

(No Model.)

5 Sheets—Sheet 1.

G. A. OWEN & G. A. BATES.
SWITCH DEVICE.

No. 581,470.

Patented Apr. 27, 1897.

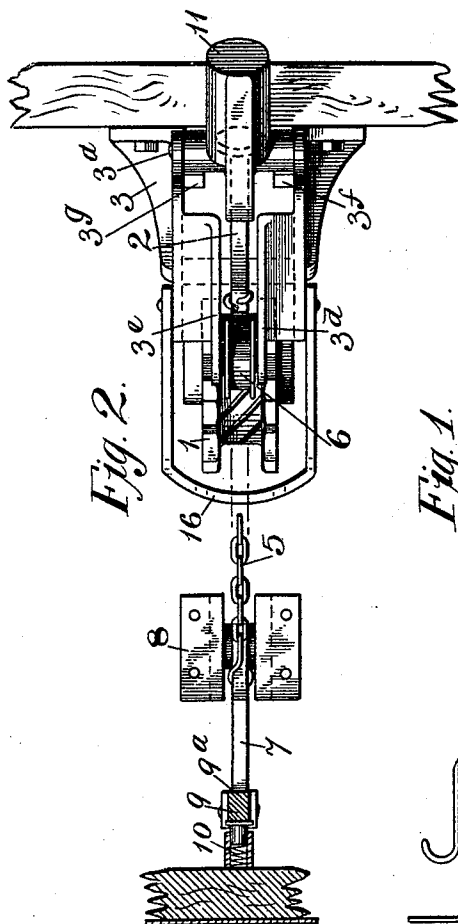


Fig. 2.

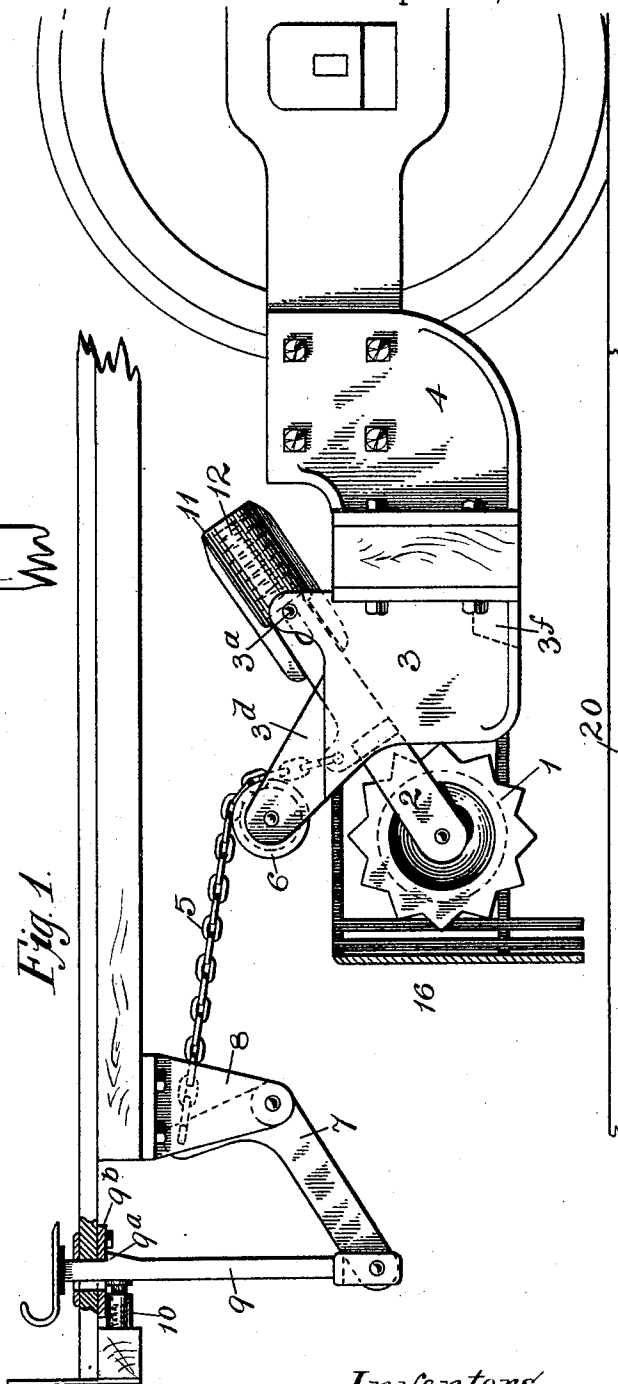


Fig. 1.

