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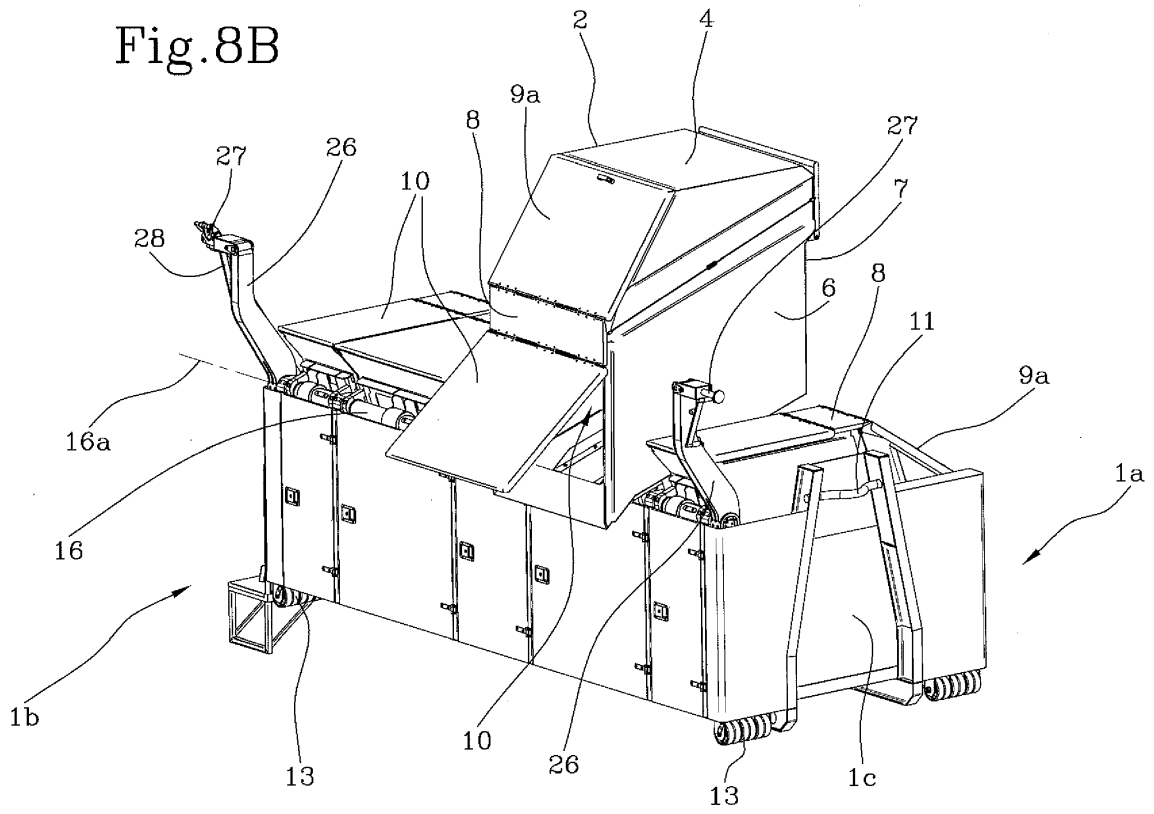
(54) **A device for collecting waste**

(57) A device for separately collecting waste comprises at least two containers (2) for separately inserting waste; a base frame (3) bearing the containers (2); a tipping mechanism (15) that comprises a shaft (16) that is angularly rotatable along a respective longitudinal axis of rotation (16a) and rotatably supported by the base frame (3), and a selective connecting system (17) associated with each container to connect a respective container (2) rotatably engaged about this shaft (16) to the shaft (16), and to enable mechanical transmission of the rotational movement from the shaft (16) to the container (2) to cause it to tip around the longitudinal axis of rotation (16a) during the emptying stage.

Fig.8B



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Description

[0001] The object of the present invention is a device for separately collecting solid waste.

[0002] In particular, the present invention relates to a mobile waste separation unit for separately collecting waste. Waste separation units are areas provided with adequate equipment for the collection of different types of waste, which make it possible to carry out the so-called neighbourhood waste collection where it is the resident who brings the waste, preventing waste collectors from having to collect it door-to-door.

[0003] Waste collection in urban areas is normally carried out using special containers, for example bins or bell-shaped containers, resting on the ground or underground on special lift platforms, suitably distributed throughout the urban districts and accessible to residents for the insertion of waste.

[0004] The containers are periodically emptied on the premises, on suitably equipped motor vehicles suited to that purpose and that provide for transport of the waste to the respective treatment areas.

[0005] For practical reasons and to reduce the amount of occupied public land, the containers dedicated to separated waste collection can be placed side by side, rather than separately distributed as individual units. However, the waste separation units thus planned must be easy to move to permit cleaning of the public areas, in addition to being able to load and unload so as to enable the transport thereof to waste disposal locations, generally by means of motor vehicles.

[0006] In particular, they can be realised as multicompartment, unloading containers, which have special internal dividing gates that are attached on one side only or slidable, and that can be opened as needed to empty the container.

[0007] Emptying takes place using a motor vehicle provided with a loading/unloading hydraulic hook that serves for transporting and for emptying it.

[0008] Once the container has been loaded onto the vehicle, it is transported to the waste disposal location and emptied from the rear by gravity, by opening rear tail gates having a horizontal or vertical hinge.

[0009] In other words, the container is tilted and the internal dividing gates are opened one after the other, thereby freeing, by gravity, the compartments of the various materials, which are dumped directly into the respective area of the waste disposal site dedicated to that particular type of waste.

[0010] The problem with this type of waste separation unit lies in managing the opening of the gates, which are typically opened manually from the outside or even directly from the inside by the waste collector.

[0011] Another drawback that is observable in containers of this type consists in the low emptying height, which makes it necessary to unload the material on the ground or in a pit.

[0012] Furthermore, another drawback lies in poor or missing sealing between one compartment and the other.

[0013] Another type of mobile waste separation unit is disclosed in document WO2010/133265.

[0014] This waste separation unit comprises a plurality of containers positioned one beside the other and mounted on a supporting frame equipped with a hydraulic system for overturning each tank and emptying it as well.

[0015] The hydraulic system also manages movement of the four vertical feet for lifting the entire multi-tank waste separation unit, so as to load it on a special vehicle used for transporting the entire waste separation unit to the disposal location.

[0016] Movement of the feet of the waste separation unit also involves opening the vertical cylinders cooperating with the feet, so as to lower the latter outside the space occupied by the vehicle.

[0017] With this aim, there are many electrical and hydraulic components on board the waste separation unit for commanding and controlling the numerous actuators.

[0018] The waste separation unit is therefore structurally complicated and heavy, in addition to requiring hydraulic connections for delivery and return of the hydraulic oil, with a resulting risk of oil leakage; in fact, the waste collector must manually connect the hydraulic lines connecting the vehicle equipped with a pump and the waste separation unit equipped with actuators and a hydraulic system.

[0019] According to the Applicant, however, there are various aspects of the prior art systems described above that can be improved.

[0020] Specifically, the aim of the present invention is to overcome the limits and drawbacks described above with reference to the prior art.

[0021] More specifically, an aim of the invention is to offer a device for separately collecting waste that enables collection of urban waste by means of a simple and safe instrument that enables residents to deliver a plurality of types of waste to one equipped location, the types of waste including for example paper, glass, plastic, unsorted waste, organic waste, batteries, pharmaceutical drugs, and oil, and that operates on public land during a daily time period or on various days according to a predefined schedule.

[0022] A further aim of the invention is to realise a device for separately collecting waste that proves to be structurally simple and easy to use in complete safety for both the user and the waste collector.

[0023] Moreover, an aim of the present invention is to offer a waste collection device that does not have elements complicated by electronic components and/or hydraulic parts.

[0024] Not least in importance, a further aim is that said device be suited to arrangement on the ground in the desired direction, that is, with the side predisposed for waste insertion facing the kerbside or the street, based on the needs of each individual preselected site. These and other aims as well are substantially achieved, according to the invention, by predisposing for at least two

containers associated with the base frame, a tipping mechanism comprising a shaft that is angularly rotatable along a respective longitudinal axis of rotation and rotatably supported by the base frame, and a selective connecting system that is associated with each container, to enable mechanical transmission of the rotational movement from the shaft to the container and cause it to tip around the shaft.

[0025] More specifically, the object of the present invention is a device for collecting waste, particularly solid urban waste, and comprising the characteristics set forth in claim 1 and/or one or more of the subsequent claims.

[0026] Further characteristics and advantages of the invention shall become more apparent from the detailed description of a preferred but not exclusive embodiment of a device for waste collection in accordance with the present invention.

[0027] This description is set forth herein below with reference to the accompanying drawings, which are provided solely by way of non-limiting example and in which:

- Figure 1 is a perspective view of a device for solid waste that is equipped with a tipping mechanism according to the present invention, with some parts partially removed to make it easier to view other parts;
- Figure 2 is a view of the base frame supporting the waste collection containers that are part of the device for collecting waste constituting the object of this invention, the base frame being associated with the cited tipping mechanism;
- Figures 3, 4, 6a and 6b are views of structural parts of the tipping mechanism associated with the device for collecting waste constituting the object of the present invention;
- Figure 5 is a view of the waste collection container associated with a structural supporting element thereof;
- Figures 7a, 7b and 7c show three stages of loading the waste collection device onto a vehicle;
- Figures 8a and 8b are two different perspective views of the waste collection device during the operating stage of emptying said device.

