

No. 737,482.

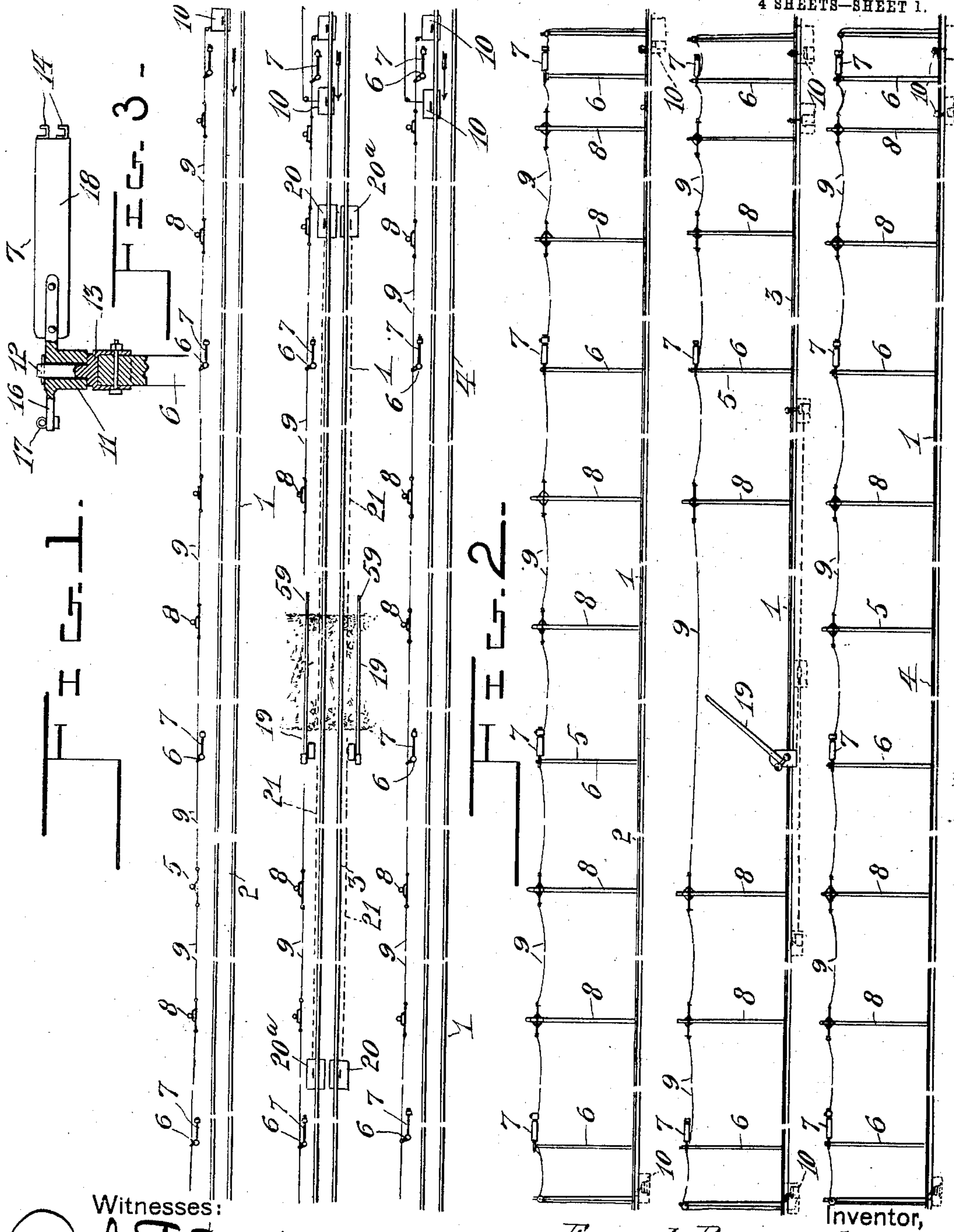
PATENTED AUG. 25, 1903.

