

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 762 965 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
09.09.1998 Bulletin 1998/37

(51) Int. Cl.⁶: **B61D 3/12**, B61F 3/12,
B61D 3/18

(21) Application number: **95920315.9**

(86) International application number:
PCT/PL95/00010

(22) Date of filing: **08.06.1995**

(87) International publication number:
WO 95/34453 (21.12.1995 Gazette 1995/54)

(54) **SET FOR BIMODAL TRANSPORT**

GARNITUR FÜR DEN SCHIENE/STRASSE TRANSPORT

ENSEMBLE DE TRANSPORT BIMODAL

(84) Designated Contracting States:
AT BE CH DE DK ES FR IT LI NL SE

(30) Priority: **10.06.1994 PL 30380494**
10.06.1994 PL 30380594
10.06.1994 PL 30380694

(43) Date of publication of application:
19.03.1997 Bulletin 1997/12

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EP 0 762 965 B1

Description

The invention concerns a bimodal transport set for transferring loads on semi-trailers along railway lines.

The road-railway transport set presented in the German laying open invention description No. 3344513 comprises a rail bogie having two separate suspension and coupling systems by means of which two adjacent semi-trailers are supported and coupled. Every semi-trailer is supported on the bogie by means of independent suspension and coupling elements, causing bogie axles to be loaded unevenly in case the semi-trailers are of different weight or are loaded in a different way. It influences unfavourably on reliability of bogie running and by the same restricts speed of the railway set.

The set presented in the Polish patent specification No. 163407 (DE 3939384A1) comprises semi-trailers, each of them with one locking pin at the front end and one at the rear end and it is supported on a coupling member connected with the bogie by a ball-and-socket joint.

Use of a very wide coupling member necessary for ensuring of semi-trailer levelling or use of semi-trailers with very high rigidity of the frame are disadvantages of this solution.

The set for bimodal transport consists of at least two semi-trailers each of them having at the rear part of its frame a road running set of adjusted wheel position level and at the front part a king pin and bogie coupling pins at both sides, as well as of two end bogies equipped with one-sided coupling seats and at least one intermediate bogie equipped with two-sided coupling seats.

The essence of the invention is that the semi-trailer frame consists of at least two longitudinal members connected crosswise with an outside cross member at each end and with an inside cross member at some distance from the latter. Two coupling pins are symmetrically spaced on the underneath of each outside cross member near its ends. The inside cross member includes a centrally placed seat, which in preferred embodiment is in the form of a port situated along the longitudinal axis of the frame. Each outside cross member of the frame is offsetted upwards above the inside cross member seat in its central part. The frame is provided with two symmetrically spaced homing hooks at both sides near ends of the frame. It is, furthermore, open from underneath at each end between the outside cross member and the seat, while inside from above and at sides it is closed with a homing guard growing narrower at sides from the outside cross member and from the longitudinal member ends to the seat.

The intermediate rail bogie includes a lower adapter mounted in the bogie by a ball-and-socket joint. The lower adapter includes a carrying cross beam on which there are symmetrically spaced two coupling seats and a supporting bar centrally situated along the longitudinal axis of the bogie. Over the lower adapter

there is situated an upper adapter connected with the latter by a ball-and-socket joint. The upper adapter includes a carrying cross beam on which there are symmetrically spaced two coupling seats and a supporting bar centrally situated along the longitudinal axis of the bogie. The lower and upper adapters are turned with their coupling seats and supporting bars in the directions opposite to each other. In the preferred solution the coupling seats of both adapters are situated on the same level. Each adapter includes a central support situated in the vertical longitudinal plane under a carrying beam, supported on spring slides mounted on the rail bogie. The supporting bars include homing mandrels near their ends placed at the same level. The carrying beams, however, are provided near their ends with horizontal extension arms equipped with slide plates mating with side spring slides of the running part of the rail bogie. The extension arms of one carrying beam are directed towards the other carrying beam. The slide plates are shaped as sectors of a ring having its centre at the vertical axis of the adapter ball-and-socket joints. The side spring slides are spaced symmetrically on the running part of the rail bogie in the vertical plane going through the vertical axis of the ball-and-socket joints.

The end rail bogie includes a ball-and-socket joint connected with a carrying cross beam including centrally situated supporting bar and two symmetrically spaced coupling seats, which together with supporting bar are turned in the direction opposite to the buffer beam. The buffer beam is connected with the carrying beam by a space frame. The carrying beam in the preferred embodiment near its ends includes horizontal extension arms, each provided with a slide plate mating with a side spring slide of the running part of the rail bogie. The slide plates are shaped as a sector of a ring having its centre at the vertical axis of the ball-and-socket joint. The side spring slides are spaced symmetrically on the running part of the rail bogie in the vertical cross plane going through the vertical axis of the ball-and-socket joint. The supporting bar have a homing mandrel coming into its tapered ending. Sides of the space frame are provided with fixed to them spring roll supports supported on a base plate of the rail bogie.

Use of the set according to the invention gives the following advantages:

- alternative use of semi-trailers both in the road transport and on the railways;
- possible use of semi-trailers of different turning rigidity;
- decrease of transport costs, especially for long-distance transport;
- elimination of non-ecological automobile transport;
- increased transport safety and increased running speed because of uniformity of bogie load;
- symmetrical system of connecting elements of semi-trailers makes easy to combine the set;
- simplicity of construction.

The set in exemplary embodiment is shown on the drawing, where:

Fig. 1 is a side view of the semi-trailer with a load carrier in the form of a tank;
 Fig. 2 is a vertical longitudinal section of one end of the frame;
 Fig. 3 is a horizontal longitudinal section of one end of the frame;
 Fig. 4 is a front view of the frame;
 Fig. 5 is a side view of the coupling device of the intermediate rail bogie;
 Fig. 6 is a half front view of the above;
 Fig. 7 is a plan view of the coupling device;
 Fig. 8 is a side view of the coupling device of the end rail bogie;
 Fig. 9 is a plan view of the coupling device;
 Fig. 10 is a view from the supporting bar side;
 Fig. 11 is a side view of a set prepared for the railway transport.

The set consists of some number of semitrailers 100, reduced by one above number of intermediate rail bogies 200 and two end bogies 300.

The semi-trailer 100 includes a load carrier in the form of a tank 101 fixed to a frame 102. The frame 102 includes a king pin 103 in its front part underneath while in the rear part there is a road running set 104 of adjusted wheel position level. The frame 102 consists of two longitudinal members 105 connected crosswise with an outside cross member 106 at each end and with an inside cross member 107 at some distance from the latter. Each outside cross member 106 near its ends underneath includes two coupling pins 108 spaced symmetrically on its supporting surfaces 109. Each inside cross member 107 comprise a horizontal through seat 110 situated centrally along the longitudinal axis of the frame 102, while each outside cross member 106 of the frame 102 is offsetted upwards in its central part above the seat 110 of the inside cross member 107. On every end of the frame 102 at the connections between the longitudinal members 105 and outside cross members 106 there are two homing hooks 111 spaced symmetrically underneath at a distance such as the distance between coupling pins 108. The frame 102 is, furthermore, open from underneath between the outside cross member 106 and the seat 110, while inside from above and at sides it is closed with a homing guard 112 growing narrower at sides from the outside cross member 106 and from ends of the longitudinal members 105 to the seat 110.

