F. E. HUGHES.

AUTOMATIC SWITCH.

APPLICATION FILED SEPT. 13, 1909.

994,161.

Patented June 6, 1911.

4 SHEETS—SHEET 1.

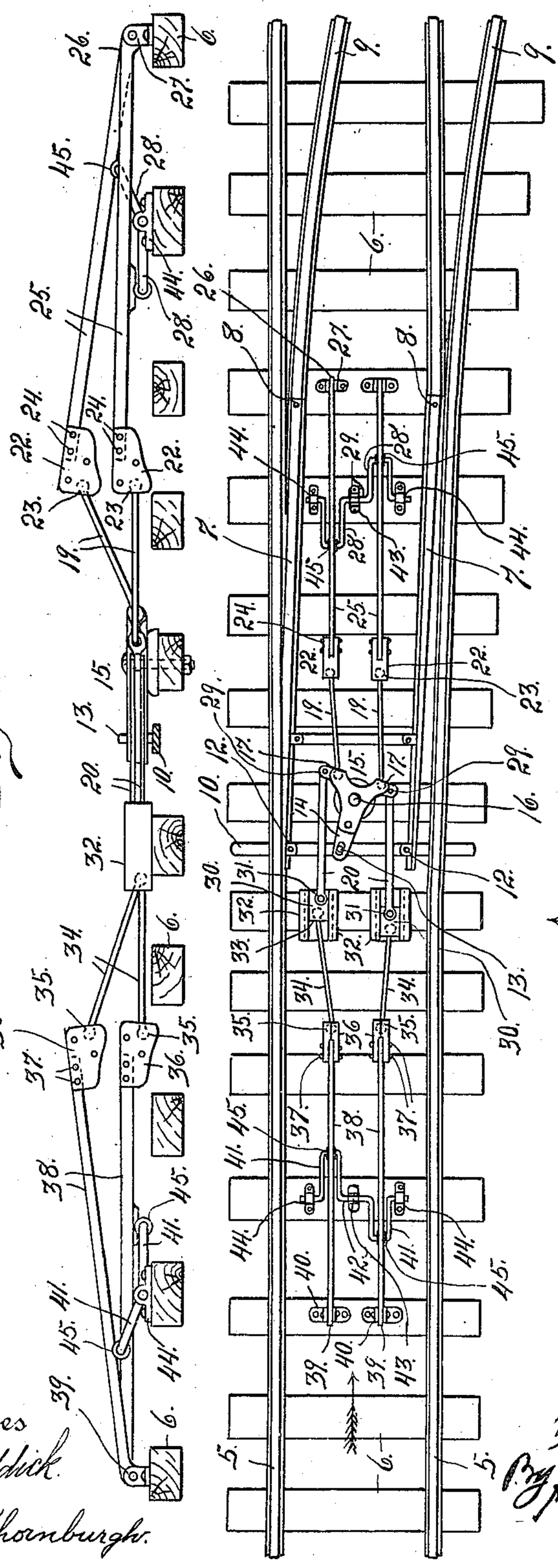

Fig. 2.

Witnesses

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4 SHEETS—SHEET 2.

