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(54) **Passenger seat fixation for a vehicle**

Befestigung eines Fahrgastsitzes für ein Fahrzeug

Fixation de siège de passager pour véhicule

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DescriptionBACKGROUND OF THE INVENTION

[0001] The invention relates to a wagon body of a vehicle, in particular a rail vehicle, according to the preamble of claim 1 and comprising a passenger compartment with a compartment floor and a seat fixation device located within the passenger compartment. The passenger compartment defines a longitudinal direction, a transverse direction and a height direction, a centerline plane, a first compartment side and a second compartment side. The centerline plane runs parallel to the longitudinal direction and the height direction, wherein the first and second compartment side are located at opposite sides of the centerline plane. The seat fixation device comprises a first seat fixation unit and a second seat fixation unit located at the compartment floor, the first seat fixation unit being located at the first compartment side at a first distance from the centerline plane and the second seat fixation unit being located at the second compartment side at a second distance from the centerline plane.

[0002] In public transportation, in particular in regional and commuter traffic, train set operators typically desire to achieve and use the maximum transport capacity of the train set in order to be as cost effective as possible. However, the attractiveness of train lines to passengers may reach its limits or even decline due to the passengers' perception of a lack in passenger comfort if train sets are always operated under their maximum seating capacity. This may lead to a situation where potential passengers may choose other perceivably more comfortable means of transportation. A situation which is, obviously, not in the interest of train set operators.

[0003] Thus, from the point of view of a train set operator there is a need for high flexibility in the internal equipment of their rolling stock allowing rapid reactions to changes in passenger comfort preferences, eventually even between different lines (e.g. a local commuter line with higher station frequencies and a regional line with lower station frequencies) operated at a time.

[0004] Conventional wagon bodies as they are known, for example, from WO 98/09860 A1 typically show a seat fixation design with first and second seat fixation units located at the compartment floor at equal distance from the centerline plane. Typically, a so called 2+2 seat arrangement (per row) is chosen with two seats on each vehicle side. The first and second seat fixation units each either support a seat post located at the inner side of the inner seat (i.e. at the central corridor) or located between the two seats supported. Both configurations allow rather limited flexibility in terms of different seat arrangements at low expense.

[0005] A generic wagon body with asymmetric seat fixation design and a so called 2+3 seat arrangement (per row) is known from US 2008/0315036 A1 (corresponding to the preamble of claim 1).

SUMMARY OF THE INVENTION

[0006] It is thus an object of the invention to, at least to some extent, overcome the above disadvantages and to provide a wagon body that allows a more flexible passenger seat arrangement at low expense.

[0007] This and other objects are achieved according to the present invention (as defined by the technical features set forth in claim 1) which is based on the technical teaching that a more flexible passenger seat arrangement at low expense is achieved using an arrangement of the first and second seat fixation units that is noticeably asymmetric with respect to the centerline plane. Such a noticeably asymmetric arrangement allows achieving a more flexible seat arrangement. More precisely, thanks to the noticeably asymmetric arrangement of the first and second seat fixation units, a basic 2+2 seat configuration (per row) can easily be upgraded or modified into a 2+3 seat configuration or even a 2+1 seat configuration, if necessary, without the necessity to modify the seat support structure (such as e.g. vertical support struts or the like).

[0008] Hence, the seat configuration may be easily adapted to the specific needs of the line to be operated in order to offer an optimized number of seats (adapted or tailored to the number of passengers to be expected on this line), the seats in turn being adapted to provide the maximum amount of comfort for the respective configuration. Thus, for example, in a 2+1 seat configuration (i.e. a situation with a comparatively low number of passengers to be expected) very wide seats may be used noticeably enhancing passenger comfort and, thus, the attractiveness of the line. On the other hand, e.g. during peak travel periods, a 2+3 seat configuration may be chosen to provide a maximum of seats for the passengers to be expected.

[0009] Thus, the present invention relates to a wagon body of a vehicle, in particular a rail vehicle, in accordance with claim 1 and comprising a passenger compartment with a compartment floor and a seat fixation device located within the passenger compartment. The passenger compartment defines a longitudinal direction, a transverse direction and a height direction, a centerline plane, a first compartment side and a second compartment side, the centerline plane running parallel to the longitudinal direction and the height direction, the first and second compartment side being located at opposite sides of the centerline plane. The seat fixation device comprises a first seat fixation unit and a second seat fixation unit located at the compartment floor, the first seat fixation unit being located at the first compartment side at a first distance from the centerline plane and the second seat fixation unit being located at the second compartment side at a second distance from the centerline plane. To achieve the noticeably asymmetric arrangement of the first and second seat fixation unit, the second distance ranges from 125% to 225% of the first distance, in particular from 150% to 225% of the first distance, preferably

from 175% to 200% of the first distance.

[0010] Depending on the overall dimensions of the wagon body, the first and second distance may have any suitable amount. However, with preferred embodiments of the invention showing advantageous dimensions providing high transport capacity, the first distance ranges from 250 mm to 550 mm, in particular from 300 mm to 500 mm, preferably from 350 mm to 450 mm. In addition or as an alternative, the second distance ranges from 600 mm to 900 mm, in particular from 650 mm to 850 mm, preferably from 700 mm to 800 mm.

[0011] The seat fixation device may be of any suitable design adapted to provide fixation of a seat unit (at each compartment side) comprising one or more passenger seats.

[0012] However, according to the invention, thanks to simple and reliable fixation properties, a conventional arrangement is chosen, wherein the seat fixation device comprises a third seat fixation unit associated to the first seat fixation unit, and the seat fixation device comprises a fourth seat fixation unit associated to the second seat fixation unit. The third seat fixation unit is located in the region of a first side wall of the compartment on the first compartment side, in particular, located at the first side wall, the third seat fixation unit, in the transverse direction, having a third distance from the first seat fixation unit. The fourth seat fixation unit is located in the region of a second side wall of the compartment on the second compartment side, in particular, located at the second side wall, the fourth seat fixation unit, in the transverse direction, having a fourth distance from the second seat fixation unit.

[0013] The first distance and the second distance are selected as a function of an individual seat width (i.e. the individual seat's dimension in the transverse direction) of an individual passenger seat to be mounted is a single seat unit, to be used by a single passenger and to be supported via the second seat fixation unit and the fourth seat fixation unit, the first distance and the second distance being selected such that the third distance ranges from 120% to 160% of the individual seat width, in particular from 130% to 150% of the individual seat width, preferably from 135% to 145% of the individual seat width. By this means it is possible to achieve a configuration where the first and third support unit are adapted to properly support a wide range of different seat units (e.g. a seat unit with two "normal" seats for a conventional 2+2 seat configuration, a seat unit with two "wide" seats for a 1+2 seat configuration, or a seat unit with three "narrow" seats for a 2+3 seat configuration etc).