E. RENAUD.
AUTOMATIC RAILWAY SIGNAL.

APPLICATION FILED MAR. 16, 1903.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses:

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J. D. Amman

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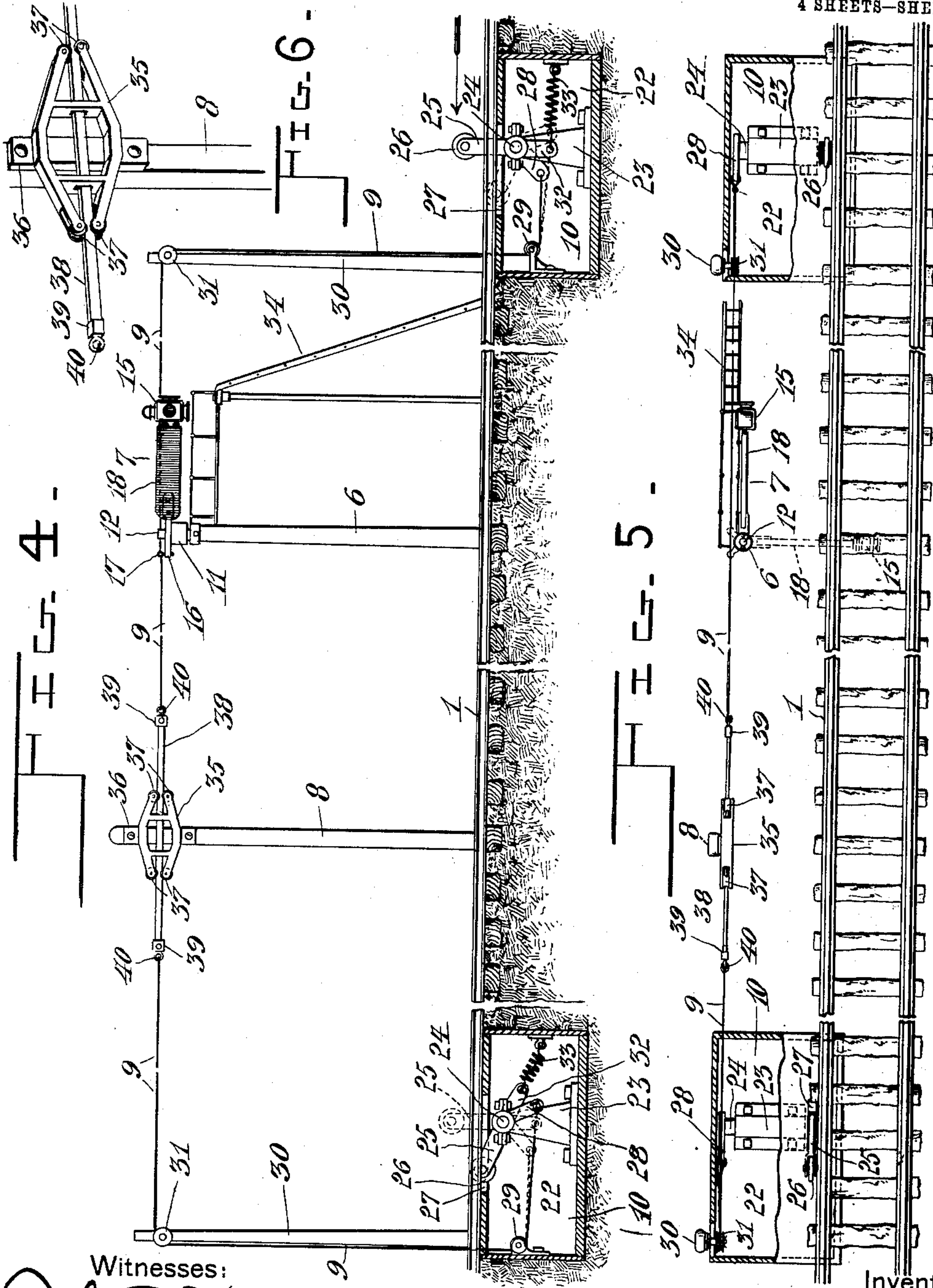
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4 SHEETS—SHEET 2.



