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(12) # EUROPEAN PATENT SPECIFICATION

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(54) **Device for emptying containers, in particular refuse containers, provided with a safety mechanism.**

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EP-A- 0 358 046
WO-A-89/03794
DE-A- 3 517 491
DE-U- 8 906 456

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Description

The invention relates to a device according to the preamble of the appended claim.

A device of this type is known from DE-U-8906456, which discloses a device for emptying containers comprising lifting arms carrying a pick-up frame for picking up the containers, the pick-up frame being provided with a pick-up element which can grasp a pick-up edge of a container, a locking element adapted to interact with the top side of the pick-up edge of a container, when grasped by the pick-up element, and a switch interacting with the locking element. When the switch is operated by the locking element, that is when the pick-up edge is properly locked on the pick-up element, a lifting movement of the lifting arms is continued. When the switch is not operated by the locking element, a lifting movement of the lifting arms is stopped.

The device disclosed in DE-U-8906456 has no means for detecting that the pick-up edge of a container is properly positioned on pick-up element at the beginning of lifting movement of the lifting arms.

The object of the invention is to provide a device for emptying containers which does not have this disadvantage and which provides an optimal safety when emptying containers.

This object is attained with a device according to the appended single claim.

A device for emptying containers designed in this way comprises a safety mechanism which has two parts, a first part which becomes operative as soon as it is clear that the pick-up edge of a container has not been placed in the envisaged way over the pick-up element of the pick-up frame, and a second part which becomes operative when for one reason or another the locking of the container edge on the pick-up element has not been fully achieved or becomes ineffective.

The invention will be explained below with reference to the drawing.

Fig. 1 shows schematically in side view the pick-up frame with lifting arms of a device according to the invention.

Fig. 2 is a front view of the pick-up frame, of Fig. 1.

Fig. 3 is a view on enlarged scale of a detail of Fig. 2.

Fig. 4 is a view along the line IV-IV in Fig. 2 of the detail of Fig. 3, on the same enlarged scale.

Fig. 5 shows the various positions of the lifting arms shown in Fig. 1.

Fig. 6 shows a container placed on the pick-up frame provided with a container lock comprising a suction cup.

The device for emptying containers, in particular refuse containers, according to the invention comprises, as shown in Figs. 1 and 2, a pick-up frame 1 and lifting arms 2 which are carried by a vehicle 3. The device is provided with a safety mechanism which comprises two parts, a first part 4 which operates when a container edge 5 does not grip properly on a pick-up element in the form of a comb 6, and a second part which operates when the container edge locking mechanism is not closed properly.

The first part 4 is situated, as Fig. 2 shows, in the second tooth from the left on the comb 6, but can be fitted, depending on the type of pick-up frame and container to be handled, at any point on the comb 6. The container edge 5 with the comb 6 is also shown in Fig. 4. A slit 7, in which one end of a round pin 8 can move up and down, is made in the tooth. The other end of the pin 8 is fixed to a switch arm 9. A bearing plate 11 is welded to the frame 1. The switch arm 9 is detachably connected to the bearing plate 11 by means of a round resilient rubber element 10, having a threaded end at both sides. On the frame is also mounted a guide 12 for the switch arm 9 and a mounting plate 13, on which a limit switch 14, which is a part of the control system for the lifting arms 2 and the pick-up frame 1, is adjustably fitted. The switch arm 9 can interact with the limit swich 14.

The lifting movement can be divided into three parts A, B and C (see Fig. 5):

Part A is the part where the lifting arm 2 moves from the lowest position (storage position) to the point where the highest container is hanging on the comb 6 with the wheels just clear of the ground.

Part B is the only part where it is electrically so regulated that the safety mechanism is active. This is a short part of the lifting movement, less than one second.

Part C is the remainder of the lifting movement.

As long as the container edge 5 is not situated over the comb 6 (see the position shown by dashed lines in Fig. 4), the limit switch 14 is not activated. When the pin 8 is pressed down by the container edge 5, the switch arm 9 will start to rotate clockwise about the round resilient rubber element 10 (to the situation shown by dashed lines), thereby coming into the switch field of the limit switch 14, as a result of which the latter will switch, during part B of the lifting movement, and the lifting movement will be continued.

If the pin 8 is not pressed in by the container edge 5, the limit switch 14 will not switch into part B of the lifting movement, as a result of which the lifting movement will be interrupted and will pass into a slow lowering movement. This is done for safety.