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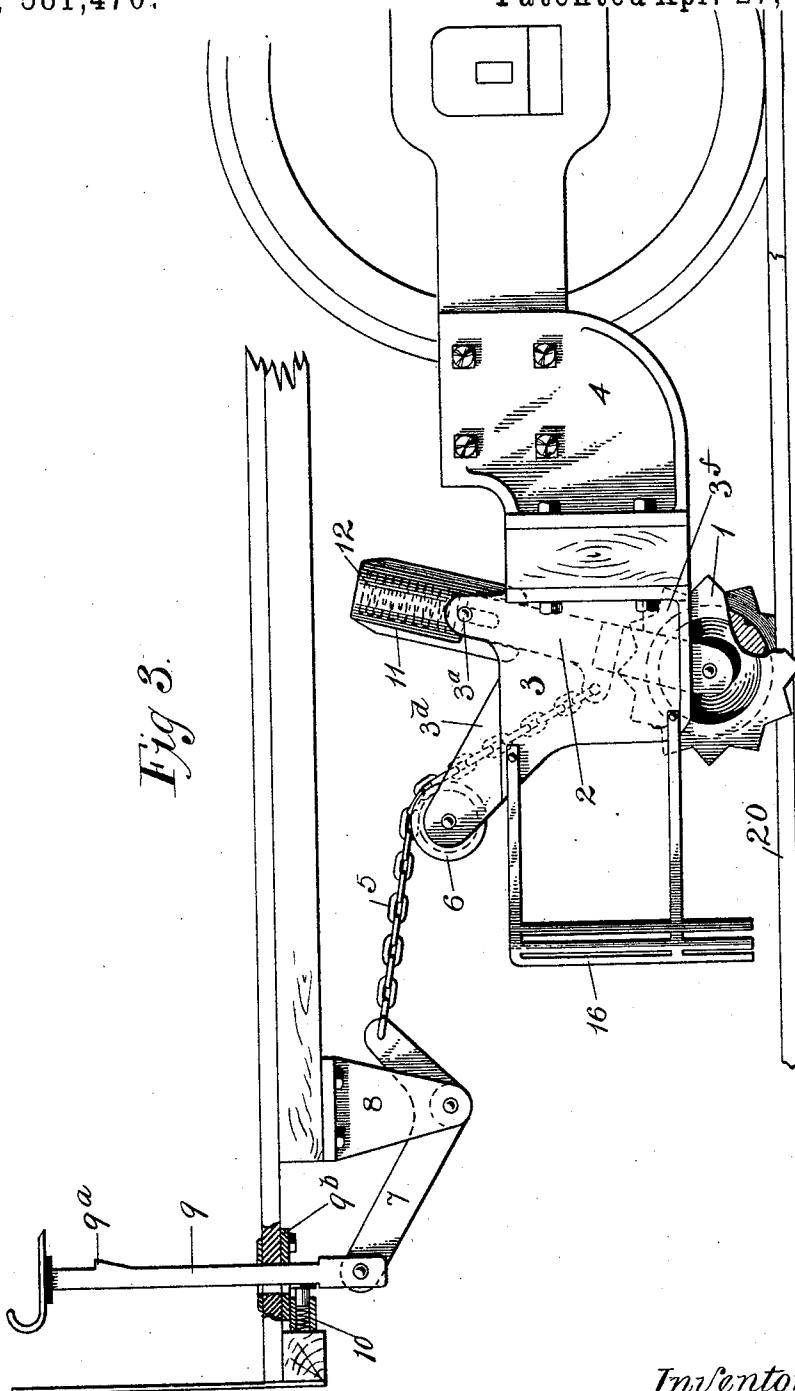
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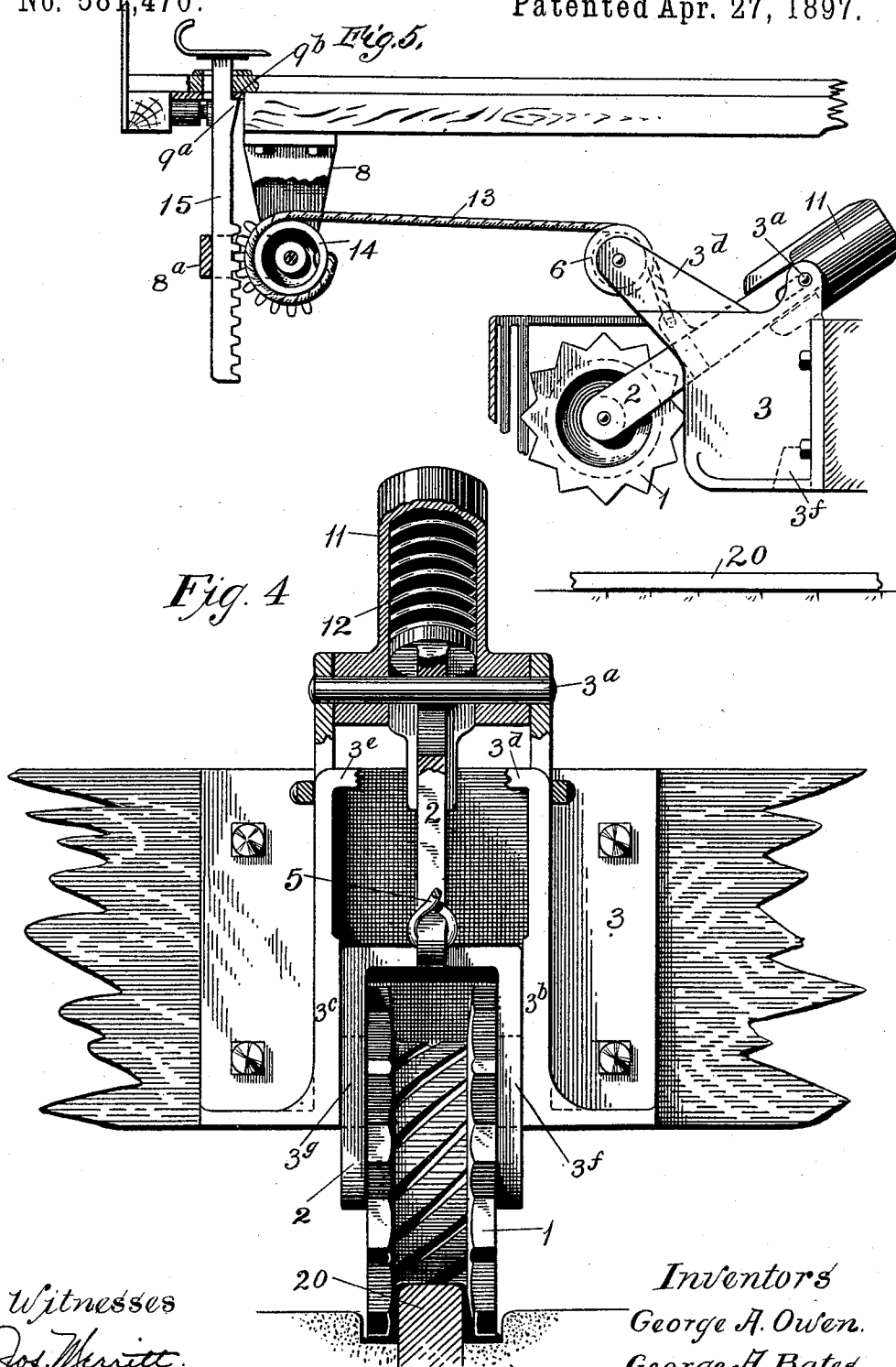