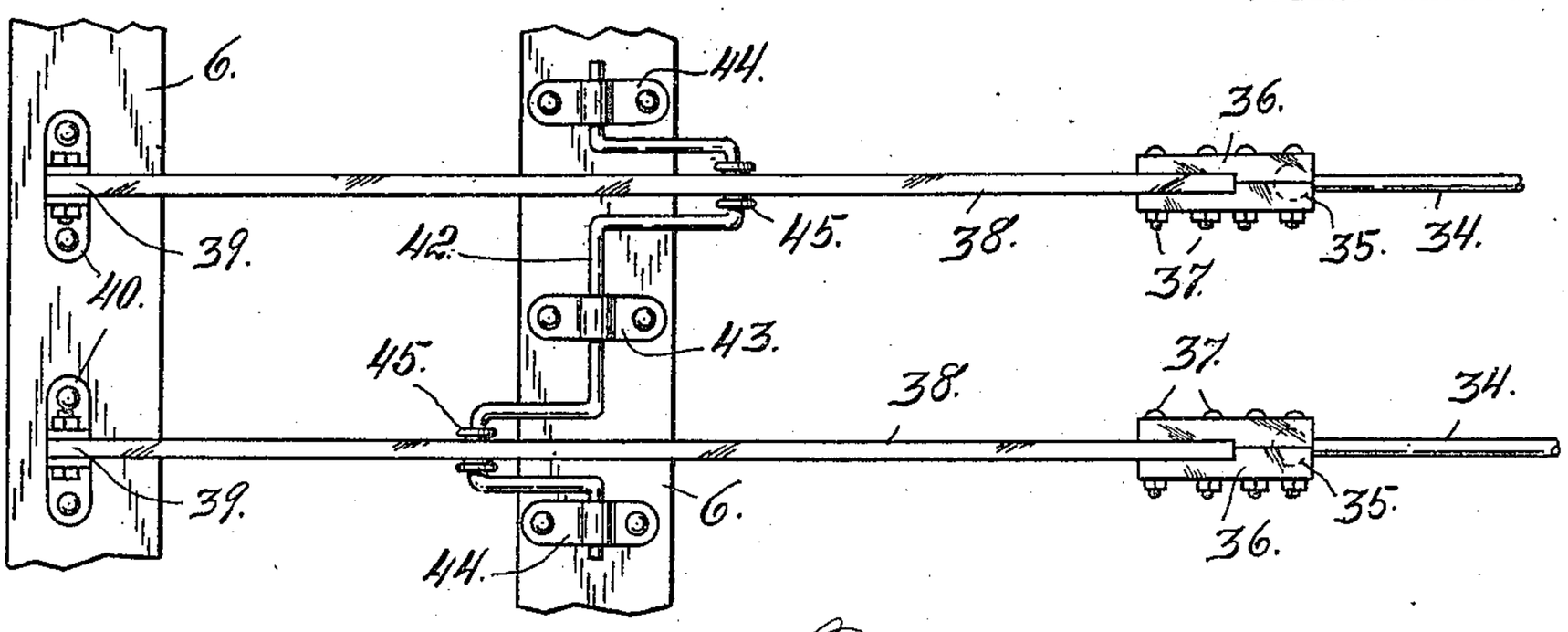

Fig. 3.

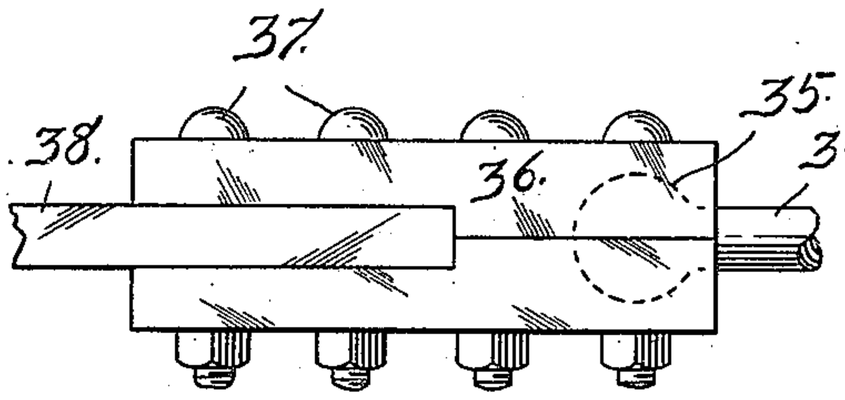

Fig. 4.

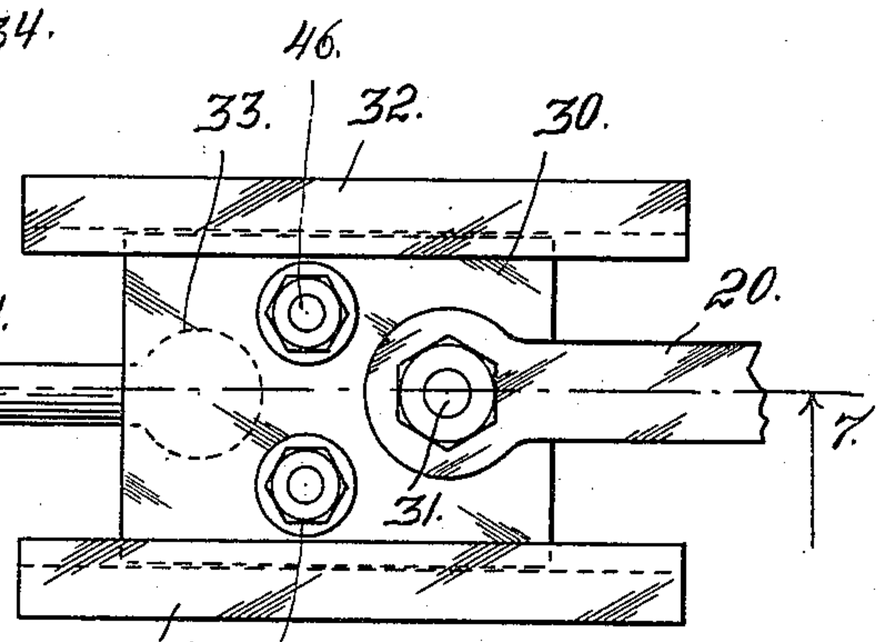

Fig. 6.

