



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**18.11.2009 Bulletin 2009/47**

(51) Int Cl.:  
**B65F 3/08 (2006.01)**

(21) Application number: **09157921.9**

(22) Date of filing: **15.04.2009**

(84) Designated Contracting States:  
**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 SE SI SK TR**

(72) Inventor: **Ottosson, Ulf**  
**570 76, Ruda (SE)**

(74) Representative: **Bergentall, Annika Maria**  
**Cegumark AB**  
**Kungsportsavenyn 10**  
**400 14 Göteborg (SE)**

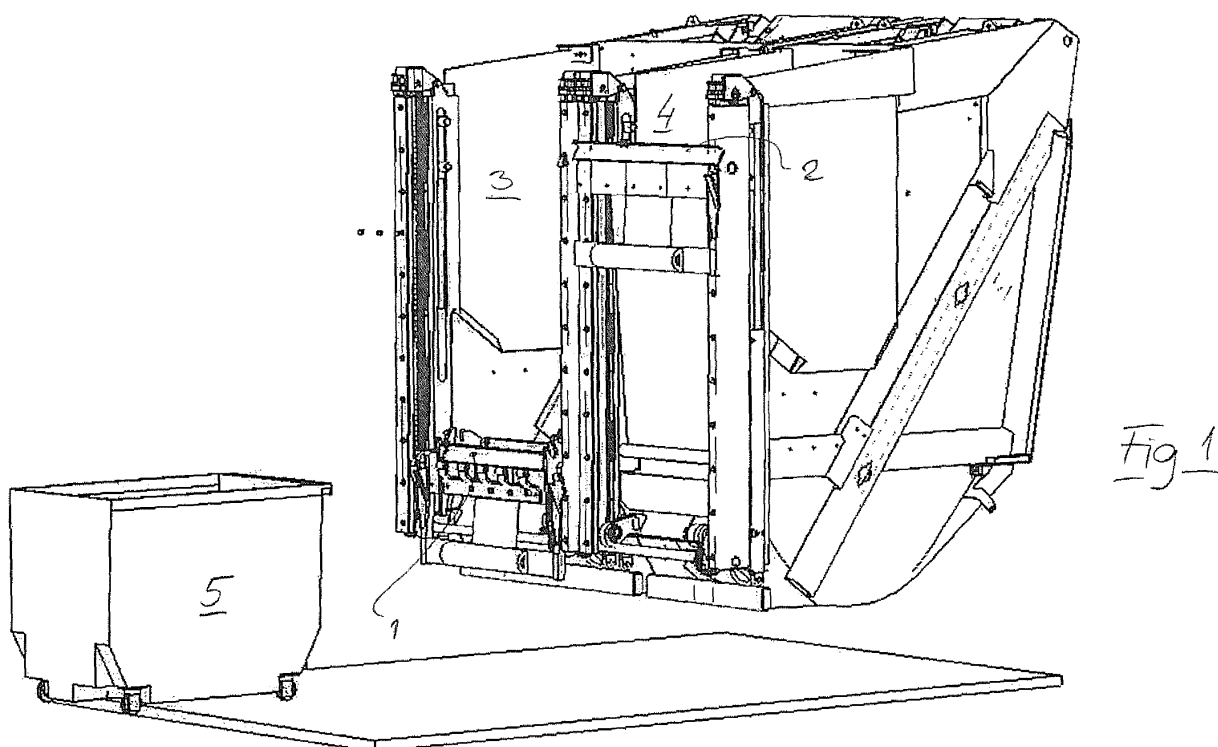
(30) Priority: **12.05.2008 SE 0801069**

(71) Applicant: **Joab Jan Olsson AB**  
**41729 Göteborg (SE)**

(54) **Method and device for a waste collecting vehicle**

(57) A method and a device for a waste collecting vehicle for, by means of at least two lift cradles (1,2) having variable initiation height up to 1,30 m above roadway and being fitted thereto at a boot, allowing, without mixing together, the lifting and, into one waste container (3,4) for each fraction, emptying of likewise at least two waste fractions from different standardized dustbins (5) in the same vehicle having one lift cradle (1,2) for each waste

fraction. For the prevention of spillage beside the intended waste container (3,4), the respective lift cradle (1,2) is associated to a turntable (14) that, if the size of the bin (5) is such that some part of the opening thereof during the course of emptying in connection with turning for emptying risks ending up above a partition or external wall of a waste container (3,4), the bin (5) is lowered by means of the turntable by a motion co-ordinated with the motion of the lift cradle (1,2) so much that this is prevented.



## Description

### Technical Field

**[0001]** The present invention relates to a procedure and a device at a waste-transportation vehicle for, by means of at least two lift cradles having variable initiation height and being fitted thereto in a boot or trunk, allowing, without mixing together, the lifting and emptying of different waste fractions into one dust compartment for each fraction from different standardized dustbins in the same vehicle having one lift cradle for each waste fraction.

### Prior Art

**[0002]** It is required by modern waste-transportation vehicles that they separately can handle at least two kinds of waste, often more. The size of the bins that the waste is kept in, before it is to be taken care of by the vehicle, varies today in such a way that it sets limits for how many different types of waste one and the same vehicle can handle. In addition, the lift cradles of the vehicles, by means of which the bins are handled, have to be constructed in such a way that they can handle both small and large bins, at the same time as emptying has to be performable starting from ground level as well as from an elevated loading position, such as a loading ramp having a height above ground of maximum 1,3 m. Usually, the waste is handled in such a way that it is loaded into a load container belonging to the vehicle from dustbins that are attached to a motor-driven guide mechanism arranged at the rear part of the vehicle and from where it, using means belonging to the vehicle, is brought into the load space, where it is compressed. In transportation of, above all, recyclable material of different types, e.g., returnable packaging's such as aluminium cans or PET bottles, respectively, it is of the utmost importance that the different waste fractions are carefully separated, otherwise the respective loaded matter will in principle be discarded and instead of constituting a renewable resource simply having to be deposited.

**[0003]** Since this waste generally consists of discrete and in many cases partially compressed packages, the possible mixing together of the waste fractions will almost exclusively arise in connection with emptying from a loading ramp, in which case the waste container that is emptied according to prior art has been lifted in such a manner that there is a risk that parts of the contents unintentionally fall down into the wrong load container.

**[0004]** In connection with the following handling of the waste, different kinds of sensor stations are used, in which the waste is scanned, e.g., the PET fraction is scanned using a metal detector in order to find out whether the load is "clean" from metal contents or not. If this is not the case, the lot has to be discarded as a consequence of it being too resource-demanding to manually search through the lot.

### The Invention in Brief

**[0005]** Therefore, it is an object of the present invention to provide a procedure and a device of the above-mentioned type, which makes it possible to be able to highly reliably guarantee that a mix of fractions in connection with emptying from a loading dock of the type mentioned is prevented.

**[0006]** According to the invention, the respective lift cradle is mounted for the prevention of spillage beside the intended waste container on a turntable that, if the size of the bin is such that some part of the opening thereof during the course of emptying in connection with turning for emptying risks ending up above a partition or external wall of a waste container, the bin is lowered by means of the turntable by a motion co-ordinated with the motion of the lift cradle so much that this is prevented.

**[0007]** By the procedure and the device according to the invention, it is prevented that spillage of one waste fraction is mixed with another during the emptying. Thereby, it is attained that recyclable resources can be made use of and be re-used to a substantially greater extent than previously.

