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(54) Refuse collection vehicle

(57) A bin-deposited-refuse collection vehicle (1) presenting a body (5) in turn presenting a loading opening (6); and a loading device (8) for moving the bin (2) to and from the loading opening (6), and in turn presenting a connecting member (11) for automatically engaging the bin (2); the loading device (8) being located at a longitudinal end of the body (5); and the connecting member (11) being movable, in relation to the body (5), between two limit lateral loading positions on opposite sides of the vertical plane through the longitudinal axis (4) of the vehicle (1).

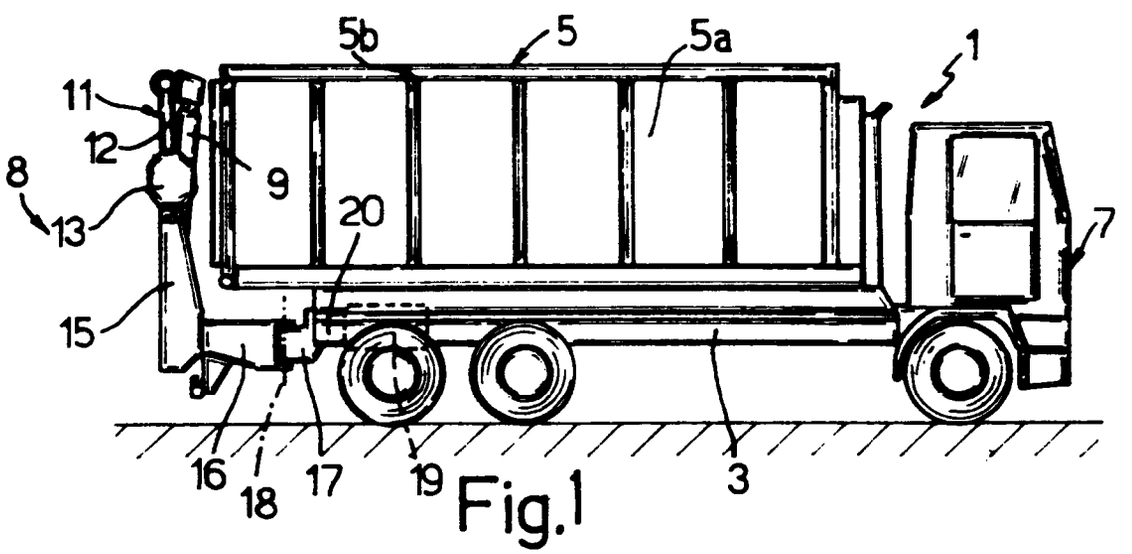

Fig.1

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Description

The present invention relates to a bin-deposited-refuse collection vehicle.

More specifically, the present invention relates to a vehicle comprising a body; a frame supporting the body; and a loading device for automatically picking up the full bins at a loading area and moving them to and from an opening in the body.

As described, for example, in Italian Patent Application n. TO91A000223 filed on 29 March, 1991, the loading device comprises a preferably telescopic arm, one end of which is connected to the frame so as to rotate in relation to the body, and the opposite end of which is fitted with a gripping member movable in relation to the arm and which automatically engages the bin.

On known vehicles, the arm is connected to a substantially mid portion of the frame so as to rotate about a vertical axis, and projects from a longitudinal lateral wall of the body.

Known vehicles of the above type present several drawbacks, all due to the location of the automatic loading device in relation to the body. Despite the arm rotating about a vertical axis, and presenting a telescopic portion enabling pickup over a relatively long distance from the vehicle, the arm provides solely for picking up the bins on one side of the body. To pick up those located, for example, on the opposite side of the body, the vehicle must be maneuvered and reversed accordingly, which is not only impossible in many cases, but invariably involves a good deal of difficulty, especially when operating in confined spaces, as in city centers.

Other vehicles are known in which the loading device comprises an arm connected to the frame so as to rotate about a horizontal axis; and the free end of the arm is fitted with a gripping member rotatable in relation to the arm into a number of loading positions between two limit positions at substantially 90° to each other: a front loading position, i.e. facing the front surface of the vehicle cab; and a lateral loading position facing a lateral surface of the vehicle cab.

