United States Patent

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[54] **MODEL RAILWAY SWITCH ASSEMBLY**
6 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **246/415**
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[50] **Field of Search** ..... 46/1, 216; 238/10 (D); 104/60; 246/415 (A); 238/10; 246/415

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ABSTRACT: A model switch assembly is provided of the kind in which the switch includes blades or rails depended upon both (a) for controlling which of two track forks a locomotive or train will be delivered onto from a main track section, and (b) for delivering electrical energy selectively to the track forks and through the track forks to operating instrumentalities on the locomotive and/or the cars.

Firm but yielding conductive pressure of both ends of either switch blade with cooperative rails is assured by providing a switch pivot which is normally biased to a datum position, but which can yield. With this arrangement, when one end of a switch blade is closed on a rail, that does not block the closing of the opposite end of the blade nor the keeping of it pressed firmly and dependably on the rail with which it is designed to cooperate.

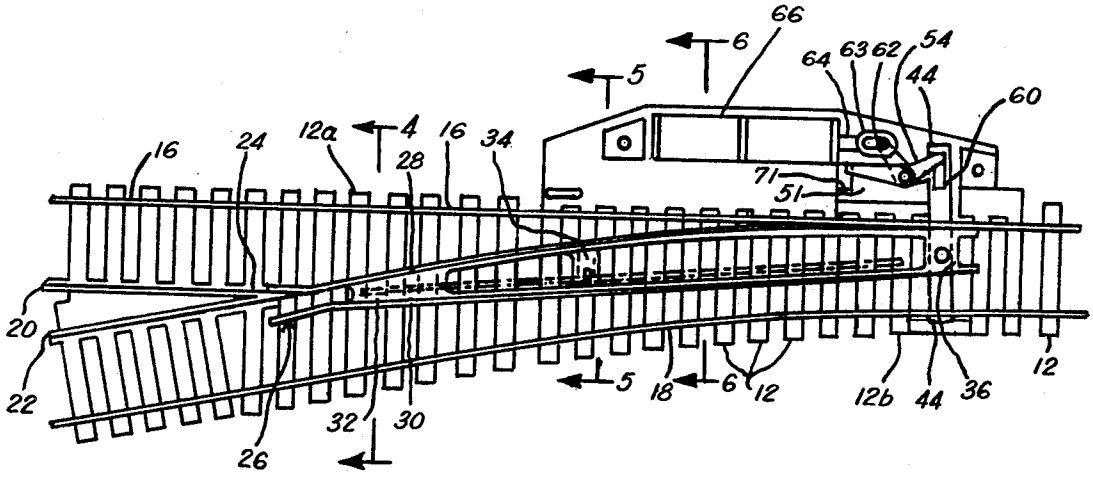


FIG. 2

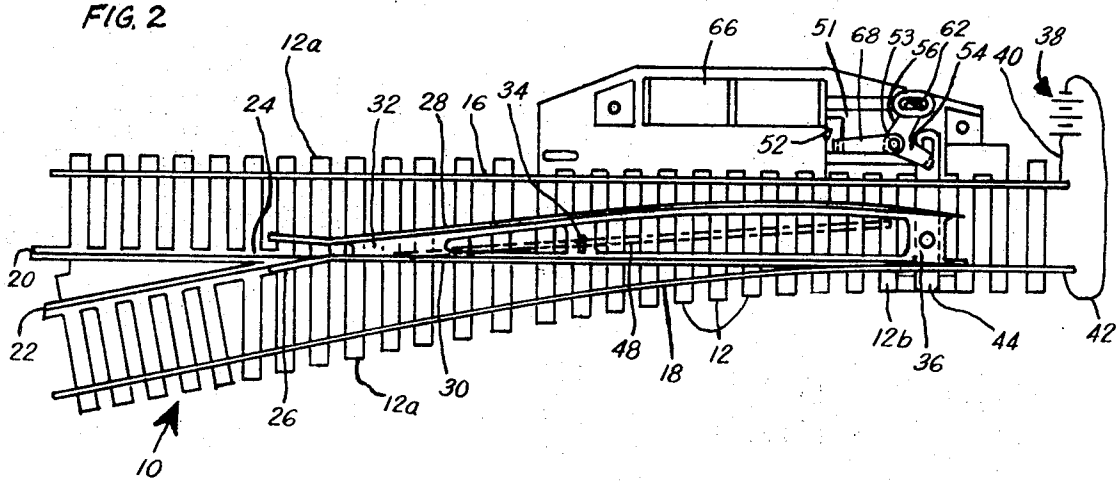


FIG. 1

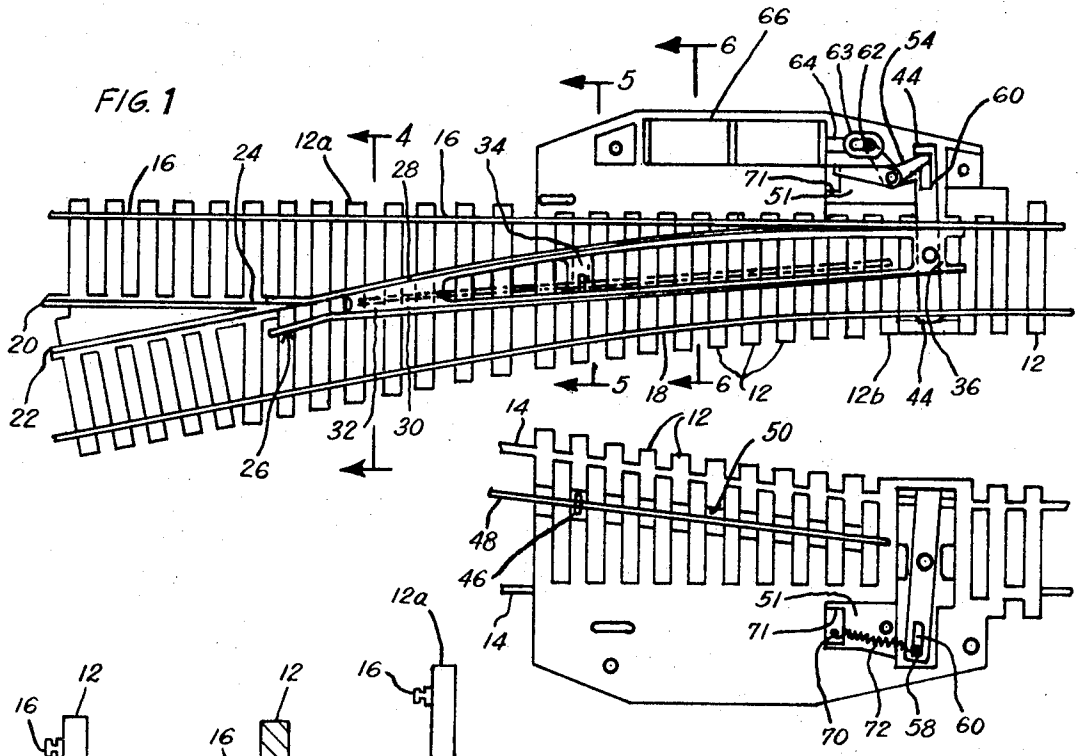


FIG. 3

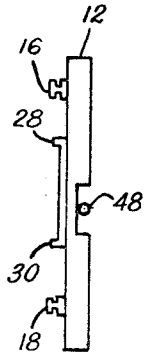


FIG. 6

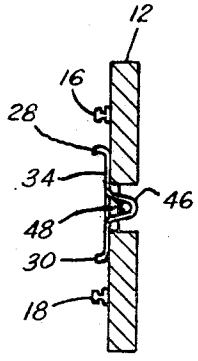


FIG 5

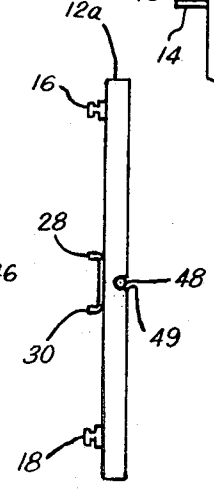


FIG. 4

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MODEL RAILWAY SWITCH ASSEMBLY

This invention relates to model railroad equipment, and more particularly to track switches.

