(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 305 714 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
11.04.2018 Bulletin 2018/15

(51) Int Cl.:
B66F 9/075 *(2006.01)* ***B66F 9/12*** *(2006.01)*

(21) Application number: **16192130.9**

(22) Date of filing: **04.10.2016**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(71) Applicant: **Toyota Material Handling Manufacturing Sweden AB**
595 81 Mjölby (SE)

(72) Inventor: **ROSENBLAD, Andreas**
590 47 Vikingstad (SE)

(74) Representative: **Ström & Gulliksson AB**
Box 5275
102 46 Stockholm (SE)

(54) **ORDER PICKER TRUCK**

(57) Order picker truck having a vertically moveable platform (2) and a gate that is opened in order to get access to the platform (2). The gate comprises an upper bar (3) having a bow form. Means are arranged allowing the bow of the upper bar (3) to be turned from a vertical position to a horizontal position and vice versa.

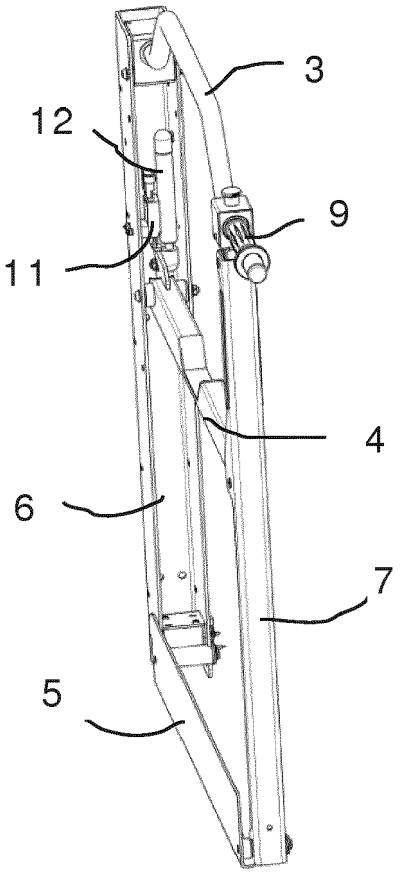

Fig. 4

EP 3 305 714 A1

Description

Technical Field

[0001] The present invention concerns an order picker truck and more precisely means to extend the range of a picker.

Background

[0002] By means of an order picker truck a driver is picking items from a rack at an elevated level. The driver is standing on a platform, which platform can be raised and lowered to desired heights. The truck may also be driven along the rack in order to pick items at different positions in a rack.

[0003] In order to be able to enter the platform some kind of gate is provided. The gate is normally also a safety device hindering the driver from falling off the platform. However, in some cases the gate may make it hard to reach items placed far into the rack. A solution to this according to prior art is to arrange the gate so that it can be tilted outwards and thereby increase the reach for the driver standing on the platform. One example of such a solution is shown in EP 2 514 708 B1, wherein an upper lateral barrier and a central lateral barrier are arranged on a carrier component. The carrier component holds one end of the upper and middle lateral barriers, respectively. The carrier component holder can be folded outwards to a limited degree.

Summary

[0004] One object of the present invention is to solve the above problem of how to reach further into a rack in a simple, economical and safe way.

[0005] According to one aspect of the invention an order picker truck is arranged with a vertically moveable platform and a gate. The gate comprises an upper bar having a bow form. Means are arranged allowing the bow of the upper bar to be rotated from a vertical position to a horizontal position and vice versa. The bow is directed away from the platform in the horizontal position.

[0006] According to a further aspect of the invention the gate is formed of interconnected columns and bars. In the closed position of the gate it comprises two vertical columns and three horizontal bars. In the fully opened position of the gates all columns and bars have an approximately horizontal position.

[0007] Further objects and advantages of the invention will be obvious to a person skilled in the art when reading the detailed description below of different embodiments.