[0028] With reference to the figures cited, a device for separately collecting waste according to the invention is indicated in its entirely by the reference number 1. The device 1 comprises at least two containers 2 for insertion of separated urban waste, the containers 2 being positioned beside each other and anchored on a base frame 3 defining the structure supporting the device 1.

[0029] There are preferably three to seven containers, each of which is independent of the others and provided with its own volume or tank (ranging for example between 1 and 6 cubic metres), delimited by a front wall 4, by a rear wall 5 opposite the front wall 4, by two side walls 6 defining respective sides, by a lower base wall 7 and by an upper wall 8 for closure.

[0030] The upper wall 8 also functions as a cover for protection against the elements.

[0031] Two openings are provided on the walls of the container: a mouth 9 where waste is inserted by the user and another mouth 10 for emptying the inserted waste.

[0032] The insertion mouth or opening 9 is preferably arranged on the front wall 4 or on the upper wall, which, in that case, is partially inclined to facilitate insertion of waste, whereas the exit mouth or opening 10 for the waste is provided on the upper wall 8, in an opposite position with respect to the insertion mouth 9.

[0033] The insertion mouth 9 is preferably equipped with a special cover 9a that can be opened by means of a handle and /or pedal 9'.

[0034] The exit opening 10 has a cover 10a that can be opened by remote control or automatically by gravity.

[0035] Each insertion mouth can be equipped with an electronic device for controlling access and comprising devices for the identification of users by means of a card with a transponder or a similar personal identification instrument, and devices for the electromechanical release of each door.

[0036] The device 1, also defined as the waste separation unit, is typically rectangular in shape with the long side usually parallel to the kerb near to which the waste separation unit is positioned.

[0037] This device has a long front side 1a for waste insertion, an opposite rear side 1b and two side walls 1c (Figures1, 8a and 8b).

[0038] The device 1 then comprises the cited base frame 3 comprising a steel structure and at least one fastening element 11, preferably a rigid rod made of steel and that is operatively engageable by a loading/unloading arm 12 borne by a motor vehicle 32 onto which the waste separation unit 1 can be loaded.

[0039] Advantageously, there can be two fastening elements 11 arranged on the opposite side walls 1c, for the purpose of enabling the waste separation unit 1 to be placed on the ground in the desired direction, that is, with the side predisposed for waste insertion facing the kerb side or the street, based on the needs of each individual preselected site.

[0040] The base frame 3 can further comprise hooks or it can be engaged by hydraulic hooks (unillustrated) for connecting the waste separation unit to the flat bed of the vehicle predisposed for transport to the disposal location.

[0041] During the transport and unloading stages, the fastening element 11 keeps the base frame 3 anchored to the vehicle (Figure 7c) by means of the main hook 12' of the loading arm 12 and by means of at least one pair of the cited hydraulic hooks that engage the horizontal beams at the base of the frame 3, thus ensuring the stability of the assembly.

[0042] Preferably, at least one pair of idler wheels 13 is provided beneath the base frame3 for sliding the device on the ground during loading and unloading manoeuvres. Advantageously, these wheels 13 can be made of Teflon® to prevent damage to the pavement in a historic

centre. The device 1 comprises a selective tipping mechanism 15 for tipping at least one container 2, so as to facilitate the emptying of the container 2, as it is visible in Figures 1 and 2.

[0043] The tipping mechanism 15 comprises a shaft 16 (Figures 1, 2 and 3) that is angularly rotatable along a respective longitudinal axis 16a of rotation and rotatably supported by the base frame 3. The shaft 16 is supported in a stable position by means of special supports 3a that are part of the base frame3by means of bearings or pairs of semi-cylindrical bushings.

[0044] In particular, each container 2 is hinged to the base frame 3 by means of a supporting structure 14 (Figure 5) provided with a sturdy hinge 14a, within which the cited shaft 16 is inserted.

[0045] Each container 2 thus proves to be rotatably engaged about the shaft 16, and rotatable around the longitudinal axis 16a of the shaft 16.

[0046] The shaft 16 is advantageously of a length corresponding more or less to the length of the waste separation unit, ranging for example between 3 and 6 metres, and it is preferably positioned at a height of about 100 ÷ 150 cm from the ground, when the device is positioned on the ground.

[0047] The tipping mechanism 15 further comprises a selective connecting system 17 associated with each container and capable of selectively connecting a container with the shaft 16 to enable mechanical transmission of the rotational movement from the shaft 16 to the container 2. In other words, during normal use of the device for the insertion of waste, each container 2 is rotatably associated with the shaft 16, without any risk of tipping, whereas when being emptied, the selected container 2 must be rigidly connected, by means of the cited selective connecting system 17, to the shaft 16, which, with the rotation thereof, brings about the tipping of the container 2.

[0048] As can be seen in Figure 1, the shaft and the selective connecting system 17 are advantageously associated with the rear wall 5 of each container 2, opposite the front wall 4 that faces the waste insertion side 1a.

[0049] The selective connecting system 17 comprises at least one slider 18 (Figures 1, 2 and 4) slidably associated with the shaft 16 and at least one interference element 19 that is present on the shaft 16.

[0050] The interference element 19 is realised by at least one projection, preferably by a plurality of projections extending radially along the shaft 16 alternating with smooth cylindrical tracts 16b.

[0051] Therefore, as can be seen in Figure 3, the shaft 16 has a succession of smooth cylindrical tracts 16b and tracts 16c with one or more protrusions intended to transmit rotational motion to the containers 2 by means of the interposition of sliders 18.

[0052] The so-called protrusions or projections defining the interference element 19 can consist of gibs, solid section bars, or section bars welded to the shaft 16 and they can be symmetric in cross-section (typically rectangular or rectangular with chamfering) or of asymmetric in cross-section, leaving a longer extension of the side that exerts the greater force during the stage of lifting a container. There can be one protrusion or a larger number of protrusions so as to subdivide the stress (for example, 4 to 8).

[0053] The slider 18, which is clearly visible in Figure 4, has an elongate body 20 extending along a longitudinal axis 18a between a first end 20a and a second end 20b, and a through opening 21 transversal to the longitudinal axis 18a and that is positioned close to the first end 20a. The through opening 21, inside of which the shaft 16 is inserted, is substantially cylindrical in shape and has at least one radial cavity 22 that is consistent in shape, number and position with the protrusion(s) afforded on the shaft; in other words, the cavity(ies) 22 found in the through opening 21 is/are shaped to match the interference element 19.

[0054] The slider 18 is movable between a first non-operating position, in which it is positioned to turn freely on the shaft 16, and a second operating position, in which it is engaged on the interference element 19 to connect the selected container 2 to the shaft 16.

[0055] The slider 18 advantageously has grip handles 18' to be gripped and suitably moved to the position for engagement or disengagement on the corresponding interference element 19.

[0056] According to an alternative, unillustrated, configuration, if the device 1 comprises a limited number of containers 2, on the order of two or three containers, the sliders 18 can be rigidly connected to each other by means of a single horizontal rod. Movement of this rod causes the simultaneous sliding of all the sliders 18 associated with the rod. Following movement of the rod, in order to have only the preselected slider engaged, rather than all the sliders, the relative position of the sliders 18 on the shaft 16 must be offset with respect to the interference elements 19. In other words, by positioning the sliders 18 in an offset position and at different distances with respect to the respective interference elements 19, it is possible to ensure engagement of only one slider 18 at a time.

[0057] Theoretically this could be valid for any number of containers 2; this configuration could have the advantage of having a rod controlled at the head from a single point, manually or possibly also by means of an electrical or electro-hydraulic control fastened on board the vehicle, and thus capable of controlling the horizontal sliding of the rod, bringing it to engage only one slider at a time.

[0058] In further detail, the slider 18 protrudes radially with respect to the shaft and along its elongate body 20, particularly near the second end 20b thereof, it has a first contact portion 23 spaced away from the longitudinal axis of rotation 16a and pushing against the container 2, when the slider 18 is engaged on the interference element 19.

[0059] With respect to the through opening 21, a second contact portion 24 extends on the side opposite the side containing the second end 20a of the elongate body

20, and it serves as a limit stop for rotation of the container 2 in the emptying stage and thus to prevent accidental tipping of the container 2 beyond a pre-established limit.

[0060] In addition, this second contact portion 24 also serves to prevent free and independent oscillation of the slider 18 around the longitudinal axis 16a of the shaft 16, when the slider 18 is not engaged on the corresponding interference element 19.

[0061] In fact, rotation of the slider 18 around the axis 16a should only be possible jointly with rotation of the shaft 16 around the same axis 16a, following engagement of the slider 18 on the interference element 19.

[0062] Advantageously, the slider 18 can also be equipped with are movable fastening system 25 for fastening it to the base frame 3 or to the structure 14 supporting the container 2, to stably connect it to one or the other when it is not in use. This fastening system 25 can comprise for example a pin provided with a peg with a split pin or a simple split pin.

[0063] The tipping mechanism 15 further comprises at least one control rod 26 (observable individually in Figures6a and 6b in two different operating states) that is connected by means of a first end thereof 26a to one end 16d of the shaft 16, with respect to which the rod 26 is positioned transversely.

[0064] In fact, the rod 26 has the function of controlling the rotation of the shaft 16 during the stage of emptying the containers 2.

[0065] As can be seen in Figure 3, the shaft 16 preferably has protrusions of the interference element 19 also at least at one end 16d, that is, where the control rod 26 is engaged.

[0066] In fact, the coupling of the first end 26a of the rod 26with the shaft 16 takes place by insertion of one end 16d of the shaft 16inside a through opening 26' shaped to match it and afforded in the first end 26a of the rod (Figures 6a and 6b).

