

CONTAINER

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This application claims the benefit of priority to Japanese Patent Application Nos. 2005-31358 and 2005-97231 filed, respectively, Feb. 8, 2005 and Mar. 30, 2005 in Japan, of which full contents are incorporated herein by reference.

10 BACKGROUND OF THE INVENTION

 The present invention relates to a container that is filled with garbage or the like by a compactor and that is transported by a container-handling vehicle.

15 Conventionally, as this type of container, a container has been provided where a rear wall is disposed, such that it can be freely opened and closed, in an opening in a rear end of a container body. A gate that connects to a push-out port of a compactor is formed in the rear wall. The gate is
20 disposed such that it can be closed by an upper cover plate and a lower cover plate. In a state where the gate and the push-out port are connected, the upper cover plate is caused to move upward by a moving mechanism disposed in the compactor and the lower cover plate becomes coupled to a push-out plate
25 disposed inside the compactor. Garbage inside the compactor is compressed and transported, through the push-out port and via the gate, to the container by the reciprocal motion of

the push-out plate.

In this type of container disposed with an upper cover plate and a lower cover plate, a cover member is disposed, such that it can be freely opened toward the outside and closed, in a gap between the upper cover plate and the lower cover plate in order to prevent the garbage from leaking to the outside through this gap during transport. The cover member is configured to open and close in conjunction with the connection of the container to, and the separation of the container from, the compactor (e.g., see Japanese Utility Model Registration No. 2,518,104).

However, in such a conventional container where the cover member opens outward and closes in accompaniment with the connection of the container to, and the separation of the container from, the compactor, the mechanism for opening and closing the cover member becomes large, and it is necessary for the moving stroke of the container needed to open and close the cover member in accompaniment with the connection and separation to be long. Thus, this leads to an increase in the size of the arrangement.

Moreover, the cover member and an arm for causing the cover member to pivot are disposed in the container in a state where they are exposed to the outside. Thus, there has been sufficient room for improving the container in terms of its design.

SUMMARY OF THE INVENTION

The present invention was conceived in view of these circumstances, and it is an object thereof to provide a container that can open and close the cover member with a simple mechanism, can simplify the arrangement necessary for opening and closing the cover member, can economize space, and is excellent in terms of its design.

In order to achieve the above object, a major aspect of the present invention provides a container having a rear wall disposed, such that it can be freely opened and closed, in an opening at a rear end of a container body, the rear wall formed with a gate that connects to a push-out port of a compactor, the gate disposed such that it can be closed by an upper cover plate and a lower cover plate, and with the gate and the push-out port connected to each other, the upper cover plate being caused to move upward by a moving mechanism disposed in the compactor while the lower cover plate becomes coupled to a push-out plate disposed inside the compactor, and garbage inside the compactor being compressed and transported, through the push-out port and via the gate, to the container by the reciprocal motion of the push-out plate, wherein the upper cover plate is provided with a cover member that slides up and down to open and close a gap between the upper cover plate and the lower cover plate.

In this configuration, the cover member is preferably configured to open and close the gap by slide means activated in conjunction with the connection of the container to, and the separation of the container from, the compactor.

Alternatively, the slide means may include a link mechanism activated in conjunction with the connection of the container to, and the separation of the container from, the compactor.

5 Alternatively, the slide means may include a manual operation mechanism with which the cover member can be manually opened and closed.

 Alternatively, the slide means may include a linear member stretched between the upper cover plate and the cover member via plural winding members disposed at the upper cover plate and the cover member, and the cover member may be caused to slide by the pulling-in of the linear member from the cover member side toward the upper cover plate side and the unreeling of the linear member from the upper cover plate side toward the cover member side in conjunction with the connection of the container to, and the separation of the container from, the compactor.

 Alternatively, the slide means may include a pinion that is disposed at the upper cover plate and rotates in conjunction with the connection of the container to, and the separation of the container from, the compactor and a rack having an intermediate portion meshed with the pinion and a lower end portion coupled to the cover member, and the cover member may be caused to slide by moving the rack in the vertical direction via the pinion in conjunction with the connection of the container to, and the separation of the container from, the compactor.

 Alternatively, the slide means may include a pair of

left and right sliders that are disposed at the upper cover plate and move in a width direction in conjunction with the connection of the container to, and the separation of the container from, the compactor and coupling members coupled to the sliders
5 and the cover member, and the cover may be caused to slide via the coupling members by the movement of the sliders in conjunction with the connection of the container to, and the separation of the container from, the compactor.

According to the container of the present invention,
10 the gap can be opened and closed with a simple configuration by simply causing the cover member to slide up and down. Thus, the mechanism necessary for opening and closing at the arrangement becomes simple, and space can be economized. Also, because the cover member can be disposed virtually inside the sub-plate,
15 the outer appearance of the container is good and its design can be improved.

