

Points system comprising electrical and manual control means

The present invention relates to a points system comprising two fixed rails and at least one movable points rail, the points system further comprising, a points system control device which controls the movement of the points rail, the device comprising:

- electrical control means for the points system,
- manual control means for the points system,
- actuation means for the points system, the actuation means connecting the electrical control means and manual control means to each other and to the points rail so as to transmit the command for moving the points rail from the control means to the points rail.

Points systems are known of the type in which the control device is arranged along one of the fixed rails so as to be accessible whilst rail vehicles are travelling on the track. Access to the space between the rails is prohibited when vehicles are travelling on the track for safety reasons.

The control device includes electrical control means and manual control means which make it large. A large space must therefore be provided at the side of the rails in order to allow the installation of the control device.

When it is desirable to install a points system on a track which is provided in a tunnel, for example, an underground track, provision is made to form a recess in the wall of the tunnel in order to release the space required for the installation and the use of the control device at the side of a fixed rail. Installation is therefore impractical and requires significant provisions in the tunnel, which may involve a blockage of the track for a prolonged period of time.

One of the objects of the invention is to overcome these disadvantages by providing a points system which has a smaller spatial requirement and which does not require that significant space be provided at the side of one of the fixed rails.

To this end, the invention relates to a points system of the above-mentioned type, wherein the electrical control means are accommodated within a casing which is arranged between the fixed rails and the manual control means are separated from the casing and arranged outside the space which extends between the fixed
5 rails.

In this manner, the electrical control means are not arranged at the side of a fixed rail, which reduces the space required for the installation of the device, whilst the manual control means, which take up little space, are arranged outside the fixed
10 rails in order to allow them to be accessed and allow them to be manoeuvred, even when rail vehicles are travelling on the rails. The installation of such a points system in a tunnel does not require a recess be formed in the wall of the tunnel owing to the small spatial requirement thereof.

15 According to other features of the points system:

- the control device further comprises means for switching between the electrical control means and the manual control means;
- the switching means are arranged outside the space which extends between the fixed rails;
- 20 - the electrical control means of the points system are arranged upstream of the movable points rail;
- the actuation means comprise a first control rod which is actuated by the output of the electrical control means or by the manual control means, the first rod being connected to a first bevel gear system, a second control rod being connected to
25 the first bevel gear system so that the movement of the first control rod brings about the movement of the second control rod via the first bevel gear system, the second control rod being connected to a second bevel gear system, a third control rod being connected to the second bevel gear system so that the movement of the second control rod brings about the movement of the third control rod via the
30 second bevel gear system, the third control rod being connected to the movable points rail so that the movement of the third control rod brings about the movement of the movable points rail;

- the first and second bevel gear systems and the second control rod are arranged outside the space extending between the fixed rails, the second control rod extending and being movable in a substantially longitudinal direction, the first and the second control rods extending and being movable in a substantially transverse direction;
 - the actuation means comprise a rod which connects the output of the manual control means to the electrical control means so that the actuation of the manual control means brings about the movement of the first control rod; and
 - the actuation means comprise a rod guide through which the second control rod extends in order to retain the second rod along a fixed rail;
 - the points system comprises two points rails which are connected to each other by a bar, the third control rod being connected to the bar; and
 - the electrical control means are covered by a protective plate.
- Other aspects and advantages of the invention will be appreciated from a reading of the following description, given purely by way of example and with reference to the appended drawings, in which:
- Figure 1 is a schematic perspective view of the points system according to the invention,
 - Figure 2 is a schematic perspective view of the electrical control means of the control device,
 - Figure 3 is a schematic perspective view of the manual control means of the control device,
 - Figure 4 is a schematic perspective view of a portion of the actuation means of the control device,
 - Figure 5 is a schematic perspective view of another portion of the actuation means of the control device.

In the description, the terms "upstream" and "downstream" are defined relative to the direction in which a rail vehicle travels on the rails. The term "longitudinal" is defined in accordance with the direction in which the rails extend and the term "transverse" is defined in accordance with a horizontal direction perpendicular relative to the longitudinal direction.

With reference to Figure 1, there is described a points system 1 which generally comprises two fixed rails 2 and 4 and at least one points rail 6 which can be moved in a substantially transverse direction. According to the embodiment
5 illustrated in Figure 1, the points system 1 comprises two movable points rails 6 which are fixedly joined in terms of movement.

The movement of the points rails 6 is controlled by a control device comprising electrical control means 8, manual control means 10 and actuation means 12
10 which connect the electrical and manual control means to the points rails 6 in order to transmit the command for moving the points rail.

The electrical control means 8 are accommodated in a casing 14, as illustrated in Figure 2. This casing 14 is arranged between the fixed rails 2 and 4 and is fixed to
15 one or more cross-members 16 upstream of the points rails 6.

