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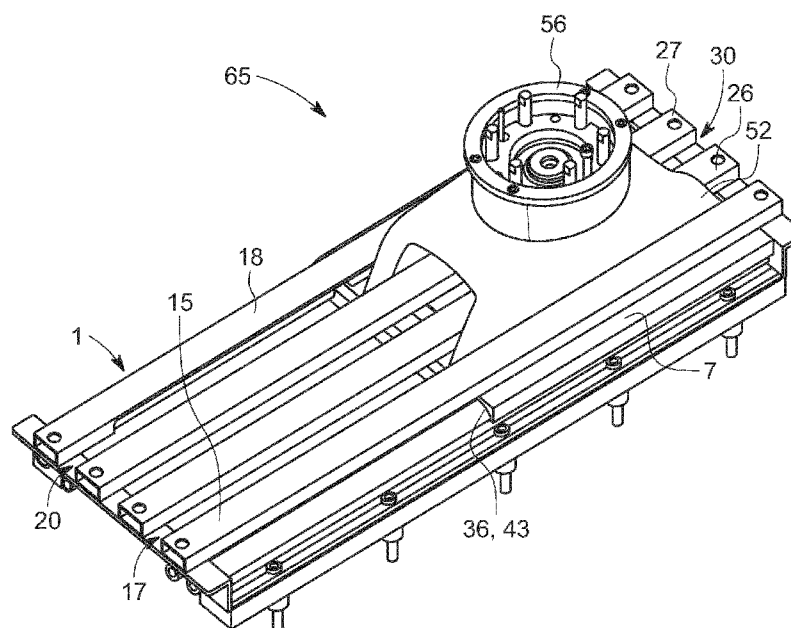


FIG. 4

(57) **Abstract:** Aspects of the present invention relate to a vehicle seat platform and a vehicle seat support. The vehicle seat platform slideably supports a seat frame in a vehicle and is mountable to a vehicle. The vehicle seat platform comprises a floor component configured to form or support a part of a cabin floor of the vehicle. The floor component comprises a plurality of slots therethrough, and a carriage mounting means configured to slideably mount a carriage beneath the floor component such that support struts are able to extend through the slots from above the floor component and engage with said carriage. The carriage mounting means is configured to permit sliding movement of the carriage in a direction parallel to the slots. The vehicle seat support supports a seat frame in a vehicle. The vehicle seat support comprises a carriage configured to be slideably mounted to the vehicle seat platform, a plurality of struts configured to extend through the slots within the floor component of the vehicle seat platform from above the floor component and



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A VEHICLE SEAT PLATFORM

TECHNICAL FIELD

The present invention relates to a vehicle seat platform for slideably supporting a seat frame. Further aspects of the invention relate to a vehicle seat support, a vehicle seat assembly, a vehicle seat, and a vehicle comprising the vehicle seat platform.

BACKGROUND

Seats are an essential feature of a vehicle and can typically be modified so that they provide comfort to an occupant. Conventional vehicle seats are mounted on two metal rails that are fixed directly to the vehicle structure with mechanical fixings. Usually the mechanical fixings are located at, or near to, the four corners of the vehicle seat. The vehicle seats can be adjusted on the rails to slide longitudinally forwards and aft in the vehicle to accommodate different occupants or loads placed in various positions within the vehicle. However, it is desirable to limit the length of conventional rails on which the vehicle seat is slideable so that the rails do not extend beyond the footprint of the vehicle seat. This is so that the rails do not take up space in the foot-well which is meant for the legs and feet of an occupant. Limiting the rails to extending only under the vehicle seat also removes a trip hazard from the floor of the cabin of the vehicle. As a result, the range of movement of a conventional vehicle seat in the fore and aft directions is limited.

SUMMARY OF THE INVENTION

Aspects and embodiments of the invention provide a vehicle seat platform for slideably supporting a seat frame, a vehicle seat support comprising the vehicle seat platform, a vehicle seat assembly comprising the vehicle seat platform, a vehicle seat comprising the vehicle seat platform, and a vehicle comprising the vehicle seat platform.

According to an aspect of the present invention, there is provided a vehicle seat platform for slideably supporting a seat frame in a vehicle, the vehicle seat platform mountable to the vehicle and comprising a floor component configured to form or support a part of a cabin floor of the vehicle, the floor component comprising a plurality of slots therethrough, and a carriage mounting means configured to slideably mount a carriage beneath the floor component such that support struts are able to extend through the slots from above the floor component and engage with said carriage, wherein the carriage mounting means is configured to permit sliding movement of the carriage in a direction parallel to the slots.

Advantageously, the vehicle seat platform provides a mounting position for a seat which is below the cabin floor and so does not provide a trip hazard whilst freeing up space in the foot well. The vehicle seat platform also provides a stable cabin floor which can be stood on by an occupant whilst providing a means of adjusting the longitudinal seat position in the cabin of the vehicle.

The carriage mounting means may comprise at least one track running parallel to the slots and along which the carriage can be slideably mounted.

Therefore, the carriage may be moved such that the struts slide along the slots to allow movement of a seat frame relative to the vehicle seat platform.

- 5 The floor component may comprise a first side element defining an outer side of a first slot, a second side element defining an outer side of a second slot, and at least one intermediate element defining an inner side of the first slot and an inner side of the second slot.

10 The floor component may further comprise a first intermediate element defining an inner side of the first slot, and a second intermediate element defining an inner side of the second slot, wherein at least one intermediate slot is defined between the first and second intermediate elements.

Optionally, at least one of the elements may be hollow. Advantageously, the hollow element may receive a cable guide configured to house a cable that may provide power from the vehicle to the vehicle seat support.

15

The first and second side elements may be supported along at least a part of their lengths.

Advantageously, the vehicle seat platform is made more robust and less prone to deformation of the floor component under loading when the floor component is being stood on by an occupant entering or exiting the vehicle.

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The vehicle seat platform may further comprise side walls that define a channel for receiving a carriage and along which the carriage mounting means is configured to permit sliding movement of the carriage, wherein the first and second side elements may be supported along at least a part of their lengths by the side walls of the vehicle seat platform.

25

Therefore, the side elements can withstand larger loads including vehicle occupants standing on the vehicle seat platform during ingress and egress without bending to contact the carriage.

30 The vehicle seat platform may further comprise a floor covering configured to be mounted to the elements of the floor component. The floor covering may comprise resiliently deformable foam element configured to temporarily seal the slots closed and be deformed by movement of a strut.

The floor covering may be supported by the elements and an upper surface of the floor covering may be configured to form a part of the cabin floor of a vehicle.

35

According to another aspect of the present invention, there is provided a vehicle seat support for supporting a seat frame in a vehicle, the vehicle seat support comprising a carriage configured to be slideably mounted to a vehicle seat platform according to the invention, a plurality of struts configured to extend through the slots within the floor component of the vehicle seat platform from above the floor component and engage with the carriage when mounted

to the vehicle seat platform, and a bridge extending between the struts and configured to support the seat frame above the floor component when the carriage is mounted to the vehicle seat platform.

Advantageously, the vehicle seat support allows a seat frame to be moved forwards and backwards in a vehicle
5 relative to the vehicle seat platform. Another benefit is that the vehicle seat support takes up a small area of the cabin floor of a vehicle.

The struts and the bridge may be integrally formed.

10 The vehicle seat support may comprise a mounting pedestal on the bridge, the mounting pedestal being configured to have the seat frame mounted thereto.

Advantageously, a swivel mechanism may be provided between the bridge and the mounting pedestal to enable the seat frame to be swivelled relative to the vehicle seat support so that an occupant can change the orientation of their
15 seat.

The carriage may comprise bearings configured to engage with at least one track of the carriage mounting means.

The vehicle seat support may further comprise a drive mechanism to slide the carriage relative to the vehicle seat
20 platform. The drive mechanism may be mounted to the carriage.

Therefore, the vehicle seat support may be moved automatically relative to the vehicle seat platform or at least with minimum effort from the occupant.

25 According to another aspect of the invention, there is provided a vehicle seat assembly comprising a vehicle seat platform according to the invention, and a vehicle seat support mounted thereto.

The vehicle seat assembly may comprise a cable guide mounted at one end to the vehicle seat platform and mounted at the other end to the vehicle seat support, the cable guide configured to house a cable which provides
30 power from a vehicle to the vehicle seat support.

According to another aspect of the invention, there is provided a vehicle seat comprising a vehicle seat assembly according to the invention, and a seat frame mounted thereto.

35 According to yet another aspect of the invention, there is provided a vehicle comprising a vehicle seat platform according to the invention, a vehicle seat assembly according to the invention, and/or a vehicle seat according to the invention.

The vehicle may comprise a cabin floor, wherein the vehicle seat platform is mounted within the vehicle such that the floor component of the vehicle seat platform forms or supports a part of the cabin floor of the vehicle.

5 Advantageously, the vehicle seat platform does not protrude into the foot well and provide a solid floor section that an occupant can stand on during ingress and egress of the vehicle.

The vehicle seat platform may be mounted within the vehicle such that an upper surface of the floor component of the vehicle seat platform lies flush with an upper surface of the cabin floor.

10 Advantageously, because the vehicle seat platform does not protrude from the cabin floor, there is no trip hazard present as well as more space in the foot well.

The vehicle may have a longitudinal medial plane and the vehicle seat platform is mounted such that the slots within the floor component of the vehicle seat platform may extend at an angle to said longitudinal medial plane.

15 A benefit of this arrangement is that it enables an occupant to ingress and egress the vehicle easily and also enables a seat frame mounted on the vehicle seat support to be moved into an area of more space.

20 The vehicle may comprise a plurality of vehicle seat platforms mounted at a plurality of seat frame mounting positions, and the vehicle seat platform at each seat frame mounting position may be mounted such that the slots within the respective floor component extend at an angle to said longitudinal medial plane.

25 The vehicle may comprise front seat frame mounting positions adjacent to each other on opposite sides of the longitudinal medial plane, wherein the slots within the floor component of the vehicle seat platform at respective front seat frame mounting positions extend at a diverging angle with respect to the longitudinal medial plane in a direction from a front towards a rear of the vehicle.

30 The vehicle may comprise rear seat frame mounting positions adjacent to each other on opposite sides of the longitudinal centre line, wherein the slots within the floor component of the vehicle seat platform at respective rear seat frame mounting positions extend at a converging angle with respect to the longitudinal centre line in a direction from a front towards a rear of the vehicle.

35 According to an aspect of the present invention there is provided a vehicle floor assembly comprising a seat platform configured to slideably support a seat frame, the seat platform being mounted to a floor assembly of the vehicle such that the seat frame supported by the seat platform is slideable in a direction between a front and a rear of the vehicle that extends at an oblique angle to a longitudinal medial plane of the vehicle.

By configuring the seat platform such that the seat frame is slideable in a direction between the front and the rear of the vehicle that extends at an angle to the longitudinal medial plane of the vehicle, the occupants may move their

seat into a position to ingress or egress the vehicle more easily, or in which they have more space to allow them to enable the occupant to swivel their seat into an orientation in which they are facing a direction other than the direction of travel.

- 5 In an embodiment, the seat platform may be configured such that the seat frame is slideable, in use, such that the seat frame moves away from the longitudinal medial plane as it slides from the front towards the rear of the vehicle.

In another embodiment, the seat platform may be configured such that the seat frame is slideable, in use, such that the seat frame moves toward the longitudinal medial plane as it slides from the front towards the rear of the vehicle.

10

Optionally, the vehicle may comprise a plurality of vehicle seat platforms. Each vehicle seat platform may be mounted to the floor assembly such that the seat frame supported by each vehicle seat platform is slideable, in use, in a direction that extends at an oblique angle to the longitudinal medial plane between the front and rear of the vehicle.

15

In an embodiment, the vehicle may comprise a first pair of vehicle seat platforms positioned in side-by-side relation, in use on opposite sides of the longitudinal medial plane. Each of the vehicle seat platforms of the first pair may be mounted to the floor assembly such that the seat frame supported by each vehicle seat platform moves, in use, in a direction away from the longitudinal medial plane as it slides from the front towards the rear of the vehicle.

20

Optionally, the vehicle may comprise a second pair of vehicle seat platforms positioned in side-by-side relation, in use on opposite sides of the longitudinal medial plane, each of said vehicle seat platforms of the second pair being mounted to the floor assembly such that the seat frame supported by each vehicle seat platform moves, in use, in a direction towards the longitudinal medial plane as it slides in a direction from a front towards a rear of the vehicle.

25

In embodiments, the vehicle seat platforms of the first pair may each slideably support a front seat frame of the floor assembly, and the vehicle seat platforms of the second pair may each slideably support a rear seat frame of the floor assembly.

30

In embodiments, the or each vehicle seat platform may be arranged such that the seat frame supported by the seat support platform, in use, moves away from the longitudinal medial plane at a first end of travel thereof proximate to a door of the vehicle.

35

In embodiments, the or each vehicle seat platform may be arranged such that the seat frame supported by the seat support platform, in use, moves towards the longitudinal medial plane at a second end of travel thereof distal from a door of the vehicle.

Each vehicle seat platform may comprise a floor component forming or supporting a part of the cabin floor of the vehicle.

The floor component may comprise a plurality of parallel elements. The elements are spaced to provide a plurality of parallel slots. The parallel slots can extend at an oblique angle to a longitudinal medial plane.

- 5 The slots may be configured to permit support struts of a seat frame mounting member to extend through the slots and enable the seat frame mounting member to slide in a direction along the slots.

In embodiments, the or each vehicle seat platform may comprise a carriage mounting means configured to slideably mount a carriage beneath the floor component such that the support struts of a seat frame mounting member
10 extending through the slots engage with the carriage.

The carriage mounting means may be configured to permit the carriage to slide in a direction parallel to the slots and, in use, at an oblique angle to the longitudinal medial plane.

- 15 Optionally, the or each vehicle seat platform may be mounted such that an upper surface of the floor component of the or each vehicle seat platform lies flush with an upper surface of the cabin floor.

A seat frame mounting member may be slideably mounted to the or each vehicle seat platform.

- 20 In some embodiments, the seat frame mounting member may comprise a base comprising pedestal mounting means configured to permit a seat frame pedestal to be mounted to the base such that the pedestal can swivel relative to the base.

A seat frame pedestal may be mounted to the base. Optionally, a seat frame is mounted to the pedestal.