BRIEF DESCRIPTION OF THE DRAWINGS

20 FIG. 1 is a front view showing a container pertaining to an embodiment of the invention;

FIG. 2 is a side view showing a rear portion of the container, and shows a state where the container is disposed in front of a compactor;

25 FIG. 3 is a front view showing the configuration of slide means applied to the embodiment;

FIG. 4 is a side view showing the configuration of the

slide means shown in FIG. 3;

FIGS. 5(a) to 5(c) are diagrams for describing an operation by which a cover member is caused by an automatic operation to move upward and open when connecting the container to the compactor;

FIGS. 6(a) to 6(c) are diagrams for describing the operation by which the cover member is caused by the automatic operation to move upward and open when connecting the container to the compactor;

FIGS. 7(a) to 7(c) are diagrams for describing the operation by which the cover member is caused by the automatic operation to move upward and open when connecting the container to the compactor;

FIGS. 8(a) to 8(c) are diagrams for describing the operation by which the cover member is caused by the automatic operation to move upward and open when connecting the container to the compactor;

FIGS. 9(a) to 9(c) are diagrams for describing the operation by which the cover member is caused by the automatic operation to move upward and open when connecting the container to the compactor;

FIGS. 10(a) to 10(c) are diagrams for describing an operation by which the cover member is caused by a manual operation to move upward and open when connecting the container to the compactor;

FIGS. 11(a) to 11(c) are diagrams for describing the operation by which the cover member is caused by the manual

operation to move upward and open when connecting the container to the compactor;

FIGS. 12(a) to 12(c) are diagrams for describing the operation by which the cover member is caused by the manual
5 operation to move upward and open when connecting the container to the compactor;

FIGS. 13(a) to 13(c) are diagrams for describing the operation by which the cover member is caused by the manual operation to move upward and open when connecting the container
10 to the compactor;

FIGS. 14(a) to 14(c) are diagrams for describing the operation by which the cover member is caused by the manual operation to move upward and open when connecting the container to the compactor;

15 FIG. 15 is a front view showing another configuration of the slide means applied to the embodiment;

FIG. 16 is an enlarged front view showing the configuration of a link mechanism of the slide means shown in FIG. 15;

FIG. 17 is a longitudinal cross-sectional view showing
20 the configuration of the link mechanism shown in FIG. 16;

FIG. 18 is a front view showing yet another configuration and the operation of the slide means, with the left half showing a state where the cover member is closed and the right half showing a state where the cover member is open;

25 FIG. 19 is an enlarged front view showing the configuration of a transmission mechanism of the slide means;

FIG. 20 is a schematic diagram showing the configuration

of a gear group of the transmission mechanism of the slide means;

FIG. 21 is a front view showing yet another configuration, and the operation the slide means; and

5 FIG. 22 is a longitudinal cross-sectional view showing the configuration of the slide means.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

10 An embodiment of the present invention will be described below with reference to the drawings.

FIG. 1 is a front view showing an embodiment of a container 1 of the present invention, and FIG. 2 is a side view of the container 1. The overall configuration of the container 1
15 of the present embodiment is illustrated by these drawings.

The container 1 is a closed-type container whose top surface and peripheral side surfaces are closed. A tailgate 2 is disposed in an opening in a rear end of a container body 11, which rear end becomes the rear side when the container
20 1 is loaded onto a later-described vehicle.

The tailgate 2 is supported, such that it can freely swing, by a pair of left and right support shafts 3 disposed at positions at the upper portion of the rear end of the container 1. A gate 4 is formed in the substantial center of the tailgate
25 2. In the gate 4, a push plate 5 serving as a lower cover plate is disposed below, and a sub-plate 6 serving as an upper cover plate is disposed above the push plate 5. The gate 4

is configured to be closed by the push plate 5 and the sub-plate 6.

The container 1 is configured such that its rear portion may be attached to, and detached from, a conventionally known compactor 100 shown in FIG. 2. The inside of the compactor 100 is disposed with a push-out plate 101 that is reciprocally operated by a hydraulic cylinder. When the container 1 and the compactor 100 are coupled together, garbage tossed in from a hopper 102 disposed in the upper portion of the compactor 100 is pushed out by the push-out plate 101 toward a push-out port 103 in the front end of the compactor 100, and the garbage is compressed and transported, through the gate 4 communicated with the push-out port 103, to the container 1.

Specifically, a hook 104 is disposed in the center of the undersurface of the compactor 100, and the hook 104 is coupled to an unillustrated coupling cylinder. The hook 104 seizes hold of and pulls the container 1, or pushes out the container 1 when the filling of the container 1 with garbage ends.

In this case, the container 1 is configured to move on wheels disposed at the four corners of the bottom portion of the container 1. Thus, the pulling-in, or pushing-out, of the container 1 by the hook 104 of the coupling cylinder can be conducted smoothly.

Then, when the tailgate 2 of the container 1 is connected to the front end of the compactor 100, the push plate 5 engages with the push-out plate 101 of the compactor 100 and the gate

4 and the push-out port 103 of the compactor 100 are communicated with (connected to) each other. Thus, the push plate 5 reciprocally moves between the inside of the compactor 100 and the inside of the container 1 in accompaniment with the reciprocal motion of the push-out plate 101, and the garbage tossed in from the hopper 102 of the compactor 100 is compressed and transported, through the push-out port 103 and the gate 104, by the push plate 5 into the container 1. In other words, the compression and transport of the garbage is conducted substantially by the push plate 5.

A pair of left and right bar members 51 (see FIG. 1), which restrain the push plate 5 in a state where the push plate 5 closes the gate 4, is disposed in the tailgate 2. The bar members 51 are configured such that they can be inserted into, and removed from, the push plate 5 by a pair of telescopic cylinders (not shown) disposed at both the left and right side portions of the compactor 100. Specifically, when the container 1 is connected to the compactor 100, the bar members 51 are removed, and the restrained state of the push plate 5 at the gate 4 is released, by the extension of the telescopic cylinders. Conversely, the bar members 51 are inserted into the push plate 5 from the outside, and the push plate 5 is restrained, by the contraction of the telescopic cylinders.