Though widely used, devices of the above type only provide for picking up the bins facing the front surface and one lateral surface of the cab, and not those facing the opposite lateral surface of the cab.

It is an object of the present invention to provide a refuse collection vehicle designed to overcome the aforementioned drawbacks in a straightforward and, at the same time, low-cost manner.

According to the present invention, there is provided a bin-deposited-refuse collection vehicle presenting a longitudinal axis, and comprising a body with a loading opening; and a loading device for moving the bin to and from the loading opening, and in turn comprising a connecting member for positively engaging the bin; characterized in that said connecting member is movable in relation to the body between two limit lateral loading positions on opposite sides of the vertical plane through said longitudinal axis.

The body of the above vehicle is preferably defined laterally by two longitudinal surfaces on opposite sides of said longitudinal axis; and said two limit loading positions are located on opposite sides of the vehicle and substantially outwards of the respective planes of said longitudinal surfaces of the body.

A number of non-limiting embodiments of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a side view of a first preferred embodiment of the vehicle according to the present invention;

Figure 2 shows a top plan view of the Figure 1 vehicle;

Figures 3 and 4 show side views of a Figure 1 detail in two different operating positions;

Figures 5 to 7 show plan views of the Figure 3 and 4 detail in three different operating positions;

Figure 8 shows a side view of a second preferred embodiment of the vehicle according to the present invention;

Figure 9 shows a top plan view of the Figure 8 vehicle;

Figure 10 shows a side view of a third preferred embodiment of the vehicle according to the present invention;

Figure 11 shows a front view of the Figure 10 vehicle.

Number 1 in Figures 1 and 2 indicates a vehicle for collecting solid urban refuse deposited in bins 2.

Vehicle 1 comprises an elongated frame 3 with a longitudinal axis 4 coincident with the longitudinal axis of the vehicle; and a body 5 supported by and connected releasably to frame 3, and in turn comprising a top loading opening 6 (Figure 2), and two longitudinal walls 5a located on either side of axis 4 and defined outwardly by respective substantially flat surfaces 5b parallel to each other.

Vehicle 1 also comprises a cab 7; and a known loading device 8 connected to frame 3, and which provides for positively and automatically engaging bin 2 and moving it to and from opening 6.

More specifically, loading device 8 - described in Italian Patent Application n. TO91A000223 filed on 29 March, 1991, and to which full reference is made herein in the interest of full disclosure - comprises a telescopic arm 9, and a fork 11 fitted to one end of arm 9. In actual use, fork 11 provides for enclosing bin 2, and comprises two arms 12, each terminating with a respective known connecting assembly 13 which, again in actual use, provides for positively and automatically engaging a respective known connecting element (not shown) on bin 2. Arms 12 are operated by a known drive assembly 14 for varying the distance between arms 12, and also the angular position of arms 12 in relation to arm 9 and about an axis perpendicular to arms 12.

As shown in Figures 1 and 2, the opposite end of arm 9 to that fitted with fork 11 is hinged to an upright 15 in relation to which it rotates about a horizontal axis.

Upright 15 is located at the opposite longitudinal end of body 5 to cab 7, and forms part of device 8, which also comprises a first and second elongated body 16, 17. Body 16 presents one end connected integral with upright 15, and the opposite end hinged to one end of body 17 by a vertical hinge pin presenting an axis 18.

The end portion of body 17 opposite that hinged to body 16 defines a slide 17a fitted in axially-sliding manner to a guide 19 connected integral with the rear end portion 20 of frame 3 along axis 4. Slide 17a is movable in relation to guide 19 between a withdrawn position (shown in Figures 1 to 4) wherein upright 15 is maintained facing the rear wall of body 5, and a forward position (shown in Figure 5 and 6) permitting upright 15 to be rotated about axis 18 into a position facing a longitudinal lateral wall of body 5 (Figures 6 and 7).

In actual use, with slide 17a in the forward position, and by rotating upright 15 about axis 18 and varying the length of arm 9, fork 11 may be set to a number of pickup positions within a circular sector with its center at axis 18 and located symmetrically in relation to the vertical plane through axis 4. In other words, in actual use, fork 11 may be set to a number of loading positions between two limit lateral loading positions separated by an angle of substantially 180°, and located on either side of the vertical plane through axis 4 and, more specifically, outwards of respective, in this case vertical, planes P, each containing a respective surface 5b. As such, any bins 2 about the rear portion of vehicle 1 may be picked up without moving the vehicle.