**[0008]** In the following, the invention will be described in more detail, reference being made to a preferred embodiment example shown in the appended drawings, wherein:

Fig. 1 shows a perspective view over a waste-handling equipment for a waste-transportation vehicle,

Fig. 2 shows a view straight from behind of the rear part of the waste-transportation vehicle,

Fig. 3 shows a side view of a side part of a bin lifting unit for a lift cradle of the waste-handling equipment,

Fig. 4 shows a side view over parts of a rear part of the cradle of a waste-transportation vehicle close by a ramp including a dustbin,

Fig. 5 shows a view corresponding to Fig. 4 but in which the dustbin has been brought inward toward the vehicle into a finished lift position,

Fig. 6 shows a view corresponding to Fig. 5 but in which the dustbin has been lifted up a bit,

Fig. 7 shows a view corresponding to Fig. 6 but in which the dustbin at the same time as it is lifted has been lowered at the front edge thereof,

Fig. 8 shows a view corresponding to Fig. 7 but in which the initiated lowering motion of the dustbin has continued,

Fig. 9 shows a view corresponding to Fig. 8 but in which the initiated lowering motion of the dustbin has

continued further,

Fig. 10 shows a view corresponding to Fig. 9 but in which the motion corresponding to a tipping has rotated the bin 90°,

Fig. 11 shows a view in which the tipping of the bin has passed 90°, and

Fig. 12 shows a view corresponding to full tipping state.

#### Detailed Description

**[0009]** The instant invention generally relates to a device for a lift cradle for a waste-transportation vehicle, more specifically a lift cradle 1, 2 intended to be arranged on the rear of such a vehicle.

**[0010]** In the following, the details included in the device according to the invention are described as well as, after that, the mutual interaction thereof. As is seen in Fig. 1, which in a perspective view shows a rear part of the lift cradle(s) 1, 2 of a waste-transportation vehicle, as well as a waste container 3 and 4, respectively, associated to each such cradle, as well as also a dustbin 5 that is rolled out into a position for taxing in, lifting and emptying.

**[0011]** In the shown state, the lift cradle 1 of one 3 of the containers is in a lower position for the lifting and emptying of a dustbin from ground level, while the lift cradle 2 of the other one 4 of the containers is in a position for the lifting and emptying of a dustbin from a level that corresponds to a loading dock/loading ramp or the like. The respective lift cradle 1, 2 is driven via a chain transmission 6 of a hydraulic motor 7 in order to move up or down. From this figure, it is also seen that each one of the two lift cradles, at the respective bottom parts thereof, embodies an extensible rubber cloth 8, which serves as spillage protection but also constitutes stipulated safety barrier to be drawn out automatically in connection with the motion of the lift cradle. The rubber cloth is arranged in the form of a roller-blind-like arrangement in such a way that the extension thereof from a storage roller takes place simultaneously with the cradle being pushed upward and the rubber cloth automatically returning at the same time as the cradle is brought back to the lower position thereof.

**[0012]** Fig. 2 shows the lift cradles 1, 2 as seen straight from behind, and similarly to Fig. 1, the right cradle 2 herein is here shown elevated into a state for emptying from a loading dock or the like. Because of that, the rubber cloth 8 is, as has been described, also drawn up. The left lift cradle is in the lower position thereof, and thus in a state for emptying of a dustbin from ground level. In this figure, the hydraulic motors 7 of the respective lift cradles 1, 2 are seen more clearly. In this view, the chain transmissions 6 are concealed behind protective plates 9.

**[0013]** Fig. 3 shows a side part 10 of a bin lift that stands

for hoisting of the respective cradles 1, 2 from the level where the dustbins are collected to the level on which they are emptied. The cradles 1, 2 are intended for catching hold of and lifting as well as swinging a dustbin 5 (not shown in this figure) before the same is emptied at the upper part of the respective containers 3, 4. The cradles 1, 2 is moved by means of the motor 7 (not shown in this figure) on the output shaft of which there are gears (not shown) that are rolled against movable chains that are fixed to the cradles (not shown) and contained in guides 8.

**[0014]** One end 12 of the respective lift cradle 1, 2 has a curvature that comprises deep "notches" 13. In connection with the hoisting of the lift cradle 1, 2, said "notches" 13 are intended to catch hold of pins 17 on a so-called turntable 14, which, under the impact of the motion of the cradle, pretty much as the engagement between a rack and a gear with a large pitch for both, swing around a dustbin 5 that is fixed to the cradle 1, 2 into a position for emptying. The turntable 14 is, under the impact of a hydraulic cylinder that acts between itself and a fixed part of either of the containers 3, 4, movable upward/downward in a guide 16. A motion indicator (not shown), which is incorporated in the hydraulic control of the turntable, senses when the two notches 13 of a cradle 1, 2 have arrived in such a position that both of them are in engagement with the pins 17 of the turntable 14, wherein the turntable 14 and the chain transmission 6, by means of a functionality that is incorporated in a control unit (not shown) for the move of the cradle 14, both are actuated to execute a co-ordinated motion of the cradle 1, 2 as well as the turntable 14, so that the dustbin will move in a way that means that nothing of the material contained therein falls outside the respective container during a course of emptying.

**[0015]** In the following, the course of an emptying cycle for a dustbin will be described in more detail, reference being made to a sequence of Figs. 4-12, from which a complete emptying sequence from start to finish is seen. Accordingly, in Fig. 4, it is seen how the rear part of a waste-transportation vehicle, more precisely containers 3, 4 and lift cradles 1, 2 have been reversed to a loading ramp 18. In the figure, all details described above take part and are present in one or other activity phase. For instance, the lift cradle is, in a manual or automatic way, elevated into a position in such a way that a dustbin 5, only by being run close by the cradle 1, 2, easily can be coupled together with the same by means of hooks 19 in order to be lifted up for emptying purposes. In the corresponding Fig. 5, it is shown how the dustbin 5 has been rolled inward toward the lift cradle 1, 2 and aligned in such a way that the hooks 19 can engage the edge of the bin. 5. In Fig. 6, it is only seen that the dustbin 5, by means of the cradle 1, 2, has been lifted up a short distance. In this connection, it should be noted that the turntable 14 still is in the upper rest position thereof. According to Fig. 7, the dustbin 5 has been lifted up further, one of the notches 13, which previously have been described

in connection with Fig. 3, having caught hold of the first one of the pins 17, which makes the cradle 1, 2 to swing out in the way shown. Also the other notch 13 has initiated an engagement with the second one of the pins 17, also the turntable 14, by means of hydraulic cylinder, having started a motion downward in the figure. In Fig. 8, it is seen that the elevation of the point of contact of the cradle clearly has been lowered considerably. This has been effected by a motion of the turntable 14 at the same time as a co-ordinated lowering of the cradle 1, 2 has been commenced. It is also seen clearly that the lowering of the cradle and the turntable 14 is just as great that the inner, lower corner of the dustbin 5 situated closest to the containers 3, 4 clears from interfering with the floor surface of the loading dock 18. What just has been mentioned is even more evident in Fig. 8; notice particularly that the turntable 14 is slightly observable behind the hydraulic cylinder 15, and here, the position thereof is clearly changed. Fig. 9 constitutes actually a continued steady state of what is shown in Fig. 8 and shows the continuity of the co-ordinated motion of the chain transmission 6 and the motion of the turntable and does not require any further explanation. According to Fig. 10, the dustbin 5 has reached a position in which the opening thereof is situated in the vertical plane and this motion continues via Fig. 11 to the position shown in Fig. 12, in which complete emptying is expected to have occurred under the impact of gravity on the recovery material contained in the dustbin. Notice particularly that the rotation of the bin 5 in the lifted position thereof between Fig. 8 and Fig. 12 in principle is provided by the fact that the turntable 14 "runs away from" the chain transmission 6.

