

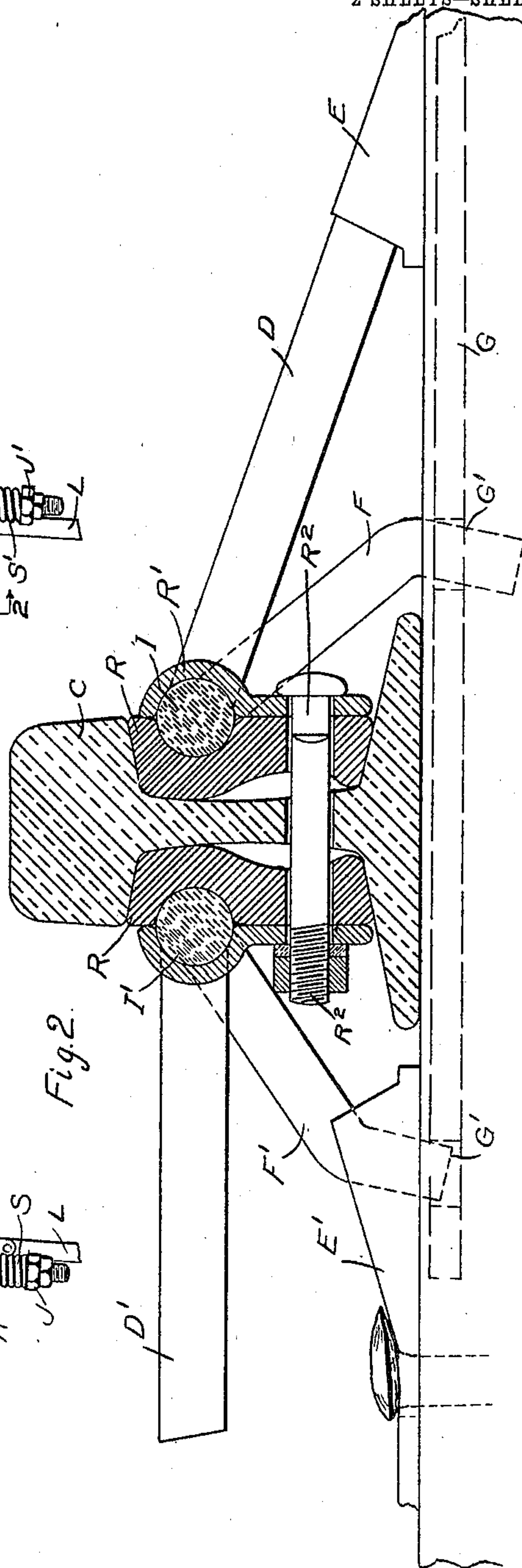
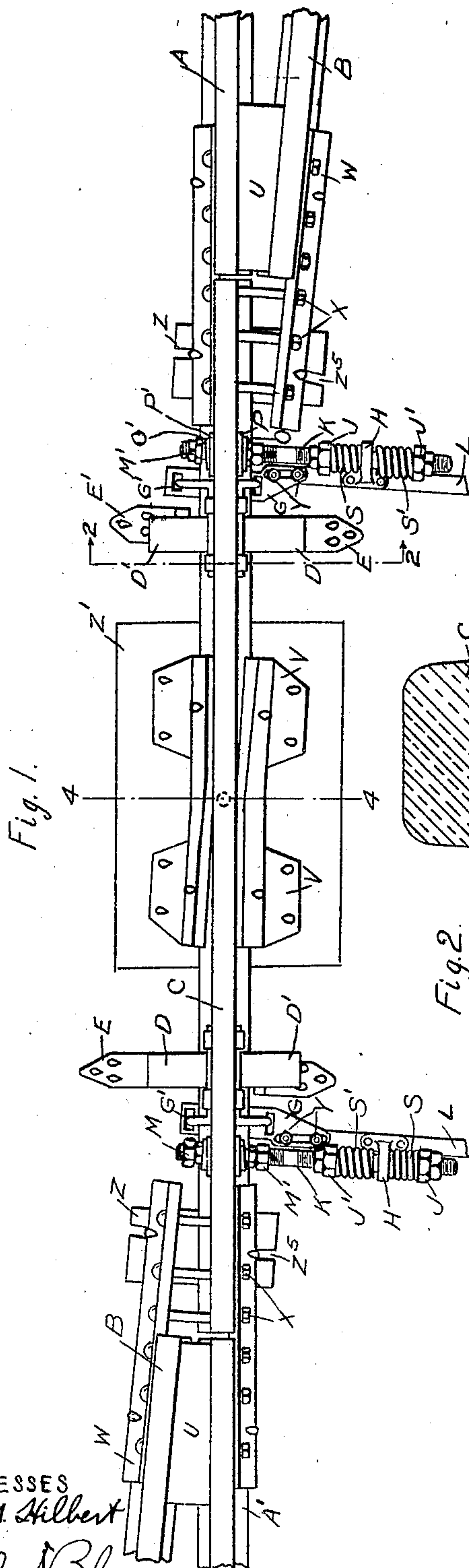
No. 812,687.

