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(54) DEVICE FOR MOVING AND EMPTYING AT LEAST ONE WASTE-HOLDING BIN INSIDE A WASTE COLLECTION CONTAINER

(57) Device (110) for moving and emptying at least one waste-holding bin inside a waste collection container (150) comprising at least:
- a first rod (1) and a first guide (10) suitable to be fixed to the container (150), where the first guide (10) includes at least one rectilinear portion (11) and a subsequent second curvilinear portion (12) which extends from the rectilinear portion (11) towards the container (150);
- a first hollow cylinder (2) mounted around the first rod (1), bidirectionally slidable along it, between an initial lowered position and a final raised position;
- at least one carriage (20) which comprises means for hooking a waste-holding
bin and is suitable to be moved between a rest position and a position for emptying the hooked waste-holding bin;
- a first connection device (30) which is connected to and is movable together with the carriage (20), and comprising a guided element (31) suitable to slide along the shaped profile of the first guide (10);
- a second connection device (40) configured to connect the first hollow cylinder (2) to the carriage (20) so that they move together, and further to allow rotation, around a second axis (102) transversal to the axis (101) of the rod, of the carriage (20) together with a hooked waste-holding bin relative to the first hollow cylinder (2) and to the first guide (10) when the guided element (31) slides along said second curvilinear portion (12).

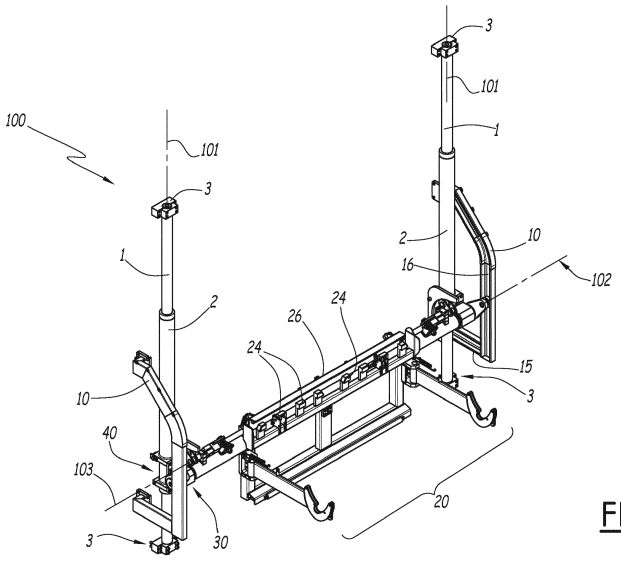

FIG.1

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Description

[0001] The present invention relates to a device for moving and emptying waste-holding bins inside a waste collection container.

[0002] The device according to the invention is particularly suitable to be used for emptying waste-holding bins inside containers mounted on waste-collection vehicles, such as trucks or vans, and will be described hereinafter with reference to such specific application without intending in any way to limit its scope of application to other possible types of waste collection structures, such as fixed structures.

[0003] In the waste collection sector, multiple solutions are known in the art which make it possible to move waste-collection bins in order to empty the contents inside a container mounted on board of a waste-collection vehicle.

[0004] For this purpose, various types of structures to be fixed directly onto the container have been realized and which are configured for hooking the waste-holding bins, raising them from the ground and positioning them so as to empty the contents inside the container itself.

[0005] For example, a traditional type of solution provides for the use of parallelogram-shaped deformable devices.

[0006] These devices present various drawbacks, in particular in terms of overall dimensions, making it difficult to access the area where the waste is to be emptied into the container, safety issues for the garbage collectors due to the presence of shearing mechanisms, and the maintenance required due to the presence of an excessive number of articulation points.

[0007] A second type provides for the use of devices which comprise a frame to which the waste-holding bin is hooked, the assembly frame and bin is then raised from the ground and subsequently tilted so that the waste-holding bin is in a suitable position to be emptied.

[0008] In particular, these solutions provide for the use of vertical column jacks fixed to the container and which, by means of suitable sliding actuating devices mounted on the jack columns, move the frame to the position where the waste-holding bin hooked to it, is to be emptied.

[0009] For example, there are solutions in the known art where four vertical columns are used, arranged two on each side of the container opposite each other with respect to a central moving area of the frame.

[0010] These solutions, although adequately serving the purposes for which they were made, can still be further improved for example in terms of structural complexity, overall dimensions, manufacturing and maintenance costs.

[0011] Therefore, the main scope of the present invention is to provide a device for moving and emptying waste-holding bins, in accordance with the second type of solutions described above, which makes it possible to improve one or more of the above-mentioned aspects.

[0012] In particular, within this scope, a main object of the present invention is to provide a device for moving and emptying waste-holding bins which, with respect to known solutions, has a more simplified structure, so reducing manufacturing and maintenance costs while at the same time guaranteeing high operational efficiency and safety standards as well as an adequate application flexibility.

[0013] This scope, as well as this object and others which will become more apparent from the following detailed description, are achieved by means of a device for moving and emptying waste-holding bins as defined in claim 1.

[0014] Particular embodiments of the device according to the invention are object of the dependent claims which are intended as integral part of the present description.

[0015] The scope, as well as the above-mentioned object and others which will become more apparent from the following description, are also achieved by means of a vehicle for waste collection, comprising a waste-collection container and characterized in that it comprises a device for moving and emptying waste-holding bins connected to the container according to one or more of the attached claims, and in particular as described hereinafter.