The sub-plate 6 is for filling in a gap 156 in the upper portion of the gate 4 when the push plate 5 is disposed in the gate 4. Similar to the push plate 5, a pair of left and right bar members 61 (see FIG. 1), which restrain the sub-plate

6 in a state where the sub-plate 6 is closed, is disposed in the upper portion of the gate 4. The bar members 61 are configured such that they can be inserted into, and removed from, the sub-plate 6 by a pair of telescopic cylinders (not shown) disposed at both the left and right side portions of the compactor 100. Specifically, when the container 1 is connected to the compactor 100, the bar members 61 are removed, and the restrained state of the sub-plate 6 at the gate 4 is released, by the extension of the telescopic cylinders. Conversely, the bar members 61 are inserted into the sub-plate 6 from the outside, and the sub-plate 6 is restrained, by the contraction of the telescopic cylinders.

Then, when the container 1 is to be filled with garbage by the push plate 5 as described above, the sub-plate 6 becomes integrally connected to a moving mechanism 105 disposed in the compactor 100 by a hook 151 of the moving mechanism 105, as shown in FIG. 2, and is moved upward by the moving mechanism 105. Thus, a space equal to how much the sub-plate 6 has moved upward arises above the push plate 5, and the inside of the container 1 can be smoothly filled with garbage by the push plate 5 while garbage is prevented by this space from being pinched.

A cover member 7 is disposed, such that it can freely slide up and down, in the tailgate 2. The cover member 7 opens and closes the gap 156 between the push plate 5 and the sub-plate 6 when the push plate 5 and the sub-plate 6 are closed in the gate 4.

The cover member 7 has a lateral width corresponding to the lateral width of the gap 156. As shown in FIG. 4, the cover member 7 includes a plate body 71 whose longitudinal cross section is formed in a substantial "L" shape. The plate body 71 is disposed, such that it can freely slide up and down while being guided by slide rails 72 (see FIG. 1), at the lower end portion of the inner surface side of the sub-plate 6.

An abutment member 73 made of rubber, for example, is disposed continuously along the width direction at the lower end of the plate body 71. The abutment member 73 abuts against the upper end portion of the push plate 5 from above, whereby the gap 156 is closed.

The slide rails 72 are disposed in the vertical direction towards both side portions of the surface of the plate body 71, and are inserted, such that they can freely slide, in guides 75 (see FIG. 5(c)) disposed in the sub-plate 6.

The cover member 7, which is disposed such that it can freely slide up and down in this manner, is configured to be opened and closed by slide means 8 in conjunction with the connection of the container 1 to, and the separation of the container 1 from, the compactor 100.

As shown in FIGS. 3 and 4, the slide means 8 includes a link mechanism comprising upper and lower pairs of link arms 81 and 82 and a link rod 83 that is coupled to the upper and lower link arms 81 and 82 and the plate body 71.

Specifically, the right and left upper link arms 81 are disposed integrally with a shaft 81a that is horizontally

axially supported by the sub-plate 6 via attachment members 6a.

The right and left lower link arms 82 are disposed integrally with shaft 82 that is horizontally axially supported
5 below the shaft 81a via the attachment members 6a.

The upper end portion of the link rod 83 is pivoted on the ends of the upper link arms 81 via a bracket 83a, the intermediate portion of the link rod 83 is pivoted (e.g., pin coupling resulting from long holes) on the end portions of
10 the lower link arms 82 such that it can follow the rotation of the upper link arms 81, and the lower end portion of the link rod 83 is pivoted on the lower end portion of the plate body 71 via a bracket 83b.

The link arms 81 and 82 and the link rod 83 are disposed
15 in the substantial center of the surface of the sub-plate 6.

The slide means 8 also includes an automatic operation rod 91 with which the cover member 7 can be automatically opened and closed in accompaniment with the connection of the container 1 to, and the separation of the container 1 from, the compactor
20 100, and a manual operation rod (manual operation mechanism) 92 with which the cover member 7 can be manually opened and closed.

The automatic operation rod 91 includes activation arms 91a and operation rods 91b. The base end portions of the
25 activation arms 91a are integrally coupled to both ends of the shaft 81a, and the operation rods 91b are disposed at the end portions of the activation arms 91a so as to protrude

horizontally sideways.

The operation rods 91b are configured such that when the container 1 is to be connected to the compactor 100, push members 152 disposed in the moving mechanism 105 of the compactor 100 abut against the operation rods 91b from the front and push them toward the container 1.

Thus, when the container 1 is to be connected to the compactor 100, the push members 152 push the operation rods 91b toward the container 1, the upper link arms 81 are pivoted in the counter-clockwise direction of FIG. 4 around the shaft 81a via the activation arms 91a, and the link rod 83 is moved upward, whereby the cover member 7 is moved upward. When the container 1 is decoupled and separated from the compactor 100, the cover member 7 is moved downward by an operation opposite to the one described above due to the self-weight of the cover member 7 and the like, whereby the gap 156 is closed.

The manual operation rod 92 includes activation arms 92a, operation rods 92b, and coupling arms 92c. The base end portions of the activation arms 92a are integrally coupled to both ends of the shaft 82a, and the operation rods 92b are disposed at the end portions of the activation arms 92a via the coupling arms 92c so as to protrude horizontally sideways.

