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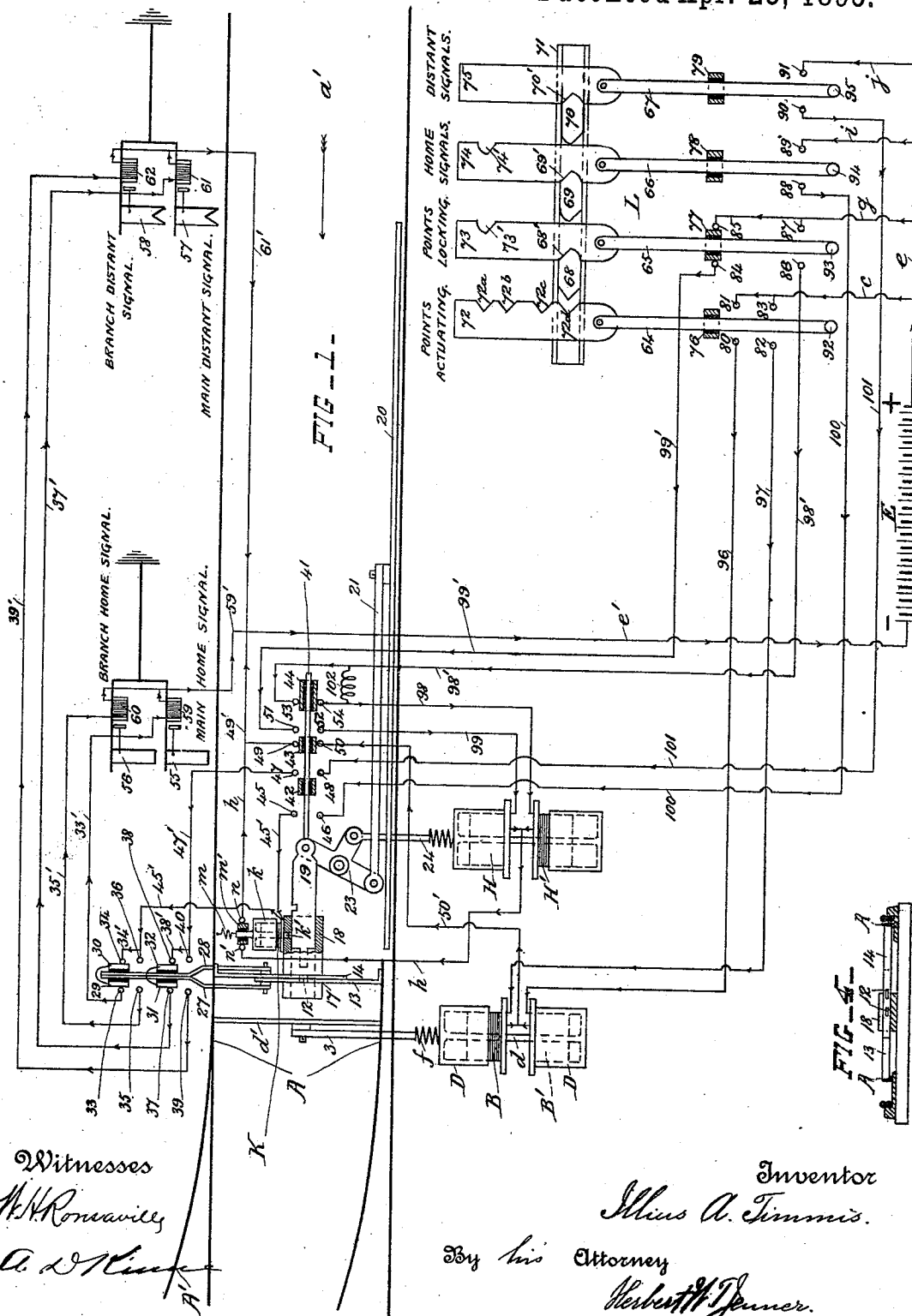
3 Sheets—Sheet 1.

I. A. TIMMIS.

WORKING OF RAILWAY POINTS AND SIGNALS BY ELECTRICITY.

No. 538,136.

Patented Apr. 23, 1895.



