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[Fortsetzung auf der nächsten Seite]

(54) **Title**: AXLE SUSPENSION FOR A VEHICLE AXLE

(54) **Bezeichnung** : ACHSAUFHÄNGUNG FÜR EINE FAHRZEUGACHSE

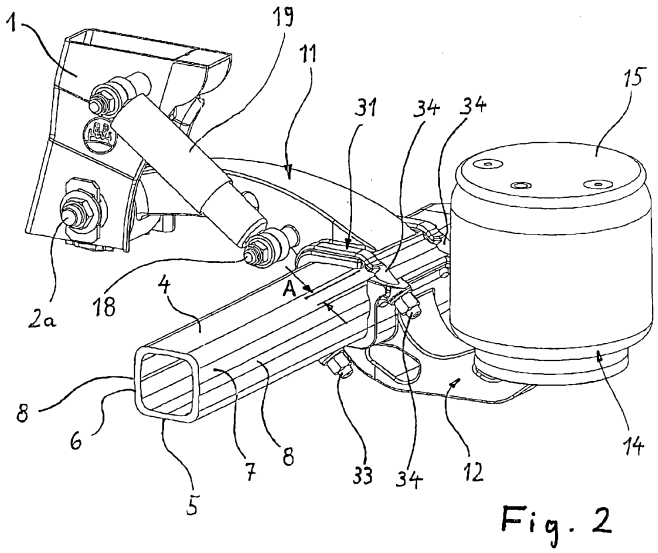

Fig. 2

(57) **Abstract**: The invention proposes an axle suspension for a vehicle axle, comprising an axle body (3) and axle guides (10) crossing the axle body at the two ends thereof and being supported with respect to the vehicle. Each axle guide (10) has two parts and is composed of a front guide section (11) viewed in the driving direction and a rear guide section (12) viewed in the driving direction. Shells (21, 22) are integrally formed on both guide sections (11, 12), and the insides of said shells extend in the axle direction such that they rest against a longitudinal section of the axle body (3) over a relatively large length. The guide sections (11, 12) are connected to each other by tractive elements (33, 34), which extend transversely to the axle body on two different sides of the axle body (3). The tractive elements (33, 34) can be part of a threaded bracket (31) guided around one shell (21).

(57) **Zusammenfassung**: Vorgeschlagen wird eine Achsaufhängung für eine Fahrzeugachse,

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Veröffentlicht:

— *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

mit einem Achskörper (3) und den Achskörper an seinen beiden Enden kreuzenden Achslenkern (10), die gegenüber dem Fahrzeug abgestützt sind. Jeder Achslenker (10) ist zweiteilig und setzt sich aus einem in Fahrtrichtung vorderen (11) und einem in Fahrtrichtung hinteren Lenkerabschnitt (12) zusammen. An beiden Lenkerabschnitten (11, 12) sind Schalen (21, 22) angeformt, deren Innenseiten sich so in Achsrichtung erstrecken, dass sie auf relativ großer Länge gegen einen Längsabschnitt des Achskörpers (3) anliegen. Die Lenkerabschnitte (11, 12) sind durch Zugelemente (33, 34) die sich auf zwei unterschiedlichen Seiten des Achskörpers (3) quer zum Achskörper erstrecken, miteinander verbunden. Die Zugelemente (33, 34) können Bestandteile eines um die eine Schale (21) herum geführten Gewindebügels (31) sein.

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Axle suspension for a vehicle axle

The invention relates to an axle suspension for a vehicle axle.

A reference herein to a patent document or other matter which is given as prior art is not to be taken as an admission or a suggestion that that document or matter was known, or that the information it contains was part of the common general knowledge as at the priority date of any of the Claims.

An axle suspension having said features is known to the Applicant from WO 2004/054825 A2.

By means of the invention, it is sought to provide an axle suspension which is improved in relation to the prior art and which can be assembled easily from only a small number of individual parts.

According to the present invention, there is provided an axle suspension for a vehicle axle, with an axle body and axle guides which cross the axle body at the two ends thereof and which are supported with respect to the vehicle, wherein each axle guide is formed from at least one front guide portion in the direction of travel and at least one rear guide portion in the direction of travel, the two guide portions having formed on them shells of which the inner sides extend in the axial direction in such a way that they rest against a longitudinal portion of the axle body and the guide portions are connected to each other by traction elements which extend transversely to the axle body on two different sides of the axle body and brace the shells against each other with the interposition of the axle body, wherein the bracing of the shells is carried out at an oblique angle to the horizontal, and free ends of the

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traction elements extend towards the rear and at an angle downwards.

In one embodiment, each shell has at least one first even inner face and at least one second even inner face, wherein the first and second inner faces are situated at an angle to each other. In one form of the invention, the shells have, as viewed in the axial direction, a V-shaped inner contour with an internal angle of 90° or slightly less than 90°.

In a further embodiment, the axle suspension includes a serrated texture which is formed in the corner area of the angle and which bites into the material of the axle body as a result of the traction elements being tightened..

In a further embodiment, it is proposed that the front guide portion and the rear guide portion is a casting in each case.

In a further refinement, it is proposed that the traction elements are part of a threaded yoke which is designed in the manner of a U-shaped yoke and which extends with a yoke portion around an abutment arranged on one of the two guide portions, and wherein the traction elements extend parallel to the course of the axle guide in the region of the axle body.

In one form of the invention, the abutment is a projection which protrudes from the top side and/or underside of the guide portion and which is provided with a groove corresponding to the bending of the yoke portion.

In an alternative embodiment, it is proposed that the traction elements are part of a threaded yoke which extends with a yoke portion around one of the two shells, and the two free ends of

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the traction elements are screwed to the other one of the two shells.

The threaded yoke may be provided with a 45°, a 90° and once again a 45° bend in succession along the extension around the shell.

In a further embodiment, it is proposed that the threaded yoke extends on the outside around the shell formed integrally on the front guide portion.

In a further embodiment, it is proposed that threaded nuts are screwed onto the free ends of the tension elements, which threaded nuts are supported against the shell integrally formed on the rear strut section.

