



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 201 568 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.05.2002 Bulletin 2002/18

(51) Int Cl.7: **B65F 3/00**

(21) Application number: **01203952.5**

(22) Date of filing: **16.10.2001**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventors:
• **Lokere, Erwin B.A.**
2614 TC Delft (NL)
• **Pluy, Gabriel R.A.**
8830 Hooglede (BE)

(30) Priority: **17.10.2000 BE 200000661**

(74) Representative: **Leherte, Georges M.L.M., Dr. et al**
K.O.B. n.v.,
Pres. Kennedypark 31c
8500 Kortrijk (BE)

(71) Applicant: **Mol CY NV**
8830 Hooglede (BE)

(54) **Protected device for emptying refuse bins in a collecting container**

(57) Device for emptying refuse bins in a collecting container, whereby at least one loading device (4) is provided for picking up a refuse bin and whereby at least one side of the loading device (4) a safety arm (8) is provided which is moveable between an active position, in which the safety arm (8) laterally shields the movement area of the loading device (4), and a rest position in which the safety arm (8) does not shield said area. The safety arm (8) comprises a part (9) which is pivotable around a horizontal axis (10), in the rest position said part (9) is located on or within the path (A) of the operating loading device (4), and in the active position said part (9) is located outside the path (A) of the operating loading device (4), such that, when the safety arm (8) is in the rest position, the safety arm (8) will be forced towards the shielding active position by the operation of the loading device (4).

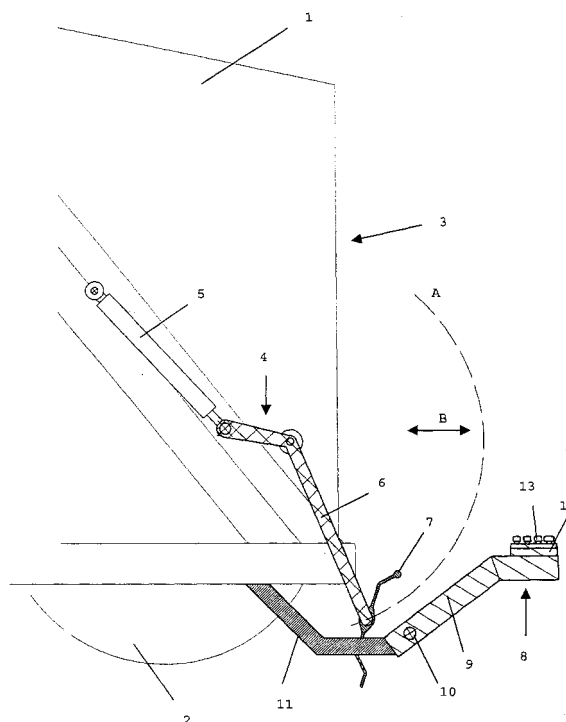


FIG. 1

EP 1 201 568 A1

Description

[0001] The invention relates to a device for emptying refuse bins in a collecting container, whereby at least one loading device is provided for picking up a refuse bin and whereby a safety arm is provided at at least one side of the loading device, the safety arm being moveable between an active position and a rest position, whereby in the active position the safety arm laterally shields the movement area of the loading device, and whereby in the rest position the safety arm does not shield the movement area.

[0002] The invention will primarily be applied with refuse collecting vehicles, where refuse bins are emptied in a collecting container. To fulfil the present safety requirements according to the norm EN-1501-1, the movement area of an automatic or semi-automatic loading device must be shielded laterally against inadvertent persons, so that these persons can not be present within the movement area of the loading device during the loading operation and thereby be jammed under the refuse bins.

[0003] Rigid (permanent) safety arms, moveable safety arms as well as contactless detection elements are used to fulfil these safety requirements.

[0004] To avoid any inconvenience from the extended safety arms when waste is transferred manually into the hopper and because of traffic related reasons, it is desirable that the safety arms can be brought in a position where they do not extend and do not cause any inconvenience whereby in said position they do not shield the movement area of the loading device. The complete safety device must ensure that the automatic or semi-automatic loading device can not be used when the safety arms are located in the non-shielding position (rest position).

[0005] The European Patent application EP0156445 (Zoller-Kipper) describes different embodiments of such a refuse collecting vehicle provided with moveable safety arms. The safety arm is pivotally connected adjacent to the loading device and can be unfolded downwardly from its upper rest position to its backwardly extended active position. In the active position the safety arm activates a switch which allows the automatic or semi-automatic use of the loading device. When the safety arm is raised and the switch is de-activated, the switch is blocking the control circuit of the loading device, so that an automatic or semi-automatic operation becomes impossible.