For additional safety, the control system is designed in such a way that, if the pin 8 for some

reason (e.g. jamming) remains pressed down after a container has been removed from the pick-up frame 1, the following lifting movement cannot be started. The advantage of this safety mechanism is the operating reliability and the low sensitivity to soiling.

The first part of the safety mechanism can also be used for the recognition of certain types of containers, in order to influence the control of the device for emptying containers.

The second part of the safety mechanism is, as mentioned, operative when the container edge locking mechanism is not closed properly. In the case of used containers with a deformed pick-up edge or in the case of non-standard containers, it can happen that, despite the pin 8 being pressed down, a part of the container edge 5 is still projecting above the comb 6. This means that a locking element 15 for the container edge locking which is here made up of an arm which is hingedly connected to the pick-up frame 1 and is provided with a flat part for locking the pick-up edge 5 of the container on the pick-up element 6 of the pick-up frame 1, cannot close properly. Said element 15 comes up against the container edge 5, instead of extending above the container edge.

The result of this would be that during the tipping movement the container will come away from the comb 6 and fall down.

This risk is guarded against by means of a limit switch 16, which becomes active shortly after the start (time settable) of the container edge locking. If the locking element 15 for the container edge is not fully closed after the above-mentioned setting time (see position shown by dashed lines in Fig. 4), the arm of the locking element is still situated in the switch field of the limit switch 16. This will cause the lifting movement to stop and switch over to the slow lowering movement.

The second part of the safety mechanism which includes the locking element 15 and the limit swich 16 is also effective during the last part of the lifting tipping movement, as will be explained below.

A device for emptying containers is often provided with a mechanism for locking a container to the pick-up frame during the tipping movement. Such a container locking mechanism may comprise (see Fig. 6) a vacuum operated suction cup 17 which can attach itself firmly to the side wall of a container 18. If this mechanism does not function properly, for example, due to a defect in the vacuum system connected to the suction cup 17 or a damaged suction cup of a damaged container, there is a risk that a container 18 placed on the pick-up frame 1 will start tipping relative to the pick-up frame 1 during the tipping movement of the pick-up frame, and particularly at the end thereof. This may cause the container to become loose from the comb 6 and to fall down.

However, the tipping movement of the container 18 relative to the pick-up frame 1 will cause the locking element 15 to rotate relative to the pick-up frame 1. The arm of the locking element 15 will then operate the limit swich 16. The control system for the drive means will then cause the automatic further movement of the lifting arms 2 and the pick-up frame 1 to stop. By manually operating a reset knob the pick-up frame 1 with container 18 can be tipped back and lowered at low speed.

The device for emptying containers according to invention has the following advantages:

- the correct engagement between the comb of the pick-up frame and the pick-up edge of the container is guaranteed;
- the lifting movement cannot be started if the sensing element, which checks the correct engagement between the comb of the pick-up frame and the pick-up edge of the container, remains pressed down, for example, due to a mechanical defect;
- the proper functioning of the container edge locking is checked;
- the automatic lifting and tipping movement of the pick-up frame is stopped when an unwanted continued tipping movement of a container relative to the pick-up frame occurs (for example, due to a defect in the vacuum operated suction cup system).
- the presence of a wrong container is indicated, or a specific container type is recognized.
- a false stroke of the lifting arms is prevented.

Claims

1. Device for emptying containers, in particular refuse containers, into a collection vehicle, intended for the transportation of material, said device comprising lifting arms (2) carrying a pick-up frame (1) for picking up containers, drive means for moving the lifting arms and the pick-up frame and a control system for the drive means, the pick-up frame (1) being provided with a pick-up element (6) which can grasp the pick-up edge (5) of a container, a locking element (15) adapted to interact with the top side of the pick-up edge (5) of a container, when grasped by the pick-up element (6), said locking element (15) being movable between a locking position in which it can lock a pick-up edge (5) of a container on the pick-up element (6) and an unlocking position, and a first switch (16) of the control system for the drive means interacting with the locking element (15), and further comprising means for

stopping the movement of the lifting arms (2) and the pick-up frame (1), when it is detected, via the first switch (16), that the locking element (15) is in the unlocking position, characterized in that the pick-up frame (1) is further provided with at least one sensing element (8, 9) adapted to interact with the bottom side of the pick-up edge (5) of a container, when grasped by the pick-up element (6), and a second switch (14) of the control system for the drive means interacting with the sensing element (8, 9), the sensing element (8, 9) being movable between an operative position when the pick-up edge (5) of a container is in a proper position on the pick-up element (6), and in an inoperative position when the pick-up edge (5) of a container is not in a proper position on the pick-up element (6), and the sensing element (8, 9) being formed by a hingedly supported crank, of which the first arm or pin (8) reaches into a slit (7) of the pick-up element (6) of the pick-up frame (1), while the second arm (9) can interact with the second switch (14), the hinged support of the crank being a rubber block (10) which is fixed on a plate (11) fitted on the pick-up frame (1), and in that the device is further provided with means for stopping the movement of the lifting arms (2) and the pick-up frame (1) when it is detected, via the second switch (14), that the sensing element (8, 9) is in the inoperative position.

