

J. R. McKINNIS.

BLOCK SWITCH.

APPLICATION FILED JUNE 10, 1909.

946,612.

Patented Jan. 18, 1910.

3 SHEETS—SHEET 1.

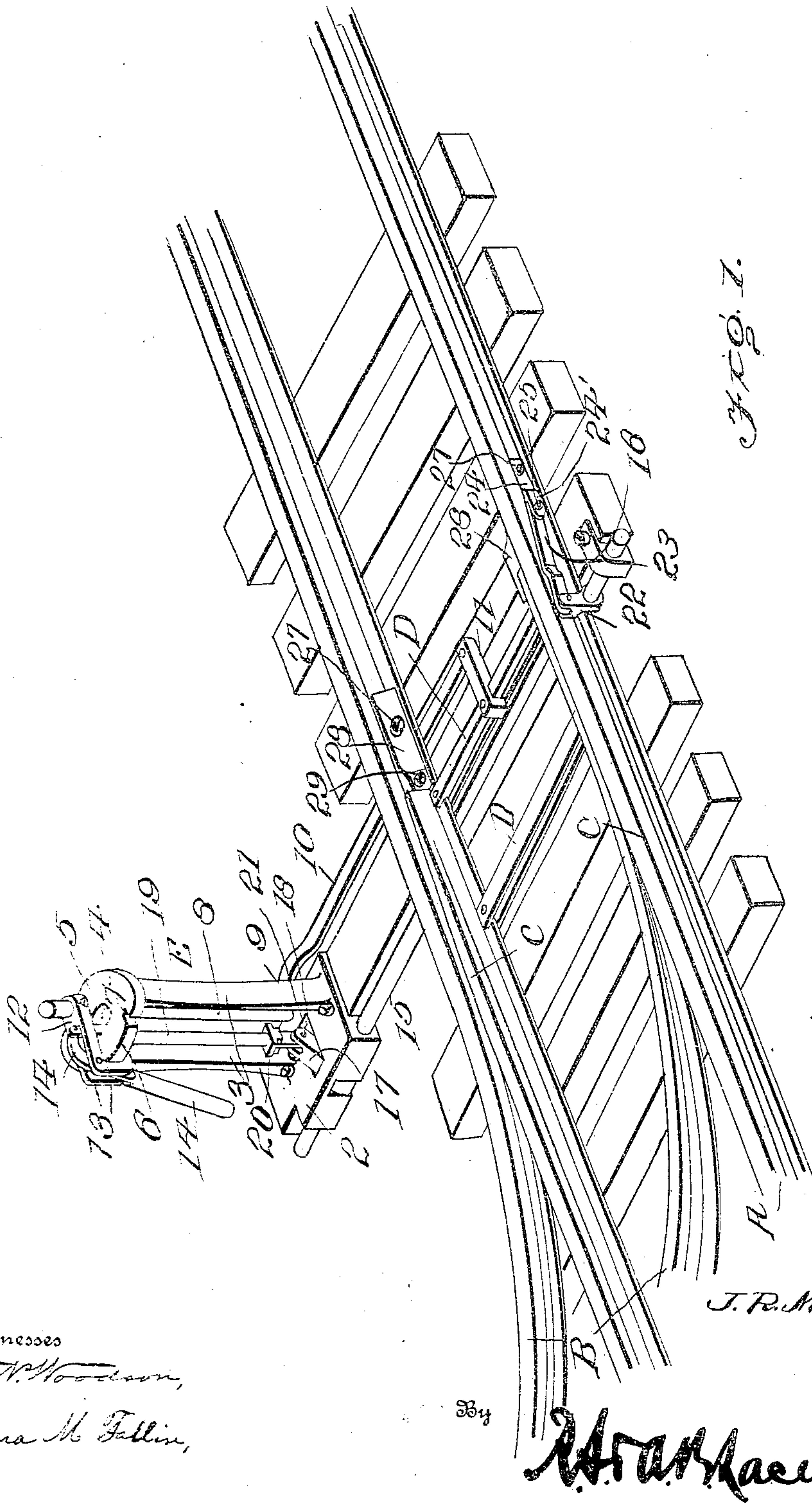


FIG. 1.

