

CHASSIS ASSEMBLY AND LAND VEHICLE

The present invention relates to a chassis assembly for a land vehicle, in particular for an off-road truck, and to a land vehicle, in particular an off-road truck, having a chassis assembly of this type.

Off-road trucks can have a flexurally rigid but torsionally soft chassis frame, and a torsionally rigid superstructure disposed on the chassis frame. The superstructure can be fastened to the chassis frame by way of a likewise flexurally rigid but torsionally soft auxiliary frame or intermediate frame. The superstructure on a lower side can have a central tube which extends in a longitudinal direction of the truck which is fixedly connected to the superstructure by way of cross-members or support arms and which at a plurality of points is connected to the intermediate frame so as to be movable by way of bearing installations. It can be prevented with the aid of this assembly that the torsionally rigid superstructure is damaged in the event of any torsioning or twisting of the chassis frame, for example when travelling off-road.

DE 27 16 994 C2 describes a cargo vehicle having a flexurally rigid but torsionally soft chassis frame which is connected to a torsionally rigid superstructure by way of three-point mountings having central and lateral fastening locations. The superstructure has a central tube which is movable about a horizontal axis and which at both ends thereof is centrally mounted in bearing shells on the chassis frame. Sliding plates are horizontally fastened to lateral fastening locations both on the chassis frame as well as on the superstructure and between said lateral fastening locations, said sliding plates being capable of being braced with play in relation to one another by in each case one anchor that is under a longitudinal spring force.

DE 25 34 155 A1 shows a truck having a box-shaped vehicle superstructure that is supported by a chassis frame, wherein the vehicle superstructure is fastened on a torsionally rigid intermediate frame which is connected to the chassis frame

at three points, one of said points being disposed in the longitudinal centerline of the vehicle, and the other two of said points forming the corners of the base of an isosceles triangle.

5 EP 0 583 750 A2 describes a cargo vehicle having a flexurally rigid but torsionally soft chassis frame. A torsionally rigid superstructure is disposed on said chassis frame by way of an intermediate frame, said superstructure on the lower side thereof having a central tube that extends in the longitudinal center of the vehicle. Said central tube is connected to the intermediate frame at a
10 plurality of points by way of bearings.

EP 123 11 29 A2 shows a cargo vehicle having a flexurally rigid but torsionally soft chassis frame on which an auxiliary frame capable of twisting is disposed, said auxiliary frame supporting a flexurally and torsionally rigid superstructure
15 which is connected to the auxiliary frame at at least three points by way of dynamic bearings.

Against this background, an object of the present invention lies in making available an improved chassis assembly for a land vehicle.

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Accordingly, a chassis assembly for a land vehicle, in particular for an off-road truck, is proposed. The chassis assembly comprises a chassis frame, an intermediate frame which is connected to the chassis frame and which comprises at least one profiled support which runs in a longitudinal direction of the chassis
25 assembly, and a support installation for supporting a superstructure of the land vehicle, wherein the support installation is mounted so as to be movable on the intermediate chassis and comprises a support arm having a support arm through-hole, said support arm running in a transverse direction of the chassis assembly, wherein the at least one profiled support is routed through the support
30 arm through-hole in such a manner that a cross section of the at least one profiled support is at least in portions disposed within the support arm through-hole.

A "land vehicle" is presently to be understood as, for example, a truck, and armored vehicle, a tractor unit, a pickup truck, a trailer, or the like. The land vehicle can be motor-driven or, in the case of the land vehicle being a trailer, not
5 comprise any dedicated drive.

The support arm can also be referred to as a cross member. The intermediate frame can also be referred to as an auxiliary frame. The support installation preferably comprises a multiplicity of support arms of this type. The chassis
10 assembly can be a so-called central tube frame or else a so-called ladder frame. The support installation can have a central tube which runs in the longitudinal direction and which with the aid of bearing installations, for example in the form of a three-point mounting, is mounted so as to be movable on the intermediate
frame.

The cross section of the at least one profiled support herein is defined as a sectional face of the at least one profiled support that is perpendicular to the longitudinal direction. The cross section can also be referred to as a cross-sectional area. The cross section of the at least one profiled support being at least
20 in portions disposed within the support arm through-hole is to be understood as meaning in particular that a first part of the cross section is disposed within the support arm through-hole, and a second part of the cross section is disposed outside the support arm through-hole. The cross section can also be completely disposed within the support arm through-hole. The cross section is preferably C-
25 shaped.

The intermediate frame preferably has two profiled supports which are disposed so as to be mutually parallel and mutually spaced apart and which run in the longitudinal direction. The profiled supports in the longitudinal direction can
30 have an offset, that is to say a bend. Accordingly, the support arm also has two support arm through-holes, wherein each support arm through-hole is assigned one profiled support. The profiled supports are preferably steel supports, in

particular cost-effective extruded sections. Offset longitudinal supports are pressed in order to be produced. The chassis frame preferably likewise has two profiled supports which are disposed so as to be mutually parallel and mutually spaced apart and which run in the longitudinal direction, said profiled supports
5 in a height direction of the chassis assembly being disposed below the profiled supports of the intermediate frame. The profiled supports of the chassis frame are preferably likewise steel supports that are C-shaped in the cross section, in particular likewise cost-effective extruded sections.