The intermediate rail bogie 200 includes a coupling apparatus 201 consisting of a lower adapter 202 connected with a running part 203 of the bogie 200 by a ball-and socket joint 204. The lower adapter 202 includes a carrying cross beam 205, on which two coupling seats 206 are symmetrically spaced. The carrying beam 205 is provided with supporting bar 207 centrally

situated along the longitudinal axis of the bogie 200, having a homing mandrel 208 near its end coming into a tapered ending of the supporting bar 207. Vertically above the ball-and-socket joint 204 the lower adapter 202 is connected with an upper adapter 210 by a second ball-and-socket joint 209, the upper adapter 210 including a carrying cross beam 211 with symmetrically spaced two coupling sockets 212 and a supporting bar 213 situated along the longitudinal axis of the bogie 200, having a homing mandrel 214 near its end, coming into a tapered ending of the supporting bar 213. The adapters 202 and 210 with their coupling sockets 206 and 212 and supporting bars 207 and 213 are turned in the directions opposite to each other. The carrying beams 205 and 211 are provided near their ends with horizontal extension arms 215 and 216 equipped with slide plates 217 and 218 mating with side spring slides 219 and 220 mounted on the running part 203 of the bogie 200, at the same time the extension arms 215 or 216 of one carrying beam 205 or 211 are directed towards the other carrying beam 211 or 205. The slide plates 217 and 218 are shaped as sectors of a ring having its centre at the vertical axis of the ball-and-socket joints 204 and 209. The side spring slides 219 and 220 are spaced symmetrically on the running part 203 in the vertical cross plane going through the axis of the ball-and-socket joints 204 and 209; the side spring slides 219 of the upper adapter 210 are placed nearer the ball-and-socket joints 204 and 209, while the side spring slides 220 of the lower adapter 202 are placed further from the joints so that their spacing corresponds to spacing of the extension arms 215 and 216. The coupling seats 206 and 212 of the adapters 202 and 210 are situated at the same level. The supporting arms 207 and 213 include the homing mandrels 208 and 214 situated at the same level. Each adapter 202 and 210 includes its central support 221 and 222 being under its carrying beam 205 and 211 in horizontal longitudinal plane and each central support 221 and 222 is supported on its central spring slide 223 and 224, mounted on the running part 203 of the bogie 200 through bracket 225 and 226 at its longitudinal axis. The adapters, lower 202 and upper 210 are of box construction welded from steel plates.

The end rail bogie 300 includes a coupling apparatus 301 connected with a running part 302 by a ball-and-socket joint 303. The apparatus consists of a carrying cross beam 304 connected by a space frame 305 with a buffer beam 306 provided with combined draw and buffing gear 307. On the carrying beam 304 there are two coupling seats 308 spaced symmetrically. Moreover the carrying beam 304 includes centrally situated supporting bar 309 having a homing mandrel 310 near its end coming into its tapered ending. The coupling seats 308 together with the supporting bar 309 are turned in the direction opposite to the buffer beam 306. The carrying beam 304 near its ends includes horizontal extension arms 311 directed towards the buffer

beam 306, each equipped with a slide plate 312 mating with a side spring slide 313 of the running part 302 of the bogie 300. The slide plates 312 are shaped as sectors of a ring having its centre at the vertical axis of the ball-and-socket joint 303. The side spring slides 313 are spaced symmetrically on the running part 302 of the bogie 300 in the vertical cross plane going through the vertical axis of the ball-and-socket joint 303. Each side of the space frame 305 is provided with fixed to it a spring roll support 314 supported on the base plate 315 of the running part 302 of the bogie 300. The beam 304 is of box construction welded from steel plates.

Connection of the set elements consists in backing the semi-trailer 100 with a tractor, not shown on the drawing, towards the end rail bogie 300. The supporting bar 309 with its homing mandrel 310 is turned in the direction of the seat 110, orientating the coupling apparatus 301 horizontally and vertically. When coming close the mandrel 310 is located in the seat 110 and the coupling pins 108 comes into the suitable coupling seats 308, where they are locked with a locking mechanism not shown on the drawing. The homing hooks 111 serve to lead the coupling pins 108 exactly vertically in the last stage of coupling after touching the base surface of the coupling apparatus 301. Then the tractor is separated in the known way and the intermediate bogie 200 is rolled under the front of the semi-trailer so that the supporting bar 207 or 213 is introduced into the seat 110 of the semi-trailer 100 front till the moment the coupling pins 108 come into suitable coupling seats 206 or 212 and are locked. After coupling the semi-trailer with both bogies 200 and 300 the running wheels 104 are lifted up and locked at proper level above the track. The side spring slides 313 or 219 and 220 restrict lateral tilting of the semi-trailer 100 in relation to the rail bogie 200 and 300. The spring roll supports 314 maintain the end coupling apparatus 301 in a position horizontal in relation to the rail bogie 300. The slide plates 217 and 218 or 312 together with the side slides 219 and 220 or 213 enables rotation of the adapters 202 and 210 or the coupling apparatus 301 round the vertical axis going through the ball-and-socket joint 204 and 209 or 303. Repetition of the coupling operations makes possible to complete a train set.

Claims

1. A set for bimodal transport consisting of at least two semi-trailers each of them having at the rear part of its frame a road running set of adjusted wheel position level and at the front part a king pin and bogie coupling pins at both sides, as well as of two end bogies equipped with one-sided coupling seats and at least one intermediate bogie equipped with two-sided coupling seats, **characterized in**, that the frame (102) of the semi-trailer (100) consists of at least two longitudinal members (105) connected crosswise with an out-

side cross member (106) at each end and with an inside cross member (107) at some distance from the latter, each outside cross member (106) near its ends underneath includes two coupling pins (108) spaced symmetrically, and the inside cross member (107) includes a centrally situated seat (110), whereas the intermediate rail bogie (200) includes a lower adapter (202) mounted with a ball-and-socket joint (204), having on its carrying cross beam (205) two symmetrically spaced coupling seats (206) and a supporting bar (207) centrally situated along the longitudinal axis of the bogie (200) and over the lower adapter (202) there is situated an upper adapter (210) connected with the latter by a ball-and-socket joint (209), having on its carrying cross beam (211) two symmetrically spaced coupling seats (212) and a supporting bar (213) centrally spaced along the longitudinal axis of the bogie (200), and the adapters (202) and (210) are turned with their coupling seats (202) and (210) and supporting bars (207) and (213) in the directions opposite to each other, moreover the end rail bogie (300) includes a ball-and-socket joint (303) connected with a carrying cross beam (304), including centrally situated supporting bar (309) and two symmetrically spaced coupling seats (308), which together with the supporting bar (309) are turned in the direction opposite to the buffer beam (306) connected with the carrying beam (304) by a space frame (305).

2. The set for bimodal transport as claimed in Claim 1, **characterized in** that the seat (110) is a horizontal port in the inside cross member (107) situated along the longitudinal axis of the frame (102)
3. The set for bimodal transport as claimed in Claim 1, **characterized in** that each outside cross member (106) of the frame (102) is offsetted upwards above the seat (110) of the inside cross member (107) in its central part.
4. The set for bimodal transport as claimed in Claim 1, **characterized in** that the frame (102) is provided with two symmetrically spaced homing hooks (111) at both sides near ends of the frame (102).
5. The set for bimodal transport as claimed in Claim 1, **characterized in** that the frame (102) is open from underneath at each end between the outside cross member (106) and the seat (110), while inside from above and at sides it is closed with a homing guard (112) growing narrower at sides from the outside cross member (106) and from the ends of longitudinal members (105) to the seat (110).
6. The set for bimodal transport as claimed in Claim 1, **characterized in** that the coupling seats (206) and

(212) of the adapters (202) and (210) are situated on the same level and each adapter (202) and (210) includes a central support (221) and (222) situated in the vertical longitudinal plane under the carrying beam (205) and (211), supported on a spring slide (223) and (224) mounted on the running part (203) of the bogie (200).

