(No Model.) 2 Sheets—Sheet 1.

S. H. TERRY.

TRACK AND SWITCH FOR CABLE ROADS.

No. 270,510. Patented Jan. 9, 1883.

Fig. 1.

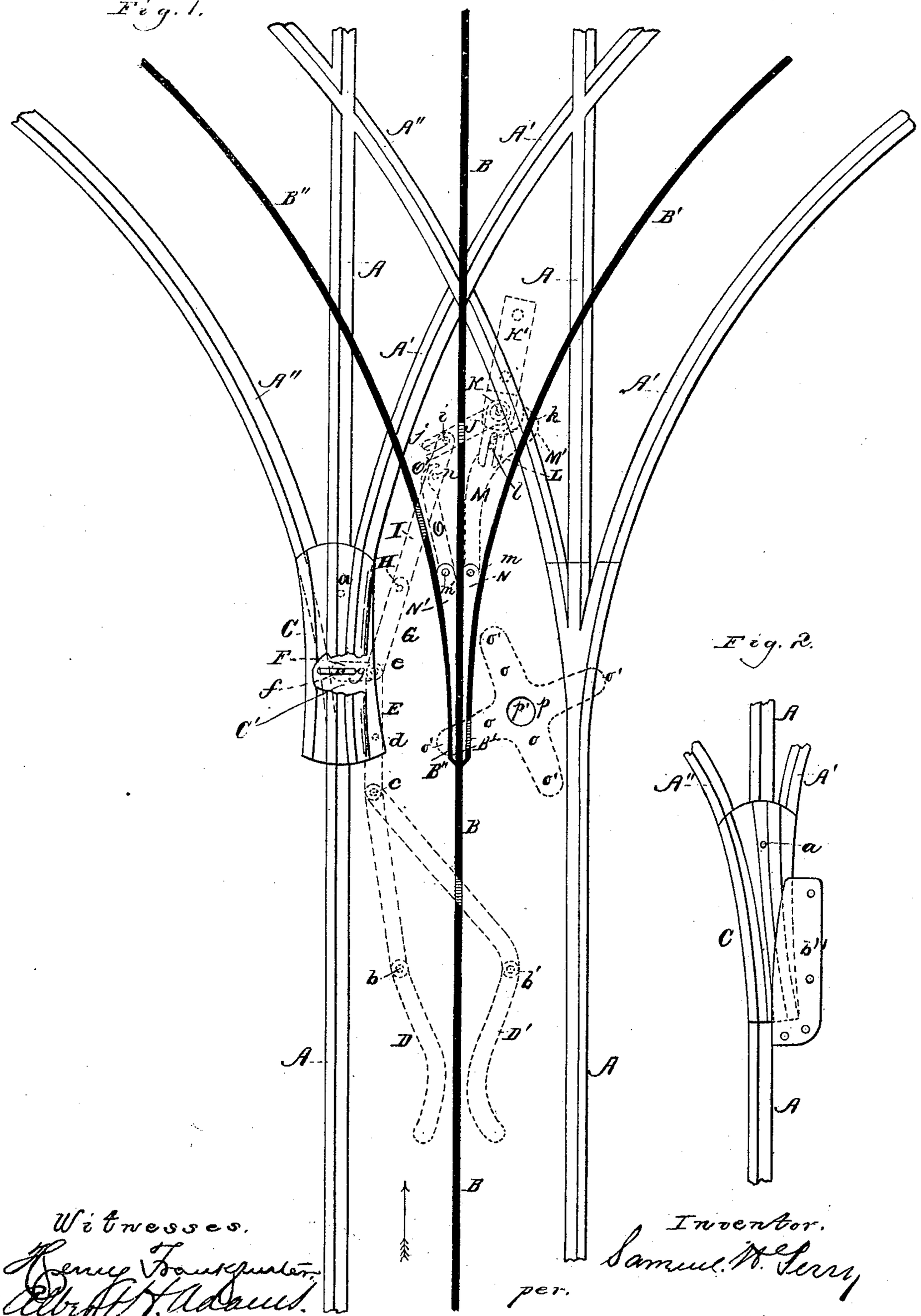

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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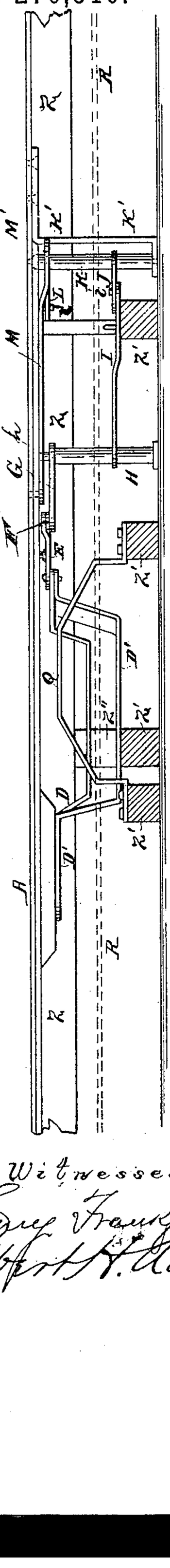

Fig. 3.

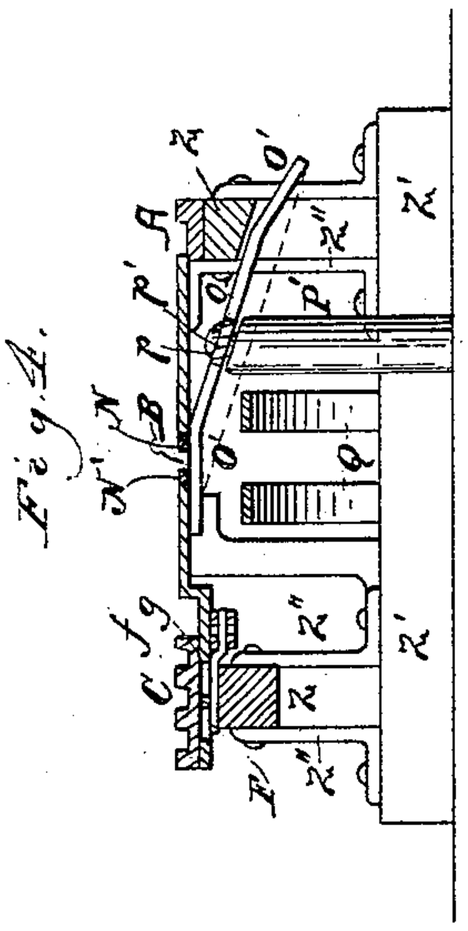

Fig. 4.

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UNITED STATES PATENT OFFICE.

SAMUEL H. TERRY, OF CHICAGO, ILLINOIS.

TRACK AND SWITCH FOR CABLE ROADS.

SPECIFICATION forming part of Letters Patent No. 270,510, dated January 9, 1883.

Application filed October 5, 1882. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL H. TERRY, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in Tracks and Switches for Cable Roads, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of a track showing two intersections or branches; Fig. 2, a plan view of the switch; Fig. 3, a vertical section, showing the devices underneath the street-surface at a branch intersection; Fig. 4, a cross-section showing the manner of supporting the points of the guides.

This invention relates to improvements in the track devices for cable railways, and has for its objects to provide efficient means for automatically adjusting the switch and the frog-plate for transferring a car or cars from one track to another, and to provide efficient means for supporting the free ends of the swinging frog-plates. These objects I accomplish by the mechanism illustrated in the accompanying drawings, and which I will now proceed to describe in detail.

A represents the main-line track, which is to be strung upon ties or supports in any suitable manner for a road operated by a continuous or endless cable, and such roads have more or less side lines running therefrom. Fig. 1 shows a road having two side or branch lines, (represented by A′ and A″,) the juncture of the two branches being, as shown, at the same point; but it will be understood, however, that this branching at the same point in two directions will seldom occur in the construction of cable railways, and such arrangement is simply shown for the purpose of illustrating a right and left action when moving the switch from one side to the other. It will, however, be understood, in this connection, that where only one branch occurs only so much and such parts of the devices as relate to that branch will be applied to the substructure. Whenever the branch or switch is applied to a cable road, as hereinafter described, the ordinary tube of the road in which the cable is located will be stopped a little distance short of the junction, and the cable-way will be considerably enlarged at the point of junction for the purpose of applying the devices and for access in repairing or oiling the parts.