PATENTED FEB. 13, 1906.

F. H. SHAKESPEARE.  
CONTINUOUS RAIL FROG AND SWITCH.

APPLICATION FILED AUG. 5, 1905.

2 SHEETS—SHEET 1.



WITNESSES  
William M. Hilbert  
Paul Blair

INVENTOR  
*Franklin H. Shakespeare*  
By *Howser and Howser*  
ATTORNEYS.



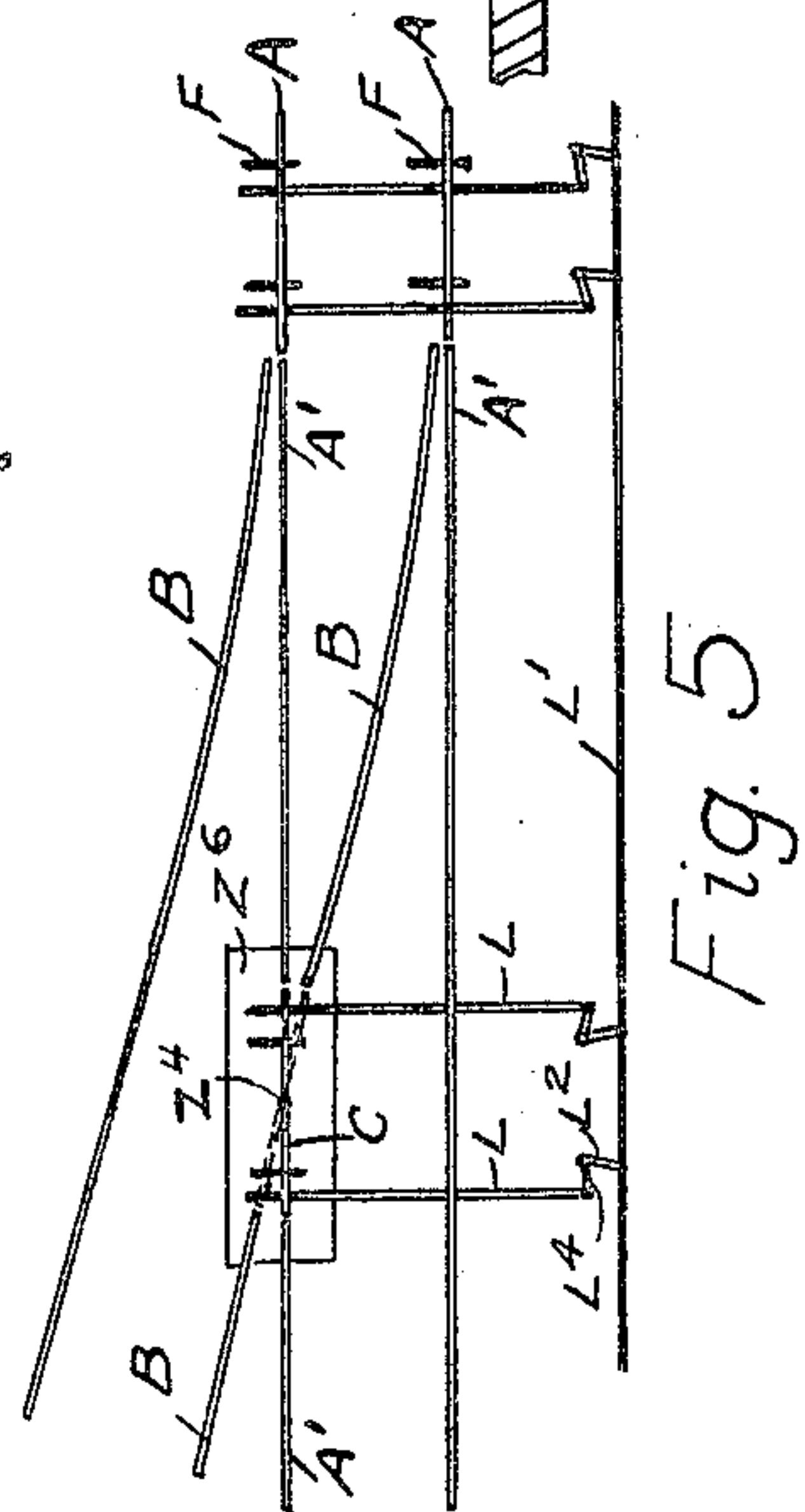
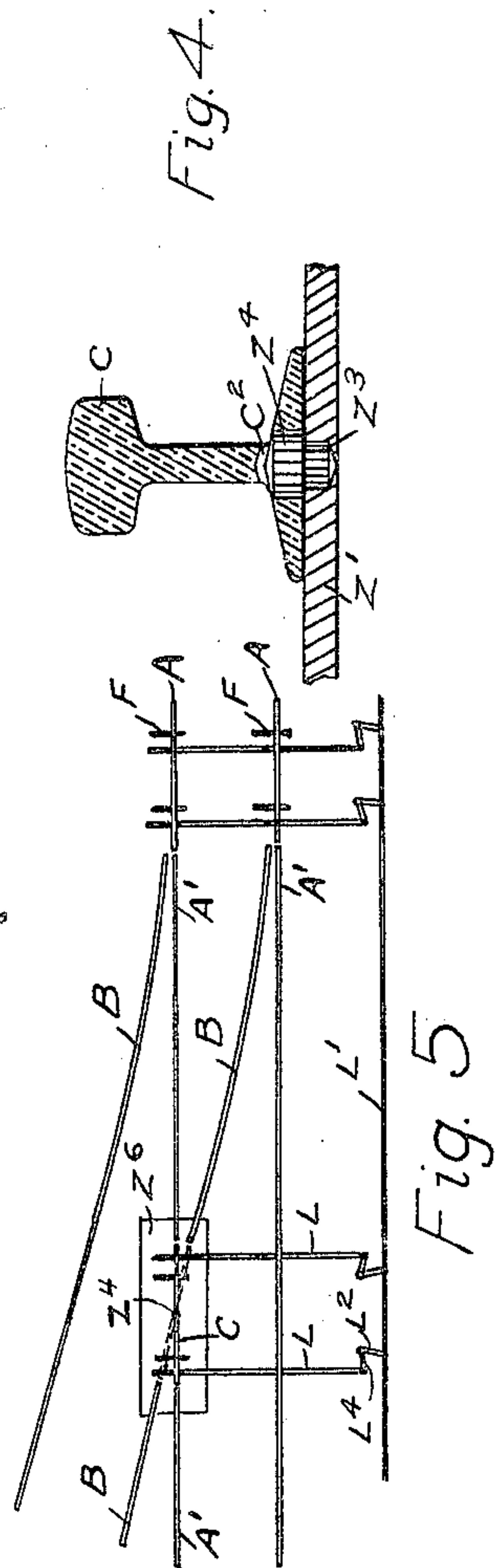
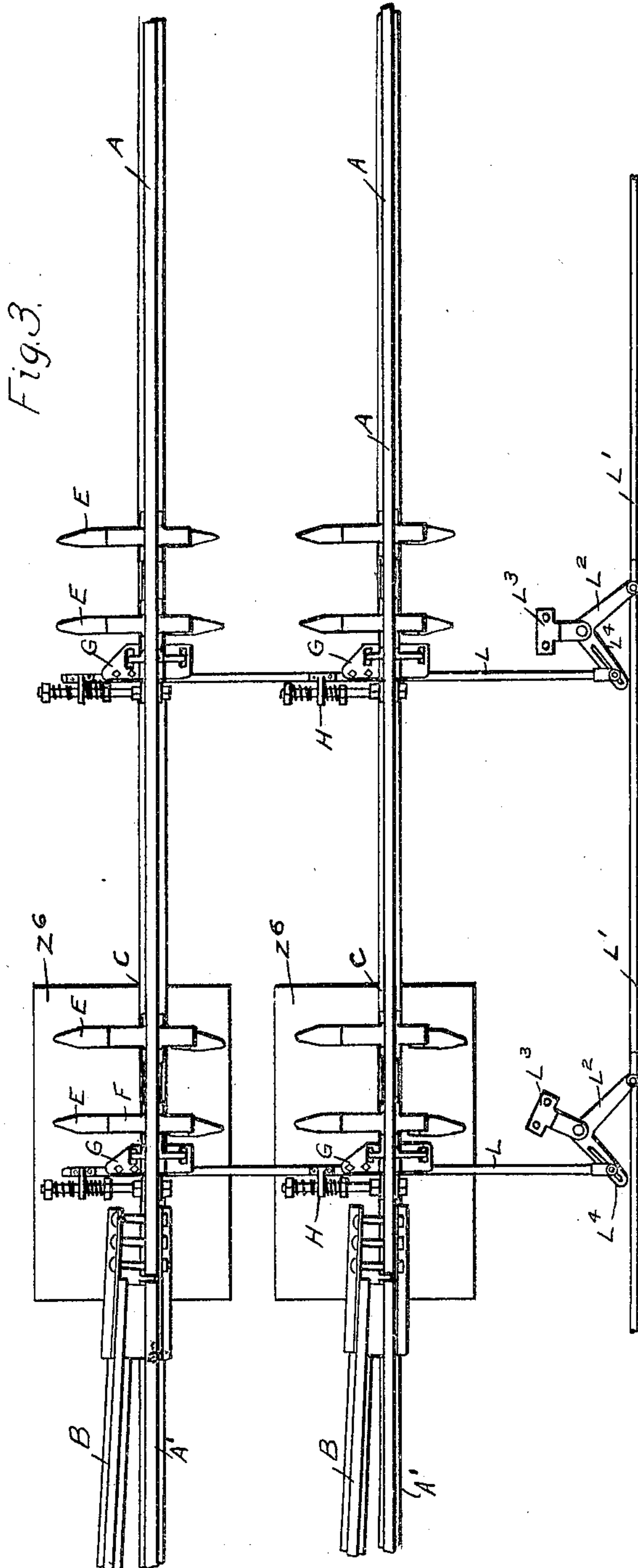
No. 812,687.

