Aug. 20, 1935. A. G. DAVIS 2,011,798

RAIL SWITCH

Filed April 8, 1932 2 Sheets-Sheet 1

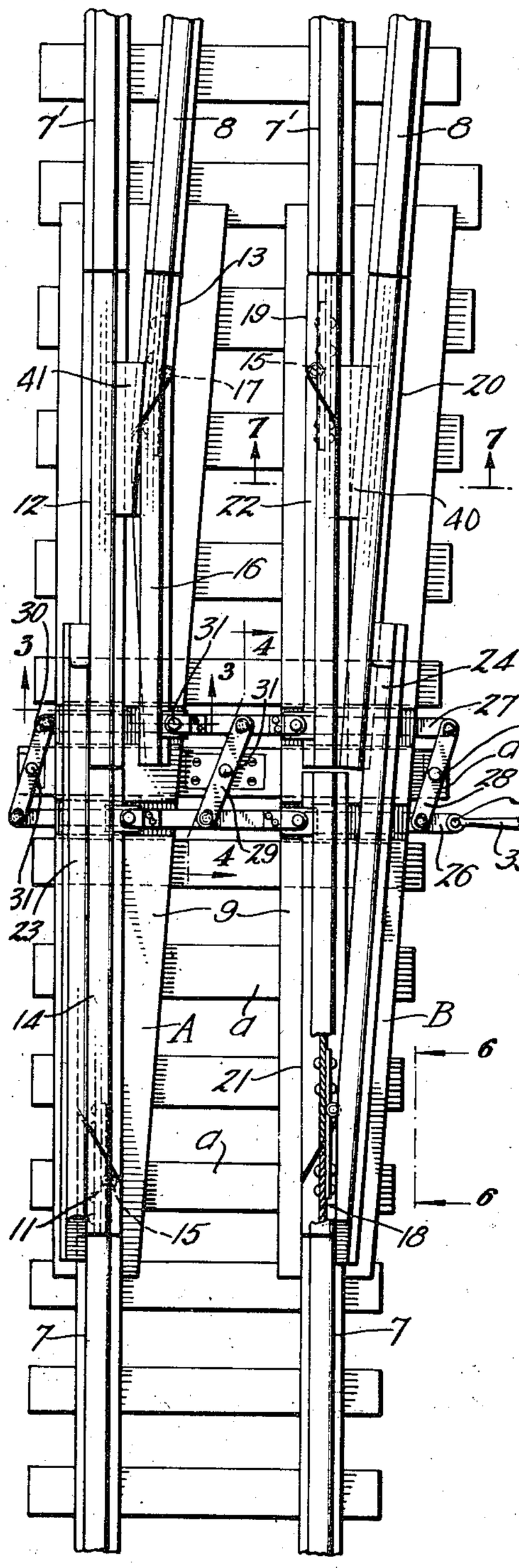

Fig. 1

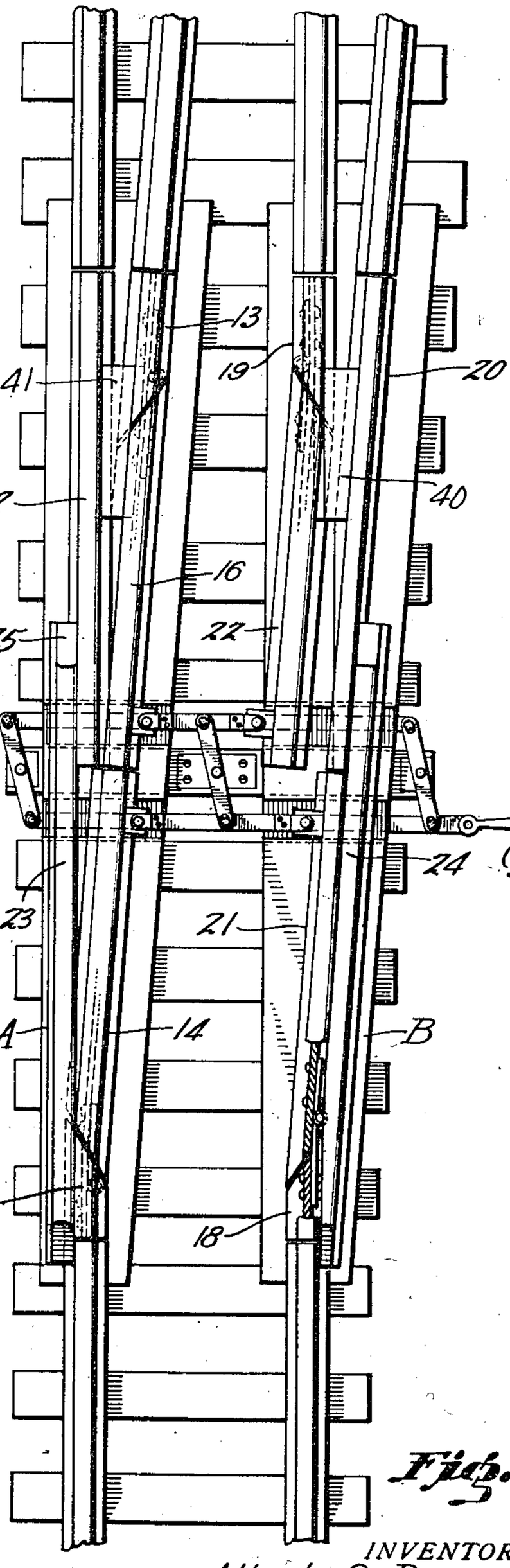

Fig. 2

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Fig. 3

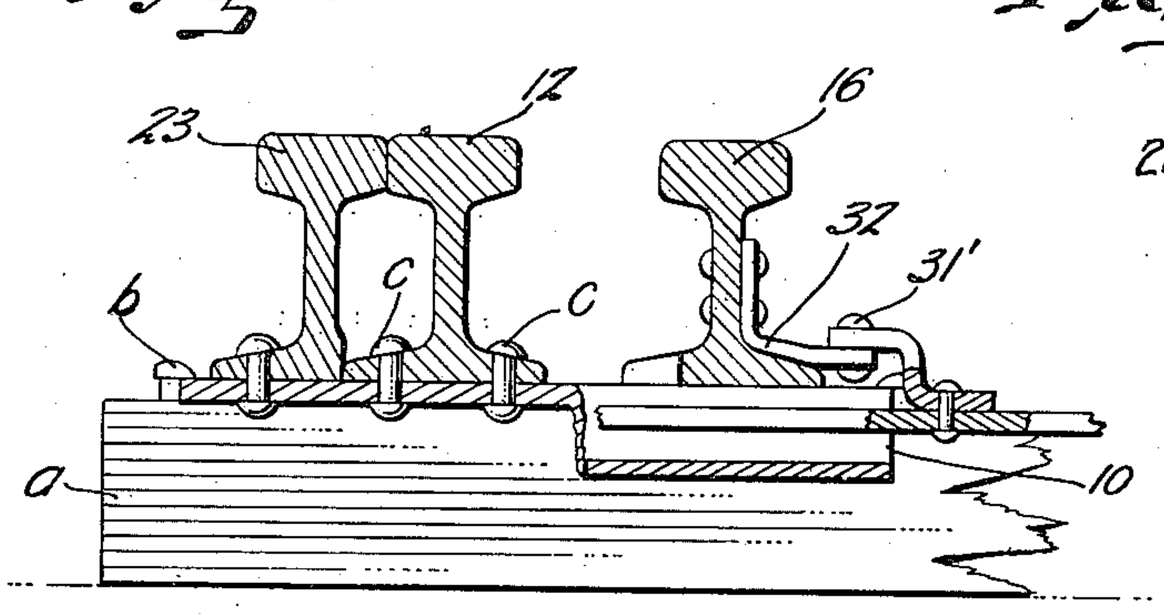


Fig. 7

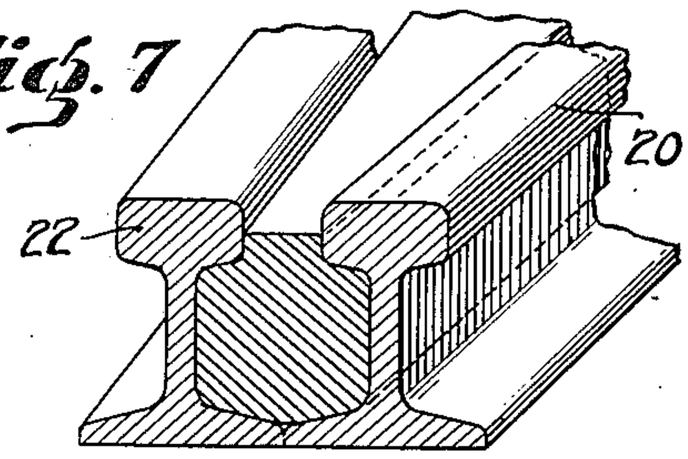


Fig. 4

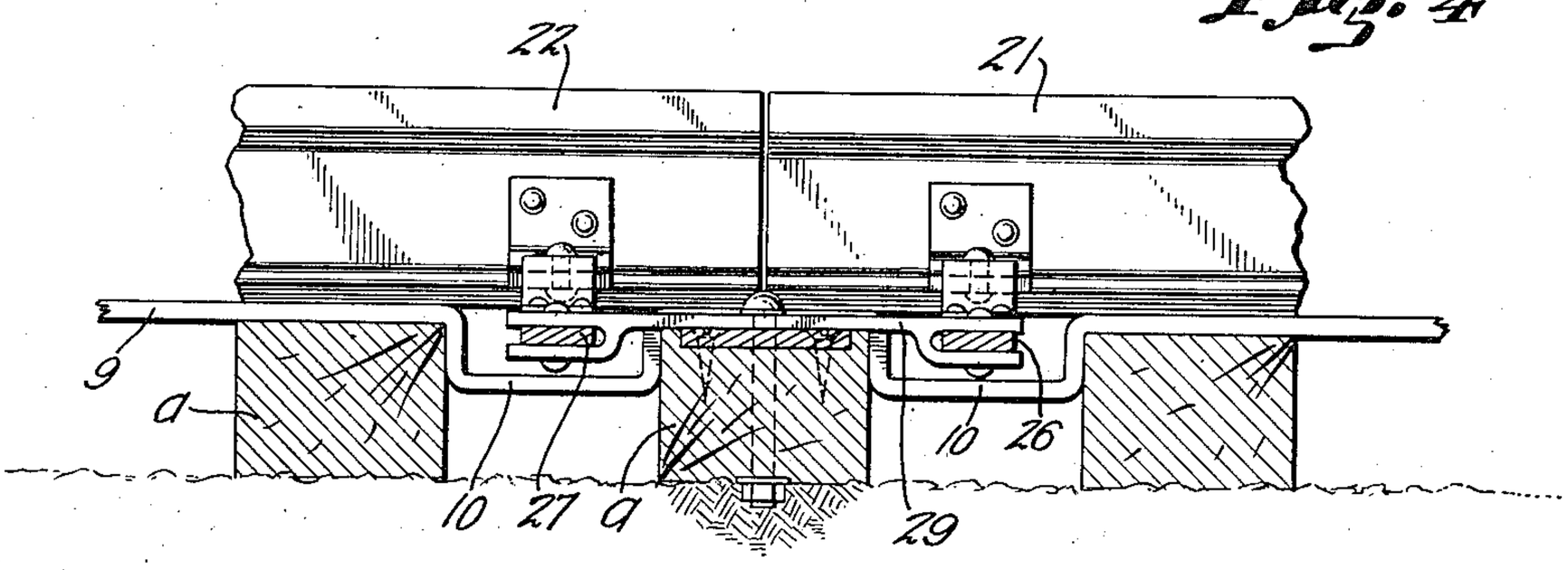


Fig. 5

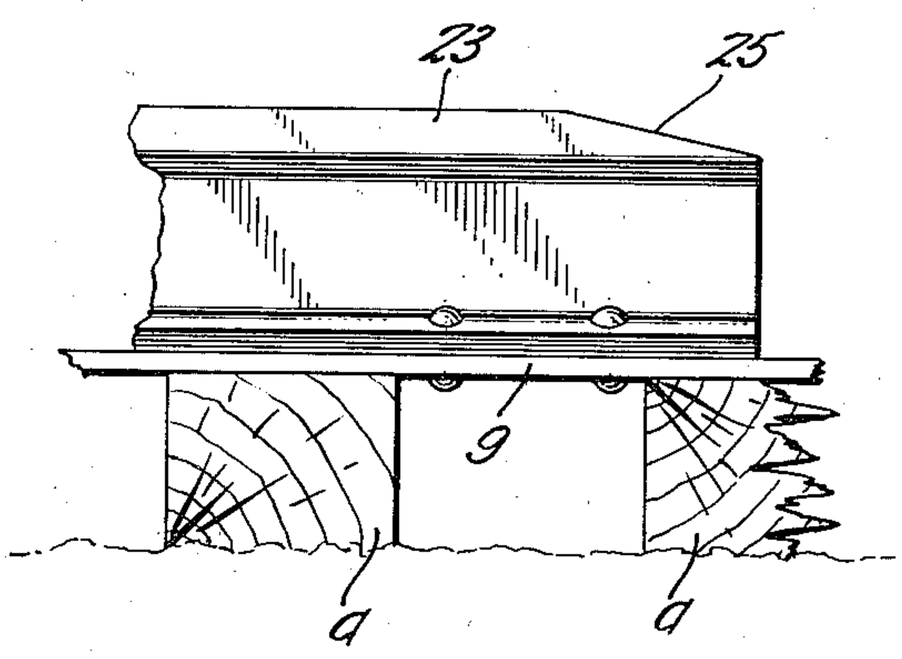
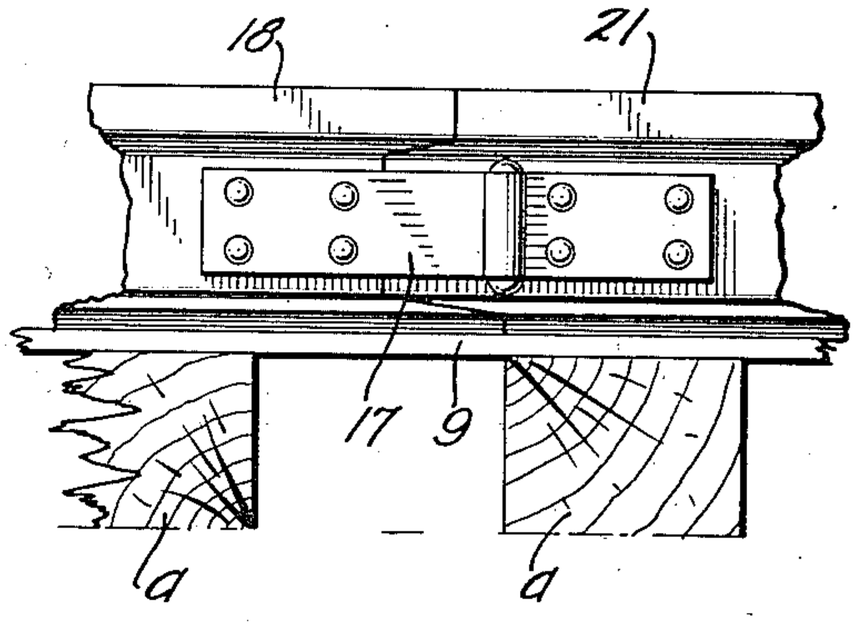


Fig. 6



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UNITED STATES PATENT OFFICE

2,011,798

RAIL SWITCH

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Application April 8, 1932, Serial No. 603,923

9 Claims. (Cl. 246—446)

My invention relates to railway switches and has for its principal object the provision of a switch which is free from the defects of switches now in substantially universal use.

Practically all switches now in use upon the railroads of this country are of the knife blade or point type, in which a pair of long tapering rail members are used. Each of such members is ordinarily about sixteen feet in length. One end of such member is of the same cross section as the track rails, and is fixedly mounted. This rail member is cut so as to taper gradually to a very thin edge at its free end, and such end is movable toward and away from the main track rail for a distance which is ordinarily about five inches. Such tapered rails are known as points and the switch itself as a point or knife blade switch.

In practical use point switches are very unsatisfactory for the following reasons:

They are expensive to produce because they consist of a large number of parts which must be made by special equipment not found in an ordinary machine shop. The cutting of rails to form the switch points is an expensive operation.

The life of the switch points is short. The thin ends wear rapidly by reason of their small cross section and frequent renewals are necessary.

