J. P. Herron,

2. Sheets. Sheet. 1.

Railway Switch.

No. 106,266. Patented Aug. 9. 1870.

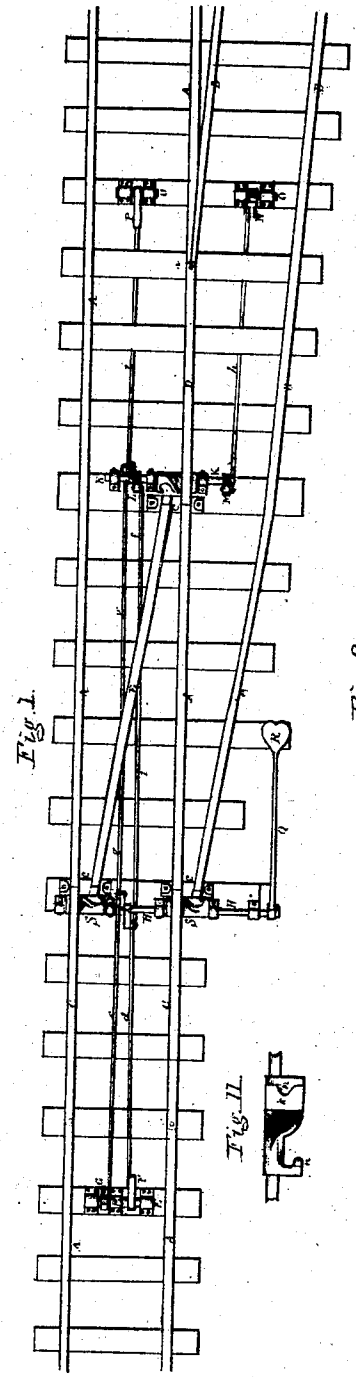

Fig. 1.