- 25 According to a further aspect of the present invention there is provided a vehicle comprising a floor assembly as described above.

- 30 Within the scope of this application it is expressly intended that the various aspects, embodiments, examples and alternatives set out in the preceding paragraphs, in the claims and/or in the following description and drawings, and in particular individual features thereof, may be taken independently or in any combination, unless such features are incompatible. The applicant reserves the right to change any originally filed claim or file any new claim accordingly, including the right to amend any originally filed claim to depend from and/or incorporate any other claim although not originally claimed in that manner.

35

BRIEF DESCRIPTION OF THE DRAWINGS

One or more embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a perspective view of a vehicle seat platform according to an embodiment of the invention;

Figure 2 shows another perspective view of the vehicle seat platform of Figure 1;

Figure 3 shows a perspective view of a vehicle seat support according to an embodiment of the invention;

Figure 4 shows a perspective view of a vehicle seat assembly comprising the vehicle seat platform of Figure 1 and
5 the vehicle seat support of Figure 3 mounted to the vehicle seat platform;

Figure 5 shows a schematic perspective view of a vehicle seat according to an embodiment of the invention, comprising the vehicle seat platform of Figure 1 with some of the elements omitted, a carriage of the vehicle seat support of Figure 2 mounted thereon, and a seat frame;

Figure 6 shows a perspective view of the vehicle seat assembly of Figure 4 with an element omitted;

10 Figure 7 shows a perspective view of a vehicle seat comprising the vehicle seat assembly of Figure 4 and a seat frame mounted to the vehicle seat assembly;

Figure 8 shows a schematic rear cross-sectional view of the vehicle seat assembly;

Figure 9 shows a perspective view of a vehicle according to the invention, with bodywork removed to reveal the floor of a cabin, the vehicle comprising the vehicle seat platform of Figure 1;

15 Figure 10 shows a cross-sectional view through the vehicle seat platform according to an embodiment of the invention;

Figure 11 shows a perspective view of a seat support assembly that includes a vehicle seat support platform that forms or supports part of a cabin floor of a vehicle, a base slideably mounted to the vehicle seat support platform, a seat frame pedestal rotatably mounted to the base, and a seat frame mounted to the seat frame pedestal;

20 Figure 12 shows a perspective view of the base to which the seat frame pedestal is rotatably mountable, and a carriage slideably mounted to the seat support platform to which the base is attached;

Figure 13 shows a perspective view of a seat frame swivel mechanism, and the carriage slideably mounted to the seat support platform, parts of the platform and the base having being omitted for clarity;

Figure 14 shows a perspective view of a vehicle according to an embodiment of the invention;

25 Figure 15 shows a front view of the vehicle shown in Figure 4;

Figure 16 shows a top plan view of the vehicle shown in Figures 4 and 5, and

Figure 17 shows a plan view of the floor assembly of the vehicle shown in Figures 4 to 6, and which includes four seat support platforms supporting, or forming part of, the cabin floor of the vehicle.

30 DETAILED DESCRIPTION

Referring to Figures 1 and 2, there is shown a vehicle seat platform 1 for slideably supporting a seat frame 2, shown in Figures 5 and 7, in a vehicle 3, shown in Figure 9. The vehicle seat platform 1 is mountable to the vehicle 3. The vehicle seat platform 1 comprises a floor component 4 configured to form, or at least support, a part of a cabin floor 39 of the vehicle 3. The floor component 4 comprises a plurality of spaced parallel elements 12 having slots 5
35 therebetween. The vehicle seat platform 1 further comprises a carriage mounting means 6 configured to slideably mount a carriage 7, shown in Figures 3, 4 and 5, beneath the floor component 4 such that support struts 41, shown in Figure 3, are able to extend through the slots 5 from above the floor component 4 and engage with the carriage 7. The carriage mounting means 6 is configured to permit sliding movement of a carriage 7 in a direction parallel to the slots 5.

The vehicle seat platform 1 comprises a front end 10 and a rear end 11 which are separated along a longitudinal axis of the vehicle seat platform 1. The spaced parallel elements 12 are configured such that adjacent elements 10 define a single slot 5 between them. The floor component 4 also has a front end at or proximate to the front end 10 of the vehicle seat platform 1 and a rear end which is at or proximate to the rear end 11 of the vehicle seat platform 1. The front and rear ends of the floor component 4 are separated along a longitudinal axis of the floor component 4. The front end 10 of the vehicle seat platform 1, and floor component 4, is configured to be located closer to the front of a vehicle 3, shown in Figure 9, than the rear end 11 of the vehicle seat platform 1, and floor component 4.

As shown in Figure 1, the floor component 4 comprises a first side element 15 and a second side element 18. The first side element 15 is a section of the floor component which forms an outer portion of the floor component 4. The first side element 15 defines an outer side 16 of a first slot 17 in the floor component 4. That is, the first side element 15 is the outer portion of the floor component 4 between the edge of the floor component 4 and the first slot 17 in the floor component 4.

Likewise, the second side element 18 is a section of the floor component 4 which forms an opposing outer portion of the floor component 4 to the outer portion formed by the first side element 15. The second side element 18 defines an outer side 19 of a second slot 20 in the floor component 4. That is, the second side element 18 is the outer portion of the floor component 4 between the edge of the floor component 4 and the second slot 20 in the floor component 4.

The floor component 4 further comprises at least one intermediate element 22. The at least one intermediate element 22 defines an inner side 23 of the first slot 17 and an inner side 24 of the second slot 20. Therefore, the at least one intermediate element 22 is always located in between the first and second side elements 15, 18 of the floor component 4. However, the first and second side elements 15, 18 are always spaced from the adjacent at least one intermediate element 22 so as to define a plurality of slots 5.

For example, in one alternative embodiment to the embodiment shown in the Figures, the floor component 4 may comprise the first and second side elements 15, 18 and a first intermediate element 26. In such an embodiment, the first intermediate element 26 is the only intermediate element 26 between the first and second side elements 15, 18. Therefore, the floor component 4 of the embodiment comprises three elements 15, 18, 26, and two slots 5. In such an embodiment, the first intermediate element 26 defines an inner side of the first slot 17 and an inner side of the second slot 20. That is, opposite sides of the first intermediate element 26 define the inner sides of the first and second slots 17, 20.

Referring back to Figures 1 and 2, it can be seen that in the present embodiment, the floor component 4 comprises a first intermediate element 26 which defines the inner side 27 of the first slot 17, and a second intermediate element 28 which defines the inner side 29 of the second slot 20. Furthermore, the first and second intermediate elements 26, 28 are adjacent to but spaced from one another. Therefore, at least one intermediate slot 30 is defined between the first and second intermediate elements 26, 28.

It will be understood that in further alternative embodiments, there may be more than two intermediate elements 26, 28, a slot 5 being defined between each adjacent element 12 such that there is one less slot 5 than the number of elements 12 that form the floor component 4. In some embodiments, the elements 12 are dimensioned such that the slots 5 are spaced evenly from one another across the width of the floor component 4. That is, in some embodiments the slots are spaced evenly from one another in a direction perpendicular to the longitudinal axis of the vehicle seat platform 1.

The first and second side elements 15, 18 are supported along at least a part of their lengths. This has the advantage of making the vehicle seat platform 1 more robust, and therefore less prone to deformation of at least the first and second side elements 15, 18 of the floor component 4 under loading for example when the weight of an occupant is un-centred on the seat frame 2 causing torsional forces from the carriage 7 beneath being transferred to the underside of the elements 15, 18 or when the floor component 4 is being stood on from above by an occupant.

The vehicle seat platform 1 further comprises end walls 32, 33 and side walls 31, 34 (Figure 10). The side walls 31, 34 which have been omitted from Figures 1 to 9 for clarity, define the periphery of the vehicle seat platform 1 between the front and rear ends 10, 11 of the vehicle seat platform 1. The side walls 31, 34 may form extremities of the vehicle seat platform 1. The side walls 31, 34 also enable the vehicle seat platform 1 to resist lateral forces transmitted to it through the carriage 7 during unexpected loading, such as, for example, collisions, by helping to preventing lateral movement of the carriage 7 relative to the vehicle seat platform 1.

Thus, the side walls 31, 34 define a channel 35, shown in Figure 5, for receiving a carriage 7, which will be described in further detail herein after. The side walls 31, 34 define the channel 35 along which the carriage mounting means 6 is configured to permit sliding movement of the carriage 7. That is, the carriage 7 is slideable along the carriage mounting means 6 along the channel 35 defined in between the side walls 31, 34.

In one embodiment, the first and second side elements 15, 18 are supported along at least a part of their lengths by the side walls 31, 34 of the vehicle seat platform 1. Therefore, loads can be transferred from the floor component 4 to the side walls 31, 34 of the vehicle seat platform 1 which helps to prevent the floor component 4 from buckling or bending under load.

In the Figures 1 to 9, the majority of the side walls 31, 34 have been omitted such that other features of the vehicle seat platform 1 can be viewed clearly but the side walls 31, 34 can be seen in Figure 10. The side walls 31, 34 may extend up from the bottom of the vehicle seat platform 1 to contact the underside of the first and second side elements 15, 18. Thus, the bending of the first and second side elements 15, 18 is limited by the additional strength given to the side elements 15, 18 due to the support provided by the side walls 31, 34.

The carriage mounting means 6 of the vehicle seat platform 1 further comprises at least one track 36. The at least one track 36 extends beneath the floor component 4 and between the side walls 31, 34 of the vehicle seat platform 1.

The at least one track 36 runs parallel to the slots 5 and is configured such that the carriage 7 can be slideably mounted thereto. Therefore, in the present embodiment, the at least one track 36 also extends parallel to the side walls 31, 34 of the vehicle seat platform 1. That is, the at least one track 36 is located in the channel 25 in which the carriage 7 is slideable.

5

In the present embodiment, the carriage mounting means 6 comprises a first track 37 and a second track 38 which extend parallel to one another. The first and second tracks 37, 38 comprise a cylindrical member extending longitudinally between the front and rear ends 10, 11 of the vehicle seat platform 1. However, it will be understood that the member forming the at least one track 36 may have a differently shaped cross-section.

10

The first track 37 is located at least partially beneath the first side element 15 and a second track 38 is located at least partially beneath the second side element 18, as shown in Figures 1 and 2. In one embodiment, the first track 37 may be completely beneath the first side element 15 and the second track 38 may be completely beneath the second side element 18. Alternatively, the tracks 37, 38 may be located in different positions below the floor component 4.

15

In the present embodiment, the plurality of slots 17, 20, 30 extend parallel to one another and parallel to the longitudinal axis of the vehicle seat platform 1. The slots 5 are shown as extending the length of the floor component 4, although it will be understood by a person skilled in the art that the plurality of slots only need to partially extend along the length of the floor component 4. However, longer slots 5 mean, in general, a greater range over which a seat frame 2 can be positioned within a vehicle 3 relative to the vehicle seat platform 1.

20

Furthermore, in the present embodiment, the slots 5 are defined by straight edges of the elements 12 which form the floor component 4 and run parallel to the at least one track 36 of the carriage mounting means 6 and the longitudinal axis of the vehicle seat platform 1. It will, however, be appreciated that the edges of the elements 12 defining the slots 5 do not necessarily need to be straight or parallel as long as they maintain a minimum distance between adjacent edges. As will become apparent hereinafter, it is beneficial to maintain the, or close to the, minimum slot width so as to minimise lateral movement of the carriage relative to the vehicle seat platform 1 and help to distribute lateral loads.

25

As the floor component 4 is to form a part of a cabin floor 39 in a vehicle 3, it is preferable that the top surfaces of the elements 12 all extend in the same plane. Therefore, when the vehicle seat platform 1 is mounted in a vehicle 3, as will be explained in more detail hereinafter, the floor component 1 is flat and so does not provide trip hazards to a person entering or exiting the vehicle 3.

30

In Figures 1 and 2, the elements 12 of the floor component 4 are shown as being formed by individual cuboidal members or rails with a flat rectangular top surface. The rails which form the elements 12 extend from the front part 10 of the vehicle seat platform 1 to the rear part 11 and are individually mounted thereto. However, it will be apparent that in an alternative embodiment, the floor component 4 may be formed from a single member with slots formed in the single member in order to define the individual elements 12 described above.

35

Preferably, the vehicle seat platform 1 is cuboidal in shape so that its footprint is rectangular. This allows the elements 12, slots 5, side walls 31, 34, and channel 35 to all be aligned such that they are parallel with each other and all extend the same length as the range of movement of the carriage 7, shown in Figure 2, so that the vehicle seat platform 1 is compact and does not occupy any unnecessary space. However, it will be understood that the vehicle seat platform 1 may be any other shape.

Referring now to Figure 3, a vehicle seat support 40 for supporting a seat frame 2 in a vehicle 3 is shown. The vehicle seat support 40 comprises the carriage 7 which is configured to be slideably mounted to the vehicle seat platform 1, described above with reference to Figures 1 and 2 and shown mounted to the vehicle seat platform 1 in Figures 4 and 5. Referring back to Figure 3, the vehicle seat support 40 further comprises a plurality of struts 41 which are configured to extend through the slots 5 within the floor component 4. The plurality of struts 41 are configured to engage with the carriage 7 when the vehicle seat support 40 is mounted to the vehicle seat platform 1. The vehicle seat support 40 also comprises a bridge 42 extending between the struts 41. The bridge 42 is configured to support the seat frame 2 above the floor component 4 when the carriage is mounted to the vehicle seat platform 1. The carriage 7 of the vehicle seat support 40 is mountable to the at least one track 36 of the carriage mounting means 6 of the vehicle seat platform 1, which is described above with reference to Figures 1 and 2. The carriage 7 comprises a bearing 43 configured to engage with the at least one track 36 of the carriage mounting means 6. The bearing 43 has substantially the same profile as at least a section of the member forming the at least one track 36 so as to cooperate with the at least one track 36 when the carriage 7 is mounted to the vehicle seat platform 1, which is shown in Figures 4 and 5. The similar profiles of the at least one track 36 and the at least one bearing 43 can be best viewed in Figures 8 and 10, which shows a cross-sectional view of the vehicle seat support 40 mounted to the vehicle seat platform 1.