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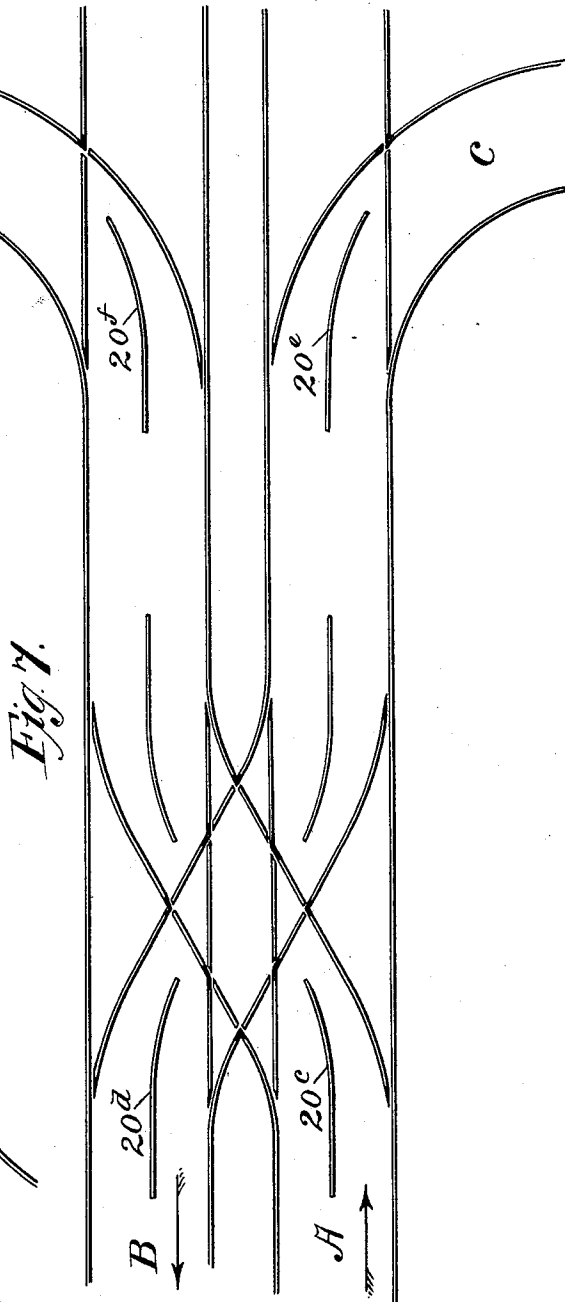
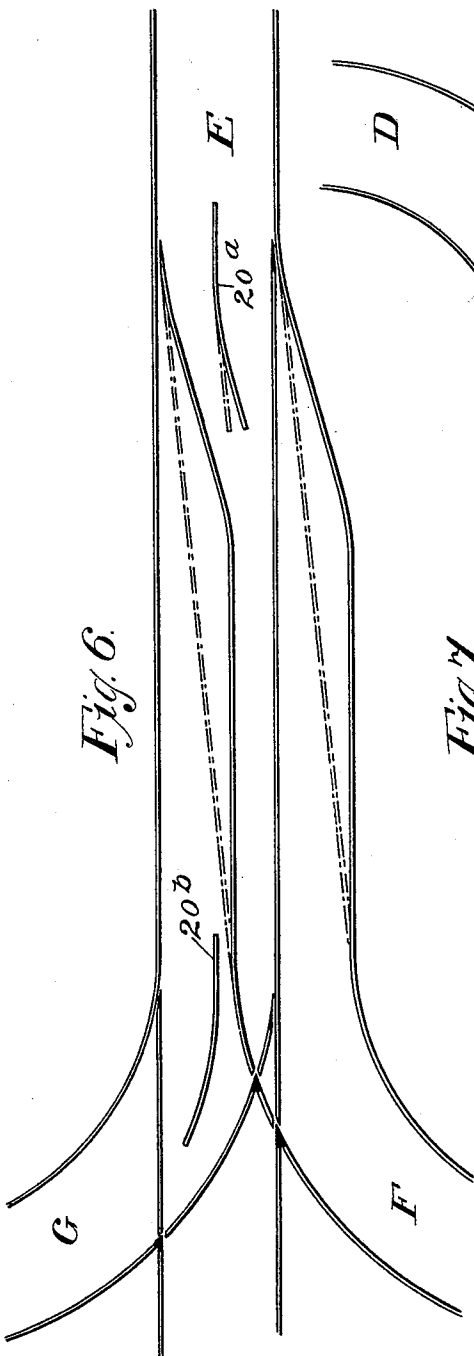
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Fig. 8.

