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(54) **Rail vehicle provided with a remote control desk**

Schienenfahrzeug mit Fernbedienungspult

Véhicule ferroviaire fourni avec un bureau de commande à distance

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Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates to a rail vehicle provided with a driving cabin for driving the vehicle in two opposite directions.

BACKGROUND ART

[0002] Most conventional multi-car track-bound vehicles as well as bidirectional locomotives are equipped with two driving cabins, one at each end of the vehicle. Only one driving cabin is used when the vehicle is running, which means that at all times, one of the two driving cabins is not used, which amounts to a loss of room and weight.

[0003] It has been suggested in EP0695253 to arrange a control desk for driving the vehicle somewhere on the rail vehicle, e.g. in a mid-section of a carriage offset from the front part of the vehicle or train, i.e. without windshield or direct visibility towards the direction of travel. The control desk is provided with a plurality of screens, which display general and detailed views of the track in front of the vehicle. The vehicle is provided with a plurality of video units which may be pivotable or not, and have a variable or fixed focal length, to generate the information available on the screens. While the vehicle could theoretically run in both directions from the control desk, there is a risk of confusion for the driver when the vehicle runs in the direction opposite the direction in which the driver is sitting, e.g. when pushing the driving joystick forward and feeling an acceleration in opposite direction. Hence, there is a risk of faulty actions, which could cause an accident.

[0004] DE 94 07 964 U discloses a locomotive provided with a first end facing a first direction, a second end facing a second, opposite, direction, and a driving cabin located in a midsection of the locomotive offset from the ends of the locomotive and raised above the ends of the locomotive. The driving cabin comprises a visual display screen assembly for displaying real time images of the track taken by a first video unit from the first end of the vehicle towards the first direction and by a second video unit from the second end of the vehicle towards the second direction. The driving cabin further comprises a sitting assembly for sitting the driver in a first sitting position towards the first direction in front of the visual display assembly, and for sitting the driver in a second sitting position towards the second direction in front of the visual display assembly, and a control desk assembly for driving the track-bound vehicle in the first direction from the first sitting position, and for driving the track-bound vehicle in the second direction from the second sitting position. The driving cabin is also provided with a first and second windscreens giving direct visibility in the first and second direction. The video units and visual display assembly provide additional visual information to the driver in regions that are not directly visible through the windscreens and are used during manoeuvres at low speed.

SUMMARY OF THE INVENTION

[0005] The invention aims at avoiding confusion of the driver of a track-bound vehicle provided with a driving cabin for driving the vehicle in two opposite directions.

[0006] According to the invention, there is provided a track-bound single-car or multi-car transportation vehicle as defined in claim 1.

[0007] Hence, the driver can always be seated in the direction facing the travel direction of the vehicle, so that there is no contradiction between the vestibular sense of the driver and his or her sitting position.

[0008] According to a preferred embodiment, the control desk assembly includes a first control desk for driving the track-bound vehicle in the first direction from the first sitting position, and a second control desk for driving the track-bound vehicle in the second direction from the second sitting position. Hence, each control desk can be dedicated to one direction of travel. If required, the control desk assembly may include means for inhibiting use of the second control desk when the vehicle is driving in the first direction and for inhibiting use of the first control desk when the vehicle is driving in the second direction. The first control desk and the second control desk are preferably identical.

[0009] Alternatively, the control desk assembly may include a single, rotatable control desk assembly, which can be moved between a first desk position for driving the track-bound vehicle in the first direction from the first sitting position, and a second desk position for driving the track-bound vehicle in the second direction from the second sitting position. This arrangement is even more economical and saves additional space.

[0010] According to a preferred embodiment, the visual display screen assembly is linked to at least a first video unit for continuously acquiring images of the track towards the first direction.

[0011] Preferably, the visual display screen assembly is linked to at least a second video unit for continuously acquiring images of the track towards the second direction. Preferably, a plurality of video units is provided for each direction to ensure redundancy. The video units may be placed at the corresponding end of the vehicle and/or on the track itself.

