A switch for a railway turnout or crossing.

The present invention relates to a rail switch for a rail turnout or crossing interposed at a junction between a set of rails said switch comprising a stock rail pivotally mounted such that one free end at least is moveable between at least two end positions wherein, at each end position, the stock rail is in line with a pair of opposed rails of said set of rails.
The present invention relates to railway lines and in particular switches which are used at rail turnouts and crossings to direct railway traffic.

Throughout the specification, the term "turnout" shall be taken to include right hand and left hand turnouts, symmetrical turnouts, tandem turnouts, free-throw turnouts, left hand or right hand tandem turnouts, similar flexure turnouts and the like, and the term "crossing" shall be taken to include all forms of junction and cross-overs.

According to conventional railway line construction practice, where it becomes necessary to have a turnout, a switch blade is used which is moved towards or way from a rail in order that the railway traffic may move over the switch blade and the railway line connected thereto or over the rail associated with the switch blade. Construction of such switch blades however requires the tapering of the end of the switch blade and the fabrication of the switch blade from a steel having the strength characteristics to withstand the load carried by the switch blade. In the event of the end of the switch blade being damaged, there is an increased possibility of a derailment and in order to prevent damage to a switch blade, it becomes necessary for railway traffic when approaching a switch to slow down in order not to place any excessive loads upon the mechanism of the turnout including the switch blade. Similarly, in relation to crossings, it is known to have
structures which are fixed and can allow for movement of rail traffic in several different directions across the crossing which requires the incorporation of spacings between the components of the crossing to allow for passage of the flanged wheels therebetween. As a result, the components located at such spacings must be formed of specialised forgings of high strength steel to withstand the loadings produced thereon by the rail traffic. In addition, on rail traffic approaching the crossing, it is necessary for that rail traffic to slow down and reduce the possibility of derailment and damage to the crossing structure.

The requirement of rail traffic to slow down when approaching a turnout or crossing results in increased costs to a rail-way operator particularly where the railway traffic involves heavy loads such as ore trains.

The present invention provides a turnout or crossing which can be negotiated by rail traffic with a reduced necessity for the traffic to slow down.

In one aspect of the present invention there is provided a rail switch for a rail turnout or crossing interposed at a junction between a set of rails, said switch comprising a stock rail pivotally mounted such that one free end at least is movable between at least two end positions wherein, at each end position, the stock rail is in line with a
pair of opposed rails of said set of rails.
The present invention will now be described, by way of example, with reference to the accompanying drawings in which:—

Figure 1 is a plan view of a dual stock rail crossing in accordance with one embodiment of the present invention;
Figure 2 is a vertical section along the line W-W of Figure 1;
Figure 3 is a vertical section along the line V-V of Figure 1;
Figure 4 is a plan view of a dual stock rail turnout in accordance with a further embodiment of the present invention;
Figure 5 is a vertical section along the line A-A of Figure 4;
Figure 6 is a vertical section along the line B-B of Figure 4;

and

Figure 7 is a plan view of a stock rail crossing in accordance with a still further embodiment of the present invention.

The embodiment of the present invention shown in Figures 1 to 3, is a dual stock rail crossing in which V- rail sections which are conventionally used in such crossings are removed and replaced by a switch 10. The switch 10 is interposed at a junction between a set of rails comprising two pairs of rails 12 and 14, to provide alternative communication therebetween.
The switch 10 comprises two straight lengths of stock rail 16 held in spaced, parallel relation by a set of heel blocks 18 located at spaced intervals along the length of the rails 18. The stock rails 16 are of full rail width and constant cross-section throughout their lengths. The pairs of stock rails 16 are connected together by "Huck" bolts passed through the rails 16 and the heel blocks 18. "Huck" bolts are in the nature of rivets.

Further, the pairs of adjacent rails 12 and 14 comprise insulated joints 20 which allow for expansion of the rails and electrically isolate the switch 10 from the remainder of the rail system.

