(No Model.) 5 Sheets—Sheet 1.

J. A. DUGGAN.

RAILROAD SWITCH.

No. 433,934. Patented Aug. 12, 1890.

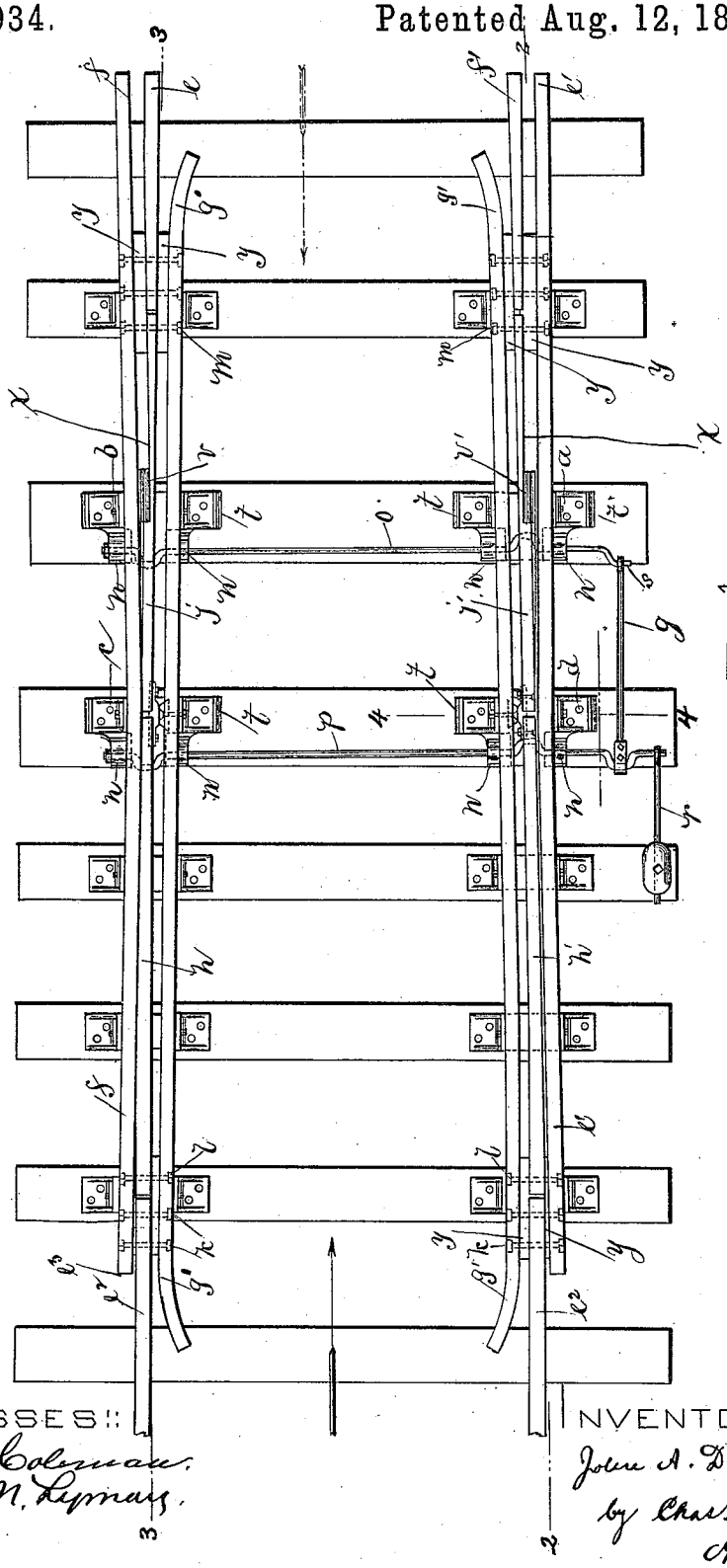


FIG. 1.

WITNESSES:
John A. Colemans.
Anson M. Lymans.

INVENTOR:
John A. Duggan
by Chas. H. Drew
Atty.

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J. A. DUGGAN.

RAILROAD SWITCH.