Brief Description of the Drawings

[0008] The invention will be described further below by way of example and with reference to the enclosed drawings. In the drawings:

Fig. 1 is a perspective view of an order picker truck according to prior art,

Fig. 2 is a front view of a gate according to one embodiment of the present invention in a closed position,

Fig. 3 is a side view of the gate of Fig. 2 in an opened position,

Fig. 4 is a perspective view of the gate of Figs. 2 and 3 in a closed position,

Fig. 5 is a view from above of the gate of Figs. 2 to 4 in a closed position,

Fig. 6 is a view from above corresponding with Fig. 5, but with an upper bar in a position where it has been rotated to a folded out position,

Fig. 7 is an exploded view of the gate of Figs 2-6, and Figs. 7a to 7d are exploded views of respective encircled parts of Fig. 7.

Detailed Description

[0009] As used in this description the expressions "horizontal", "vertical", "upper", "middle", "lower" and similar expressions are in view of the order picker truck as shown in the Figs. referred to and to the normal use of an order picker truck.

[0010] In Fig. 1 an example of a general order picker truck 1 is shown. A gate according to the present invention is intended for use with order picker trucks, such as the order picker truck 1 of Fig. 1. The order picker truck 1 has a platform 2, which can be raised and lowered such as along a mast for example. A person is to stand on the platform 2 and pick items at all levels. The platform 2 has a gate that is opened for allowing a person to go onto the platform 2. The gate is also a safety device that serves the purpose to hinder the person on the platform 2 from falling out.

[0011] In the shown embodiment the gate has an upper bar 3, a middle bar 4, a lower bar 5, a first column 6 and a second column 7. One end of each bar 3-5 is received with one end in a journaling point 8 in the first column 6, the opposite end of respective bar 3-5 is received in a journaling point 8 in the second column 7. The first column 6 is fixed to the platform. To open the gate it is turned upwards, whereby the second column 7 is lifted. As the second column 7 is lifted the bars 3-5 will be turned in relation to fixed first column 6 and to the second column 7 in the journaling points 8 of respective bar 3-5. When the gate is fully opened the first and second columns 6, 7 and the bars 3-5 all will have an approximately vertical extension, as shown in Fig. 3.

[0012] The exact design of the first and second columns 6, 7 and the middle and lower bars 4, 5 are of no importance to the present invention as such. Thus, said columns and bars can be given different designs than those shown in the enclosed Figs.

[0013] The journaling points 8 could have the form of a shaft received in bushings at opposite ends or the form of a bolt and nut. Each shaft or bolt goes through one of

the columns 6, 7 and one of the bars 3-5.

[0014] The gate is normally opened and closed by hand by gripping a handle 9, but it is also possible to provide an actuator for opening and closing of the gate. The handle 9 is provided at the end of the upper bar 3 placed at the second column 7.

[0015] A locking piston 10 is placed on the first column 6 in a position to hinder unwanted opening of the gate. In the locking position a pin of the locking piston 10 is protruded under the lower bar 5 hindering the lower bar 5, and thereby the gate, from being opened. The locking piston 10 may be controlled to only allow the gate to be opened up to a predetermined height for the platform 2. If the gate is still open when reaching said predetermined height the upwards movement of the platform 2 is stopped.

[0016] A sensor 11 is placed at the end of the middle bar 4 in the first column 6. The sensor 11 senses whether the gate is opened or not. Lifting of the platform 2 of the order picker truck 1 is only allowed if the sensor 11 registers that the gate is closed. A gas damper 12 is placed next to the sensor 11, which gas damper 12 is placed to dampen the movement of the gate when approaching the totally open and/or closed position.

[0017] The upper bar 3 has a bent form, forming a kind of bow. The bow starts a short distance from respective end of the upper bar 3. A first and second straight part 13, 14, respectively, at each end of the upper bar 3 goes via a curve 15, 16 over in a middle part 17. In the shown embodiment the middle part 17 is straight but in other embodiments the middle part has a curved form. A distance by which the middle part 17 is displaced from the ends of the upper bar 3 is about 100 mm. The exact distance may vary depending on the intended use and available space. In the horizontal position the bow of the upper bar 3 is directed away from the platform 2. By placing the bow of the upper bar 3 in a horizontal position the person standing on the platform 2 can lean further into a rack or the like compared to if the upper bar would be straight.

