

DESCRIPTION

Path-changing device for vehicles on pneumatic-tyred wheels

5 The present invention relates to the field of own-site transport, in particular by means of vehicles on pneumatic-tyred wheels guided by means of a single central rail cooperating with sloping double-roller devices fixed to the vehicle, and relates to a device for changing the path of such vehicles.

10 Own-site guided transport networks are necessarily equipped with devices for changing path, in order to create itineraries.

Such devices are commonly used in parallel two-rail means of transport of the railway or tramway type.

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The present invention relates more particularly to transport means that use only a single central guide rail, this rail having a profile designed to cooperate with a sloping double-roller means fixed to the vehicle to allow guidance in such a way as to avoid any derailment.

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Accordingly, various arrangements of central-rail track apparatus are known. Thus EP-A-0 844 329 describes an orientation device that allows a vehicle equipped with double-flange direction control rollers to change path.

25 However, to provide continuous integral guidance as in a normal track, such a device requires guidance counterrails. In addition, the device according to this document is of the vertical-guidance-surface type, such that it requires the application of a strong vertical load on the rollers to ensure good guidance cooperation avoiding to a great extent the risk of derailment.

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In addition, other configurations of track apparatus for guidance devices with rollers controlled by a channel are also known, in particular through FR-A-2 662 450. These configurations however cannot be applied when using sloping double-

roller guidance, nor when the guidance means is laid in a road intended for road traffic.

5 In general, the devices for changing path that exist at present generally have a fairly complex structure and heavy construction, leading to consequent implementation costs.

10 The object of the present invention is to overcome these drawbacks by proposing a path-changing device for vehicles on pneumatic-tyred wheels guided by means of a single central rail that allows continuous, integral and un-derailable guidance when in a normal track, while being of relatively simple construction.

15 Accordingly, the path-changing device for vehicles on pneumatic-tyred wheels guided by means of a single central rail, cooperating with sloping double-roller devices fixed to the vehicle and consisting substantially of a platform carrying a straight length of rail and a curved length of rail, this platform being equipped on its rear part with a pivot, of mechanical platform-actuating means, of a box housing said platform and mechanical actuating means and comprising a reception bearing for the platform's pivot, of entry and exit rails welded on said box and of
20 sheets of metal closing the top part of the box, flush with the roadway, is characterised in that it also has a locking means, equipped with a locking control means, and a safety and position control means, these means being fitted in the box.

25 The invention will be better understood, using the description below, which relates to a preferred embodiment, given as a non-limiting example, and explained with reference to the accompanying diagrammatic drawings in which:

30 Fig. 1 is an exploded view in perspective of the device according to the invention;

Fig. 2 is a view from above of the device;

Fig. 3 is a view in perspective of the device without the platform and metal closing sheets;

Fig. 4 is a part view in perspective, on a larger scale, and

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Figs. 5a to 5c are part views from above, on a larger scale, illustrating various operating positions of the locking means.

10 Figs. 1 and 2 of the accompanying drawings illustrate a path-changing device for vehicles on pneumatic-tyred wheels guided by means of a single central rail, cooperating with sloping double-roller devices fixed to the vehicle, which consists substantially of a platform 1 bearing a straight length of rail 1' and a curved length of rail 1'', this platform 1 being provided on its rear part with a pivot (not illustrated), of a mechanical actuating means 2 of the platform 1, of a box 3 for
15 housing said platform 1 and mechanical actuating means 2 and comprising a reception bearing 4 for the pivot of the platform 1, of entry and exit rails 5, also called feeder lines, welded on said box 3 and of sheets of metal for closing 6 the upper part of the box 3, flush with the roadway.

20 According to the invention, this device is also provided with a locking means 7, equipped with a locking control means 20, and a safety and position control means 17, these means 7, 20 and 17 being housed in the box.

25 The box 3 for housing the platform 1 and the mechanical actuating means 2 consists advantageously of an assembly of fabricated metal sheets of great thickness thus forming the device's frame.

The mechanical actuating means 2 of the platform 1 is in the form of an electrohydraulic unit comprising a tank with a pump 2' immersed in said tank and
30 connected to a cylinder 2'' by means of a hydraulic distributor. It is also possible to produce the means 2, in a known manner, in the form of a self-contained electric cylinder.