No. 433,934. Patented Aug. 12, 1890.

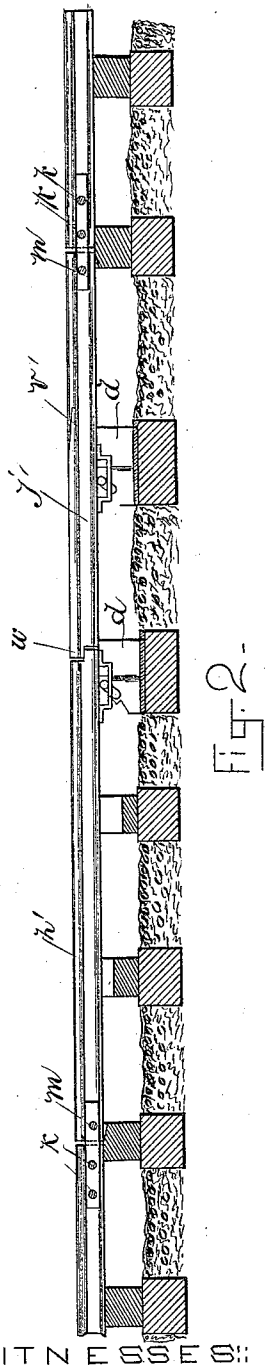


Fig. 2.

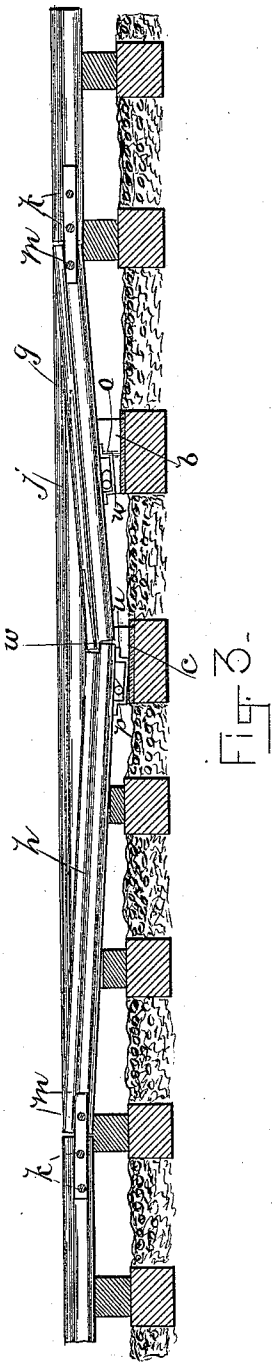


Fig. 3.

WITNESSES:
John A. Coleman.
Linton M. Lyman.

INVENTOR:
John A. Duggan
by Chas. H. Drew
Atty.