In another embodiment, the threaded yoke has a flattened cross-section along the extension around the shell.

In another embodiment, the threaded yoke is mounted in a depression along the extension around the shell.

In another embodiment, the free ends of the traction elements are designed in the form of thread portions onto which are screwed threaded nuts which are supported against the shell formed integrally on the rear guide portion.

In another embodiment, the front guide portion has a cross-section which increases in a continuous manner towards the shell.

Further advantages and details will emerge from the following description of an exemplary embodiment of an axle suspension illustrated in the drawing, in which:

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figure 1 shows a perspective view of a first embodiment of an axle suspension for an air-sprung vehicle axle;

figure 2 shows the axle suspension from a different perspective;

figure 3 shows a perspective illustration of a two-part axle strut of the axle suspension, wherein in order to be able to provide a better illustration, the axle body is not shown;

figure 4 shows a perspective exploded illustration of the individual parts of the axle suspension,

figure 5 shows a side view of details of the design of the two-part axle strut, in particular the inner surfaces thereof which surround the axle body;

figure 6 shows a side view of a second embodiment of an axle suspension for an air-sprung vehicle axle;

figure 7 shows the axle suspension according to figure 6 in a perspective illustration, and

figure 8 shows, likewise in a perspective illustration, the connecting region between the axle strut and the vehicle axle on an enlarged scale.

The axle suspension illustrated in the drawing is used primarily for vehicle axles with a continuous axle body. Such vehicle axles are used primarily in heavy goods applications and in particular in heavy goods vehicle trailers and semitrailers, because the axles are designed for high transport weights and loads in road-going operation.

A strut support 1 is fastened, on each vehicle side, below longitudinal beams of a vehicle chassis not illustrated here. Said strut support holds a pivot bearing 2 for the axle suspension. On each side of the vehicle, there is an axle strut 10 for guiding the axle body 3 which is rigid and continuous from one vehicle side to the other vehicle side. The axle strut 10 is provided, on its front end, with an integrally cast strut lug 2 which is a constituent part of the pivot bearing, in order thereby to hold the axle strut 10 in a vertically pivotable manner on the strut support 1 by means of a pin 2a. The pivot bearing 2 may have, as a constituent part, a rubber or elastomer element around the pin 2a, which rubber or elastomer element allows a certain degree of radial mobility in the pivot bearing. Such elastic elements are known.

Formed on the axle strut 10 at the rear in the direction of travel is a contact surface 13 for an air spring 14. The air spring 14 is supported with its top end plate 15 from below against the corresponding longitudinal beam of the vehicle chassis.

The axle strut 10 is formed in two parts. It is assembled from a front strut section 11 in the

direction of travel, which is designed so as to be curved upward in the shape of an arc, and a rear strut section 12 in the direction of travel, which is designed so as to be curved downward in the shape of an arc. Integrally formed on the rear strut section 12 is a contact surface 13 for the air spring 14. Integrally formed on the front strut section 11 is a fastening pin or a fastening lug 18 for a shock absorber 19.

The front strut section 11 extends from the bearing lug of the pivot bearing 2 to the axle body 3 and terminates with its rear end in an obliquely downward direction. The rear strut section 12 extends from the axle body 3 to the contact surface 13 for the air spring 14. Said rear strut section terminates with its front end in an obliquely upward direction. This two-part configuration of the axle strut 10 is advantageous because, by selecting strut sections 11, 12 of suitable size, the vehicle-specific distances between the pivot bearing 2, axle body 3 and air spring 14 can be realized individually, that is to say in a customer-specific manner.

The front strut section 11 is composed of cast metal, preferably a nodular cast steel. The rear strut section 12 is preferably also composed of cast metal, preferably a nodular cast steel.

According to figure 2, the axle body 3 is designed, over the major part of its length, as an axle tube. Said axle tube has an approximately square cross section, such that the outer surfaces of the axle tube are a top side 4, an underside 5, a side 6 pointing forward in the direction of travel and a side 7 pointing toward the rear of the vehicle. Between said sides 4, 5, 6, 7, the axle tube cross section has roundings in the form of circle quadrants.

The axle tube is assembled from a top and a bottom half-shell, as a result of which weld seams 8 are formed in the connecting region of said half-shells. On the finished axle tube, the weld seams 8 arranged in the neutral bending line form an elongate elevation on the two sides 6, 7 of the axle tube. The axle body 3 also has, as constituent parts, axle legs 9 which are welded to the ends of the axle tube. Rotatably mounted on each axle leg 9 is the respective vehicle wheel.

A fastening lug or a fastening pin 18 for supporting a shock absorber 19 is integrally cast on the front strut section 11 of the two-part axle strut 10. With its other end, the shock absorber 19 is articulatedly supported in the upper region of the rigid strut support 1.

The axle body 3 is connected into the two axle struts 10 by virtue of the axle body 3 being clamped in a positively locking fashion between the two strut sections 11, 12. For this purpose, the front strut section 11 is provided with a shell 21 of V-shaped cross section, and the rear strut section 12 is also provided with a shell 22 of V-shaped cross section. The shells 21, 22 are an integral constituent part of the cast strut sections 11, 12. For an optimum force profile in the axle strut 10, the cast form is such that the strut section 11 abuts obliquely downward against the shell 21 and the strut section 12 abuts obliquely upward against the shell 22. With the inner sides of their shells 21, 22, the strut sections 11, 12 are supported areally against the corresponding sides 4, 5, 6, 7 of the axle body 3, wherein the required clamping force is obtained by means of tension elements which brace one shell 21 against the other shell 22 with the interposition of the axle body 3. Said bracing takes place at an oblique angle W with respect to the horizontal, as shown in figure 5.

In the embodiment of figures 1 to 5, each shell 21, 22 has, as viewed in the axial direction, a length L (figure 4) considerably greater than the width B of the respective strut section 11, 12. This results in a long support of the shells 21, 22 on the corresponding longitudinal section of the axle body 3 in the axial direction.