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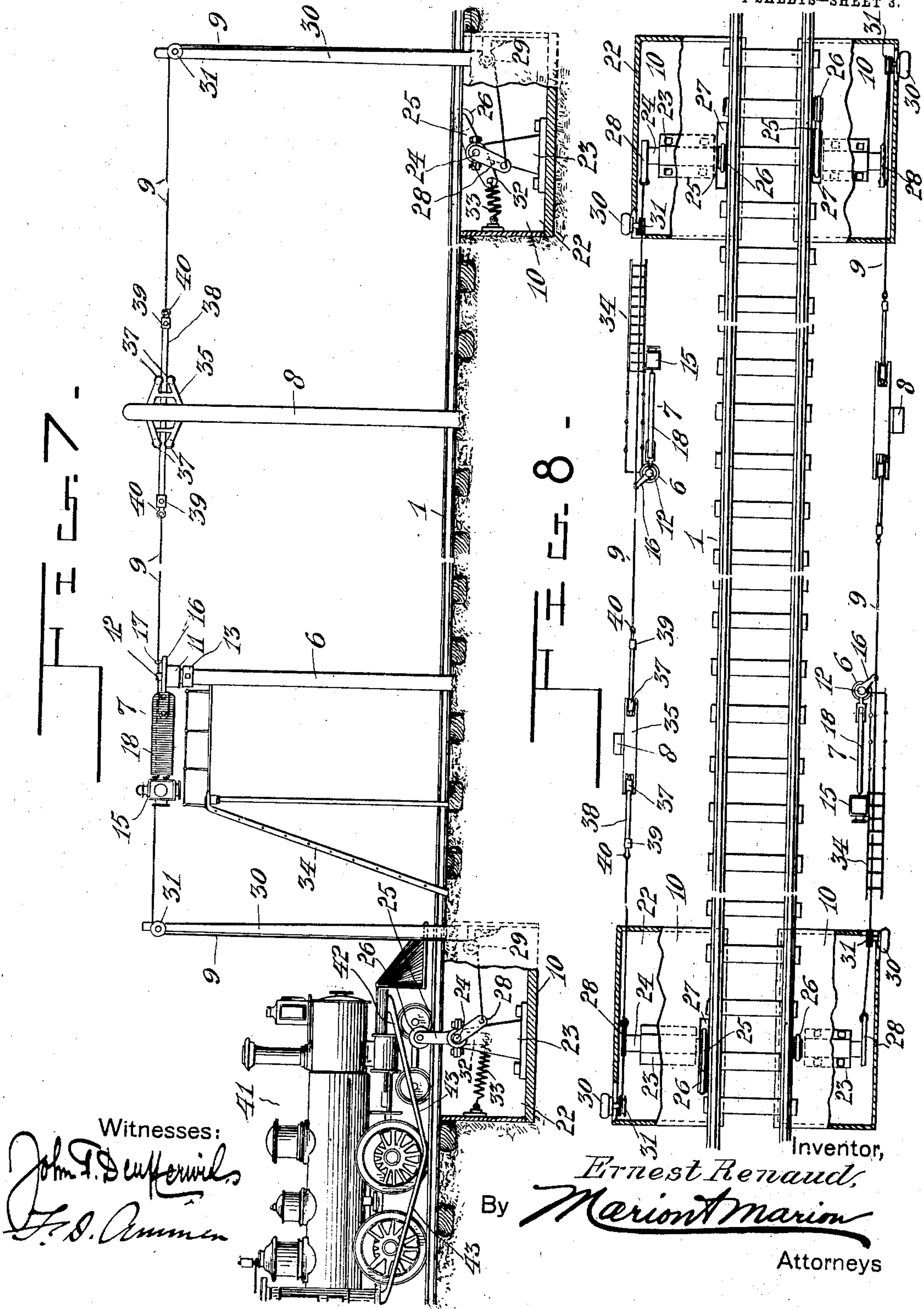
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