In a preferred embodiment, there is at least one bearing 43 per track 36 of the carriage mounting means 6. The cooperating profiles of the bearings 43 and tracks 36 are configured to limit the movement of the carriage 7 of the vehicle seat support 40 along the tracks 36 to translational movement in the longitudinal direction between the front and rear ends 10, 11 of the vehicle seat platform 1 when the vehicle seat support 40 is mounted to the vehicle seat platform 1. This is illustrated in Figures 8 and 10 which shows the at least one bearing 43 at least partially encapsulating or surrounding the at least one track 36.

Referring briefly to Figure 5, it can be seen that in the present embodiment, the carriage 7 comprises a first bearing 44 and a second bearing 45 which are both located on the first track 37. The first bearing 44 is located at the end of the carriage 7 which is to be located proximate to the end of the carriage 7 that will be closest to the front end 10 of the vehicle seat platform 1 when the vehicle seat support 40 is mounted to the vehicle seat platform 1 and the second bearing 45 is to be located proximate to the end of the carriage 7 that will be nearest the rear end 11 of the vehicle seat platform 1. Although not shown in the Figures, the opposite side of the carriage 7 has a similar configuration to the side described above in relation to Figure 5.

Locating the bearings 44, 45 at the front and rear of the carriage 7 to help with weight distribution of the seat frame 2 and an occupant etc. However, it will be understood, that the bearing 43 on a track 36 may be formed by a single bearing that extends partially along the length of the carriage 7 or along the whole length of the carriage 7.

- 5 As shown in Figure 3, the bearing 43 of the carriage 7 is shaped so that it will at least partially encompass the at least one track 36 of the vehicle seat platform 1 when the carriage 7 is mounted to the vehicle seat platform 1. That is, the bearing 43 is configured such that it will encompass the at least one track 36 of the vehicle seat platform 1 sufficiently such that the carriage 7 cannot be removed from the at least one track 36 when the vehicle seat support 40 is mounted to the vehicle seat platform 1, as shown in Figure 3.

10

In some embodiments, the carriage 7 may comprise a locking mechanism (not shown) configured to prevent movement of the carriage 7 along the at least one track 36 when the locking mechanism is activated by an occupant. The locking mechanism may be manually activated by the occupant.

- 15 The carriage 7 forms the base of the vehicle seat support 40 and is configured to be located beneath the floor component 4 of the vehicle seat platform 1 when mounted to the vehicle seat platform 1, as shown in Figure 4. That is, the carriage 7 is configured to fit within the channel 35 formed between the front and rear ends 10, 11, side walls 31, 34 of the vehicle seat platform 1 and the lower surface of the elements 12 of the floor component 4 of the vehicle seat platform 1.

20

Referring to Figure 3, it can be seen that in some embodiments, the carriage 7 may comprise a further bearing 47 on its upper surface 48, as illustrated in Figure 5. The bearing 47 provides a frictionless, or low friction, surface. The bearing 47 may be, for example, but not limited to, a dry polymer bearing or skid block. The bearing 47 is located such that it is beneath and aligned with one of the elements 12 of the floor component 4 of the vehicle seat platform 1. In some embodiments, the carriage 7 may be provided with multiple bearings 47 on its upper surface 48 so that

25 when the carriage 7 is mounted to the vehicle seat platform 1, each element 12 of the vehicle seat platform 1 has at least one bearing 47 located below it. Of course, in alternative embodiments, bearings 47 may only be located below selected elements 12 of the floor component 4.

- 30 The bearing 47 is configured so that friction between the upper surface 48 of the carriage 7 and the lower surface of the elements 12 of the floor component 4 of the vehicle seat platform 1 is minimised in the event of contact between the two when the carriage 7 is mounted to the vehicle seat platform 1 due to excessive loads. Advantageously, the bearing 47 reduces the force needed to slide the carriage 7 along the at least one track 36 in the event of contact between one of the elements 12 of the floor component 4 and the upper surface 48 of the carriage 7.

35

It will be understood that in normal operation it is envisaged that there will be no contact between the lower surface of the floor component 4 and the upper surface 48 of the carriage 7. That is, the carriage 7 is dimensioned such that it can be mounted on carriage mounting means 6 of the vehicle seat platform 1 without contacting the lower surface of the floor component 4 of the vehicle seat platform 1. However, the close proximity of the upper surface 48 of the

carriage 7 to the lower surface of the floor component 4 means that the floor component 4 can prevent, or at least limit, pitching of the vehicle seat support 40 relative to the vehicle seat platform 1 under large decelerations, such as during a collision, when the carriage 7 is mounted to the vehicle seat platform 1, as shown in Figure 4.

5 As previously mentioned, the vehicle seat support 40 comprises a plurality of struts 41 which are configured to extend through the slots 5 within the floor component 4. Each of the plurality of struts 41 are configured to be mounted to the carriage 7 at their bottom end 50 and to be mounted to the bridge 42 at the opposing upper end 51. Therefore, when the vehicle seat support 40 is mounted to the vehicle seat platform 1, the plurality of struts 41 extend from below the upper surface of the floor component 4 to above the floor component 4, as shown in Figure 4.

10

Referring to Figure 3, each of the plurality of struts 41 upstands substantially vertically from the carriage 7. The struts 41 are configured such that they can extend through the slots 5 in the floor component 4 of the vehicle seat platform 1 when the vehicle seat support 40 is mounted to the vehicle seat platform 1. That is, the width of each of the struts 41 is less than that of the corresponding slot 5 in the floor component 4 of the vehicle seat platform 1 through which it is to extend. A struts 41 which has a width that is only slightly less than the width of the slot 5 in which it is located 15 when the vehicle seat support 40 is mounted on the vehicle seat platform 1 may help prevent, or at least limit, lateral movement of the vehicle seat support 40 relative to the vehicle seat platform 1, especially under large loads.

In some embodiments, each of the struts 41 is generally blade or fin-shaped. As illustrated in Figure 3, the struts 41 20 of the present embodiment extend the length of the carriage 7 in a direction parallel to the longitudinal axis of the carriage 7 when mounted to the carriage 7. The struts 41 also taper from their bottom end 50 towards their upper end 51 so that the upper end 51 is shorter than the lower end 50. However, it will be appreciated that the struts 41 may have a different shape and length in alternative embodiments.

25 In the present embodiment, the vehicle seat support 40 comprises a first strut 52 and a second strut 53 which extend parallel to one another. The first and second struts 52, 53 are separated by a distance equal to the distance between two of the slots 5 in the floor component 4 of the vehicle seat platform 1. Furthermore, the first and second struts 52, 53 extend substantially parallel to the slots 5 in the floor component 4 of the vehicle seat platform 1 through which the first and second struts 52, 53 are configured to extend.

30

As illustrated in Figure 4, the first strut 52 is located on the carriage 7 such that when the vehicle seat support 40 is mounted to the vehicle seat platform 1, the first strut 52 extends through the first slot 17 which is defined between the first side element 15 and the first intermediate element 26. The second strut 53 is located on the carriage 7 such that 35 when the vehicle seat support 40 is mounted to the vehicle seat platform 1, the second strut 53 extends through the second slot 20 which is defined between the second side element 18 and the second intermediate element 28.

In alternative embodiments, the vehicle seat support 40 may comprise a further intermediate strut 54, as shown in Figure 8. The intermediate strut 54 is similar to the first and second struts 52, 53 described above and is configured to extend through the intermediate slot 30 defined between the first and second intermediate elements 26, 28.

Advantageously, the third strut enables the vehicle seat support 40 to withstand higher loads or allows the load to be distributed through more struts which enables the struts to be smaller and therefore save weight and space. The intermediate strut 54 may comprise a slot or aperture (not shown) configured to provide a conduit for cables (not shown) or vehicle seat orientation mechanisms (not shown) to be connected to a seat or seat frame. The aperture
5 may be an internal aperture.

In such an embodiment, each of the struts 41 may be spaced evenly from one another across the width of the carriage 7. That is, the struts 41 are spaced evenly from one another in a direction perpendicular to the longitudinal axis of the vehicle seat support 40 in a corresponding fashion to the slots 5 in the floor component 4 of the vehicle
10 seat platform 1. It will be appreciated that the vehicle seat support 40 may comprise as many struts 41 as the number of slots 5 in the floor component 4 of the vehicle seat platform 1 to which the vehicle seat support 40 is to be mounted to.

Referring back to Figure 3, the vehicle seat support 40 further comprises the bridge 42 which extends between the
15 struts 41. The bridge 42 extends substantially horizontally between the struts 41. That is, the bridge extends 42 substantially parallel to the upper surface 48 of the carriage 7. The bridge 42 is located at the upper end 51 of the struts 41 and therefore, is located above the floor component 4 of the vehicle seat platform 1 when the vehicle seat support 40 is mounted to the vehicle seat platform 1. In some embodiments, the struts 41 and the bridge 42 may be integrally formed to improve the strength of the structure. As a result, the intermediate elements 26, 28 of the vehicle
20 seat platform 1 are surrounded by the vehicle seat support 40 in order to couple the two apparatus together to provide a collision resilient structure which allows relative movement in the longitudinal direction between the two.

Referring to Figures 5 and 6, the bridge 42 of the vehicle seat support 40 is configured to support a seat frame 2 above the floor component 4 of the vehicle seat platform 1 when the vehicle seat support 40 is mounted thereon.
25 Specifically, the vehicle seat frame support 40 comprises a mounting pedestal 55 on the bridge 42. The mounting pedestal 55 is configured to have the seat frame 2 mounted thereto. The bridge 42 may comprise a mounting portion 56, shown in Figures 3 and 4, to which the mounting pedestal 55 is attached. The mounting portion 56 may comprise an orientation mechanism (not shown) which enables the mounting pedestal to be rotated relative to the vehicle seat support 40 and/or moved vertically to adjust the height of the seat frame 2 relative to the vehicle seat platform 1. The
30 mounting portion 56 may be mounted in the centre of the bridge 42. Advantageously, it means that the feet of an occupant in an adjacent seat can pass under the seat frame 2 without contacting the vehicle seat support 40 when the adjacent seat frame 2 is being swivel to face in the opposite direction.

The vehicle seat support 40 further comprises a drive mechanism 60 which is configured to slide the carriage 7
35 relative to the vehicle seat platform 1. Referring to Figure 5, it can be seen that the drive mechanism 60 is mounted to the carriage 7. The drive mechanism 60 comprises at least one motor 61 which is configured to drive a gearbox 62. The gearbox 62 is in engagement with a worm drive 63. A worm screw 64, which can also be seen in Figures 8 and 10, is mounted to the vehicle seat platform 1 and extends parallel to the at least one track 36 between the front and rear ends 10, 11 of the vehicle seat platform 1. Therefore, when the motor 61 is actuated, the gearbox 62 drives

the worm gear 63 in order to slide the carriage 7 along the at least one track 36. Therefore, the vehicle seat support 40 can be positioned relative to the vehicle seat platform 1. In one embodiment, the drive mechanism 60 is used to hold the vehicle seat support 40 in position relative to the vehicle seat platform 1 when its position is not being adjusted.

5

Referring to Figure 4, a vehicle seat assembly 65 is shown. The vehicle seat assembly 65 comprises a vehicle seat platform 1 and a vehicle seat support 40 mounted thereto.

Figure 5 shows a vehicle seat platform 1 with a vehicle seat support 40 mounted thereto. The vehicle seat support 40
10 has a mounting pedestal 55 mounted, as described above.

Referring briefly to Figure 6, an embodiment of the vehicle seat assembly 65 of Figure 4 is shown with the first side element 15 removed. In the embodiment of the vehicle seat platform 1 shown in Figure 6, at least one of the elements 12 is hollow, as is also illustrated in Figures 8 and 10. The hollow elements 12 are tubular along their
15 length. In such an embodiment, the vehicle seat assembly 65 further comprises a cable guide 66 configured to receive at least one cable (not shown). The cable guide 66 is configured to house cables which deliver, for example, but not limited to, power to the carriage 7.

The cable guide 66 comprises a first end 67 which is configured to be mounted to the front end 10 of the vehicle seat platform 1, as shown in Figure 6. It will be appreciated that the first end 67 may be mounted to the rear end 11 of the vehicle seat platform 1. The cable guide 66 further comprises a second end 68. The second end is configured to be mounted to the vehicle seat support 40, as shown in Figure 6. Preferably, the second end 68 of the cable guide 66 is mounted to the upper surface 48 of the carriage 7. The first and second ends 67, 68 of the cable guide 66 may
20 comprise electric connections to transfer power from a vehicle 3 to the vehicle seat support 40.

25

In the present embodiment, the cable guide 66 is formed by a chain link guide 69 which is formed of individual links 69a which are rotatable, via a pivot point 69b, relative to the adjacent links. The length of the cable guide 66 is slightly greater than the range of movement of the vehicle seat support 40 relative to the vehicle seat platform 1. This enables the cable guide 66 to allow the vehicle seat support 40 to operate over its full range of movement without
30 inhibiting movement by impeding the struts 41.

In some embodiments, the cable guide 66 may be configured so that its range of motion is limited. For example, the pivot point 69b may be configured such that rotation of the individual links relative to one another is within a limited range so as to prevent the cable guide 66 bending into the path of the struts 41 when the vehicle seat support 40 is
35 being moved towards the first end 67 of the cable guide 66.

The chain link cable guide 69, including the individual links 69a, is hollow such that a cable (not shown) can extend within the cable guide 66. In this way, a cable extending through the cable guide 66 is protected and cannot become

tangled or block movement of the carriage 7 along the slots 5 during repeated forward and rearward movement of the vehicle seat support 40 relative to the vehicle seat platform 1.

5 In the present embodiment, the first side element 15, which has been omitted in Figure 6 but is visible in Figure 8, comprises a cut-out (not shown) through which the cable harness 66 extends so that the second end 68 can be mounted to the carriage 7. The cut-out extends along the length of the first side element 15 so as to allow the full range of movement of the vehicle seat support 40 relative to the vehicle seat platform 1.

10 In some embodiments, the vehicle seat support 40 may comprise a projection (not shown). The projection may upstand from the upper surface 48 of the carriage 7. The projection is configured to contact the cable guide 66 to give the cable guide 66 an element to bend around during movement of the vehicle seat support 40 relative to the vehicle seat platform 1. The projection helps to keep the cable guide taut and in the correct alignment.

15 Referring to Figure 7, a vehicle seat 70 is shown. The vehicle seat 70 comprises a vehicle seat platform 1 and a vehicle seat support mounted thereto. The vehicle seat support 40 has a seat frame 2 mounted thereto. The seat frame 2 may be mounted to the vehicle seat support 40 via the mounting pedestal 55.