The locking means 7, illustrated more particularly in Figs. 3 and 4 of the accompanying drawings, is of the axially-wedged type and is in the form of a rod assembly, connected to the end of the shaft of the cylinder 2'' of the mechanical
5 actuating means 2 of the platform 1 and consisting of a bent lever 8 mounted pivoting in the box 3 and cooperating at one of its ends, with a slider 9 integral with the end of the shaft of the cylinder 2'' and, at its other end, with a wedging bar 10 held with the possibility of translation in the box 3 by means of a guidance device 11 and two clamps 12 cooperating, on the one hand, with the wedging bar
10 10 and, on the other hand, with a stop 13 fixed in the box 3 parallel to the sliding axis of the wedging bar 9.

Advantageously, the locking control means 20 provided on the locking means 7 consists, as shown more particularly in Figs. 1 and 4 of the accompanying
15 drawings, of pairs of electric end-of-travel contacts each allocated to one of the two end positions of the wedging bar 10.

The end of the bent lever 8 cooperating with the slider 9 is provided with a roller 8' guided in a transverse housing 9' of the slider 9 and the other end of said lever
20 8 is provided with a roller 8'' cooperating with an operating fork 10' of the wedging bar 10. Thus, when the shaft of the piston 2'' moves, following actuation thereof, the bent lever 8 can easily pivot round its mounting axis in the box 3, because its two ends are guided by means of the rollers 8' and 8'', allowing movement of said rollers following a curved path.

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The clamps 12 are in the form of two opposed levers connected by one of their ends to a central slider 14, their other free end being provided with two stops sloping laterally in projection 15 designed to cooperate successively with the
wedging bar 10 and with the stop 13 fixed in the box 3, the central slider 14 being
30 provided on its face opposite the bottom of the box 3 with two pins 16 designed to grip with operational play a stop or driving rib (not illustrated) provided on the internal face of the platform 1. By cooperation of these pins 16 with the stop or rib

of the platform 1, the platform is driven pivoting by the locking means 7 during actuation thereof by means of the cylinder 2''.

Each end of the clamps 12 cooperates with the wedging bar 10 by means of one of its stops sloping laterally in projection 15 by means of a corresponding housing 10'', of which the side laminae slope to correspond with the slope of the stops sloping laterally in projection 15 and of which the width is greater than that of said stops sloping laterally in projection 15. Because of this, and as shown more particularly in Figs. 3 to 5 of the accompanying drawings, each clamp is in a position of drive cooperation by the wedging bar 10 and in an end of cooperation position with the wedging bar 10.

The end positions of the wedging bar 10 are detected by the pairs of electric end-of-travel contacts, each allocated to one of the two end positions of said wedging bar 10 and forming the locking control means 20 provided on the locking means 7.

Advantageously, the safety and position control means 17 is in the form of a sealed electromechanical sensor driven by dual cut-off connected, by means of a rod assembly 17', to a detection stop 17'' integral with the platform 1 (Fig. 4).

As shown in Figs. 5a to 5c of the accompanying drawings, when the locking means 7 is actuated by means of the cylinder 2'' of the mechanical actuating means 2 of the platform 1, said cylinder 2'' moves the slider 9 either to the right, as illustrated in Fig. 5a, or to the left (Fig. b), while moving through an intermediate position (Fig. 5c).

In the first case, that is for main track passing positioning (Fig. 5a), the bent lever 8 is actuated towards the left, according to Figs. 3 to 5, following a complete exit of the shaft of the cylinder 2'' driving the slider 9 and, by means of the transverse housing 9' thereof, the roller 8' of the corresponding end of the bent lever 8. The other end of the bent lever 8 therefore also drives the wedging bar 10 towards the

left by means of its roller 8'' cooperating with the fork 10' of said wedging bar 10. It follows that the clamp 12 extending to the right in relation to the slider 14 and the pins 16, is in drive cooperation with the wedging bar 10 by maintaining its stop sloping laterally in projection 15 in the corresponding housing 10'', while
5 resting by its other end sloping laterally in projection 15 against the stop 13. Because of the slope of the wall of the housing 10 cooperating with the corresponding end of the stop 15, in the sense of complete engagement of said stop 15 in said housing 10'', the wedging bar 10 drives the pins 16 towards the right, by means of the clamp 12 and the slider 14, in such a way that the platform
10 1 is pivoted round the bearing 4 and the straight length of rail 1' is aligned with the corresponding entry and exit lengths of rail 5. In this position, the other clamp 12, driven initially by cooperation with the corresponding housing 10'', arrives at the end of the stop 13 and therefore tips over it, so that at the end of the movement of the wedging bar 10 and the slider 14, the stop sloping laterally in projection 15,
15 which has come out of the housing 10'' passes, by its external edge, under the corresponding edge of said housing 10'' and the clamp 12 is thus maintained in its position beyond the stop 13.