10 On account of the cross section of the at least one profiled support being at least in portions disposed within the support arm through-hole, a particularly low construction height of the chassis assembly and a high stability can be achieved as compared to known assemblies. In the case of the known torsionally rigid superstructures having an intermediate frame and a central tube, high load
15 requirements such as, for example, payloads of more than 15 tons and beyond, for heavy off-road use with severe vertical shocks, by virtue of large wall thicknesses required are possible only by way of a high material input. Moreover, a high weight results, the latter ultimately potentially restricting the available payload. Moreover, the consequence in the case of this known construction mode having
20 support arms which are disposed above the profiled supports of the intermediate frame is that said construction mode has a high construction height. On account thereof, the utilizable height of the superstructure is reduced in the case of a predefined restriction of the overall height of the vehicle. Moreover, the height of the profiled supports of the intermediate frame is limited, that is to say that the
25 torsional and flexural rigidity is minimized as compared to the chassis assembly according to the invention.

According to one embodiment, the at least one profiled support is routed through the support arm through-hole in a non-contacting manner.

30 Non-contacting is to be understood as meaning that the at least one profiled support in the operation of the land vehicle does not contact an internal contour

of the support arm through-hole. However, in particular in the case of severe torsion of the intermediate frame, for example when travelling off-road, the at least one profiled support can nevertheless contact the internal contour of the support arm through-hole, on account of which a defined restriction of the torsion of the chassis assembly can be achieved.

According to one further embodiment, the support arm comprises a support arm profile and at least one cover panel that is connected to the support arm profile.

For example, two or more cover panels can be provided. Alternatively, exactly one cover panel can also be provided. The support arm profile in the cross section is U-shaped and in relation to the height direction of the chassis assembly is opened toward the bottom. The cover panel closes this opening of the support arm profile. The support arm profile is a steel profile, for example. The cover panel is preferably a steel sheet. The cover panel can have a bent geometry. The support arm profile, proceeding from a periphery thereof, can have a cross-sectional height that increases toward the central tube. On account thereof, the support arm profile, when viewed in the direction of the longitudinal direction, can have a triangular or arrow-shaped geometry.

According to one further embodiment, the at least one cover panel in a height direction of the chassis assembly closes the support arm through-hole in such a manner that the support arm through-hole is circumferentially completely enclosed by the material of the support arm.

The support arm through-hole is in particular defined by a clearance that is provided in the support arm profile, said clearance with the aid of the cover panel being closed so as to form a circumferentially closed through-hole.

According to one further embodiment, the support arm profile in the cross section is configured so as to be U-shaped having a first band, a second band, and a web that connects the first band to the second band, wherein the at least one cover

panel connects the first band to the second band, and wherein the support arm through-hole penetrates both the first band as well as the second band.

5 The first band is disposed so as to be parallel with the second band. The web connects the first band to the second band in a materially integral manner. The cover panel can be fixedly connected to the first band and to the second band.

10 According to one further embodiment, a folded edge is in each case provided on the first band and on the second band, said folded edge pointing in each case away from the web, wherein the at least one cover panel is connected, in particular screw-fitted, to the folded edges.

The folded edges are preferably disposed so as to be in each case parallel with the web. The folded edges point outward in relation to the web. The folded edges can also point inward. Alternatively, one folded edge can also point outward, and the other folded edge can point inward. The folded edges are preferably interrupted in the region of the support arm through-hole. By closing the originally U-shaped support arm profile that is open toward the bottom, the rigidity of the latter can be significantly increased as compared to an open profile. In particular, any buckling of the support arm profile in the region of the support arm through-hole is effectively prevented. On account thereof, a sufficient rigidity of the support arm can be achieved even in the case of minor wall thicknesses of the support arm profile and of the cover panel. A further enhancement of the protection against buckling of the support arm profile can be established by incorporating corrugations. The connection of the support arm profile to the cover panel is preferably performed by way of a screw connection. This is advantageous in relation to a welded connection, since weld seams by virtue of weld penetration notches can form structural weak spots in the event of vibration stress.

30 According to one further embodiment, the at least one profiled support comprises a profiled support through-hole, wherein the support arm is routed through the profiled support through-hole in such a manner that a cross section of the

support arm is at least in portions disposed within the profiled support through-hole.