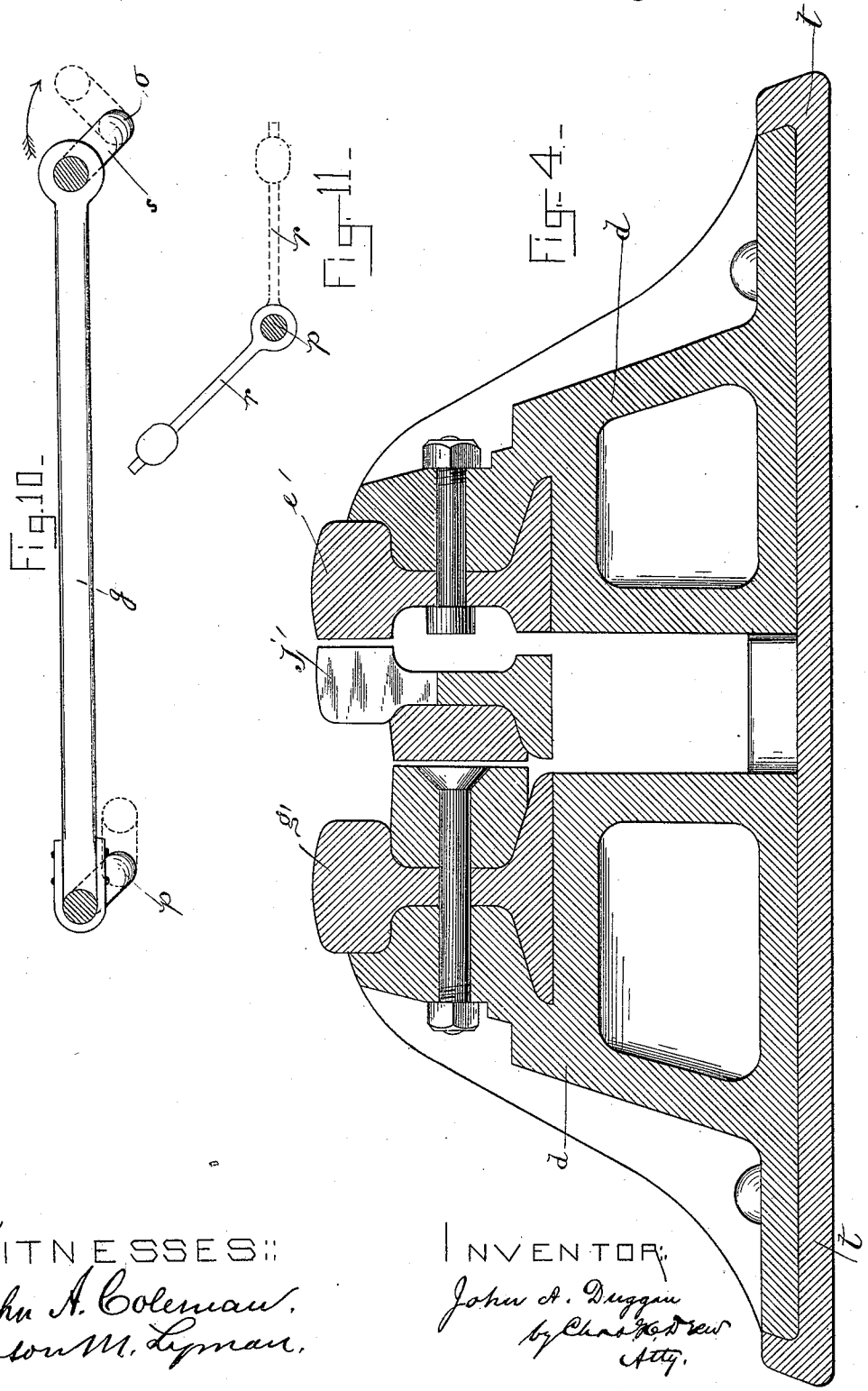
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J. A. DUGGAN.

RAILROAD SWITCH.

No. 433,934. Patented Aug. 12, 1890.



WITNESSES:
John A. Coleman.
Carlton M. Lyman.

INVENTOR:
John A. Duggan
by Chas. Hodges
Atty.

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J. A. DUGGAN.

RAILROAD SWITCH.

No. 433,934. Patented Aug. 12, 1890.