Long holes 92d (see FIG. 4) are formed in the upper end portions of the coupling arms 92c. The activation arms 92a and the coupling arms 92c are coupled together by pins 92e disposed in the end portions of the activation arms 92a through the long holes 92d. The operation rods 92b are coupled

to the lower end portions of the coupling arms 92c.

A coupling member 94 and a restraining rod 95 are coupled to intermediate portions of the left and right coupling arms 92c. When the manual operation is not to be conducted, the
5 restraining rod 95 is restrained and retained by unillustrated restraining means, whereby the entire manual operation rod 92 is retained in the state shown in FIG. 4.

When the manual operation is to be conducted with the manual operation rod 92, first, the restraint of the restraining
10 rod 95 is released so that the restraining rod 95 is freed. Then, the worker grasps the operation rods 92b and pulls the operation rods 92b downward. Thus, the lower link arms 82 are pivoted in the counter-clockwise direction of FIG. 4 around the shaft 82a via the activation arms 92a, and the link rod
15 83 is moved upward, whereby the cover member 7 is caused to move upward and open. In this case, the restraining rod 95 is retained by a retaining member 96 disposed in the sub-plate 6, whereby the upward movement of the entire manual operation rod 92 is inhibited and the cover member 7 is maintained in
20 its open state. Conversely, when the restraining rod 95 is separated from the retaining member 96, the cover member 7 is caused to move downward by an operation opposite to the one described above due to the self-weight of the cover member 7 and the like, whereby the gap 156 is closed.

25 Although not shown, a restraining mechanism that restrains and retains the tailgate 2 in a closed state and a fixing mechanism that immovably fixes and retains the container

1 connected to the compactor 100 are also disposed.

The container 1 configured in this manner includes an engagement pin (not shown) disposed at the upper portion of the front wall opposite from the tailgate 2. A hook in a handling
5 device of an unillustrated container-handling vehicle engages with the engagement pin, so that the container 1 can be loaded onto the vehicle body by the handling device and conversely unloaded from the vehicle body onto the ground or a arrangement disposed with the compactor 100.

10 By tilting (dumping) the container 1 rearward on the vehicle body with the handling device, the contents (garbage) inside the container 1 can be emptied to the outside due to the opening of the tailgate 2.

Next, the operation when connecting the container 1
15 to, and separating the container 1 from, the compactor 100 will be described in detail centering on the opening and closing of the cover member 7.

First, a case where the cover member 7 is automatically opened and closed by the automatic operation when the container
20 1 is to be connected to, and separated from, the compactor 100 will be described with reference to FIGS. 5 to 9. FIGS. 5(a), 6(a), 7(a), 8(a) and 9(a) are cross-sectional views along line A-A of FIG. 1, FIGS. 5(b), 6(b), 7(b), 8(b) and 9(b) are cross-sectional views along line B-B of FIG. 1, and FIGS. 5(c),
25 6(c), 7(c), 8(c) and 9(c) are cross-sectional views along line C-C of FIG. 1.

When the container 1 is lowered from the vehicle in

front of the compactor 100 in the arrangement, the container 1 is pulled toward the compactor 100 by the hook 104 of the coupling cylinder as previously described. Thus, the push members 152 of the moving mechanism 105 of the compactor 100 gradually approach the automatic operation rod 91 of the container 1 (see FIGS. 5).

Next, when the container 1 further approaches the compactor 100, first, the push members 152 abut against the operation rods 91b of the automatic operation rod 91. Thus, the push members 152 push the operation rods 91b. As a result, the upper link arms 81 are pivoted in the counter-clockwise direction around the shaft 81a via the activation arms 91a, and the link rod 83 moves upward, whereby the cover member 7 gradually moves upward (see FIGS. 6 to 8).

In this case, the operation rods 91b move upward while sliding on inclined surfaces 153 formed on the end portions of the push members 152.

Then, as shown in FIGS. 9, the operation rods 91b move from the inclined surfaces 153 of the push members 152 until they reach positions on the upper surfaces of the push members 152, whereby the upper link arms 81 similarly pivot upward and the cover member 7 is caused to move fully upward with respect to the sub-plate 6 via the link rod 83. As described above, when the upper link arms 81 pivot upward, the lower link arms 82 follow this and pivot upward. In other words, in the automatic operation, it is the upper link arms 81 that mainly contribute to the upward movement of the cover member

7 via the link rod 83. Even if the lower link arms 82 pivot in this state, because the activation arms 92a are pin-coupled to the lower link arms 82 through the long holes 92d, there is no adverse affect on the manual operation rod 92 by the
5 action of the long holes.

In the state where the cover member 7 has been moved fully upward in this manner, the sub-plate 6 becomes coupled to the moving mechanism 105 and the container 1 becomes connected to the compactor 100.

10 In the case where the container 1 separates and disengages from the compactor 100, when the container 1 gradually separates from the compactor 100, the push members 152 move in the direction where they separate from the operation rods 91b by the action of the self-weight of the cover member 7 and the like, whereby
15 the upper link arms 81 pivot in the clockwise direction and the link rod 83 moves downward by an operation opposite to the one described above by the action of the self-weight of the cover member 7 and the like. Thus, the cover member 7 gradually moves downward with respect to the sub-plate 6. Then,
20 in the state where the container 1 is fully separated from the compactor 100 and the push plate 5 and the sub-plate 6 are disposed above and below the gate 4 of the tailgate 2, the gap 156 between the push plate 5 and the sub-plate 6 is closed. In other words, the cover member 7 moves downward
25 until the abutment member 73 at the lower end of the cover member 7 abuts against the upper end of the push plate 5, and the gap 156 is closed.