[0006] Another embodiment is described in the European Patent application EP0962401 (Geesink). The safety arm is pivotally connected adjacent to the loading device and can be unfolded downwardly from its upper rest position to its backwardly extended active position. In the non-active position the safety arm actuates a switch which controls a locking member adjacent to the pick-up member of the loading device whereby this locking member prevents that refuse bins can be picked up

by the pick-up member. In order to operate with the loading device the safety arms must be brought in their shielding position.

[0007] The disadvantage of the known devices is that, with automatic use of the loading device conscious or unconscious sabotage of the switches can lead to very dangerous situations for the operators or for passengers. Moreover the use of switches can result in disturbances and is expensive.

[0008] The purpose of the invention is to provide a loading device which eliminates the drawbacks of the known devices.

[0009] This purpose is achieved by a device for emptying refuse bins in a collecting container, whereby at least one loading device is provided for picking up a refuse bin and whereby a safety arm is provided at at least one side of the loading device, the safety arm being moveable between an active position and a rest position, whereby in the active position the safety arm laterally shields the movement area of the loading device, and whereby in the rest position the safety arm does not shield the movement area, whereby the safety arm comprises a part which is pivotable around a horizontal axis, whereby in the rest position said part is located on or within the path of the operating loading device, and whereby in the active position said part is located outside the path of the operating loading device, such that, when the safety arm is in the rest position it will be forced towards the shielding active position by the operation of the loading device.

[0010] The advantage is that as opposed to the device described in the NL patent 8902431 (Terberg), the safety arms are located in a vertical position, pivoting around a horizontal axis, such that in the rest position the safety arms are located at the sides of the refuse collecting vehicle. The advantage of the vertically located safety arms is that they do not cause any inconveniences when the refuse collecting vehicle is used without the loading device. Hereby the refuse collecting vehicle remains multi functional for the collection of gross garbage, refuse bags etc. Moreover, within the same width of a standard refuse collecting vehicle the loading device can be built with a greater width, such that wider and larger refuse pieces can be collected in the refuse collecting vehicle.

[0011] The location on the safety arms of the control buttons of the loading device and/or the compacting device has the advantage that due to the vertical rest position of the safety arms said buttons cannot be damaged when refuse bags or gross garbage are thrown in the collecting container; throwing in of the refuse is not troubled either by the position of the control buttons.

[0012] According to a preferred embodiment of the invention there is provided a guide plate, such that the movement of the guide plate from the downwardly collapsed rest position towards an upwardly extended position will force the safety arm from its rest position towards its shielding active position.

[0013] According to another preferred embodiment of the invention there is provided a guide plate whereby the control buttons of the guide plate are located on the safety arm.

[0014] The advantage hereof is that in the first place the operator will manually bring the safety arm to its shielding active position, before bringing the guide plate to the upwardly extended position. This prevents that the loading device forces the safety arm unexpectedly towards its shielding active position.

[0015] According to another preferred embodiment of the invention a spring actuates the safety arm such that the spring can force the safety arm towards its shielding active position.

[0016] The advantage hereof is that the movement of the safety arm towards its shielding active position occurs gradually and that it ensures also that the safety arm is brought to the shielding active position. Moreover the movement of the guide plate occurs more smoothly than the movement of the loading device. Hereby the movement of the safety arms towards their shielding active position also occurs more smoothly.

[0017] According to another preferred embodiment of the invention the loading device comprises a start button which initiates an automatic loading cycle and in that the downwardly collapsed guide plate at least partially shields the non-operating loading device, so that said start button becomes inaccessible.

[0018] The advantage hereof is that the loading device cannot be operated automatically when the guide plate is not in its upwardly extended position, because the start button (which initiates the loading device) is inaccessible. When the guide plate is moved to its upwardly extended position the safety arms will be forced towards their shielding active position.

[0019] According to another preferred embodiment of the invention the safety arm is provided with sensors which can detect the position of the safety arm, such that a warning signal is generated when the safety arm is still in the rest position and the loading device is raised.

[0020] The advantage hereof is that the operator is warned about the automatic lowering of the safety arms towards their shielding active position.

[0021] According to another preferred embodiment of the invention the safety arm is provided with sensors which can detect the position of the safety arm, such that the upward movement of the loading device will be blocked when the safety arm is still in the rest position.

[0022] The advantage hereof is that the mechanical safety device according to the invention is completed by an electronic safety device. Hereby the unexpected and forced movement of the safety arms towards their shielding position is prevented. Sabotage of the sensors will not lead to the non-fulfilment of the safety norms, because the mechanical safety device will continue to fulfil the norms. As a consequence there is provided a double safety system.

[0023] According to another preferred embodiment of the invention, safety arms as described here above, are provided both at the left side and at the right side of the loading device, whereby both safety arms are connected with each other.

[0024] The advantage hereof is that when one safety arm is manually moved to its active shielding position, the other safety arm will automatically follow and will also move to its active shielding position.