7. The set for bimodal transport as claimed in Claim 1, **characterized in** that the supporting bars (207) and (213) include homing mandrels (208) and (214) near their ends, placed at the same level.
8. The set for bimodal transport as claimed in Claim 1, **characterized in** that the carrying beams (205) and (211) are provided near their ends with horizontal extension arms (215) and (216) equipped with slide plates (217) and (218) mating with side spring slides (219) and (220) of the running part (203) of the rail bogie (200), while the extension arms (215) and (216) of one carrying beam (205) and (211) are directed towards the other carrying beam, and the slide plates (217) and (218) are shaped as a sector of a ring having its centre at the vertical axis of the ball-and-socket joints (204) and (209) of the adapters (202) and (210), and the side spring slides (219) and (220) are spaced symmetrically on the running part (203) of the rail bogie (200) in the vertical plain going through the vertical axis of the ball-and-socket joints (204) and (209).
9. The set for bimodal transport as claimed in Claim 1, **characterized in** that the carrying beam (304) near its ends includes horizontal extension arms (311), each provided with a slide plate (312) mating with a side spring slide (313) of the running part (302) of the rail bogie (300), while the slide plates (312) are shaped as a sector of a ring having its centre at the vertical axis of the ball-and-socket joint (303), and the side spring slides (313) are spaced symmetrically on the running part (302) of the rail bogie (300) in the vertical cross plane going through the vertical axis of the ball-and-socket joint (303).
10. The set for bimodal transport as claimed in Claim 1, **characterized in** that the supporting bar (309), near its end, have a homing mandrel (310) coming into its tapered ending.
11. The set for bimodal transport as claimed in Claim 1, **characterized in** that the sides of the space frame (305) are provided with fixed to them spring roll supports (314) supported on a base plate (315) of the running part (302) of the rail bogie (300).

Patentansprüche

1. Vorrichtung für den bimodalen Transport, mit

zumindest zwei Sattelanhängern, von denen jeder am hinteren Teil seines Rahmens ein Straßenfahrzeuggestell mit eingestellter Radpositionshöhe und am vorderen Teil einen Gelenkbolzen und an beiden Seiten Fahrgestellkopplungsbolzen hat, sowie mit zwei Endfahrzeuggestellen, die an einer Seite mit Kopplungssitzen versehen sind, und zumindest einem Zwischenfahrzeuggestell, das an zwei Seiten mit Kopplungssitzen versehen ist,

dadurch gekennzeichnet, daß der Rahmen (102) des Sattelanhängers (100) zumindest zwei Längsbauerteile (105) hat, die an jedem Ende in Querrichtung mittels eines außenliegenden Querbauteils (106) und, von diesem letzteren beabstandet, mittels eines innenliegenden Querbauteils (107) verbunden sind, wobei jedes außenliegende Querbauteil (106) unten in der Nähe seiner Enden zwei symmetrisch beabstandete Kopplungsbolzen (108) und das innenliegende Querbauteil (107) einen mittig angeordneten Sitz (110) hat, wohingegen das Zwischenschienenfahrzeuggestell (200) einen unteren Adapter (202) hat, der mit einer Kugelgelenkverbindung (204) verbunden ist, an seinem tragenden Querbalken (205) zwei symmetrisch beabstandete Kopplungssitze (206) und einen Stützbalken (207) hat, der mittig entlang der Längsachse des Fahrzeuggestells (200) angeordnet ist, und wobei über dem unteren Adapter (202) ein oberer Adapter (210) vorgesehen ist, der mit dem letzteren mittels einer Kugelgelenkverbindung (209) verbunden ist, an seinem tragenden Querbalken (211) zwei symmetrisch beabstandete Kopplungssitze (212) und einen Stützbalken (213) hat, der mittig entlang der Längsachse des Fahrzeuggestells (200) angeordnet ist, und wobei die Adapter (202, 210) mit ihren Kopplungssitzen (202, 210) und Stützbalken (207, 213) in zueinander entgegengesetzte Richtungen drehbar sind, und daß das Endschienefahrzeuggestell (300) eine Kugelgelenkverbindung (303) hat, die mit einem tragenden Querbalken (304) verbunden ist, der einen mittig angeordneten Stützbalken (309) und zwei symmetrisch beabstandete Kopplungssitze (308) hat, die zusammen mit dem Stützbalken (309) in entgegengesetzte Richtungen zum Pufferträger (306) drehbar sind, der über einen Abstandsrahmen (305) mit dem tragenden Balken (304) gekoppelt ist.

2. Vorrichtung zum bimodalen Transport nach Anspruch 1, **dadurch gekennzeichnet**, daß der Sitz (110) ein horizontaler Kanal in dem innenliegenden Querbauteil (107) ist, der entlang der Längsachse des Rahmens (102) angeordnet ist.

3. Anordnung zum bimodalen Transport nach Anspruch 1, **dadurch gekennzeichnet**, daß jedes außenliegende Querbauteil (106) des Rahmens (102) nach oben hin bis über den Sitz (110) des

innenliegenden Querbauteils (107) in dessen Mittelteil verlagert ist.

4. Vorrichtung zum bimodalen Transport nach Anspruch 1, **dadurch gekennzeichnet**, daß der Rahmen (102) an beiden Seiten nahe der Enden des Rahmens (102) mit zwei symmetrisch beabstandeten Führungshaken (111) versehen ist. 5
5. Vorrichtung zum bimodalen Transport nach Anspruch 1, **dadurch gekennzeichnet**, daß der Rahmen (102) an jedem Ende zwischen dem außenliegenden Querbauteil (106) und dem Sitz (110) von unten her offen ist, während er innen von oben und an den Seiten durch eine Führungseinrichtung (112) geschlossen ist, die an den Seiten von dem außenliegenden Querbauteil (106) und von den Enden der Längsbauteile (105) zum Sitz (110) hin schmaler wird. 10 15 20
6. Vorrichtung zum bimodalen Transport nach Anspruch 1, **dadurch gekennzeichnet**, daß die Kopplungssitze (206, 212) der Adapter (202, 210) in der gleichen Höhe angeordnet sind und jeder Adapter (202, 210) eine mittlere, in der vertikalen Längsebene unter dem tragenden Balken (205, 211) angeordnete Halterung (221, 222) hat, die auf einem gefederten Gleitelement (223, 224) abstützend gehalten ist, das am fahrenden Teil (203) des Fahrgestells (200) montiert ist. 25 30
7. Vorrichtung zum bimodalen Transport nach Anspruch 1, **dadurch gekennzeichnet**, daß die Stützbalken (207, 213) in der Nähe ihrer Enden Führungszapfen (208, 214) haben, die in der gleichen Höhe angeordnet sind. 35
8. Vorrichtung zum bimodalen Transport nach Anspruch 1, **dadurch gekennzeichnet**, daß die tragenden Balken (205, 211) in der Nähe ihrer Enden mit horizontal verlaufenden Auslegerarmen (215, 216) versehen sind, an denen Gleitplatten (217, 218) vorgesehen sind, die mit den seitlichen gefederten Gleitelementen (219, 220) des fahrenden Teils (203) des Schienenfahrgestells (200) zusammenpassen, wobei die Auslegerarme (215, 216) von dem einen tragenden Balken (205, 211) zu dem anderen tragenden Balken hin gerichtet sind und wobei die Gleitplatten (217, 218) wie ein Sektor von einem Ring geformt sind, dessen Mitte auf der vertikalen Achse der Kugelgelenkverbindungen (204, 209) der Adapter (202, 210) liegt, und wobei die seitlichen gefederten Gleitelemente (219, 220) an dem fahrenden Teil (203) des Schienenfahrgestells (200) in der vertikalen Ebene, die durch die vertikale Achse der Kugelgelenkverbindungen (204, 209) verläuft, symmetrisch beabstandet sind. 40 45 50 55