[0067] The first end 26a thus engages onto the end 16d of the shaft 16, and is stably coupled thereto to activate rotation of the shaft 16.

[0068] The shaft 16 can advantageously comprise protrusions 19 also at the other opposite end 16d, for the purpose of engaging a second rod 26 as well, thus making it possible to load the device on board the motor vehicle in an opposite direction and as a result enabling the containers 2 to be emptied along the opposite side, based on how the waste separation unit is loaded on board the vehicle by the driver.

[0069] In other words, the device 1 can advantageously comprise two control rods 26 located on opposite sides with respect to the device 1, specifically each being positioned on a respective side wall 1c, transversal to the longitudinal axis 16a of the shaft 16.

[0070] The control rod 26 is preferably constituted by a steel section bar with a rectangular cross-section, or an edged flat bar, and it is provided with a fastening element 27 at a second end 26b thereof that is engageable with an actuating unit28(observable in Figures1 and 8a).

[0071] This latter unit can consist of a hydraulic actuator for example, which can be associated with a vehicle, as shown in Figures 7a, 7b, and 7c, and it is capable of activating the control rod 26 in the stage of emptying the containers 2.

[0072] The actuating unit 28 is installable preferably in a central position with respect to the transverse dimensions of the device 1, that is, substantially at the midpoint of the side walls 1c. When the actuating unit28 is mounted on a motor vehicle, it is advantageously positioned immediately behind the engine cab, in a central position with respect to the loading plane of the vehicle.

[0073] In this manner, regardless of the loading direction of the device and the dimensions of the control rod 26, the actuating unit 28 can be easily connected with and act directly on the control rod 26.

[0074] To facilitate movement of the control rod 26, the actuating unit 28 is advantageously hinged to an end 28a thereof, opposite an end 28b connecting with the rod 26; it can thus oscillate along a plane at a right angle to the shaft 16 around an axis 28c parallel to the longitudinal axis 16a of the shaft 16.

[0075] The fastening element 27 for engagement with the actuating unit 28 can consist of either a through hole or a gripping pin.

[0076] As illustrated in Figures6a and 6b, the control rod 26 comprises a main portion 29 bearing the end 26a, and a movable portion 30, bearing the second end 26b.

[0077] The movable portion 30 is hinged to the main portion 29 and it is movable between a first passive position (Figure 6a), in which it is aligned with the main portion 29, and a second active position (Figure 6b), in which it is positioned transversely with respect to the main portion 29 for coupling with the cited actuating unit 28.

[0078] The rod 26 remains passive during use of the waste separation unit on public land and it is positioned above the fastening element 11, or loading hook.

[0079] The rod is engaged, and thus positioned in the active position, only for the stage of emptying one or more containers.

[0080] During normal use, the waste collection device 1 is stably positioned on the ground, with the containers 2 stably positioned in a vertical position and the respective sliders 18 stopped and disengaged from the interference elements 19. The movable portion 30 of the rod 26 is aligned with the main portion 29 and positioned in a position that is substantially parallel with the ground.

[0081] When the waste separation unit needs to be transported to the waste disposal location, the motor vehicle loads the entire device 1 fastening it by means of the fastening element 11 with the loading/unloading hook 12' (Figure 7a), lifting it onto the pair of rear wheels 13 (Figure7b) and pulling it until it is loaded onto the flatbed of the vehicle (Figure 7c).

[0082] Once the device has been loaded onto the vehicle and the waste disposal location has been reached, it is possible to proceed with the selective emptying of the containers 2.

[0083] To do this, the waste collector must connect the container 2 to be emptied to the shaft 16 by engaging the corresponding slider 18 to the respective interference element 19.

[0084] Subsequently or prior to this, the actuating unit 28 is fastened to the second end 26b of the rod 26, specifically to the fastening element 27.

[0085] The actuating unit 28 can be integral with the vehicle and anchored in the zone comprised between the cab and the loading/unloading system, as shown in Figures 7a-7c, in which a hydraulic cylinder is illustrated. The hydraulic cylinder can oscillate along a horizontal axis and has a head that is connectable to the rod 26 of the waste separation unit for the purpose of rotating it by about 90°. The extension of the actuating unit 28 brings about rotation of the rod 26.

[0086] The rotation of the rod 26, in turn, brings about the rotation of the shaft 16, which, in return, brings about rotation of one or more containers 2 previously connected to the shaft by means of the selective connecting system.

[0087] In the solution described above, connection between the fastening element 27 and the actuating unit 28 takes place manually, by a collector who climbs onto the specific footboard at the rear of the cab and connects the two elements.

[0088] Alternatively, the connection can be mechanised by means of a hydraulic device (unillustrated), predisposed at the connecting end 28b of the actuating unit 28. Following its activation, this hydraulic device being attached on one side only extends towards the control rod 26, which in this case is advantageously rectilinear and without a movable portion hinged to a main portion, so as to fasten and engage the fastening element 27 provided on the second end 26b of the rod 26, and that is part of the waste separation unit.

[0089] In the case in which the vehicle 32 is not equipped with an actuating unit 28, the tipping of the container 2 can also be realised using a generic mechanical device (a small crane or another device), which directly grips the container, by means of a specific handle or gripping element (such as the opening pedal 9' for example) preferably provided at the base of the front wall 4 of the container, and overturns it.

[0090] Moreover, the emptying of each container 2 can take place by means of the rod 2 engaged in the fastening element 27 and set into rotation owing to a small crane on the ground or that is installed on the vehicle.

[0091] The device 1 enables the emptying of each individual container 2 by rotation of the horizontal shaft 16 by about 90° and on which the sliders 18 predisposed at each container 2 are engaged.

[0092] The device 1 is thus capable of emptying the individual containers using only kinematic mechanisms. It is therefore without any electric and/or hydraulic elements dedicated to the transport and/or emptying thereof. Emptying is realised by means of a sole hydraulic actuator that preferably remains fixed behind the cab and occupies a minimum amount of space. This makes it possible to employ only one element of the hydraulic distributor of the system with which the vehicle is already equipped, keeping the pipes connected and the safety valves on board the vehicle operating.

[0093] The tipping by about 90° ensures that the overall centre of gravity always remains within the base of the vehicle; in any case, as a precautionary measure, there is a possibility of equipping the vehicle with two or four stabilising feet that can be realised by four vertical axis actuators that are lowered down to the ground by means of a specific element of the hydraulic distributor of the vehicle. In any case, the stabilising feet are fixed and can thus find sufficient room remaining within the boundaries of the vehicle and thus avoiding lateral protrusions as well as further movement and additional components.

[0094] Furthermore, the described device constituting the object of the present invention enables the use of normal double- or tri-axle transport vehicles equipped with a standard hydraulic hook for loading/unloading. Lastly, a system can also be provided for user identification that can be activated with an access key and operationally connected with a control module.

Claims

1. A device for separately collecting waste, comprising:

   at least two containers (2) for separately inserting waste;
   a base frame (3) bearing said containers (2);
   a selective tipping mechanism (15) for tipping at least one container (2) to facilitate the emptying of the containers (2),
   characterised in that the tipping mechanism (15) comprises a shaft (16) that is angularly rotatable along a respective longitudinal axis of rotation (16a) and rotatably supported by said base frame (3), and a selective connecting system (17) associated with each container to connect a respective container (2)rotatably engaged about the shaft (16) to said shaft (16), and to enable mechanical transmission of the rotational movement from the shaft (16) to the container (2) to cause it to tip around said longitudinal axis of rotation (16a) during the emptying stage.

2. The device according to claim 1, **characterised in that** said selective connecting system (17) comprises at least one slider (18) slidably associated with said shaft (16), and at least one interference element (19), present on said shaft (16), said slider (18) being movable between a first non-operating position, wherein it is positioned in such a manner as to turn freely on said shaft (16), and a second operating position, wherein it is engaged on said interference element (19), to connect the selected container (2)

to said shaft (16).

3. The device according to claim 1 or 2, **characterised in that** the slider (18) has an elongate body (20) extending along a longitudinal axis (18a) between a first end (20a) and a second end (20b), and a through opening (21) transversal to said longitudinal axis (18a) and positioned close to said first end (20a), inside of which said shaft (16) is inserted; said opening (21) having at least one cavity (22) shaped to match said interference element (19).

4. The device according to claim 2 or 3, **characterised in that** said slider (18) protrudes radially relative to said shaft (16) and has a first contact portion (23) spaced away from the longitudinal axis of rotation (16a) of the shaft (16) and pushing against said container (2), when the slider (18) is engaged on the interference element (19).

5. The device according to claim 3, **characterised in that** said slider (18) comprises a second contact portion (24) protruding along the longitudinal axis (18a) on the side opposite, with respect to the opening (21), the portion containing the second end (20b), in such a manner as to avoid any accidental tipping of the container beyond the pre-established limit during the emptying stage.

6. The device according to any one of the preceding claims, **characterised in that** it comprises at least one control rod (26) connected by means of a first end (26a) thereof, to one end (16d) of said shaft (16) and positioned transversely with respect to the shaft (16), to control the rotation of said shaft (16) during the stage of emptying said containers (2).