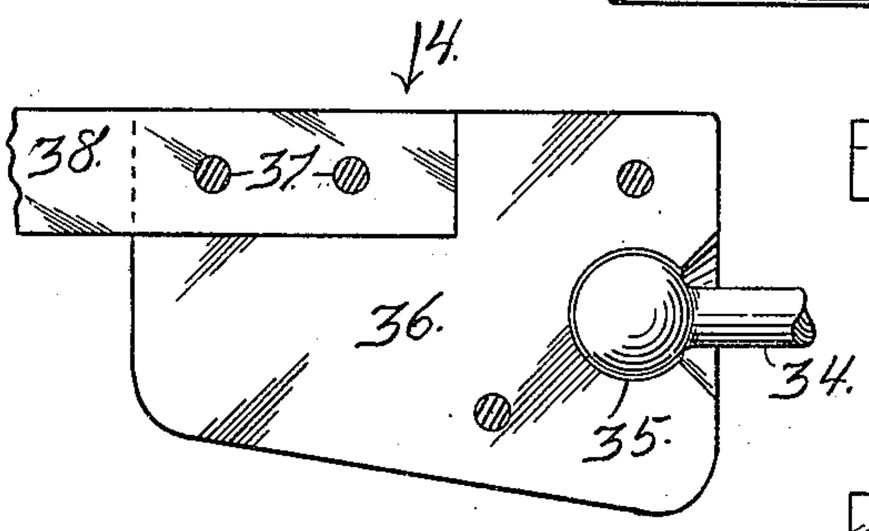

Fig. 5.

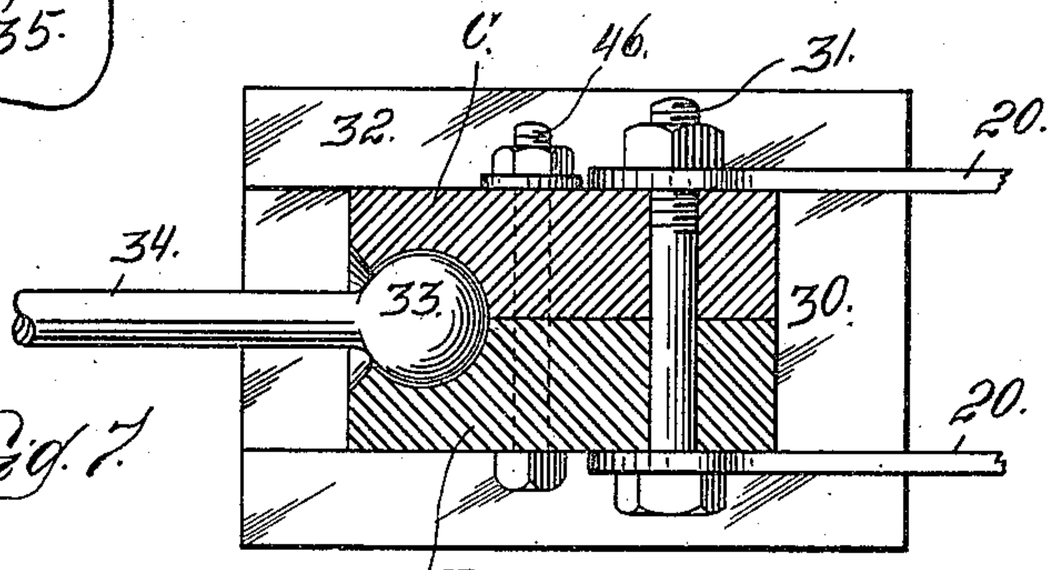

Fig. 7.

Witnesses

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4 SHEETS—SHEET 3.

