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(54) Loading device for a refuse collection device provided with safety means

(57) A loading device for a refuse-collection device comprises a pick-up device for picking up refuse containers which are provided with a pick-up part (4) which is open downwards. The pick-up device is provided with a pick-up member (5) which can engage beneath this pick-up part (4), and a locking member (7) which is arranged in the vicinity of the pick-up member (5) and can move between a locking position and a non-locking position. In the locking position, the locking member (7) is situated at a distance above the pick-up member (5), and in the non-locking position the locking member (7) is situated next to the pick-up member (5). The loading device furthermore comprises control means for automatically controlling the said device. The locking member (7) is coupled to the control means, which are designed such that, in the event of certain predefined unsafe states of the loading device occuring, the locking member (7) is moved into the locking position by the control means, so that it is impossible for a refuse container to be placed on the pick-up member (5).

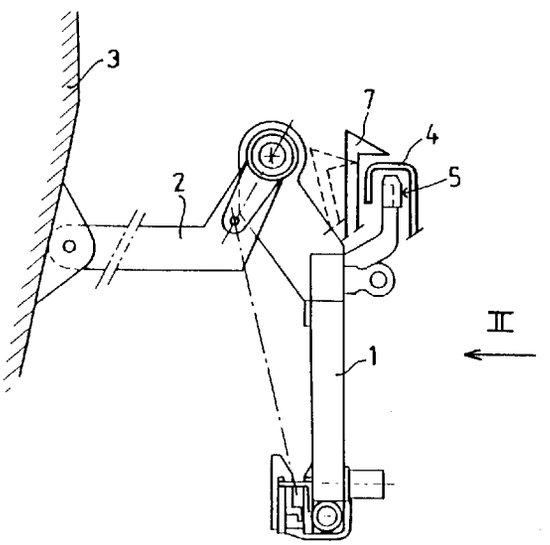

Fig. 1.

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Description

[0001] The invention relates to a loading device for a refuse collection device according to the preamble of claim 1.

[0002] A loading device of this nature is known.

[0003] The control means of the known loading device are designed such that, in the event of certain predefined unsafe states of the loading device occurring, an automatic loading cycle of the loading device cannot start or cannot continue. In the latter case, the loading cycle is interrupted when the pick-up member is already at a certain height. This has the drawback that a filled container of considerable weight (max. approx. 100 kg) has to be lowered in an unsafe situation. Moreover, the undesirable movements of the loading device waste time.

[0004] The object of the invention is to eliminate the abovementioned drawbacks and to provide a loading device which is simpler and safer.

[0005] This object is achieved by means of a loading device according to claim 1.

[0006] In the loading device according to the invention, the pick-up part of a container cannot be placed over the pick-up member in the event of the relevant unsafe states occurring. The pick-up device is then unable to pick up a container, and the loading device is practically unusable. This prevents a container from being picked up in an unsafe situation and being lifted to a certain height, from which it then has to be lowered again.

[0007] Preferred embodiments of the loading device according to the invention are given in the dependent claims.

[0008] The invention will be explained in more detail in the following description of an exemplary embodiment and with reference to the drawing, in which:

Fig. 1 diagrammatically depicts the structure of a specific loading device,

Fig. 2 shows a view of the loading device from Fig. 1 as seen in the direction of arrow II in Fig. 1,

Fig. 3 diagrammatically depicts a pick-up member with edge-locking member and actuating means for the edge-locking member,

Fig. 4 diagrammatically depicts a specific embodiment of a shielding element of the loading device in the shielding position,

Figs. 5 and 6 show more detailed views of the pivot of a shielding element in accordance with Fig. 4 in combination with a shield-locking member, in the locking position (Fig. 5) and the non-locking position (Fig. 6).

[0009] The loading device which is diagrammatically depicted in Figs. 1 and 2 and is provided in duplicate is intended to form part of a refuse collection device, such as a refuse collection vehicle. A loading device may in practice be designed in a large number of different ways which are known to the person skilled in the art. In the embodiment illustrated, the loading device comprises a pick-up device 1 and lifting arms 2, which are supported by a supporting part 3 (indicated diagrammatically here) of the refuse collection device. This part 3 is, for example, the loading container of a refuse collection vehicle.

