No. 848,610. PATENTED MAR. 26, 1907.

B. WILBUR.

OVERHEAD TROLLEY FROG.

APPLICATION FILED JULY 18, 1905.

Fig. 1.

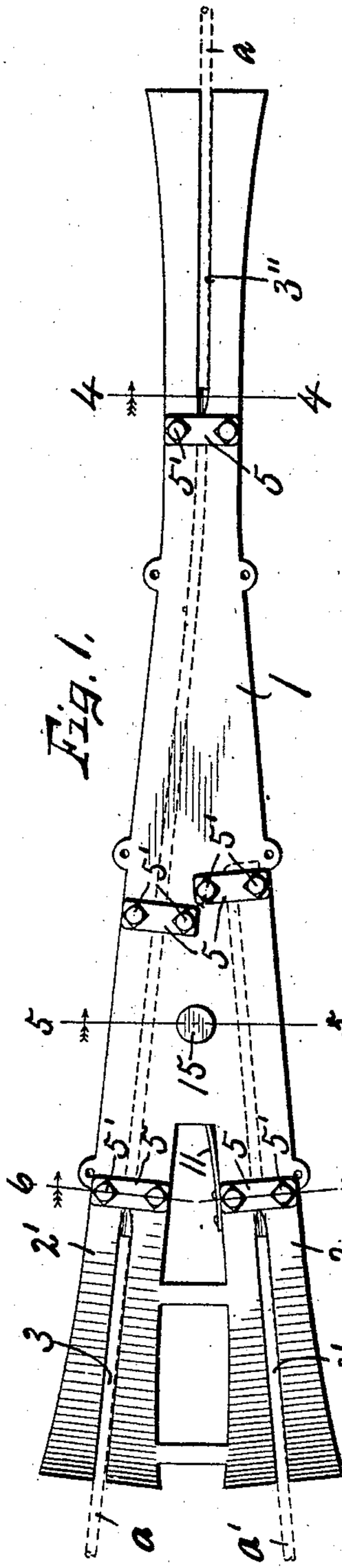

Fig. 2.

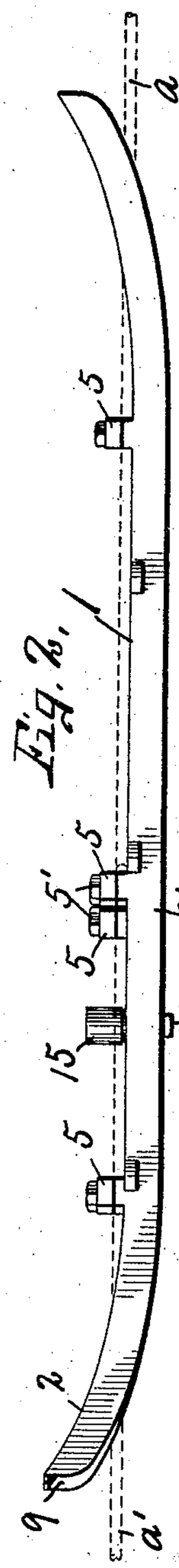

Fig. 3.

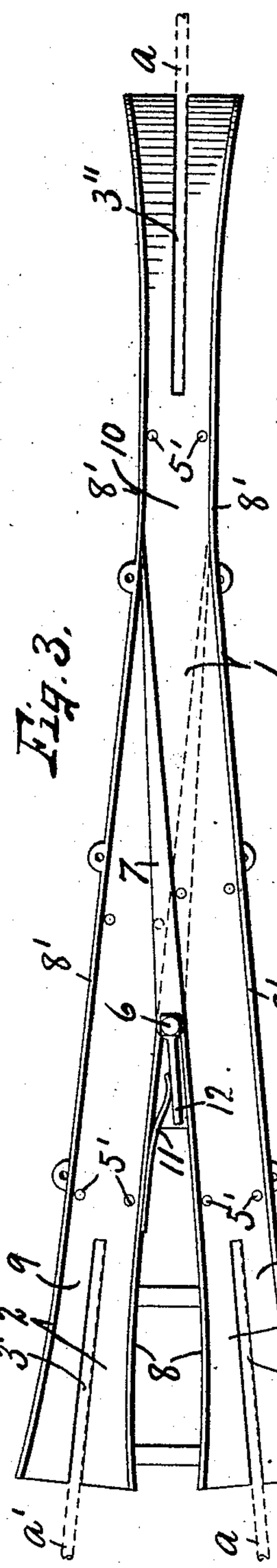

Fig. 6.