B B′ B″ represent the gripper-openings in the respective lines of track A A′ A″. The cable-way is not shown in detail, but is to be made, in the usual manner, of the full width of the track, with the space between the tracks filled with metallic plates of sufficient strength to support the street traffic, such plates terminating to form the gripper-opening in each track. The surface-plates can be supported on ordinary posts, which can be arranged so as not to interfere with the operation of the cable, the gripper, or the operating-levers, while furnishing a sufficient support for the plates.

C is a switch-plate, pivoted at *a* to the rail of the main-line track, and having, as shown, the rails for the three tracks A A′ A″ continued across its face; but where only two tracks—a main line and one side branch—are used the switch-plate C would have the tracks across its face arranged accordingly. When three tracks are used a shield, *b″*, may be applied to the surface-plate of the tube and arranged to partly cover the switch, as shown in Fig. 2, forming a guard against the entrance of dirt or other impediments which might interfere with the operation of the switch, and also acting to prevent the accidental displacement of the switch by the wheels of a passing vehicle or otherwise.

D D′ are levers, bent as shown in Figs. 1 and 3, or in some other suitable manner, so as to leave a clear passage for the cable, and to have their ends engaged by a projection on the cable-gripper or a hanger or other device applied to the car or to the gripper, and turn the levers, respectively, as required, for the side track or branch on which the car is to be switched or turned. The lever D is pivotally supported on a post or standard, *b*, extending up from one of the ties, and the lever D′ is supported on a corresponding post or standard, *b′*; or these levers D D′ might be supported from brackets or plates extending out from the rails or girders, or on other support, to bring their pivots at the proper points for the ends to be engaged by the actuating device or devices. The lever D′ is bent or formed to have its inner end connected, by a suitable pin or pivot, *c*, to the inner end of the lever D, at a

point forward of the pivotal point of the lever D, as shown in Fig. 1, so that as either lever is operated the other will be brought into position to throw the switch straight for the main line by the engagement of the gripper therewith, requiring no attention other than the travel of the cars for the respective lines to operate the switch.

E is an arm or lever, pivoted at one end by the pin or pivot *c* to the inner ends of the levers D D′, and supported at or near its center in any suitable manner, so as to swing or turn freely. As shown, it is supported at or near its center by pin or pivot, *d*, from the under side of the base-plate C′ of the switch-plate; but it could be supported in some other manner and by other means.

F is an arm or lever, connected at its outer end, by a suitable pin or pivot, *e*, to the lever E, and connected at its inner end by a pin, *f*, with the switch-plate C, which pin passes through a slot, *g*, in the bed-plate C′, on which the switch is supported, so that as the levers D D′ have their outer ends moved by the actuating device on the gripper or car the inner end of the lever D will, through the arm or lever E, arm F, and pin *f*, turn the switch-plate C on its pivot *a*, bringing the tracks on the switch-plate in correct relation with the main-line track and the side tracks, respectively, as required for the running of the car.

G is a link or arm, one end of which is connected by the pin or pivot *c* with the arms or levers E F, and the other end of which is rigidly connected with a post or standard supported so as to turn and allow the free end of the arm or link G to vibrate with the movement of the lever E and arm F.

H is the post or rock-shaft, to which the end of the link or arm G is firmly secured, which shaft or post is suitably journaled at its lower end on one of the ties or other support in such manner as to hold it in a vertical position and at the same time free to work or turn. Its upper end projects above the arm or link G, as shown in Fig. 3.

I is an arm or link, firmly secured at one end to the rock-shaft or post H, and arranged to lie above the ties, and so as not to interfere with the travel of the cable, and having at its outer or free end a stud or pin, *i*.