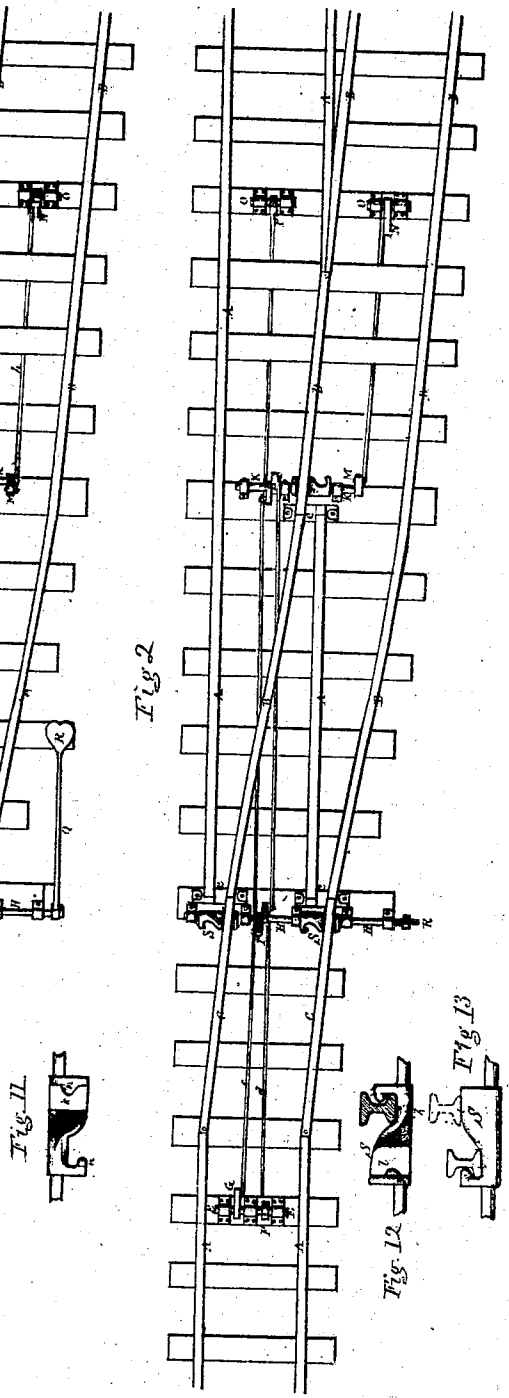

Fig. 2

Fig. 11

Fig. 12

Fig. 13

Witnesses
Guy C. Humphries
Charles Herron

Inventor
James P. Herron

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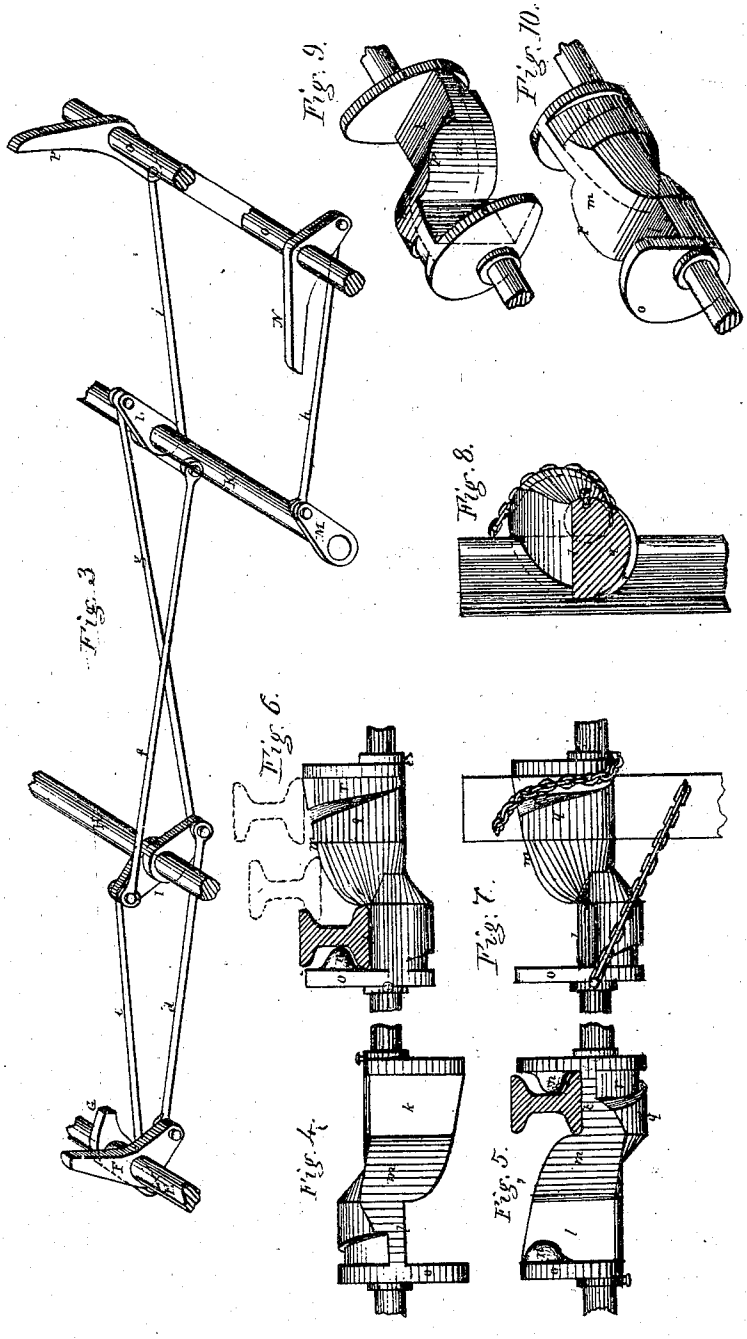

Witnesses
Guy C. Humphries
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Inventor
James P. Herron

United States Patent Office.

JAMES P. HERRON, OF ATLANTA, GEORGIA.