In model railroading the two rails of a track are commonly connected to the opposite terminals of a battery or transformer, so that current may be provided through the rails for operating the motor of the locomotive, and other instrumentalities carried on the locomotive and on the cars.

Where a track is forked or branched, to provide a siding or spur for example, the right-hand rail of the main track may extend continuously through to provide the right-hand rail of the right fork, and the left-hand rail of the main track may extend continuously through to form the left-hand rail of the left fork. The remaining fixed rail structure starts with a frog and includes branches which form, respectively, the left-hand rail of the right fork and the right-hand rail of the left fork.

The switch structure includes two switch blade or rail members, operable as a unit between two position. In the first of these positions the first of the blade members directs the right-hand wheels of the locomotive and cars from the right-hand main rail onto the frog and thence onto the right-hand rail of the left fork, while the second switch blade member is mechanically ineffective. The first switch blade member serves at the same time to connect the right-hand rail of the main track electrically to the frog, and through the frog to the right-hand rail of the left fork.

In the second operating position of the switch, the second switch blade member directs the left-hand wheels of the locomotive and cars from the left-hand main rail onto the frog and thence onto the left-hand rail of the right fork, while the first switch blade member is mechanically ineffective. The second switch blade member serves at the same time to connect the left-hand rail of the main track electrically to the frog, and through the frog to the left-hand rail of the right fork.

It has been common practice in the past to mount the switch on a fixed pivot and to swing it back and forth about the pivot through direct manual control, or through remote electrical control, of a spring toggle actuator. If the switch parts are made with sufficient precision to cause the switch to close firmly and simultaneously at its opposite ends in each of its operating positions, the operation can be reasonably satisfactory for a time, both mechanically and electrically, for movement of the trains from the main track to and along either fork, or from either fork to and along the main track.

The required precision, however, is difficult of attainment, because the active switch blade member should press firmly at its opposite ends against the frog and against the rail with which it cooperates. Since the ends of the switch blade members are gradually tapered to points, and are necessarily of light construction, they can readily become deformed accidentally. The mounting of the assembly on a curved or sloping surface can distort the parts, and can disturb the desired relationships. A very slight error of construction, or deformation, can result in switch splitting, derailments, or the rendering of one fork, or both, electrically inoperative.

It is the primary object of the present invention to obviate the drawbacks referred to. To these ends, the switch pivot is yieldingly biased to a datum position by a force which is substantial, yet so light that the pivot can be displaced laterally by the toggle spring to permit complete closing at both switch ends when, without such yielding, the closing of one switch end would necessarily preclude dependable, operative closing of the other end.

Other objects and advantages will hereinafter appear.

In the drawing forming part of this specification:

FIG. 1 is a fragmentary plan view of a forked track assembly in which a practical and advantageous embodiment of the invention is included, the switch structure being shown in one of its two possible operating conditions;

FIG. 2 is a view similar to FIG. 1 but showing the switch structure in the other of its two possible operating positions;

FIG. 3 is a fragmentary back view of the assembly of FIGS. 1 and 2, with the parts in the positions of FIG. 1;

FIG. 4 is a sectional view, on a considerably larger scale than FIGS. 1 to 3, the section being taken on the line 4–4 of FIG. 1, looking in the direction of the arrows;

FIG. 5 is a sectional view on the scale of FIG. 4, taken on the line 5–5 of FIG. 1, looking in the direction of the arrows; and

FIG. 6 is a sectional view on the scale of FIG. 4, taken on the line 6–6 of FIG. 1, looking in the direction of the arrows.

In FIGS. 1 to 6 an illustrative forked track assembly is shown generally and in detail, which embodies practical and advantageous features of the invention. The structure actually shown is a unitary piece of equipment adapted for assembly with other pieces for making up a complete model railroad.