Patentansprüche

1. Vorrichtung zum Entleeren von Behältern, insbesondere Müllbehältern, in ein Sammelfahrzeug, zum Transport von Material, wobei die Vorrichtung Hebearme (2) aufweist, die einen Aufnehmerahmen (1) zum Aufnehmen von Behältern tragen, eine Antriebsvorrichtung zum Bewegen der Hebearme und des Aufnehmerahmens sowie ein Steuersystem für die Antriebsvorrichtung, wobei der Aufnehmerahmen (1) mit einem Aufnehmeelement (6) versehen ist, welches in der Lage ist, den Aufnehmerand (5) eines Behälters zu greifen, einem Verriegelungselement (15), welches so ausgelegt ist, daß es mit der Oberseite des Aufnehmerandes (5) eines Behälters interagiert, wenn es von dem Aufnehmeelement (6) ergriffen wird, wobei das Verriegelungselement (15) zwischen einer Verriegelungsstellung, in der es einen Aufnehmerand (5) eines Behälters auf dem Aufnehmeelement (6) verriegeln kann, und einer Entriegelungsstellung hin- und herbewegt werden kann, und einem ersten Schalter (16) des Steuersystems für die Antriebsvorrichtung, der mit dem Verriegelungselement (15) interagiert, und weiterhin eine Vorrichtung zum Anhalten der Bewegung der Hebearme (2) und des Aufnehmerahmens (1) umfaßt, wenn über den ersten Schalter (16) erfaßt wird, daß das Verriegelungselement (15) sich im entriegelten Zustand befindet, dadurch gekennzeichnet, daß der Aufnehmerahmen (1) des weiteren mit mindestens einem Erfassungselement (8, 9) versehen ist, welches mit der Unterseite des Aufnehmerandes (5) eines Behälters interagieren kann, wenn es von dem Aufnehmeelement (6) ergriffen wird, und einem zweiten Schalter (14) des Steuersystems für die Antriebsvorrichtung, der mit dem Erfassungselement (8, 9) interagiert, wobei das Erfassungselement (8, 9) zwischen einer In-Betrieb-Stellung, wenn sich der Aufnehmerand (5) eines Behälters in einer richtigen Stellung auf dem Aufnehmeelement (6) befindet, und einer Außer-Betrieb-Stellung, wenn sich der Aufnehmerand (5) eines Behälters nicht in einer richtigen Stellung auf dem Aufnehmeelement (6) befindet, hin- und herbewegbar ist, und wobei das Erfassungselement (8, 9) durch eine aufgehängte Kurbel gebildet wird deren erster Arm oder Stift (8) in einen Schlitz (7) des Aufnehmeelementes (6) des Aufnehmerahmens (1) hineinreicht, während der zweite Arm (9) mit dem zweiten Schalter (14) interagieren kann, wobei die aufgehängte Lagerung der Kurbel ein Gummiblock (10) ist, der auf einer Platte (11) befestigt ist, welche auf dem Aufnehmerahmen (1) befestigt ist, und daß die Vorrichtung weiterhin mit einer Vorrichtung zum Anhalten der Bewegung der Hebearme (2) und des Aufnehmerahmens (1) versehen ist, wenn über den zweiten Schalter (14) erfaßt wird, daß das Erfassungselement (8, 9) sich in der Außerbetriebsstellung befindet.