[0012] According to the invention, the visual display screen assembly may include a first visual display screen assembly for displaying real time images of the track taken from the first end of the vehicle towards the first direction to a driver sitting in the first sitting position and looking in the first direction, and a second visual display screen assembly for displaying real time images of the track taken from the second end of the vehicle towards the second direction to a driver sitting in the second sitting position and looking in the second direction.

[0013] In order to avoid any mistake from the driver,

the visual display screen assembly may include inhibiting means for inhibiting display of real time images of the track from the first end of the vehicle towards the first direction to a driver sitting in the first sitting position and looking in the first direction when the vehicle is driving in the second direction, and for inhibiting display of real time images of the track from the second end of the vehicle towards the second direction to a driver sitting in the second sitting position and looking in the second direction, when the vehicle is driving in the first direction.

[0014] The sitting assembly may comprise a first seat for sitting in the first sitting position and a second seat for sitting in the second position.

[0015] Alternatively, the sitting assembly may comprise a rotatable seat for sitting in the first sitting position and in the second sitting position. This rotatable seat can be associated with a rotatable control desk assembly and/or a rotatable visual display screen assembly. In particular, the rotatable seat, rotatable control desk and/or rotatable visual display screen assembly can be fixed to a common rotatable platform. In this context, "rotatable" means any type of rotation or combination of rotation and translation, which allow the rotatable elements to move from the first position towards the first direction to the second, opposite, position.

[0016] Advantageously, at least some of the input and output signals to and from the driving cabin can be stored on an on-board signal recorder, e.g. the real time images displayed by the visual display assembly as well as signals from the video units, control desk and/or seat actuator or from a seat position sensor for detecting the first and second positions of the seat. The on-board signal recorder may be placed in the driving cabin or elsewhere on the vehicle for the purpose of facilitating the investigation of an accident or incident. For this reason, the recorder can be protected so as to withstand conditions likely to be encountered in a severe accident, in particular acceleration above 500 g and temperatures of over 1000 °C.

[0017] According to a preferred embodiment, it is possible to locate the driving cabin according to the mass repartition of the car body or of the train. The fact that the driving cabin is spaced apart from the front and rear ends of the vehicle also increases the safety for the driver in the event of a collision. Most track-bound vehicles are provided with crush zones, in particular at the ends of the vehicle, adapted to deform and absorb kinetic energy during an impact with an obstacle on the track. The driving cabin is preferably spaced apart from such deformable zones of the car body and located in a reinforced, non-deformable part of the vehicle.

BRÈVE DESCRIPTION DES FIGURES

[0018] Other advantages and features of the invention will then become more clearly apparent from the following description of a specific embodiment of the invention given as non-restrictive examples only and represented in the accompanying drawings in which:

- figure 1 is a diagrammatic illustration of a vehicle according to a first embodiment of the invention;
- figure 2 illustrates a vehicle according to a second embodiment of the invention;
- figures 3A, 3B and 3C illustrate a driving cabin of the vehicle of figure 2;
- figures 4A, 4B and 4C illustrate a variant of the driving cabin of figure 2.

[0019] Throughout the description and drawings, identical reference numbers will be used to indicate identical or similar elements of the various embodiments.

DETAILED DESCRIPTION OF A PREFERED EMBODIMENT

[0020] With reference to Figure 1, single-car or multi-car track-bound transportation vehicle 10 has a first end 12A facing a first direction 14A, a second end 12B facing a second, opposite, direction 14B. The vehicle is powered by motors or engines to run in both directions.

[0021] First, resp. second sets of video units 16A, 16B, are provided at the first, resp. second end 12A, 12B of the vehicle for the acquisition of continuous images of the track towards the first, resp. second direction 14A, 14B.

[0022] The vehicle is provided with a driving cabin 18, which can be located anywhere on the vehicle, and preferably offset from the front and rear ends 12A, 12B of the vehicle.

