



(51) International Patent Classification:

B60G 9/02 (2006.01) B62D 21/18 (2006.01)
B62D 53/02 (2006.01)

(72) Inventor: PEETERS, Daniel Petrus Marie; PEETERS, Daniel Petrus Marie, Wuustwezelsteenweg 32, 2920 Nieuwmoer-Kalmthout (BE).

(21) International Application Number:

PCT/NL2019/050029

(74) Agent: ALGEMEEN OCTROOI - EN MERKENBU-
REAU B.V.; P.O. Box 645, 5600 AP Eindhoven (NL).

(22) International Filing Date:

18 January 2019 (18.01.2019)

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(25) Filing Language:

Dutch

(26) Publication Language:

English

(30) Priority Data:

2020295 18 January 2018 (18.01.2018) NL

(71) Applicant: PEETERS LANDBOUWMACHINES B.V.
[NL/NL]; Munnikenheiweg 47, 4879 NE ETTEN-LEUR
(NL).

(54) Title: VEHICLE

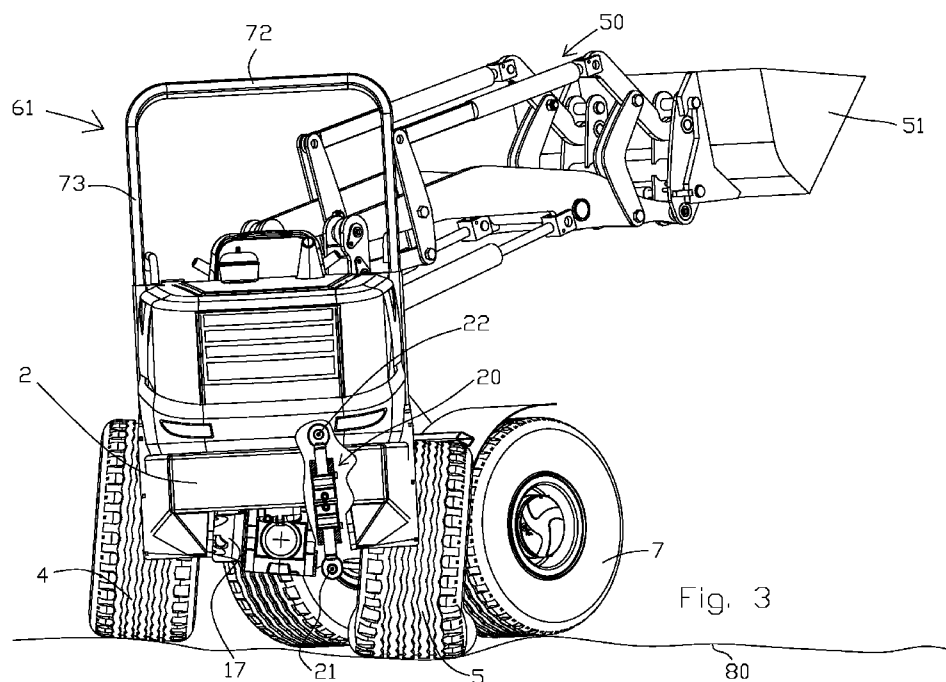


Fig. 3

(57) Abstract: The invention provides a vehicle comprising a frame with a front frame part and a rear frame part, two front wheels which are connected to the front frame part so as to be rotatable about respective front horizontal rotation axes, two rear wheels which are connected to the rear frame part so as to be rotatable about respective rear horizontal rotation axes and drive means for driving both the two front wheels and the two rear wheels. The vehicle further comprises a steering device for steering the vehicle by pivoting the front frame part and the rear frame part with respect to each other about a vertical pivot pin. The connection between the two rear wheels, on the one hand, and the corresponding frame part, on the other hand, is accomplished via an axle body which, on opposite ends thereof, is provided with respective wheel hubs to which the rear wheels are attached. The axle body is able to swing to and fro with respect to the respective frame part. The vehicle is provided with a compensating member which engages with the axle body and



(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

with the frame part. The length of the compensating member is at least adjustable between a short position, a long position and a centre position situated between the short position and the long position. The vehicle further comprises control means for adjusting the length of the compensating member. The compensating member comprises two series- connected cylinder/piston assemblies.

Description

The present invention relates to a vehicle according to the preamble
5 of Claim 1. Such a vehicle is described in German publication DE 2450236 A1.

The invention relates in particular to construction vehicles, such as
loaders, telescopic handlers, tractors, and generally tool carriers, whose main reason
of existence is based on the fact that they are suitable to carry out certain tasks, such
as in particular lifting a load. This distinguishes them from, for example, passenger
10 vehicles, busses or lorries which are primarily suited for transporting people and/or
goods. It is exactly because of their specific suitability that such construction vehicles
are at an increased risk of tipping over during use. The invention is furthermore aimed
at, in particular, but not exclusively, relatively small loaders in a weight category of
2,500 to 5,000 kg dead weight. More specifically, the invention is aimed at making
15 such vehicles safer. Partly due to their limited wheel base combined with a load which
raises the centre of gravity and is carried in a relatively high position by the vehicle
and small turning circles, there is a risk of the vehicle tipping over, in particular if the
vehicle is used on an uneven or sloping surface.

With the vehicle as described in the above publication
20 DE 2450236 A1, a compensating member which is designed as a single hydraulic
cylinder is operated manually by means of a valve block with three settings. With two
out of the three settings of the valve block, the hydraulic cylinder is brought into one
of two limit positions of the cylinder. In the third position of the valve block, the cylinder
may be fixed in an arbitrary position while it is moving between the two limit positions.
25 From a practical point of view, it is not possible to fix the cylinder in the same position
between the two limit positions in a repeatable manner. The invention aims to reduce
the risk of undesired tipping over of the vehicle. To this end, the vehicle according to
the invention also complies with the description according to the characterizing part of
Claim 1. This offers, in a relatively simple manner, the possibility of fixing the
30 respective compensating member in a centre position situated between the limit
positions in a repeatable manner.

By using, according to the invention, at least one axle body and an
associated compensating member whose length can be varied using the control
means, the risk of a wheel of the vehicle losing contact with the terrain, which could

result in undesired tipping over, is limited. In this way, it is possible, by means of the invention, to reduce the risk of the vehicle tipping over in an undesired way in a relatively simple way. The combination of an axle body with an associated compensating member may be provided solely at the front frame part, solely at the rear frame part and both at the front frame part and the rear frame part.