In figure 5, each of the two shells 21, 22 has, as viewed in the axial direction, at least one first planar inner surface and, arranged at right angles thereto, at least one second planar inner surface. Two first flat inner surfaces 23a, 23b are provided which lie in the same plane, and two second flat inner surfaces 24a, 24b are provided which lie in the same plane and which are arranged at right angles to said first inner surfaces 23a, 23b. The stated angle with respect to one another is however preferably slightly less than 90°, for example 88 or 89°. As a result of the fact that the internal angle is not quite a right angle, when the tension elements 31 are tightened so as to increase the clamping stress, the flat inner surfaces 23a, 23b and 24a, 24b nestle against the likewise flat sides 4, 5, 6, 7 of the square axle body 3 by virtue of the right-angled contour of the shells 21, 22 being spread slightly in the assembled state. The inner surfaces 23a, 23b, 24a, 24b are then in areal and play-free contact with the outer surfaces of the axle body 3. The flat and play-free contact is promoted in that, where the weld seams 8 (figure 2) of the axle tube are situated during assembly, specifically between the inner surfaces 23a and 23b arranged in the same plane, the shells 21, 22 are provided with adequately large recesses 25. There is therefore no contact between the inner sides of the shells 21, 22 and the axle body 3 in the region of the recesses 25. There is

also a similar recess 26 between the two other inner surfaces 24a, 24b, but said recess 26 is shallower.

When the axle suspension is assembled, the shell 21 of the front strut section 11 is supported simultaneously against the top side 4 and against the forward-pointing side 6 of the axle body. In contrast, the other shell 22 is supported simultaneously against the underside 5 and against the rearward-pointing side 7. The inner sides of the two shells 21, 22 therefore together surround the axle body 3 over almost its entire periphery. However, there remains a certain non-surrounded peripheral gap A (figure 2, figure 5) between the outer edges of one shell 21 and the adjacent outer edges of the other shell 22. The gap A is necessary to ensure that no contact occurs between the two shells 21, 22 under any circumstances, even under intense torsional loading.

For tolerance compensation, intermediate layers, for example thin metal sheets, may also be arranged between the inner sides of the shells 21, 22 and the axle body 3.

It will be explained below how the shells 21, 22 of the strut sections 11, 12 can be pulled against one another by means of tension elements 33, 34 which extend perpendicular to the axle body on two different sides of the axle body 3. In the embodiment according to figures 1 to 5, in each case one threaded bracket 31 is provided both on the vehicle-inner side and also on the vehicle-outer side of the axle strut 10. Said threaded bracket 31 is composed of a bracket section 32 with three bends and of two straight sections 33, 34 which are parallel to one another and which, as the actual tension elements, transmit the tension force and which are formed as threaded sections in the region of their

free ends. In each case one threaded nut 35 can be screwed onto said threaded sections.

The threaded bracket 31 is shaped such that its bent section, that is to say the bracket section 32, bears from the outside without play against the shell 21 of the strut section 11 around which the bracket section 32 is guided. The threaded bracket 31 is guided around in that longitudinal section of the shell 21, as viewed in the axial direction, in which the length L of the shell 21 projects beyond the width B of the adjoining strut section 11 (figure 4). The outer side of the shell 21 therefore forms the abutment when the bracket 31 is tightened.

Along its profile guided around the shell 21, the threaded bracket 31 has, in succession, a 45° bend, a 90° bend and another 45° bend. Therefore, the longitudinal profile of the bracket section 32 guided around the shell 21 is likewise V-shaped, like the V-shaped outer contour of the shell 21 at both sides of the strut section 11.

To prevent the threaded bracket 31 slipping off in the axial direction, the shell 21 is provided with a duct-like depression 39 for a seat of the bracket section 32 recessed with respect to the axle tube. The threaded bracket 31 has a flatter cross section over the length of the bracket section 32 than over its remaining length.

The other shell 22, that is to say the shell integrally formed on the rear strut section 12, is provided with leadthroughs for the two straight sections 33, 34, which serve as tension elements, of the threaded bracket 31 and with pressure surfaces 37 against which the screwed-on threaded nuts 35 are provided, if appropriate with the interposition of washers 36.

It is advantageous that, in the region of the connection of the axle body 3, the tension elements 33, 34 extend along, that is to say parallel to, the profile of the axle strut 10, as a result of which the ends of the tension elements 33, 34 with the nuts 35 screwed thereon extend rearward and obliquely downward, as indicated in figure 5 by the directional arrow R and the angle W with respect to the horizontal. This leads to optimally protected positioning primarily of the upper tension element 34 and its nut 35. This is because, even in the case of an intense compression movement of the axle strut, no contact occurs between the tension element 34 or the nut 5 and those chassis parts of the vehicle which are situated above, such as can occur for example with the construction according to EP 1 088 687 A.

Both the front strut section 11 in the direction of travel and also the rear strut section 12 in the direction of travel are formed as hollow bodies that can be produced in a casting process. Additional openings 40, 41, 42 may be provided to facilitate the removal of the casting core during the casting process. Demoldability of the strut section 11 during casting is also promoted by virtue of the interior of said strut section also being open toward the strut lug 2 and toward the inner side of the shell 21.

To obtain expedient deformation behavior of the front strut section during driving operation, according to figure 4, the cross section of said strut section 11 is at its smallest behind the strut lug 2, and then increases in size in the rearward direction, that is to say in the direction of the shell 21. This can be achieved by virtue of the width B of said strut section 11 being at its smallest behind the strut lug 2 and increasing continuously in the direction of the shell

21. The height H of the strut section 11 is also at its smallest behind the strut lug 2 and then increases continuously in the direction of the shell 21.

A curved contour may be integrally formed on the underside of the front strut section 11 by casting, as is described for example in DE 10 2006 015 671 A1. A piston rod of a compressed-air-actuated axle lift may be supported on such a contour in order to lift the axle.