[0023] The driving cabin 18 is provided a single, rotating driver's seat 20 which can be moved between a first sitting position towards the first end 12A and the first direction 14A, and a second, opposite, sitting position towards the second end 12B and the second direction 14B. The driving cabin 18 is further provided with a control desk assembly 22 including a first control desk 22A used in the first sitting position for driving the track-bound vehicle 10 in the first direction 14A and a second control desk 22B used in the second position for driving the track-bound vehicle 10 in the second direction 14B. The driver's seat 20 and the control desk 22A, 22B can be rotated automatically or manually. For a manual rotation the driver can be given an instruction to rotate the seat by means of visual information (lamp, screen, etc.) and /or by means of audible information (buzzer, etc.) until the seat and control desk face the direction of travel.

[0024] The driving cabin is further provided with a visual display screen assembly 24 including a first, resp. second visual display screen 24A, 24B, located on the first, resp. second control desk 22A, 22 and connected to the first, resp. second set of video units 16A, 16B for displaying real time images of the track in the direction

the driver is facing.

[0025] To avoid any error, the control desk 22A, 22B opposite to the direction of travel, is deactivated by an inhibiting means (not shown). Alternatively, only the visual display screen 24A, 24B opposite to the direction of travel can be deactivated.

[0026] The second embodiment illustrated in Figure 2 and 3 differs from the embodiment of Figure 1 in the particular, more compact, design of the driving cabin 20, which includes a single control desk 22 that pivots together with the driver's seat 20. The control desk 22 is equipped with one or more visual display screens 24, which are connected to the video units 16A, 16B at the front and rear ends of the vehicle.

[0027] In order to avoid any disturbance of the driver, the screen 24 can only display images in the direction in which the driver is sitting. Accordingly, when the driver is sitting in the first sitting position of Figure 3A, the screen 24 displays images from the video units 16A located at the first end 12A of the vehicle, while in the second sitting position of Figure 3C, the screen 24 displays images taken from the second end 12B of the vehicle. In the intermediate position of Figure 3C, it may be decided that no image are available or that a choice can be made between the display directions. For safety reasons controls and commands are disabled in the intermediate position. The seat 20 and the control desk 22 can be driven by the same actuator (motor, pneumatic cylinder or any kind of mechanical system allowing a final rotation) or have different actuators. A common actuator is simpler than separate actuators, which require synchronization.

[0028] If more than one visual display screen 24 are used, e.g. a main display screen directly in front of the seat and a rear-view screen directly next to the main screen, the two screens are automatically linked to the video units at the corresponding end of the vehicle, depending on position of the seat 20 and control desk 22.

[0029] In the variant of figures 4A to 4C, the driving cabin 18 is equipped with a rotating seat 20 provided with a control desk assembly 22 comprising two side control panels 22.1, 22.2 directly adjacent to the arm rests of the seat 20. This configuration offers a better access to the seat 20. The side control panels 22.1, 22.2 may comprise a joystick-type drive-by-wire control member, e.g. as disclosed in EP1400426, or any type of control members that allow control of the essential driving functions of the vehicle, including at least drive power and braking of the vehicle. The side control panels 22.1, 22.2 do not include the visual display screens 24A, 24B, which are stationary and placed on two end walls 12A, 12B of the driving cabin 18. As previously discussed in connection with the first embodiment, one visual display screen 24A or set of screens is visible from the seat 20 in the first sitting position of Fig. 4A and displays the images from the video units 16A at the first end 12A of the vehicle, while the other visual display screen or set of screens 24B is dedicated to the other direction 14B. If there is not sufficient space for all visual displays 24A, 24B on the control desk 22 some buttons or visual displays 24A, 24B can be fixed on the walls of the driving cabin 18.

[0030] While the above examples illustrate preferred embodiments of the present invention it is noted that various other arrangements of the driving cabin 18 and vehicle 10 may also be considered, which fall within the scope of the appended claims.

[0031] The visual display screen can be linked to video units distributed at regular interval along the track, in the direction of travel.

[0032] The vehicle cabin can be provided with an external and/or internal door. It can also be provided with a side window, which can provide additional direct information on the direction of travel.

[0033] A second set of display screens can be included for a second driver.

[0034] To reach a good safety level, some components, in particular the video units 16A, 16B and links between video units 16A, 16B and screens 24A, 24B are duplicated. A wireless connection between the video units 16A, 16B and screens 24A, 24B is also contemplated.