PATENTED FEB. 13, 1906.

F. H. SHAKESPEARE.  
CONTINUOUS RAIL FROG AND SWITCH.

APPLICATION FILED AUG. 5, 1905.

2 SHEETS—SHEET 2.



WITNESSES:  
William M. Silbert  
Paul A. Blair.

INVENTOR  
Franklin H. Shakespeare  
BY  
Horsman and Horsman  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

FRANKLIN H. SHAKESPEARE, OF EAST ORANGE, NEW JERSEY.

## CONTINUOUS-RAIL FROG AND SWITCH.

No. 812,687.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed August 5, 1905. Serial No. 272,882.

*To all whom it may concern:*

Be it known that I, FRANKLIN H. SHAKESPEARE, a citizen of the United States of America, residing in East Orange, in the county of Essex, State of New Jersey, have invented certain new and useful Improvements in Continuous-Rail Frogs and Switches, of which the following is a specification.

My invention relates to railroad-frogs, and particularly to that style known as "movable-rail" frogs, in which a rail is moved transversely near the point of intersection of the rails of the diverging tracks, so as to form a continuous line of rails at such point. My invention is also applicable to switches having similarly-movable rails operated simultaneously with the rail of the frog.

The primary object of my invention is to produce a simple, inexpensive, and substantial movable-rail frog with or without a movable-rail switch at the point of intersection of the rails of the diverging tracks, whereby a continuous or unbroken rail bearing is provided for the wheels of a car moving on either track, thus overcoming the danger of derailment, obviating all jarring and jolting, and consequently reducing the wear both on the switch and frog and their parts, as well as the rolling-stock.

Other objects of my invention are to provide means to properly guide and limit the movement of the movable rails and to lock the same after perfect alinement with the track over which the cars are to pass is attained, to obviate all necessity for the use of guard-rails in connection with frogs or switches, to produce a frog or switch wherein the wearing parts can be cheaply renewed, and to produce a frog and switch in which the main parts are interchangeable with those of a frog and switch of different angle. The elimination of guard-rails, pointed frogs, and pointed switch-rails reduces the cost of construction. The general maintenance cost of railway connections and crossings will be reduced, due to the fact that with these frogs and switches it will not be necessary to keep on hand a supply of frogs of different angles for use in case of an emergency, for the main parts of these frogs and switches are interchangeable, since they are the same in shape and dimensions for varying angles of the frog, or, in other words, the main parts used in a frog of one angle may be interchanged with similar parts of a frog of a different angle or

with those of a switch, and this is an important object of this invention.