On account thereof, the support arm and the at least one profiled support can be
5 nested to and/or in one another. The profiled support through-hole is in particular an elongate hole that extends in the longitudinal direction. The cross section of the support arm is preferably partially disposed within the profiled support through-hole and partially outside the profiled support through-hole. The cross section of the support arm herein is defined as a sectional face of the
10 support arm profile and of the cover panel that is perpendicular to the transverse direction. The cross section can also be referred to as the cross-sectional area of the support arm.

According to one further embodiment, the at least one cover panel is routed
15 through the profiled support through-hole.

This means that the part of the cross section of the support arm that is disposed within the profiled support through-hole is provided by the cover panel.

20 According to one further embodiment, the support arm is routed through the profiled support through-hole in a non-contacting manner.

The chassis assembly in the off-road operation of the land vehicle can preferably be torsioned until the cover panel nevertheless contacts an internal contour of the
25 profiled support through-hole. In particular, the cover panel restricts the maximum possible torsion of the chassis assembly in such a manner that the cover panel in the case of excessive torsion contacts either an upper edge or a lower edge of the profiled support through-hole of the at least one profiled support. In this case, the chassis assembly can no longer yield to the torsion
30 required by the effect of the terrain, and in consequence at least one vehicle wheel of the land vehicle will be lifted from the hard ground once the potential spring travel of the axle has been exhausted. This protects the intermediate

frame against excessive torsion. On account thereof, any damage to the chassis assembly, or a collision of components, respectively, is precluded.

5 According to one further embodiment, the at least one profiled support is routed through the support arm through-hole in such a manner that the cross section of the at least one profiled support is completely disposed within the support arm through-hole.

10 This means that an internal contour of the support arm through-hole completely encircles the at least one profiled support.

15 According to one further embodiment, the at least one profiled support has a cross-sectional constriction which is routed through the support arm through-hole.

The cross-sectional constriction can be generated in that a lower band of the at least one profiled support is routed toward an upper band of said profiled support.

20 According to one further embodiment, additionally to the at least one profiled support of the intermediate frame at least one profiled support of the chassis frame is routed through the support arm through-hole, wherein the at least one profiled support of the chassis frame is routed through the support arm through-hole in such a manner that a cross section of the at least one profiled support of
25 the chassis frame is at least in portions disposed within the support arm through-hole.

In particular, a part of the cross section of the at least one profiled support of the chassis frame is disposed within the support arm through-hole, and a part of the
30 cross section is disposed outside the support arm through-hole. On account thereof, the construction height of the chassis assembly can be reduced yet again. The cross section of the at least one profiled support of the chassis frame herein

is defined as a sectional face of the at least one profiled support that is perpendicular to the longitudinal direction. The cross section can also be referred to as the cross-sectional area of the at least one profiled support.

5 According to one further embodiment, the at least one profiled support of the chassis frame comprises a profiled support through-hole, wherein the support arm is routed through the profiled support through-hole in such a manner that a cross section of the support arm is at least in portions disposed within the profiled support through-hole.

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In particular, the cover panel of the support arm is routed through the profiled support through-hole. In particular, the cover panel is routed through the profiled support through-hole in a non-contacting manner.

15 According to one further embodiment, the support installation comprises a central tube which runs in the longitudinal direction and which is fixedly connected to the support arm, wherein the central tube is mounted so as to be movable on the intermediate frame.

20 This means that the chassis assembly can be a central tube frame. Alternatively, the chassis assembly can also be a ladder frame, as has already been mentioned above. The central tube with the aid of bearing installations is mounted so as to be movable on the intermediate frame. Three bearing installations of this type can be provided for forming a three-point mounting, for example.

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Furthermore, a land vehicle, in particular an off-road truck, having a chassis assembly of this type is proposed.

The land vehicle, apart from the chassis assembly, preferably has a
30 superstructure which is supported by the support installation. The superstructure can comprise, for example, a flatbed, a container, a box, a tank, or the like. Different superstructures can be provided.

The features described in the context of the chassis assembly also apply to the land vehicle, and vice versa.

5 Further potential implementations of the chassis assembly and/or of the land vehicle also comprise combinations not explicitly mentioned of features or embodiments described above or hereunder with reference to the exemplary embodiments. A person skilled in the art herein will also add individual aspects as improvements or additions to the respective basic form of the chassis assembly
10 and/or of the land vehicle.

Further advantageous design embodiments and aspects of the chassis assembly and/or of the land vehicle are the subject matter of the dependent claims and of the exemplary embodiments described hereunder of the chassis assembly and/or
15 of the land vehicle. Furthermore, the chassis assembly and/or the land vehicle will be explained in more detail by means of preferred embodiments with reference to the appended figures in which:

- fig. 1 shows a schematic side view of an embodiment of a land vehicle;
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- fig. 2 shows a schematic plan view of the land vehicle according to fig. 1;
- fig. 3 shows a schematic perspective view of an embodiment of a chassis assembly for the land vehicle according to fig. 1;
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- fig. 4 shows a schematic sectional view of an embodiment of a support arm for the chassis assembly according to fig. 3;
- fig. 5 shows a schematic sectional view of an embodiment of the profiled support for the chassis assembly according to fig. 3;
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fig. 6 shows a schematic perspective view of a further embodiment of a chassis assembly for the land vehicle according to fig. 1;

fig. 7 shows a schematic perspective view of a further embodiment of a chassis assembly for the land vehicle according to fig. 1;

fig. 8 shows a schematic sectional view of an embodiment of a profiled support for the chassis assembly according to fig. 7; and

fig. 9 shows a schematic perspective view of a further embodiment of a chassis assembly for the land vehicle according to fig. 1.