[0035] The vehicle cabin described above can be integrated to any kind of track-bound single-car or multi-car bidirectional transportation vehicle, including locomotives and locomotive-hauled trains, railcars or single powered coaches or articulated vehicles with distributed motive power.

Claims

1. A track-bound single-car or multi-car transportation vehicle (10) provided with a first end (12A) facing a first direction (14A), a second end (12B) facing a second, opposite, direction (14B), and a driving cabin (18) located in a midsection of the vehicle offset from the first and second ends (12A, 12B) for driving the vehicle (10) in the first and second directions, wherein the driving cabin is without windshield and without direct visibility towards the direction of travel and comprises: a visual display screen assembly (24) for displaying real time images of the track at least from the first end (12A) of the vehicle towards the first direction (14A)
characterised in that the driving cabin further comprises:

- a sitting assembly (20) for sitting the driver in a first sitting position towards the first direction (14A), and for sitting the driver in a second sitting position towards the second direction (14B), wherein the visual display screen assembly (24) includes a first visual display screen (24A) for displaying real time images of the track taken from the first end of the vehicle towards the first direction to a driver sitting in the first sitting position and looking in the first direction, and a sec-

ond visual display screen (24B) for displaying real time images of the track taken from the second end of the vehicle towards the second direction to a driver sitting in the second sitting position and looking in the second direction; and
- a control desk assembly (22) for driving the track-bound vehicle in the first direction (14A) from the first sitting position, and for driving the track-bound vehicle in the second direction (14B) from the second sitting position, wherein the one of the first and second visual display screens (24A, 24B) opposite to the direction of travel can be deactivated.

2. The track-bound vehicle of claim 1, wherein the control desk assembly (22) includes a first control desk (22A) for driving the track-bound vehicle in the first direction from the first sitting position, and a second control desk (22B) for driving the track-bound vehicle in the second direction from the second sitting position.

3. The track-bound vehicle of claim 2, wherein the control desk assembly (22) includes means for inhibiting use of the second control desk (22B) when the vehicle is driving in the first direction and for inhibiting use of the first control desk (22A) when the vehicle is driving in the second direction.

4. The track-bound vehicle of claim 2 or claim 3, wherein the first control desk (22A) and the second control desk (22B) are identical.

5. The track-bound vehicle of claim 1, wherein the control desk assembly includes a rotatable control desk assembly (22), which can be moved between a first desk position for driving the track-bound vehicle in the first direction from the first sitting position, and a second desk position for driving the track-bound vehicle in the second direction from the second sitting position.

6. The track-bound vehicle of any one of the foregoing claims, wherein the visual display screen assembly is linked to at least a first video unit (16A) for continuously acquiring images of the track towards the first, resp. second direction (14A).

7. The track-bound vehicle of claim 6, wherein the visual display screen assembly is linked to at least a second video unit (16B) for continuously acquiring images of the track towards the second direction (14B).

8. The track-bound vehicle of any one of the foregoing claims, wherein the visual display screen assembly (24) includes inhibiting means for inhibiting display of real time images of the track from the first end of the vehicle towards the first direction to a driver sitting in the first sitting position and looking in the first direction when the vehicle is driving in the second direction, and for inhibiting display of real time images of the track from the second end of the vehicle towards the second direction to a driver sitting in the second sitting position and looking in the second direction, when the vehicle is driving in the first direction.

9. The track-bound vehicle of any one of the foregoing claims, wherein the sitting assembly (20) comprises a rotatable seat for sitting in the first sitting position and in the second sitting position.

10. The track-bound vehicle of claims 5 and 9, wherein the rotatable control desk assembly rotates with the rotatable seat.

