

(19)



(11)

EP 1 808 385 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
17.06.2009 Bulletin 2009/25

(51) Int Cl.:
B65F 3/04 (2006.01)

(21) Application number: **07100368.5**

(22) Date of filing: **11.01.2007**

(54) Device for picking up and emptying refuse containers

Hubkippvorrichtung zum Entleeren von Müllbehältern

Dispositif de levage pour vider des récipients à ordures

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR**

(30) Priority: **11.01.2006 NL 1030897**

(43) Date of publication of application:
18.07.2007 Bulletin 2007/29

(73) Proprietor: **OMB Nederland B.V.,
8251 JP Dronten (NL)**

(72) Inventor: **Van Beusichem, Maarten Marinus
8243 XL, Lelystad (NL)**

(74) Representative: **Hutter, Jacobus Johannes
Nederlandsch Octrooibureau
P.O. Box 29720
2502 LS Den Haag (NL)**

(56) References cited:
EP-A- 0 675 058 EP-A- 1 148 001

EP 1 808 385 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present invention relates to a device for picking up and emptying refuse containers, in particular for side loading, which device is fixed on the frame of the vehicle and is provided with:

- a first swivelling arm, one end of which is pivotably fixed on the frame by way of a first pivot point,
- a second swivelling arm, one end of which is pivotably fixed on the other end of the first swivelling arm by way of a second pivot point,
- a first lever, one end of which is pivotably fixed on the second swivelling arm,
- a second lever, one end of which is fixed on the first lever by way of a third pivot point,
- a third lever, one end of which is fixed on the other end of the second lever by way of a fourth pivot point, and the other end of which is connected to the first swivelling arm by way of a fifth pivot point, which fifth pivot point is situated at a certain distance from the first pivot point and second pivot point,

a first cylinder pivotable connected between a sixth pivot point on the frame of the vehicle and the fourth pivot point, and

a second cylinder pivotable connected between on the second swivelling arm and the first lever, a guide bar between the fourth pivot point and the frame fixed by way of a pivot point on the frame, and

a container pick-up element on the second swivelling arm.

Prior Art

[0002] A device of this type is disclosed in EP1148001. In this known device one end of the first lever is fixed on the second swivelling arm by means of the second pivot point, so that a four-bar linkage is formed.

[0003] Similar devices are furthermore disclosed in DE19746401 and EP0709310.

[0004] During operation of the device disclosed in EP1148001 the vehicle is driven into a position alongside a container in which the device can grasp the container. The first and second cylinders are taken out of an idle position into an initial position, in which the pick-up element fixed on the second swivelling arm is situated in a position ready to act upon the container. The cylinders are then operated in such a way that the container is first lifted to a sufficiently high level and is subsequently tilted in order to empty the contents of the container into the refuse reservoir on the vehicle. A disadvantage of the known device is that the position of the container, particularly in the first part of its movement path, undergoes a relatively great change.

Brief description of the invention

[0005] The object of the present invention is now to improve the known device in this respect and to provide a device in the case of which it is possible to make the angular position of the container vary much less relative to the vertical, particularly during the first part of the movement path.

[0006] This object is achieved in a device of the type described above in that the one end of the first lever is fixed on the second swivelling arm by way of a seventh pivot point at a distance from the second pivot point. The first lever is designed in such a way that it has three pivot points, two of which form the abovementioned third and seventh pivot points, while the remaining pivot point serves to fix the second cylinder. This means that a five-bar linkage is formed by the first and second swivelling arms and by the first, second and third levers. By means of this five-bar linkage the angular variation undergone by the container in the first part of its movement path is significantly reduced. This makes handling the container easier, particularly in a restricted environment.

[0007] It has furthermore been found that, thanks to this five-bar linkage, the second cylinder needs to perform a significantly smaller movement to fulfil its task. That means that less hydraulic fluid needs to be pumped and that controlling the position of the container is achieved more quickly. When a vehicle with such a device is used for emptying many dozens or even many hundreds of containers, for example in a residential area, a considerable overall time saving is achieved, thanks to the cumulative effect of the slight time gained per container.

[0008] It is furthermore preferable for the second cylinder to be fixed on the first lever by way of a part projecting beyond the axis of the second lever, on which part the pivot point concerned for the second cylinder is fixed.