20 Referring to Figure 8, the rear perspective view of an embodiment of the seat assembly 65 is shown. The seat assembly 65 comprises the vehicle seat platform 1 and the vehicle seat support 40, as described above. In the present embodiment, the vehicle seat platform 1 further comprises a floor covering 72 which forms a part of the floor component 4. The floor covering 72 comprises a covering 73. The covering 73 may be formed by, for example, but not limited to, carpet or lining.

25 In the embodiment of the vehicle seat platform 1 comprising the floor covering 72, the floor covering 72 is configured to form a part of the cabin floor 39 of a vehicle 3 and the elements 12 of the floor component 4 are configured to support the floor covering 72. An upper surface 74 of the floor covering 72 may be configured to lie flush with an upper surface of the cabin floor 39 of a vehicle 3.

30 The floor covering 72 further comprises a support moulding 75. The support moulding 75 is configured to attach the floor covering 72 to elements 12 of the floor component 4. In the present embodiment, a support moulding 75 is mounted to the upper surface of each of the elements 12 of the floor component 4. Furthermore, each covering 73 of the floor covering 72 is attached to each of the support moulding 75. The covering 73 may be bonded to the support moulding 75. Therefore, the support moulding 75 attaches the covering 73 to the element 12 it is mounted on and ensures that correct alignment is maintained.

35 In the present embodiment, each covering 73 extends across the element 12 to which it is mounted by the support moulding 75 and also extends over the side of the element 12 to which it is mounted such that at least a part of the covering 73 extends into one of the slots 5. That is, the covering 73 extends vertically into slots 5. This improves the appearance of the vehicle seat platform 1.

The floor covering 72 further comprises a foam element 76. The foam element 76 is mounted to a side edge of the element 12 and configured to be placed in a slot 5 and extend along the side edge of an element 12 along slot 5. The foam element 76 is configured to extend out into the slot 5 and bias the covering 73 to close the slot 5. This may be
5 achieved by foam elements 76 attached to adjacent elements 12 contacting in the middle of the slot 5. Each side edge of an element 12 may comprise a foam element 76.

The foam elements 76 enable the floor covering 73 to close a length of the slot 5 when the vehicle seat support 40 is not present along that length of the vehicle seat platform 1. However, when the vehicle seat support 40 is moved
10 along the slot 5, the struts 41 compress the foam elements 76 and separate adjacent floor coverings 72 allowing the vehicle seat support 40 to be moved forwards and backwards relative to the vehicle seat platform 1. Advantageously, the blade shape of the struts 41 enables floor coverings 72 to be separated easily. The foam element 76 may be bonded to the covering 73 and/or the side of an element 12.

15 The floor covering 72 may further comprise a spring strip 77. The spring strip 77 is bonded between the covering 73 and the foam element 76 and may extend along the length of the slot 5. The spring strip 77 is configured to help the foam element 76 regain its original shape when the vehicle seat support 40 is not present at that specific location.

Referring to Figure 9, a vehicle 3 is shown with the outer body work removed to show the internal features more
20 clearly. The vehicle 3 comprises at least one vehicle seat platform 1 as described above. Although not shown in Figure 8, the vehicle 3 may comprise the vehicle seat 70 as described above.

More specifically, Figure 9 shows the cabin floor 39 of a vehicle 3 to which four vehicle seat platforms 1 have been mounted. Two pairs of vehicle seat platforms have been mounted to the cabin floor 39 of the vehicle 3 with one pair
25 behind the other. One pair forms the mounting position for the front seats of the vehicle 3 whilst the other pair forms the mounting position of the rear seats of the vehicle 3.

Each of the vehicle seat platforms 1 have been mounted to the cabin floor 39 such that a vehicle seat support 40, which may have a seat frame 2 attached, supported by the vehicle seat platform 1 will slide in a direction between
30 the front and rear of the vehicle 3 which extends at an angle to a longitudinal medial plane of the vehicle 3. That is, the longitudinal axis of each of the vehicle seat platforms 1 extends at an angle to the longitudinal medial plane of the vehicle 3. The longitudinal medial plane is a longitudinal plane that divides the vehicle 3 down the middle so that half the vehicle 3 is on one side of the longitudinal medial plane and the other half is on the other side of the longitudinal medial plane.

35 Whilst Figure 9 shows that all four vehicle seat platforms 1 have been mounted so that they extend at an angle to the longitudinal medial plane of the vehicle, it will be appreciated that only one or more of the vehicle seat platforms 1 may extend in the way. For example, at least one vehicle seat platform 1 may be configured so that the vehicle seat support 40 slideably mounted to that vehicle seat platform 1 moves parallel to the longitudinal medial plane.

Alternatively, at least one vehicle seat platform 1 may be configured so that the vehicle seat support 40 slideably mounted to that vehicle seat platform 1 moves in a direction away from the longitudinal medial plane as it slides in a direction from the front towards the rear of the vehicle 3. In another alternative, at least one vehicle seat platform 1
5 may be configured so that the vehicle seat support 40 is slideable in a direction towards the longitudinal medial plane as it slides from the front towards the rear of the vehicle 3.

The vehicle seat platforms 1 may form a pair to provide the front or rear seats of the vehicle 3 that are arranged so that the vehicle seat support 40 slideably mounted to the vehicle seat platform 1 of one pair are both slideable in a
10 direction away or towards the longitudinal medial plane as the slide from the front towards the rear of the vehicle 3.

In the particular arrangement shown in Figure 9, the pair of vehicle seat platforms 1 providing the front seats of the vehicle 3 are arranged so that the vehicle seat supports 40 supported by each of the vehicle seat platforms 1 both move away from the longitudinal medial plane, and so away from each other, as the seat frame slide along the
15 platforms from the front towards the rear of the vehicle 3.

Furthermore, the pair of vehicle seat platforms 1 providing the rear seats of the vehicle are arranged so that the vehicle seat supports 40 supported by each of the support platforms both move towards the longitudinal medial planes, and so move closer to each other, as the vehicle seat supports 40 slide along the vehicle seat supports 40
20 from the front towards the rear of the vehicle 3.

The arrangement of the vehicle seat platforms 1 as shown in Figure 9 most closely resembles the shape of a rhombus or diamond. The benefit of this arrangement is that it enables all the occupants to ingress and egress the vehicle 3 easily and also enables a seat frame 2 mounted on the vehicle seat support 40 to be moved into an area of
25 more space so as to make it easier for an occupant to swivel the seat frame 2.

In some embodiments, at least one of the vehicle seat platforms 1 may be mounted at an angle to the plane of the cabin floor 39 of the vehicle 3. For example, the front end 10 of the vehicle seat platform 1 may be higher than the rear end of the vehicle seat platform 1. This enables an occupant to increase their elevation relative to the cabin floor
30 39 of the vehicle 3 as they move the vehicle seat platform 40, with a seat frame 2 mounted thereto. This is particularly advantageous for an occupant of the driver's seat so that they can adjust their view of the road.

With reference to Figure 11, there is shown a vehicle seat support assembly 101 that includes a seat support platform 102 which provides a floor component forming part of a cabin floor 103a (Figure 17) of a vehicle 104, or
35 which at least supports part of the cabin floor 103a of a vehicle 104, and to which a seat frame mounting member in the form of a base 105 is slideably mounted. The floor component may be formed from a plurality of spaced parallel structural elements 120.

The base 105 has struts 106 that extend through slots 107 in the platform 102 between the elements 120 and which attach to a carriage 108. The carriage 108 is slideably mounted beneath the seat support platform 102 on carriage mounting means comprising shafts 8a along which the carriage 108 can run on linear bearings 108b, so that the base 105 and the carriage 108 can slide together in a direction extending along the length of the slots 107.

5

A seat frame pedestal 109 is mountable to the base 105, and a seat frame 110 is mountable to the pedestal 109. The base 105 may include seat frame mounting means 111 that permits the pedestal 109 and seat frame 110 to be attached to the base 105 via a seat frame swivel mechanism 112 (see Figure 13). The seat frame swivel mechanism 112 may comprise a drivetrain configured so that upon activation of a drive motor 113 by an occupant of the seat
10 frame 110, the drivetrain rotates to cause the seat frame 110 to swivel. In an alternate embodiment, the seat frame 110 is directly attached to the base 105 so that it cannot swivel. The seat frame swivel mechanism 112 may also be configured to permit the height of the seat frame 110 and pedestal 109 to be adjusted.

In the embodiment illustrated in Figure 13, the seat frame swivel mechanism 112 comprises a seat frame swivel gear
15 114, to which the seat frame 110 is attached, and a pinion gear 115 in meshing engagement with the seat frame swivel gear 114. The pinion gear 115 has a drive shaft 116 which is attached to the drive motor 113 so that, upon activation of the motor 113, the pinion gear rotates which in turn drives the seat frame swivel gear 114 to rotate the pedestal 109 and the seat frame 110.

20 A seat frame support shaft 117 extends along the axis of rotation of the seat frame swivel gear 114 and the pedestal 109 is mounted to an upper end of the seat frame support shaft 117. An air spring 118 may be located between the seat frame support shaft 117 and the pedestal 109.

A front perspective view of a vehicle 104 according to the embodiments of the invention is shown in Figure 14. Front
25 and top plan views of the vehicle are also shown in Figures 15 and 16. Marked on Figures 15 and 16 are lines representing the medial longitudinal plane M, which is a plane that extends down the middle of the vehicle and splits or divides the vehicle 104 in half from front to back. The arrow marked "F" shown on Figures 14 to 16 represents a direction towards the front of the vehicle 104, whereas arrow marked "R" represents a direction towards the rear of the vehicle 104.

30

Figure 17 shows a plan view of a floor assembly 3 of the vehicle of Figures 14 to 16. In the illustrated embodiment, four seat support platforms 102 have been mounted, or form part of, the floor assembly 103. More specifically, Figure 17 shows that two pairs of seat platforms 102a, 102b have been mounted to the floor assembly 103 of the vehicle 104 with one pair 102a, 102b behind the other and the seat platforms 102a, 102b of each pair being positioned in
35 side-by-side relation on opposite sides of the medial longitudinal plane M. One pair 102a are the platforms 102 for the front seats of the vehicle 104 whilst the other pair 102b are the platforms 102 for the rear seats of the vehicle 104.

Each of the seat platforms 102 have been mounted to the floor assembly 103 so that a seat frame 110 supported by a seat platform 102 will slide in a direction between a front F and a rear R of the vehicle 104 but at an angle, rather than parallel, to the longitudinal medial plane M of the vehicle 4.

5 Whilst Figure 17 shows that all four seat support platforms 102 have been mounted so that they extend at an angle to the longitudinal medial plane M of the vehicle 104, it will be appreciated that only one or more of the seat support platforms 102 may extend in this way. For example, at least one seat platform 102 may be configured so that the seat frame 110 slideably mounted to that seat platform 102 moves in a direction away from the longitudinal medial plane M as it slides in a direction from the front F towards the rear R of the vehicle 104. Alternatively, at least one
10 seat platform 102 may be configured such that the seat frame 110 slideably mounted to that seat platform 102 moves in a direction toward the longitudinal medial plane M as it slides from the front F towards the rear R of the vehicle 104.

If the seat platforms are in a pair, i.e. a front pair 102a and a rear pair 102b, the seat platforms of each pair can be
15 arranged so that both the seat frames 110 of that pair are both slideable in a direction away, or towards, the longitudinal medial plane as they slide from the front F towards the rear R of the vehicle 104.

In the particular arrangement shown in Figure 17, the pair of seat support platforms 102a that support the seat frames 110 of the front seats of the vehicle 104 are arranged so that the seat frames 110 supported by each of the support platforms both move away from the longitudinal medial plane, and so away from each other, as the seat
20 frames 110 slide along the platforms 102 in a direction from the front F towards the rear R of the vehicle 104.

Additionally, the pair of seat platforms 102b providing the rear seats of the vehicle 104 are arranged so that the seat frames 110 supported by each of the support platforms 102 both move towards the longitudinal medial plane M, as
25 so move closer to each other, as the seat frames 110 slide along the platforms 102 from the front F towards the rear R of the vehicle 104.

The arrangement of seat support platforms 102, as shown in Figure 17, most closely resembles the shape of a rhombus or diamond. The benefit of this arrangement is that the support platforms 102 are arranged such that their
30 respective seat frames 110 are moved away from the longitudinal medial plane M at a first end of travel thereof proximate to a door 140 (Figures 14 and 16) of the vehicle 104 to facilitate ingress and egress of occupants, and it also enables a seat frame 110 to be moved into an area of more space which is particularly desirable if the seat frames 110 are designed to swivel, as additional leg room for the occupant is required.

35 Furthermore, the support platforms 102 are further arranged such that their respective seat frames 110 are moved towards the longitudinal medial plane M at a second end of travel thereof distal from said door 140 of the vehicle 104, thereby permitting said seat frame 110 to travel inwardly of a wheel arch (not shown) of the vehicle 104. Advantageously, this enables the seat frame to travel further forward or rearward within the vehicle than would

otherwise be possible with conventional seat movement parallel to the longitudinal medial plane M. In particular, this enables the seat frame 110 and/or the legs of the occupant to fit between wheel arches of the vehicle.

It will be appreciated that various changes and modifications can be made to the present invention without departing
5 from the scope of the present application.

CLAIMS

1. A vehicle seat platform for slideably supporting a seat frame in a vehicle, the vehicle seat platform mountable to the vehicle and comprising:
- 5 a floor component configured to form or support a part of a cabin floor of the vehicle, the floor component comprising a plurality of slots therethrough; and
- a carriage mounting means configured to slideably mount a carriage beneath the floor component such that support struts are able to extend through the slots from above the floor component and engage with said carriage,
- 10 wherein the carriage mounting means is configured to permit sliding movement of the carriage in a direction parallel to the slots.
2. A vehicle seat platform according to claim 1, wherein the carriage mounting means comprises at least one track running parallel to the slots and along which the carriage can be slideably mounted.
- 15 3. A vehicle seat platform according to claim 1 or claim 2, wherein the floor component comprises:
- a first side element defining an outer side of a first slot;
- a second side element defining an outer side of a second slot; and
- at least one intermediate element defining an inner side of the first slot and an inner side of the second slot.
- 20 4. A vehicle seat platform according to claim 3, wherein the floor component comprises:
- a first intermediate element defining an inner side of the first slot; and
- a second intermediate element defining an inner side of the second slot,
- wherein at least one intermediate slot is defined between the first and second intermediate elements.
- 25 5. A vehicle seat platform according to claim 3 or claim 4, wherein at least one of the elements is hollow and configured to receive a cable guide.
6. A vehicle seat platform according to any one of claims 3 to 5, wherein the first and second side elements are supported along at least a part of their lengths.
- 30 7. A vehicle seat platform according to any one of claims 3 to 6, further comprising a floor covering configured to be mounted to the elements of the floor component, optionally wherein the floor covering comprises a resiliently deformable foam element configured to temporarily seal the slots and be deformed by movement of a strut of the carriage.
- 35 8. A vehicle seat platform according to any one of claims 6 comprising side walls that define a channel for receiving a carriage and along which the carriage mounting means is configured to permit sliding movement of the carriage; wherein the first and second side elements are supported along at least a part of their lengths by the side walls of the vehicle seat platform.

