



(11) **EP 2 868 599 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
20.04.2016 Bulletin 2016/16

(51) Int Cl.:
B65F 1/12^(2006.01)

(21) Application number: **13380051.6**

(22) Date of filing: **31.10.2013**

(54) **Device for handling and emptying waste collection containers**

Vorrichtung zum Handhaben und Entleeren von Abfallsammelbehältern

Dispositif pour manipuler et vider des récipients de collecte de déchets

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(43) Date of publication of application:
06.05.2015 Bulletin 2015/19

(73) Proprietor: **Palvi, S.L.**
25310 Agramunt (Lleida) (ES)

(72) Inventors:
• **Padullés Omedes, Albert**
25310 Agramunt (Lleida) (ES)

• **Domènech Mestres, Carlos**
08030 Barcelona (ES)

(74) Representative: **Juncosa Miro, Jaime et al Torner, Juncosa i Associates, S.L.**
Gran Via de les Corts Catalanes, 669 bis, 1^o, 2^a
08013 Barcelona (ES)

(56) References cited:
EP-A1- 1 916 218 EP-A2- 0 911 293
DE-U1- 9 418 696 DE-U1- 29 905 551

EP 2 868 599 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

Technical Field

[0001] The present invention relates to the field of devices for handling and emptying waste collection containers, and more particularly to the field of devices for handling and emptying containers that are attached to a manipulator arm installed in a collection truck, and that are envisaged for being coupled to a handle of a waste container, to hold and lift up the container and to operate a gate operator element for opening and closing lower gates of the container while the container is hoisted up.

State of the Art

[0002] Waste collection containers are known to comprise a hollow body provided with a loading mouth, lower gates, a handle fixed on an outer surface of the hollow body for holding the container, and a gate operator element mechanically linked to said lower gates. The handle comprises a fixed vertical rod ending in a perimetral flange, a ring or another gripping element than be held, and the gate operator element comprises a moving vertical rod arranged adjacent and/or concentric to the handle and ending in a perimetral flange, a ring or another gripping element that can be held. Generally, when the handle and the gate operator element are arranged adjacent to one another, they both end in respective rings or other gripping elements that can be held, and when the handle and the gate operator element are arranged in a concentric or telescopic manner, they both end in respective perimetral flanges.

[0003] Document DE 29905551 U1 discloses a device for handling and emptying waste collection containers of the type described above, including a coupling head comprising a head structure bearing a first holding member suitable for being coupled to the handle of a container, a second holding member suitable for holding the gate operator element, which in this case is arranged concentric to the handle, and operating means suitable for linearly shifting by means of a moving carriage said second holding member when same is held to said gate operator element of the container, thus opening and closing the lower gates through said mechanical link of the gate operator element with the lower gates of the container.

[0004] One drawback of said document DE 29905551 U1 is that the first and second holding members are configured as forks provided with fixed branches positioned in a horizontal manner towards one side of the coupling head, and as a result for coupling the head to the handle and to the gate operator element of the container, said head must perform a series of relatively complex movements to first locate the coupling head on the side of the handle and of the gate operator element of the container at a specific height in relation to same, to then position the forks in relation to the handle and the gate operator element of the container, and finally to laterally couple

the forks to the handle and to the gate operator element of the container. This series of movements, which must be carried out by means of the manipulator arm, are difficult to control manually, even with the help of machine vision means, and they are difficult to automate.

[0005] Document 94 18 696 U1 discloses a device for handling and emptying waste collection containers according to the preamble of claim 1.

10 Brief Description of the Invention

[0006] The present invention contributes to mitigating the foregoing and other drawbacks by providing a device for handling and emptying waste collection containers according to claim 1. It includes a coupling head comprising a head structure. This head structure bears a first holding member suitable for being coupled to a handle fixed on an outer surface of a container for holding up said container, and a second holding member suitable for holding a gate operator element arranged in the container, adjacent and/or concentric to said handle and mechanically linked to lower gates of the container for opening and closing same. This second holding member is installed in a moving carriage vertically movable along said head structure. The head structure also bears operating means suitable for shifting said moving carriage between gate closing and opening positions, in which the gate operator element of the container, held by said second holding member, performs the closure and allows the opening of said lower gates of the container, respectively.

[0007] Said first holding member comprises one or more moving elements operated by a holding activation device for moving between holding and release positions which determine the holding and the release of said handle, respectively. Similarly, said second holding member comprises one or more moving elements operated by a holding activation device for moving between holding and release positions which determine the holding and the release of said gate operator element, respectively.

[0008] The head structure has retaining elements which contact with stops of the one or more moving elements of the second holding member preventing the movement thereof towards said release position when said one or more moving elements of the second holding member are in said holding position and said moving carriage is in said gate closing position or in any intermediate position between said gate opening position and the gate closing position. As a result, the one or more moving elements of the second holding member can only move towards the release position when the moving carriage is in the gate closing position, in which said stops of the one or more moving elements of the second holding member are free of interference with said retaining elements.

[0009] The one or more moving elements of the first holding member comprise a first pair of moving jaws movable between said holding and release positions by

means of at least one articulation, acting as a first clamp. The jaws of this first pair of moving jaws of the first holding member have respective upper planar faces which, in said holding position and in a loading situation, contact with a lower surface of a perimetral flange of the handle of the container, receiving vertical loads from said flange, and lower planar faces which, in the holding position and in a loading situation, transmit said vertical loads to and rest on a complementary planar surface of said head structure. Therefore, the vertical load of the container is primarily borne by the head structure and does not substantially affect the jaws of the first pair of jaws or the articulation thereof.