9. Vorrichtung zum bimodalen Transport nach Anspruch 1, **dadurch gekennzeichnet**, daß der tragende Balken (304) in der Nähe seiner Enden horizontal verlaufende Auslegerarme (311) hat, die jeweils mit einer Gleitplatte (312) versehen sind, die mit einem seitlichen gefederten Gleitelement (313) des fahrenden Teils (302) des Schienenfahrgestells (300) zusammenpassen, wobei die Gleitplatten (312) als ein Sektor von einem Ring geformt sind, dessen Mitte auf der vertikalen Achse der Kugelgelenkverbindung (303) liegt, und wobei die seitlichen gefederten Gleitelemente (313) an dem fahrenden Teil (302) des Schienenfahrgestells (300) in der vertikalen Querschnittsebene, die durch die vertikale Achse der Kugelgelenkverbindung (303) verläuft, symmetrisch beabstandet sind.
10. Vorrichtung zum bimodalen Transport nach Anspruch 1, **dadurch gekennzeichnet**, daß der Stützbalken (309) in der Nähe von seinem Ende einen Führungszapfen (310) hat, der an seinem Ende spitz zuläuft.
11. Vorrichtung zum bimodalen Transport nach Anspruch 1, **dadurch gekennzeichnet**, daß die Seiten des Abstandsrahmens (305) mit daran befestigten Federrollhalterungen (314) versehen sind, die an einer Basisplatte (315) des fahrenden Teils (302) des Schienenfahrgestells (300) gehalten sind.

Revendications

1. Ensemble pour un transport suivant deux modes, constitué par au moins deux semi-remorques, dont chacune comporte, au niveau de la partie arrière de son châssis, un ensemble pour se déplacer sur route, dans la position des roues est à un niveau réglé et, sur sa partie arrière, un pivot et des broches d'accouplement de boggies situées des deux côtés, ainsi que deux boggies d'extrémité équipés de sièges d'accouplement unilatéraux et au moins un boggie intermédiaire équipé de deux sièges d'accouplement bilatéraux, caractérisé en ce que le châssis (102) de la semi-remorque (100) est constitué d'au moins deux éléments longitudinaux (105) raccordés transversalement, au niveau de chaque extrémité, à un élément transversal extérieur (106) et à un élément transversal intérieur (107) situé à une certaine distance de l'élément transversal extérieur, que chaque élément transversal extérieur (106) comporte sur sa face intérieure, à proximité de ses extrémités, deux broches d'accouplement (108) espacées dans une disposition symétrique, et l'élément transversal intérieur (107) comprend un siège (110) en position centrée, tandis que le boggie de rail intermédiaire (200) comporte un adaptateur inférieur (202) monté

- avec une articulation sphérique (204) et comportant, sur sa traverse de support (205), deux sièges d'accouplement (206) espacés dans une disposition symétrique et une barre de support (207) située en position centrée sur l'axe longitudinal du boggie (200), tandis qu'au-dessus de l'adaptateur inférieur (202) est disposé un adaptateur supérieur (210) raccordé au précédent par une articulation sphérique (209) et comporte, sur sa traverse porteuse (211) deux sièges d'accouplement (212) espacés dans une disposition symétrique et une barre de support (213) espacée en position centrée sur l'axe longitudinal du boggie (200), et que les adaptateurs (202) et (210) sont orientés de telle sorte que leurs sièges d'accouplement (206) et (212) et leurs barres de support (207) et (213) sont tournés dans des directions réciproquement opposées, qu'en outre le boggie d'extrémité (300) comprend une articulation sphérique (303) raccordée à une traverse porteuse (304), comprenant une barre de support (309) située en position centrée et deux sièges d'accouplement (308) espacés dans une disposition symétrique, et qui sont orientés, conjointement avec la barre de support (309) dans la direction opposée à la traverse d'attelage (306) raccordée à la traverse porteuse (304) au moyen d'un cadre d'entretoisement (305).
2. Ensemble pour le transport suivant deux modes selon la revendication 1, caractérisé en ce que le siège (110) est un orifice horizontal aménagé dans l'élément transversal intérieur (107) et qui s'étend le long de l'axe longitudinal du châssis (102).
 3. Ensemble pour le transport suivant deux modes selon la revendication 1, caractérisé en ce que chaque élément transversal extérieur (106) du châssis (102) est décalé vers le haut au-dessus du siège (110) de l'élément transversal intérieur (107), dans sa partie centrale.
 4. Ensemble pour le transport suivant deux modes selon la revendication 1, caractérisé en ce que le châssis (102) est équipé de deux crochets de guidage (111) espacés dans une disposition symétrique et situés sur les deux côtés à proximité d'extrémités du châssis (102).
 5. Ensemble pour le transport suivant deux modes selon la revendication 1, caractérisé en ce que le châssis (102) est ouvert à sa partie inférieure au niveau de chaque extrémité entre l'élément transversal extérieur (106) et le siège (110), tandis qu'intérieurement à partir du dessus et sur les côtés il est fermé par un élément de protection d'attache (112), qui se rétrécit sur les côtés à partir de l'élément transversal extérieur (106) et à partir des extrémités d'éléments longitudinaux (105) en direction du siège (110).
 6. Ensemble pour le transport suivant deux modes selon la revendication 1, caractérisé en ce que les sièges d'accouplement (206) et (212) des adaptateurs (202) et (210) sont situés au même niveau et que chaque adaptateur (202) et (210) comprend un support central (221) et (222) situé dans le plan vertical longitudinal au-dessous de la traverse porteuse (205) et (211) et supporté par un coulisseau à ressort (223) et (224) monté sur la partie courante (203) du boggie (200).
 7. Ensemble pour le transport suivant deux modes selon la revendication 1, caractérisé en ce que les barres de support (207) et (213) comprennent des mandrins de guidage (208) et (214) à proximité de leurs extrémités et disposés au même niveau.
 8. Ensemble pour le transport suivant deux modes selon la revendication 1, caractérisé en ce que les traverses porteuses (205) et (211) comporte, à proximité de leurs extrémités, des bras d'extension horizontaux (215) et (216) équipés de plaques de glissement (217) et (218) engrenant avec des coulisseaux latéraux à ressort (219) et (220) de la partie courante (203) du boggie (200), tandis que les bras d'extension (215) et (216) d'une traverse porteuse (205) et (211) sont dirigés vers l'autre traverse porteuse, et les plaques de glissement (217) et (218) sont conformées à la manière d'un secteur d'anneau, dont le centre est situé sur l'axe vertical des articulations sphériques (204) et (209) des adaptateurs (209) et (210), et les coulisseaux latéraux à ressort (219) et (220) sont espacés dans une disposition symétrique sur la partie courante (203) du boggie (200) dans le plan vertical passant par l'axe vertical des articulations sphériques (204) et (209).
 9. Ensemble pour le transport suivant deux modes selon la revendication 1, caractérisé en ce que la traverse porteuse (304) comporte, à proximité de ses extrémités, des bras d'extension horizontaux (311), dont chacun est équipé d'une plaque de glissement (312) engrenant avec un coulisseau latéral à ressort (313) de la partie courante (302) du boggie (300), tandis que les plaques de glissement (312) sont agencées sous la forme d'un secteur d'un anneau dont le centre est situé sur l'axe vertical de l'articulation sphérique (303) et les coulisseaux latéraux à ressort (313) sont espacés dans une disposition symétrique sur la partie courante (302) du boggie (300), dans le plan vertical transversal passant par l'axe vertical de l'articulation sphérique (303).
 10. Ensemble pour le transport suivant deux modes

selon la revendication 1, caractérisé en ce que la barre de support (309) possède, à proximité de son extrémité, un mandrin de guidage (310) qui se termine par une extrémité de forme rétrécie.