Patentansprüche

1. Schienengebundenes Einzelwagen- oder Mehrwagen-Transportfahrzeug (10) ausgestattet mit einem ersten Ende (12A), das in eine erste Richtung (14A) zeigt, einem zweiten Ende (12B), das in eine zweite, entgegengesetzte Richtung (14B) zeigt, und eine Fahrerkabine (18), die sich in einem mittleren Abschnitt des Fahrzeugs befindet, versetzt vom ersten und vom zweiten Ende (12A, 12B), um das Fahrzeug (10) in die erste und in die zweite Richtung zu fahren, wobei die Fahrerkabine keine Windschutzscheibe und keine direkte Sicht in die Fahrtrichtung aufweist und Folgendes umfasst: eine visuelle Bildschirmanordnung (24) zur Anzeige von Echtzeitbildern des Schienen mindestens vom ersten Ende (12A) des Fahrzeugs in die erste Richtung (14A),
dadurch gekennzeichnet, dass die Fahrerkabine weiter Folgendes umfasst:

- eine Sitzanordnung (20) zum Sitzen des Fahrers in einer ersten Sitzposition in die erste Richtung (14A) und zum Sitzen des Fahrers in einer zweiten Sitzposition in die zweite Richtung (14B), wobei die visuelle Bildschirmanordnung (24) einen ersten visuellen Bildschirm (24A) umfasst, um Echtzeitbilder der Schienen, aufgenommen vom ersten Ende des Fahrzeugs in die erste Richtung, einem Fahrer anzuzeigen, der in der ersten Sitzposition sitzt und in die erste Richtung schaut, und einen zweiten visuellen Bildschirm (24B), um Echtzeitbilder der Schienen, aufgenommen vom zweiten Ende des Fahrzeugs in die zweite Richtung, einem Fahrer anzuzeigen, der in der zweiten Sitzposition sitzt und in die zweite Richtung schaut, und
- eine Schaltpultanordnung (22), um das schienengebundene Fahrzeug in die erste Richtung

(14A) von der ersten Sitzposition zu fahren, und um das schienengebundene Fahrzeug in die zweite Richtung (14B) von der zweiten Sitzposition zu fahren, wobei der eine des ersten und des zweiten Bildschirms (24A, 24B) entgegen der Fahrtrichtung deaktiviert werden kann.

2. Schienengebundenes Fahrzeug nach Anspruch 1, wobei die Schaltpultanordnung (22) ein erstes Schaltpult (22A) umfasst, um das schienengebundene Fahrzeug in die erste Richtung von der ersten Sitzposition zu fahren, und ein zweites Schaltpult (22B), um das schienengebundene Fahrzeug in die zweite Richtung von der zweiten Sitzposition zu fahren.

3. Schienengebundenes Fahrzeug nach Anspruch 2, wobei die Schaltpultanordnung (22) Mittel umfasst, um die Verwendung des zweiten Schaltpults (22B) zu unterbinden, wenn das Fahrzeug in die erste Richtung fährt, und um die Verwendung des ersten Schaltpults (22A) zu unterbinden, wenn das Fahrzeug in die zweite Richtung fährt.

4. Schienengebundenes Fahrzeug nach Anspruch 2 oder Anspruch 3, wobei das erste Schaltpult (22A) und das zweite Schaltpult (22B) identisch sind.

5. Schienengebundenes Fahrzeug nach Anspruch 1, wobei die Schaltpultanordnung eine drehbare Schaltpultanordnung (22) umfasst, die zwischen einer ersten Pultposition, um das schienengebundene Fahrzeug von der ersten Sitzposition in die erste Richtung zu fahren, und einer zweiten Pultposition um das schienengebundene Fahrzeug von der zweiten Sitzposition in die zweite Richtung zu fahren, bewegt werden kann.

6. Schienengebundenes Fahrzeug nach einem der vorhergehenden Ansprüche, wobei die visuelle Bildschirmanordnung mit mindestens einer ersten Videoeinheit (16A) verbunden ist, um ununterbrochen Bilder der Schienen zur ersten bzw. zur zweiten Richtung hin (14A) zu erhalten.

7. Schienengebundenes Fahrzeug nach Anspruch 6, wobei die visuelle Bildschirmanordnung mit mindestens einer zweiten Videoeinheit (16B) verbunden ist, um ununterbrochen Bilder der Schienen zur zweiten Richtung hin (14B) zu erhalten.