[0014] In addition or as an alternative, the first distance and the second distance are selected such that the fourth distance ranges from 70% to 110% of the individual seat width, in particular from 80% to 100% of the individual seat width, preferably from 85% to 95% of the individual seat width. By this means it is possible to achieve a configuration where the second and fourth support unit are adapted to a wide range of different seat units (e.g. a

seat unit with two "normal" seats for a conventional 2+2 seat configuration, a seat unit with one "wide" seat for a 1+2 seat configuration, or a seat unit with two "narrow" seats for a 2+3 seat configuration etc).

[0015] Again, depending on the overall dimensions of the wagon body, the individual seat width may have any suitable amount. However, with preferred embodiments of the invention showing advantageous dimensions providing high transport capacity at an appropriate level of passenger comfort, the individual seat width ranges from 520 mm to 720 mm, in particular from 580 mm to 690 mm, preferably from 620 mm to 670 mm.

[0016] The seat fixation device may be of any suitable design providing proper fixation of the respective seat units. With preferred embodiments of the wagon body according to invention showing a high flexibility in the seat row pitch (i.e. seat distance in the longitudinal direction of the vehicle), the first seat fixation unit comprises a first seat fixation rail at the compartment floor, in particular within the compartment floor, and/or the second seat fixation unit comprises a second seat fixation rail at the compartment floor, in particular within the compartment floor.

[0017] Furthermore, with preferred embodiments of the invention having a particularly simple and robust design, the seat fixation device comprises a first seat fixation post associated to the first seat fixation unit and extending in the height direction and/or the seat fixation device comprises a second seat fixation post associated to the second seat fixation unit and extending in the height direction. Such seat fixation posts provide a simple and robust support interface to the respective seat units to be installed.

[0018] Mounting on the seat units is further simplified and flexibility in the seat row pitch is enhanced as the seat fixation device comprises a third seat fixation unit associated to the first seat fixation unit, the third seat fixation unit comprising a third seat fixation rail located in the region of, preferably at a first side wall of the compartment on the first compartment side. The same applies as, in addition, the seat fixation device comprises a fourth seat fixation unit associated to the second seat fixation unit, the fourth seat fixation unit comprising a fourth seat fixation rail located in the region of, preferably at a second side wall of the compartment on the second compartment side.

[0019] With preferred embodiments of the invention, a 2+3 seat configuration is realized, wherein a first seat unit is mounted via the first seat fixation unit and a second seat unit is mounted via the second seat fixation unit; the first seat unit comprising three passenger seats and the second seat unit comprising two passenger seats. Preferably, each of the passenger seats has a seat width, in the transverse direction, ranging from 445 mm to 455 mm.

[0020] With other preferred embodiments of the invention a 2+2 seat configuration is realized, wherein a first seat unit is mounted via the first seat fixation unit and a

second seat unit is mounted via the second seat fixation unit, the first seat unit and the second seat unit comprising two passenger seats. Preferably, each of the passenger seats has a seat width, in the transverse direction, ranging from 480 mm to 520 mm.

[0021] With further preferred embodiments of the invention a 1+2 seat configuration is realized, wherein a first seat unit is mounted via the first seat fixation unit and a second seat unit is mounted via the second seat fixation unit, the first seat unit comprising two passenger seats and the second seat unit comprising one passenger seat. Preferably, each of the passenger seats has a seat width, in the transverse direction, ranging from 630 mm to 680 mm.

[0022] It will be appreciated that the present invention may be used in the context of any type of vehicle. For example it may be used in the context of single deck vehicles. Preferably, the present invention is used in the context of double-deck vehicles since, here, its advantages may be particularly effective. It will be further appreciated that the arrangement of the seat fixation device according to the invention may be provided in either one or both of the decks of the double deck vehicle.

[0023] For example, one of the decks (e.g. the upper deck) may be provided with another seat configuration than the other deck (e.g. the lower deck). Thus, for example, the upper deck may be (initially) designed as a first-class area with a 1+2 seat configuration, while the lower deck may be (initially) provided with a conventional 2+2 seat configuration. However, thanks to the flexibility of the seating arrangement provided with the invention, the seat arrangement on the respective deck may be easily adapted to be actual needs of the respective line to be operated.

[0024] The present invention further relates to a vehicle, in particular a rail vehicle, with a wagon body according to the invention.

[0025] Further embodiments of the invention will become apparent from the dependent claims and the following description of preferred embodiments which refers to the appended figures, the scope of the invention being defined by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026]

- Figure 1 is a schematic sectional representation of a preferred embodiment of the vehicle according to the invention comprising a preferred embodiment of the wagon body according to the invention;
- Figure 2 is a schematic sectional representation of a part of the vehicle of Figure 1 with a different seat configuration;
- Figure 3 is a schematic sectional representation of a part of the vehicle of Figure 1 with a further seat configuration.

DETAILED DESCRIPTION OF THE INVENTION

[0027] In the following, a preferred embodiment of vehicle according to the invention in the form of a double deck rail vehicle 101 will be described with reference to Figure 1 to 3. In order to simplify the explanations given below, an xyz-coordinate system has been introduced into the Figures, wherein (on a straight, level track) the x-axis designates the longitudinal direction of the vehicle 101, the y-axis designates the transverse direction of the vehicle 101 and the z-axis designates the height direction of the vehicle 102.

[0028] The vehicle 101 comprises a wagon body 102 with an upper deck compartment 103 and a lower deck compartment 104. Both decks 103, 104 are equipped with passenger seating in a 2+3 seat configuration (per row) as it is suitable for operation on a commuter line with high station frequency for a large number of passengers as will be explained in the following with reference to the upper deck 103.

[0029] The upper deck 103 comprises a first seat unit 105 located at a first compartment side 103.1 of a centerline plane 102.1 of the wagon body 102 and a second seat unit 106 located at a second compartment side 103.2 of the centerline plane 102.1 (the centerline plane 102.1 running parallel to the longitudinal direction and the height direction, i.e. corresponding to the xz-plane).

[0030] The first seat unit 105 comprises three first passenger seats 105.1 with a seat width W_1 (i.e. a dimension in the transverse direction y) of about 450 mm combined in a single module mounted to the structure of the wagon body 102. The second seat unit 106 comprises two second passenger seats 106.1 with a seat width $W_2 = W_1$ (i.e. a dimension in the transverse direction y) of about 450 mm also combined in a single module mounted to the structure of the wagon body 102.

[0031] Fixation of the first seat unit 105 and the second seat unit 106 is provided via a seat fixation device 107 comprising first to fourth seat fixation units 107.1 to 107.4. More precisely, the first seat unit 105 is mounted via the first seat fixation unit 107.1 and the associated third seat fixation unit 107.3 while the second seat unit 106 is mounted via the second seat fixation unit 107.2 and the associated fourth seat fixation unit 107.4.

[0032] In the embodiment shown, the first to fourth seat fixation units comprise seat fixation rails 107.1 to 107.4 integrated within the floor structure 103.3 of the upper deck compartment 103 (rails 107.1 and 107.2, not shown in greater detail) and compartment side walls (103.4, 103.5) of the structure of the wagon body 102 (rails 107.3 and 107.4), respectively. Such seat fixation rails are beneficial in terms of allowing modification of the seat pitch. However, it will be appreciated that, with other embodiments of the invention, any other seat fixation concept (eventually not allowing such easy modification of the seat pitch) may be chosen.