Witnesses
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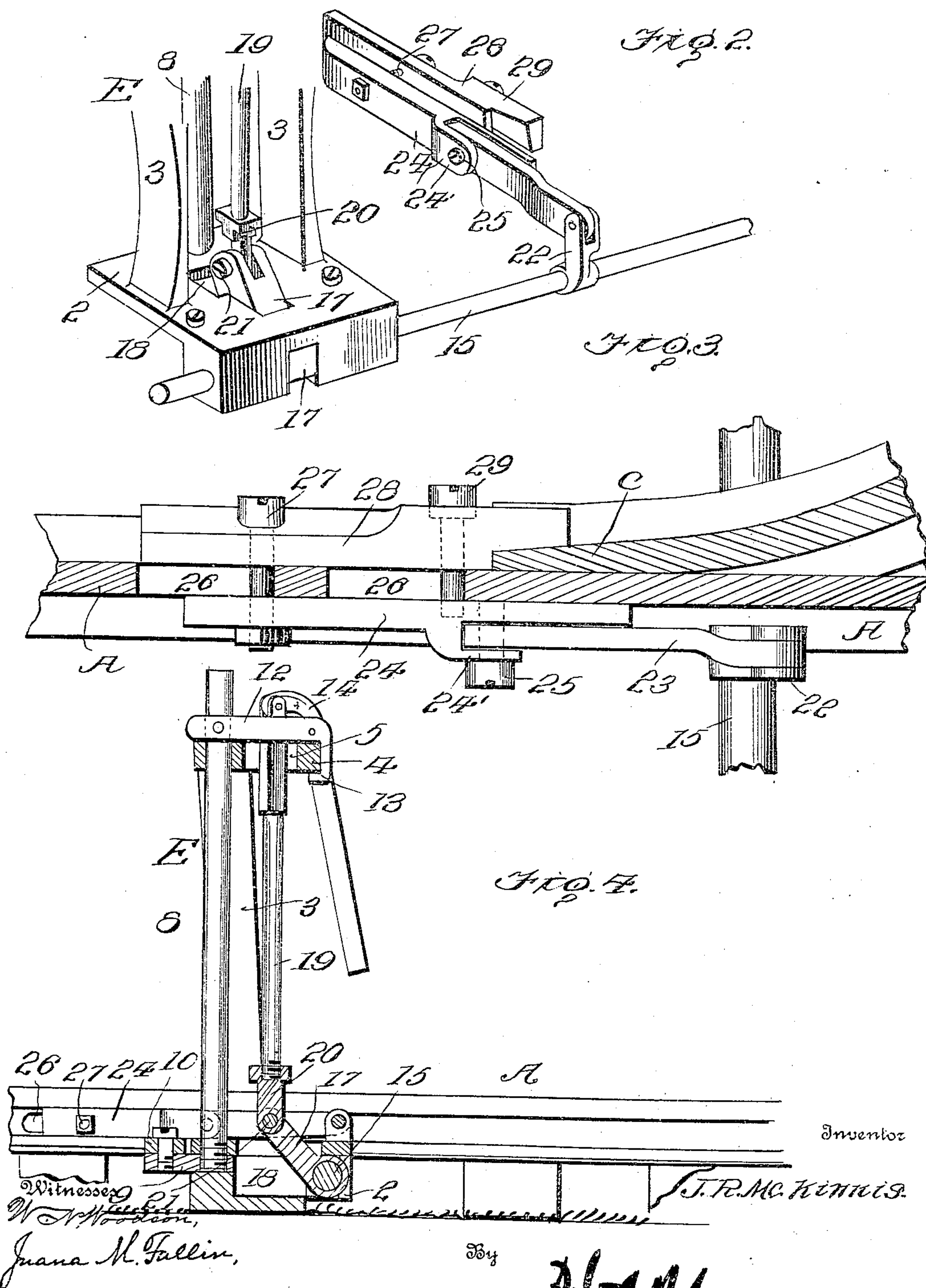
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