8. Schienengebundenes Fahrzeug nach einem der vorhergehenden Ansprüche, wobei die visuelle Bildschirmanordnung (24) Unterbindungsmittel zur Unterbindung der Anzeige von Echtzeitbildern der Schienen vom ersten Ende des Fahrzeugs in die erste Richtung an einen Fahrer, der in der ersten Sitzposition sitzt und in die erste Richtung schaut, wenn das Fahrzeug in die zweite Richtung fährt, und zur Unterbindung der Anzeige von Echtzeitbildern der Schienen vom zweiten Ende des Fahrzeugs in die zweite Richtung an einen Fahrer, der in der zweiten Sitzposition sitzt und in die zweite Richtung schaut, wenn das Fahrzeug in die erste Richtung fährt, umfasst.

9. Schienengebundenes Fahrzeug nach einem der vorhergehenden Ansprüche, wobei die Sitzanordnung (20) einen drehbaren Sitz umfasst, um in der ersten Sitzposition und in der zweiten Sitzposition zu sitzen.

10. Schienengebundenes Fahrzeug nach Anspruch 5 und 9, wobei sich die drehbare Schaltpultanordnung mit dem drehbaren Sitz dreht.

Revendications

1. Véhicule de transport (10) assujetti à une voie, à voiture unique ou à voitures multiples, pourvu d'une première extrémité (12A) faisant face à une première direction (14A), d'une deuxième extrémité (12B) faisant face à une deuxième direction (14B) opposée, et d'une cabine de conduite (18) située dans une section centrale du véhicule décalée des première et deuxième extrémités (12A, 12B) pour conduire le véhicule (10) dans les première et deuxième directions, dans lequel la cabine de conduite est sans pare-brise et sans visibilité directe dans la direction de déplacement et comprend : un ensemble d'écrans d'affichage visuel (24) pour afficher des images en temps réel de la voie au moins à partir de la première extrémité (12A) du véhicule dans la première direction (14A),
caractérisé en ce que la cabine de conduite comprend en outre :

- un ensemble formant siège (20) pour asseoir le conducteur dans une première position assise dans la première direction (14A), et pour asseoir le conducteur dans une deuxième position assise dans la deuxième direction (14B), dans lequel l'ensemble d'écrans d'affichage visuel (24) comprend un premier écran d'affichage visuel (24A) pour afficher des images en temps réel de la voie prises à partir de la première extrémité du véhicule dans la première direction pour un conducteur assis dans la première position assise et regardant dans la première direction, et un deuxième écran d'affichage visuel (24B) pour afficher des images en temps réel de la voie prises à partir de la deuxième extrémité du véhicule dans la deuxième direction pour un conducteur assis dans la deuxième position assise et regardant dans la deuxième direction ; et

- un ensemble formant pupitre de commande (22) pour conduire le véhicule assujetti à une voie dans la première direction (14A) dans la première position assise, et pour conduire le véhicule assujetti à une voie dans la deuxième direction (14B) dans la deuxième position assise, dans lequel celui des premier et deuxième écrans d'affichage visuel (24A, 24B) qui est opposé à la direction de déplacement peut être désactivé.

2. Véhicule assujetti à une voie selon la revendication 1, dans lequel l'ensemble formant pupitre de commande (22) comprend un premier pupitre de commande (22A) pour conduire le véhicule assujetti à une voie dans la première direction dans la première position assise, et un deuxième pupitre de commande (22B) pour conduire le véhicule assujetti à une voie dans la deuxième direction dans la deuxième position assise.

3. Véhicule assujetti à une voie selon la revendication 2, dans lequel l'ensemble formant pupitre de commande (22) comprend des moyens pour empêcher l'utilisation du deuxième pupitre de commande (22B) lorsque le véhicule se déplace dans la première direction et pour empêcher l'utilisation du premier pupitre de commande (22A) lorsque le véhicule se déplace dans la deuxième direction.

4. Véhicule assujetti à une voie selon la revendication 2 ou la revendication 3, dans lequel le premier pupitre de commande (22A) et le deuxième pupitre de commande (22B) sont identiques.