The installation of a point switch and the renewal of worn points is expensive by reason of the time necessarily consumed in such operations.

The points easily become bent or damaged and cause the derailment of trains. For example, if the switch points are thrown to permit movement of a train from the main track to a side track, one of the points is held against a main track rail. In case a car should be backed down the main track in the direction opposite to that of the train to be switched, the wheel flanges will pass between the main track rail and the switch point and bend the latter, whereby it becomes permanently bent or misshaped and the head rod by which the points are operated may also become bent at the same time. After this has occurred the switch point cannot be thrown close enough to the main track rail to function properly to permit a train to move on either the main or the side track, but may permit some of the wheels to move along the main track while others are diverted by the switch point and derailment of the train ensues.

Switch points are easily rendered inoperative by ice and snow and must be kept free from same at considerable expense.

According to my invention, tapered or knife blade switch points are done away with and the diversion of traffic from main to side track effected by means of movable track members of large cross-sectional area, preferably equal to that of the main line rails. Furthermore, instead of using one track member for connecting each main rail with a side track rail, I combine with the main and side track rails pairs of oppositely movable pivotal track members and thereby secure the desired connection by a lateral movement of the free ends of the movable track members, which movement is only one half as great as is necessary when a single movable rail member is used. Means are also provided for simultaneous operation of both members of each pair, one of such members being moved in one direction while the other member is being moved in the opposite direction, the pair of track members being thereupon brought into or out of alignment with each other.

It has been proposed heretofore to make use of oppositely disposed pivotal track members movable into and out of alignment with each other in order that each may have only about one half the necessary throw of a single pivotal track member, but all such prior structures have been defective and incapable of practical use for railroad service because the sum of the distances traversed by the free ends of the alignable pivotal members has been equal to the track width, or in other words each of such pivotal members must be movable back and forth a distance equal to substantially one-half of the track width. According to the present invention the free end of a pivotal member needs to be moved a distance only about equal to the width of a rail, or even a rail head, for example, 2½ inches.

My invention has an additional advantage in that, by reason of the small throw of the pivotal members, all of the fixed and movable track members for one side of the track may be permanently mounted on a base or bed plate of small dimensions, both longitudinal, and lateral, thereby forming a switch unit of suitable size for manual handling, and such bed plate is provided or formed with means for engagement with an ordinary tie to prevent any possibility of longitudinal shifting of the switch unit, such means also serving to increase the lateral stiffness of the bed plate.

My invention also comprises connecting seat rails mounted exterior to the main and side track

rails in lateral alignment with the free ends of the movable track members, said seat rails forming abutments for limiting the outward movement of said members as well as preventing any chance of the spreading of the fixed rails and also preferably serving to protect the free and pivoted ends of the movable track members against undue wear, as will be shown.

Various other details are included within the scope of my invention, which will be fully described and defined in the accompanying claims. Reference is hereby made to the accompanying drawings of which—

Fig. 1 is a plan view of a railway switch constructed in accordance with my invention and in closed position for permitting passage of traffic on the main line.

Fig. 2 is a similar view of the switch of Fig. 1 in open position to permit passage of traffic from the main line to a spur or side track.

Fig. 3 is an enlarged section on line 3—3 of Fig. 1.

Fig. 4 is an enlarged section on line 4—4 of Fig. 1.

Fig. 5 is an enlarged side elevation along the line 5—5 of Fig. 2.

Fig. 6 is an enlarged side elevation along the line 6—6 of Fig. 1, and

Fig. 7 is an enlarged section on line 7—7 of Fig. 1.

In the structure illustrated, the main track rails 7 are separated from the main track rails 7' and branch or side track rails 8 by gaps which are closed by switch units A and B. The unit A comprises a bed plate 9 of heavy sheet metal which is secured to the ties *a* in the usual manner by spikes *b*, Fig. 3. The plate 9 is preferably formed with a pair of transverse depressions 10, which form channels for receiving certain parts of the switch operating mechanism and also for increasing the lateral stiffness of the plate. The depressions 10 are fitted to the ties *a* as shown in Fig. 4 and the plate 9 is thereby held against all possibility of longitudinal shifting.