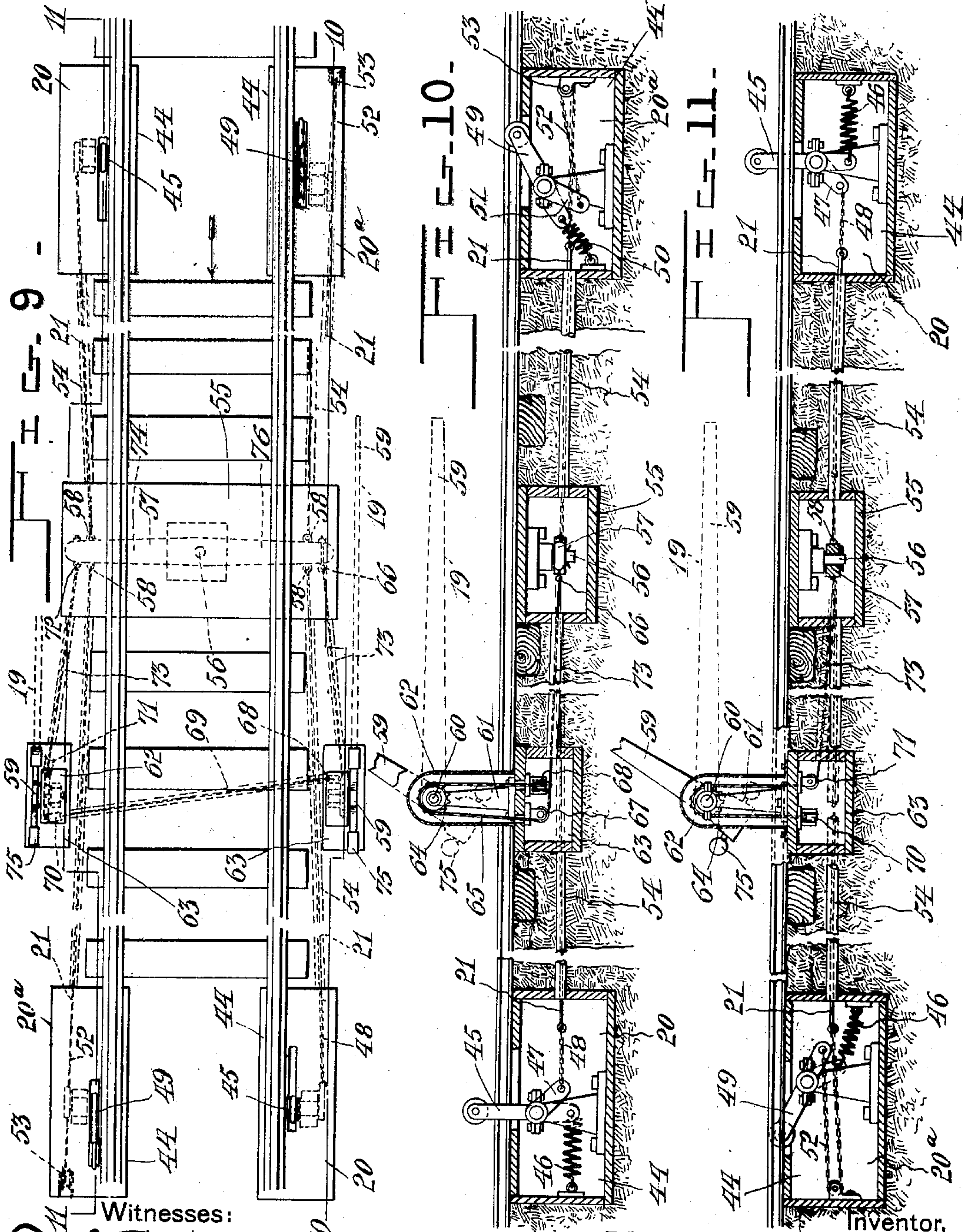
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

