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(74) Representative: **Litton, Rory Francis et al**
Cruickschank & Co.
8a Sandyford Business Centre
Sandyford
Dublin 18 (IE)

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(71) Applicant: **McKeown, John**
County Offaly (IE)

(72) Inventor: **McKeown, John**
County Offaly (IE)

Remarks:

A request for correction the drawings (fig.4a, 20 and 23) has been filed pursuant to Rule 139 EPC. A decision on the request will be taken during the proceedings before the Examining Division (Guidelines for Examination in the EPO, A-V, 3.).

(54) **A multi-compartment refuse storage container**

(57) The present invention is directed towards a multi-compartment recyclable refuse storage container (1) for mounting on a wheeled chassis (2) whereby the storage container (1) comprises a plurality of lower side-by-side in-line recyclable refuse receiving compartments (5,6,7,8) mounted on the wheeled chassis (2); an enclosed upper recyclable material compartment (11) extending across one or more of the lower side-by-side in-line recyclable refuse receiving compartments (5,6,7,8); and, a lower recyclable material receiving compartment

(5) communicating with the enclosed upper recyclable material compartment (11) through an opening (39) in the floor (30) of the enclosed upper recyclable material compartment (11); wherein the storage container (1) further comprises a lifting and compacting device (40) to lift recyclable material from the lower recyclable material receiving compartment (5) into the enclosed upper recyclable material compartment (11) through the opening (39) and to compact the recyclable material against the roof (31) of the upper recyclable material compartment (11).

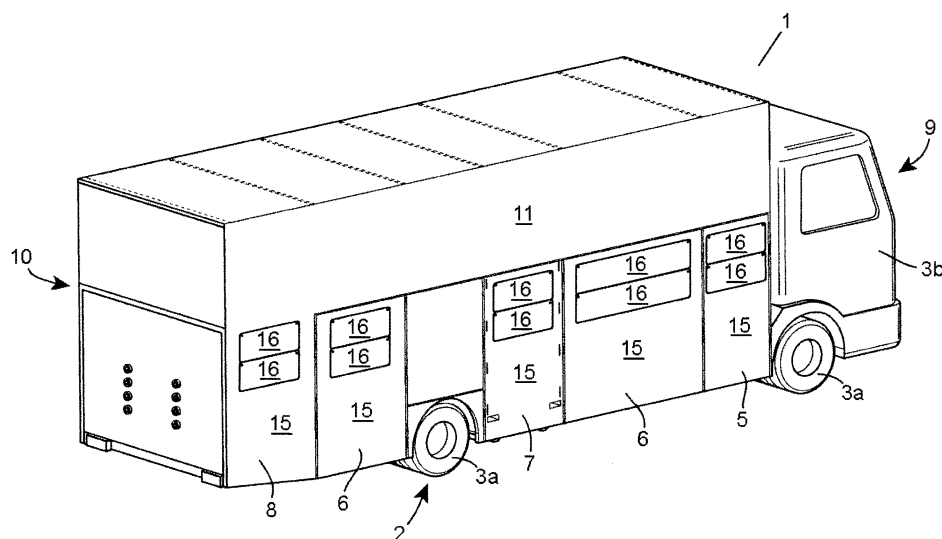


Figure 1

Description

Introduction

[0001] The present invention relates to a multi-compartment recyclable refuse storage container for mounting on a wheeled chassis.

[0002] Such a multi-compartment recyclable refuse storage container for mounting on a wheeled chassis is generally of the type in which the storage container comprises a plurality of side-by-side in-line refuse receiving compartments mounted along the wheeled chassis from a proximal end to a distal end of the chassis. An enclosed upper recyclable material compartment extending across some or all of the other refuse receiving compartments from adjacent the proximal end to the distal end of the chassis is also provided.

[0003] For example, one such type of recyclable refuse storage container is disclosed in Belgian Patent Publication Number BE1003808 A5 (CLERCK) which has a multi-compartmental vehicle with upper deck compartments. Moreover, PCT Patent Publication Number WO 2006/048667 (SKEA) also shows a multi-compartmental refuse receiving container vehicle which has an upper compartment and lifts refuse into this upper compartment using lifting devices. Lastly, US Patent Number US 6,027,300 (RICHARDS) also discloses a similar multi-compartmental refuse receiving vehicle, which lifts some of the refuse contents into an upper compartment by a lifting device.

[0004] As can be seen, these lifting devices are comprised of complicated bucket and chain mechanisms or other such complicated mechanisms which are prone to mechanical failure.

[0005] The enclosed upper recyclable material compartment generally comprises a floor, a roof, a pair of facing elongated sidewalls which connect the floor and the roof thus giving a proximal end and a distal end of the enclosed upper recyclable material compartment. The distal end of the enclosed upper recyclable material compartment has a discharge door, and a refuse receiving compartment adjacent the proximal end of chassis is connected to the upper recyclable material compartment through a opening in the floor. The upper recyclable material compartment also includes a product transferring device to move the packaging materials, after compaction, away from the proximal end towards the distal end of the upper recyclable material compartment.

[0006] There are many such containers usually mounted on a vehicle chassis and often called simply a kerbside recycling vehicle which clearly the present invention is not. It is strictly speaking a vehicle which is used to separate refuse into various types for subsequent recycling. The container which is a multi-compartment container usually has a number of compacting devices mounted in more than one compartment to facilitate crushing and compacting of the refuse which if not compacted would occupy too large a volume of the compartment. This is

particularly the case with paper and cardboard where, for example, the cardboard is not pre-shredded but often is effectively an article of packaging with a considerable amount of voids.

5 [0007] An additional problem with cardboard and paper is that it has a relatively active memory whereby even after having been compacted it will often spring up to assume its former shape or at least something approaching it.

10 [0008] Another example of articles which are difficult to handle include containers and bottles made of plastics material or metal such as beverage cans. Many of these articles are effectively sealed so that even when engaged by compactors, the articles do not compact or reduce in volume as they are sealed and prevented from doing so by virtue of being sealed. Additionally, the articles often have a considerable active memory.

15 [0009] An additional problem with many of the known constructions of such kerbside recycling vehicles is that often the removal subsequently from the vehicle of the refuse, such as for example food and other natural products suitable for composting, is that they generally contain some liquids and accordingly form a flowable or semi-flowable material. This flowable or semi-flowable material has to be kept in a removable stillage for transport to another site for subsequent disposal of the material and cleaning of the removable stillage. The problem is that this requires the use of some form of mechanical handling equipment such as a forklift truck. Operators who are not sufficiently trained or do not take due care when operating the forklift truck and removing and replacing the removable stillage can damage the removable stillage, the kerbside recycling vehicles and co-workers. Ideally, the taking of the removable stillage from the multi-compartment refuse, for-recycling, storage container should not require the use of a forklift truck or other mechanical handling equipment.

30 [0010] A further problem with known refuse recycling containers is that the level of noise which emanates from the container when recyclable glass is emptied into the container exceeds regulatory stipulations. In Ireland and the UK, regulations state that the level of noise must be less than 85dB for an operator on a daily basis. Current multi-compartmental refuse recyclable container vehicles do not address this problem.

35 [0011] The present invention is directed to overcoming at least some of these problems and additionally providing a more efficient construction of multi-compartment refuse, for-recycling, storage container for mounting on a wheeled chassis.

Statements of Invention

40 [0012] The present invention is directed towards a multi-compartment recyclable refuse storage container for mounting on a wheeled chassis whereby the storage container comprises a plurality of lower side-by-side in-line recyclable refuse receiving compartments mounted on

the wheeled chassis; an enclosed upper recyclable material compartment extending across one or more of the lower side-by-side in-line recyclable refuse receiving compartments; and, a lower recyclable material receiving compartment communicating with the enclosed upper recyclable material compartment through an opening in the floor of the enclosed upper recyclable material compartment; wherein, the storage container further comprising a lifting and compacting device to lift recyclable material from the lower recyclable material receiving compartment into the enclosed upper recyclable material compartment through the opening, and, to compact the recyclable material against the roof of the upper recyclable material compartment.

[0013] This is advantageous as the recyclable material is lifted to a heightened position within the enclosed upper recyclable material compartment and is also crushed at the same time. Furthermore, the lifting and compacting device forms part of the profile of the floor of the enclosed upper recyclable material compartment when in the lifted position. Therefore, this increases the capacity of the enclosed upper recyclable material compartment as a final load of recyclable material may be passed into the multi-compartment at recyclable refuse storage container and lifted up into the enclosed upper recyclable material compartment, crushed and then the lifting and compacting device is held in its extended, lifted position to hold the final load of the recyclable material up in the enclosed upper recyclable material compartment.

[0014] In a preferable embodiment, the lifting and compacting device is a pantographic type of lifting and compacting device. In particular, the pantographic type lifting and compacting device may be a scissors lift. This is advantageous as scissor lifts are not prone to mechanical failure and are more reliable than the lifting devices known in the prior art. Heretofore such scissor lifting devices have been dismissed as these types of lifting devices do not allow for continual operation. Namely, when the scissors lift is in a raised, extended position, recyclable material cannot be passed into the recyclable material compartment as the recyclable material compartment is not ready to receive the recyclable material. The operator must wait for the scissor lift to be lowered so that the recyclable material can be placed into the area above the scissor lift. The known lifting mechanisms do not have this disadvantage and therefore have been preferred to date as they offer a continual operation in that a never-ending loop of buckets are presented to the operator to allow the operator to pass recyclable material into the recyclable material compartment at any moment. Using a scissor lift type of lifting device is counterintuitive to the teachings to date.

[0015] In a further embodiment, the plurality of lower side-by-side in-line recyclable refuse receiving compartments extend from a proximal end to a distal end of the wheeled chassis; the enclosed upper recyclable material compartment comprises a floor, a roof, a pair of facing elongated sidewalls connecting the floor and the roof, a

proximal end wall and a distal end wall having a discharge door; the lower recyclable material receiving compartment is located at the proximal end of the storage container; and the upper recyclable material compartment includes a recyclable material transferring device to move the recyclable material, after compaction, away from its proximal end wall towards its distal end wall.

[0016] In a further embodiment, the distal end wall of the upper recyclable material compartment further comprises an outwardly and downwardly extending L-shaped lip along its upper edge to receive and retain the discharge door in a closed and/or locked position. This is advantageous as the L-shaped lip can hold the discharge door in a closed and locked position and any pressure exerted on the discharge door, which predominantly forms the distal end wall, by recyclable material which has been shifted down the enclosed upper recyclable material compartment by the recyclable material transferring device, will not cause the discharge door to inadvertently spring open. The simple mechanical nature of the L-shaped lip ensures that a mechanical failure of the discharge door is extremely unlikely.

[0017] In a further embodiment, the roof above the opening incorporates a recyclable material piercing device onto which the recyclable material is directed by the lifting and compacting device. This is advantageous as many of the recycled materials which are lifted into the enclosed upper recyclable material compartment are lightweight materials such as aluminium cans, plastic drinks bottles and the like. Occasionally such recyclable materials cannot be crushed as lids have been replaced on the plastic bottles for example and the trapped air prevents the plastic bottles from being crushed. Piercing such recyclable materials greatly assists with crushing the recyclable materials.

[0018] In a further embodiment, the recyclable material piercing device comprises a plurality of downwardly directed spikes.

[0019] In a further embodiment, the recyclable material piercing device comprises a plurality of downwardly projecting spikes mounted on the roof and projecting through a recyclable material engaging plate with biasing means urging the recyclable material engaging plate downwards against any recyclable material impinging thereon. This is advantageous as the recyclable material engaging plate prevents any recyclable materials pierced by the downwardly projecting spikes from becoming stuck on the spikes as they are pushed off the downwardly projecting spikes by the recyclable material engaging plate.

[0020] In a further embodiment, the biasing means comprises a plurality of springs each of which is mounted intermediate the roof of the upper recyclable material compartment and the product engaging plate.

[0021] In a further embodiment, the recyclable material piercing device comprises a plurality of downwardly projecting spikes mounted on a plurality of cylinder shafts which form part of a plurality of cylinders.

[0022] The present invention is further directed to-

wards a multi-compartment recyclable refuse storage container for mounting on a wheeled chassis whereby the storage container comprises a plurality of lower side-by-side in-line recyclable refuse receiving compartments mounted on the wheeled chassis, one of the recyclable refuse receiving compartments is a paper receiving compartment, whereby the paper receiving compartment comprises a two-part floor, a proximal end wall mounting one part of the two-part floor, a distal hinge mounted door mounting the other part of the two-part floor, and, a pair of facing sidewalls connecting the proximal end wall to the distal end wall. The two-part of floor is seen to be an advantage over known prior art containers as the split caused by the two-part floor allows compressed paper to be easily ejected from the paper receiving compartment.

[0023] In a further embodiment, the paper receiving compartment houses a paper compacting device which acts downwardly to compact paper against the two-part floor. Using the paper compacting device as an ejection assistance tool is advantageous as the compressed paper can be easily ejected from the paper receiving compartment.

[0024] In a further embodiment, the one part of the two-part floor mounted on the proximal end wall is downwardly pivotable relative to the proximal end wall. Again, this further assists with ejection of the compressed paper from the paper receiving compartment.

[0025] In a further embodiment, the paper receiving compartment further comprising at least one set of compressed paper locking pins movable laterally with respect to the movement of the paper on compression to hold compressed paper in position upon the paper compacting device being withdrawn on completion of a compression cycle.

[0026] In a further embodiment, at least one of the refuse receiving compartments is a flowable material receiving compartment and includes an additional refuse receiving wheel-mounted stillage whereby the flowable material is delivered into the wheel-mounted container for subsequent removal; whereby, the additional refuse receiving wheel-mounted stillage comprises a receiving means to allow the refuse receiving wheel-mounted stillage to be lifted and locked into the flowable material receiving compartment.

[0027] The present invention is further directed towards a multi-compartment recyclable refuse storage container for mounting on a wheeled chassis whereby the storage container comprises a plurality of lower side-by-side in-line recyclable refuse receiving compartments mounted on the wheeled chassis, the recyclable refuse storage container comprising a recyclable glass receiving compartment having a mounting plate which pivots outwardly to receive and secure a recyclable glass bin, and, a sound reducing curtain to cover the gap formed when the mounting plate is outwardly pivoted; the mounting plate comprises a recyclable glass receiving opening formed therein which allows recyclable glass pass from

the recyclable glass bin to the recyclable glass receiving compartment, recyclable glass bin retaining means provided on its outer face to secure the recyclable glass bin, and, an arcuate chute surrounding the recyclable glass receiving opening and projecting inwardly from its inner face; whereby, the mounting plate and/or the arcuate chute are arranged to only direct recyclable glass from the recyclable glass bin to the recyclable glass receiving compartment when a discharge end of the arcuate chute has been pivoted inwardly beyond the plane of the sound reducing curtain.

[0028] There is a significant advantage to such a recyclable glass receiving compartment. Due to the regulatory constraints on noise levels which an operator may be subjected to, the requirement that the discharge end of the arcuate chute has pivoted past the sound reducing curtain ensures that the noise which emanates from the recyclable glass receiving compartment, when the recyclable glass is dumped into a storage box within the recyclable glass receiving compartment, is minimised and at least kept below the regulatory requirements.

[0029] In a further embodiment, the recyclable glass receiving compartment further comprises gas struts to assist with pivoting the mounting plate having the recyclable glass bin secured thereto from an outwardly pivoted, open position to a closed position. This is advantageous as it assists the operator to raise the mounting plate from its lowered, outwardly pivoted position to the raised, closed position.

[0030] The present invention is directed towards a multi-compartment recyclable refuse storage container for mounting on a wheeled chassis of the type in which the storage container comprises a plurality of side-by-side in-line refuse receiving compartments mounted along the wheeled chassis from a proximal end to a distal end of the wheeled chassis and an enclosed upper recyclable material compartment extending across some or all of the other refuse receiving compartments from adjacent the proximal end to the distal end the enclosed upper recyclable material compartment comprising a floor, a roof, a pair of facing elongated sidewalls connecting the floor and the roof and a proximal end wall and a distal end wall having a discharge door and in which a packaging receiving compartment, adjacent the proximal end is connected to the upper recyclable material compartment through an opening in the floor and in which the refuse receiving compartment further incorporates a lifting and compacting device to lift recyclable material into the upper recyclable material compartment up against the roof to compact recyclable material and in which the upper recyclable material compartment includes a product transferring device to move the recyclable material, after compaction, away from the proximal end wall towards the distal end wall.

[0031] The advantage of using a lifting and compacting device to lift recyclable material into the upper recyclable material compartment is that the lifting and compacting device formed part of the floor of the enclosed upper re-

cyclable material compartment when the last load of recyclable material into the upper recyclable material compartment. Thus, the overall load carrying capacity of the enclosed upper recyclable material compartment is increased.

[0032] In a further embodiment, the roof above the opening incorporates a recyclable material piercing device onto which the recyclable material is directed by the lifting and compacting device. Any sealed plastic bottles with caps, or indeed any sealed containers made of any material are pierced to allow a comprehensive compression to take place.

[0033] In a further embodiment, the recyclable material piercing device comprises a plurality of downwardly directed spikes.

[0034] In a further embodiment, the recyclable material piercing device comprises a plurality of downwardly projecting spikes mounted on the roof and projecting through a product engaging plate and biasing means urging the product engaging plate downwards against any recyclable material impinging thereon.

[0035] In a further embodiment, the biasing means comprises a plurality of springs each of which is mounted on a spike intermediate the roof and the product engaging plate.

[0036] In a further embodiment, the recyclable material piercing device comprises a plurality of downwardly projecting spikes mounted on a plurality of cylinder shafts which form part of a plurality of cylinders.

[0037] In a further embodiment, one of the refuse receiving compartments is a paper receiving compartment including a paper compacting device and at least one set of compressed paper locking pins movable laterally with respect to the movement of the paper on compression to support compressed paper on the paper compacting device being withdrawn on completion of a compression cycle. The locking pins prevent the paper from springing and expanding after compression due to material memory.

[0038] In a further embodiment, at least one of the refuse receiving compartments is a flowable material receiving compartment and includes an additional refuse receiving wheel-mounted stillage whereby the flowable material is delivered into the wheel-mounted container for subsequent removal.

[0039] In a further embodiment, the additional refuse receiving wheel-mounted stillage comprises a receiving means to allow the refuse receiving wheel-mounted stillage to be locked into the flowable material receiving compartment. The wheel mounted stillage may be removed remotely from the storage container to allow the flowable material, which may be cumbersome to handle to be deposited in a separate recycling point, designed to receive such messy and difficult to handle, flowable material.

[0040] In a further embodiment, the additional refuse receiving wheel-mounted stillage comprises a receiving means to allow the refuse receiving wheel-mounted stillage to be lifted and subsequently locked into place in

the flowable material receiving compartment.

[0041] In an alternative embodiment, a glass receiving recycling stillage comprises an inlet drawer which inlet drawer comprises a glass receiving bucket to receive glass which is to be passed into the glass receiving recycling stillage, wherein, the glass receiving bucket is designed to only pass glass from the glass receiving bucket into the glass receiving recycling stillage when a discharge opening from the glass receiving bucket is disposed within the glass receiving recycling stillage and the inlet drawer has formed a substantially noise-tight fit with the glass receiving recycling stillage. This reduces the noise exposure to the user which is legally recommended to be below 85dB on a daily basis. This is also providing a safer working environment for the user as no glass can spill out of the bucket until the drawer face which contains the discharge outlet of the bucket is housed within the stillage. The bucket cavity may be angled relative to the planar face of the rotatably inlet drawer such that no glass is discharged from the bucket until the inlet drawer has been rotated sufficiently to ensure that the discharge opening has been rotated to be housed within the stillage.

