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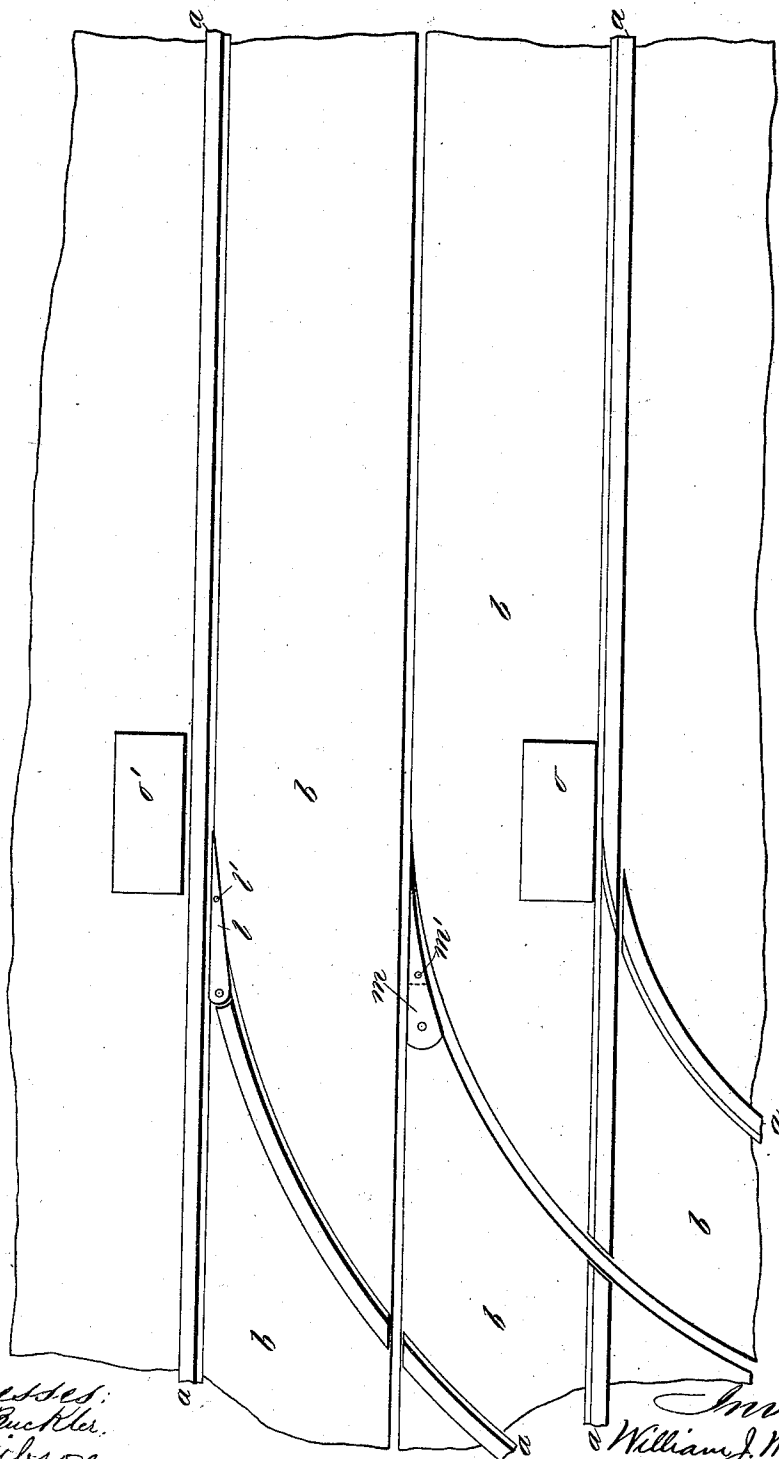
3 Sheets—Sheet 1.

W. J. McFARLAND.
AUTOMATIC RAILWAY SWITCH.

No. 546,051.

Patented Sept. 10, 1895.

Fig. 1.



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M. Gibson.