[0010] The one or more moving elements of the second holding member comprise a second pair of moving jaws movable between said holding and release positions by means of at least one articulation, acting as a second clamp, and the mentioned stops are attached to the jaws of said second pair of moving jaws. According to the present invention, the jaws of the second pair of moving jaws of the second holding member have respective upper planar faces which, in said holding position and in a loading situation, contact with a lower surface of a perimetral flange of the gate operator element of the container, receiving vertical loads from said flange, and lower planar faces which, in the holding position and in said loading situation, transmit said vertical loads to and rest on a complementary planar surface of the moving carriage. Therefore, the vertical load of the gates of the container, which bear the load of the content of the container when they are in a closed position, is primarily borne by the moving carriage and does not substantially affect the jaws of the second pair of jaws or the articulation thereof.

[0011] It must be pointed out that instead of the pairs of jaws like the one or more moving elements of the first holding member and like the one or more moving elements of the second holding member, in alternative devices not forming part of the present invention, moving pins, moving forks or other elements suitable for holding rings or other gripping elements that can be held, are provided, fixed to the handle and to the gate operator element, both when they are arranged adjacent to another and when they are arranged in a concentric or telescopic manner.

[0012] The mentioned holding activation device operating the second holding member is preferably arranged outside the moving carriage such that it does not move together with same. In one embodiment, the first and second holding members are operated simultaneously by means of a single holding activation device shared by both members. For example, this single shared holding activation device comprises a first actuator moving a mechanism between jaw closing and opening positions. Said mechanism is kinematically connected to lever arms attached to the jaws of the first pair of moving jaws of the first holding member and to moving rams arranged in the head structure facing zones free of interference with said retaining elements corresponding to the gate opening

position of the moving carriage which, in this embodiment, is the lower position of travel.

[0013] When the mechanism of the holding activation device is moved to the jaw closing position, the mechanism moves by means of respective levers the jaws of the first pair of jaws towards the holding position and at the same time moves the moving rams such that they push said stops of the jaws of the second pair of moving jaws of the second holding member when the moving carriage is in the gate opening position.

[0014] Therefore, when the moving carriage starts its movement from the gate opening position towards the gate closing position, which in this embodiment is the upper position of travel, the stops of the jaws of the second pair of jaws lose contact with the moving rams but immediately begin interfering with the retaining elements, which keeps the jaws of the second pair of jaws in the holding position while the stops slide along the retaining elements and the jaws of the second pair of jaws drive the gate operator element of the container to the gate closing position, or upper position of travel.

[0015] The jaws of the second pair of moving jaws of the second holding member are permanently pushed towards the release position by an elastic element, such as a spring, installed in contact with both jaws. Therefore, when the moving carriage is moved from the gate closing position to the gate opening position again, which is located in said zone free of interference with the retaining elements, the stops no longer contact with the retaining elements and contact again with the rams of the holding activation device, and the jaws of the second pair of jaws remain in the holding position. Only when the mechanism of the holding activation device is moved to the jaw opening position will the moving rams be withdrawn and said elastic element be allowed to bring the jaws of the second pair of moving jaws back to the release position, releasing the gate operator element of the container.

[0016] In one embodiment, the operating means shifting the moving carriage comprise a second actuator, such as an electric motor or a hydraulic motor, causing the rotation of one or more vertical spindles coupled to one or more nut elements fixed to the moving carriage. Therefore, when this second actuator is activated, it causes the rotation of the one or more spindles in a first direction for raising the moving carriage towards the gate closing position and in a second direction for lowering the moving carriage towards the gate opening position.

[0017] The head of the device for handling and emptying containers of the present invention is envisaged to be attached to a manipulator arm installed in a collection truck, and a worker controls the operation of said manipulator arm by means of suitable controls for coupling the head to the handle of a waste container, to lift the container, hold it up, and operate the gate operator element for opening and closing lower gates of the container while the container is hoisted up.

[0018] To aid the operations of coupling the head to the handle and to the gate operator element of the con-

tainer, in an upper region of the head structure there is installed an image capturing camera the line of sight of which is directed downwards between the jaws of the first pair of moving jaws of the first holding member when they are in the release position, between the jaws of said second pair of moving jaws of the second holding member when they are in the release position, and through an opening of the moving carriage and through a lower opening of the head structure. Images provided by said image capturing camera are, for example, shown on a display and are used by the worker to position the head structure in relation to the handle of the container.

[0019] When the head is correctly positioned in relation to the handle of the container, the head is lowered and the handle and the gate operator element of the container are inserted through said lower opening of the head structure and said opening of the moving carriage. The head structure has at least one stop surface contacting with an upper surface of said perimetral flange of the handle of the container determining a limit position of insertion for the head structure. In this limit position of insertion, said upper planar faces of the jaws of the first pair of moving jaws of the first holding member are located at a level lower than said lower surface of said perimetral flange of the handle of the container, and said upper planar faces of the second pair of moving jaws of the second holding member are located at a level lower than said lower surface of said perimetral flange of the gate operator element of the container.

[0020] This limit position of insertion is detected by a first detector element arranged in the head structure. This first detector element is movable between a standby position and a detection position, and is pushed by an elastic element towards said standby position. When the head structure reaches the limit position of insertion, the first detector element is pushed to said detection position by the perimetral flange of the handle of the container and is detected in the detection position by a first sensor arranged in the head structure.

[0021] There is installed in the moving carriage a second detector element movable between upper, intermediate and lower positions and an elastic element pushing said detector element towards said lower position, where it is kept as long as the gate operator element of the container is not inserted into the head. The second detector element is pushed to said upper position by the gate operator element of the container when the head structure reaches the limit position of insertion and the moving carriage is in the gate opening position, i.e., the lower position of travel, and it is kept in said intermediate position by the gate operator element of the container when the moving carriage is moved towards the gate closing position, i.e., the upper position of travel.

[0022] A second sensor and a third sensor are arranged in the moving carriage. Said second sensor detects the second detector element when it is in any of the intermediate and upper positions, whereas the third sensor detects the second detector element only when it is

in the upper position. None of the second and third sensors detect the second detector element when it is in the lower position.