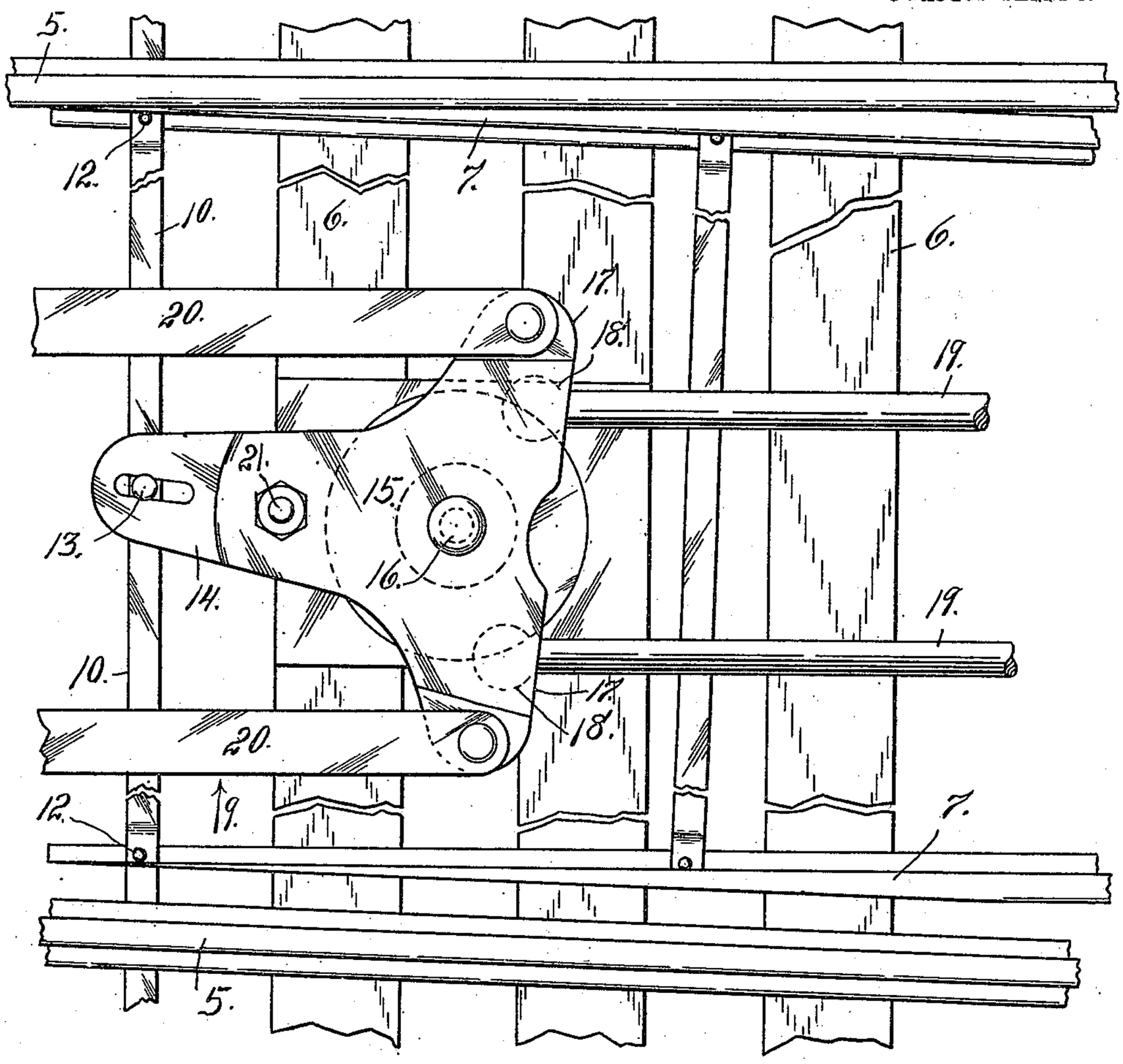

Fig. 8.

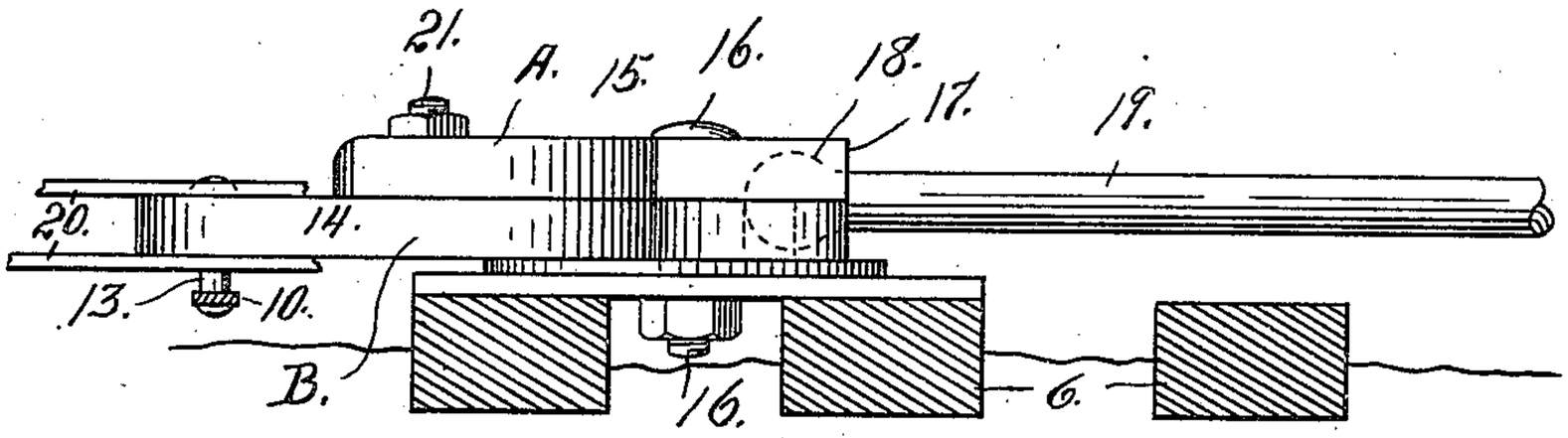

Fig. 9.

Witnesses

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APPLICATION FILED SEPT. 13, 1909.

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4 SHEETS—SHEET 4.