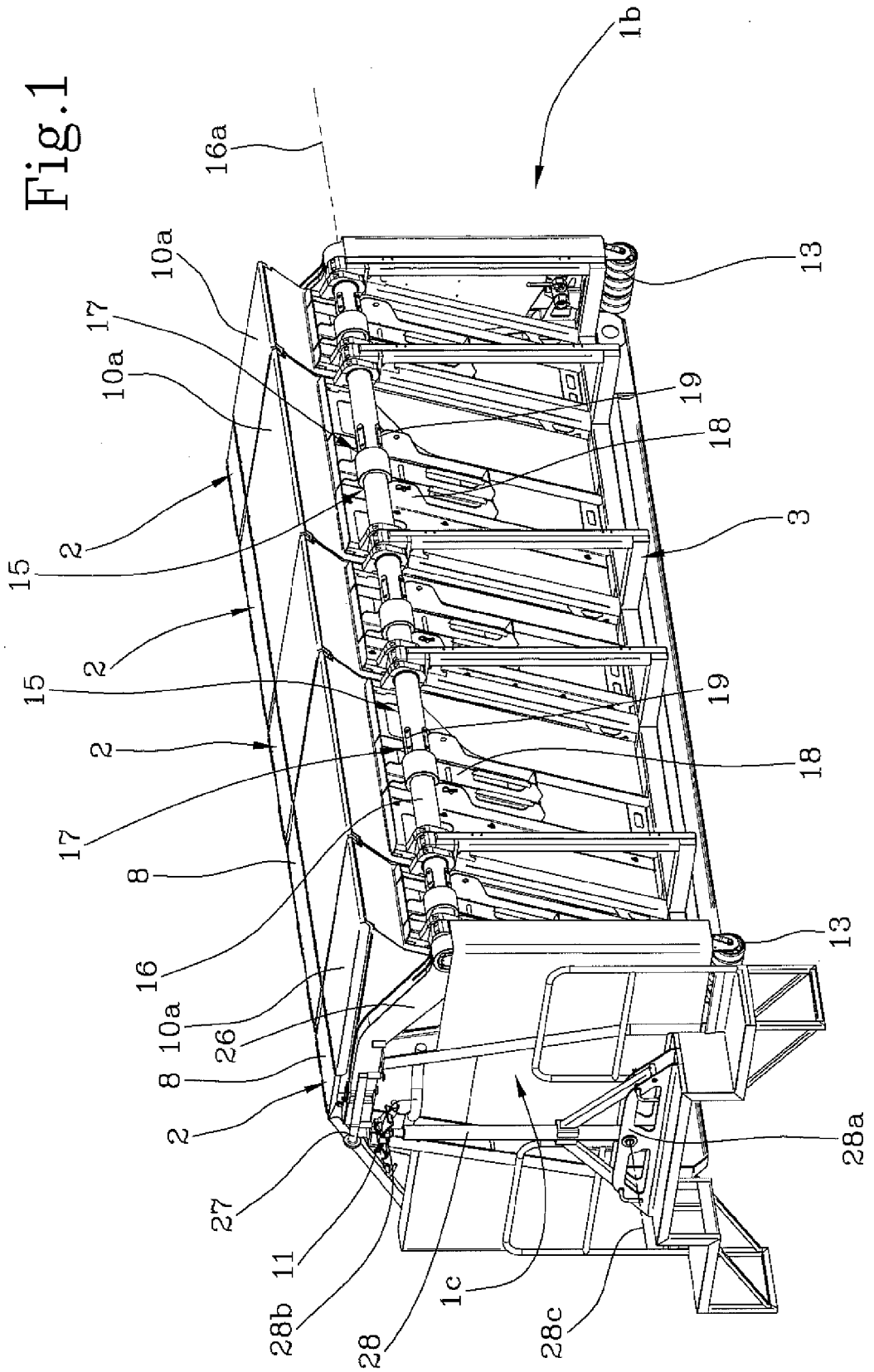
7. The device according to the preceding claim, **characterised in that** the control rod (26) comprises a main portion (29) bearing said first end (26a) and a movable portion (30) bearing a second end (26b) of said control rod (26), said movable portion (30) being hinged to the main portion (29) and movable between a first passive position, wherein it is aligned with the main portion (29), and a second active position, wherein it is positioned transversely to said main portion (29) for coupling with an actuating unit (28).

8. The device according to the preceding claim, **characterised in that** said control rod (26) comprises, at a second end (26b), a fastening element (27) engageable with the actuating unit (28) which is able to move the control rod (26) during the stage of emptying said containers (2) .

9. The device according to the preceding claim, **characterised in that** it comprises two control rods (26), each positioned at an opposite side wall (1c) of the device, transversal to the longitudinal axis (16a) of the shaft (16), said actuating unit (28) being installable in a central position relative to the dimensions of said side walls (1c) and hinged to one end (28a), opposite an end (28b) connecting with said rod (26), so as to oscillate along a plane at a right angle to the shaft (16) around an axis (28c) parallel to the longitudinal axis (16a) of said shaft (16).

10. The device according to any one of the preceding claims, **characterised in that** said base frame (3) comprises at least one fastening element (11) that is operatively engageable by a loading/unloading arm (12) borne by a motor vehicle; the device preferably comprising two fastening elements (11) located on opposite side walls (1c) of the device, transversal to the longitudinal axis (16a) of the shaft (16) so as to allow two-sided loading of the device (1).

Fig.1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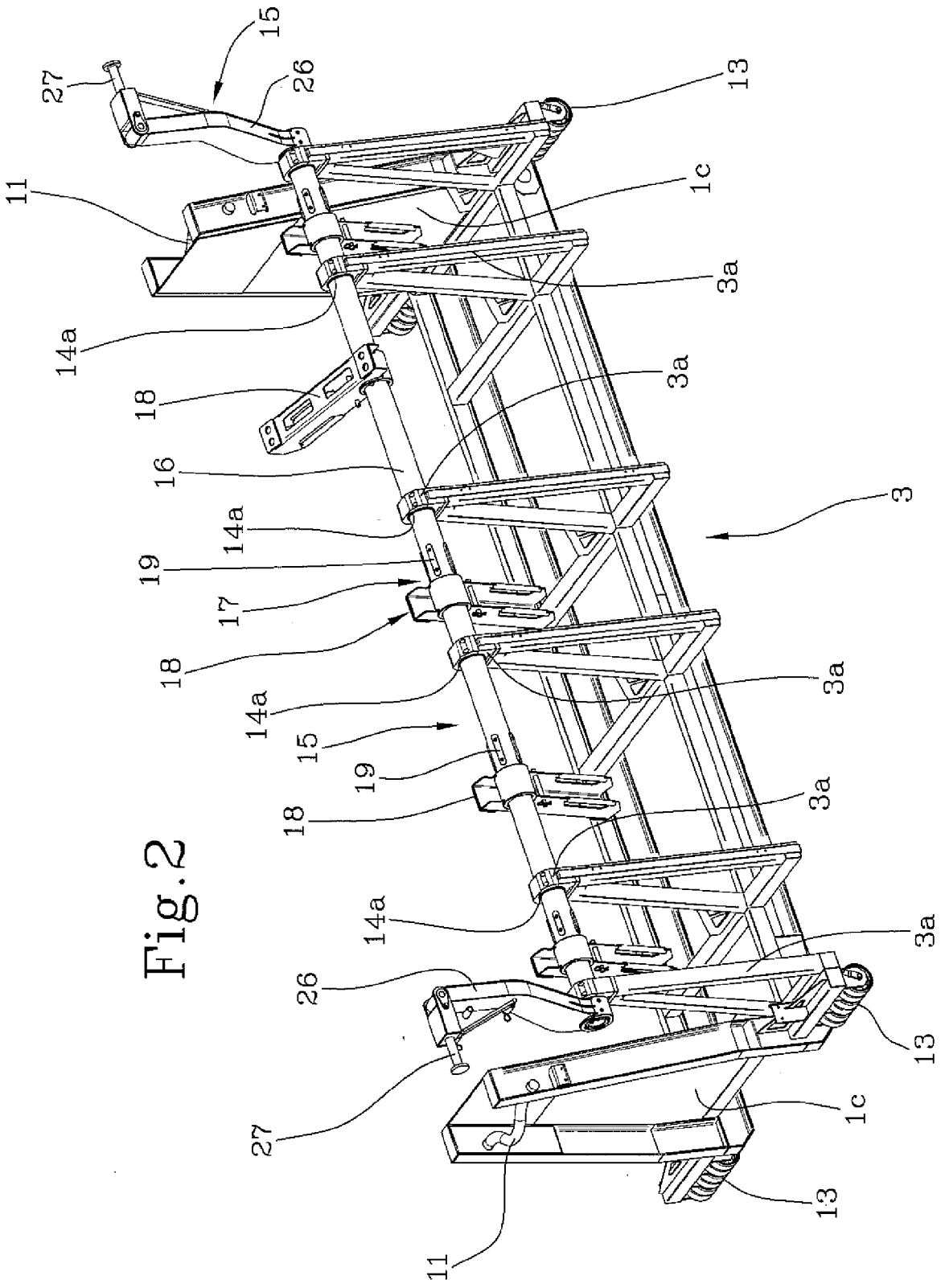
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3a
14a
18
3a
16
3
14a
19
17
18
3a
14a
15
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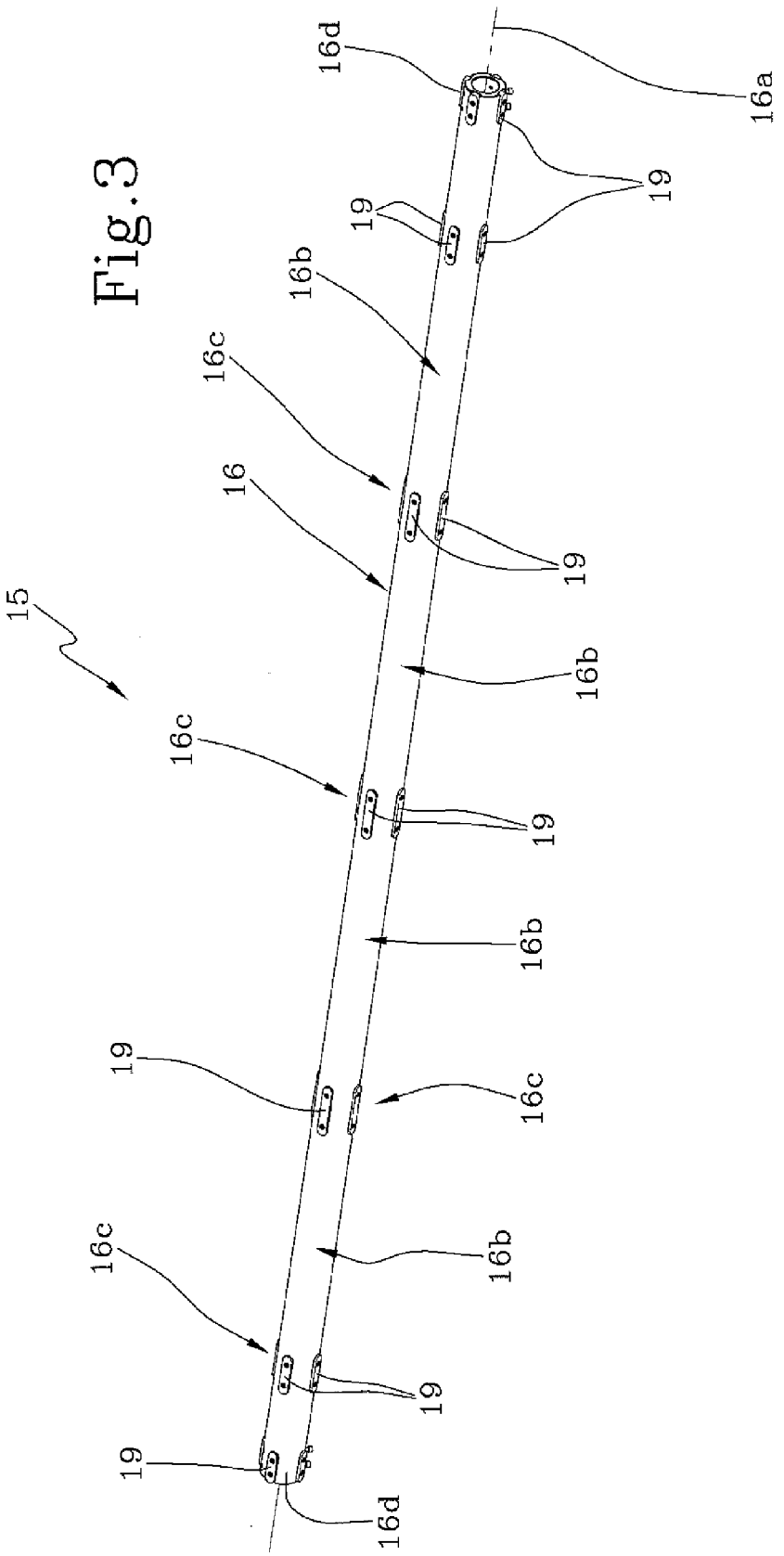
3a
14a
3a
26
13
27
1c
13
11