ERNEST RENAUD, OF MONTREAL, CANADA, ASSIGNOR OF ONE-HALF TO HENRI BEAUCHEMIN, OF ST. JEAN, CANADA, AND FREDERIC BEAUCHEMIN, OF FARNHAM, CANADA.

AUTOMATIC RAILWAY-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 737,482, dated August 25, 1903.

Application filed March 16, 1903. Serial No. 147,911. (No model.)

To all whom it may concern:

Be it known that I, ERNEST RENAUD, a subject of the King of Great Britain, residing in the city and district of Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Automatic Railway-Signals; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to railways; and its object is to provide for the safety of passengers and persons crossing the railway.

To this end the invention includes an improved form of block-signal system and an automatic railway-gate adapted to be placed at crossings, the block system being of course to prevent accidents, such as collisions, and to facilitate the intelligent operation of the railway system.

The invention consists in the construction and combination of parts to be more fully described hereinafter and definitely set forth in the claims.

In the drawings, Figure 1 represents in plan and upon a small scale three adjacent sections of track supposed to aggregate several miles in length, showing my invention applied to the same. Fig. 2 represents in elevation the aforesaid sections of track illustrated in Fig. 1. Fig. 3 is a view, upon an enlarged scale, representing a semaphore which I use, partly shown in section, as will appear, for the sake of greater clearness. Fig. 4 represents in detail, upon an enlarged scale, parts of the apparatus comprised in my signal system. This view represents the apparatus generally in elevation, the view, however, being a section below the ground-line. Fig. 5 represents, substantially in plan, the apparatus shown in Fig. 4, certain parts being broken away, as will appear. Fig. 6 is a detail perspective, upon an enlarged scale, of the head of one of the poles which I use in connection with my system. Fig. 7 is a view very similar to Fig. 4, showing short sections of the track and signal system. This view shows a locomotive which is about to operate a signal automatically. Fig. 8 rep-

resents, substantially in plan, the apparatus shown in Fig. 7, certain parts being broken away at some points to more clearly disclose the mechanism. This figure illustrates a duplicate arrangement of the apparatus, adapting the same for passing trains in both directions. Fig. 9 represents in plan short sections of track supposed to be more or less remote from each other, one of which sections includes a gate supposed to be located at a crossing, the gate being in open position. Fig. 10 shows certain of the parts of Fig. 9 substantially in section, which parts are located on the left side of the track with reference to the arrow indicated upon the track in Fig. 9. Fig. 11 is a view similar to Fig. 10, but representing the apparatus at the right of the track.

Throughout the drawings and specification the same numerals of reference indicate like parts.

Referring to the parts more particularly, 1 represents a railway-track, and referring especially to Figs. 1 and 2 it should appear that three sections are represented, which are designated, respectively, by the numerals 2, 3, and 4. At the right of these sections arrows are represented, indicating the direction in which trains are supposed to pass. It should be understood that these three sections are supposed to represent adjacent portions of the track, the section indicated by 2 being supposed to lie at the right of section 3, while section 4 is supposed to lie at the left of section 3. This arrangement is adopted for the purpose of bringing the figure within the confines of the sheet, while maintaining it upon a suitably large scale.

As briefly stated above, the track-sections 2 3 4 are supposed to aggregate in length several miles, an aggregate of two miles being considered usually sufficient for the purposes of the invention. At the side of the track are provided a succession of poles 5, disposed at a suitable distance apart, as indicated. Ordinary telegraph-poles would serve the purpose under ordinary circumstances. Certain of these poles, such as those designated by the numeral 6, are provided with semaphores 7, and these semaphores

may be located at such distances apart as considered practicable, paying due regard to the safety and operativeness of the system. The poles 8, which do not carry the semaphores, are intended to support operating cables or wires 9, by means of which the semaphores are actuated at the proper times. The construction of the semaphores and the devices in connection with the poles will be more fully described hereinafter. It should be understood that there is one of the aforesaid operating-wires 9 in connection with each of the sections 2 3 4, and at their extremities these wires are connected with track devices 10, by means of which the semaphores are automatically controlled. In this manner each of the sections constitutes a signal-block. These blocks or sections are supposed to be arranged so that the ends of the sections overlap, as it were, from which arrangement the first track device of a succeeding section will be operated by a passing train before the last track device of the section which has just been left by the train. This plan makes it absolutely certain that the train will always be within range of the signals. Such an arrangement appears to be necessary, for the reason that otherwise it would be possible for a very short train—for instance, such as a locomotive and tender—to come to a stop exactly between two blocks or sections, there being no indication to an approaching train that a collision was imminent.

Referring especially to Fig. 3, it should appear that the semaphores 7 comprise bosses or hubs 11, which are rotatably mounted upon pintles 12, which pintles are integral with caps 13, which surmount the poles in the manner shown. At their extremities the semaphores are provided with brackets or hooks 14, which enable lamps 15 to be attached, respectively, to each, one of the said lamps being shown in Figs. 4 and 7. It should, however, appear that the hub of each semaphore has an integral rearward extension or arm 16, which is provided with an eye 17, in which the operating-wire 9 may be attached. From the arrangement indicated in Fig. 1 it should appear that if a train passed in the direction of the arrow it could operate the corresponding track device 10 as it reached a block so as to produce a pull in the wire 9, as will be readily understood, and through the medium of the extensions 16 all of the semaphores in that block are thrown into the danger position, with their signal-arms 18 projecting transversely of the track. This position for the signals is maintained by all of the signals in that block until the next track device is operated. This next track device may be substantially similar to the one first reached; but it operates to produce a pull upon the wire 9 in the opposite direction, whereupon all the semaphores in the block are returned to their inoperative position.