5 Brief Description of the Drawings

[0023] The foregoing and other advantages and features will be more clearly understood based on the following detailed description of an embodiment in reference to the attached drawings which must be interpreted in an illustrative and non-limiting manner, in which:

Figure 1 is a side view of a device for handling and emptying waste collection containers according to an embodiment of the present invention attached to a manipulator arm installed in a collection truck stopped adjacent to a container;

Figure 2 is a perspective view of several elements of a coupling head which is part of the device of Figure 1 facing a handle and a gate operator element of the container, and showing the position of an image capturing camera vertically extracted from its position;

Figure 3 is a perspective view of first and second holding members and a mechanism of a corresponding holding activation device of the coupling head, facing a handle and a gate operator element of the container;

Figure 4 is a perspective view of the first and second holding members and a mechanism of a corresponding holding activation device, shown in relation to a moving carriage and retaining elements of the coupling head, said first holding member and said mechanism of the holding activation device being extracted from their position of assembly for better understanding;

Figure 5a is a partial horizontal section through a plane coinciding with the second holding members, also showing the moving carriage and the retaining elements, the first and second holding members being in a release position and the moving carriage being in a gate opening position corresponding to a lower position of travel;

Figure 6a is a side elevational view of the first and second holding members and mechanism in the position corresponding to Figure 5a;

Figure 5b is a partial horizontal section through a plane coinciding with the second holding members, also showing the moving carriage and the retaining elements, the first and second holding members being in a holding position and the moving carriage being in the gate opening position corresponding to the lower position of travel;

Figure 6b is a side elevational view of the first and second holding members and mechanism in the position corresponding to Figure 5b;

Figure 5c is a partial horizontal section through a plane coinciding with the second holding members,

also showing the moving carriage and the retaining elements, the first and second holding members being in a holding position and the moving carriage being in a gate closing position corresponding to an upper position of travel;

Figure 6c is a side elevational view of the first and second holding members and mechanism in the position corresponding to Figure 5c;

Figure 7a is a vertical cross-section of a lower portion of the head facing the handle and the gate operator element of the container and separated from same, showing on the right side a plan depiction of the first and second holding members in a release position corresponding to such situation;

Figure 7b is a vertical cross-section of a lower portion of the head with the handle and the gate operator element of the container inserted in a limit position of insertion, and with the moving carriage in the gate opening position, showing on the right side a plan depiction of the first and second holding members in a release position corresponding to such situation;

Figure 7c is a vertical cross-section of the lower portion of the head with the handle and the gate operator element of the container inserted therein, in a stand-by situation and with the moving carriage in the gate closing position, showing on the right side a plan depiction of the first and second holding members in a holding position corresponding to such situation; Figure 7d is a vertical cross-section of the lower portion of the head with the handle and the gate operator element of the container inserted therein, in a loading situation and with the moving carriage in the gate closing position, showing on the right side a plan depiction of the first and second holding members in a holding position corresponding to such situation; and

Figure 7e is a vertical cross-section of the lower portion of the head with the handle and the gate operator element of the container inserted therein, in a loading situation and with the moving carriage in the gate opening position, showing on the right side a plan depiction of the first and second holding members in a holding position corresponding to such situation;

Detailed Description of an Embodiment

[0024] Figure 1 shows a device for handling and emptying waste collection containers according to an embodiment of the present invention, which comprises a coupling head 70 attached to a free end of a manipulator arm 71 installed in a collection truck 72 provided with a cab 73 carrying a worker, and a collection body 74. In the cab 73 or in another part of the collection truck 72, there are controls whereby the worker can control the necessary movements of the manipulator arm 71 to couple the coupling head 70 to a handle 1 fixed on an outer upper surface of a container 3 and to a gate operator element 2 arranged in the container 3 concentric to said

handle 1 and mechanically linked to lower gates 4 of the container 3 for opening and closing the container.

[0025] Figure 2 shows a head structure 50 of the coupling head 70. A first holding member 10 suitable for being coupled to the handle 1 of the container 3 and a second holding member 20 suitable for holding the gate operator element 2 of the container 3 are installed in said head structure 50. This second holding member 20 is installed in a moving carriage 51 vertically movable along said head structure 50. Operating means described in detail below shift said moving carriage 51 between a gate closing position, corresponding to the upper position of travel, in which the gate operator element 2 of the container 3, held by said second holding member 20, performs the closure of the lower gates 4 of the container 3, and a gate opening position, corresponding to the lower position of travel, in which the gate operator element 2 of the container 3, held by said second holding member 20, allows the opening of the lower gates 4 of the container 3 by gravity.

[0026] As shown in Figures 3 and 4, said first holding member 10 comprises a first pair of moving jaws 10a, 10b movable about a first articulation acting as a first clamp, and the second holding member 20 comprises a second pair of moving jaws 20a, 20b movable about a second articulation acting as a second clamp. The handle 1 of the container 3 comprises a hollow rod having a square cross-section, and the jaws of said first pair of moving jaws 10a, 10b have gripping surfaces configured such that they are externally coupled to said hollow rod having a square cross-section preventing the container 3 from rotating with respect to the head 70 when the handle 1 is gripped by the first holding member 10.

[0027] The jaws of the first pair of moving jaws 10a, 10b have lever arms 11 projecting from their rear portion, and the jaws of said second pair of moving jaws 20a, 20b have stops 21 projecting from their rear portion.

[0028] The second pair of moving jaws 20a and 20b installed in the moving carriage has an elastic element 24 (shown in Figure 5a, 5b and 5c) permanently pushing the second holding member 20 towards the release position. In the shown embodiment, said elastic element 24 is a metal torsion spring, although alternatively there can be more than one elastic element 24 comprising one or more torsion or compression coil springs, or one or more bodies made of an elastomeric material, etc.