[0016] The invention should not be considered to be limited by the description above, but is only limited by the accompanying claims, for the interpretation of which support can be found in the description.

## Claims

1. Procedure at a waste-transportation vehicle for, by means of at least two lift cradles (1, 2) having variable initiation height up to 1,30 m above roadway and being fitted thereto at a boot, allowing, without mixing together, the lifting and, into one waste container (3, 4) for each fraction, emptying of likewise at least two waste fractions from different standardized dustbins (5) in the same vehicle having one lift cradle (1, 2) and one waste container for each waste fraction, **characterized in that** the respective lift cradle (1, 2), for the prevention of spillage beside the intended waste container (3, 4), is associated to a turntable (14) that, if the size of the bin is such that some part of the opening thereof during the course of emptying in connection with turning for emptying risks ending up above a partition or external wall of a waste container (3, 4), the bin is lowered by means of the turntable (14) by a motion co-ordinated with the motion

of the lift cradle so much that this is prevented.

2. Procedure according to claim 1, **characterized in that** the respective lift cradle (1, 2) is driven by a chain transmission (6) driven by a hydraulic motor (7).
3. Procedure according to any one of the preceding claims, **characterized in that** the turntable (14) is lowered under the impact of a hydraulic cylinder (15) that mechanically is coupled to the lower end of the turntable (14).
4. Device for a waste-transportation vehicle for at least two waste fractions embodying at least two lift cradles (1, 2) having variable initiation height up to 1,30 m above roadway and being fitted thereto at a boot, **characterized in that** it furthermore embodies a hydraulically operated vertically displaceable turntable (14) associated to the respective lift cradle (1, 2), which turntable, by pins (17) arranged thereon, in a tooth-engagement-like manner, is arranged to co-operate with recesses (13) arranged on the respective lift cradle, the turntable (14) being arranged in such a way that it, after the pins (17) thereof having engaged completely with the recesses (13), sensors via an electronic control system being arranged to initiate the vertically downward motion of the turntable (14) in such a way that the dustbin (5), by a co-ordinated motion of the lift cradle and the turntable, becomes swingable more than a quarter of a revolution without any part of the bin interfering with the surroundings, and whereby the dustbin becomes swingable without mixing together of the different waste fractions taking place.
5. Device according to claim 4, **characterized in that** the respective lift cradle (1, 2) has a chain transmission (6) driven by a hydraulic motor (7).
6. Device according to any one of claims 4 or 5, **characterized in that** the turntable (14) is lowerable under the impact of a hydraulic cylinder (15) that is attached to the lower end thereof.