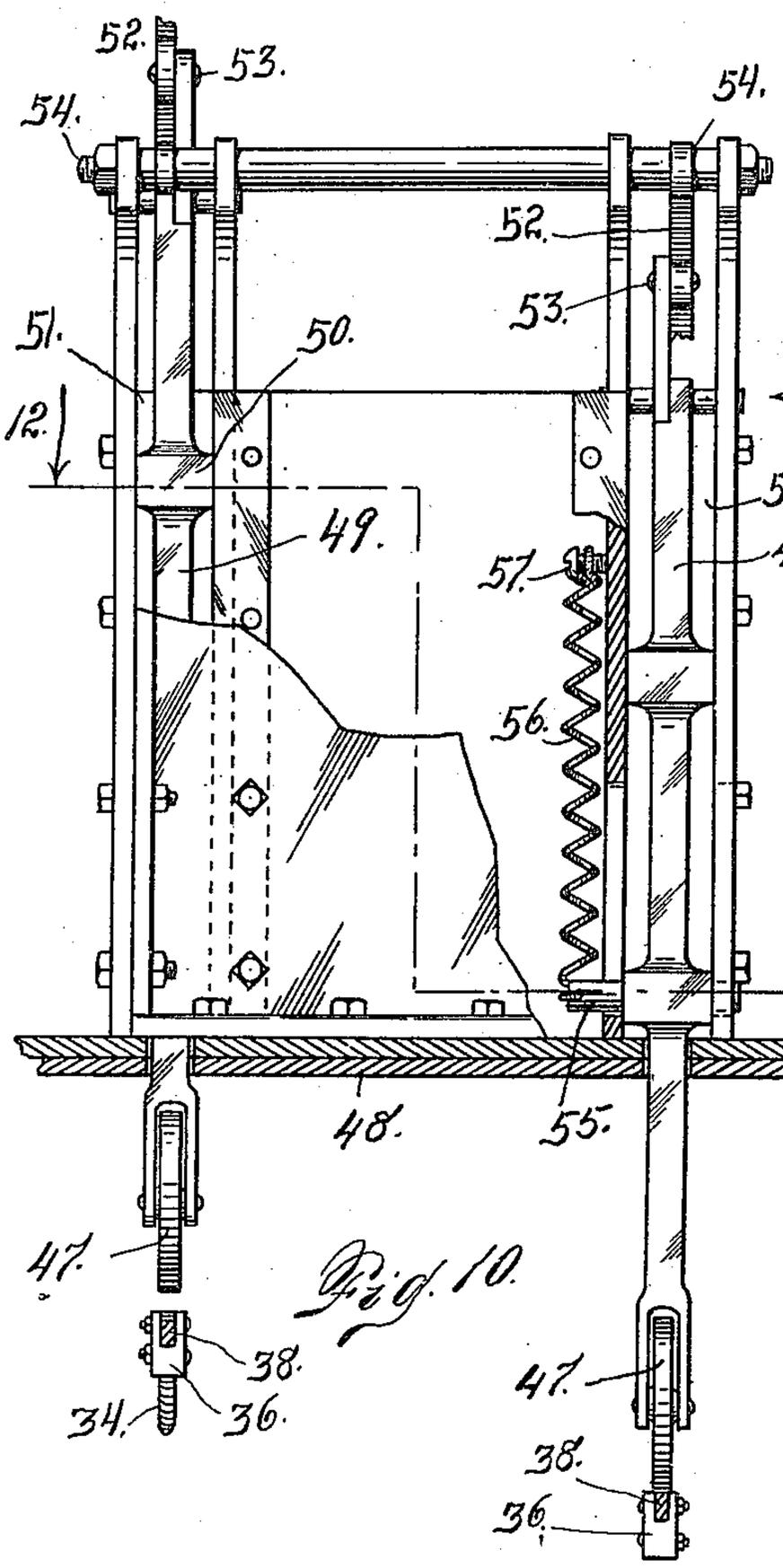

Fig. 10.