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(No Model.)

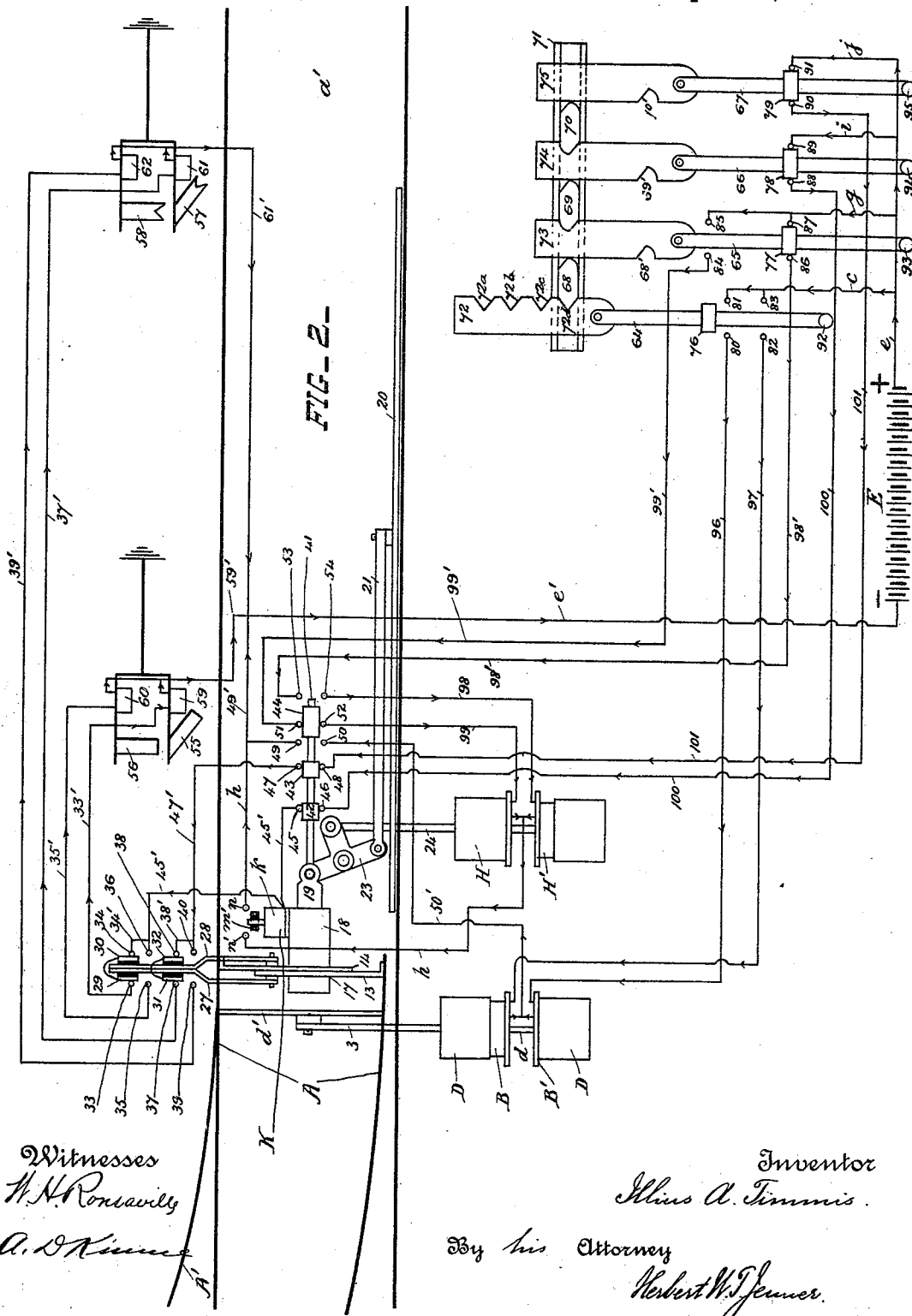
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