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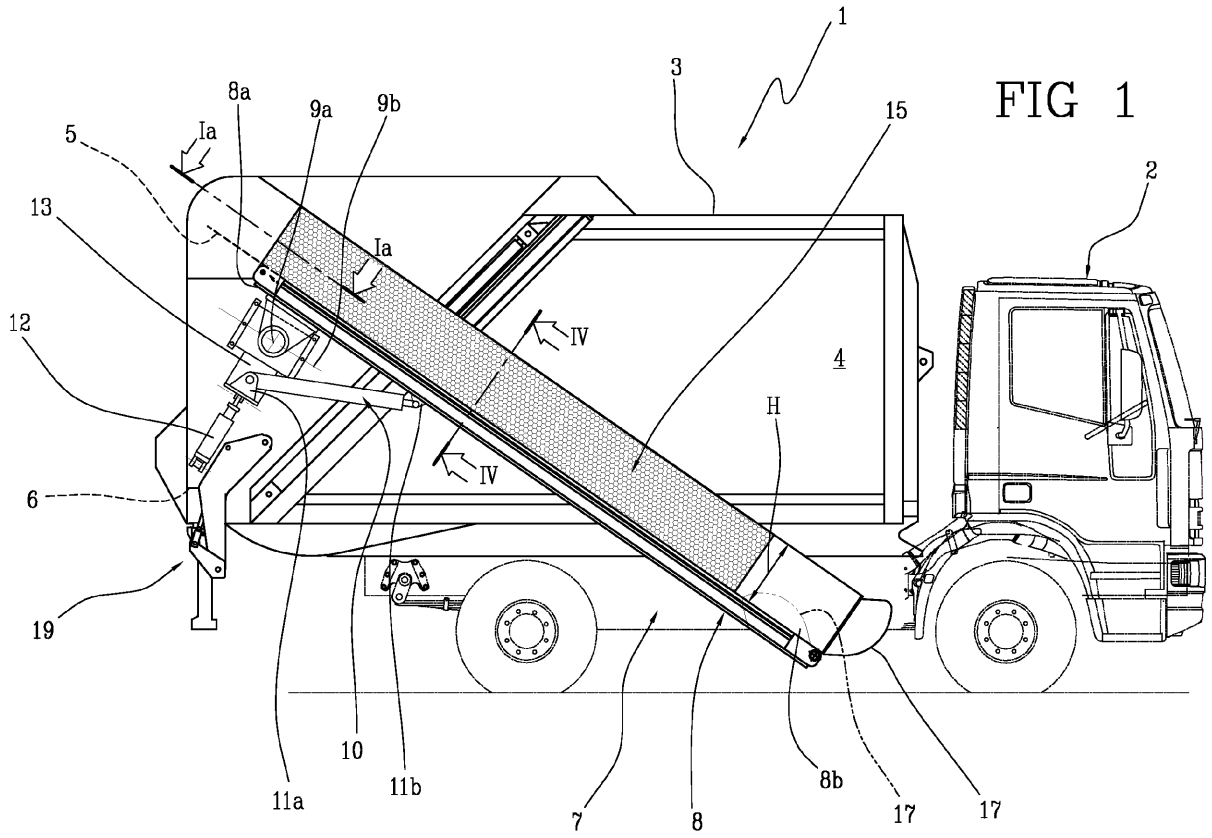
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(54) A motor-vehicle for rubbish collection

(57) A motor-vehicle for collecting municipal solid waste or rubbish comprises a holding compartment (4) accessible through a loading threshold (5) disposed on at least one side of the motor-vehicle, and movable loading means (7) adapted to transfer the rubbish into the holding compartment (4). This loading means (7) comprises at least one linear conveyor (8), of the belt type for example, conveying the rubbish from the ground level to the loading threshold along a loading platform (8d).

FIG 1



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Description

[0001] In particular, the invention advantageously applies to the field of collection and disposal of municipal solid waste or rubbish.

[0002] It is known that municipal waste collection is usually carried out with the aid of throwaway bags of plastic material and/or suitable containers that in case of need are positioned along the streets to be emptied onto suitable motor-vehicles for collection and transport of the rubbish to the dumps or other places intended for disposal of same. These motor-vehicles are usually equipped with a body having a wide opening at the rear that, through a loading threshold, gives access to a hopper communicating with a holding compartment extending towards the front portion of the body.

[0003] Operating in the vicinity of the loading threshold are devices adapted to engage the rubbish contained in dustbins, bulk refuse containers or containers of other type, for lifting said containers from the ground, emptying them into the hopper by an overturning motion beyond the loading threshold and positioning the emptied containers to the ground again.

[0004] A compacting device housed in the motor-vehicle body carries out transfer of the rubbish deposited in the loading hopper into the holding compartment.

[0005] For collection of the throwaway plastic bags, operators are normally required to pick up the bags laid on the ground along the pavement edges and carry them behind the motor-vehicle, for then energetically throwing them into the hopper beyond the loading threshold that, for constructive and operational requirements, is usually placed at a high level, often more than 150-160 cm from the ground.