[0029] Retaining elements 52 arranged adjacent to the moving carriage 51 along almost the entire travel thereof geometrically interfere with the stops 21 of the second pair of moving jaws 20a and 20b, keeping them in the jaw closing position, and preventing the release of the gate operator 2 held by said jaws. Said retaining elements 52 do not interfere with said stops 21, and the elastic element 24 can open the second pair of moving jaws 20a and 20b only when the moving carriage 51 is in the release position and in this position alone. In this embodiment, the retaining elements 52 consist of vertical walls guiding the vertical shift of the moving carriage 51, and

as can be seen in Figure 4, they have an opening at their lower end, coinciding with the position of the stops 21, the moving carriage 51 being in the release position for releasing the gate operator 2.

[0030] The opening and closure of the jaws are operated by means of a holding activation device 40, shown in Figures 3 and 4, which simultaneously moves the first pair of moving jaws 10a and 10b about a first articulation between jaw closing and opening positions which determine the holding and the release of the handle 1 of the container 3 and the second pair of moving jaws 20a, 20b about a second articulation between jaw closing and opening positions which determine the holding and the release of the gate operator element 2 of the container 3.

[0031] In the present embodiment, said holding activation device 40 consists of an articulated quadrangle formed by a vertical bar 44 articulated with respect to the head structure 50 by means of connecting rods 45, and one of said connecting rods 45 having moving rams 42 arranged for pushing said stops 21 of the jaws of the second pair of moving jaws 20a, 20b when the moving carriage 51 is in the release position for releasing the gate operator 2, that being a zone which is free of interference with the retaining elements 52.

[0032] The upper end of the vertical bar 44 is attached to the first actuator 41 which in the present embodiment is a piston, and its lower end is kinematically connected to lever arms 11 of the jaws of the first pair of moving jaws 10a, 10b of the first holding member 10. The activation of the first actuator 41 shifts the vertical bar 44, moving the lever arms 11 of the first pair of moving jaws 10a, 10b closer to or away from one another, causing the opening or closure of the first holding member 10, while at the same time pushing the moving rams 42 against or withdrawing them away from the stops 21 of the second pair of moving jaws 20a and 20b, causing the opening or closure of the second holding member 20.

[0033] Said kinematic attachment between the vertical bar 44 and the first pair of moving jaws 10a and 10b is by means of articulated arms 43 having spherical articulations at their two ends for converting a lateral vertical shift of the vertical bar 44 into a horizontal movement of the lever arms 11 of the first pair of moving jaws 10a and 10b.

[0034] Figures 5a and 6a show the second pair of moving jaws 20a and 20b in the release position for releasing the gate operator 2, the moving carriage 51 being in the gate opening position 4. In this position, the holding activator 40 keeps the first pair of moving jaws 10a and 10b open, and the moving rams 42 withdrawn.

[0035] Figures 5b and 6b show the second pair of moving jaws 20a and 20b in the holding position for holding the gate operator 2, the moving carriage 51 being in the gate opening position 4. In this position, the holding activator 40 keeps the first pair of moving jaws 10a and 10b closed, and the moving rams 42 in the pushing position.

[0036] Figures 5c and 6c show the second pair of moving jaws 20a and 20b in the holding position for holding

the gate operator 2, the moving carriage 51 being in the gate closing position 4. In this position, the holding activator 40 keeps the first pair of moving jaws 10a and 10b closed, and the moving rams 42 in the pushing position, and the retaining elements 52 keep said second pair of moving jaws 20a and 20b in the holding position for holding the gate operator 2.

[0037] Figures 5a to 7e show how the first pair of moving jaws 10a and 10b have an upper face 12 complementary to a lower surface of a perimetral flange 1a of the handle 1, and a lower face 13 complementary to a complementary planar surface 56 of the head structure 50. With said first pair of moving jaws 10a and 10b being closed around said handle 1, and the container 3 being hoisted from said handle 1, the vertical load of the container is transmitted from the handle 1 to the head structure 50 by means of the contact of these planar surfaces.

[0038] The same drawings also show how, according to the shown embodiment, the second pair of moving jaws 20a and 20b have an upper face 22 complementary to a lower surface of a perimetral flange 2a of the gate operator element 2, and a lower face 23 complementary to a complementary planar surface 57 of the moving carriage 51. With said second pair of moving jaws 20a and 20b being closed around said gate operator 2, and the container 3 being hoisted, the vertical load of the waste, borne by the gates 4 of the container 3, is transmitted from the gate operator 2 to the moving carriage by means of the contact between these planar surfaces.

[0039] Figures 7a, 7b, 7c, 7d and 7e show steps of the process of collecting, lifting and emptying a waste container 3. The first drawing shows how the coupling head 70 has been vertically aligned on the handle 1 with the help of an image capturing camera 58 (Figure 2), the first and second holding members 10 and 20 being open.

[0040] Figure 7b shows how the coupling head 70 is lowered, inserting said handle 1 and gate operator 2 into a lower opening made on said head. When the handle 1 contacts with a stop surface 60 located inside the coupling head 70, a first detector element 61 is operated by said contact, shifting it against an elastic element 63, and said shift being detected by a first sensor 31. The gate operator 2 also contacts with a second detector element 62, shifting it against an elastic element 64, this movement being detected at two different points of travel by a second sensor 32 and by a third sensor 33. The positive detection of the three mentioned sensors indicates that the handle 1 and the gate operator 2 have correctly reached the limit position of insertion inside the coupling head 70, and are in a position suitable for being held. After conducting this check, the first and second holding members 10 and 20 are closed, holding the handle 1 and the gate operator 2, respectively.

