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(72) Inventor: **Demeulenaere, Ludovic**
59310 ORCHIES (FR)

(74) Representative: **Broydé, Marc et al**
BUGNION SA
P.O.Box 375
1211 Geneva 12 (CH)

(71) Applicant: **Bombardier Transportation GmbH**
10785 Berlin (DE)

(54) **Rail vehicle provided with a panoramic passenger front-end portion and an offset driving cabin**

(57) A passenger rail vehicle (10) for circulating on a rail track (12), consists of a streamlined front-end portion (14) provided with a panoramic windshield (38) providing a view on the rail track (12) in front of the passenger rail vehicle (10), a rear-end portion (18) and an intermediate

portion (16) extending from the front-end portion (14) to the rear-end portion (18). The passenger rail vehicle (10) accommodates a driving cabin (25) located in the intermediate portion (16) without direct view on the track (12) and at least one passenger area (34) that extends within the front-end portion (14).

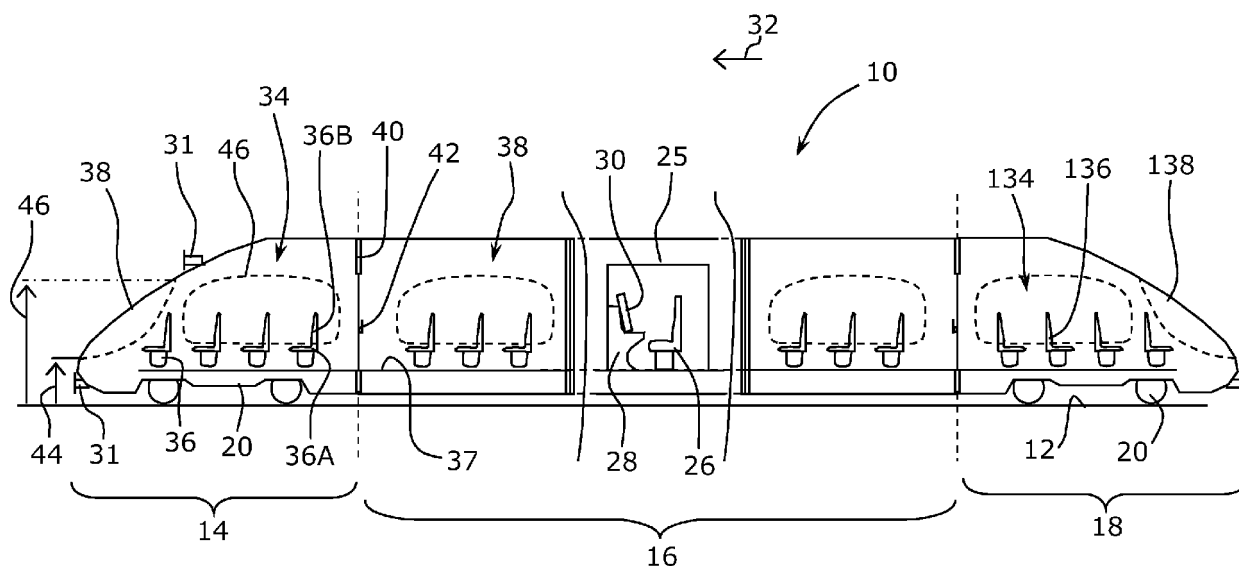


Fig. 1

Description

TECHNICAL FIELD OF THE INVENTION

[0001] This invention relates to a passenger rail vehicle, in particular but not exclusively to an intercity or a high-speed self-propelled multiple-unit rail vehicle for carrying passengers.

BACKGROUND ART

[0002] EP 0 891 909 discloses a streamlined double-decker vehicle or motor carriage for standard-gauge railway trains, with a driver's cab that can be locked relative to the passenger area and is provided centrally above the running gear relative to the longitudinal centre of the vehicle, the space situated between the front end of the carriage and the driver's cab being designed as a passenger area, which is accessible from the interior of the vehicle via a side corridor situated laterally next to the driver's cab, and panoramic glazing extending from the front passenger area over the driver's cab. The driver's cab is arranged on a floor level that is between the height predetermined by the overall height of the running gear and the floor level of the top deck. The space underneath the driver's cab is provided for accommodating technical equipment. In this configuration, the front passenger area has a limited space and a limited view, since room has to be allocated to the driver's cab with a direct view on the track in front of the vehicle.

[0003] It has been suggested in EP 0 695 253 to arrange a control desk for driving a rail 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 to generate the information available on the screens. This document, however, does not suggest taking advantage of the space at the front end of the vehicle for a dedicated passenger area.

SUMMARY OF THE INVENTION

[0004] It is an object of the present invention to provide a rail vehicle with enhanced passenger comfort, in particular in a front portion of the vehicle.