Letters Patent No. 106,266, *dated August* 9. 1870.

IMPROVEMENT IN RAILWAY SWITCHES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JAMES P. HERRON, of Atlanta, in the county of Fulton and State of Georgia, have invented a Self-acting Railroad Switch; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawing making part of this specification, in which—

Figures 1 and 2 are plans showing my invention in two different positions;

Figure 3 is a perspective view, purposely distorted to show the connection of some of the parts of the invention; and

Figures 4, 5, 6, 7, 8, 9, 10, are different views of the principal mechanical devices in the combination, and will be more particularly referred to hereafter.

The nature of my invention consists in an arrangement of rock-shafts, levers, rods, and tumbler-cams, which shall be operated on the approach of a train by the cow-catcher, or by the brake-bar of the rear car if the train is moving backward, to shift the rails if it be necessary; if not, then the rails shall lay undisturbed.

In the drawing—

A A are the permanent rails of a straight or main track, and

B B are those of a branch road or siding.

C C D are the shifting rails, which, with the other devices, constitute the switch. The rails are laid and secured upon ties, in the usual way, by spikes and chairs.

The shifting rails C C D are jointed at one end to the permanent rails in such a manner (see *a b*, figs. 1 and 2,) that their other ends may have not only lateral but vertical play, sufficient to allow them to be lifted the height of a rail or more, say four and a half or five inches.

This vertical play is for the purpose of clearing the jaws of the double chair *c*, which supports the end of a shifting rail, and the ends of the two permanent rails of two tracks that the shifting rail connects with.

The double chair *c* has a depressed seat for the end of each rail, so that the space in the bottom of the chair between the rails is higher than the lower flanges of them, in order to hold them secure from lateral motion. It is also an advantage in icy weather, when the rails may be frozen end to end, and extremely difficult to slide, to have them arranged to be lifted free before they are moved to the other rails.

At a short distance from the jointed ends of the rails *c c*, a shaft or axle, E, is placed, and secured in bearings attached to one of the ties of the permanent track.

On this shaft vibrate freely two bell-cranks or bent levers, F G.

The lever F is connected by a rod, *d*, jointed to its lower end with the lower end of a lever, I, set fast at its middle upon the rock-shaft H.

This rock-shaft is supported in bearings secured to the tie which supports the movable ends of the rails C, and extends to some distance beyond and under them on each side of the track, and will be more fully referred to further on.

When the upper limb of the lever F stands vertically between the rails, its upper end is about two inches above the level of their top flanges, and its lower limb is inclined toward the rock-shaft H, at an angle of about forty-five degrees, and the lever I is parallel with the said lower limb, having the same inclination. The position of these parts, as shown in fig. 3, is that which they will have when the switch is on the side track, as in fig. 2.

The upper limb of the bent lever G is shorter than that of F by about two inches, and its lower end is connected by a rod, *e*, to the upper end of the lever I, so that, when the lever F stands vertical, the lever G is horizontal, and *vice versa*.

It will be seen that a movement of either of the levers F G from a vertical to a lateral position will cause the rock-shaft H to make a quarter of a revolution, and make the other lever rise to a vertical position.

The rock-shaft K is supported in the same manner as H, under the moving end of the shifting rail D, upon the same tie, and extends from the middle of the main to the middle of the side track, figs. 1 and 2.

Upon the end of this rock-shaft, which is between the rails A, is firmly attached a lever, L, constructed exactly like I, and connected by its ends with the ends of the lever I by means of the rods *f g*, which both extend from the top of one lever to the bottom of the other, so that the two shall always incline in opposite directions, (see fig. 3.)

On that end of the rock-shaft K which is between the rails of the side track, is firmly fastened a crank-arm, M, equal in length to one-half the lever L, and connected at its upper end, by the rod *h*, to the lower limb of the bell-crank or bent lever N.