5. Véhicule assujetti à une voie selon la revendication 1, dans lequel l'ensemble formant pupitre de commande comprend un ensemble formant pupitre de commande (22) tournant, qui peut être déplacé entre une première position de pupitre pour conduire le véhicule assujetti à une voie dans la première direction dans la première position assise, et une deuxième position de pupitre pour conduire le véhicule assujetti à une voie dans la deuxième direction dans la deuxième position assise.

6. Véhicule assujetti à une voie selon l'une quelconque des revendications précédentes, dans lequel l'ensemble d'écrans d'affichage visuel est relié à au moins une première unité vidéo (16A) pour acquérir continûment des images de la voie dans la première, respectivement la deuxième direction (14A).

7. Véhicule assujetti à une voie selon la revendication 6, dans lequel l'ensemble d'écrans d'affichage visuel est relié à au moins une deuxième unité vidéo (16B) pour acquérir continûment des images de la voie dans la deuxième direction (14B).

8. Véhicule assujetti à une voie selon l'une quelconque des revendications précédentes, dans lequel l'ensemble d'écrans d'affichage visuel (24) comprend des moyens d'interdiction pour empêcher un affichage d'images en temps réel de la voie à partir de la première extrémité du véhicule dans la première direction pour un conducteur assis dans la première position assise et regardant dans la première direction lorsque le véhicule se déplace dans la deuxième direction, et pour empêcher un affichage d'images en temps réel de la voie à partir de la deuxième extrémité du véhicule dans la deuxième direction pour un conducteur assis dans la deuxième position assise et regardant dans la deuxième direction, lorsque le véhicule se déplace dans la première direction.

9. Véhicule assujetti à une voie selon l'une quelconque des revendications précédentes, dans lequel l'ensemble formant siège (20) comprend un siège pouvant tourner pour s'asseoir dans la première position assise et dans la deuxième position assise.

10. Véhicule assujetti à une voie selon les revendications 5 et 9, dans lequel l'ensemble formant pupitre de commande pouvant tourner tourne avec le siège pouvant tourner.