5 If the control means are configured to adjust the length of the front compensating member and/or of the rear compensating member as a function of the steering by the steering device the vehicle may, as it were, anticipate an increased risk of undesired tipping over when the vehicle is going through a bend. Depending on the steering direction, to the left or to the right, from the centre position, the control means may in this case be configured to increase or decrease the length of the respective compensating member or the lengths of the respective compensating members as a function of the steering direction. It is also possible for the adjustment of the length of the at least one compensating member to be infinitely variable on the basis of the degree of steering of the vehicle by the steering device without departing from the scope of the invention.

10 In a further advantageous embodiment, at least one cylinder/piston assembly is double-acting and/or the two cylinder/piston assemblies are arranged mirror-symmetrically with respect to each other, in which case, more preferably, the two cylinder/piston assemblies are of the same type.

It may be preferable if the vehicle is provided with switching means for switching the control means between an active position and a non-active position. By means of the switching means, the control means may then, for example, be brought into the non-active position if the risk of undesired tipping over of the vehicle is relatively small, for example because the vehicle carries no load and/or because the vehicle is driving over an entirely flat terrain.

20 The safety and the driving comfort may in this case benefit from the situation in which the switching means are configured to be operational on the basis of a control signal emitted by the sensor means of the vehicle. On the other hand, it is also possible for the switching means themselves to be manually operated by the driver of the vehicle without departing from the scope of the invention.

30 The sensor means may be configured, for example, to detect how great the load acting on the vehicle is, for example due to a load which is carried by the vehicle, or to detect information about the terrain on which the vehicle rests, such

as the unevenness or angle of inclination thereof. In order to be able to detect information about the terrain, the sensor means could be fitted with, for example, a gyroscope or an inclinometer.

A vehicle according to the invention may in particular be used advantageously, if the vehicle is provided, for example at the front frame part, with a lifting arm. The lifting arm may be used to lift a load, such as for example sand. This may significantly raise the centre of gravity of the vehicle, as a result of which the risk of the latter tipping over in principle increases. As a result of the invention, this risk can be reduced.

The invention will be explained in more detail below by means of the description of a possible embodiment of the vehicle according to the invention with reference to the following figures:

Figs. 1a, 1b and 1c show a top view of an embodiment of a vehicle, the parts of which are situated relatively high have not been illustrated for the sake of clarity, according to the present invention, wherein the front wheels of the vehicle are directed to the left, in line, and to the right, relative to the rear wheels respectively;

Figs. 2a, 2b and 2c show longitudinal sections of an embodiment of a compensating member with a valve block situated underneath for actuating the compensating member, as is used in the vehicle from Figs. 1a, 1b and 1c in the respective positions thereof;

Fig. 3 shows a rear view of the vehicle on uneven terrain;

Fig. 4 shows a rear view of the vehicle in flat terrain in which the compensating member has been deactivated;

Fig. 5 shows the lifting arm as it forms part of the vehicle;

Fig. 6 shows a perspective view of the driver's space of the vehicle, including two fall prevention elements;

Fig. 7 shows a perspective view of the rear axle body of the vehicle.

The vehicle such as will be explained below by means of Figs. 1a to 7 is a construction vehicle, more specifically a so-called articulated loader 1. The articulated loader 1 comprises a frame with a front frame part 3 and a rear frame part 2. The front frame part 3 is provided with two front wheels 6, 7 which are connected to the front frame part 3 so as to be rotatable about respective coaxial front horizontal

rotation axes 13, 14. Furthermore, a lifting arm 50 is provided on the front frame part 3. At the front free end of the lifting arm 50, a bucket 51 is fitted for receiving a load, such as for example sand or silage. It is possible for another lifting tool to be fitted to the front frame part 3, such as for example a pallet fork, stone clamp, gin pole, stone rotator or a sweeping broom.

The rear frame part 2 has two rear wheels 4, 5 which are connected to the rear frame part 2 so as to be rotatable about respective coaxial rear horizontal rotation axes 11, 12. The connection between the two rear wheels 4, 5, on the one hand, and the rear frame part 2, on the other hand, is accomplished via a rear axle body 17. At its opposite ends, the rear axle body 17 is provided with respective wheel hubs 38, 39 (Fig. 7) to which the rear wheels 4, 5 are attached. The rear axle body 17 is able to swing to and fro with respect to the rear frame part 2 about a horizontal swinging axis 18 which is oriented at right angles to the respective rotation axes 11, 12 for the two rear wheels 4, 5.

The articulated loader 1 is furthermore provided with drive means which are not illustrated in more detail, such as for example a hydrostatic drive in which a hydro pump is driven by a diesel engine, or an electric motor, for driving both the two front wheels 6, 7 and the two rear wheels 3, 4 in a way which is already known to the person skilled in the art.

The articulated loader 1 may be steered by a driver seated in seat 62 by turning the wheel 64, in which case steering cylinder 36 is actuated which makes the front frame part 3 and the rear frame part 2 pivot about a vertical pivot pin with respect to each other so that the vehicle can be steered to the left, straight ahead and to the right, according to Figs. 1a to 1c, respectively. This pivot pin coincides with the centre axis of pivot pin body 16 which pivotably connects the front frame part 3 and the rear frame part 2 to each other.

Furthermore, articulated loader 1 is provided with at least one compensating member 20 which, at one end 21 thereof, engages with the rear axle body 17 at a distance from the swinging axis 18 at the location of a first point of engagement 48, and, at another end 22 thereof, engages with the rear frame part 2 at the location of a second point of engagement 49, in which case the distance between the first point of engagement 48 and the second point of engagement 49 determines the length of the compensating member 20.

The at least one compensating member 20 comprises two series-connected double-acting hydraulic cylinders which are provided mirror-symmetrically with respect to each other, namely a first cylinder 23 and a second 24 cylinder. The hydraulic actuation of the cylinders 23, 24 is performed by means of valve block 40.

5 This actuation makes it possible for the length of the compensating member to be adjustable between a short position (as can be seen in Fig. 2a), a long position (as can be seen in Fig. 2c) and a centre position situated between the short position and the long position (as can be seen in Fig. 2b).