Brief description of the figures

[0009] The invention will be explained in more detail below with reference to the appended figures.

Figure 1 shows diagrammatically a first embodiment of a device according to the invention.

Figure 2 shows diagrammatically a second embodiment of a device according to the invention.

Description of embodiments

[0010] The device shown diagrammatically in Figure 1 comprises a first swivelling arm 1, a second swivelling arm 2, a first lever 3, a second lever 4, a third lever 5, and a guide bar 6. Furthermore, the device comprises a first hydraulic cylinder 21 and a second hydraulic cylinder 22. The abovementioned components are pivotably connected to each other and to the frame 9 of a vehicle by way of various pivot points. The frame 9 is only partially

shown, and further details of the vehicle will not be shown and discussed because these are assumed to be known to the person skilled in the art.

[0011] One end of the first swivelling arm 1 is connected to the frame 9 by way of a first pivot point 11. The other end of the swivelling arm 1 is connected to one end of the second swivelling arm 2 by way of a second pivot point 12. The first lever 3 is connected to the second lever 4 by way of a third pivot point 13. The other end of the second lever 4 is connected to one end of the third lever 5 by way of a fourth pivot point 14. The other end of the third lever 5 is connected to the first swivelling arm 1 by way of a fifth pivot point 15. In this embodiment the fifth pivot point 15 is situated at a distance from both the first pivot point 11 and the second pivot point 12. The connection between the first lever 3 and the second swivelling arm 2 is achieved by way of a seventh pivot point 17. Together the pivotably interconnected first and second swivelling arms 1, 2 and the levers 3, 4 and 5 form a five-bar linkage which can move relative to the frame 9 of the vehicle.

[0012] The movement of the five-bar linkage is achieved by means of the hydraulic cylinders 21 and 22. The first cylinder 21 is connected by one end to the frame 9 by way of a sixth pivot point 16, and is connected by the other end to the fourth pivot point 14. The second cylinder 22 is connected by the one end to the second swivelling arm 2 by way of an eighth pivot point 18 and is connected by the other end to one end of the first lever 3 by way of a ninth pivot point 19. As shown in the figure, there is a distance between the seventh pivot point 17 and the second pivot point 12.

[0013] Between the pivot point 14 and the frame 9 a guide bar 6 is also present, which guide bar is fixed on the frame 9 by way of a pivot point 20.

[0014] Furthermore, a pick-up/gripping element 24 is fixed on the second swivelling arm 2, which pick-up/gripping element is used to act upon and/or take hold of the container to be emptied. Such pick-up/gripping elements are known in various embodiments in the prior art and it is therefore considered unnecessary to give any further details.

[0015] At the start of operation of the device the cylinder 21 is first fully retracted, with the result that the swivelling arm 1 is turned downwards and is situated close to the frame 9. The entire five-bar linkage assumes a fairly flat configuration here. The second cylinder is set in a position in which the pick-up element is situated in a position ready to act upon the container (not shown in the figure). The first cylinder is then activated and the pick-up element acts upon the container. The container is lifted. By further extending the first cylinder, the container is taken to a point above the vehicle, where the container is tilted (partially) and its contents emptied into the refuse reservoir of the vehicle. If desired, the second cylinder can be operated here to tip or shake the container further, so that the container is emptied better. By means of a reverse movement, the container subse-

quently returns to its original position.

[0016] The first lever 3 in this example is provided with a bend, so that the pivot points 13, 17 and 19 lie on the corner points of an imaginary triangle. Only the part of the first lever 3 between the pivot points 13 and 17 in fact forms one of the bars of the abovementioned five-bar linkage. Depending on the dimensioning, in this configuration a dead point can occur in the movement, which is undesirable. It is therefore preferable to position the three pivot points in such a way that the points 19 and 17 have changed places. Figure 2 gives a possible embodiment of the configuration then achieved.