[0016] Further characteristics and advantages of the invention will become more apparent from the following detailed description of exemplary embodiments, illustrated as non-limiting examples and with reference to the attached drawings, wherein :

Figure 1 is a perspective view of an embodiment of the device according to the invention in a lowered position for hooking at least one waste-holding bin;
Figure 2 is a perspective view illustrating the device in figure 1 in a second position of moving towards the final position for emptying a waste-holding bin;
Figure 3 is a perspective view illustrating in detail, and partially in a cross-sectional view, some components of the device illustrated in figures 1 and 2;
Figure 4 is a rear view of some components of the device illustrated in figures 1-3;
Figure 5 is a view illustrating the device according to the invention mounted on the rear of a waste-collection vehicle.

[0017] It should be noted that in the following detailed description identical or similar components, from both structural and/or functional points of view, may be indicated with the same reference numbers, independently of the fact that they are shown in different embodiments or in components different from the present description; furthermore it should be noted that, in order to illustrate this invention clearly and concisely, the drawings are not necessarily to scale and certain characteristics of the description may be shown in a rather schematic form.

[0018] Furthermore, when the term "arranged" or "configured" or "shaped", or a similar term is used in this context with reference to any component whatsoever as a

whole or to any part whatsoever of a component, it must be understood as comprising correspondingly the structure and/or the configuration and/or the shape and/or the positioning of the component or part to which it refers to.

[0019] Finally, in the following description the ordinal numbers first, second, third, further, etc. will be used, whose sequence is intended only for greater illustrative clarity; therefore, unless implicitly or clearly indicated to the contrary in the description, the definition for example of a second element does not necessarily imply the presence of a first element, and so on.

[0020] Figures 1 and 2 illustrate a device according to the invention, indicated with the reference number 100, for moving and emptying waste-holding bins inside a waste-collection container, such as for example a collection container 150 mounted on board a vehicle 200 for waste collection, as illustrated in figure 5.

[0021] According to embodiments and functions which will be described in more details hereinafter, the device 100 comprises at least a first rod 1, at least a first guide 10, at least a first hollow cylinder 2, at least one carriage 20 for moving the waste-holding bins, at least a first connection device 30 suitable to operatively connect the at least one carriage 20 to the first guide 10, and at least a second connection device 40 suitable to connect the at least one carriage 20 to the first hollow cylinder 2.

[0022] In particular, according to a preferred but non-limiting embodiment, shown in the attached drawings, the device 100 according to the invention comprises only one carriage 20 and further a second rod 1 substantially identical to the first rod 1, a second hollow cylinder 2 substantially identical to the first hollow cylinder 2, a third guide 10 substantially identical to the first guide 10, a fourth guide 50 substantially identical to the second guide 50, a third connection device 30 substantially identical to the first connection device 30, and a fourth connection device 40 substantially identical to the second connection device 40.

[0023] The second rod 1, the second hollow cylinder 2, the third guide 10, the fourth guide 50, the third connection device 30 and the fourth connection device 40 are intended to be mounted on one part of the container 150 opposite the part where the corresponding and identical components are intended to be mounted, symmetrical with each other and with the carriage 20 placed there between.

[0024] Therefore, for ease of description, the following description will refer to the components arranged on one side of the carriage 20 and mounted on the corresponding side of the container 150; such description, from a structural and functional point of view, is to be considered entirely similar and applicable to the identical components mounted symmetrically on the opposite side.

[0025] More in detail, the first rod 1 has a body which extends longitudinally along a first reference axis 101 and is suitable to be fixed to the container 150, for example in a substantially vertical position, on a rear wall 151 of the container itself and laterally with respect to a central area 152 for movement of the bins to be emptied, as shown in figure 5, and where an opening for waste discharge is provided.

[0026] The first hollow cylinder 2 is mounted around the first rod 1, bidirectionally slidable along the first reference axis 101 between an initial lowered position shown in figure 1 and a final raised position, passing through an intermediate tilted position shown in figure 2.

[0027] In a possible embodiment, as shown in more detail in figure 1, the first rod 1 is a hollow rod provided, at its opposite ends, with means 3 for connection to the container 150, said means 3 comprising for example mounting flanges screwed to the wall 151. In particular, the connection means 3 are configured to define a passage of a fluid, for example oil under pressure, inside the hollow rod 1 from top to bottom or in the opposite direction depending on the sliding direction to be imposed to the hollow cylinder 2.

[0028] In this way, the oil flowing inside the hollow rod 1 causes the hollow cylinder 2 to slide on the outside of the rod 1 along the first reference axis 101.

[0029] In its turn, the first guide 10 is also suitable to be fixed to the container 150, near the first rod 1, for example by fixing it to the rear part of a lateral wall 153 of the container 150 in such a way that it is in close proximity to and alongside the first rod 1, outside the central area 152.

[0030] In a possible embodiment shown in more detail in figures 1 and 2, the first guide 10 comprises: at its lower end, an arm 15 which is fixed to the lateral wall 153 and which extends away from the container 150; a central portion with a shaped profile having at least an initial rectilinear part, for example substantially parallel to the reference axis 101; and a subsequent curvilinear part with the concavity facing the container 150. In particular, in the embodiment illustrated, the shaped profile of the guide 10 comprises a first portion 11, substantially rectilinear, which extends from the arm 15, for example substantially parallel to the first reference axis 101, a subsequent intermediate curvilinear portion 12 which extends from the rectilinear portion 11 towards the container 150, and a final portion 13 which extends rectilinearly, for example inclined at a certain angle with respect to the direction of the first rectilinear portion 11, from the intermediate curvilinear portion 12 to a second upper end 14 also fixed for example to the same lateral wall 153.

[0031] In particular, as shown in figures 1 and 2, the first guide 10 comprises a hollow rail 16 defining the first rectilinear portion 11, the subsequent intermediate curvilinear portion 12, and the final inclined rectilinear portion 13.