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11. Ensemble pour le transport suivant deux modes selon la revendication 1, caractérisé en ce que les côtés du cadre formant entretoise (305) sont pourvus de supports (314) de rouleaux de ressort, qui sont fixés à ces côtés et sont supportés par une plaque de base (315) de la partie courante (302) du boggie (300).

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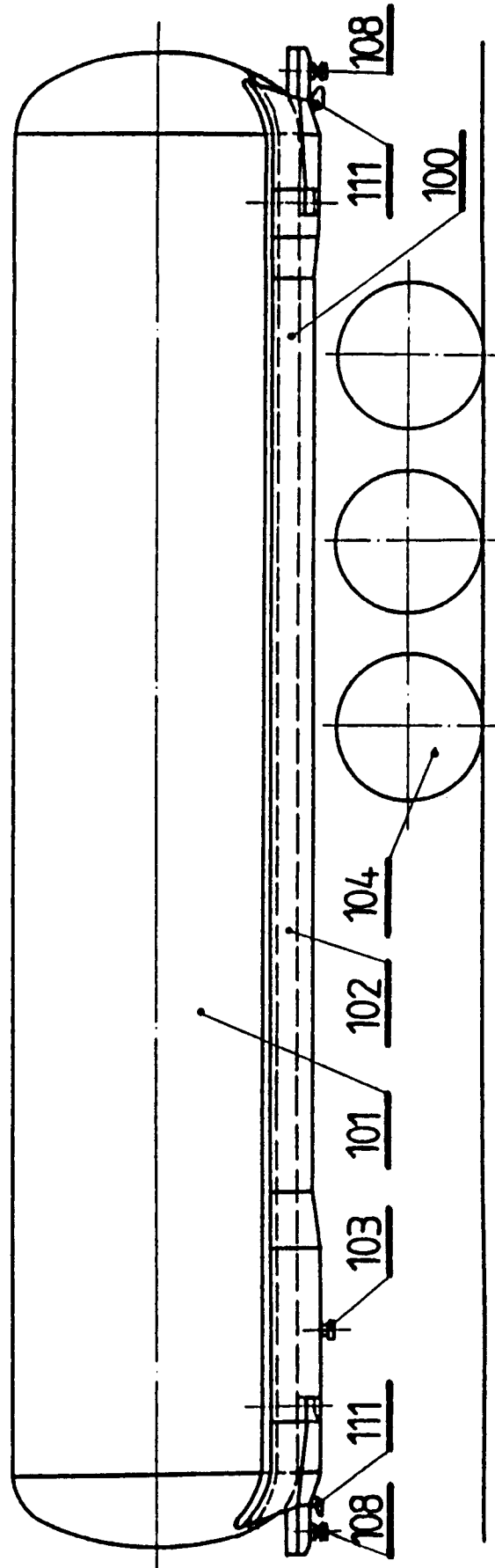


