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- (73) Patenthaver: **Palfinger AG, Lamprechtshausener, Bundesstraße 8, 5101 Bergheim bei Salzburg, Østrig**
- (72) Opfinder: **FABI, Daniel, Oberweißbau 16, 5222 Munderfing, Østrig**
- (74) Fuldmægtig i Danmark: **Plougmann Vingtoft A/S, Strandvejen 70, 2900 Hellerup, Danmark**
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**Description**

The present invention relates to a subframe with the features of the preamble of claim 1 and a vehicle with a subframe of this type. Subframes which are known in the prior art are used to mount a working implement on a chassis of a vehicle, wherein the subframe is usually disposed between the vehicle chassis and the working implement mounted on the subframe. As a rule, subframes of this type have longitudinal members with transverse members running between them. In order to mount the subframe on the vehicle chassis, the longitudinal members are usually placed on vehicle chassis longitudinal members of the vehicle chassis and connected to them, for example by screwing them on. In order to keep the resulting build height of the subframe and of the vehicle chassis low – and therefore in order to keep the loading edge of a working implement placed on the subframe low – known subframes have a low build height, and therefore a low rigidity. When operating a working implement mounted on the subframe, for example in the form of a crane, various forces due to the loads hoisted by the working implement, such as torsional forces, can act on the subframe and therefore on the vehicle chassis, which can lead to unwanted distortions (in particular twisting) of the subframe and of the vehicle chassis.

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DE 3 535 634 A1 discloses a mounting frame with adjustable longitudinal members for a container structure for a utility vehicle. It discloses the features of the preamble of claim 1.

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DE 3 033 707 A1 discloses a container base frame with longitudinal members and transverse members.

The aim of the invention is to provide a subframe which can be used to reduce unwanted distortions.

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This aim is achieved by means of a subframe with the features of claim 1 and a vehicle with a subframe of this type. Advantageous embodiments of the invention are defined in the dependent claims.

5 As is the case with subframes which are known in the art, the subframe in accordance with the invention is suitable for mounting at least one working implement on a vehicle chassis of a vehicle. However, it is also conceivable for other vehicle structures, such as a loading bed for a payload, to be able to be mounted on subframes. In particular, a working implement may be at least one  
10 hydraulic lifting device such as, for example, a crane or a hook lift system. The term "vehicle chassis" should be understood to mean a supporting part described as an undercarriage, frame, chassis or base frame, such as for supporting the drive and the bodywork of a vehicle.

15 Firstly, the subframe in accordance with the invention has at least two longitudinal members extending in a longitudinal direction and at least two transverse members running between the at least two longitudinal members, wherein the at least two transverse members extend transversely to the longitudinal direction of the at least two longitudinal members. A subframe of this type may, for example, be  
20 constructed in the manner of a ladder frame or box frame.

In contrast to the prior art, the subframe in accordance with the invention is now characterized in that the subframe has at least one reinforcing element which runs at least in sections between the at least two transverse members in order to increase the  
25 torsional stiffness of the subframe.

Thus, in addition to the longitudinal members, at least one reinforcing element may be provided, which runs substantially in the longitudinal direction of the at least two longitudinal members, in order to take up torsional forces which act on the  
30 subframe.

The at least one reinforcing element may be disposed centrally between the longitudinal members and run between them at least in sections.

5 A “central disposition” between the longitudinal members may correspond to an arrangement which is in the middle and/or is symmetrically disposed between the longitudinal members.

10 By means of the at least one reinforcing element, the torsional rigidity of the subframe can be increased without making it necessary to make modifications to the longitudinal members. This means that a torsion-resistant subframe with an advantageously low build height can be provided. In addition, an increase in the flexural strength of the subframe by means of the at least one reinforcing element should not be excluded.

15 The at least one reinforcing element of the subframe may run over at least a section of the longitudinal member between the at least two transverse members. It is conceivable for the longitudinal extent of the at least one reinforcing element to substantially correspond to the longitudinal extent of the at least two longitudinal members. It is also conceivable for the longitudinal extent of the at least one  
20 reinforcing element to be less than the longitudinal extent of the at least two longitudinal members.

25 Provision is made for the at least one reinforcing element to be respectively connected in a force-fitting manner at a respective attachment region respectively to the at least two transverse members.

30 Thus, for example, a torsional force acting locally on the subframe – for example at an attachment position for the working implement on the longitudinal members or transverse members – can be transferred onto the at least one reinforcing element via one of the at least two transverse members by means of the force-fitting connection between the at least two reinforcing elements and the respective transverse member. The torsional force which is transferred in this manner onto the

at least one reinforcing element can in turn be transferred onto the second of the at least two transverse members, whereupon the torsional force which acts locally on the subframe can be distributed over the entire subframe. In this manner, in total, the twisting of the subframe is reduced.

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When the at least one reinforcing element is respectively connected in a force-fitting manner at a respective attachment region respectively to the at least two transverse members, in addition to the at least two longitudinal members, a torsional force can be transferred between the transverse members via the at least one reinforcing  
10 element.

It can be provided for the at least one reinforcing element to be respectively connected in an interlocking manner by means of releasable and/or non-releasable connections at a respective attachment region respectively to the at least two  
15 transverse members. By means of such an interlocking connection, in addition to the at least two longitudinal members, a torsional force can be transferred between the transverse members via the at least one reinforcing element. The connection may be releasable and/or non-releasable, for example by means of a screw, rivet, or welded connection. It is also conceivable for the interlocking connection between the at  
20 least one reinforcing element and the at least two transverse members to be formed by a corresponding cross sectional shape of the reinforcing element and at least one respective corresponding recess in the at least two transverse members.

The term "attachment region on a transverse member" should be understood to  
25 mean a region of the transverse member at which the at least one reinforcing element is connected to the transverse member. The attachment region may correspond to the region where force is applied between the at least one reinforcing element and the transverse member.

30 It may be advantageous in this regard, if the at least two transverse members have a reinforcement in the respective attachment region. The reinforcement may preferably be formed by a locally multi-layered construction of the transverse

member. It is also conceivable for the reinforcement in the attachment region to be formed by a greater wall thickness of the transverse member.

5 The at least two longitudinal members and/or the at least two transverse members may in general be profiled in construction and have an open and/or closed cross sectional shape. Thus, for example, it is possible for the at least two longitudinal members to each have a substantially rectangular cross sectional shape and for the at least two transverse members to each have an open, for example U-shaped, cross sectional shape.

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Advantageously, the reinforcing element may have at least one radially protruding flange for connection to the transverse members. A flange, i.e. a flat web which protrudes out from at least a portion of the circumference of the reinforcing element, can produce an extensive connection to the transverse members, so that the force

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which is applied can be distributed correctly over the attachment region.

Provision is made for the at least one reinforcing element to be connected via a torsion-resistant connection to the transverse members by means of connection means. Because the at least one reinforcing element primarily acts to increase the torsional rigidity of the subframe, the primary task of the connection between the at least two transverse members and the at least one reinforcing element is for it to transfer torsional forces. Preferably, the connection means are in the form of at least one clamping sleeve or screw connection. It is also conceivable for the connection means to comprise weld or rivet connections.

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When connecting the at least one reinforcing element to the at least two transverse members, it may be advantageous for receiving openings to be provided for the connection means in the at least one radially protruding flange and the at least two transverse members, wherein the receiving openings are disposed coaxially, preferably concentrically, to a longitudinal axis of the reinforcing element. The receiving openings for the connection means may be disposed at regular distances

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with respect to each other and at a regular distance from the surface of the reinforcing element.

5 Provision is made for the respective at least two transverse members to be profiled in construction and at least one recess is provided in at least one of the at least two transverse members for receiving at least a portion of the at least one reinforcing element. At least sections of the transverse members may have an open, for example U-shaped, or a closed, for example a substantially rectangular, cross sectional shape. In at least one of the at least two transverse members, at least one recess may be  
10 provided into which the at least one reinforcing element can protrude – for example with an end region. Thus, for example, this would make it possible for the at least two longitudinal members, the at least two transverse members and the reinforcing element to be capable of being substantially disposed in a common plane.

15 Regarding the subframe, the at least two longitudinal members and/or the at least two transverse members may have a respective height and the height of the at least one reinforcing element may be substantially entirely disposed within the height of the longitudinal members and/or the height of the transverse members. In other words, in respect of the subframe, the height of the at least one reinforcing element  
20 may be less than or equal to the height of the subframe.

In respect of the subframe, the cross sectional shape of the at least two longitudinal members and/or of the at least two transverse members may differ from the cross sectional shape of the at least one reinforcing element.

25 As an example, the longitudinal members and/or the transverse members may have a substantially rectangular, open or closed cross sectional shape, whereupon, for example, mounting on a vehicle chassis can be facilitated. The at least one reinforcing element may, for example, have a different, polygonal or circular cross  
30 sectional shape, whereupon in particular, the torsional rigidity can be optimized.

In respect of the subframe, this may be configured for mounting directly on a vehicle chassis of a vehicle. In this regard, the subframe may have at least one attachment position for the at least one working implement. The longitudinal members and/or transverse members may have attachment positions for mounting  
5 the subframe on a vehicle chassis.

In order to mount a working implement on a vehicle chassis, only one single frame may be provided; specifically, only a single subframe in accordance with the invention is necessary.