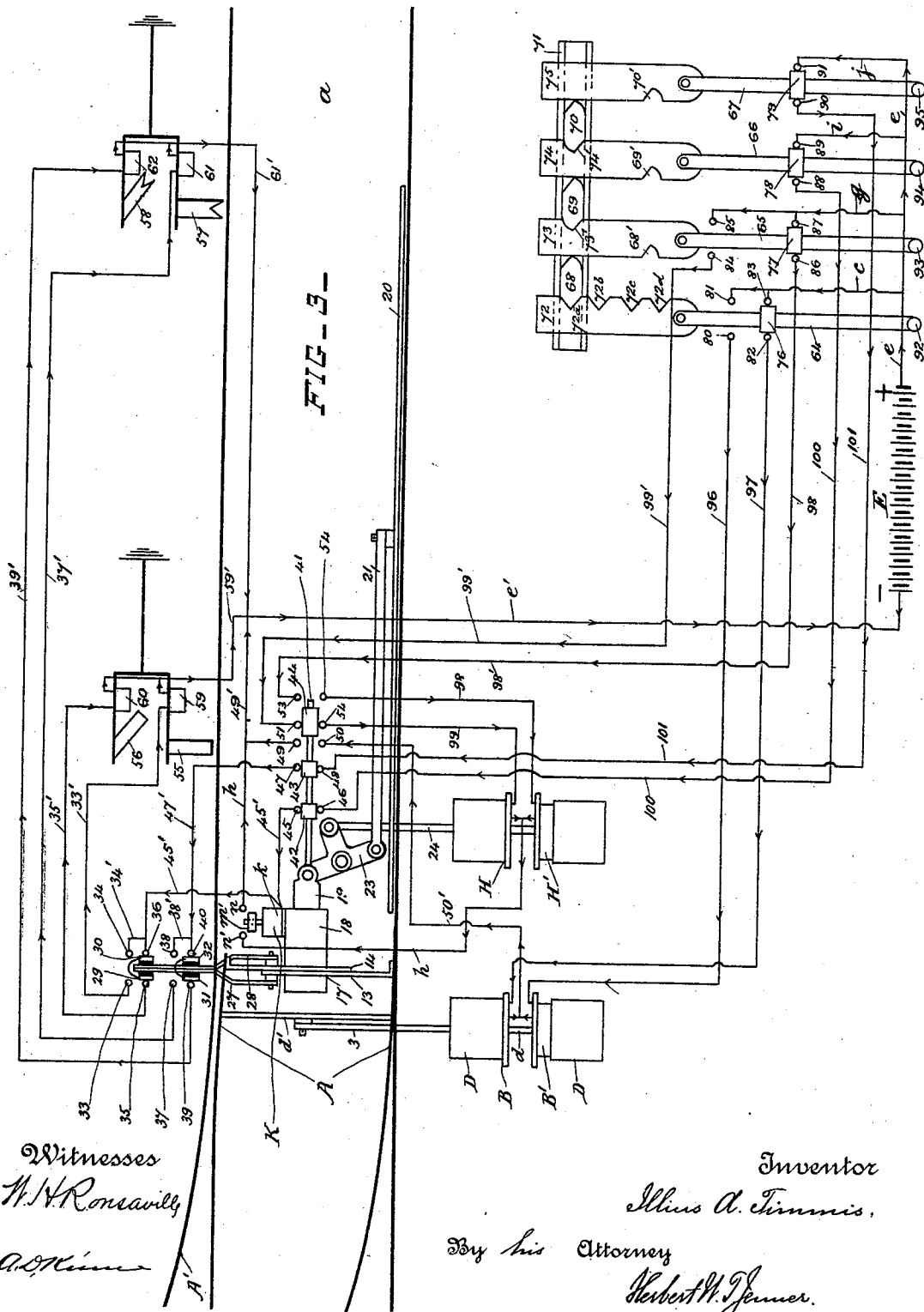
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UNITED STATES PATENT OFFICE.