Identical or functionally equivalent elements have been provided with the same reference sign in the figures, in as far as not otherwise stated.

Fig. 1 shows a schematic side view of an embodiment of a land vehicle 1. Fig. 2 shows a schematic plan view of the land vehicle 1. The land vehicle 1 is in particular an off-road truck. The land vehicle 1 can be a three-axle vehicle, as is shown in fig. 1. Alternatively, the land vehicle 1 can also have an arbitrary number of axles. The land vehicle 1 comprises a flexurally rigid and torsionally soft chassis frame 2. The chassis frame 2 extends from a motor of the land vehicle 1 up to a rear of the vehicle and can have two profiled supports that run in a longitudinal direction L.

An auxiliary frame or intermediate frame 3 is placed on the chassis frame 2. The intermediate frame 3 can be screw-fitted to the chassis frame 2, for example. The intermediate frame 3, in a manner analogous to the chassis frame 2, is torsionally soft and flexurally rigid, and can be displaced and/or torsioned to a limited extent in relation to said chassis frame 2. The chassis frame 2 and the intermediate frame 3 are part of a chassis assembly 4 of the land vehicle 1. The chassis assembly 4 is suitable for supporting a torsionally rigid superstructure 5 of the land vehicle 1. The superstructure 5 can comprise, for example, a flatbed,

a container, a box, a tank, or the like. The chassis assembly 4 comprises the longitudinal direction L, a transverse direction Q that is oriented so as to be perpendicular to the longitudinal direction L, and a height direction H that is perpendicular to both the longitudinal direction L and the transverse direction Q.

5 The height direction H herein is oriented so as to be counter to and parallel with a direction of gravity.

The chassis assembly 4 furthermore comprises a support installation 6, shown in fig. 2, for supporting the superstructure 5. The support installation 6 comprises a

10 central tube 7 that runs in the longitudinal direction L, and a multiplicity of cross members or support arms 8 that run in the transverse direction Q. The number of support arms 8 is arbitrary. The support installation 6 serves as a link between the torsionally soft intermediate frame 3 and the torsionally rigid superstructure 5. Damage to the superstructure 5 by virtue of torsioning of the

15 chassis assembly 4 in the event of off-road travel of the land vehicle 1 can be prevented with the aid of the support installation 6. The central tube 7 is connected to the intermediate frame 3 in an axially fixed and rotatable manner by way of bearing installations (not illustrated).

20 The support arms 8 are fixedly connected, for example screw-fitted, to a lower side of the superstructure 5. The central tube 7 can be movably connected to the intermediate frame 3, for example with the aid of a three-point mounting. For example, a rear rotary bearing can be located in a rear region of the land vehicle 1, the central tube 7 being able to rotate about said rotary bearing about a

25 rotation axis DA that is located in the center of the vehicle of the land vehicle 1. Said rotary bearing can be a fixed bearing in relation to the longitudinal direction L. The three-point mounting of the central tube 7 can furthermore be supplemented by two lateral friction bearings. The mounting of the central tube 7 on the intermediate frame 3 can also be performed by way of any other bearing

30 installations. The chassis assembly 4 can also be referred to as a central tube frame. The chassis assembly 4 can however also be a so-called ladder frame.

As can furthermore be derived from fig. 2, the intermediate frame 3 comprises two profiled supports 9, 10 that run in the longitudinal direction L. Furthermore, the chassis frame 2, as has already been mentioned above, also comprises two profiled supports of this type that run in the longitudinal direction L, said profile supports in the orientation of fig. 2 however being disposed below the profiled supports 9, 10 of the intermediate frame 3 and therefore not being visible.

Fig. 3 shows a schematic perspective view of an embodiment of a chassis assembly 4 for the land vehicle according to figs. 1 and 2. The chassis frame 2 is not illustrated in fig. 3. The chassis assembly 4, as has already been mentioned, apart from the chassis frame 2 comprises the support installation 6. The support installation 6 comprises a plurality of support arms 8 that run in the transverse direction Q, only one of said support arms 8 however being shown in fig. 3. The support arm 8 is preferably made from a steel material. The support 8 can also be made from a titanium or aluminum material. The support arm 8 can furthermore also be made from a glass-fiber-reinforced plastics material (GFRP) or a carbon-fiber-reinforced plastics material (CFRP) having fittings laminated therein. The support arm 8 comprises a support arm profile 11 which in the cross section is U-shaped, as is shown in fig. 4, and in the orientation of figs. 3 and 4 is opened toward the bottom.