This bent lever is constructed like the lever F, but with its upper limb so long as to extend, when vertical, high enough to come in contact and be moved by the brake-bar of any railway-truck frame. It is loose like the lever F, on an angle, O, supported on one of the ties between the rails of the side track, as seen in figs. 2 and 3.

A similar bent lever, P, is supported in the same manner on the same tie between the rails of the main track, and is connected at its lower end by the rod *i* to the lower end of the lever L.

Thus, whatever may be the direction in which the lever L and arm M incline, the lower limbs of the

bent levers N P will be in a direction at right angles with each other, so that, when the upper limb of one is vertical, the other will be horizontal, as is the case with F and G.

It will be seen by this arrangement of levers and rods that when F and P are standing erect, G and N will be down, as seen in fig. 3, and that a depression of either of the bent levers at one end of the switch will change the relative positions of the bent levers at the other end.

The rock-shaft H extends to some distance beyond the rail of the main track, and bears an arm, Q, having at its extremity any suitably shaped device for a signal, R, figs. 1 and 2.

The arm is so set on the end of the rock-shaft that when the levers F and P are down, the signal is down and out of sight from an approaching train. When these levers rise, the signal rises so as to be seen; or the reverse of this arrangement may be adopted, as circumstances may direct.

It should be stated here that the position of the levers, rods, &c., as shown in fig. 3, is that which they will assume when the main track is closed, and the switch is open, as shown in fig. 2, and, also, that the movement of the parts is produced by a pull upon the rods *d e h i*, and never by a thrust.

The upper ends of the levers F and G are to be depressed toward the switch by a drop attached to the cow-catcher of an engine, which will be controlled in its action by the engine-driver.

This drop is so arranged as to always be in position to knock down the lever F, when approaching the switch from the left, if the train is to keep on the main track; but if the train is to run on the switch, which is open, as the signal R will show, the drop is to be raised so as to clear the top of the lever F, and the train passes onto the switch, and leaves it standing.

If the main track be open, and it is desired to take the switch, then the engine-driver raises the drop, as before, so that the lever F may clear it as it rises, but another part of the drop descends and strikes the lever G, throwing it down, and the lever F up.

On the rock-shaft H are firmly secured two tumbler-cams, S S, one under the end of each shifting-rail C, and on the rock-shaft K, under the moving end of the rail D, is secured another and similar tumbler-cam, S. This cam (for the description of one will serve for all) is so constructed as to form two rail-chairs, as far apart as is required for the play of the rails, but so arranged that the two seats *k l* shall be at right angles with each other, so that when one seat is horizontal, as in supporting a rail end, the other seat shall be perpendicular, and when the rock-shaft and cam shall have made about a quarter of a revolution, the positions of the seats will be relatively changed to a like degree.

Fig. 4 is a plan or top view of the cam B in the position it will assume when the side track is open, as in fig. 2.

Fig. 5 is a side view of the same looking toward the switch.

The seat *k*, as shown in plan, fig. 4, is, in fig. 5, in profile, and a section of rail is shown as resting upon it. While the seat *l* in this figure is a plane surface, in fig. 4 it is only shown by a line, which is the edge of its vertical plane in that figure.

The two seats, *k l*, are connected by two curved and sloping surfaces *m m*.

Their arrangement is plainly shown in figs. 9 and 10, which are perspective views of a cam in two positions. The broken and dotted line in each of these figures indicates the edge of a plane passing through the axis of the cam, and intersecting the surface *m*.

Fig. 6 shows the position of the cam, when it has made a quarter of a revolution from the position of fig. 5. The rail is shown by dotted lines as having been lifted, by the rising edge of the seat *k*, up from its position in fig. 5, then by dotted lines as sliding down the curved surface *m*, and finally by full lines as having reached its new position in the seat *l*.

Lugs or projections *n n* may be cast on the flanges *o o* of the cam, as shown in figs. 5 and 6, that will permit the lower flange of the rail to slide under them before they have completed the quarter turn, and which, when the rail is down square upon its seat, will be on the top of the flange, and hold the rail securely in place.