[0041] Figure 7c shows how, while the container is still on the ground, a second actuator 53 which causes the rotation of vertical spindles 54 is operated causing the vertical shift of a nut element 55 fixed to the moving carriage 51 (Figure 2), causing the vertical drive thereof.

This movement of the moving carriage 51 drives the second holding member 20, and thereby the gate operator 2, thus assuring the closure of the gates 4 of the container 3 before lifting the container. After performing this vertical shift, the gate operator 2 moves down until the lower surface of its perimetral flange 2a contacts with the upper face 22 of the second holding member 20 due to the existing clearance. As it moves down, the second detector element 62 also moves down pushed by the elastic element 64, causing the third sensor 33 to no longer detect it, but the second sensor to continue detecting it, thus indicating the correct closure of the gates.

[0042] Figure 7d shows how, upon lifting the container 3 from the ground, the handle 1 moves down until the lower surface of a perimetral flange 1a of the handle 1 contacts with the upper face 12 of the first holding member 10 and transmits the vertical load. As it performs this downward movement, the first detector element 61 is shifted pushed by the elastic element 63, causing the first sensor 31 to no longer detect its presence. The correct lifting of the container is confirmed when only the second sensor 32 provides a positive reading.

[0043] Finally, Figure 7e shows how, with the container 3 being lifted, and therefore without having a positive reading from the first or from the third sensor 31 and 33 but with a positive reading from the second sensor 32, the second actuator 53 (Figure 2) is operated to cause the rotation of the spindles 54, lowering the moving carriage 51, and thereby the second holding member 20, which drives the gate operator 2 and allows the opening of said gates 4 for emptying the container 3.

Claims

1. A device for handling and emptying waste collection containers, comprising a coupling head comprising a head structure (50) bearing:

- a first holding member (10) suitable for being coupled to a handle (1) fixed on an outer surface of a container (3) for holding said container (3);
- a second holding member (20) suitable for holding a gate operator element (2) arranged in the container (3), adjacent and/or concentric to said handle (1) and mechanically linked to lower gates (4) of the container (3) for opening and closing same, said second holding member (20) being installed in a moving carriage (51) movable along said head structure (50); and
- operating means suitable for shifting said moving carriage (51) between gate closing and opening positions, in which the gate operator element (2) of the container (3), held by said second holding member (20), performs the closure and allows the opening of said lower gates (4) of the container (3), respectively;

wherein

- said first holding member (10) comprises a first pair of moving jaws (10a, 10b) acting as a first clamp operated by a holding activation device (40) for moving said first pair of moving jaws (10a, 10b) between holding and release positions which determine the holding and the release of said handle (1);
- said second holding member (20) comprises a second pair of moving jaws (20a, 20b) acting as a second clamp operated by said holding activation device (40) for moving said second pair of moving jaws (20a, 20b) between holding and release positions which determine the holding and the release of said gate operator element (2); and
- the head structure (50) integrates retaining elements (52) which contact with stops (21) of the second pair of moving jaws (20a, 20b) preventing the movement thereof towards said release position, being in said holding situation and said moving carriage (51) being in any position of travel except in a position in which the moving carriage (51) is in its opening position;

characterised in that

- the jaws of said first pair of moving jaws (10a, 10b) have respective upper planar faces (12) which, in said holding position and in a loading situation, contact with a lower surface of a perimetral flange (1a) of the handle (1) of the container (3) receiving vertical loads from said flange, and lower planar faces (13) which, in the holding position and in a loading situation, transmit said vertical loads to and rest on a complementary planar surface (56) of said head structure (50).
2. The device according to claim 1, **characterized in that** the jaws of said second pair of moving jaws (20a, 20b) of the second holding member (20) have respective upper planar faces (22) which, in said holding position and in a loading situation, contact with a lower surface of a perimetral flange (2a) of the gate operator element (2) of the container (3) receiving vertical loads from said flange, and lower planar faces (23) which, in the holding position and in a loading situation, transmit said vertical loads to and rest on a complementary planar surface (57) of the moving carriage (51).
3. The device according to any one of the preceding claims, **characterized in that** said holding activation device (40) operating the second holding member (20) is arranged outside the moving carriage (51) and does not shift together with it.