[0033] In the transverse direction (y direction), the centerline of the first seat fixation rail 107.1 defines a first

seat fixation location which has a first distance $D1 = 400$ mm from the centerline plane 102.1 while the second seat fixation rail 107.2 defines a second seat fixation location which has a second distance $D2 = 750$ mm from the centerline plane 102.1. Thus, the second distance $D2$ is 187.5% of the first distance $D1$ such that a noticeably asymmetric arrangement (in the transverse direction) of the first seat fixation rail 107.1 and the second seat fixation rail 107.2 is achieved. This noticeably asymmetric arrangement is beneficial in terms of enhancing the flexibility of the seat configuration as will be explained further below with reference to Figures 1 to 3.

[0034] The first seat unit 105 is supported via a simple first seat fixation post 107.5 of the first seat fixation unit 107.1, the first seat fixation post 107.5 generally extending in the height direction (z-direction) and mounted at its ends to the first seat unit 105 and the seat fixation rail 107.1, respectively. The second seat unit 106 is supported via a simple second seat fixation post 107.6 of the second seat fixation unit 107.2, the second seat fixation post 107.5 generally extending in the height direction (z-direction) and mounted at its ends to the first seat unit 105 and the second seat fixation rail 107.2, respectively.

[0035] As can be seen from Figure 1, the first seat fixation post 107.5 and the second seat fixation post 107.6 both are designed as comparatively narrow posts having a plane of main extension mainly extending in the height direction (z-direction) of the vehicle 101 in a manner generally parallel to the centerline plane 102.1. However, it will be appreciated that, with other embodiments of the invention, these first and second seat fixation posts do not necessarily have to be arranged substantially parallel to the centerline plane 102.1. More precisely, any other arrangement with an inclination of the plane of main extension of the respective seat fixation post with respect to the centerline plane 102.1 may be chosen as well. Furthermore, any other shape of the respective first and second seat fixation post (in the sectional plane of Figure 1) such as, for example, an arbitrarily curved and/or a generally triangular shape etc may be chosen.

[0036] Figures 2 and 3 show the upper deck 103 of vehicle 101 in different seat configurations, namely a 2+2 seat configuration (per row) in Figure 2 as it is suitable for operation on a regional line with moderate station frequency, and a 1+2 seat configuration (per row) in Figure 3 as it is suitable for operation in a first-class compartment on an intercity line with comparatively low station frequency.

[0037] As can be seen from Figure 2, the only difference with respect to the configuration shown in Figure 1 lies within the fact that a different first seat unit 205 and a different second seat unit 206 are mounted to the otherwise identically configured vehicle 101. The first seat unit 205 comprises two first passenger seats 205.1 with a seat width $W3$ (i.e. a dimension in the transverse direction y) of about 500 mm combined in a single module mounted to the structure of the wagon body 102. The second seat unit 206 comprises two second passenger

seats 206.1 with a seat width $W4 = W3$ (i.e. a dimension in the transverse direction y) of about 500 mm also combined in a single module mounted to the structure of the wagon body 102.

[0038] As can be seen from Figure 3, the only difference with respect to the configuration shown in Figure 1 lies within the fact that a different first seat unit 305 and a different second seat unit 306 are mounted to the otherwise identically configured vehicle 101. The first seat unit 305 comprises two first passenger seats 305.1 with a seat width $W5$ (i.e. a dimension in the transverse direction y) of about 650 mm combined in a single module mounted to the structure of the wagon body 102. The second seat unit 306 comprises a single individual second passenger seat 306.1 with an individual seat width $W6 = W5$ (i.e. a dimension in the transverse direction y) of about 650 mm that is also mounted to the structure of the wagon body 102.

[0039] As can be further seen from Figure 3, the first distance $D1$ and the second distance $D2$ are selected such that, in the transverse direction (y -direction), a third distance $D3$ between the first seat fixation rail 107.1 and the third seat fixation rail 107.3 is about $D3 = 940$ mm (i.e. about 145% of the individual seat width $W6$), while a fourth distance $D4$ between the second seat fixation rail 107.2 and the fourth seat fixation rail 107.4 is about $D4 = 580$ mm (i.e. about 89% of the individual seat width $W6$).

[0040] The described selection of the first distance $D1$ and the third distance $D3$ has the advantage that any of the first seat units 105, 205 and 305 may be mounted to the vehicle 101 without any modification of the support device 107. The same applies to the described selection of the second distance $D2$ and the fourth distance $D4$. Any of the second seat units 106, 206 and 306 may be mounted to the vehicle 101 without any modification of the support device 107.

[0041] In particular, (seen in the transverse direction) comparatively narrow seat units (namely the two seat unit 205.1 and the individual seat unit 306.1) may be mounted as well as comparatively wide seat units (namely the two seat unit 206.1 and the three seat unit 105.1 as well as the two seat unit 205.1) without any modification of the support device 107. Thus, an easy modification of the upper deck compartment 103.1 is possible between a commuter train configuration with a maximum number of passenger seats 105.1, 106.1 (Figure 1), a regional train configuration with a lower number of (wider) passenger seats 205.1, 206.1 (Figure 2) and a first-class intercity train configuration with an even lower number of very wide and high comfort passenger seats 305.1, 306.1 (Figure 3). This greatly increases the flexibility of the vehicle 101 in terms of the seating configuration implemented.

[0042] It will be appreciated that the lower deck compartment 104, in the embodiment shown in Figure 1, has a seat fixation device 108 with a first seat fixation unit in the form of a first seat fixation rail 108.1 and second seat

fixation unit in the form of a second seat fixation rail 108.2 of identical design as the first and second seat fixation rail 107.1, 107.2, integrated within the lower deck compartment floor 104.1 in a manner arranged in symmetry with respect to the centerline plane 102.1. However, it will be appreciated that, within other embodiments of the invention, the asymmetric arrangement as described in the context of the seat fixation device 107 of the upper deck compartment may also be realized in addition or exclusively within the lower deck compartment. Moreover, the asymmetric arrangement as described in the context of the seat fixation device 107 may of course also be implemented in a single deck vehicle.

[0043] In the foregoing, the invention has been described in the context of rail vehicles. However, it will be appreciated that the invention may be used in the context of any other type of vehicles used for passenger transport.

