

J. C. McCARTHY.
SAFETY SWITCH.

Patented June 18, 1895.

Fig. 1.

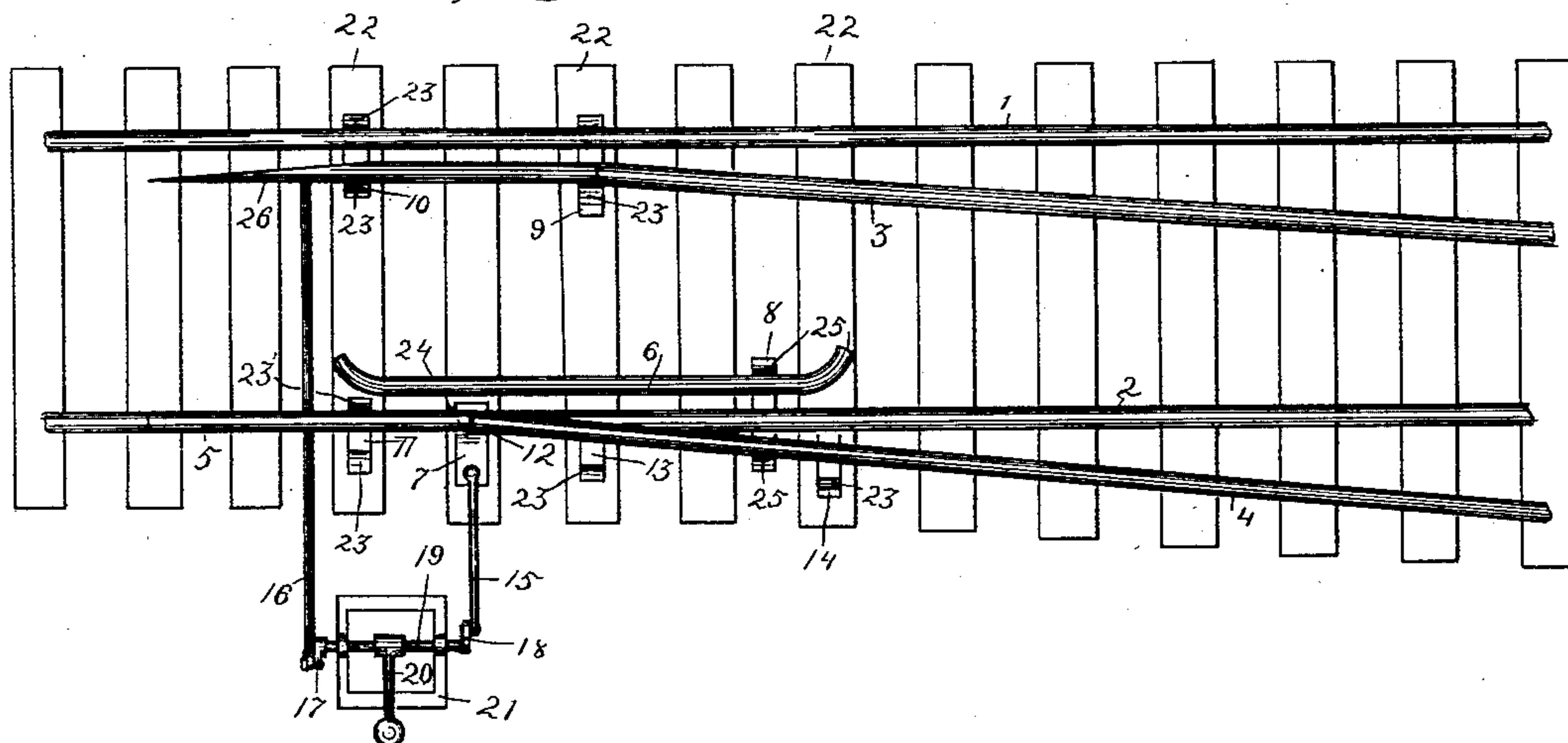


Fig. 2.

