

A vehicle having a lifting device

Field of the invention

The present invention relates to vehicles having lifting devices, particularly for lifting and tilting garbage containers.

5

Background of the invention

The majority of housing in large cities is provided by way of high-rise apartment buildings, often twelve storeys or more in height. To facilitate the waste disposal of individual occupiers, the apartments of each vertical column have access to a common garbage chute. This common garbage
10 chute terminates at a garbage collection point at the bottom of the building often at the ground or basement level. Each vertical column of apartments is equipped with a common garbage chute, with all of the garbage chutes in a building terminating at a common garbage collection point.

Garbage is collected in the garbage collection point in garbage
15 containers, which are emptied periodically into a larger bin. This larger bin is then towed to a central bin compound, remote from the building. At the central bin compound, the larger bin is lifted and emptied into a compactor bin. Alternatively, the garbage containers are transported to the central bin compound on the tray of a small vehicle. At the central bin compound, the
20 garbage containers are then emptied into a larger bin which is then mechanically lifted and emptied into a compactor bin. At regular intervals, a large industrial garbage truck collects the garbage in the compactor bin from the bin compound and disposes of it, typically to an incinerator.

To empty the garbage container into the larger bin at the central bin
25 compound, the container is required to be manually lifted and tipped by two or more people, depending on the size of the garbage container.

Manual lifting of the containers is laborious and requires two or more people to lift, tip and empty the container's contents into the larger bin which is then mechanically lifted and emptied into a compactor bin. The intermediate process of transferring from garbage containers to larger bins
5 and then to a compactor bin is utilised because it is not possible nor efficient for the garbage containers to be lifted and emptied directly into the compactor bin due to the compactor's height.

A trailer having a yard waste handling apparatus for collecting and transporting grass clippings is disclosed in United States patent 6,206,477.
10 The apparatus includes a dump box, which is filled by using a hopper that is swung from a ground position to above the dump box to empty its contents into the dump box. The dump box is emptied by pivoting it about its front lower edge, which is attached to the trailer tray. This allows the yard waste to be emptied on the ground next to the trailer. This apparatus does not
15 allow the yard waste to be emptied into another bin, unless the top of the other bin is lower than the trailer tray.

The applicant does not concede that the prior art discussed above forms part of the common general knowledge in the art at the priority date.

It is therefore an object of the invention to provide a vehicle having a
20 lifting device that facilitates efficient lifting and emptying of garbage containers.

Summary of the invention

In a first aspect, the present invention provides a vehicle having a lifting device, the lifting device including:

25 at least one series of longitudinal members pivotally interconnected, the series of longitudinal members being moveable between a

retracted container transport condition and an extended container emptying condition;

5 attachment means pivotally attaching to the vehicle a longitudinal member that is a lower longitudinal member in the extended condition of said series;

second attachment means on a longitudinal member that is an upper longitudinal member in the extended condition of said series, adapted to mount a garbage container; and

10 a further longitudinal member having one end pivotally fixed to the upper longitudinal member along its length and the other end being connected to means in contact with the vehicle;

wherein, in said retracted condition, the upper longitudinal member is substantially horizontal to position the garbage container substantially horizontal for receiving garbage and transporting the container;

15 characterised in that the garbage container's base is mounted adjacent to the upper longitudinal member, the means in contact with the vehicle is moveable substantially horizontally with respect to the vehicle, and to move to the extended condition the moveable means moves towards the attachment means of the lower longitudinal
20 member to cause the upper longitudinal member to be raised and tilted simultaneously, whereby the garbage container is raised and tilted in a single operation for emptying the garbage.