The two shells 21, 22 are each provided, on their inner sides, with tooth structures 45 to improve the frictional connection to the axle body 3. Said structures are situated in the rounded corner region between the inner surface 23a and, at right angles thereto, the inner surface 24a. The structures 45 may be integrally formed by casting, but are preferably produced retroactively by milling machining processes, in the same way as the inner surfaces 23a, 23b, 24a, 24b are preferably also produced by retroactive cutting machining of the cast parts.

During the clamping of the shells 21, 22 by tightening the threaded nuts 35 of the threaded bracket 31, the tooth structures 45 arranged in the region of the corner rounding dig into the corresponding rounding on the outer side of the axle body 3, which is smooth. This results not only in positive locking in the circumferential direction but also, on account of the fact that the structures 45 dig into the surface and the material of the axle body, in positive locking in the axial direction.

Figures 6-8 show a second embodiment of an axle suspension according to the invention, with the same or functionally identical parts and elements being

provided with the same reference numerals as in the first embodiment according to figures 1-5.

The embodiment according to figures 6-8 differs from the first embodiment in the design of the two shells 21, 22 and in the arrangement of the two threaded brackets 31.

As viewed in the longitudinal direction of the axle body 3, the shells 21, 22 are not longer, or at best are not significantly longer, than the width B of the respective strut sections 11, 12. The angled shell shape important for the abutment against the square axle body 3 is obtained substantially by virtue of the front strut section 11 being provided with an angled cutout on its rear end and the rear strut section 12 being provided with an angled cutout on its front end, such that in both cases a shell 21, 22 of V-shaped cross section is provided. The shells 21, 22 are therefore shorter than in the first embodiment described above, but are nevertheless an integral constituent part of the two strut sections 11, 12.

For an optimum force profile in the axle strut 10, the cast form of the strut sections 11, 12 is again such that the obliquely downwardly directed rear end of the strut section 11 forms the shell 21 and the obliquely upwardly directed front end of the strut section 12 forms the shell 22. With the inner surfaces formed in this way, the strut sections 11, 12 are supported areally against the corresponding sides 4, 5, 6, 7 of the axle body 3, wherein again, the required clamping force is obtained by means of mountable and dismountable tension elements which brace the shell 21 of the front strut section 11 against the shell 22 of the rear strut section 12 with the interposition of the axle body 3. Said bracing takes place at an oblique angle W with respect to the horizontal.

The bracing of the strut sections 11, 12 against one another takes place again by means of two threaded brackets 31 composed in each case of a bent bracket section 32 and two straight sections 33, 34 which are parallel to one another and which, as the actual tension elements, transmit the tensile force. In the region of their free ends, the sections 33, 34 are provided with external threads onto which in each case one threaded nut 35 is screwed.

The bracket section 32 of each threaded bracket 31 is guided around an abutment 50 integrally formed on the front strut section 11. The abutment 50 is a lobe which is integrally formed on the strut section 11 and which is provided with a groove corresponding to the bend of the bracket section 32. It can be seen from figure 1 that a first lobe projects, without weakening the strut cross section, from the top side 51 of the strut section 11, and a second lobe projects from the underside 52 of the strut section 11. Each lobe is provided, along its base, with a groove corresponding to the bend of the bracket section 32, such that the bracket section 32 runs in a positively locking manner in said groove and cannot spring off the lobe, that is to say the abutment 50.

In this embodiment of the arrangement of the threaded bracket 31, too, it is achieved that, in the region of the connection of the axle body 3, the tension elements 33, 34 extend along, that is to say parallel to, the profile of the axle strut 10, and the ends of the tension elements 33, 34 with the nuts 35 screwed thereon extend rearward and obliquely downward. Again, this serves to provide optimally protected positioning of the tension elements, because even in the case of an extreme compression movement of the axle strut, contact with the chassis parts of the vehicle situated above

does not occur. As in the first embodiment, an axle suspension is provided which is improved in relation to the prior art and which can be assembled easily from only a small number of individual parts. Since the strut sections of the axle suspension are connected by means of separate tension elements 33, 34, the axle suspension can also be dismounted again with little expenditure and in a non-destructive manner, for example for repair purposes.

List of reference symbols

1	Strut support
2	Strut lug
2a	Pin
3	Axle body
4	Top side
5	Underside
6	Forward-pointing side
7	Rearward-pointing side
8	Weld seam
9	Axle leg
10	Axle strut
11	Front strut section
12	Rear strut section
13	Contact surface
14	Air spring
15	Closure plate
18	Fastening pin, lug
19	Shock absorber
21	Shell
22	Shell
23a	Inner surface
23b	Inner surface
24a	Inner surface
24b	Inner surface
25	Recess
26	Recess
31	Threaded bracket
32	Bracket section
33	Tension element, threaded section
34	Tension element, threaded section
35	Threaded nut
36	Washer
37	Pressure surface
39	Recess
40	Opening
41	Opening

42 Opening
45 Tooth structure
50 Abutment
51 Top side
52 Underside

A Circumferential spacing
B Width
H Height
L Length
R Direction
W Angle

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An axle suspension for a vehicle axle, with an axle body and axle guides which cross the axle body at the two ends thereof and which are supported with respect to the vehicle, wherein each axle guide is formed from at least one front guide portion in the direction of travel and at least one rear guide portion in the direction of travel, the two guide portions having formed on them shells of which the inner sides extend in the axial direction in such a way that they rest against a longitudinal portion of the axle body and the guide portions are connected to each other by traction elements which extend transversely to the axle body on two different sides of the axle body and brace the shells against each other with the interposition of the axle body, wherein the bracing of the shells is carried out at an oblique angle to the horizontal, and free ends of the traction elements extend towards the rear and at an angle downwards.

2. An axle suspension according to claim 1, wherein each shell has at least one first even inner face and at least one second even inner face, wherein the first and second inner faces are situated at an angle to each other.

3. An axle suspension according to claim 1 or 2, wherein as viewed in the axial direction, the shells have a V-shaped inner contour with an internal angle of 90° or slightly less than 90°.