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In respect of the subframe, in general, it may be advantageous for the at least two transverse members to be respectively connected together with the at least two longitudinal members by means of a releasable connection, preferably by means of a screw connection. A subframe which is releasably connected together in this  
15 manner, for example a subframe which is screwed together, has the advantage that the placement of the at least two transverse members along the longitudinal direction of the at least two longitudinal members can essentially be freely selected. In this manner, fitting (position of the transverse members relative to parts of the vehicle or the vehicle chassis) of the subframe on the vehicle chassis provided for  
20 attaching is easily carried out. It is also possible for the transverse members to be connected to the longitudinal members via non-releasable connections, such as a riveted connection or a welded connection.

In respect of the subframe, it may be advantageous for the at least one reinforcing  
25 element to be constructed separately from the longitudinal members. In this regard, the at least one reinforcing element which is constructed separately from the longitudinal members may be connected to the longitudinal members via the at least two transverse members.

30 Particularly advantageously, the at least two transverse members may have a transverse extent which runs transversely to the longitudinal direction of the at least two longitudinal members and the at least one reinforcing element may be disposed

substantially in the centre of the transverse extent between the at least two transverse members. In other words, the reinforcing element may be disposed centrally between the at least two longitudinal members. In general, when twisting, the subframe may have a torsional axis (undeformed seam) and the at least one reinforcing element may be disposed in a manner such that the at least one reinforcing element encloses at least sections of the torsional axis. This may be achieved, for example, by disposing the at least one reinforcing element with the centroid of its cross sectional area on the torsional axis of the subframe.

10 In general, in respect of the subframe, it may be advantageous for the at least one reinforcing element to run substantially parallel to the at least two longitudinal members. This may be of application in the case of a rectangular subframe, for example.

15 In respect of the subframe, it may be advantageous for the at least one reinforcing element to be configured in the form of a hollow profile. In this regard, preferably, the hollow profile may have a closed profile shape. The at least one reinforcing element may be tubular in configuration, for example. A concentric disposition of a plurality of reinforcing elements should not be excluded.

20 In respect of subframes, it may be advantageous for the at least one reinforcing element to have a polygonal or circular cross section. It is conceivable for the at least one reinforcing element to have a triangular, 4-cornered or polygonal cross sectional shape. In a particularly advantageous embodiment, the at least one reinforcing element is constructed with a circular cross sectional shape. Preferably, the cross sectional shape along a longitudinal extent of the at least one reinforcing element has a constant (uniform) cross sectional area.

30 Advantageously, the subframe may have at least one attachment position for the at least one working implement in a region of one of the at least two transverse members, wherein the at least one reinforcing element is connected to the at least one attachment position for the at least one working implement. As an example, the

attachment position may be in the form of brackets which can be disposed on the at least two longitudinal members, or on one of the at least two transverse members, or in the form of one of the at least two transverse members. Because the force is applied through the working implement onto the subframe substantially at the attachment position, the at least one reinforcing element may advantageously be connected – directly or indirectly – to the attachment position. As an example, the at least one working implement may be capable of being attached to the at least one attachment position via a screw connection.

Advantageously, the at least one reinforcing element may be constructed in one piece. In a preferred embodiment, the at least one reinforcing element may be in the form of a single continuous tube. In a further preferred embodiment, at least sections of the at least one reinforcing element may be formed as a single piece. In an embodiment of this type, the at least one reinforcing element may therefore be formed from reinforcing sections which can be – directly or indirectly – connected together.

In this regard, the at least one reinforcing element has at least two reinforcing sections which are separate from each other and which can be connected together.

Thus, for example, a section of the at least one reinforcing element which runs between the at least two transverse members may consist of at least two reinforcing sections which are connected together, or the at least one reinforcing element of the subframe may consist of sections which are connected together, each running between two transverse members, or in fact consist of a combination thereof.

In this regard, it may be advantageous for the at least two reinforcing sections to be respectively disposed between two adjacent transverse members. The at least one reinforcing element of the subframe may therefore consist of a plurality of reinforcing sections which are connected together (directly or indirectly), which respectively run between two transverse members.

In respect of the subframe, it may be advantageous for the at least two longitudinal members to be respectively formed in one piece or from longitudinal sections which are connected together. In the case of an embodiment in which the at least two longitudinal members are produced from interconnected longitudinal sections, then  
5 the subframe can be constructed so that its length can be varied.

As already discussed above, protection for a vehicle with a vehicle chassis and a subframe as described above disposed on the vehicle chassis is also sought. The arrangement of the subframe on the vehicle chassis can advantageously lead to an  
10 increase in the torsional rigidity of the vehicle. Preferably, the vehicle is constructed as a heavy good vehicle.

Preferably, the subframe in accordance with the invention may be disposed directly on the vehicle chassis. Further frame constructions can therefore be dispensed with.

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In respect of the vehicle, it may be advantageous for the subframe disposed on the vehicle chassis to have at least one attachment position for the at least one working implement in a region of one of the at least two transverse members. As an example, the attachment position may be in the form of brackets which can be disposed on the  
20 at least two longitudinal members, or on one of the at least two transverse members, or in the form of one of the at least two transverse members.

Provision is made here for the at least one reinforcing element to be connected (directly or indirectly) to the at least one attachment position for the at least one  
25 working implement and to extend at least to a rear axle of the vehicle. Because the force is applied through the working implement onto the subframe substantially at the attachment position, the at least one reinforcing element can advantageously be connected – directly or indirectly – to the attachment position.

30 At least one attachment position for the at least one working implement may be located relative to the vehicle in a region which is in the vicinity of the front axle of the vehicle. As an alternative or in addition, at least one attachment position for the

at least one working implement may be located in a region which is in the vicinity of the rear axle of the vehicle (at the back) relative to the vehicle.

Because the subframe is disposed on the vehicle chassis, a force which acts on the subframe is transferred to the vehicle chassis and from there, it is at least partially  
 5 (the possibility of the vehicle having additional supports should not be excluded) dissipated into the carriageway on which the vehicle is located via the front and rear axles and via the tyres. By means of a subframe in accordance with the invention, the application of such a force can be communicated via a lower connection of the  
 10 subframe, the vehicle chassis and the vehicle.

It may be possible for the at least one working implement to be capable of being fastened to the at least one attachment position via a screw connection.

15 Exemplary embodiments of the invention will be discussed with the aid of the figures, in which:

Figures 1a to 1c show different views of a first embodiment of the subframe,  
 Figures 2a to 2c show detailed views of the subframe in accordance with the  
 20 embodiment of Figure 1,  
 Figures 3a and 3b show different views of a second embodiment of the subframe,  
 Figure 4 shows a perspective view of a third embodiment of the subframe,  
 Figures 5a to 5c show different views of an arrangement of a vehicle, a working  
 25 implement and a subframe in accordance with the embodiment of Figure 1, and  
 Figure 6 shows a perspective view of a further arrangement of a vehicle, two working implements and a subframe in accordance with the embodiment of Figure 1.

30 Figures 1a to 1c show a first embodiment of a subframe 1 for mounting at least one working implement on a vehicle chassis of a vehicle (not shown here; see Figure 5

and Figure 6, for example), with two longitudinal members 5 which extend in a longitudinal direction and a plurality of transverse members 6 which run between the two longitudinal members 5. The respective longitudinal members 5 in this embodiment are formed from two interconnected longitudinal sections 15. As an alternative to that shown, it is also conceivable for the longitudinal members to be formed in one piece. The transverse members 6 respectively extend transversely to the longitudinal direction of the two longitudinal members 5 and are connected to them via screw connections, which are not shown in further detail. In sections, the subframe 1 has a reinforcing element 7 for increasing the torsional rigidity of the subframe 1 which runs between the transverse members. The reinforcing element 7 is disposed centrally between the longitudinal members 5.

The reinforcing element 7 is attached to a respective attachment region 8 (in this regard, see also the detailed view in Figure 2) via a flange 9 which protrudes radially from the reinforcing element 7. In the embodiment shown, the transverse members 6 each have a reinforcement 9 in the attachment region 8 formed by a locally multi-layered construction of the transverse member 6. As an alternative to that shown, a reinforcement in the form of a thickening of the wall thickness of the transverse member 6 could also be envisaged.

In the embodiment shown, the subframe 1 has two attachment positions 13 for at least one working implement, wherein the attachment positions 13 are each in the form of a transverse member 6. The reinforcing element 7 is directly connected to one of the attachment positions 13 and indirectly connected to the other attachment position 13 via the longitudinal members 5.

In order to mount the subframe 1 on a vehicle chassis, it has a plurality of attachment positions 18 disposed on the longitudinal members 5.

As can be seen in the views of Figures 1b and 1c, the subframe 1 in this first embodiment has profiled transverse members 6, parts of which have at least one recess 12 for receiving at least a portion of the reinforcing element 7. The profile

shape of the transverse member substantially corresponds to an open, U-shaped profile shape. However, other profile shapes may also be envisaged. Here, the reinforcing element 7 is constructed as one piece (but this is not absolutely necessary – see Figure 3a and Figure 3b, for example) and sections thereof are disposed inside the cross sectional profile of the transverse member 6. The reinforcing element 7 is fastened by the end regions to the respective transverse members 6, respectively via two flanges 9 which protrude radially from the reinforcing element 7.