Thus, the container 1 is transported in a state where the gap 156 is closed by the cover member 7, and the garbage can be prevented from leaking to the outside through the gap 156.

5 Next, a case where the cover member 7 is opened and closed by the manual operation when the container 1 is to be connected to, and separated from, the compactor 100 will be described with reference to FIGS. 10 to 14. FIGS. 10(a), 11(a), 12(a), 13(a) and 14(a) are cross-sectional views along line
10 A-A of FIG. 1, FIGS. 10(b), 11(b), 12(b), 13(b) and 14(b) are cross-sectional views along line B-B of FIG. 1, and FIGS. 10(c), 11(c), 12(c), 13(c) and 14(c) are cross-sectional views along line C-C of FIG. 1.

When the container 1 is lowered from the vehicle in
15 front of the compactor 100 in the arrangement, the restraining rod 95 of the manual operation rod 92 is detached from the restraining means and the restraint thereof is released from the state where the gap 156 shown in FIGS. 10 is closed (see FIGS. 11).

20 In this state, the worker grasps the operation rods 92b and pulls the operation rods 92b downward so as to pull the coupling arms 92c downward, whereby the lower link arms 82 are pivoted in the counter-clockwise direction around the shaft 82a via the activation arms 92a. Thus, the link rod
25 83 moves upward and the cover member 7 gradually moves upward (see FIGS. 12).

Then, the worker further pulls the operation rods 92b

downward, so that the cover member 7 is moved fully upward
as shown in FIGS. 13, and the restraining rod 95 becomes retained
by the retaining member 96 in this state. Thus, the upward
movement of the entire manual operation rod 92 is inhibited
5 and the cover member 7 is retained in this state (see FIGS.
14).

As described above, when the lower link arms 82 pivot
upward, the upper link arms 81 follow this and pivot upward.
In other words, in the manual operation, it is the lower link
10 arms 82 that mainly contribute to the upward movement of the
cover member 7 via the link rod 83.

Thereafter, the container 1 is connected to the compactor
100 and the container 1 is filled with garbage.

When the filling of the container 1 with garbage ends
15 and the container 1 is to be disengaged from the compactor
100, the worker releases the retention of the restraining rod
95 by the retaining member 96, whereby the lower link arms
82 pivot in the clockwise direction and the link rod 83 moves
downward by an operation opposite to the one described above
20 by the action of the self-weight of the cover member 7 and
the like. Thus, the cover member 7 moves downward with respect
to the sub-plate 6 and abuts against the upper end of the push
plate 5, whereby the gap 156 is closed.

Thus, the container 1 is transported in a state where
25 the gap 156 is closed by the cover member 7, and the garbage
can be prevented from leaking to the outside through the gap
156.

An urging member such as a spring may be disposed between the sub-plate 6 and the link mechanism in order to urge the cover member 7 downward. The urging force of the urging member also causes the cover member 7 to move downward so that the
5 cover member 7 can be more reliably closed.

In this manner, because the gap 156 can be opened and closed with a simple configuration by simply causing the cover member 7 to slide up and down via the slide means 8, the mechanism needed for the opening and closing in the arrangement becomes
10 simple. Thus, space can be economized. Also, because the cover member 7 is disposed virtually inside the sub-plate 6, the outer appearance of the container 1 is good and its design can be improved.

Also, the cover member 7 can be opened and closed by
15 the automatic operation accompanying the connection of the container 1 to, and the separation of the container 1 from, the compactor 100, the workability is good, and the manual operation can also be conducted though operation by the worker is necessary. Thus, the container 1 can be connected to an
20 existing compactor 100, which is convenient.

FIG. 15 shows the configuration of other slide means. The same reference numerals will be given to members that are the same as those in the previously described container 1, and description of those same members will be omitted.

25 The slide means 10 includes a linear member 120 stretched between the sub-plate 6 and the cover member 7 via plural winding members 110 disposed at the sub-plate 6 and the cover member

7. The cover member 7 is caused to slide by the pulling-in of the linear member 120 from the cover member 7 side toward the sub-plate 6 side and the unreeling of the linear member 120 from the sub-plate 6 side toward the cover member 7 side
5 in conjunction with the connection of the container 1 to, and the separation of the container 1 from, the compactor 100.

Specifically, pulleys or sprockets are used as the winding members 110. A wire is used as the linear member 120 when the winding members 110 are pulleys, and a chain is used as
10 the linear member 120 when the winding members 110 are sprockets.

One end of the linear member 120 is attached to the lower end in the substantial center of the sub-plate 6, the intermediate portion of the linear member 120 is stretched as described below by the plural winding members 110, and the
15 other end of the linear member 120 is attached to the lower end of one end portion (the left-side portion in FIG. 15) of the sub-plate 6.