[0017] All components in Figure 2 are indicated by the same reference numerals as those in Figure 1. The main difference between the embodiments in Figures 1 and 2 can be found in the shape of the first lever 3 and the connection of said lever 3 to the second swivelling arm 2, the second lever 4, and the second cylinder 22. In Figure 2 the first lever 3 is T-shaped, but it can be of another shape if desired, depending on the position of pivot point 19. The transverse bar of the T shape forms part of the first lever 3 and serves as one of the bars in the five-bar linkage, while the stem of the T shape on its underside contains the ninth pivot point 19, by means of which the first lever 3 is connected to the second cylinder 22. The position of the ninth pivot point 19 must lie somewhere on the lever 3 at a certain distance from the pivot point 17; it can also coincide with pivot point 13. In this embodiment the second swivelling arm 2 is provided with a projecting part 2a, so that the pivot point 17 is moved slightly outside the axis of the second swivelling arm 2. However, this is not essential for the functioning of the system because pivot points 17 and 18 can also coincide, although the condition for this is that the pivot points (13, 19) and (17, 18) are not made to coincide simultaneously because the cylinder 22 then goes into line with the first lever 3, with the result that the cylinder 22 stops working.

[0018] It has been found that this five-bar linkage simplifies controlling the position of the container, in particular during lifting of said container. During the first part of the movement path in particular, when the container is being lifted to a level which approximately corresponds to the height of the container, it is desirable not to change the slanting position of the container, in order to ensure that no obstruction is encountered from any objects which may be present in the vicinity of the container. After the initial position of the pick-up element 24 in this five-bar linkage has been set by means of the second cylinder 22, the position of the container relative to a reference, for example the vertical, remains virtually unchanged when cylinder 21 is driven to full output. That means that any adjustment by means of the second cylinder is unnecessary, or only a slight adjustment need be made. This therefore means that the control of the second cylinder is simplified compared with the prior art. A smaller cylinder will suffice, less hydraulic fluid needs to be pumped, and any adjustment desired can be made more quickly.

[0019] It is pointed out that many further design variants are possible within the scope of the above description and within the scope of the appended claims. For instance, the position of pivot point (19) in certain embodiments can also coincide with pivot point (13), without influencing the functioning of the system. Cylinder (22) in that case also serves to adjust the position of the first lever (3) relative to the position of the second swivelling arm (2). Furthermore, the pivot points 17 and 18 can also coincide if desired, except that the two situations cannot occur simultaneously because in that case the cylinder 22 no longer functions (it is then lying in line with lever 3). Even if either the pivot points (13, 19) or the pivot points (17, 18) coincide, this is still a five-bar linkage with the advantages described above.

Claims

1. Device for picking up and emptying refuse containers, in particular for side loading, which device is fixed on the frame (9) of the vehicle and is provided with:

- a first swivelling arm (1), one end of which is pivotably fixed on the frame (9) by way of a first pivot point (11),
- a second swivelling arm (2), one end of which is pivotably fixed on the other end of the first swivelling arm (1) by way of a second pivot point (12),
- a first lever (3), one end of which is pivotably fixed on the second swivelling arm (2),
- a second lever (4), one end of which is fixed on the first lever (3) by way of a third pivot point (13),
- a third lever (5), one end of which is fixed on the other end of the second lever (4) by way of a fourth pivot point (14), and the other end of which is connected to the first swivelling arm (1) by way of a fifth pivot point (15), which fifth pivot point (15) is situated at a certain distance from the first pivot point (11) and second pivot point (12),

a first cylinder (21) pivotable connected between a sixth pivot point (16) on the frame (9) of the vehicle and the fourth pivot point (14),

a second cylinder (22) pivotable connected between the second swivelling arm (2) and the first lever (3), a guide bar (6) between the fourth pivot point (14) and the frame (9) fixed by way of a pivot point (20) on the frame (9), and

a container pick-up element (24) on the second swivelling arm (2), **characterized in that** said one end of the first lever (3) is fixed by way of a seventh pivot point (17) on the second swivelling arm (2) at a distance from the second pivot point (12), and that the

first lever (3) has three pivot points (13, 17, 19), two of which form the abovementioned third and seventh pivot points (13, 17), while the remaining pivot point (19) serves to fix the second cylinder (22).

