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Omar

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[54] **SWITCH FOR ELEVATED BINARY RAILWAY VEHICLES**

[75] Inventor: **Alejandro Goicoechea Omar,** Madrid, Spain

[73] Assignee: **S.A. De Trenes Vertebrados,** Madrid, Spain

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[52] **U.S. Cl.** **104/130,** 246/389

[51] **Int. Cl.** **A63h 9/32**

[58] **Field of Search** ..... 104/96, 103, 130; 246/382–387, 389–319, 415 R, 415 A

[56] **References Cited**

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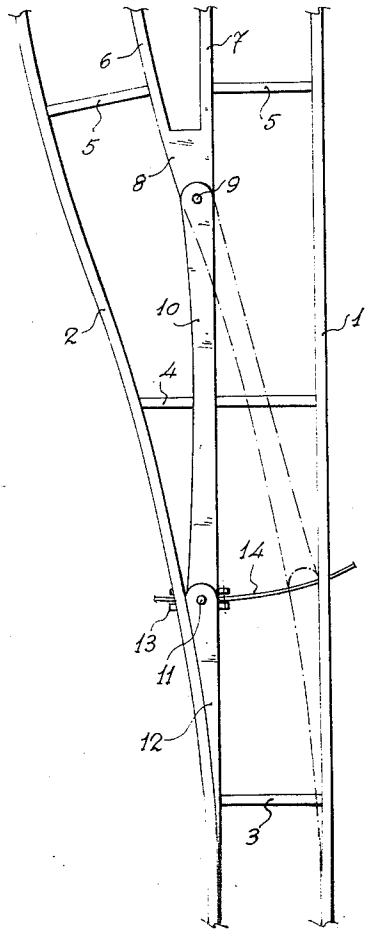
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Primary Examiner—Gerald M. Forlenza
Assistant Examiner—D. W. Keen
Attorney—Lindenberg, Freilich & Wasserman

[57] **ABSTRACT**

A switch for elevated binary railway vehicles, in which the outer rails are completely fixed and the only moving piece is a central articulated tongue or blade which turns through the angle necessary to allow trains to pass over one or other of the two tracks of the fork. The free end member of the tongue is articulated so that when its inner end makes contact with the fixed track its outer end can continue turning towards the inside of the track and thereby provide a smooth path for the passage of the trains.