When fork 11 is set to either one of the limit lateral positions, slide 17a may be restored to the withdrawn position, to move device 8 away from the rear end of body 5, and enable body 5 to be engaged and detached in known manner from frame 3.

The Figure 8 and 9 embodiment relates to a vehicle 22 similar to vehicle 1, and the component parts of which are indicated wherever possible using the same numbering system.

Vehicle 22 differs from vehicle 1 by comprising a low-mounted cab 23; and a body 24 presenting a narrower front portion 25 projecting partly over cab 23 and in turn presenting a top loading opening 26.

Vehicle 22 also differs from vehicle 1 by comprising a loading device 27 connected to a portion 20a of frame 3 located between portion 25 of body 24 and cab 23, and which differs from loading device 8 by comprising an upright 28 extending upwards from frame 3, substantially from the same supporting surface as body 24, and hinged directly to frame 3 by a known hinge assembly 29 enabling upright 28 to rotate in relation to body 24 about a vertical axis 30. The telescopic arm 9 of device 27 is hinged to one end of a beam 31 extending above the roof of cab 23, and the opposite end of which is connected integral with upright 28.

In actual use, by rotating upright 28 about axis 30, fork 11 may be set to a number of loading positions between two limit lateral loading positions (not shown) separated by an angle of over 180°, and each located outwards of a respective plane P; and the particular design of body 24 enables fork 11 to be set, in addition to a front unloading position, also to two different lateral unloading positions facing each other (Figure 9).

The Figure 10 and 11 embodiment relates to a vehicle 32 similar to vehicle 22, and the component parts of which are indicated wherever possible using the same numbering system.

Vehicle 32 differs from vehicle 22 by comprising a low-mounted cab 33 of such a width as to extend entirely on one side of the vertical plane through axis 4; by comprising a body similar to body 5; and by upright 28 being located adjacent to cab 33, and more specifically on the opposite side of said vertical plane to cab 33, and being hinged to frame 3 so as to rotate, in relation to frame 3, about a vertical axis 34. In this embodiment also, in actual use, fork 11 is movable between two limit lateral loading positions, each outwards of a respective plane P.

The design of loading devices 8 and 27, and the arrangement of them in relation to respective bodies 5 and 24, therefore provide not only for greatly simplifying but also for speeding up pickup of bins 2, by enabling all the bins along the route of the vehicle to be picked up, regardless of whether they are on one side or the other of the vehicle.

Unlike known solutions, therefore, bins 2 may be engaged and lifted with no need for reversing or complicated maneuvering of the vehicle, and may be emptied into the body with very little maneuvering of the fork and, hence, the bin itself.

Clearly, changes may be made to vehicles 1, 22, 32 as described and illustrated herein without, however, departing from the scope of the present invention. In particular, the loading devices may present bin engaging members and relative operating arms other than those described, providing the loading devices enable pickup of all the bins in the vicinity of the vehicle, and more specifically of all the bins on both longitudinal sides of the vehicle.

Claims

1. A bin-deposited-refuse collection vehicle (1; 22; 32) presenting a longitudinal axis (4), and comprising a body (5; 24) with a loading opening (6; 26); and a loading device (8; 27) for moving the bin (2) to and from the loading opening (6; 26), and in turn comprising a connecting member (11) for positively engaging the bin (2); characterized in that said connecting member (11) is movable in relation to the body (5: 24) between two limit lateral loading positions on opposite sides of the vertical plane through said longitudinal axis (4).

2. A vehicle as claimed in Claim 1, characterized in that said body (5; 24) is defined laterally by two longitudinal surfaces (5b) on opposite sides of said longitudinal axis (4); and said two limit lateral loading positions are located on opposite sides of the vehicle (1; 22; 32) and substantially outwards of respective planes (P) containing said longitudinal surfaces (5b) of the body (5; 24).

3. A vehicle as claimed in Claim 1 or 2, characterized in that it comprises a structure (3) for supporting the body (5; 24); and said connecting member is fitted to said supporting structure (3), and is rotatable in relation to the body (5; 24) about an axis (18; 28; 34) crosswise to said longitudinal axis (4).