[0005] According to the invention, there is provided a passenger rail vehicle for circulating on a rail track, consisting of a streamlined front-end portion provided with a panoramic windshield providing an outside view on the rail track in front of the passenger rail vehicle, a rear-end portion and an intermediate portion between the front and rear-end portions, the passenger rail vehicle accommodating a driving cabin located in the intermediate portion without direct view on the track, and at least one passenger area that extends within the front-end portion.

[0006] Thanks to the position of the driving cabin outside the front-end portion, more space can be allocated to passengers willing to sit in the front portion. The size of the panoramic windshield, and its height in particular, is not limited. the panoramic windshield provides passengers with a wide-angle view in front, beside, above and under their position.

[0007] According to a preferred embodiment, the passenger area includes seats located in the front portion. The seats can be arranged in one or preferably a plurality of rows one behind the other. The seats preferably face the panoramic windshield to provide the view to the passengers.

[0008] The panoramic windshield can be made in one or several parts. The front-end portion may also be provided with side windows.

[0009] According to one embodiment, the passenger area within the front-end portion is separated from the intermediate portion by a partition wall provided with an access door. This partition wall is used for restricting the access to the front portion with the view through the panoramic windshield to a specific category of passengers or to passengers willing to experience the view.

[0010] The front-end portion of the rail vehicle is preferably provided with a fender and a shock-absorbing structure. The part of the front portion of the rail vehicle where the passengers are located is preferably reinforced so as not to collapse in case of a collision.

[0011] According to one embodiment, the rear-end portion of the rail vehicle is provided with a coupler for coupling the passenger rail vehicle to a further passenger rail vehicle and with an intercirculation for accessing the further passenger rail vehicle.

[0012] Alternatively, the rear-end portion of the rail vehicle can be similar to the front-end portion, in particular if the rail vehicle is intended to run in both directions. In such a case, the rear-end portion is preferably streamlined and can be provided with a panoramic windshield and with a passenger area, which can include passenger seats. The seats at both ends of the vehicle can also be individual pivotable seats, such that the passengers in the front and rear passenger areas can always sit in the direction of travel.

[0013] The passenger rail vehicle can be a single-deck vehicle or a double-deck vehicle, a multiple-car or single car vehicle and is preferably self-propelled.

[0014] The passenger rail vehicle is preferably provided with at least one video unit for continuously acquiring images of a track in front of the front-end portion of the rail vehicle, the driving cabin being provided with at least one display screen for displaying the images from the video unit, as disclosed e.g. in EP 0 695 253.

DESCRIPTION OF THE FIGURES

[0015] An illustrative embodiment of the invention will now be described, purely by way of example and without limitation to the scope of the claims, and with reference

to the accompanying drawing, in which Fig. 1 is a diagrammatic illustration of a rail vehicle according to the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0016] With reference to Figure 1, a self-propelled multiple-unit passenger rail vehicle 10 for circulating on a standard gauge rail track 12. In this example, the rail vehicle includes at least a front carriage and a rear carriage, and potentially one or several intermediate carriages. The multiple-unit rail vehicle 10 has a streamlined front-end portion 14, an intermediate portion 16 and a rear-end portion 18. The front-end and rear-end portions extend over less than half the length of the front, resp. rear carriages. The intermediate portion includes more than half of the front and rear carriages and, if provided, all the intermediate carriages. The front-end portion 14 includes a front bogie 20, and the rear-end portion 18 a rear bogie 22. These bogies can be motorised.

[0017] The vehicle is provided with a driving cabin 25, which can be located anywhere in the intermediate portion 16 of the vehicle, offset from the front-end portion 14 and rear-end portion 18 of the vehicle without direct view through the windshield on the track in front of the vehicle. The driving cabin 25 is provided with at least one driver's seat 26 in front of at least one control desk 28 including at least one visual display screen 30 connected to a set of video units 31 for displaying real time images of the track in the direction of travel 32. The driving cabin is preferably provided with a door for isolating the driving cabin from the passenger saloon in the intermediate portion.

[0018] The free space at the front end of the vehicle is allocated to passengers. More specifically, a passenger area 34 equipped with seats 36 located in the front-end portion and facing a panoramic windshield 38 providing the passengers with a wide-angle outside view on the rail track in front of the rail vehicle. The seats 36 have seat cushions 36A and seat backs 36B and are arranged in a plurality of rows one behind the other. The passenger area 34 is preferably a passenger compartment, separated from the main saloon 38 in the intermediate part 16 of the vehicle by a partition wall 40, with an access door 42.