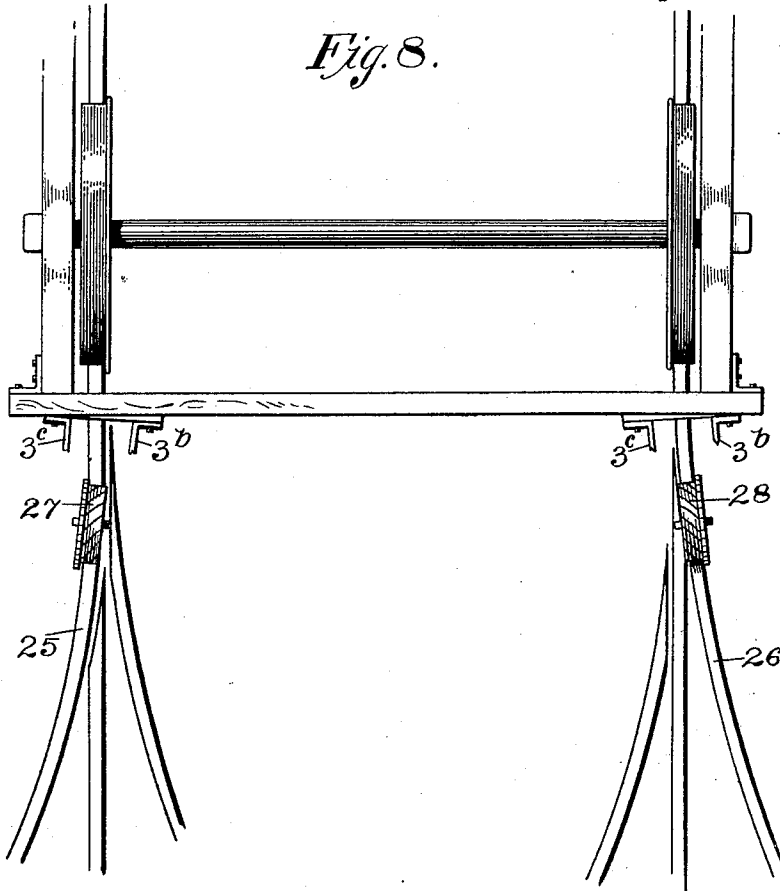
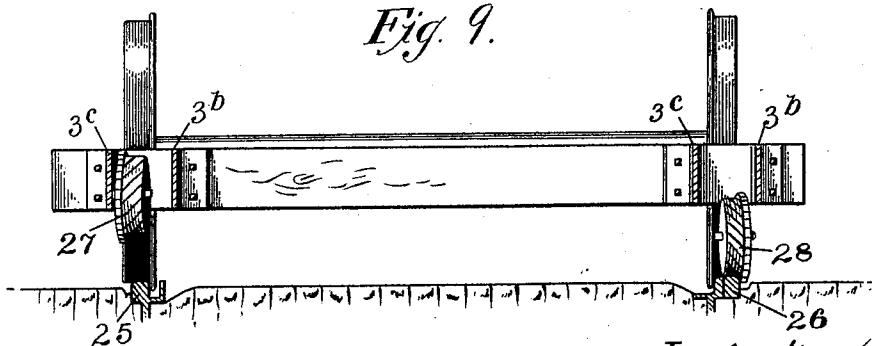