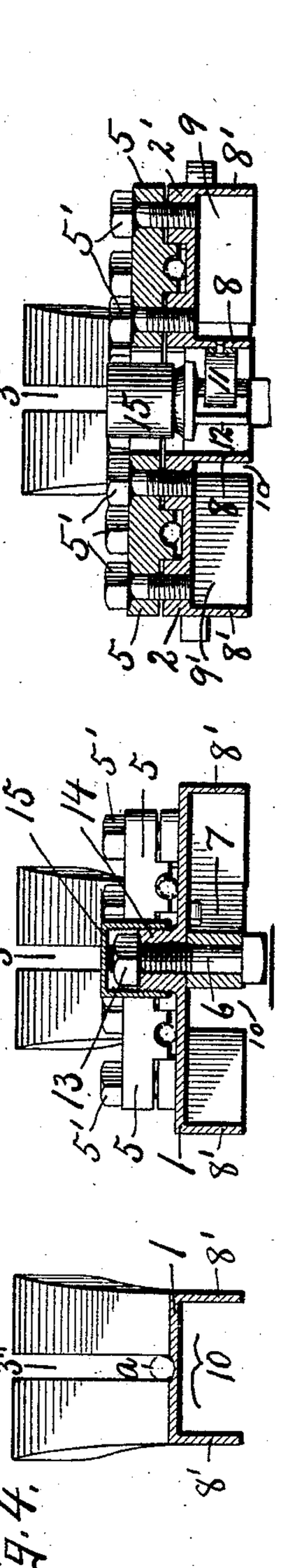

Fig. 5.

Fig. 4.

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OVERHEAD TROLLEY-FROG.

No. 848,610. Specification of Letters Patent. Patented March 26, 1907.

Application filed July 18, 1905. Serial No. 270,205.

To all whom it may concern:

Be it known that I, BURT WILBUR, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Overhead Trolley-Frogs, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in overhead trolley-switches for electric railways, and is distinguished from the ordinary overhead trolley-switch in that the trolley is caused to ride from the wire into a grooved turnout instead of the usual lengthwise rib or ribs forming a continuation of the trolley-wire.

The invention therefore comprises a comparatively light plate having converging grooves merging into a single groove with a movable guard-rail or point hinged at the point of convergence of the grooves and spring-pressed across one groove into contact with its outer wall, or rather with one of the side walls of the single groove, and adapted to be forced by the trolley-wheel against the action of the spring toward the opposite flange or side of the single groove, whereby an open way is maintained from the single groove to one of the diverging grooves, and at the same time the trolley-wheel riding in the other groove toward the point of the movable guard-rail simply presses said point laterally sufficient to allow the wheel to continue into the single groove.

This device, therefore, strictly speaking, is not a switch, but rather an overhead turnout with a movable guard-rail or point.

I have discovered that where a grooved trolley-wheel rides along the wire and upon a rib which forms a continuation of the wire the end of the rib toward the approaching trolley is necessarily more or less abrupt, both downwardly and laterally—that is, beneath and at the sides of the wire—for the reason that it is necessary to have enough stock or thickness of material at this point to properly hold the wire or rather to keep said point of the switch-rib in exact alinement with the wire. This abrupt approach of the ends of the switch-rib makes it imperative that the speed of the car be materially reduced, for the reason that if the car is running at ordinary speed the sudden contact of the trolley-wheel with the abrupt ends of the ribs causes the trolley-wheel to rebound from the rib and wire with sufficient force to throw it clear of the wire and switch before its spring has time to recover its tension, which makes it possible for the trolley to become dislodged from the wire and switch with more or less liability of breaking the overhead connections or damaging the contact device.

In my invention I have sought to cause the trolley to enter the grooves of the switch-plate while it is still riding naturally along the wire and to make the approaches of the switch-plate on rather long inclines terminating some distance above the trolley-wire, so that when the flanges of the trolley-wheel enter between the flanges forming the sides of the grooves of the switch-plate it is gradually depressed by contact with the lower side of the plate between the flanges, and as the ends of the top have a gentle incline from a plane some distance above the trolley-wire to a plane very slightly below that of the trolley-wire it is evident that the car may approach the switch under a high speed without liability of being thrown out of contact with either the wire or switch-plate.

Another object is to give the side flanges at the approaches to the grooves a considerable lateral flare, as well as upward inclination, so that there will be no liability of the flanges of the trolley-wheel striking any abrupt shoulders at the approaches to the switch-plate.