2. Device according to claim 1, **characterized in that** the first lever (3) is formed in such a way that the three pivot points (13, 17, 19) on the first lever (3) are situated in an imaginary triangle.
3. Device according to claim 1, **characterized in that** the first lever (3) is in the shape of a boomerang.
4. Device according to claim 1, **characterized in that** the first lever (3) is T-shaped.
5. Device according to claim 1, **characterized in that** the ninth pivot point (19) coincides with the third pivot point (13), on condition that the seventh and eighth pivot points (18, 17) do not coincide.
6. Device according to one of the preceding claims, **characterized in that** the second cylinder (22) is fixed on the second swivelling arm (2) by way of an eighth pivot point (18) at a distance from the second pivot point (12) and seventh pivot point (17).
7. Device according to claim 6, **characterized in that** the seventh and eighth pivot points (17, 18) coincide, on condition that the third and ninth pivot points (13, 19) do not coincide.
8. Device according to claim 6, **characterized in that** the second swivelling arm (2) is formed in such a way that the eighth pivot point (18) is situated outside the line through the second pivot point (12) and the seventh pivot point (17).

Patentansprüche

1. Vorrichtung zum Aufnehmen und Entleeren von Müllbehältern, insbesondere zur Seitenbeladung, welche Vorrichtung an dem Rahmen (9) des Fahrzeugs befestigt ist und versehen ist mit:

- einem ersten Schwenkarm (1), von welchem ein Ende schwenkbar an dem Rahmen (9) durch einen ersten Anlenkpunkt (11) befestigt ist,
- einem zweiten Schwenkarm (2), an welchem ein Ende schwenkbar am anderen Ende des ersten Schwenkarms (1) durch einen zweiten Anlenkpunkt (12) befestigt ist,
- einem ersten Hebel (3), von welchem ein Ende schwenkbar an dem zweiten Schwenkarm (2) befestigt ist,
- einem zweiten Hebel (4), von welchem ein Ende an dem ersten Hebel (3) durch einen dritten

Anlenkpunkt (13) befestigt ist,

- einem dritten Hebel (5), von welchem ein Ende am anderen Ende des zweiten Hebels (4) durch einen vierten Anlenkpunkt (14) befestigt ist, und dessen anderes Ende mit dem ersten Schwenkarm (1) durch einen fünften Anlenkpunkt (15) verbunden ist, welcher fünfte Anlenkpunkt (15) in einem bestimmten Abstand von dem ersten Anlenkpunkt (11) und dem zweiten Anlenkpunkt (12) angeordnet ist,
- einem ersten Zylinder (21), der schwenkbar zwischen einem sechsten Anlenkpunkt (16) am Rahmen (9) des Fahrzeugs und dem vierten Anlenkpunkt (14) verbunden ist,
- einem zweiten Zylinder (22), der schwenkbar zwischen dem zweiten Schwenkarm (2) und dem ersten Hebel (3) verbunden ist,
- einer Führungsstange (6) zwischen dem vierten Anlenkpunkt (14) und dem Rahmen (9), der durch einen Anlenkpunkt (20) am Rahmen (9) befestigt ist, und
- einem Behälter-Aufnahmeelement (24) auf dem zweiten Schwenkarm (2),

dadurch gekennzeichnet, dass ein Ende des ersten Hebels (3) durch einen siebten Anlenkpunkt (17) am zweiten Schwenkarm (2) in einem Abstand von dem zweiten Anlenkpunkt (12) befestigt ist, und dass der erste Hebel (3) drei Anlenkpunkte (13,17,19) aufweist, von denen zwei die vorstehend erwähnten dritten und siebten Anlenkpunkte (13,17) sind, während der verbleibende Anlenkpunkt (19) dazu dient, den zweiten Zylinder (22) zu befestigen.

2. Vorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der erste Hebel (3) derart ausgebildet ist, dass die drei Anlenkpunkte (13,17,19) an dem ersten Hebel (3) in einem gedachten Dreieck angeordnet sind.

3. Vorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der erste Hebel (3) die Form eines Bumerangs aufweist.

4. Vorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der erste Hebel (3) T-förmig ist.

5. Vorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der neunte Anlenkpunkt (19) mit dem dritten Anlenkpunkt (13) zusammenfällt, falls der siebte und der achte Anlenkpunkt (18,17) nicht übereinstimmen.

6. Vorrichtung gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der zweite Zylinder (22) an dem zweiten Schwenkarm (2) durch einen achten Anlenkpunkt (18) in einem Abstand von dem zweiten Anlenkpunkt (12) und dem

siebten Anlenkpunkt (17) befestigt ist.