[0019] Passengers sitting in the front passenger compartment 34 will experience a unique view on the track 12 in the direction of travel 32. In order to further enhance the feeling of speed experienced when the rail vehicle runs at high speed, the surface of the windshield 38 is maximised, reaching from a height 44 below the height of the cushions 36A of the seats 36 in the front passenger compartment 34 and preferably from the floor level 37 in the front passenger compartment up to a height 46 above the height of the back 36B of the seats 36 and preferably greater than 1.8 meters measured from the floor level. The windshield 38 is made of a transparent material, pref-

erably glass, in one or several planar or curved panes to give a maximum external view to the passengers. The front-end portion 14 is provided with side windows 46 in continuity with the windshield. Structural pillars between the panes of the windshield and/or between the windshield 38 and the side windows 46 can be added to confer rigidity to the structure of the front-end portion.

[0020] The front-end portion 14 is provided with a reinforced structure at the level of the sitting area and a plastically deformable energy-absorbing zone in front of the sitting area.

[0021] Various changes can be made.

[0022] The driving cabin 25 can be located anywhere on the rail vehicle at a position offset from the front and rear-end portions, in particular in an intermediate carriage or in the intermediate portion of the front carriage.

[0023] The rear-end portion 18 of the rail vehicle can be streamlined and provided with a panoramic windshield 138 similar to the front-end portion 14, to accommodate another passenger area 134 with passenger seats 136. If the vehicle is intended to drive in both directions, the seats 36, 136 in the front-end and rear-end portions can be provided with pivot means to pivot by 180° and face the direction of travel. Many different interior arrangements can be imagined with different type of seat, bench, standing area. Preferably, the driving cabin 25 is such that the driver can always sit in the direction of travel as disclosed in co-pending European patent application No. 11000656.6, the content of which is hereby incorporated by reference.

[0024] The main saloon 38 may be provided with individual display screens in front of each seat or with one or more larger display screen for a plurality of passengers, to display the images captured by the video units 31.

[0025] It is also possible to provide the front and/or rear-end portion with a removable or retractable windscreen. The removable windscreen at the rear end of the vehicle can be removed or retracted and replaced with a safety net. This allows passengers willing to feel the speed of the vehicle to stay or sit in the rear-end passenger compartment in safety. Above a certain speed, access to the rear-end passenger compartment is automatically prevented. Alternatively, the rear-end windscreen is automatically put back in place above a certain speed.

[0026] While the drawings illustrate a single-deck vehicle, the same principle can be applied to a double-deck vehicle.

Claims

1. A passenger rail vehicle (10) for circulating on a rail track (12), consisting of a streamlined front-end portion (14) provided with a panoramic windshield (38) providing a view on the rail track (12) in front of the passenger rail vehicle (10), a rear-end portion (18) and an intermediate portion (16) extending from the front-end portion (14) to the rear-end portion (18),

the passenger rail vehicle (10) accommodating a driving cabin (25) and at least one passenger area (34), **characterised in that** the driving cabin (25) is located in the intermediate portion (16) without direct view on the track (12), and the passenger area (34) extends within the front-end portion (14).

2. The passenger rail vehicle of claim 1, **characterised in that** the panoramic windshield (38) provides the passengers with an external view in front, beside, above and under their position. 10
3. The passenger rail vehicle of claim 1 or claim 2, **characterized in that** the passenger area (34) includes seats (36) located in the front portion. 15
4. The passenger rail vehicle of claim 3, **characterised in that** the seats (36) face the panoramic windshield.
5. The passenger rail vehicle of claim 3 or claim 4, **characterised in that** the seats are arranged in a plurality of rows one behind the other. 20
6. The passenger rail vehicle of any one of claims 3 to 5, **characterised in that** the seats (36) have a seat cushions (36A) and a seat backs (36B) and **in that** the windscreen (38) extends from a height below the seat cushions up to a height above the seat backs. 25
7. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the front-end portion is provided with side windows (46). 30
8. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the passenger area (34) within the front-end portion is separated from the intermediate portion (16) by a partition (40) provided with an access door opening (42). 35
9. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the rear-end portion (18) of the rail vehicle is provided with a panoramic windshield. 40
10. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the rear-end portion of the rail vehicle is provided with passenger seats. 45
11. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the passenger rail vehicle is a single-deck vehicle. 50
12. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the passenger rail vehicle is a double-deck vehicle. 55
13. The passenger rail vehicle of any one of the preceding

ing claims, **characterised in that** the front-end portion (14) and rear-end portion (18) are provided with bogies (20, 22).