The support arm profile 11 comprises a first band 12, a second band 13 that is disposed so as to be opposite the first band 12 and spaced apart therefrom, and a web 14 that is disposed between the first band 12 and the second band 13 and connects the bands 12, 13 to one another. A first folded edge 15 which points outward from the web 14 is provided on the first band 12. A second folded edge 16 which likewise points outward from the web 14 is provided on the second band 13. The folded edges 15, 16, or one of the folded edges 15, 16, can also point inward.

Toward the bottom, that is to say so as to point away from the web 14, the support arm profile 11 is closed with the aid of a cover panel 17 that is assigned

to the support arm 8. A multiplicity of bores 18, 19 are in each case provided in the folded edges 15, 16, said bores 18, 19 corresponding to bores 20, 21 that are provided in the cover panel 17. A multiplicity of screws 22 is routed through the bores 18 to 21, said screws 22 fixedly connecting the cover panel 17 to the support
5 arm profile 11. Alternatively, the cover panel 17 can also be welded or riveted to the support arm profile 11. However, the cover panel 17 is preferably screw-fitted to the support arm profile 11 and thus releasably connected to the latter.

The support arm 8 on both sides has receptacle elements 23, 24 which are
10 disposed laterally on the support arm profile 11 and to which the superstructure 5 can be fastened. The receptacle elements 23, 24 can be equipped with standardized connectors for receiving containers, for example. Other design embodiments of end regions of the support arm 8 are also possible. The connection between the support arm 8 and the receptacle elements 23, 24 can be
15 established by a welded connection, for example, wherein a screw-fitting or riveted-fitting is however also possible.

The support arm profile 11, proceeding from the receptacle elements 23, 24 in the direction toward the central tube 7, has a cross-sectional elevation. This means a
20 height of the cross section A1 of the support arm 8, in each case proceeding from the receptacle elements 23, 24 in the direction toward the central tube 7, increases in the height direction H. On account thereof, the support arm profile 11, when viewed in the direction of the longitudinal direction L, is imparted a triangular or arrow-shaped geometry. The cross section A1 herein is defined as a
25 sectional face of the support arm profile 11 and of the cover panel 17 that is perpendicular to the transverse direction Q. The cross section A1 can also be referred to as the cross-sectional area of the support arm 8.

The central tube 7 is fixedly connected to the support arm profile 11 with the aid
30 of flanges 25, 26. To this end, the flanges 25, 26 can be screw-fitted to the support arm profile 11 with the aid of a multiplicity of screws 27. The flanges 25, 26 can be welded to the central tube 7. The central tube 7 is preferably likewise made

from a steel material. The central tube 7 can also be made from a titanium or aluminum material, or from GFRP or CFRP. A very low weight can advantageously be achieved with the use of GFRP or CFRP.

5 The support arm 8 comprises two support arm through-holes 28, 29 which are disposed so as to be mutually spaced apart in the transverse direction Q and which penetrate the support arm profile 11. In particular, a first support arm through-hole 28 and a second support arm through-hole 29 are provided. The support arm through-holes 28, 29 have a U-shaped geometry. The support arm
10 through-holes 28, 29 in the height direction H are closed by the cover panel 17 in such a manner that the support arm through-holes 28, 29 are in each case circumferentially completely enclosed by material of the support arm 8. The support arm through-holes 28, 29 are routed both through the first band 12 as well as through the second band 13 of the support arm profile 11. The folded
15 edges 15, 16 are interrupted in the region of the support arm through-holes 28, 29.

The profiled supports 9, 10 in the cross-section are C-shaped and, as is shown in figs. 3 and 5, comprise in each case a first band 30, a second band 31 that is
20 disposed so as to be spaced apart from and parallel with said first band 30, and a web 32 that connects the first band 30 to the second band 31. The profiled supports 9, 10 have in each case a cross section A2. The cross section A2 can also be referred to as the cross-sectional area of the profiled supports 9, 10. The cross section A2 herein is defined as a sectional face of the respective profiled support
25 9, 10 that is perpendicular to the longitudinal direction L. The profiled supports 9, 10 can also have a closed cross section.

The profiled supports 9, 10 are routed through the support arm through-holes 28, 29 in such a manner that the respective cross section A2 of the profiled supports
30 9, 10 is at least in portions disposed within the respective support arm through-hole 28, 29. As can be seen in fig. 3, the respective cross section A2 of the profiled supports 9, 10 is partially disposed within the respectively assigned support arm

through-hole 28, 29, and partially disposed outside the respectively assigned support arm through-hole 28, 29. This means that the profiled supports 9, 10 are not completely disposed within the respectively assigned support arm through-hole 28, 29.