Another object is to pivot the movable guard-rail at the junction of the inner side flanges of the diverging grooves in the switch-plate and to provide said guard-rail with a projecting heel between the adjacent flanges, forming an abutment for engaging the free end of the spring, by which the guard-rail is normally held in one position with its point resting against one of the side flanges of the single groove.

A further object is to slot the approach ends of the top wall of each groove longitudinally and centrally, so as to bring the wire against the top of the plate and allow it to pass through the slots of the upwardly-inclined end or approaches, which, as previously stated, terminate some distance above the wire.

A still further object is to pivot the guard-rail upon a vertical bolt which passes through the top of the plate and is housed by a screw-cap, which protects it from the elements,

especially from sleet and ice, which would interfere with the operation of the guard-rail.

In the drawings, Figures 1, 2, and 3 are respectively top plan, side elevation, and inverted plan views of my improved overhead switch or turnout. Figs. 4, 5, and 6 are sectional views taken, respectively, on lines 4 4, 5 5, and 6 6, Fig. 1.

These overhead trolley-switches are usually secured to and supported by the trolley-wires and may be additionally supported by transverse stay-wires, and in the drawings of my present application I have shown a comparatively thin metal plate 1, forming an acute angle in plan view and bifurcated at its larger end to form outwardly-diverging arms 2 and 2′, which incline upwardly toward their free ends and are each formed with a central lengthwise slot 3 and 3′ for receiving converging wires *a* and *a′*, the latter forming the electric conductors at the turnout. The opposite end of the plate 1 is also inclined upwardly, but considerably narrower than the other end, and is provided with a lengthwise central slot 3″ for receiving a continuation of the conductor *a*. These conductors *a* and *a′* are firmly secured close to the top of the plate 1 by suitable clamps 5, all of which are of substantially the same construction and are each held in place by a pair of clamping-bolts 5′.

The conductor *a* is continuous along the top of the plate 1 and passes through the slots 3 and 3″; but the turnout-conductor *a′* is "dead-ended" on the plate by bending the end of the conductor laterally against one of the clamps 5, as best seen in Fig. 1, although this end of the conductor may be bent over and back upon the top of the clamp, if desired. This plate 1 has its opposite longitudinal edges formed with depending lengthwise flanges extending from end to end of the plate and of sufficient depth to receive between them the trolley-wheel and prevent lateral displacement of the wheel from the under side of the plate.

At the narrower end of the plate the flanges are spaced apart a distance slightly greater than the face width of the trolley-wheel, but are flared or inclined laterally from each other toward the approach, so that the distance between the flanges at the approach to the plate is considerably wider than the thickness of the trolley-wheel to allow the latter to enter the groove which is formed by said flanges in the lower face of the plate without liability of contacting with the abrupt ends of the plate. This lateral flare, as well as the upward inclination of the approach to the narrower end of the plate, is of considerable length and quite gradual, and the slot 3″ is therefore of considerable length, so as to keep the wire in about the same horizontal plane as the top face of the plate, while the free end of the approach rises gradually at opposite sides of the wire to a point some distance above the same, as best seen in Fig. 2 and also in Fig. 4. In like manner the approaches of the branch arms 2 and 2′ are inclined gradually upward, terminating in planes some distance above the wire and having comparatively long slots 3 to allow the branch wires *a* and *a′* to lie in substantially the same plane as the upper face of the plate 1. The inner edges of these branch arms 2 and 2′ are also formed with depending lengthwise flanges diverging toward their approaches and running toward the opposite end in lines substantially parallel with the outer lengthwise flanges to the point of intersection with each other, or rather to a point near the intersection where they terminate, and at which point is pivoted at 6 a movable guard-rail or laterally-swinging point 7. These converging inner flanges, which may be designated by the numerals 8, are of substantially the same depth vertically as the outer lengthwise flanges, which may be designated by the numerals 8′, and are spaced apart from the flanges 8′ substantially the same distance as the distance between the flanges 8′ at the narrower point of the plate—that is, the distance between the flanges 8 and 8′ is slightly greater than the thickness of the trolley-wheel. It is now clear that this turnout-plate 1 is provided with inwardly-converging grooves 9 and 9′, which merge into a single groove 10 at the opposite end of the plate, as best seen in Fig. 3, except that the movable guard-rail 7 extends diagonally across the inner end of the groove 9, forming a continuation of the flange 8, and substantially parallel with one of the flanges 8′, the point of the guard-rail 7 normally bearing against the inner face of the opposite flange 8′ a considerable distance from its pivot 6, thereby leaving a continuous open way or groove for the trolley-wheel from one end to the other of the plate. The guard-rail or switch-point 7 is held in this normal position by a suitable spring 11, which is secured to the inner face of one of the flanges 8 and has its free end bearing upon one side of a heel 12 of the guard-rail 7.