Claims

1. A wagon body of a vehicle, in particular a rail vehicle, comprising

- a passenger compartment (103) with a compartment floor (103.3) and
- a seat fixation device (107) located within said passenger compartment (103);
- said passenger compartment (103) defining a longitudinal direction, a transverse direction and a height direction, a centerline plane (102.1), a first compartment side (103.1) and a second compartment side (103.2);
- said centerline plane (102.1) running parallel to said longitudinal direction and said height direction;
- said first and second compartment side (103.1, 103.2) being located at opposite sides of said centerline plane (102.1);
- said seat fixation device comprising a first seat fixation unit (107.1) and a second seat fixation unit (107.2) located at said compartment floor (103.3);
- said first seat fixation unit (107.1) being located at said first compartment side (103.1) at a first distance (D1) from said centerline plane (102.1);
- said second seat fixation unit (107.2) being located at said second compartment side (103.2) at a second distance (D2) from said centerline plane (102.1);
- said seat fixation device (107) further comprising a third seat fixation unit (107.3) associated to said first seat fixation unit (107.1), and
- said seat fixation device (107) further comprising a fourth seat fixation unit (107.4) associated to said second seat fixation unit (107.2);
- said third seat fixation unit (107.3) being located

ed in the region of a first side wall (103.4) of said compartment (103) on said first compartment side (103.1);

- said third seat fixation unit (107.3), in said transverse direction, having a third distance (D3) from said first seat fixation unit (107.1);

- said fourth seat fixation unit (107.4) being located in the region of a second side wall (103.5) of said compartment (103) on said second compartment side (103.2);

- said fourth seat fixation unit (107.4), in said transverse direction, having a fourth distance (D4) from said second seat fixation unit (107.2);

characterized in that

- said second distance (D2) ranges from 125% to 225% of said first distance (D1), and

- said first distance (D1) and said second distance (D2) are selected as a function of an individual seat width (W6), in said transverse direction, of an individual passenger seat (306.1) to be used by a single passenger and to be supported via said second seat fixation unit (107.2) and said fourth seat fixation unit (107.4); wherein

- said first distance (D1) and said second distance (D2) are selected such that said third distance (D3) ranges from 120% to 160% of said individual seat width (W6);

and/or

- said first distance (D1) and said second distance (D2) are selected such that said fourth distance (D4) ranges from 70% to 110% of said individual seat width (W6).

2. The wagon body according to claim 1, wherein

- said first distance (D1) ranges from 250 mm to 550 mm, in particular from 300 mm to 500 mm, preferably from 350 mm to 450 mm,

and/or

- said second distance (D2) ranges from 600 mm to 900 mm, in particular from 650 mm to 850 mm, preferably from 700 mm to 800 mm.

3. The wagon body according to claim 1 or 2, wherein

- said third seat fixation unit (107.3) is located at said first side wall (103.4);

and/or

- said fourth seat fixation unit (107.4) is located at said second side wall (103.5);

and/or

- said second distance (D2) ranges from 150% to 225% of said first distance (D1), preferably from 175% to 200% of said first distance (D1),

and/or

- said third distance (D3) ranges from 130% to

- 150% of said individual seat width (W6), preferably from 135% to 145% of said individual seat width (W6);
and/or
- said fourth distance (D4) ranges from 80% to 100% of said individual seat width (W6), preferably from 85% to 95% of said individual seat width (W6);
4. The wagon body according to any one of the preceding claims, wherein said individual seat width (W6) ranges from 520 mm to 720 mm, in particular from 580 mm to 690 mm, preferably from 620 mm to 670 mm.
5. The wagon body according to any one of the preceding claims, wherein
- said first seat fixation unit comprises a first seat fixation rail (107.1) at said compartment floor (103.3), in particular within said compartment floor (103.3);
and/or
- said second seat fixation unit comprises a second seat fixation rail (107.2) at said compartment floor (103.3), in particular within said compartment floor (103.3).
6. The wagon body according to any one of the preceding claims, wherein
- said seat fixation device (107) comprises a first seat fixation post (107.5) associated to said first seat fixation unit (107.1) and extending in said height direction;
and/or
- said seat fixation device (107) comprises a second seat fixation post (107.6) associated to said second seat fixation unit (107.2) and extending in said height direction.
7. The wagon body according to any one of the preceding claims, wherein
- said seat fixation device (107) comprises a third seat fixation unit (107.3) associated to said first seat fixation unit (107.1), said third seat fixation unit comprising a third seat fixation rail (107.3) located at, in particular within, a first side wall (103.4) of said compartment (103) on said first compartment side (103.1);
and/or
- said seat fixation device (107) comprises a fourth seat fixation unit (107.4) associated to said second seat fixation unit (107.2), said fourth seat fixation unit comprising a fourth seat fixation rail (107.4) located at, in particular within, a second side wall (103.5) of said compartment (103)
- on said second compartment side (103.2).
8. The wagon body according to any one of the preceding claims, wherein
- a first seat unit (105) is mounted via said first seat fixation unit (107.1) and a second seat unit (106) is mounted via said second seat fixation unit (107.2);
- said first seat unit (105) comprising three passenger seats (105.1) and said second seat unit (106) comprising two passenger seats (106.1);
- each of said passenger seats (105.1, 106.1), in particular, having a seat width (W1, W2), in said transverse direction, ranging from 445 mm to 455 mm.
9. The wagon body according to any one of claims 1 to 7, wherein
- a first seat unit (205) is mounted via said first seat fixation unit (107.1) and a second seat unit (206) is mounted via said second seat fixation unit (107.2);
- said first seat unit (205) and said second seat unit (206) comprising two passenger seats (205.1, 206.1);
- each of said passenger seats (205.1, 206.1), in particular, having a seat width (W3, W4), in said transverse direction, ranging from 480 mm to 520 mm.
10. The wagon body according to any one of claims 1 to 7, wherein
- a first seat unit (305) is mounted via said first seat fixation unit (107.1) and a second seat unit (306) is mounted via said second seat fixation unit (107.2);
- said first seat unit (305) comprising two passenger seats (305.1) and said second seat unit (306) comprising one passenger seat (306.1);
- each of said passenger seats (305.1, 306.1), in particular, having a seat width (W5, W6), in said transverse direction, ranging from 630 mm to 680 mm.
11. The wagon body according to any one of the preceding claims, wherein
- said wagon body (102) is designed as a double deck unit;
- said compartment being an upper deck compartment (103) of said double deck unit
and/or
- said compartment being a lower deck compartment (104) of said double deck unit.