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Each profiled support 9, 10 comprises a profiled support through-hole 33 that runs in the longitudinal direction L of the chassis assembly 4. The support arm 8 is routed through the respective profiled support through-hole 33 of the profiled supports 9, 10 in such a manner that the cross-section A1 of the support arm 8 is at least in portions disposed within the respective profiled support through-hole 33. In particular, the cover panel 17 of the support arm 8 is routed through the respective profiled support through-hole 33 of the profiled supports 9, 10. The cover panel 17 herein is routed through the profiled support through-holes 33 such that said cover panel 17 does not contact the respective profiled support 9, 10.

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In order for the chassis assembly 4 to be assembled, the intermediate frame 3 is first connected to the chassis frame 2. To this end, the intermediate frame 3 can be screw-fitted to the chassis frame 2, for example. First, the cover panel 17 by virtue of the angular shape thereof is threaded into the profiled support through-holes 33. The central tube 7, conjointly with the flanges 25, 26 and the support arms 8, is subsequently movably connected to the intermediate frame 3 with the aid of bearing installations, as has already been mentioned. The support arm through-holes 28, 29 of the profiled supports 9, 10 herein at least partially enclose the profiled supports 9, 10, so as to have a certain spacing from the profiled supports 9, 10. The webs 32 of the profiled supports 9, 10 in the region of said enclosure have in each case the profiled support through-hole 33 that has already been mentioned above.

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An extent of the respective profiled support through-hole 33 in the longitudinal direction L and in the height direction H of the chassis assembly 4 herein is chosen to be of a size that a width of the folded edges 15, 16 in the longitudinal

direction L is smaller than a length of the profiled support through-holes 33 in the longitudinal direction L. A height of the profiled support through-holes 33 in the height direction H is chosen to be of at least a size such that the folded edges 15, 16 do not contact the profiled support through-holes 33 in the event of any
5 twisting or torsioning of the chassis assembly 4.

The support arm profile 11 in the orientation of fig. 3 is then closed on the lower side by the cover panel 17, the bent shape of said cover panel 17 that deviates from a planar face corresponding to a lower contour of the support arm profile 11.

10 A width of the cover panel 17 in the longitudinal direction L is chosen such that said width corresponds to the width of the folded edges 15, 16. The bores 20, 21 that are provided in the cover panel 17 are in alignment with the bores 18, 19 of the folded edges 15, 16. The screws 22 are incorporated in the bores 18 to 21 and are screw-fitted together in order for the cover panel 17 to be connected to the
15 support arm 11. In order for the cover panel 17 to be assembled, the latter is pushed along the support arm profile 11 through the profiled support through-holes 33 and screw fitted to the support arm profile 11. Two or a plurality of cover panels 17 of this type, which are mutually separated in a corresponding manner, can be provided herein. This simplifies the assembly of the cover panel 17.

20 The cover panel 17 herein can fulfil a plurality of functions. The rigidity of the support arm 8 is substantially increased by the closing of the originally U-shaped support arm profile 11 that is open towards the bottom. In particular, any buckling of the support arm profile 11 in the region of the support arm through-
25 holes 28, 29 is effectively prevented. On account thereof, a sufficient rigidity of the support arm 8 can also be achieved in the case of low wall thicknesses of the support arm profile 11 and of the cover panel 17. Furthermore, the cover panel 17 restricts the maximum possible torsion of the chassis assembly 4 in that the cover panel 17 in the event of excessive torsion contacts either an upper edge or a
30 lower edge of the respective profiled support through-hole 33 of the profiled supports 9, 10. In this case, the chassis assembly 4 can no longer yield to the torsion required by the effect of the terrain, and in consequence at least one

vehicle wheel of the land vehicle 1 will be lifted from the hard ground once the spring travel of the axles has been exhausted. This protects the intermediate frame 3 against excessive torsion.

- 5 The connection of the support arm profile 11 to the cover panel 17 is preferably established by way of a screw connection with the aid of the screws 22. This is advantageous in relation to a welded connection, since weld seams by virtue of weld penetration notches form structural weak spots in the event of vibration stress. For this reason, weld seams are to be avoided in highly stressed regions.
- 10 Furthermore, high-strength fine-grained steel types which are difficult to weld and which in the region of the fused zone around a weld seam lose the high strength thereof by virtue of grain coarsening can thus be chosen. In particular, comparatively high-strength steel types such as, for example, S500MC or S700MC, can be used. On account thereof, a significant weight saving can be
- 15 achieved in relation to the use of other steel types. On the other hand, steel types of a lower quality can also be used in the case of an unmodified wall thickness.

Additional openings or through-holes can be provided for further weight savings, the position of said openings or through-holes being chosen such that said

20 openings or through-holes do not negatively influence the rigidity of the support arm 8. Furthermore, the support arm through-holes 28, 29 and/or the profiled support through-holes 33 can be reinforced. To this end, sleeves, doubling panels, or screwed-on perforated panels can be used. It is furthermore possible for the shaping of the support arm through-holes 28, 29 and/or of the profiled support

25 through-holes 33 to be varied in geometrical terms, so as to avoid particularly stressed regions such as notches.