A railway-gate 19 is represented at substan-

tially the middle portion of the section 3. This gate is automatically operated by means of the track devices 20 and 20^a, which are located, respectively, on either side of the same and at sufficiently remote points. They are in connection with the gate through the medium of pull connections 21 or similar devices. It should be understood that an approaching train operates the first of the devices 20 which it passes to close the gate 19, the gate remaining closed until the second track device 20^a is passed. The actuation of the second device returns the gate to its normal open position.

Referring especially to Figs. 4 to 6, inclusive, it should appear that the aforesaid track devices 10, which are there shown, are disposed in boxes 22, which are located at the side of the track and depressed. These track devices are substantially similar. One of them will now be described. Each track device comprises a pillow-block or pedestal-bearing 23, in which is rotatably mounted a short horizontal shaft 24, disposed in a direction substantially at right angles to the direction of the track at that point. At its extremity adjacent to the track the shaft 24 carries rigidly an arm or lever 25, which may project upwardly, so that it is adapted to be struck by a passing train. In furtherance of its purpose its extremity is provided with a contact-roller 26. It should appear that this lever 25 projects upwardly through the top of the box, passing through an opening 27, provided for that purpose. A second arm 28, which is also rigid with the shaft 24, projects downwardly from the same, and to its extremity is attached the signal-wire 9, which wire passes over a sheave 29, whence it passes in a vertical direction to a pole 30, which constitutes the end pole of that block. This pole is provided with a sheave 31, about which the wire passes, as shown. Another arm 32, which is rigid with the aforesaid shaft 24, projects from the same in a direction substantially opposite to the arm 25. To its lower extremity there is attached a light helical spring 33, and it should be observed that a tension in this spring is applied in a direction adapted to take up the slack of the wire 9, and it should further appear that in conjunction with the wire 9 this spring 33 could operate to maintain the lever 25 in an erect or vertical position, such as that shown in the right-hand track device of Fig. 4. It should be stated that this erect position is the operative position for this lever, in which position it is adapted to be struck by a passing train in a manner which will be described hereinafter. It will then be depressed into an inclined position, lying in the direction in which the train is passing. It should be understood that the track device shown at the right in Fig. 4 is the one supposed to be struck by a train as it passes onto the corresponding block and that the track device shown at the left of Fig. 4 is

adapted to be struck as the train passes off of this block. It should appear also that the normal positions of the levers 25 in the two track devices are complementary—that is, when the lever 25 on the right-hand device is erect, as shown in Fig. 4, the corresponding lever 25 of the other track device is depressed, as indicated. The dotted lines in connection with the devices represent them in reversed position.

The arrangement for effecting the simultaneous movement of the semaphore-signals 18 when a train passes onto the block has been already described. In connection with each semaphore-pole 6 a ladder 34 may be provided for the purpose of attending to the semaphore.

Each of the poles 8 is provided near its upper extremity with a guide-bracket 35, preferably of the form shown, comprising a plate 36, adapted to be attached to the side of the pole in the manner indicated. At each end of each of these brackets is provided with cooperating rollers 37, between which is mounted a draw-bar 38. The construction of all these poles 8 and all the brackets 35 is substantially the same. The draw-bars 38 comprise heads 39 with eyes 40, in which eyes are attached the sections of the operating-wire 9. From this arrangement the force necessary to operate the wire 9 is much reduced and the taking up of slack in the line is also facilitated.

In Fig. 7 a locomotive 41 is represented which is about to enter one of the blocks or signal-sections. This locomotive comprises a cam-bar 42, which comprises opposite inclined branches 43, and this cam-bar is disposed so that as the locomotive passes it may strike one of the rollers 26, already described in connection with the track devices, depressing the same, with the desired effects already referred to. It should appear that this cam-bar 42 is of considerable length, extending, as it does, substantially throughout the entire length of the locomotive-frame. From this arrangement the shock which would be produced by trains moving at very high velocity is averted.