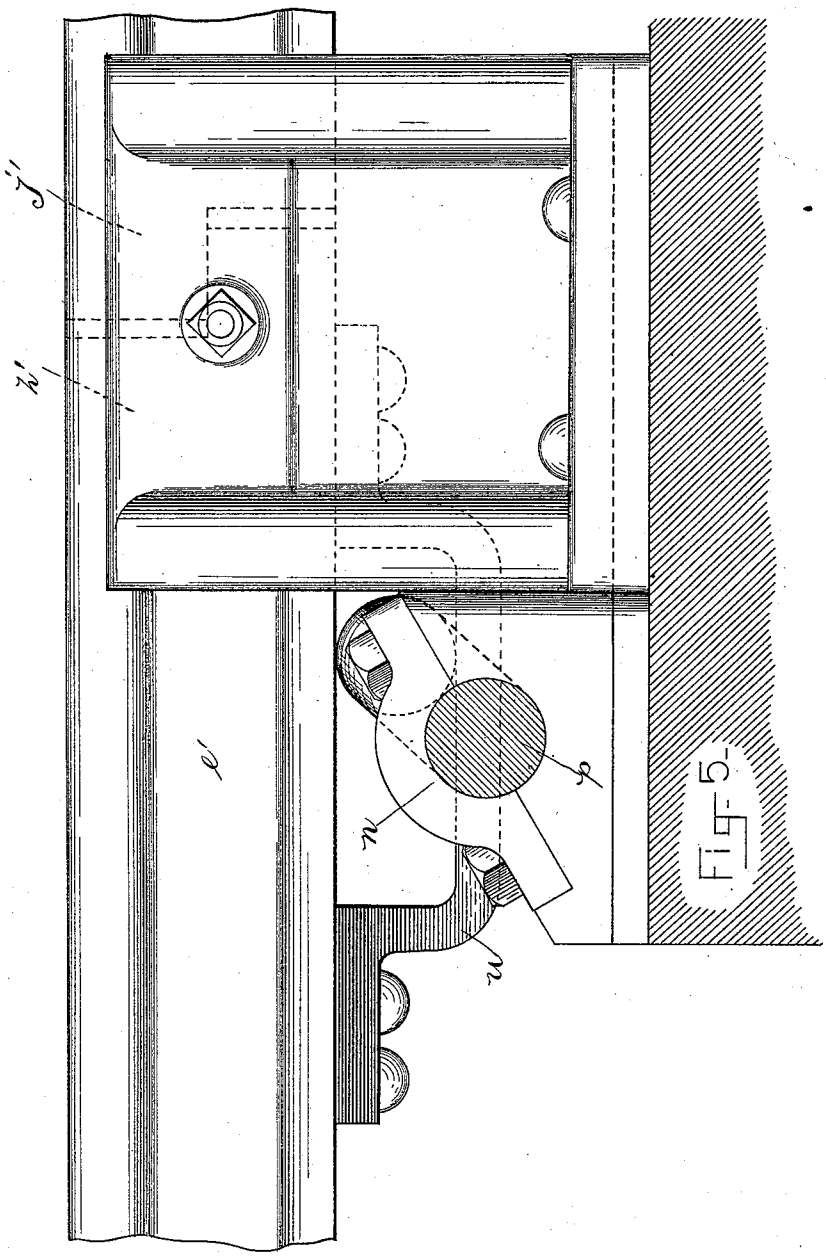


Fig. 5.

WITNESSES:
John A. Coleman.
Custon M. Lyman.

INVENTOR:
John A. Duggan
by Chas. H. Drew
Atty.

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(No Model.)

5 Sheets—Sheet 5.

J. A. DUGGAN.

RAILROAD SWITCH.

No. 433,934. Patented Aug. 12, 1890.

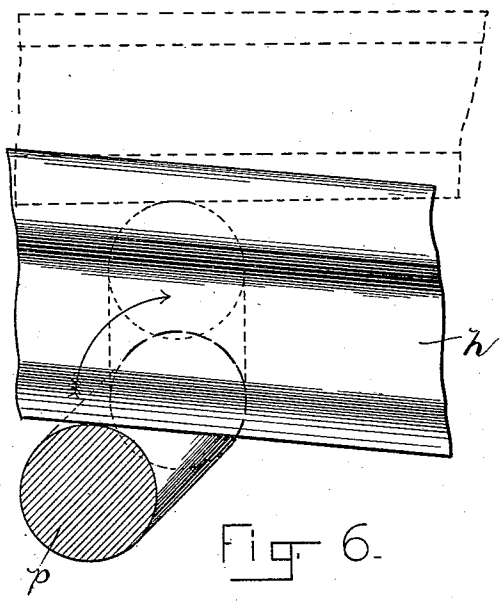


Fig. 6.