9. A vehicle seat support for supporting a seat frame in a vehicle, the vehicle seat support comprising:
a carriage configured to be slideably mounted to a vehicle seat platform of any preceding claim;
a plurality of struts configured to extend through the slots within the floor component of the vehicle seat
5 platform from above the floor component and engage with the carriage when mounted to the vehicle seat platform;
and
a bridge extending between the struts and configured to support the seat frame above the floor component
when the carriage is mounted to the vehicle seat platform.
10. A vehicle seat support according to claim 9, wherein the struts and the bridge are integrally formed.
11. A vehicle seat support according to claim 9 or claim 10, wherein the vehicle seat support comprises a
mounting pedestal on the bridge, the mounting pedestal being configured to have the seat frame mounted thereto.
12. A vehicle seat support according to any one of claims 10 to 12 wherein the carriage comprises bearings
15 configured to engage with at least one track of the carriage mounting means.
13. A vehicle seat support according to any one of claims 10 to 13, comprising a drive mechanism to slide the
carriage relative to the vehicle seat platform, optionally wherein the drive mechanism is mounted to the carriage.
- 20 14. A vehicle seat assembly comprising a vehicle seat platform of any one of claims 1 to 8 and a vehicle seat
support mounted thereto, optionally comprising a cable guide mounted at one end to the vehicle seat platform and
mounted at the other end to the vehicle seat support, the cable guide configured to house a cable which provides
power from a vehicle to the vehicle seat support.
- 25 15. A vehicle seat comprising a vehicle seat assembly according to claim 14 and a seat frame mounted
thereto.
16. A vehicle comprising a vehicle seat platform of any one of claims 1 to 8, a vehicle seat assembly according
30 to claim 14 and/or a vehicle seat according to claim 15.
17. A vehicle according to claim 16 comprising a cabin floor, wherein the vehicle seat platform is mounted
within the vehicle such that the floor component of the vehicle seat platform forms or supports a part of the cabin floor
of the vehicle, optionally wherein the vehicle seat platform is mounted within the vehicle such that an upper surface of
35 the floor component of the vehicle seat platform lies flush with an upper surface of the cabin floor.
18. A vehicle according to claim 16 or 17, wherein the vehicle has a longitudinal centre line and the vehicle
seat platform is mounted such that the slots within the floor component of the vehicle seat platform extend at an
angle to said longitudinal centre line, optionally wherein the vehicle comprises a plurality of vehicle seat platforms

mounted at a plurality of seat frame mounting positions, and the vehicle seat platform at each seat frame mounting position is mounted such that the slots within the respective floor component extend at an angle to said longitudinal centre line.

5 19. A vehicle according to claim 18, comprising front seat frame mounting positions adjacent to each other on opposite sides of the longitudinal centre line, wherein the slots within the floor component of the vehicle seat platform at respective front seat frame mounting positions extend at a diverging angle with respect to the longitudinal centre line in a direction from a front towards a rear of the vehicle.

10 20. A vehicle according to claim 18 or claim 19, comprising rear seat frame mounting positions adjacent to each other on opposite sides of the longitudinal centre line, wherein the slots within the floor component of the vehicle seat platform at respective rear seat frame mounting positions extend at a converging angle with respect to the longitudinal centre line in a direction from a front towards a rear of the vehicle.

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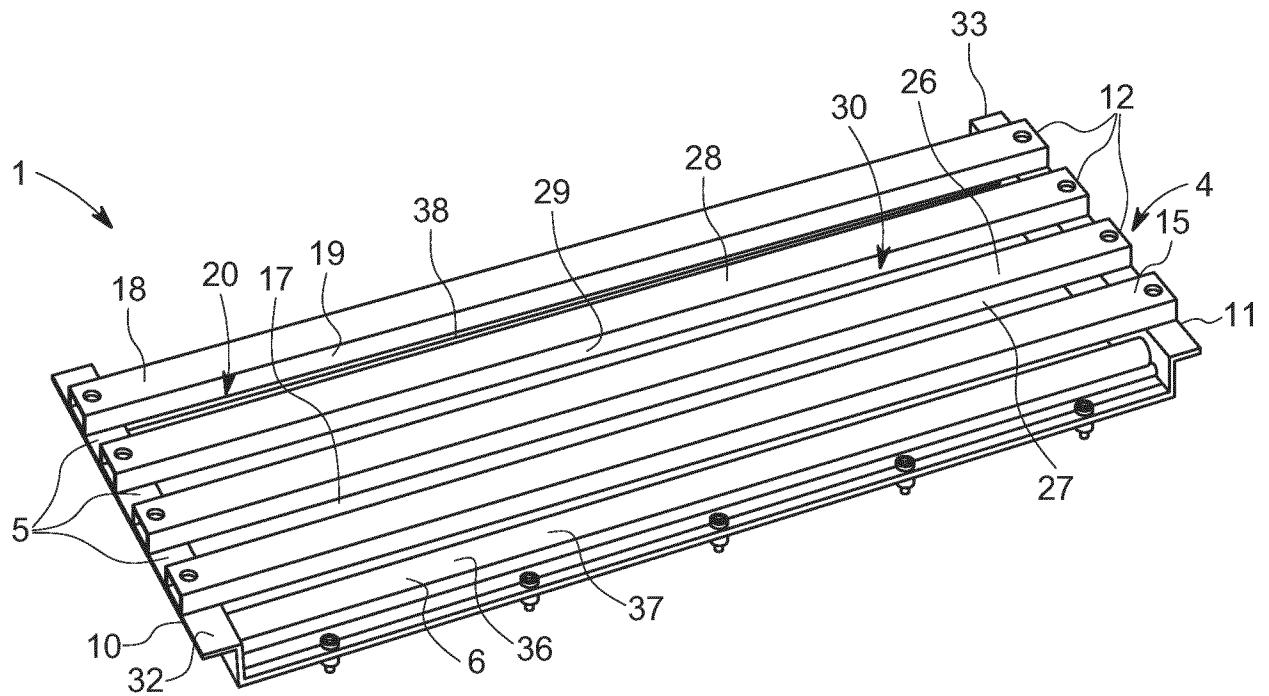


FIG. 1

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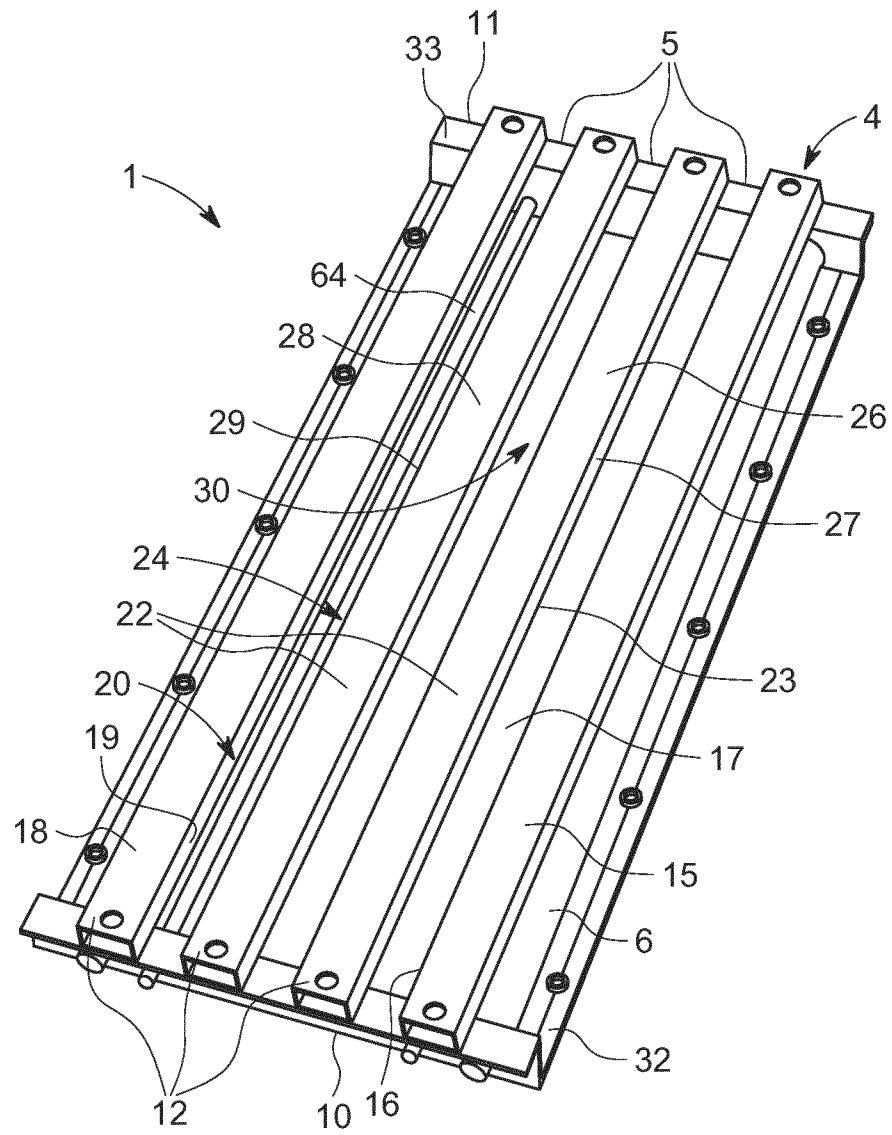