The electrical control means 8 comprise a drive motor (not illustrated) which is supplied with electrical power and which is capable of bringing about, at the output
17, the movement of the actuation means 12 in order to move the points rails 6.
20 The electrical actuation means will not be described in detail in this instance and are, for example, similar to the device described in document FR-2 896 752.

The electrical control means are covered with a protective plate 18 which protects the casing 14 from components which may protrude from a rail vehicle travelling
25 on the rails 2 and 4.

The manual control means 10 are arranged outside the fixed rails 2 and 4, that is to say, outside the space which extends between these rails. The manual control means 10 are, for example, fixed to the cross-member 16, to one side of one of
30 the fixed rails so as to be able to be actuated without accessing the space which extends between the fixed rails.

The manual control means comprise a lever 20 which can be rotated about a substantially transverse axis and which brings about the rotation of a bar 22 which connects the lever 20 to the electrical control means 8. The bar 22 passes below the fixed rail 2 and extends substantially transversely. The rotation of the lever 20
5 allows the actuation means 12 to be driven when a manual command for the movement of the points rails is selected, as described below.

The bar 22 is connected at one of the end portions thereof to the lever 20 via a series of pinions 24 which allows the lever 20 to be raised with respect to the bar
10 22 and thus make it more accessible for manual control. The other end portion of the bar 22 is connected to a shaft (not illustrated) which protrudes from the casing 14 via another series of pinions 26. The series of pinions 26 is rotatably coupled to the output 17 of the electrical control means 8, for example, as described in document FR-2 896 752.

15 The output 17 of the electrical control means 8 is fixedly joined to the end portion 27 of a first control rod 28 which extends substantially transversely and which passes below the fixed rail 2 so that the other end portion 30 of the first control rod 28 is arranged outside the space which extends between the two fixed rails 2 and
20 4. The rotation of the output 17 of the control means brings about the translation movement in a substantially transverse direction of the first control rod 28, as indicated by arrow F_1 of Figure 1.

The other end portion 30 of the first control rod 28 is connected to a first bevel
25 gear system 32 which is connected, on the other hand, to an end portion 34 of a second control rod 36. The second control rod 36 extends substantially longitudinally along the fixed rail 2. The first bevel gear system 32 is illustrated in Figure 4 and is known per se. It allows the transverse movement of the first control rod 28 to be converted into a substantially longitudinal movement of the second
30 control rod 36, as indicated by the arrow F_2 in Figure 1.

In order to adjust the dimensions of the control device to the constraints of the location where it is installed, the connection between the control rods 28 and 36

and the first bevel gear system 32 is carried out, for example, via a threaded end which is provided at the end portion of each control rod 28 and 36 which is screwed to a greater or lesser extent into a respective cover of the first bevel gear system 32, as illustrated in Figure 4. In this manner, the dimensions of the actuation means can be adapted to the terrain where they are installed.

The second control rod 36 extends in a downstream direction along the fixed rail 2 as far as the points rails 6. The distance separating the electrical control means 8 and the points rails 6 which corresponds substantially to the length of the second control rod 36 can be quite large. To this end, when this length is large, a rod guide 38 is fixed at the side of the fixed rail 2 and the second control rod 36 extends through it in order to ensure that it is supported and prevent it from becoming buckled or deformed during its longitudinal movements. The rod guide 38 is, for example, a roller rod guide known per se.

The other end portion 40 of the second control rod 36 is connected to a second bevel gear system 42 which is connected, at the other side, to an end portion 44 of a third control rod 46. The third control rod 46 extends substantially transversely and passes below the fixed rail 2. The second bevel gear system 42 is illustrated in Figure 5 and is known per se. It allows the longitudinal movement of the second control rod 36 to be converted into a substantially transverse movement of the third control rod 46, as indicated by the arrow F_3 of Figure 1.

The connection between the third control rod 46 and the second bevel gear system 42 is carried out, for example, via a threaded end which is provided at the end portion 44 of the third control rod 46 which is screwed to a greater or lesser extent into a cover of the second bevel gear system 42, as illustrated in Figure 5, which allows the dimensions of the actuation means to be adjusted in accordance with the terrain where they are installed.

The other end portion 48 of the third control rod 46 is connected to a transverse bar 50 which extends between the two points rails 6 and which is fixedly joined thereto. In this manner, when the third control rod 46 is moved transversely

following the command of the electrical or manual control means 8 or 10, respectively, the third control rod 46 brings about the movement of the bar 50 which brings about the movement in a substantially transverse direction of the points rails 6.

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The connections between the output 17 of the electrical control means 8 and the first control rod 28, between the first, second and third control rods 28, 36, 46 and the first and second bevel gear systems 32, 42, between the third control rod 46 and the bar 50, and between the bar 50 and the points rails 6 are carried out by
10 means of pivot connections in order to prevent any deformation of the points system during the movements of these various elements relative to each other.