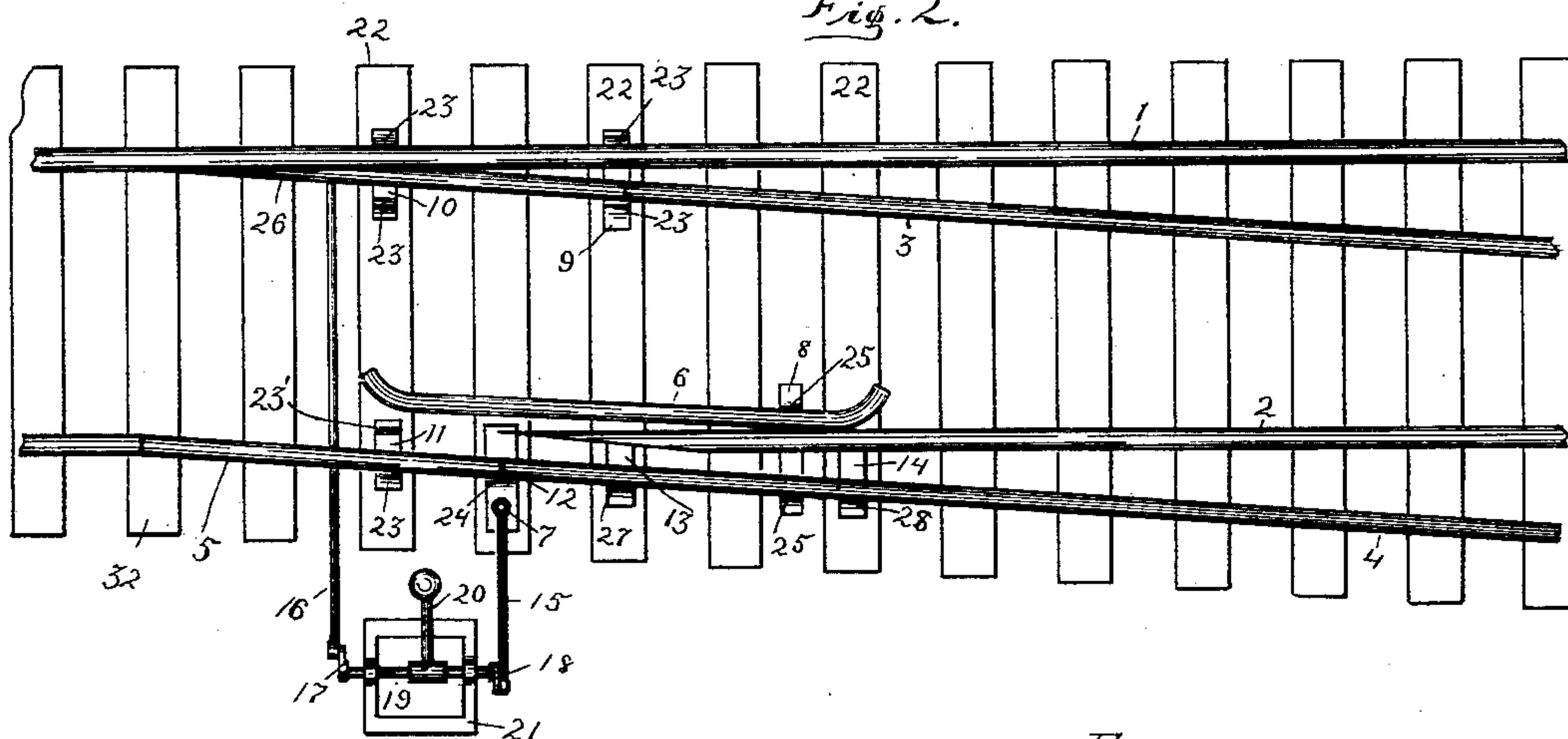


Fig. 4.