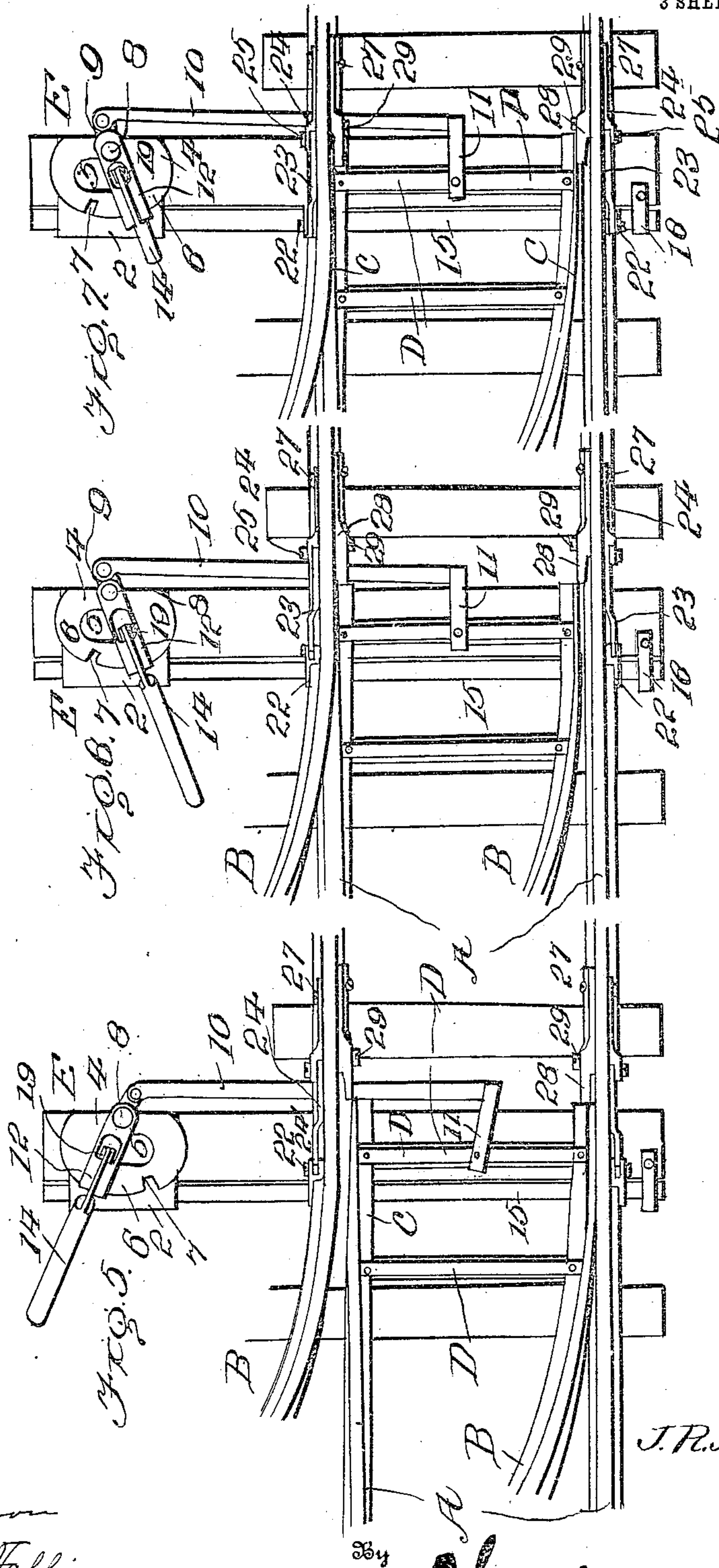
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Witnesses