Fig.2

Fig.3


16d
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19
19
16b
16c
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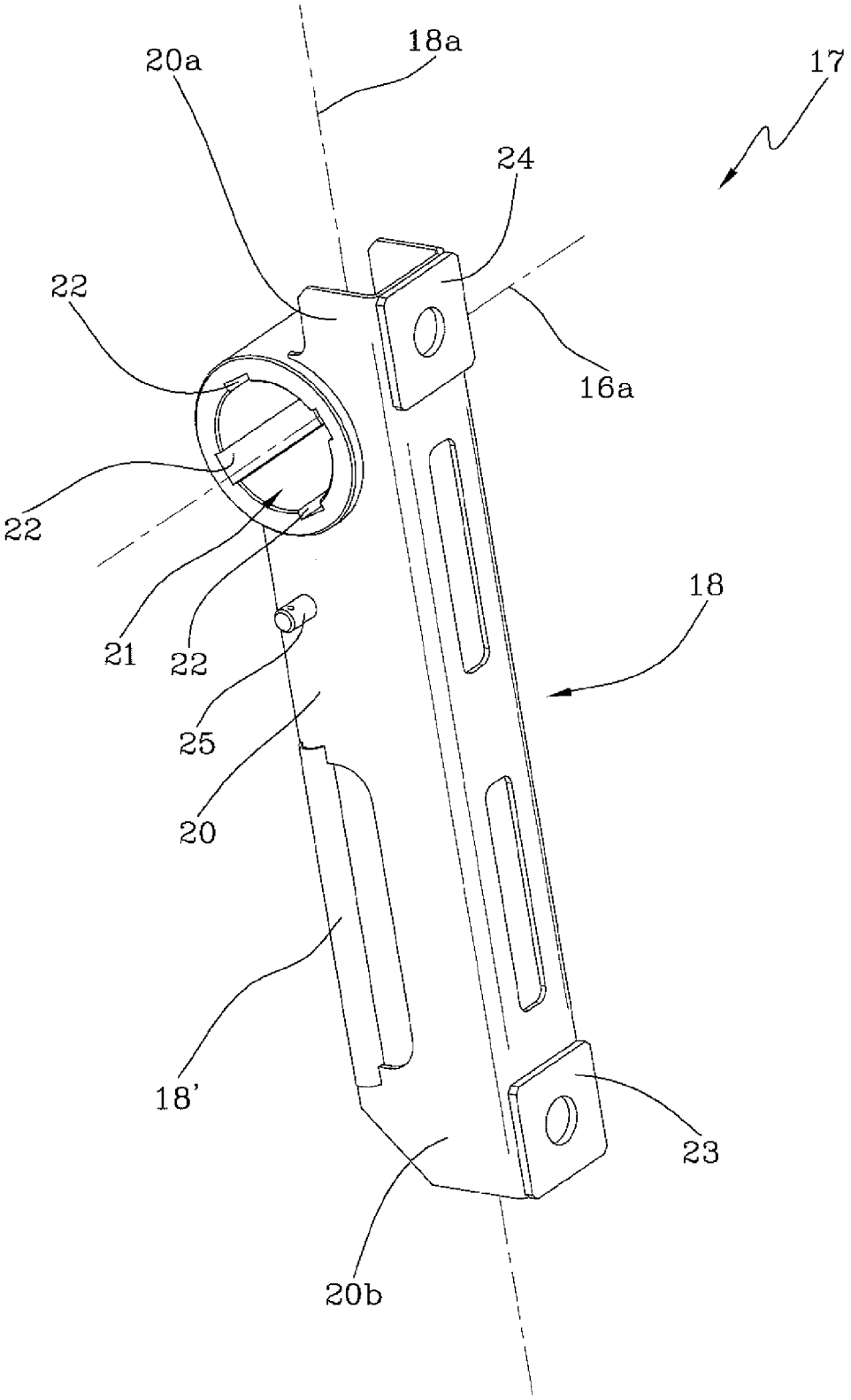
16b
19
16c
16b
16c
19
19
16d