Fixed main-track members 11 and 12, and branch-track member 13, are secured to the plate 9 by rivets *c*, Fig. 3, the member 13 being in close proximity to the inner side or surface of the member 12, that is, the surface which is interior to the two rail lines which form the main track. The ends of the main-track rails 7, 7' and branch-track rail 8 are secured respectively to the track members 11, 12 and 13 by the usual fish plates or other suitable means.

Movable track members 14 and 16 are hinged respectively to the fixed track members 11 and 13 by any suitable means, as for example, the hinge means disclosed and claimed in U. S. Patent No. 1,751,105, granted to me on June 3, 1930, or by bent plate strap hinges 15 and 17 respectively which are of ordinary construction and similar to the hinge 17 of Fig. 6. The plates of said hinges are riveted respectively to the webs of said members 14 and 11, 16 and 13.

The switch unit B comprises a bed plate 9 similar to that of unit A and secured in proper position in a manner similar to that previously described. Fixed main-track members 18, 19 and branch-track member 20 are riveted to the plate 9, the member 20 being in close proximity to the outer side or surface of the member 19, that is, the surface which is exterior to the two rail lines of the main track. The ends of the rails 7, 7' and 8 are respectively secured to the members 18, 19 and 20.

A movable track member 21 is hinged to the fixed track member 18 by the hinge 17 as shown in Fig. 6. A movable track member 22 is hinged to the fixed track member 19 by the hinge 15 similar in construction to hinge 17. The plates of said hinges are riveted to the webs of the members to which they are applied. In order to give desirable lateral support to the movable track member 22 when in the position of Fig. 1, a heel block, 40, preferably of cast metal, is placed between the webs of the fixed track members 19 and 20 and bolted thereto as shown in Fig. 7. This heel block tapers, as shown in Fig. 1, so as to act as a lateral abutment or support for the movable track member 22 when moved from the position of Fig. 2 to that of Fig. 1. Similarly a heel block 41 is placed between the webs of the fixed track members 12 and 13 and bolted thereto, said heel block acting as lateral abutment for the movable track member 16 when moved from the position of Fig. 1 to that of Fig. 2.

The connecting seat rails 23 and 24 are riveted to the respective bed plates 9 in the positions shown. The seat rail 23 is in close proximity to the fixed track members 11 and 12 and exterior thereto as regards the two rail lines of the main track. The movable track member 14 abuts against the seat rail 23 when in the position of Fig. 1 whereby the seat rail bridges the gaps between the movable member 14 and the fixed members 11 and 12. Similarly, the connecting seat rail 24 is close to the fixed track members 20 and 18 and exterior thereto as regards the two rail lines of the branch track. The movable track member 21 abuts against the seat rail when in the position of Fig. 2, whereby the seat rail bridges the gaps between the movable member 21 and the fixed members 20 and 18.

Each end of the seat rails 23 and 24 is beveled as shown at 25, Fig. 5. One of the base flanges of each of the seat rails is cut away as shown in Fig. 3 to permit the top flanges of the seat rails to contact respectively with the similar flanges of the track members 11, 12 and 14, and 18, 20 and 21 whereby their wheel-carrying area is laterally extended.

The switch operating mechanism comprises the rods 26 and 27 which are connected together by pivotal links 28, 29 and 30, the ends of each link being forked (Fig. 4) and connected to said rods by pin and slot connections. The links are freely rotatable upon vertical pins 31 secured by any suitable means to the tie *a*. The rod 27 is connected to the movable track member 16 by means of a pivot pin 31' which is mounted on a bracket 32, Fig. 3, the latter being riveted to the web of said member 16. There are similar connections between said rod 27 and the movable track member 22, and between the rod 26 and the movable track members 14 and 21. An operating link 33 is pivotally connected to one end of the rod 26 by a pin 34. The link 33 is connected to any well known switch stand for throwing and locking the switch, as will be understood.

It should be noted that the fixed end of each of the movable track members 14, 16, 21 and 22 is cut diagonally, that the adjacent end of the fixed track member to which it is hinged is similarly cut, and that the diagonal lines when extended, form the sides of a diamond shaped quadrilateral figure. The axes of the hinges of the members 14, 16 and 22 are interior to the tracks and substantially at the ends of the diag-

onal cuts, and the axis of the hinge of the member 21 is exterior to the track and substantially at the end of the diagonal cut. Such arrangement is very advantageous in practice as it causes the fixed track members to offer lateral support to the diagonal ends of the movable track members to resist spreading and to relieve the hinge pins of undue shearing stress.