Revendications

1. Dispositif pour vider des conteneurs, en particulier des poubelles, dans un véhicule de collecte, destiné au transport de matières, ce dispositif comprenant des bras de levage (2) portant un châssis de préhension (1) pour prendre des conteneurs, des moyens d'entraînement pour déplacer les bras de levage et le châssis de préhension, et un système de commande pour les moyens d'entraînement, le châssis (1) étant muni d'un élément de préhension (6) qui peut s'accrocher au rebord de prise (5) d'un conteneur, un élément de verrouillage (15) conçu pour interagir avec la face supérieure du rebord de prise (5) , lorsqu' il est accroché par l'élément de préhension (6), cet élément de verrouillage (15) pouvant être

déplacé entre une position de verrouillage dans laquelle il peut verrouiller un rebord de prise (5) d'un conteneur sur l'élément de préhension (6), et une position de déverrouillage, et un premier interrupteur (16) du système de commande pour les moyens d'entraînement, qui interagit avec l'élément de verrouillage (15), comprenant en outre des moyens pour arrêter le mouvement des bras de levage (2) et du châssis de préhension (1) dans le cas de la détection, par le premier interrupteur (16), du fait que l'élément de verrouillage (15) est dans la position de déverrouillage, caractérisé en ce que le châssis de préhension (1) comporte en outre au moins un élément de détection (8, 9) conçu pour interagir avec la face inférieure du rebord de prise (5) d'un conteneur, lorsqu' il est accroché par l'élément de préhension (6), et un second interrupteur (14) du système de commande des moyens d'entraînement, qui coopêre avec l'élément de détection (8, 9), cet élément de détection (8, 9) pouvant être déplacé entre une position active lorsque le rebord de prise (5) d'un conteneur est dans une position correcte sur l'élément de préhension (6), et une position inactive lorsque le rebord (5) n'est pas dans une position correcte sur l'élément de préhension (6), l'élément de détection (8, 9) étant formé par un levier supporté de façon articulée, dont le premier doigt, ou tige (8), pénètre dans une fente (7) de l'élément de préhension (6) du châssis (1), tandis que son second doigt(9) peut interagir avec le second interrupteur (14), le support articulé du levier étant constitué par un bloc de caoutchouc (10) fixé sur une plaque (11) montée sur le châssis de préhension (1), et en ce que le dispositif comporte en outre des moyens pour arrêter le mouvement des bras de levage (2) et du châssis de préhension (1), dans le cas de la détection, par le second interrupteur (14), du fait que l'élément de détection (8, 9) est dans s a position inactive.

