

(No Model.)

2 Sheets—Sheet 1.

J. CHRISTIANSEN.
RAILROAD SWITCH.

No. 465,791.

Patented Dec. 22, 1891.

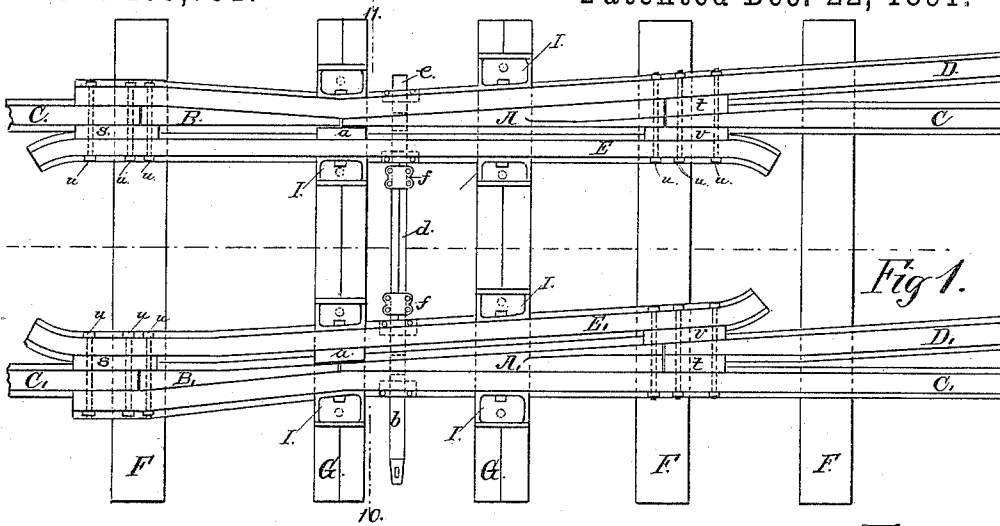


Fig 1.

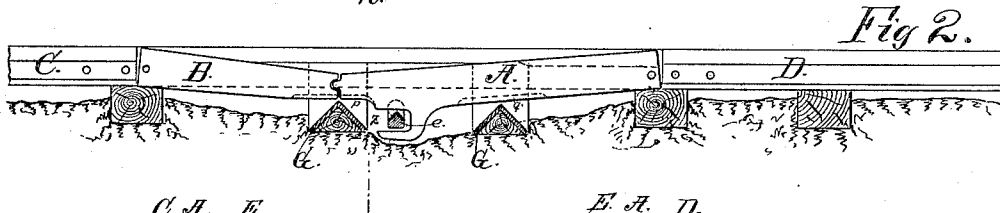


Fig 2.

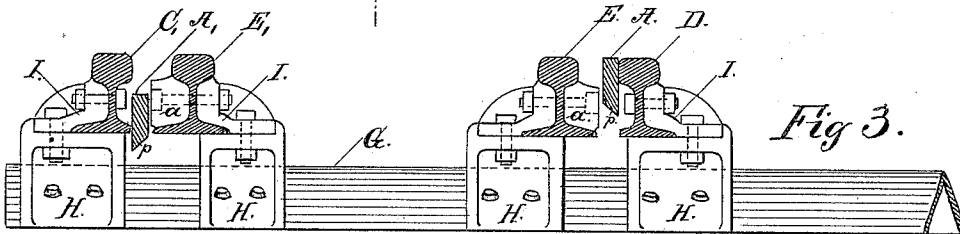


Fig 3.

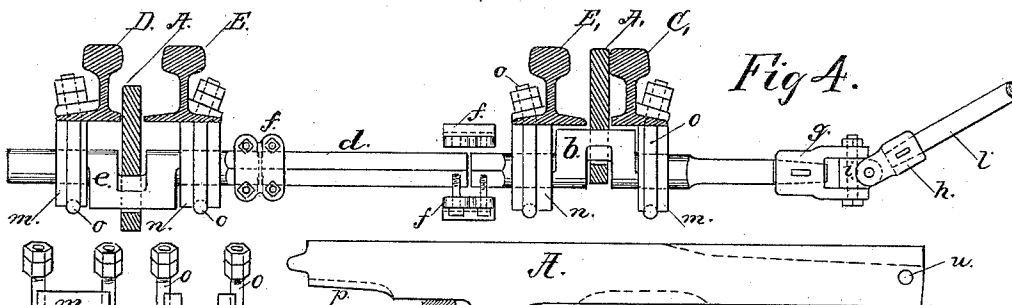


Fig 4.