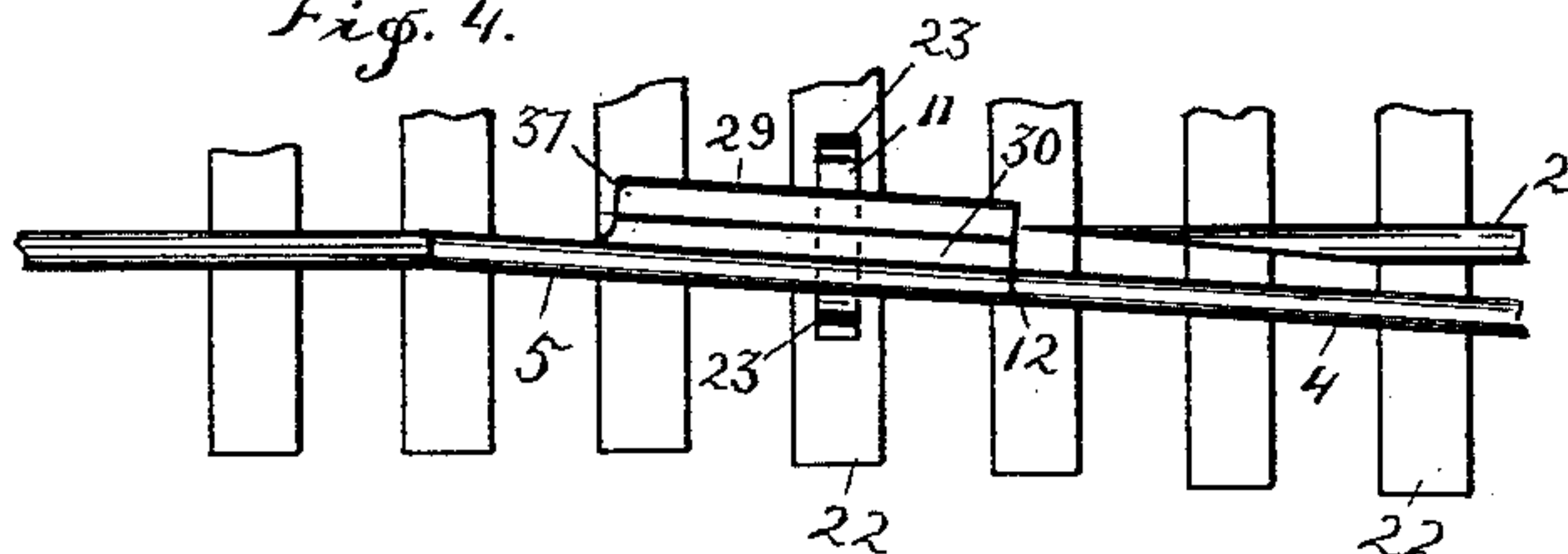
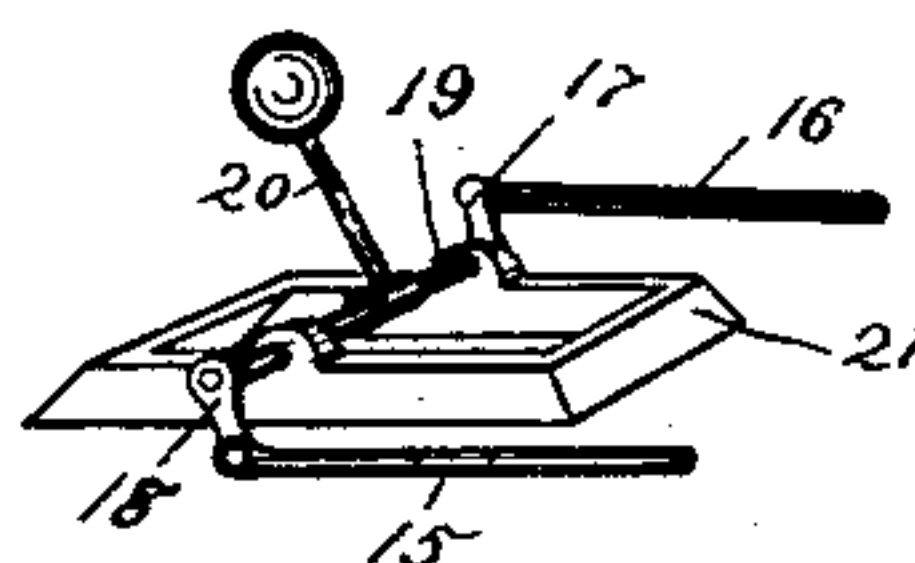


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN C. MCCARTHY, OF FORT WAYNE, INDIANA.

SAFETY-SWITCH.

SPECIFICATION forming part of Letters Patent No. 541,176, dated June 18, 1895.