Detailed Description of the Invention

[0042] The invention will be more clearly understood by the following description of some embodiments thereof, given by way of example only with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a multi-compartment recyclable refuse storage container mounted on a vehicle chassis;

Figure 2 is an enlarged perspective view of portion of the storage container illustrated in Figure 1 showing a door of a refuse receiving compartment in the open position;

Figure 3a is a perspective view of a rear storage container of Figure 1;

Figure 3b is a perspective view of the rear storage container of Figure 3a with a paper compacting device in an extended state;

Figure 3c is a side view of the rear storage container of Figure 3a in a closed state;

Figure 3d is a side view of the rear storage container of Figure 3a in a partially open state;

Figure 3e is a side view of the rear storage container of Figure 3a in a partially open state;

Figure 3f is a side view of the rear storage container of Figure 3a in a fully open state;

Figure 4a is a perspective see-through view of an alternative embodiment of a rear storage container of Figure 1;

Figure 4b is a perspective view similar to Figure 4a illustrating a compacting device in a retracted state and locking pins adjacent the rear storage container;

Figure 4c is a perspective view similar to Figures 4a and 4b showing the locking pins in position in the rear storage container;

Figure 4d is a perspective view similar to Figures 4a to 4c illustrating a door of the rear storage container in an open position ready to discharge paper;

Figure 4e is a perspective view similar to Figure 4d illustrating the door of the rear storage container in the open position and the compacting device in an extended state to discharge paper;

Figure 5 is a perspective see-through view of an upper recyclable material compartment according to the invention;

Figure 6 is a view similar to Figure 5 of a different working position in the upper recyclable material compartment;

Figure 7 is a side see-through view of a distal end portion of an upper recyclable material compartment of Figure 1 with a discharge door in a closed and locked position;

Figure 8 is a side see-through view of the distal end portion of the upper recyclable material compartment of Figure 7 with the discharge door in a closed and unlocked position;

Figure 9 is a side see-through view of the distal end portion of the upper recyclable material compartment of Figure 7 with the discharge door in an open position;

Figure 10 is a perspective see-through view of portion of a refuse receiving compartment connecting with the upper recyclable material compartment;

Figure 11 is a perspective view of a compacting device which is mounted in the refuse receiving compartment connecting with the upper recyclable material compartment, in its partially extended position, in use;

Figure 12 is a perspective view of the compacting device of Figure 11 in the retracted position;

Figure 13 is a perspective view of a piercing device

according to the invention;

Figure 14 is a perspective view of an alternative construction of piercing device according to the invention;

Figure 15 is a perspective view of an alternative construction of compacting device mounted in the upper recyclable material compartment;

Figure 16 is a perspective view of an additional refuse receiving wheel-mounted container;

Figure 17a is a perspective view of the additional refuse receiving wheel-mounted container in a mounted position on the multi-compartment recyclable refuse storage container;

Figure 17b is a perspective view of the additional refuse receiving wheel-mounted container in a partially de-mounted position on the multi-compartment recyclable refuse storage container;

Figure 17c is a perspective view of the additional refuse receiving wheel-mounted container in a fully de-mounted position away from the multi-compartment recyclable refuse storage container;

Figure 18a is a side view, similar to Figure 17a, of the additional refuse receiving wheel-mounted container in a mounted position on the multi-compartment recyclable refuse storage container;

Figure 18b is a side view, similar to Figure 17b, of the additional refuse receiving wheel-mounted container in a partially de-mounted position on the multi-compartment recyclable refuse storage container;

Figure 18c is a side view, similar to Figure 17c, of the additional refuse receiving wheel-mounted container in a fully de-mounted position away from the multi-compartment recyclable refuse storage container;

Figure 19 is a perspective view of an mounting mechanism used to mount the additional refuse receiving wheel-mounted container on the multi-compartment recyclable refuse storage container;

Figure 20 is a perspective view of a glass refuse receiving container in the multi-compartment recyclable refuse storage container of Figure 1 with a glass recycling bin mounted to the glass refuse receiving container;

Figure 21 is a front plan view of the glass refuse receiving container of Figure 20 without the glass recycling bin mounted on the glass refuse receiving

container;

Figure 22 is a side view of the glass refuse receiving container of Figure 20 in an open, outwardly pivoted position;

Figure 23 is a side view of the glass refuse receiving container of Figure 20 in a partially open position;

Figure 24 is a side view of the glass refuse receiving container of Figure 20 in a closed position;

Figure 25 is a view of the glass recycling bin being secured to the glass refuse receiving container of Figure 20;

Figure 26 is a further view of the glass recycling bin being secured to the glass refuse receiving container of Figure 20;

Figure 27 is a view of the glass recycling bin secured to the glass refuse receiving container of Figure 20;

Figure 28 is a perspective see-through view of an alternative embodiment of a glass refuse receiving container of the multi-compartment recyclable refuse storage container of Figure 1;

Figure 29a is a side view of the glass refuse receiving container of Figure 28 with its drawer in an open, extended position;

Figure 29b is a side view of the glass refuse receiving container of Figure 28 with its drawer in an partially closed position; and,

Figure 29c is a side view of the glass refuse receiving container of Figure 28 with its drawer in a fully closed position.

[0043] Referring to the drawings and initially to Figure 1 there is provided a multi-compartment recyclable refuse storage container indicated generally by the reference numeral 1 mounted on a wheeled chassis, indicated generally by the reference numeral 2. The wheeled chassis 2 in this embodiment is a vehicle only the wheels 3a and cab 3b of which are illustrated.

[0044] Referring now to Figures 1 and 2, the storage container 1 comprises a plurality of side-by-side in-line refuse receiving compartments, namely a packaging receiving compartment 5, a flowable material receiving compartment 6, a glass material receiving compartment 7, a further flowable material receiving compartment 6 and a paper receiving compartment 8 extending from a proximal end 9 of the storage container 1 towards a distal end 10 together with an enclosed upper recyclable material compartment 11 extending across some or all of the other refuse receiving compartments 5, 6, 7 and 8.

[0045] Referring now specifically to Figure 2, each of the refuse receiving compartments 5, 6, 7 and 8 all have hinged main doors 15 which in turn include smaller hinged refuse receiving flaps 16. Some or all of the doors 15 and flaps 16 may be duplicated on the opposite side of the container 1 while some of the compartments may in fact be divided into two by divider walls.

[0046] Referring now to Figures 3a to 3f, the paper receiving compartment 8 comprises a two-part floor wherein a proximal pivotable floor portion 28 is connected to an inclined rear portion 21 and a distal floor portion 27 is connected to a hinge mounted door 24. The pivotable floor portion 28 is pivotable relative to the inclined rear portion 21. The proximal floor portion 28 is shown in its downwardly pivoted position in Figures 3a and 3b. A vertically arranged compacting plate 22 is mounted on an actuating scissors mechanism 23 in the paper receiving compartment 8. The compacting plate 22 is shown in its downwardly extended position in Figure 3b. The compacting plate 22 is used to contact and compress paper in the paper receiving compartment 8, and it is also used to assist with ejecting paper from the paper receiving compartment 8. A paper compartment cylinder 29 is connected intermediate a proximal end of the inclined rear portion 21 and a proximal end of the pivotable floor portion 28.

[0047] Referring now to Figures 4a to 4e (inclusive), wherein like parts previously described have been assigned the same reference numerals, there is shown the paper receiving compartment 8 in more detail comprising a one piece floor 20 which connects with the inclined rear portion 21 and a vertically arranged compacting plate 22 on an actuating scissors mechanism 23. A further hinge mounted door 24 is provided. The floor 20 may preferably form part of the hinge mounted door 24 so as to form a cantilevered L-shaped rear door. Dowels may be provided on one or both of the floor 20 of the rear door and/or the inclined rear portion 21 to allow the floor 20 to solidly interlock with the inclined rear portion 21.

[0048] Referring to Figures 4b and 4c in particular, locking pins 26 are provided to allow a user (not shown) to pass the locking pins 26 through brushes 25 on the hinge mounted door 24 so as to prevent the paper, which can have a strong memory for shape, from expanding back up to fill the paper receiving compartment 8 after the compacting plate 22 has compressed the paper. The locking pins ensure that a maximum amount of paper can be held in the paper receiving compartment 8 as the compartment will not appear full due to paper expanding after compression. A plurality of bushing may be provided at differing heights to accommodate the locking pins 26 at different heights as the paper receiving compartment 8 fills up. It will be appreciated that receptive blind holes will be provided opposite the bushings 25 to receive the tips of the locking pins 26.

[0049] Referring now to Figures 5 to 12 inclusive there is illustrated the compartment 11 which extends across all of the other refuse receiving compartments (not

shown). The upper recyclable material compartment 11 comprises a floor 30, a roof 31 a pair of facing elongate sidewalls 32 connecting the floor 30 and the roof 31 and a proximal end wall 33 and a distal end wall 34. It will be understood that the roof 31 and sidewalls 32 may be preferably be constructed from a plurality of sheets of stainless steel so as to facilitate and quick and relatively inexpensive replacement of just a portion of a sidewall or roof should that portion, which is to say plate of stainless steel, become damaged. The roof 31 and sidewalls 32 and distal end wall 34 may be advantageously constructed so as to form a single structure which may be removed from the storage container 1 to allow easy access to other components of the storage container 1 for maintenance and the like.

[0050] The proximal end wall 33 mounts a product transferring device, indicated generally by the reference numeral 35 comprising in this embodiment a compacting plate 36 on an actuating scissors mechanism 37. The distal end wall 34 mounts a hinged discharge door 38 which effectively provides substantially the entire distal end wall 34 in this embodiment. The discharge door 38 in one embodiment has tapered dowel pins which locate in a tapered section at the bottom of the distal end wall 34. The purpose is to ensure that the discharge door 38 is firmly locked in position during compaction as will be described below. An opening 39 in the form of a hole is provided in the floor 30 connecting the upper recyclable material compartment 11 to the recyclable material receiving compartment 5.

[0051] Referring in particular to Figures 7 to 9, the distal end wall 34 which is predominantly formed by the discharge door 38 is open, closed and locked using a single hydraulic cylinder 44. The hydraulic cylinder 44 is connected to the discharge door 38 via a linkage mechanism 45, 46, 47 which passes through a pair of rollers 48a, 48b. The discharge door 38 is hinged in slotted mountings 49a which allow the discharge door 38 to travel upwardly and downwardly relative to the container 1. An L-shaped lip acts as a catch along an upper edge of the distal end wall 34 of the enclosed upper recyclable material compartment 11.

[0052] Referring still to Figures 5 to 12 (inclusive) and more particularly to Figures 10 to 12 (inclusive) the refuse receiving compartment 5 incorporates a lifting and compacting device indicated generally by the reference numeral 40. The lifting and compacting device 40 comprises a plate 41 having inclined end walls 42 mounted on a pantographic like device such as a scissors lift mechanism 43.

[0053] Referring now to Figure 13 there is illustrated a recyclable material piercing device, indicated generally by the reference numeral 50, which can be mounted in the roof 31 of the upper recyclable material compartment 11 up of the opening 39. The product piercing device 50 comprises a base plate 51 for mounting on the roof 31. The base plate 51 carries a plurality of downwardly projecting spikes 52 which, in turn, carry a product engaging

plate 53 urged away from the base plate 51 by biasing means, indicated generally by the reference numeral 54 in this case springs 55.

[0054] Referring now to Figure 14 there is illustrated an alternative construction of recyclable material piercing device, indicated generally by the reference numeral 60 which comprises a plurality of sealed pneumatic cylinders 61. Each pneumatic cylinder 61 comprises a downwardly acting cylinder shaft 62 which comprises a pointed, replaceable tip 63.

[0055] Referring to Figure 15 in which parts similar to those described with reference to the previous drawings are identified by the same reference numerals there is illustrated an alternative construction of product transferring device, again for simplicity indicated by the reference numeral 35 which instead of incorporating a scissors mechanism incorporates a multistage hydraulic cylinder 80 comprises a plurality of interengaging telescopic portions 81.

[0056] Referring to Figure 16 there is illustrated a flowable material receiving wheel mounted stillage indicated generally by the reference numeral 70 having an inlet door 72 which stillage 70 is so constructed as to fit snugly in the flowable material compartment 6 with the inlet door 72 coinciding with the inlet flaps 16 in the door 15. It will also be noted that the wheel mounted stillage 70 has sockets 73 for reception of the tines of a forklift truck (not shown). The flowable material receiving wheel mounted stillage 70 further comprises a lip 74 to receive a locking bar (not shown).

[0057] With reference to Figures 17a to 17c and 18a to 18c, a lifting mechanism indicated generally by reference numeral 75 is shown to lift and lock the a flowable material receiving wheel mounted stillage 70 into the flowable material compartment 6. In order to release the flowable material receiving wheel mounted stillage 70 from the flowable material compartment 6, the lifting mechanism 75 lowers the flowable material receiving wheel mounted stillage 70 as indicated by reference arrow A and allows flowable material receiving wheel mounted stillages 70 on both sides of the multi-compartment recyclable refuse storage container 1 to be wheeled away as indicated by reference arrows B. With particular reference to Figure 19, the lifting mechanism 75 comprises a drive mechanism, such as a hydraulic cylinder 77 to raise and lower a pair of locking bars 78, which are dimensioned to inter-engage in a complementary manner with lips 74 on the wheel mounted stillages 70 on either side of the multi-compartment recyclable refuse storage container 1. Guide rails 76 are also provided to assist with security mounting the flowable material receiving wheel mounted stillages 70 on to the chassis of the multi-compartment recyclable refuse storage container 1.

[0058] With reference to Figures 22 to 27, a recyclable glass receiving compartment is shown which comprises an outer frame 82 which pivotably mounts a mounting plate 83. The mounting plate 83 pivots outwardly to re-

ceive and secure a recyclable glass bin 84. The mounting plate 83 comprises a recyclable glass receiving opening 87 which allows recyclable glass to pass through from the recyclable glass bin 84 into a storage bucket (not shown) in the recyclable glass receiving compartment.

[0059] The mounting plate 83 comprises recyclable glass bin retaining means 85a, 85b on its outer face which act to receive and secure the recyclable glass bin 84 to the mounting plate 83. At least one of the recyclable glass bin retaining means 85a, 85b may be a movable spring biased retaining means.

[0060] An arcuate chute 86 extends from an interface of the mounting plate 83. The arcuate chute 86 surrounds the recyclable glass receiving opening 87. The outer face of the mounting plate 83 is not truly horizontal, the outer face of the mounting plate 83 is angled so that the mounting plate 83 must be pivoted to a predetermined angle before any glass will fall out of the recyclable glass bin 84 and pass through the recyclable glass receiving opening 87. A strip curtain is provided in the recyclable glass receiving compartment to minimise the amount of noise which emanates from within the recyclable glass receiving compartment and which can be heard by an operator. Furthermore, brush curtains 88a, 88b are provided on either side of the mounting plate 83 within the outer frame 82 to assist with the reduction of noise which can be heard by an operator and for safety purposes. Gas struts 89a, 89b are also provided to assist an operator (not shown) to lift the mounting plate 83 from a lowered, open position to a raised, closed position. This is important as there may be up to 15 kg of glass and/or other recyclable materials in the recycling bin which is connected to the mounting plate 83. It will be appreciated that other types of recycling bins and retaining means may be used. A handle (not shown) may be provided to assist an operator to pull the mounting plate 83 into an open position.

[0061] Referring to Figure 28 and Figures 29a to 29c, there is provided an alternative embodiment of a recyclable glass receiving compartment formed as a glass material recycling stillage indicated generally by reference numeral 90 having an inlet drawer 91. The inlet drawer 91 is dimensioned to form a tight fit with the glass material recycling stillage 90 so as to reduce the noise emanating from the stillage 90 as the glass is emptied into the stillage 90. A legal recommendation is that noise levels which users of the recycling vehicle are exposed to on a daily basis should not exceed 85dB. The stillage 90 is so constructed as to fit snugly in the glass material compartment 7. It will also be noted that the stillage 90 has a plurality of brushes 92 to assist with noise reduction as glass is emptied on top of glass already in the stillage 90.

[0062] In operation, and referring generally to the drawings refuse is delivered from domestic houses, commercial properties or other premises into designated refuse receiving compartments whether it be packaging, general refuse, paper or indeed glass products as almost certainly one or more of the refuse receiving compart-

ments will be designated for receiving the latter product.

[0063] In use, with reference to Figures 3a to 3f, paper is passed into the paper receiving compartment 8. The paper is compressed using the compression device 22, 23 by extending the compression device 22, 23 using the scissors lift downwardly towards the floor 27, 28 of the paper receiving compartment 8. The paper compartment hydraulic cylinder 29 is shown to be connected intermediate a proximal end of the inclined rear portion 21 and a proximal end of the pivotable floor portion 28. The pivotable floor portion 28 interconnects with the distal floor portion 27 using in such a manner that the two-part floor 27, 28 cannot open inadvertently through mechanical failure. As pressure is exerted downwardly on the two-part floor 27, 28, the interlocking mechanism comprises overlapping, abutting edges which do not allow the hinge mounted door 24 to pivot outwardly open. In order to allow the hinge mounted door 24 to pivot outwardly open, the paper compartment hydraulic cylinder 29 is extended to slightly lift the pivotable door portion 28 upward, thus releasing the hinge mounted door 24 to pivot outwardly as shown in Figure 3e. The paper compartment hydraulic cylinder 29 is then withdrawn to pivot the pivotable floor portion 28 downwardly to assist the compressed paper in being ejected from the paper receiving compartment 8 as shown in Figure 3f.

[0064] In operation, and referring firstly to Figures 4a to 4e (inclusive) paper is passed into the paper receiving compartment 8 through flaps 16. The paper is compressed using the compression device 22, 23 by extending the compression device 22, 23 using the scissors lift downwardly towards the floor 20 of the paper receiving compartment 8. Once the compression device 22, 23 has been retracted upwardly, the locking pins 26 may be inserted through the bushings 25 which are located on the hinge mounted door 24. It will be appreciated that the use of these horizontally arranged compressed paper locking pins 26 for retaining compressed paper and cardboard will eliminate spring back caused by material memory will greatly increase the capacity. Once the paper receiving compartment 8 has been filled to capacity, the hinge mounted door 24 is opened as shown in Figure 6. If the compression device 22, 23 is extended in order to assist the paper out of the paper receiving compartment 8. It will be understood that the inclined rear portion 21 will direct the paper out would leave from the paper receiving compartment 8. It will also be appreciated that using the compression device 22, 23 to discharge the paper and cardboard is particularly efficient. In an alternative embodiment, at least one set of compressed paper locking pins 26 movable laterally with respect to the movement of the paper on compression to support compressed paper on the paper compacting device 22, 23 will be provided and are designed and controlled to be withdrawn on completion of a compression cycle.

[0065] In operation, and referring to Figures 5 to 12 (inclusive) recyclable material will be delivered through the flaps 16 into the packaging receiving compartment 5

with the lifting and compacting device 40 in the lowered position that is to say with the scissor lift mechanism 43 in its collapsed state. Then the scissors lift mechanism 43 is operated to raise the plate 41 up towards and through the opening 39 and up against the roof 31 to compact the recyclable material. Then the plate 41 is lowered to coincide with the floor 30 covering the opening 39 when the product transferring device is operated to push the compacted recyclable material down the floor 30 towards the distal end wall 34 with the compacting plate 36 providing secondary compacting. When the upper recyclable material compartment 11 requires emptying the discharge door 38 will be opened and the product transferring device 35 used to empty the upper recyclable material compartment 11.