FIG. 2

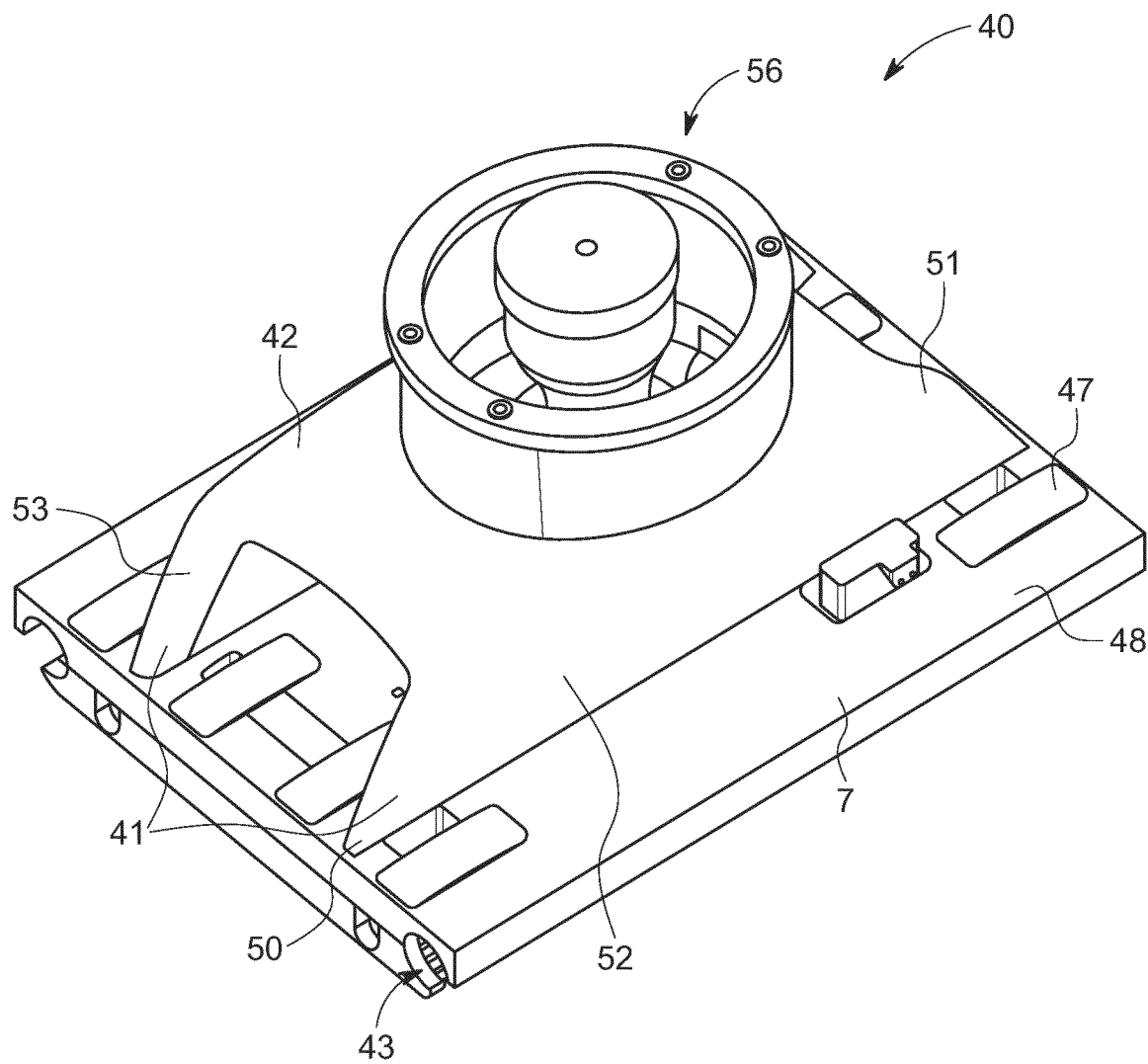


FIG. 3

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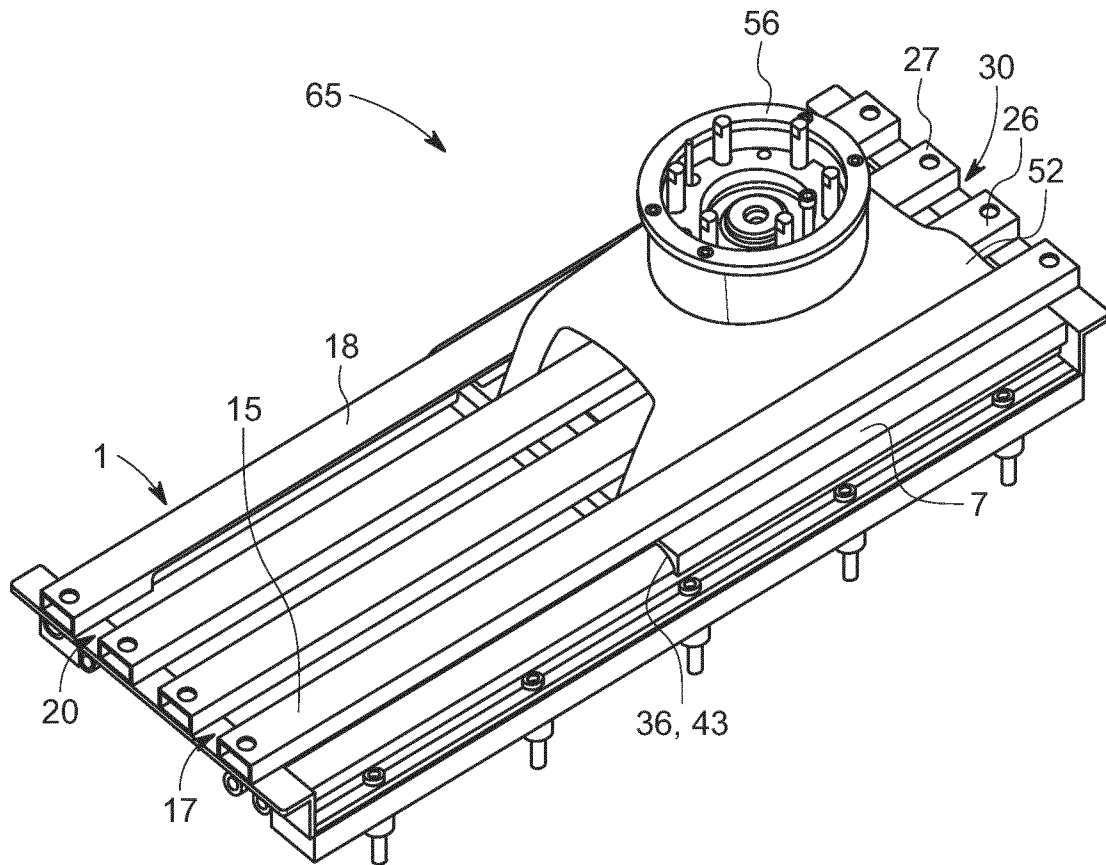


FIG. 4

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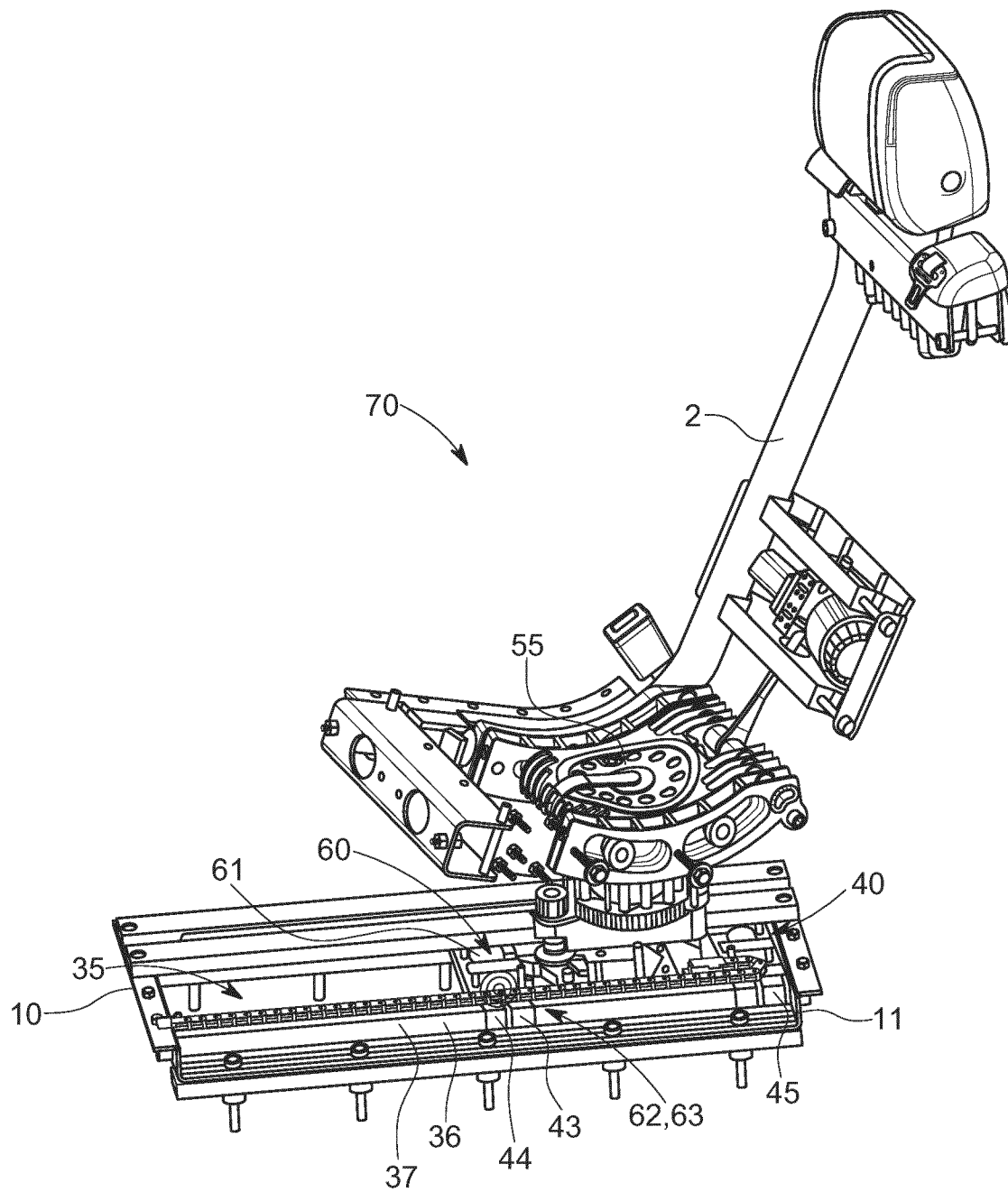


FIG. 5

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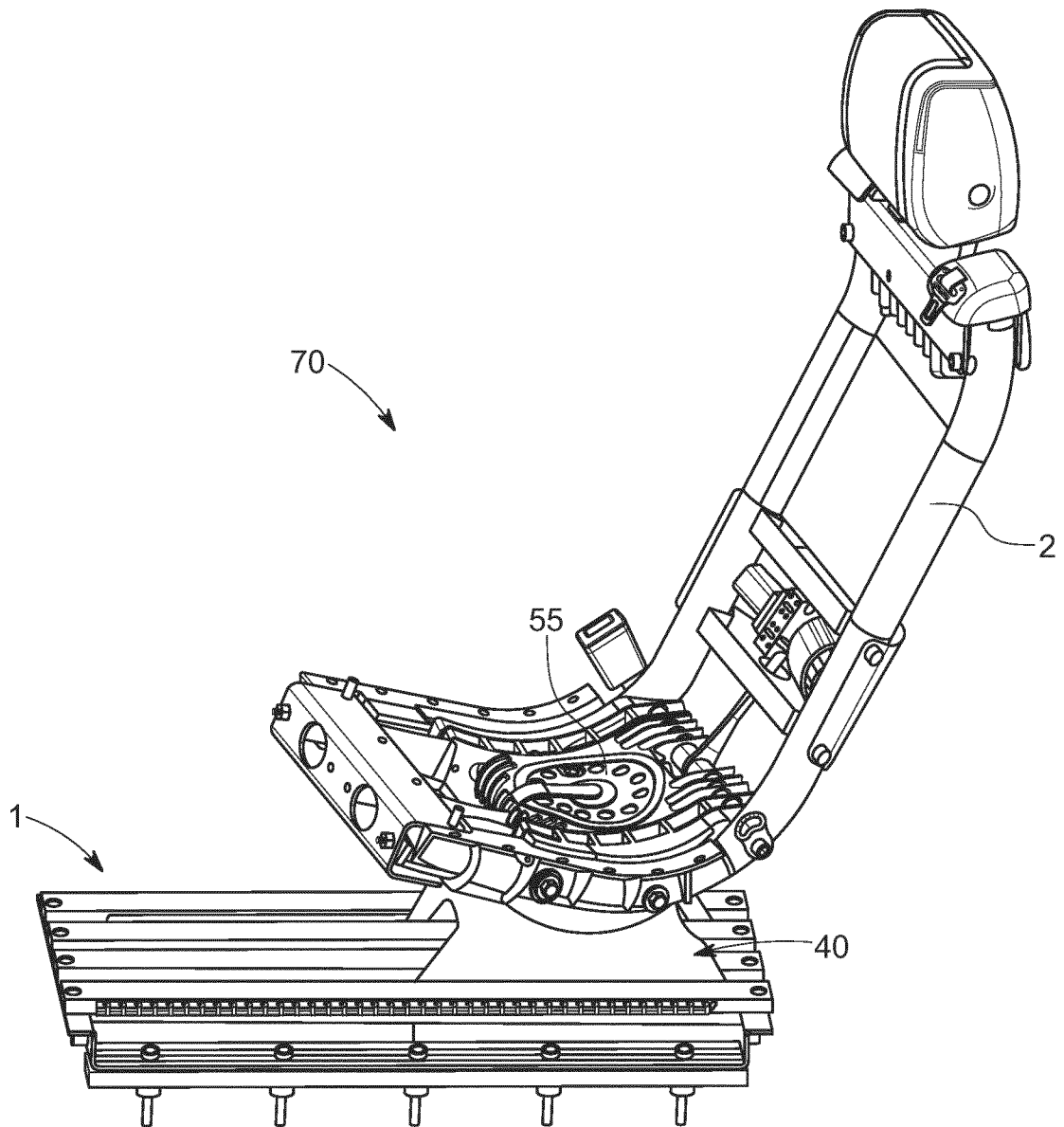