12. A vehicle, in particular a rail vehicle, with a wagon body (102) according to any one of the preceding claims.

der zweiten Sitzbefestigungseinheit (107.2) aufweist;

Patentansprüche

1. Wagenkasten eines Fahrzeugs, insbesondere eines Schienenfahrzeugs, umfassend

- einen Fahrgastraum (103) mit einem Raumboden (103.3) und
- eine Sitzbefestigungsvorrichtung (107), die innerhalb des Fahrgastraums (103) angeordnet ist; wobei
- der Fahrgastraum (103) eine Längsrichtung, eine Querrichtung und eine Höhenrichtung, eine Mittenebene (102.1), eine erste Raumseite (103.1) und eine zweite Raumseite (103.2) definiert;
- die Mittenebene (102.1) parallel zu der Längsrichtung und der Höhenrichtung verläuft;
- die erste und zweite Raumseite (103.1, 103.2) an gegenüberliegenden Seiten der Mittenebene (102.1) angeordnet sind;
- die Sitzbefestigungsvorrichtung eine erste Sitzbefestigungseinheit (107.1) und einen zweiten Sitzbefestigungseinheit (107.2) umfasst, die an dem Raumboden (103.3) angeordnet sind;
- die erste Sitzbefestigungseinheit (107.1) auf der ersten Raumseite (103.1) in einem ersten Abstand (D1) von der Mittenebene (102.1) angeordnet ist;
- die zweite Sitzbefestigungseinheit (107.2) auf der zweiten Raumseite (103.2) in einem zweiten Abstand (D2) von der Mittenebene (102.1) angeordnet ist;
- die Sitzbefestigungsvorrichtung (107) weiterhin eine dritte Sitzbefestigungseinheit (107.3) umfasst, die der ersten Sitzbefestigungseinheit (107.1) zugeordnet ist, und
- die Sitzbefestigungsvorrichtung (107) weiterhin eine vierte Sitzbefestigungseinheit (107.4) umfasst, die der zweiten Sitzbefestigungseinheit (107.2) zugeordnet ist;
- die dritte Sitzbefestigungseinheit (107.3) im Bereich einer ersten Seitenwand (103.4) des Fahrgastraums (103) auf der ersten Raumseite (103.1) angeordnet ist;
- die dritte Sitzbefestigungseinheit (107.3) in der Querrichtung einen dritten Abstand (D3) von der ersten Sitzbefestigungseinheit (107.1) aufweist;
- die vierte Sitzbefestigungseinheit (107.4) im Bereich einer zweiten Seitenwand (103.5) des Fahrgastraums (103) auf der zweiten Raumseite (103.2) angeordnet ist;
- die vierte Sitzbefestigungseinheit (107.4) in der Querrichtung einen vierten Abstand (D4) von

dadurch gekennzeichnet, dass

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- Der zweite Abstand (D2) 125% bis 225% des ersten Abstands (D1) beträgt und
- der erste Abstand (D1) und der zweiten Abstand (D2) in Abhängigkeit von einer Einzelsitzbreite (W6) eines einzelnen Passagiersitzes (306.1) in der Querrichtung gewählt sind, der durch einen einzigen Fahrgast verwendet und über die zweite Sitzbefestigungseinheit (107.2) und die vierte Sitzbefestigungseinheit (107.4) abgestützt werden soll;
- wobei
- der erste Abstand (D1) und der zweite Abstand (D2) so gewählt sind, dass der dritte Abstand (D3) 120% bis 160% der Einzelsitzbreite (W6) beträgt,
- und/oder
- der erste Abstand (D1) und der zweite Abstand (D2) so gewählt sind, dass der vierte Abstand (D4) 70% bis 110% der Einzelsitzbreite (W6) beträgt.

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2. Wagenkasten nach Anspruch 1, wobei

- der erste Abstand (D1) 250 mm bis 550 mm, insbesondere 300 mm bis 500 mm, vorzugsweise 350 mm bis 450 mm, beträgt
- und/oder
- der zweite Abstand (D2) 600 mm bis 900 mm, insbesondere 650 mm bis 850 mm, vorzugsweise 700 mm bis 800 mm, beträgt.

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3. Wagenkasten nach Anspruch 1 oder 2, wobei

- die dritte Sitzbefestigungseinheit (107.3) an der ersten Seitenwand (103.4) angeordnet ist;
- und/oder
- die vierte Sitzbefestigungseinheit (107.4) an der zweiten Seitenwand (103.5) angeordnet ist;
- und/oder
- der zweite Abstand (D2) 150% bis 225% des ersten Abstands (D1), vorzugsweise 175% bis 200% des ersten Abstands (D1), beträgt,
- und/oder
- der dritte Abstand (D3) 130% bis 150% der Einzelsitzbreite (W6), vorzugsweise 135% bis 145% der Einzelsitzbreite (W6), beträgt;
- und/oder
- der vierte Abstand (D4) 80% bis 100% der Einzelsitzbreite (W6), vorzugsweise 85% bis 95% der Einzelsitzbreite (W6), beträgt;

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4. Wagenkasten nach einem der vorhergehenden Ansprüche, wobei die Einzelsitzbreite (W6) 520 mm bis

720 mm, insbesondere 580 mm bis 690 mm, vorzugsweise 620 mm bis 670 mm, beträgt.

5. Wagenkasten nach einem der vorhergehenden Ansprüche, wobei

- die erste Sitzbefestigungseinheit eine erste Sitzbefestigungsschiene (107.1) an dem Raumboden (103.3), insbesondere in dem Raumboden (103.3), umfasst, und/oder
- die zweite Sitzbefestigungseinheit eine zweite Sitzbefestigungsschiene (107.2) an dem Raumboden (103.3), insbesondere in dem Raumboden (103.3), umfasst.

6. Wagenkasten nach einem der vorhergehenden Ansprüche, wobei

- die Sitzbefestigungsvorrichtung (107) einen ersten Sitzbefestigungsposten (107.5) umfasst, welcher der ersten Sitzbefestigungseinheit (107.1) zugeordnet ist und sich in der Höhenrichtung erstreckt; und/oder
- die Sitzbefestigungsvorrichtung (107) einen zweiten Sitzbefestigungsposten (107.6) umfasst, welcher der zweiten Sitzbefestigungseinheit (107.2) zugeordnet ist und sich in der Höhenrichtung erstreckt.

7. Wagenkasten nach einem der vorhergehenden Ansprüche, wobei

- die Sitzbefestigungsvorrichtung (107) eine dritte Sitzbefestigungseinheit (107.3) umfasst, die der ersten Sitzbefestigungseinheit (107.1) zugeordnet ist, wobei die dritte Sitzbefestigungseinheit eine dritte Sitzbefestigungsschiene (107.3) umfasst, die sich an, insbesondere in, einer ersten Seitenwand (103.4) des Fahrgastraums (103) auf der ersten Raumseite (103.1) befindet; und/oder
- die Sitzbefestigungsvorrichtung (107) eine vierte Sitzbefestigungseinheit (107.4) umfasst, die der zweiten Sitzbefestigungseinheit (107.2) zugeordnet ist, wobei die vierte Sitzbefestigungseinheit eine vierte Sitzbefestigungsschiene (107.4) umfasst, die sich an, insbesondere in, einer zweiten Seitenwand (103.5) des Fahrgastraums (103) auf der zweiten Raumseite (103.2) befindet.

8. Wagenkasten nach einem der vorhergehenden Ansprüche, wobei

- eine erste Sitzeinheit (105) über die erste Sitz-

befestigungseinheit (107.1) montiert ist und eine zweite Sitzeinheit (106) über die zweite Sitzbefestigungseinheit (107.2) montiert ist;

- die erste Sitzeinheit (105) drei Passagiersitze (105.1) aufweist und die zweite Sitzeinheit (106) zwei Passagiersitze (106.1) aufweist;
- jeder der Passagiersitze (105.1, 106.1) in der Querrichtung insbesondere eine Sitzbreite (W1, W2) aufweist, die 445 mm bis 455 mm beträgt.

