R. GRAY.

Railway Switch.

No. 202,021. Patented April 2, 1878.

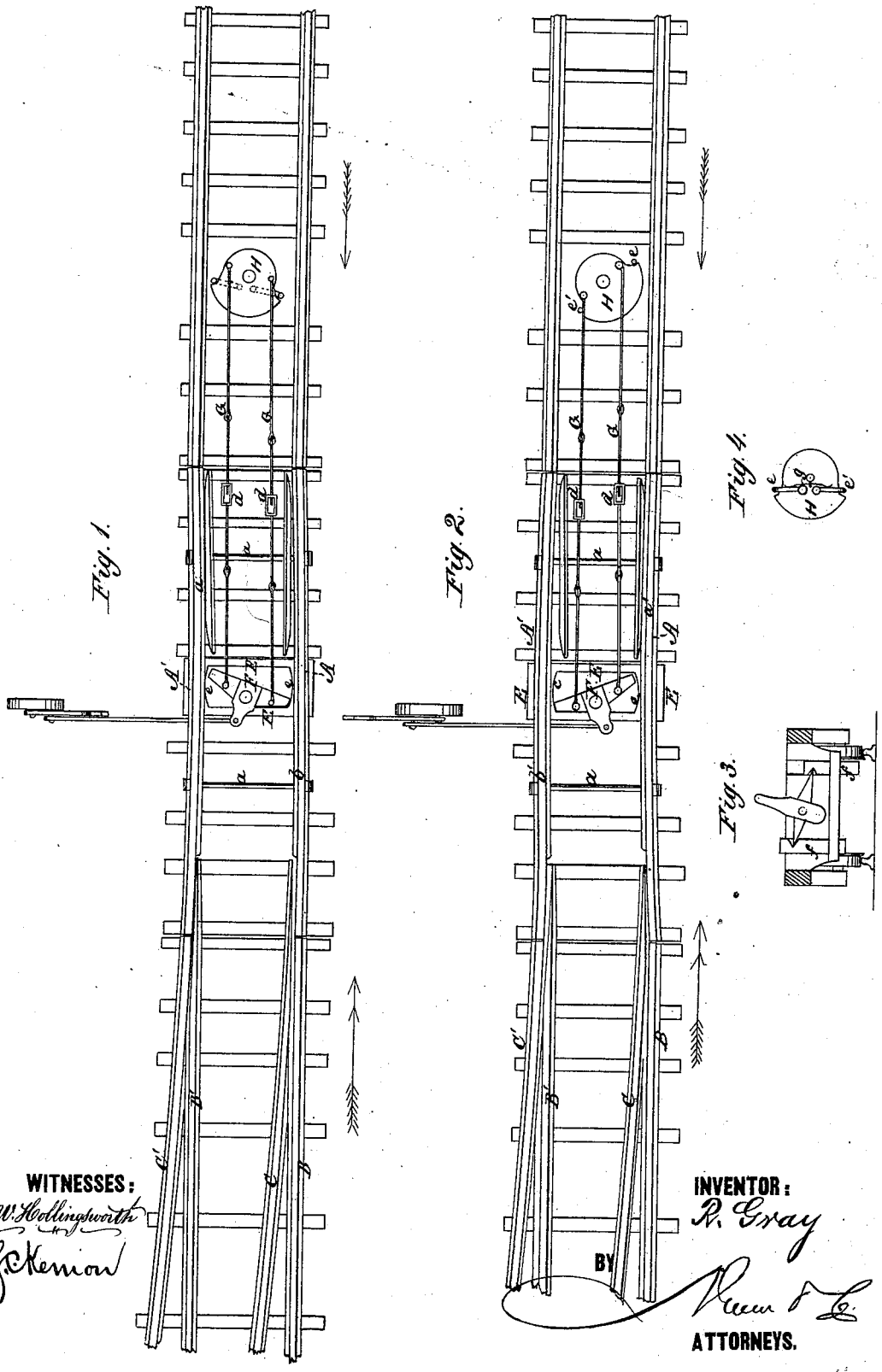

Fig. 1.