In a second aspect, there is provided a garbage handling apparatus, including:

25 a garbage container;

at least one series of longitudinal members pivotally interconnected, the series of longitudinal members being moveable between a retracted container transport condition and an extended container emptying condition;

5 attachments means on a longitudinal member that is a lower longitudinal member in the extended condition of said series, adapted to pivotally mount the lower longitudinal member to a vehicle;

10 a second attachment means attaching the garbage container to a longitudinal member that is an upper longitudinal member in the extended condition of said series; and

a further longitudinal member having one end pivotally fixed to the upper longitudinal member along its length and the other end being connected to means in contact with the vehicle;

15 wherein, in said retracted condition, the upper longitudinal member is substantially horizontal to position the garbage container substantially horizontal for receiving garbage and transporting the container;

20 characterised in that, the garbage container is attached such that its base is adjacent to the upper longitudinal member, the means in contact with the vehicle is moveable substantially horizontally with respect to the vehicle, and to move to the extended condition the moveable means moves towards the attachment means of the lower longitudinal member to cause the upper longitudinal member to be raised and tilted simultaneously, whereby the garbage container is raised and tilted in a single operation for emptying the garbage.

25

The means in contact with the vehicle is preferably moveable substantially horizontally by virtue of a roller. Advantageously, there is provided means to move the series between the retracted and extended condition. Such means may be a hydraulic mechanism.

5 Preferably, the longitudinal members are pivotally connected at end portions. There may be two series of longitudinal members pivotally interconnected at mid portions to form a scissor lift mechanism. Preferably, said further longitudinal member is a one of the members of the scissor lift mechanism.

10 Advantageously, there are two series of longitudinal members or scissor lift mechanisms spaced apart by transverse members.

The garbage container may be permanently mounted to the upper longitudinal member.

Advantageously, the vehicle includes a chassis and ground wheels.

15 The lifting device is typically located above the chassis. The movement of the series of longitudinal members is preferably above the chassis. The vehicle may include a driver console. The lifting device is preferably located behind the driver console. The lifting device may be located at the back edge of the vehicle, allowing the garbage container to be emptied over the

20 back edge of the vehicle.

Preferably, the garbage container has a base, two sides and two ends. One end of the garbage container may include a door, such that when the garbage container is tilted, the garbage empties through the door.

Brief description of the drawings

The invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

5 Figure 1 is a side view of a vehicle according to the invention, with the series of longitudinal members in a retracted container transport condition;

Figure 2 is a partial side view of the vehicle of Figure 1, with the series of longitudinal members in an extended container emptying condition;

Figure 3 is a partial perspective view of the vehicle of Figure 2; and

10 Figure 4 is a perspective view of the lifting device of Figure 3 shown from the opposite side.

Detailed description of the embodiments

A vehicle 10 is used to transport garbage collected at a garbage collection area at the bottom of a building to a central bin compound. Garbage (not shown) is collected in a garbage container 12 located at the back of the vehicle, through the open top 14 of the garbage container 12. The vehicle 10 includes a chassis 16, ground wheels 18 and a driver console 20. There is a wire mesh 22 separating the driver console 20 from the garbage container 12 and a tray 17 on the chassis 16. It will be understood that this is a purpose built vehicle, but that any appropriate vehicle may be used.

The vehicle 10 has a lifting device 24, which is used to lift the garbage container 12. The lifting device 24 is located behind the driver console 20 and above the chassis 16 on tray 17. The lifting device 24 includes at least one series 26 of longitudinal members 28 pivotally connected at points 30, being at end portions of the longitudinal members 28. The series 26 of longitudinal members 28 is moveable between a retracted container transport condition (as shown in Figure 1) and an extended container emptying condition (as shown in Figures 2, 3 and 4). The extended condition allows garbage in the garbage container 12 to be emptied either on the ground, or into another bin. There is provided an attachment means 32 which pivotally attaches, to the vehicle 10, a longitudinal member 28a that is a lower longitudinal member in the extended condition. There is also provided a second attachment means 34 on a longitudinal member 28b that is an upper longitudinal member in the extended condition, and is adapted to mount the garbage container 12. The garbage container may be permanently mounted to longitudinal member 28b or may be removably mounted.

As can be seen in Figure 2, there are two series 26, 126 of longitudinal members 28, 128 pivotally connected at points 42 being at mid

portions to form a scissor lift mechanism 44. As can be seen in Figures 3 and 4, there are two scissor lift mechanisms 44, 144 spaced apart by traverse members 46. The traverse members 46 are substantially the same width as the garbage container 12. This construction, best shown in Figure 4 gives stability to the lifting device 24, as the contents of the garbage container 12 may be relatively heavy.