[0010] The pick-up device 1 is designed to pick up containers, in particular refuse containers, which are provided with a pick-up part which is open downwards, in the form of a top edge 4 which is bent over outwards and downwards in the form of a U. The pick-up device 1 is provided with a pick-up member 5 which can engage beneath the U-shaped top edge 4 of a container which is to be picked up.

[0011] In the embodiment illustrated, the pick-up member 5 comprises a pick-up plate with pick-up teeth 6. However, the pick-up member may also be of different design, for example in the form of a strip.

[0012] The pick-up member may also be designed in such a manner that it is suitable for picking up containers with a round top edge or containers with a so-called delta-shaped pick-up part. In the latter case, the pick-up member is designed as a so-called "delta pick-up".

[0013] In the embodiment illustrated, the pick-up device furthermore comprises an edge-locking member 7 which is arranged in the vicinity of the pick-up member 5 and, by means of actuating means (not shown in Fig. 1), can be moved between a locking position (shown in solid lines) and a non-locking position (shown in dashed lines). In the locking position, the edge-locking member 7 is situated at least partly at a certain distance above the pick-up member 5, in such a manner that when the pick-up member 5 engages beneath the top edge 4 of a container, the edge-locking member 7 holds the U-shaped top edge 4 of the container securely on the pick-up member 5.

[0014] In the non-locking position, the edge-locking member 7 is situated next to the pick-up member 5, in such a manner that the U-shaped top edge 4 of a container can be positioned over the pick-up member 5.

[0015] Fig. 3 diagrammatically depicts a slightly different design of pick-up member 5 with edge-locking member 7. The edge-locking member 7 is provided with actuating means in order to move the edge-locking member 7 out of the non-locking position into the locking position. In the embodiment illustrated in Fig. 3, the actuating means comprise a pneumatic bellows 11 with an air line 12 which is connected thereto and in which a two-way valve 13 is accommodated and which is connected to a compressed-air source 14. The two-way valve 13 is electromagnetically actuated (coil 15). When the coil 15 is energised, a spring 16 presses the valve 13 into the position illustrated in Fig. 3, in which the bellows 11 is under pressure and the edge-locking member is in the locking position.

[0016] The actuating means may also be differently designed, for example may be of hydraulic or magnetic

design.

[0017] The loading device furthermore comprises control means for the automatic control of the loading device, the actuating means of the edge-locking member 7 being coupled to the control means.

[0018] The control means of the loading device are designed in such a manner that, in the event of certain predefined unsafe states of the loading device occurring, the edge-locking member 7 is moved into the locking position by the control means and the actuating means.

[0019] In the locking position (Figs. 1 and 4), the edge-locking member 7 shields the pick-up member 5, so that a U-shaped top edge 4 of a container can no longer be placed onto the pick-up member 5.

[0020] In this way, the edge-locking member 7 functions as a safety member. Although the loading device can move, it is not possible for a container to be picked up, so that the loading device is practically unusable.

[0021] The top side 17 of the edge-locking member 7 is preferably bevelled, making it impossible to attach a top edge 4 of a container to the edge-locking member 7.

[0022] If the loading device is not provided with a locking member (edge-locking member 7) which interacts directly with the pick-up member, or if it is not desirable for the locking member also to fulfil the safety function described above, the loading device may be provided with a separate safety member arranged in the vicinity of the pick-up member 5. This safety member should then be moveable between an active position, in which it prevents the pick-up member 5 from being able to engage beneath the pick-up part (the top edge 4) of a container, and an inactive position, in which the pick-up member can engage beneath the pick-up part (the top edge 4) of a container. A safety member of this nature is then coupled to the control means in such a manner that, when an unsafe state is signalled, the safety member is moved into the active position.

[0023] An unsafe state may occur if a monitoring member 18 (illustrated diagrammatically in Fig. 2), which is arranged in the vicinity of the pick-up member and is coupled to the control means, for monitoring the presence of a U-shaped top edge 4 of a container on the pick-up member 5 indicates the presence of a U-shaped top edge on the pick-up member after a loading cycle of the loading device has ended, in an operating position of the pick-up device 1 which is so low that it is impossible for there to be a U-shaped top edge 4 on the pick-up member 5.