As can be seen, the reinforcing element 7 is constructed separately from the longitudinal members 5. In addition, the reinforcing element 7 runs substantially parallel to the two longitudinal members 5, which provides for a rectangular construction of the subframe 1. In the case of other constructions for a subframe, however, the parallel profile might not be appropriate.

The view of Figure 1b shows that the transverse member 6 for this rectangular construction of the subframe 1 has a transverse extent  $q$  which runs transverse to the longitudinal direction of the two longitudinal members 5 and the reinforcing element 7 is disposed at  $q/2$  in the centre of the transverse extent  $q$  between the two transverse members 6.

Figures 2a to 2c show detailed views of the subframe 1, and in particular detailed views of the attachment region 8 of the reinforcing element 7. Here, it can be seen that the reinforcing element 7, which is configured here in one piece at least in the view shown, is connected in the attachment region 8 to a transverse member 6 provided with a reinforcement 19 via connection means 10, here a combination of a screw connection and clamping sleeve introduced into receiving openings 11 of the flange 9 and into corresponding receiving openings in the transverse member 6 (not shown here), in order to form an at least torsion-resistant connection. The flanges 9 of Figure 2, which are not provided with visible connection means 10, may either not yet have been connected to the transverse members 6 or do not have directly visible connection means, for example in the form of welded or riveted connections.

Figure 2b shows the detailed view of a radially protruding flange 9. It can be seen here that the receiving openings 11 for the connection means 10 are disposed coaxially, in this particular case concentrically with a longitudinal axis of the reinforcing element 7.

The grid lines of the view in Figure 2c show that the transverse member 6 which is depicted has two recesses 12 for receiving sections of the reinforcing element 7, shown as being in one piece in the section shown.

Figures 3a and 3b show an embodiment of the subframe 1 in which the reinforcing element 7 is formed by a plurality of mutually separated and interconnected reinforcement sections 14. The reinforcement sections 14 each have a radially protruding flange 9 in their end regions, with which the reinforcement sections 14 are respectively fastened between two adjacent transverse members 6.

In the detailed view of Figure 3b (dashed region in Figure 3a), it can be seen how two separate reinforcement sections 14 are connected to the transverse member 6 via a flange 9 respectively disposed in an end region. The transverse member 6 has two recesses 12, wherein here, in fact, only one recess 12 would be required in order to dispose a section of one of the reinforcement sections 14 in the cross sectional profile of the transverse member 6.

In the embodiments of the subframe 1 of Figures 1, 2 and 3 (and which will also be seen later in Figures 5 and 6), the reinforcing element 7 or a respective reinforcement section 14 is formed as a closed hollow profile with a circular cross section. In addition, the cross sectional shape shown therein has a constant cross sectional area along a longitudinal extent of the at least one reinforcing element 7 or along the respective reinforcement section 14 (however, this does not have to be the case; varying cross sectional shapes may also be envisaged).

Figure 4 shows a further embodiment of the subframe 1, wherein this embodiment essentially only differs from the embodiment of the subframe 1 in the remaining figures in that the reinforcing element 7 (which may also consist of at least two reinforcement sections) has a different cross sectional shape. In this embodiment of the subframe 1, the reinforcing element 7 is formed as a closed hollow profile with a hexagonal cross section. In addition, the cross sectional shape shown has a constant cross sectional area along a longitudinal extent of the at least one reinforcement element 7 (however, this does not have to be the case; varying cross sectional shapes may also be envisaged).

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Figures 5a to 5c show different views of an arrangement of a vehicle 4, a working implement 2 in the form of a loading crane and a subframe 1 with a reinforcing element 7 in accordance with the embodiment of Figure 1. In order to attach the subframe 1 to the vehicle chassis 3, the subframe 1 has attachment positions 18 disposed on the longitudinal members 5. A connection may, for example, be made by means of a screw connection.

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As can be seen in Figures 5a to 5c, a single subframe 1 may be sufficient for mounting a working implement 2 on a vehicle chassis 3 of a vehicle 4.

The subframe 1 may be disposed directly on the vehicle chassis 3.

In order to attach the working implement 2 to the subframe 1, the subframe has an attachment position 13.

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In Figure 5b, the subframe 1 or the attachment position 13 is orientated on the subframe 1 in a manner such that the working implement 2 is attached in a region of the front axle 16 of the vehicle 4. In the embodiment shown, the reinforcing element 7 runs from the attachment position 13 to a back end of the vehicle chassis 3 and therefore up to and beyond the rear axle 17.

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In Figure 5c, the subframe 1 or the attachment position 13 is orientated on the subframe 1 in a manner such that the working implement 2 is attached in a region of the rear axle 17 of the vehicle 4. In the embodiment shown, the reinforcing element 7 runs from the attachment position 13 along to a front end of the vehicle chassis 3 in the region of the front axle 16.

In the embodiment shown in Figure 5, the working implement 2 in the form of a loading crane has stabilizer extensions 20, via which the working implement 2 in the form of the loading crane may additionally be stabilized on a carriageway on which the vehicle 4 is placed. Advantageously, the stabilizer extensions 20 are mounted on that transverse member 6 on which the attachment position 13 is formed and to which the reinforcing element 7 is also attached.

Figure 6 shows a perspective view of a further arrangement of a vehicle 4 which is analogous to Figure 5b, with two working implements 2 and a subframe 1 with a reinforcing element 7 in accordance with the embodiment of Figure 1. Two working implements 2 in the form of a loading crane and a hook lift system for loading a container 21 are attached to the subframe 1 disposed on the vehicle chassis 3 in a region of the front axle 16 of the vehicle 4.

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## List of reference numerals

1	subframe
2	working implement
25	3 vehicle chassis
4	vehicle
5	longitudinal member
6	transverse member
7	reinforcing element
30	8 attachment region of reinforcing element
9	flange
10	connection means

- 17 -

- 11 receiving opening
- 12 recess
- 13 attachment position for working implement
- 14 reinforcement section of reinforcing element
- 5 15 longitudinal section of longitudinal member
- 16 front axle
- 17 rear axle
- 18 attachment position of vehicle chassis
- 19 reinforcement
- 10 20 stabilizer extensions
- 21 container
- q transverse extent

**Patentkrav**

1. Hjælperamme (1) til montering af mindst et arbejdsredskab (2), især mindst en hydraulisk løfteindretning, på et chassis (3) på et køretøj (4) med
- mindst to længdedragere (5), der strækker sig i en længderetning, og
  - 5 - mindst to mellem de mindst to længdedragere (5) forløbende tværdragere (6), hvilke mindst to tværdragere (6) strækker sig på tværs af de mindst to længdedrageres (5) længderetning,
- idet hjælperammen (1) har mindst et centralt i det mindste i afsnit mellem længdedragerne (5) forløbende og i det mindste i afsnit mellem de mindst to
- 10 tværdragere (6) forløbende afstivningselement (7) til forøgelse af hjælperammens (1) torsionsstivhed, **kendetegnet ved, at** det mindst ene afstivningselement (7) er forbundet med hver af de mindst to tværdragere (6) på et aktuelt fastgørelsesområde (8), i hvert tilfælde kraftbettinget over en torsionsfast forbindelse med forbindelsesmidler (10), idet de mindst to tværdragere (6) hver
- 15 især er udformet profileret, og der i mindst en af de mindst to tværdragere (6) er tilvejebragt mindst en udsparring (12) til i det mindste delvis optagelse af det mindst ene afstivningselement (7).
2. Hjælperamme (1) ifølge krav 1, hvori de mindst to tværdragere (6) hver især
- 20 har en forstærkning (19) i fastgørelsesområdet (8).
3. Hjælperamme (1) ifølge et af de foregående krav, hvori det mindst ene afstivningselement (7) hver især er forbundet formluttende med hver af de mindst to tværdragere (6) på et aktuelt fastgørelsesområde (8) over aftagelige
- 25 og/eller ikke aftagelige forbindelser, idet de mindst to tværdragere (6) fortrinsvis hver især har en forstærkning (19) i fastgørelsesområdet (8).
4. Hjælperamme (1) ifølge et af kravene 1 til 3, hvori afstivningselementet (7) har mindst en radialt fremstående flange (9) til forbindelse med tværdragerne (6).
- 30
5. Hjælperamme (1) ifølge et af kravene 1 til 4, hvori det mindst ene afstivningselement (7) er forbundet med tværdragerne (6) over mindst en spændemuffe.

**6.** Hjælperamme (1) ifølge de to foregående krav, hvori optagelsesåbninger (11) til forbindelsesmidlerne (10) er tilvejebragt i den mindst ene radialt fremstående flange (9) og de mindst to tværdragere (6), idet optagelsesåbningerne (11) er anbragt koaksialt, fortrinsvis koncentrisk, med en længdeakse i

5 afstivningselementet (7).

**7.** Hjælperamme (1) ifølge et af de foregående krav, hvori de mindst to tværdragere (6) hver især er forbundet sammen med de mindst to længdedragere (5) over en aftagelig forbindelse, fortrinsvis over en skrueforbindelse.