[0032] The carriage 20 comprises means for hooking at least one waste-holding bin, and is suitable to be moved between an initial rest position and a final raised position for emptying the hooked waste-holding bin.

[0033] For this purpose, and as shown in more detail in figures 3 and 4, the first connection device 30 is connected to the carriage 20 so as to move together with it,

and comprises in particular a guided element 31, for example an extremity element, suitable to slide along the shaped profile of the first guide 10.

[0034] In its turn, the second connection device 40 is configured to interconnect the first hollow cylinder 2 to the carriage 20 so that they move together and so as to further allow the rotation, with respect to first hollow cylinder 2 and the guide 10, of the carriage 20 together with a hooked waste-holding bin around a second axis 102 transversal to the first axis 101.

[0035] The term transversal is here intended to mean a direction of an element or of an axis which is not parallel to that element or to that axis being referred to, the perpendicular direction to be considered as a particular case of transversal direction.

[0036] In a possible embodiment, the clamping means comprise a second guide 50 having a cam profile 51; in particular, the second guide 50 is connected to the first hollow cylinder 10 in so as to move, and in particular to translate solidly with it, with the cam profile 51 facing the carriage 20.

[0037] In the embodiment shown in the drawings, the carriage 20 comprises a resting base 21 for a waste-holding bin, surmounted by a beam 22 which extends transversally along the second rotation axis 102, and is connected to both the first and second connection devices 30, 40 at its first end portion 23.

[0038] The hooking means of the carriage comprise a plurality of teeth 24 which protrude from the beam 22, spaced apart from each other.

[0039] The clamping means comprise a second rod 25 which is connected to the beam 22 so as to rotate, relative to it, around a third axis 103 substantially parallel to the second rotation axis 102 of the beam 22 itself, and a clamping flange 26, solidly mobile with the second rod 25 and suitable to clamp, in cooperation with the plurality of teeth 24, an associated portion of at least one waste-holding bin to be hooked.

[0040] According to embodiments known in the art and therefore not illustrated herein, said associated portion can comprise for example an edge and/or one or more raised ribs placed on a wall of the waste-holding bin resting against the base 21 of the carriage.

[0041] The rod 25 is connected to the upper part of the carriage 20 and in particular to the beam 22, by fixing means 39 and is subjected to the action of one or more return springs 45 which tend to keep it in a non-clamping rotated position.

[0042] The clamping means further comprise a pair of connecting rods 27 fixed at a first end to the second rod 25 and connected at the opposite end to a mobile element, for example a first roller 28. The first roller 28, placed between the two connecting rods 27 and is movably hinged relative to them, is adapted to act in abutment against the cam profile 51 of the second guide 50 so as to force the rod 25 into a position such that the clamping flange 26 remains in the waste-holding bin clamping position, in particular when the carriage 20 moves towards the position where the hooked waste-holding bin is emptied.

[0043] As shown in more detail in figure 3, the first connection device 30 comprises a further connecting rod 35 having a first end 36 fixed solidly to the carriage 20, for example to the end 23 of the beam 22, and an opposite end 37 fixed to the guided element 31.

[0044] In particular, in the embodiment illustrated, the guided element 31 comprises a second roller movable relative to the further connecting rod 35 and suitable to engage and slide along the hollow rail 16 of the first guide 10.

[0045] In its turn, as shown in figures 3 and 4, the second connection device 40 comprises for example: a pair of flanges 41 fixed externally to the first hollow cylinder 2 and on which the second guide 50 is fixed laterally, on the opposite side with respect to the first guide 10; a bearing 42 mounted around an end portion of the carriage 20, for example around the end portion 23 of the beam 22; an anchoring plate 43 connected for example screwed onto the pair of flanges 41; a jaw-like or clamp-shaped body 44 suitable to embrace externally the bearing 42 and to be clamped on said anchoring plate 43.

[0046] In this way, thanks to the bearing 42, the carriage 20 is mounted in the second device 40 rotating around the axis 102 with respect to said device 40 and in particular with respect to the hollow cylinder 2.

[0047] Furthermore, the carriage 20 can rotate solidly with the connection rod 35 and with the hooked bin, around the same axis 103 with respect to the first guide 10 and the first hollow cylinder 2 itself, when the roller 38 moves along the intermediate curvilinear portion 12 of the guide 10 itself.

[0048] In practice, in the device 100 the sliding movement of the hollow cylinder 2 from the initial lowered position to the final raised position determines at first the raising of the carriage 20 from the initial position to an intermediate position for hooking the at least one waste-holding bin and the sliding of the guided element 31 along a first rectilinear portion 11 of the guide 10, then the subsequent rotation, around the second axis 102, of the carriage 20 together with the hooked bin when the guided element 31 moves along the second curvilinear portion 12 of the guide 10, and finally reaching the emptying position when the first hollow cylinder 2 reaches the final raised position and the guided element 31 is along the inclined portion 13 of the guide 10.

[0049] More in detail, for example starting from the initial lowered position shown in figure 1, the approaching of the at least one waste-holding bin to be emptied causes the intervention of a driving mechanism which triggers starting flow of oil in the rods 1.

[0050] According to well-known solutions, this driving mechanism comprises for example an activation element 4, movably connected to one of the teeth 24, and associated to a proximity sensor 5, for example of the magnetic type. Displacement of the element 4 caused by the positioning of the waste-holding bin at the base 21 pro-

vokes the intervention of the sensor 5 which, in its turn, starts the flow of oil and, therefore, the consequent sliding of each hollow cylinder 2 along the respective rod 1.

[0051] During said sliding movement, the hollow cylinder 2 drags together with it the carriage 20 with the teeth 24 hooking the waste-holding bin, raising it while the guided element 31 slides along the first rectilinear portion 11 of the guide 10.