J is an arm or lever, having in its end a slot, *j*, to receive the pin *i*, and connecting this arm with the arm I.

K is a rock shaft or post, stepped or otherwise suitably journaled at its lower end in a frame or support, K′, the upper end of which frame is secured to the surface-plate, covering the space between the rails at a point to not interfere with the travel of the cables on the main line or the siding, as shown in Fig. 1; but this post could be supported in some other suitable manner that will allow it to turn or rock, and at the same time hold it in a vertical position. The arm or link J is firmly secured to the shaft or post K at a point below the line of the cable, so as not to interfere with the running of the cable, and leave a clear space for the operation of the gripper on the cable, and this arrangement is also true of the arm or link I, which is attached to the post or shaft H.

L is an arm, firmly attached at one end, in any suitable manner, to the rock post or shaft K, near its upper end, as shown in Figs. 1 and 3, and having at its outer or free end a slot, *k*, as shown in Fig. 1.

M is an arm or lever, having a pin, *l*, to enter the slot *k* and connect the arm L with the arm or lever M, so that as the rock-shaft K is actuated the arm or lever M will be moved by the arm L. As shown, the upper end of the rock-shaft K has a spindle or journal thereon, which enters the cover or surface-plate, to which the frame-piece K′ is attached. The arm or lever M is formed, as shown in Figs. 1 and 3, with a rear extension, M′, which is curved or bent, and the forward end of this arm or lever is firmly secured to the pivot-pin of the frog N, which pin *m* passes loosely through the frog-supporting plate, and has the frog-plate rigidly secured to its upper end, so that the arm or lever M will turn the frog-plate to close the slot in the tube of the side track or branch A′.

N is the frog-plate for the slot B′, supported upon a base or under plate the edge of which is in line with the surface-plate of the tube. This frog is formed as shown in Fig. 1, its free end being brought to a point, or nearly so, and being tapered to its base or pivotal end. The slot B″ also has a frog-plate, N′, corresponding to the frog-plate N, except that its edge is formed to correspond to the curve of the slot B″.

O is an arm, secured at its inner end in any firm manner to the lower end of the pivot-pin *m′*, and having its free end arranged to be engaged by a pin or rod, *n*, on the arm or lever I, so that as such arm or lever is vibrated the pin or rod *n* will vibrate the arm or lever O and turn the switch-frog N′. This arm or lever O has its outer or free end bent or curved, and is so arranged that when the switch is open this end O′ will lie across the slot B″, and the rear extension, M′, of the arm or lever M is also arranged to lie across the slot B′ when the frog is turned to open such slot. The object of thus turning and arranging the ends M′ O′ of the arms or levers M O is to cause the car, through the gripper, to strike such ends and throw the respective frogs N N′ back to close the respective slots B′ B″.

As shown, the upper end of the rock shaft or post H has a pintle or journal, *h*, formed thereon, which enters a suitable opening in the surface-plate, to support and retain the shaft or post in its vertical position; but this end of this post H, as well as the upper end of the post K, might be supported otherwise than from the surface-plate or base-plate of the frog. It is to be understood that the surface-plates for the tube may form the base-plates for the frogs; or these plates may be made separate, being so formed as to allow the frogs

to operate and open or close the respective openings B′ B″.