Fig.4



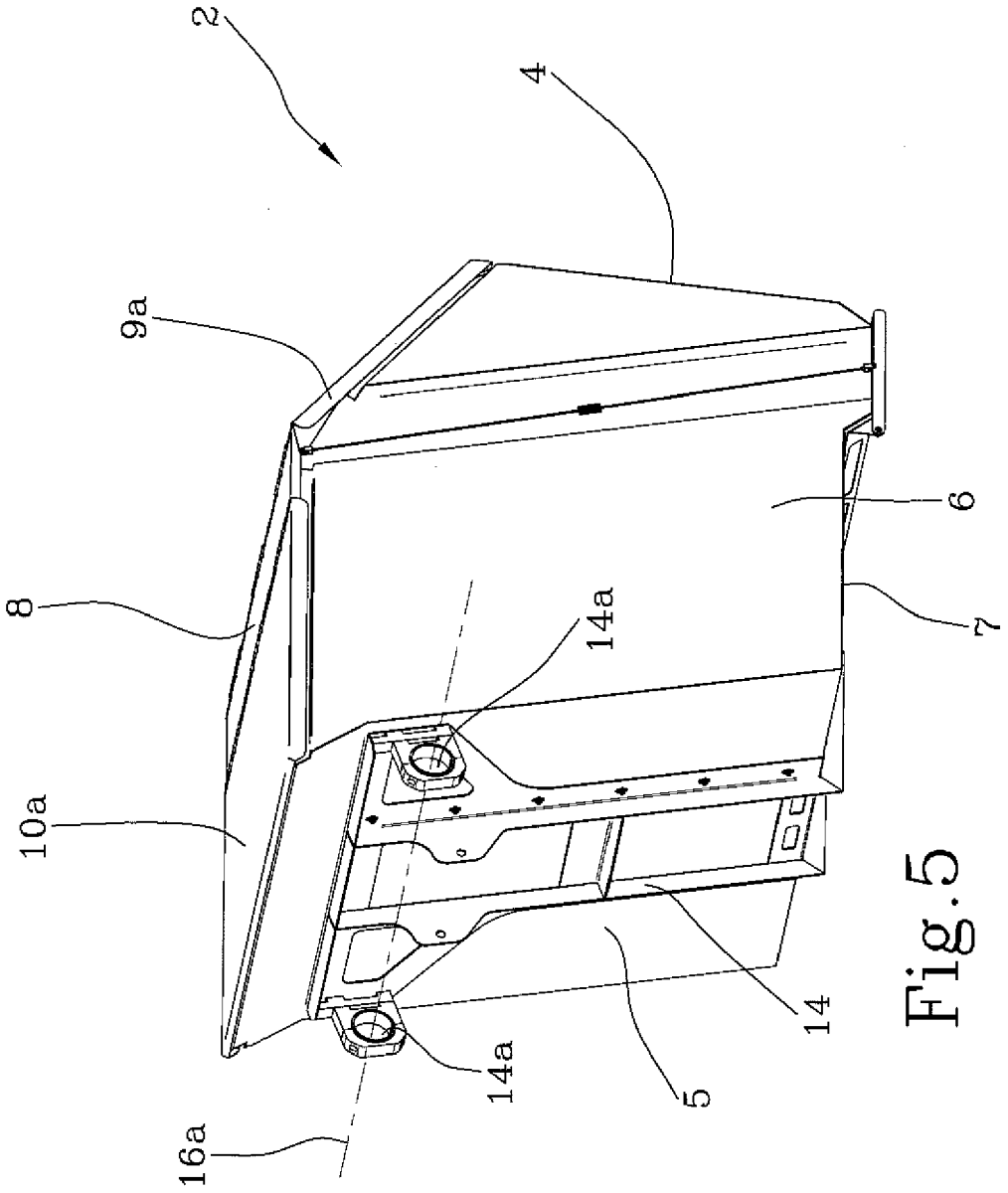


Fig.5

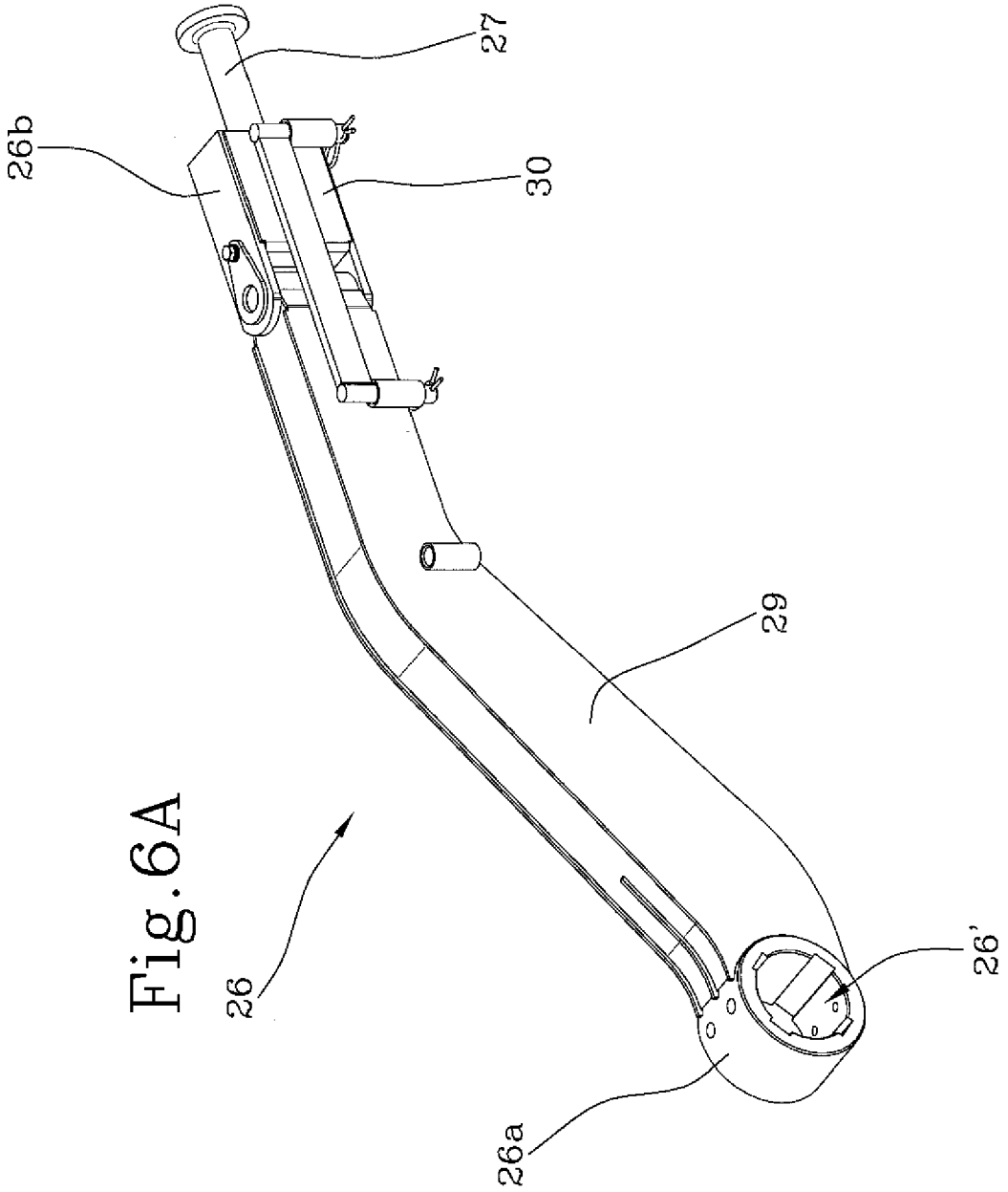


Fig.6A