Recurring again to the track devices, it should be stated that while the aforesaid springs 33 afford means in connection with the pull-wires for maintaining the levers 25 erect at times they also evidently afford means for returning these levers to an erect position if they have been thrown from such an erect position by a locomotive passing in a direction opposite to that indicated by the arrow in Fig. 4. Evidently a reverse movement of these levers will have no effect upon the signals.

In Figs. 9, 10, and 11 the arrangement for operating the railway-gate 19 is fully illustrated. In this connection reference has already been made briefly to the track devices 20 and 20^a, which are for the purpose of automatically actuating this gate. As shown

in Fig. 9, there are altogether four of these track devices in connection with the gate, disposed in pairs adjacent, respectively, to the two rails of the track. It should be stated that the pair of track devices which are adjacent to one rail are intended to be operated by a train passing in one direction, while those on the opposite side of the track are intended to be operated by a train passing in the other direction, it being understood that there is only one cam-bar 42 on each locomotive, located, as indicated, on the right-hand side of the same. The track devices 20 are the ones which operate to close the gates, while the track devices 20^a are the ones which operate to reopen the gate after the train has passed. All these track devices in connection with the gate are suitably arranged in boxes 44 similar to the aforesaid boxes 22. The track devices 20 are in every respect substantially similar to the aforesaid track devices 10, which have already been described, comprising upwardly-extending arms or levers 45, which are adapted to be deflected by the cam-bar 42, springs 46 being employed in connection with these track devices which are similar to the springs 33, described in connection with the track devices 10 and for the same purpose. They comprise also the arms or levers 47, which attach to the pull connections 21, which connections comprise chains 48. The track devices 20^a are in many respects substantially the same as the track devices 20, comprising upwardly-extending levers or arms 49, springs 50, and arms 51, to which are attached chains 52. Before attachment to the pull connections 21, however, these chains 52 pass around sheaves 53, so as to make use of the direction of movement of the lever in an opposite direction, as will be readily understood. The pull connections 21 may pass through suitable conduits 54 in the manner indicated.

Adjacent to the gate 19 there is located in the bed of the track a box 55, in which there is pivotally mounted at 56 a lever 57, which is disposed longitudinally of the box and transversely of the track, as indicated. Near its extremities this lever 57 is provided with oppositely-disposed eyes 58, in which eyes attach the aforesaid pull connections 21. This lever 57 affords means for actuating the gate by means of any one of the track devices. Referring especially to the construction of the gate, it should be understood that this gate comprises individual gate members or bars 59, which are disposed, respectively, on opposite sides of the track, and it should be understood that these bars are raised or lowered simultaneously into their open or closed position. These gate members 59 are mounted upon suitable trunnions 60, carried in pedestals 61, which are inclosed within casings 62, mounted upon the gate-boxes 63. These trunnions each carry rigidly a sprocket-wheel 64, over which passes a sprocket-chain 65, and evidently movement of this chain

affords means for raising and lowering the gate. One extremity of this chain is attached at 66 to a suitable eyebolt, whence it passes around a guide-pulley 67, then over one of the sprocket-wheels 64. Returning downwardly it passes over a second guide-pulley 68, from which point it crosses the track in a suitable conduit 69 and passes upwardly around a guide-pulley 70, similar to the guide-pulley 68 aforesaid, and from this point it passes over the corresponding sprocket-wheel 64 of the opposite gate member. Passing downwardly again it runs around another guide-pulley 71, and from this point it passes to an eyebolt 72, disposed at a point opposite to the point 66. In passing from the gate-boxes to the gate-lever 57 this chain passes through suitable conduits 73. From the arrangement described it should appear that if the locomotive shown in Fig. 7 were to pass in the direction of the arrow shown in Fig. 9 the lever 45 of the track device 20 on the right-hand side of the track would be deflected before the locomotive reached the gate. This would operate to produce a pull in the corresponding pull connection 21, which would deflect the right-hand arm 74 of the lever 57 toward the right and in a direction opposite to that in which the train approached. This would evidently move the chain 65 in a direction which would shut the gates. The gate members 59 being suitably balanced by counterweights 75 maintain themselves in the open position until the track device 20^a is reached, whereupon the arm 74 will be pulled in the opposite direction. The arm 76 then operates to produce a pull in the chain 65 in the reverse direction, so that the gates are returned thereby to their normal closed position.