[0052] In a possible embodiment of the device 100 according to the invention, the translating movement, substantially vertical, is briefly blocked, for greater safety, for example just before the roller 31 enters along the curvilinear portion 12 of the guide 10. Afterwards, the operator can reactivate the flow of oil for example by using the pushbutton panel 155, thus causing further upward movement of the carriage 20.

[0053] When the hollow cylinder 2 continues its upward movement along the rod 1, the guided element 31 enters and moves along the second curvilinear portion 12 of the first guide 10 so causing the rotation, around the second axis 102, of the carriage 20 together with the hooked waste-bin with respect to the hollow cylinder 2 and the first guide 10 and the roller 31 sliding within it. Furthermore, at the entrance to the curvilinear portion 12, the waste-holding bin is clamped thanks in particular to the collaboration of the flange 26 with the plurality of teeth 24.

[0054] During the movement along the curvilinear portion 12, the carriage 20 tilts together with the clamped waste-holding bin into a position suitable for it to be emptied which takes place when the first hollow cylinder 2 reaches the final raised position while the roller 31 has meanwhile moved along at least a part of the final inclined rectilinear portion 13.

[0055] During this movement from the intermediate position to the emptying position, the sliding movement of the roller 28 in abutment against the cam profile 51 forces the clamping flange 26 into the clamping position so maintaining the waste-bin solidly coupled to the carriage 20.

[0056] By inverting the flow of oil, the movement is reversed so bringing down the emptied waste-holding bin, with the clamping flange 26 rotating around the axis 103 under the action of the return spring 45 when the roller 28 is positioned along the cam profile 51 in a position no longer suitable to contrast the return force of the spring itself.

[0057] Clearly, what above described relative to one side of the carriage, takes place in the same manner and synchronously on the other side of the container 150.

[0058] According to a further embodiment, not illustrated in the figures, the at least one carriage 20 can comprise two separate carriages 20, substantially identical to each other and of the same shape as the carriage 20 shown in the attached drawings. In this case, the two carriages 20 can be mounted aligned along the axis 102 between the two guides 10, with the two respective beams 22 mounted each in a cantilever way, in other words with the respective end portion 23 connected to the respective connection devices 30 and 40 as previously described, and with the internal free ends facing and spaced apart from each other along the rotation axis 102, and the teeth 24 divided between the two carriages 20. Likewise, the rod 25 and the clamping flange 26 can be divided into two substantially equal parts, duplicating both on one side and on the other side the same operation as described in the case of a single carriage 20.

[0059] In this case, it is possible to realize a separate and independent movement of the two carriages 20 by means of the two respective hollow cylinders 2.

[0060] In practice it has been ascertained how the device 100 and the corresponding vehicle 200 for waste collection according to the invention make it possible to reach the scope as well as the given objects since they present a manufacturing structure simplified, flexible, and with reduced production and maintenance costs. In fact, unlike the known solutions, the device 100 advantageously uses only and exclusively two rods 1, namely a rod on the right (or first rod 1) and a rod on the left (or second rod 1) and two corresponding hollow cylinders 2, the two rod-hollow cylinder pairs being placed on two corresponding sides of the associated waste collection container. Furthermore, the raising and subsequent tilting of the container takes place substantially by means of a single mechanism with each guide 10 providing a fixed, reliable and precise path for the carriage. Moreover, the hooking means ensure a safe and reliable hooking of the waste bins with great safety of use.

[0061] Furthermore, the device 100 is also flexible to use and can easily be fitted with further hooking elements so as to further increase its versatility.

[0062] For example, in the illustrated embodiment, the hooking means further comprise a pair of hooking arms 60 each with a seat 61 suitable to receive a corresponding protuberance on the waste-holding bin to be hooked, and two corresponding stoppers 62 each mounted oscillating on the respective arm 60. The protuberance on the waste-holding bin can be composed of pins protruding from its side walls, according to embodiments already known in the art, and the arms 60 and respective stoppers 62 therefore make it possible to hook other waste-holding bins different from those which can be hooked by means of the teeth 24 and the clamping flange 26.

[0063] In practice, in this case, when the carriage 20 is moved between the initial position and the final raised position for emptying the hooked waste-holding bin, in the rotated or tilted position, the stoppers 62 oscillating through gravity prevent the pins from going out from the seats 61, therefore maintaining the waste-holding bin hooked to the carriage 20.

[0064] Therefore, it turns out that the carriage 20 is suitable to move waste-holding bins of different types, waste-holding bins of the same type but with different widths, two waste-holding bins at the same time; furthermore, in the case of using two separate carriages 20 it is possible to operate one carriage simultaneously or independently of the other.

[0065] Naturally, without prejudice to the scope of the invention, many variations and implementation details thereof may be applied to the above-described exemplary and non-limiting embodiments, without departing from the scope of protection of the invention as defined by the accompanying claims. For example, some of the above-described hooking means, as well as some of the connection means, could be configured and/or positioned and/or reciprocally connected differently from what described, while still remaining capable of carrying out the functions and scopes for which they were designed within the scope of the present invention; the movement of the carriage could be carried out without interruption, etc.