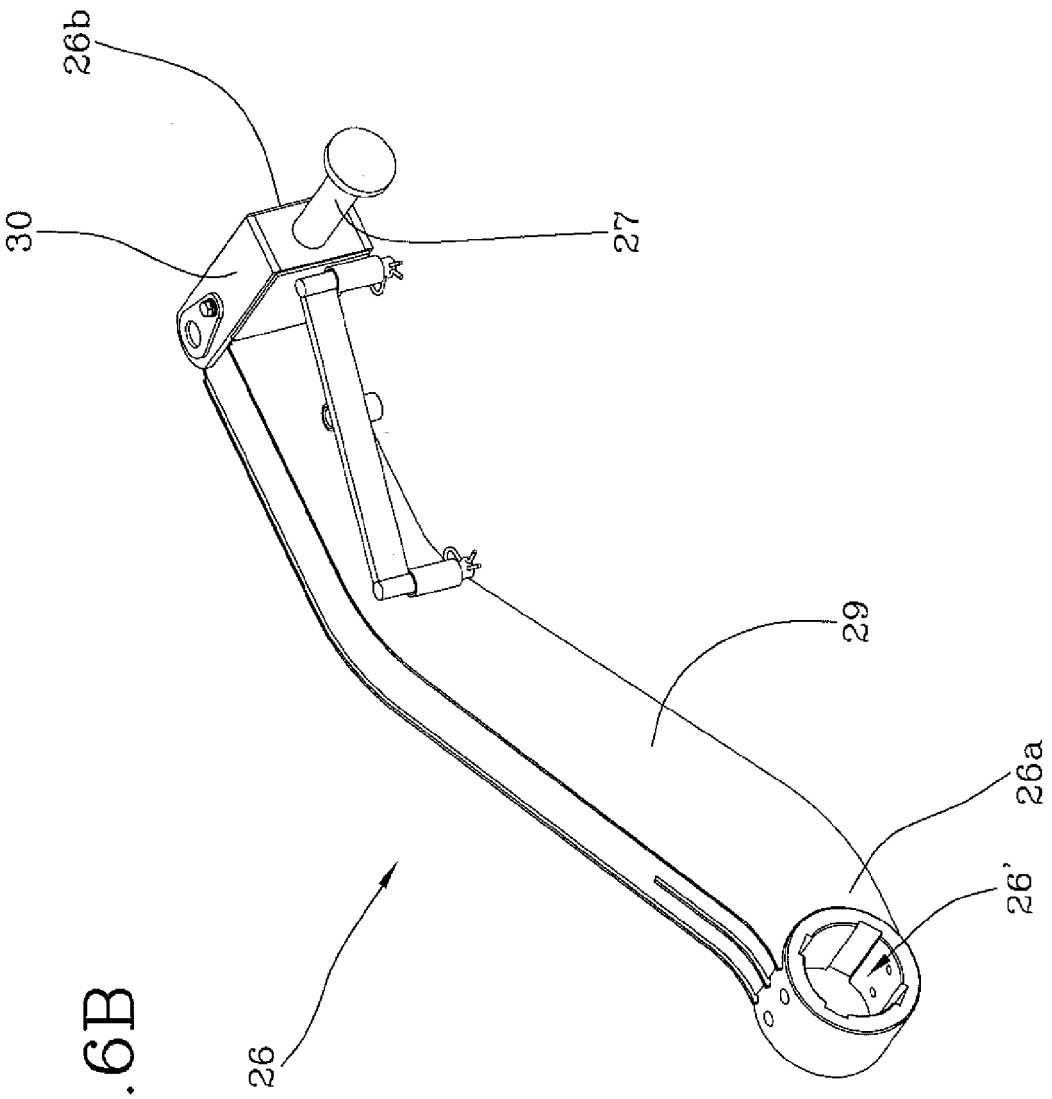


Fig.6B

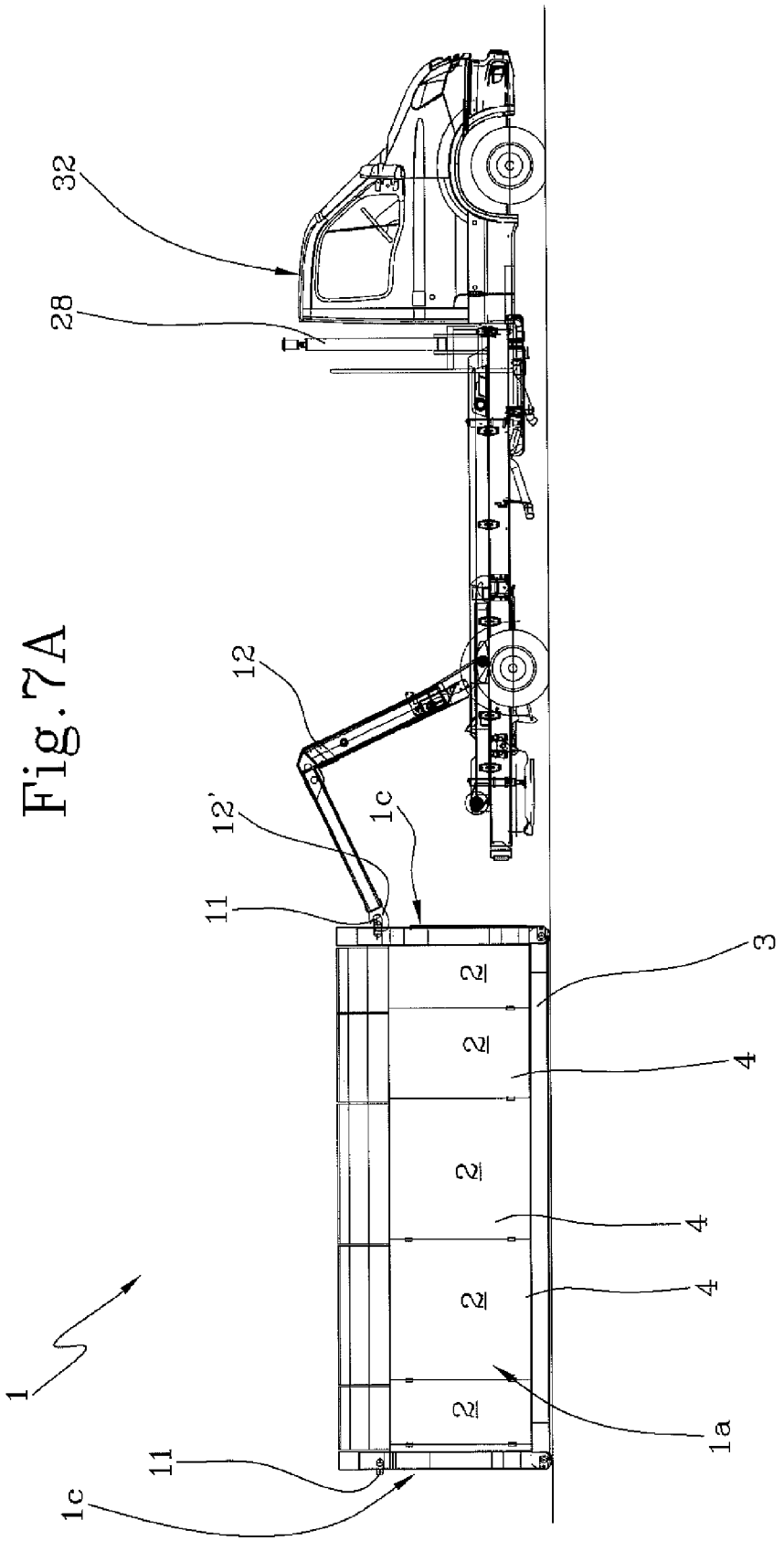
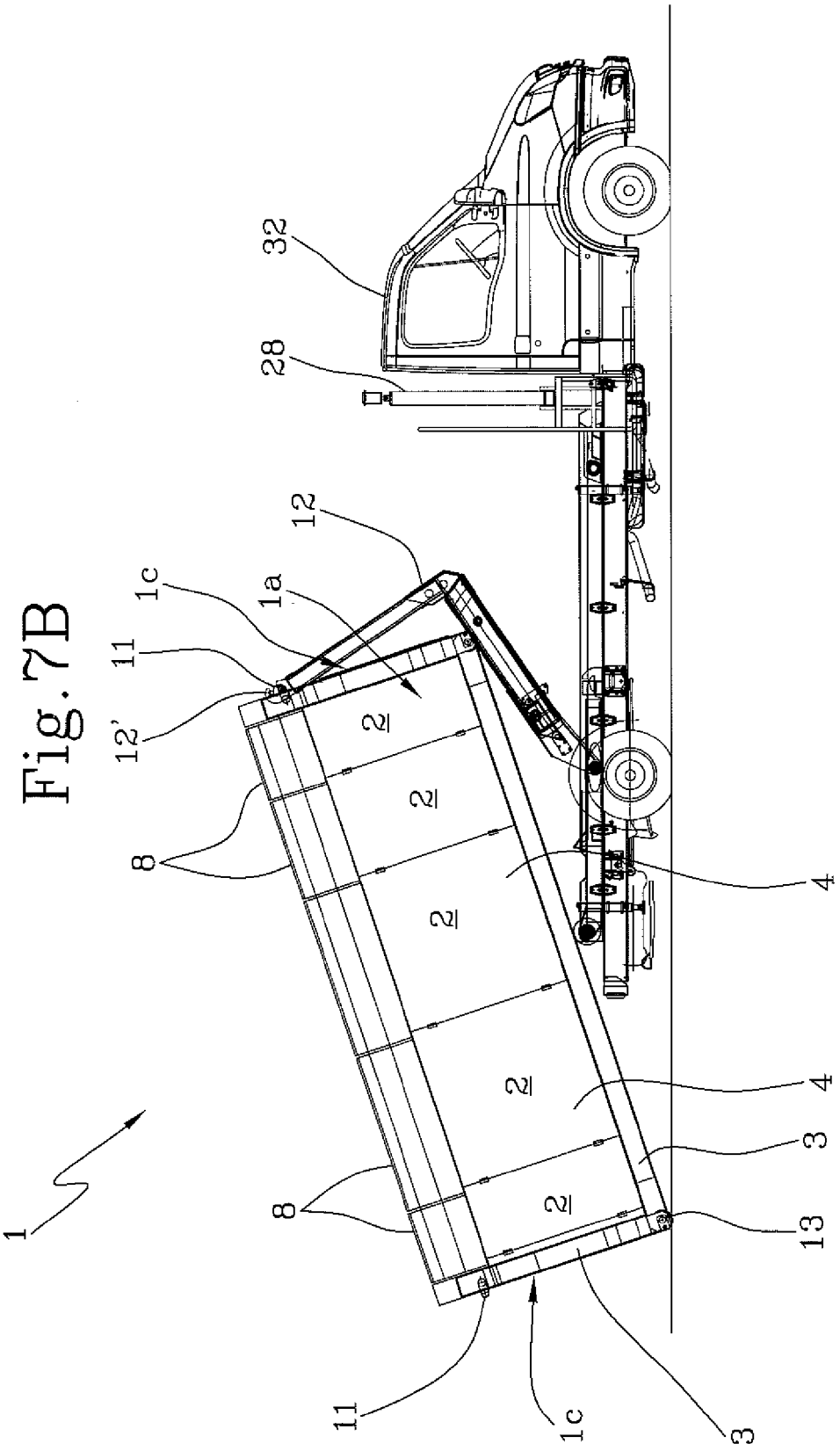