The first and the second hydraulic cylinders 23, 24 each comprise a
10 chamber 25, 26 in which a piston 28, 27 and a portion of a piston rod 33, 34 is provided. The piston 28, 27 is connected to an end 22, 21 by means of the piston rod 33, 34. Furthermore, the cylinders 23, 24 each have two connections 29, 30, 31, 32 which are in communicative connection with the valve block 40.

The valve block 40, which is itself provided on the rear frame part 2,
15 comprises a pivot arm 41, a free end of which is mechanically coupled to the front frame part 3 of the vehicle 1. By steering the front frame part 3 with respect to the rear frame part 2 by means of the steering device, the position of the pivot arm 41 changes, resulting in actuation of the valve block 40 and the hydraulic cylinders 23, 24. As a result thereof, the hydraulic cylinders 23, 24 are automatically actuated when an angle
20 is formed between the front frame part 3 and the rear frame part 2, in which case both the front and the rear frame parts 2,3 pivot about the pivot pin body 16.

The pivot arm 41 is movable between a first position corresponding with the short position of the compensating member 20 (Figs. 1a, 2a), a second position corresponding with the centre position of the compensating member 20 (Figs.
25 1b, 2b) and a third position corresponding with the long position of the compensating member 20 (Figs. 1c, 2c).

The action of the compensating member 20 causes one of the rear wheels 4, 5 to be pushed more firmly onto the terrain over which the loader 1 is driving when going through a bend, in dependence of a steering movement. Such a situation
30 is illustrated in Fig. 3. This shows, that when the front wheels are steered to the right, the compensating member 20 causes the rear axle body 17 to pivot more with respect to the rear frame part 2 about swinging axis 18, causing the right rear wheel to be pressed onto the ground 80 with additional pressure, so that the tendency of loader 1 to tip over is counteracted, precisely because it is going through a right-hand bend.

In an embodiment, the control means are provided with a selector switch 43. The selector switch 43 makes it possible to (de)activate the operation of the valve block 40. Deactivation of the valve block may be effected manually or otherwise, by means of a button or lever provided near the driver's space, or automatically, by means of a measuring and control unit. The deactivation of valve block 40 is achieved by allowing the active liquid, which is required in order to adjust the hydraulic cylinders 23, 24, to flow in and out of the chambers 25, 26 of the hydraulic cylinders 23, 24 in an unpressurized manner. To this end, the valve block 40 is provided with a free return line.

A situation in which the valve block 40 has been deactivated is illustrated in Fig. 4. Despite the fact that the front wheels 6, 7 are in a steered position, the compensating member 20 is fixed in the centre position. The deactivation of the valve block 40 is particularly advantageous if there is relatively small risk of the vehicle 1 tipping over. This may be the case, for example, if there is no load or only a small load on the lifting arm 50 and/or if the vehicle 1 is driven across an even surface.

In one embodiment, the selector switch 43 of the control means is settable in three positions; namely "auto", "off", or "locked". If the selector switch 43 is set to "auto", the compensating member is actuated as described above in dependence of the pivot arm 41 of the valve block 40. If the selector switch 43 is set to "off", the liquid can move freely through the chambers of the hydraulic cylinders and the respective swinging axis can therefore swing freely. If the selector switch 43 is set to "locked", the compensating member is blocked in the centre position and thus the valve block 40 is actually deactivated, as has been described above.

In an embodiment according to the present invention, the compensating member 20 is settable with respect to the front frame part 3 and/or a load which is placed on the lifting arm 50 in dependence of a position of the lifting arm 50. Such an embodiment can be seen in Fig. 5. In this embodiment, the control means not only comprise a valve block 40, but also a pressure switch 42 and a selector switch 43. The pressure switch 42 is communicatively connected to a lifting cylinder 52, such as for example, a hydraulic cylinder, in order to lift the lifting arm 50 with respect to the front frame part 3. The pressure switch 42 is also communicatively connected to the selector switch 43. At a low operating pressure, the pressure switch 42 does not send any signal to the selector switch 43. However if a load is placed in the bucket 51 of the lifting arm 50, the operating pressure at the pressure switch 42 increases, as a

result of which the pressure switch 42 sends a signal to the selector switch 43. Thus, it is for example possible to switch the selector switch 43 automatically to the "auto" position at a relatively high operating pressure, in which case the valve block 40 is activated.

5 In an embodiment according to the invention, the vehicle 1 is provided with a driver's space 60 with a rollover protection 61, a steering wheel 64, two fall prevention elements 63a, 63b (denoted together below by reference numeral 63), and a seat 62 for a driver. The driver's space 60 is situated on the side of the rear frame part 2 near the pivot pin 16. In Fig. 6, fall protection element 63b is in the closed position and the fall protection element 63a is in the open position, each of the fall protection elements 63 being provided with a tubular guide element 66 for moving between the open position and the closed position.

10 The rollover protection 61 delimits the driver's space 60. The rollover protection is provided with a frame which, viewed in the viewing direction of a driver B seated on the seat 62, extends substantially behind the seat 62, in which a driver B is situated within the boundaries of the rollover protection 61 during normal use of the vehicle 1.

15 Relative terms regarding the orientation of the vehicle and/or components thereof, such as for example, horizontal, vertical, above, below, along, in this document are based on a normal frame of reference, in which the vehicle is situated on an even, horizontal terrain and the vehicle wheels are in contact with the terrain, unless indicated otherwise.

CLAIMS

1. Vehicle comprising a frame with a front frame part and a rear frame part, two front wheels which are connected to the front frame part so as to be rotatable about respective front horizontal rotation axes, two rear wheels which are connected to the rear frame part so as to be rotatable about respective rear horizontal rotation axes, drive means for driving both the two front wheels and the two rear wheels, the vehicle further comprising a steering device for steering the vehicle by pivoting the front frame part and the rear frame part with respect to each other about a vertical pivot pin, wherein the connection between the two rear wheels, on the one hand, and the rear frame part, on the other hand, is accomplished via a rear axle body which, on opposite ends thereof, is provided with respective wheel hubs to which the rear wheels are attached, which rear axle body is able to swing to and fro with respect to the rear frame part about a rear horizontal swinging axis which is oriented at right angles to the respective rotation axes for the two rear wheels and/or wherein the connection between the two front wheels, on the one hand, and the front frame part, on the other hand, is accomplished via a front axle body which, at opposite ends thereof, is provided with respective wheel hubs to which the front wheels are attached, which front axle body is able to swing to and fro with respect to the front frame part about a front horizontal swinging axis which is oriented at right angles to the respective rotation axes for the two front wheels, wherein the vehicle is provided with a rear compensating member which, at one end thereof, engages with the rear axle body at a distance from the rear swinging axis at the location of a first rear point of engagement, and, at another end thereof, engages with the rear frame part at the location of a second rear point of engagement, wherein the distance between the first rear point of engagement and the second rear point of engagement determines the length of the rear compensating member and the length of the rear compensating member is at least adjustable between a short position, a long position and a centre position situated between the short position and the long position and/or that the vehicle is provided with a front compensating member which, at one end thereof, engages with the front axle body at a distance from the front swinging axis at the location of a first front point of engagement and, with another end thereof, engages with the front frame part at the location of a second front point of engagement, wherein the distance between the first front point of engagement and the second front point of engagement determines the