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**8.** Hjælperamme (1) ifølge et af de foregående krav, idet

- det mindst ene afstivningselement (7) er fremstillet adskilt fra længdedragerne (5), og/eller
- det mindst ene afstivningselement (7) forløber i det væsentlige parallelt med de mindst to længdedragere (5), og/eller
- 15 - det mindst ene afstivningselement (7) er udformet i form af et, fortrinsvis lukket, hulprofil, og/eller
- det mindst ene afstivningselement (7) i form af et hulprofil har et polygonalt eller cirkelrundt tværsnit, fortrinsvis med konstant
- 20 tværsnitsareal langs en længdeudstrækning af det mindst ene afstivningselement (7), og/eller
- det mindst ene afstivningselement (7) er fremstillet i et stykke, fortrinsvis i det mindste i afsnit, og/eller
- det mindst ene afstivningselement (7) har mindst to fra hinanden adskilte
- 25 afstivningsafsnit (14), der kan forbindes med hinanden, idet de mindst to afstivningsafsnit (14) fortrinsvis hver især er anbragt mellem to tilstødende tværdragere (6).

**9.** Hjælperamme (1) ifølge et af de foregående krav, hvori de mindst to

30 tværdragere (6) har en på tværs af de mindst to længdedrageres (5) længderetning forløbende tværudstrækning (q), og det mindst ene afstivningselement (7) er anbragt mellem de mindst to tværdragere (6) i det væsentlige i midten af tværudstrækningen.

**10.** Hjælperamme (1) ifølge et af de foregående krav, hvori hjælperammen (1) har mindst et fastgørelsessted (13) til det mindst ene arbejdsredskab (2) i et område for en af de mindst to tværdragere (6), fortrinsvis i form af en af de mindst to tværdragere (6), idet det mindst ene afstivningselement (7) er  
5 forbundet med det mindst ene fastgørelsessted (13) til det mindst ene arbejdsredskab (2).

**11.** Hjælperamme (1) ifølge et af de foregående krav, hvori de mindst to længdedragere (5) hver især er udformet i et stykke eller af med hinanden  
10 forbundne længdeafsnit (15).

**12.** Hjælperamme (1) ifølge et af de foregående krav, hvori de mindst to længdedragere (5) og/eller de mindst to tværdragere (6) hver især har en højdeudstrækning, og det mindst ene afstivningselement (7) med sin  
15 højdeudstrækning er anbragt i det væsentlige fuldstændigt inden for længdedragerens (5) højdeudstrækning og/eller tværdragerens (6) højdeudstrækning

**13.** Hjælperamme (1) ifølge et af de foregående krav, hvori de mindst to  
20 længdedrageres (5) og/eller de mindst to tværdrageres (6) tværsnitsform afviger fra det mindst ene afstivningselements (7) tværsnitsform.

**14.** Hjælperamme (1) ifølge et af de foregående krav, hvilken hjælperamme (1) er udformet til umiddelbar montering på et chassis (3) på et køretøj (4).  
25

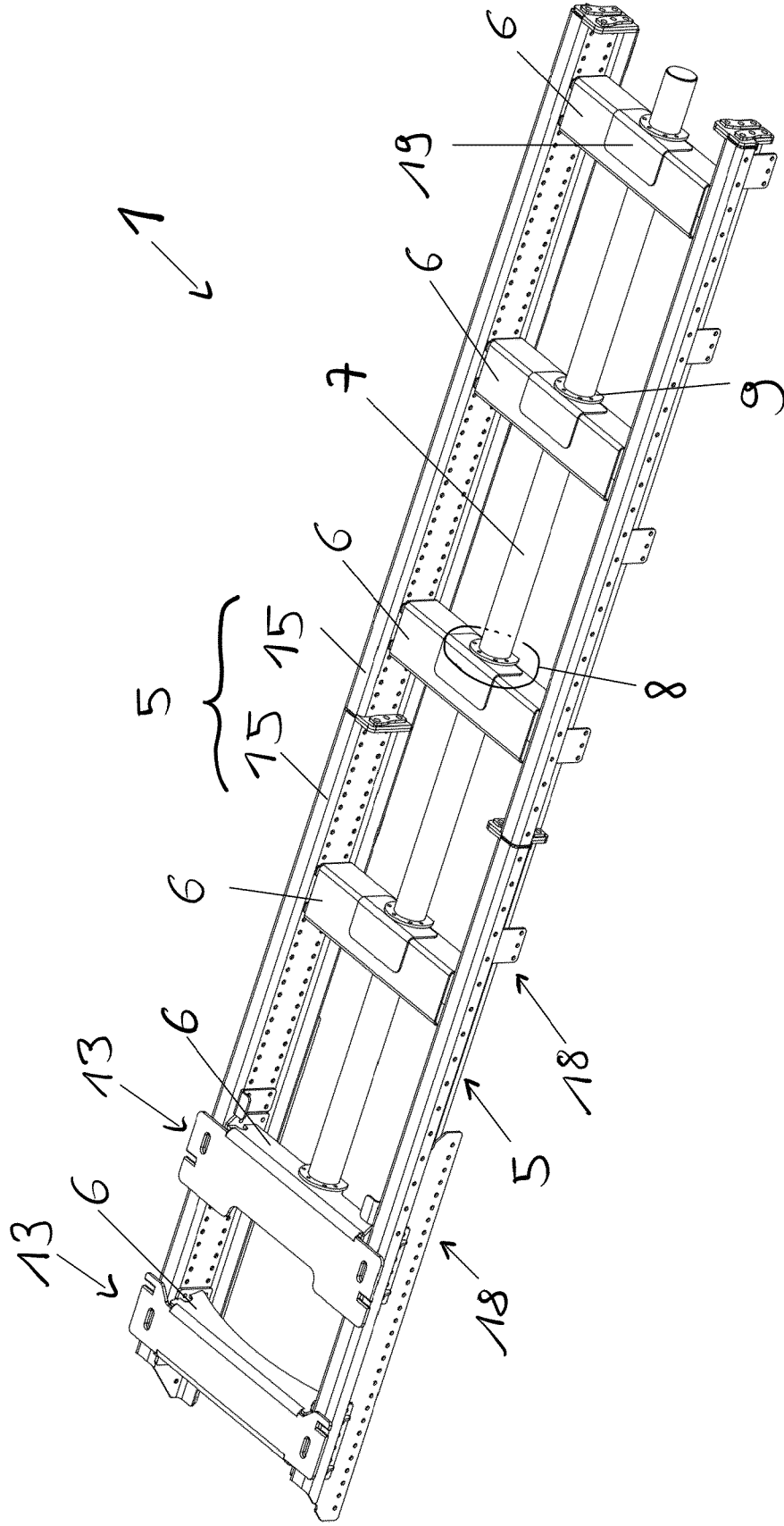
**15.** Køretøj (4), fortrinsvis lastbil, med et chassis (3) og en på chassiset (3) anbragt hjælperamme (1) ifølge et af de foregående krav, hvor hjælperammen (1) fortrinsvis er anbragt umiddelbart på chassiset (3).

**16.** Køretøj (4) ifølge det foregående krav, hvori hjælperammen (1) har mindst et fastgørelsessted (13) til det mindst ene arbejdsredskab (2) i et område ved en af de mindst to tværdragere (6), fortrinsvis i form af en af de mindst to tværdragere (6), idet det mindst ene afstivningselement (7) er forbundet med det mindst ene fastgørelsessted (13) til det mindst ene arbejdsredskab (2) og i det mindste

4

strækker sig til en bagaksel (17) på køretøjet (4).