4. A vehicle as claimed in Claim 3, characterized in that said crosswise axis (18; 28; 34) is perpendicular to said longitudinal axis (4).

5. A vehicle as claimed in Claim 3 or 4, characterized in that said loading device (8; 27) is located at a longitudinal end of said body (5; 24), and is connected to a longitudinal end portion (20; 20a) of said supporting structure (3).

6. A vehicle as claimed in Claim 5, characterized in that it comprises a cab (7); and said loading device (8) is located at the opposite end of said body (5) to said cab (7).

7. A vehicle as claimed in Claim 6, characterized in that it comprises connecting means (17a, 19) for connecting said loading device (8) to said supporting structure (3); said connecting means comprising a guide (19) fitted to said supporting structure (3), and a slide (17a) fitted to said guide (19) so as to slide in relation to the supporting structure (3); said loading device (8) being connected to said slide (17a).

8. A vehicle as claimed in any one of the foregoing Claims from 3 to 5, characterized in that it comprises a cab (23); and said loading device (27) is connected to an end portion of said supporting structure (3) extending between said cab (23) and said body (5).

9. A vehicle as claimed in one of the foregoing Claims from 3 to 5, characterized in that it comprises a cab (33); and said loading device (27) is located to the side of said cab (33).

10. A vehicle as claimed in Claim 9, characterized in that, in relation to said cab (33), said loading device (27) is located substantially on the opposite side of the vertical plane through said longitudinal axis (4).