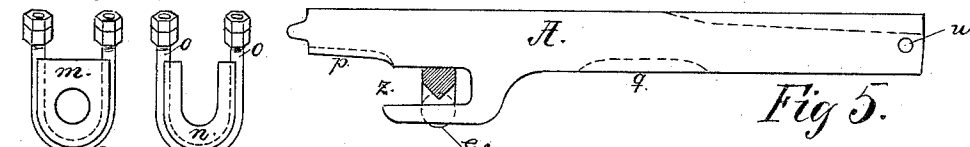


Fig 5.

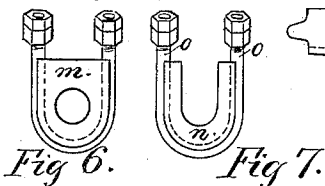


Fig 6.

Fig 7.

Witnesses.
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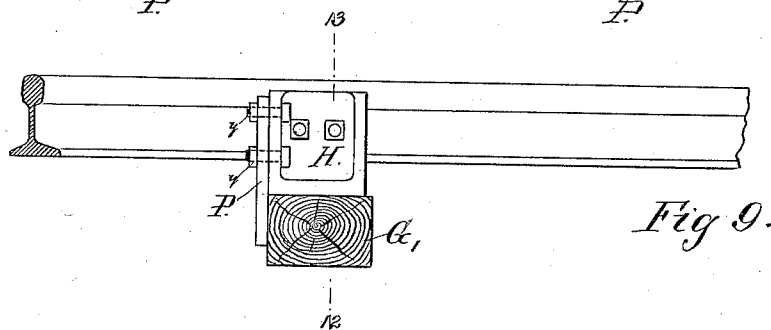
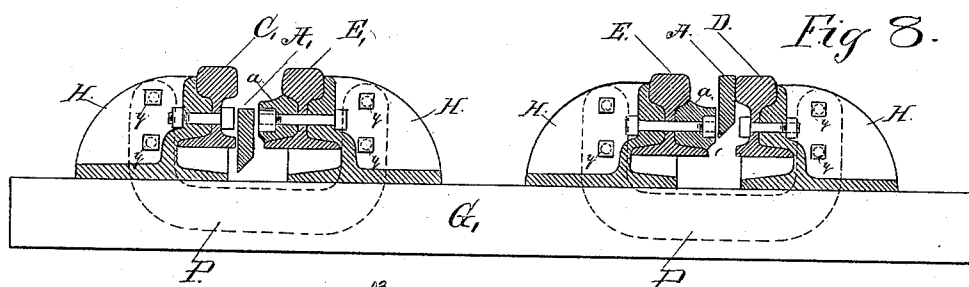
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2 Sheets—Sheet 2.

J. CHRISTIANSEN.
RAILROAD SWITCH.

No. 465,791.

Patented Dec. 22, 1891.



Witnesses.
George L. Hill
Hattie L. Durrell

Inventor.
John Christiansen

UNITED STATES PATENT OFFICE.

JOHN CHRISTIANSEN, OF QUINCY, MASSACHUSETTS.

RAILROAD-SWITCH.

SPECIFICATION forming part of Letters Patent No. 465,791, dated December 22, 1891.

Application filed March 26, 1891. Serial No. 386,545. (No model.)

To all whom it may concern:

Be it known that I, JOHN CHRISTIANSEN, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Railroad-Switches, of which the following is a specification.

My invention relates to improvements in railroad-switches, and in particular in that class of switches in which the switch-rails are movable vertically instead of sidewise, and which are described in Patents No. 330,878, dated November 24, 1885; No. 405,020, dated June 11, 1889, and No. 433,934, dated August 12, 1890, granted to John A. Duggan, of Quincy, Massachusetts; and the objects of my improvements are, first, to lessen or entirely obviate the liability of clogging by snow or ice packing under the switch-rail or between the switch-rail and the underlying tie, making the switch inoperative; second, to make the switch safer and more permanent by the use of two or more metallic ties in the place of wooden ones; third, to prevent the spreading or moving of rails at the point of danger in the switch by the use of metallic ties with rail-chairs fastened permanently to same; fourth, making the switch self-locking after throwing it into either one or the other position by means of a crank having a square face, increasing thereby the safety of the switch; fifth, providing for a thorough interchangeability of parts with the least possible expense in material as well as in labor. I attain these objects by the mechanism illustrated in accompanying drawings, in which—

Figure 1 is a plan view of a switch; Fig. 2, a sectional elevation, guard-rail E removed, showing switch-rails A and B; Fig. 3, a cross-section on line 10 11 of Fig. 1, looking to the left. Fig. 4 is a cross-section on line 10 11 of Fig. 1, in an enlarged scale, looking toward the right; Fig. 5, a detail of switch-rail showing square-faced crank holding it in position; Figs. 6 and 7, end views and details of box-hangers for suspending the crank-shaft from the rails; Fig. 8, a cross-section of switch, showing construction of rail-chairs for wooden ties; Fig. 9, an end view of chair and wooden tie.