4 Claims, 4 Drawing Figures



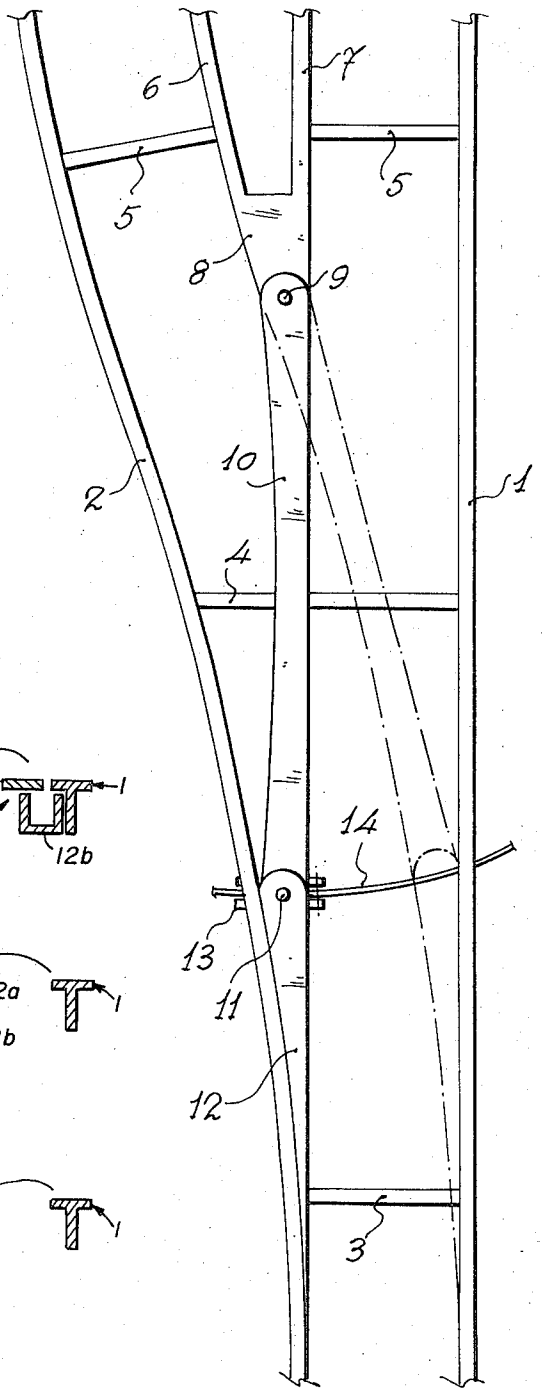


FIG. 1

FIG. 2A

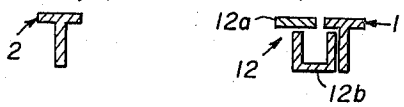


FIG. 2B

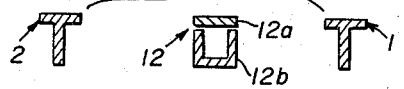
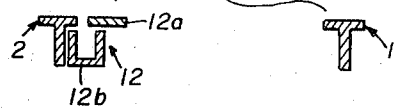


FIG. 2C



SWITCH FOR ELEVATED BINARY RAILWAY VEHICLES

In elevated trains, whether mono-rail or binary, the switchpoints have always constituted a problem difficult to solve, due, among other causes, to the complex nature of the mechanism, the great volume of the pieces, the low speed of manoeuvre and/or their limited safety conditions.

All the problems mentioned above can be solved with the utilisation of the switch of the present invention, which utilizes a minimum of moving pieces and of a shape which minimizes the risk of accidents.

In the said switch, the outer rails are completely fixed and the only moving piece is a central articulated tongue or blade which turns through the angle necessary to allow trains to pass over one or other of the two tracks of the fork.

The free end of the tongue is articulated so that when the inner part of the free end makes contact with the fixed track the outer part of the free end can continue turning towards the inside of the track and thereby provide a smooth path for the passage of the trains.

Both the lateral guide wheels of the rolling stock and the traction wheels roll without any discontinuity whatsoever in either of the two positions of the tongue, since the latter has regions on each side that minimize discontinuities in the running surfaces.

The mechanism that causes the switch to operate may be either manually operated or operated by electric, pneumatic, hydraulic, etc. devices.

In order that the subject of the patent may be better understood, and merely by way of example, there is attached a sheet of drawings in which a diagramatic representation of the switch in accordance with the invention is given, the drawings including a FIG. 1 which is a plan view of the switch and FIGS. 2A, 2B, and 2C which are sectional end views of the switch.

In the said drawings, and in the following description, the elements constituting the complex and its principal parts have been designated in accordance with the following nomenclature:

1. Outer rail
2. Outer rail
3. Anterior crosstie
4. Middle crosstie
5. Posterior crossties
6. Inner rail
7. Inner rail
8. Frog
9. Vertical shaft
10. Arm
11. Moveable shaft
12. Switchblade
13. Carriage
14. Small curved rail

Referring to the drawing mentioned above, we can see that the outer rails **1–2** are kept fixed and follow an appropriate divergent path that is maintained by an anterior crosstie **3** and by a middle crosstie **4**; the posterior crossties **5** correspond to the two tracks that are located after the fork.

The inner rails **6–7** are also fixed and converge on a common part or frog **8** at the end of which there is a vertical shaft **9** on which there is articulated one end of an arm **10**, on the other end of which, and on a moveable shaft **11** there is articulated a switch-blade **12** which completes the complex of the moveable tongue of the switch.

The point of articulation determined by the moveable shaft **11** is moved supported either on a carriage **13** which circulates over a small curved rail **14**, or suspended from a gantry when this is necessary, and this intermediate support, in addition to permitting the correct functioning of the switch, makes it possible to reduce the length of the arm **10** which takes the part of a rail in this zone and, consequently, the dimensions of its section.

In those cases when it is considered advisable these means of movement — the carriage and the small rail or gantry — can be situated on the end of the switchblade, with the elimination or not of the intermediate support carriage at the point of articulation determined by the moveable shaft **11**.