length of the front compensating member and the length of the front compensating member is at least adjustable between a short position, a long position and centre position situated between the short position and the long position, and with control means for adjusting the length of the front compensating member and/or the length of the rear compensating member in each of the associated short position, the centre position and the long position, **characterized in that** the front compensating member and/or the rear compensating member comprises two series-connected cylinder/piston assemblies.

2. Vehicle according to Claim 1, wherein the control means are configured to adjust the length of the front compensating member and/or of the rear compensating member as a function of the steering by the steering device.

3. Vehicle according to Claim 1 or 2, wherein at least one cylinder/piston assembly is double-acting.

4. Vehicle according to one of the preceding claims, wherein the two cylinder/piston assemblies are provided mirror-symmetrically with respect to each other.

5. Vehicle according to one of the preceding claims, wherein the two cylinder/piston assemblies are of the same type.

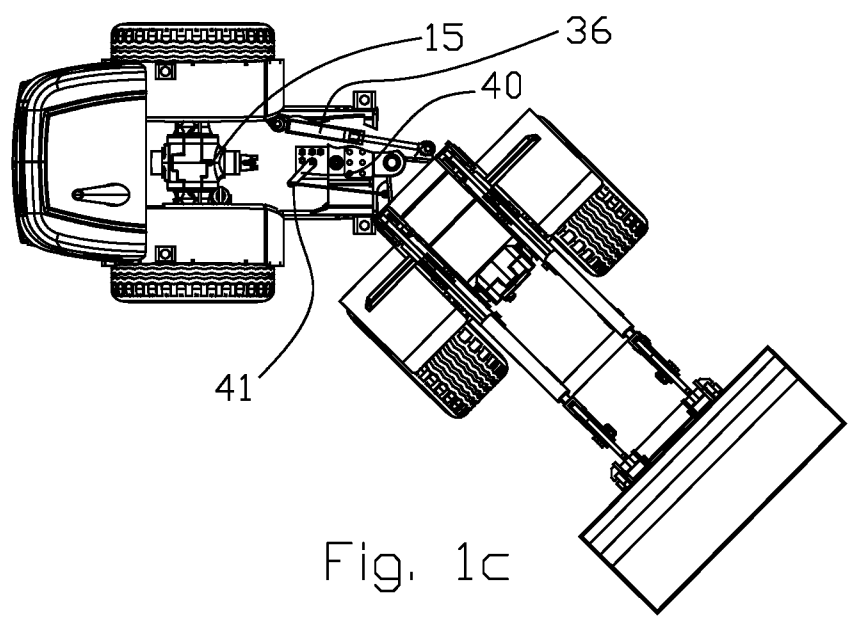
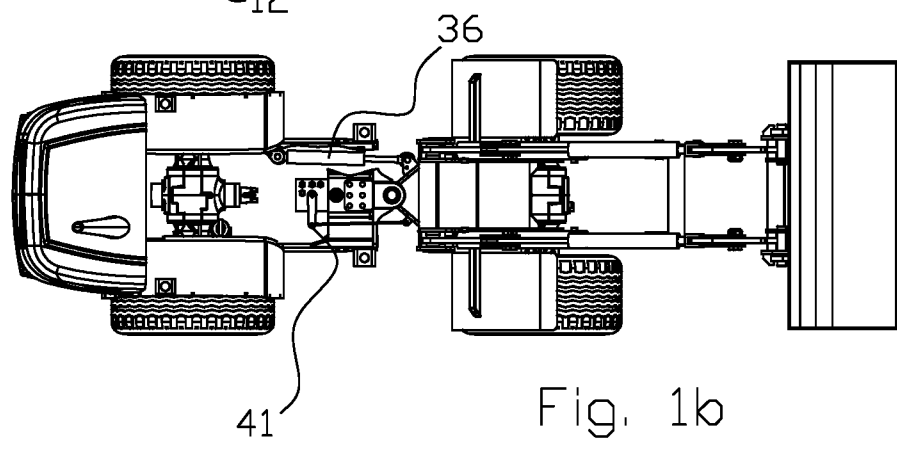
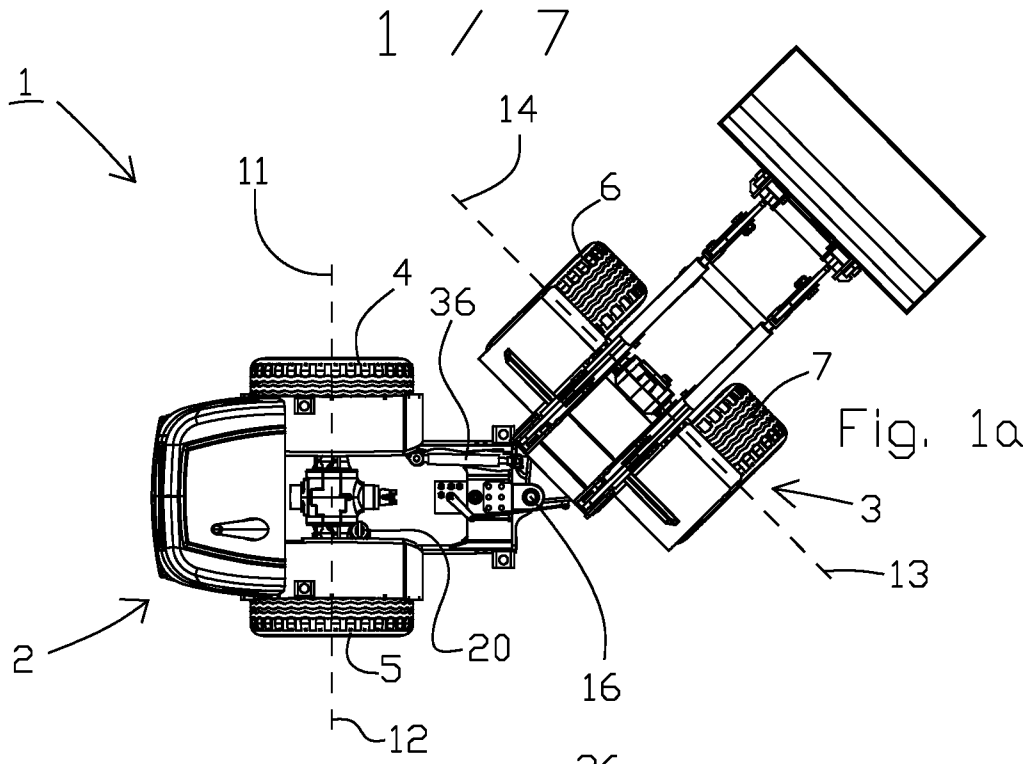
6. Vehicle according to one of the preceding claims, wherein the vehicle is provided with switching means for switching the control means between an active position and a non-active position.

