectively and connected by an insulating bar 14 at their opposite or free ends, which bar carries an armature 15 common to a pair of oppositely disposed magnets 16 and 17 connected electrically to battery 18. The arm 19 of the switch constituted by said arm and terminal 9, is adapted to be operated alternately by the magnets 20 and 21 electrically connected to the battery 22.

23 is a conductor connecting battery 18 with a contact 24 at one end of the section or block. 25 is a conductor connecting the same below the said battery with a contact 26 at the opposite end of the section or block and at the same side of the trackway as contact 24.

27 is a contact normally held yieldingly elevated above and out of engagement with contact 24 through its own resiliency or the pressure of a spring 28 and said contact 27 is electrically connected by conductor 29 with magnet 16. A similar yieldingly elevated contact 30 is electrically connected by conductor 31 to magnet 17.

30 At the same end of the section or block as contact 26 and contact 30 is a contact 32 and a contact 33, the latter being held yieldingly elevated normally above and out of engagement with contact 32, and said contact 32 is electrically connected by a conductor 34 with magnet 21, the contact 33 being electrically connected by conductor 35 with battery 22. A conductor 36 leading also from the same side of said battery 22 connects with contact 37 and held yieldingly above and out of engagement with said contact 37 is a contact 38 electrically connected by conductor 39 with magnet 20. 40 is a battery connected by conductors 41 and 42 to switch arms 10 and 11 respectively. Trains passing over this section or block of trackway are provided with equipment for establishing electrical engagement with the third rail and also with equipment whereby the yieldingly elevated contacts may be caused to engage the underlying contacts, the proper equipment of trains traveling to the right being employed to depress the right

hand yieldingly elevated contacts only. The preferred equipment for accomplishing this purpose is as follows and is preferably mounted on a locomotive 43 as shown, that is to say, 44 indicates a pair of brushes or equivalent contacts carried by the locomotive and adapted to engage the third rail while in a section or block and thus be placed in electric connection with switch terminal 6, the left-hand brush in the arrangement shown, engaging said third rail when the train is traveling in one direction and the right-hand brush when the train is traveling in the opposite direction, it being noticed that this electric connection is broken only for the fraction of an instant of time which elapses when the locomotive is passing from the end of one section to the end of the other section of said third rail.

Mounted upon the cow-catcher by preference is an air cylinder 45 containing a piston 46 and a spring 47 to force said piston yieldingly downward, the piston having a depending stem 48 pivotally connected to an arm 49 hinged at 50 to a bracket 51 or its equivalent carried by the cow-catcher, the front end of arm 49 being equipped with a roller 52 which roller is adapted if depressed to successively depress the contacts 27 and 30 successively or the contacts 33 and 38 successively into engagement with the underlying contacts.

Any suitable means may be employed to lift and hold the rollers 52 in inoperative position, the preferred means being as follows:—53 indicates a compressed air tank carried by the locomotive and supplied with compressed air in any suitable manner. 54 is a pipe leading from said tank to a suitable coupling 55 which is also connected by a pipe 56 to the cylinder 45 below piston 46, the coupling being equipped with any suitable valve 57 for controlling the passage of air from tank 53 to the cylinder.

Assuming that the switches are arranged as shown in Fig. 1, and that a train enters the protected section or block with its roller 52 depressed, it will be apparent that it will first depress contact 27 into engagement with contact 24, if traveling to the right. As a result of this engagement a circuit will be completed as follows:—from battery 18 through conductor 23, contact 24, contact 27, conductor 29 and magnet 16 back to battery. The energization of said magnet will attract armature 15 and cause the switch arms 10 and 11 respectively to engage terminals 6 and 7. As the train passes out of the section or block the roller 52 depresses contact 30 into engagement with contact 36 and completes a circuit through the closing magnet and thus returns armature 15 and switch arms 10 and 11 to their original positions the circuit being traced as follows:—from battery 18 through 25, contact 26, contact