Fig. 1

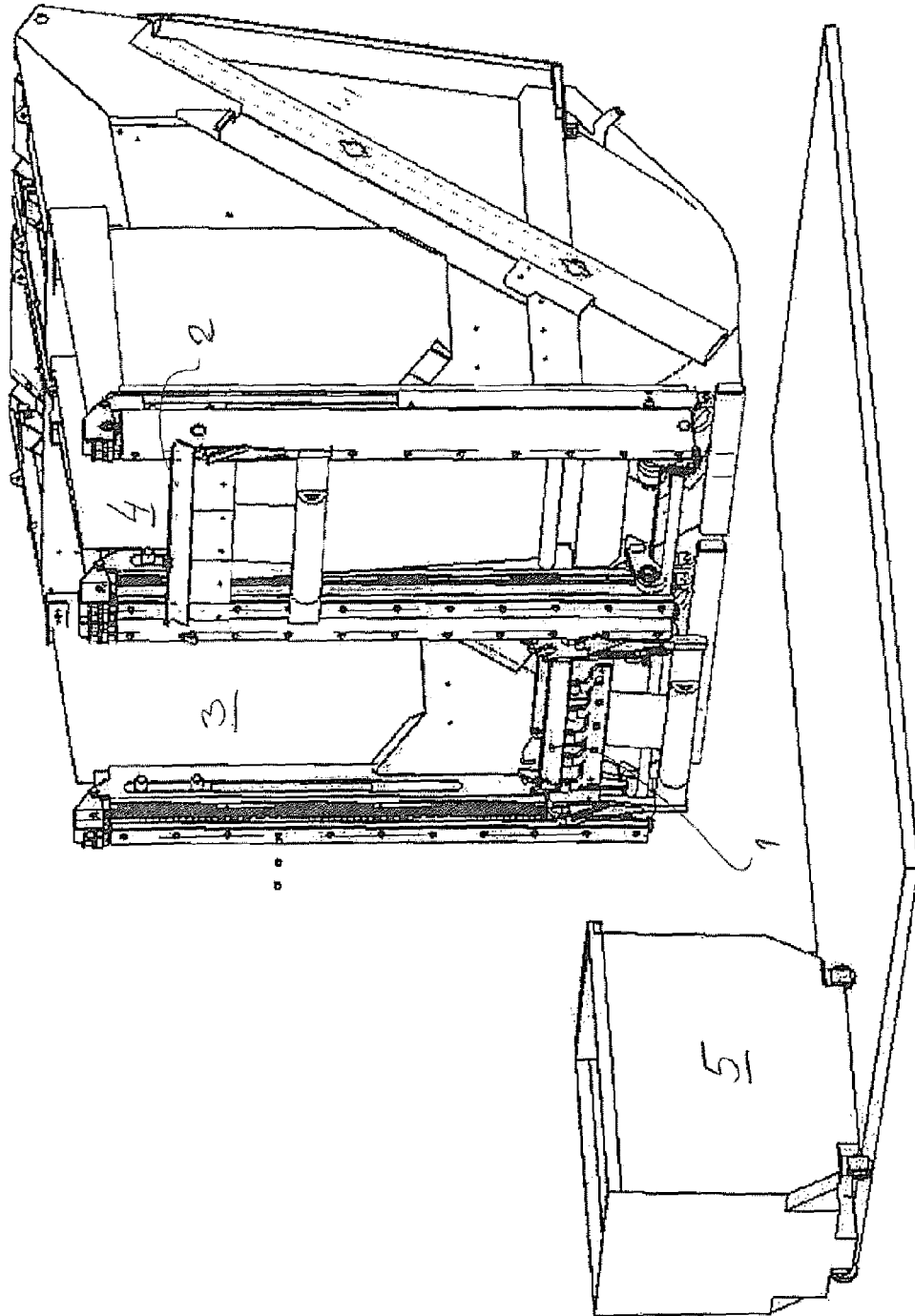


Fig 2

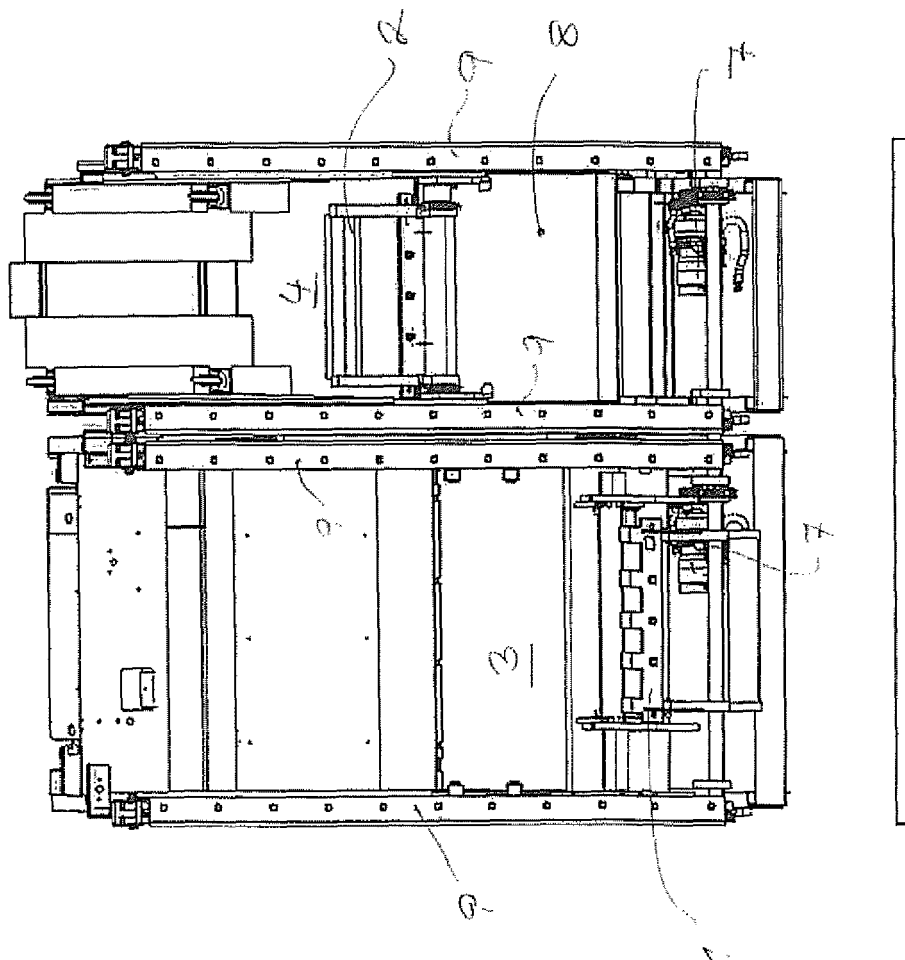


Fig 3

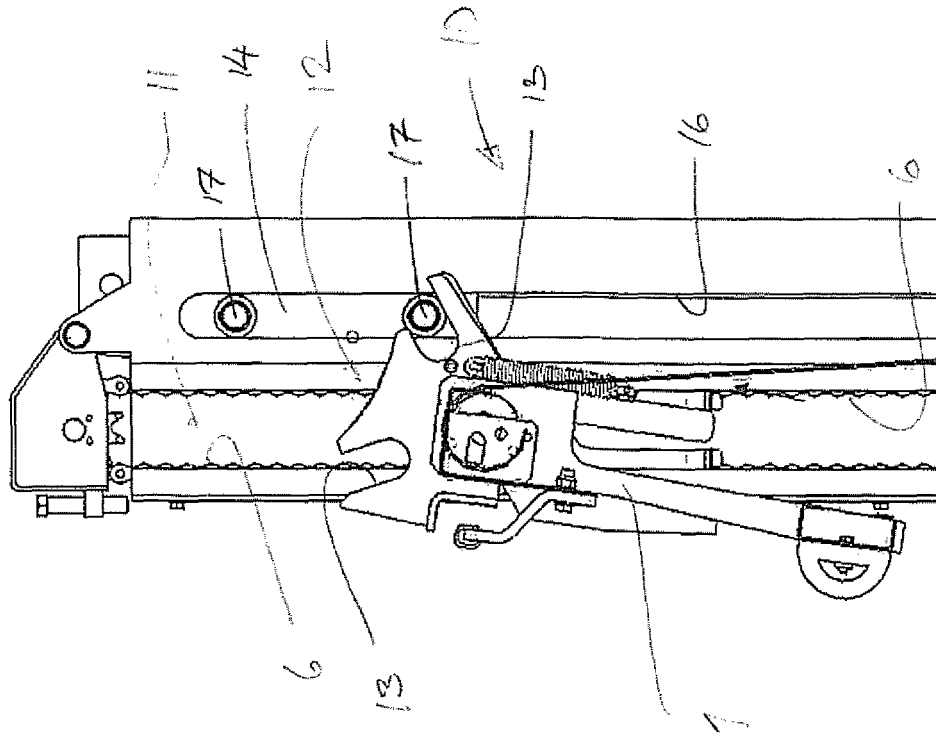
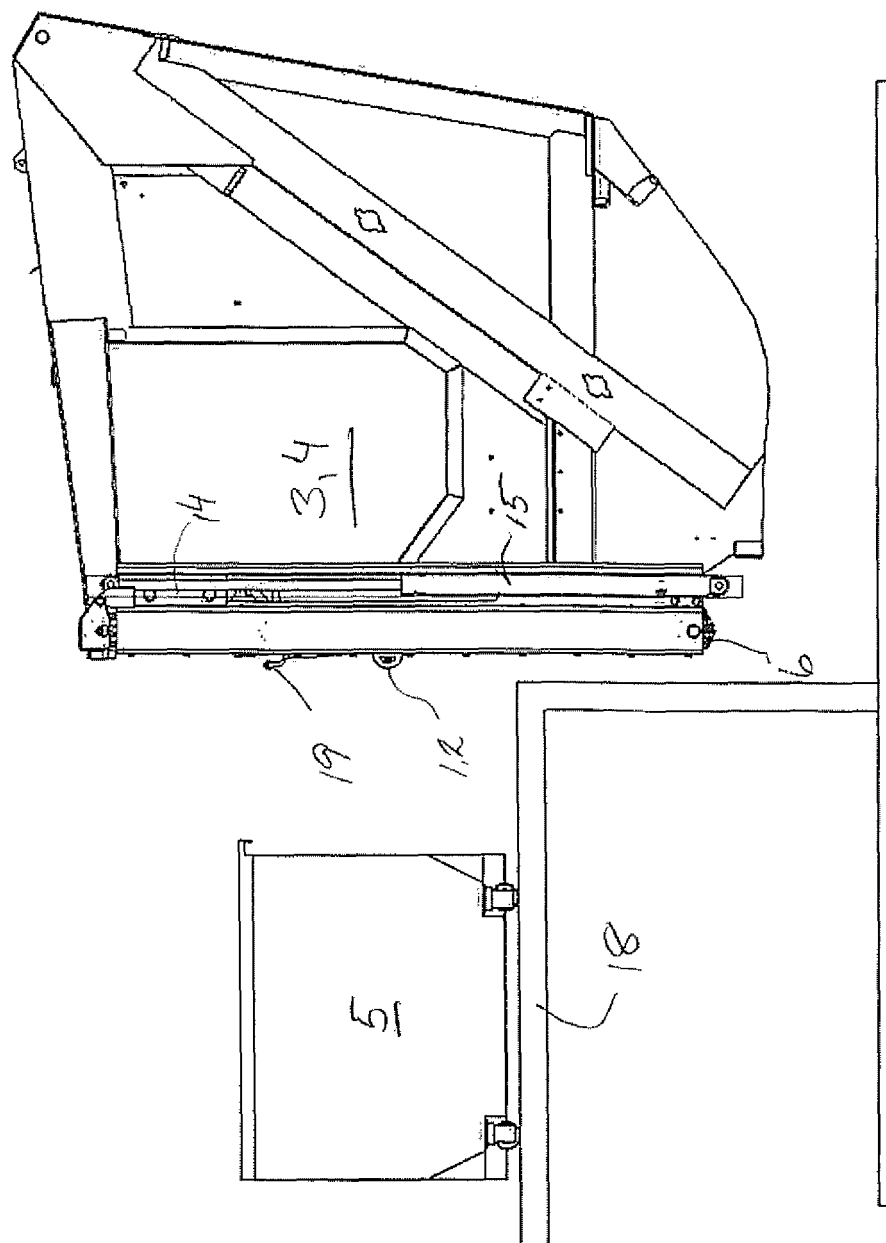