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UNITED STATES PATENT OFFICE.

JOHN R. McKINNIS, OF MARCELINE, MISSOURI.

BLOCK-SWITCH.

946,612.

Specification of Letters Patent.

Patented Jan. 18, 1910.

Application filed June 10, 1909. Serial No. 501,335.

To all whom it may concern:

Be it known that I, JOHN R. McKINNIS, citizen of the United States, residing at Marceline, in the county of Linn and State of Missouri, have invented certain new and useful Improvements in Block-Switches, of which the following is a specification.

My invention relates to railroad switches, and particularly to the means for operating the switch points, the invention consisting in the provision of means whereby when the points are thrown from one position to another, they shall be automatically locked to the rail, or held from the rail, as circumstances may require, and whereby it will be impossible to throw the switch if any obstruction, however slight, is interposed between the switch point and the adjacent rail.

The object of this invention is to provide a means of absolutely preventing any chance of accident occurring from the train running against the switch points or the flanges of the wheels splitting the points, as is so often the case, resulting in disastrous wrecks entailing heavy loss of life and great damage to property. It is, however, well known that a large proportion of the wrecks which occur on railroads are caused by switches being defective. The reason for defective action of the switches in use today on railroads is that after they have been in use for some little time, and are a little worn, the points may be opened, and if an obstruction, as for instance a piece of wood or a pebble of even one-half inch in diameter, is placed between the point and the rail, the lever of the switch stand may be pulled around to throw the switch, and yet one of the points will be held sufficiently far from the face of the adjacent rail to catch the flange of a wheel of a train approaching the same. This result is caused by lost motion in the reversing rods and spring in the points. It is a constant source of accidents on roads, for the reason that the switchmen having thrown the switch handle or lever to its full extent, supposes naturally that the switch points have followed suit, when as a matter of fact, the intervening obstruction has prevented the switch point from moving in close to the rail, as above described. This prevention of the full movement of the switch point is very liable to occur in snowy or icy weather, and all railroads today have a standing order that in stormy or snowy weather, switchmen shall examine the switches used,

to see if the points fit up properly upon the rails, before leaving them.

The switch now to be described differs in general form hardly any from the ordinary standard switch stand, but the construction is such that the switch cannot be thrown to normal position without the points fitting up properly in their place. When the points fit properly up against one or the other of the track rails, the switch is locked, and not until then. Hence, the switchman has a perfect means of knowing whether or not the switch points are obstructed in their movement. Further than this, I provide means whereby the points are locked in their position against the adjacent rail when the switch is thrown, and whereby slight obstructions between the points will be cleared away, to some extent, upon one movement of the point-locking mechanism, so that they will not interfere with the following movement of the switch point.

I have illustrated my invention in the accompanying drawings, and therein:

Figure 1 is a perspective view of my switch locking device applied to a railway switch; Fig. 2 is a fragmentary perspective view of the locking mechanism and point lock detached from the track rails; Fig. 3 is a longitudinal section, enlarged, of a main track rail and a point, with my point locking devices engaging the point; Fig. 4 is a fragmentary longitudinal section through the switch stand; Figs. 5 and 6 are plan views showing the switch points thrown to two opposite positions; and, Fig. 7 is a like view to Fig. 6, but with the handle depressed and the points locked.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to the drawings, A designates a main line of track, and B a line branching off therefrom. C designates the switch points of the usual construction, pivoted as usual. These points are connected by the usual tie rods D. The rails of course are supported upon the ties usual to all track constructions. Mounted at the side of the track is the usual switch stand E, consisting of the base 2, the opposed standards 3, and the table 4, this table having the central opening 5 and the arcuate face 6 with the notches 7. Mounted in the base 2 and table 4 is the shaft 8 which at its lower end has