Similar letters refer to similar parts throughout the several views.

In Fig. 1, C C and c c are the main track rails in a railroad; D D, the siding; E E, the guard-rails; A A and B B, the switch-rails. These are shown also in Fig. 2, and switch-rail A is shown in Fig. 5.

Experience has demonstrated that switches of the kind shown, if placed on wooden ties, are liable, under certain conditions of snow and frost, to be interfered with by the snow while drifting, packing in between the switch-rail and the underlying tie. The places where the snow is liable to be packed hard by the repeated vertical movements of the switch-rails are difficult of access and cannot easily be cleaned. To avoid such occurrence I use two or more metallic ties G G, (shown in Figs. 1, 2, and 3,) formed of rolled angle-iron, the inclosed angle filled with wood to facilitate tamping, the angle-iron being placed inverted upon the ground, as shown in Fig. 2, so as to present a sharp ridge or edge upward, meeting the switch-rails A A and B B, which latter I also provide with a sharpened or beveled edge at their bottom, at such places as in their descent meet the underlying railroad-ties, or they may be sharpened and beveled throughout their whole length. Figs. 2, 3, and 5 show this sharpening or beveling at p and q. In this wise two sharp and cutting edges meet each other at right angles and make any packing of snow impossible.

The metallic ties G G are provided with chairs H H, (shown in Figs. 1 and 3,) riveted on permanently, and to these the rails are secured by means of shoes or brackets I I, making thus a very substantial and permanent fastening, preventing any lateral movement of the rails, keeping the same at all times to the proper gage.

The switch-rails are operated by a rotating crank-axle. Heretofore this crank-axle has had its bearing or journals in boxes formed in the chairs which support the rails; also, it has been made of one piece of forged wrought-iron, the cranks at each end engaging in an elongated eye formed at the bottom of the switch-rails. I find in the practical construction and operation of the switch that this construction is open to objections. First, the roughness of that class of castings to which rail-chairs belong makes it difficult and expensive to provide a bearing for the crank-

shaft in the proper and exact location required, and to retain such bearing in the spiking of said chairs to rough railroad-ties, and to prevent binding of the shaft in the bearings.

5 I suspend my crank-shaft from the rails, as shown in Fig. 4, by means of U-shaped bolts with cast boxes, as shown in Figs. 6 and 7, the solid box *m* being hung to the outside or bearing rail, whereas the open or slotted box *n* is
10 hung to the inside or guard rail. I also construct my crank-shaft in three pieces, making the two cranks *e* and *b* separately, and of cast-steel, joining them by a piece of common square wrought-iron, corresponding in size to square
15 ends formed upon the cranks, and by means of clamps or couplings *f f*. (See Fig. 4, also Fig. 1.) The purpose of this construction now is as follows: The hangers and boxes *o*, *m*, and *n* may be permanently bolted to the
20 rail-flanges, and in mounting and placing a switch in the track the cranks are separately placed in their respective and proper positions by shoving them in through the slot in box *n*, after which the wrought-iron bar *d* is
25 placed between them and secured to them by the clamps *f f*. The switch-rails *A* and *A'* are then, by means of their fork-shaped open slot *Z*, Fig. 5, placed in position and the bolts *u u* inserted and tightened. A removal and
30 replacement of the cranks, which may be necessitated by derailment of cars, bending the same, or for other reasons, is effected in the same manner and with the least possible expenditure of time, whereas, if the crank-shaft
35 were made in one piece it would not only be more expensive in manufacture, but it would be difficult to place it in position, and still more so to remove it when bent or disabled by accident.