[0006] The bags have such sizes that they contain an important rubbish volume so that their weight too is rather considerable. Lifting and throwing the bags full of rubbish, repeatedly in the space of a day, from the ground level to a height exceeding one meter and a half often involves an excessive physical effort by the operator.

[0007] A partial solution to this inconvenience consists in the employment of automated equipment essentially involving use of a bucket element to be positioned to a short distance from the ground for receiving a plurality of bags, manually transferred by an operator, which bags are then dropped beyond the loading threshold by a lifting and overturning motion of the bucket element.

[0008] However this solution too is not devoid of drawbacks.

[0009] In fact, the loading threshold is located at the rear of the motor-vehicle and this involves risks for the operators' safety who are continually exposed to the danger of being run over by the cars that, in the town traffic, arrive from behind the collecting motor-vehicle or travel in the vicinity of same.

[0010] In addition, this equipment has a necessarily discontinuous operation limiting the rapidity in bag collection.

[0011] It has been also found that loading of the bags and loose rubbish into a loading hopper necessarily also conceived for receiving the rubbish emptied out of dustbins and bulk refuse containers involves the risk of uncontrolled rubbish escape, which rubbish is projected externally due to the action of the compacting devices operating in the hopper region.

[0012] In addition, the known equipment does not reach a satisfactory operating versatility that on the contrary would be required for an optimal management of rubbish collection in the main modes usually adopted in the town centres.

[0013] Accordingly, the main aim of the present invention is to provide a motor-vehicle for rubbish collection that is devoid of one or more of the above mentioned drawbacks.

[0014] In particular, an aspect of the present invention consists in proposing a motor-vehicle for rubbish collection that is able to reduce the physical effort of the operators who have to load the rubbish into the holding compartment.

[0015] In another aspect, the present invention makes available a motor-vehicle for rubbish collection ensuring safe work situations and drastically reducing possible risks of accidents to the operators.

[0016] It is a further aspect of the present invention to propose a motor-vehicle for rubbish collection that is versatile and can be easily adapted to management of different methodologies for rubbish loading.

[0017] More particularly, the present invention proposes a motor-vehicle for rubbish collection as defined in claim 1 and in one or more of the following claims.

[0018] Further features and advantages will become more apparent from the detailed description of a preferred but not exclusive embodiment of a motor-vehicle for rubbish collection in accordance with the present invention. This description will be set out hereinafter with reference to the accompanying drawings, given by way of non-limiting example, in which:

- Fig. 1 is a side view of a motor-vehicle intended for collection of municipal solid waste or rubbish, provided with a device for rubbish collection in accordance with the present invention, in an operating position and with some parts removed for the sake of clarity;
- Fig. 1a is a sectional view of Fig. 1 along line I-I;
- Fig. 2 is a side view of the motor-vehicle seen in Fig. 1, in a non-operating position;
- Fig. 2a shows a section similar to that in Fig. 1a, with the loading device in a minimum-bulkiness configuration;
- Fig. 3 shows a possible variant of the motor-vehicle in Fig. 1 or 2 in an operating position;
- Fig. 4a diagrammatically shows a section view of Fig. 1 along line IV-IV;
- Fig. 4b shows the section view seen in Fig. 4a in a non-operating position and in a closed configuration.

[0019] With reference to the drawings, a motor-vehicle for rubbish collection according to the present invention has been generally identified by reference numeral 1. Motor-vehicle 1 essentially comprises a traction unit 2 carrying a body 3 of a substantially parallelepiped shape and horizontal extension, internally defining a compartment 4 for holding rubbish and accessible through at least one loading threshold 5 extending on at least one side of body 3. Preferably the loading threshold 5 is placed on top of body 3; an alternative embodiment contemplates an auxiliary loading threshold 6 disposed transversely on the back side of body 3, in addition to or for replacing the one placed on top of same.

[0020] Motor-vehicle 1 comprises movable loading means 7 adapted to transfer the rubbish into the holding compartment 4.

[0021] As shown in the accompanying drawings, the loading means 7 comprises at least one linear conveyor 8, of the belt, chain or roller type, conveying the rubbish preferably along a loading platform 8d, from the ground level to the loading threshold 5.

[0022] In particular, the linear conveyor 8 is inclined to the ground and has a first end 8a located in the vicinity of the loading threshold 5 and a second end close to the ground for facilitating the operations for loading the plastic bags filled with rubbish, as well as with other waste of various nature such as paper, glass, wood or other, in a closely packed manner or loose.

[0023] The linear conveyor 8 is able to vary its inclination relative to the motor-vehicle 1 and the ground, and the height of its second end 8b relative to the ground, in such a manner that it can be lowered to the height of the road surface for facilitating the rubbish loading operations, and then be lifted during normal running of the motor vehicle, as denoted by arrow F in Fig. 2.

[0024] During the rubbish loading operations, the linear conveyor 8 projects from one side of the motor-vehicle (Fig. 1a and 4b) being the loading platform 8d orthogonal to said motor-vehicle's side.