The winding members 110 comprise five members at the sub-plate 6 and two members at the cover member 7, for a total
20 of seven members, and are rotatably disposed. Specifically, a first winding member 111 is disposed in the substantial center of the sub-plate 6 via a link mechanism 130, fourth and seventh winding members 114 and 117 are disposed at the left and right sides of the sub-plate 6 at positions slightly higher than
25 the first winding member 111, and second and third winding members 112 and 113 are disposed at the left and right sides between the first winding member 111 and the fourth winding

member 114 and at positions slightly lower than the first and fourth winding members 111 and 114.

Fifth and sixth winding members 115 and 116 are disposed at the cover member 7 at both side portions below the fourth
5 and seventh winding members 114 and 117.

The linear member 120 is guided upward from one end side, wound around the first winding member 111, folded downward, guided sideways by the second winding member 112, guided upward by the third winding member 113, wound around the fourth winding
10 member 114, folded downward, guided to the opposite side by the fifth winding member 115, guided upward by the sixth winding member 116, and folded downward by the seventh winding member 117. The other end of the linear member 120 is attached to the sub-plate 6.

15 As shown in FIGS. 16 and 17, the link mechanism 130 includes upper and lower pairs of link arms 131 and 132 and coupling links 133 coupled between the end portions of the upper and lower link arms 131 and 132.

Specifically, the right and left upper link arms 131
20 are disposed integrally with a shaft 131a that is horizontally axially supported by the sub-plate 6 via attachment members 6a.

The right and left lower link arms 132 are disposed integrally with a shaft 132a that is horizontally axially
25 supported below the shaft 131a via attachment members 6a.

The upper end portions of the coupling links 133 are pivoted by a pin 133a on the ends of the upper link arms 131,

and the lower end portions of the coupling links 133 are pivoted by a pin 133b on the end portions of the lower link arms 132, such that the two left and right coupling links 133 are disposed parallel to each other.

5 The link arms 131 and 132 and the coupling links 133 are disposed in the substantial center of the surface of the sub-plate 6, and the first winding member 111 is disposed at the coupling links 133 via an attachment plate 134 (see FIG. 16). Specifically, the attachment plate 134 is disposed between
10 the left and right coupling links 133, and the first winding member 111 is rotatably supported by the attachment plate 134.

 The link mechanism 130 configured in this manner is disposed with activation means 135 for automatically opening and closing the cover member 7 in accompaniment with the connection
15 of the container 1 to, and the separation of the container 1 from, the compactor 100.

 The activation means 135 includes activation arms 136 and operation rods 137. The base end portions of the activation arms 136 are integrally coupled to both ends of the shaft 131a,
20 and the operation rods 137 are disposed at the end portions of the activation arms 136 so as to protrude horizontally sideways.

 The operation rods 137 are configured such that when the container 1 is to be connected to the compactor 100 in the same manner as previously described, push members 152 disposed
25 in the moving mechanism 105 of the compactor 100 abut against the operation rods 137 from the front and push them toward the container 1 (see FIG. 2).

The link mechanism 130 is also disposed with urging members for smoothly closing the cover member 7. Specifically, springs 138 (urging members) are coupled to the sub-plate 6 and to ends of attachment arms 139, which are integrally coupled to both ends of the shaft 132a and extend in the same direction as the lower link arms 132.

Reference numerals 75a shown in FIG. 15 are slide pads disposed on the guides 75. The slide pads 75a allow the slide rails 72 of the cover member 7 to slide smoothly with respect to the guides 75.

Thus, when the container 1 is to be connected to the compactor 100, the push members 152 push the operation rods 137 toward the container 1, the upper link arms 131 are pivoted in the counter-clockwise direction of FIG. 17 around the shaft 131a via the activation arms 136, and the coupling links 133 are moved upward, whereby the first winding member 111 is moved upward via the attachment plate 134. Due to the upward movement of the first winding member 111, the linear member 120 is pulled from the cover member 7 side toward the first winding member 111 side, and in accompaniment with this, the cover member 7 is caused to move upward counter to the urging force of the springs 138 and open.

When the container 1 is decoupled and separated from the compactor 100, the first winding member 111 is moved downward by the self-weight of the cover member 7 and the like and by the urging force of the springs 138. Then, in accompaniment with the downward movement of the first winding member 111,

the linear member 120 is unreeled from the first winding member 111 side toward the cover member 7 side. Thus, the cover member 7 moves downward and closes the gap 156.

In this manner, because the gap 156 can be opened and closed with a simple configuration by simply causing the cover member 7 to slide up and down via the slide means 10, the mechanism needed for the opening and closing in the arrangement becomes simple. Thus, space can be economized. Also, because the cover member 7 is disposed virtually inside the sub-plate 6, the outer appearance of the container 1 is good and its design can be improved.

FIG. 18 shows the configuration of other slide means. The same reference numerals will be given to members that are the same as those in the previously described container 1, and description of those same members will be omitted.

The slide means 20 includes a pinion 210 and a rack 220. The pinion 210 is disposed at the sub-plate 6 and rotates in conjunction with the connection of the container 1 to, and the separation of the container 1 from, the compactor 100. The intermediate portion of the rack 220 is meshed with the pinion 210, and the lower end portion of the rack 220 is coupled to the cover member 7. The rack 220 is moved in the vertical direction via the pinion 210 in conjunction with the connection of the container 1 to, and the separation of the container 1 from, the compactor 100, whereby the cover member 7 is caused to slide.

Specifically, the pinion 210 is configured to rotate

via a transmission mechanism 230 in accompaniment with the connection of the container 1 to, and the separation of the container 1 from, the compactor 100.