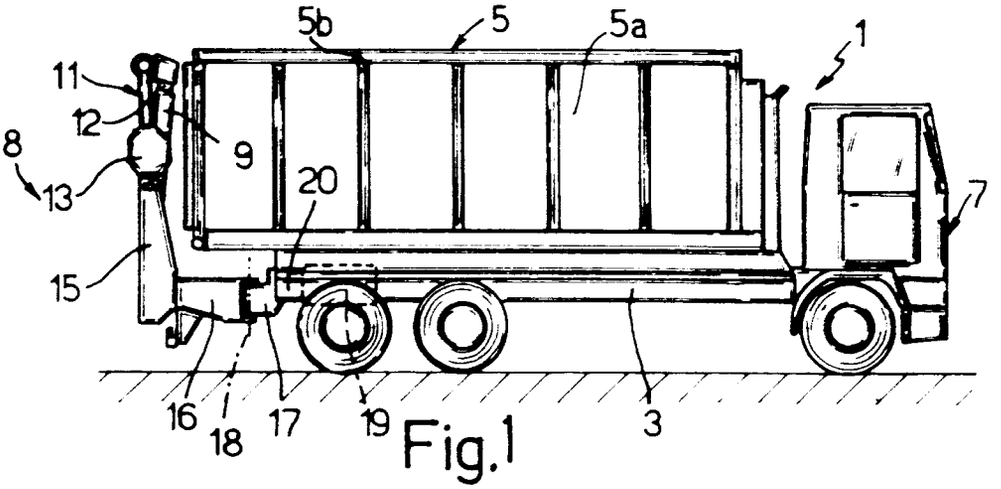

Fig.1

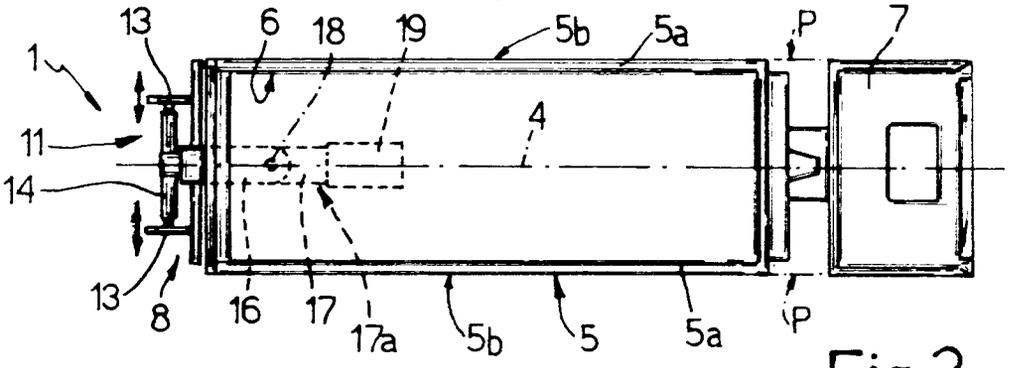

Fig.2

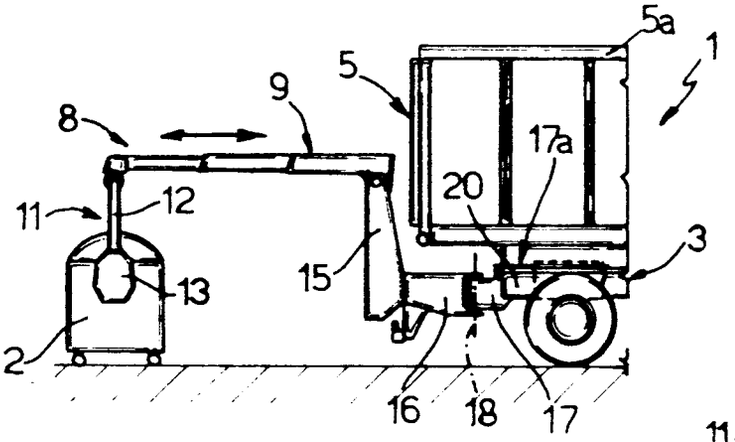

Fig.3

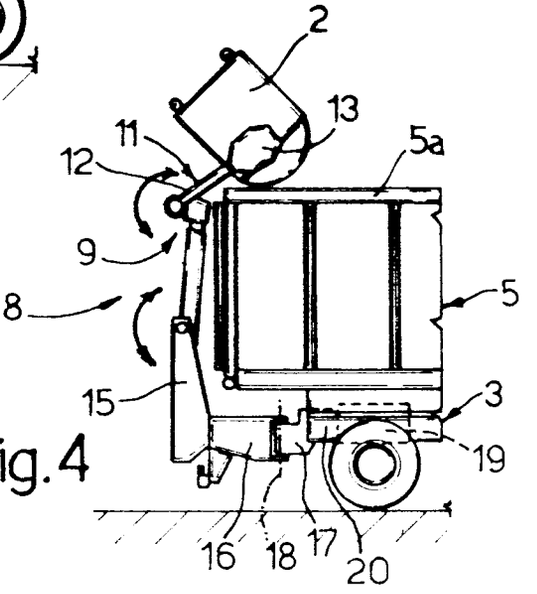

Fig.4

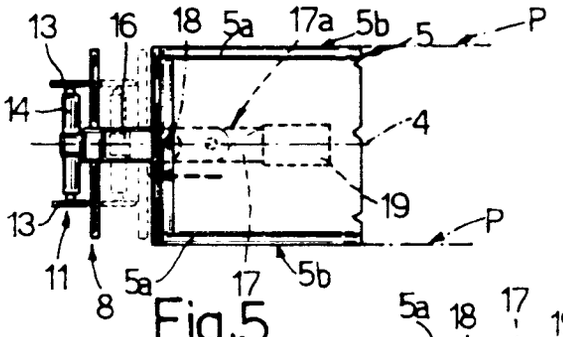

Fig.5

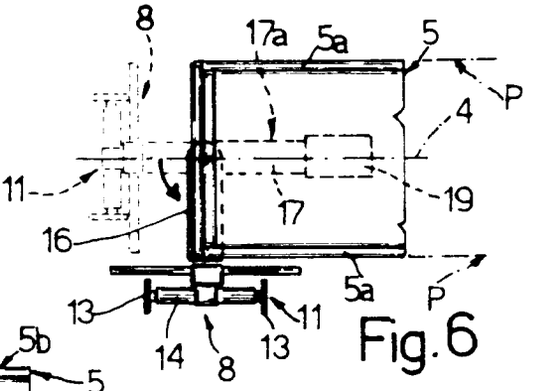

Fig.6

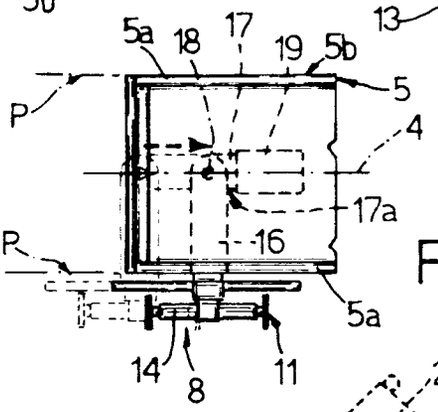

Fig.7

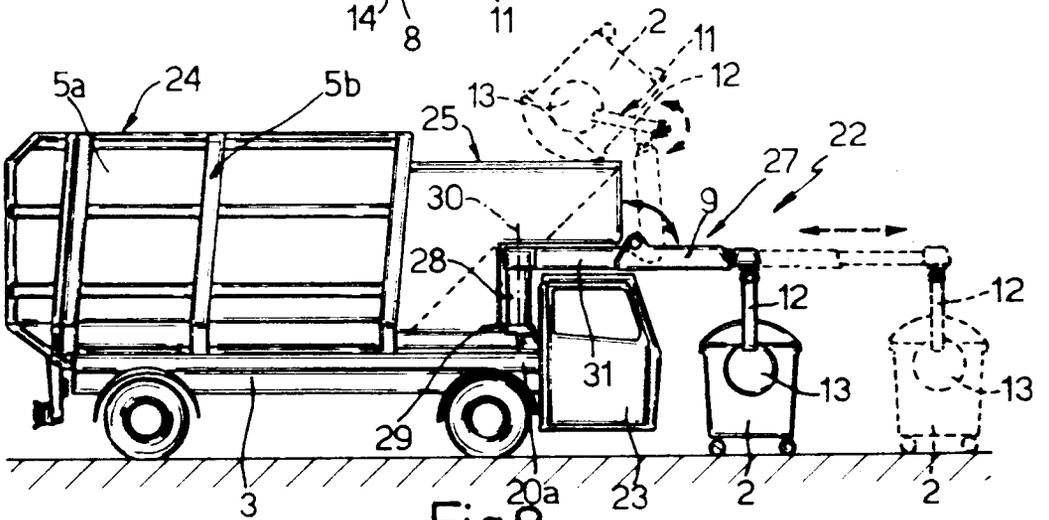

Fig.8

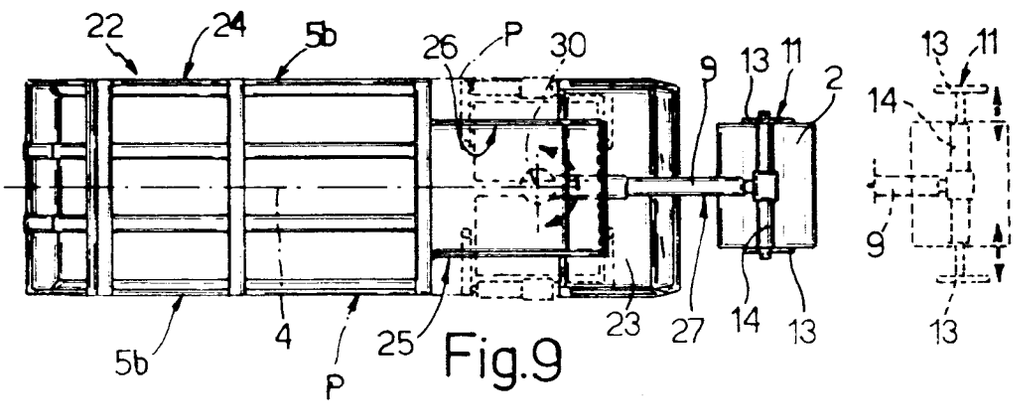

Fig.9

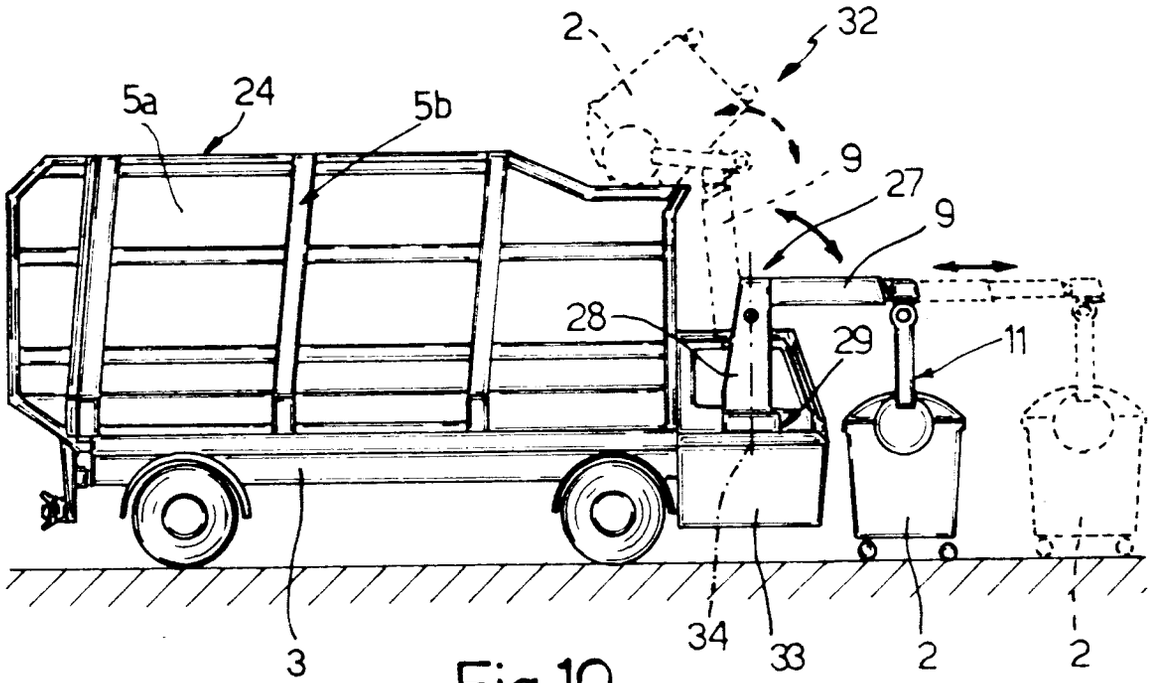
2
32
5a
24