Fig. 9.



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UNITED STATES PATENT OFFICE.

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SWITCH DEVICE.

SPECIFICATION forming part of Letters Patent No. 581,470, dated April 27, 1897.

Application filed March 13, 1896. Serial No. 583,067. (No model.)

To all whom it may concern:

Be it known that we, GEORGE A. OWEN, residing at Springfield, in the county of Hampden and State of Massachusetts, and GEORGE
5 ALBERT BATES, residing at Brooklyn, in the county of Kings and State of New York, citizens of the United States, have invented certain new and useful Improvements in Switch Devices, of which the following is a full, clear,
10 and exact specification.

This invention relates to switching devices for cars and other vehicles which run upon and are guided by rails. It is found to be highly desirable to dispense with everything
15 of a movable nature upon or in connection with the rails or the road-bed, inasmuch as all such movable parts are liable to become clogged or blocked with snow, ice, or mud.

In the employment of switches containing
20 movable tongues or frogs it is usually necessary for the car to be stopped upon approaching the point of divergence of a branch in order to enable the person in charge of the car to move the tongue or switch in the right direction. This causes unnecessary delay of
25 the car, that delay being very considerable during stormy or freezing weather because of the frequent necessity of cleaning out the accumulations before the movable tongue can
30 be turned.

The object of this invention is to provide means whereby the person controlling the progress of the car shall be enabled without leaving his post of duty upon the car to direct
35 it upon a branch or turnout upon either side of the main line and to enable him to do this without stopping the car or arresting its motion to any greater extent than is necessary or advisable to lessen the shock or blow inseparably connected with the deflection of a
40 heavy moving car from the line of its previous course. In pursuance of this general object we further aim to provide a simple, inexpensive, substantial, and effective device so
45 placed upon the car as to exercise its function to best advantage and so connected with operating devices located conveniently near the operator as not to be affected by the rocking or swaying movement of the car-body upon
50 its wheels when it is running at speed.