4. An axle suspension according to claim 2 or 3, wherein a serrated texture which is formed in the corner area of the angle and which bites into the material of the axle body as a result of the traction elements being tightened.

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5. An axle suspension as according to any one of the preceding Claims, wherein the front guide portion and the rear guide portion is a casting in each case.

6. An axle suspension according to any one of the preceding Claims, wherein the traction elements are part of a threaded yoke which is designed in the manner of a U-shaped yoke and which extends with a yoke portion around an abutment arranged on one of the two guide portions, and wherein the traction elements extend parallel to the course of the axle guide in the region of the axle body.

7. An axle suspension according to claim 6, wherein the abutment is a projection which protrudes from the top side and/or underside of the guide portion and which is provided with a groove corresponding to the bending of the yoke portion.

8. An axle suspension according to any one of Claims 1 to 5, wherein the traction elements are part of a threaded yoke which extends with a yoke portion around one of the two shells, and the two free ends of the traction elements are screwed to the other one of the two shells.

9. An axle suspension according to claim 8, wherein the threaded yoke is provided with a 45°, a 90° and once again a 45° bend in succession along the extension around the shell.

10. An axle suspension as according to Claim 8 or 9, wherein the threaded yoke extends on the outside around the shell formed integrally on the front guide portion.

11. An axle suspension according to any one of Claims 8 to 10, wherein the threaded yoke has a flattened cross-section along the extension around the shell.

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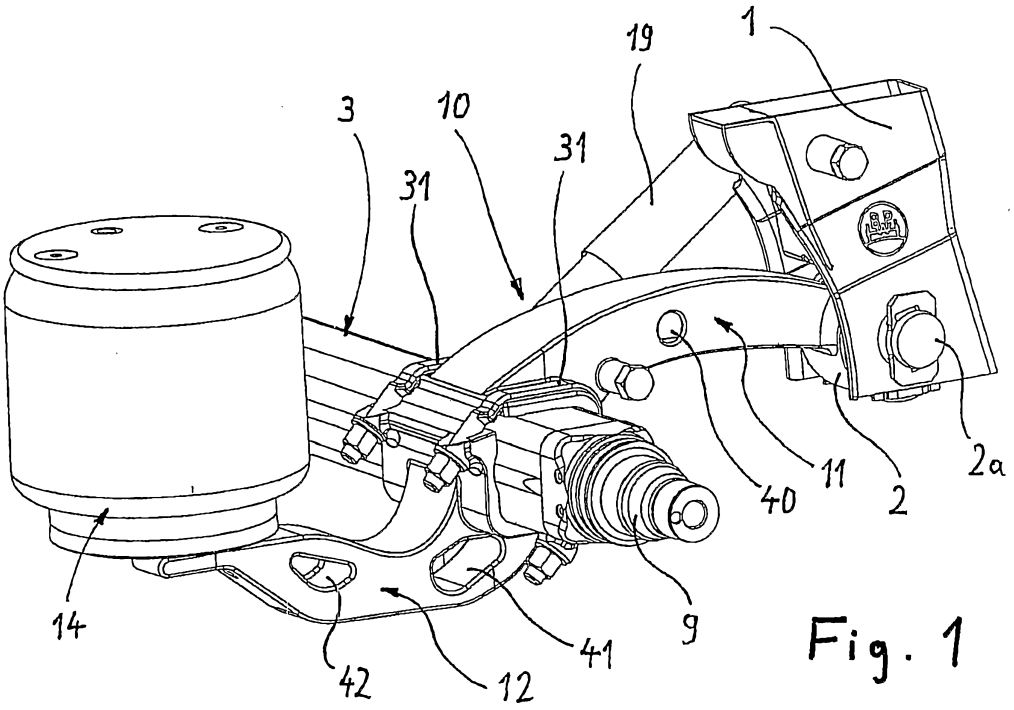
12. An axle suspension according to any one of Claims 8 to 11, wherein the threaded yoke is mounted in a depression along the extension around the shell.

13. An axle suspension according to any one of the preceding Claims, wherein the free ends of the traction elements are designed in the form of thread portions onto which are screwed threaded nuts which are supported against the shell formed integrally on the rear guide portion.

14. An axle suspension according to any one of the preceding Claims wherein the front guide portion has a cross-section which increases in a continuous manner towards the shell.

15. An axle suspension substantially as herein described with reference to any one of the embodiments of the invention as shown in the accompanying drawings.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2a
14
42
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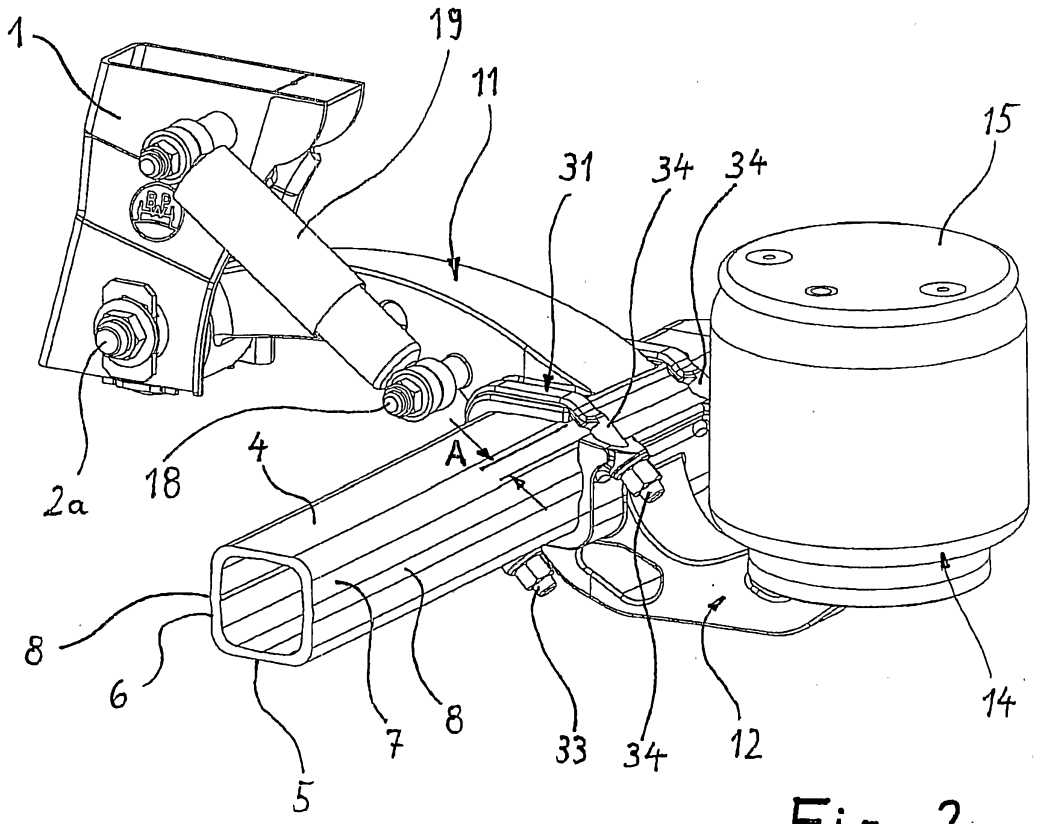
41
9