9. Wagenkasten nach einem der Ansprüche 1 bis 7, wobei

- eine ersten Sitzeinheit (205) über die erste Sitzbefestigungseinheit (107.1) montiert ist und eine zweite Sitzeinheit (206) über die zweite Sitzbefestigungseinheit (107.2) montiert ist;
- die erste Sitzeinheit (205) und die zweite Sitzeinheit (206) zwei Passagiersitze (205.1, 205.1) umfasst;
- jeder der Passagiersitze (205.1, 206.1) in der Querrichtung insbesondere eine Sitzbreite (W3, W4) aufweist, die 480 mm bis 520 mm beträgt.

10. Der Wagenkasten nach einem der Ansprüche 1 bis 7, wobei

- eine erste Sitzeinheit (305) über die erste Sitzbefestigungseinheit (107.1) montiert ist und eine zweite Sitzeinheit (306) über die zweite Sitzbefestigungseinheit (107.2) montiert ist;
- die erste Sitzeinheit (305) zwei Passagiersitze (305.1) aufweist und die zweite Sitzeinheit (306) einen Passagiersitz (306.1) aufweist;
- jeder der Passagiersitze (305.1, 306.1) in der Querrichtung insbesondere eine Sitzbreite (W5, W6) aufweist, die 630 mm bis 680 mm beträgt.

11. Wagenkasten nach einem der vorhergehenden Ansprüche, wobei

- der Wagenkasten (102) als Doppelstockeinheit ausgebildet ist; wobei
- der Fahrgastraum ein Oberdeckraum (103) der Doppelstockeinheit ist und/oder
- der Fahrgastraum ein Unterdeckraum (104) der Doppelstockeinheit ist.

12. Fahrzeug, insbesondere ein Schienenfahrzeug, mit einem Wagenkasten (102) nach einem der vorhergehenden Ansprüche.

Revendications

1. Une caisse de wagon d'un véhicule, notamment un véhicule ferroviaire, comprenant

- un compartiment passager (103) avec un plancher de compartiment (103.3), et
 - un dispositif de fixation de siège (107) situé à l'intérieur dudit compartiment passager (103);
 - ledit compartiment passager (103) définissant une direction longitudinale, une direction transversale et une direction de hauteur, un plan médian (102.1), un premier côté du compartiment (103.1) et un second côté du compartiment (103.2);
 - ledit plan médian (102.1) étant parallèle à ladite direction longitudinale et ladite direction de hauteur;
 - lesdits premier et second côtés du compartiment (103.1, 103.2) étant situés sur des côtés opposés dudit plan médian (102.1);
 - ledit dispositif de fixation de siège comprenant une première unité de fixation de siège (107.1) et une deuxième unité de fixation de siège (107.2) situé audit plancher de compartiment (103.3);
 - ladite première unité de fixation de siège (107.1) étant situé audit premier côté du compartiment (103.1) à une première distance (D1) à partir dudit plan médian (102.1);
 - ladite seconde unité de fixation de siège (107.2) étant situé audit second côté du compartiment (103.2) à une deuxième distance (D2) à partir dudit plan médian (102.1);
 - ledit dispositif de fixation de siège (107) en plus comprenant une troisième unité de fixation de siège (107.3) associée à ladite première unité de fixation de siège (107.1), et
 - ledit dispositif de fixation de siège (107) en plus comprenant une quatrième unité de fixation de siège (107.4) associée à ladite seconde unité de fixation de siège (107.2);
 - ladite troisième unité de fixation de siège (107.3) étant situé dans la région d'une première paroi latérale (103.4) dudit compartiment (103) sur ledit premier côté du compartiment (103.1);
 - ladite troisième unité de fixation de siège (107.3), dans ladite direction transversale, ayant une troisième distance (D3) de ladite première unité de fixation de siège (107.1);
 - ladite quatrième unité de fixation de siège (107.4) étant situé dans la région d'une deuxième paroi latérale (103.5) dudit compartiment (103) sur ledit second côté de compartiment (103.2);
 - ladite quatrième unité de fixation de siège (107.4), dans ladite direction transversale, ayant une quatrième distance (D4) à partir de ladite seconde unité de fixation de siège (107.2);

caractérisé en ce que

- ladite seconde distance (D2) est de 125% à

225% de ladite première distance (D1), et
 - ladite première distance (D1) et ladite seconde distance (D2) étant choisie en fonction d'une largeur de siège individuel (W6) dans ladite direction transversale d'un siège de passager individuel (306.1) qui doit être utilisé par un seul passager et être supporté par ladite seconde unité de fixation de siège (107.2) et ladite quatrième unité de fixation de siège (107.4);
 dans laquelle
 - ladite première distance (D1) et ladite seconde distance (D2) étant choisies de telle sorte que ladite troisième distance (D3) est de 120% à 160% de ladite largeur de siège individuel (W6) et/ou
 - ladite première distance (D1) et ladite seconde distance (D2) étant choisies de telle sorte que ladite quatrième distance (D4) est de 70% à 110% de ladite largeur de siège individuel (W6).

2. La caisse de wagon selon la revendication 1, dans laquelle

- ladite première distance (D1) est de 250 mm à 550 mm, en particulier de 300 mm à 500 mm, de préférence de 350 mm à 450 mm, et/ou
 - ladite seconde distance (D2) est de 600 mm à 900 mm, en particulier de 650 mm à 850 mm, de préférence de 700 mm à 800 mm.

3. La caisse de wagon selon la revendication 1 ou 2, dans laquelle

- ladite troisième unité de fixation de siège (107.3) est situé à ladite première paroi latérale (103.4);
 et/ou
 - ladite quatrième unité de fixation de siège (107.4) est situé à ladite seconde paroi latérale (103.5);
 et/ou
 - ladite seconde distance (D2) est de 150% à 225% de ladite première distance (D1), de préférence de 175% à 200% de ladite première distance (D1),
 et/ou
 - ladite troisième distance (D3) est de 130% à 150% de ladite largeur de siège individuel (W6), de préférence de 135% à 145% de ladite largeur de siège individuel (W6);
 et/ou
 - ladite quatrième distance (D4) est de 80% à 100% de ladite largeur de siège individuel (W6), de préférence de 85% à 95% de ladite largeur de siège individuel (W6);

4. La caisse de wagon selon l'une quelconque des re-

vendications précédentes, dans laquelle ladite largeur de siège individuel (W6) est de 520 mm à 720 mm, en particulier de 580 mm à 690 mm, de préférence de 620 mm à 670 mm.

5. La caisse de wagon selon l'une quelconque des revendications précédentes, dans laquelle

- ladite première unité de fixation de siège comprend un premier rail de fixation de siège (107.1) audit plancher de compartiment (103.3), en particulier dans ledit plancher de compartiment (103.3);

et/ou

- ladite seconde unité de fixation de siège comprend un second rail de fixation de siège (107.2) audit plancher de compartiment (103.3), en particulier dans ledit plancher de compartiment (103.3).