The two rear lower longitudinal members 28a, 228b are fixed to the vehicle by attachment means 32 in the form of a bracket and is pivotable about point 50. The other lower longitudinal member 128a includes a roller 52, allowing it to move horizontally along the tray 17 of the vehicle 10. When in the retracted condition, the roller 52 is located the full length of longitudinal member 28 away from bracket 32. When moving to the extended condition roller 52 moves towards bracket 32, allowing the longitudinal members 28 to be raised.

The garbage container 12 has a base 36, two sides, 38, 38a and two ends 40, 40a. The base 36 of the garbage container 12 is mounted adjacent to the upper longitudinal member 28b. When in the retracted condition, the upper longitudinal member 28b is substantially horizontal, as can be seen in Figure 1. This positions the garbage container 12 substantially horizontal for receiving garbage and transporting the garbage container 12. The vehicle 10 and garbage container 12 may both be permanently located under a chute for receiving garbage. Alternatively, the garbage container 12 may be located under the chute and the vehicle 10 periodically removes and returns the container 12. It may also be that garbage collects in the chute and the vehicle 10 and garbage container 12 are positioned under the chute, which is then opened allowing the garbage container to fill, the chute is then closed and the vehicle 10 receives the garbage collected. Alternatively, the garbage is received into a bin positioned under the chute, which is then periodically emptied into the garbage container 12 of the vehicle 10. The vehicle 10 then transports the garbage to a central bin compound.

When moving to the extended condition, the upper longitudinal member 28b is raised and tilted simultaneously, by pivoting about point 30a. The lifting device 24 includes means 64 to move the series 26, between the two conditions. Such means 64 may be a hydraulic mechanism. However,
5 any suitable mechanism may be used. As the base 36 of the garbage container 12 is mounted adjacent the longitudinal member 28b, the garbage container 12 is raised and tilted in a single operation for emptying the garbage contained within it.

For the scissor lift mechanisms 44, 144 to enable the garbage
10 container to be mounted to longitudinal members 28b, 228b and to be tilted, the longitudinal members 128b and 328b must terminate at the mid portion of the longitudinal members 28b and 228b, pivoting about point 42b. The garbage container 12 includes doors 54, 56, such that when the garbage container 12 is tilted, the garbage empties through the doors 54, 56. When in
15 the retracted condition, the doors are held shut by a rod 58 and a clasp 60, preventing the garbage from falling out. The top lip of the lower door 56 overlaps the bottom of upper door 54 to prevent it from opening. When the vehicle 10 is in position to be emptied, before raising the garbage container 12, the clasp 60 is undone and the rod 58, is lowered with the door 56. A
20 chain 62 on either side of door 56 prevents the door 56 from falling vertically and provides a guide for the garbage to follow out of the garbage container 12. As the garbage container 12 is raised and tilted simultaneously, the garbage can be easily emptied into another bin in the bin compound, simply and easily.

25 It will be understood that the invention disclosed and defined in this specification extends to all alternative combinations of two or more of the individual features mentioned or evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

The claims defining the invention are as follows:

1. A vehicle having a lifting device, the lifting device including:

at least one series of longitudinal members pivotally interconnected,
the series of longitudinal members being moveable between a
retracted container transport condition and an extended container
emptying condition;

attachment means pivotally attaching to the vehicle a longitudinal
member that is a lower longitudinal member in the extended condition
of said series;

- a second attachment means on a longitudinal member that is an
upper longitudinal member in the extended condition of said series,
adapted to mount a garbage container; and

- a further longitudinal member having one end pivotally fixed to the
upper longitudinal member along its length and the other end being
connected to means in contact with the vehicle;

wherein, in said retracted condition, the upper longitudinal member is
substantially horizontal to position the garbage container substantially
horizontal for receiving garbage and transporting the container;

- characterised in that the garbage container's base is mounted
adjacent to the upper longitudinal member, the means in contact with
the vehicle is moveable substantially horizontally with respect to the
vehicle, and, to move to the extended condition the moveable means
moves towards the attachment means of the lower longitudinal
member to cause the upper longitudinal member to be raised and

tilted simultaneously, whereby the garbage container is raised and tilted in a single operation for emptying the garbage.