The point of the tongue or switchblade **12** can carry out on the shaft **11** a turning movement of limited angle which prevents interference with the rails **1–2**. This makes it possible for the zone of articulation determined by the shaft **11** to abut either of the said rails between which the carriage **13** or other device moves. This permits abutment of the whole length of the switchblade **12** with the rail that it first contacts when the switch is operated. Such turning of the switchblade this produces a change of position with respect to that of the arm **10** to permit total abutment of the lateral surface of the switchblade **12** to the inner face of one or another of the outer rails **1–2**.

The said switchblade **12** or articulated end of the tongue will also have joined to it the necessary locking devices to operate signalling devices, safety systems, etc., as soon as there has been produced a perfect contact of the lateral elements of the said switchblade with the adjacent stretches of the fixed rails **1–2**, which contacts can be made on either straight or curved lines, according to the path followed by the run of the tracks that begin at the fork.

All that has been expounded above can be applied on those cases in which the rolling stock has lateral guide wheels which can bear against side surfaces of the rails, such as happens with rails of T section or the like.

In these cases the switchblade **12** can be composed of two pieces: as illustrated in FIGS. 2A through 2C, these include the parallellogram **12*a*** formed by the upper flange and a box-like portion **12*b*** under the flange with walls on both sides, but in which the movements of the box-like portion is greater than the upper flange to bring about tangential contacts with the lateral guide surfaces of the fixed rails.

This movement of greater amplitude is easily achieved by any mechanical means of transmission that utilises the turning movement, such as a rack and pinion device, or a pinion and chain device, a pair of conical gears, a connecting rod, cams, etc., or a hydraulic, pneumatic or electric device, any of which can be utilised as an auxiliary means without pertaining to the subject of the patent.

The construction of this switch does not require the employment of special materials due to the fact that its constitution does not impose any extraordinary stress on the structure. POrtions such as the switchblades **12**, are completely supported along a great length on the fixed outer rails **1–2**, which in those zones can be endowed with reinforced sections that will contribute the necessary rigidity.

There will thus be variable the circumstances of size, form and material with particular reference to each one of the elements that integrate the complex of the switch, in which there may be varied all that which does not suppose an alteration in the essence of the subject expounded in the above description, which should be taken in its widest sense and not as a limitation of possibilities of implementation.

What is claimed is:

1. A switch for an elevated binary railway with inner and outer rails in which the outer rails remain fixed and follow a suitable divergent path and the inner rails divide at the fork, and with a frog where the inner rails diverge, comprising:

a vertical shaft on an end of the frog, an arm articulated at one end to the shaft and having another moveable end, a second shaft mounted on the moveable end of the arm, a switchblade articulated at the second shaft, and intermediate support means for supporting the assembly of the arm and switchblade during their entire movement between positions wherein the switchblade lies adjacent different outer rails, said support means supporting the assembly near the point of articulation of the arm and switchblade.

2. A switch for an elevated binary railway as defined in claim **1**, characterized in that the point of articulation of the switchblade and arm determined by the moveable shaft is supported on a carriage which circulates over a small curved rail.

3. A railway switch comprising:

a pair of laterally spaced outer rails that diverge;

a frog located between said outer rails at a region where they diverge;

a pair of laterally spaced inner rails that extend downpath from said frog;

a switch arm pivotally mounted at said frog and extending in an up-path direction therefrom and located between said outer rails; and

a blade pivotally mounted at the up-path end of said arm to selectively contact said outer rails as said switch arm pivots, said blade having opposite sides formed to extend tangentially to the respective outer rail which it contacts;

said blade includes an upper flange and a box-like portion under the flange which can move laterally with respect to the flange.

4. A switch for an elevated binary railway with inner and outer rails in which the outer rails remained fixed and follow a suitable divergent path and the inner rails divide at the fork, and with a frog where the inner rails diverge, comprising:

a vertical shaft on an end of the frog, an arm articulated at one end to the shaft and having another moveable end, a second shaft mounted on the moveable end of the arm, and a switchblade articulated at the second shaft;

the switchblade including two pieces of which one is an upper flange and the other is a box-like portion with walls on both sides of the flange, but in which the box-like portion can pivot further than the flange.

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