FIG. 7

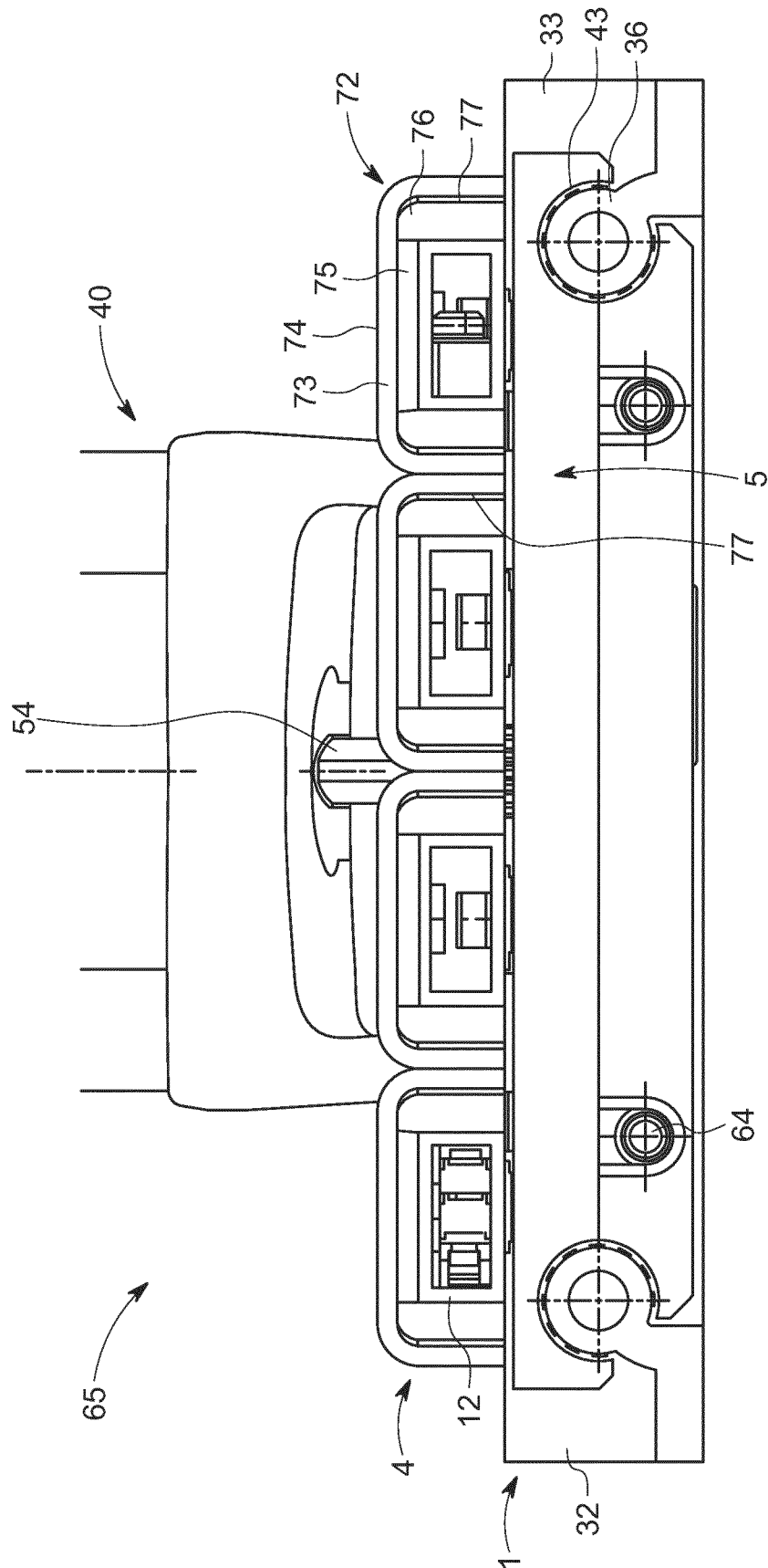


FIG. 8

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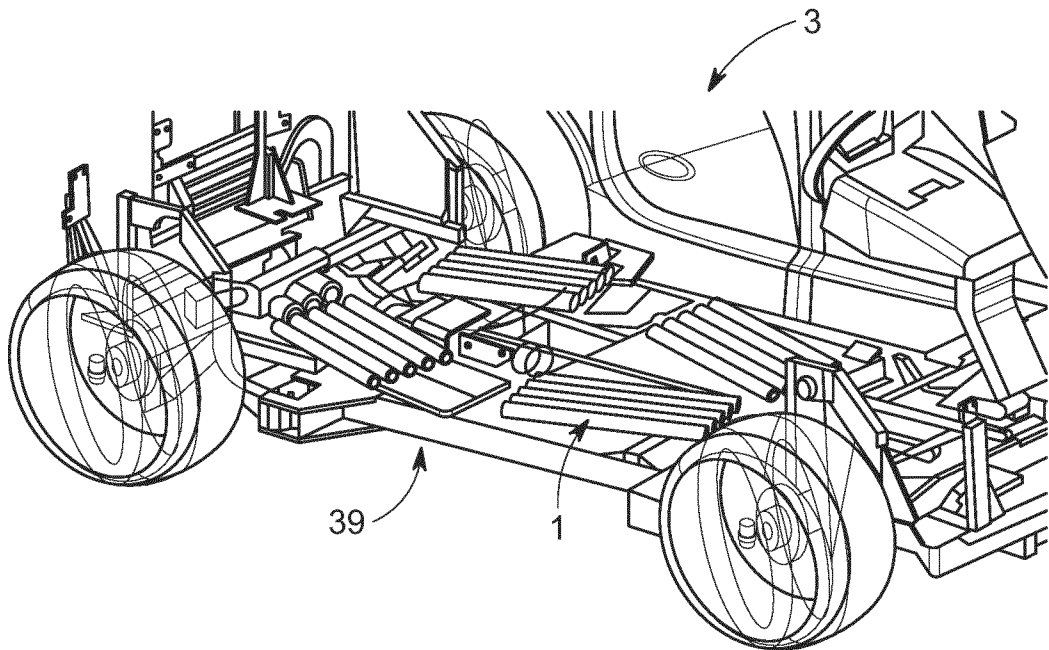


FIG. 9

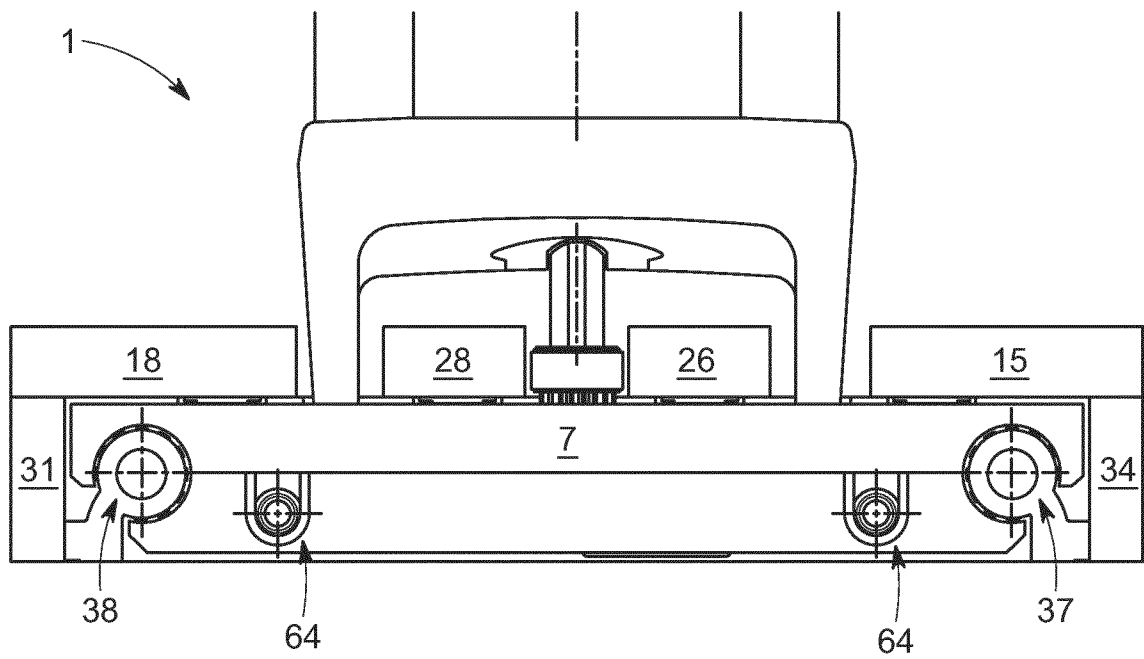


FIG. 10

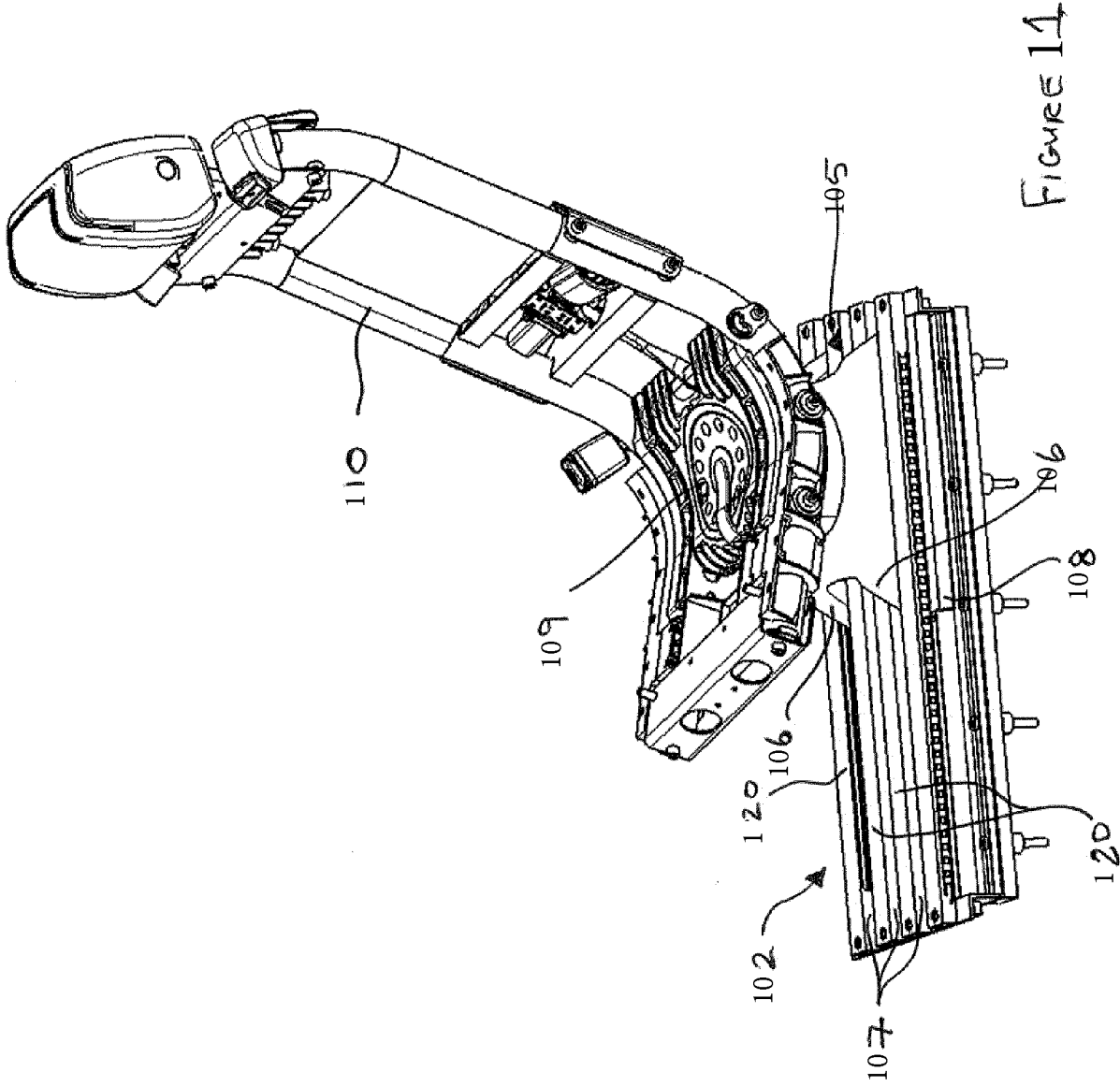
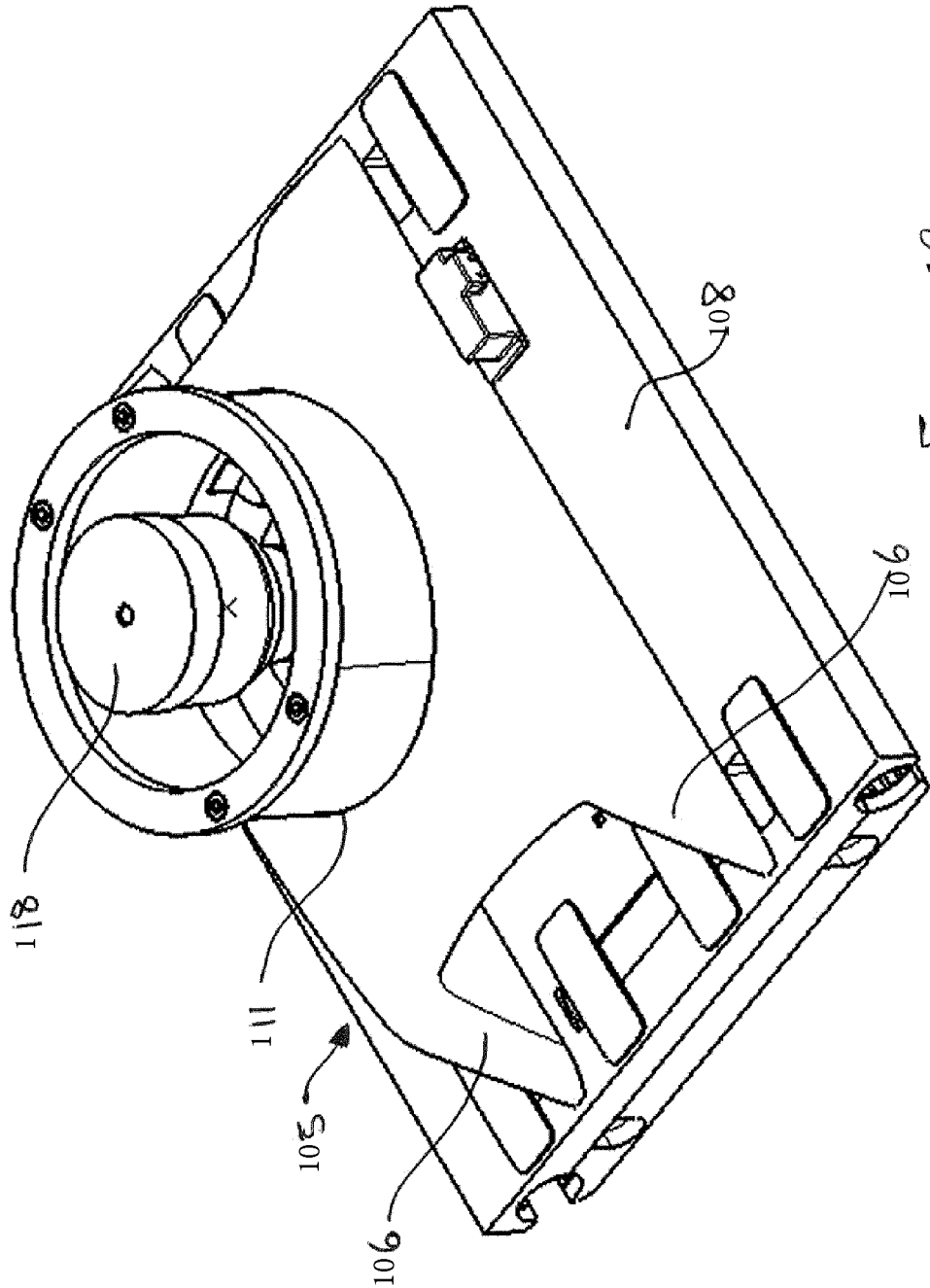