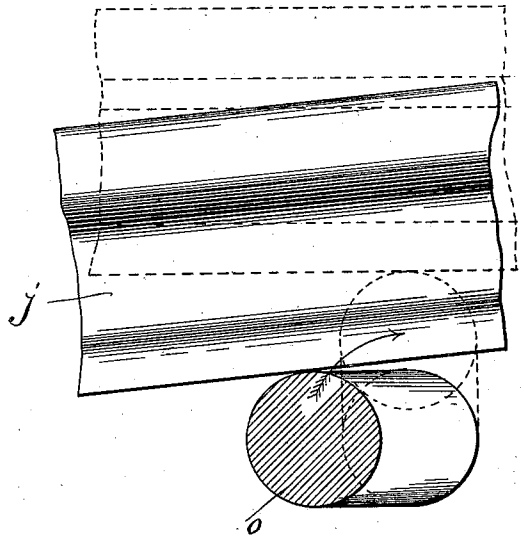


Fig. 7.

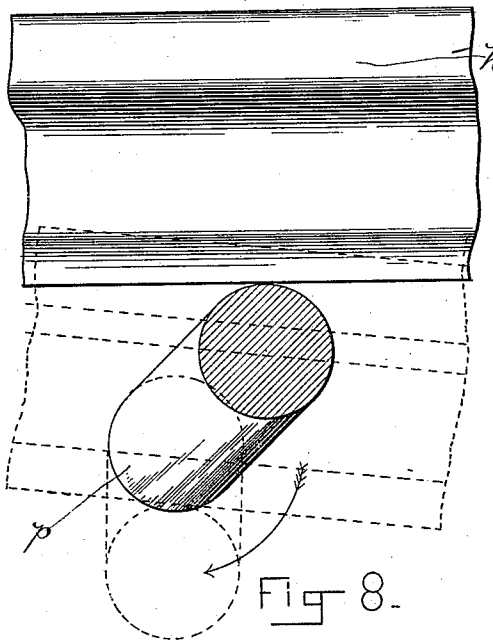


Fig. 8.

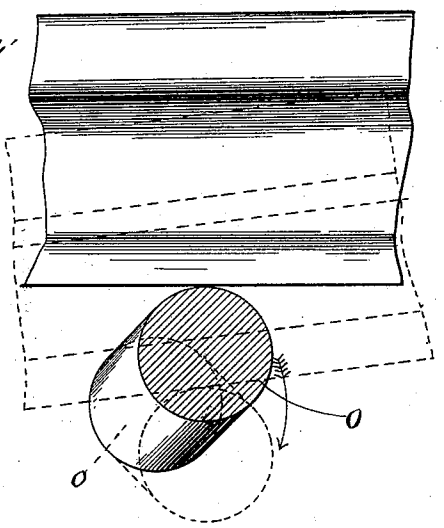


Fig. 9.

WITNESSES:

John A. Coleman.

Anson M. Lyman

INVENTOR:

John A. Duggan

by Chas. McDrew

Atty.

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UNITED STATES PATENT OFFICE.

JOHN A. DUGGAN, OF QUINCY, MASSACHUSETTS, ASSIGNOR TO THE BURNHAM & DUGGAN RAILWAY APPLIANCE COMPANY, OF PORTLAND, MAINE.

RAILROAD-SWITCH.

SPECIFICATION forming part of Letters Patent No. 433,934, dated August 12, 1890.

Application filed September 26, 1887. Serial No. 250,674. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. DUGGAN, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Railroad-Switches; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of switches in which the switching is accomplished by vertically-moving rails, as described in Letters Patent to me, No. 330,878, dated November 24, 1885, and in my application for Letters Patent filed July 17, 1886; but the mechanism differs from the devices described in said patent and application in important particulars, as will be hereinafter shown, the principal difference consisting in making the middle rail, by which the switching is accomplished, only in two parts, and in lowering and raising this rail at its middle point, where the two parts meet.

In the drawings, Figure 1 is a plan view of my improved switch. Fig. 2 is a sectional elevation on line 2 2, Fig. 1. Fig. 3 is a sectional elevation on line 3 3, Fig. 1. Fig. 4 is a section on line 4 4, Fig. 1, looking toward the right. Fig. 5 is a side elevation of the chair and rails shown in section. Figs. 6, 7, 8, and 9 are detail views showing the different positions of the cranks and of the middle rails, which are raised and lowered by them. Fig. 10 is a side elevation of the rod connecting the shifting-rods and the cranks to which it is attached. Fig. 11 is a detail view of the handle by which the switch is thrown. In Fig. 1 the lower flanges of the rails are omitted to avoid confusion.