[0018] The upper bar 3 is received with a first end in a first housing 18 on the fixed first column 6 and a second end in a second housing 19 on the second column 7. In the first housing 18 in the first column 6 the first end of the upper bar 3 goes through a bushing 20. The first end of the upper bar 3 received in the first housing 18 has a protruding part 21 protruding from the outer end of the upper bar 3. The protruding part 21 has a relatively short extension along the circumference of the upper bar 3. The protruding part 21 is to cooperate with a sensor 22 to establish whether the bow of upper bar 3 is in a horizontal or vertical position. In the shown embodiment the protruding part 21 is placed at the sensor 22 when the bow of the upper bar 3 is in a vertical position. A torsion spring 23 is placed inside the housing 18, surrounding the first end of the upper bar 3 and placed between the bushing 20 and the sensor 22. The torsion spring 23 is connected to the upper bar 3 and the function of the torsion spring 23 is to automatically return the upper bar 3 to the position in which the bow of the upper part has a vertical position, in case no force is applied to the upper bar 3. A tensioning screw 24 is provided in the first housing 18 and acting on one end of the torsion spring 23. By means of the tensioning screw 24 the force of the torsion spring 23 can be adjusted to a desired level.

[0019] The second housing 19 of the second column 7 comprises a support sleeve 25. The upper bar 3 goes through the support sleeve 25 of the second housing 19 and through a bushing 26 at an inner end of the housing 19. The upper bar 3 is free to rotate inside the support sleeve 25. The second end of the upper bar 3 protrudes from the second housing 19. The handle 9 is placed on the part of the upper bar 3 protruding from the second housing 19. The handle 9 is fixed to the upper bar 3 in such a way that the upper bar 3 will be rotated when the handle 9 is rotated. One example of the connection between the handle 9 and the upper bar 3 is to use a lock screw, as indicated in Fig. 7b.

[0020] The support sleeve 25 of the second housing 19 receives a pin 27 in grooves 28 on opposite sides of the support sleeve 25. Each groove 28 extends about 90° around the circumference of the support sleeve 25. The pin 27 is placed in first openings 29 opposite each other in the upper bar 3, projecting outside the upper bar 3 in such a way that the ends of the pin 27 is placed in respective groove 28 of the support sleeve 25. By cooperation between the pin 27 and the grooves 28 the maximal rotation of the upper bar 3 is restricted to about 90°. Thereby the upper bar 3 may be rotated between a position where the bow of the upper bar 3 has a vertical position and a position where the bow of the upper bar 3 has a horizontal position.

[0021] An index bolt 30 is arranged on the second housing 19 at the second column 7. The index bolt 30 has a pin 31 at the lower end to be received in an opening 32 of the support sleeve 25. A second opening 33 of the upper bar 3 is placed in line with the opening 32 of the support sleeve 25 when the upper bar 3 is in the position in which the bow of the upper bar 3 is in a vertical position. The pin 31 of the index bolt 30 is pretensioned to go into the second opening 33 of the upper bar 3, locking the upper bar 3 from being rotated, when the bow of the upper bar 3 is in the vertical position. Thus, the index bolt 30 has to be lifted in order to rotate the upper bar 3. However, the index bolt 30 may be locked in the lifted position, whereby it is not necessary to lift the index bolt 30 every time one wants to rotate the upper bar 3.

[0022] If the pin 31 of the index bolt 30 is lifted out of the second opening 33 of the upper bar 3, the bow of the upper bar 3 may be rotated towards a horizontal position either by hand or by leaning against the bow of the upper bar 3. When the sensor 22 in the first housing 18 at the first column 6 detects that the upper bar 3 has been rotated from the position in which the bow of the upper bar 3 has a vertical position, movement of the order picker truck 1 as well as the platform 2 is hindered. If one lets

the upper bar 3 go, for instance by not leaning against it any more, the bow of the upper bar 3 will be brought to the vertical position by means of the torsion spring 23. In that position the sensor 22 will register that the upper bar 3 is back in the original position allowing movement for the truck 1 and the platform 2.