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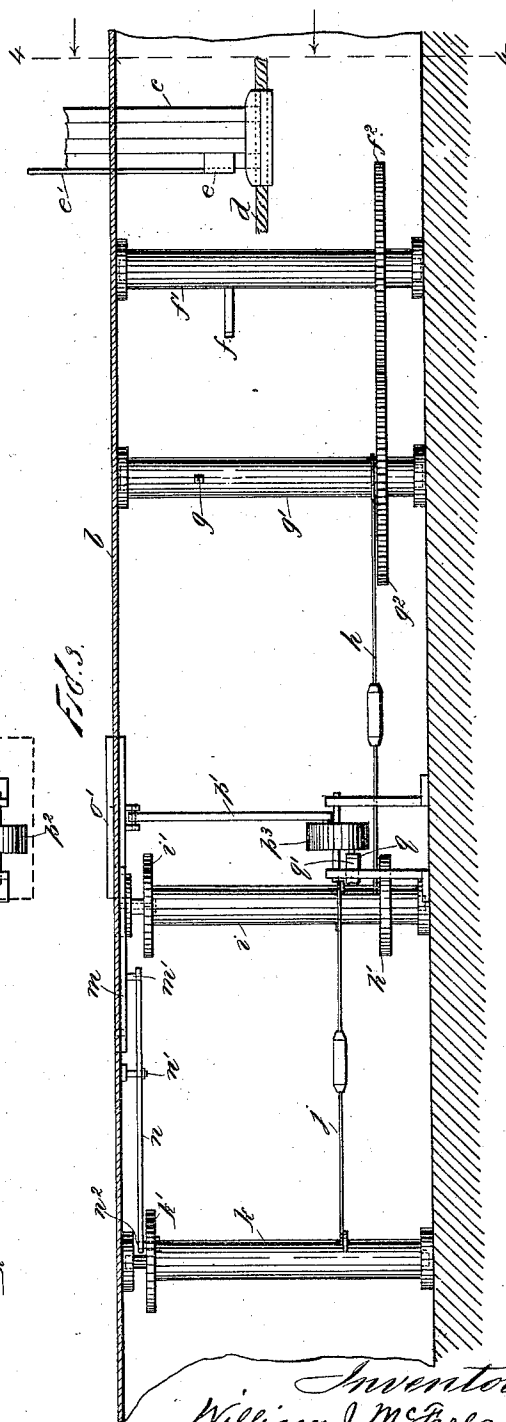
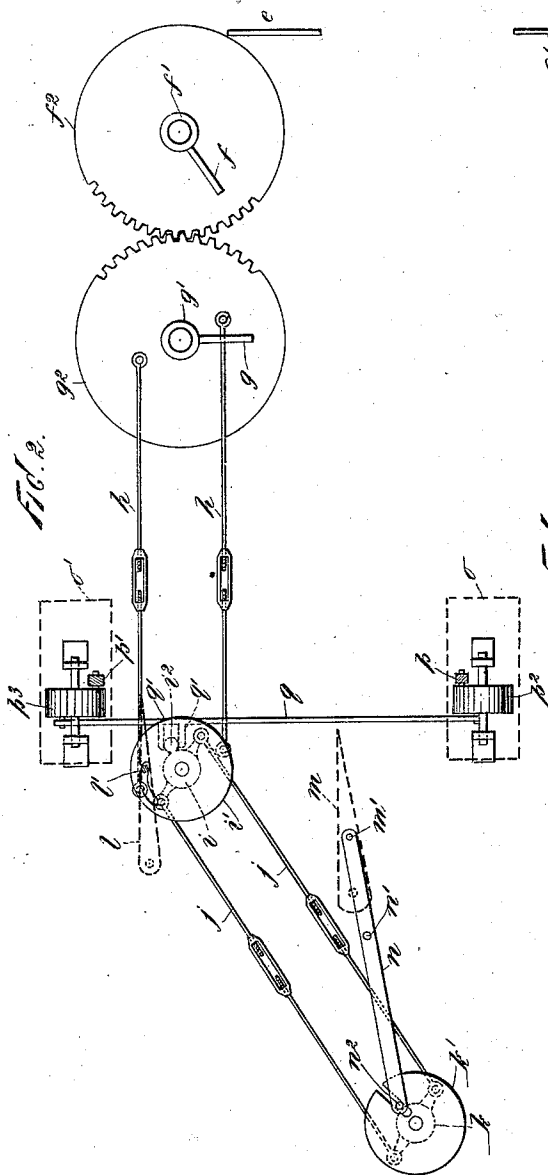
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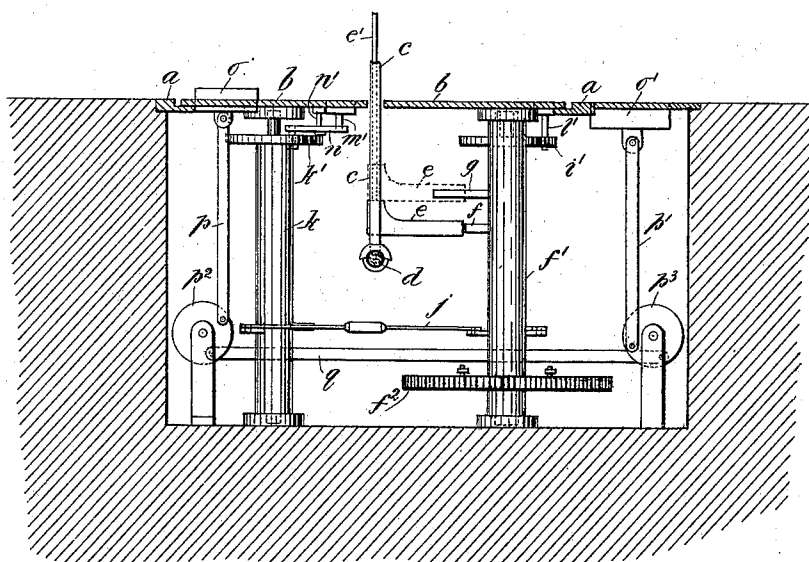
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FIG. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM J. MCFARLAND, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND
THOMAS H. BASKERVILLE, OF SAME PLACE.