Fig. 1a



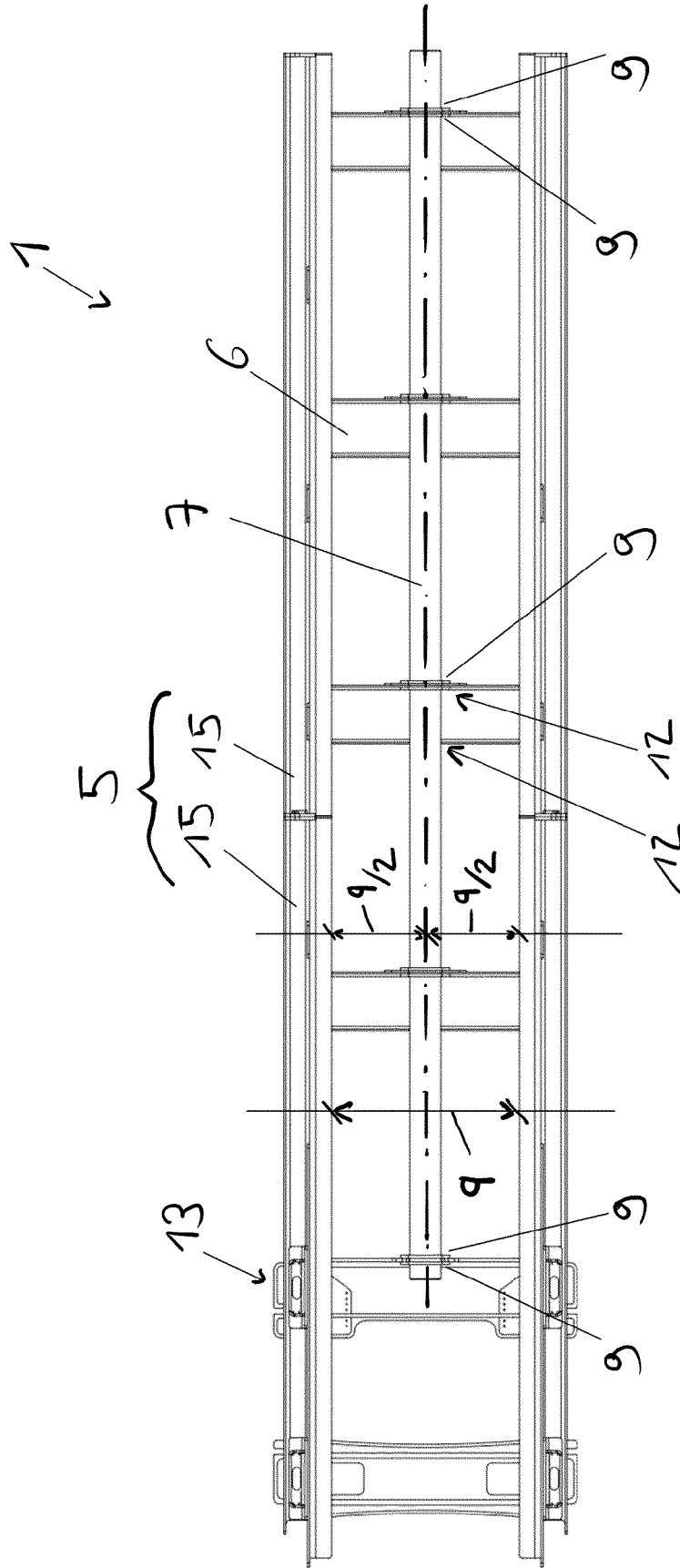
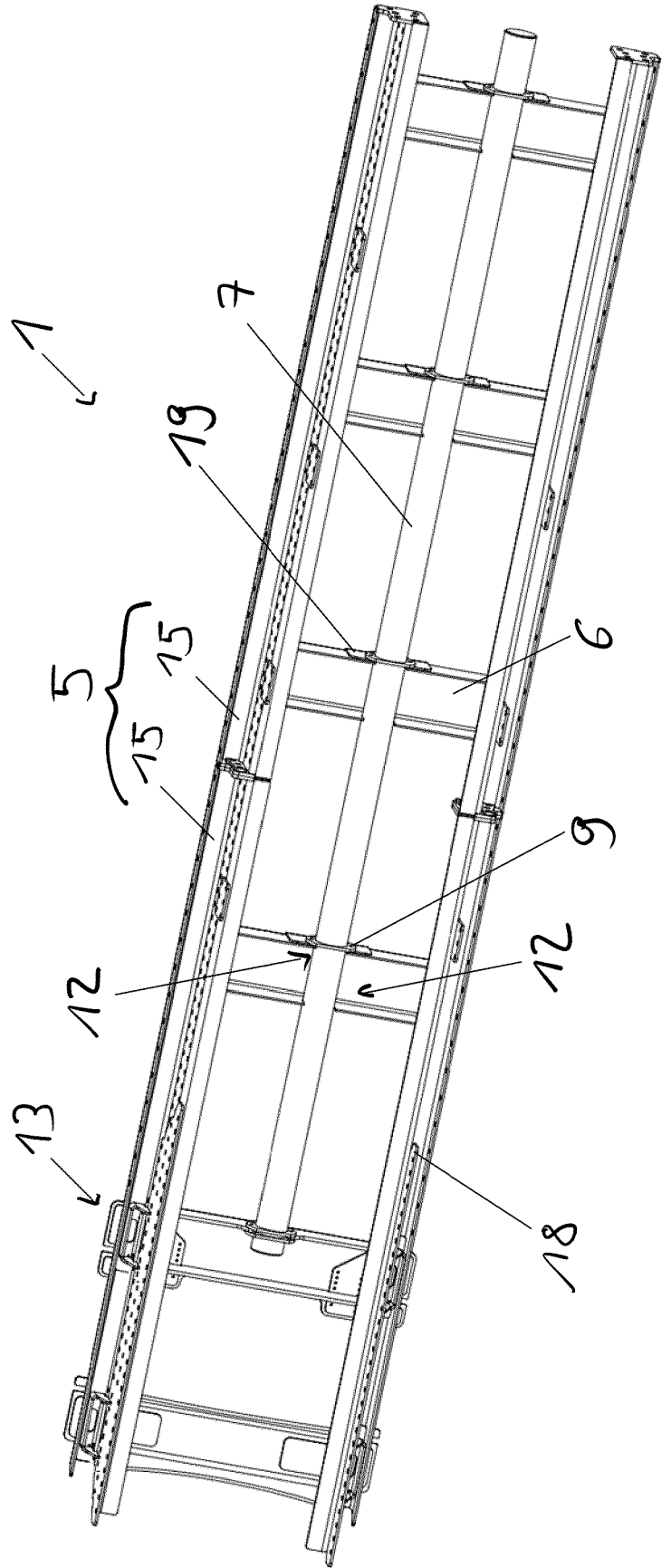