[0024] The monitoring member 18 may be designed in various ways.

[0025] For example, the monitoring member 18 may comprise two start switches which are arranged next to and at a distance from one another and can be actuated by the front wall of a container which is to be picked up when this container is placed against the pick-up member 5 in order to start a load cycle.

[0026] The monitoring member 18 may also comprise an element (chip-reader) of a container-recognition system or a monitoring switch which can be actuated by the U-shaped top edge 4 of a container which has been picked up by the pick-up member 5.

[0027] An unsafe state may also occur with regard to shielding elements which are arranged on either side of the loading device, for shielding the movement area of the loading device at the side.

[0028] Fig. 4 diagrammatically depicts a shielding element 21 for shielding the movement area of a loading device of a refuse collection device. Generally, a loading device would be mounted at the rear or on the side of a refuse collection vehicle. The shielding elements are used to shield the movement area of the loading device from the side during operation, in order to prevent people from inadvertently coming into the movement area of the loading device from the side, which could cause unsafe situations.

[0029] In the embodiment illustrated, the shielding element 21 comprises a bracket 22 which is pivotably connected to the device for emptying refuse containers by means of a pivot 23 with a horizontal pivot axis. Fig. 4 shows the shielding element 21 in the shielding position. In the non-shielding position, the shielding element 21 is in a position in which it has been rotated through approx. 90° in the direction of arrow 24 with respect to the shielding position illustrated in Fig. 4.

[0030] The shielding element in accordance with Fig. 4 is provided with a panel 25 which is provided with actuating buttons for actuating the loading device.

[0031] Signalling means for signalling the position of the shielding element are arranged in the vicinity of the pivot 23 of the shielding element 21. These signalling means are shown in more detail in Figs. 5 and 6.

[0032] It can be seen from Figs. 5 and 6 that a pivot bush 27, which is fixedly connected to the bracket 22, of the pivot 23 is provided with a recess 28. The pivot bush 27 can rotate about a pivot pin 29 which is connected to the refuse collection device. In the vicinity of the pivot 23, there is a sensor 30 which signals whether the shielding element 21 is in the shielding position (Fig. 5) or in the non-shielding position (Fig. 6). In the shielding position (Fig. 5), the recess 28 in the pivot bush 27 is at an angular distance of approx. 90° from the sensor 30. In the non-shielding position (Fig. 6), the recess 28 is positioned directly opposite the sensor 30. The sensor 30 emits a different signal in each of these two situations.

[0033] The shielding element can also be of different design, and the position of the shielding element could be signalled in a different way, for example in the way described and illustrated in EP-A-0671346 in the name of the applicant.

[0034] According to the invention, the shielding elements 21 and the edge-locking member 7 are coupled to one another in such a manner, in this case via signalling means (sensor 30), the control means and the actuating means 11-16 of the edge-locking member 7, that

when one or both of the shielding elements 21 is/are in the non-shielding position (Fig. 6), the edge-locking member 7 is in the locking position.

[0035] In order to increase safety further and in order to prevent a shielding element 21 from easily and/or inadvertently being moved into the non-shielding position, a manually actuable shield-locking member is arranged at each shielding element 21, which shield-locking member can be moved between a non-locking position and a locking position, in which the shield-locking member locks the shielding element 21 in the shielding position.

[0036] In the embodiment illustrated (Figs. 5 and 6), the shield-locking member, which is denoted by 32, is designed as a lever 34 which can rotate about a pivot point 33 and is provided, on its top side, with a knob 35 for manual actuation. The lever 34 is furthermore provided with a projection 36 which can latch into the recess 28 in the pivot bush 27 of the pivot 23 of the shielding element 21 when the shielding element 21 is in the shielding position (Fig. 5), in order to block a rotational movement of the shielding element 21. The lever 34 is connected to a spring 37 (in this case a tension spring), which forces the shield-locking member 32 into the locking position. In the state illustrated in Fig. 5, the spring 37 is pulling the projection 36 into the recess 28 in the pivot bush 27. In order for it to be possible to move the shielding element 21 into the non-shielding position, the shield-locking member 32 has to be moved manually, and counter to the force of the spring 37, into the position illustrated in Fig. 6 (non-locking position). Only then can the shielding element be moved into the non-locking position (Fig. 6).