30, conductor 31 and magnet 17 back to battery 18. If the engineer of the first train entering the section knows that another train is following him, he operates the valve 57 to cause air to enter the cylinder 47 and force the piston 46 upward and thus raise roller 52 to inoperative position after entering the section or block so that the roller of his train shall not depress contact 30 as his train passes out of the section or block. He thus leaves to the roller of the following train the duty of depressing said contact 30 and restoring the armature 15 and switch arms 10 and 11 to their original positions. If the engineer of the first of said trains traveling in the same direction left his roller 52 depressed it would on leaving the section or block force contact 30 into engagement with contact 26 and thus restore switch arms 10 and 11 to the position shown in Fig. 1, and consequently if a train traveling in the opposite direction entered the block, no circuit would be completed to operate the alarm mechanism and warn the engineers that two trains were approaching each other in the section or block. The roller of a train traveling to the left depresses contact 33 into engagement with contact 32 and thus completes a circuit; from battery 22 through 35, 33, 32, 34, and 21 back to the battery, the energization of magnet 21 attracting switch arm 19 into engagement with the terminal contact 9. As such train passes out of the block it depresses contact 38 into engagement with contact 37 and completes a second circuit as follows: from battery 22, through 36, 37, 38, 39, and 20 back to the battery, the energization of magnet 20 attracting switch arm 19 and breaking the connection between the same and terminal 9. Should trains enter the block from opposite ends one of them will effect the engagement of switch arms 10 and 11 with terminals 6 and 7 as explained and the other the engagement of arm 19 with terminal 9 and the brushes of both trains will engage the third rail. When the parts occupy this relation, a circuit will be completed through electro-magnetic bells or equivalent alarm mechanisms 58 connected electrically by conductors 59 and 60 to the brushes 44 and axles of the trains and thus both engineers will be aware of the fact that two trains are in the section or block traveling toward each other. The circuit through the alarm mechanism is as follows:—from battery 40, through 41, 12, 10, 6, 5, the two conductors 4, the third rail, the brushes 44, conductors 59, the alarm mechanisms 58, the conductors 60, the track rail 2, conductors 61 connecting said track rail with armature 19, the last-named armature, terminal 9, conductor 8, terminal 7, switch arm 11 and the conductor 42 back to battery.

From the above description it will be seen that we have provided electrical means for

protecting a section or block of track effectively against the danger of the collision of two trains traveling in the section or block in opposite directions and through which
 5 any number of trains may pass successively without disturbing the proper relation of the operative parts of the mechanism, provided the last of a series of trains passing through the block in the same direction shall be utilized for closing the circuit through contacts
 10 26 and 30 or 37 and 38 accordingly as the train is traveling in one direction or the other and while we have illustrated and described the preferred embodiment of the invention, it will be apparent that it is susceptible of modification in minor particulars without departing from the principle and scope of the appended claims.

Having thus described the invention what we claim as new and desire to secure by Letters-Patent, is:—

1. A pair of track rails, a third rail, a pair of yieldingly-separated contacts, a source of current supply having its opposite
 25 poles electrically connected to said contacts, and a second pair of yieldingly-separated contacts electrically connected to opposite poles of said source of electric current supply, in combination with a car traveling on
 30 said trackway and provided with means for successively effecting the engagement of the yieldingly-separated contacts, oppositely disposed magnets in each of said circuits, an armature to be alternately attracted by said
 35 magnets, a double-pole switch having its arms insulated from each other and said armature and carrying the latter, a source of electric current supply in circuit with said arms, a pair of poles adapted to be engaged
 40 by the arms of the switch when the armature is attracted by one of said magnets and to be disengaged from said arms when the armature is attracted by the other magnet, a conductor between the third rail and one
 45 of said poles, a single-pole switch having its pole electrically connected with the other pole of the double-pole switch, a conductor connecting the arm of the single-pole switch with one of the track-rails, third and fourth
 50 pairs of yieldingly-separated contacts, and a source of electric current supply electrically connected to the contacts of said third and fourth pairs of contacts, and an electro-magnet in each of said circuits and adapted to

alternately attract the arm of the single-pole switch. 55

2. A pair of track rails, a third rail, a pair of yieldingly-separated contacts, a source of current supply having its opposite poles electrically connected to said contacts, and a
 60 second pair of yieldingly-separated contacts electrically connected to opposite poles of said source of electric current supply, means for successively effecting the engagement of the yieldingly-separated contacts, oppositely-disposed magnets in each of said
 65 circuits, an armature to be alternately attracted by said magnets, a double-pole switch having its arms insulated from each other and said armature and carrying the latter, a source of electric current supply in circuit with said arms, a pair of poles adapted to be engaged by the arms of the switch when
 70 the armature is attracted by one of said magnets and to be disengaged from said arms when the armature is attracted by the other magnet, a conductor between the third rail and one of said poles, a single-pole switch having its pole electrically connected with the other pole of the double-pole switch, a
 80 conductor connecting the arm of the single-pole switch with one of the track rails, third and fourth pairs of yieldingly-separated contacts, a source of electric current supply electrically connected to the contacts of said
 85 third and fourth pairs of contacts, an electro-magnet in each of said circuits and adapted to alternately attract the arm of the single-pole switch, a pair of cars traveling in opposite directions on the track-rails, one of them
 90 being equipped with means to close the circuit through the first pair of contacts to cause the armature of the double-pole switch to be attracted until the arms of said switch engage the poles thereof and the other with means to close the circuit through the third
 95 pair of contacts to cause the armature of the single-pole switch to engage its pole, and electro-magnetic alarm mechanisms carried by the cars and electrically connected to the
 100 third rail and to the track-rails.

In testimony whereof we affix our signatures, in the presence of two witnesses.

WILLARD KIRKPATRICK.

FRANK W. VAN TUYL.

Witnesses:

H. C. RODGERS,

G. Y. THORPE.