[0025] In order to take a minimum-bulkiness configuration (Figs. 1b and 4b) during running of motor-vehicle 1, the linear conveyor 8 can be able to close taking an arrangement (therefore disposing the loading platform) parallel to one side of motor-vehicle 1.

[0026] To this aim, conveyor 8 is preferably hinged, at a respective side of motor-vehicle 1, at least around a first hinge axis 9a orthogonal to the longitudinal extension axis 8c of conveyor 8 and parallel to the loading platform 8d of the conveyor itself.

[0027] The first end 8a of the linear conveyor 8 is hinged to motor-vehicle 1 while the second end 8b is free.

[0028] The rotating motions of conveyor 8 are carried out by a first actuator 10 causing the inclination of the conveyor belt to vary. The first actuator 10 preferably acts between an attachment bracket 11a placed in the vicinity of the first end 8a of the linear conveyor 8, and a fastening portion 11b placed on the lower face of the linear conveyor 8 and acting between the first 8a and second 8b ends.

[0029] A second actuator 12 can be provided for promoting overturning, and therefore closure, of conveyor 8 against motor-vehicle 1 to bring it to the position of minimum bulkiness.

[0030] To enable closure of the linear conveyor 8 against the corresponding side of motor-vehicle 1, it can be hinged at least around a second hinge axis 9b, orthogonal to the hinge axis 9a and parallel to the longitudinal axis 8c of the loading platform 8d of the linear conveyor 8 itself.

[0031] The second actuator 12 preferably acts between the motor-vehicle and a thrust arm 13 connected to the linear conveyor 8 for overturning the latter around the second hinge axis 9b. In greater detail, the thrust arm 13 is hinged around the second hinge axis 9b and preferably carries said attachment bracket 11a, integral therewith.

[0032] Advantageously, at least one lateral edge or board 14 can be provided along the linear conveyor 8 for rubbish containment (shown in Fig. 3 by way of example), to prevent said rubbish from falling during the transportation step to the loading height into the holding compartment 4.

[0033] The lateral edge 14 can also be integrated with or replaced by a cover 15 placed at the sides and/or over the linear conveyor 8 so that with the later it creates a rubbish conveying tunnel. Cover 15 can be made of fabric or other pliable material, possibly supported by ribs of flexible material (not shown) to enable folding to the minimum-bulkiness condition between the motor-vehicle side and the linear conveyor 8.

[0034] Preferably, the conveying tunnel defined by cover 15 has an appropriate size in height "H" enabling the upper wall of cover 15 to mechanically interfere with the bags of rubbish moved by conveyor 8, at least in case said bags will tend to roll downwards along the loading platform 8d. Under this circumstance, said bags would be conveniently pressed between the loading platform 8d and the upper wall of cover 15 and consequently would be led to roll against the latter towards the loading threshold 5, so as to prevent the rubbish from rolling downwards. To this aim, the height "H" detectable between the loading platform 8d and the top of cover 15 can be provided to be substantially equal to or slightly smaller (i.e. not greatly higher) than a maximum-bulkiness size that can be, on average, detected on the rubbish bags.

[0035] A linear conveyor 8 of the belt, chain, or similar type can be, in case of need, provided with a plurality of rolling-preventing cross members 16 (figure 3) transverse to the longitudinal axis 8c and movable along the loading platform 8d following operation of the linear conveyor 8 itself, so as to help rubbish transport towards the loading threshold and hinder rolling downwards of said rubbish.

[0036] At the second end 8b of conveyor 8, therefore close to the ground, a barrier 17 for containment can be present, so as to prevent falling, which possibly rotates

around a hinge axis orthogonal to the longitudinal axis 8c between a rest position in which this barrier is in alignment with the loading platform 8d of belt 8 and a work position at which it stands up substantially perpendicular to the loading platform itself.

[0037] At the top of the linear conveyor 8, at a first end 8a thereof, a deviation panel 18 is preferably present in the vicinity of the loading threshold 5, for conveying rubbish into the holding compartment 4. In other words, when rubbish reaches the top of conveyor 8, panel 18 deviates it and conveys it to the inside of the holding compartment 4 of motor-vehicle 1, possibly through a chute 18a sloping down from the first end 8a to the loading threshold 5.

[0038] Preferably, conveyor 8 is located on a lateral side of the motor-vehicle, therefore on the right-hand or lefthand side relative to the driver compartment. The presence of two distinct conveyors 8, on the right side and left side respectively of the motor-vehicle, can be also provided.

[0039] Under this situation, the operator intended for carrying out rubbish loading can operate without being obliged to travel or stop behind the motor-vehicle, so that accident risks are drastically reduced. The operator in fact can load the linear conveyor 8 from the pavement where he/she stands in a safe position.

[0040] In addition to, or in place of the conveyor 8 positioned along the motor-vehicle's lateral side, an auxiliary linear conveyor 20 operating on the back side of the motor-vehicle itself can be provided, as shown in Fig. 3, for conveying the rubbish through the auxiliary loading threshold 6.