[0037] In the vicinity of the lever 34, there is a second sensor 38, which signals whether the lever 34, and therefore the shield-locking member 32, is in the locking position (Fig. 5) or the non-locking position (Fig. 6). The sensor 38 is the same type of sensor as the sensor 30. This sensor 38 is also coupled to the actuating means of the edge-locking member 7 via the control means, in such a manner that when the sensor 38 signals that the shield-locking member 32 is in the non-locking position (Fig. 6), the edge-locking member 7 moves into the locking position (Figs. 1 and 3) .

[0038] Furthermore, the control unit of the loading device is designed in such a manner that if, during a normally proceeding movement cycle for emptying a container which has been picked up by the loading device, a shielding element is moved into the non-shielding position, this cycle of the loading device is brought to an end. During the downwards movement of the loading device, the edge-locking member 7 will at some time move into the non-locking position, in order to allow the container to be removed from the pick-up member 5, but in the at-rest position, in which it is no longer possible for a container to be picked up, will move into the locking position in order to be able to exercise the safety function.

[0039] The lever 34 of the shield-locking member 32 may furthermore be coupled to the piston rod 41 of a single-acting cylinder 42 which, when the loading device is active, is activated and holds the shield-locking member 32 in the locking position (Fig. 5) and is not activated only when the loading device is in the at-rest position. As a result, the shield-locking member can only be moved manually out of the locking position in the situation in which the loading device is in the at-rest position.

[0040] It is also possible to have a single-acting blocking member which comprises, for example, a single-acting cylinder acting directly on a shielding element 21, in parallel with the shield-locking member 32. A blocking member of this nature could be provided with a projection which is able to latch into a recess in the pivot bush 27, such as the projection 36 which is able to latch into the recess 28, and in this way blocks the shielding element 21 in the shielding position.

[0041] The measures described above provide an optimum level of safety. The shielding elements 21 can only be moved into the non-shielding position when the loading device is entirely inactive and is in the at-rest position. In order to be able to use the loading device, i.e. in order to be able to pick up and empty containers, it is necessary to move the shielding elements 21 into the shielding position, in order to move the edge-locking member 7 into the non-locking position, so that a container can be picked up. Once this has taken place, the shielding elements may only be moved back into the non-shielding position when the loading device is deactivated.

[0042] Furthermore, the action of the sensors 30 and 38 is monitored by the control means. When the loading device is started up, it is firstly necessary to change the state of the sensors (30 and 38) by moving the shielding elements into the shielding position. The control means then monitor the action of the sensors 30 and 38, and the loading device is enabled if they function correctly.

[0043] A further safety measure which can be incorporated is that when the shielding elements 21 move out of the non-shielding position into the shielding position, the edge-locking member 7 does not move directly into the non-locking position, but rather waits for the actuation of a button (for example the "down" button of the loading device).

Claims

1. Loading for device for a refuse collection device, comprising a pick-up device for picking up containers, in particular refuse containers, which are provided with a pick-up part which is open downwards, which pick-up device is provided with a pick-up member which is able to engage beneath the pick-up part of a container which is to be picked up, and furthermore comprises control means for automatically controlling the loading device, and safety

means, which are coupled to the control means and come into action in the event of certain predefined unsafe states of the loading device occurring, characterized in that the loading device is provided with a safety member which is arranged in the vicinity of the pick-up member and can move between an active position, in which it prevents the pick-up member from being able to engage beneath the pick-up part of a container, and an inactive position, in which the pick-up member can engage beneath the pick-up part of a container, and in that the control means of the loading device are designed such that, in the event of certain predefined unsafe states of the loading device occurring, the safety member is moved into the active position by the control means.

2. Loading device according to claim 1, characterized in that the safety member is formed by a locking member which is present on the loading device and can move between a locking position, in which it is situated at least in part at a certain distance above the pick-up member, such that when the pick-up member engages beneath the pick-up part of a container, the edge-locking member holds the pick-up part of the container securely on the pick-up member, and a non-locking position, in which the locking member is situated next to the pick-up member, in such a manner that the pick-up member can engage beneath the pick-up part of the container.