7. Vehicle according to Claim 6, wherein the vehicle is provided with sensor means and wherein the switching means are configured to be operational on the basis of a control signal emitted by the sensor means of the vehicle.

8. Vehicle according to Claim 7, wherein the sensor means are configured to detect how great the load acting on the vehicle is.

9. Vehicle according to Claim 7 or 8, wherein the sensor means are configured to detect information about the terrain on which the vehicle rests.

10. Vehicle according to one of the preceding claims, wherein the vehicle is provided with a lifting arm.



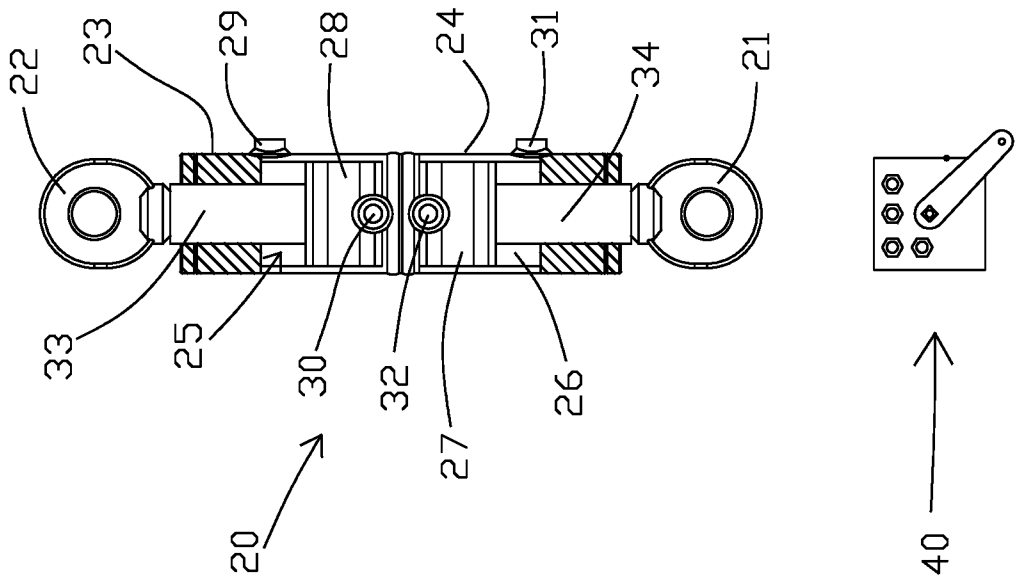


Fig. 2a

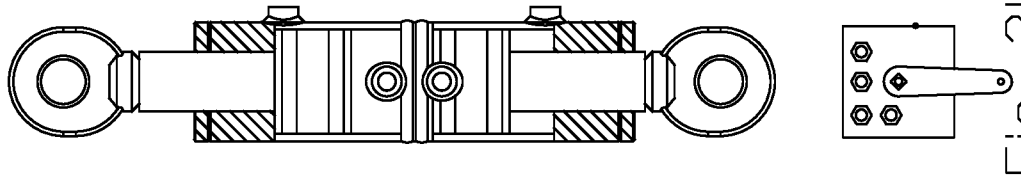


Fig. 2b

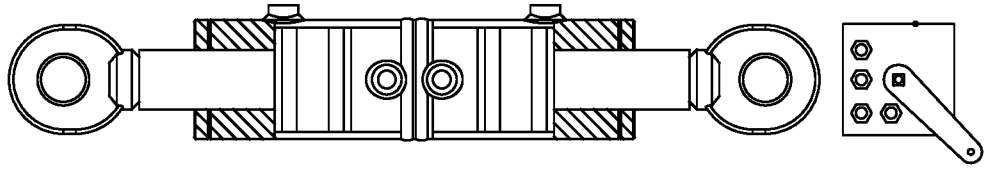
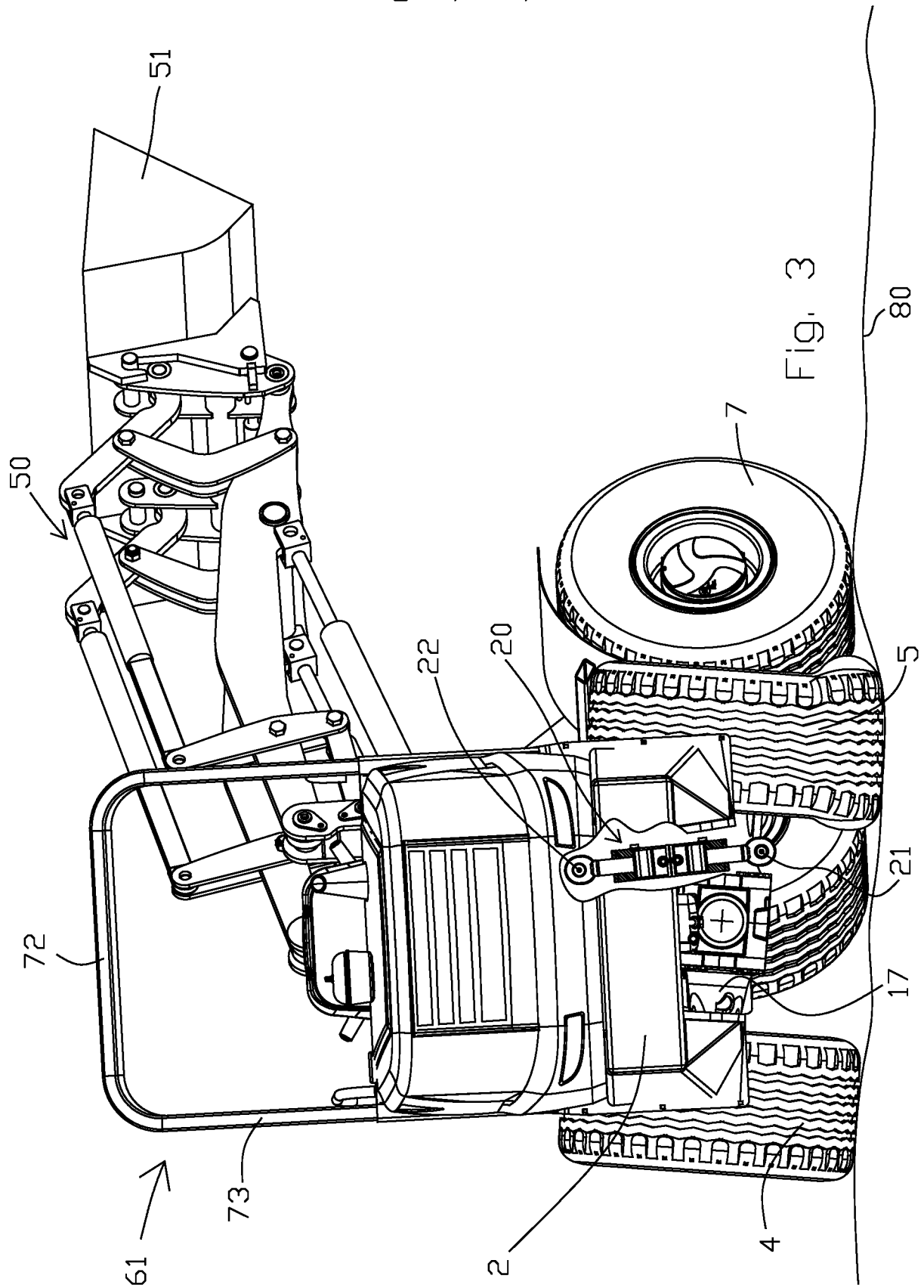
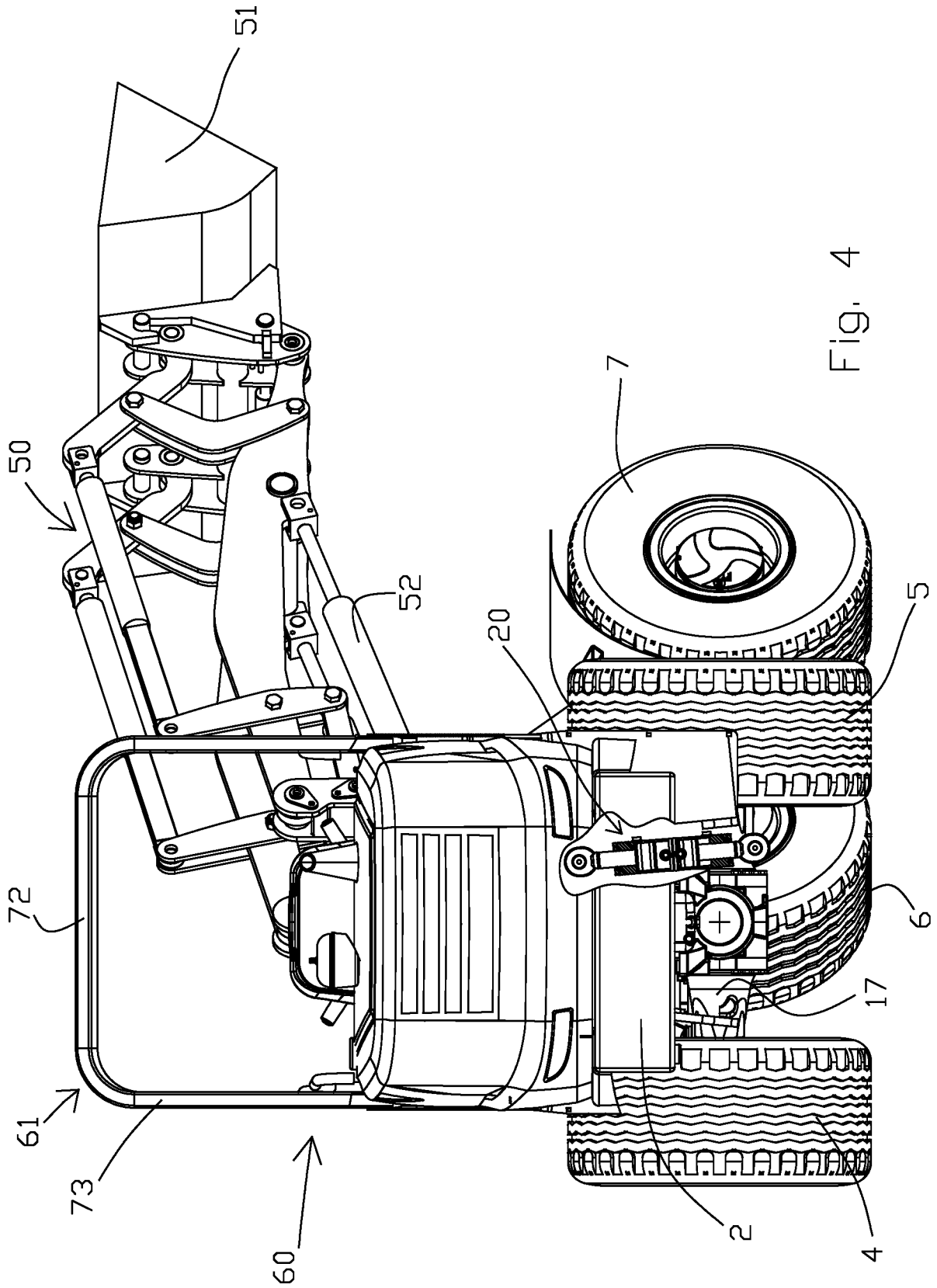