There is substantially no gap between the diagonal ends of the fixed and movable track members of the main line track when the switch is closed. When open, the gap is ordinarily very small inasmuch as the movable track members may be approximately eight feet in length and the movement of their free ends two and one half inches, and about equal to the width of one of the fixed track members, as shown in Figs. 1 and 2.

The operation of the switch is as follows: The switch normally occupies the position shown in Fig. 1 which allows trains to run on the main line track in either direction. In order to permit a train to take the side or branch track, the link 33 and rod 25 are caused to move to the right. Such movement causes the pivotal track members 14 and 21 to move into the position of Fig. 2, the seat rail 24 serving as an abutment to limit the movement. At the same time the links 28, 29 and 30 turn on their pivots and cause the rod 27 together with the pivotal track members 15 and 22 to move to the left into the position of Fig. 2.

In closing the switch, a thrust is imparted to the link 33 and rod 25 to restore the parts to their initial position, the seat rail 23 acting as an abutment to limit the movement.

Among the advantages of my invention are the following:

The parts are few in number as compared to the standard point switch in common use. It may be manufactured at low cost for this reason and also because the track members may be easily made from ordinary rails by means of the ordinary machine shop equipment.

The device may be installed at very low cost because the bed plates 9 and members connected therewith may be of standard construction and assembled in the shop. In laying the rails of the main line and side track, a suitable gap is left to receive the two switch units A and B. These units may then be quickly inserted into the gaps and spiked to the ties. The installation of a point switch of standard construction requires much time and labor.

The life of this switch is many times greater than that of the point switch, because the movable track members are of ample cross section at every point and their free ends protected by the seat rails.

Spreading of the movable track members and shearing of the hinge pins are prevented by the arrangement of the diagonal cuts at the pivotal ends of said track members.

Spreading is further prevented by the riveting of the fixed track members to the bed plates, by the use of seat rail abutments 23 and 24, also riveted thereto, and by the use of heel blocks 40.

Lengthening or shortening of the gaps within which the pivotal track members swing is prevented by the use of the fixed track members 11, 12, 13, 18, 19 and 20, which are riveted to the bed plates 9.

The effect of running a car or train through this switch in the wrong direction on the main track while the switch is open would ordinarily be the derailment of the car or train. It would not bend a switch point so as to cause derailment of a later train running on the main line track in the proper direction to take the side track when the switch has been thrown to its open position.

It takes much less power to throw the present switch than the standard point switch, because in order to throw such a switch the point must be bent upward in order to clear the bottom flange of the main track rail and bring the point against the side of the rail tread, whereas no bending takes place in throwing the present switch.

By reason of its freedom from delicate or easily injured parts, this improved switch is of long life, requires few repairs and permits the running of heavy trains at high speed with minimum risk of accident.

I claim:

1. In a rail switch, two fixed track members in each rail line of the main track and separated by a gap, a fixed side-track member at one end of each of said gaps, and a pair of pivotal track members hinged to the fixed main track members at the other end of said gap, and movable to connect the last named main track members with either main or side track members, the adjacent ends of the pivotal members and the track members to which they are hinged being cut diagonally and fitted to each other in such manner that the diagonal portions of the fixed members are, with respect to the center of the track, exterior to the diagonal portions of the pivotal members.

2. In a rail switch, two fixed track members separated by a gap, a track member pivoted at one end of the gap and movable for closing and opening said gap, and a seat rail parallel to said fixed track members and having an upper surface at the same level as the upper surfaces of said fixed track members and said pivotal track member, and sufficiently close thereto to increase their wheel-carrying area when the pivotal track member is in gap-closing position, and to act as a lateral abutment thereto, said seat rail extending along the entire length of said pivotal track member and beyond each end thereof, and a rigid bed plate secured to both of the track members and to the seat rail.