Application filed September 13, 1894. Serial No. 522,893. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. MCCARTHY, a citizen of the United States, residing at Fort Wayne, in the county of Allen, in the State of Indiana, have invented certain new and useful Improvements in Safety-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, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in safety switches.

The most obvious, well known, and dangerous defect in the split switches now in almost universal use upon the railways of the country, is that derailment of a passing train is practically certain and unavoidable in either one or both of two frequently recurring emergencies, viz: first, when from the carelessness or inattention of the operator or other cause the switch is left partially open, or at least not tightly closed, so that the wheel flanges pass between the movable main track lead rail and the adjacent fixed side track rail, derailment with its attendant loss of life, limb, and property is inevitable; second, the sharp point of the main track lead rail is from its position when set for the main track, subject to continual lateral wear from the car wheel flanges, thus weakening said sharp pointed end and thereby rendering it more easily bent or sprung. Under such circumstances when a heavy train or car, not under full control, or in the hands of an inexperienced crew is backed or run on to the main track from the siding when the switch is open for the main track, the wheel flanges forcing themselves between the sharp point of the main track lead rail and the adjacent fixed side track rail, will spring or bend the said point out of position, and the next passing train on the main track, from the opposite direction is dangerously liable to derailment, a well known frequent occurrence, and even when under such circumstances, the sprung or bent end of the said lead rail is partially repaired in the usual manner by a few hasty strokes of a car link or a coal pick, it is still unsafe as the said end will not likely be sprung back to its

normal position in close contact with its adjacent side track rail, and an approaching engine with a sharp wheel flange is likewise liable to derailment, also a frequent occurrence. It is obvious that like disastrous results must inevitably follow in the above mentioned form of switch, when the pointed end of the said lead rail is slightly sprung or bent out of position by a pebble, piece of coal, a chunk of ice, or other like obstacle. There is also a serious objection to that form of switch in which it is sought to protect the said exposed sharp point of the main lead rail by a bed-plate adapted to receive the wheel flange upon its upper surface, for the reason that in so doing the end of the car is thus abruptly elevated about the height of the wheel flange in passing onto said plate, and in case of a heavily loaded car coupled to an empty car, by one of the common forms of couplers having coupling knuckles, they are apt to be, and frequently are thus uncoupled.

The object, therefore, of my invention is to provide a safety switch so constructed that should it be inadvertently or otherwise left either partially or entirely open, a passing train on the main track from either direction will either continue on the main track or pass safely to the siding, as the case may be, without the least danger of derailment; and so arranged that a train or a single car passing from the siding on to the main track when the switch is closed or locked, will automatically force the switch open to the siding even to the extent of breaking the switch, without the least strain or injury to either the sharp pointed lead rail or to the split end of the main track rail, and without the least danger of derailment, thus constituting a switch over which a train at any proper speed can with perfect safety, pass from, or on either track and in either direction with the switch either open or closed or other position.

My invention comprises a forwardly extended lead rail, and two laterally movable abutting rail sections, with proper operating mechanism adapted to throw the said lead rail in a direction opposite to that of the said rail sections, simultaneously.

The novel features of my invention are, first, the construction by which I employ but one lead rail in the switch, which also serves

as a guard rail for the main track split-fixed point; second, the arrangement by which the lead rail is protected against being bent, sprung or other injury under all ordinary conditions of service, and by which a passing train is rendered secure against derailment from a misplacement of the switch; third, the arrangement by which the lead rail is operated simultaneously with the said movable sections, but in an opposite direction, and by which a train from the siding will automatically open a closed or even a locked switch without danger of derailment.

In the accompanying drawings similar figures of reference indicate corresponding parts throughout the several views.

Figure 1 is a plan of my improved switch, showing the relative position of the movable rail-sections when the switch is closed for the main track. Fig. 2 is a plan of the same open for the side track. Fig. 3 is a detail of the switch-stand, showing the arrangement of the operating mechanism. Fig. 4 is a detail of a safety device designed for use in the emergency of an open switch.