Fig. 1

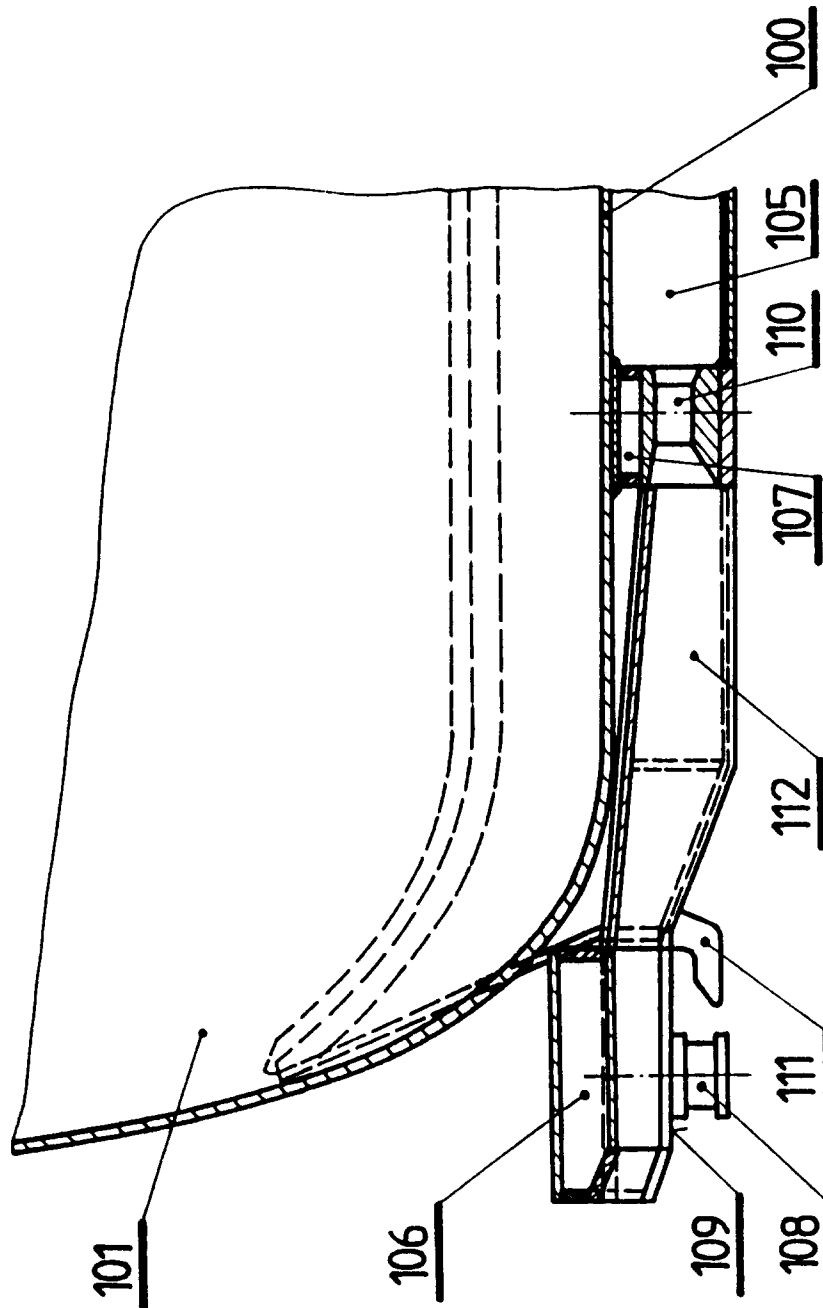


Fig. 2

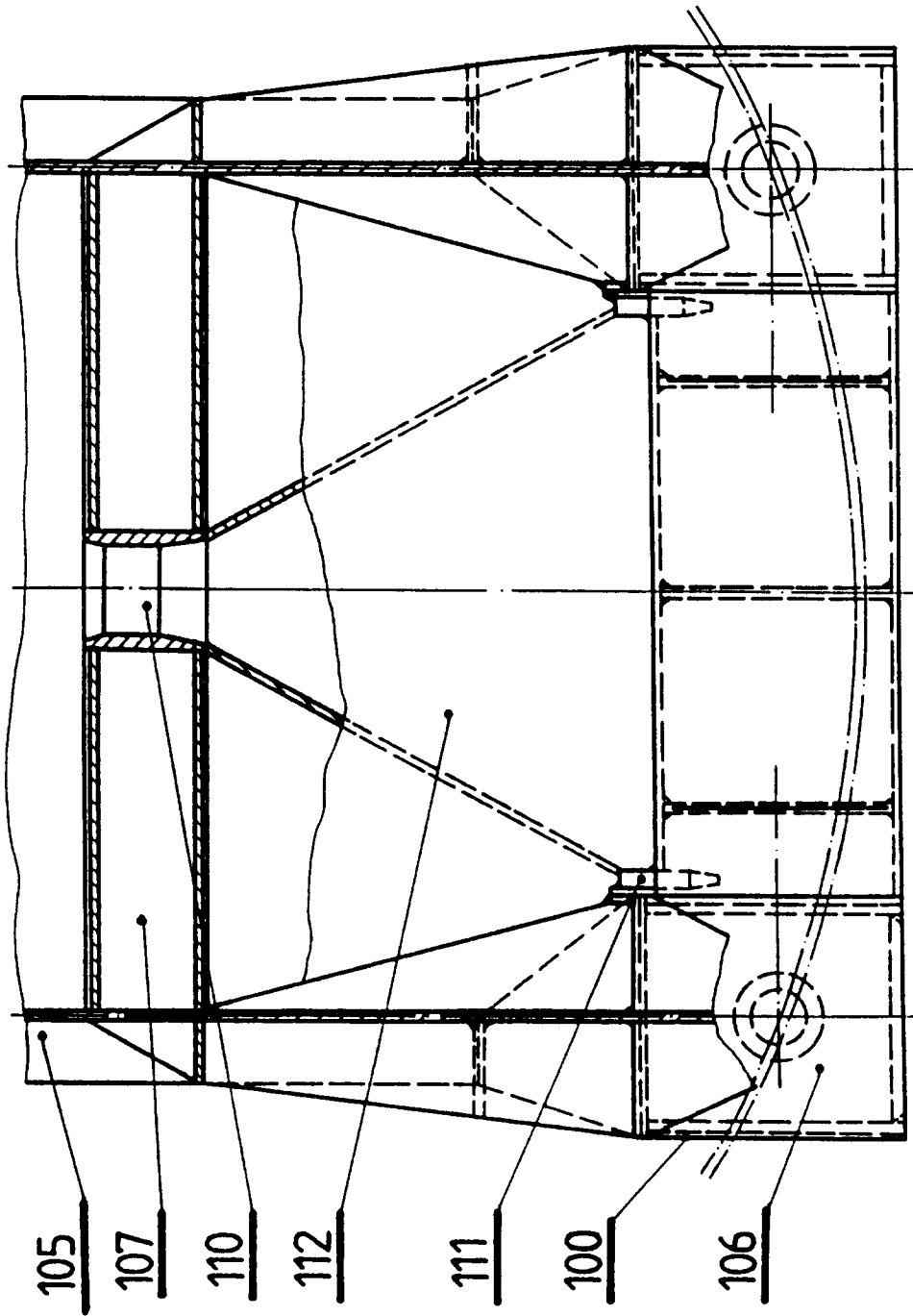


Fig. 3

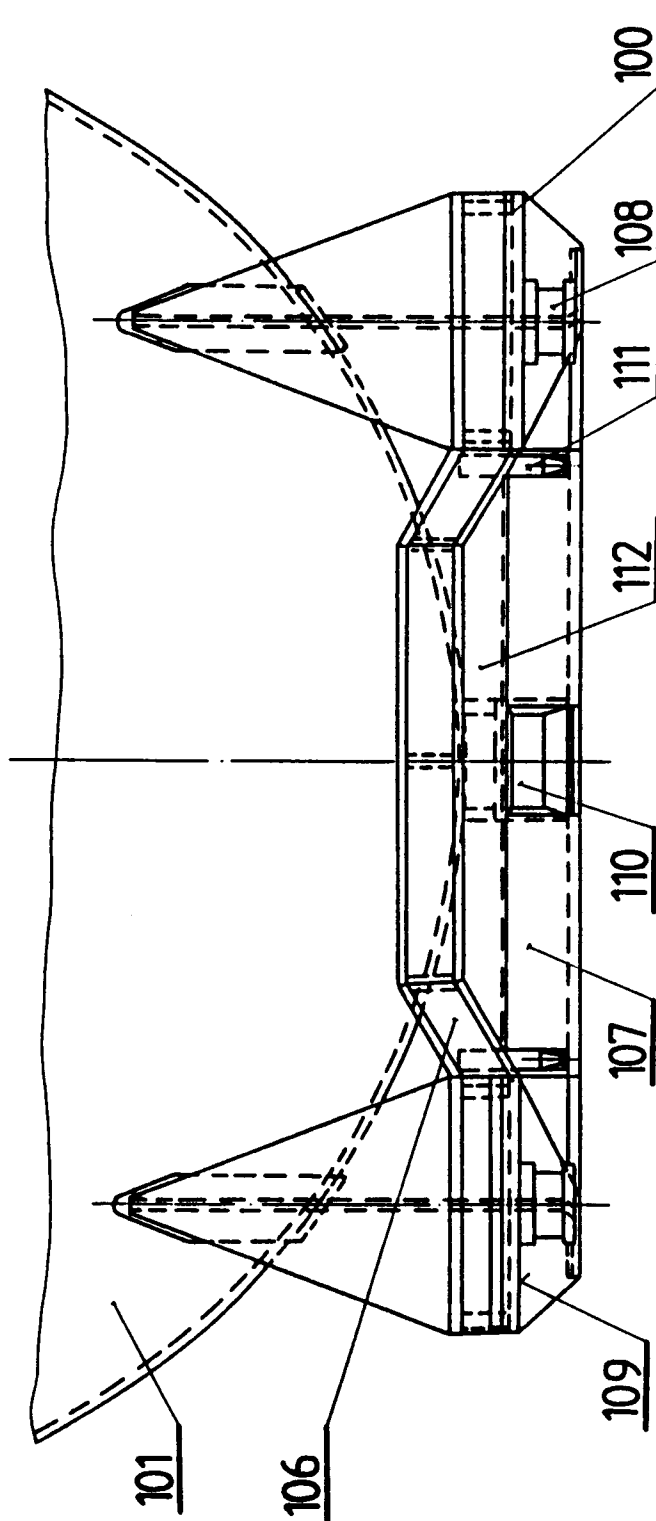


Fig. 4