Fig. 6 shows a schematic perspective view of a further embodiment of a chassis assembly 4 for the land vehicle 1 according to figs. 1 and 2. The chassis assembly

30 4 according to fig. 6 differs from the chassis assembly 4 according to fig. 3 in that the profiled supports 9, 10 are routed through the support arm through-holes 28, 29 in such a manner that the respective cross section A2 of the profiled supports

9, 10 is completely disposed within the respective support arm through-hole 28, 29. To this end, the profiled supports 9, 10 have in each case a cross-sectional constriction 34 which is formed in that the lower or first band 30 is routed toward the upper or second band 31.

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Fig. 7 shows a schematic perspective view of a further embodiment of a chassis assembly 4 for the land vehicle 1 according to figs. 1 and 2. The chassis assembly 4 according to fig. 7 differs from the chassis assembly 4 according to fig. 3 on the one hand in that the profiled supports 9, 10 of the intermediate frame 3 are routed through the support arm through-holes 28, 29 such that the respective cross section A2 of the profiled supports 9, 10 is completely disposed within the respective support arm through-hole 28, 29. On the other hand, the profiled supports 35, 36 of the chassis frame 2, which like the profiled supports 9, 10 of the intermediate frame 3 run in the longitudinal direction L of the chassis assembly 4, are routed through the respective support arm through-hole 28, 29 in such a manner that a cross section A3, shown in fig. 8, of the respective profiled support 35, 36 is at least in portions disposed within the respective support arm through-hole 28, 29. The cross section A3 herein is defined as a sectional face of the respective profiled support 35, 36 that is perpendicular to the longitudinal direction L.

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The profiled supports 35, 36 are steel supports. Each profiled support 35, 36 has a lower first band 37, an upper or second band 38 that is disposed so as to be spaced apart from the first band 37 and parallel therewith, and a web 39 that connects the first band 37 to the second band 38. The profiled supports 9, 10 of the intermediate frame 3 bear in each case on the second band 38 of the profiled supports 35, 36. The profiled supports 35, 36 of the chassis frame 2 in the height direction H have a greater height than the profiled supports 9, 10 of the intermediate frame 3. The profiled supports 35, 36 of the chassis frame 2 comprise in each case a profiled support through-hole 40 through which the support arm 8 is routed in such a manner that the cross section A1 of the support arm 8 is at least in portions disposed within the profiled support through-hole 40.

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The profiled support through-holes 40 are in each case disposed in the web 39 of the profiled supports 35, 36. In particular, the cover panel 17 is routed through the profiled support through-holes 40 such that a part of the cross section A3 of the respective profiled support 35, 36 is disposed within the support arm through-hole 28, 29, and a part of the cross section A3 is disposed outside the respective support arm through-hole 28, 29. Furthermore, another through-hole 41, for example for weight saving or for routing through a drive shaft, can be provided in the support arm profile 11.

Fig. 9 shows a schematic perspective view of a further embodiment of a chassis assembly 4 for the land vehicle 1 according to figs. 1 and 2. The chassis assembly 4 according to fig. 9 differs from the chassis assembly 4 according to fig. 7 in that the profiled supports 35, 36 of the chassis frame 2 are also routed through the support arm through-holes 28, 29 of the support arm 8 in such a manner that the respective cross section A3 of the profiled supports 35, 36 is completely disposed within the support arm through-holes 28, 29. Furthermore, the profiled supports 9, 10 of the intermediate frame 3, and the profiled supports 35, 36 of the chassis frame 2 in the height direction H have in each case identical heights.

While the present invention has been described by means of exemplary embodiments, said invention can be modified in multiple ways.

LIST OF REFERENCE SIGNS

	1	Land vehicle
	2	Chassis frame
5	3	Intermediate frame
	4	Chassis assembly
	5	Superstructure
	6	Support installation
	7	Central tube
10	8	Support arm
	9	Profiled support
	10	Profiled support
	11	Support arm profile
	12	Band
15	13	Band
	14	Web
	15	Folded edge
	16	Folded edge
	17	Cover panel
20	18	Bore
	19	Bore
	20	Bore
	21	Bore
	22	Screw
25	23	Receptacle element
	24	Receptacle element
	25	Flange
	26	Flange
	27	Screw
30	28	Support arm through-hole
	29	Support arm through-hole
	30	Band

	31	Band
	32	Web
	33	Profiled support through-hole
	34	Cross-sectional constriction
5	35	Profiled support
	36	Profiled support
	37	Band
	38	Band
	39	Web
10	40	Profiled support through-hole
	41	Through-hole
	A1	Cross section
	A2	Cross section
15	A3	Cross section
	DA	Rotation axis
	g	Direction of gravity
	H	Height direction
	L	Longitudinal direction
20	Q	Transverse direction