ILLIUS AUGUSTUS TIMMIS, OF LONDON, ENGLAND.

WORKING OF RAILWAY POINTS AND SIGNALS BY ELECTRICITY.

SPECIFICATION forming part of Letters Patent No. 538,136, dated April 23, 1895.

Application filed June 9, 1894. Serial No. 514,087. (No model.) Patented in England November 11, 1893, No. 21,946.

To all whom it may concern:

Be it known that I, ILLIUS AUGUSTUS TIMMIS, a subject of the Queen of Great Britain and Ireland, residing at No. 2 Great George Street, Westminster, London, in the county of Middlesex, England, have invented certain new and useful Improvements in the Working of Railway Points and Signals by Electricity, (for which I have obtained a patent in Great Britain, No. 21,946, bearing date November 11, 1893,) of which the following is a specification.

This invention relates to apparatus for working railroad points and their locking devices and signals by means of electricity; and it consists in the novel combination of the parts hereinafter fully described and claimed.

In the drawings, Figure 1 is a diagram of the apparatus, showing the points set for the main line but not locked. Fig. 2 is a similar diagram, but shows the points locked and the main home and distant signals lowered. Fig. 3 is a similar diagram but shows the points set and locked for the branch line, and the branch home and distant signals lowered. Fig. 4 is an end view of the points showing the slots of the locking bars.

A represents the points.

A' is the branch line, and a' is the main line.

The points are facing points for a train moving in the direction of the arrow.

The points are operated by an electric motor of any approved construction. The preferred form of motor consists of two stationary electro-magnets B B', having two armatures D. The armatures are connected together by the rod d, and to the stretcher bar d', secured to the points, by the rod 3. If desired, a spring f may be interposed between the armatures and the rod 3.

L is a signal station or cabin containing a switch frame.

64 is the points actuating switch.

65 is the points locking switch.

66 is the home signals operating switch.

67 is the distant signals operating switch.

The switches 64, 65, 66, and 67 are provided, respectively, with the notched tappets 72, 73, 74 and 75, which slide crosswise of a grooved guide 71 provided with cross grooves for the said tappets to slide in.

68, 69 and 70 are locks interposed between the four tappets and sliding longitudinally in the guide 71. The tappets 73 and 74 have each two notches 73', 68', and 74', 69', respectively. The tappet 72 has four notches 72^a, 72^b, 72^c and 72^d, the use of which will be more fully described hereinafter. The tappet 75 has one notch 70'.

The switches 64, 65, 66 and 67 are respectively provided with operating handles 92, 93, 94 and 95 of approved construction, and insulated contact pieces 76, 77, 78 and 79. These contact pieces are of any approved construction, and may be rings insulated from the switches by brushes of non-conducting material.

E is an electricity generator or battery for supplying current to the motor B B', and to the other motors and magnets hereinafter fully described.

The battery E is provided with a positive main conductor e, and a negative main conductor e'.

80, 81, and 82, 83, are two pairs of contacts working in connection with the contact piece 76 of the points actuating switch 64. The contacts 81 and 83 are connected to the positive main e by the lead c. The contact 80 is connected to the electro-magnet B' by the conductor 96, and the contact 82 is connected to the electro-magnet B by the conductor 97. The points are actuated by moving the contact piece 76. When this contact piece connects the contacts 80 and 81 the electro-magnet B' is energized, and the points are set for the main as shown in Fig. 1. When the contact piece 76 connects the contacts 82 and 83, the electro-magnet B is energized, and sets the points for the branch as shown in Fig. 3. The contact piece is moved away from the contacts after the points have been set, so that the current may not be wasted.

Two locking bars 13 and 14 are preferably provided, and are secured to the respective tongues of the points. These bars are provided with two slots 12 or notches for the locking bolt to engage with as shown in Fig. 4. These locking bars slide in a groove 17 of the box 18 which is of ordinary approved construction and is secured between the rails.

19 is a locking bolt which slides in the box 18 transversely of the locking bars and en-

gages with their slots 12. The locking bolt has a bar 41 attached to it, and this bar is provided with the insulated contact pieces 42, 43 and 44, the use of which will be more fully described hereinafter. The slots 12 permit the locking bolt to be pushed in when the points are at their extreme positions, but not when they are in intermediate positions. The locking bolt 19 is operated by an electric motor of any approved construction.

H H' are electro-magnets which may be used to operate the locking bolt. These electro-magnets are similar to the electro-magnets B B' hereinbefore described, and are provided with an actuating rod 24.