[0025] According to another preferred embodiment of the invention the loading device is provided with means to identify the refuse bins and with means to weigh the contents of the refuse bins.

[0026] The invention will be explained in more detail in the following description of an exemplary embodiment and with reference to the drawing, in which:

- *Figure 1:* A schematic side view of the rear part of a refuse collecting vehicle (type rear-loader) with the safety arm in its active shielding position;
- *Figure 2:* A schematic side view of a refuse collecting vehicle (type rear-loader) with the safety arm in its rest position;
- *Figure 3:* A schematic rear view of a refuse collecting vehicle (type rear-loader) with the safety arm in its rest position;
- *Figure 4:* A schematic side view of a refuse collecting vehicle (type rear-loader) with the safety arm in the rest position and the guide plate in the downwardly collapsed position, when the loading device is not operating;
- *Figure 5:* A schematic side view of the rear part of a refuse collecting vehicle (type rear-loader) with the safety arm in the active shielding position and the guide plate in the upwardly extended position, when the loading device is operating;
- *Figure 6:* A schematic rear view of a refuse collecting vehicle (type rear-loader) with the safety arm in the rest position and the guide plate in the downwardly collapsed position, when the loading device is not operating.

[0027] The figures show only the rear part of a refuse collecting vehicle (type rear-loader) according to the invention.

[0028] In a first embodiment according to the invention, the figures 1,2 and 3 show a refuse collecting vehicle (1) suitable for the transport of refuse, whereby the refuse collecting vehicle (1) is provided with a hopper (2) which is accessible via a loading opening (3).

[0029] As known the refuse is collected in refuse bins, which are emptied by means of the loading device (4) in the hopper (2) via the loading opening (3). The loading device (4) comprises a hydraulic lift cylinder (5) and a pick-up device (7) supported by a rod mechanism, whereby the pick-up device (7) can be hooked behind the edge of a refuse bin to be emptied.

[0030] The loading device (4) is provided with a safety

arm (8a, 8b) both at the left and at the right side; these safety arms (8a, 8b) shield laterally the movement area of the loading device (4) against inadvertent persons, so that these persons can not be present within the movement area of the loading device during the loading operation.

[0031] Each safety arm (8a, 8b) consists of a beam (9) which is pivotally connected to a fixed beam (11) by means of a pivot (10) having a horizontal pivotal axis; the fixed beam (11) is fixed to the refuse collecting vehicle (1).

[0032] The safety arms (8a, 8b) can be moved between a rest position and a shielding active position. As shown in figure 1 the shielding active position is the position wherein the safety arms (8a, 8b) shield laterally the movement area of the loading device (4). The safety arms are then located outside the path (A) of the main arm (6) of the operating loading device (4). As shown in the figures 2 and 3 the rest position is the position wherein the movement area of the loading device (4) is not shielded and wherein the safety arms (8a, 8b) are located within the path (A) of the main arm (6) of the operating loading device (4).

[0033] By the actuation of a start button (not shown in the figure) which is located on the loading device (4), an automatic loading cycle is initiated. The lift cylinder (5) will move after the start of the operation of the loading device (4). Hereby the main arm (6) moves upwardly and automatically forces the safety arms (8a, 8b) downwardly towards their shielding active position.

[0034] The movement of the safety arms (8a, 8b) from the rest position towards the shielding active position and vice versa, is indicated by the arrow (B), whereby the safety arms (8a, 8b) are upwardly and downwardly pivoted over an angle of about 90° degrees.

[0035] As shown in the figures 1 and 2 the safety arms (8a, 8b) are provided with a panel (12) which comprises control buttons (13) for the operation of the loading device (4).

[0036] The operator is expected to move the safety arms (8a, 8b) manually towards the active shielding position. However, even after sabotage or disturbances there will never be created a situation wherein the loading device (4) can operate automatically or semi-automatically whereby the movement area of the loading device (4) is not shielded laterally by the safety arms (8a, 8b).

[0037] According to a second embodiment of the invention, and as shown in the figures 4, 5 and 6 the refuse collecting vehicle (1) comprises a safety arm (8a, 8b) at the left and at the right side of the loading device (4) whereby the safety arms (8a, 8b) are interacting with the position of the guide plate (14); the guide plate (14) ensures the minimum distance (as prescribed by the norms) towards the press, which compresses the refuse in the collecting refuse vehicle, and also guides the refuse from the refuse bin to the hopper (2). When refuse is to be collected in the refuse collecting vehicle

(1) without use of the loading device (4), it is necessary that the guide plate (14) is collapsed downwardly so that a freely accessible loading opening (3) is created.