7. Vorrichtung gemäß Anspruch 6, **dadurch gekennzeichnet, dass** die siebten und achten Anlenkpunkte (17,18) zusammenfallen, falls der dritte und der neunte Anlenkpunkt (13,19) nicht zusammenfallen.

8. Vorrichtung gemäß Anspruch 6, **dadurch gekennzeichnet, dass** der zweite Schwenkarm (2) derart ausgebildet ist, dass der achte Anlenkpunkt (18) außerhalb der Linie durch den zweiten Anlenkpunkt (12) und den siebten Anlenkpunkt (17) angeordnet ist.

Revendications

1. Dispositif de levage pour vider des poubelles, en particulier pour un chargement latéral, ce dispositif étant fixé au châssis (9) du véhicule et comportant :

- un premier bras pivotant (1) dont une extrémité extérieure est fixée de manière pivotante au châssis (9) par l'intermédiaire d'un premier point de pivotement (11),
- un second bras pivotant (2) dont une extrémité est fixée de manière pivotante à l'autre extrémité du premier bras pivotant (1) par l'intermédiaire d'un second point de pivotement (12),
- un premier levier (3) dont une extrémité est reliée de manière pivotante au second bras pivotant (2),
- un second levier (4) dont une extrémité est fixée au premier levier (3) par l'intermédiaire d'un troisième point de pivotement (13),
- un troisième levier (5) dont une extrémité est fixée à l'autre extrémité du second levier (4) par l'intermédiaire d'un quatrième point de pivotement (14) et dont l'autre extrémité est reliée au premier bras pivotant (1) par l'intermédiaire d'un cinquième point de pivotement (15), ce dernier étant situé à une certaine distance du premier point de pivotement (11) et du second point de pivotement (12),
- un premier vérin (21) relié de manière pivotante entre un sixième point de pivotement (16) du châssis (9) du véhicule et le quatrième point de pivotement (14),
- un second vérin (22) relié de manière pivotante entre le second bras pivotant (2) et le premier levier (3),
- une barre de guidage (6) entre le quatrième point de pivotement (14) et le châssis (9), fixée par l'intermédiaire d'un point de pivotement (20) au châssis (9), et
- un élément de prise de poubelle (24) porté par le second bras pivotant (2),

caractérisé en ce qu'

une extrémité du premier levier (3) est fixée par l'intermédiaire d'un septième point de pivotement (17) au second bras pivotant (2) à une distance du second point de pivotement (12) et le premier levier (3) comporte trois points de pivotement (13, 17, 19) dont deux constituent le troisième et le septième point de pivotement (13, 17) ci-dessus, et le point de pivotement restant (19) permet de relier le second vérin (22).

5

10

2. Dispositif selon la revendication 1,

caractérisé en ce que

le premier levier (3) est formé pour que les trois points de pivotement (13, 17, 18) du premier levier (3) soient situés au sommet d'un triangle imaginaire.

15

3. dispositif selon la revendication 1,

caractérisé en ce que

le premier levier (3) a la forme d'un boomerang.

20

4. Dispositif selon la revendication 1,

caractérisé en ce que

le troisième levier (3) a une forme en T.

25

5. Dispositif selon la revendication 1,

caractérisé en ce que

le neuvième point de pivotement (19) coïncide avec le troisième point de pivotement (13) à condition que les septième et huitième points de pivotement (18,17) ne coïncident pas.

30

6. Dispositif selon l'une des revendications précédentes,

caractérisé en ce que

le second vérin (22) est fixé au second bras pivotant (2) par l'intermédiaire d'un huitième point de pivotement (18) à distance du second point de pivotement (12) et du septième point de pivotement (17).

35

40

7. Dispositif selon la revendication 6,

caractérisé en ce que

le septième et le huitième point de pivotement (17, 18) coïncident à condition que le troisième et le neuvième point de pivotement (13, 19) ne coïncident pas.

45

8. Dispositif selon la revendication 6,

caractérisé en ce que

le second bras pivotant (2) est formé de façon que le huitième point de pivotement (18) soit situé à l'extérieur de la ligne passant par le second point de pivotement (12) et le septième point de pivotement (17).