Fig. 1b

Fig. 1c



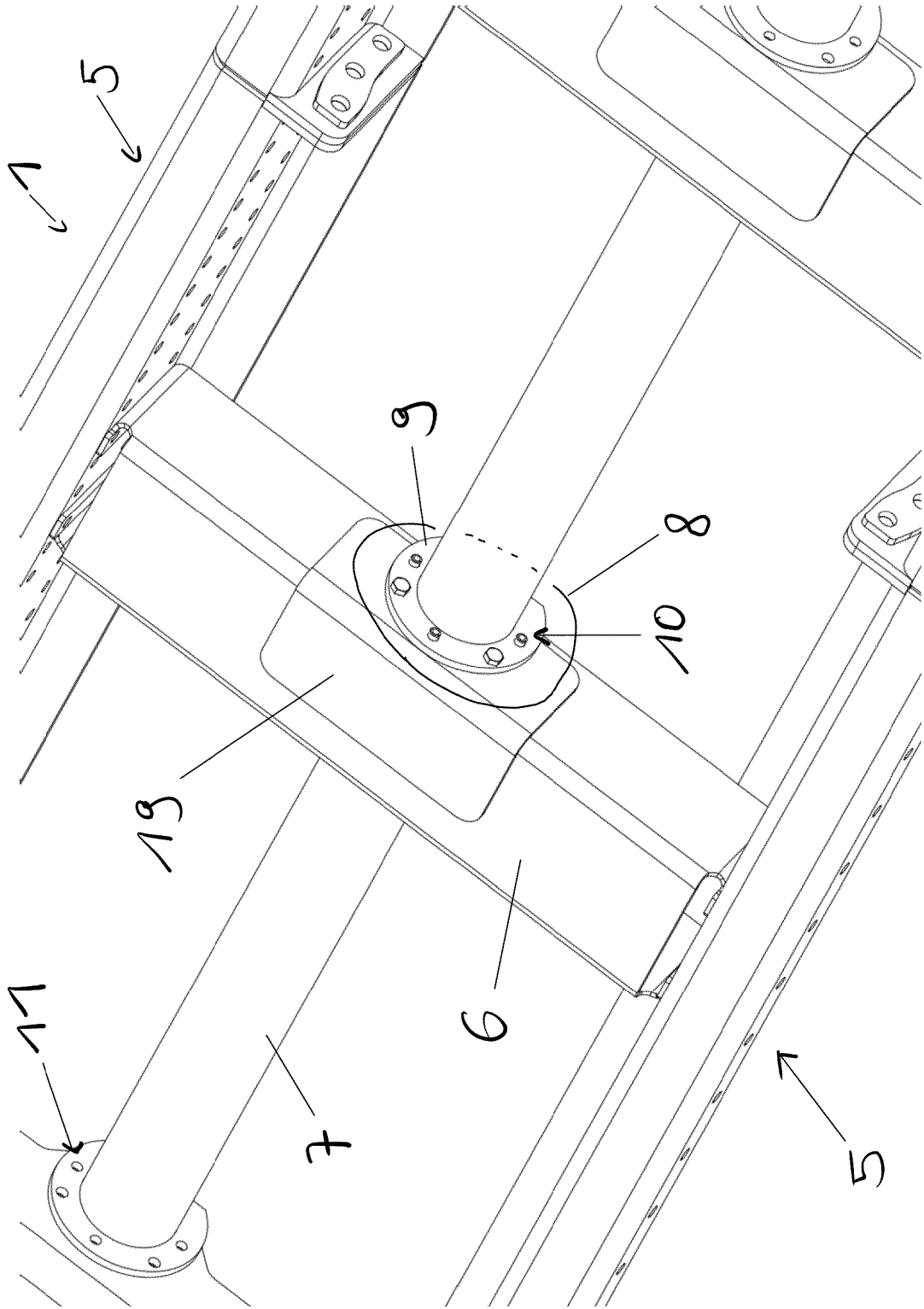


Fig. 2a

Fig. 2b

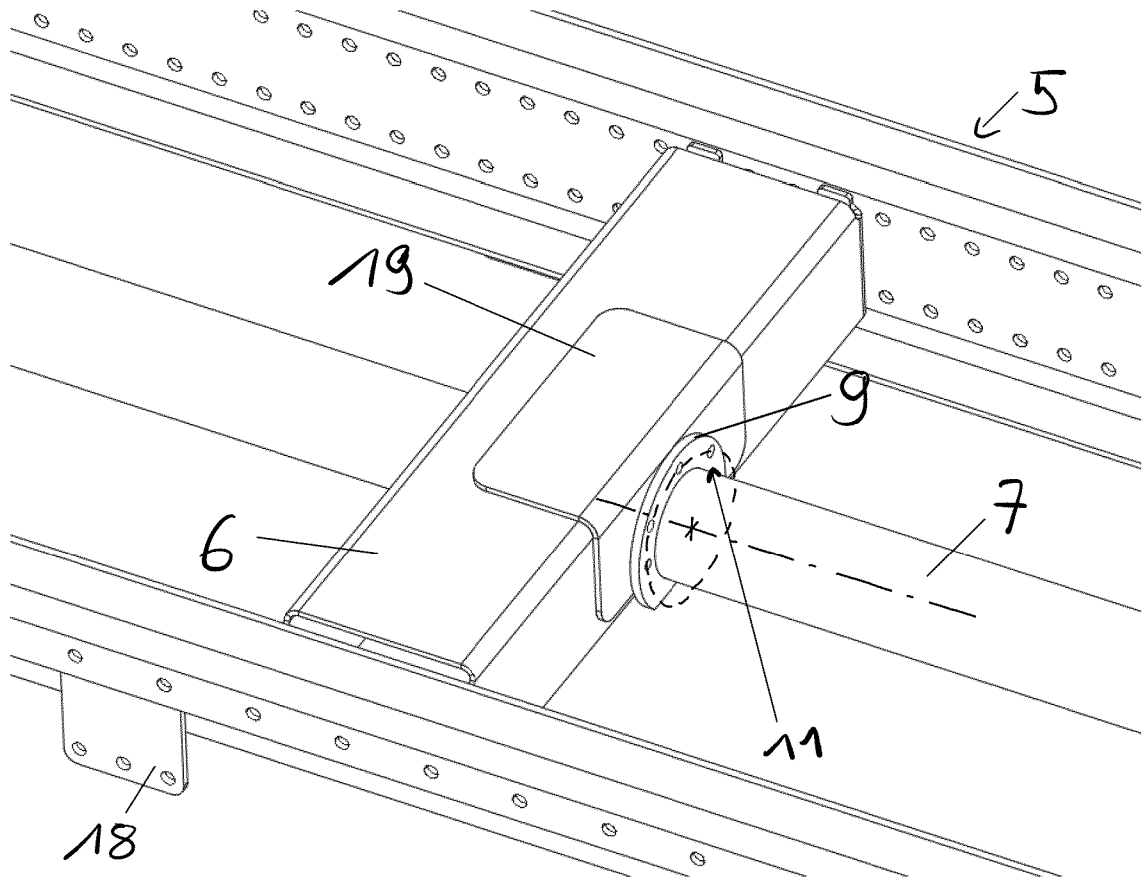


Fig. 2c

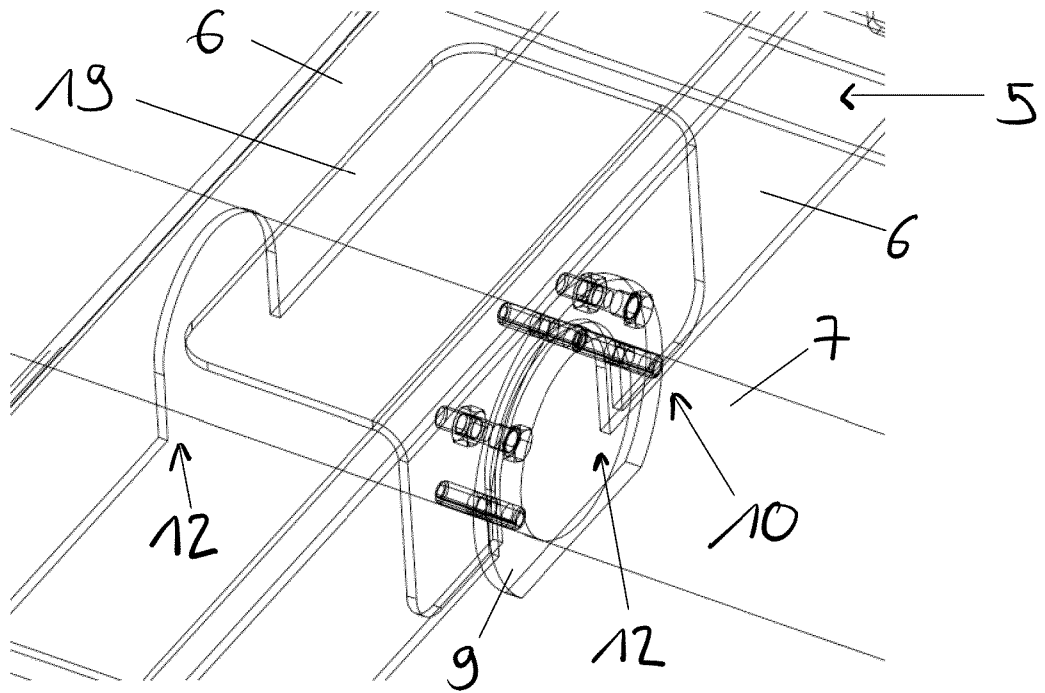
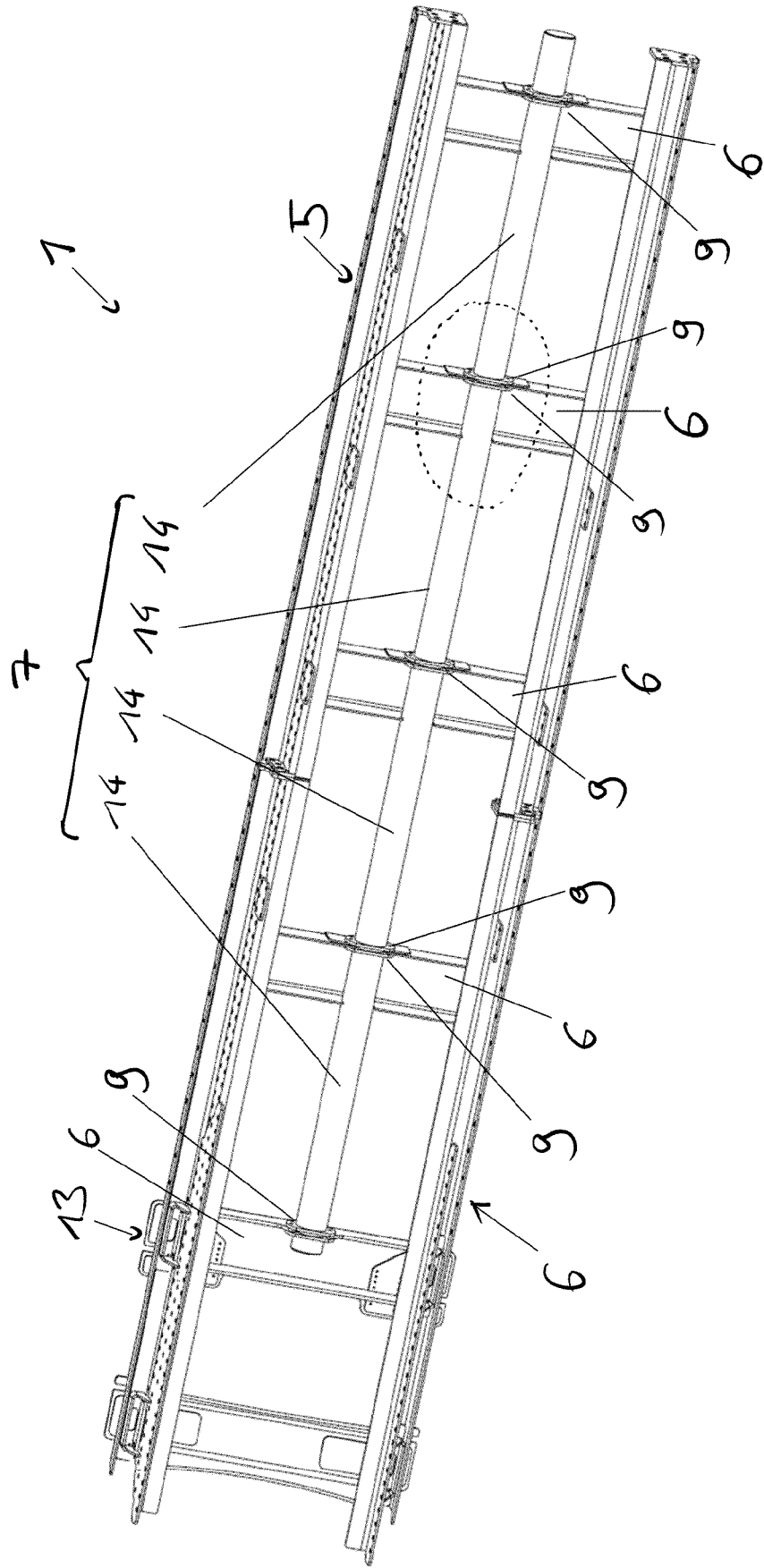