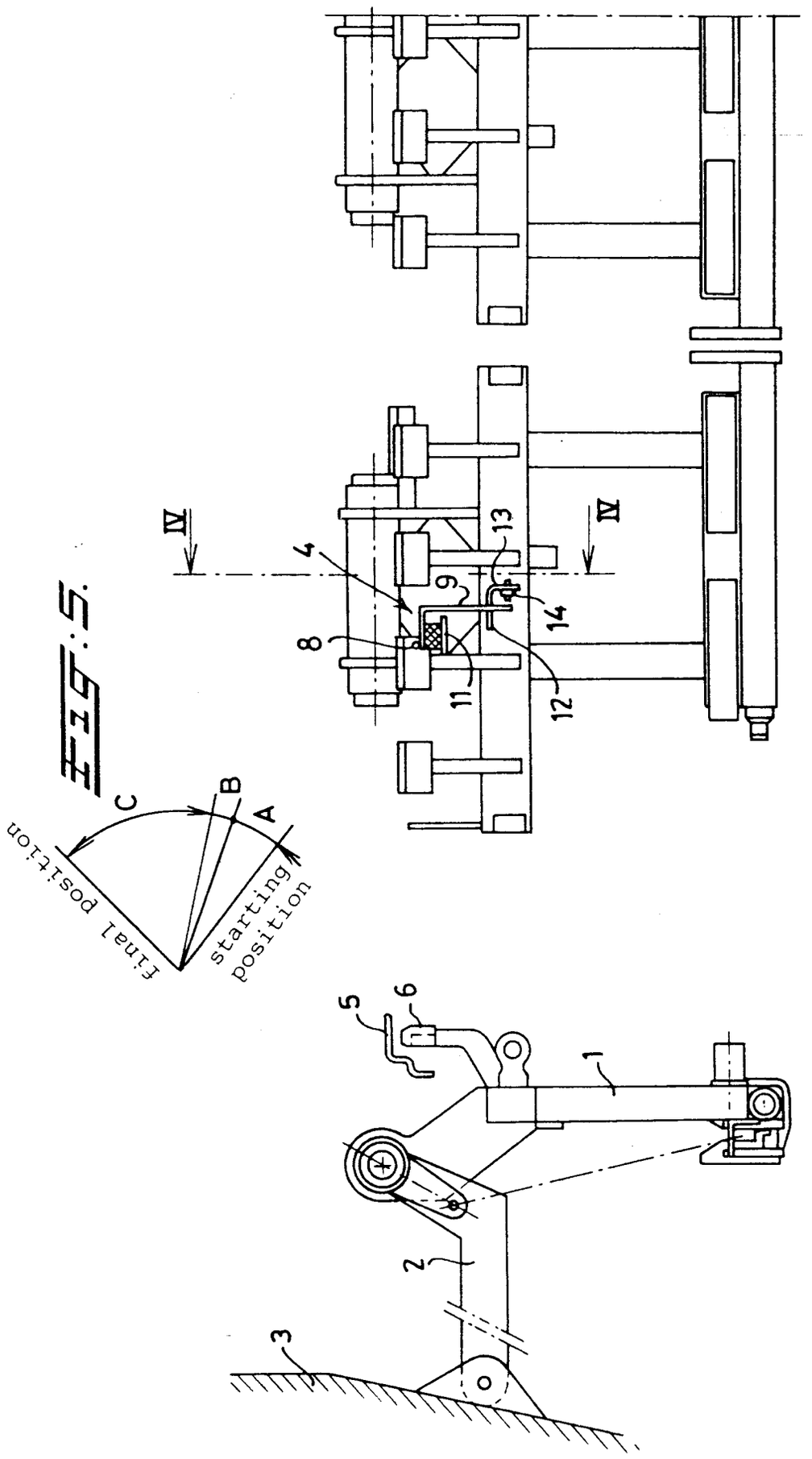

FIG. 2.

FIG. 3.

FIG. 1.