23 is a pivoted bell-crank lever operatively connecting the rod 24 with the locking bolt 19.

49 and 50 are two contacts which are connected by the contact piece 43. The contact 50 is connected to the electro-magnets B B' by the conductor 50', and the contact 49 is connected to the negative main e' by the conductor 49', so that the negative portion of the circuit between the battery E and the electro-magnets B B' is complete when the locking bolt 19 is pushed out as shown in Fig. 1.

The electro-magnets H H' are connected to the negative main e' by the conductors h and 49'. The electro-magnet H' is connected to the positive main e by the conductors 98, 98' and g . The conductors 98 and 98' are connected by their contacts 54 and 53 through the contact piece 44 when the locking bolt is pushed out. The conductors 98 and g are connected by their contacts 86 and 87 through the contact piece 77 on the points locking switch 65.

The electro-magnet H is connected to the positive main e by the conductors 99, 99' and g . The conductors 99 and 99' are connected by their contacts 52 and 51 through the contact piece 44, as shown in Fig. 2, when the locking bolt is pushed in. The conductors 99' and g are connected by their contacts 84 and 85 through the contact piece 77 on the points locking switch 65. When the locking bolt is pushed in, as shown in Fig. 2, and the connection between the contacts 53 and 54 is broken, a weak current is preferably still allowed to pass from the conductor 98' to the conductor 98 through the resistance 102. This weak current energizes the electro-magnet H' sufficiently to hold the locking bolt in position and prevent it from slipping back.

20 is a locking bar or detector bar of any approved construction, such as that shown in the United States Letters Patent to Burley, No. 397,414. This bar 20 rises and falls in the usual way, and is pivotally connected to the bell-crank lever 23 by the rod 21. The weight of the bar 20 may be relied on to hold the locking bolt when pushed in, instead of, or as an auxiliary to, the current which passes through the resistance 102 hereinbefore described. When the wheels of a train come over the bar 20, it cannot be raised and the locking bolt 19 therefore cannot be operated.

Selector bars 27 and 28 are attached to the locking bars 13 and 14 respectively. Pairs of insulated contact pieces 29 30 and 31 32 are attached to the bars 27 and 28, and the contact pieces of each pair are connected by wires. The bars 27 and 28 also act as detectors, because if one moves without the other, as would be the case if the bar 4 were to break, the said wires would be broken and the circuit would not be made or maintained through the pairs of contact pieces.

The signals used in connection with this invention are of any approved kind, worked by electro-magnets, such as, for instance, that shown in the United States Letters Patent to Timmis, No. 503,505, dated August 15, 1893.

55 is the main home signal, and 59 is its magnet.

56 is the branch home signal, and 60 is its magnet.

57 is the main distant signal, and 61 is its magnet.

58 is the branch distant signal, and 62 is its magnet.

The magnets 59 and 60 are connected with the negative main e' by the conductor 59', and the magnets 62 and 61 by the conductor 61'.

The conductor 51' may be joined to the conductor 49', or to the main e' direct, at or beyond the point where the conductor 49' is connected to it.

The two home signals 55 and 56 are operated by a current taken from the positive main e through the lead i . This current passes through the contacts 89 and 88, when connected by the contact piece 78 on the home signal switch 66, and thence through the conductor 100 to the conductor 45'. The conductors 100 and 45' are provided with contacts 46 and 45 which are connected by the contact piece 42 when the locking bolt is pushed in. The current passes through the conductors 45' and 35' to the magnet 60 of the branch home signal when the contacts 36 and 35 of the said conductors 45' and 35' are connected by the pair of contact pieces 29 30, which occurs when the points are set for the branch as shown in Fig. 3. This energizes the magnet 60 which lowers the signal 56. The signal rises automatically when the circuit is broken. The current passes through the conductors 45' and 33' to the magnet 59 of the main home signal, when the contacts 33 and 34 are connected by the said pair of contact pieces 29 30. The contact 33 is at one end of the conductor 33', and the contact 34 is at one end of a branch conductor 34' which is connected to the conductor 45'.