As shown in FIG. 19, the transmission mechanism 230 includes a gear group 240 and activation means 250 for causing the gear group 240 to rotate to automatically open and close the cover member 7 in accompaniment with the connection and separation of the container 1.

As shown in FIGS. 19 and 20, the gear group 240 comprises four large and small gears 241, 242, 243 and 244, and adjacent gears mesh with each other. The uppermost gear 241 is integrally disposed on the intermediate portion of a shaft 245 horizontally axially supported by the sub-plate 6 via attachment members 6a, and the lowermost gear 244 is meshed with the pinion 210.

The gear 243 comprises a small diameter portion 243a and a large diameter portion 243b that are integrally formed. The gear 242 is meshed with the small diameter portion 243a, and the gear 244 is meshed with the large diameter portion 243b.

The following pitch diameters are used for the gears 241 to 244 and the pinion 210. The pitch diameter of the gear 241 is $\Phi 50$, the pitch diameter of the gear 242 is $\Phi 15$, the pitch diameter of the small diameter portion 243a of the gear 243 is $\Phi 15$, the pitch diameter of the large diameter portion 243b of the gear 243 is $\Phi 32$, the pitch diameter of the gear 244 is $\Phi 15$, and the pitch diameter of the pinion 210 is $\Phi 60$. Thus, the speed can be nearly doubled. These pitch diameters

are merely examples and may be appropriately set in accordance with the stroke and the like necessary for opening and closing the cover member 7.

5 The activation means 250 includes activation arms 251 and operation rods 252. The base end portions of the activation arms 251 are integrally coupled to both ends of the shaft 245, and the operation rods 252 are disposed at the end portions of the activation arms 251 so as to protrude horizontally sideways.

10 The operation rods 252 are configured such that when the container 1 is to be connected to the compactor 100 in the same manner as described previously, push members 152 disposed in the moving mechanism 105 of the compactor 100 abut against the operation rods 252 from the front and push them toward the container 1 (see FIG. 2).

15 Also, the lower end portion of the rack 220 is fixed to the cover member 7 so that the rack 220 is moved in the vertical direction along the surface of the sub-plate 6 by the rotation of the pinion 210.

20 Thus, when the container 1 is to be connected to the compactor 100, the push members 152 push the operation rods 252 toward the container 1 and the shaft 245 is rotated in the counter-clockwise direction of FIG. 20 via the activation arms 251, whereby the pinion 210 is similarly rotated in the counter-clockwise direction of FIG. 20 through the gear group 240. As a result, the rack 220 moves upward, and the cover member 7 is caused to move upward by the movement of the rack 220 and open.

Also, when the container 1 is decoupled and separated from the compactor 100, the pinion 210 is rotated in the clockwise direction of FIG. 20 by the self-weight of the cover member 7 and the like, and the rack 220 is moved downward, whereby
5 the cover member 7 is caused to move downward and close the gap 156.

An urging member such as a spring may be disposed between the sub-plate 6 and the rack 220 in order to urge the cover member 7 downward. The urging force of the urging member also
10 causes the cover member 7 to move downward so that the cover member 7 can be more reliably closed.

In this manner, because the gap 156 can be opened and closed with a simple configuration by simply causing the cover member 7 to slide up and down via the slide means 20, the mechanism
15 needed for the opening and closing in the arrangement becomes simple. Thus, space can be economized. Also, because the cover member 7 is disposed virtually inside the sub-plate 6, the outer appearance of the container 1 is good and its design can be improved.

20 FIG. 21 shows the configuration of still other slide means. The same reference numerals will be given to members that are the same as those in the previously described container 1, and description of those same members will be omitted.

The slide means 30 includes a pair of left and right
25 sliders 310 and coupling members 320. The sliders 310 are disposed at the sub-plate 6 and move in the width direction in conjunction with the connection of the container 1 to, and

the separation of the container 1 from, the compactor 100.
The coupling members 320 are coupled to the sliders 310 and
the cover member 7. The cover member 7 is caused to slide
via the coupling members 320 by the movement of the sliders
5 310 in conjunction with the connection of the container 1 to,
and the separation of the container 1 from, the compactor 100.

Specifically, the sliders 310 are disposed as a pair
somewhat at the left and right sides of the upper portion of
the sub-plate 6, and each includes a pair of slide rails 311
10 disposed above and below parallel to each other along the width
direction and a slider body 312 disposed so as to be slidable
along the slide rails 311.

The left and right slider bodies 312 are configured
to synchronously slide in opposite directions with a
15 synchronizing link 313. The synchronizing link 313 is
configured by a pivot link 313a, which is pivotably supported
at a width-direction center portion of the sub-plate 6, and
coupling links 313b, which are coupled to both ends of the
pivot link 313a and the slider bodies 312.

20 The left and right slider bodies 312 that synchronously
slide in the width direction in this manner are coupled to
the cover member 7 via coupling members 320 such as rods.
Specifically, the end portions of the coupling members 320
are pivoted on the width-direction center portion of the cover
25 member 7, and the base end portions of the coupling members
320 are pivoted on bilaterally symmetrical positions of the
slider bodies 312.

Also, each of the slider bodies 312 is disposed with activation means 330 for causing the slider bodies 312 to slide and automatically open and close the cover member 7 in conjunction with the connection of the container 1 to, and the separation
5 of the container 1 from, the compactor 100.

