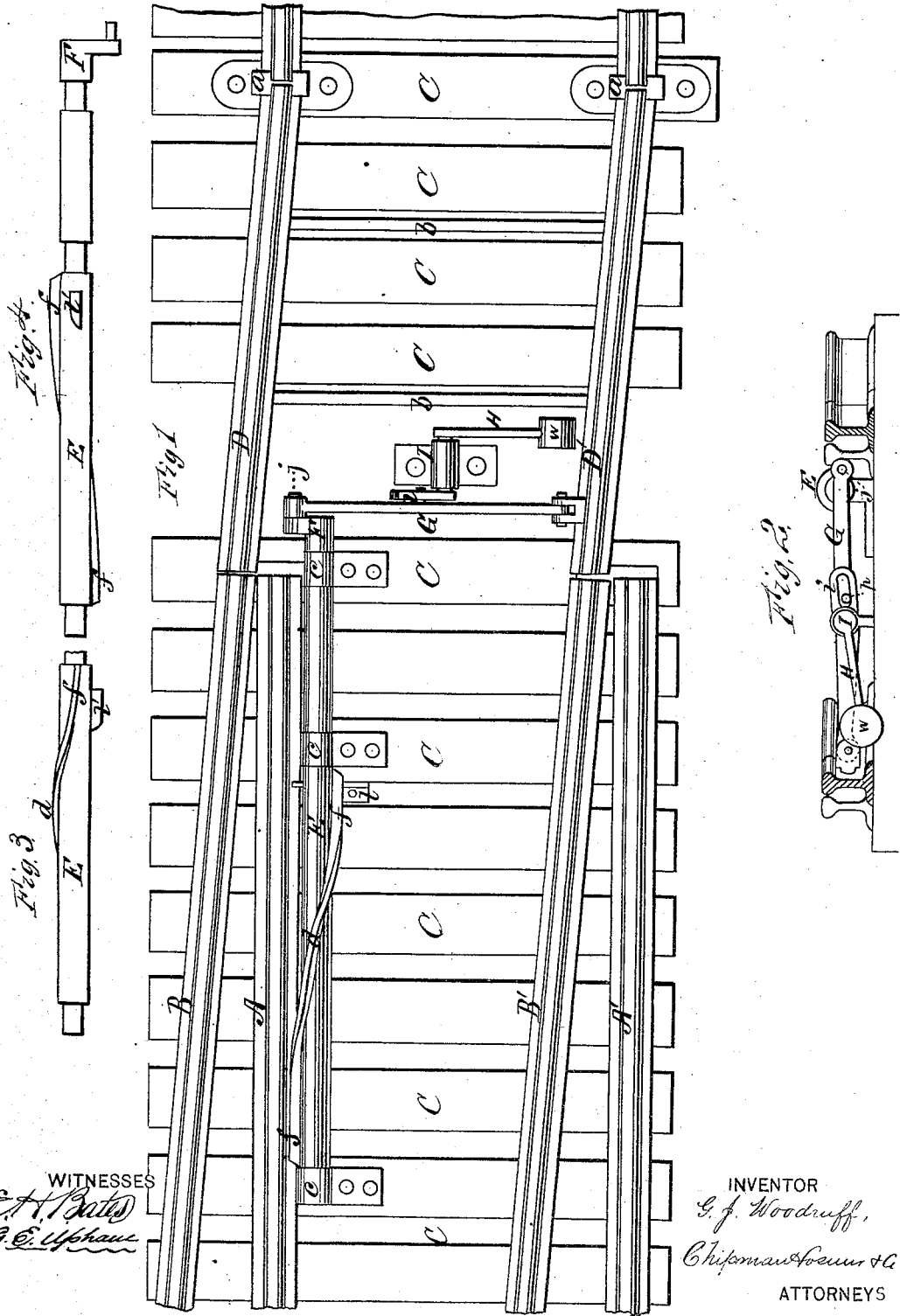


G. J. WOODRUFF.
Railway-Switch.

No. 160,135.

Patented Feb. 23, 1875.



WITNESSES
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GEORGE J. WOODRUFF, OF NORRISTOWN, PENNSYLVANIA.

IMPROVEMENT IN RAILWAY-SWITCHES.

Specification forming part of Letters Patent No. **160,135**, dated February 23, 1875; application filed January 29, 1875.

To all whom it may concern:

Be it known that I, GEORGE J. WOODRUFF, of Norristown, in the county of Montgomery and State of Pennsylvania, have invented a new and valuable Improvement in Railroad-Switches; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawing is a representation of a plan view of my switch; and Figs. 2, 3, and 4 are detail views of the same.

This invention has relation to improvements in automatic railroad-switches, wherein a twisted bar in the nature of a screw arranged in bearings beside the fixed rails of the main track is caused to rotate by the flange of the front wheel of the first car of the train, thereby actuating the switch to a realignment with the main track by means of a crank-arm upon the end of the said bar operating the switch-rails through the medium of a pitman and a tie-rod connecting the same.

