

TITLE: Strapontin with ischial support and associated vehicle

The present invention relates to a folding seat (Strapontin) for a vehicle comprising a backrest and a seat, the backrest being suitable for being fastened to the vehicle, the seat base being movable with respect to the backrest between a folded-out position and a folded-in position, the seat base extending against the backrest in the folded position, the seat base comprising a seating surface and a support surface opposite the seating surface, the seating surface forming a seat with the backrest in the folded-out position of the seat base.

The invention further relates to an associated vehicle.

Document EP 2 865 563 A1 describes a folding seat for a railway vehicle comprising a foldable seat element tiltable about a tilting axis in order to fold out or fold in the seat, and a locking element. The locking element can be placed in a locked state, wherein movement of the foldable seat element is locked, and in an unlocked state. The locking element further provides a seating area of a perched seat.

However, such folding seat system comprises a plurality of moving parts, hence it is complex. Furthermore, folding out or folding in the seat requires a plurality of movements, which cannot be done easily and quickly.

However, it is particularly advantageous to be able to easily move the seat between the folded-out or folded-in position, in particular for adapting to variations in traffic, e.g. between off-peak hours and peak hours.

A purpose of the invention is thus to propose a folding seat apt to be easily folded-out and folded-in.

To this end, the subject matter of the invention relates to a folding seat of the aforementioned type, wherein the seat base has a shape such that, in the folded-in position, the support surface extends in the continuity of the backrest and forms an ischial support with the backrest.

The folding seat is easily movable between a folded-out position and a folded-in position, the seating surface serving as a seat base in the folded-out position and the support surface being intended for being used as an ischial support in the folded-in position of the seat base. A comfortable support in this way is provided for a user of the folding seat in the folded-out position but also in the folded-in position of the seat.

The folding seat can further have one or a plurality of the following features, considered individually or in all technically possible combinations:

- the folding seat includes a motor configured for moving the seat base between the folded-out position and the folded-in position;

- the movement between the folded-out position and the folded-in position corresponds to a rotation about an axis; and/or

- the folding seat comprises at least one sensor, the sensor being configured for detecting whether the seat is in the folded-out position and/or in the folded-in position and/or whether the seat is at the end of the travel thereof and/or whether an obstacle prevents the seat base from moving.

The invention further relates to a vehicle comprising a folding seat of the type described hereinabove.

The vehicle can further have one or a plurality of the following features, considered individually or in all technically possible combinations:

- the folding seat comprises an actuator, the actuator being configured for moving the seat base between the folded-out position and the folded-in position, the actuator being controlled by a centralized control;

- the vehicle comprises a vehicle control and supervision system, the centralized control being performed by the vehicle control and supervision system;

- the vehicle comprises at least one mechanical system for holding the seat base in the folded-out position and/or the folded-in position;

- the vehicle comprises a wall, one of the wall or the seat base comprises at least one first pin, the other one of the wall or the seat base comprising at least one first complementary hole, each complementary hole corresponding to one of the at least one pins, each of the at least one pins being deployable in the at least one complementary hole corresponding to one of the folded-out position and the folded-in position, the at least one mechanical holding system comprising the at least one pin and the at least one complementary hole;

- the or each pin can be actuated by at least one power cylinder; and/or

- one of the wall or the seat base comprises at least one first pin, the other one of the wall or the seat base comprising at least one first complementary hole, each first complementary hole corresponding to one of the at least one first pin, each of the at least one first pin being deployable in the at least one corresponding first complementary hole in the folded-out position, and wherein one of the walls or the seat base comprises at least one second pin, the other wall or the seat base comprising at least one second complementary hole, each second complementary hole corresponding to one of the at least one second pin, each of the at least one second pin being deployable in the at least one second corresponding complementary hole in the folded-in position.

Other features and advantages of the invention will appear upon reading the following description which follows embodiments of the invention, given only as a limiting example, and making reference to the following drawings, wherein:

Figure 1 is a schematic sectional view of a folding seat in a vehicle according to an embodiment of the invention, the seat base being in the folded-in position, and

Figure 2 is a schematic sectional view of the folding seat shown in Figure 1, the seat base being in the folded-out position.

A folding seat 10 according to an embodiment of the invention is shown in Figures 1 and 2.

As can be seen in the figures, the folding seat 10 is integrated into a vehicle, e.g. a railway vehicle.