[0038] In the rest position, as shown in the figures 4 and 6, the safety arms (8a, 8b) are located within the path (A) of the main arm (6) of the operating loading device and the guide plate (14) covers the loading device (4), so that it is impossible to hang up a refuse bin onto the pick-up device (7) of the loading device (4). The buttons for initiating the automatic loading cycle are also located under the downwardly collapsed guide plate (14) so that these buttons cannot be actuated by a refuse bin. In order to use the loading device (4) and to make the start button accessible, the guide plate (14) has to be moved towards its upwardly extended position either manually or by its own lift cylinder (not shown) after actuation of the control buttons (13). The upward movement of the guide plate (14) causes the safety arm (8) to move downwardly towards its shielding active position, as shown in figure 5. The safety arms (8a, 8b) are then located outside the path (A) of the main arm (6) of the operating loading device (4).

[0039] The guide plate (14) can force the safety arms (8a, 8b) into the shielding active position or otherwise after disconnection of the elements (15) a spring (16) will move the safety arm (8) towards its shielding active position. By this embodiment the safety arms (8) are moved automatically towards the shielding active position by the upward movement of the guide plate (14).

[0040] According to another embodiment of the invention (not shown) the control button of the guide plate is located on the safety arm. This stimulates the operator to bring the safety arm manually towards its shielding active position, before moving the guide plate towards the upwardly extended position; hereafter the start button can be actuated to initiate the automatic loading cycle. As the safety arms have already been put manually in their active shielding position, they will not unexpectedly be forced towards that position. This enhances the safe use of the loading device with its safety arms.

[0041] The measures described here above lead to an optimal safety: a reliable safety device for an automatic loading device of a refuse collecting vehicle is achieved by mechanical means. Additional safety can be achieved if the safety arms are provided with sensors which can detect the position of the safety arm. When the safety arms are in the rest position and the loading device is raised (either automatically, semi-automatically or manually) a warning signal can be generated. Hereby the operator is warned about the automatic downward movement of the safety arms towards the active shielding position.

[0042] Additional safety can also be achieved by the provision of sensors which can detect the position of the safety arm, and whereby these sensors are blocking the movement of the loading device, when the safety arms are not yet in the active shielding position.

Claims

1. Device for emptying refuse bins in a collecting container, whereby at least one loading device (4) is provided for picking up a refuse bin and whereby at least one side of the loading device (4) a safety arm (8) is provided which is moveable between an active position, in which the safety arm (8) laterally shields the movement area of the loading device (4), and a rest position in which the safety arm (8) does not shield said area, **characterized in that** the safety arm (8) comprises a part which is pivotable around a horizontal axis, which in the rest position said part is located on or within the path of the operating loading device (4), and which in the active position said part is located outside the path of the operating loading device (4), such that, when the safety arm (8) is in the rest position, the safety arm (8) will be forced towards the shielding active position by the operation of the loading device (4).

5
10
15
20

2. Device according to claim 1, **characterized in that** a guide plate (14) is provided, which can bring the safety arm (8) from the rest position into the shielding active position by bringing said guide plate (14) from a downwardly collapsed rest position towards an upwardly extended active position.

25

3. Device according to claim 1, **characterized in that** a guide plate (14) is provided, whereby the control buttons (13) of the guide plate (14) are located on the safety arm (8).

30

4. Device according to any one of claims 1 up to and including 3, **characterized in that** a spring (16) actuates the safety arm (8) such that the spring (16) can force the safety arm (8) towards the shielding active position.

35

5. Device according to any one of claims 1 up to and including 4, **characterized in that** the loading device (4) comprises a start button which initiates an automatic loading cycle and that the downwardly collapsed guide plate (14) shields at least partially the non-operating loading device (4), so that said start button becomes inaccessible.

40
45

6. Device according to any one of claims 1 up to and including 5, **characterized in that** the safety arm (8) is provided with sensors which can detect the position of the safety arm (8), such that when raising the loading device (4), a warning signal is generated when the safety arm (8) is still in the rest position.

50

7. Device according to any one of claims 1 up to and including 6, **characterized in that** the safety arm (8) is provided with sensors which can detect the position of the safety arm (8), such that when raising

55

the loading device (4) the upward movement of the loading device (4) will be blocked when the safety arm (8) is still in the rest position.

8. Device according to any one of claims 1 up to and including 7, **characterized in that** at the left side of the loading device (4) a safety arm (8a) and at the right side of the loading device a safety arm (8b) according to any of the preceding claims are provided, whereby said safety arms (8a, 8b) are connected with each other.

9. Device according to any one of claims 1 up to and including 8, **characterized in that** the loading device (4) is provided with means to identify the refuse bins and to weigh the contents of the refuse bins.