Fig.7A

Fig.7B



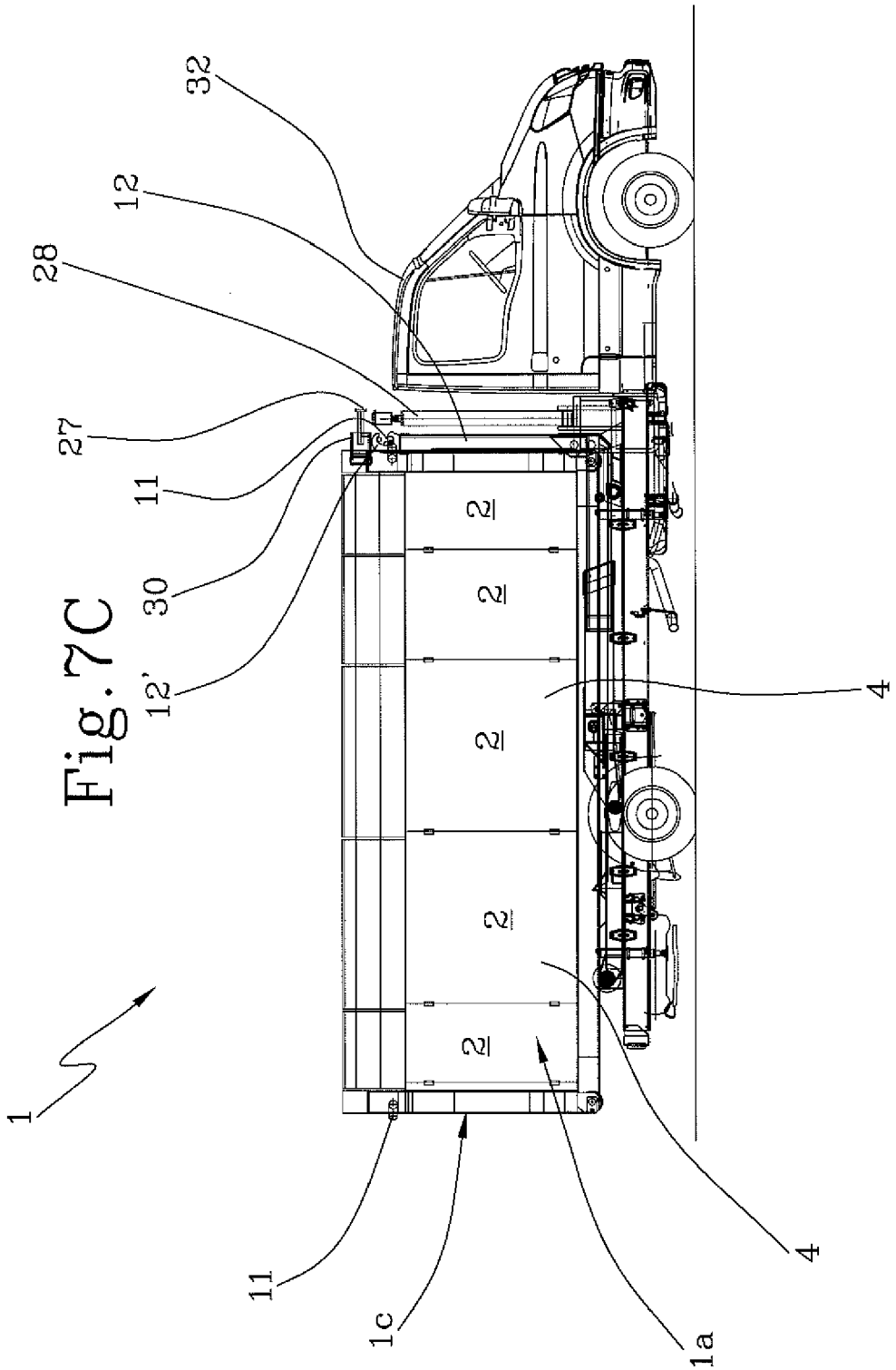
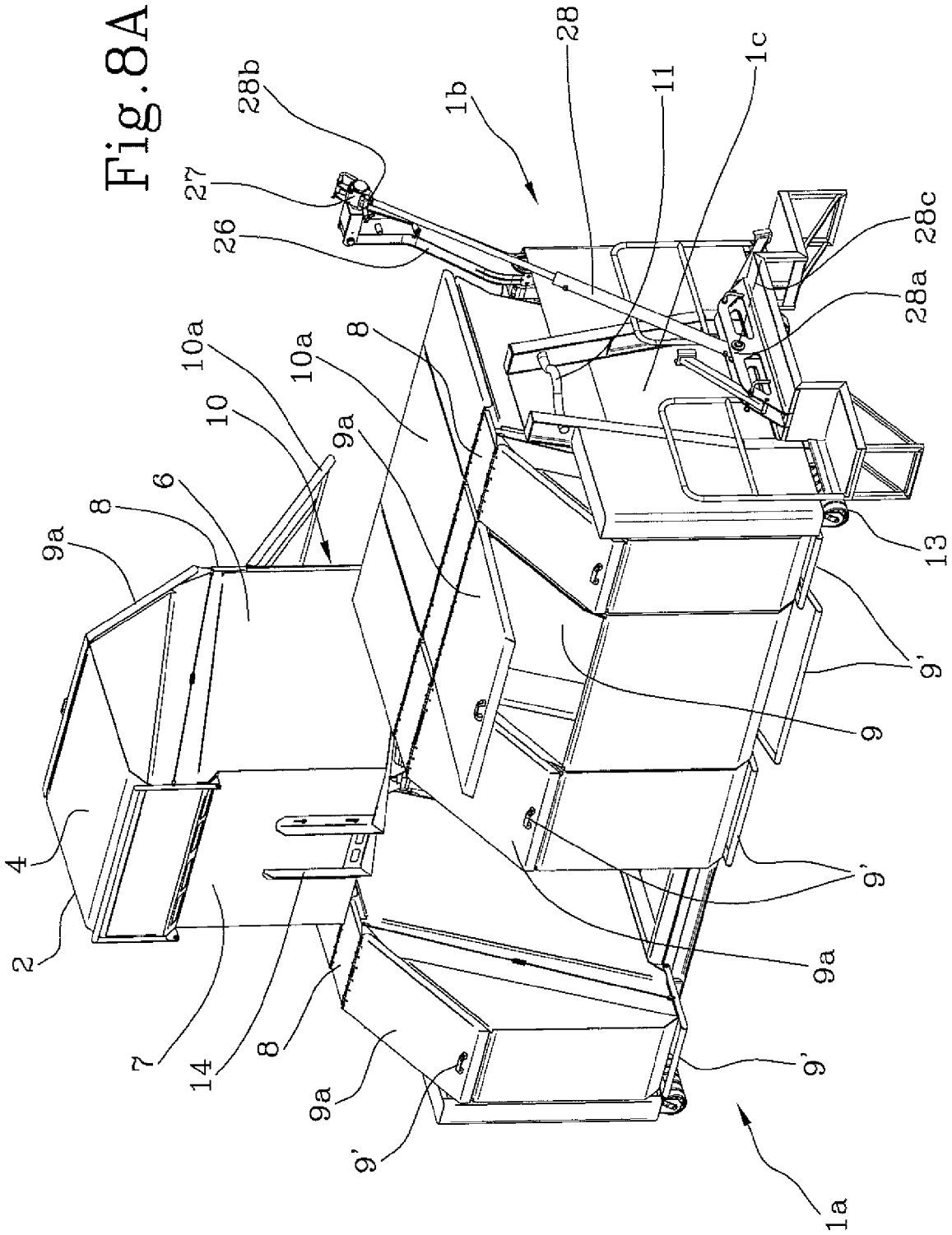


Fig.7C

Fig.8A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26
1b
28
11
1c
28c
28a
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8
10
9a
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6
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9'
9
4
9'
2
9a
7
14
8
9a
9'
9'
1a

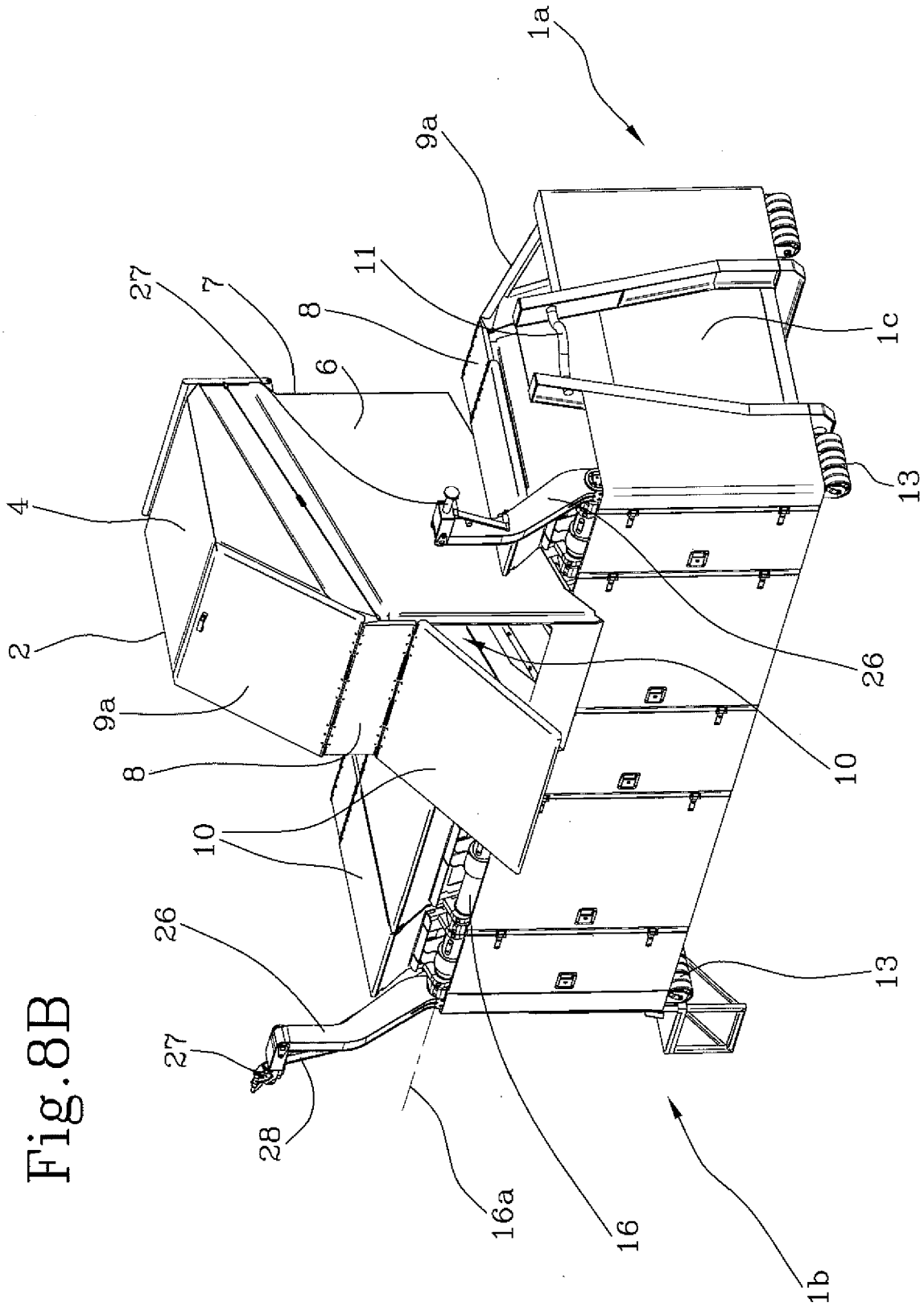

Fig.8B

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EUROPEAN SEARCH REPORT

Application Number
EP 14 16 5287

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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 July 2014	Pardo Torre, Ignacio

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