Fig. 2c





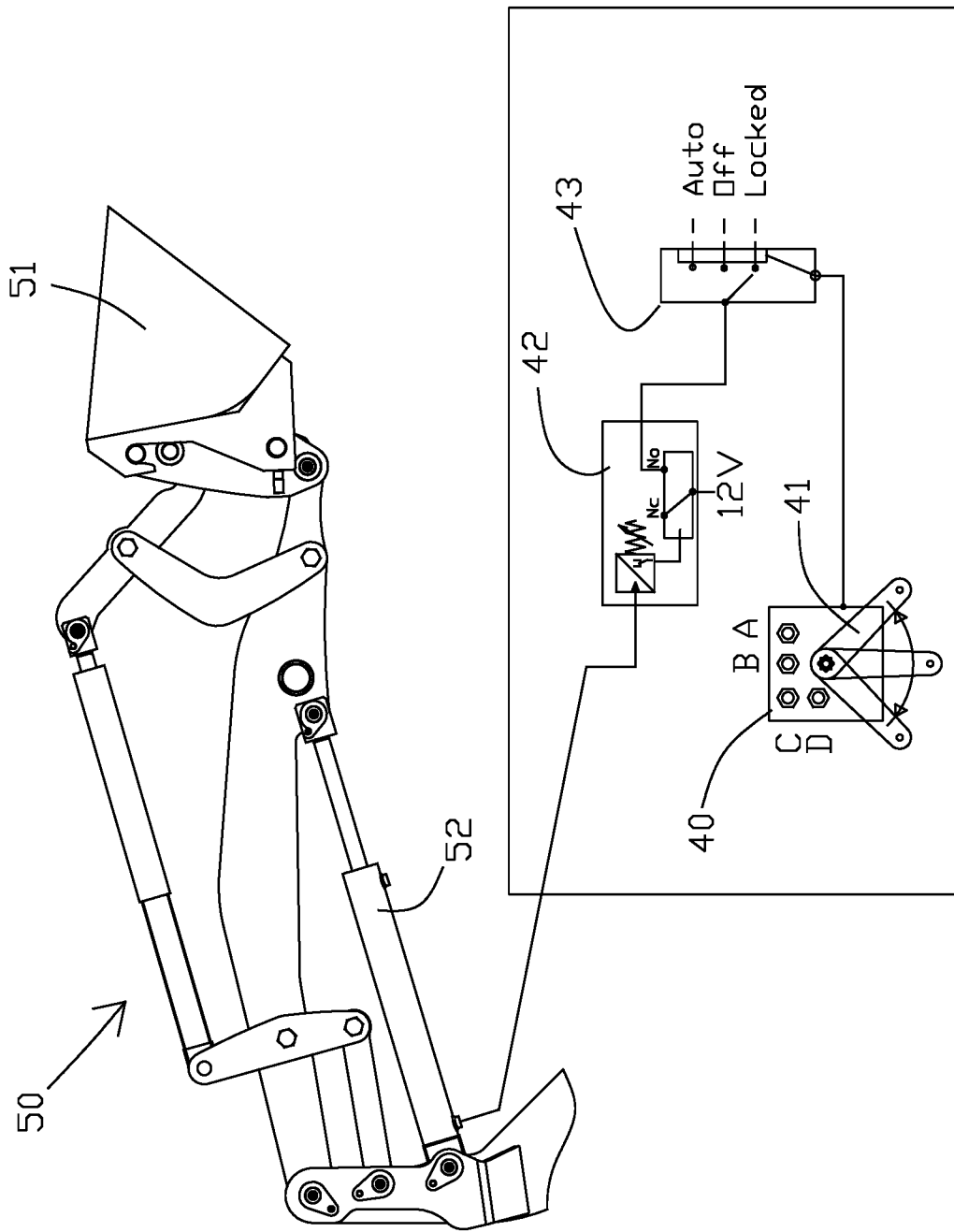
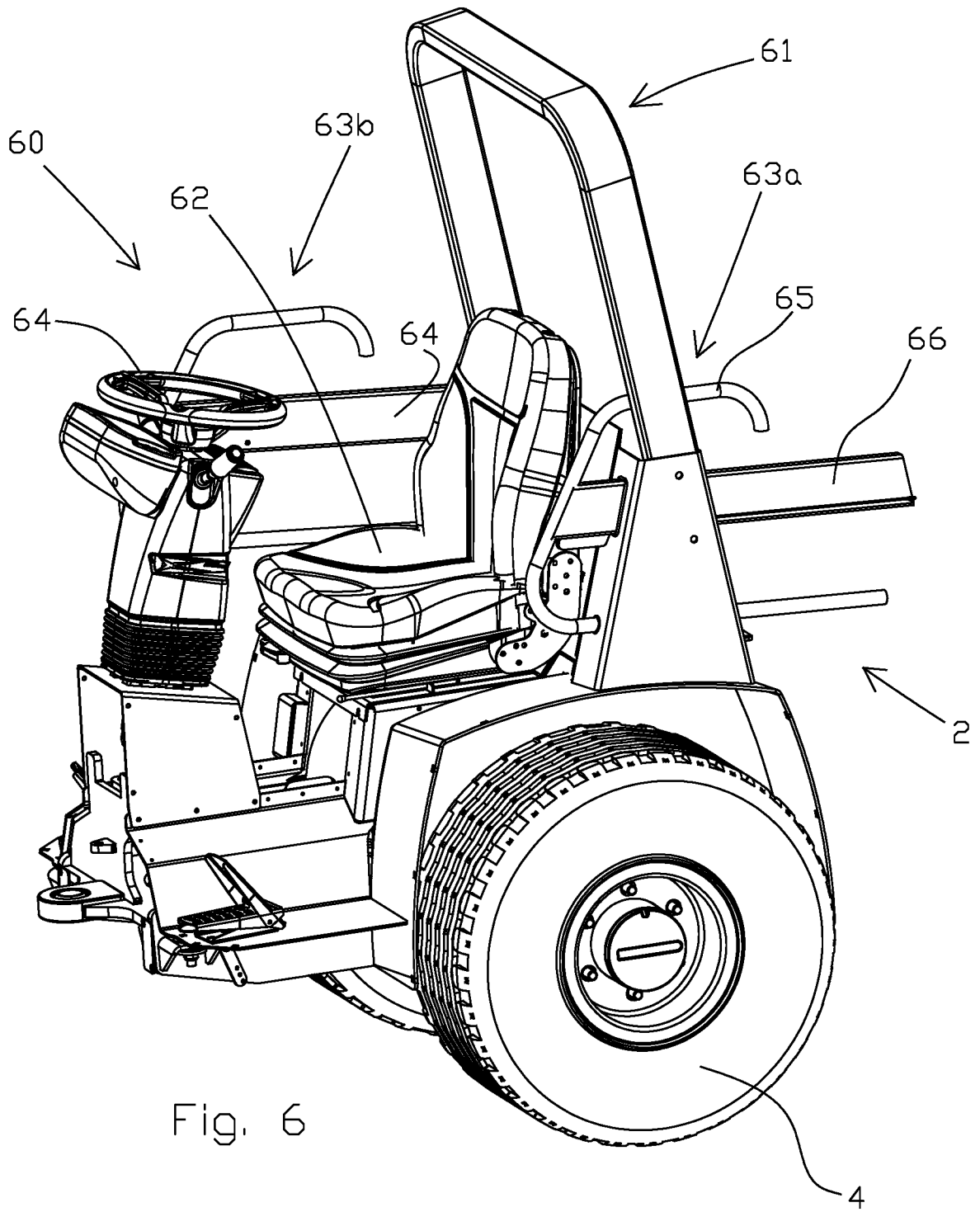