the projecting arm 9 connected by the throw rod 10 to the bridle strap 11, this strap being in turn connected to one of the cross bars D. The upper end of the shaft 8 is formed with the outwardly projecting bifurcated arm 12 having the downwardly and inwardly turned end 13. This arm is bifurcated or slotted to receive between it the switch-operating lever 14. This lever, at its end, is downwardly curved for attachment to a lock-operating rod, as will be later described. The lever 14, at its upper end, is reduced in thickness so as to fit between the bifurcated end of the arm 12 and be pivoted therein, the lever being just thick enough to be received in one of the notches 7 in the table 4, when the lever is turned to its downwardly extending position. This construction is usual in practically all switch stands in use to-day. When the lever 14 is lifted so as to clear the notch 7, the switch shaft can be turned to throw the switch points from one side to the other. When the arm is downwardly turned and in engagement with the notch, of course, it is impossible to throw the switch.

15 designates a transverse or horizontal shaft which is mounted at one end in the base 2 and extends beneath the rails of the track and is mounted in a bearing stirrup 16 attached to one end of the ties. This shaft is a rock shaft and is actuated by a crank arm 17 which is attached to the shaft and projects out beneath the base 2. This base is slotted, as at 18, to permit the upward movement of the arm 17 therethrough. The extremity of the lever 14 is pivotally connected to a rod 19 which, at its lower end, is formed with a head 20 having a reduced extremity received between the bifurcated end of the arm 17 and pivoted thereto by the pintle bolt 21. The two sides of the bifurcated end of the lever are spaced from each other to a degree rather larger than the reduced end of the head 20. Hence, there is a certain amount of rotary play between the reduced ends of the head. The reason for this will be hereafter stated.

The rock shaft 15, as before stated, extends beneath the track and is provided on the outside of the outermost rails with the crank arms 22. Links 23 connect these crank arms with slides 24 which fit between the base flange of the rail and longitudinally slide in this space. The link 23 is of course pivotally connected at its ends to the arm 22 and to the extremity of the slides. The inner end of the slides is bifurcated as at 24' for this purpose. A pivot bolt 25 connects the slide and link. The rails are both longitudinally slotted, as at 26, and passing through one of these slots is the bolt 27 which connects the slides 24 with the sliding locking blocks 28. These locking blocks are located on the inner faces of the outermost rails and just in advance of the switch point.

They are so formed in cross section as to fit between the base flange and the tread flange or head of the rail and to slide in this space and upon the base flange. The rear end of the sliding blocks is thinned away, and through this reduced portion passes the bolt 27 which passes through the slot 26 in the rail. The forward end of the locking block is also connected to the slide 24 by means of a stud bolt 29, which passes through a slot in the rail. The extreme forward end of each of the slides 24 is beveled outwardly and forwardly, in other words, outwardly and toward the end of the slide, this bevel having substantially the same angle as the bevel of the point of the rail, so that, in other words, the locking blocks may be slid over the point, as shown in Fig. 3, and thus hold the point to the rail from any liability of sidewise movement. The inner ends of these sliding blocks are of a width equal to or slightly less than the distance separating the point from the rail when the point has been thrown outward from the rail, and thus act as separating means preventing the inward movement of the outwardly thrown point, while the opposite locking block holds its point in positive contact with the rail.

While I have shown what I believe to be the preferable form of my invention, and a form which is entirely practical and in conformity with the best practice today for railroad work, I do not wish to be limited to the exact details of construction, as it is obvious that a number of changes might be made in the details of construction, without departing from the spirit of the invention.