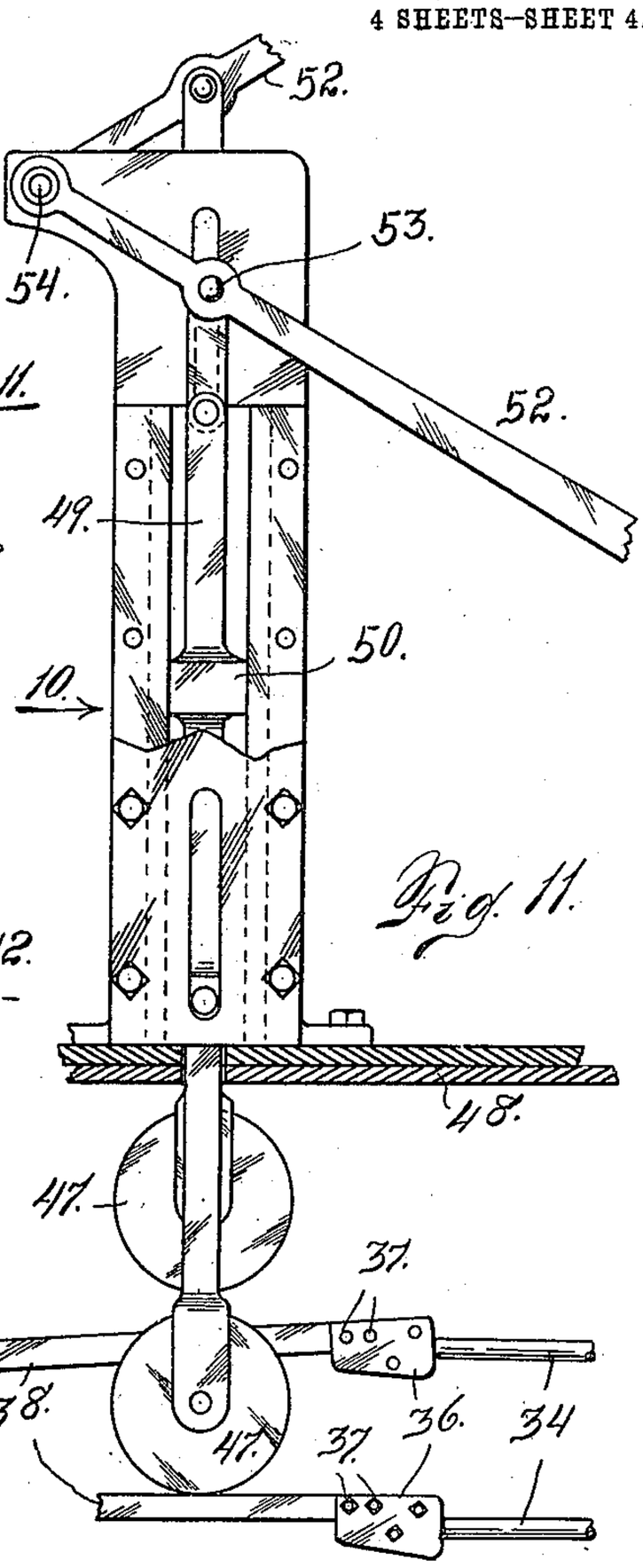

Fig. 11.

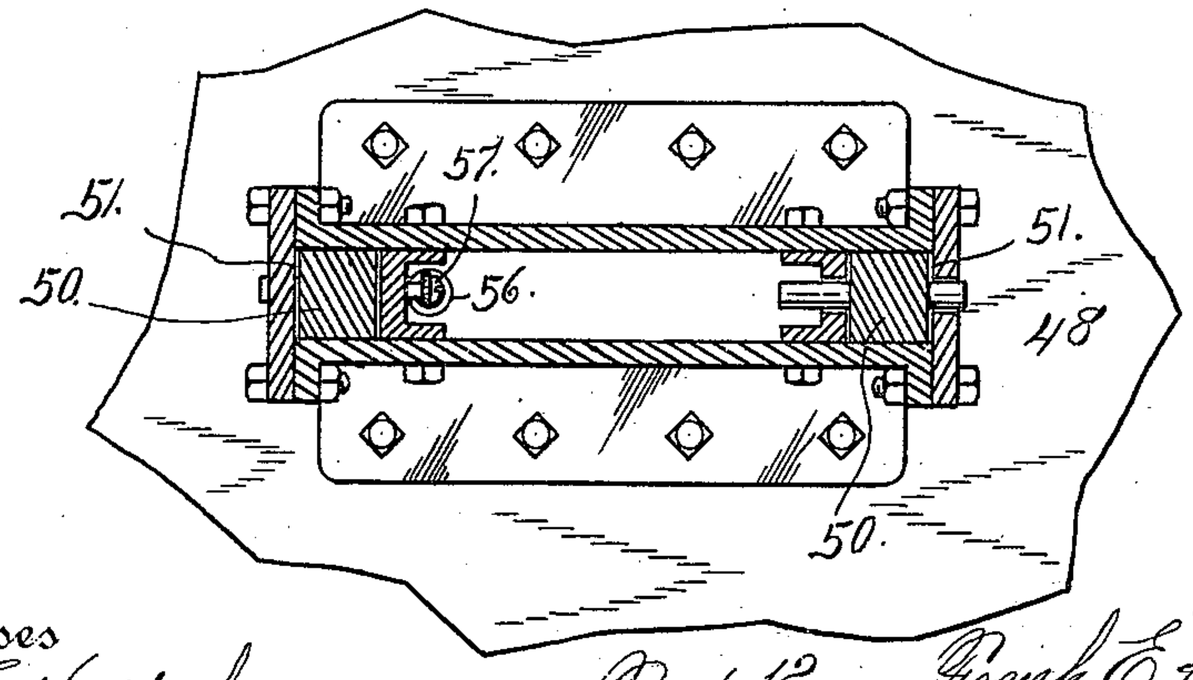

Fig. 12.

Witnesses

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UNITED STATES PATENT OFFICE.

FRANK EADKER HUGHES, OF LUCERNE, COLORADO.

AUTOMATIC SWITCH.

994,161. Specification of Letters Patent. Patented June 6, 1911.

Application filed September 13, 1909. Serial No. 517,445.

To all whom it may concern:

Be it known that I, FRANK EADKER HUGHES, a citizen of the United States, residing at Lucerne, county of Weld, and State of Colorado, have invented certain new and useful Improvements in Automatic Switches; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in railway switches.

My improved switch construction is adapted to be operated by a passing train, the latter being equipped with a device adapted to be thrust downwardly into contact with a part of the switch mechanism, whereby the switch tongues may be shifted in the one direction or the other, according as it is necessary for the train to take the curve or continue on the straight track.

My improved mechanism is adapted to be operated by a train traveling in either direction. Any train may be so equipped that after operating the switch mechanism to cause the train to either take the curve or remain upon the straight track, the mechanism may be again operated, whereby it is thrown into the same condition that it originally occupied, the last action, however, being brought about by an actuating device mounted upon the rear car of the train.