6. La caisse de wagon selon l'une quelconque des revendications précédentes, dans laquelle

- ledit dispositif de fixation de siège (107) comprend un premier poste de fixation de siège (107.5) associé à ladite première unité de fixation de siège (107.1) et s'étendant dans ladite direction de la hauteur;

et/ou

- ledit dispositif de fixation de siège (107) comprend un deuxième poste de fixation de siège (107.6) associé à ladite seconde unité de fixation de siège (107.2) et s'étendant dans ladite direction de la hauteur.

7. La caisse de wagon selon l'une quelconque des revendications précédentes, dans laquelle

- ledit dispositif de fixation de siège (107) comprend une troisième unité de fixation de siège (107.3) associée à ladite première unité de fixation de siège (107.1), ladite troisième unité de fixation de siège comprenant un troisième rail de fixation de siège (107.3) situé à, en particulier dans, une première paroi latérale (103.4) dudit compartiment (103) sur ledit premier côté du compartiment (103.1);

et/ou

- ledit dispositif de fixation de siège (107) comprend une quatrième unité de fixation de siège (107.4) associée à ladite seconde unité de fixation de siège (107.2), ladite quatrième unité de fixation de siège comprenant un quatrième rail de fixation de siège (107.4) situé à, en particulier dans, une deuxième paroi latérale (103.5) dudit compartiment (103) sur ledit deuxième côté du compartiment (103.2).

8. La caisse de wagon selon l'une quelconque des revendications précédentes, dans laquelle

- une première unité de siège (105) est montée par l'intermédiaire de ladite première unité de fixation de siège (107.1) et une deuxième unité de siège (106) est montée par l'intermédiaire de ladite deuxième unité de fixation de siège (107.2);

- ladite première unité de siège (105) comprenant trois sièges passagers (105.1) et ladite deuxième unité de siège (106) comprenant deux sièges passagers (106.1);

- chacun desdits sièges passagers (105.1, 106.1), en particulier, ayant une largeur de siège (W1, W2) dans ladite direction transversale qui est de 445 mm à 455 mm.

9. La caisse de wagon selon l'une quelconque des revendications 1 à 7, dans laquelle

- une première unité de siège (205) est montée par l'intermédiaire de ladite première unité de fixation de siège (107.1) et une deuxième unité de siège (206) est montée par l'intermédiaire de ladite seconde unité de fixation de siège (107.2);

- ladite première unité de siège (205) et ladite deuxième unité de siège (206) comprenant deux sièges passagers (205.1, 206.1);

- chacun desdits sièges passagers (205.1, 206.1), en particulier, ayant une largeur de siège (W3, W4) dans ladite direction transversale qui est de 480 mm à 520 mm.

10. La caisse de wagon selon l'une quelconque des revendications 1 à 7, dans laquelle

- une première unité de siège (305) est montée par l'intermédiaire de ladite première unité de fixation de siège (107.1) et une deuxième unité de siège (306) est montée par l'intermédiaire de ladite deuxième unité de fixation de siège (107.2);

- ladite première unité de siège (305) comprenant deux sièges passagers (305.1) et ladite deuxième unité de siège (306) comprenant un siège passager (306.1);

- chacun desdits sièges passagers (305.1, 306.1), en particulier, ayant une largeur de siège (W1, W2) dans ladite direction transversale qui est de 630 mm à 680 mm.

11. La caisse de wagon selon l'une quelconque des revendications précédentes, dans laquelle

- ladite caisse de wagon (102) est conçue comme une unité à deux étages;

- ledit compartiment étant un compartiment d'étage supérieure (103) de ladite unité à deux étages
et/ou

- ledit compartiment étant un compartiment d'étage inférieure (104) de ladite unité à deux étages.

12. Un véhicule, notamment un véhicule ferroviaire, comprenant une caisse de wagon (102) selon l'une quelconque des revendications précédentes.

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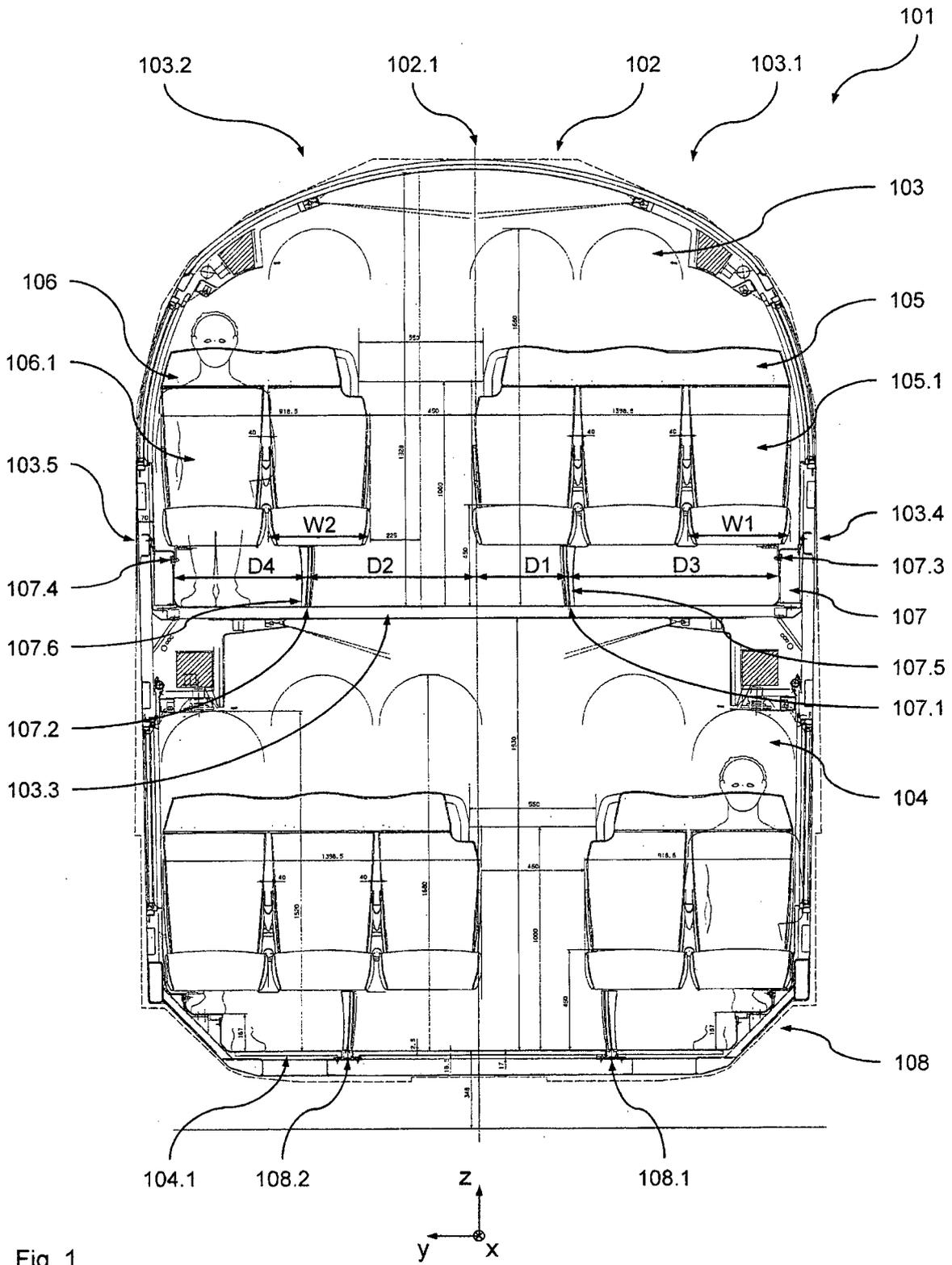