The operation of automatically shifting the switch by these devices is as follows: The car running on the main track has a projection or other device on the gripper-plate or on the car, arranged to strike, for instance, the lever D at its outer or free end and carry such end away from the cable-opening. This movement of the outer or free end of the lever D carries the inner end toward the cable-opening, turning the lever on its pivotal point, carrying the arm F inward, turning the switch-plate C on its pivotal point *a*, and bringing the line of track on the switch-plate corresponding to the branch or side track, A′, in position for the car to pass onto such branch or side track. At the same time the movement of the lever E carries outward the outer end of the arm G, turning the rock shaft or post H to the extent of the movement of the arm G, and this movement of the rock shaft or post H moves the outer end of the arm I, and, through the engagement of the pin *i* with the slot *j* of the arm J, moving such arm and partially rotating the rock shaft or post K, which rocking of the shaft or post K moves the outer end of the arm L, which arm, by reason of the engagement of the pin *l* on the arm M with the slot *k* of the arm L, turns the arm M on its pivot, throwing the frog-plate N across the slot B of the main track and opening the slot B′ of the branch or siding A′, so that as the gripper passes along it will be deflected by this frog-plate N into the slot or opening B′, causing the car to pass onto the branch or siding A′. When the car is to be switched onto the branch or siding A″ the lever-operating device on the gripper or car is set to strike the outer end of the lever D′ and carry the end of such lever away from the gripper-slot, reversing the movement of the levers at the pivotal point *c*, and the movement of the lever E carries the arm F inward and turns the switch-plate C on its pivot *a* to bring the track thereon corresponding to the track A″. This movement of the lever E reverses the movement of the arm G, rock-shaft H, and other devices operated therefrom, causing the pin *n* on the arm I to engage with the arm or lever O and turn such arm or lever to throw the frog-plate across the opening B, closing such opening and leaving the slot B″ clear for the passage of the gripper, which is deflected therein by the action of the frog-plate N′, so that the car will pass onto the branch or siding A″. The movement of the levers M and O to throw their respective frog-plates N and N′ into position for the car to pass onto the respective branch tracks A′ A″ brings the ends M′ O′ of the respective levers across the slots B′ B″, respectively, so that as the gripper passes along either slot it will strike these ends and give a reverse movement to the several devices, throwing the switch back to its normal position in line for the main track and turning the respective frog-plates to close the openings or slots B′ B″ and clear the slot or opening B for the car to pass over the main line. By this arrangement it will be seen that whichever way the switch-plate C is moved by the action of the levers D or D′ the pivoted frog-plate corresponding to the branch or side track for which the switch-plate is moved will be turned to pass the car onto such branch or side track with the gripper in the groove or slot thereof, and it will also be seen that this construction and arrangement prevent any damage or injury to the switch or other devices from any carelessness on the part of the operator, as the switch and the frog-plates must be set by the movement of the car itself for the side track on which it is to run.

Although the device is primarily designed for use with switches of a traction rope or cable railroad, it is evident that it could be used for other kinds of roads, the operating-levers being arranged to be engaged by a proper device on the car of a horse-railway or an engine or other motive power of other railroads.

It will be noticed that the form of the frog-plates N N′ is such as to fill the space at the point where they are located, as well as to act as guides for the gripper to deflect to the respective slots, and this construction prevents an unduly large opening at the point where the frog is located, leaving virtually an opening of not much greater width than the slot, which opening is not an improper one, or one liable to produce injury or render the street impassable to vehicles.

P is a revolving support, formed of a center, *p*, with arms or branches *o o′*, four arms or branches being provided, as shown. This support is mounted on the upper end of a post, P′, which post at its upper end is inclined, and the support P is held in position on its post by a suitable pin or bolt, *p′*, passing through its center or hub *p*. The extreme or outer ends, *o′*, of the arms stand at an angle to the remaining portion *o*, and this angle is such in relation to the inclination of the support P as that the ends *o′*, when the arm is up, will lie in a horizontal plane, or nearly so, so as to conform to the plane of the surface-plates on the cable-way. This support is located so that as each arm is brought beneath the surface-plate it will lie beneath the slots for the frog-plates and support the outer or moving ends of such plates, which otherwise would be unsupported and might drop down and interfere with the operation of the switch and its devices, and the support is set inclined, so that as it is rotated the end of the arm will successively pass under the stringer on one side of the track. This construction is necessary where a large rotary support is used; but a smaller support of a diameter to lie within the girder or track on one side could be used, in which case its post or support P′ would have to be raised higher to bring it in a plane corresponding to the plane of the under surface of the cable-

way plates. This rotary support P is formed with arms or spokes to allow the gripper to enter between the arms or spokes and rotate the support, and the arms are so arranged that before one arm is carried out of supporting range of the frog-plate by the gripper another arm will take its place under the frog-plate, giving them a firm and suitable support, by which they are held so as to be free to move at their outer ends.