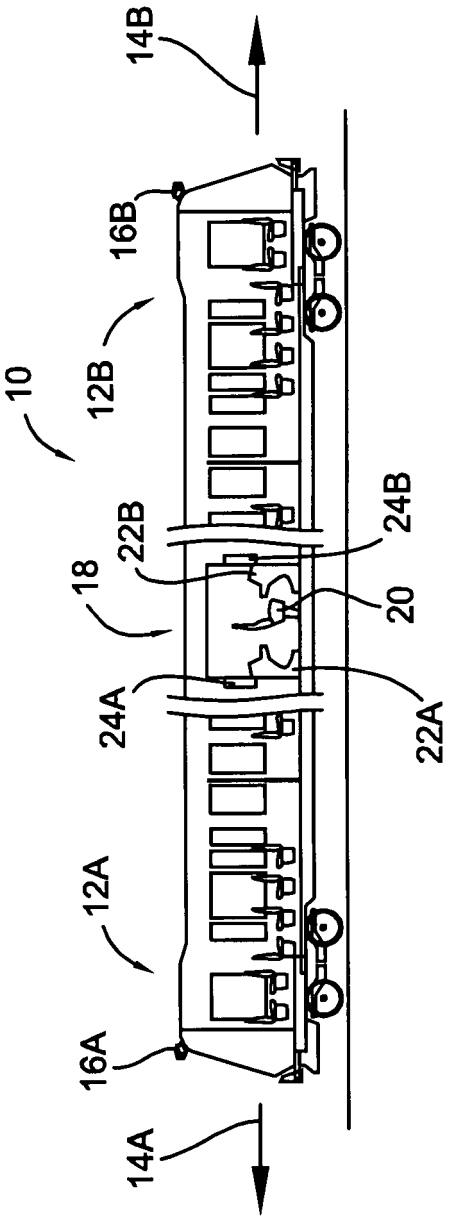

14B
16B
12B
10
22B
24B
18
20
24A
22A
12A
16A
14A

Fig. 1

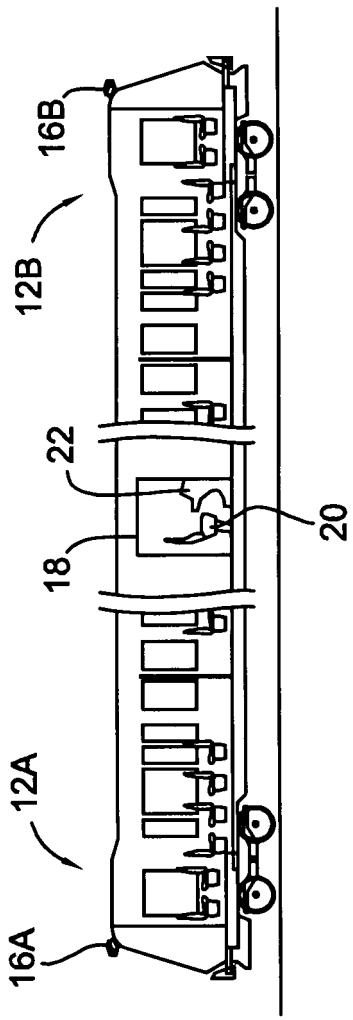

16B
12B
22
18
20
12A
16A

Fig. 2

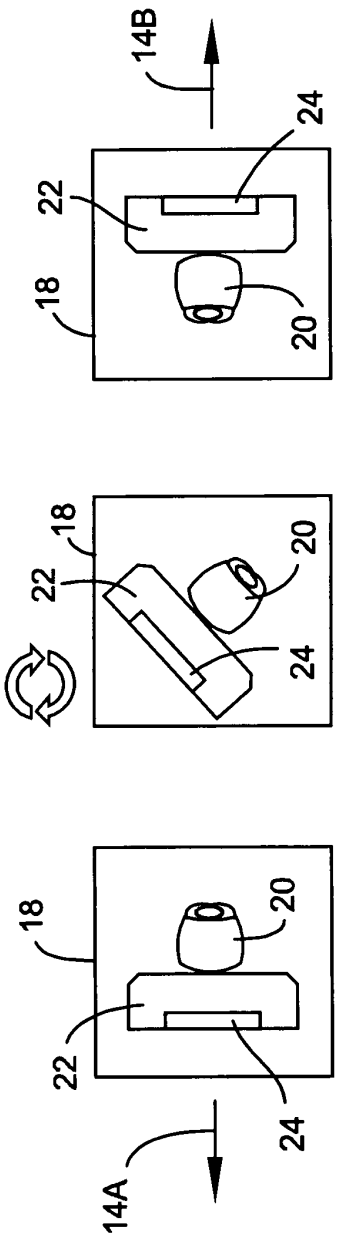


Fig. 3A

Fig. 3B

Fig. 3C

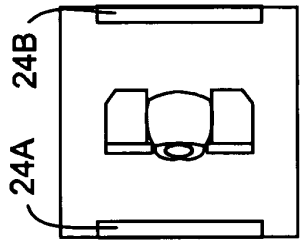


Fig. 4C

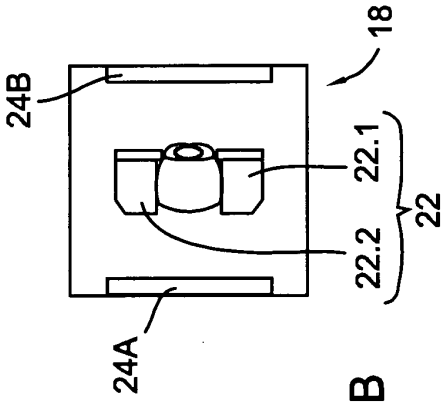


Fig. 4B

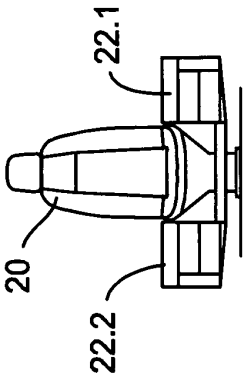


Fig. 4A

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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