[0066] Referring in particular to Figures 7 to 9, in order to open the discharge door 38, the hydraulic cylinder 44 extends the cylinder shaft 45. Due to the linkage mechanism 46, 47 and the rollers 48a and 48b, the weight of the discharge door 38 causes the discharge door 38 to travel downwardly in the slotted mountings 49a. This downward movement unlocks the discharge door 38. As the hydraulic cylinder shaft 45 further extends, the discharge door 38 pivots outwardly into a partially open position as shown in Figure 9. It will be appreciated that in the fully open position, the discharge door 38 will pivot to at least a horizontal level, and preferably to below the horizontal level. When the discharge door 38 is to be closed, the hydraulic cylinder 44 is activated to retract the hydraulic cylinder shaft 45. The hydraulic cylinder shaft 45 pulls the linkage mechanism 46, 47 through the rollers 48a and 48b. The discharge door 38 is first pivoted back into a closed position, and then due to the continued retraction of the hydraulic cylinder shaft 45 by the hydraulic cylinder 44, the discharge door at 38 is shifted slightly upwardly so that the upper edge of the discharge door at 38 extends into the L-shaped lip 49b which acts as a safety catch.

[0067] Referring to Figures 5 to 12, it will be appreciated that when the plate 41 is lowered to coincide with the floor 30 covering the opening 39, the plate 41 acts as a part of an extended floor in the upper recyclable material compartment 11. In known kerbside recycling vehicles, it is common for up to 17% of the length of the upper recyclable material compartment 11 to be used to accommodate a lifting and compacting device to lift packaging materials into the upper recyclable material compartment.

[0068] Therefore, on the last lift of packaging materials into the upper recyclable material compartment 11, the plate 41 may be held in a raised state coincident with the floor 30 of the upper recyclable material compartment 11 to lengthen the effective floor area of the upper recyclable material compartment 11.

[0069] In most situations it is preferable to use the product piercing devices 50 and 60 as illustrated in Figures 13 and 14 respectively. For example with the product piercing device 50 as the recyclable material is being

pushed up towards the roof 31 it will impinge against the spikes 52 which will penetrate the packaging which would then be forced further onto the spikes 52 pushing the product engaging plate 53 towards the base plate 51 which will compress the springs 54. When the plate 41 is withdrawn the springs will 54 will urge the product engaging plate 53 down over the spikes 52 to release the pierced recyclable material.

[0070] Again, with the product piercing device 60, each pneumatic cylinder 61 is activated to extend its shaft 62 downwardly into the recyclable material. The pointed, replaceable tips 63 pierce the recyclable material. As the pneumatic cylinders 61 retract the shafts 62 in an upward direction, the product engaging place 64 will release the pierced recyclable material from the tips 63.

[0071] In use, with reference to Figures 16 to 19 inclusive, the flowable material receiving wheel mounted stillage 70 is held aloft from the ground by a lifting and locking mechanism 75. The locking mechanism 75 is lowered by a pneumatic cylinder 77 to lower the flowable material receiving wheel mounted stillage 70 into contact with the ground. As this happens, the lip 74 on the flowable material receiving wheel mounted stillage 70 disengages from the locking bar 78 on the locking mechanism 75. The flowable material receiving wheel mounted stillage 70 may be then wheeled away by a user to be emptied in a particular recycling area, remote from the storage container 1.

[0072] It will be appreciated that in alternative embodiments, the locking bar 78 may extend along the length of the storage container 1 so that all of the stillages that are lifted and locked into place will be contemporaneously lowered to ground level and released so as to be removable from their compartments respectively. Alternatively, individual locking mechanisms may be used for each stillage in each particular compartment. Hooks, loops, or other such receiving means may be used instead of the lip 78. It is envisaged that the additional locking mechanisms may be activated to securely hold the spillage in place as the storage container 1 is in movement.

[0073] With reference to Figures 22 to 27, the operation of the recyclable glass receiving compartment is described. An operator (not shown) pulls open the mounting plate 83 on the recyclable glass receiving compartment so that the mounting plate 83 is in an open, outwardly pivoted position. A recyclable glass bin 84 is connected to the mounting plate 83. Referring in particular to Figures 25 to 27, it can be seen that cooperating handles on the recyclable glass bin 84 interconnect with the recyclable glass bin retaining means 85a, 85b. The operator firstly places one handle of the recyclable glass bin 84 in one side of the recyclable glass bin retaining means 85a, and then the second handle is pushed up against the second side of the recyclable glass bin retaining means 85b. This second side of the recyclable glass bin retaining means 85b is movably spring biased such that the recyclable glass bin retaining means 85b will move to allow the han-

dle of the recyclable glass bin 84 to latch onto it.

[0074] Returning to Figures 22 to 24 in general, an operator, having secured the recyclable glass bin 84 to the mounting plate 83, closes the mounting plate 83. As the mounting plate 83 pivots inwardly in a closing manner, the free end of the arcuate chute 86 passes through the plane of the outer frame 82 so that the noise reducing strip curtain (not shown) forms a loose seal around the arcuate chute 86 to minimise the made of noise which can emanate from the recyclable glass receiving compartment to be heard by the operator. The gas struts 89a, 89b assist the operator to pivot the mounting plate 83 upwards with the weight of the recyclable glass bin 84 attached to the mounting plate 83. When the mounting plate 83 is in a fully closed position as shown in Figure 24, all of the recyclable glass in the recyclable glass bin 84 will pass into the recyclable glass receiving compartment.

[0075] As can be seen, this embodiment is extremely advantageous due to the significant amount of noise reduction which is achieved through the design of the mounting plate 83, the arcuate chute 86 and the use of a strip curtain and brush curtains 88a, 88b.

[0076] The operation of an alternative glass material recycling stillage 90 will now be described hereinunder with reference to Figures 28 and 29a to 29c. Glass is placed into the inlet drawer 91 of the glass material recycling stillage 90. The inlet drawer 91 is probably hinged to the stillage 90. The inlet drawer 91 comprises a glass receiving bucket 93. When the bucket 93 is full, the inlet drawer 91 is rotated so as to dispose of the glass in the bucket 93 into the stillage 90. The inlet drawer 91 and the glass receiving bucket 93 are designed such that no material is released from the bucket 93 until a front face 94 of the inlet drawer 91 has passed the outward face 95 of the stillage 90. In this manner, due to the tight fitting nature of the inlet drawer 91 to the stillage 90, a reduced level of noise from the glass falling and breaking within the stillage 90 will emanated from the stillage 90. Additionally, the brushes 92 will also reduce the level of noise. In a preferred embodiment, natural rubber may line the bucket 93, the inner part of the stillage 90 so as to further reduce the level of noise.

[0077] The glass receiving compartments and/or stillages may be advantageous located adjacent wheeled axels of the container 1 for a load-bearing purposes.

[0078] It is envisaged that all compartments will be so constructed as to have smoothed inner faces so as to avoid refuse been trapped on protrusions.

[0079] It is envisaged that hydraulic or pneumatic cylinders will be used to open and close the doors which generally will be as wide as possible to prevent the necessity of an operator having to leave a vehicle cab.

[0080] It is further envisaged that the control for all operations including compaction transfer and discharge will be controlled electronically. In a preferred embodiment, the standard CanBus protocol will be used to provide an icon based control system to an operator in the vehicle

cab. A display screen of the icon based control system would show the operator the current status of an ongoing operation, any faulty components such as a transducer, a solenoid, a valve and the like to allow for a quick replacement of the broken component part.

[0081] In a further embodiment, the kerbside cycling vehicle may comprise an air axle on the chassis which acts to lower the ride height of the kerbside recycling vehicle when the vehicle is in a stationary position. This control may be incorporated into the CanBus control mechanism and may be automatically activated when the kerbside recycling vehicle is programmed to be in a refuse collection operative state. The reduction in ride height of the vehicle will allow easier access to the refuse receiving flaps for operators. As the vehicle moves off, the ride height may be increased to a normal operating level again should the speed of the vehicle increase above a predetermined threshold, such as 5 km/h.

[0082] It is envisaged that the container 1 will be manufactured from lightweight stainless steel with high-strength space framed twin skin construction with the sheeting forming the sides of the container and made for easy removal and replacement of damaged panels and components.

[0083] It is envisaged that in place of the flaps 16 referred to throughout this specification, strip curtains such as those commonly found in the entrance way to cold rooms, maybe alternatively used.

[0084] In this specification the term "wheeled chassis" includes not just simply a trailer mounted on wheels for towing behind a vehicle, but also a vehicle itself and any other form of transporting device or equipment. Indeed, one could well envisage situations where the chassis would not have wheels would simply be loaded on an off a transport vehicle while resting on skids. However, in general the chassis would-be wheeled trailers or vehicles. Thus, the term "wheeled chassis" must be accorded the widest possible interpretation.

[0085] Additionally, in this specification, the terms "distal" and "proximal" are essentially used for convenience and do not, strictly speaking, in any way limit the invention in the sense that something should always be at one particular end of a vehicle or container.

[0086] It will be thoroughly understood that any references to hydraulic cylinders and/or rams throughout the specification should not be interpreted as limiting in that known alternative devices such as pneumatic devices and the like may be used in their stead.

[0087] While it is appreciated that many materials such as cardboard are strictly speaking packaging materials the term "packaging materials" or "recyclable materials" is used to identify containers of plastics or other materials and tin/aluminium cans. Cardboard and paper are generally referred to in this specification as "paper". Again, the descriptions should not be taken too literally or as limiting.

[0088] In this specification the terms "include" and "comprise" and any grammatical variations thereof are

to be given the widest possible interpretation and to be deemed to be used interchangeably.

[0089] The invention is not limited to the embodiments hereinbefore described which may be varied in both construction and detail within the scope of the claims.

Claims

1. A multi-compartment recyclable refuse storage container (1) for mounting on a wheeled chassis (2) whereby the storage container (1) comprises:

a plurality of lower side-by-side in-line recyclable refuse receiving compartments (5, 6, 7, 8) mounted on the wheeled chassis (2);
an enclosed upper recyclable material compartment (11) extending across one or more of the lower side-by-side in-line recyclable refuse receiving compartments (5, 6, 7, 8); and,
a lower recyclable material receiving compartment (5) communicating with the enclosed upper recyclable material compartment (11) through an opening (39) in the floor (30) of the enclosed upper recyclable material compartment (11);

characterised by,

the storage container (1) further comprising a lifting and compacting device (40) to lift recyclable material from the lower recyclable material receiving compartment (5) into the enclosed upper recyclable material compartment (11) through the opening (39), and, to compact the recyclable material against the roof (31) of the upper recyclable material compartment (11).

2. A multi-compartment recyclable refuse storage container (1) as claimed in claim 1, wherein, the plurality of lower side-by-side in-line recyclable refuse receiving compartments (5, 6, 7, 8) extend from a proximal end (9) to a distal end (10) of the wheeled chassis (2); the enclosed upper recyclable material compartment comprises a floor (30), a roof (31), a pair of facing elongated sidewalls (32) connecting the floor (30) and the roof (31), a proximal end wall (33) and a distal end wall (34) having a discharge door (38); the lower recyclable material receiving compartment (5) is located at the proximal end of the storage container (1); and
the upper recyclable material compartment (11) includes a recyclable material transferring device (35) to move the recyclable material, after compaction, away from its proximal end wall (33) towards its distal end wall (34).
3. A multi-compartment recyclable refuse storage container (1) as claimed in claim 2, wherein, the distal end wall (34) of the upper recyclable material com-

partment (11) further comprises an outwardly and downwardly extending L-shaped lip (49b) along its upper edge to receive and retain the discharge door (38) in a closed position.

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4. A multi-compartment recyclable refuse storage container (1) as claimed in claim 1, wherein, the roof (31) above the opening (39) incorporates a recyclable material piercing device (50, 60) onto which the recyclable material is directed by the lifting and compacting device (40).

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5. A multi-compartment recyclable refuse storage container (1) as claimed in claim 3, in which, the recyclable material piercing device (50, 60) comprises a plurality of downwardly directed spikes (52).

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6. A multi-compartment recyclable refuse storage container (1) as claimed in claims 3 or 4, in which, the recyclable material piercing device (50) comprises a plurality of downwardly projecting spikes (52) mounted on the roof (31) and projecting through a recyclable material engaging plate (53) with biasing means (54) urging the recyclable material engaging plate (53) downwards against any recyclable material impinging thereon.

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7. A multi-compartment recyclable refuse storage container (1) as claimed in claim 5, in which, the biasing means comprises a plurality of springs (55) each of which is mounted intermediate the roof (31) of the upper recyclable material compartment (11) and the product engaging plate (53).

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8. A multi-compartment recyclable refuse storage container (1) as claimed in claim 4, in which, the recyclable material piercing device (60) comprises a plurality of downwardly projecting spikes (52) mounted on a plurality of cylinder shafts which form part of a plurality of cylinders (61).

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9. A multi-compartment recyclable refuse storage container (1) as claimed in any preceding claim, in which, one of the recyclable refuse receiving compartments (4, 5, 6, 7, 8) is a paper receiving compartment (8), whereby the paper receiving compartment comprises a two-part floor (27, 28), a proximal end wall (21) mounting one part (28) of the two-part floor (27, 28), a distal hinge mounted door (24) mounting the other part (27) of the two-part floor (27, 28), and, a pair of facing sidewalls connecting the proximal end wall (21) to the distal end wall (24).

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10. A multi-compartment recyclable refuse storage container (1) as claimed in claim 9, wherein, the paper receiving compartment (8) houses a paper compacting device (22, 23) which acts downwardly to compact paper against the two-part floor (27, 28).

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11. A multi-compartment recyclable refuse storage container (1) as claimed in claims 9 or 10, wherein, the one part (27) of the two-part floor (27, 28) mounted on the proximal end wall (21) is downwardly pivotable relative to the proximal end wall (21). 5
12. A multi-compartment recyclable refuse storage container (1) as claimed in any preceding claim, the paper receiving compartment (8) further comprising at least one set of compressed paper locking pins (26) movable laterally with respect to the movement of the paper on compression to hold compressed paper in position upon the paper compacting device (22, 23) being withdrawn on completion of a compression cycle. 10 15
13. A multi-compartment recyclable refuse storage container (1) as claimed in any preceding claim, in which, at least one of the refuse receiving compartments (5, 6, 7, 8) is a flowable material receiving compartment (7) and includes an additional refuse receiving wheel-mounted stillage (70) whereby the flowable material is delivered into the wheel-mounted container for subsequent removal; whereby, the additional refuse receiving wheel-mounted stillage (70) comprises a receiving means to allow the refuse receiving wheel-mounted stillage (70) to be lifted and locked into the flowable material receiving compartment (7). 20 25 30
14. A multi-compartment recyclable refuse storage container (1) as claimed in any preceding claims, in which, the recyclable refuse storage container (1) comprises a recyclable glass receiving compartment having a mounting plate (83) which pivots outwardly to receive and secure a recyclable glass bin (84), and, a sound reducing curtain to cover the gap formed when the mounting plate (83) is outwardly pivoted from a supporting frame (82) of the recyclable glass receiving compartment; 35 40 the mounting plate (83) comprises a recyclable glass receiving opening (87) formed therein which allows recyclable glass pass from the recyclable glass bin (84) to the recyclable glass receiving compartment, recyclable glass bin retaining means (85a, 85b) provided on its outer face to secure the recyclable glass bin (84), and, an arcuate chute (86) surrounding the recyclable glass receiving opening (87) and projecting inwardly from its inner face; whereby, 45 50 the mounting plate (83) and/or the arcuate chute (86) are arranged to only direct recyclable glass from the recyclable glass bin (84) to the recyclable glass receiving compartment when a discharge end of the arcuate chute (86) has been pivoted inwardly beyond the plane of the sound reducing curtain. 55
15. A multi-compartment recyclable refuse storage container (1) as claimed in claim 14, in which, the recyclable glass receiving compartment further comprises gas struts (89a, 89b) to assist with pivoting the mounting plate (83) having the recyclable glass bin (84) secured thereto from an outwardly pivoted, open position to a closed position.