A further object of my invention is to provide means for connecting the frog with the switch-operating mechanism and for moving and locking the same in position simultaneously with the operation of the switch from the switch-tower or elsewhere.

In the accompanying drawings, Figure 1 represents a plan view of the two intersecting rails of a frog embodying my invention. Fig. 2 represents an enlarged cross-section taken on the line 2 2 of Fig. 1. Fig. 3 represents a plan view of part of my invention, showing the arrangement of the switch-rails without the frog. Fig. 4 represents a central sectional elevation of the movable rail of the frog, showing the pivot about which the rail moves, taken on the line 4 4, Fig. 1; and Fig. 5 represents a diagrammatic view of the movable-rail switch and frog and the operating mechanism whereby they are moved simultaneously.

Referring to the drawings, especially to Fig. 1, in which the details of my invention as applied to the frog are shown, the letters A and A' denote the rails of a main track, and B the rails of a side track, and C the movable rails which in one position connect the parts of the rails A with the rails A' and in another position connect with the siding-rails B.

As shown in the drawings, the rails A' and B are arranged with their ends even and connected by bolts which pass through a wedge-shaped filler-block U of the desired angle placed between the rails. The flanged splice-bars or fish-plates W are placed on the outer side of each rail A' and B, and the two plates extend beyond the ends of the rail substantially equal distances. The ends of the rail C are placed between those extended ends of the splice-bars W which are connected by the curved bolts X, passing through holes in the end of the rail C, thereby limiting and guiding the movement of the rail and preventing longitudinal movement of the rails C. It will be noticed that these flanged splice-bars are of the same style as those used at the joint of any two rails, and the same plate or bar may be used on either side of the rail. It will also be seen that these bars extend to and are supported by the plate Z on the next tie, where they are firmly secured against lateral displacement.

The outer end of the rail C is supported on



the plate Z, which has perforations or slots Z<sup>5</sup>, by which with the use of spikes it is secured to the tie. In varying the frog angle the segmental bolts X and the filler wedge or block U may have to be changed, but the plate Z remains the same in size and shape, although the angle may vary within certain limits. This plate Z may, however, be of a different shape and extend the entire length of the splice-bars W, thereby supporting the ends of the rails A and B and assuring equal level of the rails A, A', and B at the point of connection, or, if desired, the whole frog may be mounted on a plate, as indicated at Z<sup>6</sup>, in the case of the switch, Fig. 3.

The mechanism for moving and locking the movable rails C consists of several distinct parts. Beginning with the rod K, which has preferably two diameters, the smaller of which passes through a hole in the web of the rail C, this rod is provided on each side of the opening or hole and next to the rail between the head and the base with flat bars or plates P P'. O O' are small wedge-shaped pieces on the outer sides of P P', through which the rod K also passes. As the rail C swings from one position to another the angle between the center line of the rod K and the center line of the rail C must vary by an amount equal to the frog angle. The rod K serves to move the rail C, and this variation of angle is taken care of by means of the wedge-shaped pieces O O' and the nuts M M' on the rod K, one of which abuts squarely against the wedge-piece and holds the rail in alined position. The nuts M are adjustable, so as to hold the rail C in line with the rail A' when the rod K is at the end of its stroke for any angle or width of rail. The nuts M' are also adjustable to hold the rail C in its other position in line with the rail B. In the adjustment of these nuts M allowance should be made for lost motion in the stroke of the rod K, so that the plates P P' and wedge-shaped pieces O O' will have sufficient play to permit the slight lengthwise motion necessary along the rail C as the angle between the rod K and rail C changes. On the opposite end of the rod K are the nuts J J', between which are helical springs S S'. The sleeve H is fastened to the operating-rod L, Fig. 1, and separates the springs S S'. The rod L continues to the side of the track and there connects with the rod or bar L', running along the track to the switch-tower and switch mechanism for operating the switch. By this bar the frog and switch are worked automatically on turning the switch-lever for one track or the other. Near the end of the rod L are studs Y, which pass through a slot in the plate G and serve, in combination with other means, to secure the plate to the rod. The locking means for the movable rail is also operated from the rod L. Fig. 2 shows a sectional view of the device by means of which the rail C is braced