The pivot 6 consists of a bolt passed upwardly through apertures in the movable rail 7 and top of the plate 1, the aperture in the plate being threaded to receive the threaded end of the bolt, which is held from rotation by a lock-nut 13, engaging the top face of a boss on the plate 1, in which the threaded aperture is formed. This boss, as 14, has an exterior thread which is engaged by a screw-cap 15, forming a housing inclosing the upper end of the bolt and its lock-nut 13 and protecting the same from the elements, and especially from sleet and ice, which would interfere with the free action of the guard-rail. It will be observed that the guard-rail 7 is covered at the top and sides by

the plate 1 and flanges 8′ and is therefore protected as much as possible from the elements.

The plate 1 and its flanges 8 and 8′ are preferably made of cast metal—such as malleable iron—which permits it to be made very thin and therefore light, and owing to the fact that the approaches have a long easy incline and that the trolley-wheel contacts mostly with the top of the plate it is evident that the battering and wear and tear is reduced to a minimum and at the same time allows the car to approach the switch at full speed without liability of displacing the trolley from the wire or switch-plate. This will be better understood by assuming that a trolley-wheel is approaching one end, as the narrow end, of the plate, as seen in Fig. 2, during which the trolley travels naturally along the wire, as *a*, until the flanges of the wheel have entered the groove 10, and is safely between the flanges 8′, at which time the periphery of the trolley-wheel engages the gentle inclined top of the plate and is thereby gradually depressed from contact with the wire and readily travels along the under side of the top of the plate in the groove 10 until it engages the guard-rail 7, by which it is slightly deflected gradually into the branch groove 9′. On the other hand, if the trolley-wheel is approaching the branch 9′ a similar action takes place without effecting any movement of the guard-rail 7. This device is of course adapted to maintain one open way through the switch-plate and to allow the trolley to enter the other branch way or groove 9 from one direction only—that is, from its approach toward the guard-rail.

When the trolley-wheel enters the approach to the groove 9, the action is similar to that described when entering the groove 9′ or 10, except that as the trolley continues to travel from the approach along the groove 9 it comes in contact with the switch-point or guard rail 7 and by bearing against the opposite flange 8′ crowds the guard-rail to the position shown by dotted lines in Fig. 3 or rather rocks said guard-rail upon its pivot 6 against the action of the spring 11 until the point of the guard-rail is moved from the flange 8′, with which it is normally in contact across the groove 10, to the opposite flange 8′, thereby allowing the trolley-wheel to continue its passage into and out of the open end of said groove 10, where it readily centers itself and rides upon the wire *a*, the guard-rail 7 returning to its normal position as soon as the trolley-wheel leaves its point.

It will be seen upon reference to Figs. 1 and 3 that the main and branch conductors are in a direct line with the centers of the groove in which the trolley travels, and the width of these grooves where the wire passes through the slots being of substantially the same or slightly greater width than the face width of the trolley-wheel it is evident that the flanges at the side of the groove must bring the trolley-wheel in direct line with the wire which it is to take and that the upward inclination of the top of the plate against which the trolley rides serves to ease the upward tendency of the trolley in passing from the switch-plate onto the wire.

What I claim is—

A switch for overhead trolleys, comprising a substantially Y-shaped member having its intermediate top portion flat and straight, and its opposite ends curved upwardly and provided with slots to receive the current-conductors, flanges depending from said plate, a switch-point pivoted at the juncture of the two converging arms of said Y-shaped member, said switch-point having a rearwardly-projecting heel, said heel lying between the two converging arms of said Y-shaped member, a spring secured to one of said converging arms, said spring bearing against said heel member and adapted to maintain said switch-point in engagement with one of said depending flanges, and clamps carried by the top face of said switch, said clamps adapted to receive the electrical conductors, and forming means for supporting said switch therefrom.

In witness whereof I have hereunto set my hand this 30th day of June, 1905.

BURT WILBUR.

Witnesses:
H. E. CHASE,
M. M. NOTT.