The two distant signals 57 and 58 are operated by a current taken from the positive main e through the lead j . This current passes through the contacts 91 and 90, when connected by the contact piece 79 on the distant signals switch 67, and thence through the conductor 101 to the conductor 47'. The conductors 101 and 47' are provided with contacts 48 and 47 which are connected by the

contact piece 43 when the locking bolt 19 is pushed in. The current passes through the conductors 47' and 39' to the magnet 62 of the branch distant signal when the contacts 40 and 39 of the said conductors 47' and 39' are connected by the pair of contact pieces 31 32, as shown in Fig. 3. The magnet 62 is then energized and the signal 58 is lowered.

The current passes through the conductors 47' and 37' to the magnet 61 of the main distant signal, when the contacts 37 and 38 are connected by the said pair of contact pieces 31 32. The contact 37 is at one end of the conductor 37', and the contact 38 is at one end of a branch conductor 38' which is connected to the conductor 47'.

K is an electro-magnet included in the run of the conductor 45'. This electro-magnet is secured to the box 18, and its armature *k* is provided with a lock or bolt *k'* which engages with a notch in the locking bolt 19 and prevents it from being moved when the electro-magnet K is energized. The armature is normally held off by the spring *m*, and *m'* is an insulated contact piece which connects the contacts *n n'* of the conductor *h* and keeps the parts of the conductor *h* connected as long as the electro-magnet K is not energized.

The arrow heads on the conductors indicate the directions of the currents.

The switches 65, 66 and 67 can be locked by moving the tappet 72 so that no one of its notches is in front of the lock 68.

When the parts are in the positions shown in Fig. 1, no current is passing, but the switch 65 may be moved to place the contact piece 77 between the contacts 86 and 87. This movement of the switch 65 causes the lock 68 to enter the notch 72^d of the tappet 72 and locks the points actuating switch. The current then passes from the main *e*, through the conductors 98' and 98 to the electro-magnet H', which pushes in the locking bolt 19 to the position shown in Fig. 2, and also operates the locking bar 20, when used unless a car wheel or wheels should be upon the rail over the bar 20 and thereby lock it by preventing it from being raised. The movement of the locking bolt 19 disconnects the contacts 53 and 54, and 49 and 50, and connects the contacts 51 and 52, 47 and 48, and 45 and 46. The notch 73' of the tappet 73 being in front of the lock 69, the home signals switch 66 may now be moved to connect the contacts 88 and 89. The current now passes from the main *e* through the conductors 100 and 45' and energizes the electro-magnet K, which locks the locking bolt 19 and interrupts the return circuit of the electro-magnet H' by moving the contact piece *m'* from between the contacts *n n'* of the conductor *h*. The current in the conductor 45' passes through the conductors 34' and 33' to the electro-magnet 59 and lowers the main home signal 55, because, the points being set for the main line, the selector bars 27 28 have placed the pair of contact pieces 29 30 between the contacts 33 and 34. This

position of the selector bars also places the pair of contact pieces 31 32 between the contacts 37 and 38, so that when the distant signals switch 67 is moved, and its contact piece 79 placed between the contacts 90 and 91, the current passes from the main *e* through the conductors 101, 47', 38' and 37' to the electro-magnet 61 of the main distant signal 57. The position of the parts at this stage is illustrated in Fig. 2.

In order to restore the parts to the positions shown in Fig. 1, the switches 67, 66 and 65 must be moved back in the reverse order to that previously described. The reverse movement of the switch 66 frees the locking bolt 19 from the lock *k'*, and the reverse movement of the switch 65 energizes the electro-magnet H which draws out the locking bolt.

The points are set for the main in Fig. 1 because the contact piece 76 has last been between the contacts 80 and 81 in the act of moving the switch 64. When the contacts 80 and 81 are thus connected the current from the main *e* passes through the conductor 96 and energizes the electro-magnet B' which sets the points for the main as shown in Fig. 1. The switch 64 may be left with the contact piece 76 between the contacts 80 and 81, if desired, because the lock 68 can then enter the notch 72^c, and the next movement of the points locking switch 65 will break the circuit of the electro-magnet B' because the contact piece 43 will be moved from between the contacts 49 and 50 which are in the return circuit between the electro-magnet B' and the negative main *e'*. It is however preferable not to leave the contact piece 76 between the contacts 80 and 81, or between the contacts 82 and 83, as if there is any delay in operating the points locking switch there will be a corresponding waste of current. If the points are not fully moved over when the attempt is made to operate the locking bolt 19, they can be pushed over by moving back the switch 64 to re-establish the circuit through the contacts 80 and 81, or 82 and 83.