AUTOMATIC RAILWAY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 546,051, dated September 10, 1895.

Application filed May 23, 1894. Serial No. 512,174. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. MCFARLAND, a citizen of the United States, and a resident of the city and county of New York, State of New York, have invented certain new and useful Improvements in Automatic Railway-Switches, of which the following is a specification, reference being had to the accompanying drawings, forming part hereof.

This invention relates to switches for railways or tramways, and has for its objects to provide improved means whereby a reliable automatic action may be had, and whereby the switch may be operated either by a part projecting from a moving car or by the weight of the horses that draw a car.

In the embodiment of my invention herein particularly explained the switch is constructed so as not only to control the point or points of movable rail or rails of the track, but also to control a point whereby the slot of a conduit-railway (such as a cable railway or an electric railway receiving its current from underground conductors) is switched so that not only will the car-wheels be guided in the desired direction and prevented from going in any other direction, but the arm projecting downward through the slot will be also thus guided.

The accompanying drawings illustrate an embodiment of my invention on a road adapted for a cable propulsion.

Figure 1 is a plan view of a portion of a cable-railway track and turnout or siding or branch, showing the switch-points in position to direct the car along the main line and to prevent it from turning into the branch. Fig. 2 is a plan view of the switch-operating mechanism located below the surface of the ground and in the conduit. Fig. 3 is a vertical longitudinal section of the road-bed, conduit, and operating mechanism. Fig. 4 is a vertical transverse section of the same, taken on the line 4 4, Fig. 3.

The construction of the frame supporting the road-bed and of the underground tunnel or conduit is not particularly shown, since the same forms no part of this invention, and may be of any of the usual constructions employed in cable railways, as well understood by those skilled in the art. The tracks *a a* and the cov-

ering portions or plates *b b* of the conduit and the frame for supporting the same may be of any usual and well-known pattern, provided that sufficient space be allowed underground for the operating mechanism of my improved automatic switch. The slot is shown as formed centrally between the tracks, and the arm *c*, which is attached to a car in any usual and suitable manner, projects downward through this slot and is provided with suitable means for gripping the cable *d*. Only a short portion of this cable *d* is shown in the drawings, but it will be understood that it may extend either along the main line or out on the branch, or may not extend further than the switch, and that supplementary cables may be provided along either the main line or branch line, as desired. The grip will be of any usual and suitable construction, and may be provided with the usual and well-known cable-ejector, so that it may be caused to throw out the cable at any time, all as well understood in the art.