Fig 4





151  
191

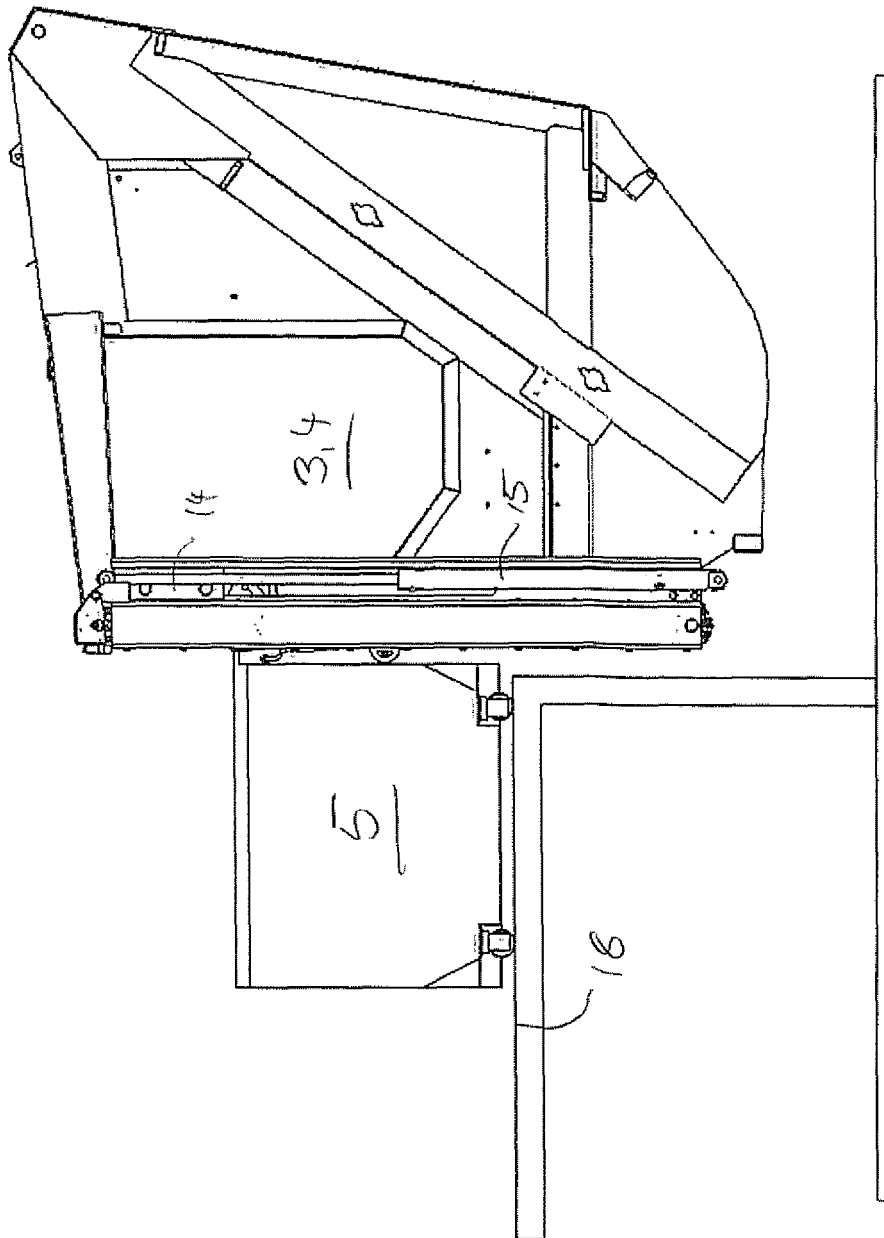
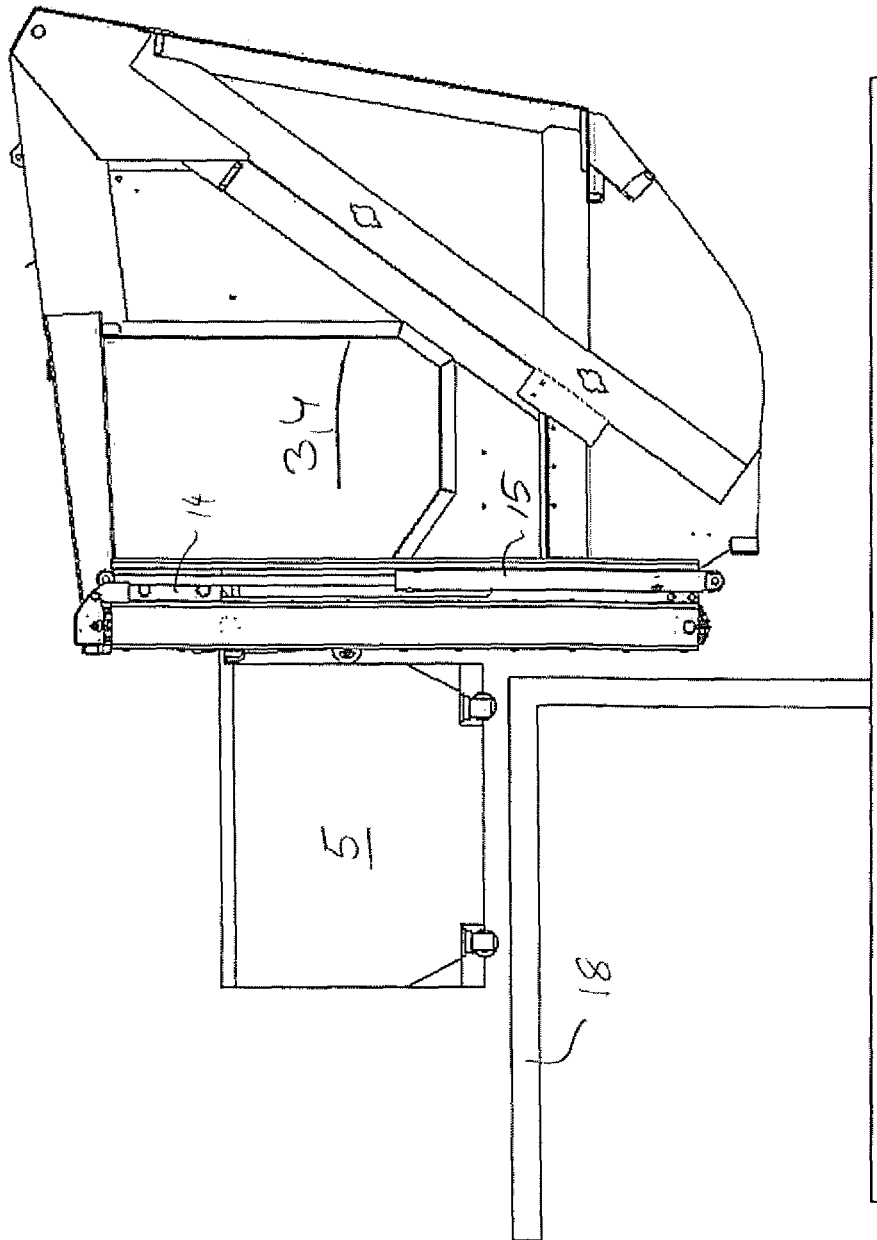