Fig. 2.

Fig. 4.

Fig. 3.

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IMPROVEMENT IN RAILWAY-SWITCHES.

Specification forming part of Letters Patent No. **202,021,** dated April 2, 1878; application filed March 25, 1878.

To all whom it may concern:

Be it known that I, RICHARD GRAY, of Bloomington, in the county of McLean and State of Illinois, have invented a new and useful Improvement in Railway-Switches; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention consists, chiefly, in fixing or attaching the ends of the switch-rails to the ties or sleepers, leaving the body of the rails free or movable, and in combining with them some device by which they can be bent or sprung laterally in a horizontal plane, in order to cause, by the principle of centrifugal action, as hereinafter explained, a train of cars to continue on the main line or pass onto the side track, as may be desired—that is to say, the direction of motion of a train is controlled or determined by the lateral curve of the switch-rails.

The invention further consists in the peculiar construction and arrangement of the means for operating the switch-rails and locking them in either position, which result is effected by an ordinary switch-lever or through the medium of devices attached to the locomotive.

The invention further consists in combining the flexible switch-rails, fixed at their ends only, with tapered and fixed side and main track rails, which are preferably extended past the ends of the switch-rails, as hereinafter described.

In the accompanying drawing, forming part of this specification, Figures 1 and 2 are plan views of a switch, showing the different positions or curvatures which the switch-rails may assume. Fig. 3 is a cross-section of a locomotive-truck, showing the devices for operating the switch from the same. Fig. 4 is a bottom plan view of the lever which is connected with and operates the lever that acts directly on the switch-rails.

A A′ are the switch-rails; B B′, the main-line rails, and C C′ the side-track rails or siding. The switch-rails A A′ are fastened at each end, but otherwise left free through their length. They are, however, rigidly connected by bridles or tie-bars *a a*. Said rails are wider apart at the ends which meet the side rails than at the other end. The switching operation is effected by springing or bending the middle portion of the rails A A′ laterally to the right or left by means hereinafter described. The bend or deflection thus caused in the track has practically the same effect upon a train passing over it as if the train were passing around a permanent curve in the track—that is to say, by a well-understood natural law, a body in motion tends to pursue a right line. Hence, a train passing around a curve hugs the outer rail, and will continue to do so until the curve has been left behind.

I avail myself of this principle of centrifugal action in the present invention. Thus, suppose the switch-rails are bent or curved laterally toward the left, as in Fig. 1; then, if a train should approach in the direction indicated by single arrows, the locomotive and each car following it would be successively diverted from the right line or general direction of motion of the train as a whole, and bear off to the left, and thus pass onto the main track. On the other hand, if the switch-rails were bent or curved to the right, as in Fig. 2, the contrary result would ensue, and the train pass onto the side track.

The action or operation would be more particularly as follows: If a train approaches from the direction specified, and the switch-rails are curved to the left, as in Fig. 1, then the wheels on the right side of the locomotive and connected cars will bear against the inwardly-curved part *a′* of the right-hand switch-rail A′, and thus cause the locomotive and cars to turn successively to the left, when the wheels on the other side will, in turn, come in contact with the inwardly-curved part *b* of the left-hand rail A, and, in accordance with the same law or tendency to continue to move in a right line, will continue to bear against the left-hand rail, and thus cause the train to continue on the main track; for, it

will be observed, the right and left switch-rails abut and form practically continuations of the outer side and main track rails C′ B respectively.

If the position of the switch-rails be reversed, the action and result correspond, to wit: thus, if the switch-rails be bent or curved to the right, as in Fig. 2, the left-hand train-wheels will encounter and hug the inward curved half *a′* of the left-hand rail A, and, a diversion of the individual parts of the train to the right being thus effected, the right-hand wheels will bear against the outwardly-curved half *b′* of the right-hand rail A′, so that the train will hold the direction of motion thus imparted, and continue to follow the right-hand rail, and thus naturally pass onto the side track C C′.

The shifting or bending of the switch-rails to the left, Fig. 1, therefore causes the train to take the left or main track, and the shifting to the right, Fig. 2, the right or side track.