40 It will be seen in Figs. 2 and 5 that I construct my crank with a square outer face instead of making it round, as cranks usually and universally are. This I do for the purpose of making the switch self-locking, and
45 this purpose is accomplished perfectly, for in operating the switch if by reason of negligence or imperfections in any of the moving parts of the switch-stand or switch-rod connections the crank should be thrown short of
50 its perpendicular position or beyond the same, then as soon as a load is brought to bear upon the switch-rail it will have the tendency to move the crank into its proper perpendicular position and to keep it there,
55 and while the load is moving over the switch no ordinary power applied to the crank would be able to throw or move it, whereas if the crank were made round and were not placed absolutely perpendicular, then with the load
60 of a driving-wheel upon the switch-rail a tremendous torsional strain would be caused upon the crank-shaft and its connections to the switch-stand and upon the lock in the switch-stand. As the crank-shaft lies below
65 the natural surface of the ground a so-called "ground-switch" attached to a linear exten-

sion of the crank-shaft would also be below the surface of the ground, which would be objectionable, snow covering it in winter and switchmen having to stoop very low to operate it. I therefore raise my switch-stand to any desirable height above the ground.

Fig. 4 shows the switch-rod *l* from any switch-stand.

g, i, and h constitute a universal joint, forming the connection between the crank-shaft and the switch-rod *l*. This arrangement enables me to operate my crank-shaft from any point above as well as also sidewise of the crank-shaft so long as the switch-rod *l* forms
80 an angle with the linear extension of the crank-shaft of less than ninety degrees, at which angle a universal joint becomes inoperative.

As the application of metallic ties enhances the cost of the switch, and as wooden ties will be employed to a large extent, I show in Fig. 8 a switch placed on wooden ties *G*. The beveled edge at the bottom of the switch-rails *A A'* will yet, to a great extent, prevent
90 the packing of snow between the tie and the rail.

In constructing a switch for wooden ties I find it necessary to employ a yoke *P*, (shown in Figs. 8 and 9,) which is bolted onto each
95 of the chairs *H H*. I find namely that in connecting the various rails and tightening the bolts *u u u* at the joints shown in Fig. 1 the point where the two switch-rails *A* and *B* meet is very sensitive, and that unless the
100 filling-blocks *s, v, and t* are exceedingly accurately fitted there will be either a spreading of the rails *D* and *E* at that point or a contraction of same, causing either too loose a fit of the switch-rail in the slot formed by
105 the track-rail *D* and the block *a* bolted onto the guard-rail *E*, or a binding of the switch-rail in the slot preventing or impeding its free vertical movement. This may be further aggravated by the rough process of spiking
110 the chairs *H H* to rough wooden ties. The yoke *P* now guards against all this and insures an accurate and proper fit under all circumstances. The yoke is made of heavy wrought-iron, bolted with strong bolts, which
115 are in line with the rails, and there being two bolts in each chair a tipping on account of roughness of ties is made impossible.

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

1. A vertically-moving switch-rail having its bottom edge beveled to form a sharp cutting-edge, substantially as and for the purpose specified.

2. In a vertically-moving switch-rail, an open forked slot *Z* at the bottom for withdrawing the rail or placing it in position without removing the crank-shaft, substantially as set forth.

3. The combination of a railroad-switch having vertically-movable switch-rails, with the metallic ties *G*, composed of inverted an-

gle-irons presenting their sharp ridge upward, substantially as above described.

4. In a switch of the kind described, the combination of a vertically-moving switch-rail having a sharpened or cutting bottom edge, with metallic ties presenting a sharp upward-extending ridge.

5. In a switch of the kind described, a crank-shaft composed of two separate cranks and an intervening straight bar coupled to the cranks by clamps or couplings, substantially as and for the purpose described.

6. In a switch of the kind described, a crank-shaft for operating the switch-rails suspended by hangers from the flanges of the main and guard rails, substantially as described.

7. In a switch of the kind described, the combination of a crank-shaft consisting of two separate cranks and an intervening straight bar coupled to the cranks by clamps or couplings, with hangers suspending said crank-shaft from the flanges of the main and guard rails, the boxes in hangers suspended from the guard-rails being slotted or open to

admit of the passage of the cranks, substantially as described.

8. In a switch of the kind described, a crank for operating the switch-rails having a square outer face, substantially as shown, and for the purpose described.

9. In a switch of the kind described, a crank-shaft coupled to the switch-rod of a switch-stand by means of a universal joint, substantially as described.

10. In a switch of the kind described, the combination of a crank-shaft and a switch-rod leading off from said crank-shaft to any switch-stand under an angle upward and sidewise, with a universal joint *g i h*, substantially as described.

11. In a switch of the kind described, the combination of the rail-chairs *H H* with a yoke *P*, substantially as set forth.

JOHN CHRISTIANSEN.

Witnesses:

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HATTIE L. BURRELL.