Claims

1. An order picker truck having a vertically moveable platform (2) and a gate, **characterized in that** the gate comprises an upper bar (3) having a bow form and that means are arranged allowing the bow of the upper bar (3) to be rotated 90° from a vertical position to a horizontal position and vice versa, whereby said bow is placed laterally outside the platform (2) in the horizontal position, that the bow of the upper bar (3) is formed by a middle part (17) going over by means of curves (15, 16) into a first straight part (13) of the upper bar (3) and a second straight part (14) of the upper bar (3), respectively, that the middle part (17) is displaced in relation to the first and second straight parts (13, 14), respectively, of the upper bar (3) and that a torsion spring (23) is arranged to act in a direction to urge the bow of the upper bar (3) to its vertical position.

2. The order picker truck of claim 1, wherein the middle part (17) of the upper bar (3) is straight or curved and wherein the displacement of the middle part (17) of the upper bar (3) is about 100 mm.

3. The order picker truck of claim 1 or 2, wherein the gate further comprises a middle bar (4), a lower bar (5), a first column (6) and a second column (7), wherein the first column (6) is fixed in a vertical position, wherein one end of the upper, middle and lower bars (3-5), respectively, are connected to the first column (6) in journaling points (8), wherein the opposite end of respective upper, middle and lower bars (3-5) are connected to the second column (7) in journaling points (8), wherein the gate is moveable between an open position and a closed position, wherein each of the upper, middle and lower bars (3-5) and the first and second columns (6, 7) has an approximately vertical position in the open position of the gate and wherein each of the upper, middle and lower bars (3-5) has an approximately horizontal position in the closed position of the gate.

4. The order picker truck of claim 3, wherein the torsion spring (23) is received in a first housing (18) on the first column (6) and wherein a first end of the upper bar (3) is received inside the torsion spring (23) inside the first housing (18).

5. The order picker truck of claim 4, wherein a tensioning screw (24) for controlling the force of the torsion spring (23) is received in the first housing (18).

6. The order picker truck of claim 4 or 5, wherein the first end of the upper bar (3) has a protruding part (21) and wherein a sensor (22) is placed inside the first housing (18) for cooperation with the protruding part of the upper bar (3).

7. The order picker truck of any of the claims 3-6, wherein the upper bar (3) goes through a support sleeve (25) in a second housing (19) on the second column (7), wherein a second end of the upper bar (3) protrudes outside the second housing (19), wherein a handle (9) is placed on the second end of the upper bar (3), protruding outside the second housing (19) and wherein the handle (9) is fixed to the upper bar (3).

8. The order picker truck of claim 7, wherein the upper bar (3) is free to rotate inside the support sleeve (25), wherein a pin (27) is fixed in first openings (29) of the upper bar (3), which pin (27) is received in grooves (28) of the support sleeve (25), and wherein the pin (27), fixed to the upper bar (3), and the groove (28) of the support sleeve (25) cooperate to restricted the rotation of the upper bar (3) in relation to the support sleeve (25) to 90°.

9. The order picker truck of claim 7 or 8, wherein an index bolt (30) is placed in the second housing (19), which index bolt (30) has a pin (31) which is received in an opening (32) of the support sleeve (25) and a second opening (33) of the upper bar (3) in order to hinder rotation of the upper bar (3).

10. The order picker truck of claim 9, wherein the pin (31) of the index bolt (30) is lifted from the second opening (33) of the upper bar (3) in order to allow rotation of the upper bar (3) and wherein the index bolt (30) can be locked in the position with the pin (31) of the index bolt (30) is lifted out of the second opening (33) of the upper bar (3).

11. The order picker truck of any of the claims 3-10, wherein a sensor (11) is arranged to register whether the gate is open, in which case movement of the order picker truck is hindered.