3. Device according to claim 2, characterized in that the top side of the locking member runs obliquely towards a container which is to be picked up.

4. Loading device according to one of claims 1-3, characterized in that the control means of the loading device are designed such that the safety member is in the active position when at least one of shielding elements, which are arranged either side of the loading device and can each move between a shielding position, in which the shielding element shields the movement area of the loading device at the side, and a non-shielding position, in which the shielding element does not shield this area, is in the non-shielding position.

5. Device according to claim 4, characterized in that a manually actuable shield-locking member is arranged in the vicinity of each shielding element, said shield-locking member can move between a non-locking position and a locking position, in which the shield-locking member locks the shielding element in the shielding position.

6. Device according to claim 5, characterized in that a spring which forces the shield-locking member into the locking position acts on the shield-locking member.

7. Device according to claim 5 or 6, characterized in that second signalling means are provided for signalling the position of the shield-locking member, which signalling means are coupled to the actuating means of the safety member in such a manner that, when the shield-locking member is in the non-locking position, the safety member is in the active position.

8. Device according to one of claims 5-7, characterized in that the shield-locking member is coupled to a blocking member, which acts in one direction and, when the loading device is active, is activated and keeps the shield-locking member in the locking position and is not activated only when the loading device is in the at-rest position.

9. Device according to one of claim 5-7, characterized in that each shielding element has a blocking member which acts in one direction and which, when the loading device is active, is activated and blocks the shielding element in the shielding position, and is not activated only when the loading device is in the at-rest position.

10. Device according to claim 8 or 9, characterized in that the blocking member which acts in one direction is a single-acting cylinder.

11. Loading device according to one of claims 1-3, characterized in that the control means of the loading device are designed such that the safety member is in the active position when a monitoring member, which is arranged in the vicinity of the pick-up member and is coupled to the control means, for monitoring the presence of a pick-up part of a container on the pick-up member indicates the presence of a pick-up part of a container on the pick-up member after a loading cycle of the loading device has ended and the pick-up device is in an operating position which is so low that it is impossible for there to be a pick-up part on the pick-up member.

12. Loading device according to claim 11, characterized in that the monitoring member comprises two start switches which are arranged next to and at a distance from one another and can be actuated by the front wall of a container which is to be picked up when this container is placed against the pick-up member, in order to start a loading cycle.

13. Loading device according to claim 11, characterized in that the monitoring member comprises an element of a container-recognition system.

14. Loading device according to claim 11, characterized in that the monitoring member comprises a monitoring switch which can be actuated by the pick-up

part of a container which has been picked up by the pick-up member.