Consequently, the slider 14 with the pins 6 is locked in its extreme position, such
20 that an action on the platform 1, that is by means of the vehicle guidance device cooperating with the length of rail 1', has no effect, in other words pivoting of the platform 1 is prevented, as the platform is totally locked.

Fig. 5c illustrates the locking means 7 in an intermediate position, corresponding,
25 for example, to a change in position of the platform 1 from that illustrated in Fig. 5a to that illustrated in Fig. 5b.

It appears clearly here that to achieve this intermediate position, the wedging bar 10 is moved to the right. It follows that, initially, from the position in Fig. 5a, the
30 wedging bar 10 moves, while the clamps 12 and the slider 14 bearing the pins 16 remain unmoved.

When the right wall of the housing 10'' cooperating with the left stop 15 arrives in contact with the corresponding wall of this stop 15, the housing 10'' allocated to the corresponding stop 15 of the other clamp 12 is then facing said stop 15. This stop 15 of the right clamp 12 may then, as a consequence of the movement already
5 generated by driving the left clamp 12, and because the left clamp is retained in the housing 10'' by the stop 13, penetrate the corresponding housing 10'', because the sloping face of the opposite stop 15 of the same clamp slides over the ridge of the stop 13 and rests thereon.

10 As a consequence of the displacement movement towards the position illustrated in Fig. 5b, the slider 14 and pins 16 are driven by the right clamp 12, until reaching the end of movement in a position corresponding to a diverted track, in other words in which the bent track 1'' cooperates with the corresponding entry and exit rails 5.

15 In this last position, wedging and locking are performed as described previously in relation to Fig. 5a.

According to another characteristic of the invention, the device may also be
20 provided with a manual operating means 18 consisting of an articulated lever on the bottom of the box 3 and connected in articulation to the slider 9, integral with the end of the shaft of the piston of the cylinder 2'' of the mechanical actuating means 2 of the platform 1, this lever comprising advantageously a device for fixing an operating handle or similar (not illustrated) and being limited in height
25 to the height of the box and accessible through an opening 6' of the corresponding closing plate 6, said opening 6' being provided with a closing hatch (not illustrated) secured by means of an electric device that releases on opening. Such a security device is more particularly designed to interrupt the electrical supply of the device, when the hatch opens. As appears more particularly in Figs. 1, 3 and 4
30 of the accompanying drawings, the device for fixing a handle or similar may be in the form of a simple insertion boring for such a handle.

In addition, the device according to the invention may be provided with an automatic heating device designed to maintain a temperature inside the box above freezing, in particular in the region of the movable elements and hydraulic conduits.

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In a known manner, the electrical supply of the device is produced by means of a sealed electrical connection box opening inside the box 3 by means of a cable 3' passing through, the supply of the control means being produced by cables 3'' passing through (Fig. 1). The box 3 is insulated electrically from the ground by an insulation cladding while a flexible cable (not illustrated) provides electrical continuity between the points, formed by the platform 1 and the rail lengths 1' and 1'', and the box 3. Finally, the bottom part of the box is provided, also in a known manner, with drainage holes 19 (Figs. 3 and 4) that can be connected to an existing sewer network.

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According to another characteristic of the invention, as shown more particularly in Figs. 1 and 3 of the accompanying drawings, the entry and exit rails 5 are advantageously provided with anti-creep means 21 extending transversely to said rail 5. These means 21 are designed to absorb and block any residual movement of the long welded rails and thus protect the device at the front and back.

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Using the invention, a central guidance track device can be produced combining all the control and wedging elements in the box, such that the size on the ground of such a device is greatly reduced and the movement of the tyres, of the vehicles thus guided is carried out without contact with the metal sheets closing the device. An important advantage results from this, on the one hand, concerning noise nuisance and, on the other hand, with regard to the maintenance of the covers of the devices forming this apparatus.

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Moreover, the very structure of the locking means 7 and in particular the provision of pins 16, and the anti-creep means 21 provide, on the one hand, excellent

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resistance to the large stresses transmitted by the guidance device fitted to the vehicle and, on the other hand, perfect positioning of the device.