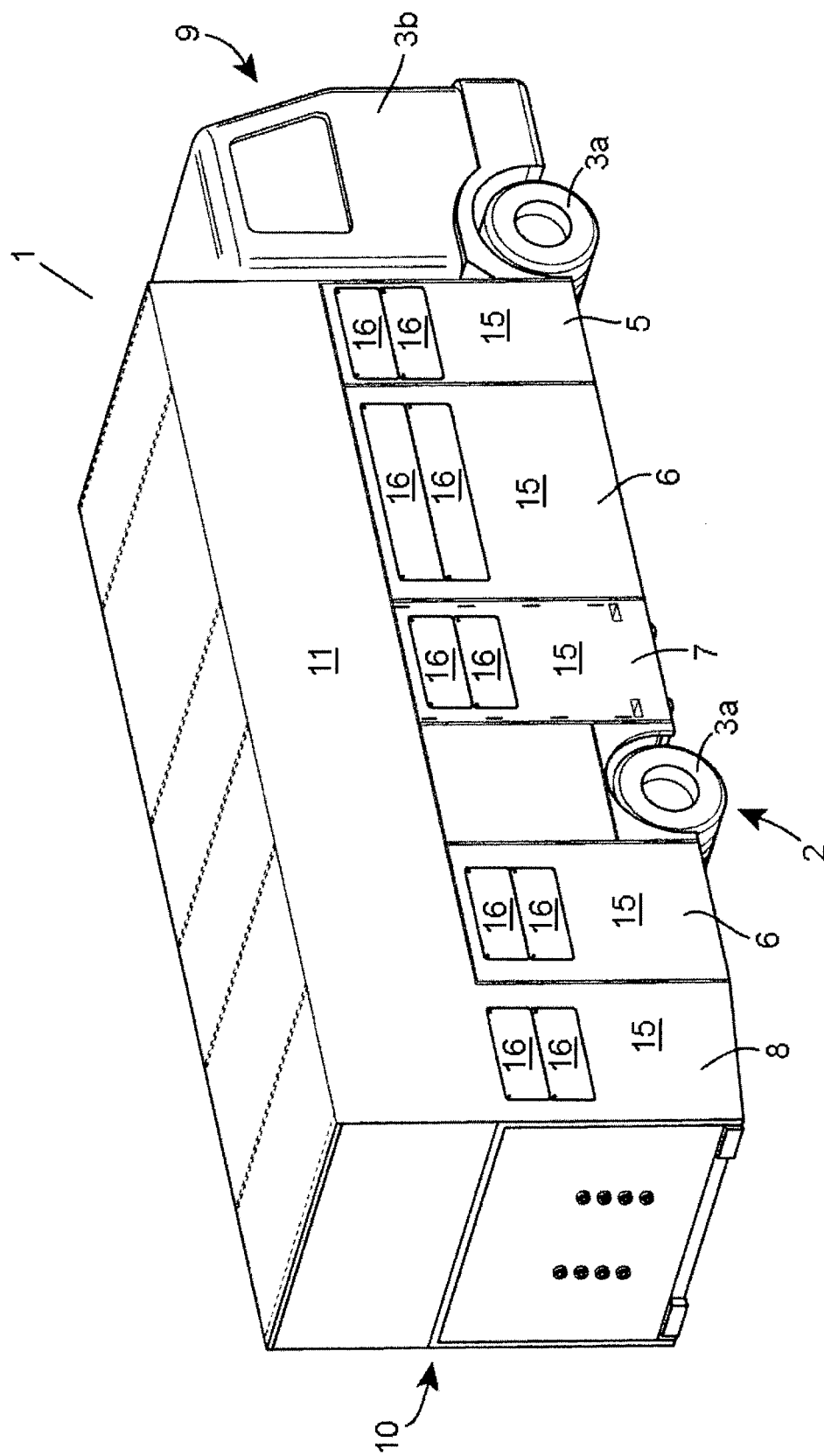


Figure 1

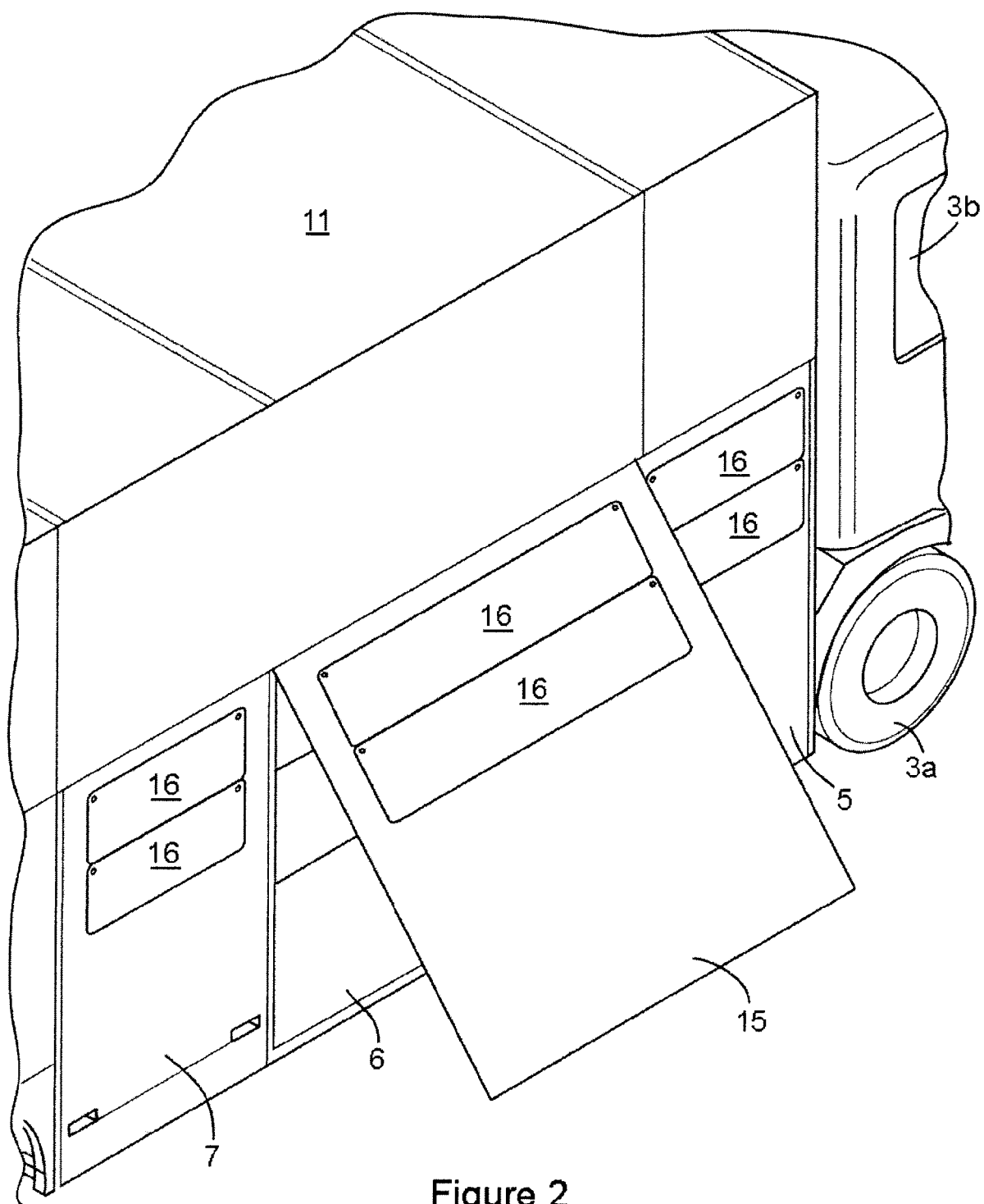


Figure 2

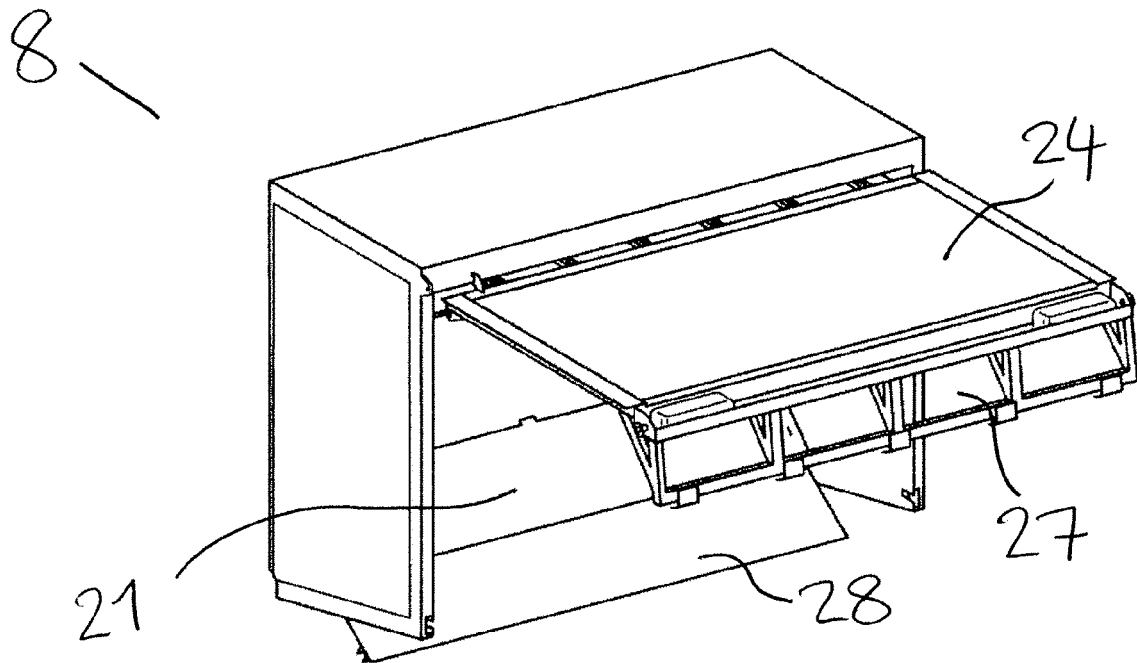


Figure 3a

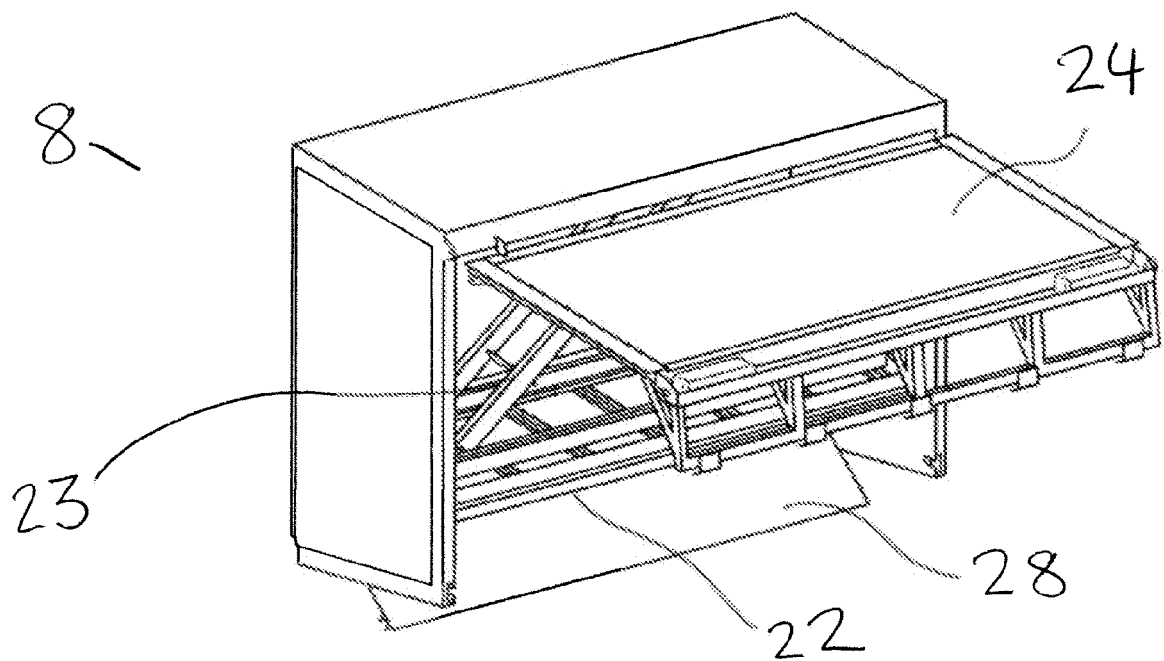


Figure 3b

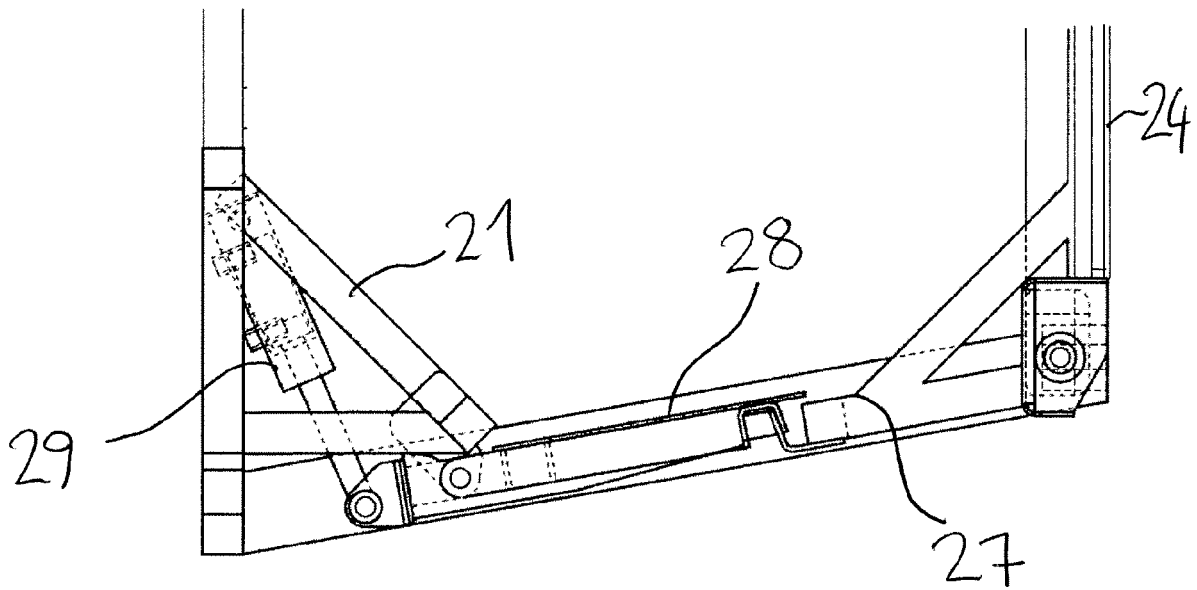


Figure 3c

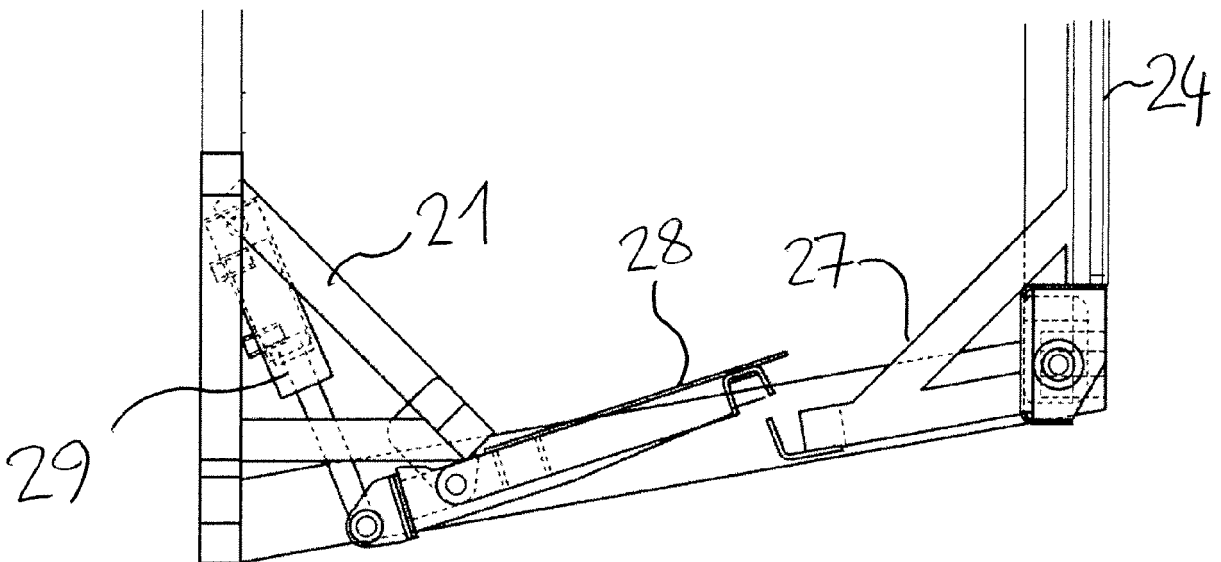


Figure 3d

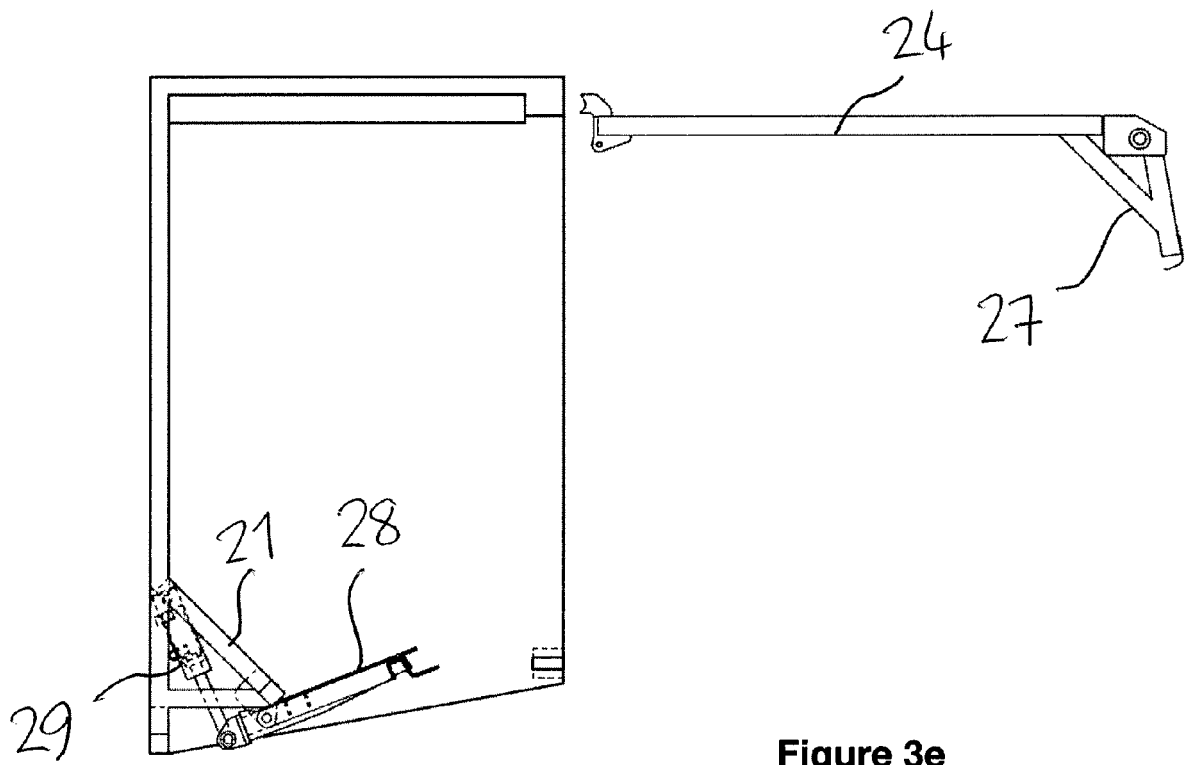


Figure 3e

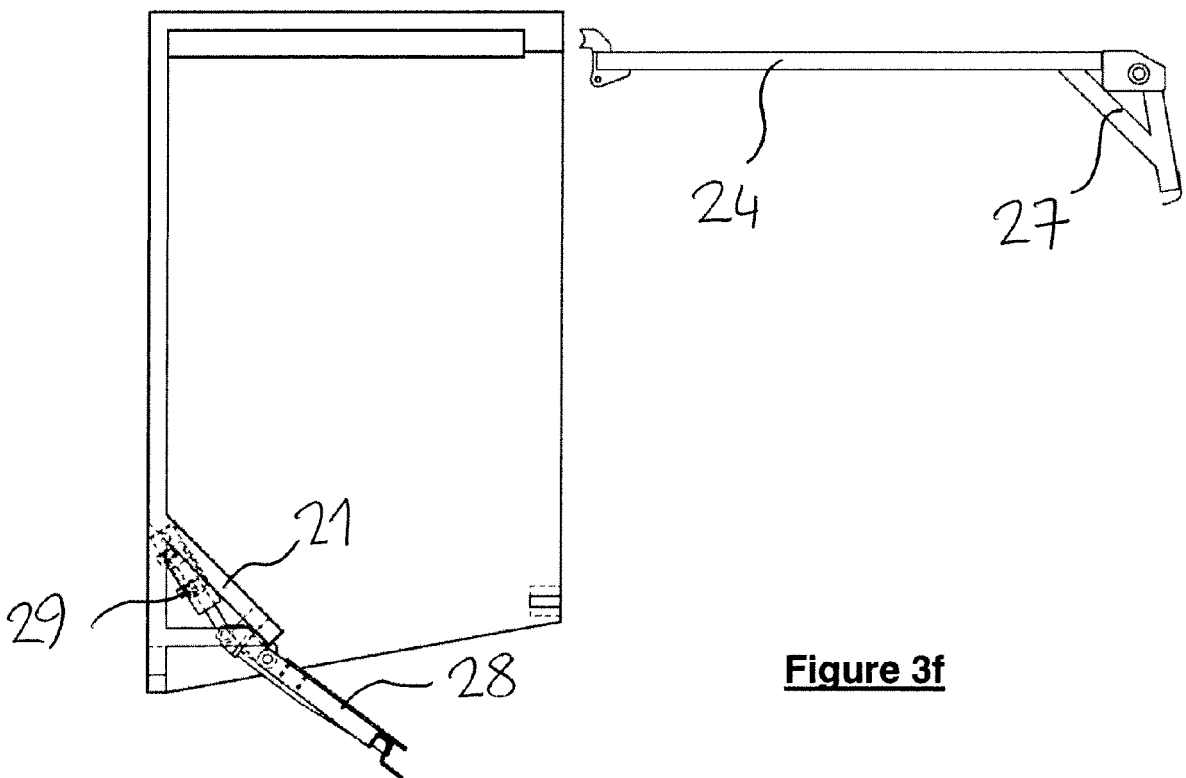


Figure 3f

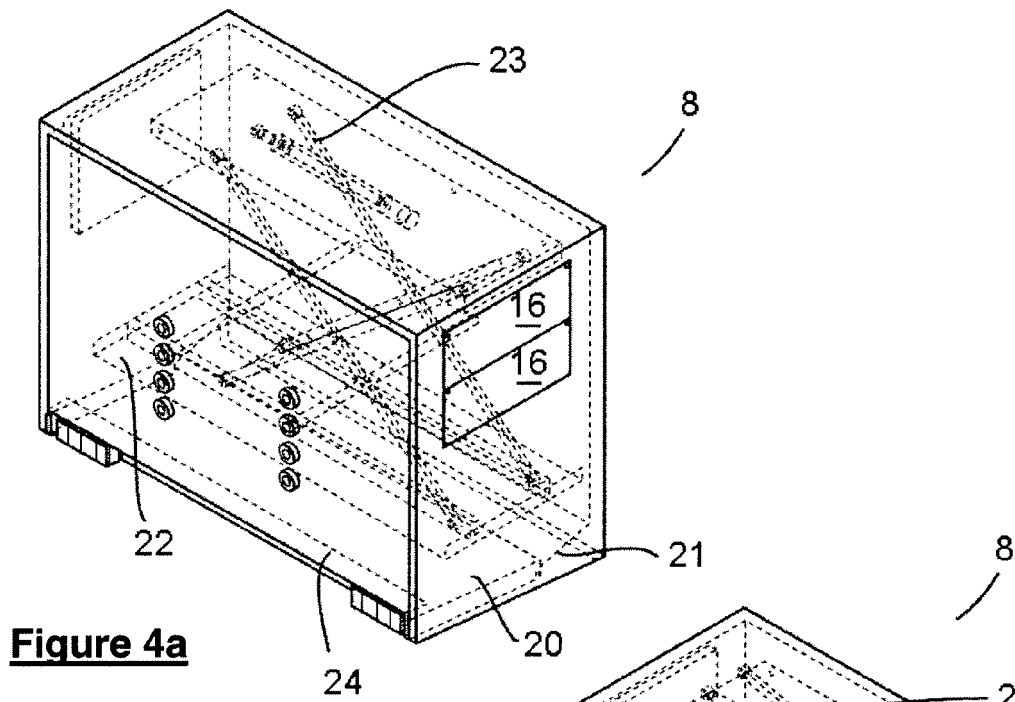


Figure 4a

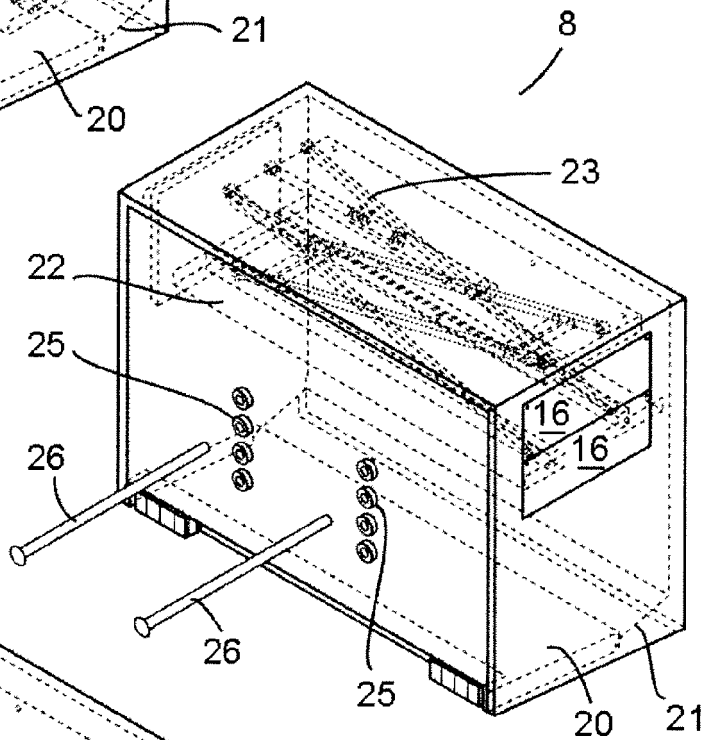


Figure 4a

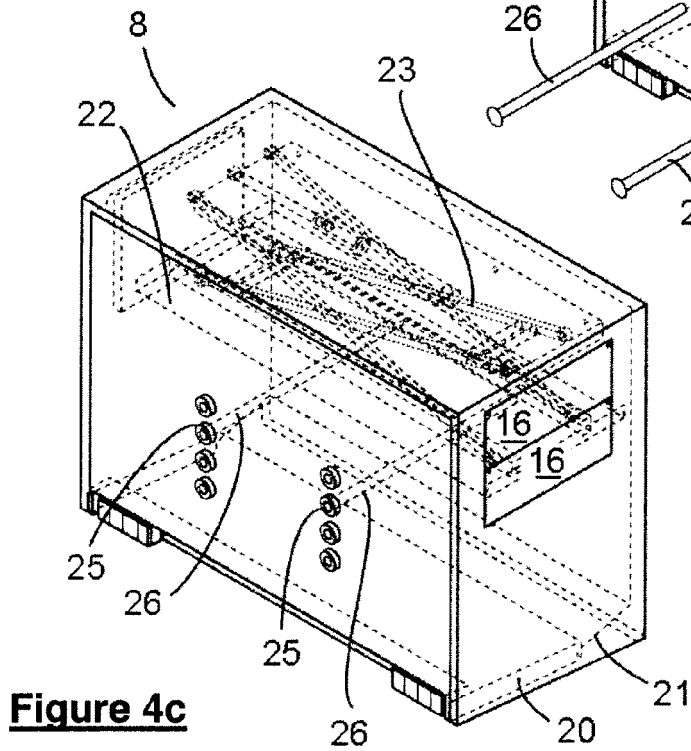


Figure 4c

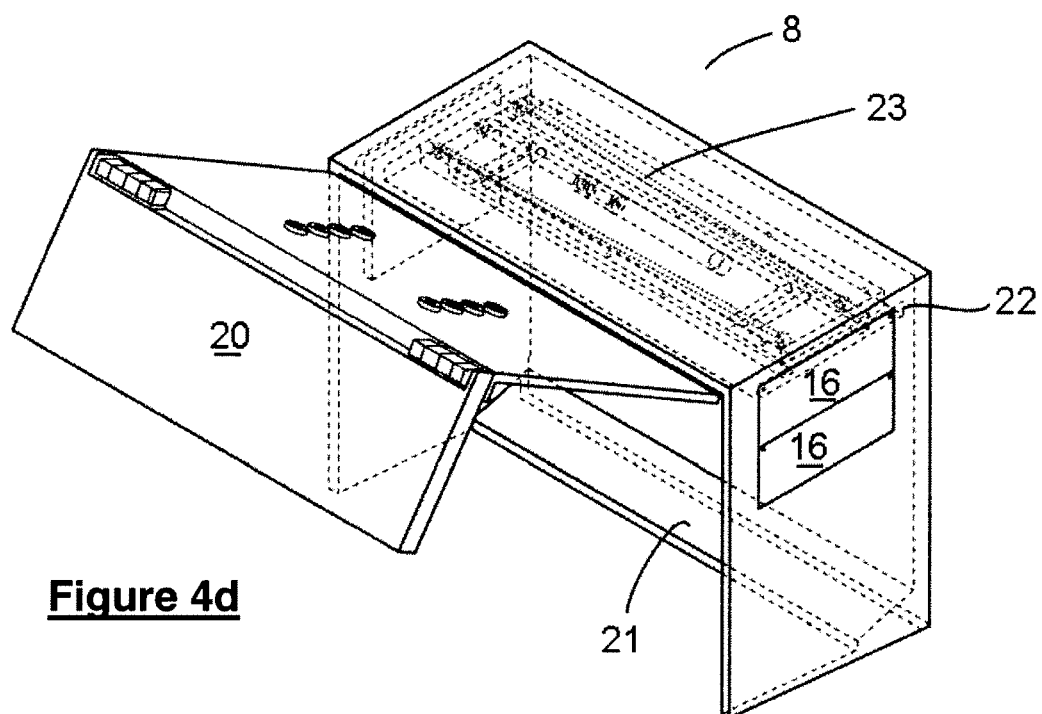


Figure 4d

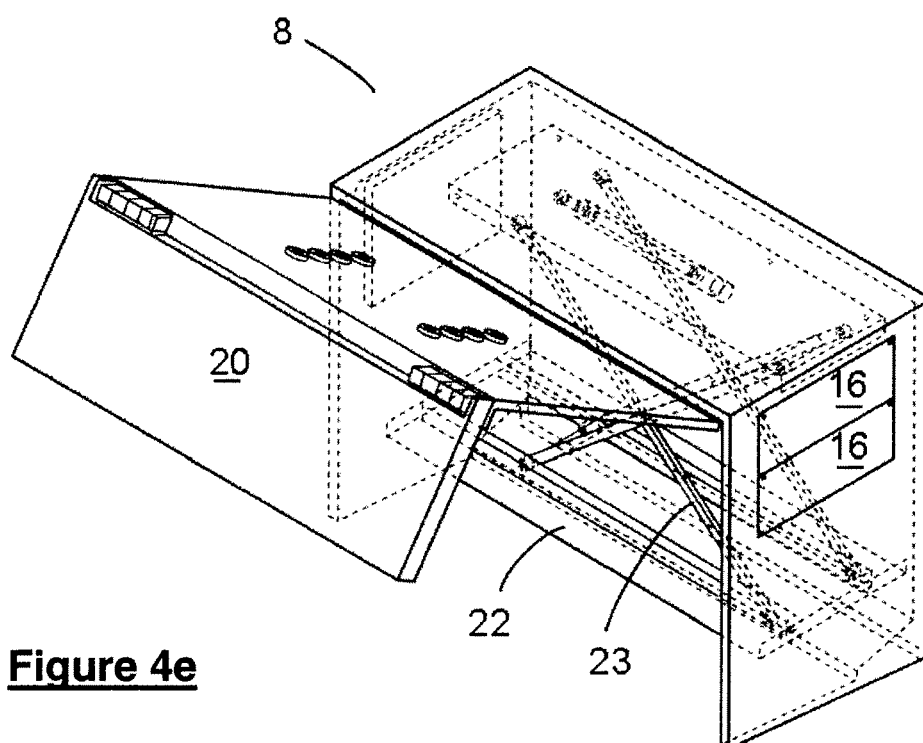


Figure 4e