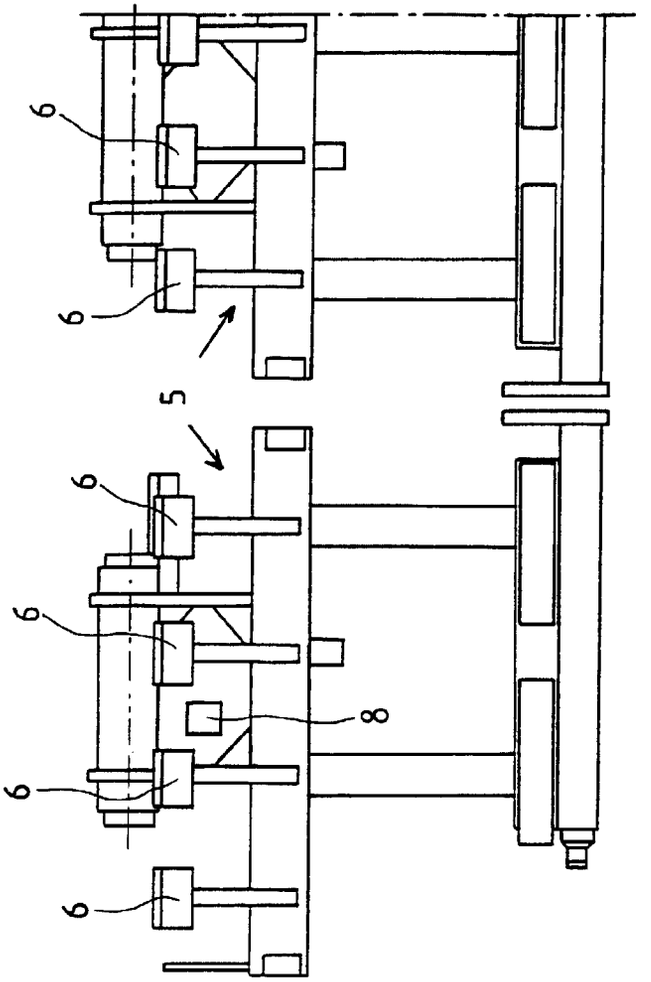

FIG. 2.

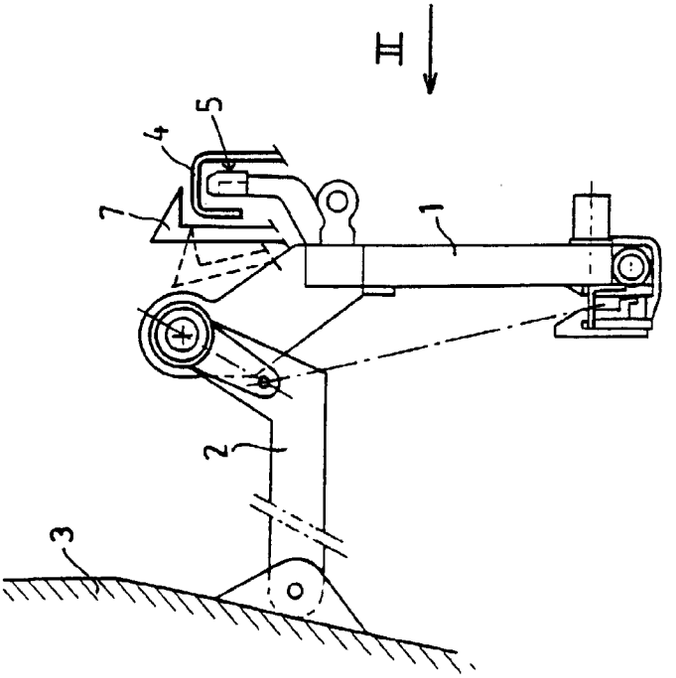

FIG. 1.

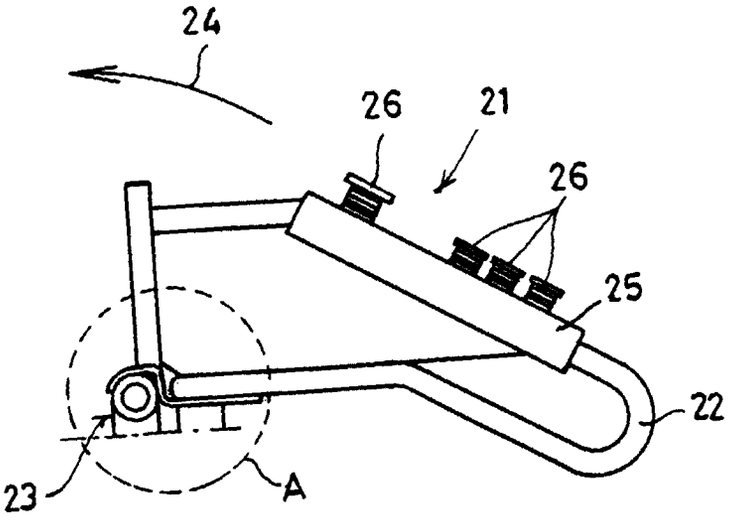

Fig: 4.

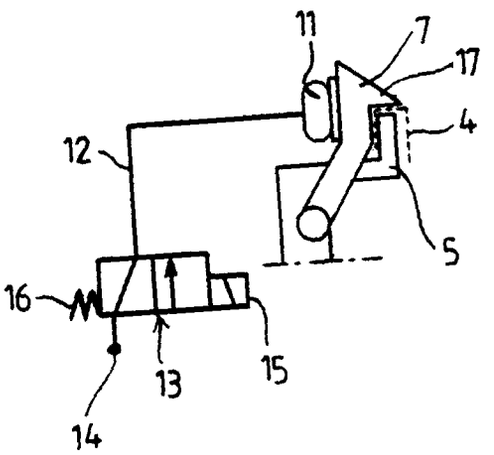

Fig: 3.