and kept in position after it has been brought into alinement with the rail intended. I I' denote circular rods or bars running along and fitting into a concave bar R, secured to the web of the rail, one being on each side of the rail C. These bars I I' are held in place by means of plates R', which are in turn held in place by bolts and nuts R<sup>2</sup>, Fig. 2. The plates R and R' act as bearings for the bar I. Attached to or forming part of the bars I I' are the locking-braces D D', which serve to keep the rail in a locked position. Attached to or forming parts of the bars I I' are the levers F F', which serve to turn the bar, and consequently raise or lower the locking-braces D D', as the case may be. E E' are stationary brace-blocks secured to the tie or fixed by other means, one on each side of the movable rail, against which one of the braces D D' bears when in locked position. The ends of the levers F F' are bent as shown in Fig. 2 and are adapted to engage in the holes G' of the plate G, which is moved laterally to and fro under the rail C. These holes G' are so placed and the ends of the levers F F' are so bent that when the plate G is half-way between locked position the levers F F' will have their bent ends in the holes G' at equal distances from the rail C, and the braces D D', which are turned therewith by the rods I I', will hang equally on each side of the rail C, their ends being a little more than high enough to clear the top of the brace-blocks E E'. These slots G' are also cut wide enough to allow sufficient space for the ends of the levers F F' to move without interference and long enough to allow for the lateral motion of the levers F F' relative to the plate G, caused by variations of the angle between the plate G and the rail C. The tie on which the brace-blocks E E' are fastened may be cut away, if necessary, to permit the sliding movement of the plate G and the levers F F'. This plate G moves laterally with respect to the rail C and serves, through the levers F F', to operate the braces D D', as before mentioned, in their positions against the brace-blocks E E', thus locking or unlocking the rail C before shifting to its other position, as the case may be. This device may be modified and strengthened by extending the rod I and adding more brace-rods D and brace-blocks E, as shown, on the movable rails of the switch in Fig. 3.

The central point about which the rail C of the frog turns may or may not be a pivot-pin. In Fig. 1 the pivot appears in dotted lines at the central point, and the rail is also shown supported by braces V, these being bent an amount equal to the frog angle and so placed as to support the rail C in both positions or for either track. These braces may be two or more in number, each bent or placed at the proper angle and mounted on a plate Z'. The axial pivot-pin, which is also employed to prevent any longitudinal movement of the



rail in connection with these braces or plates V, is constructed as shown in Fig. 4. A hole C<sup>2</sup> is bored in the central part of the base of the rail C, extending partially through into the web. A hole of smaller diameter Z<sup>3</sup> is bored into the plate Z' at the corresponding point. A cylindrical pivot or pin Z<sup>4</sup> of two diameters is then inserted by placing the smaller diameter in the hole Z<sup>3</sup>, and the rail C is placed so that the hole C<sup>2</sup> is over the pivot Z<sup>4</sup>. As the hole C<sup>2</sup> is preferably bored entirely through the rail-base, there will be a small hole on each side of the web, whereby oil may be introduced around the pivot-pin.

As before stated, the mechanism for operating the movable rails of the switch is almost identical with that for moving the rail of the frog, and both rails are operated by the rods L, attached to the main switch-rod L', so that one cannot be operated without the other, as shown in Fig. 5.

The rod L' is attached to one arm of a bell-crank lever L<sup>2</sup>, secured to an adjustably-movable block L<sup>3</sup> at the end of the tie. In the other arm of the bell-crank lever is a slot L<sup>4</sup>, as shown in Fig. 3, through which passes a pin in the end of the rod L. By changing the position of the block L<sup>3</sup> the distance between the corresponding bell-crank center and the center line of its rod L is varied, thus varying the throw of the rod L.