The points system 1 further comprises means 52 for switching between the electrical control means 8 and the manual control means 10 in order to allow an
15 operator to move from electrical control to manual control of the points system. These switching means 52 are arranged at the outer side of the fixed rails 2 and 4 so as to allow them to be actuated without access to the space which extends between the fixed rails, as illustrated in Figure 1. The switching means 52 are, for example, fixed to a wall of a tunnel when the points system 1 is installed on an
20 underground track. The switching means 52 are, for example, connected via a pulling cable 53 to a member 54 of the electrical control means 8. The actuation of the switching means 52 brings about the movement of the member 54 via the cable 53, which brings about the movement between electrical actuation and manual actuation in a manner known per se. The actuation of the switching means
25 52 can be made secure, for example, by making provision for actuation using one or more keys, in order to prevent accidental or malicious actuation of the points system 1.

The points system described above is small whilst complying with safety standards.
30 The casing 14 of the electrical control means 8 is arranged between the fixed rails 2 and 4, that is to say, at a location where the space is not restricted, whilst the manual actuation means 10 and the switching means 52 are arranged at the outer side of the fixed rails 2 and 4, that is to say, at a location where an operator can

access them without accessing the space between the rails 2 and 4 which is prohibited when rail vehicles are travelling on the rails 2 and 4.

5 Such a points system 1 does not therefore require a significant space at the side of the fixed rails for its installation and can be readily installed on a track which extends, for example, into a tunnel. It is not necessary to form a recess in the wall of the tunnel in order to provide sufficient space for the points system 1. This points system 1 can be readily installed on fixed rails 2 and 4 which are already positioned, since it does not require that the installation thereof be modified.

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The locations of the manual control means and switching means can be selected so as to be as practical as possible and the points system 1 can therefore be readily adjusted and can be adapted to numerous configurations of terrain.

CLAIMS

1. Points system (1) comprising two fixed rails (2, 4) and at least one movable points rail (6), the points system further comprising, a points system control device
5 which controls the movement of the points rail (6), the device comprising:
- electrical control means (8) for the points system,
 - manual control means (10) for the points system,
 - actuation means (12) for the points system, the actuation means (12) connecting
10 the electrical control means (8) and manual control means (10) to each other and
to the points rail (6) so as to transmit the command for moving the points rail (6)
from the control means (8, 10) to the points rail (6),
- characterised in that the electrical control means (8) are accommodated within a casing (14) which is arranged between the fixed rails (2, 4) and the manual control
means (10) are separated from the casing (14) and arranged outside the space
15 which extends between the fixed rails (2, 4).
2. Points system according to claim 1, characterised in that the control device
further comprises means (52) for switching between the electrical control means (8)
and the manual control means (10).
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3. Points system according to claim 2, characterised in that the switching means
(52) are arranged outside the space which extends between the fixed rails (2, 4).
4. Points system according to any one of claims 1 to 3, characterised in that the
25 electrical control means (8) of the points system (1) are arranged upstream of the
movable points rail (6).
5. Points system according to any one of claims 1 to 4, characterised in that the
actuation means (12) comprise a first control rod (28) which is actuated by the
30 output (17) of the electrical control means (8) or by the manual control means (10),
the first rod (28) being connected to a first bevel gear system (32), a second
control rod (36) being connected to the first bevel gear system (32) so that the
movement of the first control rod (28) brings about the movement of the second

control rod (36) via the first bevel gear system (32), the second control rod (36) being connected to a second bevel gear system (42), a third control rod (46) being connected to the second bevel gear system (42) so that the movement of the second control rod (36) brings about the movement of the third control rod (46) via
5 the second bevel gear system (42), the third control rod (46) being connected to the movable points rail (6) so that the movement of the third control rod (46) brings about the movement of the movable points rail (6).

6. Points system according to claim 5, characterised in that the first and second
10 bevel gear systems (32, 42) and the second control rod (36) are arranged outside the space extending between the fixed rails (2, 4), the second control rod (36) extending and being movable in a substantially longitudinal direction, the first and second control rods (28, 46) extending and being movable in a substantially transverse direction.

15 7. Points system according to claim 5 or 6, characterised in that the actuation means (12) comprise a bar (22) which connects the output of the manual control means (10) to the electrical control means (8) so that the actuation of the manual control means (10) brings about the movement of the first control rod (28).

20 8. Points system according to any one of claims 5 to 7, characterised in that the actuation means (12) comprise a rod guide (38) through which the second control rod (36) extends in order to retain the second rod (36) along a fixed rail (2).

25 9. Points system according to any one of claims 5 to 8, characterised in that it comprises two points rails (6) which are connected to each other by a bar (50), the third control rod (46) being connected to the bar (50).

30 10. Points system according to any one of claims 1 to 9, characterised in that the electrical control means (8) are covered by a protective plate (14).