Having briefly outlined my improved construction, I will proceed to describe the same in detail, reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a top plan view of a section of track equipped with my improved switch. Fig. 2 is a side elevation of the same, looking in the direction of arrow 2, Fig. 1, the rails of the track being omitted in order to better illustrate the switch mechanism, which otherwise would be largely concealed in a side view, by the track rails. Fig. 3 is a top plan view of a portion of the switch mechanism, showing a shaft provided with double cranks, the two cranks occupying planes forming angles with each other. In this view the parts are shown on a larger scale than in Figs. 1 and 2. Fig. 4 is a top plan view in detail, and on a larger scale, illustrating the manner of connecting two of the members of the switch mechanism. This is a view looking in the direction of arrow 4 Fig. 5. Fig. 5 is a side view of the construction shown in Fig. 4, a portion of the last named construction, however, being removed. Fig. 6 is a top plan view, on a larger scale, illustrating a slidable block connecting two members of the mechanism. Fig. 7 is a vertical section taken on the line 7—7, Fig. 6. Fig. 8 is a top plan view, on a larger scale, illustrating a triangular lever, shown in operative relation with the switch tongue shifting bar. Fig. 9 is a side elevation of the same, being a view looking in the direction of arrow 9, Fig. 8. Fig. 10 is a sectional view taken through the floor of the cab of the engine, or other car of the train, illustrating the vertically movable devices carried by the train for operating the switch mechanism. This view is obtained by looking in the direction of arrow 10, Fig. 11. Fig. 11 is an elevation looking in the direction of arrow 11, Fig. 10. Fig. 12 is a horizontal section taken on the line 12—12, Fig. 10.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the rails of a railway track; 6, the cross ties, and 7, two switch points pivoted at 8, whereby the train may be caused to take the curve or side track composed of rails 9.

Slidably mounted below the rails 5 is a transverse bar 10, which is connected, as shown at 12, with the switch points 7 near the smaller extremities of the latter, being the ends remote from the switch tongue pivots 8. The bar 10 is pivotally connected, as shown at 13, with an arm 14 of a triangular lever 15. This lever is centrally fulcrumed, as shown at 16, and is provided with three arms. The arm 14 is connected with the bar 10, as just explained, while the other arms, which are each designated 17, are each pivotally connected with two rods, designated 19 and 20, and extending in opposite directions from the lever. Each rod 19 is connected with the arm 17 of the said lever by a ball and socket joint 18. Attention is called to the fact that this triangular lever is composed of upper and lower members A and B, which are connected by the fulcrum pin 16, and also by an additional

bolt 21. Each rod 19 is connected, at its extremity remote from the lever 15, with a block 22 by means of a ball and socket joint 23. Each block 22 is rigidly connected, as shown at 24, with one extremity of a rod 25, whose opposite extremity is pivotally connected, as shown at 26, with a bracket 27 secured to a cross tie. Each rod 25 intermediate its extremities rests upon a crank 28 with which a rock shaft 29 is provided. This shaft has two cranks 28 located in planes forming angles with each other, so that when the shaft is properly actuated, one crank will be down while the other is up.

Each rod 20 is connected at one extremity with a lever arm 17 by a pivot pin 29, while its opposite extremity is connected with a block 30, by a pivot bolt 31. The block 30 is slidably mounted in ways 32. This block 30 is also connected, by means of a ball and socket joint 33, with one extremity of a rod 34, whose opposite extremity is connected by means of a ball and socket joint 35 with a block 36, which is also rigidly connected, as shown at 37, with a rod 38, whose extremity remote from the last named block, is pivotally connected, as shown at 39, with the bracket 40 suitably secured to a cross tie. Each rod 38 rests upon a crank 41 of a rock shaft 42. This shaft 42, like the shaft 29, is provided with two cranks of similar construction, each being designated 41 and located in planes forming angles with each other. The shaft 42 (see Fig. 3), is journaled in bearings 43 and 44, there being a single central bearing 43, and two end bearings 44. The shaft 29 is similarly journaled, and the corresponding bearings are therefore designated by the same reference characters.

Attention is called to the fact that the switch mechanism is composed of two sets of parts, each set being composed of members which are substantially identical, hence there are two of each of the following members: that is to say, rods 38, 34, 20, 19 and 25. There are also two blocks 22, two slidable members 30, and two blocks 36. The two blocks 36 are located on one side of the lever 15, while the two similar blocks 22 are located upon the opposite side of the said lever. By virtue of the operation of the mechanism one block 36 is always raised when the other block 36 is down. This is also true of the blocks 22. When one of the blocks 36 is raised, the corresponding block 22 upon the same side of the track is lowered. In order to facilitate the operation of the crank arms 41 or 28, as the case may be, the portion of each of these arms which is engaged by a rod 38 or 25, is equipped with a roller 45. To facilitate the assembling of the mechanism, each slidable block 30 is composed of two members C and D, which are connected by bolts 46. The pivot bolt 31, which connects the rod 20 with the block, also serves as a connecting device for the two members.