The operation of my device is as follows: Assuming the switch to be in the position shown in Fig. 3 and the frog as in Fig. 1, the rods L, which are all connected with the switch-rod L', are moved in the direction of the rail B through the bell-crank levers. The movement of the rod L causes the sleeve H to slide along the rod K, thus releasing the spring S and bringing the sleeve H into contact with the spring S'. In the meantime the rod L has moved the plate G to its midway position in respect to the rail C and through the lever F has raised the brace-bar D into a position high enough to clear the brace-block E and through the lever F' lowered the brace-bar D' only so far as to still clear the top of the brace-block E'. The rail C is now free to move over into position in line with the rail B. The rod L continues to move. The spring S' is so designed that the force necessary to cause its compression is in excess of that necessary to move the rail C from one position to the other. The movement of the rod L is transmitted, through the sleeve H, spring S', and the nuts J', to the rod K. The nut M then moves away from the wedge O, and the nuts M' come into contact with the wedge O'. Motion is thereby transmitted to the rail C, which moves over into position in alinement with the rail B, at which point the nuts M' come squarely into contact with the wedge-piece O' and serve to press the rail C firmly over against the splice-

bars W, extending along the outside of the rail B. As the rod K cannot now move any farther in the same direction, a further movement of the rod L serves to compress the spring S' and move the plate G laterally with respect to the rail C, thus lowering the brace-bar D' into position against the brace-block E', and thereby locking the rail C in position of alinement.

From this description it will be seen that most of the parts are interchangeable with the parts of other switches and frogs for any degree of angle. It will also be seen that with very slight alterations the device can be applied to three intersecting rails, as well as to the entrance of a third-rail switch, by applying the device to the rails of all three tracks at the point of entrance.

I claim as my invention—

1. A railroad frog or switch having a movable rail, means connected therewith at the point of divergence of the rails for moving the rail so as to form a continuous line of rails at such point, said means connected to the switch-operated mechanism at one end, a sleeve attached to the other end, and a bolt passing through said sleeve and rail, in combination with means to lock said rail in alined position.

2. A railroad frog or switch having a movable rail, means connected therewith for moving said rail so as to form a continuous line of rails for the wheels of the car at the point of divergence of the rails, a sleeve on said means, a bolt passing loosely through said sleeve and movable rail, and springs on said bolt separated by said sleeve.

3. A railroad frog or switch having a movable rail at the point of divergence of the rails, means connected thereto for moving the rail so as to form a continuous line of rails at such point, said means consisting of a rod, a sleeve on said rod, a bolt having parts of different diameter passing through said sleeve and through the movable rail, nuts on said bolt, and a wedge-shaped piece secured to the movable rail against which one of said nuts abuts when in alined position.

4. A railroad frog or switch having a movable rail, means connected thereto for moving the rail so as to form a continuous rail-bearing for the wheels of the car at the point of divergence of the rails, a sleeve on said means, a bolt passing through said sleeve, means for securing the bolt to the rail, and means between said securing means and the rail against which one of the said nuts abuts when the rail is in alined position.

5. A railroad frog or switch having a movable rail at the point of divergence of the rails, means connected thereto for moving the rail so as to form a continuous line of rails at such point, said means consisting of a rod, means for moving said rod, a plate secured to the



rod, and means on said rail engaged by said plate for moving the rail from one position to another, after the plate has started to move.

6. A railroad frog or switch having a movable rail at the point of divergence of the rails, means connected thereto for moving the rail so as to form a continuous line of rails at such point, a plate secured to said means, and means on the rail adapted to engage said means for moving the rail from one position to another.

7. A railroad frog or switch having a movable rail at the point of divergence of the rails, means connected thereto for moving the rail so as to form a continuous line of rails at such point, said means consisting of a rod, a plate secured thereto, holes in said plate and means on the rail for engaging the holes in the plate for moving the rail after the said plate is moved.

8. A railroad frog or switch having a movable rail at the point of divergence of the rails, means connected thereto for moving the rail so as to form a continuous line of rails at such point, said means consisting of a rod, a plate thereon, and means engaged thereby for moving said rail, in combination with a locking device on the movable rail for holding said rail in alined position.

9. A railroad frog or switch having a movable rail at the point of divergence of the rails, means connected thereto for moving the rail so as to form a continuous line of rails at such point, said means comprising a rod, a plate thereon, and means on the rail engaged thereby for moving said rail, in combination with a locking device comprising a bracing-block secured to the ties of the track, and means connected to the movable rail for engaging the same.

10. A railroad frog or switch having a movable rail at the point of divergence of the rails, means connected thereto for moving the rail so as to form a continuous line of rails at such point, in combination with a locking device for holding the rail when in alined position, said locking device comprising blocks secured to the ties of the track and pivoted braces for engaging said blocks when in alined position.