- 5 14. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the passenger rail vehicle (10) is provided with at least one video unit (31) for continuously acquiring images of a track in front of the front-end portion of the rail vehicle, the driving cabin (25) being provided with at least one display screen (30) for displaying the images from the video unit (31). 10
15. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the windscreen can be removed or retracted and replaced with a safety net. 15

20 Amended claims in accordance with Rule 137(2) EPC.

1. An intercity or high-speed self-propelled multiple-unit passenger rail vehicle (10) for circulating on a rail track (12), consisting of a streamlined front-end portion (14) provided with a panoramic windshield (38) providing a view on the rail track (12) in front of the passenger rail vehicle (10), a rear-end portion (18) and an intermediate portion (16) extending from the front-end portion (14) to the rear-end portion (18), the passenger rail vehicle (10) accommodating a driving cabin (25) and at least one passenger area (34), **characterised in that** the driving cabin (25) is located in the intermediate portion (16) without direct view on the track (12), the rail vehicle (10) is provided with at least one video unit (31) for continuously acquiring images of a track in front of the front-end portion of the rail vehicle, the driving cabin (25) is provided with at least one display screen (30) for displaying the images from the video unit (31) and the passenger area (34) extends within the front-end portion (14). 30

2. The passenger rail vehicle of claim 1, **characterised in that** the panoramic windshield (38) provides the passengers with an external view in front, beside, above and under their position. 35

3. The passenger rail vehicle of claim 1 or claim 2, **characterized in that** the passenger area (34) includes seats (36) located in the front portion. 40

4. The passenger rail vehicle of claim 3, **characterised in that** the seats (36) face the panoramic windshield. 45

5. The passenger rail vehicle of claim 3 or claim 4, **characterised in that** the seats are arranged in a

plurality of rows one behind the other.

6. The passenger rail vehicle of any one of claims 3 to 5, **characterised in that** the seats (36) have a seat cushions (36A) and a seat backs (36B) and **in that** the windscreen (38) extends from a height below the seat cushions up to a height above the seat backs. 5

7. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the front-end portion is provided with side windows (46). 10

8. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the passenger area (34) within the front-end portion is separated from the intermediate portion (16) by a partition (40) provided with an access door opening (42). 15

9. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the rear-end portion (18) of the rail vehicle is provided with a panoramic windshield. 20

10. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the rear-end portion of the rail vehicle is provided with passenger seats. 25

11. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the passenger rail vehicle is a single-deck vehicle. 30

12. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the passenger rail vehicle is a double-deck vehicle. 35

13. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the front-end portion (14) and rear-end portion (18) are provided with bogies (20, 22). 40

14. The passenger rail vehicle of any one of the preceding claims, **characterised in that** the windscreen can be removed or retracted and replaced with a safety net. 45

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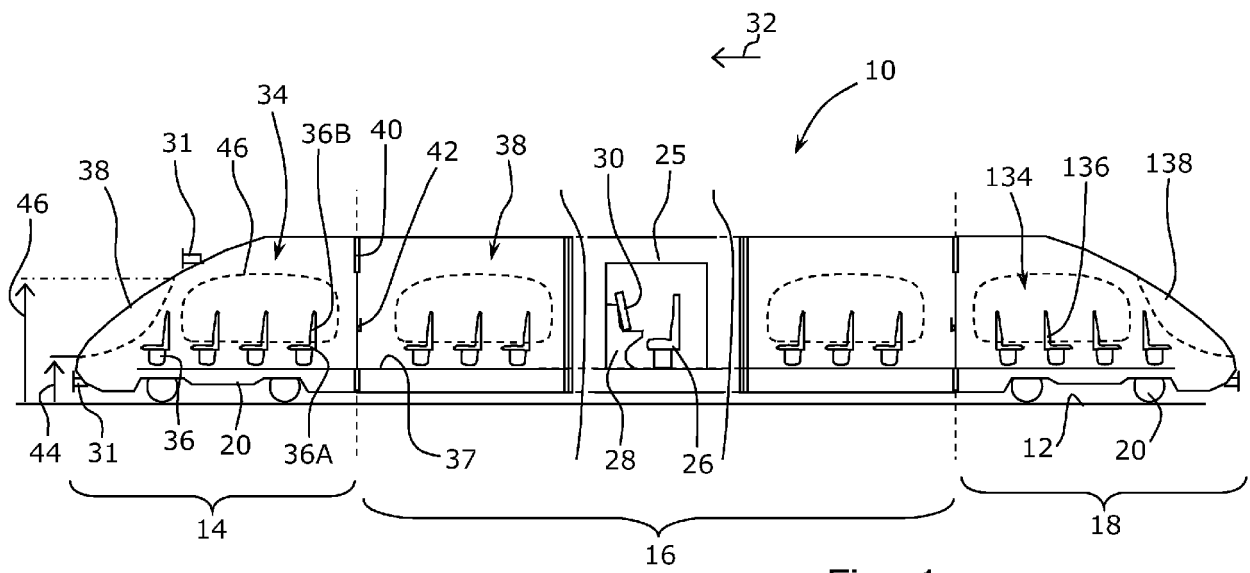


Fig. 1



EUROPEAN SEARCH REPORT

Application Number
EP 12 15 5551

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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 10 July 2012	Examiner Chlost, Peter
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- EP 0695253 A [0003] [0014]
- EP 11000656 A [0023]