3. The rail switch of claim 2 in which the rigid bed plate is provided with tie-engaging means.

4. In a rail switch, first and second fixed main-track members 18 and 19 in alignment with each other in the main-track line which is crossed by a branch track line, and separated by an elongated gap, a third fixed main-track member 11 in the other main track line and terminating at a point in substantial lateral alignment with the gap end of the main-track member 18 to form a gap end in its own track line, a fixed branch-track member 20 exterior to the rail lines of the main track, said branch-track member being in close proximity to the main-track member 19 and aligned with the main-track member 18 across an elongated gap, and two movable members 21 and 22 pivoted respectively at the gap ends of the main-track members 18 and 19, said pivotal members being movable in opposite directions about points near the center line of the main-track members 18 and 19 into one position in which one pivotal member closes the gap between the main-track member 18 and the fixed branch-track member 20, while the other pivotal member is in idle position with respect to all of the main and branch track members, and into a second position in which the two pivotal members are aligned to close the gap between the main-track members 18 and 19, the extent of movement of the free end of each pivotal member be-

ing about equal to the width of a track member.

5. The rail switch of claim 4 in which a seat rail is placed exterior to the rail lines of the main and branch tracks and alongside the pivotal track member 21 when in position for closing the gap in the branch track, the upper surface of the seat rail being at the same level as the upper surfaces of the pivotal and fixed track members 21, 18 and 20 and sufficiently close to the pivotal track member and adjacent end portions of the fixed main-track member 18 and fixed branch track member 20 to increase their wheel-carrying area.

6. In a rail switch, first and second fixed main-track members 11 and 12 in alignment with each other in one of the main-track lines and separated by an elongated gap, a third fixed main-track member 18 in the other main track line and terminating at a point in substantial lateral alignment with the gap end of the main-track member 11 to form a gap end in its own track line, a fixed branch-track member 13 interior to the rail lines of the main track, said branch-track member being in close proximity to the main-track member 12 and aligned with the main-track member 11 across an elongated gap, and two movable members 14 and 16 pivoted respectively at the gap ends of the main-track member 11 and branch-track member 13, said pivotal members being movable in opposite directions about points near the center lines of the main-track member 11 and branch-track member 13 into one position in which one pivotal member closes the gap between the main-track members 11 and 12, while the other pivotal member is in idle position with respect to all of the main and branch track members, and into a second position in which the two pivotal members are aligned to close the gap between the main-track member 11 and the fixed branch-track member 13, the extent of movement of the free end of each pivotal member being about equal to the width of a track member.

7. The rail switch of claim 6 in which a seat rail 23 is placed exterior to the rail lines of the main and branch tracks and alongside the pivotal track member 14 when in position for closing the gap in the main track, the upper surface of the seat rail being at the same level as the upper surfaces of the pivotal and fixed main-track members 14, 11 and 12, and sufficiently close to the pivotal track member and adjacent end portions of the fixed main-track members to increase their wheel-carrying area.

8. A rail switch comprising two aligned fixed track members in each rail line of the main track spaced apart to form switch gaps, one end of each gap being in lateral alignment with respect to the other, a fixed track member in each rail line of the branch track, one such branch-track member being exterior to the rail lines of the main track and in close proximity to one of said fixed main-track members of one rail line and in alignment with the other across a switch gap, and the other branch-track member being interior to said rail lines and in close proximity to one of said fixed main-track members of the other rail line and in alignment with the other across a switch gap, and means for closing and opening said switch gaps, each gap closing and opening means comprising two pivotal members movable about their axes to cause their free ends to move into and out of alignment with each other, the sum of the distances traversed by the free ends of two alignable pivotal members being much less than one-half the distance between the two rail lines of the track, and the arrangement of parts being such that when two pivotal members are out of alignment one of such pivotal members closes a gap in a line of track while the other pivotal member is idle and out of alignment with any of the lines of track, and when two pivotal members are in alignment they jointly close a gap in a line of track.

9. The combination of a rail switch unit comprising a bed plate provided with three fixed track members forming two switch gaps, and two track members movable in opposite directions to close and open said gaps, said bed plate being bent to form a pair of parallel transverse channels of substantial depth opening upwardly, three spaced cross ties between which said channels are closely fitted, and the adjacent walls of the two channels forming a downwardly opening channel within which the central one of such ties is fitted, and switch operating rods mounted in the upwardly opening channels.

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