4. The device according to any one of the preceding claims, **characterized in that** the first and second holding members (10, 20) are simultaneously operated by means of a single shared holding activation device (40).
5. The device according to claim 4, **characterized in that** the first and second holding members (10, 20) are simultaneously operated by means of a single holding activation device (40) comprising a first actuator (41) moving a mechanism kinematically connected to lever arms (11) of the jaws of the first pair of moving jaws (10a, 10b) of the first holding member (10) and to moving rams (42) arranged in zones free of interference with said retaining elements (52) for pushing said stops (21) of the jaws of the second pair of moving jaws (20a, 20b) of the second holding member (20) when the moving carriage (51) is in the gate opening position.
6. The device according to claim 5, **characterized in that** each of the jaws of the second pair of moving jaws (20a, 20b) of the second holding member (20) are permanently pushed towards the release position by an elastic element (24).
7. The device according to any one of the preceding claims, **characterized in that** said operating means suitable for shifting the moving carriage (51) comprise a second actuator (53) causing the rotation of at least one vertical spindle (54) coupled to at least one nut element (55) fixed to the moving carriage (51).
8. The device according to any one of the preceding claims, **characterized in that** in the head structure (50) there is installed an image capturing camera (58) the line of sight of which is directed downwards between the jaws of said first pair of moving jaws (10a, 10b) of the first holding member (10) when they are in the release position, between the jaws of said second pair of moving jaws (20a, 20b) of the second holding member (20) when they are in the release position, and through an opening (59) of the moving carriage (51), and said image capturing camera (58) provides images which are used for positioning the head structure (50) in relation to the handle (1) of the container (3).
9. The device according to claim 2, **characterized in that** the head structure (50) has at least one stop surface (60) contacting with an upper surface of said perimetral flange (1a) of the handle (1) of the container (3) determining a limit position of insertion of the head structure (50), in which said upper planar faces (12) of the jaws of the first pair of moving jaws (10a, 10b) of the first holding member (10) are located at a level lower than said lower surface of said perimetral flange (1a) of the handle (1) of the container (3) and said upper planar faces (22) of the second pair of moving jaws (20a, 20b) of the second holding member (20) are located at a level lower than said lower surface of said perimetral flange (2a) of the gate operator element (2) of the container (3).
10. The device according to claim 9, **characterized in that** in the head structure (50) there is arranged a first detector element (61) movable between a standby position and a detection position, and an elastic element (63) pushing said first detector element (61) towards said standby position, the first detector element (61) being pushed to said detection position by the perimetral flange (1a) of the handle (1) of the container (3) when the head structure (50) is in said limit position of insertion.
11. The device according to claim 10, **characterized in that** a first sensor (31) detecting the first detector element (61) when it is in the detection position is arranged in the head structure (50).
12. The device according to claim 9, 10 or 11, **characterized in that** there is installed in the moving carriage (51) a second detector element (62) movable between upper, intermediate and lower positions, and an elastic element (64) pushes said detector element (61) towards said lower position, the second detector element (62) being pushed to said upper and intermediate positions by the gate operator element (2) of the container (3) when the head structure (50) is in the limit position of insertion and when the moving carriage is moved towards the close gate position, respectively.
13. The device according to claim 12, **characterized in that** a second sensor (32) only detecting the second detector element (62) when it is in any of the intermediate and upper positions and a third sensor (33) only detecting the second detector element (62) when it is in the upper position are arranged in the moving carriage (51).
14. The device according to claim 1, **characterized in that** the jaws of said first pair of moving jaws (10a, 10b) of the first holding member (10) have gripping surfaces configured for being externally coupled to a hollow rod having a square cross-section which is part of the handle (1) of the container (3) preventing the container (3) from rotating with respect to the head when the handle (1) is gripped by the first holding member (10).

Patentansprüche

1. Vorrichtung zum Handhaben und Entleeren von Ab-

fallsammelbehältern, umfassend einen Kopplungskopf, welcher eine Kopfstruktur (50) umfasst, die Folgendes trägt:

- ein erstes Halteelement (10), welches dazu geeignet ist, mit einem Griff (1), welcher an einer Außenfläche eines Behälters (3) befestigt ist, gekoppelt zu werden, um den genannten Behälter (3) zu halten; 5
- ein zweites Halteelement (20), welches dazu geeignet ist, ein in dem Behälter (3) angeordnetes Türantriebsselement (2), anliegend an und/oder konzentrisch zum genannten Griff (1) und an unteren Türen (4) des Behälters (3) für die Öffnung und das Schließen derselben mechanisch verknüpft, zu halten, wobei das genannte zweite Halteelement (20) auf einem beweglichen Wagen (51) installiert ist, welcher entlang der genannten Kopfstruktur (50) beweglich ist; und 10
- Betätigungsmittel, welche dazu geeignet sind, den genannten beweglichen Wagen (51) zwischen einer Türverschleißstellung und einer Türöffnungsstellung zu verlagern, in welchen das Türantriebsselement (2) des Behälters (3), von dem genannten zweiten Halteelement (20) gehalten, jeweils das Schließen ausführt und die Öffnung der genannten unteren Türen (4) des Behälters (3) ermöglicht; 15 20 25

wobei:

- das erste Halteelement (10) ein erstes Paar von beweglichen Backen (10a, 10b) umfasst, welches als eine erste Klemme wirkt, durch Betätigung von einer Halteaktivierungsvorrichtung (40) für die Bewegung des genannten ersten Paares von beweglichen Backen (10a, 10b) zwischen einer Halte- und einer Lösestellung, welche das Halten und das Lösen des genannten Griffs (1) bestimmen; 30 35
- das genannte zweite Halteelement (20) ein zweites Paar von beweglichen Backen (20a, 20b) umfasst, welches als eine zweite Klemme wirkt, durch Betätigung von der genannten Halteaktivierungsvorrichtung (40) für die Bewegung des genannten zweiten Paares von beweglichen Backen (20a, 20b) zwischen einer Halte- und einer Lösestellung, welche das Halten und das Lösen des genannten Türantriebsselements (2) bestimmen; und 40 45
- die Kopfstruktur (50) Fixierelemente (52) integriert, welche mit Anschlägen (21) des zweiten Paares von beweglichen Backen (20a, 20b) in Kontakt kommen und die Bewegung derselben zur genannten Lösestellung verhindern, sodass sie sich in der genannten Haltesituation befinden, und wobei sich der genannte bewegliche 50 55

Wagen (51) in einer Bewegungsstellung befindet, mit Ausnahme von einer Stellung, in welcher sich der bewegliche Wagen (51) in seiner Öffnungsstellung befindet;