FIGURE 11



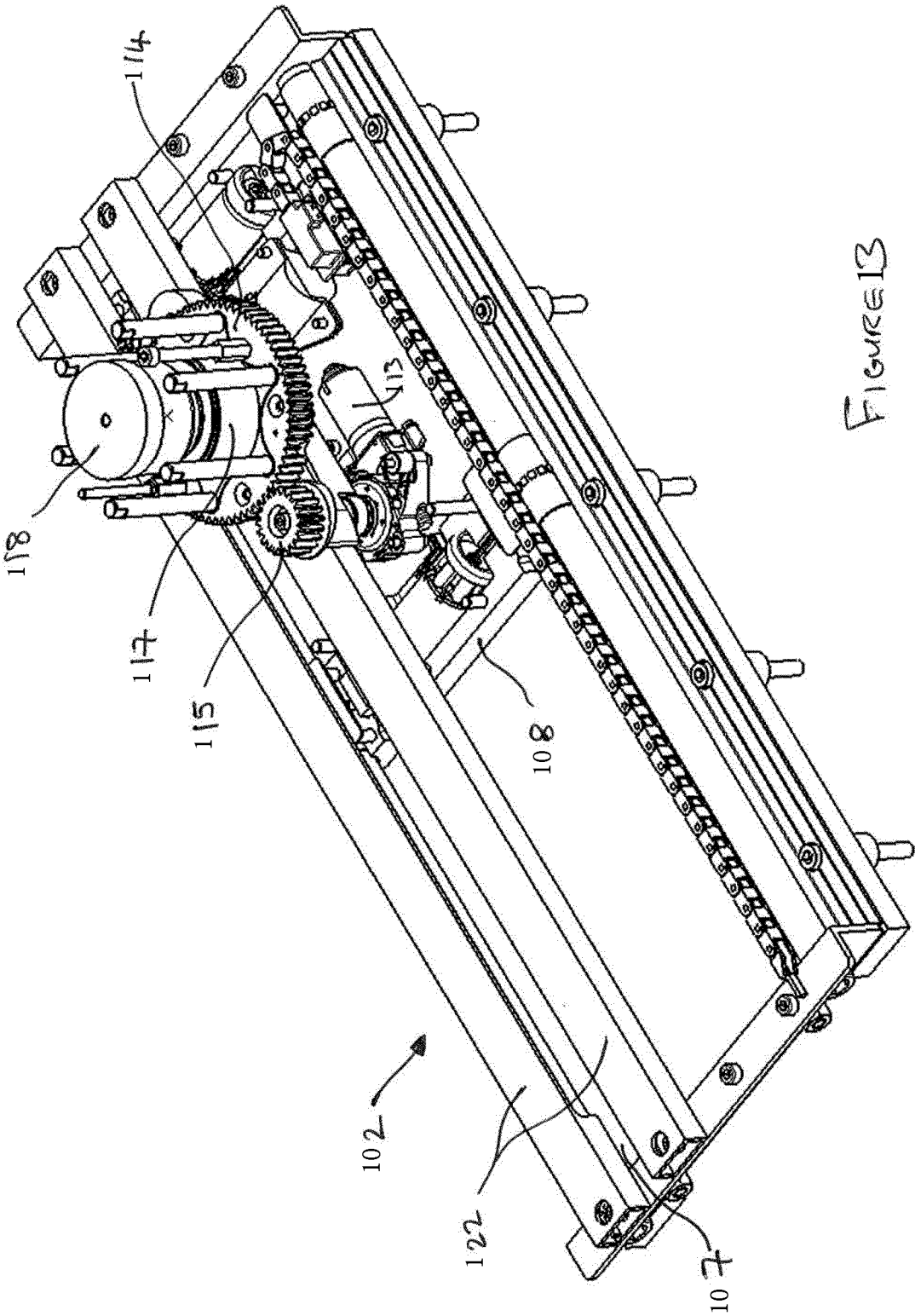


Figure 13

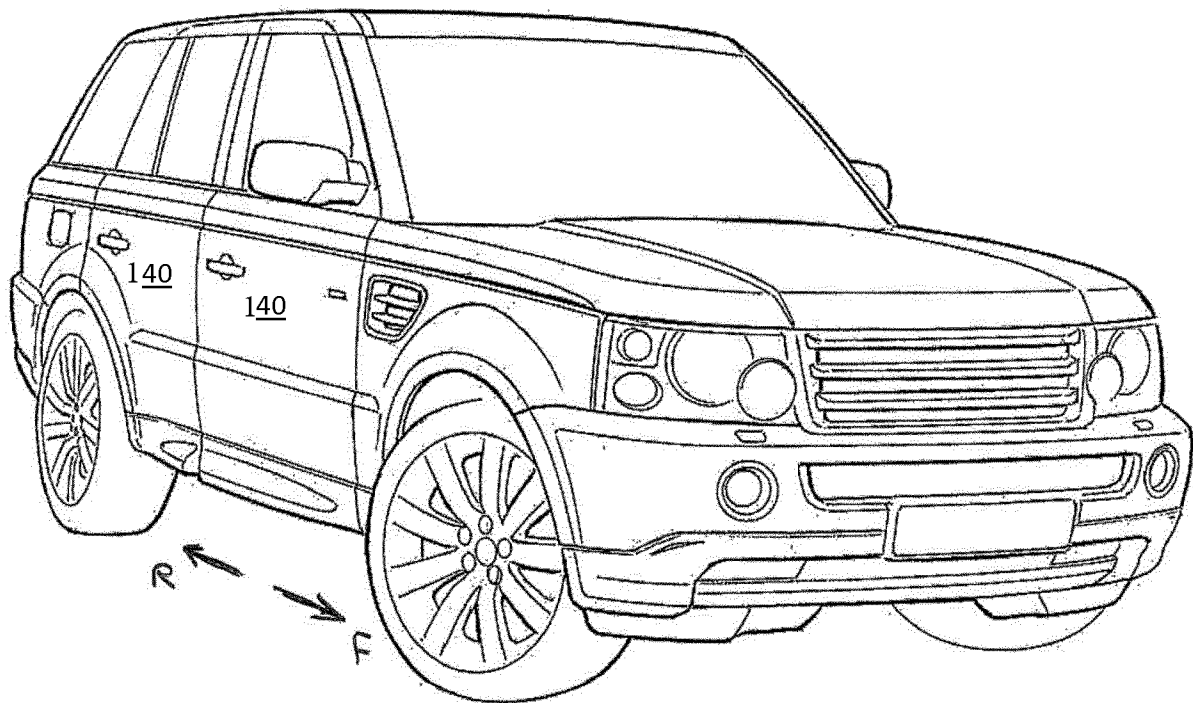


FIGURE 14

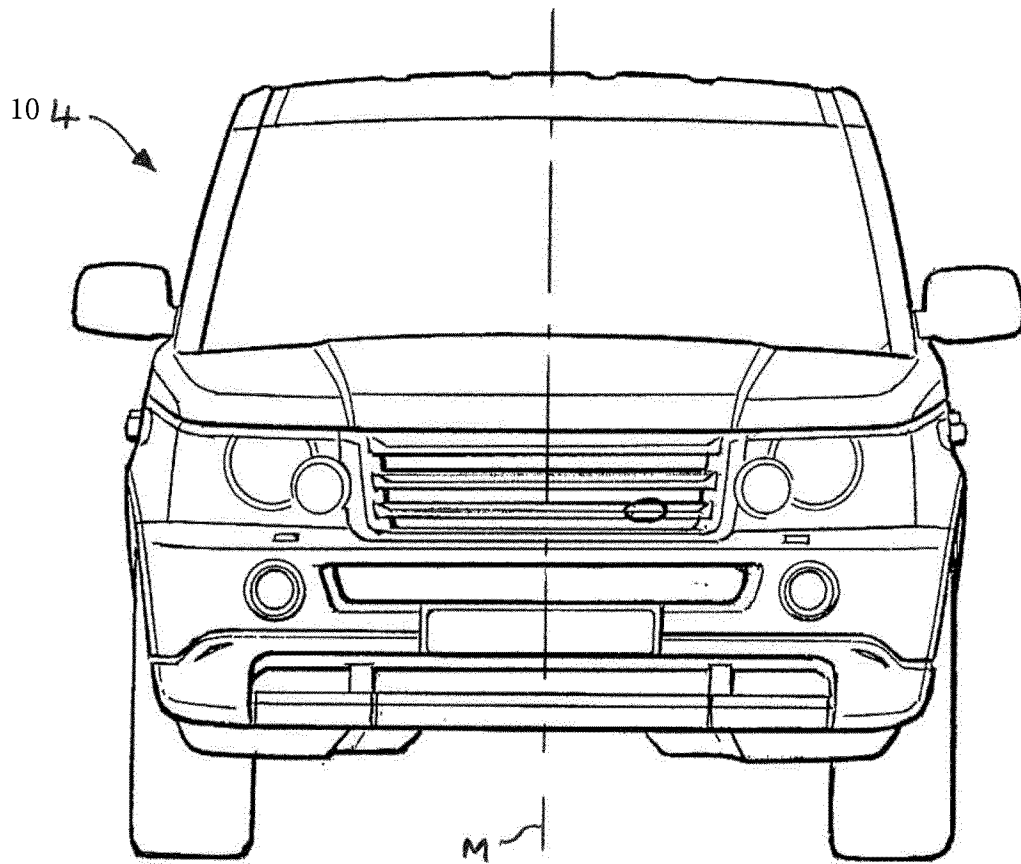


FIGURE 15

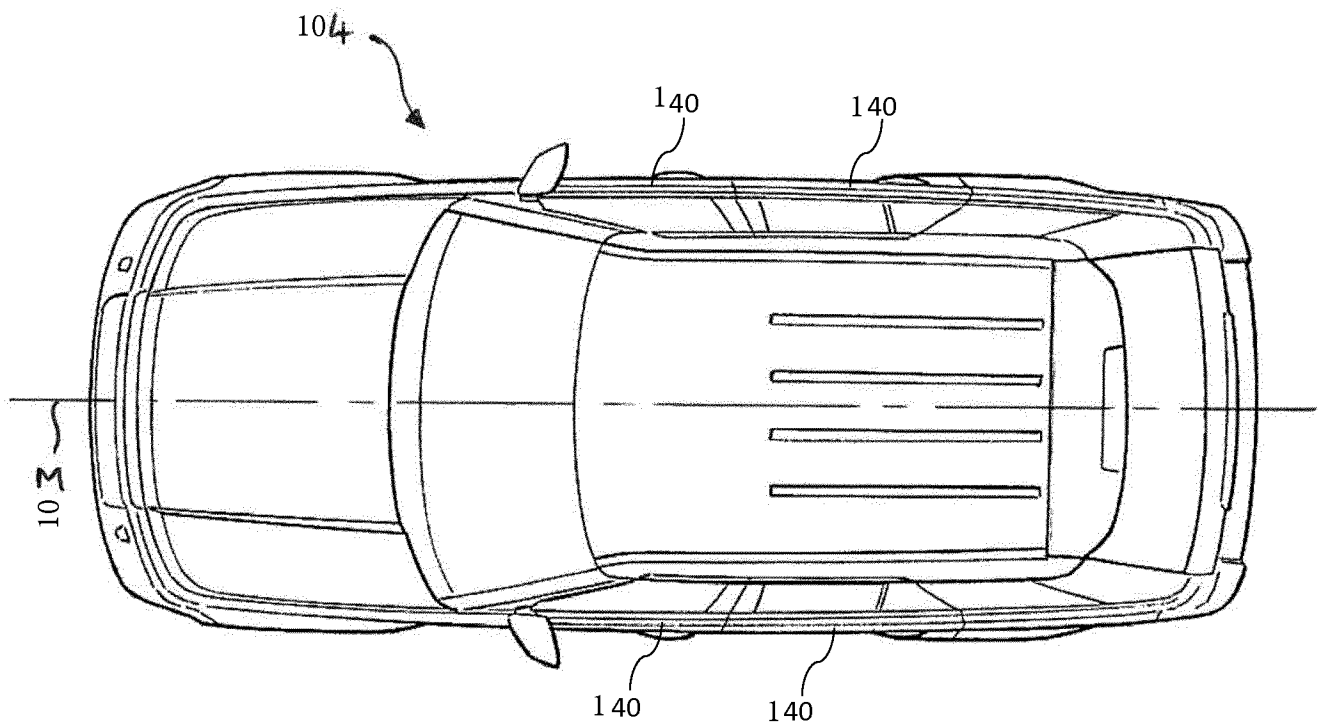


FIGURE 16

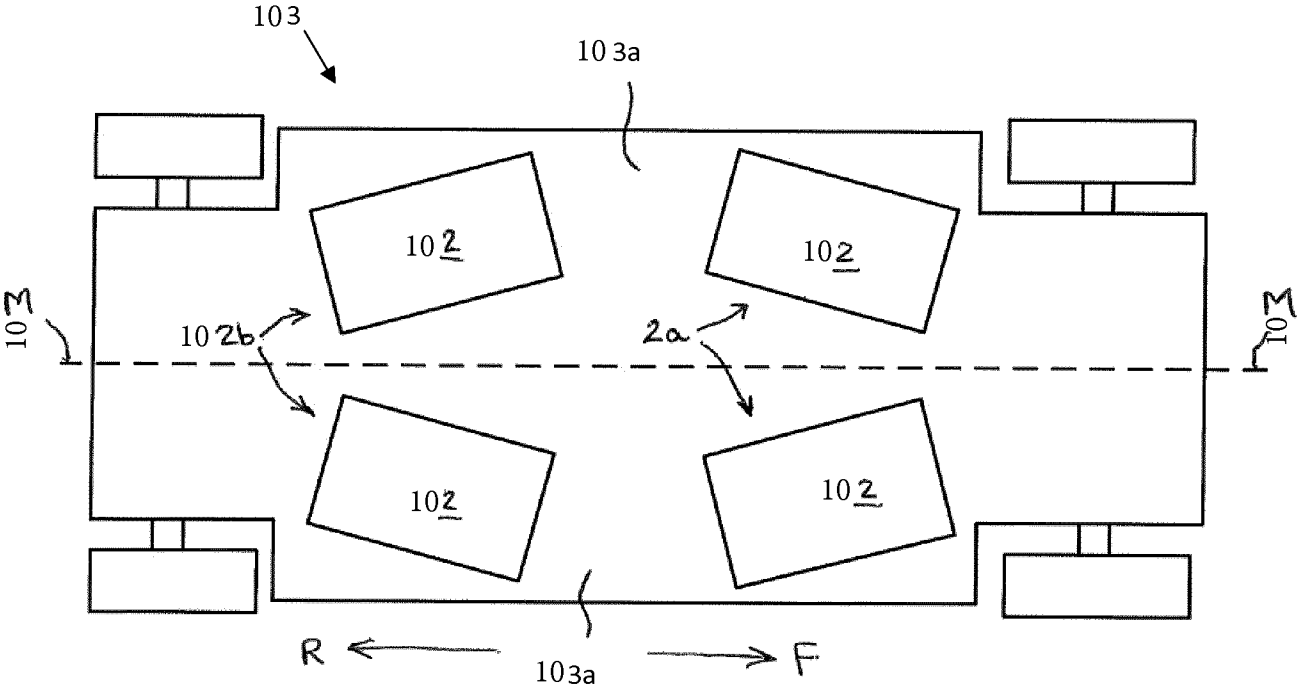


FIGURE 17

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/083328

A. CLASSIFICATION OF SUBJECT MATTER
INV. B60N2/015 B60N2/07 B64D11/06
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B60N B64D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 916 167 A3 (RENAULT SAS [FR]) 21 November 2008 (2008-11-21)	1-13
A	the whole document	14-20
X	US 2008/290680 A1 (BUSHY BRYAN [US] ET AL) 27 November 2008 (2008-11-27)	1-13
A	the whole document	14-20
X	FR 2 900 876 A1 (ANTOLIN GRUPO ING SA [ES]) 16 November 2007 (2007-11-16)	1-13
A	the whole document	14-20



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

1 April 2020

Date of mailing of the international search report

15/04/2020

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Authorized officer

González Dávila, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2019/083328

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2916167	A3	21-11-2008	NONE

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		FR 2900876 A1 16-11-2007	
		WO 2007135249 A2 29-11-2007	