When it is desired to operate the branch line, the switch 64 is moved to the position shown in Fig. 3. In passing to this position the contact piece 76 was last in contact with the contacts 82 and 83, and a current was sent from the main *e*, through the conductor 97 to the electro-magnet B, which was energized, and pulled over the points and the selector bars 27 and 28 to the positions shown in Fig. 3. The selector bars now place the pairs of contact plates 29 30 and 31 32 between the contacts 35 and 36, and 39 and 40, so that when the switches 65, 66 and 67 are operated in rotation, as hereinbefore described, the points are first locked and the home and distant signals are operated, but with this difference, that the currents of electricity are now sent to actuate the branch home and distant signals instead of the main home and distant signals.

What I claim is—

1. The combination, with the points provided with a locking bar, and an electric motor operatively connected to the points; of a locking bolt engaging with the said locking bar, and a second electric motor operatively connected to the said bolt; an electricity generator, and conductors, for operating the two said motors; and two switches provided with interlocking mechanism, preventing them from being operated simultaneously, and operating to connect the said generator with the respective motors, substantially as set forth.

2. The combination, with the points provided with a locking bar, and an electric motor operatively connected to the points; of a locking bolt engaging with the said locking bar, a detector bar 20, and a second electric motor operatively connected to the said locking bolt and detector bar; an electricity generator, and conductors; and two switches provided with interlocking mechanism and operating to connect the said generator with the respective motors, substantially as set forth.

3. The combination, with the points provided with a locking bar; of a locking bolt engaging with the said bar; an electric motor for operating the locking bolt; an electro-magnet K provided with a lock, and a contact piece arranged in the circuit of the said motor; and two interlocking switches, one operating to supply current to the motor, and the other operating to supply current to the electro-magnet thereby causing it to lock the said locking bolt and to break the circuit of the said motor after the locking bolt has been pushed in by it, substantially as set forth.

4. The combination, with the points provided with a locking bar; of the locking bolt engaging with the said locking bar; two electric motors for operating the points and the locking bolt respectively; the branch home and distant signals, and the main home and distant signals, each provided with an electro-magnet for operating it; a selector bar connected with the points and provided with two separate insulated contact pieces, and connections placing the magnets of the branch or of the main line signals in circuit with the

said contact pieces according to the position of the points; and interlocking switches and electrical connections operating to send current to the said motors, and to the said magnets of the home and distant signals, in rotation, substantially as set forth.

5. The combination, with the points and their two locking bars 13 and 14 each provided with slots or notches for a locking bolt and connected to a point; of the two selector bars 27 and 28 connected to the respective locking bars; and a pair of insulated contact plates connected by a wire, each plate being secured to one of the said bars 27 and 28, and the said pair of plates being arranged in the circuit of an electrically operated signal, whereby the said wire is broken and the circuit to the signal interrupted when the points fail to work simultaneously, substantially as set forth.

6. The combination, with the points provided with a locking bar, and the locking bolt engaging with the said bar and provided with the contact pieces 42, 43 and 44; of the electro-magnet K provided with a lock for the locking bolt, and a contact piece *m'*; two separate electric motors for operating the points and the locking bolt; a selector bar connected with the points and provided with two contact pieces; the four main and branch, home and distant, signals, each provided with an electro-magnet for operating it, and the connections between the said magnets and the contact pieces of the selector bar substantially as set forth; the four interlocking switches provided with the contact plates 76, 77, 78 and 79; an electricity generator; and electric connections provided with contacts and arranged to connect the electricity generator with the contact plates, signal magnets, motors and the electro-magnet K substantially as set forth.

May 24, 1894.

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