The illustrative structure comprises a one-piece road bed 10 consisting of crossties 12 and longitudinally extending members 14 which connect the crossties 10 to one another. The members 14 lie directly beneath the rails and are concealed by the rails in FIGS. 1 and 2, but are shown in FIG. 3.

Rails 16, 18, 20 and 22 directly overlie members 14, and are fixedly interlocked with them. The combined track and road bed form a generally rigid structure of limited but practical strength. The rail 16 forms a segment of the right-hand rail of a first or main track section, and continues through a point of branching to form the right-hand rail of a right track fork. The rail 18 runs parallel to the rail 16 to form a segment of the left-hand rail of the first or main track section, but diverges from the rail 16 and continues through the point of branching to form a segment of the left-hand rail of a left track fork. The tracks 20 and 22 form branches of a frog 24. The track 20 forms a segment of the left-hand rail of the right fork, and the track 22 forms a segment of the right-hand track of the left fork.

Between the diverging portions of rails 16 and 18, there is interposed a switch 26 which consists of right-hand and left-hand switch blades or rails 28 and 30, and blade connecting webs 32, 34 and 36.

The switch 26 rests on the rail bed. It is adapted to be swung counterclockwise to the position shown in FIG. 1. In this condition of the switch the blade 30 is idle, both mechanically and electrically, but the blade 28 serves both to guide the wheels of the locomotive and cars to or from the left track fork, and to connect the right track 16 electrically with the frog 24. The tapered end of the blade 28 remote from the frog 24 is pressed firmly against the left face of the rail 16, and the opposite end of the switch blade 28 is pressed firmly against the right face of the frog 24.

The switch 26 may be swung clockwise to the position shown in FIG. 2. In this condition of the switch the blade 28 is idle, both mechanically and electrically, but the blade 30 severs both to guide the wheels of the locomotive and the cars to and from the right track fork, and to connect the left track 18 electrically with the frog 24.

Operating current is furnished through the rails to the locomotive motor and to other electrically operated instrumentalities carried by the locomotive and the cars. Any suitable source of electrical energy may be provided, a battery 38 being shown as having one terminal connected through conductor 40 to rail 16, and the opposite terminal connected through conductor 42 to rail 18.

A switch operator 44, adapted to be shifted back and forth transversely of the main track section, is pivotally connected to the switch 26 through web 36, the web 36 being located at the end of the switch remote from the frog.

As thus far described, if the switch web 34 were connected to the fixed and rigid track bed through a fixed pivot, the construction would be purely conventional. In that event, engagement of the switch blade 28 with either the frog 24 or the rail 16 before the other would positively block further closing movement of the blade 28 and would thereby block all possibility of completing the electrical connection between the rail 16 and the frog, and all possibility of rendering the left fork operative.

Similarly, engagement of the switch blade 30 with either the frog 24 or the rail 18 before the other would positively block

further closing movement of the blade 30, thereby blocking all possibility of completing the electrical connection between the rail 18 and the frog, and all possibility of rendering the right fork operative.

The present invention, however, is characterized by the fact that the switch pivot is not positively fixed, but is merely biased toward a datum position, and can bend and yield laterally of the track when one end of the switch is blocked, to permit the firm closing of the other end of the switch also.

To this end, the web 34 is formed with a depressed, channel forming, central portion 46 which extends downward nearly, but not quite, to the plane of the bottom of the road bed. The channel forming portion 46 is adapted to receive loosely a resilient, longitudinally extending wire 48. The ends of the spring wire 48 are received in notches 49 formed in the lower faces of crossties 12*a* and 12*b*, having light pressed fits in said notches, and all the crossties between 12*a* and 12*b* have channels 50 formed in their lower faces for accommodating the wire without interfering with lateral movement of the wire relative to the track bed.