The main rail 1 and the adjacent side track rail 3 are fixed on the track sleepers 22 in the usual manner. The split rail section 2 of the main track is also rigidly fixed on said sleepers, instead of being movable in the usual manner. The siding rail 4 and the short adjacent rail section 5 opposite to the lead rail are laterally movable, and are pivotally secured at their outer ends to the said sleepers, but their abutting ends are pivotally fixed on the movable plate 7. The said section 4 is arranged to slide laterally on the plates 13 and 14 which are rigidly fixed on the said sleepers.

The short rail section 5 is slidably mounted upon the fixed plate 11 on one of the said sleepers, has one end secured to the sleeper 32 and the other end pivotally fixed on the said plate in such a manner as to be in alignment with the movable rail 4 when the switch is open, and in alignment with the fixed main rail 2 when the switch is closed, as seen in Figs. 1 and 2.

The lead rail 26 has its rear end properly secured to the fixed plate 9 and is laterally movable on the fixed plate 10 on the sleeper 22, its split end being adapted to closely fit against the main rail 1 in the usual manner.

The guard rail 6 of the usual form has one end pivotally secured to the sleepers in any proper manner, and the other end is rigidly fixed on the inner end of the plate 8 which is arranged between two track sleepers as seen in Figs. 1 and 2, which has its outer end rigidly fixed on the lower surface of the said rail 4, and is movable therewith, carrying with it the surmounted end of the said guard rail, as seen in Fig. 2. The said guard rail may be omitted if desired when the safety plate on the rail section 5, hereinafter described, is employed, though I prefer to use them conjointly when practical, by shortening some-

what the forward end of the said guard rail. The said fixed plates 9 and 10 have the vertical lugs 23 at both ends thereof, which add to the security with which the lead rail 26 is sustained in position against outward lateral pressure. The said plate 8 is provided with the vertical lugs 25 on each end thereof to secure the said rails 4 and 6 against spreading and also aid in keeping them in their fixed relative position at all times.

The plate 7 has a transverse central vertical lug 24 to aid in securely retaining the abutting ends of the movable rails 4 and 5 in their relative position against outward lateral pressure. The plates 13 and 14 have the terminal vertical lugs 27 and 28 respectively adapted to secure the rail 4 in position against outward lateral pressure when in use. The plate 11 has the terminal vertical lugs 23 and 23' to limit the lateral movement of the said rail section 5.

The rail section 5 may be provided upon its inner face with a plate 29, preferably integral therewith having a longitudinal recess 30 for the wheel flange, and a longitudinal tread surface 31 adapted under certain conditions hereinafter described, to receive the passing wheel flange, and is of such a height relatively to the rail tread that when the wheel flange rests on the said surface the wheel tread will be but slightly above the tread of the rail section 5, so that the said wheel will readily pass from the said plate to the said rail section without perceptible jar or danger of uncoupling cars. It is obvious that when the said plate 29 is employed the plate 11 will be proportionately lengthened and the said guard rail will be properly shortened to make room for the said plate. The plate 29 is arranged at the rear end of the rail section 5 adjacent to the joint 12 and immediately opposite the pointed end of the fixed rail 2, to receive the passing wheel therefrom.

The switch stand 21 may be of any proper form and construction, preferably an integral rectangular frame or base, as shown, in the opposite sides of which is rotatably mounted a transverse shaft 19 having rigidly fixed on its projecting ends the crank arms 17 and 18, arranged in diametrically opposite directions, which crank arms are pivotally connected at their outer ends with the parallel switch operating rods 16 and 15 respectively. The short switch rod 15 is secured at its other extremity to the movable plate 7, and the extended operating rod 16 passes beneath the rail section 5 and is secured at its other extremity to the lower face of the lead rail 26 near to or at a proper distance from the forward end thereof.

The weighted switch lever 20 is rigidly mounted on the rotatable shaft 19 at or near its center, and so arranged that in any position in which the switch may be placed, the said lever will be in an oblique position and the said crank arms are never at dead centers, thus allowing the switch, under certain con-

ditions hereinafter described, to be readily operated automatically by a passing train.