The rail set comprises a main line 22 which has corresponding parallel rail portions in the pairs of rails 12 and 14 and a branch line 24 which also has corresponding parallel rail portions in the pairs of rails 12 and 14. The rails 10, 12, 14, 22 and 24 are mounted on steel sleepers or the like 26. Further, the components of the switch 10 are mounted on chair plates 28. As can be seen in Figure 2, an electrically insulating layer 30 is located between each chair plate 28 and its associated sleeper 26.

Further, each chair plate 28 is provided with a low friction, U.V. resistant bearing pad 32 of the type described and claimed in Australian Patent No. 534716. The bearing pads 32 are each of a width so as to provide a support for the stock rails 16 in all of their positions. Further, adjacent each end of each bearing pad 32 there is provided a wing bracket 34. The wing brackets 34 are so located to correspond with the extreme positions of the stock rails 16 so as to prevent
spreading of the track defined by the stock rails 16, in use. Further, the pairs of rails 12 and 14 are directly interconnected on each side of the switch 10 by an anti-expansion rail 36. The anti-expansion rails 36 are fixedly connected to the rail sets 12 and 14 and are mounted to the chair plates 28 by means of track clips 38. The anti-expansion rails 36 resist expansion or contraction of the rails 12 and 14 between the joints 20 so as to reduce variations in the gaps between the stock rails 16 and the pairs of rails 12 and 14. Typically, the said gaps are maintained at about 5mm.

The switch 10 is pivotally supported adjacent one end of the stock rails 16 on a pivot mounting 40. The pivot mounting 40 comprises, as can be seen in Figure 3, a base plate 42 having a central recess having mounted therein a correspondingly shaped pivoting table 44. A bushing 46 formed of, for example, low friction plastics material or brass is interposed between the base plate 42 and the pivoting table 44 and an electrically insulating layer 48 is located between the base plate 42 and the sleepers 26.

Further, the rails 16 are firmly attached to the pivoting table 44 such as by means of a plurality of set screws 50. A conventional point operating machine 52 is located adjacent the end of the switch 10 remote from the pivot mounting 40. The point operating machine 52 is connected to the rails 16 by an articulated linkage 54 of known type.

In use, the stock rails 16 are moved by the point operating
machine 52 through the articulated linkage 54, between a first extreme position shown in Figure 1 in which one of the stock rails 16 is aligned with the main lines of the sets of rails 12 and 14 and is parallel to the rail 22. In this position the switch 10 is set for main line operation. If it is desired to set the switch 10 for branch line operation, the stock rails 16 are pivoted on the pivot mounting 40 by extending the linkage 54 by means of the machine 52 so that the other of the stock rails 16 is aligned with the branch lines of the sets of rails 12 and 14 and is parallel to the rail 24. In this position the switch 10 is set for branch line operation. The arrangement shown in Figures 4 to 6 is similar to that shown in Figures 1 to 3, and like reference numerals denote like parts. The arrangement shown in Figures 4 to 6 is a stock rail turn out comprising a pair of switches 10. However, the pair of straight rails 16 is replaced in each case by a pair comprising one straight rail 60 and one curved rail 62. Further, the rail system comprises a pair of parallel main line rails 64 on each side of the switch 10 and a pair of parallel, branch line rails 66 on a side of the switch 10. Further, the apparatus comprises a point changing machine 66 comprising a rod 70 connected to both switches 10 and arranged for longitudinal movement to move the stock rails 60 and 62 between two extreme positions.
In the first extreme position shown in Figure 4, each curved stock rail 62 is aligned with a main line rail 64 and a branch line rail 66. In this position, the turnout is arranged to direct traffic from the main line to the branch line.

To move to the second extreme position, the rod 70 is retracted so that each straight stock rail 60 is aligned with two main line rails 64. In this position, the turnout is arranged for traffic movement along the main line.

In the embodiment shown in Figure 7, there is shown a single V-shaped rail section 70 comprising a pair of rails 72 and 74 converging together. The rail 72 is aligned with a further rail 76 and is parallel to a rail 78 and forms a main line. The rail 74 is aligned with a further rail 80, is parallel to a rail 82 and forms a branch line.