In assembling the wire 48 with the track bed and the switch, the switch is first put into place with the track bed and switch inverted. The leading end of the wire 48 is then threaded through the channel forming portion 46 of the web 34 and fixed in the notch of crosstie 12*a* for anchorage, after which the trailing end of wire 48 is allowed to slip into the notch of crosstie 12*b* for anchorage. With this arrangement, the channel in web 34 is wide enough to permit limited pivoting of the switch without disturbance of the wire, but when the active switch member engages the frog, the wire can yield through flexure, permitting further movement of the free end of the switch to closed condition.

It is a feature that the end of the switch remote from the operator is arrested before the stroke of the switch operator is completed. The yieldable pivot, however, enables the switch to be pressed closed at the opposite end.

It will be noted that the spring wire 48 serves the additional function of retaining the switch in operative association with the track and track bed.

It is not broadly novel to provide a spring toggle actuator for a railroad switch, but with the present switch the spring toggle actuator performs a function which it could not perform before, namely the providing of firm spring pressure simultaneously between a conductive switch member and a frog on the one hand, and between the same conductive switch member and an electrically energized rail on the other. A spring toggle operator is, therefore, an important element of the present combination.

A plate 51, mounted marginally on the upper face of the track bed over a cutout 52, serves through a eyelet 53 to provide pivotal support for a bellcrank lever 54—56. The output arm 54 of the bellcrank has a downturned finger 58 which is received in a slot 60 of the transversely slidable switch operator 44. The input arm 56 of the bellcrank has an upturned finger 62 which is received in a slot 63 of a longitudinally extending push-pull bar 64 that runs lengthwise of the track. The bellcrank can be operated to-and-fro by direct manual engagement of the finger 62, or by manually moving the bar 64 in either direction along the track. Most desirably, however, the bar 64 constitutes the movable member or armature of a two-coil solenoid 66 which may be selectively operated to shift the bar in opposite directions form a remote control station.

The eyelet 53 also provides pivotal support for a spring anchoring arm 68 which has a downturned finger 70 at its end remote from the finger 58 of the bell crank arm 54. The finger 70 plays in a notch 71, of the plate 51, being limited to extreme positions by shoulders which form the notch boundaries. A tension coil spring 72 connects the finger 58 with the finger 70. As the bellcrank is swung in either direction to change the position of the switch, the spring 72 is displaced by the finger 58 across dead center; i.e., across the axis of the bellcrank. This immediately causes the bellcrank and the arm 68 to spring over to the opposite extreme positions from those in which they were originally retained. The described movement of the bell crank produces reversal of the switch. As the switch is reversed the switch member which is being made active first engages the frog and is arrested by it. This does not arrest the switch, however, because the switch pivot is made free to shift through flexure of the wire 48. The wire ends are free to shift longitudinally to a limited degree, in the notches in which they are confined, so that further pivoting of the switch and bodily movement of the switch pivot do not depend upon stretching of the wire, but merely upon flexure of the wire. The coil spring 72 is strong enough to bend the wire, and so to press the switch member (which is being rendered active) into firm bearing relation with the appropriate rail.

In analyzing the action of the switch in either direction of operation, three fulcra must be taken into account. The action is the same for either operation of the switch, so it will be assumed that the switch is to be operated from the position of FIG. 1 to the position of FIG. 2.

Initially, both ends of the switch rail 30 are free and the switch turns about the pivot with the pivot maintained in its datum position by the spring wire 48 until the rail 30 makes contact with, and is blocked by, the frog, establishing a second fulcrum. With respect to this second fulcrum, the operator 44 has a decided mechanical advantage over the spring wire 48 which acts at the pivot point 34, and the spring wire 48 is flexed, opposing, but permitting, lateral displacement of the pivot as the movement continues.