The operation of my improvement thus described is, briefly stated, as follows: When the switch is securely closed a train will of course pass over in the usual manner, the extended lead rail then being in the usual position as in the ordinary split switch, firmly held in such position by the operating rod 16; the movable rail section 5 being in alignment with the fixed main track rail 2, and rigidly braced in such position by the vertical lugs 23' and 24, one on each side thereof on the plates 11 and 7 respectively. When it is desired to throw the switch open to the siding the operator reverses the position of the weighted switch lever 20, as seen in Fig. 2, which also reverses the position of the crank arms rigid on the shaft 19, thereby operating the switch rods 15 and 16 simultaneously, but in opposite directions, thus moving outwardly the plate 7 carrying the adjacent or abutting ends of the rails 4 and 5 by means of the rod 15, and simultaneously moving in an opposite direction the lead rail 26 into contact with the main fixed rail 1, by means of the operating rod 16. The rail section 5 will now be out of alignment with the rail 2 and in alignment with the movable rail 4, and the two rails 4 and 5 will be parallel with the rails 3 and 26, and will be securely held in position for the siding by the rod 15 and the said outer lugs on the plates 7, 8, 13 and 14. As the guard rail 6 has its rear end pivotally fixed on the plate 8, the outward movement of the rail 4 brings the said end in contact at one point with the fixed rail 2. Now it is obvious that should a train approach the switch when open, from one direction it will safely take the siding and should it approach the switch from the opposite direction the flanges of the first passing wheels will strike the inwardly curved end of the guard rail 6 at the point where it impinges on the fixed rail 2, thereby forcing the said guard rail over and away from the rail 2 which at the same time by means of the plate 8 brings the rails 4 and 5 into position for the main track, but the inward lateral movement of the said rails also simultaneously withdraws the said lead rail 26 from its contact with its adjacent main rail, and throws it into position for the main track, where it also acts as a guard rail in passing the switch. It is apparent that even in case the switch should fail, from any cause, to thus promptly respond to the action of the passing wheels, the plate 29 will receive the wheels as they leave the rail 2 and guide them onto the tread of the rail 5 and thus pass the danger point in safety, for the flanges of a locomotive will force the lead rail 26 over even to the extent of breaking the switch or bending the operating rod 16 before it will climb up onto the rail tread and be derailed. The

same operation and result would follow in the same circumstances in case the switch were but partially open. It is also obvious that owing to the arrangement of the advanced lead rail, an approaching train is inevitably forced to take either the main track or the siding, in any position in which my improved switch may be placed, rendering derailment impossible so long as the switch is in working order.

In case of running a train or even a car from the siding onto the main track, it will be seen that the wheel flanges will automatically open the switch by forcing the movable rails 4 and 5, and the lead rail 26, into position for the main track thereby avoiding all danger of derailment.

Having thus described my invention and the manner in which the same is employed, what I desire to secure by Letters Patent is—

1. In a railway switch the combination of the following instrumentalities: the fixed main rails 1 and 2, the movable lead rail 26, a siding rail 4 slidable on the fixed plates 13 and 14, and having one end pivoted to the movable plate 7 opposite the pointed end of the said rail 2, a main rail section 5 having one end pivoted to the said plate 7 abutting the said rail 4, the pivoted rail 6 rigidly mounted on the movable plate 8, as described, the switch rod 15 secured at one end to the said plate 7, and at the other end to the crank arm 18, and the switch rod 16, having one end secured to the lead rail 26 and the other to the crank arm 17, the said rods being adapted to operate the said movable rail sections in opposite directions simultaneously, with suitable actuating mechanism for operating the same, all substantially as described.

2. In a railway switch, the combination of the fixed rail 1, the laterally movable lead rail 26, the pointed main rail 2, the movable siding rail 4, mounted on the fixed plates 13 and 14, and having one end pivoted on the movable plate 7, the movable main rail section 5 having one end pivoted on the said plate 7, abutting the rail 4, and provided with a recessed plate 29 arranged opposite the said pointed end of the rail 2, for the purpose specified, and the movable plate 7 carrying the abutting ends of the sections 4 and 5, with the rods 15 and 16 adapted to connect the plate 7 and the said lead rail respectively, with the actuating mechanism, and means for actuating the said rods, all substantially as described.

Signed by me, at Fort Wayne, Allen county, State of Indiana, this 8th day of September, A. D. 1894.

JOHN C. MCCARTHY.

Witnesses:

WM. J. LENNART,
F. S. LUMBARD.