As shown in FIGS. 21 and 22, the activation means 330 is configured by a roller 332 that is vertically axially supported by the slider body 312 via a bracket 331 in a state where it protrudes frontward.

10 When the container 1 is to be connected to the compactor 100, the rollers 332 are pushed sideways of the container 1 by activation members 154 disposed in the moving mechanism 105 (see FIG. 2) of the compactor 100 and represented by the two-dot chain lines in FIG. 21. In other words, the outer
15 surfaces of the end portions of the activation members 154 are formed as inclined surfaces (not shown). When the end portions of the activation members 154 approach the container 1 and abut against the roller 332, the rollers 332 are pushed outward by the action of the inclined surfaces, whereby the
20 sliders 310 are caused to slide sideways.

Thus, when the container 1 is to be connected to the compactor 100, the activation members 154 push the rollers 332 sideways of the container 1. Thus, the sliders 310 synchronously slide sideways in opposite directions and cause
25 the cover member 7 to open via the coupling members 320.

Also, when the container 1 is decoupled and separated from the compactor 100, the sliders 310 move inward due to

the self-weight of the cover member 7 and the like, whereby the cover member 7 is caused to move downward and close the gap 156.

5 An urging member such as a spring may be disposed between the sub-plate 6 and the sliders 310 in order to urge the cover member 7 downward. The urging force of the urging member also causes the cover member 7 to move downward so that the cover member 7 can be more reliably closed.

10 In this manner, because the gap 156 can be opened and closed with a simple configuration by simply causing the cover member 7 to slide up and down via the slide means 30, the mechanism needed for the opening and closing in the arrangement becomes simple. Thus, space can be economized. Also, because the cover member 7 is disposed virtually inside the sub-plate 6, the
15 outer appearance of the container 1 is good and its design can be improved.

The present invention can be implemented in a variety of other ways without departing from the spirit or salient characteristics thereof. Thus, the description set forth in
20 the preceding embodiment is not intended to be exhaustive or to limit the invention. It is intended that the scope of the invention be defined by the following claims and is in no way restricted to the body of the specification. All modifications and alterations belonging to an equivalent scope of the claims
25 are also within the scope of the invention.

CLAIMS

What is claimed is:

1. A container having a rear wall disposed, such that it can be freely opened and closed, in an opening at a rear end of a container body, the rear wall formed with a gate that connects to a push-out port of a compactor, the gate disposed such that it can be closed by an upper cover plate and a lower cover plate, and with the gate and the push-out port connected to each other, the upper cover plate being caused to move upward by a moving mechanism disposed in the compactor while the lower cover plate becomes coupled to a push-out plate disposed inside the compactor, and garbage inside the compactor being compressed and transported, through the push-out port and via the gate, to the container by the reciprocal motion of the push-out plate,

wherein the upper cover plate is provided with a cover member that slides up and down with respect to the upper cover plate to open and close a gap between the upper cover plate and the lower cover plate.

2. The container according to claim 1, wherein the cover member is configured to open and close the gap by slide means activated in conjunction with the connection of the container to, and the separation of the container from, the compactor.

3. The container according to claim 2, wherein the slide means includes a link mechanism activated in conjunction with the connection of the container to, and the separation of the container from, the compactor.

4. The container according to claim 2 or 3, wherein the slide means includes a manual operation mechanism with which the cover member can be manually opened and closed.

5. The container according to claim 2, wherein the slide means includes a linear member stretched between the upper cover plate and the cover member via plural winding members disposed at the upper cover plate and the cover member, and

wherein the cover member is caused to slide by the pulling-in of the linear member from the cover member side toward the upper cover plate side and the unreeling of the linear member from the upper cover plate side toward the cover member side in conjunction with the connection of the container to, and the separation of the container from, the compactor.

6. The container according to claim 2, wherein the slide means includes a pinion that is disposed at the upper cover plate and rotates in conjunction with the connection of the container to, and the separation of the container from, the compactor and a rack having an intermediate portion meshed with the pinion and a lower end portion coupled to the cover member, and

wherein the cover member is caused to slide by moving the rack in the vertical direction via the pinion in conjunction with the connection of the container to, and the separation of the container from, the compactor.

7. The container according to claim 2, wherein the slide means includes a pair of left and right sliders that are disposed at the upper cover plate and move in a width direction in conjunction with the connection of the container to, and the separation of the container from, the compactor and coupling members coupled to the sliders and the cover member, and

wherein the cover is caused to slide via the coupling members by the movement of the sliders in conjunction with

the connection of the container to, and the separation of the container from, the compactor.

8. A container having a rear wall disposed, such that it can be freely opened and closed, in an opening at a rear end of a container body, the rear wall formed with a gate that connects to a push-out port of a compactor, the gate disposed such that it can be closed by an upper cover plate and a lower cover plate, and with the gate and the push-out port connected to each other, the upper cover plate being caused to move upward by a moving mechanism disposed in the compactor while the lower cover plate becomes coupled to a push-out plate disposed inside the compactor, and garbage inside the compactor being compressed and transported, through the push-out port and via the gate, to the container by the reciprocal motion of the push-out plate,

wherein the upper cover plate is provided with a cover member that slides up and down with respect to the upper cover plate to open and close a gap between the upper cover plate and the lower plate, and a manual operation mechanism with which the cover member can be manually opened and closed is provided.