The operation of my device will be obvious from the above description, and its advantages are also clear. It will prevent any depression of the operating lever of the switch stand into the notches 7 of the switch stand until the points are thrown one way or the other to their full extent and are in positive contact with the side of the rail. When this has been accomplished, and only then, will the lock operate, and until the sliding locking block operates, the switch handle cannot be depressed. Therefore, the switchman will know positively that the points have not been thrown and that there is some obstruction between the point and the adjacent rail which prevents the full throwing thereof. Once thrown, it will be seen that the switching point in use at that time is locked against being outwardly moved or wedged. There is no danger of the switch "splitting", from which so many accidents occur. The point cannot open until the switch-actuating mechanism has been actuated to withdraw the locking block and to throw the switch.

Another advantage resulting from my movable locking blocks lies in the fact that to a small extent the sliding blocks act to

clear away small objects which might lodge between the extremity of the point and the adjacent rail. My device is simple and may be easily applied to switch stands in use today and to ordinary switches. This simplicity is of course a point in its favor, and also the fact that it requires no departure from the ordinary railroad practice and requires no different manner of operating: an important matter when the training of a large number of operators has to be taken into consideration.

Having thus described the invention, what I claim is:—

1. In a railway switch, main track rails, side track rails, opposed switch points, means for throwing the switch points, opposed locking members directly connected to the rail and longitudinally movable thereon, and mechanism for longitudinally moving said locking members preliminary to and after the throwing of the switch points in either direction, locking one point to the rail against which the point is thrown and interposed between and engaging with both the other rail and the other point to hold said last named point away from its adjacent rail.

2. The combination with a rail and a switch point, of a point-locking member mounted directly upon the rail for movement in a plane parallel with the rail and directly engaged at all times with the rail and thereby prevented from any transverse movement independent thereof, said locking member having sliding engagement to disengage it from the point and permit the point to be shifted, and for movement in a reverse direction to engage either face of the point to hold it to the adjacent rail, or the interior face of the point to hold it away from said rail.

3. In a switch, main rails, side track rails, a pair of opposed switch points, a switch stand, a rotatable shaft, means connecting the shaft with the switch points, a handle for operating the shaft, a table having notches therein, into which the handle may be dropped upon a movement of the shaft to the limit of its position in either direction, movable point-locking members directly engaged with the main rails of the track between the head of the rail and the base flange thereof for longitudinal movement into locking and unlocking position, but prevented from lateral movement thereby and adapted to engage over the points when either of the points is moved against said rails, and means connecting the movable locking members with the switch-operating mechanism, whereby when said handle is depressed into one or the other of said notches, the locking members shall be thrown into engagement with the points.

4. In a railroad switch, opposed track

rails and switch points engaged with the track rails upon movement in one direction or the other, a shaft having a link connection to said switch points to throw the points, a projecting arm, a table having a removable surface formed with notches, a lever pivotally attached to the arm and adapted to project into one or the other of said notches upon the movement of the arm to its limit in either direction, a rock shaft passing transversely above the track, means connecting the lever with the rock shaft for operating the latter in one or the other direction when the lever is moved into or out of engagement with the notches in the table, sliding locking members directly supported on the rails in contact therewith and between the head and base flange thereof and in front of said points, said members being adapted thereby to be brought forward over one or the other of the points to hold it against an adjacent rail, and means connecting said rock shaft with said sliding members to operate the latter from the former.

5. In a railroad switch, main track rails, switch points, a switch stand, a point-shifting mechanism on the switch stand, a movable handle for operating the point-shifting mechanism, means for locking the handle when thrown from either of its point-shifting positions, with which means the handle may be engaged upon an engaging movement thereof, and opposed locking means shiftably mounted between the head of each main rail and base thereof and both simultaneously longitudinally shiftable into and out of engagement with the switch points, said locking means being operatively connected to the point-shifting handle and moved into engagement with the rails when the handle is moved into engagement with its locking means.

6. In a railway switch, main track rails, switch points, a switch stand, a point-shifting shaft on the switch stand, a handle movable in one plane for operating the point-shifting mechanism, said handle being actuated in another plane for locking it, means for locking the handle when thrown to either of its point-shifting positions, with which means the handle may be moved into engagement after the points have been thrown, and locking means mounted directly upon the rails, between the heads and base flange thereof, and longitudinally shiftable into or out of engagement simultaneously with both switch points, said locking means being connected to the handle and movable into engagement with the switch points when the handle is moved into engagement with its locking means.