The switch proper consists of two guard-rails g' g', the main-track rails e e', side-track rails f f', and pivoted middle rails h h' and j j'. The rails e^2 e^2 are portions of the main track, and are secured to the ties. The ends of these rails e^2 are secured by bolts k k and blocks y y. The middle rails h h' are pivoted on bolts l l, which pass through and are fastened to the guard-rails g' g' and rails f and e'. The middle rails j and j' are pivoted in like manner on bolts m m.

On the sides of the chairs a, b, c, and d are bearings or boxes n n, on which the switch-rods o and p rotate. The switch-rods o and p are bent under the middle rails, so as to form cranks for lifting and depressing those rails. The middle rails at their point of connection should be dropped to such depth that the surface of the rails j and j', near the head of the incline v and v', shall be so low that the wheel-flanges passing over them shall not touch them. A crank is also formed near the end of each switch-rod and connected with each other by the rod g. A weighted handle r is attached to the end of the rod p, by which that rod can be given a partial rotation, and by means of its connection with the rod o by the rod g a portion of the rotary motion is given to the rod o, as will be hereinafter more fully explained. There is not at any time any considerable strain on this handle, except when it is improperly placed—that is, it will not be thrown by the movement of the train—but it is deemed best to have the handle weighted to counteract any strain that might be exerted by the train when it is improperly placed.

The relative positions of the cranks under the middle rails h and j' of the main track are shown in Figs. 6 and 7, where the rails are represented as down, the dotted lines indicating the positions of the rails and cranks when the middle rails on the main track are raised.

Figs. 8 and 9 show the relative positions of the cranks and middle rails on the side tracks, the dotted lines indicating the positions of the same when the middle rails on the side track are lowered.

Fig. 10 illustrates the relative positions of the cranks on the rods o and p, the full lines and dotted lines corresponding to those in Figs. 6, 7, 8, and 9. The cranks are connected by the rod g. The crank on the rod o is made longer than that on the rod p, so that when the rod p is turned by the handle r through about three-eighths of a revolution the rod o will be turned by its connecting-rod g and crank s through about a quarter of a revolution, as shown in Figs. 7, 9, and 10.

The construction of the chair d is illustrated in Figs. 4 and 5, in which is shown the

middle rail j', free to be moved up and down between the rails e' and g'. The two sides of the chair d are tied together by a shoe t, turned up at each end, thus preventing the spreading of the rails g' and e'. The chairs a, b, and c are of a similar construction.

In Fig. 5 is shown a side elevation of the chair d, showing the bearing-box in which the rod p turns. The strap u is bolted to the under side of the rail h', whereby it is lowered when rod p is turned three-eighths of a revolution, as shown in Fig. 8. A similar strap is attached to the rails h, j, and j', so as to engage the cranks shown, respectively, in Figs. 6, 7, and 9. When the rod p is turned through about three-eighths of a revolution by the handle r, as shown in Fig. 11, the middle rails on the main track will be raised and those on the side track will be lowered.

The several figures illustrate the middle rails on the main track as lowered and those on the side track raised. Ordinarily when the rails are in proper position for the passage of wheels the middle rails do not bear the weight of the engine or cars to any extent, but only guide it by means of the wheel-flange, the wheel-flange being wide enough to bear the weight of the engine and cars on the solid rails e' and f. When the middle rails h' and j', with the side track, are raised, the engine will be guided onto the side-track rails $f f'$, the train being understood to be moving in the direction indicated by the arrow in Fig. 1. If the train is moving in the same direction and the rails h and j are raised and the rails h' and j' are lowered, the train will be guided by the rails h and j onto the main rails e and e'.