The curved corner or angle *p*, extending from one seat to the other, and which is common to the two surfaces *m m*, figs. 9 and 10, may be cut or rounded away between the seats, so as to lessen the width of sliding surface, and allow the rail greater freedom in sliding.

That part of the cam which is under each seat is swelled, so as to form an eccentric, *q*, on the rock-shaft, as seen in fig. 8.

Around this eccentric a groove, *r*, commences at the end of the cam, where the surface of the eccentric is nearest the axis of the cam, and extends spirally around the eccentric, until it runs out at the moving edge of the seat.

A chain or wire cord, fig. 7, is attached to each end of the cam, as near as possible to the line of the axis, and in line with the beginning of the groove *r*, and is attached at the other end to the under side of the bottom flange of the rail, near the furthest edge thereof, as shown in fig. 7.

When the cam, in turning, begins to lift the rail up from its seat, the chain on that end begins to unwind and slackens, and, as it does so, the other chain pulls on the rail to help it over from one seat to the other, until its groove catches it, and the eccentric tightens the chain, and, by its increasing motion, brings the rail quickly and surely to its new position.

By this construction of the cam S, the rail, after being lifted from its seat, will never come to a stand between its two proper positions, but will either continue its movement to the end, or, if from any cause its movement is checked, it will immediately return to its first position, its weight alone being sufficient to produce this effect, so that there can be no danger of running off the track so long as the rail remains unbroken.

Figures 11, 12, and 13 show the cam S, modified by the absence of the eccentric *q*, as it may be deemed sometimes expedient to dispense with the chain or cord.

This invention operates as follows, viz:

When the main track is open, as in fig. 1, the levers G and N are erect; F and P are down, as is also the signal R. If the train, which we will suppose to come from the left, is to keep on the main track A, the driver knows, from not seeing the signal, that it is all right, and goes ahead; if the signal is up, the lever F is up, and he still drives on, knowing that the drop under the cow-catcher will throw down the lever F and open the main track. If, however, he wishes to take the switch, he raises the drop, so as to be above the top of the lever F, at one side, and low enough on the other to strike the lever G. If the switch be closed, it will open at the falling of the lever G, and if it be open, the the lever F, which is up, will not be interfered with by the drop, which has been raised to clear it. This is the only case in which the engineer has to move the drop under the cow-catcher. The change of position of the switch-rails is effected before the cow-catcher gets over them.

Now, if, while this train is on the side track, another train should pass in either direction over the main track, it would throw down the levers F and P, and close the switch to the train on the siding. Then if this train is to back toward the left onto the main track again,

the brake-bar of the rear truck strikes the lever N, throwing it down, and opening the switch to the main track.

If the driver of a train coming from the right sees by the signal that the switch is open, he knows that his cow-catcher will throw down the lever P, and open the main track.

If the switch be for a branch road, and a train be coming from the right on that road, after another train has passed over the main road, the lever N will be thrown down by the cow-catcher of the coming engine, and open the switch to the main track.

The only and exceptional occasion for the switch to be moved by the hand is when a train, having come from the right on the main track, is compelled, after passing the switch, to back onto it. In this case the brake-bar of the rear truck is too high to operate the lever F, and it is an easy matter for a man to raise the signal-arm and open the switch.

Having thus fully described my invention,

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

1. The levers F G N P, rods *d e h i*, levers I L M, and rock-shafts H K, combined and operating substantially as herein set forth.

2. The cam S, consisting of the rail-seats *k l* and the curved and sloping surfaces *m m*, with or without the lugs *n n*, in combination with and operated by a rock-shaft, substantially as and for the purpose set forth.

3. The cam S, when provided with the grooved eccentric, and the chains, or their equivalent, substantially as set forth.

JAMES P. HERRON.

Witnesses:

GUY C. HUMPHRIES,
CHARLES HERRON.