5 In addition, the compactness of the device thus achieved allows track apparatus thus formed to be installed with a minimal distance between axes when laid, in perpendicular tracks.

10 Finally the channels of the device according to the invention can be very small, in fact identical to those of the normal track, such that the safety of pedestrians and other users, particularly cyclists, is improved, said device being fully integrated in the roadway.

15 Of course, the invention is not limited to the embodiment described and illustrated in the accompanying drawings. Modifications are possible, particularly from the point of view of the constitution of the various elements or by substitution of technical equivalents, without thereby departing from the scope of protection of the invention.

CLAIMS

1. Path-changing device for vehicles on pneumatic-tyred wheels guided by means of a single central rail, cooperating with sloping double-roller devices fixed
5 to the vehicle which consists substantially of a platform (1) carrying a straight length of rail (1') and a curved length of rail (1''), this platform (1) being equipped on its rear part with a pivot, of mechanical actuating means (2) of the platform (1), of a box (3) housing said platform (1) and mechanical actuating means (2) and comprising a reception bearing (4) for the pivot of the platform (1),
10 of entry and exit rails (5), also called feeder lines, welded on said box (3) and of sheets of metal (6) closing the top part of the box (3), flush with the roadway, characterised in that it also has a locking means (7), equipped with a locking control means (20), and a safety and position control means (17), these means (7, 20 and 17) being fitted in the box (3).

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2. Device according to claim 1, characterised in that the locking means (7) is of the axially-wedged type and is in the form of a rod assembly, connected to the end of the shaft of the cylinder (2'') of the mechanical actuating means (2) of the platform (1) and consisting of a bent lever (8) mounted pivoting in the box (3) and
20 cooperating at one of its ends, with a slider (9) integral with the end of the shaft of the cylinder (2'') and, at its other end, with a wedging bar (10) held with the possibility of translation in the box (3) by means of a guidance device (11) and two clamps (12) cooperating, on the one hand, with the wedging bar (10) and, on the other hand, with a stop (13) fixed in the box (3) parallel to the sliding axis of
25 the wedging bar (9).

3. Device according to claim 1, characterised in that the locking control means (20) provided on the locking means (7) consists of pairs of electric end-of-travel contacts each allocated to one of the two end positions of the wedging bar
30 (10).

4. Device according to claim 2, characterised in that the end of the bent lever (8) cooperating with the slider (9) is provided with a roller (8') guided in a transverse housing (9') of the slider (9) and the other end of said lever (8) is provided with a roller (8'') cooperating with an operating fork 10' of the wedging
5 bar (10).

5. Device according to any one of claims 3 and 4, characterised in that the clamps (12) are in the form of two opposed levers connected by one of their ends to a central slider (14), their other free end being provided with two stops sloping
10 laterally in projection (15) designed to cooperate successively with the wedging bar (10) and with the stop (13) fixed in the box (3), the central slider (14) being provided on its face opposite the bottom of the box (3) with two pins (16) designed to grip with operational play a stop or driving rib provided on the internal face of the platform (1).

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6. Device according to any one of claims 3 to 5, characterised in that each end of the clamps (12) cooperates with the wedging bar (10) by means of one of its stops sloping laterally in projection (15) by means of a corresponding housing (10''), of which the side laminae slope to correspond with the slope of the stops
20 sloping laterally in projection (15) and of which the width is greater than that of said stops sloping laterally in projection (15).

7. Device according to claim 1, characterised in that the safety and position control means (17) is in the form of a sealed electromechanical sensor driven by
25 dual cut-off connected, by means of a rod assembly (17'), to a detection stop (17'') integral with the platform (1).

8. Device according to any one of claims 1 to 7, characterised in that it is also provided with a manual operating means (18) consisting of an articulated lever on the bottom of the box (3) and connected in articulation to the slider (9), integral
5 with the end of the shaft of the piston of the cylinder (2'') of the mechanical actuating means (2) of the platform (1), this lever comprising a device for fixing an operating handle or similar and being limited in height to the height of the box and accessible through an opening (6') of the corresponding closing plate (6), said
10 opening (6') being provided with a closing hatch secured by means of an electric device that releases on opening.

9. Device according to any one of claims 1 to 8, characterised in that it is provided with an automatic heating device designed to maintain a temperature inside the box above freezing, in particular in the region of the movable elements
15 and hydraulic conduits.

10. Device according to claim 1, characterised in that the entry and exit rails (5) are provided with anti-creep means (21) extending transversely to said rail (5).