[0041] The auxiliary conveyor 20 has a first end 20a hinged on the motor-vehicle along a hinge axis orthogonal to the longitudinal extension axis of the conveyor itself, and possibly slidable along a vertical guide 21. Upon the action of suitable actuators not shown, the auxiliary conveyor 20 is movable between a vertical non-operating position parallel to the back side of the motor-vehicle, and an inclined operating position relative to the back side, represented in chain line in Fig. 3, to create a ramp for lifting and transport of rubbish from the ground to the loading height.

[0042] According to a further variant, shown in the accompanying figures, along the back side of motor-vehicle 1, at a lower position relative to the auxiliary loading threshold 6, gripping and lifting means 19 is operatively positioned for hooking, lifting and overturning the dustbins or rubbish containers. This gripping and lifting means 19 is movable astride the auxiliary loading threshold 6, between a grip position for picking up the rubbish at the outside of the holding compartment 4, and a transfer position for transferring the rubbish into the holding compartment 4 itself.

[0043] This gripping means can represent an alternative or be in addition to the auxiliary linear conveyor 20 placed on the back side of the motor-vehicle. In this way, the motor-vehicle is made versatile and adaptable to the different types of rubbish collection.

[0044] The invention achieves important advantages.

[0045] In fact, the presence of the belt conveyor enables the rubbish to be conveyed to the inside of the holding compartment without fatigue, avoiding excessive physical efforts to the operators.

[0046] In addition, the side position of the conveyor reduces the risks of accidents that might occur to the operators.

[0047] The invention also allows the height of the loading threshold to be greatly raised, until the top of body 3, thus achieving a better use of the inner spaces of the holding compartment 4. The invention further allows the rubbish to be loaded through a small opening provided at the body top, that can be conveniently closed at least when the conveyor is lifted to a rest condition in order to avoid an uncontrolled escape of waste during the compacting step and/or during transport. An appropriate protective closure, if necessary, can be provided on the back side of body 3 and/or at the loading threshold 5.

[0048] Finally, the possibility of integrating different mechanisms for gripping and conveying the rubbish into a single motor-vehicle gives the motor-vehicle a great versatility.

Claims

1. A motor-vehicle for rubbish collection, comprising:

- a holding container or compartment (4) accessible through a rubbish loading threshold (5, 6);
- movable loading means (7) adapted to transfer the rubbish into the holding compartment (4);

characterised in that said loading means (7) comprises at least one linear conveyor (8, 20) conveying the rubbish from the ground level to the loading threshold (5, 6) along a loading platform (8d).

2. A motor-vehicle as claimed in claim 1, wherein said linear conveyor (8, 20) is hinged at least around a first hinge axis (9a) to a lateral side of said motor-vehicle (1).

3. A motor-vehicle as claimed in claim 1 or 2, wherein said hinge axis (9a) is orthogonal to a longitudinal extension axis (8c) of the conveyor (8) and parallel to the loading platform (8d) of the conveyor (8) itself.

4. A motor-vehicle as claimed in one of claims 1 to 3, wherein said linear conveyor (8, 20) is of variable inclination relative to the ground and has a first end (8a) hinged on the motor-vehicle (1) and in the vicinity of which the rubbish is discharged into the holding compartment (4), and a second free end (8b) at which the rubbish is loaded on said linear conveyor (8, 20).

5. A motor-vehicle as claimed in the preceding claim, wherein said second end (8b) of the linear conveyor (8, 20) is adjustable in height relative to the ground level; said second end (8b) being at a lowered position, close to the ground level, during the step of loading the rubbish on the linear conveyor (8, 20) and in a raised position during the motor-vehicle's run.

6. A motor-vehicle as claimed in one of the preceding claims, wherein said linear conveyor (8, 20) is hinged at least around a second hinge axis (9b) at one side of said motor-vehicle (1).

7. A motor-vehicle as claimed in claim 6, wherein said hinge axis (9b) is parallel to the longitudinal axis (8c) of the conveyor (8).

8. A motor-vehicle as claimed in claim 6 or 7, wherein said linear conveyor (8, 20) is collapsible against one side of the motor-vehicle (1) at a position of minimum bulkiness, so as to dispose the loading platform (8d) parallel to said motor-vehicle's side.

9. A motor-vehicle as claimed in one or more of the preceding claims, wherein said linear conveyor (8, 20) comprises at least one lateral edge or board (14) for rubbish containment, to avoid falling of the rubbish during the transportation step from the ground level to the loading height into the holding compartment (4).

10. A motor-vehicle as claimed in one or more of the preceding claims, comprising a cover (15) placed at the sides of and over the linear conveyor (8, 20) by which a rubbish conveying tunnel is created until the loading height into the holding compartment (4).

11. A motor-vehicle as claimed in the preceding claim, wherein said conveying tunnel has a size in height (H) suitable to mechanically interfere with the rubbish enclosed in respective bags actuated by the conveyor (8, 20), said size in height (H) being preferably substantially equal to or slightly smaller than a size of maximum bulkiness detectable on average on said rubbish bags.

12. A motor-vehicle as claimed in one or more of the preceding claims, wherein said linear conveyor (8, 20) comprises a plurality of rolling-preventing cross members (16) movable along a loading platform (8d) of the conveyor itself to push and guide the rubbish towards the loading height.