Figure 1 of the drawings is a side view of

our invention applied upon a car of the type now most commonly in use upon electric street-car lines, showing the device latched in its inoperative position. Fig. 2 is a plan
55 view of a portion of what is shown in Fig. 1, the floor and some of the supporting-timbers being omitted therefrom in order to show more clearly the devices comprised in our invention. Fig. 3 is a side view similar to that
60 of Fig. 1 excepting that the device is herein shown in its operative position in contact with the guiding-rail. Fig. 4 is an enlarged front view, looking from the left-hand side of Fig. 3, of that part of our device which carries the
65 deflecting-wheel, showing how it is supported sidewise by the bracket upon which it is carried and also showing the spring arrangement which allows it to yield or telescope together upon striking an obstruction upon the road-
70 bed or rail. Fig. 5 is a side view of a modified form of our device occupying the same position as that shown in Fig. 1. Fig. 6 is a plan view of a track system, showing our most
75 approved method of providing for deflecting the cars in either direction from a single-track line to a branch line running at right angles to the original course of the car. Fig. 7 is a plan view of a double-track system, illustrating our method of switching the car from one
80 of the main lines to the other and for switching it in either direction onto a street which crosses the main line. Fig. 8 is a plan view, and Fig. 9 a front view, showing a modified arrangement of our device in which the em-
85 ployment of a central guiding-rail is dispensed with, the guiding being performed by the inner curving rail of the turnout or branch upon which it is desired that the car-wheels shall run, there being in this case two of the
90 devices shown in Figs. 1, 2, and 3 mounted on opposite sides of the car substantially in line with the two track-wheels of the car, but in advance thereof, each being set at such an angle as to adapt it to the curvature of the
95 turnout-rails of its own side. In Fig. 9 the right-hand deflecting-wheel is shown to be in engagement with its rail, the other being raised.

The numeral 1 in Figs. 1, 2, 3, 4, and 5 in-
100 dicates the deflecting-wheel, which in the forms shown in those figures is adapted to

engage with the central guiding-rail 20 and deflect the car in the direction in which that guiding-rail leads. This wheel is provided with a double flange adapted to pass on both
 5 sides of the guiding-rail, and these flanges are preferably notched or toothed, as shown in the several figures, in order that they may more effectually break up and clear away the
 10 accumulations of mud, ice, or snow which are liable to form upon the sides of the guiding-rail or in the grooves on either side thereof. The cylindrical portion of the wheel between the flanges is also preferably grooved, as
 15 shown in Figs. 3 and 4, in order to exercise a like function upon incrustations or accumulations on the top surface of the guiding-rail, and these grooves are preferably made at an angle or spirally, as shown.

The deflecting-wheel 1 is shown to be
 20 mounted in a bifurcated carrier 2, pivotally mounted upon the bracket 3 by means of the pin 3^a. The carrier 2 is fitted between the flanges 3^b and 3^c, which extend far enough to firmly support the carrier while it is at or
 25 near its operative position shown in Fig. 3, so that the side thrust imparted to the wheel 1 by the guiding-rail 20 shall be directly imparted to the truck-frame 4 of the car to which the bracket 3 is preferably bolted.

30 Attached to the carrier 2 is the chain 5, which passes over a sheave 6, journaled in extensions 3^d 3^e of the bracket 3. That chain passes thence to an arm of the lever 7, which is pivotally mounted upon the brackets 8.
 35 Another arm of the lever 7 is pivotally connected to the operating-rod 9, and that rod passes upward through the floor of the car at a point convenient to the position occupied by the motorman or the person who is
 40 to control the direction of the car. The upper end of this rod may, if desired, be provided with a pedal for the application of the foot of the operator or it may have a handle if it is desired to operate it by hand. As a
 45 means of retaining the device in the position shown in Fig. 1 the rod 9 may be provided with a shoulder 9^a, adapted to catch under a striking-plate 9^b, as shown in Figs. 1 and 5, being held to this position by means of the
 50 spring 10, so that the device is latched automatically as soon as it is pushed down to the position shown in those figures. To release it therefrom, it is only necessary to push the rod 9 forward, compressing the spring 10 and
 55 releasing the shoulder 9^a from its striking-plate, the weight of the wheel 1 and its carrier being made sufficient to carry it to the position shown in Fig. 3, where it rests against projections 3^f 3^g, which serve to support the carrier and prevent any further
 60 backward movement of the carrier from the position shown in Fig. 3.

Inasmuch as the wheel 1 is liable to encounter pebbles or other obstructions while
 65 in its downward or operative position (shown in Fig. 3) it is found desirable to adapt it to yield upon striking such an obstruction. As

a means of enabling it thus to yield the upper end 2^a of the carrier is extended beyond the pivot-pin 3^a into a spring-holder 11,
 70 which is provided with a spring 12, the carrier being slotted where the pin 3^a passes through it in order to enable it to yield to the desired extent. The spring-holder 11 is also
 75 pivotally mounted upon the pin 3^a and turns thereon with the movement of the carrier, as best seen by a comparison of Figs. 3, 4, and 5, so that the tension of the spring in no way
 80 operates to interfere with the oscillating movement of the carrier upon its pin and is equally effective as permitting longitudinal or telescoping movement of the carrier, whether that carrier is in the position shown in Fig. 1 or in that shown in Fig. 3.