It will be noted, however, that, to enable this action to take place, the interrupted right-hand rail of the main track and the corresponding left-hand rail of the side track must have the form and position shown in the drawing—namely, the ends of said rails must be tapered, and are preferably extended beyond the ends of the switch-rails, and fixed in position close alongside the latter, but at such distance therefrom that, when the switch-rails are bent in either direction, that one of the rails which is curved inward shall come in contact, or nearly so, with the contiguous tapered rail, and thus form practically one continuous rail, while a clear space is left between the other switch-rail and the contiguous tapered rail for the flanges of the car-wheels.

This form and position of the rails also enables a train approaching in direction indicated by double arrows, on either the main or side track, to continue its course and pass onto the switch-rails, and thus along the main track, without requiring any change to be made in the position of the switch-rails.

I will now describe the means I employ for operating the switch-rails and locking them in either position. The means consist, chiefly, of a horizontal movable frame, E, and an eccentrically-pivoted lever, F. Said frame E is attached to the switch-rails, on the under side, at the middle of their length, and its end portions *c c* are curved on the inner side concentrically with an imaginary circle described from the center of the frame.

The lever F is pivoted eccentrically as to its ends, also as to the frame E—that is to say, its pivotal point is at the center of the length of the lever, but not on a right line drawn between its ends, and the pivot has the same relation to the central point and end of the frame E. It hence results that if the lever F is placed straight across the track, or at right angles to the general direction of the same, the switch-rails will also be straight, or not bent in either direction; but when the lever is thrown into a diagonal position, one of its ends will, by pushing against the contiguous arc-shaped end *c* of frame E, bend or curve the switch-rails outward in that direction. Thus, by changing the diagonal position of the lever, said rails will be caused to assume a corresponding position or lateral curvature; and, further, they will be locked in such position by the ends of the lever abutting the arcs *c*, as will be readily understood by reference to the drawing. The lever therefore serves both for operating and locking the switch.

The lever may be operated by an ordinary hand-lever when required; but I also operate it by means of wires or chains G and a vibrating plate or broad lever, H, which is pivoted between the rails of the main track a short distance from the switch-rails.

The wires or chains G are attached to the two levers on opposite sides of their pivots, and provided with adjusting-nuts *d*, for securing requisite tension.

The broad lever H has upwardly-projecting arms *e e′*, which are attached, one on each side, eccentrically to its pivot.

The switch is operated by contact of pendent arms *f f* on the locomotive or tender with these arms *e e′* of the lever. Thus, when a train approaches in the direction indicated by single arrows, and the engineer desires to change the switch, he lowers one of the arms *f* on the locomotive, and allows it to strike the corresponding arm *e* of lever H, which will turn the latter, and thereby shift the switch-lever F and bend the rails A A′ in the required direction.

To provide against any change in the position of the switch-rails, also against danger of breaking the arms *e e′* by contact of the locomotive-arms *f f* therewith when a train is moving in the direction indicated by double arrows, I pivot said arms *f f*, and place springs *g* behind them, so that they will yield in place of resisting.

What I claim is—

1. In combination with the main and side track rails, a pair of switch-rails, which are fastened at their ends, and not elsewhere, throughout their length, and a suitable device for bending or curving them laterally, and for locking them in either position.

2. In combination with the switch-rails fastened at the ends only, and with the outer rails of the main and side tracks, the tapered rails, the same being fixed in position, as and for the purpose specified.

3. In combination with the switch-rails fastened at their ends only, the frame having end bars, which are curved on the inner side, the lever pivoted eccentrically within the frame, substantially as shown and described, for the purpose of bending or shifting the rails and locking them in either position.

4. I do not claim, broadly, a pivoted lever

and connecting-wires for use in operating a switch automatically, but the combination, with the switch-rails fastened at their ends only and the lever pivoted eccentrically, of the wires, and the broad lever provided with arms, for engagement with the pendent arms of the locomotive, all as shown and described.

5. In combination with the pivoted lever H, the pivoted arms *f* and the spring *g*, as shown and described.

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Witnesses:
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