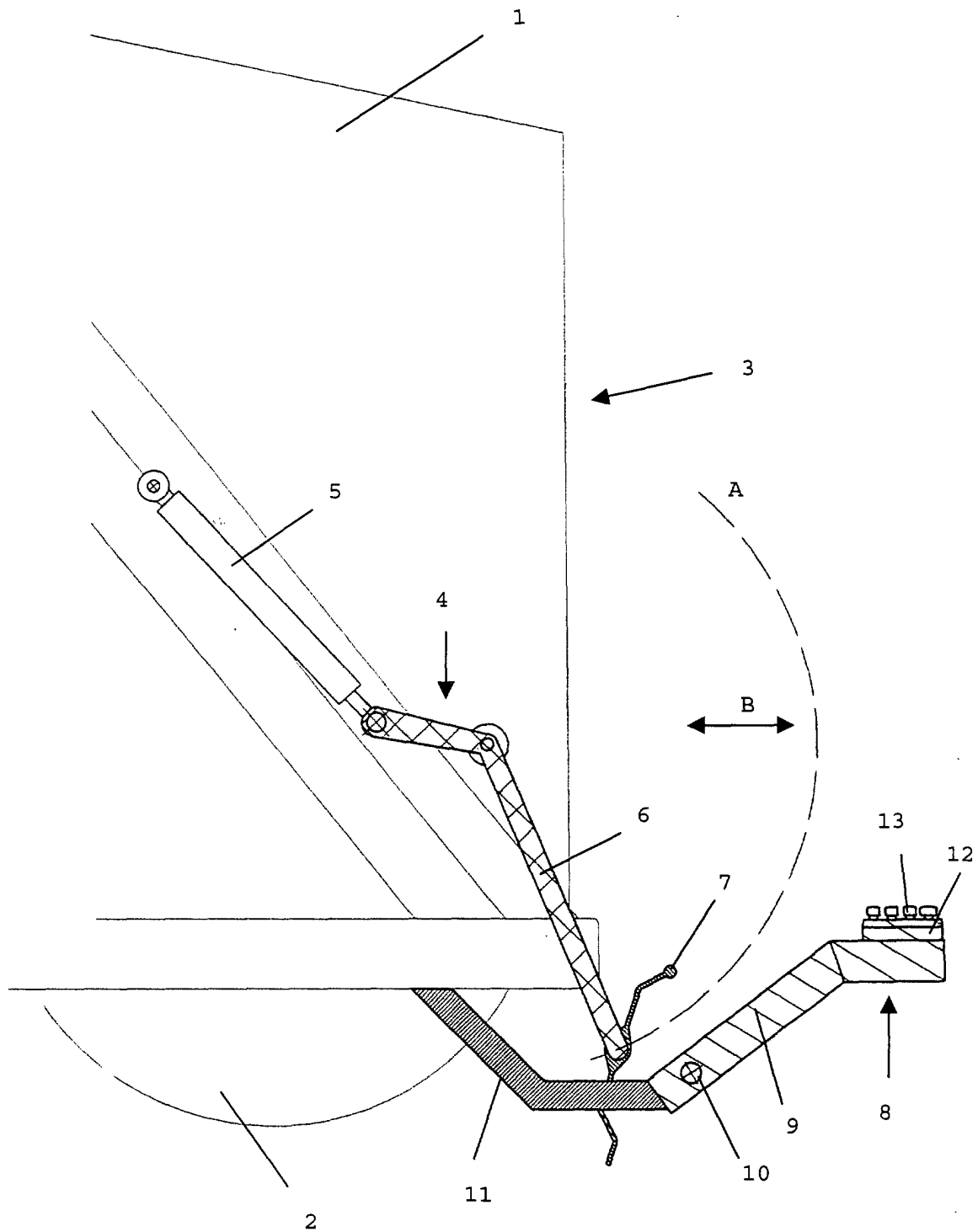


FIG. 1

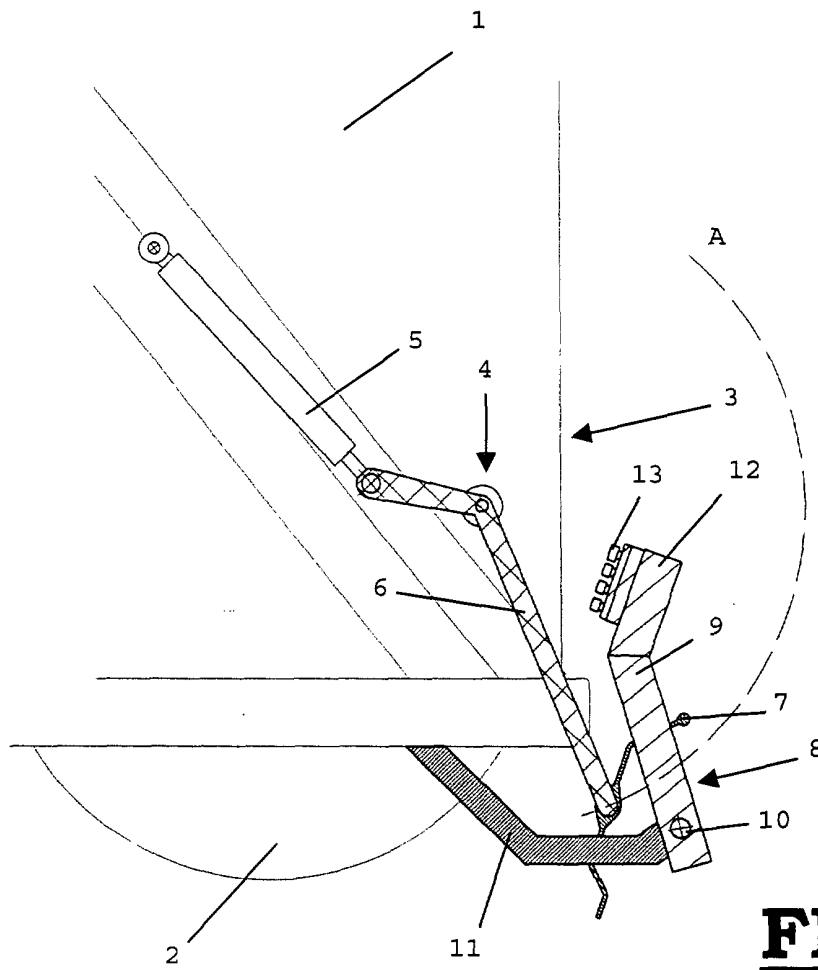


FIG. 2

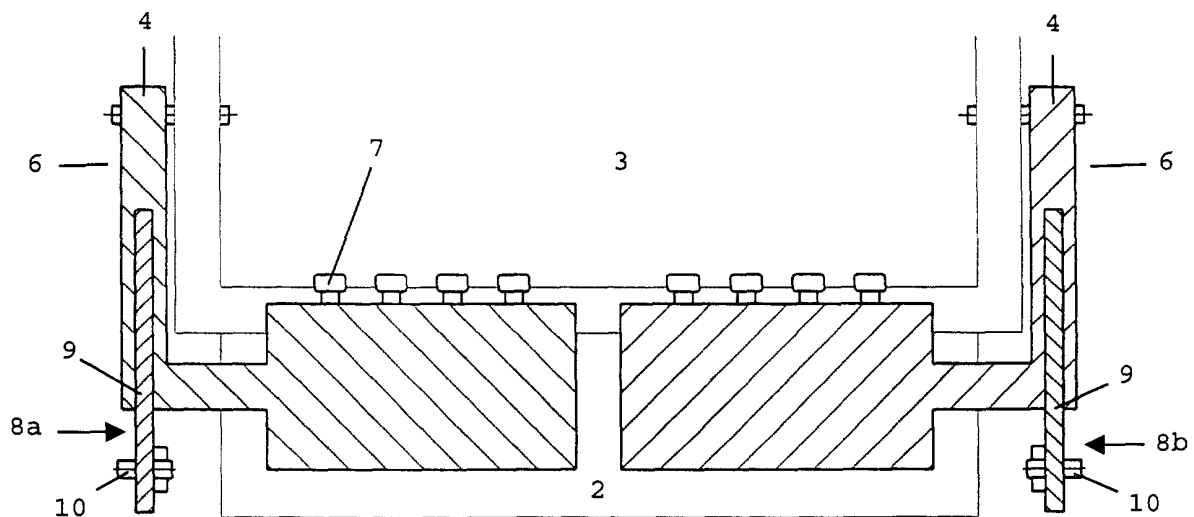


FIG. 3

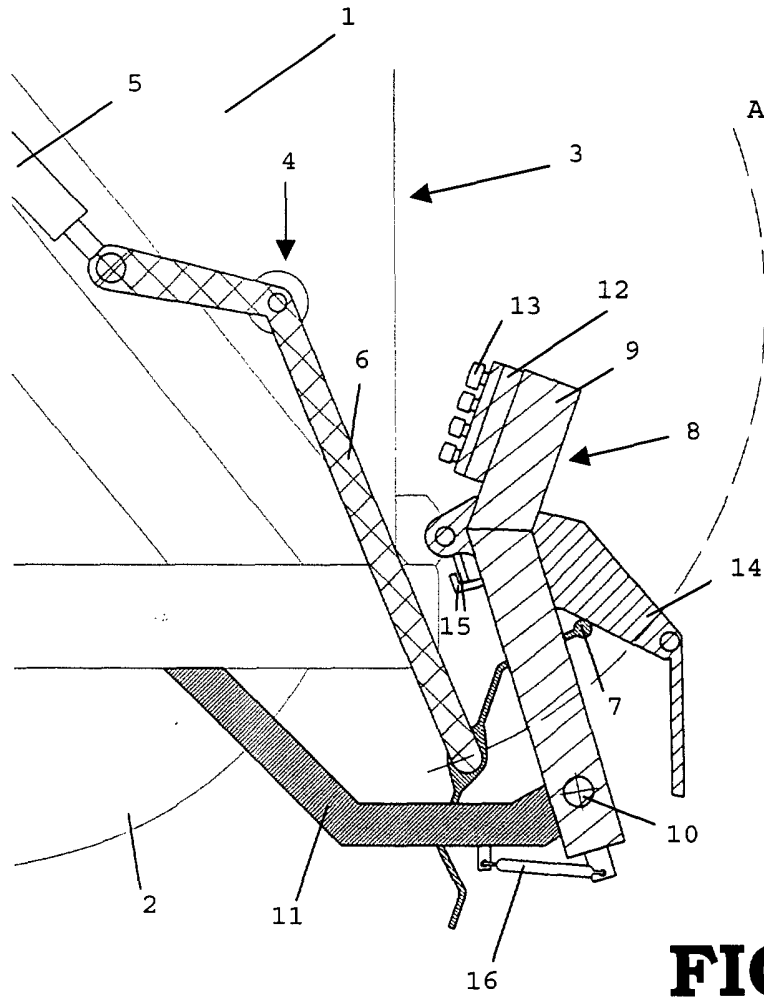


FIG. 4

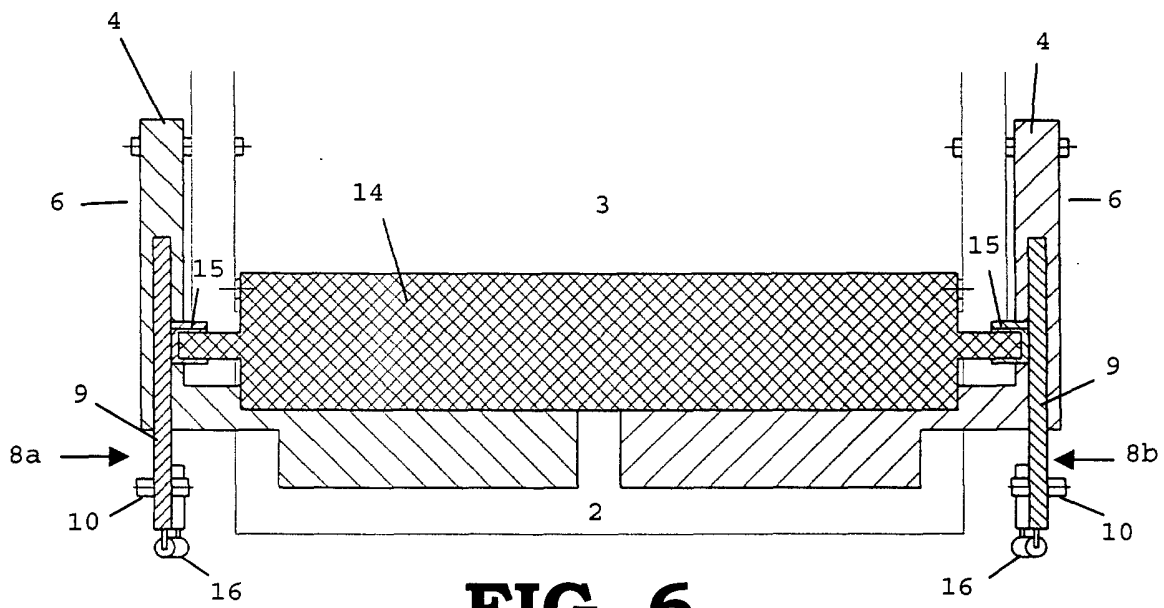


FIG. 6

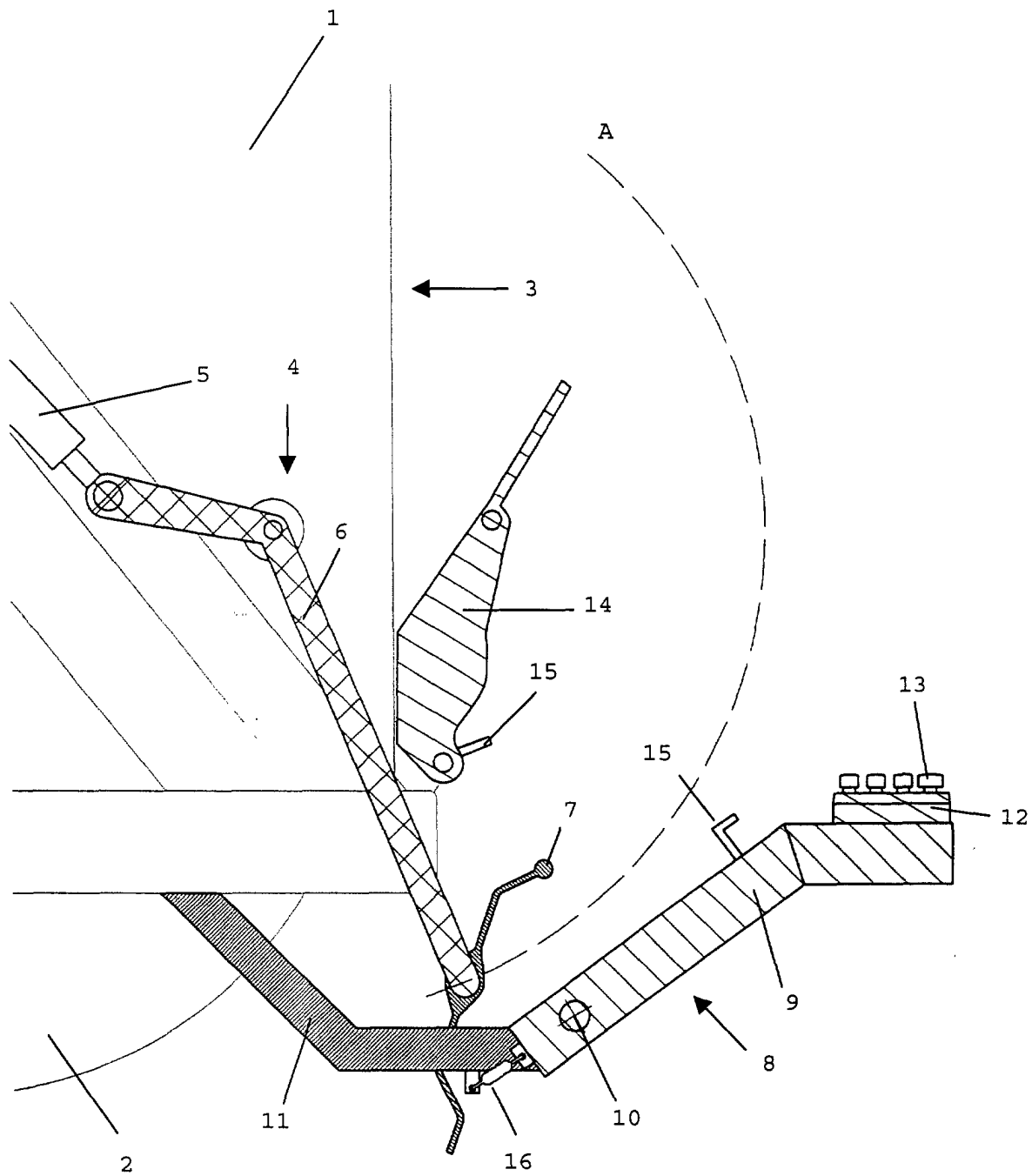


FIG. 5



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 20 3952

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	US 4 722 656 A (J. NAAB) 2 February 