13. A motor-vehicle as claimed in one or more of the preceding claims, wherein said linear conveyor (8, 20) at a free end (8b) thereof comprises a barrier (17) against fall, substantially standing perpendicular to the loading platform and possibly hinged to said end, and collapsible for aligning itself with the loading platform (8d) of the linear conveyor (8).

14. A motor-vehicle as claimed in one or more of the preceding claims, further comprising, at a first end (8a) of the linear conveyor (8, 20) close to the loading threshold (5), a deviation panel (18) for conveying the rubbish to the inside of the holding compartment (4).

15. A motor-vehicle as claimed in one or more of the preceding claims, wherein said linear conveyor (8, 20) is located on a lateral side of said motor-vehicle (1).

16. A motor-vehicle as claimed in one or more of claims 1 to 15, wherein said linear conveyor (8, 20) is located on a rear side of said motor-vehicle (1).

17. A motor-vehicle as claimed in claim 16, wherein said linear conveyor (8, 20) has a first end (8a) hinged to the rear side of the motor-vehicle for passing from a non-operating position parallel to the rear side of the motor-vehicle to an operating position inclined to the rear side of the motor-vehicle; said first end (8a) possibly being vertically slidable.

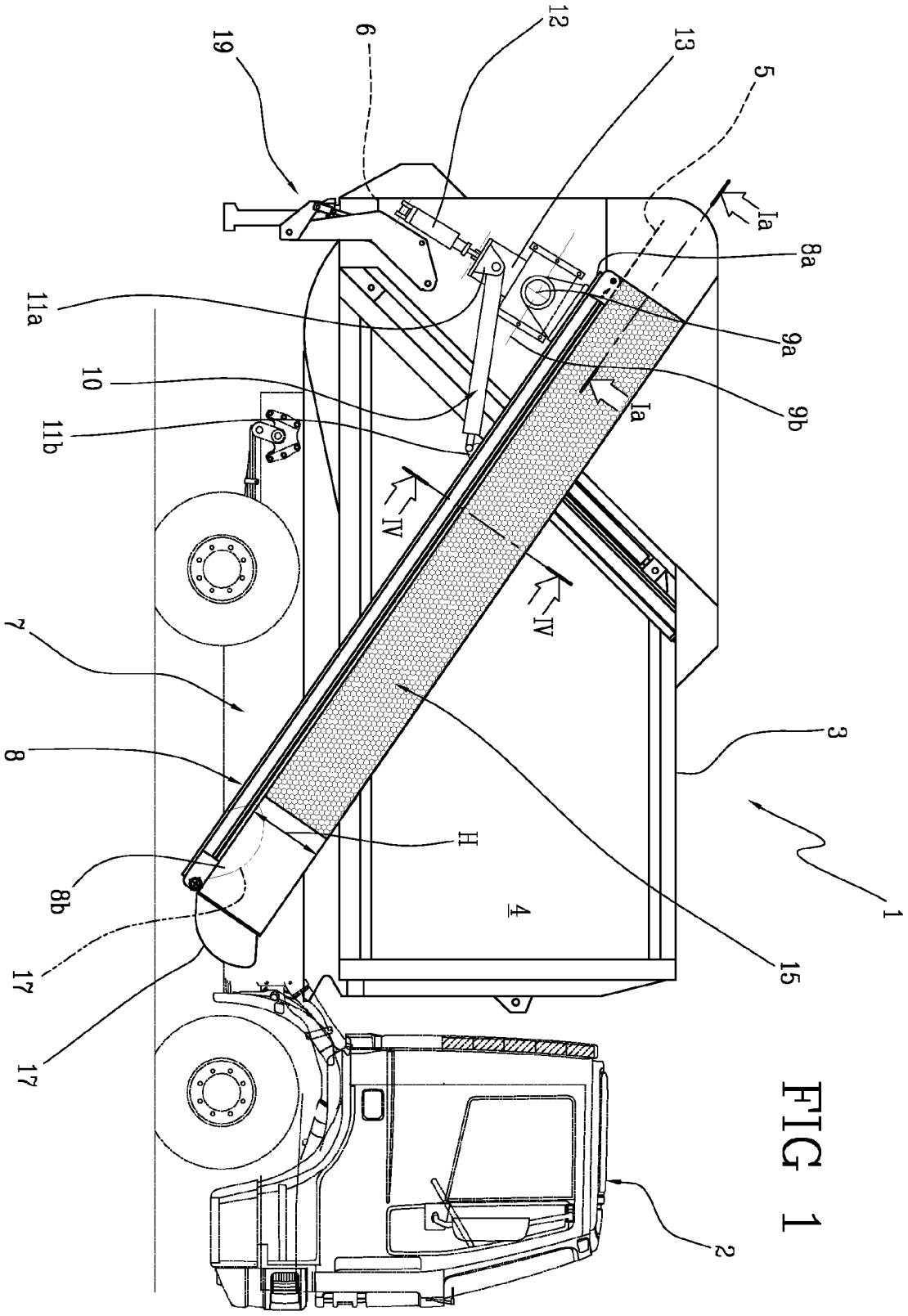