Claims

1. Device (100) for moving and emptying at least one waste-holding bin inside a waste collection container (150), **characterized in that** it comprises at least:

   - a first rod (1) and a first guide (10) suitable to be fixed to the container (150), said first rod (1) extending longitudinally along a first reference axis (101) and said first guide (10) having a shaped profile including at least one rectilinear portion (11) and a subsequent second curvilinear portion (12) which extends from the rectilinear portion (11) towards said container (150);
   - a first hollow cylinder (2) mounted around the first rod (1), bidirectionally slidable along said first reference axis (101) between a lowered initial position and a raised final position;
   - at least one carriage (20) which comprises means for hooking said at least one waste-holding bin, and is adapted to be moved between a rest position and a position for emptying the hooked at least one waste-holding bin;
   - a first connection device (30) which is connected to and is movable together with said carriage (20), and comprising a guided element (31) suitable to slide along said shaped profile of the first guide (10);
   - a second connection device (40) configured to connect the first hollow cylinder (2) to the carriage (20) so that they move together, and further to allow the rotation, about a second axis (102) transverse to the first axis (101), of the carriage (20) together with a hooked waste-holding bin relative to the first hollow cylinder (2) and to the first guide (10) when the guided element (31) slides along said second curvilinear portion (12).

2. Device (100) according to claim 1, wherein the hooking means comprise clamping means configured to be actuated and tighten a hooked waste-holding bin after lifting the carriage (20) from the initial position and when the guided element (31) enters said subsequent second curvilinear portion (12).

3. Device (100) according to claim 1 or 2, wherein said carriage (20) comprises a resting base (21) for a waste-holding bin, said resting base being surmounted by a beam (22) which extends transversely along said second axis (102) and having an end portion (23) connected to said first and second connection devices (30, 40).

4. Device (100) according to claim 3, wherein said hooking means comprise a plurality of teeth (24) which protrude from the beam (22), spaced apart from each other, and said clamping means comprise a second rod (25) which is connected to the beam (22) so as to be able to rotate, with respect to it, around a third axis (103) substantially parallel to the second axis (102), and a clamping flange (26) movable solidly with the second rod (25) and adapted to tighten, in collaboration with said plurality of teeth (24), an associated portion of the hooked at least one waste-holding bin.

5. Device (100) according to one or more of the previous claims, wherein said clamping means further comprise a second guide (50) having a cam profile (51), said second guide (50) being connected to and solidly movable with the first hollow cylinder (2), with the cam profile (51) facing the carriage (20).

6. Device (100) according to claim 5 when dependent on claim 4, wherein said clamping means further comprises a pair of connecting rods (27) fixed solidly to the second rod (25) at a first end, and connected to a first roller (28) at an opposite end, said first roller (28) being movable relative to the pair of connecting rods (27) and adapted to act in abutment against the cam profile (51) of the second guide (50) so as to force the clamping flange (26) in the position of tightening the waste-holding bin.

7. Device (100) according to one or more of the previous claims, wherein said first guide (10) comprises a hollow rail (16) defining said first rectilinear portion (11) and the subsequent curvilinear portion (12) and further comprising a third rectilienar portion (13) which extends from said curvilinear portion (12) further towards the container (150) inclined with respect to the first rectilinear portion (11).

8. Device (100) according to claim 7, wherein said first connection device (30) comprises a further connecting rod (35) having a first end (36) fixed solidly to the carriage (20) and an opposite end (37) fixed to the guided element (31), and wherein said guided element (31) comprises a second roller (32) movable relative to the further connecting rod (35) and suita-

ble to engage slidably inside the hollow rail of the first guide (10).

9. Device (100) according to one or more of the previous claims, wherein said second connection device (40) comprises a pair of flanges (41) fixed externally to the first hollow cylinder (2) and on which the second guide (50) is fixed laterally, a bearing (42) mounted around an end portion of the carriage (20), an anchoring plate (43) connected to said pair of flanges (41), a jaw-like body (44) suitable to embrace externally said bearing (42) and to be clamped on said anchoring plate (43).

10. Vehicle (200) for the collection of waste, comprising a waste collection container (150), **characterized in that** it comprises at least one device (100) according to one or more of the previous claims, connected to said container (150).