5b
9
27
9
28
29
11
3
34
33
2
2

Fig.10

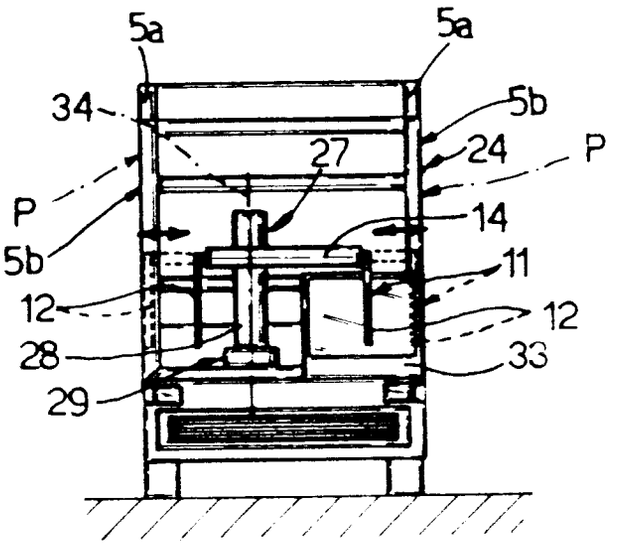
5a
5a
34
5b
27
24
P
P
14
5b
11
12
12
28
33
29

Fig.11

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 11 2080

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	EP-A-0 078 011 (FRIEDRICH KAMPWERTH MASCHINENFABRIK) * figures 5,6 *	1-4 5-10	B65F3/04
Y A	US-A-4 175 903 (W. CARSON) * column 1, line 67 - column 2, line 35 * * column 2, line 50 - column 3, line 3 * * figure 1 *	5-7,9,10 1-4	
Y A	US-A-3 762 586 (E. UPDIKE, JR.) * column 3, line 8 - column 4, line 60 * * figures 1,3,4 *	7 1-6	
P,Y	DE-U-93 13 338 (MB ABFALLBESEITIGUNGS GMBH & CO TRANSPORT KG) * figure 1 *	8	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	9 November 1995	Smolders, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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O : non-written disclosure
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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