Fig. 1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A
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7
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33
34
12
14

Fig. 2

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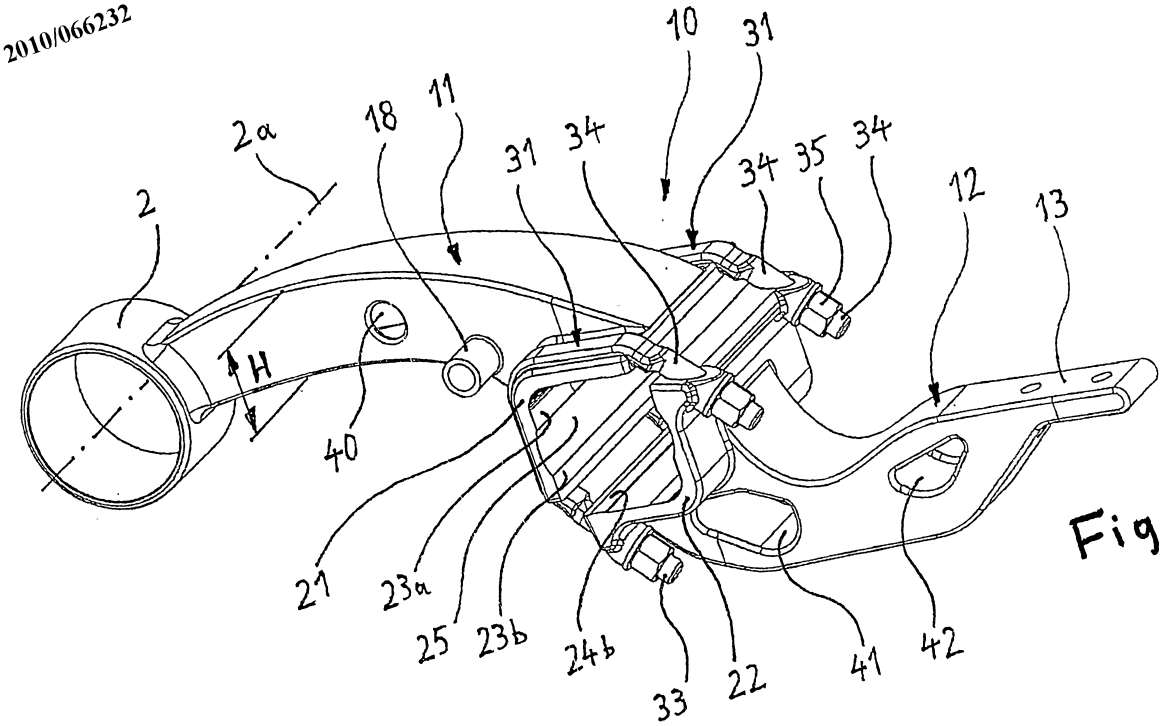