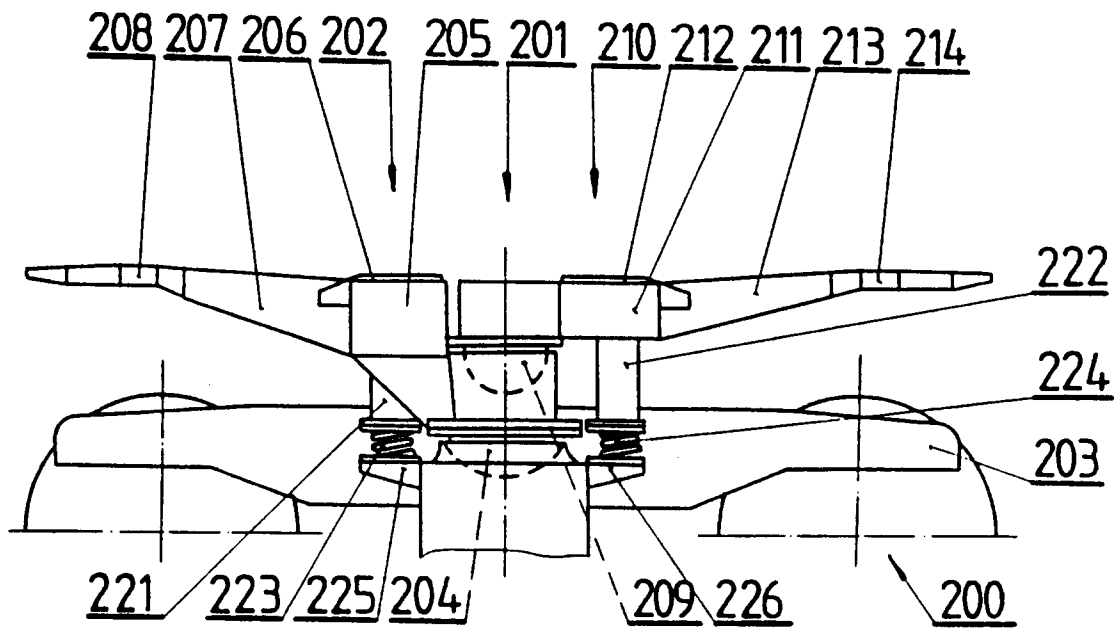


Fig. 5

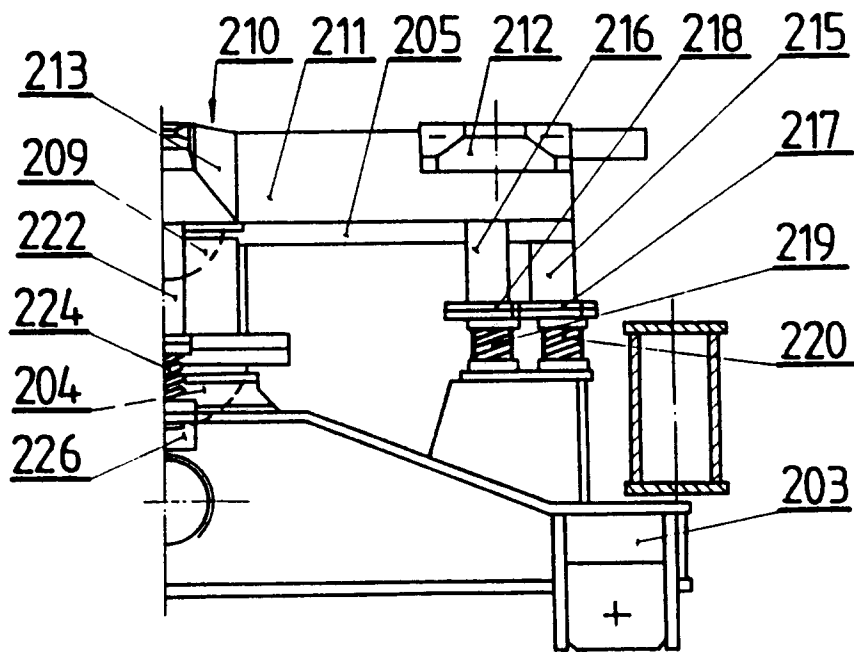


Fig. 6

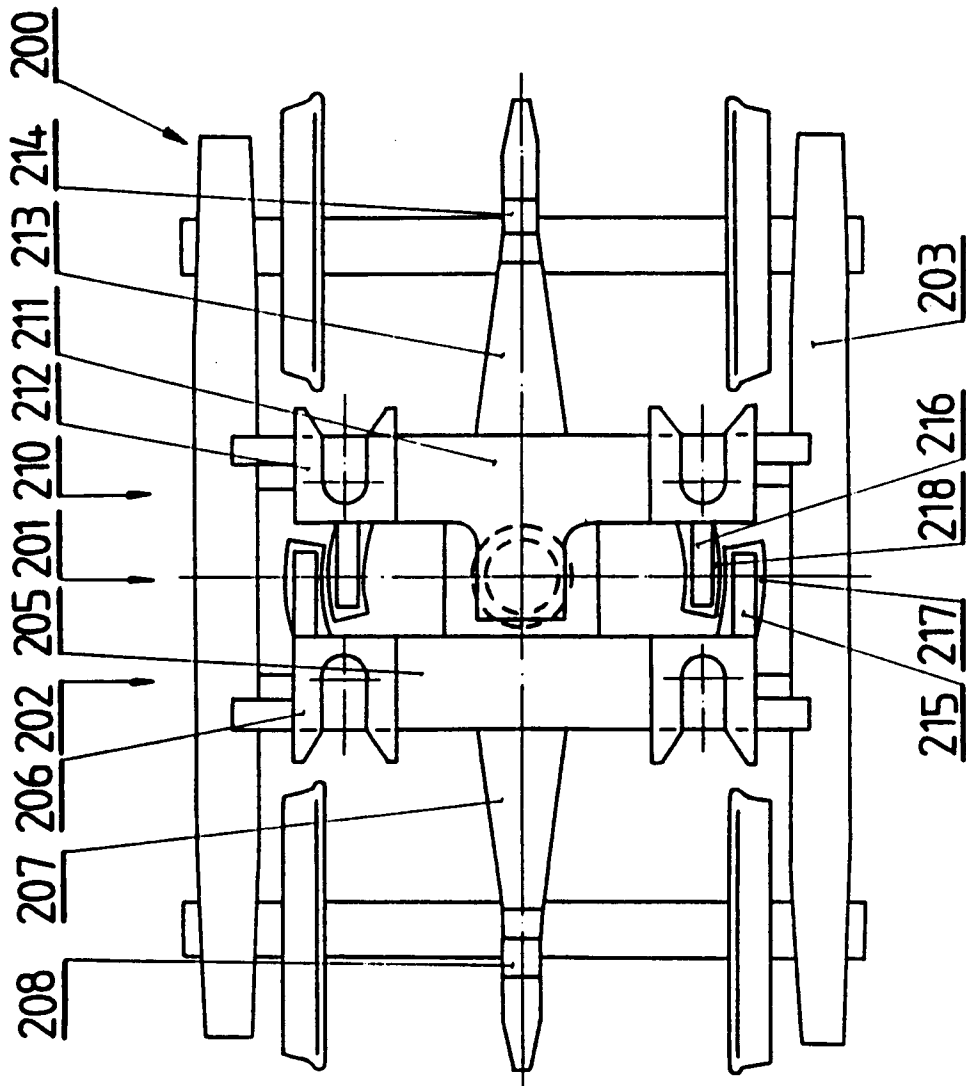


Fig. 7

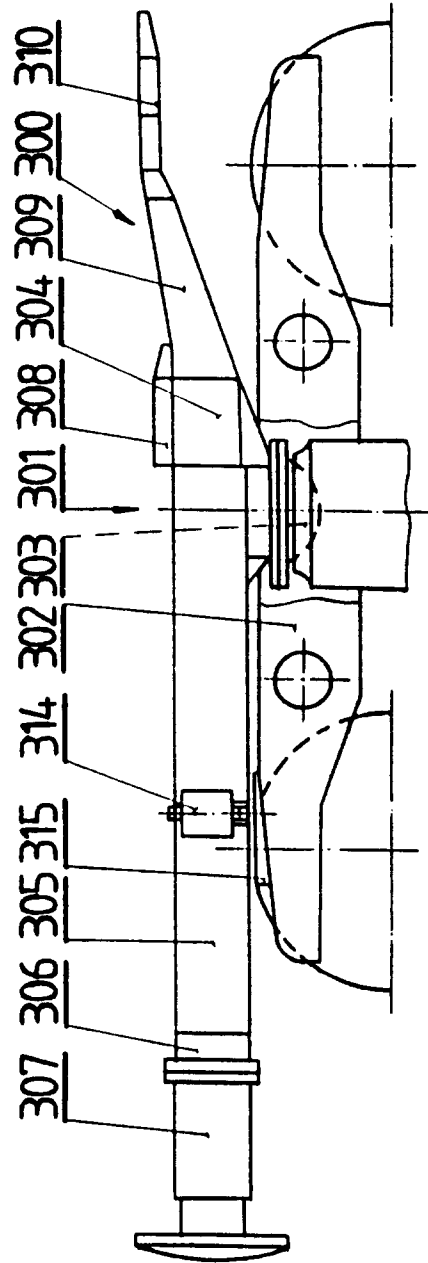