Fig. 3a



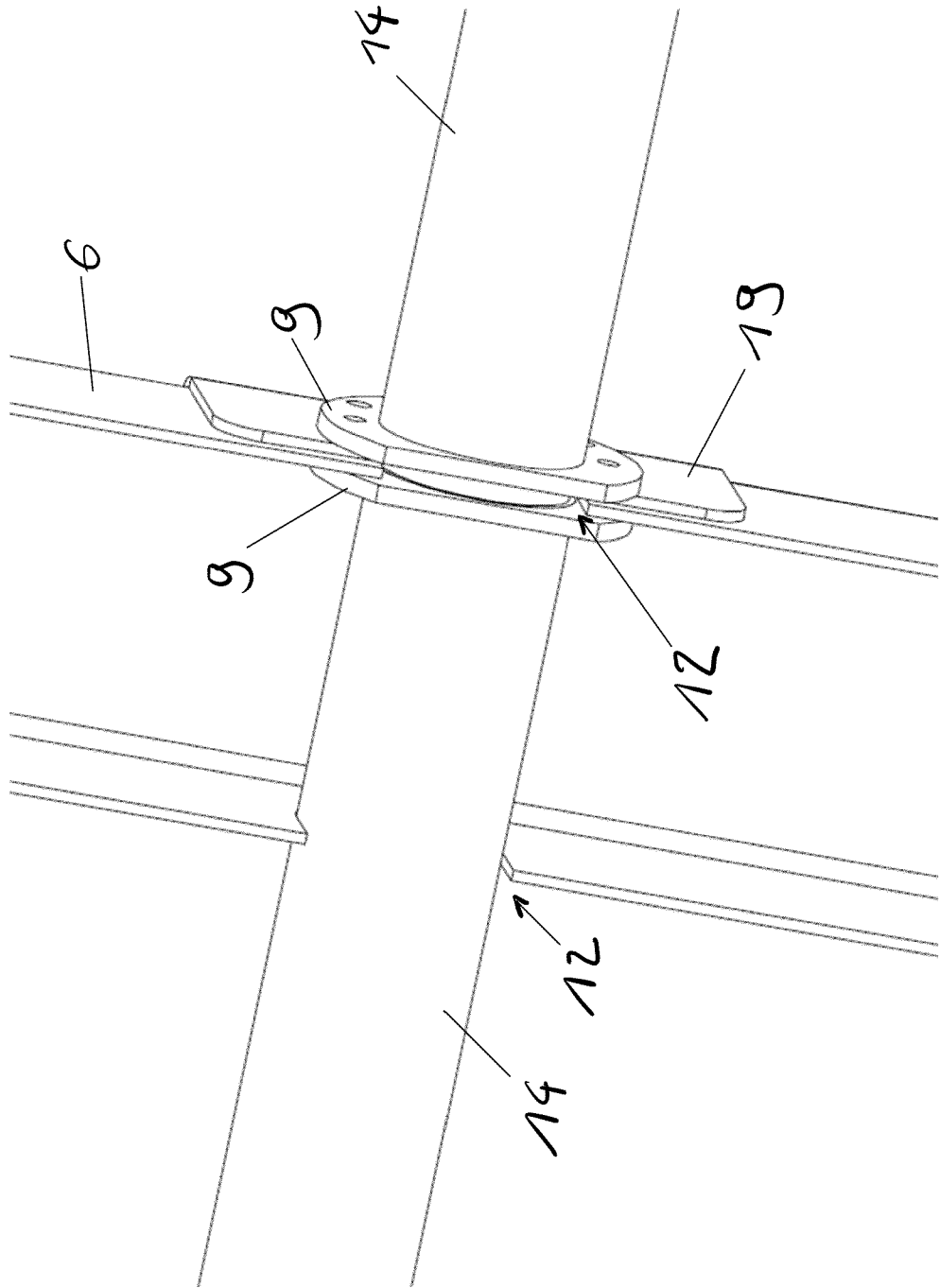


Fig. 3b

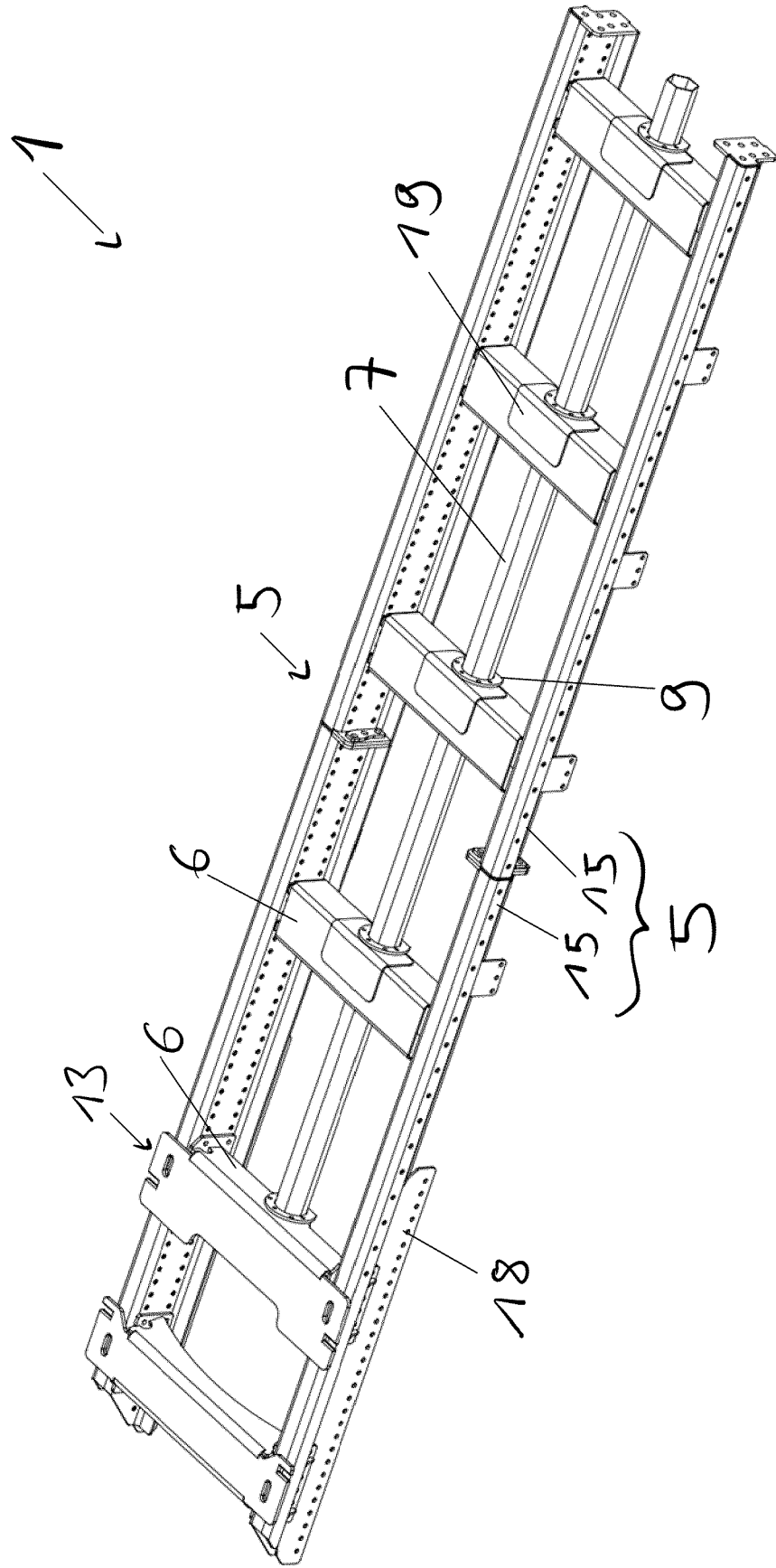
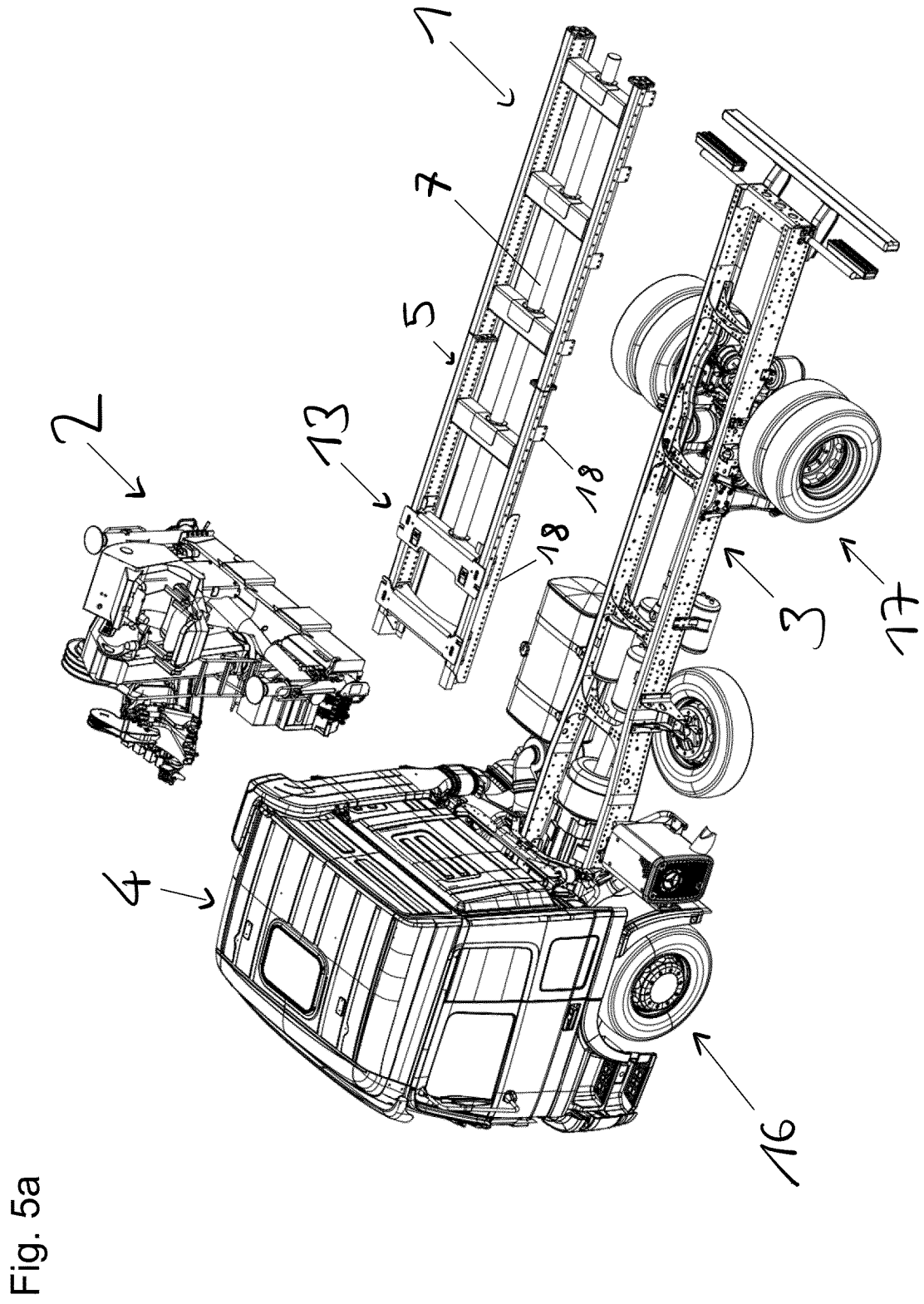