Fig. 3

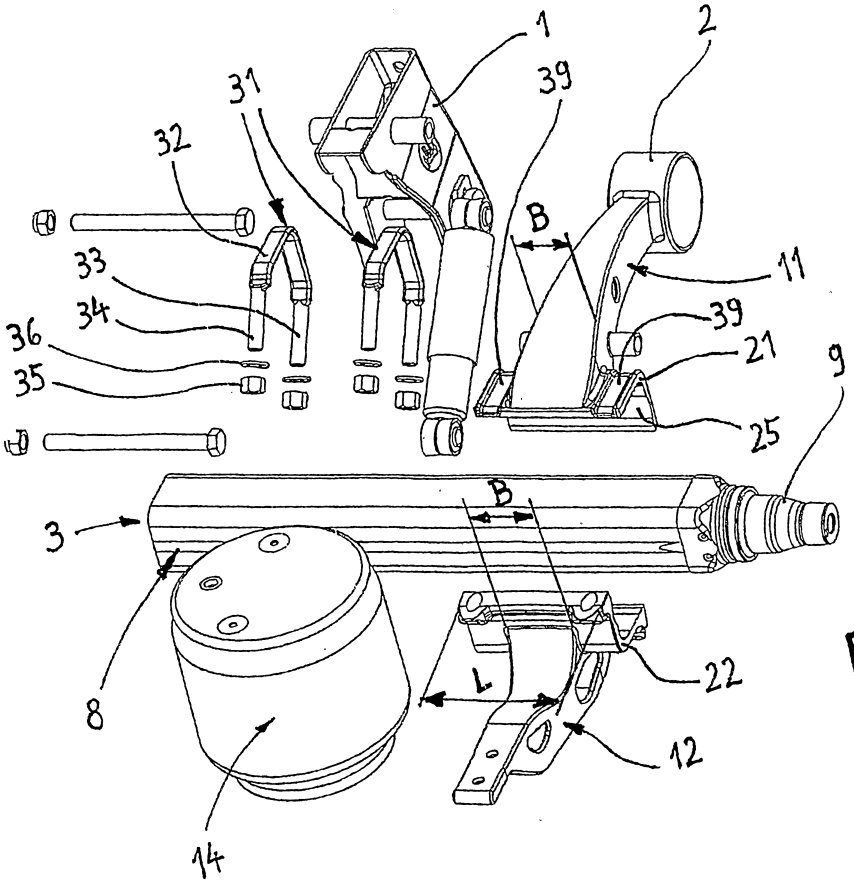
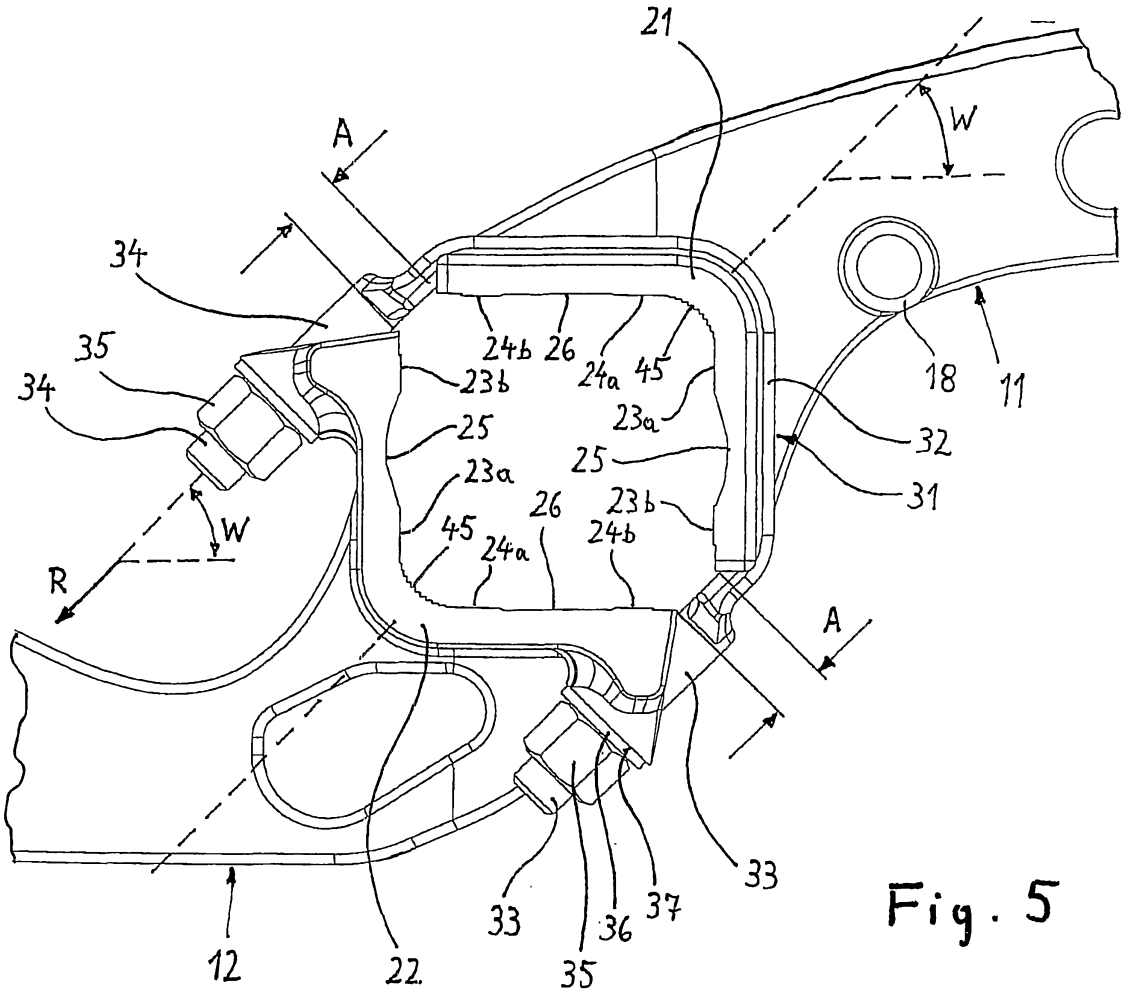


Fig. 4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W
34
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24b
26
24a
45
23b
25
23a
25
23a
26
23b
45
24a
24b
W
R
A
18
11
32
31
12
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35
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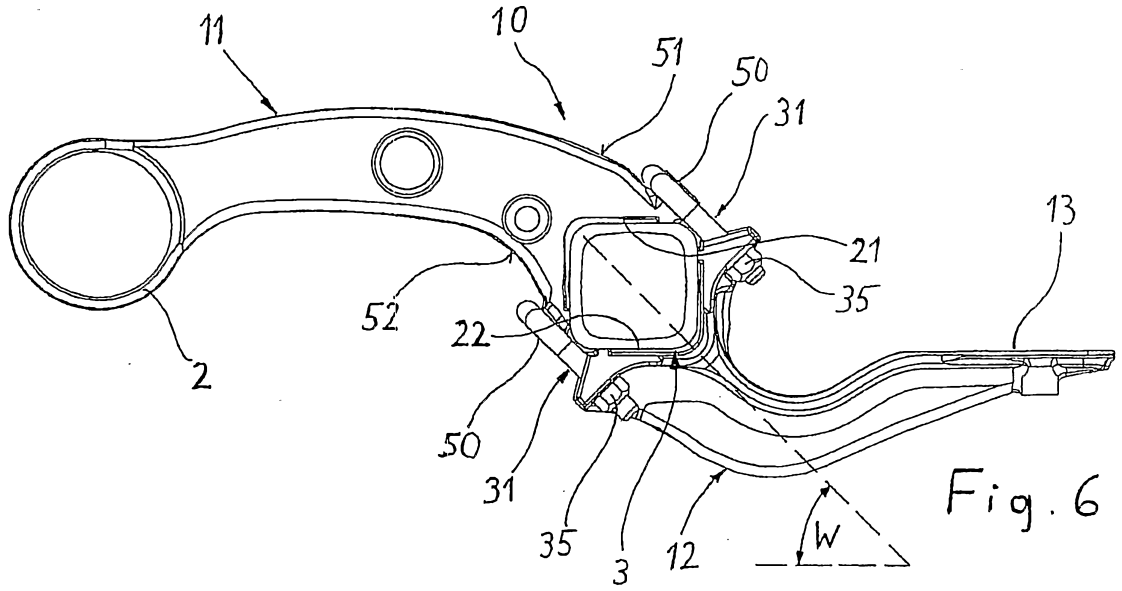
36
37