12. The order picker truck of any of the claims 3-11, wherein a gas damper (12) is arranged to act on the middle bar (4).

13. The order picker truck of any of the claims 3-12, wherein a locking piston (10) is arranged to hinder that the gate is opened when the platform has reached a predetermined height.

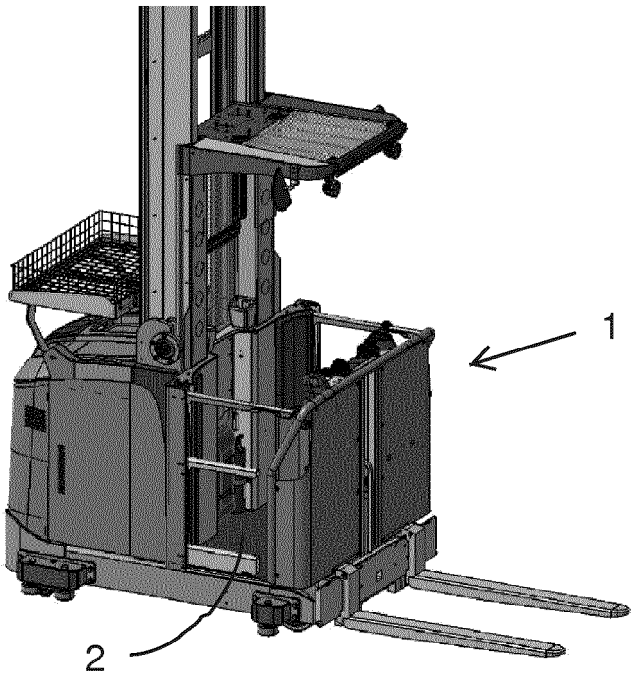

Fig. 1

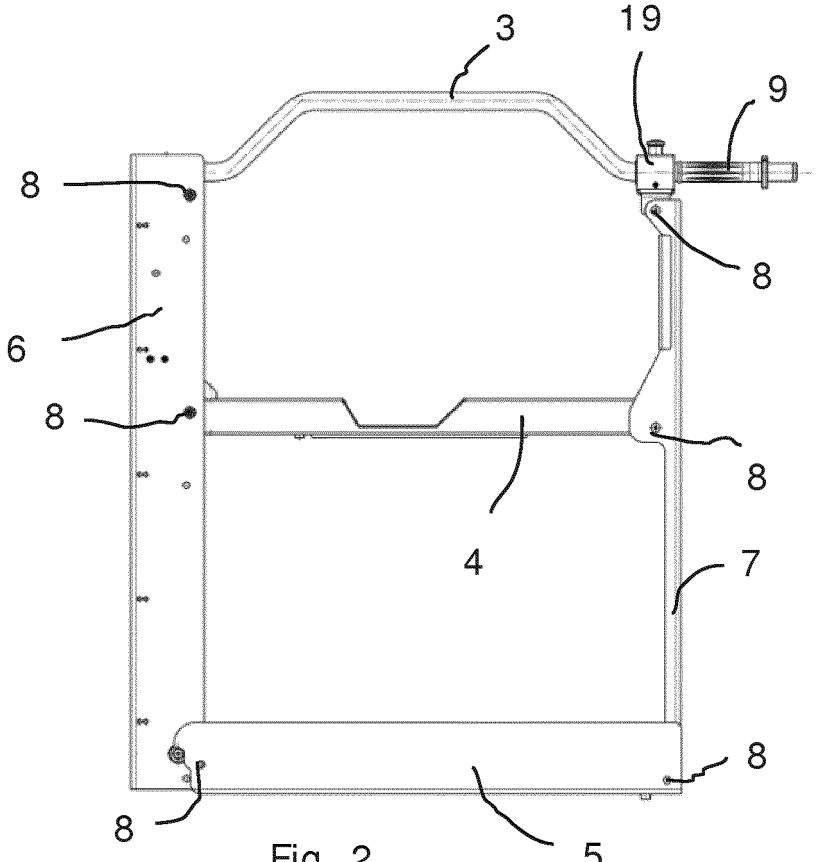

Fig. 2

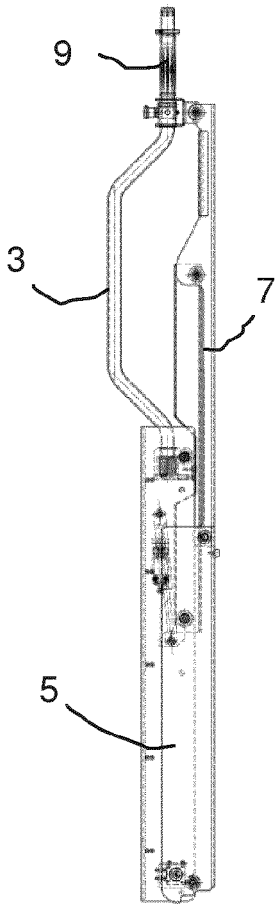

Fig. 3

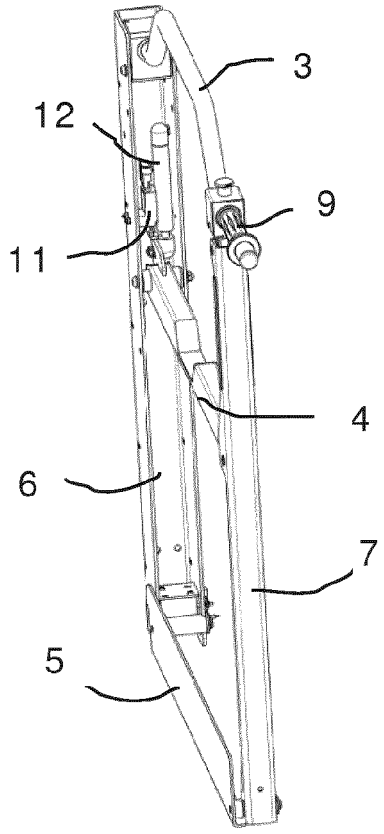

Fig. 4

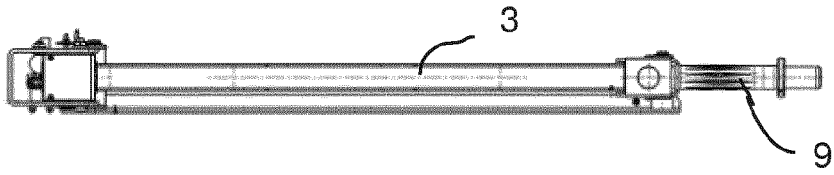