While I have shown in the accompanying drawings the preferred form of my invention, it will be understood that I do not limit myself to the precise form shown, for many of the details may be changed in form or position without affecting the operativeness or utility of my invention, and I therefore reserve the right to make all such modifications as are included within the scope of the following claims or of mechanical equivalents to the structures set forth.

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

1. In combination, a plurality of signals disposed along the railway-track, a cable connecting said signals, a plurality of poles, guides carried by said poles, bars longitudinally movable in said guides, cables connecting with said bars, and automatic means for actuating said cables.

2. In combination, a plurality of semaphores disposed along the railway-track, a plurality of poles therebetween, guides carried by said poles and having rollers at the extremities thereof, bars movably mounted in said guides between said rollers, a pull-

wire successively connecting said bars and said signals, and automatic means for actuating said pull-wire by a passing train.

3. In combination, a plurality of signals constituting a railway signal-block, track devices located respectively at the ends of said block, said track devices each comprising a lever, which levers have operative and inoperative positions, the inoperative position of one lever corresponding to the same signal position as the operative position of the other lever, and a cam-bar adapted to be carried by a train, and which may deflect said levers from their operative position.

4. In combination, a plurality of signals constituting a railway signal-block, track devices located respectively at the ends of said block, said track devices comprising actuating-levers, means whereby one of said levers normally occupies an operative position, a member carried by a passing train and adapted to deflect said lever from said operative position, the other of said levers normally occupying an inoperative position, means whereby said first lever may throw said signals into the danger position, and throw said second lever into its operative position, and means whereby said second lever may return said signals and said first lever.

5. In combination, a plurality of signals constituting a railway signal-block, track devices, said track devices comprising levers, means whereby the deflection of said levers in one direction may actuate said signals, and means whereby said levers may be deflected in a reverse direction without affecting said signals.

6. In combination, a plurality of signals constituting a railway signal-block, track devices comprising levers, a pull-wire connecting said signals with said levers, springs opposed to said pull-wire and connected with said levers, said springs cooperating with said pull-wire so that said levers may be maintained in an operative position.

7. In combination, a plurality of signals constituting a railway signal-block, track devices located respectively at the ends of said block, said track devices comprising levers, a pull-wire connecting said levers with said signals whereby the deflection of said levers in one direction may actuate said signals and springs connected with said levers, and adapted to return them when deflected in a reverse direction.

8. In a railway-crossing gate, in combination, a bar, which may be disposed across the roadway, and having an axis of rotation, a sprocket-wheel carried by said bar, a chain passing thereabout, a lever to which the extremities of said chain attach, automatic track devices located at opposite points upon the railway-track, and means for connecting said track devices with said lever.

9. In a railway-crossing gate, in combination, a pair of pivotally-mounted bars disposed on opposite sides of the railway-track, sprocket-wheels carried thereby, a chain pass-

ing over said sprocket-wheels and adapted to
move said bars simultaneously, a lever to
which the extremities of said chain attach,
and automatic track devices adapted to ac-
5 tuate said lever.

10 10. In a railway-crossing gate, in combina-
tion, a pair of bars disposed on opposite sides
of the railway - track, means for pivotally
mounting said bars, wheels carried by said
10 bars, a flexible member passing successively
over said wheels in the same direction, where-
by said bars may be simultaneously raised or
lowered, a lever having oppositely-extending
arms, the ends of said flexible member being
15 attached respectively to said arms, and auto-
matically-operated track devices adapted to
actuate said lever.

11. In a railway-crossing gate, in combina-
tion, a pair of bars disposed on opposite sides

of the railway-track, means for supporting 20
the same upon substantially horizontal pivots,
sprocket-wheels carried by said bars, a chain
passing successively over said sprocket-
wheels, a lever connecting with the said
sprocket-chain, a track device located at one 25
side of said gate and connected with said le-
ver, a second track device located at the op-
posite side of said gate and also connected
with said lever, said lever being adapted to
raise and lower said gates by the opposite 30
movements thereof.

In witness whereof I have hereunto set my
hand in the presence of two witnesses.

ERNEST RENAUD.

Witnesses:

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A. FORGUES.