The means for actuating the automatic switch from the cable car consist of the striker-arm *e*, fitted to slide vertically upon the grip-arm *c* and controlled by a rod *e'*, which may be operated directly or by suitable connecting-levers, so as to be moved into two different positions. The lower of these positions is shown by the full lines in Fig. 4, while the upper of these positions is indicated by the dotted lines in the same figure. In the lower position the striker-arm will turn the switch into the position shown in Fig. 1, so as to direct the car along the main line, and in the upper position the striker-arm will turn the switch so as to direct the car along the branch or turnout. The parts with which the striker-arm *e* engages consist of the operating-arm *f*, extending from the vertical shaft *f'*, suitably held to oscillate in vertical bearings, and the operating-arm *g*, extending from another vertical shaft *g'*, also fitted to oscillate in suitable bearings, and these two shafts *f'* and *g'* are connected together so that the rotation of one will cause a corresponding rotation of the other, but in the opposite direction, by means of the meshing gear-teeth on the disks *f²* and *g²* fitted upon the shafts *f'* and *g'*, respectively, or by other suitable connecting means. When the striker-

arm *e* is set in its lower position, as shown in the full line, its operation is to move the operating-arm *f* into the oblique position shown, and when the striker-arm *e* is set in the upper position its operation is to move the operating-arm *g* into an oblique position corresponding to that shown as occupied by the arm *f*, and this movement of the arm *g* operates through the connections of the two shafts *f'* and *g'* to throw the arm *f* back again into a position corresponding to that shown as occupied by the arm *g*. Thus it will be seen that the operation of either one of the arms *f* and *g* by the striker-arm *e* throws the other arm back into position to be operated upon.

The connections of the shafts *f'* and *g'* to the point-actuating mechanism are shown as consisting of adjustable connecting-rods *h h*, each pivoted or otherwise joined at one end to the disk *g²* or other part connected with the shafts *f'* or *g'*, and each pivoted or otherwise joined at its other end to a disk or plate *h'*, or other part of a vertical shaft *i*, fitted to oscillate in suitable bearings, and connecting-rods *j j*, each pivoted or otherwise joined at one end to an arm projecting from the vertical shaft *i* and at the other end to an arm projecting from the vertical shaft *k*, which shaft *k* is also fitted to oscillate in suitable bearings. The rods *h h* and *j j* are shown as adjustable, so as to provide for adjusting the parts and maintaining the proper tension of the rods. It is of course evident that other connecting means may be employed for imparting the movements of the shafts *f'* and *g'* to the shafts *i* and *k*, but the means shown are peculiarly adapted for the purposes and functions of this structure.

The track-point *l* (shown in Fig. 1 and indicated by dotted lines in Fig. 2) is suitably pivoted and has a downwardly-projecting pin or stud *l'*, which works against a cam-surface or into a cam-slot formed in a disk or plate *i'*, secured or formed upon the vertical shaft *i*, and this cam or slot is so shaped that the oscillation of the plate and shaft *i'*, caused by the operation of the shafts *f'* and *g'*, moves the stud *l'* toward and from the axis of the shaft *i*, and thereby moves the switch-point *l* into one or the other of its positions, as desired, and also firmly locks and holds the switch-point in desired position. The slot-point *m*, also shown in Fig. 1 and indicated by dotted lines in Fig. 2, is suitably pivoted and has pivotally connected to it an arm *n*, which is pivoted on a stud *n'* and connected at one end to the slot-point *m* through the pivot-pin *m'*, while at the other end it has a pin or stud *n²* working in a slot or groove formed in the disk or plate *k'*, which plate *k'* is secured to or formed upon the vertical shaft *k*, and the oscillations of the vertical shaft *k* and its disk *k'* cause the pin *n²*, working in the slot of said disk *k'*, to move the arm *n*, and the arm *n*, through the stud *m'*, to actuate the slot-point *m* and to move the slot-

point *m* into one or the other of the two desired positions thereof; and this mechanism, when at rest, holds the said point *m* in either one of said positions.