A single stock rail 84 is connected to a pivoting table 40 as described hereinabove, at one end. The stock rail 84 is arranged to be pivoted as described in relation to Figures 1 to 3, between the position shown in Figure 7 in which it is arranged for branch line operation and a further position in which it is arranged for main line operation.

The position of the switches of the present invention at either of their extreme positions may be signalled by a sensor means located at appropriate positions corresponding to the positions adjacent the free end of the switches. Further, an
electromagnet may be provided adjacent the free end of each switch at each extreme position thereof. The electromagnet would be arranged to be activated on activation of the sensor means to hold the stock rail in position.

As a result of the present invention a turnout or crossing is provided whereby a pathway is defined through the turnout or crossing which does not require the use of any specialised forgings to support the load of any rail vehicle passing through the turnout or crossing and which may be subject to damage and as a result cause derailment.

Turnouts or crossings in accordance with the present invention avoid discontinuities in the running surface which is a major problem especially with conventional turnouts. Further, the use of a stock rail throughout the length of the switch enables a rail vehicle to pass through the crossing or turnout with less reduction of speed than has heretobefore been customary. Further, in relation to the embodiments of Figure 1 to 6, the switch can be used with double flanged wheels.

The switches of the present invention are suitable for use in conditions where there is a problem with snow since the snow does not become compacted between parts which are moved together as in conventional turnouts. Also, the use of the pads 32 reduces the tendency of the stock rail to become frozen to the base plate. Further, the crossings of the present invention can be operated without guide rails which are required in
conventional crossings, and the wing brackets 34 help prevent lateral forces pushing the stocks outwardly as is normally the case with conventional crossings.

In dual stock rail switches according to the present invention, each stock rail only takes the load from one line which is either the main line or the branch line, so that the stock rails tend to wear equally.

Further, to repair a switch according to the present invention it is possible to replace the stock rails only and re-use the remainder of the switch, rather than throw away the entire switch.

Modifications and variations such as would be apparent to a skilled addressee are deemed within the scope of the present invention.
CLAIMS:-

1. A rail switch for a rail turnout or crossing interposed at a junction between a set of rails characterised in that said switch comprises a stock rail pivotally mounted such that one free end at least is moveable between at least two end positions wherein, at each end position, the stock rail is in line with a pair of opposed rails of said set of rails.

2. A rail switch according to claim 1, characterised in that it comprises a base plate having mounted thereon a pivoting table which is secured to the stock rail.

3. A rail switch according to claim 1 or 2, characterised in that the stock rail is mounted on a mounting located adjacent one end of the stock rail and the opposite end of the stock rail is said free end.

4. A rail switch according to claim 3, characterised in that a point operating machine is located adjacent the free end of the stock rail assembly for effecting movement thereof.

5. A rail switch according to any one of the preceding claims, characterised in that it is in the form of a crossing which comprises at least one stock rail assembly comprising a pair of straight rails arranged in side by side parallel relation to one another.

6. A rail switch according to any one of claims 1 to 4, characterised in that it is in the form of a turnout which comprises at least one dual stock rail assembly comprising
a straight rail and a curved rail arranged in side by side parallel relation to one another.

7. A rail switch according to claim 6, characterised in that the turnout comprises a pair of said stock rail assemblies which are arranged to be moved simultaneously.

8. A rail switch according to any one of claims 5 to 7, characterised in that the dual stock rails are spaced apart by a plurality of heel blocks located at spaced intervals between the stock rails.

9. A rail switch according to claims 3 or 4, characterised in that it comprises a single stock rail and the set of rails comprises a V-section rail located adjacent the pivotally mounted end of the stock rail.

10. A rail switch according to any one of the preceding claims, characterised in that the stock rail assembly is mounted on a plurality of chairplates provided with wing brackets arranged at locations corresponding to the extreme positions of the stock rail.

11. A rail switch according to any one of the preceding claims, characterised in that the stock rail assemblies rest on pads of low friction material.

12. A rail switch according to any one of the preceding claims, characterised in that anti-expansion rails are mounted to the sets of rails across the switch to minimise fluctuations in the gaps between the switch and the set of rails.