The seat 10 is suitable for receiving a plurality of persons, the folding seat 10 being apt to form a bench.

The folding seat 10 is alternatively suitable for receiving only one adult person.

The folding seat 10 comprises a backrest 12 and a seat base 14.

The backrest 12 is fastened to the rest of the vehicle.

The backrest 12 is e.g. rigidly attached to the rest of the vehicle in an upper portion of the backrest 12, in the example shown via a pivot having a pivot axis A.

The axis A extends along the transverse direction Y, as defined below.

A rotation of the backrest 12 can thus be generated during the folding out and the opening of the seat base 14.

The back 12 has herein a rest surface 16.

The rest surface 16 is intended for receiving the back of a user, more particularly a user sitting on the seat base 14, as will be described thereafter.

The rest surface 16 extends mainly along an elevation direction Z and a transverse direction Y perpendicular to the elevation direction Z.

The seat base 14 comprises a seating surface 18 and a support surface 20.

The support surface 20 is opposite the seating surface 18 along a thickness of the seat base 14.

The seat base 14 comprises a free edge 22.

The seat base 14 further comprises a connected end portion 24 opposite the free edge 22.

The thickness of the seat base 14 narrows at the free edge 22. In other words, the seat base 14 tapers at the free edge 22.

In the example shown, the support surface 20 and the seating surface 18 meet herein at the free edge 22.

The seating surface 18 extends herein substantially along a main seating plane.

The support surface 20 extends e.g. parallel to the main seating plane within 5° over at least 90% of the extension of the support surface 20.

The thickness of the seat base is herein substantially perpendicular to the seating surface 18.

The seat base 14 is movable with respect to the backrest 12 between a folded-in position shown in Figure 1, and a folded-out position shown in Figure 2.

The seat base 14, more particularly the connected end portion 24, is connected to the backrest 12, more particularly in a lower portion of the backrest 12.

The movement between the folded-out position and the folded-in position corresponds to a rotation about an axis of rotation D.

The axis of rotation D extends along the transverse direction Y.

The seat base 14 and the backrest 12 are connected by a pivot making possible the rotation about the axis of rotation D.

The pivot has herein a pivot axis corresponding to the axis of rotation D.

The pivot is e.g. an eccentric pivot.

In the folded-out position of the seat base 14, the seating surface 18 forms a seat with the backrest 12.

More particularly, the seating surface 18 extends perpendicular to within 5°, more particularly perpendicular to the resting surface 16.

The seating surface 18 extends e.g. in the transverse direction Y and a longitudinal direction X perpendicular to the transverse direction Y and to the elevation direction Z.

In the folded-in position, the seat base 14 extends against the backrest 12. More particularly, the seating surface 18 extends in contact with the resting surface 16.

The support surface 20 has a shape such that, in the folded-in position, the support surface 20 extends in the continuity of the backrest 12 and forms an ischial support 26 with the backrest 12.

The folding seat is attached to the vehicle in such a way that the ischial support is located at a height comprised between 80 cm and 120 cm.

According to a particular embodiment, the ischial support 26 is formed by a bulge provided on the support surface 20.

More particularly, the seat base 14 is such that a user can lean on the ischial support 26.

The folding seat 10 comprises herein an actuator (not shown), more particularly a motor, configured for moving the seat base 14 between the folded-out position and the folded-in position.

More particularly, the motor is apt to control the rotation of the pivot about the pivot axis D.

The folding seat 10 also comprises herein e.g. at least one sensor.

5 The at least one sensor is e.g. one or a plurality of the following sensors: a sensor detecting whether the seat base is in the folded-out position and/or in the folded-in position, a sensor detecting whether the seat is at the end of the travel thereof and/or a sensor detecting whether an obstacle prevents the seat base from moving.

10 The sensor detecting whether the seat base is in the folded-out position and/or in the folded-in position detects e.g. the angular position of the motor corresponding to the rotation at the time of detection.

The sensor detecting whether the seat base is at the end of the travel thereof, is suitable for detecting whether the seat base 14 is approaching the folded-out and/or folded-in position.

15 The sensor detecting whether an obstacle prevents the movement of the seat base measures, e.g. the motor torque and detects when the measured torque is abnormal during the movement of the seat base from the folded-out to the folded-in position or vice versa, which would correspond to an obstacle to the movement of the seat base 14.

The vehicle comprises a wall in the vicinity of the folding seat 10.