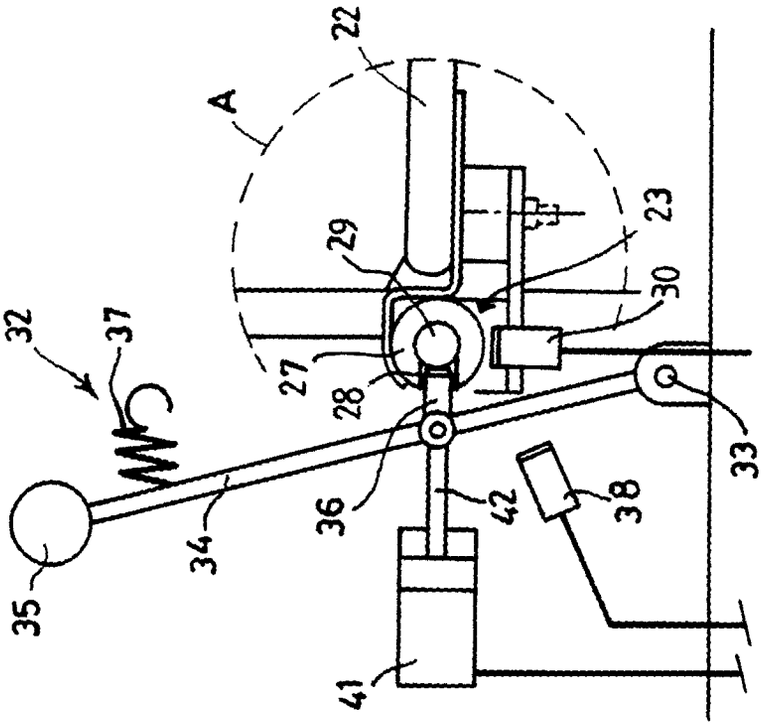
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FIG. 5.

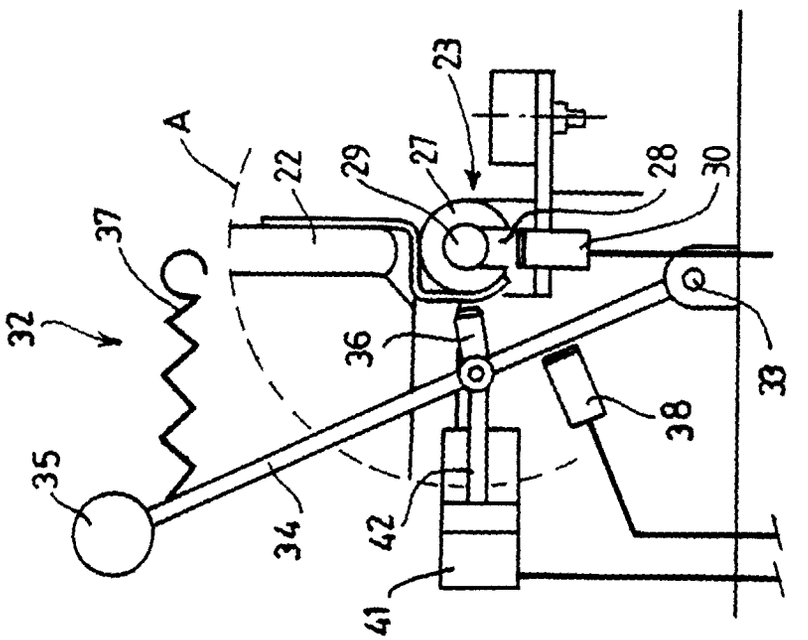
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FIG. 6.

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EUROPEAN SEARCH REPORT

Application Number
EP 99 20 1780

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A	NL 8 902 431 A (TERBERG MACHINES BV) 16 April 1991 (1991-04-16) * page 3, line 4 - page 5, line 5; figures 1-4 *	1	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14 September 1999	Smolders, R

CATEGORY OF CITED DOCUMENTS

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