50

55

Fig 1

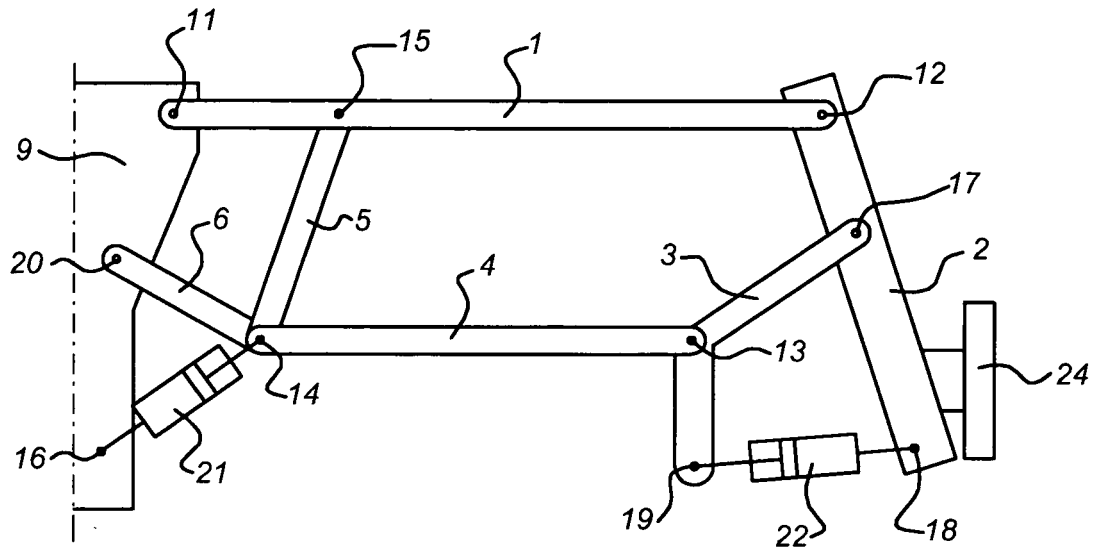
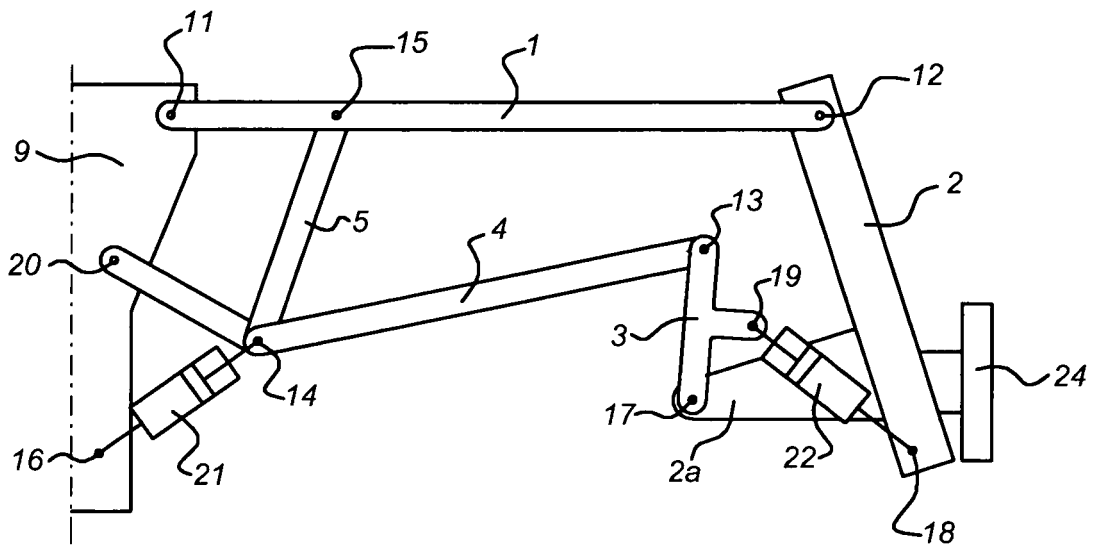


Fig 2



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1148001 A [0002] [0004]
- DE 19746401 [0003]
- EP 0709310 A [0003]