2. A vehicle according to claim 1, wherein the means in contact with the vehicle is moveable substantially horizontally by virtue of a roller.

5 3. A vehicle according to claim 1 or 2, wherein the longitudinal members are pivotally interconnected at end portions.

4. A vehicle according to claim 1, 2 or 3, wherein there are two series of longitudinal members pivotally connected at mid portions to form a scissor lift mechanism.

10 5. A vehicle according to claim 4, wherein said further longitudinal member is a one of the members of the scissor lift mechanism.

6. A vehicle according to claim 1 or 2, wherein there are two series of longitudinal members spaced apart by transverse members.

15 7. A vehicle according to claim 4, wherein there are two scissor lift mechanisms spaced apart by traverse members.

8. A vehicle according to any one of the preceding claims, wherein the garbage container is permanently mounted to the upper longitudinal member.

9. A vehicle according to any one of the preceding claims, wherein the vehicle includes a chassis and ground wheels.
10. A vehicle according to claim 9, wherein the lifting device is located above the chassis.
- 5 11. A vehicle according to claim 9 or 10, wherein the movement of the series of longitudinal members is above the chassis.
12. A vehicle according to any one of the preceding claims, wherein the vehicle includes a driver console.
- 10 13. A vehicle according to claim 12, wherein the lifting device is located behind the driver console.
14. A vehicle according to claim 13, wherein the lifting device is located at the back edge of the vehicle, allowing the garbage container to be emptied over the back edge of the vehicle.
- 15 15. A vehicle according to any one of the preceding claims, wherein the garbage container has a base, two sides and two ends.
16. A vehicle according to claim 15, wherein one end of the garbage container includes a door, such that when the garbage container is tilted, the garbage empties through the door.
- 20 17. A vehicle according to any one of the preceding claims, wherein there is provided means to move the series of longitudinal members between the retracted and extended conditions.
18. A garbage handling apparatus, including:

a garbage container;

at least one series of longitudinal members pivotally interconnected,
the series of longitudinal members being moveable between a
retracted container transport condition and an extended container
emptying condition;

attachments means on a longitudinal member that is a lower
longitudinal member in the extended condition of said series, adapted
to pivotally mount the lower longitudinal member to a vehicle;

a second attachment means attaching the garbage container to a
longitudinal member that is an upper longitudinal member in the
extended condition of said series; and

a further longitudinal member having one end pivotally fixed to the
upper longitudinal member along its length and the other end being
connected to means in contact with the vehicle;

wherein, in said retracted condition, the upper longitudinal member is
substantially horizontal to position the garbage container substantially
horizontal for receiving garbage and transporting the container;

characterised in that the garbage container is attached such that its
base is adjacent to the upper longitudinal member, the means in
contact with the vehicle is moveable substantially horizontally with
respect to the vehicle, and to move to the extended condition the
moveable means moves towards the attachment means of the lower
longitudinal member to cause the upper longitudinal member to be
raised and tilted simultaneously, whereby the garbage container is
raised and tilted in a single operation for emptying the garbage.

19. A vehicle according to claim 18, wherein the means in contact with the vehicle is moveable substantially horizontally by virtue of a roller.
20. A garbage handling apparatus according to claim 18, wherein the longitudinal members are pivotally interconnected at end points.
- 5 21. A garbage handling apparatus according to claim 18, 19 or 20, wherein there are two series of longitudinal members pivotally connected at mid portions to form a scissor lift mechanism.
22. A vehicle according to claim 21, wherein said further longitudinal member is a one of the members of the scissor lift mechanism.
- 10 23. A garbage handling apparatus according to 18 or 19, wherein there are two series of longitudinal member spaced apart by transverse members.
24. A garbage handling apparatus according to 21, wherein there are two scissor lift mechanisms spaced apart by traverse members.
25. A garbage handling apparatus according to any one of claims 18 to
15 24, wherein the garbage container has a base, two sides and two ends.

26. A garbage handling apparatus according to claim 25, wherein one end of the garbage container includes a door, such that when the garbage container is tilted, the garbage empties through the door.
27. A garbage handling apparatus according to any one of claims 18 to 5 26, wherein there is provided means to move the series of longitudinal members between the retracted and extended conditions.