Fig. 5

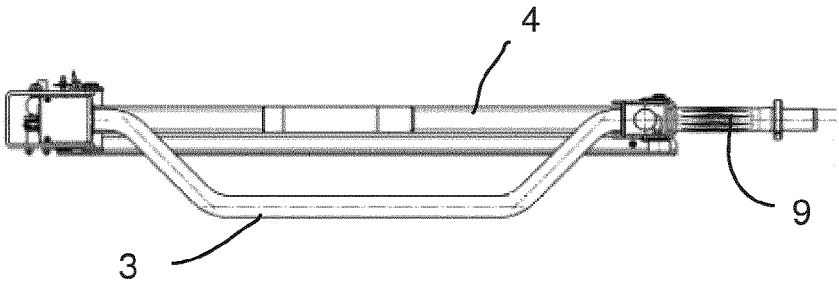

Fig. 6

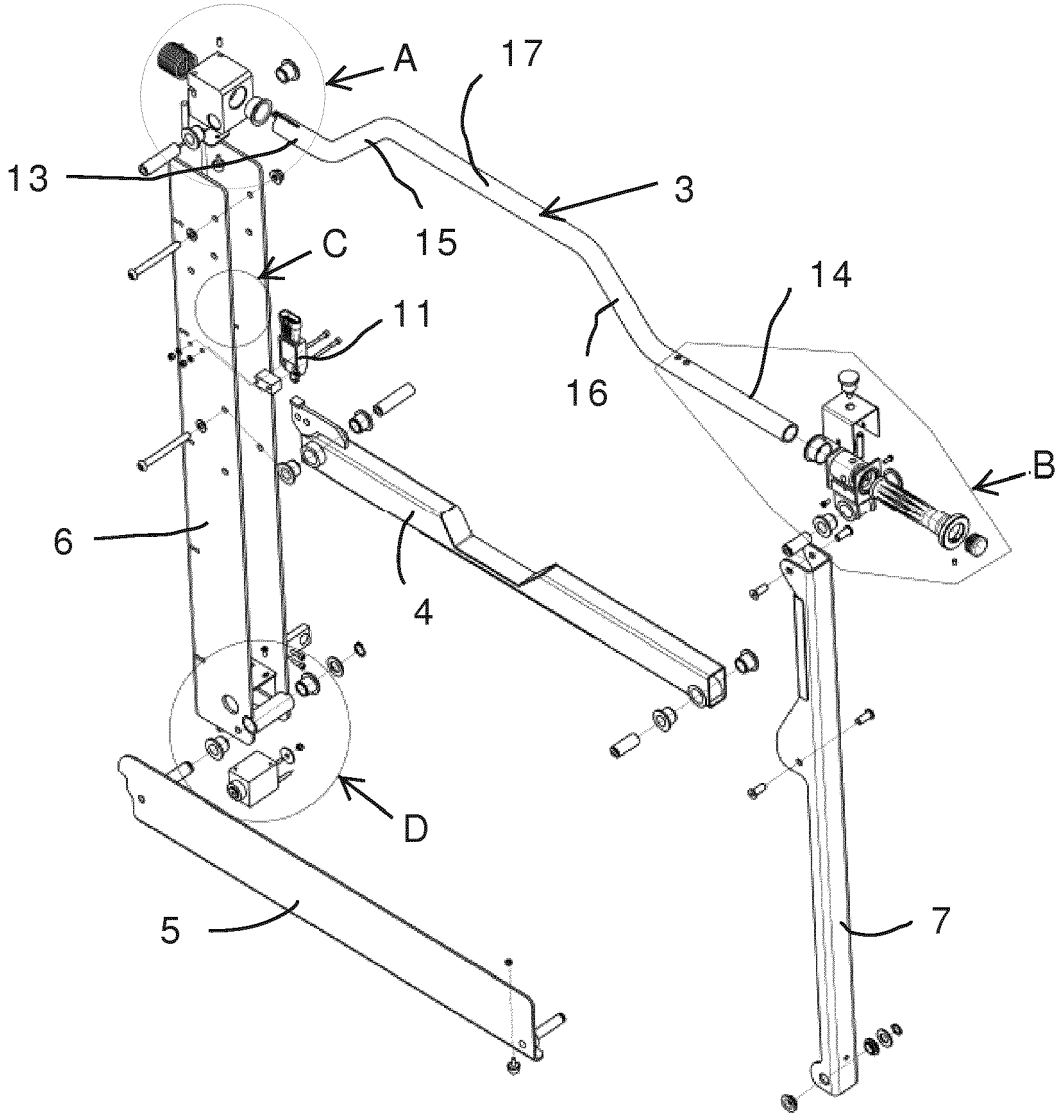

Fig. 7

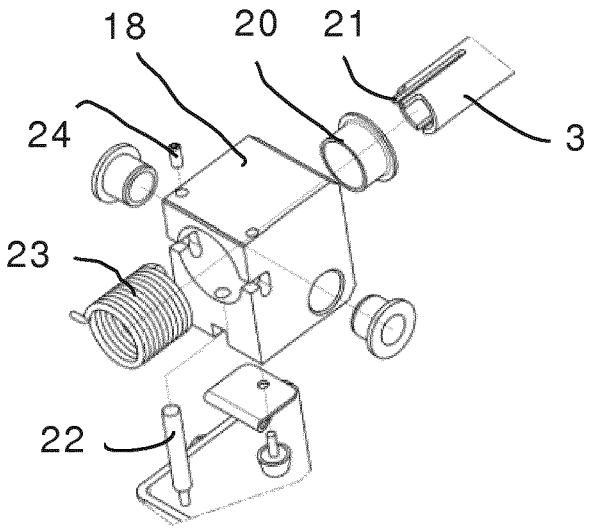

Fig. 7a

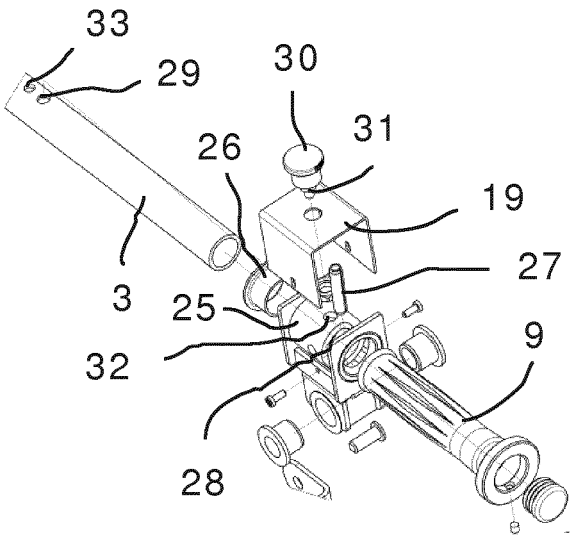

Fig. 7b

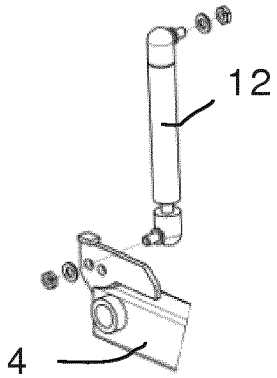

Fig. 7c

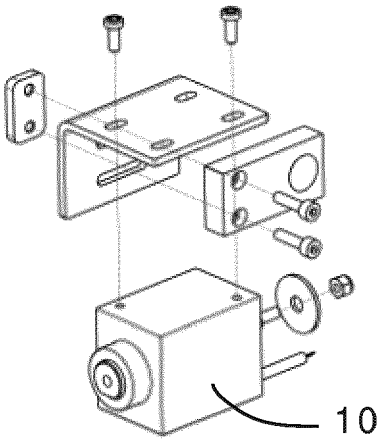

Fig. 7d

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 16 19 2130

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 2 289 669 A (LANSING LINDE LTD [GB]) 29 November 1995 (1995-11-29) * abstract; figures 1,11-13 *	1-13	INV. B66F9/075 B66F9/12
A	DE 198 17 563 A1 (STILL WAGNER GMBH & CO KG [DE]) 21 October 1999 (1999-10-21) * abstract; figures *	1	
A,D	EP 2 514 708 B1 (KION WAREHOUSE SYSTEMS GMBH [DE]) 17 December 2014 (2014-12-17) * figure 4 *	1	
A	JP 2001 226091 A (NIPPON YUSOKI CO LTD) 21 August 2001 (2001-08-21) * abstract; figures 4,6 *	1	
A	JP 2002 302390 A (NIPPON YUSOKI CO LTD) 18 October 2002 (2002-10-18) * abstract; figures 6a, 6b, 13 *	1	

TECHNICAL FIELDS SEARCHED (IPC)

B66F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	27 March 2017	Verheul, Omiros

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 19 2130

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-03-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2289669 A	29-11-1995	DE 19518116 A1	23-11-1995
		GB 2289669 A	29-11-1995
DE 19817563 A1	21-10-1999	NONE	
EP 2514708 B1	17-12-2014	DE 102011018455 A1	25-10-2012
		EP 2514708 A1	24-10-2012
JP 2001226091 A	21-08-2001	NONE	
JP 2002302390 A	18-10-2002	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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 2514708 B1 **[0003]**