Fig. 8

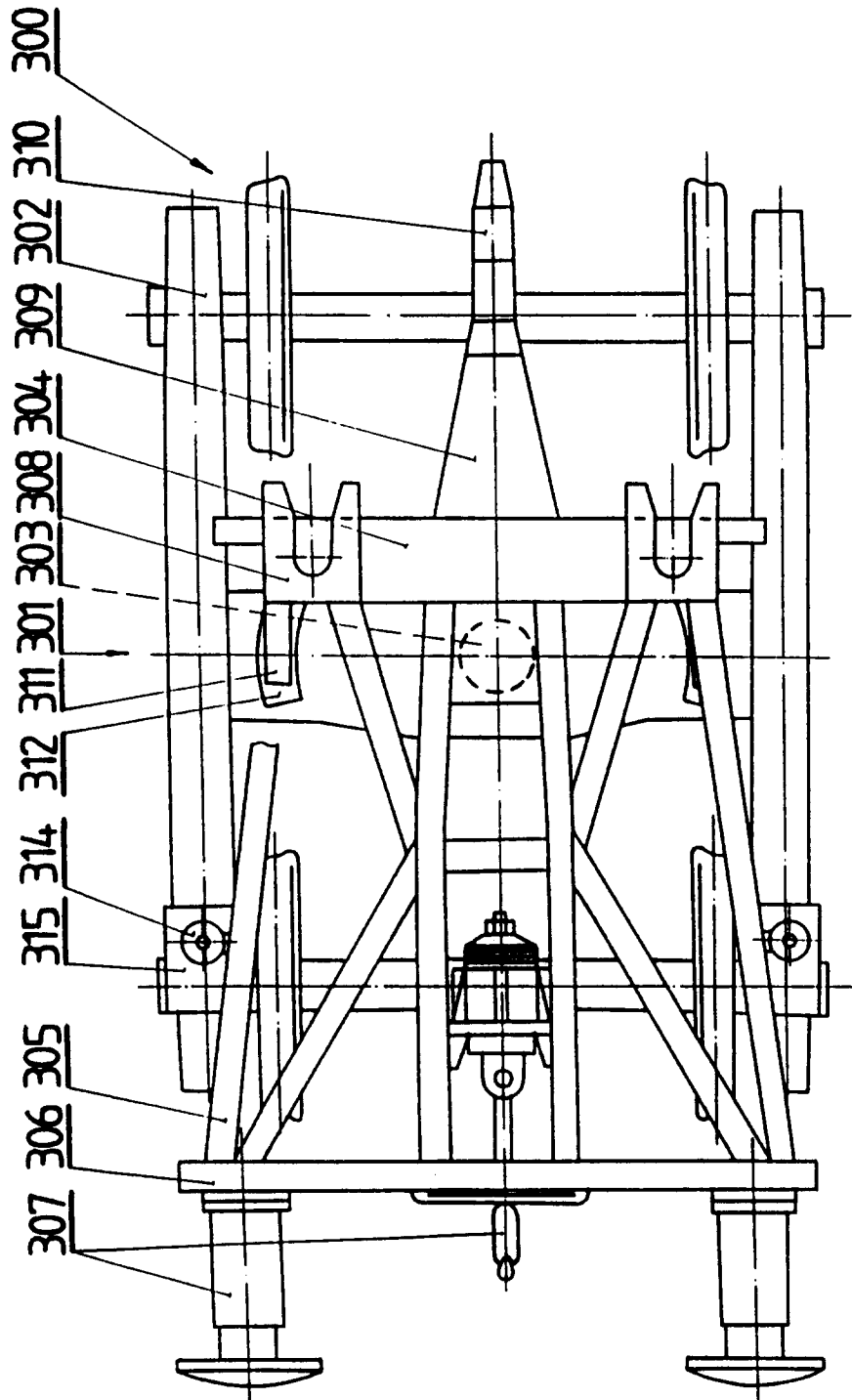


Fig. 9

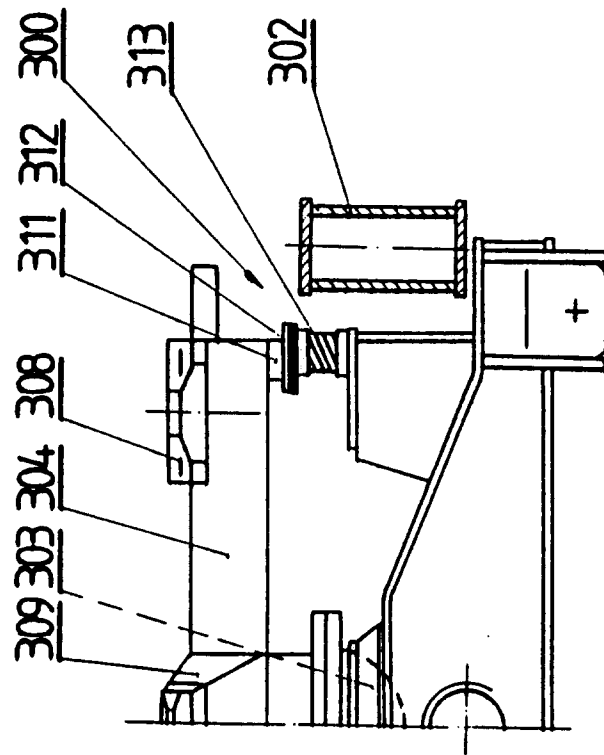


Fig.10

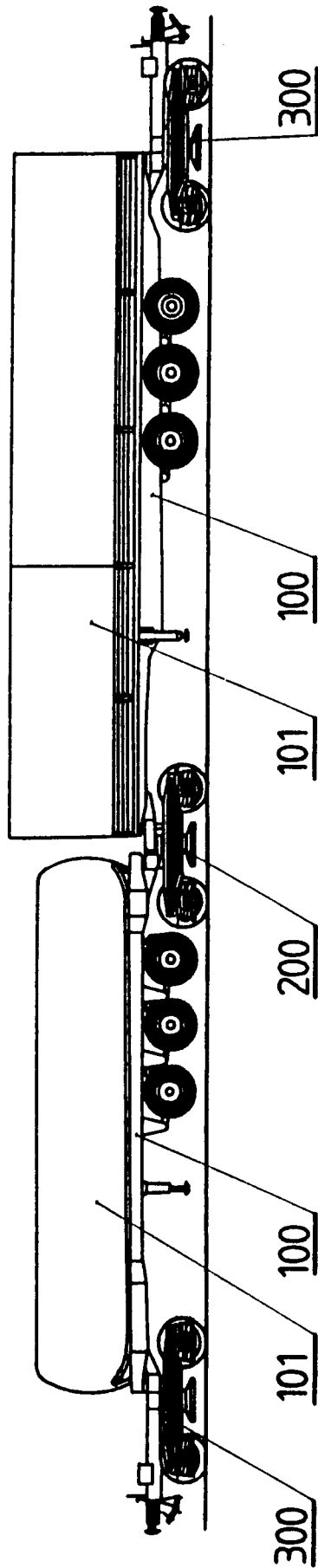


Fig.11