On the middle rails j and j' are cut inclines v and v', as shown in Figs. 1, 2, and 3. If the train is going down the side track in the direction indicated by the dotted arrow in Fig. 1—that is, "heel on"—and the rails h and j are raised or set—that is, for the main track—the cranks being in the position indicated by dotted lines in Figs. 6, 7, 8, 9, and 10, the flanges of the wheels will ride up the incline and over the middle rails h and j, onward to the rails e^2 e^2, because the cranks which support the middle rails h and j are vertical, or nearly so, as shown by dotted lines in Figs. 6 and 7. If, however, the train is going in the same direction (indicated by dotted arrow)—that is, heel on—on the main track, and the switch is set for the side track—that is, with the rails h' and j' raised—the cranks being in the positions indicated by the full lines in Figs. 6, 7, 8, 9, and 10, (the middle rail on one side being raised and thus being an obstruction to the passage of the wheel-flange at the point where the incline is placed,) the wheel-flange will bear upon this incline v' and the pressure exerted by the wheels will depress the rails and thus change the crank shown in Figs. 8 and 9 from the position shown in full lines to that shown in dotted lines, the other cranks m and p being moved at the same time by the rod g, thus automatically setting the switch for the main track and insuring a clear passage for all the wheels passing in the same direction, and thus also insuring a switch properly fixed for the main track for trains moving in the other direction or "head on." The inclines v and v' are formed on the back part, respectively, of the rails j and j', the running sides of these rails being unbroken. The middle rail on each side, from the incline to the end of the outside rail at e^3, must be in close contact with the latter rail.

It is of great importance to have the space between the running sides of the guard-rail and the running side of the outside rail very narrow, because this will insure the bearing of the tread of the wheels on the outside rail, which is solid and immovable. This narrow space is obtained by making the middle rail on each side narrow on its top, from the point x, Fig. 1, to the inclines v and v'. This also provides a space or pathway through which the wheel-flanges can pass when the treads of the wheel are bearing on the outside rails on that side.

At the point of connection between the two rails h and j and h' and j' a joint is made, as shown in Figs. 2 and 3, at w, the upper part of j and j' projecting over a corresponding notch in h and h', made by cutting away a part of the end of h and h' on the upper side. This joint insures the surface of both parts of the middle rail being always continuous, whether they are raised or lowered.

The box n, on each of the chairs a, b, c, and d, is so made as to furnish a bearing on each side of the rails for the rods o and p and leave an open space between, in which is the crank on those rods, respectively, by which the rails h h' and j j' are actuated.

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

1. In a railroad-switch, the middle rails h h' j j', pivoted at their outer ends by means of bolts l l and m m to the guard-rails g' g' and rails e' f, and capable of being raised and lowered at the point of junction, respectively, of h and h' and of j and j', substantially as above described.

2. The middle rails j j', constructed with narrow upper surfaces, so that the tread of the wheels of the train will have a bearing over the middle rail and on the outside rail, and provided, respectively, with the inclines v and v', substantially as and for the purpose above described.

3. The inclines v and v', cut in the central portion of the heel part, respectively, of the middle rails j and j'

4. The middle rails h h' and j j', made in two parts, and having the upper surface of one of those parts projecting into a corresponding notch cut in the upper surface of the other part, substantially as and for the purpose above described.

5. The chairs a, b, c, and d, in combination

with the strap *u*, the outside rail, the middle rail, and the guard-rail, and the rods *p*, *o*, and *g*, substantially as described.

6. The box *n*, attached to the chairs *a*, *b*, *c*, and *d*, for the purpose of furnishing bearings for the rods *o* and *p* on each side of the rails, and having an open space in which are to be placed the cranks on the rods *o* and *p*, substantially as and for the purpose above described.

7. The handle *r*, the rods *o* and *p*, provided with cranks, the crank on the rod *o* being longer than that on the rod *p*, the connecting-rod *g*, and the crank *s*, all in combination substantially as and for the purpose above described.

8. The handle *r*, provided with a weight on its outer extremity, in combination with rods *o*, *p*, and *g*, and vertically-moving rails *h h'* and *j j'*, and adapted to be actuated by the pressure of the wheel-flanges of a railroad-train, substantially as and for the purpose above described.

9. The rod *p*, adapted to receive a greater rotary motion than the rod *o*, in combination with the rod *o* and the rod *g*, substantially as and for the purpose above described.

JOHN A. DUGGAN.

Witnesses:
THOS. H. WAKEFIELD,
ANSON M. LYMAN.