1988 (1988-02-02) * column 9, line 67 - column 10, line 12 * * column 16, line 28 - line 68 * * figure 1 *	1,4,8,9	B65F3/00
D	& EP 0 156 445 A (ZÖLLER-KIPPER GMBH) 2 October 1985 (1985-10-02) -----		
Y	GB 1 498 955 A (GLOVER, WEBB & LIVERSIDGE LIMITED) 25 January 1978 (1978-01-25) * the whole document *	1,4,8,9	
A	EP 1 031 520 A (ZÖLLER-KIPPER GMBH) 30 August 2000 (2000-08-30) * paragraph '0028! - paragraph '0030! * * figure 2 * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B65F
Place of search		Date of completion of the search	Examiner
THE HAGUE		17 December 2001	Smolders, R
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 20 3952

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.

17-12-2001

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4722656	A	02-02-1988	DE 3405997 A1	22-08-1985
			AT 35122 T	15-07-1988
			AU 573811 B2	23-06-1988
			AU 4111285 A	10-09-1985
			CA 1259959 A1	26-09-1989
			CS 8501162 A2	11-06-1991
			DD 233355 A5	26-02-1986
			DE 3448135 C2	15-09-1988
			WO 8503689 A2	29-08-1985
			EP 0156445 A2	02-10-1985
			EP 0173727 A1	12-03-1986
			ES 540519 D0	16-04-1986
			ES 8606174 A1	01-10-1986
			GR 850433 A1	13-05-1985
			JP 7112881 B	06-12-1995
			JP 61501266 T	26-06-1986
			PT 79991 A , B	01-03-1985
			US 5004392 A	02-04-1991
			ZA 8501246 A	30-10-1985
GB 1498955	A	25-01-1978	NONE	
EP 1031520	A	30-08-2000	EP 1031520 A1	30-08-2000