dadurch gekennzeichnet, dass

- die Backen des genannten ersten Paares von beweglichen Backen (10a, 10b) jeweilige obere flache Seiten (12) aufweisen, welche, in der genannten Haltestellung und in einer Ladesituation, mit einer unteren Fläche eines perimetrischen Flansches (1a) des Griffs (1) des Behälters (3), unter Empfang der Vertikallasten von dem genannten Flansch, in Kontakt kommen, und untere flache Seiten (13) aufweisen, welche, in der Haltestellung und in einer Ladesituation, die genannten Vertikallasten an eine komplementäre flache Fläche (56) der genannten Kopfstruktur (50) übertragen und sich darauf abstützen.
- 2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Backen des genannten zweiten Paares von beweglichen Backen (20a, 20b) des zweiten Halteelements (20) jeweilige obere flache Seiten (22) aufweisen, welche, in der genannten Haltestellung und in einer Ladesituation, mit einer unteren Fläche eines perimetrischen Flansches (2a) des Türantriebsselements (2) des Behälters (3), unter Empfang der Vertikallasten von dem genannten Flansch, in Kontakt kommen, und untere flache Seiten (23) aufweisen, welche, in der Haltestellung und in einer Ladesituation, die genannten Vertikallasten an eine komplementäre flache Fläche (57) des beweglichen Wagens (51) übertragen und sich darauf abstützen. 30 35
- 3. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die genannte Halteaktivierungsvorrichtung (40), welche das zweite Halteelement (20) betätigt, außerhalb des beweglichen Wagens (51) angeordnet ist und sich nicht mit diesem zusammen verlagert. 40
- 4. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das erste Halteelement (10) und das zweite Halteelement (20) über eine einzige gemeinsame Halteaktivierungsvorrichtung (40) gleichzeitig betätigt werden. 45
- 5. Vorrichtung nach Anspruch 4, **dadurch gekennzeichnet, dass** das erste Halteelement (10) und das zweite Halteelement (20) über eine einzige Halteaktivierungsvorrichtung (40) gleichzeitig betätigt werden, umfassend einen ersten Aktuator (41), welcher einen Mechanismus bewegt, der an Hebelarme (11) der Backen des ersten Paares von beweglichen Ba- 50 55

- cken (10a, 10b) des ersten Halteelements (10) und an beweglichen Stößeln (42) kinematisch verbunden ist, die in Bereichen angeordnet sind, welche die genannten Fixierelemente (52) nicht beeinflussen, um die genannten Anschläge (21) der Backen des zweiten Paares von beweglichen Backen (20a, 20b) des zweiten Halteelements (20) zu drücken, wenn sich der bewegliche Wagen (51) in der Türöffnungsstellung befindet.
- 5
6. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** jede der Backen des zweiten Paares von beweglichen Backen (20a, 20b) des zweiten Halteelements (20) zur Lösestellung durch ein elastisches Element (24) ständig gedrückt werden.
- 10
7. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die genannten Betätigungsmittel, welche dazu geeignet sind, den beweglichen Wagen (51) zu verlagern, einen zweiten Aktuator (53) umfassen, welcher die Rotation von zumindest einer vertikalen Spindel (54) bewirkt, die mit zumindest einem Mutterelement (55), das an dem beweglichen Wagen (51) befestigt ist, gekoppelt ist.
- 15
8. Vorrichtung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** in der Kopfstruktur (50) eine Bildaufnahmekamera (58) installiert ist, wobei die Sichtlinie derselben zwischen den Backen des genannten ersten Paares von beweglichen Backen (10a, 10b) des ersten Halteelements (10) wenn sie sich in der Lösestellung befinden, zwischen den Backen des genannten zweiten Paares von beweglichen Backen (20a, 20b) des zweiten Halteelements (20) wenn sie sich in der Lösestellung befinden, und durch eine Öffnung (59) des beweglichen Wagens (51) nach unten gerichtet ist, und wobei die genannte Bildaufnahmekamera (58) Bilder bereitstellt, welche für die Positionierung der Kopfstruktur (50) in Bezug auf den Griff (1) des Behälters (3) verwendet werden.
- 20
9. Vorrichtung nach Anspruch 2, **dadurch gekennzeichnet, dass** die Kopfstruktur (50) zumindest eine Anschlagfläche (60) aufweist, welche mit einer oberen Fläche des genannten perimetrischen Flansches (1a) des Griffs (1) des Behälters (3) in Kontakt kommt, wobei eine Grenzstellung für die Einführung der Kopfstruktur (50) bestimmt wird, in welcher sich die genannten oberen flachen Seiten (12) der Backen des ersten Paares von beweglichen Backen (10a, 10b) des ersten Halteelements (10) auf ein Niveau befinden, das tiefer als die genannte untere Fläche des genannten perimetrischen Flansches (1a) des Griffs (1) des Behälters (3) ist, und sich die genannten oberen flachen Seiten (22) des zweiten Paares von beweglichen Backen (20a, 20b) des
- 25
- zweiten Halteelements (20) auf ein Niveau befinden, das tiefer als die genannte untere Fläche des genannten perimetrischen Flansches (2a) des Türantriebslements (2) des Behälters (3) ist.
- 30
10. Vorrichtung nach Anspruch 9, **dadurch gekennzeichnet, dass** in der Kopfstruktur (50) ein erstes Erfassungselement (61) angeordnet ist, das zwischen einer Ruhestellung und einer Erfassungsstellung beweglich ist, und ein elastisches Element (63) angeordnet ist, welches das genannte erste Erfassungselement (61) zur genannten Ruhestellung drückt, wobei das erste Erfassungselement (61) zur genannten Erfassungsstellung über den perimetrischen Flansch (1a) des Griffs (1) des Behälters (3) gedrückt wird, wenn sich die Kopfstruktur (50) in der genannten Grenzstellung für die Einführung befindet.
- 35
11. Vorrichtung nach Anspruch 10, **dadurch gekennzeichnet, dass** sich ein erster Sensor (31), welcher das erste Erfassungselement (61) erfasst, wenn es sich in der Erfassungsstellung befindet, in der Kopfstruktur (50) angeordnet ist.
- 40
12. Vorrichtung nach Anspruch 9, 10 oder 11, **dadurch gekennzeichnet, dass** in dem beweglichen Wagen (51) ein zweites Erfassungselement (62) installiert ist, welches zwischen einer oberen Stellung, einer Zwischenstellung und einer unteren Stellung beweglich ist, und dass ein elastisches Element (64) das genannte Erfassungselement (61) zur genannten unteren Stellung drückt, wobei das zweite Erfassungselement (62) zur genannten oberen Stellung und zur genannten Zwischenstellung über das Türantriebslement (2) des Behälters (3) gedrückt wird, wenn sich jeweils die Kopfstruktur (50) in der Grenzstellung für die Einführung befindet und wenn sich der bewegliche Wagen zur geschlossenen Türstellung bewegt.
- 45
13. Vorrichtung nach Anspruch 12, **dadurch gekennzeichnet, dass** ein zweiter Sensor (32), der nur das zweite Erfassungselement (62) erfasst, wenn es sich in einer der Zwischenstellung und oberen Stellung befindet, und ein dritter Sensor (33), der nur das zweite Erfassungselement (62) erfasst, wenn es sich in der oberen Stellung befindet, in dem beweglichen Wagen (51) angeordnet sind.
- 50
14. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Backen des genannten ersten Paares von beweglichen Backen (10a, 10b) des ersten Halteelements (10) Greifflächen aufweisen, welche dazu ausgebildet sind, sich außen mit einer hohlen Stange zu koppeln, welche einen rechtwinkligen Querschnitt aufweist und Teil des Griffs (1) des Behälters (3) ist, wobei verhindert wird, dass sich der
- 55