The object of the invention is, first, to cause the switch-rails to be operated in such a manner that a train going at a maximum rate of speed will not strain or loosen the fastenings of the same to the ties, owing to the sudden violent shock imparted thereto; and, secondly, to provide a means whereby the switch-rails will be automatically held against casual displacement in a positive alignment with the rails of the main track. To this end the nature of the invention consists in a cylindrical rod rotating in bearings beside one of the fixed rails, having a flange extending from its rear end to within a few feet of its front end and half around the said rod, adapted to be borne down upon and rotated by the flange of the front wheel of a train, the twist of the said flange being very slight at its ends, and becoming more pronounced as it approaches the center of its length, whereby the said rod will be very gradually rotated when its flange is first touched by the car-wheel, the speed of its rotation being gradually increased as the wheel approaches the center of its length, and finally decreased and terminated as the wheel ap-

proaches and reaches the end of the said flange, thereby gradually overcoming the inertia of the switch-rails at the beginning of their movement and their momentum at its end, and effectually preventing the racking, loosening, and tearing away of the switch-rails from their fastenings. It also consists in the combination, with such a rotating rod, having upon its end a crank-arm actuating a vertically-vibrating pitman pivoted to one of the rails of the switch, and having a pin projecting out from it, a vertically-vibrating lever having a slotted weight end, into which the said pin is received, and a weighted power end, whereby the automatic switch mechanism is adapted to be worked by hand, and the switch-rails are automatically locked against lateral displacement, as will be hereinafter more fully explained.

In the annexed drawings, A A' designate the rails of the main track, and B B' those of a siding, both being rigidly secured in any suitable manner to cross-ties C. D D' indicate the switch-rails, pivoted in the usual well-known manner at *a* in close contact with the ends of the rails of the continuation of the main track, and rigidly secured together by means of tie-rods *b*, as shown in Fig. 1.

It has heretofore been customary to operate switches by hand, and also by means of various automatic devices, among which is one wherein is employed a twisted rectangular bar of metal arranged in bearings alongside the track, and rotated automatically by the flange on a wheel of a passing car, the movement thus given to the rod being imparted through the medium of various well-known devices to the switch-rails. In this case the twist in the bar is regular, the curve thus produced being equal from end to end of the same, and was found inoperative, for the reason that at the moment the flange struck the bar so rapid and violent a rotation was imparted to the latter in overcoming the inertia of the switch-rails and their actuating mechanisms as to rack not only the bar itself and its connections, but also to tear the switch-rails loose from their fastenings to the ties. This defect I remedy by means of the hereinafter-described devices.

E represents a cylindrical rod, arranged in bearings *c* alongside one of the fixed rails A

of the main track. This rod is provided with a broad curved metallic flange, *d*, extending from its rear end to within a few feet of its front end, and making a half-turn around the same, as shown in Figs. 3 and 4.

The flange *d* at its ends *f* is but very slightly curved, its curve gradually increasing toward the center of its length, and becoming more decided at that point, so that when rod E is reached by a car-wheel, its flange, striking flange *d*, will at first impart a barely perceptible rotation to the said rod, which will be gradually increased as the wheel reaches the center of the length of the same, from which point this rotation will be as gradually decreased until, as the switch reaches an alignment with the main track, it ceases altogether. By this means the inertia of the switch at the beginning of the rotation of rod E, as well as its momentum at the end of the same, is so gradually overcome that there is no jerk or jar, nor is there any wrench or twist whereby the rod, its connections, or the switch would be in the least injured. The importance of this improvement will be readily appreciated when the rate of speed obtained both by mail and burden trains is considered. The rotary motion thus given to rod E is converted into a rectilinear motion for the switch by means of a crank-arm, F, rigidly secured upon the end of the said rod next the switch, and by means of a pitman, G, applied upon a wrist-pin, *j*, on the said arm, and pivoted in any suitable manner to rail D'. H designates an angular vertically-vibrating lever, having its fulcrum in an upright standard, I, rigidly secured in any suitable manner to the road-bed, preferably in the center thereof. The power end of this lever is provided with a weight, *w*, and its weight-arm, bent at right angles to its power-arm, passes through the upper end of standard I, and terminates in a slotted plate, *i*, adapted to receive a pin, *p*, projecting from pitman G, as shown in Fig. 2. By this means the automatic switch mechanism above described is capable of being operated by hand, and when the power end of this lever H is thrust down into the position shown in Fig. 2, with its free end below the horizontal plane of its axis of rotation, it will securely lock the switch against lateral displacement, and hold it to its alignment either with the siding or with the main track, as the case may be.

With a view to holding rod E against un-

due rotation, a metallic plate, *l*, is rigidly secured in an upright position to the ties or to the road-bed, under that portion of the said rod at which the flange *d* terminates, abutting at each rotation against the upper flat outwardly-projecting surface of which the ends of the said flanges will effectually check undue rotation; and in order to hold said rod against endwise displacement, a lug, *l'*, is rigidly attached thereto, which abuts against plate *l*, and effectually accomplishes the desired result.

In practice I may prefer to use a rotating rod, E, at the side of each of the fixed rails A A', in which case I shall have them connected by suitable crank-arms and rods, for the purpose of rendering their movement simultaneous. I also prefer that the upper surfaces of these rods should be flush, or nearly so, with those of the rail, as in this case, the flange being rotated under by the wheel-flange out of the way, they serve also as guard-rails.

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

1. In a railroad-switch operated by a rock-shaft actuated by the wheel-flange, the lengthwise-curved flange *d*, extending partly around the shaft, and having a very slight curvature at each end, gradually becoming more marked in the center of its length, for the purpose of gradually overcoming the inertia of the switch-rails, giving them a rapid intermediate movement, and then gradually overcoming their momentum, substantially as specified.

2. The combination, with the flanged rotating rod E, crank-arm F, and pitman G, pivoted to the switch-rails, and having pin *p*, of the vertically-vibrating locking-lever H and slotted plate *i*, receiving pin *p*, substantially as specified.

3. The combination, with the flanged rotating shaft E, of the check-plate *l*, substantially as specified.

4. The combination, with the plate *l*, of lug *l'* on rotating shaft E, for the purpose of preventing endwise displacement of the said rod, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

GEO. J. WOODRUFF.

Witnesses:

GEORGE E. UPHAM,
JOS. B. LOOMIS.