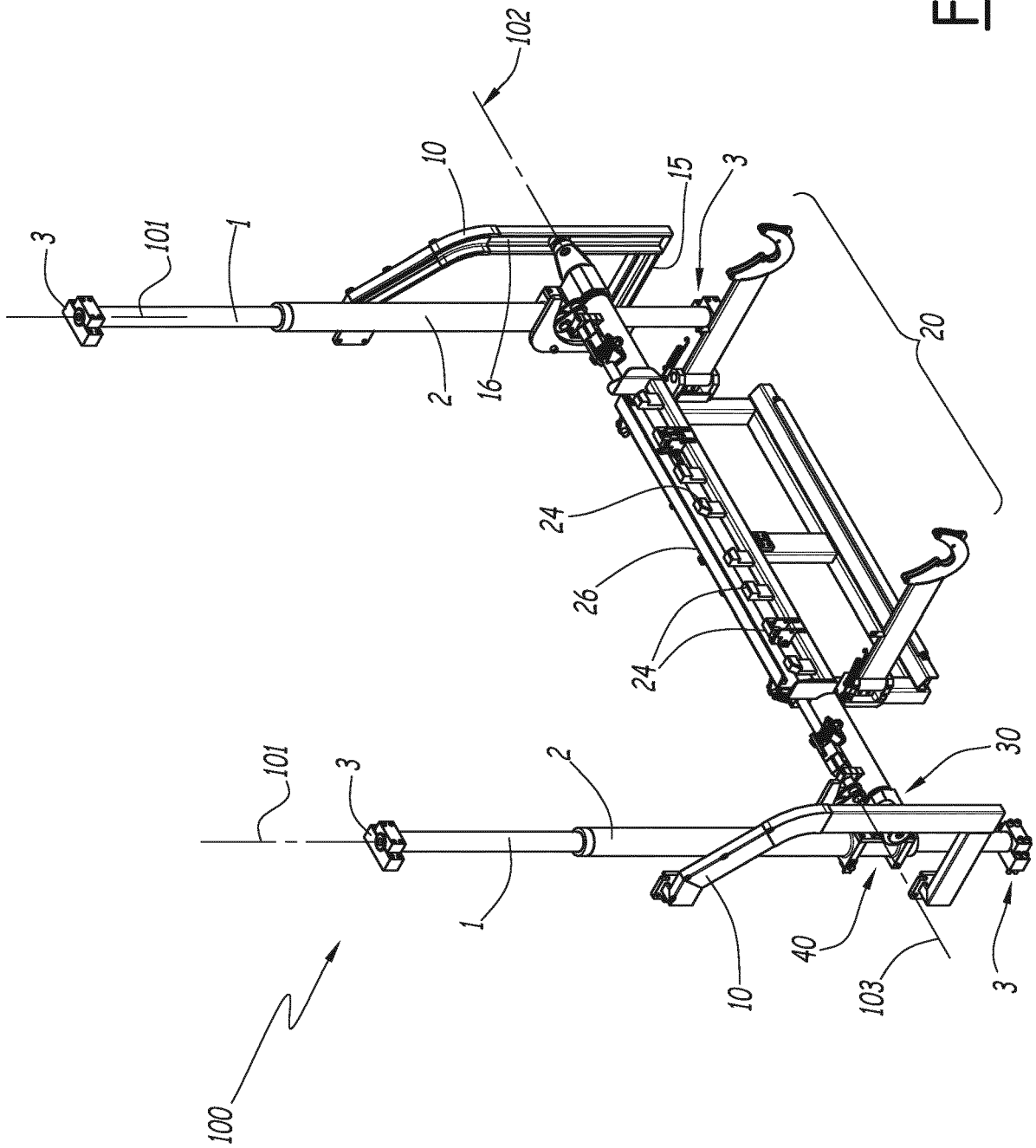

FIG.1

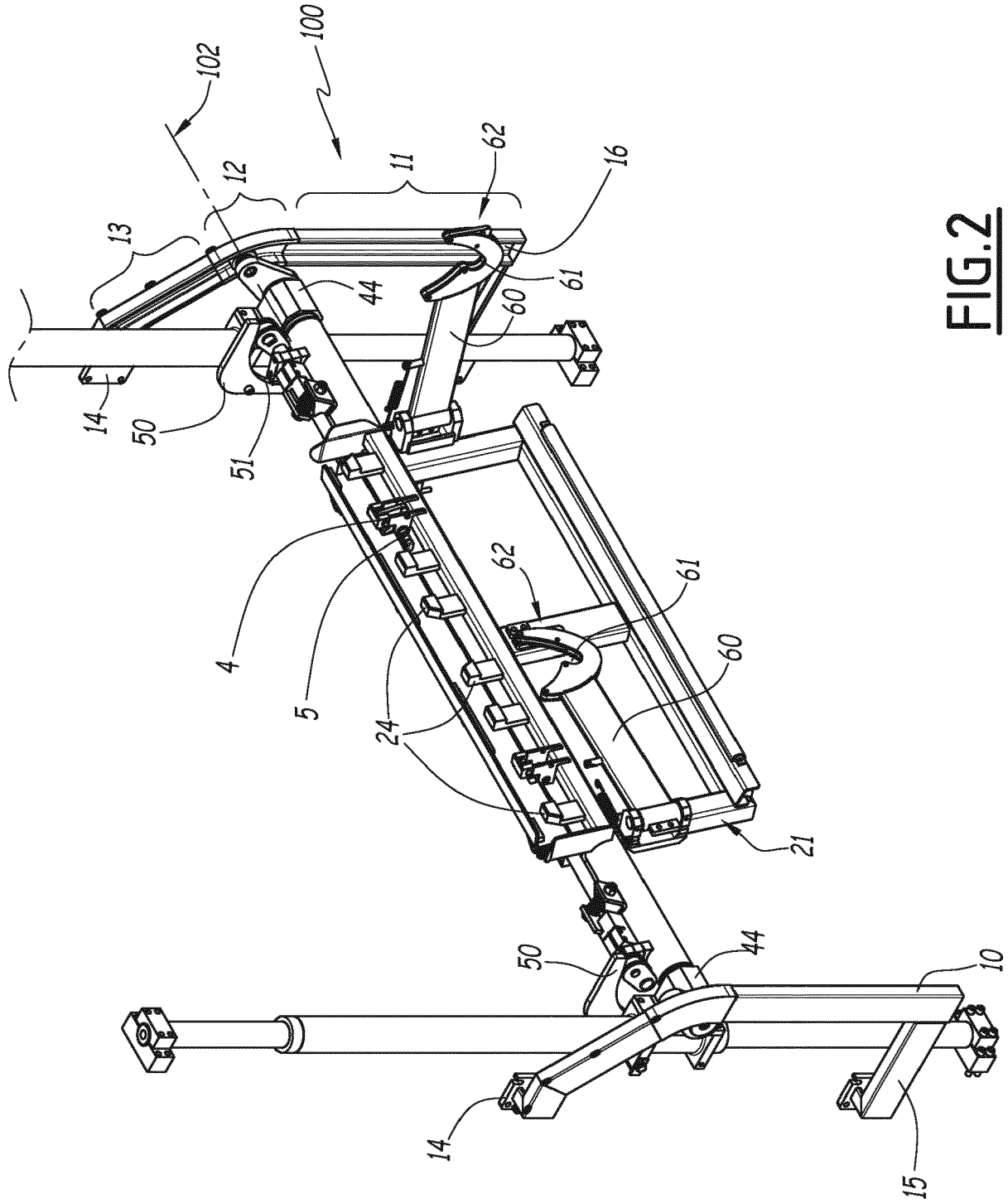
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FIG.2