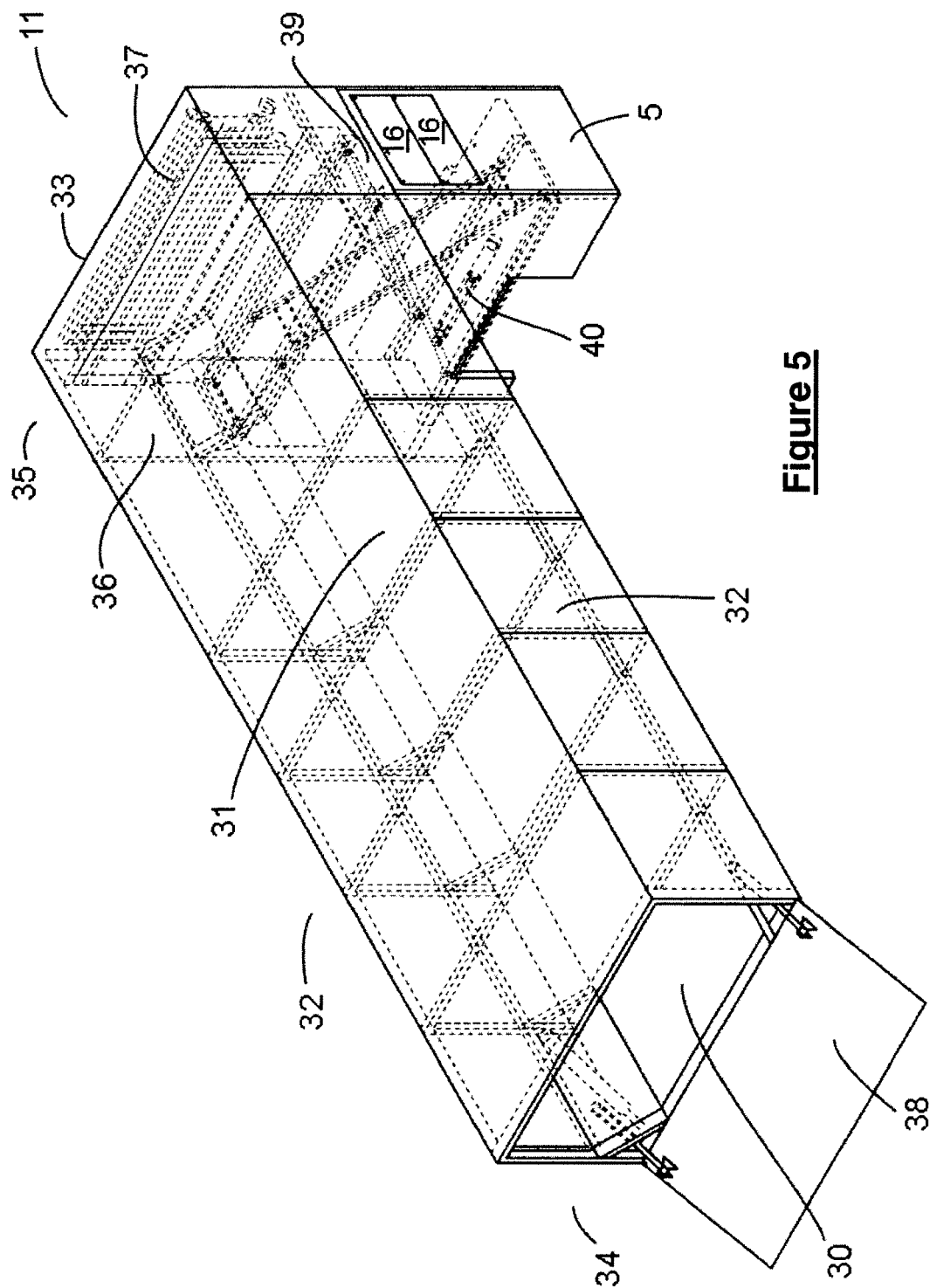


Figure 5

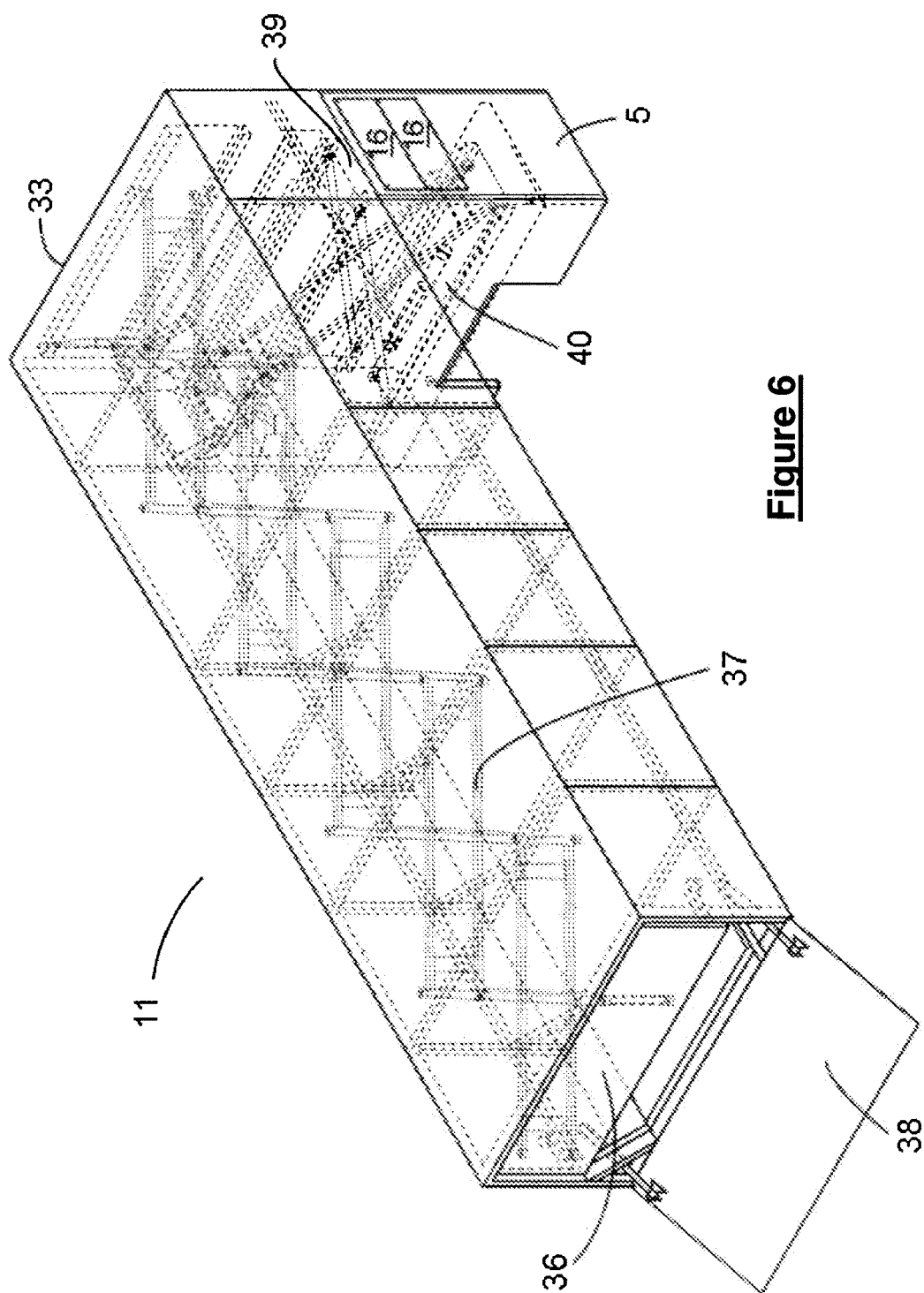


Figure 6

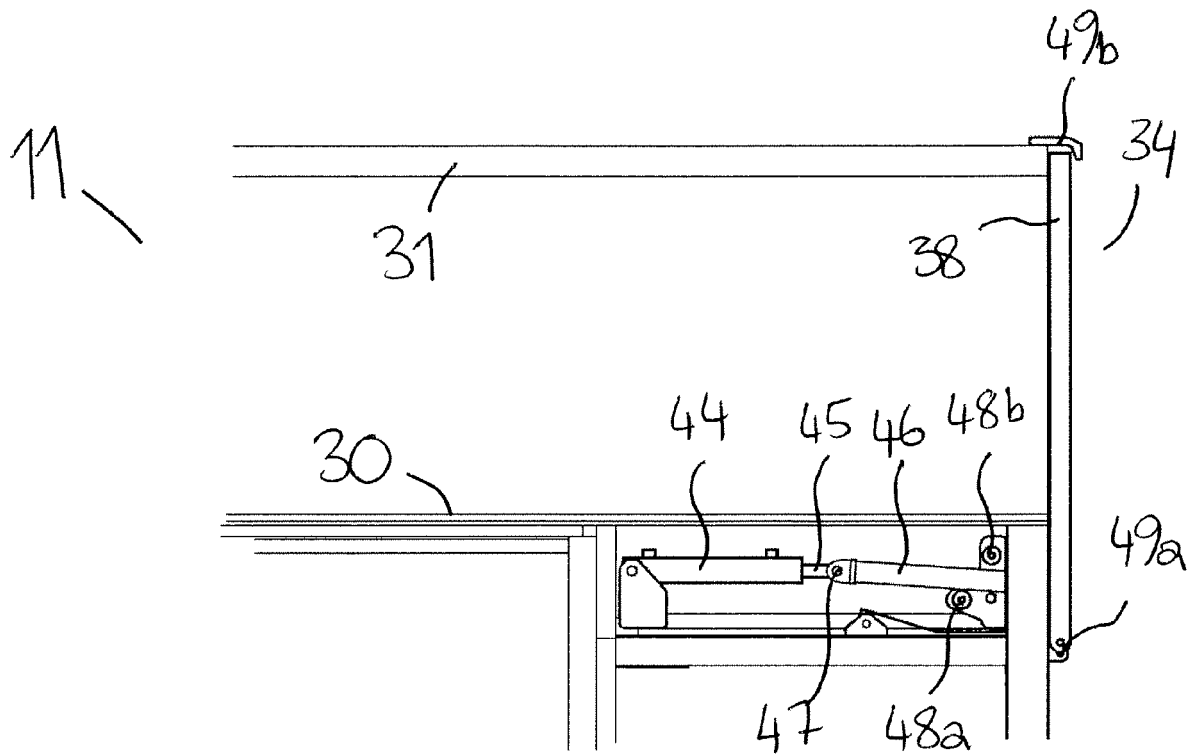


Figure 7

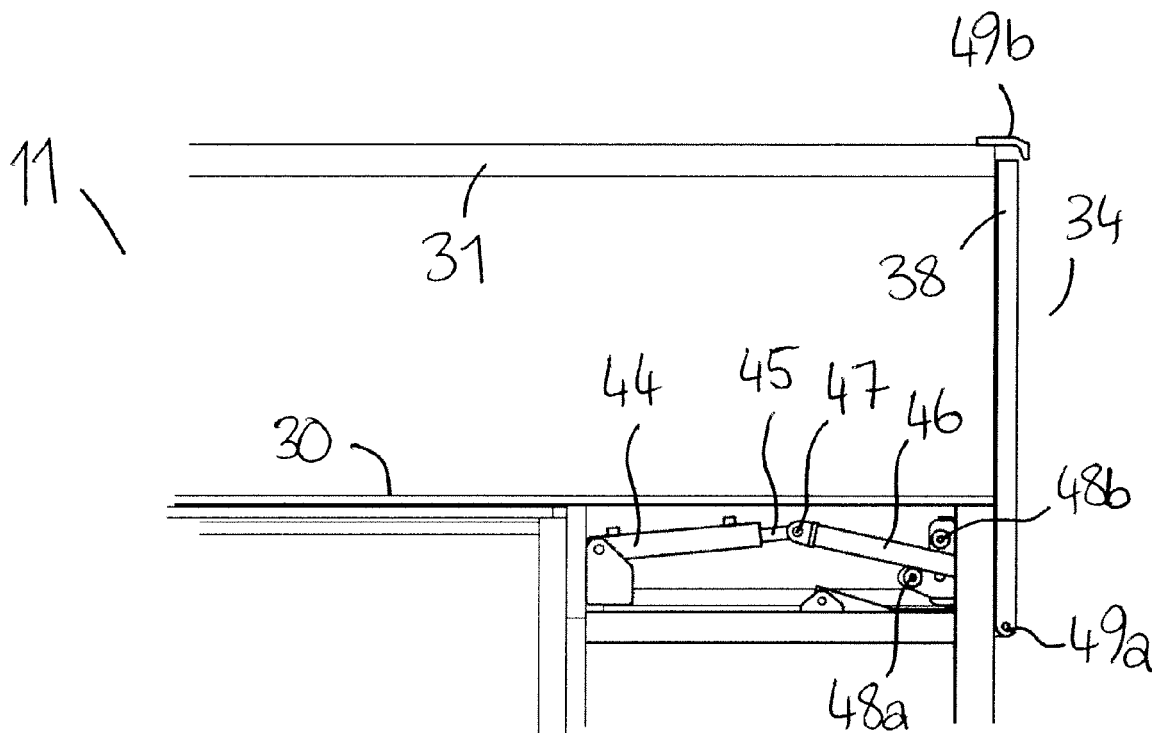


Figure 8

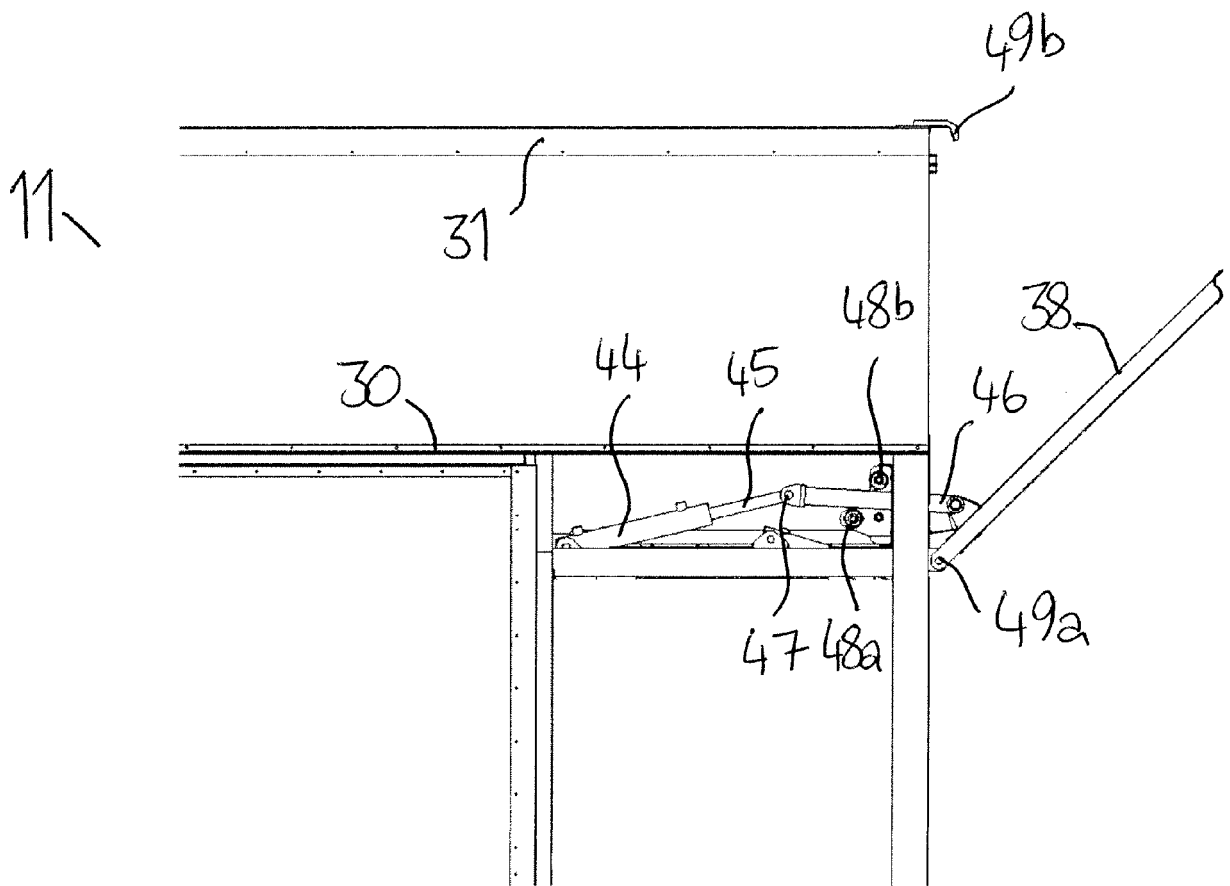


Figure 9

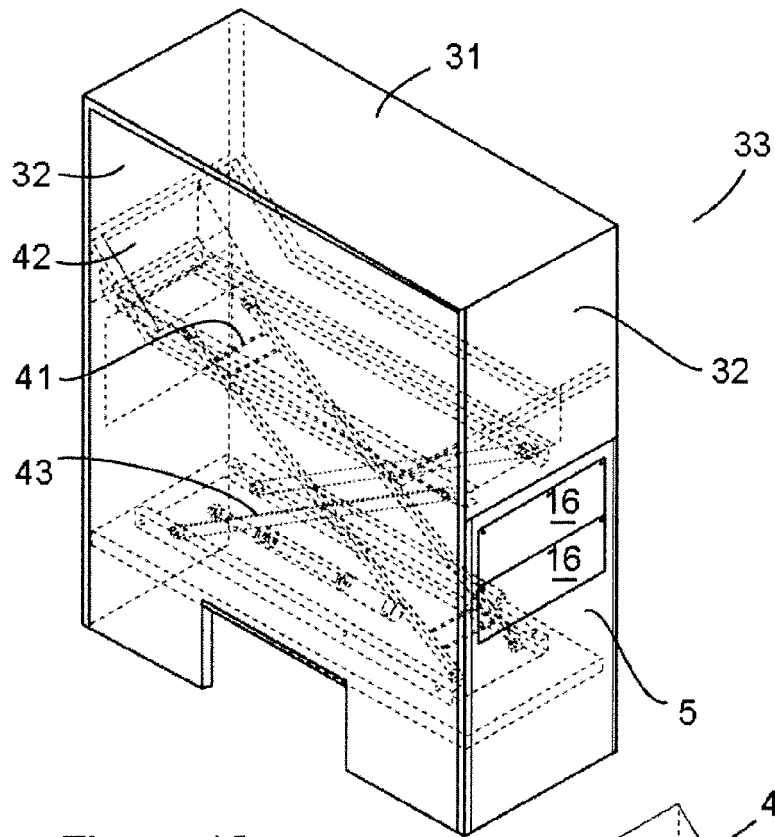


Figure 10

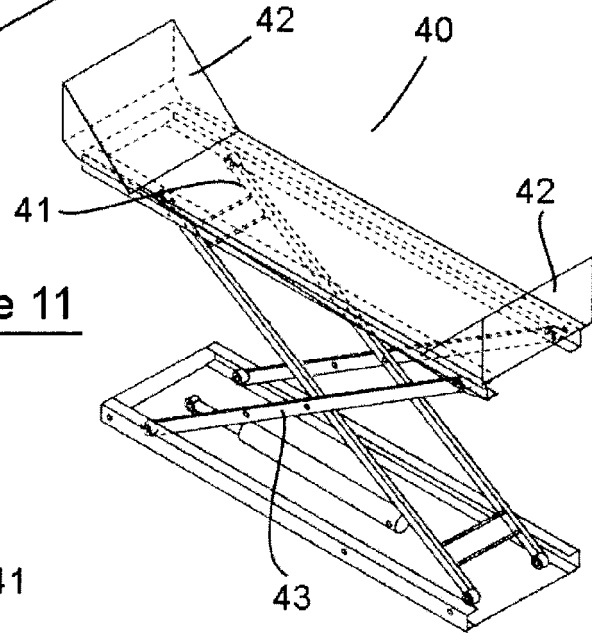


Figure 11

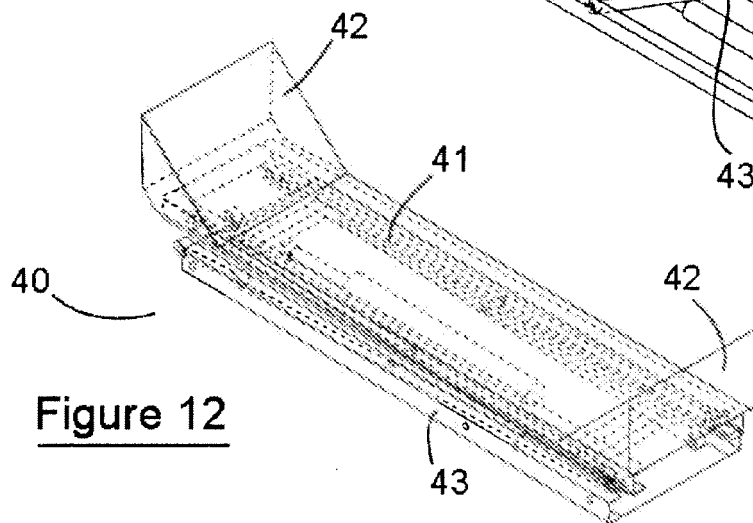


Figure 12

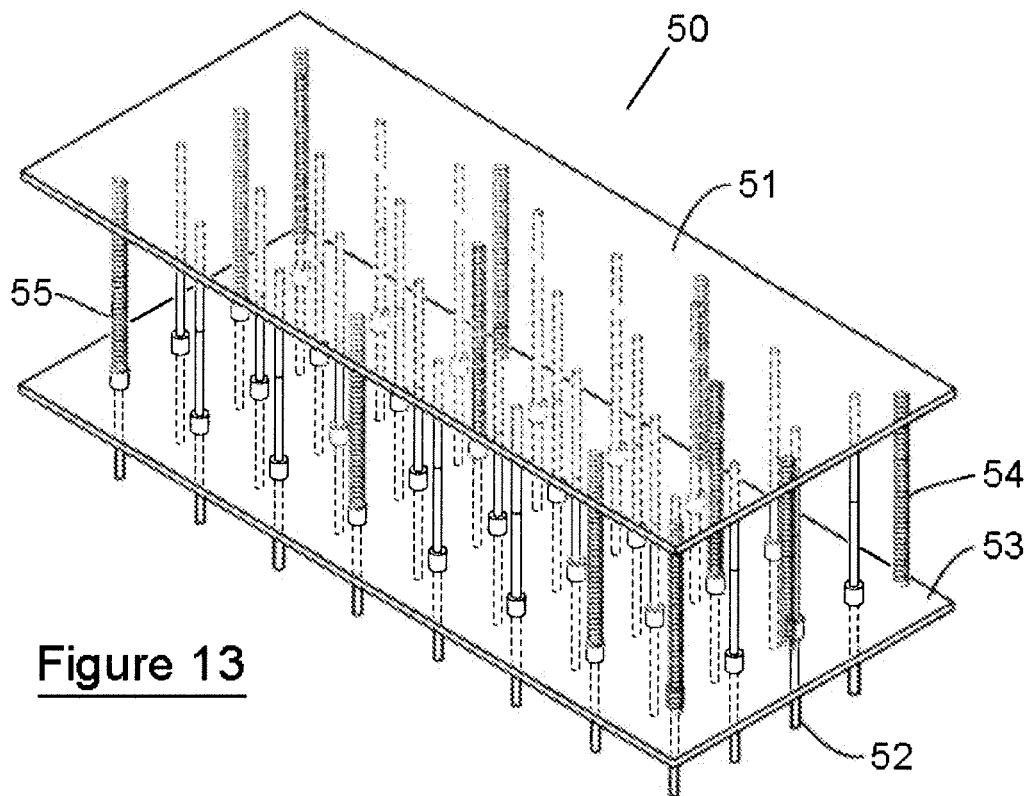


Figure 13

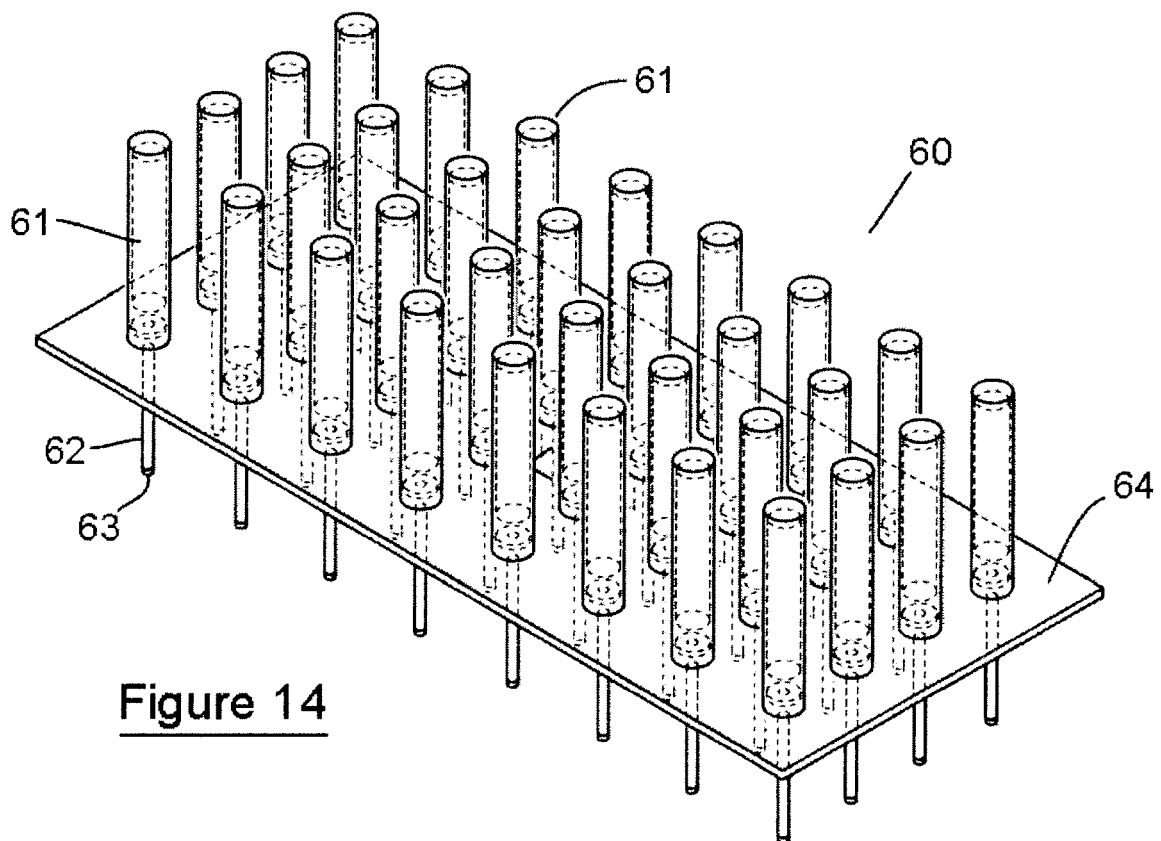


Figure 14

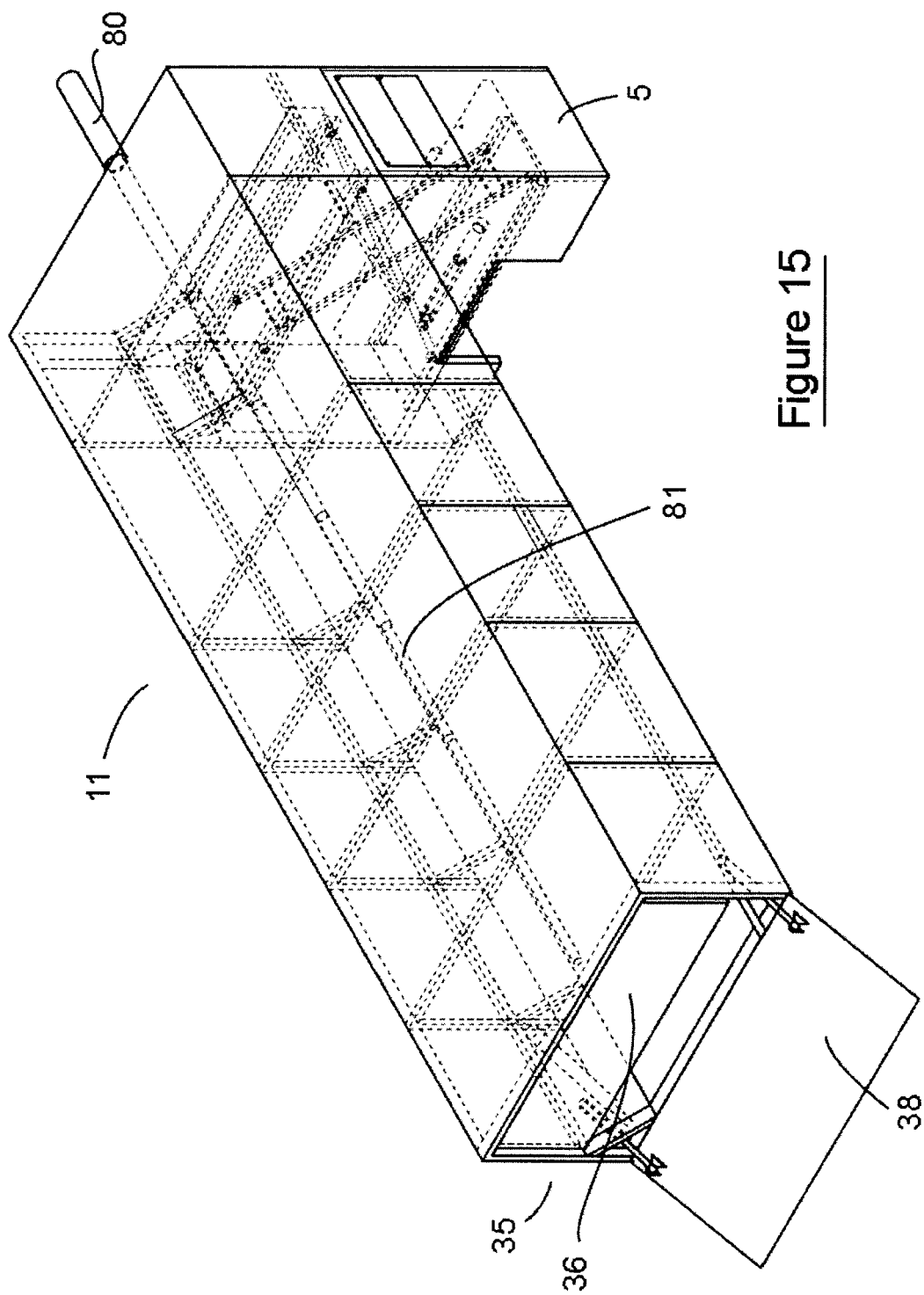


Figure 15

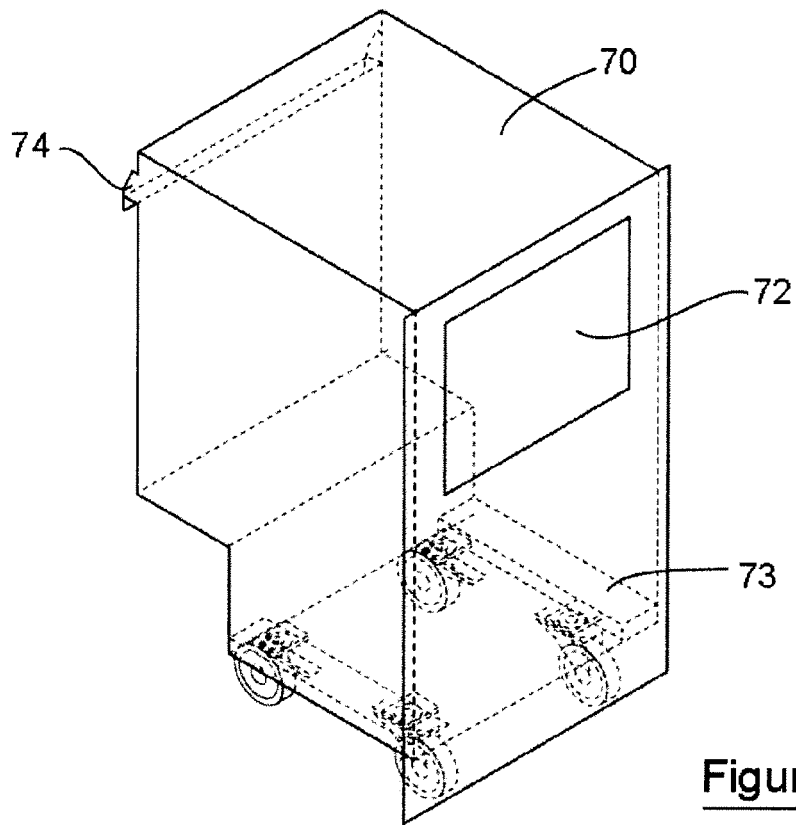


Figure 16

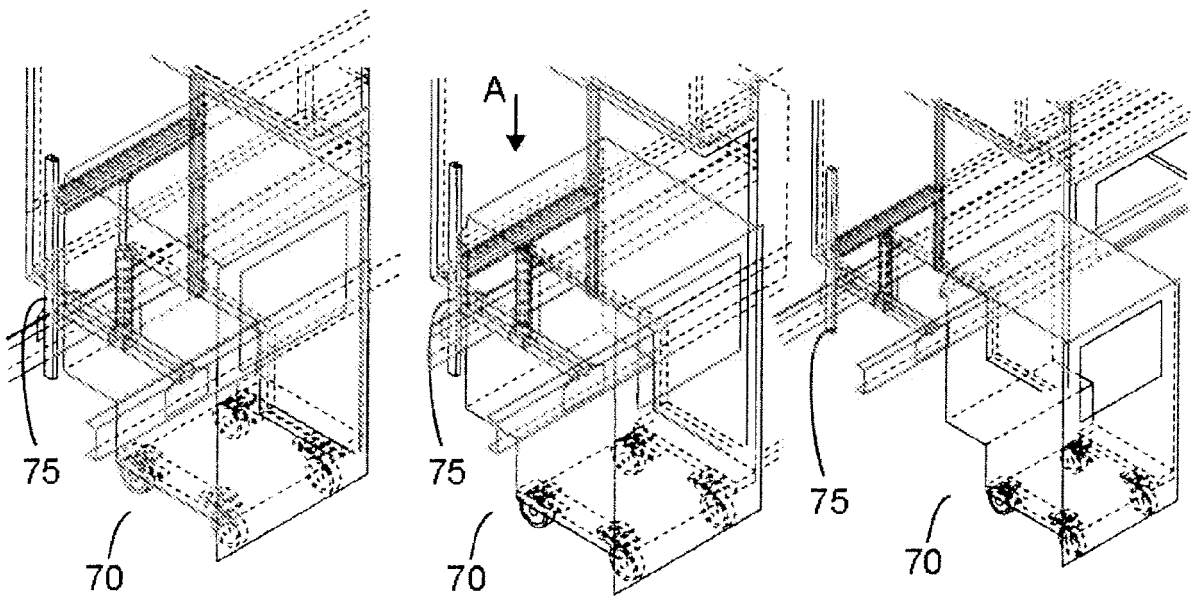


Figure 17a

Figure 17b