FIG 1

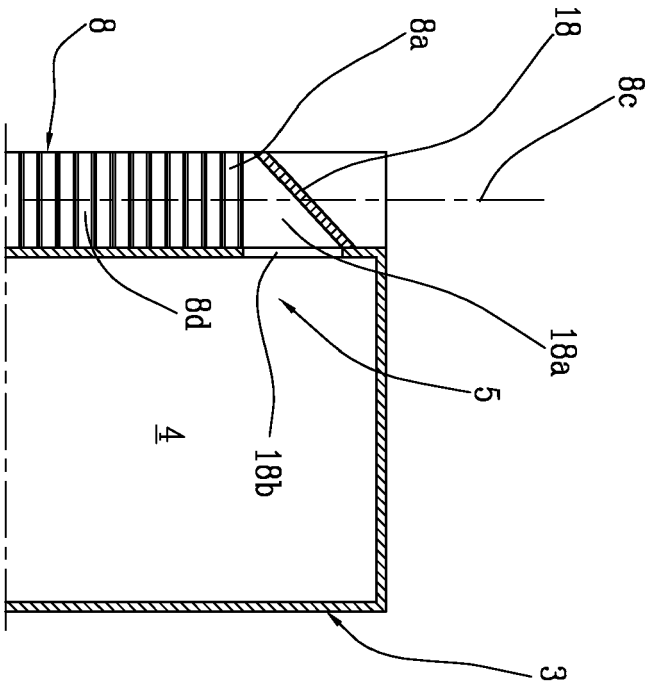


FIG 1a

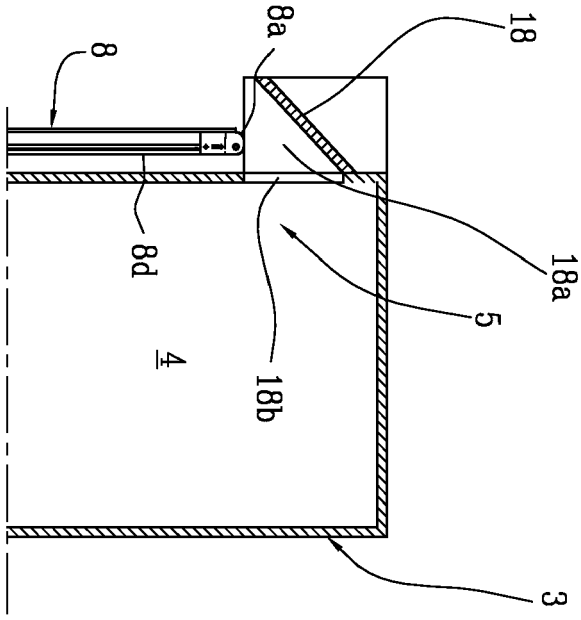


FIG 2a

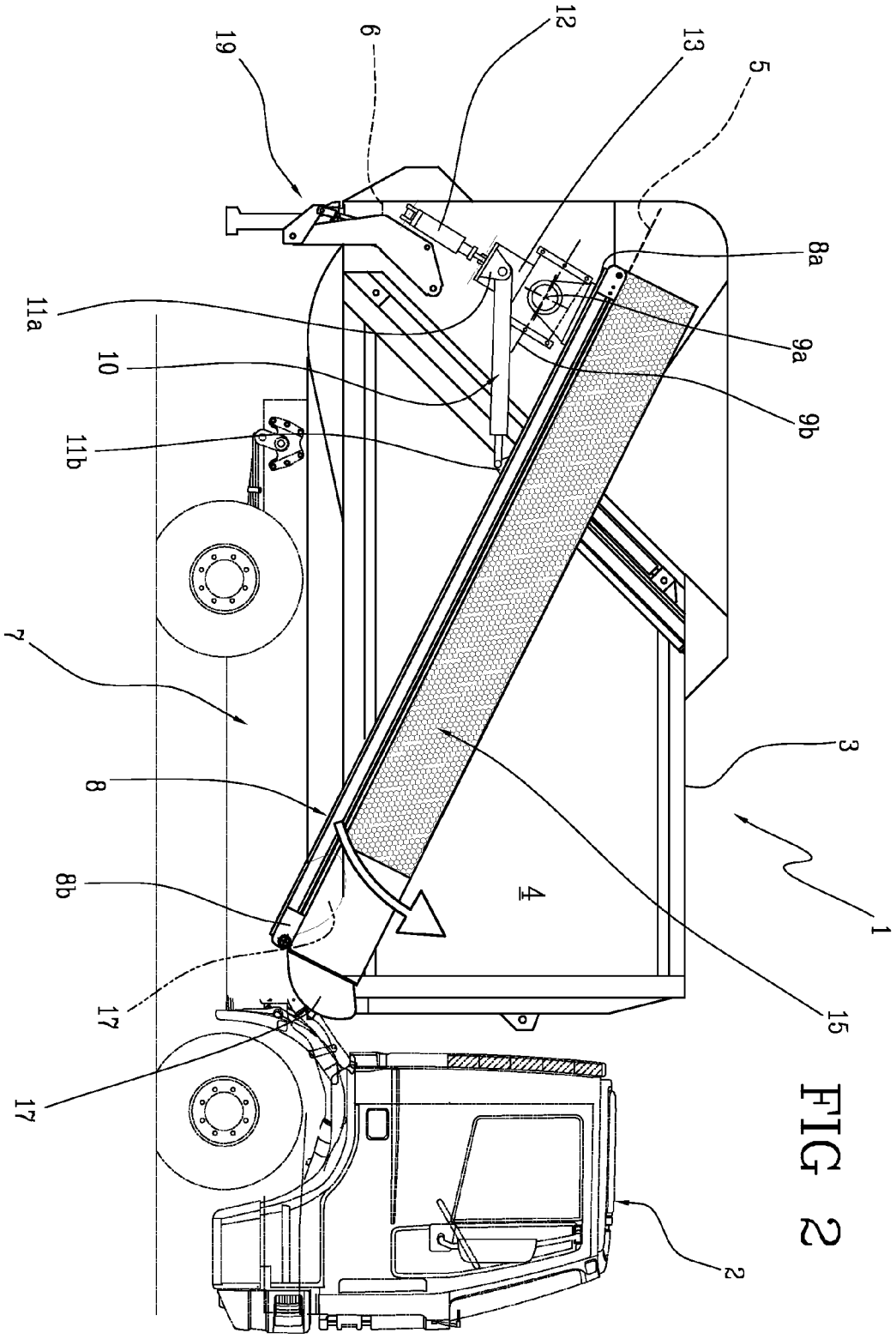


FIG 2

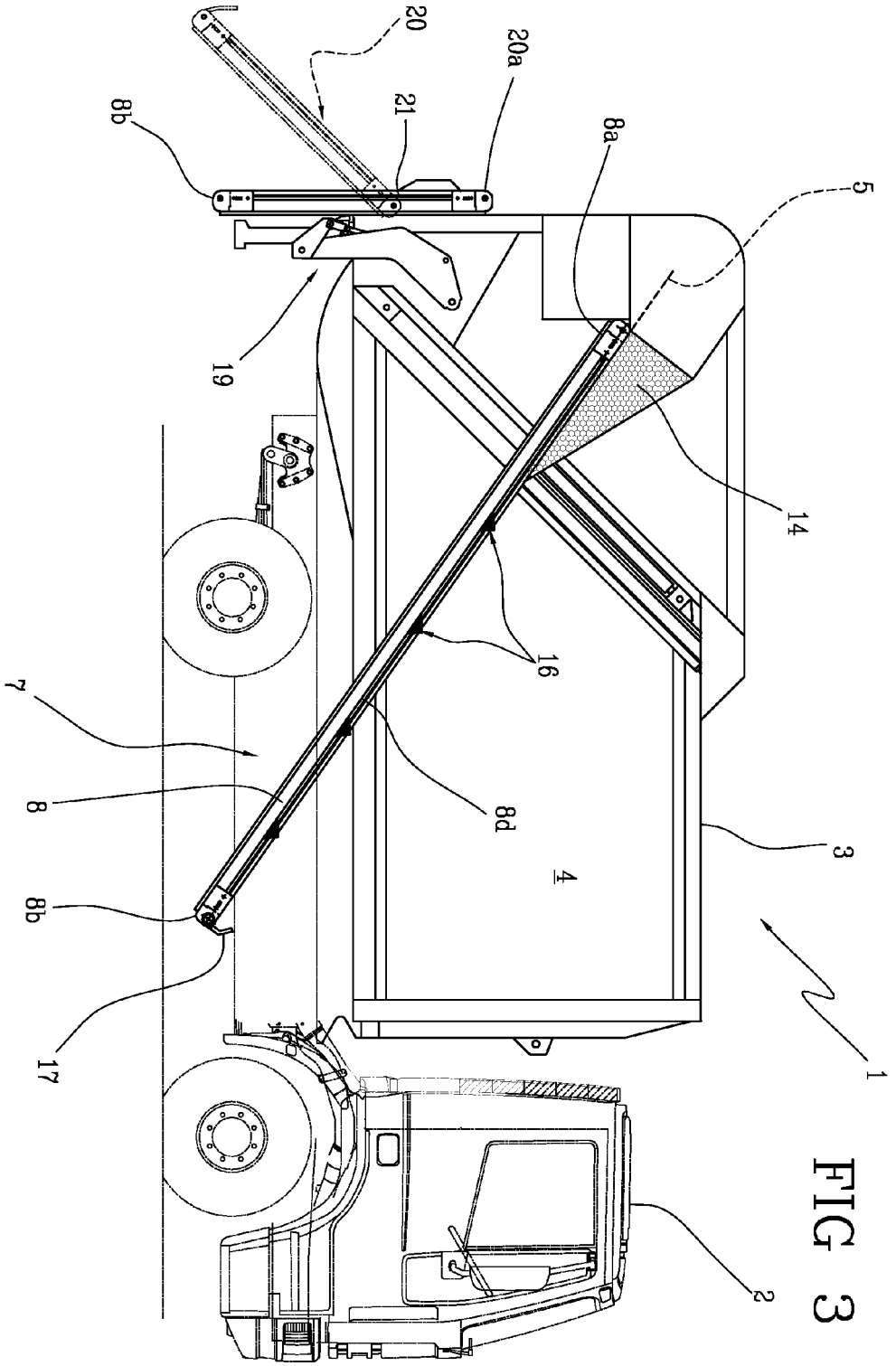


FIG 3

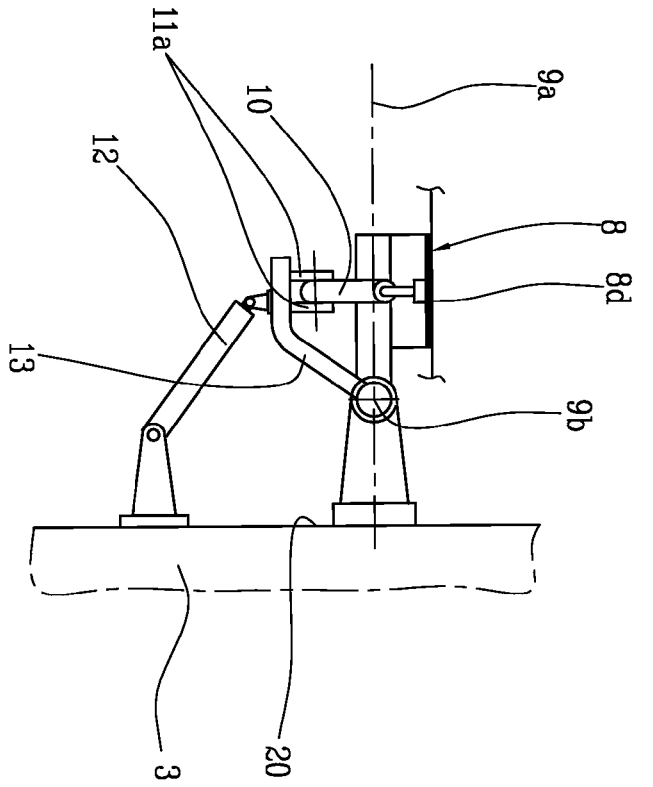


FIG 4a

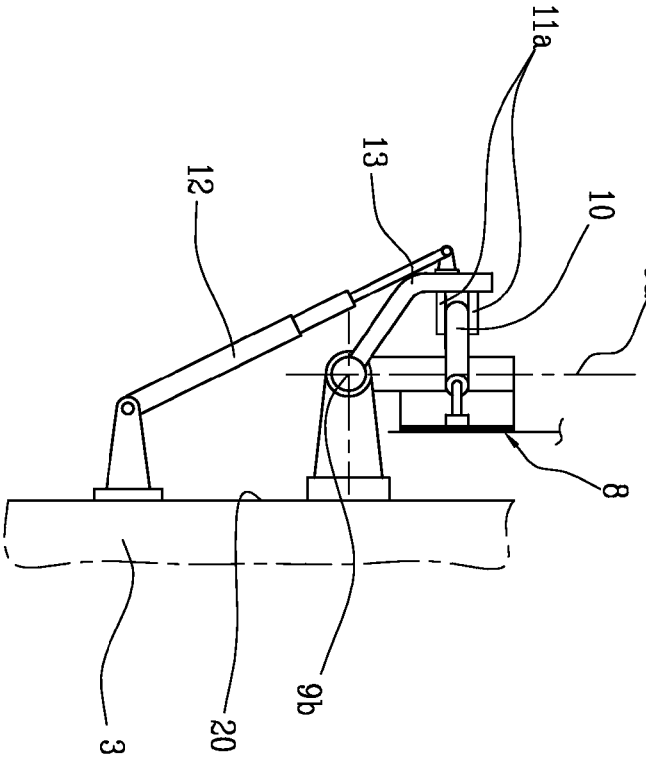


FIG 4b

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EUROPEAN SEARCH REPORT

Application Number
EP 11 16 2168

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 3 927 780 A (W. DEARLOVE) 23 December 1975 (1975-12-23) * column 2, line 15 - column 3, line 62 * * figures 1-3 *	1-5, 9-11,15 12-14	INV. B65F3/18
X A	AU 593 257 B2 (A. LEASK) 8 February 1990 (1990-02-08) * the whole document *	1,9-12 4,5,14, 15	
X	US 2 393 732 A (V. BALBI) 29 January 1946 (1946-01-29) * the whole document *	1,9,12, 15	
X A	DE 85 03 393 U1 (H. KEESE) 27 June 1985 (1985-06-27) * the whole document *	1,12,15 16	

TECHNICAL FIELDS SEARCHED (IPC)

B65F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 September 2011	Smolders, Rob

CATEGORY OF CITED DOCUMENTS

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22-09-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3927780 A	23-12-1975	NONE	
AU 593257 B2	08-02-1990	AU 5883386 A	24-12-1987
US 2393732 A	29-01-1946	NONE	
DE 8503393 U1	27-06-1985	NONE	

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