20 More particularly, the vehicle comprises a rear wall 28 located behind the seat 10 and to which the backrest 12 is e.g. fastened.

The vehicle further comprises herein at least one side wall, more particularly herein two side walls, more particularly one side wall on each side of the folding seat along the transverse direction Y.

25 The sidewalls have at least one surface portion extending substantially perpendicular to the transverse direction Y.

The vehicle comprises at least one mechanical system for holding the seat base 14 in the folded-out position and/or in the folded-in position, herein a first mechanical system 30 for holding the seat base 14 in the folded-out position and a second mechanical system 32 for holding the seat base 14 in the folded-in position.

30 In one embodiment, each side wall is provided with at least one first deployable pin. The seat base 14, more particularly the connected end portion 24, has herein, on each of the edges thereof along the transverse direction Y, at least one first complementary hole. Each first complementary hole corresponds to one of the at least one first pins.

The at least one first complementary hole is e.g. formed by embossing.

More particularly, in the example shown, the seat base 14 comprises a first complementary hole on each of the edges thereof along the transverse direction Y, each lateral wall being provided with a first deployable pin.

Each first pin can be deployed in the corresponding first complementary hole in the folded-out position of the seat base 14, as shown in Figure 2.

The first pin is e.g. deployable substantially along the transverse direction Y.

Alternatively or additionally, the seat base, more particularly the linked end portion 24, is provided with at least one first pin which can be deployed on at least one of the edges thereof along the transverse direction Y, herein each side wall facing said edge defining at least one first complementary hole, each first complementary hole corresponding to a first pin, and each first pin being deployable in the corresponding first complementary hole in the folded-out position of the seat base 14.

The assembly of the first deployable pin(s) and of the first complementary hole(s) forms the first mechanical system 30 for holding the seat base 14 in the folded-out position.

The or each first deployable pin can be actuated e.g. by a power cylinder.

The or each first pin is e.g. automatically deployed when the seat base 14 is in the folded-out position, e.g. through the detection by the sensor detecting whether the seat base is in the folded-out position.

Additionally or alternatively, each side wall is provided with at least one second deployable pin. The seat base 14, more particularly an end portion of the seat base 14 comprising the free edge 22, has herein, on each of the edges thereof along the transverse direction Y, at least one second complementary hole. Each second complementary hole corresponds to one of the at least one second pin.

The at least one second complementary hole is e.g. formed by embossing.

More particularly, in the example shown, the seat base 14 comprises a second complementary hole on each of the edges thereof along the transverse direction Y, each lateral wall being provided with a second deployable pin.

Each second pin can be deployed in the corresponding second complementary hole in the folded-in position of the seat base 14, as shown in Figure 1.

In this way, in particular the seat base can be held in a folded-in position, even if a person forces the seat base 14 in an attempt to fold it out, without acting on the motor.

The second pin is e.g. deployable substantially along the transverse direction Y.

Alternatively or additionally, the seat base, more particularly an end portion of the seat base 14 comprising the free edge 22, has at least one second pin which can be deployed on at least one of the edges thereof along the transverse direction Y, each side wall facing said edge defining at least one second complementary hole, each second

complementary hole corresponding to a second pin, and each second pin being deployable in the corresponding second complementary hole in the folded-in position of the seat base 14.

5 The assembly of the second deployable pin or pins and of the second complementary hole or holes forms the second mechanical system 32 for holding the seat part 14 in the folded-in position.

The or each second pin can be actuated e.g. by a power cylinder.

10 The or each second pin is e.g. automatically deployed when the seat base 14 is in the folded-in position, e.g. through the detection by the sensor detecting whether the seat base is in the folded-in position.

The vehicle further comprises a system for controlling and supervising the vehicle, more particularly the train, also known as TCMS (which is the acronym of Train Control and Management System).

The vehicle control and supervision system is commanded by a driver of the vehicle.

15 The vehicle control and supervision system is configured for sending a centralized command.

The actuator moving the seat base from the folded-in to the folded-out position and vice versa is e.g. controlled by centralized command, more particularly only controlled by centralized command from the vehicle.

20 Thus, only a driver of the vehicle is apt to move the seat base from the folded-in position to the folded-out position and vice versa, in particular for adapting the configuration of the vehicle to variations in traffic, e.g. between off-peak hours and peak hours.