Figure 17c

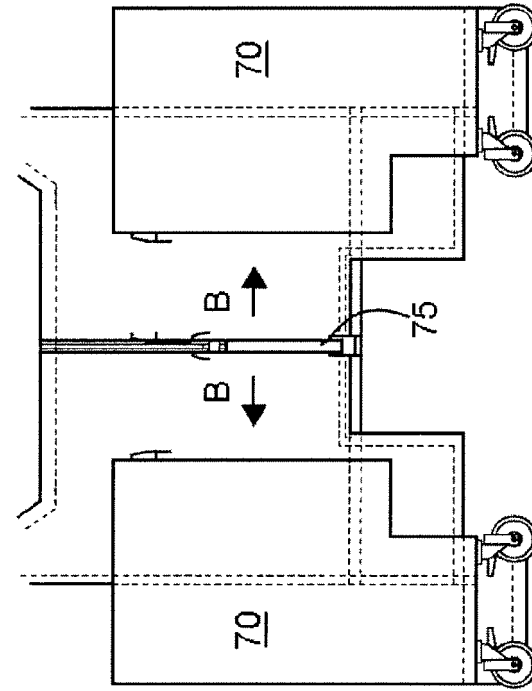


Figure 18a

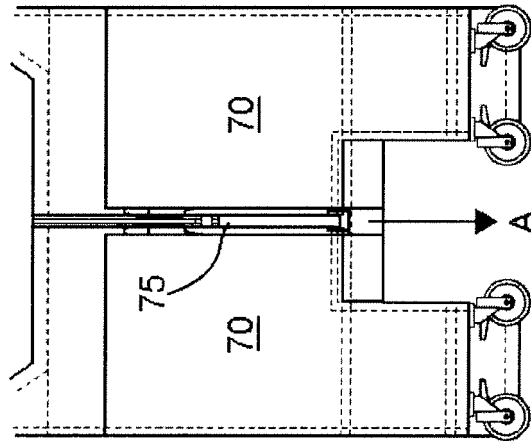


Figure 18b

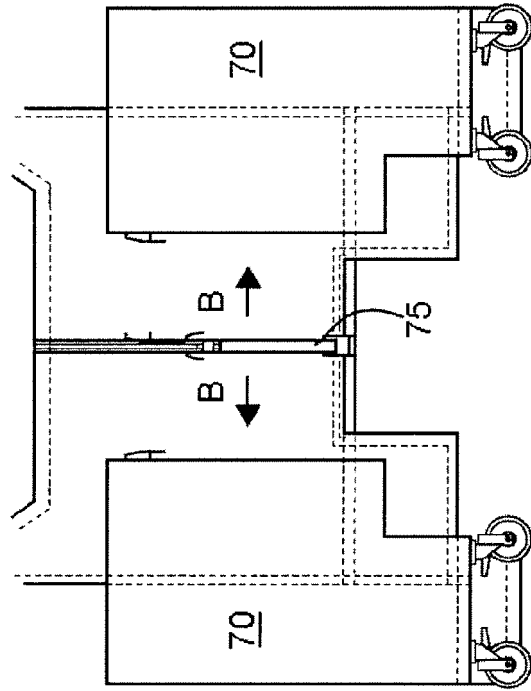


Figure 18c

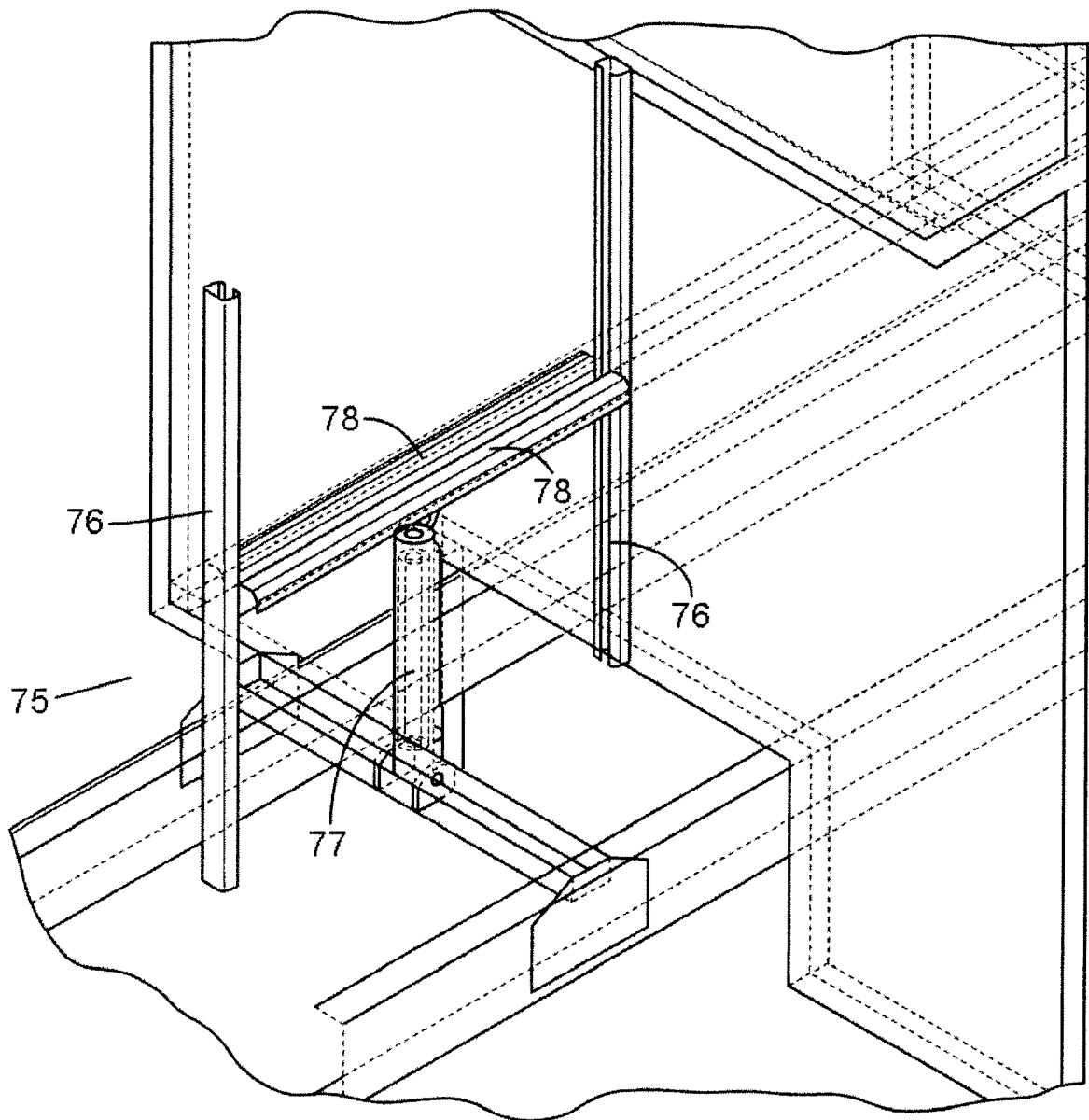


Figure 19

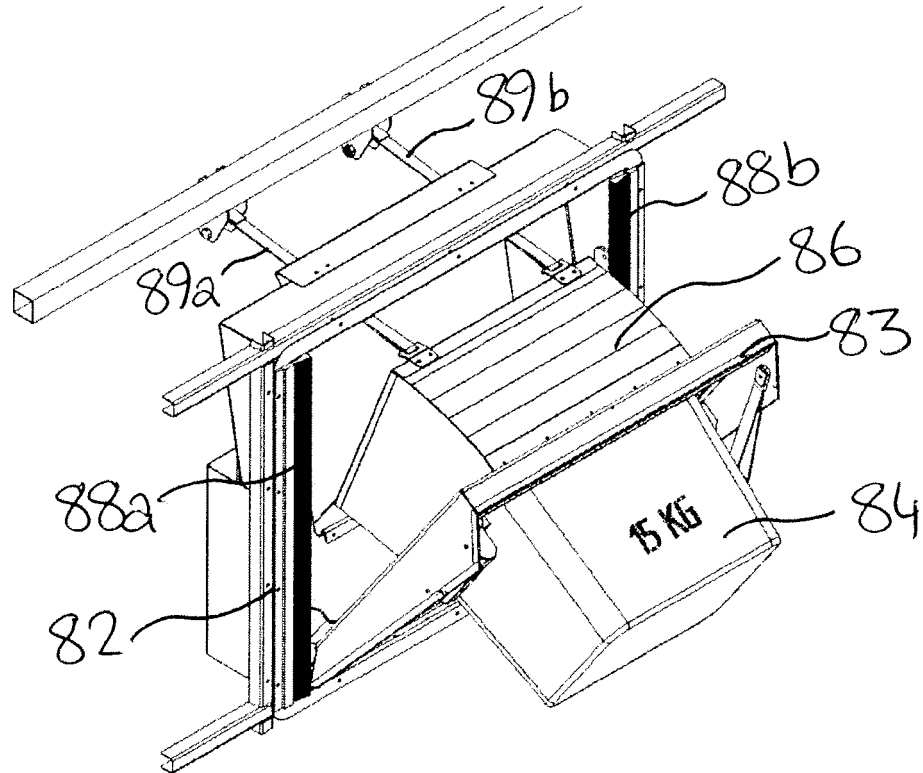


Figure 20

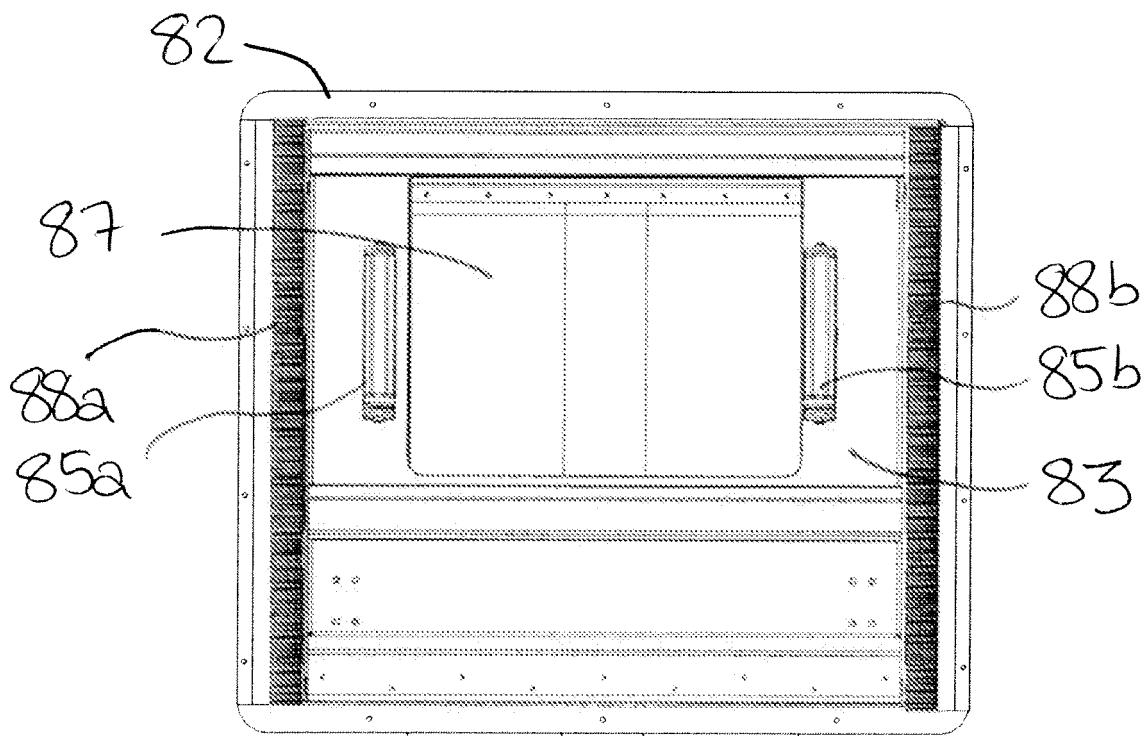


Figure 21

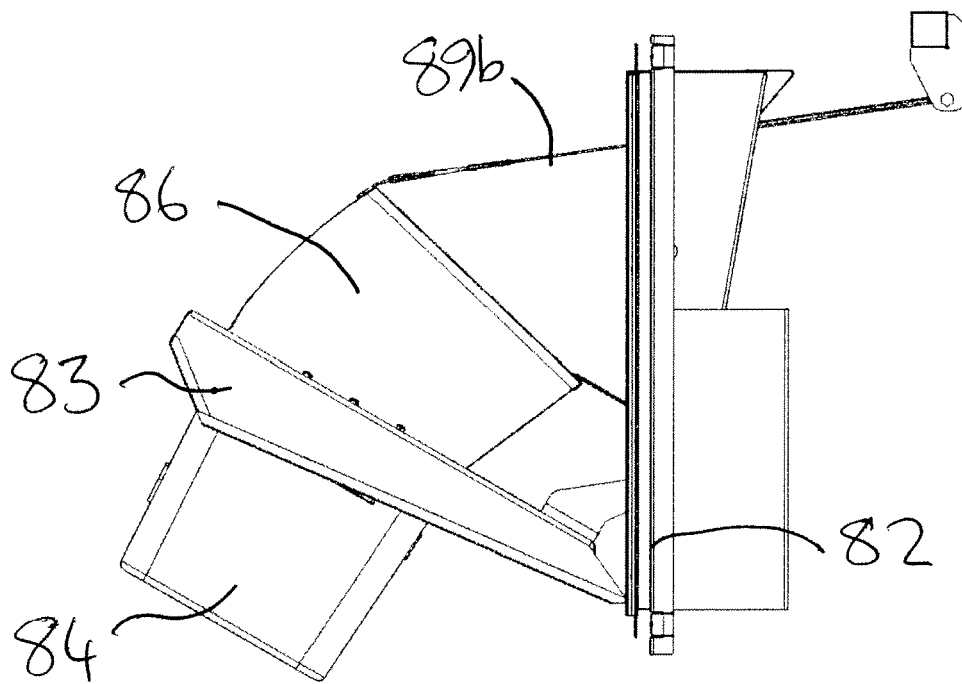


Figure 22

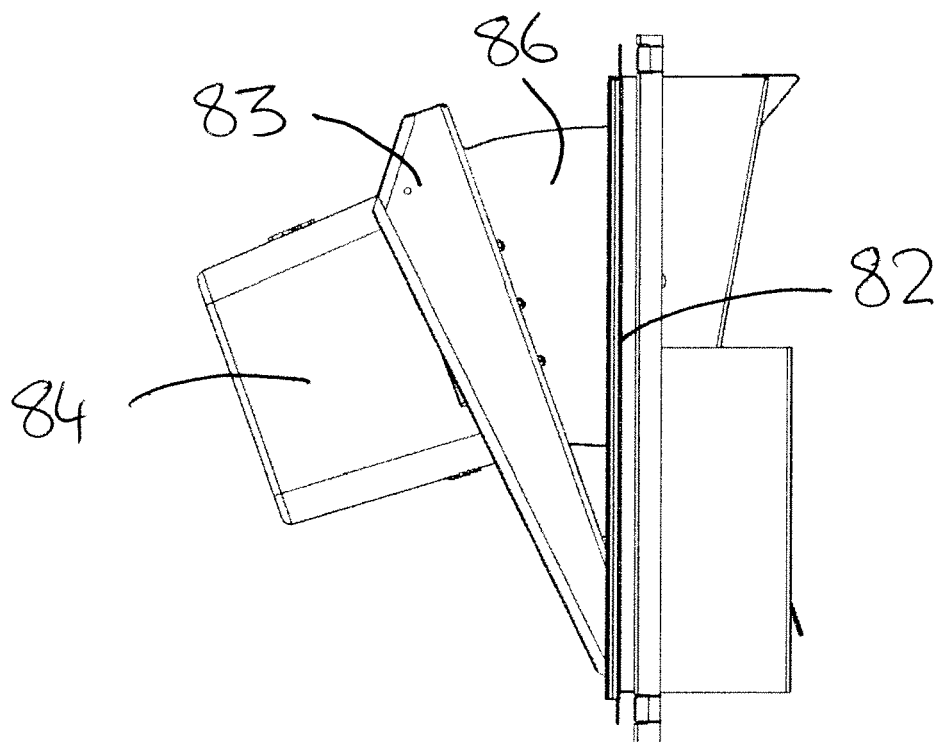


Figure 23

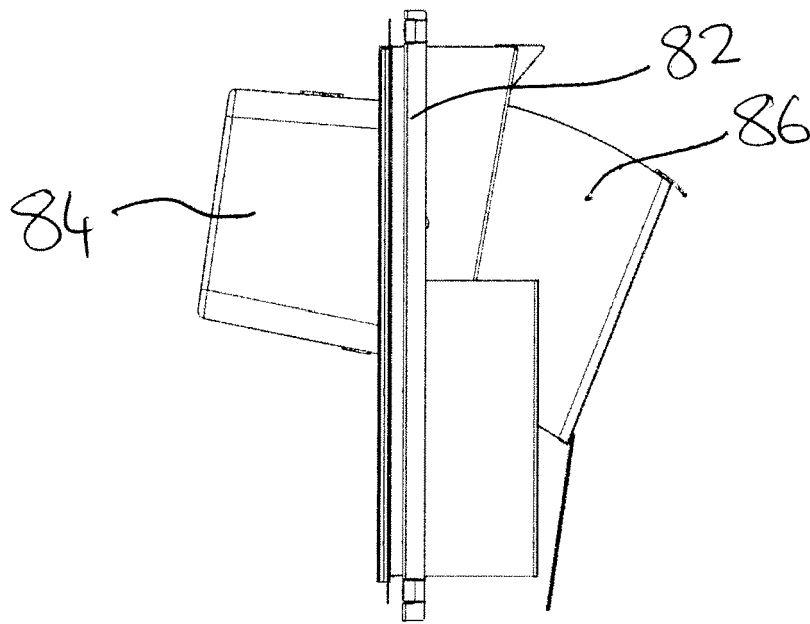


Figure 24

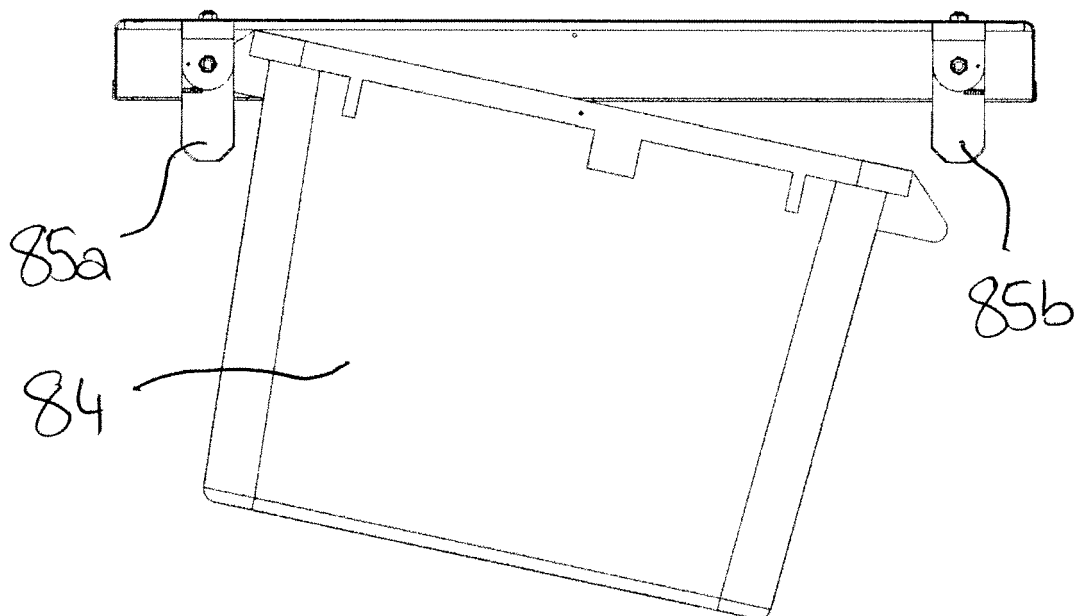


Figure 25

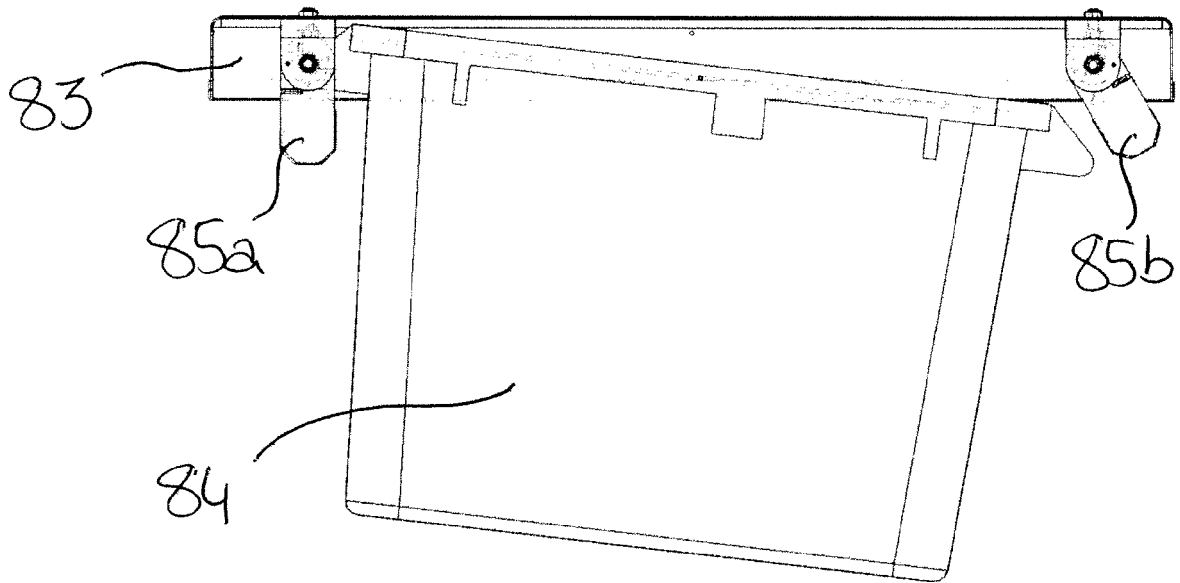


Figure 26

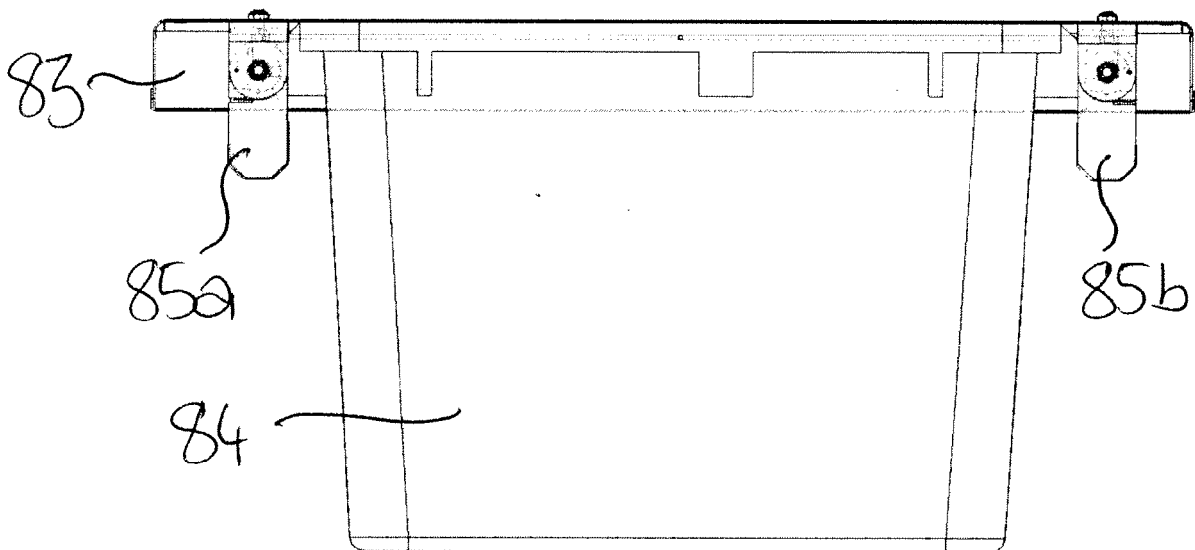


Figure 27

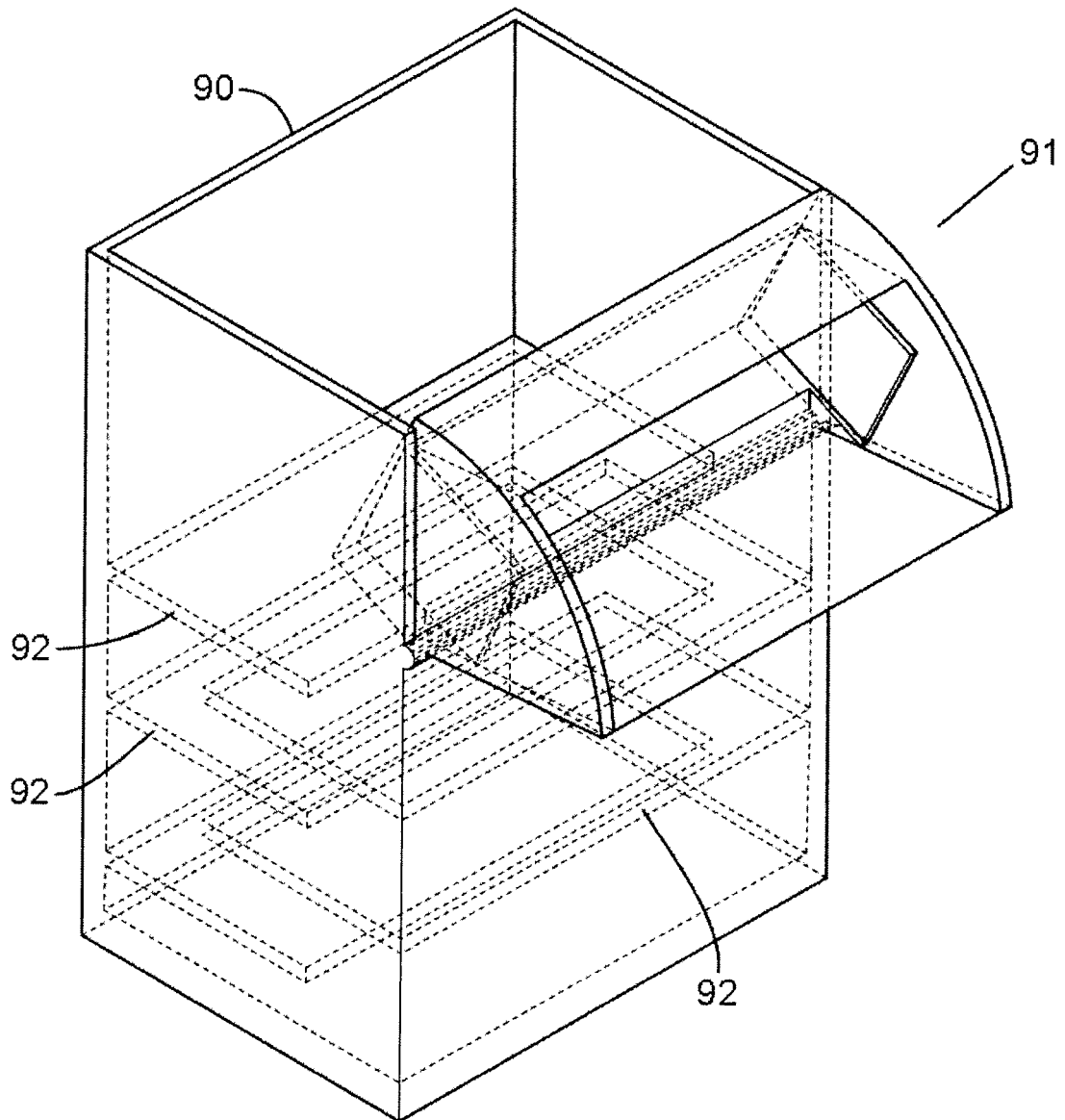