The operation of the automatic switch as caused by the projecting striker-arm *e* will be evident from the above description. When the striker-arm *e* is set in lower position and passes by the operating-arm *f*, it will move said arm *f* into the position shown, and the shafts *f'*, *g'*, *i*, and *k* will all assume the positions shown and the switch will be set to guide the car along the main line, and the operating-arm *g* will be set to the position shown. When the striker-arm *e* is set into upper position and passes by the operating-arm *g*, it will actuate said arm *g* and the shafts *f'*, *g'*, *i*, and *k* into their other extreme position and will move the points so as to guide the car along the branch or turnout, and will, at the same time, set the operating-arm *f* back again into position to be operated by a striker-arm *e* when properly adjusted for operating it. Thus the gripman is enabled to set the striker-arm *e* so that it will operate the switch mechanism to guide his car in either path that he may desire, and if the switch mechanism is already in the desired position the striker-arm will pass by without operating it, but if the switch mechanism is not in the desired position, it will necessarily be in the position to be operated by the striker-arm, and the striker-arm in passing by will set the switch so as to properly guide the car.

The means for operating the switch by the weight of the horses of a horse-car is shown as consisting of the two movable platforms *o* and *o'* (indicated by dotted lines in Fig. 2) and placed at opposite sides of the track, so that the horses may be guided to operate either one or the other at the will of the driver. These movable platforms are connected, respectively, by downwardly-extending connecting-rods *p* and *p'* to the pivoted disks *p²* and *p³*, respectively, and the two pivoted disks *p²*, *p³* are joined by the connecting-rod *q*, so that the downward movement of the platform *o'* causes a corresponding upward movement of the platform *o*, and vice versa, and the movement of either causes a longitudinal movement of the connecting-rod *q*, (see Fig. 4) the downward movement of the platform *o'* causing the rod *q* to be pulled toward the disk *p³* and the downward movement of the platform *o* causing the rod *q* to be pulled toward the disk *p²*. The connecting-rod *q* is connected to or caused to suitably engage with a part projecting from the vertical shaft *i*—as, for instance, by the lateral arms *q'* *q'*, as shown—embracing an arm *i²* extending from said shaft. This connection of the connecting-rod *q*, and the vertical shaft *i* causes the longitudinal movement of said rod *q* to produce an oscillation of said vertical shaft *i* and of the other parts of the switch-operating mechanism and the switch points connected therewith,

and thus the movement of the platforms *o* and *o'* produces a setting of the switch points and of the various parts of the switch-operating mechanism, the downward movement of the platform *o'* setting the switch points to guide the car along the main line, and the downward movement of the platform *o* setting the switch points to guide the car along the branch.

From the above description it will be evident that my improved automatic switch is adapted to be used upon a road carrying cars propelled by horses and on a road carrying cars propelled by cables or any other power, and also on a road carrying some cars propelled by horse-power and others propelled by cables or any other power. It will of course be evident that it is not essential that the switch-operating mechanism be located underground, although that arrangement is highly desirable upon any line of railway where a conduit is employed, and may be desirable upon other kinds of rail or tram ways. It is also evident that parts of my invention may be employed separately or in connection with other parts of different constructions, and I do not therefore limit my invention to the particular construction described herein and shown; but

What I claim, and desire to secure by Letters Patent, is—

1. In a railway switch mechanism the combination of a rail switch point and a slot switch point and two directly connected oscillating shafts and means connecting each of said shafts with one of said switch points whereby the oscillation of said shafts actuates said switch points, and two movable operating arms mounted upon two oscillating shafts, said latter shafts being directly connected together to move in opposite directions and connecting means joining one of said latter shafts to one of the switch point actuating shafts, and a striker arm carried by a car and adapted to be set into one position to engage with one of said operating arms and into another and different position to engage with the other of said operating arms when the car passes by said arms, substantially as set forth.