Finally, the end of the switch rail 30 adjacent the operator 44 and remote from the frog engages the rail 18 and is blocked by the rail, thus establishing a third potential fulcrum. Up to this point the spring 72, through the operator 44, has been urging the switch clockwise. Now it may urge the switch counterclockwise about this third fulcrum, if the operator is connected to the switch between this third fulcrum and the pivot. The spring 48, acting at 34 has already been put under strain, however, and since it can be, and is, arranged to have a great mechanical advantage over the operator 44 with respect to the third fulcrum, it serves both to prevent separation of the rail 28 from the frog and to maintain a substantial and effective spring pressure between the rail 28 and the frog.

This is an unique mode of switch operation, the result being new and extremely advantageous both from an electrical and a mechanical point of view. The fact that the spring wire is put under strain by displacement from the datum position is essential to the realization of this result. A very substantial tolerance is acceptable.

Since the switch is yieldingly held in an assigned position by spring 72, the switch can be manually moved over to an abnormal position, but this will not carry the finger 58 across dead center. As soon as the manual pressure on the switch is relieved, therefore, the switch will snap back to the set position from which it was displaced.

We have described what we believe to be the best embodiments of our invention. We do not wish, however, to be confined to the embodiments shown, but what we desire to cover by letters patent is set forth in the appended claims.

We claim:

1. A model railroad forked track assembly comprising, in combination:

a. first and second principal rail members having parallel portions which form a main track section, but which diverge to form elements of two forked track sections, together with first and second auxiliary, frog-connected, divergent rail members which cooperate, respectively, with the first and second principal rail members to constitute, respectively, distinct alternatively active continuations of the main track section;

b. a rail bed supporting all of said rail members in fixed relation with one another;

c. a switch unit which includes alternatively active, side by side, first and second wheel bearing rail members, interposed between the main track section portions of the

principal rail members and the forked sections, and operable between opposite extreme positions in the first of which the first rail member of the switch bears firmly in wheel sustaining and guiding relation at its opposite ends, respectively, with the first principal rail member and the frog, and in the other of which the second rail member of the switch bears firmly in wheel sustaining and guiding relation at its opposite ends, respectively, with the second principal rail member and the frog;

d. a yieldable switch operator movable laterally of the track and connected to the switch near one extremity thereof, for placing the main track section selectively in communication with one or the other of the forked sections through a pivotal action of the switch;

e. a yieldable actuator for urging the switch operator toward either of two opposite extreme positions;

f. spring means providing an intermediate floating pivot for the switch, said pivot-providing spring means being constructed and arranged constantly to urge the switch pivot to a definite datum position, and serving to maintain the pivot in that position so long as both ends of the switch are free; and

the construction and arrangement being such that in any switch shifting operation the end of the switch remote from the switch operator will always be first closed and blocked against further movement, the pivot providing spring means will then yield laterally through resilient deformation sufficiently to permit the switch end adjacent the operator to be fully and firmly closed, while resiliently urging the first closed switch end to its closed position and maintaining it there.

2. A model railroad forked track assembly as set forth in claim 1 in which the yieldable actuator for the switch operator is a spring toggle actuator adapted when it has been moved from either extreme position across dead center to urge the operator toward the opposite extreme position.

3. A model railroad forked track assembly as set forth in claim 2 which further includes:

g. a source of electrical energy; and

h. means connecting opposite terminals of said source to the respective rails which form the first track section, and in which said rails are selectively connected to the remaining rails of the forked sections through the switch, as required by the setting of the switch.

4. A model railroad forked track assembly as set forth in claim 1 in which the means providing intermediate pivotal support for the switch consists of a resilient length of wire having its ends confined and fixed against lateral movement by the track bed, the wire and the switch being connected to one another with limited freedom for relative pivotal movement.

5. A model railroad forked track assembly as set forth in claim 4 in which the switch is supported on the track bed between the rails of the first section and the wire is disposed beneath the track bed, the switch having a wire receiving eye portion which extends down below the track bed, the construction and arrangement being such that the switch is retained in operative relation to the track bed chiefly, at least, by the wire.

6. A model railroad forked track assembly as set forth in claim 5 in which at least one end of the wire has freedom to shift longitudinally as the wire bends, so that lateral displacement of the switch pivot demands flexure of the wire but no stretching of the wire.