Fig 6



77

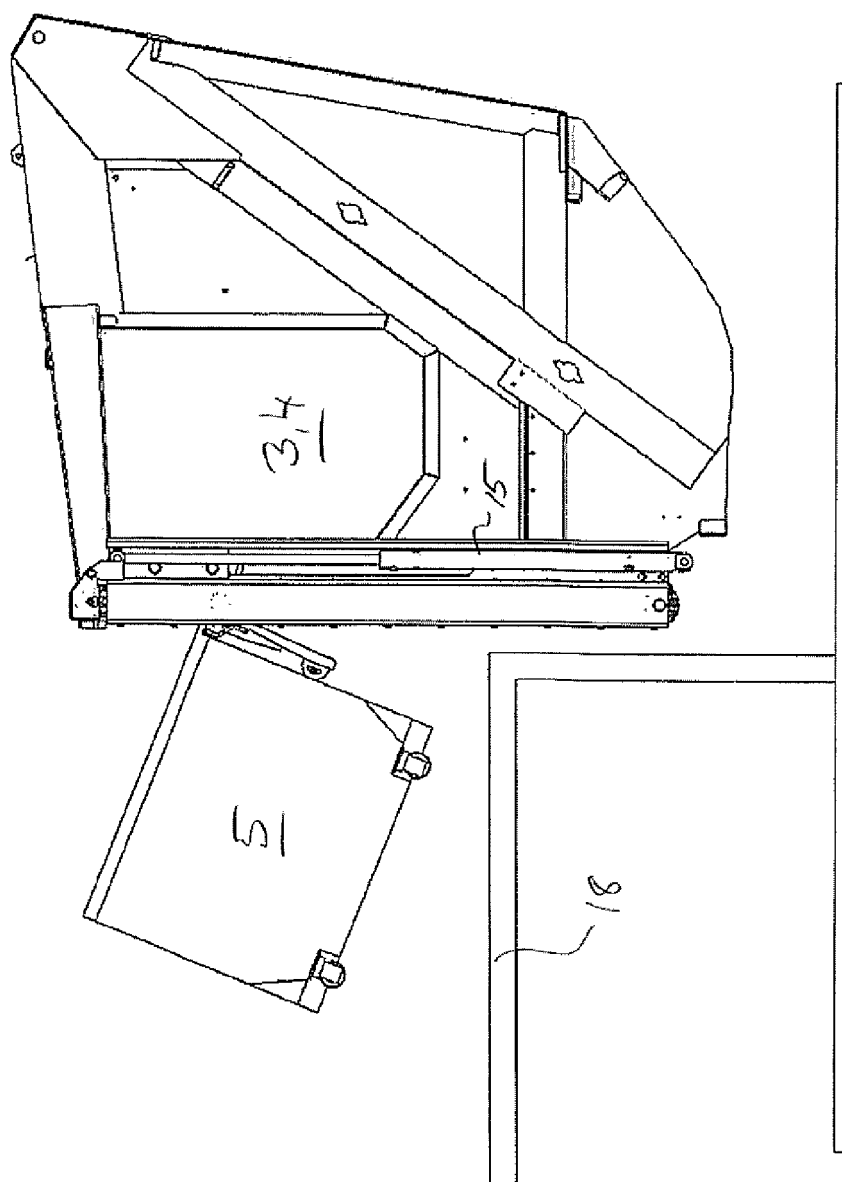


Fig 8

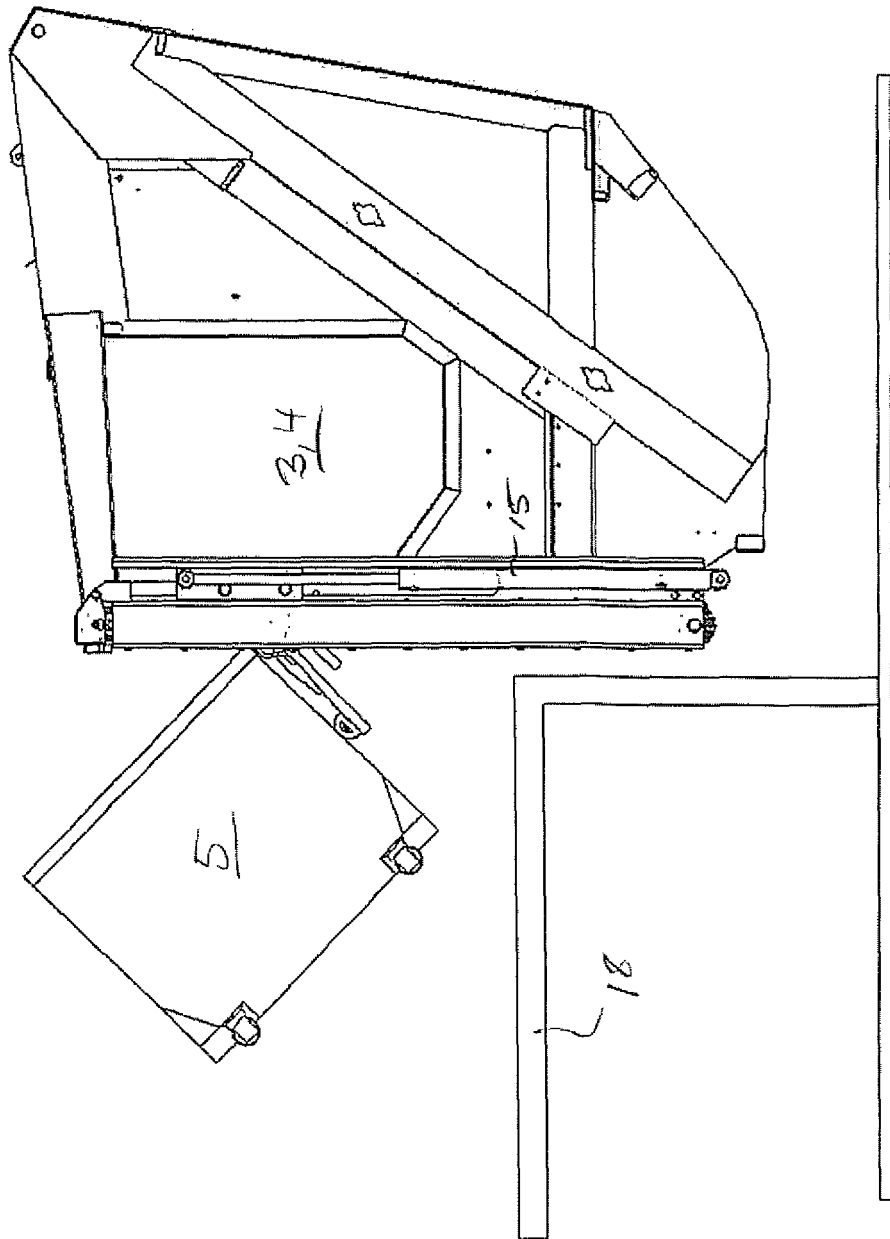


Fig 9

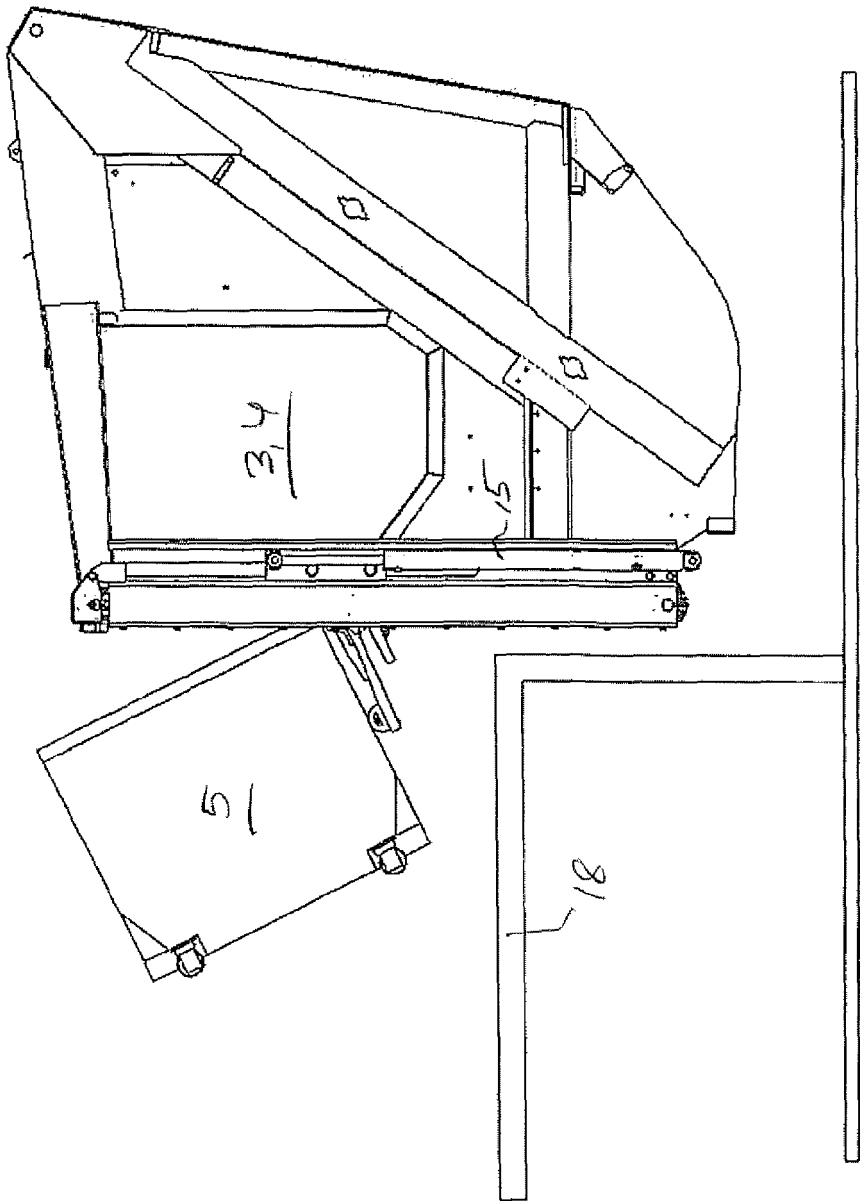


Fig 10

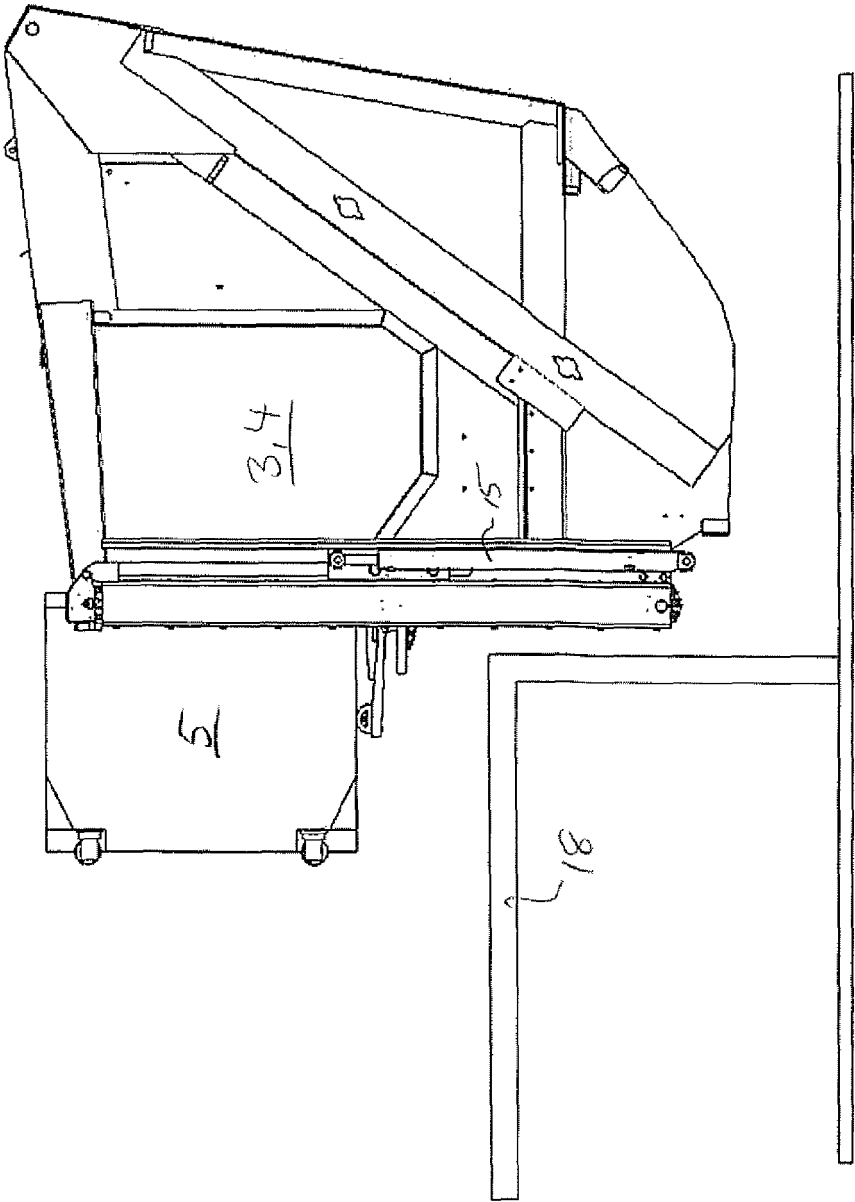


Fig. 11

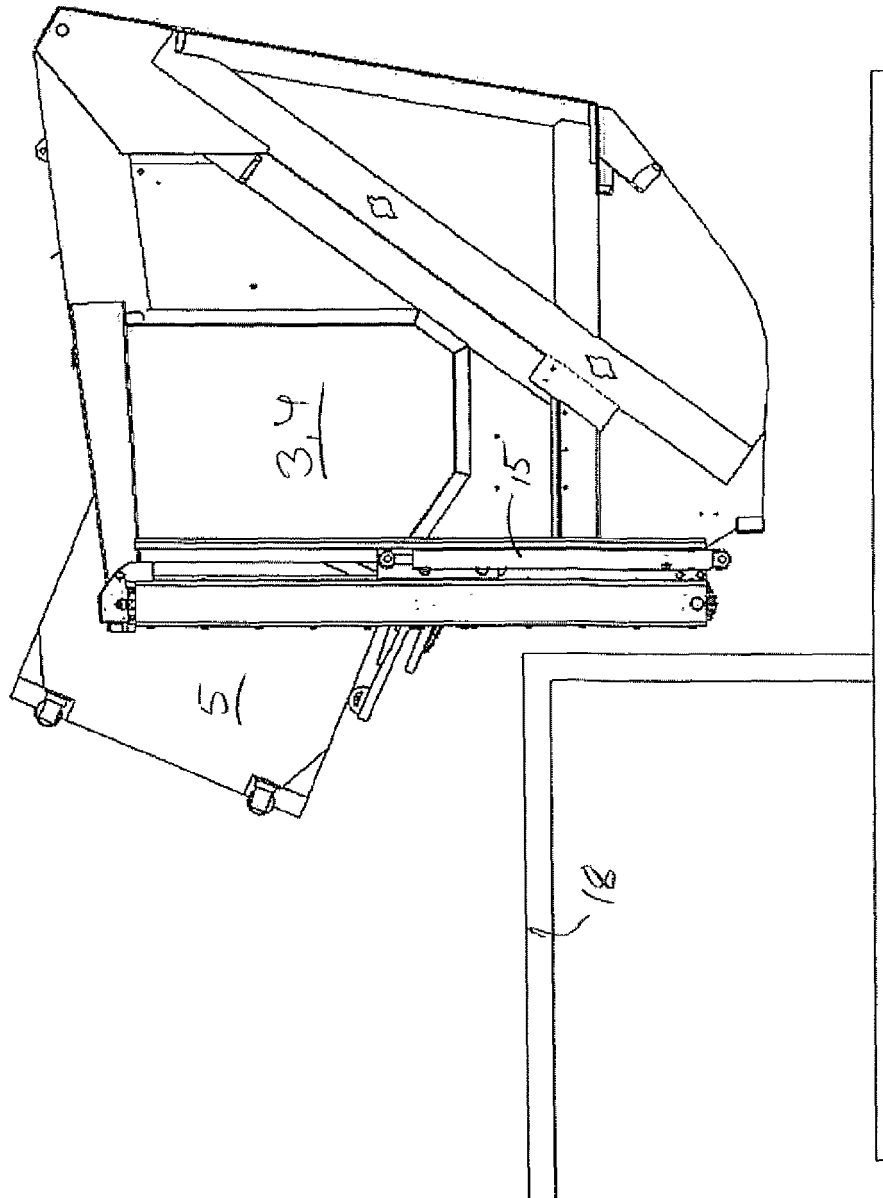
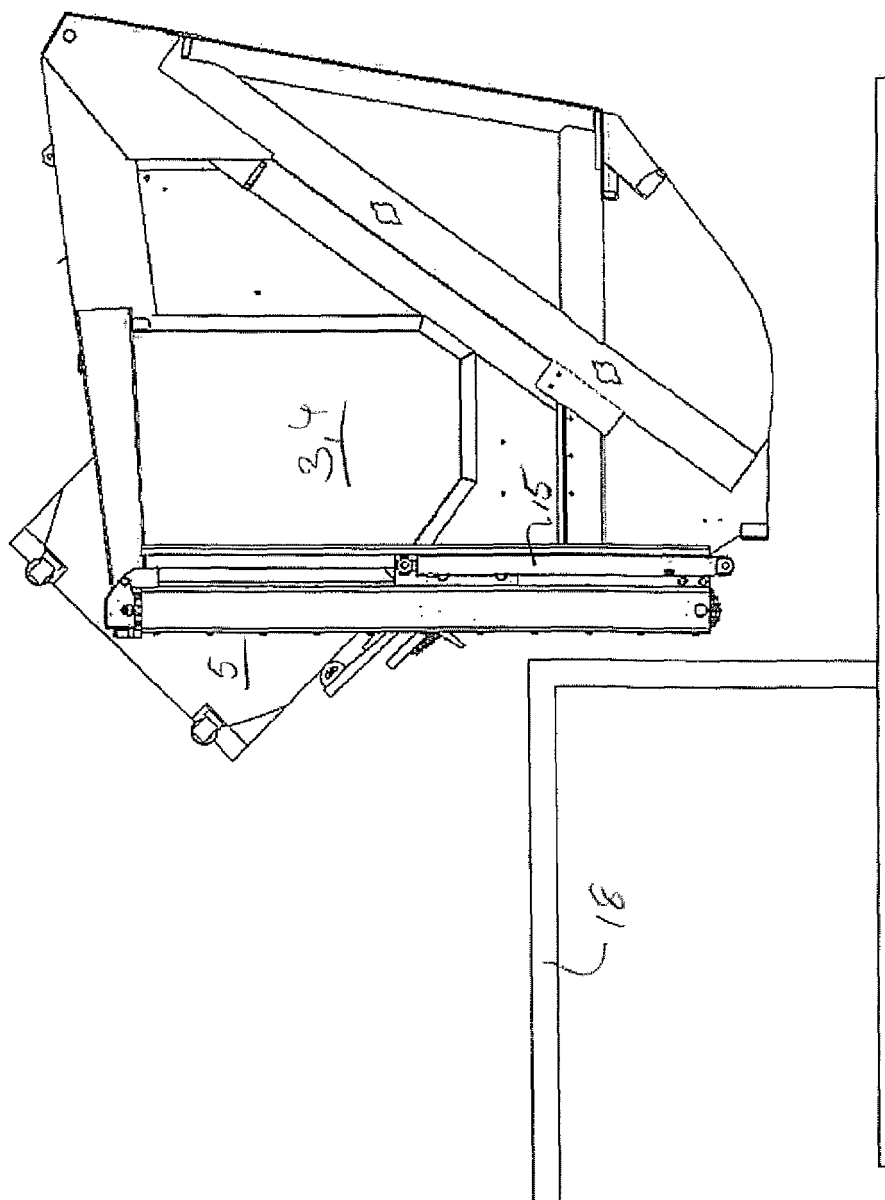


Fig 12







## EUROPEAN SEARCH REPORT

Application Number  
EP 09 15 7921

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	DE 44 08 723 A1 (E. SOBITSCH) 22 September 1994 (1994-09-22) * column 2, line 58 - column 3, line 61 * * figures 1,2 *	1,4	INV. B65F3/08