2. In a railway switch mechanism, the combination with one or more switch points of movable platforms adapted to be operated by the weight of horses drawing a car and connected to said switch point or points, and one or more movable operating arms adapted to be operated by a striker arm carried by a car, said operating arm or arms being also connected to said switch point or points, whereby the switch may be set in desired position by either the platforms or striker arm, substantially as set forth.

3. In a railway switch mechanism, the combination with a pivoted switch point and a pin or stud projecting therefrom, of a vertical oscillating shaft and a plate on said shaft having a cam surface radially inclosing said

pin at varying distances from the center of said shaft, and said cam surface arranged so as to work against said pin or stud and set the switch point when the shaft is oscillated, whereby the switch point is locked in desired position substantially as set forth.

4. In a railway switch mechanism, the combination of one or more switch points and two movable operating arms, said arms being mounted upon separate vertical oscillating shafts, and said shafts being connected together so that the operation of one arm throws the other arm into position to be operated, and connecting mechanism joining one of said oscillating arms and said switch point or points, and a vertically movable striker arm carried by a car and adapted to be set into position to engage with either one of said operating arms, substantially as set forth.

5. In a railway switch mechanism, the combination of a rail switch point and a slot switch point, and mechanism connecting the same so that the movement of one causes a corresponding movement of the other, two movable operating arms so connected that the operation of one throws the other into position to be operated, and connecting mechanism joining said operating arms and switch points, and a striker arm carried by a car and adapted to be set into position to engage with either one of said operating arms, and two movable platforms adapted to be operated by the weight of horses drawing a car and connected to said switch points, substantially as set forth.

6. In a railway switch mechanism, the combination of a pivoted switch point and a pin or stud projecting therefrom, a vertical oscillating shaft and a plate on said shaft having a cam surface radially inclosing said pin at varying distances from the center of said shaft, and said cam surface arranged so as to work against said pin or stud and set the switch point when the shaft is oscillated, whereby the switch point is locked in desired position, two movable platforms, two oscillating disks connected respectively thereto, and a connecting rod joining said disks, said rod being connected to or engaging with said oscillating shaft, substantially as set forth.

7. In a railway switch mechanism, the combination of a pivoted rail switch point and a pin or stud projecting therefrom, an oscillating shaft and a plate on said shaft having a cam surface arranged so as to work against said pin or stud and set the switch point when the shaft is oscillated, a pivoted slot switch point and an oscillating shaft and means for actuating the slot point from said shaft, said rail point operating shaft and slot point operating shaft being connected so as to move together; two movable operating arms mounted upon separate oscillating shafts, said latter shafts being connected together so as to move together in opposite directions, and be-

ing also connected to the rail point operating shaft, and a striker arm carried by a car and adapted to be set into position to engage with either one of said operating arms, substantially as set forth.

8. In a railway switch mechanism, the combination of a rail switch point, an oscillating shaft and means for actuating said switch point from said shaft, a slot switch point and an oscillating shaft and means for actuating said slot point from said shaft, said rail point operating shaft and slot point operating shaft being connected so as to move together, two movable platforms, two oscillating disks connected respectively thereto, and a connecting rod joining said disks said rod being connected to or engaging with said rail point operating shaft, two movable operating arms mounted upon separate oscillating shafts, said latter shafts being connected together so as to move together in opposite directions and being also connected to the rail point operating shaft, and a striker arm carried by a car and adapted to be set into position to engage

either one of said operative arms, substantially as set forth.

9. In a railway switch mechanism the combination with a rail switch point and a slot switch point, of two movable operating arms mounted on separate oscillating shafts, said shafts being directly connected together so as to move in opposite directions and said arms being so located that a projection from a car in one position will operate one of said arms and a projection from a car in another position will operate the other of said arms, and two oscillating shafts each adapted to actuate one of said switch points, said two shafts being directly connected together, and connecting means joining one of said shafts to one of the shafts provided with operating arms, substantially as set forth.

This specification signed and witnessed this 3d day of May, A. D. 1894.

WM. J. MCFARLAND.

In presence of—

HENRY D. WILLIAMS,
E. M. TAYLOR.