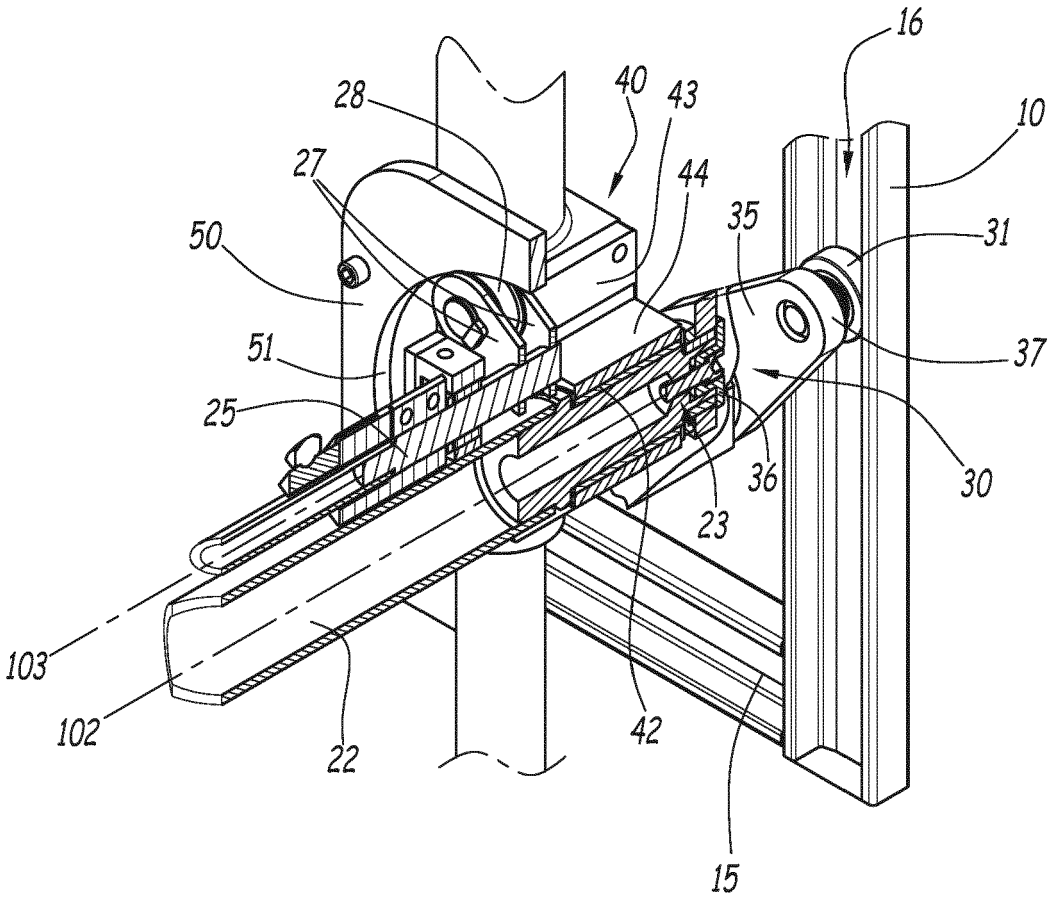

FIG.3

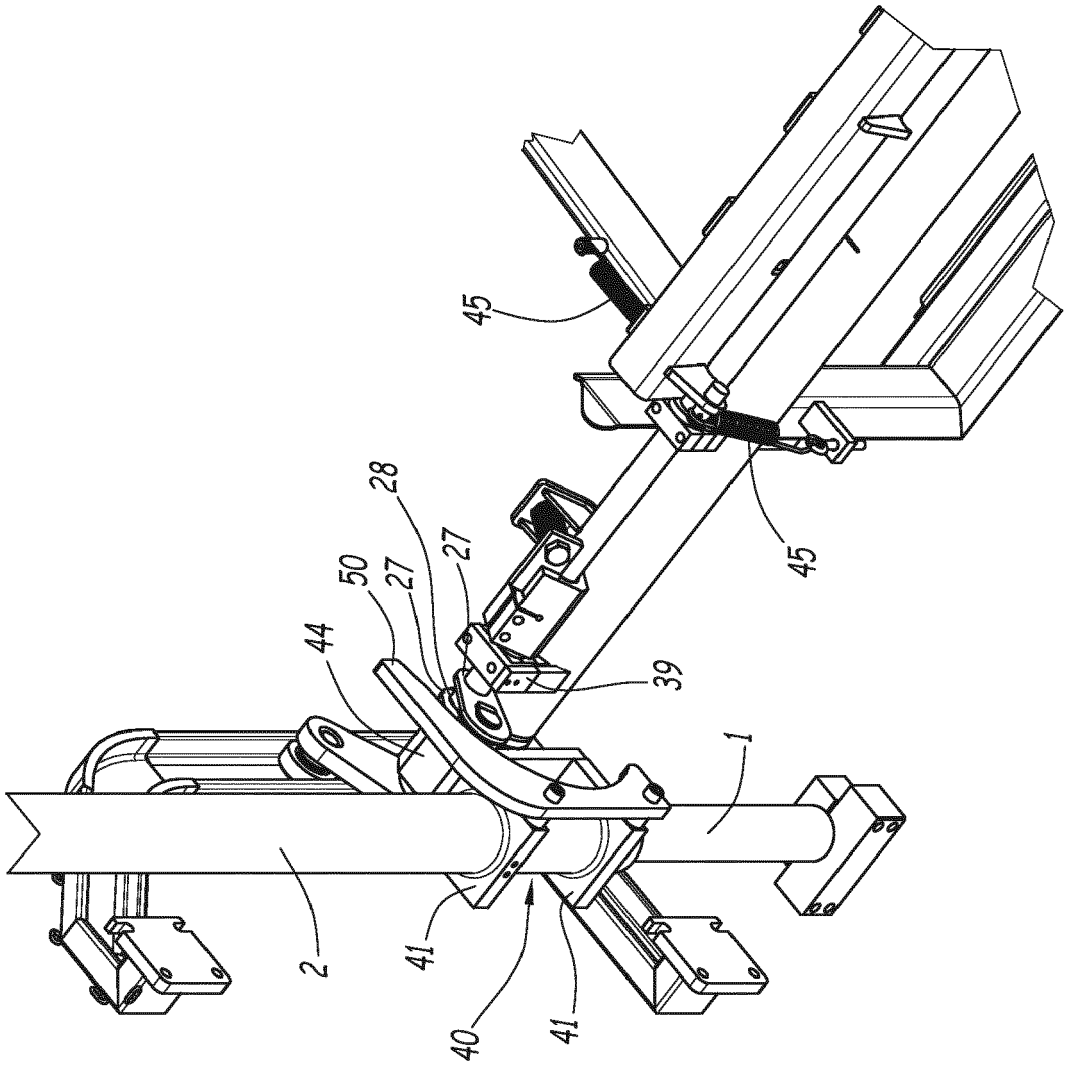

FIG.4

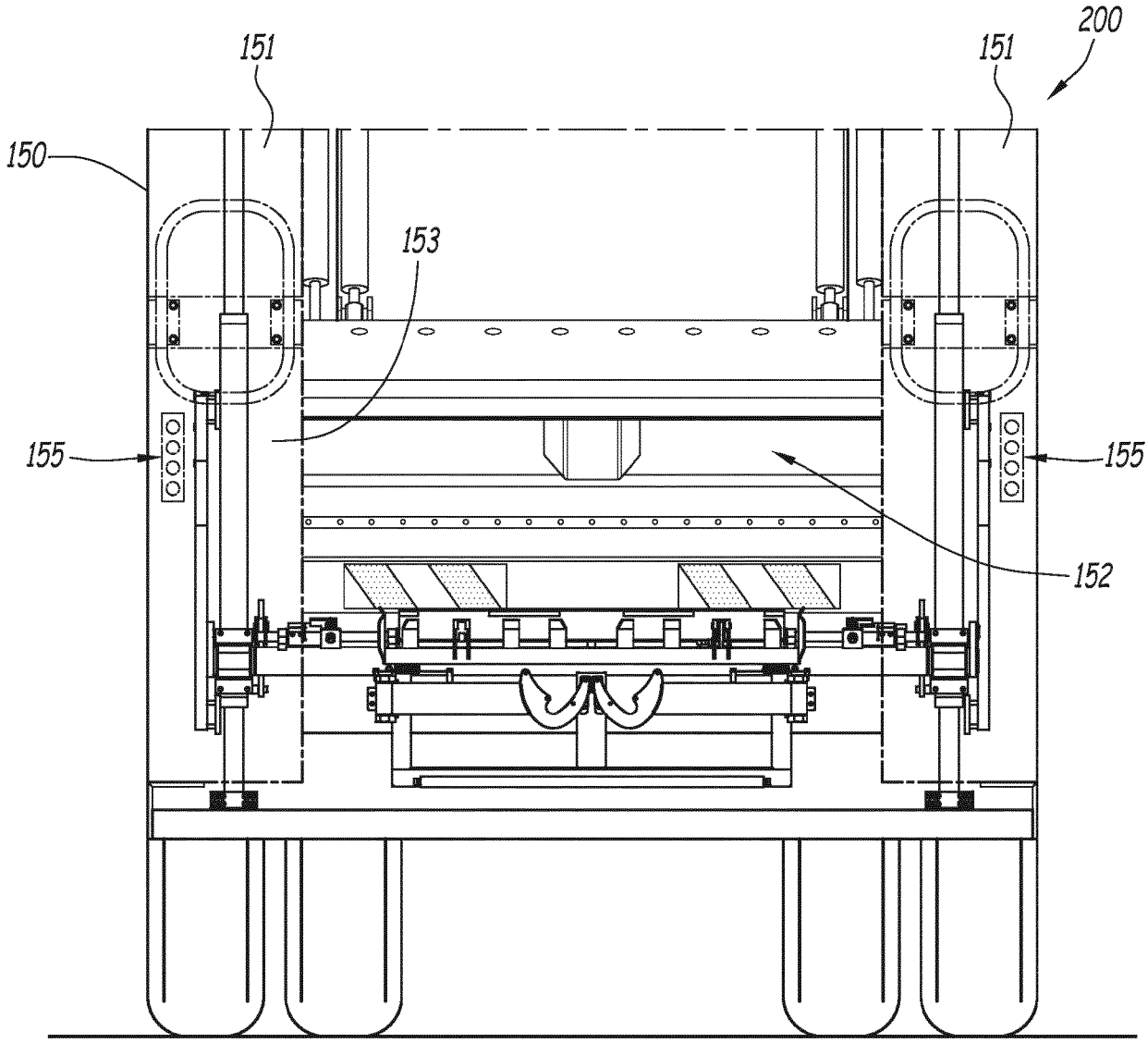

FIG.5

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 21 4697

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	EP 0 313 269 A2 (ALLEN JACK MOTOR BODIES [GB]) 26 April 1989 (1989-04-26) * the whole document * -----	1-8,10 9	INV. B65F3/08
X	AT 384 799 B (EURO WAREN HANDELSGESELLSCHAFT [AT]) 11 January 1988 (1988-01-11) * page 3, line 28 - line 51; figures 1-3 * -----	1,3,7,8, 10	

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	29 April 2021	Wartenhorst, Frank

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