A	EP 0 379 475 A1 (STUMMER EURO-WAREN HANDELSGESELLSCHAFT M.B.H.) 25 July 1990 (1990-07-25) * column 3, line 36 - column 4, line 45 * * figures 1,2 *	1,4	
A	DE 43 38 838 A1 (STUMMER EUROWAREN HANDELS- UND VERTRIEBSGESELLSCHAFT MBH) 19 May 1994 (1994-05-19) * column 2, line 50 - column 4, line 9 * * figures 1-4 *	1,4	
A	AT 384 799 B (STUMMER EURO-WAREN HANDELSGESELLSCHAFT M.B.H.) 11 January 1988 (1988-01-11) * page 3, line 28 - page 4, line 5 * * figures 1-3 *	1,4	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 1 September 2009	Examiner Smolders, Rob
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	

 1  
EPO FORM 1503 03.82 (P04C01)

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

EP 09 15 7921

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.

01-09-2009

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 4408723	A1	22-09-1994	NONE
EP 0379475	A1	25-07-1990	AT 391118 B 27-08-1990 AT 77340 T 15-07-1992 DE 59000157 D1 23-07-1992 EP 0379060 A1 25-07-1990 ES 2034850 T3 01-04-1993 GR 3005721 T3 07-06-1993
DE 4338838	A1	19-05-1994	AT 397793 B 27-06-1994
AT 384799	B	11-01-1988	NONE