7. In a railroad switch, main track rails, switch points, a switch stand, a point-shifting shaft on the switch stand, a handle movable in one plane and connected to the shaft

operating point-shifting mechanism, said handle being also movable in another plane to lock it when fully shifted, means for locking the handle when thrown to either of its point-shifting positions, a locking block slidably mounted upon each rail between the head and base flange thereof, and engaged in every position with said rail, said locking block being longitudinally shiftable into or out of engagement with the switch point, a rock shaft connected to the locking block to move the same, and means connecting the switch stand handle with the rock shaft, whereby the latter may be rocked upon a movement of the handle into engagement with the handle-locking means.

8. In a railway switch, main rails, switch points, a point-shifting mechanism, a handle for operating the point-shifting mechanism, said handle being adapted to be moved into engagement with a locking means when thrown to either of its point-shifting positions, a rock shaft connected to the handle, a slide mounted on one side of the rail between the base and head thereof, a locking block mounted on the other side of the rail between the base and tread flange thereof, said rail being slotted, bolts connecting the locking block with the said slide passing through the slots in the rail, and a link connecting the rock shaft with the slide, the forward end of the locking block being cut away to fit over a switch point and hold it into engagement with the track rail.

9. The combination with a main rail and a switch point, of a locking member mounted directly upon the main rail and housed between the head and base flange thereof and longitudinally movable into position between the rail and the point and in contact with both, when the point is shifted away from the rail, and into position on the opposite side of the point and against the same when the point is in engagement with the rail said member having a locking means forming a connection between the member and the rail and also a guide for the member.

10. The combination with a main rail, a switch point and an operating lever connected to the switch point to throw it, of a locking member mounted adjacent to the switch point and directly connected to the main rail and longitudinally movable parallel thereto, into position between the rail and the point and into contact with both, when the point is shifted away from the rail, and into position on the opposite side of the point and against the same when the point is in engagement with the rail, and connections between the locking mem-

ber and the switch lever, whereby the locking member shall be thrown out of operative engagement with the switch point to permit the point to be shifted, and then into operative engagement with the switch point after it is shifted by a point-shifting movement in either direction of the switch-operating lever.

11. The combination with a main rail, a switch point, and a switch-operating lever connected to the switch point to throw it from one position to the other, of a locking member slidably connected directly to the rail between the head and base flanges thereof and adapted to engage at one limit of its movement between the rail and the point and in contact with both when the point is shifted away from the rail and into position on the opposite side of and against the point when the point is in engagement with the rail, a rocking bar relatively engaged with the locking member to move it longitudinally and into and out of locking position, and gearing for rotating the rocking bar upon an actuation of the switch-operating lever.

12. The combination with opposed main rails and opposed switch points, of opposed sliding locking blocks slidably mounted upon the rails between the head and base flanges thereof and each movable simultaneously longitudinally therealong into positions between either rail and either point, and in contact with both a point and the adjacent rail when the point is shifted away from the rail, or into position on the opposite side of the point and against the same when the point is in engagement with the rail said locking blocks being directly connected to the rail along their whole length.

13. The combination with a main rail and a switch point, of a locking block slidably mounted to contact with the inside face of the main rail and between the head and the base flange thereof, said block, at its forward end and on its inside face, being cut away to provide a recess for the reception of the extremity of the switch point, means for sliding the block longitudinally along the rail to engage the switch point with the rail, or to engage with both the rail and switch point to hold the point away from the rail and common means for holding said block directly connected to rail and also for guiding the same.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN R. McKINNIS. [L. s.]

Witnesses:

FRANK S. STEINER,
ETHNA L. SMEDLEY.