PATENT CLAIMS

1. A chassis assembly (4) for a land vehicle (1), in particular for an off-road truck, having:

5 a chassis frame (2),

an intermediate frame (3) which is connected to the chassis frame (2) and which comprises at least one profiled support (9, 10) which runs in a longitudinal direction of the chassis assembly (4), and

10 a support installation (6) for supporting a superstructure (5) of the land vehicle (1), wherein the support installation (6) is mounted so as to be movable on the intermediate frame (3) and comprises a support arm (8) having a support arm through-hole (28, 29), said support arm (8) running in a transverse direction (Q) of the chassis assembly (4), wherein the at least one profiled support (9, 10) is routed through the support arm through-hole (28, 29) in such a manner that a
15 cross section (A2) of the at least one profiled support (9, 10) is at least in portions disposed within the support arm through-hole (28, 29).

2. The chassis assembly as claimed in claim 1,
characterized in that

20 the at least one profiled support (9, 10) is routed through the support arm through-hole (28, 29) in a non-contacting manner.

3. The chassis assembly as claimed in claim 1 or 2,
characterized in that

25 the support arm (8) comprises a support arm profile (11) and at least one cover panel (17) that is connected to the support arm profile (11).

4. The chassis assembly as claimed in claim 3,
characterized in that

30 the at least one cover panel (17) in a height direction (H) of the chassis assembly (4) closes the support arm through-hole (28, 29) in such a manner that the

support arm through-hole (29, 29) is circumferentially completely enclosed by the material of the support arm (8).

5. The chassis assembly as claimed in claim 3 or 4,

5 characterized in that

the support arm profile (11) in the cross section (A1) is configured so as to be U-shaped having a first band (12), a second band (13), and a web (14) that connects the first band (12) to the second band (13), wherein the at least one cover panel (17) connects the first band (12) to the second band (13), and wherein the support
10 arm through-hole (28, 29) penetrates both the first band (12) as well as the second band (13).

6. The chassis assembly as claimed in claim 5,

characterized in that

15 a folded edge (15, 16) is in each case provided on the first band (12) and on the second band (13), said folded edge (15, 16) pointing in each case away from the web (15), wherein the at least one cover panel (17) is connected, in particular screw-fitted, to the folded edges (15, 16).

20 7. The chassis assembly as claimed in one of claims 3 – 6,

characterized in that

the at least one profiled support (9, 10) comprises a profiled support through-hole (33), wherein the support arm (8) is routed through the profiled support through-hole (33) in such a manner that a cross section (A1) of the support arm (8) is at
25 least in portions disposed within the profiled support through-hole (33).

8. The chassis assembly as claimed in claim 7,

characterized in that

the at least one cover panel (17) is routed through the profiled support through-hole (33).
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9. The chassis assembly as claimed in claim 7 or 8,

characterized in that

the support arm (8) is routed through the profiled support through-hole (33) in a non-contacting manner.

5 10. The chassis assembly as claimed in one of claims 1 to 6,
characterized in that

the at least one profiled support (9, 10) is routed through the support arm
through-hole (28, 29) in such a manner that the cross section (A2) of the at least
one profiled support (9, 10) is completely disposed within the support arm
10 through-hole (28, 29).

11. The chassis assembly as claimed in claim 10,
characterized in that

the at least one profiled support (9, 10) has a cross-sectional constriction (34)
15 which is routed through the support arm through-hole (28, 29).

12. The chassis assembly as claimed in claim 10 or 11,
characterized in that

additionally to the at least one profiled support (9, 10) of the intermediate frame
20 (3) at least one profiled support (35, 36) of the chassis frame (2) is routed through
the support arm through-hole (28, 29), wherein the at least one profiled support
(35, 36) of the chassis frame (2) is routed through the support arm through-hole
(28, 29) in such a manner that a cross section (A3) of the at least one profiled
support (35, 36) of the chassis frame (2) is at least in portions disposed within the
25 support arm through-hole (28, 29).

13. The chassis assembly as claimed in claim 12,
characterized in that

the at least one profiled support (35, 36) of the chassis frame (2) comprises a
30 profiled support through-hole (40), wherein the support arm (8) is routed through
the profiled support through-hole (40) in such a manner that a cross section (A1)

of the support arm (8) is at least in portions disposed within the profiled support through-hole (40).

14. The chassis assembly as claimed in one of claims 1 to 13,

5 characterized in that

the support installation (6) comprises a central tube (7) which runs in the longitudinal direction (L) and which is fixedly connected to the support arm (8), wherein the central tube (7) is mounted so as to be movable on the intermediate frame (3).

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15. A land vehicle (1), in particular an off-road truck, having a chassis assembly (4) as claimed in one of claims 1 to 14.