In the modification of the deflecting device
 85 shown in Fig. 5, a wire rope 13 is shown in place of the chain 5, and a drum 14, on which that rope is adapted to wind, is shown in place of the lever 7. That drum is provided with
 90 teeth either wholly or partially around its circumference, which are adapted to engage with corresponding teeth upon the rod 15, which is herein substituted for the rod 9 of the other figures, that rod being thus adapted
 95 to serve as a rack to oscillate the drum 14 in raising or lowering the deflecting-wheel 1 from and to its operating position. An extension 8^a of the brackets 8 is adapted to guide the rack portion of the rod 15 in suitable relation to the teeth of the drum 14.
 100

A guard 16 is preferably attached to the bracket 3 and extends in front of the deflecting-wheel for the purpose of pushing aside
 105 whatever objects may happen to lie in the path of that wheel.

In all of the views herein shown the deflecting-wheel 1 and its supports are shown appurtenant to the truck-frame of the car, this being deemed preferable from the fact that it is the wheels and not the body of the car
 110 that must be moved aside in order to take the desired direction; but the motorman and the other occupants of the car are located upon the body portion thereof, which, by reason of the springs employed between it and the
 115 truck-frame, is liable to pitch or rock when traveling over an uneven surface or when running at high speed, and this pitching or rocking is sometimes so great, especially at the extreme ends of the car, as to render it
 120 difficult to provide and maintain a suitable connection between the rocking ends of the car and the non-rocking truck, so that the motion of the rocking ends of the car shall not be transmitted to or unduly affect those portions
 125 of the switching device which are located upon the truck. We effect this object by so arranging the parts that the chain or other connection shall extend from the point of connection with the rocking portion of the
 130 car in a direction substantially radial to the center upon which the car-body oscillates, that center of oscillation being substantially at or near the wheels of the car. When thus

arranged, the rocking movement of those portions of the device which are attached to the ends of the car move the chain in a direction substantially at right angles to its length, and do not therefore operate to lengthen or shorten the chain to any appreciable extent.

In order to show our devices upon a scale sufficiently large to be clear, and at the same time to show an unbroken connection with the devices which are attached to the platform, we have in the drawings represented a car which is probably shorter than most of those in common use, but it will readily be seen that in a longer car the length of chain between the sheave 6 and the lever 7 would be correspondingly greater, and would thus be adapted to the greater rocking movement of the longer car.

A description will now be given of the preferred arrangement of the track system employed in connection with these devices.

Figs. 6 and 7 represent track systems to be employed in connection with cars having their deflecting devices, such as have already been described, arranged substantially central between the traction-wheels thereof, requiring therefore their supplemental or guiding rails 20 to be located upon the roadway substantially central between the two track-rails. The relative longitudinal location of the guiding-rail 20 with relation to its turnout track-rails must correspond to that which exists between the deflecting-wheel 1 and the leading car-wheels. For example, if the deflecting-wheel is located two feet in advance of the point of contact of the leading truck-wheel with its rail the deflecting portion of the guide-rail 20 should also be two feet in advance of the correspondingly-curved portions of the turnout track-rails in order that the deflecting-wheel shall move the car sidewise just as the leading truck-wheels reach those portions of their rails which allow them so to move.

It will readily be seen that the use of a double-flanged deflecting-wheel, such as the one shown, does not permit of the use of a Y-shaped deflecting-rail, inasmuch as such a wheel can only be deflected in one direction, to the right or to the left, respectively. We therefore place the guiding-rails for the right and the left hand switches at different locations longitudinally of the system of tracks, as shown in Figs. 6 and 7. In the latter arrangement a car at A, in order to take the turnout D, would be deflected by the guide-rail 20^a onto the other line B, and upon reaching the guide-rail 20^f would, by means of that guide-rail, be deflected onto the turnout D.

In the case of a single-track road, as represented in Fig. 26, a car at E, in order to take the turnout F, would be deflected by the guide-rail 20^a. On the other hand, if it were desired to take the turnout G, the deflecting-wheel would not be pushed down until the guide-rail 20^b is reached. By this arrangement the operators are enabled to determine

with certainty and without confusion, error, or delay the direction the car shall take.