Q are guards located at the point of juncture of the switch, and formed, as shown in Fig. 3, with inclined ends and horizontal center, which guards are provided for the purpose of releasing the gripper from the main-line cable automatically to do the switching and pass the gripper to the branch cable. The said guards and the gripper for seizing and holding the cable R will be of the character shown and described in my application for Letters Patent filed April 25, 1882, Serial No. 59,435, which gripper is capable of vertical movements, so as to be raised by the guards Q, and after leaving the same to drop and be caused to seize the cable.

The arrangement of switch-plate, levers, arms, and frog-plates described is for use for a double intersection. For a single intersection, or where only one siding occurs, either the lever D or the lever D′, with the connecting devices, switch-plate, and single frog-plate, is to be used, according to the direction in which the car or train is to be moved. The switch-plate C is so constructed as to leave a wide space between the rails on its surface, so that the danger of having the feet caught in the frog or switch plate, as is now the case, will be entirely overcome, the space being sufficient to clear the heel of the boot or shoe.

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

1. An arm or lever, D, lever E, link or arm F, and switch-plate C, in combination with the arm or lever G, a frog-plate, and connecting devices between such arm or lever and the frog-plate, for automatically changing the frog-plate to correspond with the change of the switch plate, substantially as and for the purposes specified.

2. An arm or lever, D, lever E, arm or link F, and switch-plate C, in combination with the arm or lever G, rock shaft or post H, arm I, and a connection between the arm I and a movable frog-plate, for automatically operating the frog-plate with the movement of the switch-plate, substantially as and for the purposes specified.

3. An arm or lever, D, lever E, arm or link F, and switch-plate C, in combination with arm or lever G, rock-shaft H, arm I, arm J, rock post or shaft K, arm L, arm or lever M, and a movable frog-plate, for automatically shifting the frog-plate with the movement of the switch-plate, substantially as and for the purposes specified.

4. The combination, with an automatic switch-moving device, of an arm or lever connected with a frog-plate and with the switch devices for changing the switch and the frog-plate automatically by the passage of the train or car, substantially as specified.

5. The combination, with a movable switch-plate and a movable frog-plate, of devices connecting such plates and adapted to operate both plates simultaneously from the same point, substantially as and for the purposes specified.

6. The combination of two levers, D D′, arm or lever E, link or arm F, and movable switch-plate C with two movable frog-plates and devices connecting the switch-plate or frog-plate, for automatically operating either frog-plate to correspond to the movement of the switch-plate, substantially as and for the purposes specified.

7. The combination of the arms or levers D D′, lever E, link or arm F, and switch-plate C with the arm or lever G and devices connecting such arm or lever with two independent frog-plates, for automatically changing either frog-plate at a common junction, as required for the switch, substantially as specified.

8. The arms or levers D D′, lever E, arm or link F, and switch-plate C, in combination with the arm or lever G, rock-shaft H, arm or lever I, connecting devices between the arm or lever I and two movable frog-plates, for automatically shifting either plate, as required for the position of the switch, substantially as and for the purposes specified.

9. The arms or levers D D′, lever E, link or arm F, and switch-plate C, in combination with the arm or lever G, rock post or shaft H, arm I, arm J, rock post or shaft K, arm L, arms or levers M O, and movable frog-plates N N′, substantially as specified.

10. The arms or levers D D′, lever E, arm or link F, and switch-plate C, in combination with the arm or lever G, rock post or shaft H, arm I, arm J, rock post or shaft K, arm L, arm or lever M, having extension M′, arm or lever O, having the end or extension O′, and two independent frog-plates, N N′, for operating either frog-plate for the position of the switch, substantially as and for the purposes specified.

11. The switch-plate C, having a pivot, *a*, and pin *f*, in combination with the arm or link F and arms or levers E and D, for swinging a switch to the desired line of track, substantially as specified.

12. The rotary support P, in combination with one or more swinging frog-plates, for holding the frog-plates up at the free end, substantially as specified.

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