Fig. 5



7 / 7

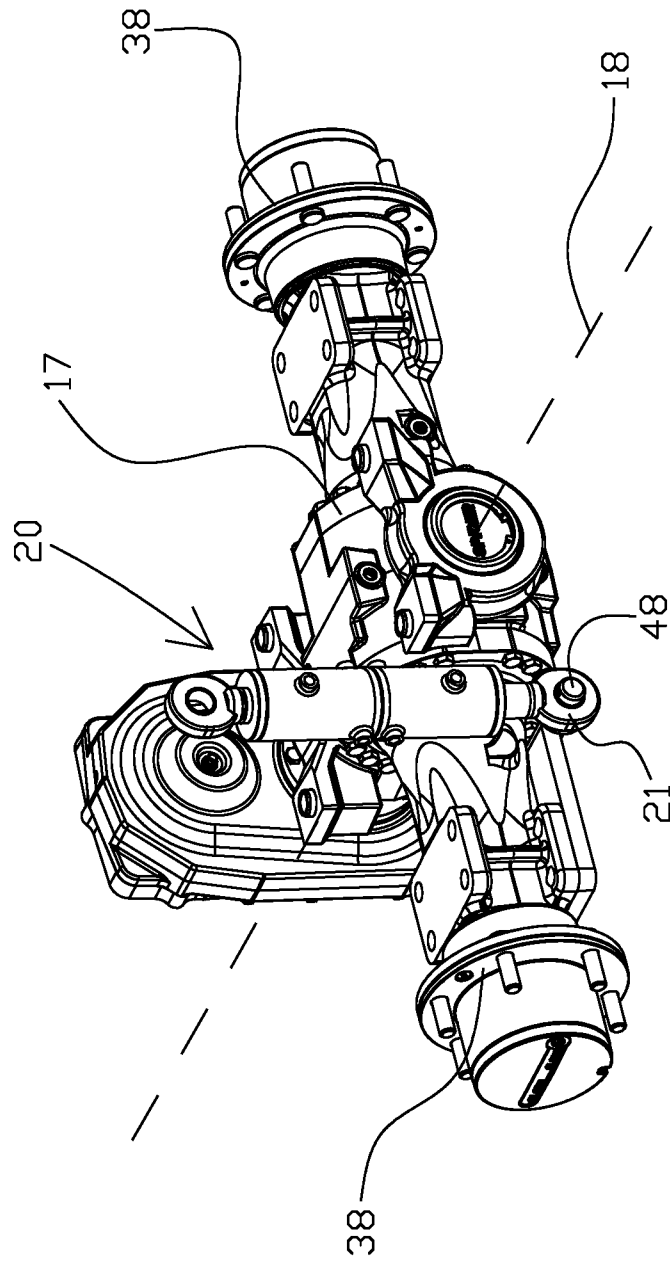


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2019/050029

A. CLASSIFICATION OF SUBJECT MATTER
INV. B60G9/02 B62D53/02 B62D21/18
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
B60G B62D F15B

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 24 50 236 A1 (ORENSTEIN & KOPPEL AG) 29 April 1976 (1976-04-29) page 6, line 14 - last line page 7 - paragraph 1; figures -----	1,4,5,10
X	US 5 180 028 A (PERRENOUD JR STEPHEN A [US]) 19 January 1993 (1993-01-19) column 4, line 61 - column 5, line 18 column 8, line 38 - line 55 column 6, line 14 - line 37 column 9, line 8 - line 15 column 9, line 34 - line 53 column 11, line 45 - line 58; figure 3 -----	1,3-5
X	EP 0 159 338 B1 (VALMET OY [FI]) 15 March 1989 (1989-03-15) column 3, line 16 - line 40; figure 3 ----- -/--	1,2,4,5

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search 12 June 2019	Date of mailing of the international search report 19/06/2019
---	--

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Areal Calama, A
--	---

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2019/050029

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 36 32 416 A1 (SCHAEFF KARL GMBH & CO [DE]) 7 April 1988 (1988-04-07) column 5, line 27 - line 29; figures 4,5 -----	1,4-9
A	EP 1 972 471 A2 (CNH ITALIA SPA [IT]) 24 September 2008 (2008-09-24) paragraph [0026] -----	7,8

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/NL2019/050029

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2450236	A1	29-04-1976	DE 2450236 A1
			JP S5164707 A
			29-04-1976
			04-06-1976

US 5180028	A	19-01-1993	NONE

EP 0159338	B1	15-03-1989	BR 8407117 A
			DE 3477168 D1
			DK 256585 A
			EP 0159338 A1
			FI 833661 A
			US 4669566 A
			WO 8501702 A1
			27-08-1985
			20-04-1989
			06-06-1985
			30-10-1985
			08-04-1985
			02-06-1987
			25-04-1985

DE 3632416	A1	07-04-1988	NONE

EP 1972471	A2	24-09-2008	NONE