Fig. 5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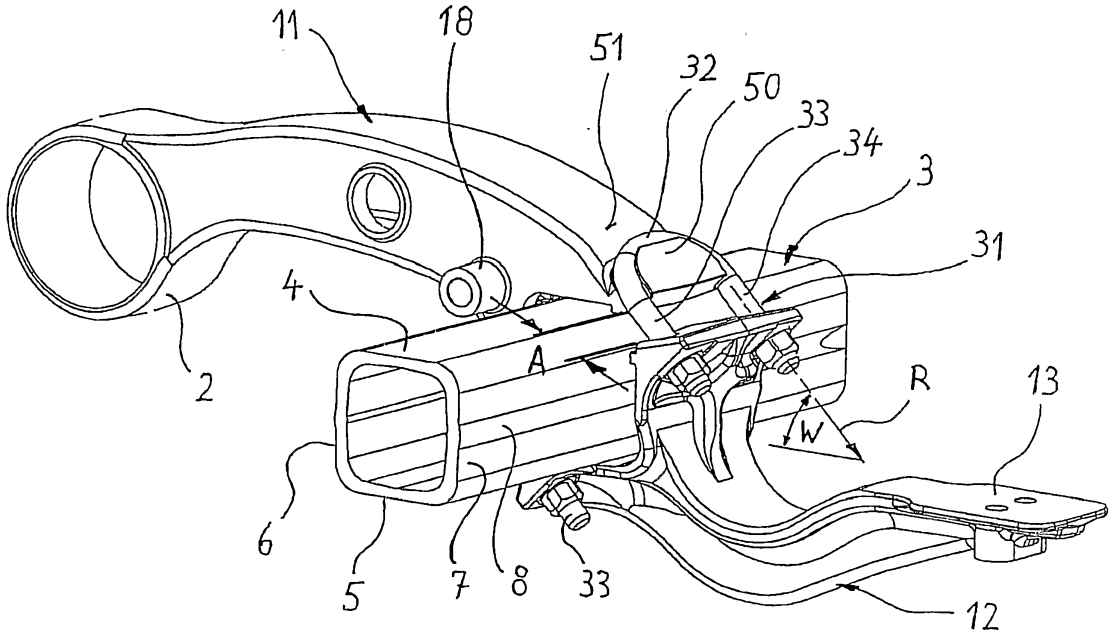
3
12
W

Fig. 6


11
18
51
32
50
33
34
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31
4
A
R
13
W
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6
5
7
8
33
12

Fig. 7

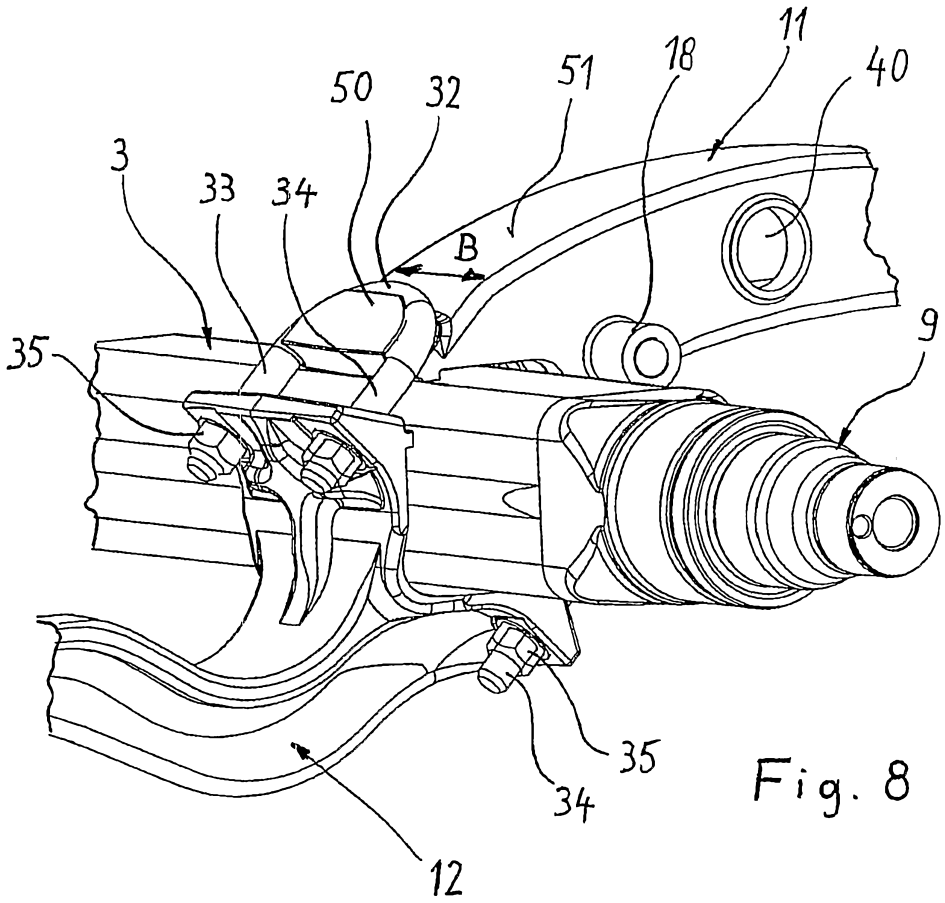

Fig. 8