25 In an alternative embodiment (not shown), the backrest is not rigidly attached to the rest of the vehicle via a pivot in the upper portion. The backrest has e.g. a point of rotation in a lower portion and is designed to slide in a housing delimited in the rest of the vehicle in the upper portion. The backrest then slides in said upper housing during the folding out.

A method of operating a vehicle as described above will now be described.

A schedule is e.g. determined beforehand so as to differentiate between off-peak and peak hours of the vehicle traffic.

30 The vehicle comprises at least one folding seat according to one embodiment of the invention, more particularly a plurality of folding seats according to the invention.

All the folding seats are e.g. initially in the folded-out position, in particular during a period corresponding to off-peak hours.

35 When approaching a period corresponding to peak hours, the vehicle is at a time emptied of passengers, e.g. after the end of a line before leaving in the other direction or outside a commercial service.

A centralized command is then sent e.g. by the driver by the control and supervision system of the vehicle to move the seat bases of each of the vehicle seats according to the invention, into the folded-in position.

Thus, all the seat bases of the folding seats are then moved into the folded-in position.

Conversely, at the end of the peak hour period, the vehicle is at a time emptied of passengers, e.g. after the end of a line before leaving in the other direction or out of a commercial service.

A centralized command is then sent, e.g. by the driver, by the control and supervision system of the vehicle to move the seats of each of the seats according to the invention of the vehicle into the folded-out position.

The folding seat is easily movable by rotation between a folded-out position and a folded-in position. The capacity of people in the vehicle can be adjusted in this way so as to adapt to off-peak and peak hours.

Management by the driver makes it possible to avoid people folding out the folding seats during peak hours when the vehicle is full.

The presence of an ischial support allows people to rest comfortably on the seat when the seat is in the folded-in position.

CLAIMS

1. A vehicle comprising a folding seat (10) comprising a backrest (12) and a seat base (14), the backrest (12) being suitable for being fastened to the vehicle, the seat base (14) being movable relative to the backrest (12) between a folded-out position and a folded-in position, the seat base (14) extending against the backrest (12) in the folded-in position, the seat base (14) comprising a seating surface (18) and a support surface (20) opposite the seating surface (18), the seating surface (18) forming a seat with the backrest (12) in the folded-out position of the seat base (14), characterized in that the seat base (14) has a shape such that, in the folded-in position, the support surface (20) extends in the continuity of the backrest (12) and forms an ischial support (26) with the backrest (12), wherein the folding seat (10) comprises an actuator, the actuator being configured for moving the seat base (14) between the folded-out position and the folded-in position, the actuator being controlled by a centralized command.

2. The vehicle according to claim 1, comprising a vehicle control and supervision system, the centralized command being issued by the vehicle control and supervision system.

3. The vehicle according to claim 1 or 2, comprising at least one mechanical system (30, 32) for holding the seat base (14) in the folded-out position and/or in the folded-in position.

4. The vehicle according to claim 3, comprising a wall, one of the wall or the seat base (14) comprising at least one pin, the other one of the wall or the seat base (14) comprising at least one complementary hole, each complementary hole corresponding to one of the at least one pin, each of the at least one pin being deployable in the at least one complementary hole corresponding to one of the folded-out position and the folded-in position, the at least one mechanical holding system (30, 32) comprising the at least one pin and the at least one complementary hole.

5. The vehicle according to claim 4, wherein the or each pin can be actuated by at least one power cylinder.

6. The vehicle according to claim 3, comprising a wall, one of the wall or the seat base comprises at least one first pin, the other one of the wall or the seat base comprising at least one first complementary hole, each first complementary hole corresponding to one of the at least one first pin, each of the at least one first pin being

deployable in the at least one corresponding first complementary hole in the folded-out position, and wherein one of the walls or the seat base comprises at least one second pin, the other wall or the seat base comprising at least one second complementary hole, each second complementary hole corresponding to one of the at least one second pin, each of
5 the at least one second pin being deployable in the at least one second corresponding complementary hole in the folded-in position.

7. The vehicle according to according to any of claims 1 to 6, wherein the actuator is a motor.

10 8. The vehicle according to any of claims 1 to 7, the movement between the folded-out position and the folded-in position corresponds to rotation about an axis (D).

15 9. The vehicle according to any of claims 1 to 8, wherein the folding seat comprises at least one sensor, the sensor being configured for detecting whether the seat base (14) is in the folded-out position and/or in the folded-in position and/or whether the seat is at the end of the travel thereof and/or whether an obstacle is preventing a movement of the seat base.