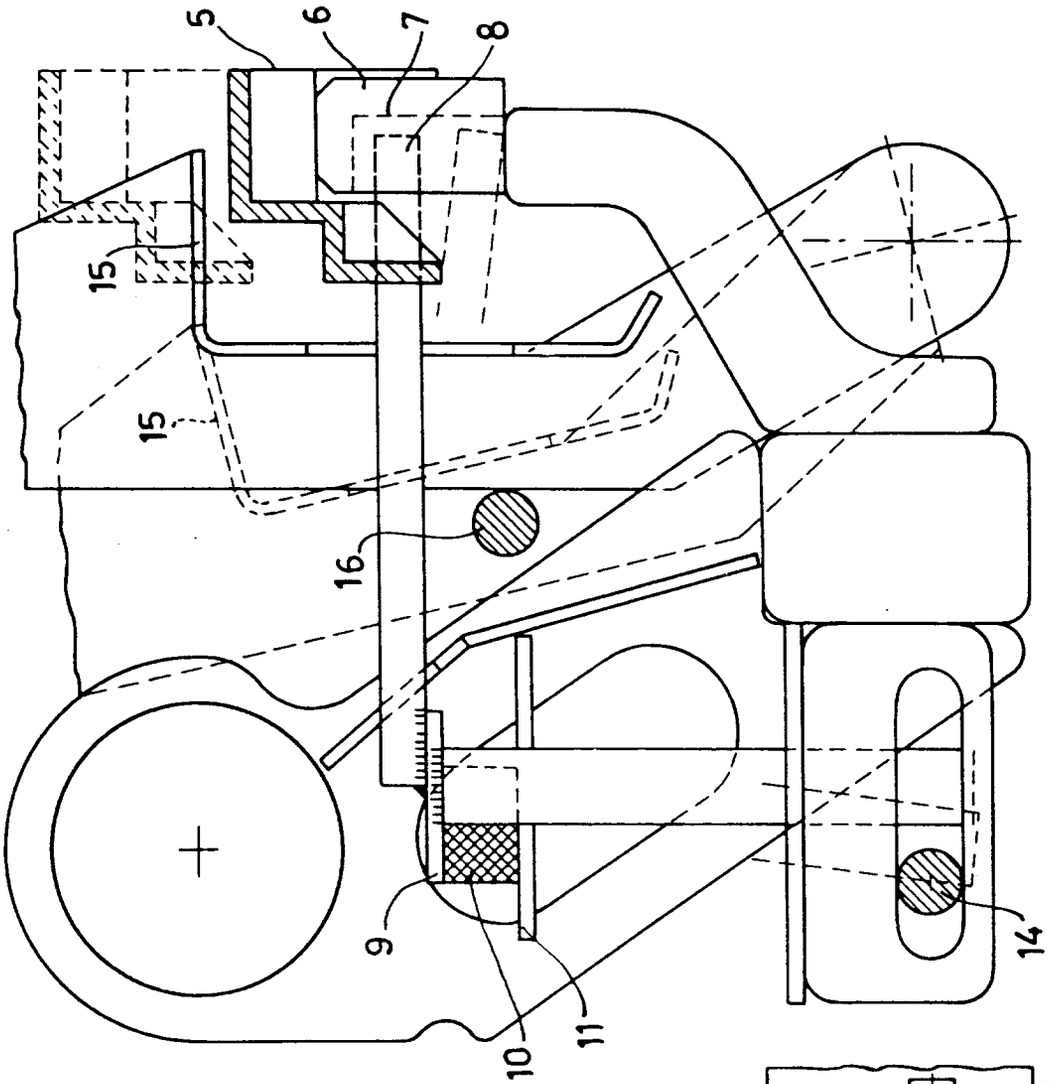

Fig. 4.

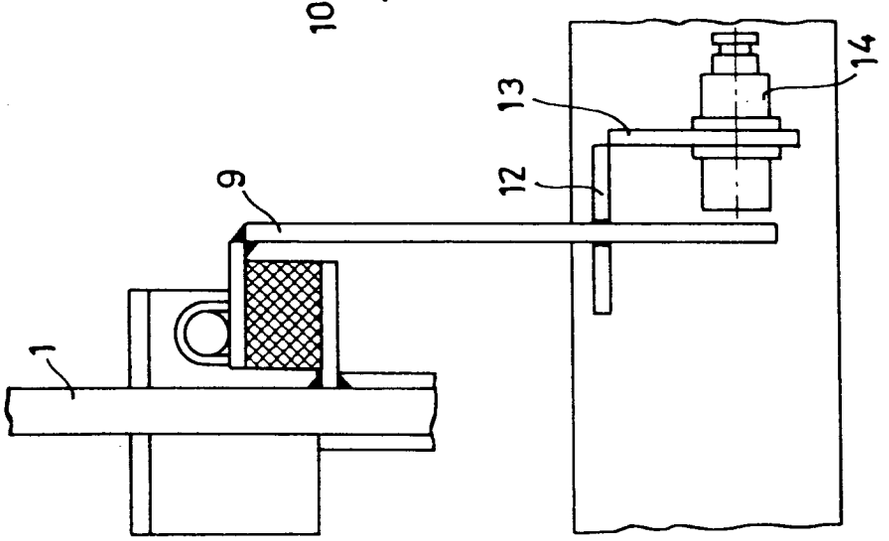

Fig. 3.

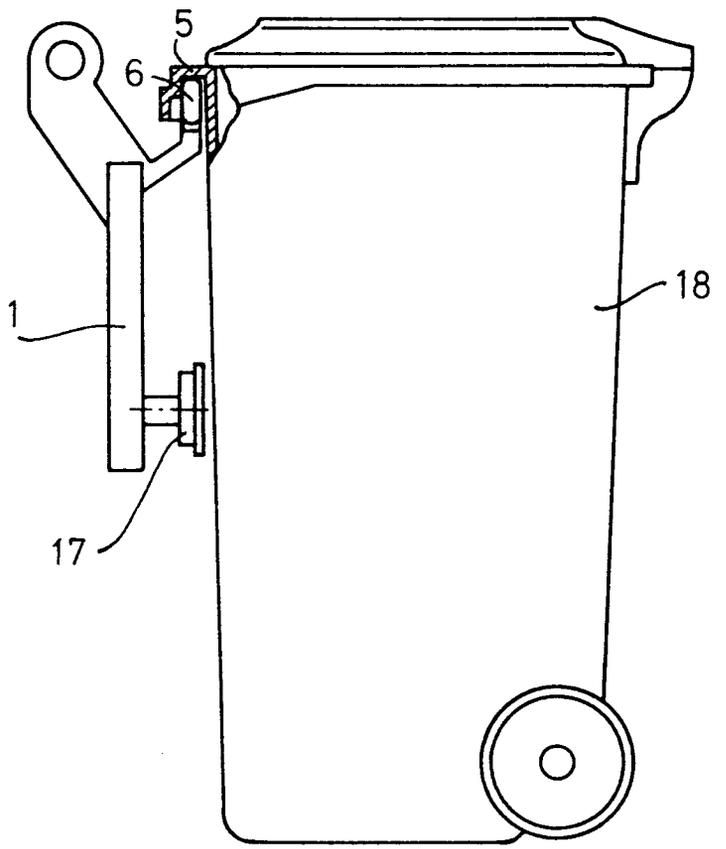

Fig. 6.