Figure 28

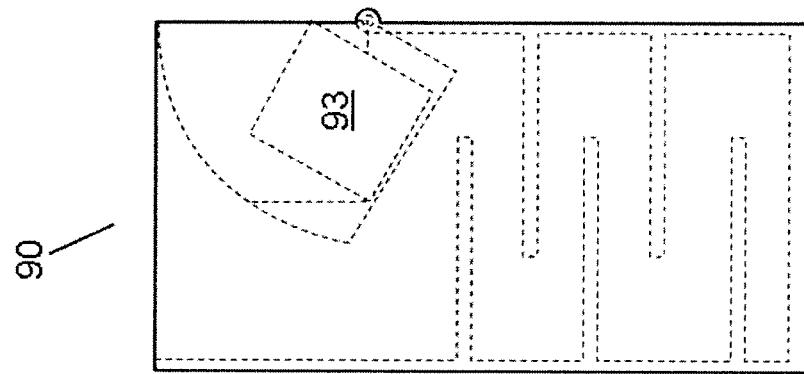


Figure 29a

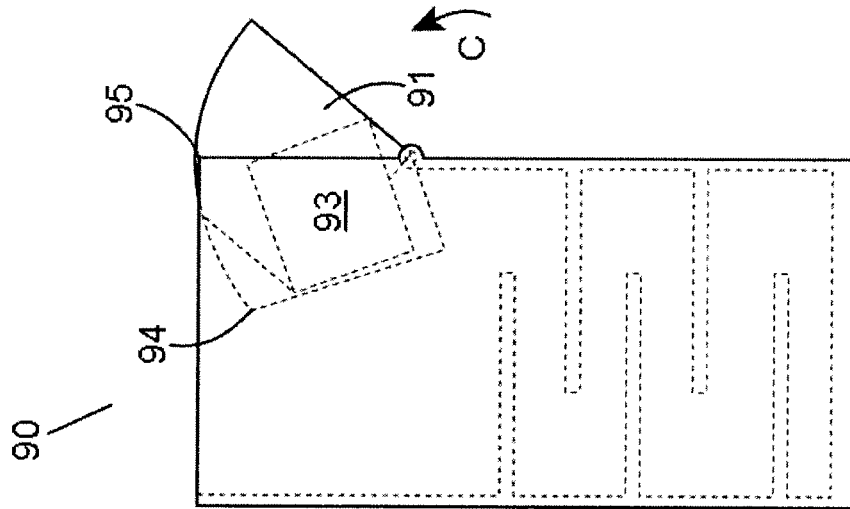


Figure 29b

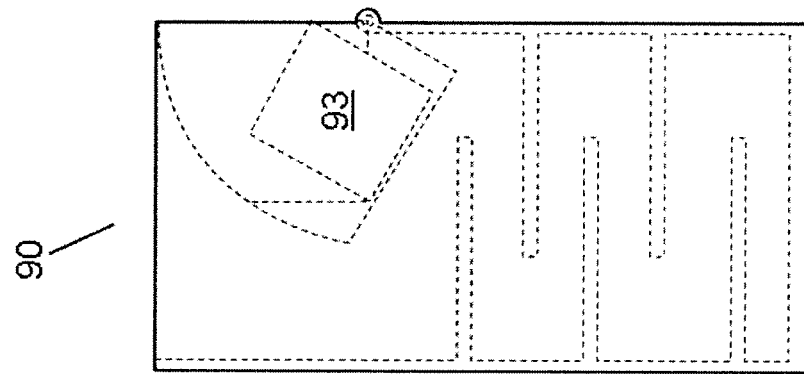


Figure 29c



EUROPEAN SEARCH REPORT

Application Number
EP 11 16 6128

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,D	US 6 027 300 A (I. RICHARDS) 22 February 2000 (2000-02-22) * column 5, line 26 - column 7, line 14 * * figures 6-10 * -----	1	INV. B65F3/00 B65F3/20 B65F3/24 B65F3/28
A	CA 2 204 318 A1 (P. DURON ET AL.) 2 November 1998 (1998-11-02) * page 7, line 26 - page 9, line 14 * * figures 1,6-9 * -----	1	
A	US 5 829 842 A (S. LOMBARDI) 3 November 1998 (1998-11-03) * column 3, line 33 - column 5, line 54 * * figures 1-7 * -----	1	
			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 23 August 2011	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)

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ON EUROPEAN PATENT APPLICATION NO.**

EP 11 16 6128

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The members are as contained in the European Patent Office EDP file on
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23-08-2011

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6027300	A	22-02-2000	NONE	
CA 2204318	A1	02-11-1998	NONE	
US 5829842	A	03-11-1998	NONE	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- BE 1003808 A5 [0003]
- WO 2006048667 A [0003]
- US 6027300 A [0003]