In describing the operation of the mechanism, it may be assumed, referring to Figs. 1 and 2, that a train is traveling toward the right, or in the direction of the feathered arrow in Fig. 1. It may also be assumed that the right hand block 36 is raised, while the left hand block 36 is lowered. At the same time, the left hand block 22 must be considered raised while its companion block 22 is lowered. It will then be understood that the cranks 41 and 28 of the rock shafts 42 and 29, occupy positions to harmonize with the positions of the said blocks. I will also assume that the lever 15 occupies the position shown in Fig. 1, whereby the switch point shifting bar 10 is moved toward the left, throwing the switch points into a position to cause the train to take the curve. I will also assume that it is desired for the train traveling toward the right, or in the direction of the feathered arrow in Fig. 1, to occupy the straight track beyond the switch. In this event, a vertically movable device, mounted upon the engine, will be actuated to depress the right hand rod 38, whereby the corresponding block 36 is forced downwardly, while the corresponding rod 34 is moved toward the right, imparting a corresponding movement to the slidable block 30 with which it is connected. The movement toward the right of the block 30 acts upon the corresponding rod 20, to throw the lever 15 to a position the reverse of that illustrated in Fig. 1, whereby the bar 10 will be shifted to throw the switch points 7 to a position the reverse of that shown in Fig. 1, whereby the train will be compelled to keep the straight track. During these movements, the block 22, which was previously down, will be raised, while its companion block 22 will be lowered, by virtue of the connections between the blocks 22 and the arms 17 of the lever 15, through the medium of the rods 19, as heretofore explained. The device for lowering the block 36 should be so mounted that after it has performed its function upon the said block, it will immediately return to its normal or raised position, so that it will not interfere with the upward movement of the block 22, since the latter is arranged in alinement with the actuated block 36. If it were desired for a train traveling toward the right, or in the direction of the feathered arrow in Fig. 1, to take the curve, there would be no necessity for actuating the switch mechanism.

In further explanation of the operation of the mechanism, it may be stated that if it is desired that the train traveling toward the right shall leave the switch mechanism in its original condition, it will be understood that a device located in the rear of the

wheels of the last car of the train might be operated by acting upon the block 36, which was raised by virtue of the downward movement of its companion block 36, to perform the aforesaid function. Again, assuming that a train is approaching a switch and traveling toward the left, or in a direction the reverse of that indicated by the feathered arrow in Fig. 1, and if we also assume that the switch points 7 are in the position shown in the last named figure, the switch mechanism may be actuated to shift the switch tongues to a proper position to allow the train to occupy the straight track, by actuating a device mounted upon the engine, which would act upon the raised block 22, to move the latter downwardly and operate the lever 15, since it is not my intention to rely upon the wheels of the train to actuate the switch point 7.

In Figs. 10, 11, and 12 I have illustrated means mounted upon the train for depressing the raised blocks 36 or 22, as the case may be. It is my intention to equip the engine with two vertically movable rollers 47, each of which projects below the floor 48 of the cab and is connected with a vertically movable rod 49, equipped with cross heads 50 having parts engaging ways 51 of suitable construction. Each of these rods is connected with a lever 52 fulcrumed at 54 and connected with a rod, as shown at 53. Each rod is also connected, as shown at 55, with a coil spring 56, one extremity of which is secured to a stationary pin 57. As either roller is moved downwardly, in order to act upon the block 36 or 22, as the case may be, the spring 56 is distended or placed under tension. This spring is of such strength that its recoil will automatically return the rod 49 to its normal position, as soon as the operator releases the lever 52.

Having thus described my invention what I claim is:—

1. In a railway switch, the combination with a switch point, of a pivotally mounted triangular lever provided with arms, one arm being operatively connected with the switch point, operating rods pivotally connected with the other arms of the lever and extending in opposite directions from the switch point, the said rods being provided with a joint intermediate their extremities and pivotally secured at their extremities remote from the triangular lever, guide ways in which the rods on one side of the switch point are slidably mounted, rock shafts positioned on opposite sides of the switch point, the said shafts being provided with crank arms forming angles with each other upon which the rods rest, whereby the rods are held in operative relation, the crank arms being arranged to be operated from a moving train traveling in either direction, and mechanism mounted on the train for the purpose set forth.

2. A railway switch, comprising in combination with a switch point, the herein described operating mechanism, consisting of a pivotally mounted lever provided with arms, one arm being operatively connected with the switch point, a pair of operating rods pivotally connected with the other arms of the lever, each pair extending in opposite directions therefrom, the said rods being provided with a joint intermediate their extremities, and pivotally secured at their extremities remote from the lever, guide ways mounted on one side of the switch point in which one pair of operating rods is slidably mounted, rock shafts positioned on opposite sides of the switch point, the said shafts being provided with crank arms forming angles with each other and upon which the shafts rest, whereby one of the operating shafts of each pair is raised, while the other rod is lowered, the whole being arranged to be operated by a moving train traveling in either direction, and means mounted on the train, for the purpose set forth.

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

FRANK EADKER HUGHES.

Witnesses:

JESSIE HOBART,

M. F. MANEY.