Cars which are intended to run in both directions must of course be provided with a deflecting device upon each end, the one in advance being always the one employed.

In the arrangement shown in Figs. 8 and 9 the central guiding-rail is dispensed with, and the curved track-rails 25 and 26 of the turnouts to be taken are utilized to guide the car thereon. This arrangement requires the use of two of the devices shown in Figs. 1 to 3 upon each end of the car, one over each track-rail. In this case the wheels 27 and 28 require flanges on their outer sides only, and they should be set at an angle substantially agreeing with the sidewise deviation of their respective rails 25 and 26, as shown in Figs. 8 and 9. These wheels may be mounted in a carrier 2 and bracket 3, similar to those of Figs. 1 to 5, and these carriers may be and preferably are connected with independent operating devices, similar to those herein shown and described, located on the body or platform of the car. The deflector-wheels must be so placed relative to the guiding edges of the turnout-rails as to engage with the latter just when the track-wheels reach the portions of their rails which allow of their being moved laterally, as explained in connection with the central guiding-rail.

The angle at which the carrier 2 rests, as shown in Fig. 3, is that which we find to be best adapted to the conditions under which it must operate. If it were inclined more toward the position shown in Fig. 1, it would be liable to be turned on its pivot 3^a still farther toward the position shown in Fig. 1 upon meeting any trifling irregularity or obstruction. In the position shown in Fig. 3 it is sufficiently near a vertical position to cause it to hold its position against accidental displacement and at the same time that slightly-angular position adapts it to yield or telescope longitudinally more readily than if it were to occupy a position more nearly vertical. This slightly-angular position also enables it to be raised away from the guiding-rail, when desired, more readily than if it occupied a vertical position.

It is obvious that non-rotating shoes may be substituted for the deflecting-wheels 1, 27, and 28, although such a substitution would entail a great amount of friction, operating as a brake upon the progress of the car. In other respects the devices herein shown may be modified, or equivalent devices may be substituted without departing from the essential features of the invention.

The dot-and-dash lines of Fig. 6 indicate a modified arrangement of the first branch track and its guiding-rail, it being not essential that the branch should, after its first divergence, be brought again into parallel relation to the main line.

We claim as our invention—

1. In a switching device, the combination

of a deflecting-wheel, a carrier therefor, a spring-holder pivotally mounted upon a fixed portion of the car and oscillating in the plane of the direction of the car, the carrier being supported by and oscillating with the spring-holder, substantially as described.

2. In a switching device, the combination of a deflecting-wheel, a carrier therefor, a spring-holder pivotally mounted upon a fixed portion of the car and oscillating in the plane of the direction of the car, the carrier being supported by and oscillating with the spring-holder, and a spring between the spring-holder and the carrier for pressing the latter toward its operative position.

3. In a switching device, the combination of a deflecting-wheel, a carrier therefor, a spring-holder pivotally mounted upon a fixed portion of the car and oscillating in the plane of the direction of the car, the carrier being supported by and oscillating with the spring-holder, a spring between the spring-holder and the carrier for pressing the latter toward its operative position, and a bracket on which the carrier and the spring-holder are pivotally mounted, provided with flanges extending on opposite sides of the carrier adjacent to the wheel for sustaining the latter against lateral movement, substantially as described.

4. In a switching device of the class specified, the combination of a guiding-wheel, a carrier on which that wheel is journaled, a bracket on which the carrier is pivotally mounted, provided with flanges 3^b and 3^c, extending on opposite sides of the carrier adjacent to the wheel, and having projections extending rearwardly of the carrier and adjacent to the wheel when in its operative position,

all arranged and operating to sustain the guiding-wheel directly and rigidly against rearward movement, and to impart the sidewise deflection thereof directly and rigidly to the truck or car.

5. In a switching device of the class specified, the combination of a guiding-wheel, a carrier on which that wheel is journaled, a bracket on which the carrier is pivotally mounted, provided with sidewise and rearwardly sustaining flanges for the carrier, extending upon both sides and rearwardly thereof in immediate proximity to the guiding-wheel when in its downward or operative position, with means substantially as described operable from the car-platform for raising and lowering the carrier upon its pivot to and from its operative position, substantially as described.

6. In a switching device, in combination with a guiding or deflecting wheel, and a pivotally-mounted carrier therefor, rearwardly supporting-stops for holding the carrier slightly in advance of a vertical position, an operating-rod upon the car-platform, and a flexible connection between the operating-rod and the carrier, whereby the latter may be positively raised out of its lower or operative position, substantially as described.

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