Fig. 1

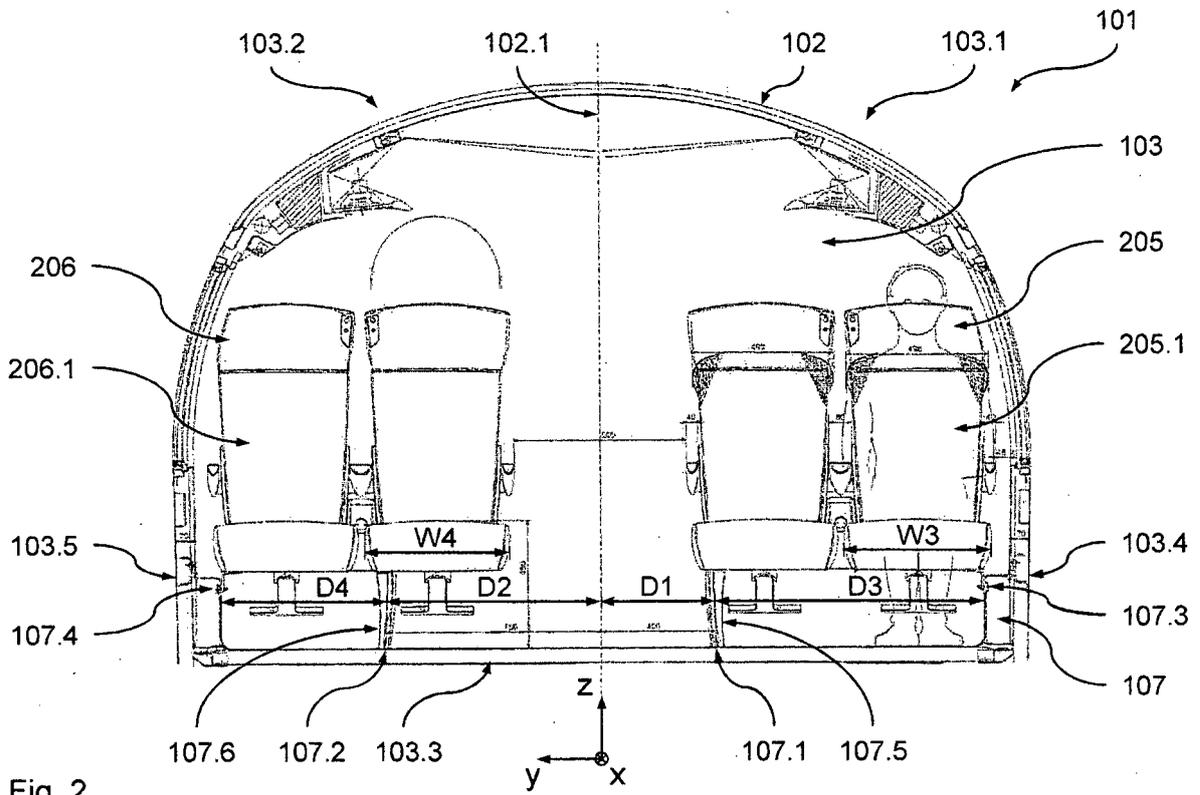


Fig. 2

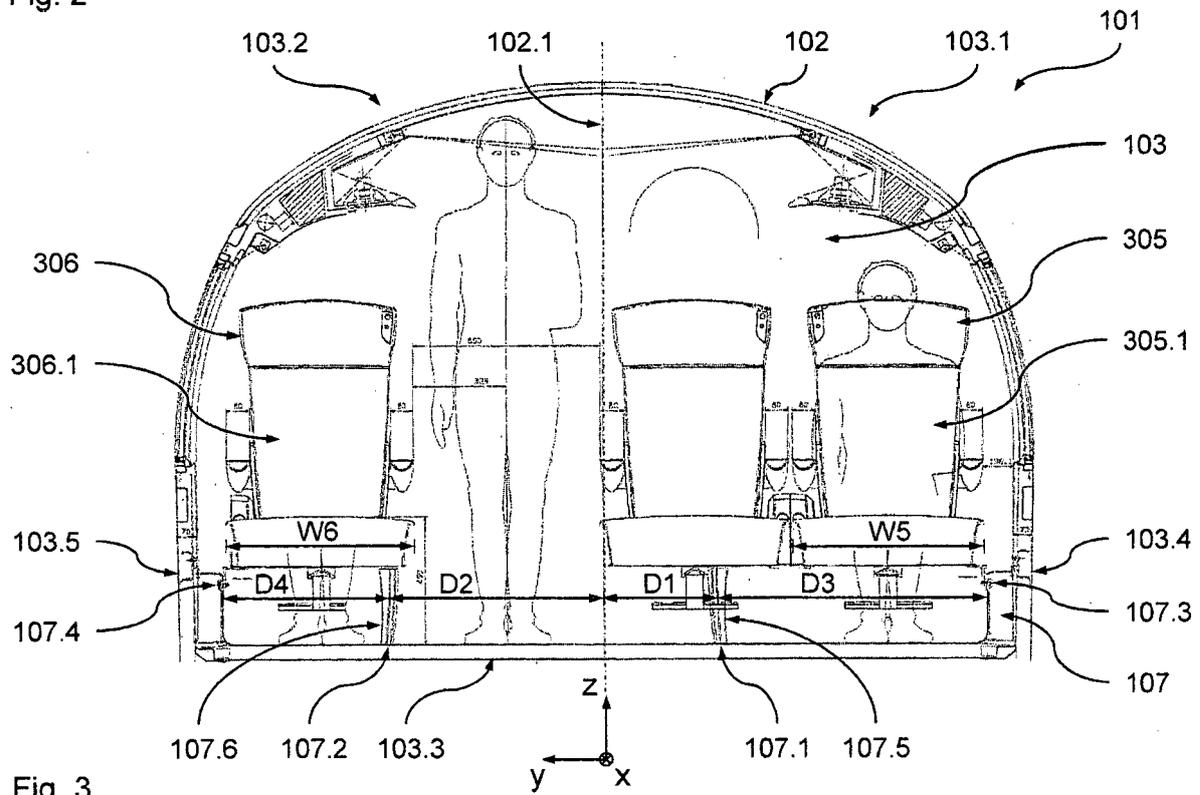


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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