11. A railroad frog or switch comprising stationary rails of the main track and side track, a movable rail of the track at the point of divergence of the rails, means connected with said movable rail for moving the same so as to form a continuous line of rails at said point, a plate secured to said movable rail operated by said means, and a locking device on the movable rail for holding said rail when in alined position.

12. A railroad frog or switch comprising stationary rails of the main track and side track, a movable rail of the track at the point of divergence of the rails, means for moving said rail so as to form a continuous line of

rails at said point, and a plate secured to said moving means, in combination with levers secured to the rail, engaged by said plate, a bar connected with said levers and locking means operated by said bar for holding the rail in alined position.

13. A railroad frog or switch comprising stationary rails of the main track and side track, a movable rail of the track at the point of divergence of the rails, means for moving said rail so as to form a continuous line of rails at such point, and a plate secured to said means in combination with a locking device, said device comprising a bar mounted in bearings secured to said movable rail, levers on said bar adapted to be engaged by said plate, brace-bars on said bar, and blocks secured to the ties of the track against which said brace-bars abut.

14. A railroad frog or switch having a movable rail at the point of divergence of the rails, means connected thereto for moving the rail so as to form a continuous line of rails at such point, in combination with means to guide and limit the movement of the rail, said means comprising ordinary fish-plates extending beyond the ends of the stationary rails, and a plurality of curved bolts connecting said extending fish-plates and passing through holes in said movable rail.

15. A railroad-switch having movable rails near the point of divergence of the tracks to form a continuous line of rails at such point, in combination with a movable-rail frog consisting of a rail-section adapted to move about a central point between the terminals of the intersecting rails, and pivoted locking-braces connected with the movable rail of said frog and the movable rail of said switch for locking said rails in alined position, and means for operating said frog-rail and switch-rails simultaneously.

16. A railroad-switch having means connected to the approaching rails near the point of divergence of the tracks for moving the rails so as to form a continuous line of rail at such point, in combination with a movable-rail frog consisting of a rail-section adapted to move about a central point between the terminals of the intersecting rails so as to form a continuous line of rail at such point, said rail-section having pivoted locking-braces connected therewith for locking the same in alined position and means for operating said movable frog-rail on movement of the switch-rails.

17. A railroad-switch having means connected to the approaching rails of the main track near the point of divergence of the side track for moving the rails so as to form a continuous line of rails at such point, and means consisting of a rod passing beneath the rails, sleeves on said rod, and bolts passing through said sleeves and secured to the movable rails,



in combination with a movable-rail frog and means for operating said frog simultaneously with said switch.

5 18. A railroad-frog comprising stationary rails and a movable rail and means for moving the latter, in combination with means for limiting the movement of said rail, comprising ordinary fish-plates extending beyond the ends of said stationary rails, a wedge-shaped filler-block between the rails, and  
10 bolts connecting said rails, which pass through said filler-block.

15 19. A railroad-frog having a movable rail at the point of intersection of the main track and side track so as to form a continuous line of rails at such point, said movable rail having a central pivot-point about which it turns, said pivot having parts of different diameter, the large part mounted in said movable rail.

20 20. A railroad-frog having a movable rail at the point of intersection of the main track and side track so as to form a continuous line of rails at such point, said movable rail having a central pivot-point about which it turns,  
25 said pivot-point mounted in the base of said movable rail and having holes on each side of the web of the rail whereby said pivot may be oiled.

30 21. A railroad-frog having a movable rail at the point of intersection of the main track

and side track so as to form a continuous line of rails at such point, a pivot removably mounted in the under side of said movable rail, and a plate beneath the frog having a hole therein in which said pivot bears.

35 22. A railroad-frog having a movable rail at the point of intersection of the main track and side track so as to form a continuous line of rails at such point, said movable rail having a pivot removably mounted in the under side thereof about which it turns, a plate beneath the frog and ordinary fish-plates for holding the pivoted rail against lateral displacement.

40 23. A railroad-frog having a movable rail at the point of intersection of the main track and side track so as to form a continuous line of rails at such point, said rail having means to prevent longitudinal motion and locking means to prevent lateral motion, said latter  
45 means comprising a pivoted brace-bar on each side of the rail, and a block against which said brace-bar abuts.

In testimony whereof I have signed my name to this specification in the presence of  
50 two subscribing witnesses.

FRANKLIN H. SHAKESPEARE.

Witnesses:

GEORGE E. MINER,  
PAUL H. BLAIR.