Fig. 4



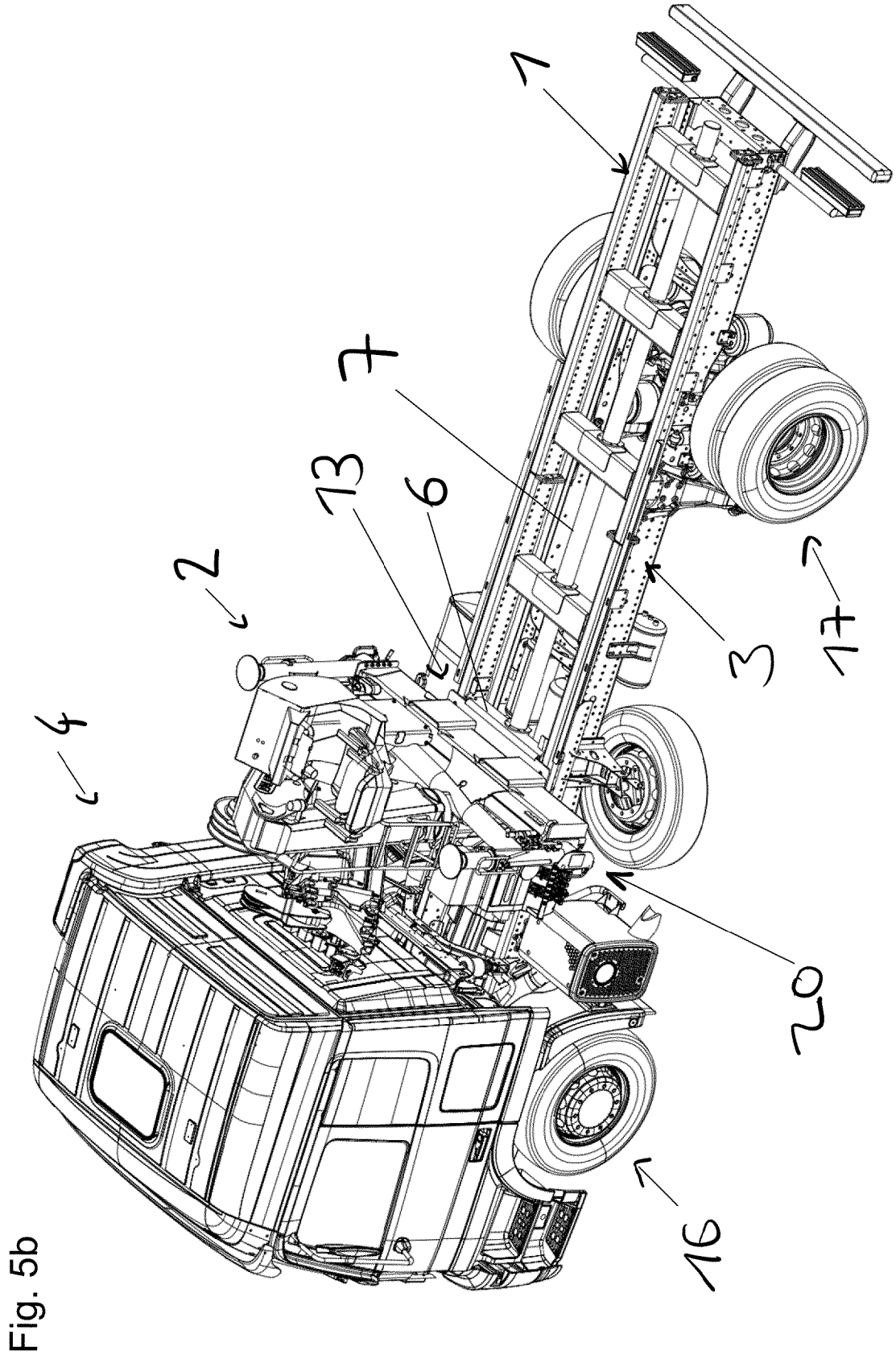


Fig. 5b

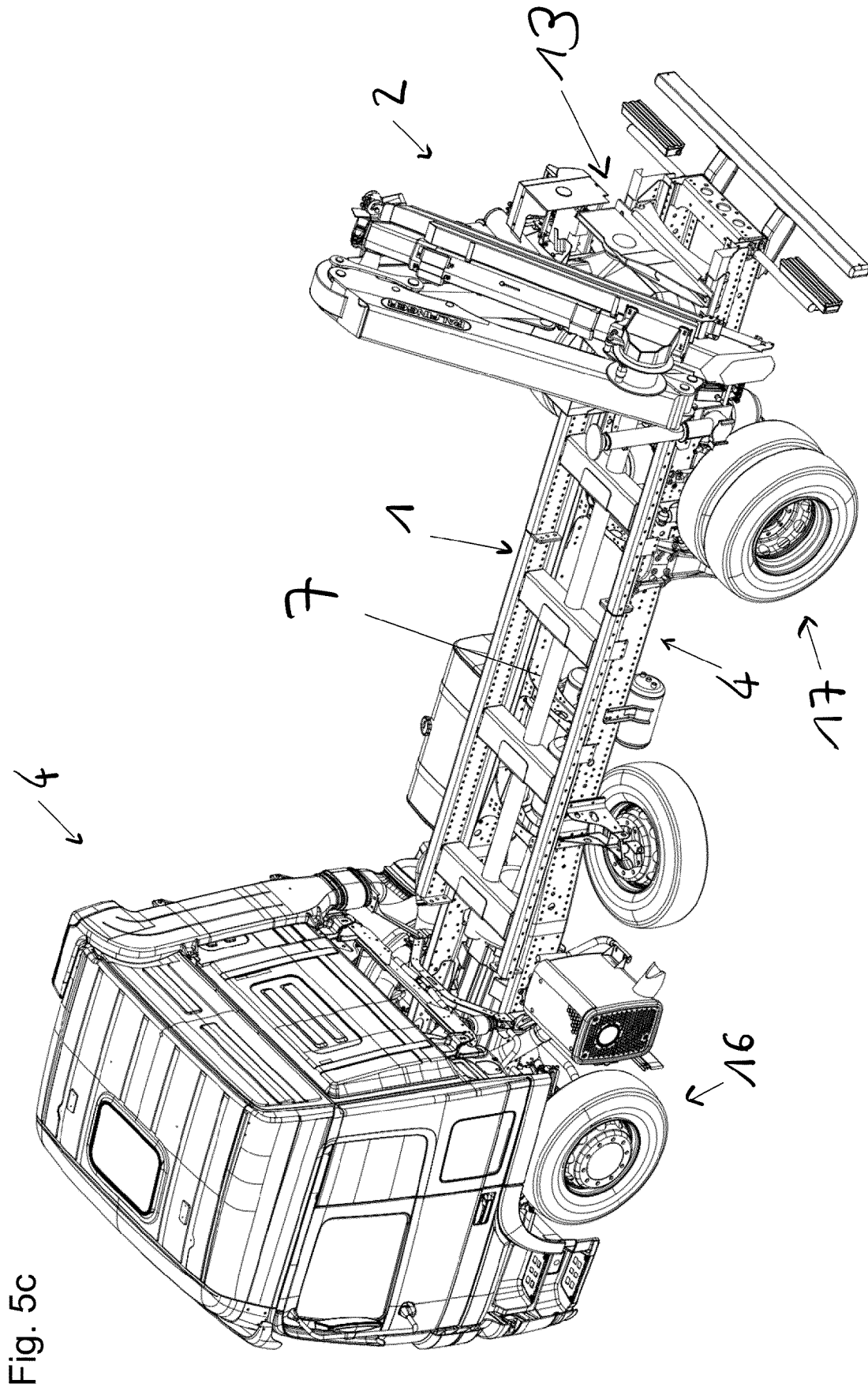


Fig. 5c

Fig. 6