Behälter (3) in Bezug auf den Kopf dreht, wenn der Griff (1) von dem ersten Halteelement (10) gegriffen wird.

Revendications

1. Un dispositif pour manier et vider des bennes à ordures, comportant une tête d'accouplement comportant une structure de tête (50) portant:

- un premier élément de serrage (10) adapté pour être couplé à un manche (1) fixé sur une surface extérieure d'une benne (3) pour maintenir cette benne (3);
- une deuxième élément de serrage (20) adapté pour serrer un élément opérateur de porte (2) agencé dans la benne (3), adjacent et/ou concentrique à ce manche (1) et relié mécaniquement aux portes inférieures (4) de la benne (3) pour l'ouvrir et la fermer, ce deuxième élément de serrage (20) étant installé sur un chariot mobile (51) pouvant se déplacer le long de cette structure de tête (50); et
- des moyens opérateurs adaptés pour déplacer ce chariot mobile (51) entre les positions de fermeture et d'ouverture de porte, dans lesquelles l'élément opérateur de porte (2) de la benne (3), maintenu par ce deuxième élément de serrage (20), assure la fermeture et permet l'ouverture de ces portes inférieures (4) de la benne (3), respectivement;

dans lequel

- ce premier élément de serrage (10) comporte une première paire de mâchoires mobiles (10a, 10b) agissant comme premier étau actionné par un dispositif d'activation de serrage (40) pour déplacer cette première paire de mâchoires mobiles (10a, 10b) entre les positions de serrage et de desserrage déterminant le serrage et le desserrage de ce manche (1);
- ce deuxième élément de serrage (20) comporte une deuxième paire de mâchoires mobile (20a, 20b) agissant comme un deuxième étau actionné par ce dispositif d'activation de serrage (40) pour déplacer cette deuxième paire de mâchoires mobiles (20a, 20b)

entre les positions de serrage et desserrage déterminant le serrage et le desserrage de cet élément opérateur de porte (2); et

- la structure de tête (50) comporte des éléments de rétention (52) qui entrent en contact avec des butées (21) de la deuxième paire de mâchoires mobiles (20a, 20b) empêchant leur mouvement

vers cette position de desserrage, étant dans cette situation de serrage et ce chariot mobile (51) étant dans une position quelconque de déplacement excepté dans une position dans laquelle le chariot mobile (51) est dans sa position d'ouverture;

caractérisé en ce que:

- les mâchoires de cette première paire de mâchoires mobiles (10a, 10b) ont des surfaces supérieures planes (12) respectives qui, dans cette position de serrage et dans une situation de chargement, entrent en contact avec la surface inférieure d'une bride périmétrique (1 a) du manche (1) de la benne (3) recevant des charges verticales de cette bride, et des surfaces planes inférieures (13) qui, dans la position de serrage et dans une situation de chargement, transmettent ces charges verticales à et reposent sur une surface plane complémentaire (56) de cette structure de tête (50).

2. Le dispositif conformément à la revendication 1, **caractérisé en ce que** les mâchoires de cette deuxième paire de mâchoires mobiles (20a, 20b) du deuxième élément de serrage (20) ont des surfaces planes supérieures respectives (22) qui, dans cette position de serrage et dans une situation de chargement entrent en contact avec une surface inférieure d'une bride périmétrique (2a) de l'élément opérateur de porte (2) de la benne (3) recevant des charges verticales de cette bride, et des surfaces planes inférieures (23) qui, dans la position de serrage et dans une situation de chargement transmettent ces charges verticales à et reposent sur une surface plane complémentaire (57) du chariot mobile (51).
3. Le dispositif conformément à une quelconque des revendications précédentes, **caractérisé en ce que** ce dispositif d'activation de serrage (40) actionnant le deuxième membre de serrage (20) est agencé à l'extérieur du chariot mobile (51) et ne se déplace pas avec lui.
4. Le dispositif conformément à une quelconque des revendications précédentes, **caractérisé en ce que** les premier et deuxième éléments de serrage (10, 20) sont actionnés simultanément au moyen d'un seul dispositif d'activation de serrage (40) partagé.
5. Le dispositif conformément à la revendication (4) **caractérisé en ce que** les premier et deuxième éléments de serrage (10, 20) sont actionnés simultanément au moyen d'un seul dispositif d'activation de serrage (40) comportant un premier actionneur (41) déplaçant un mécanisme cinématiquement relié à des bras de levier (11) des mâchoires de la première

- paire de mâchoires mobiles (10a, 10b) du premier élément de serrage (10) et à des vérins mobiles (42) agencés dans des régions libre d'interférences avec ces éléments de rétention (52) pour pousser ces butées (21) des mâchoires de la deuxième paire de mâchoires mobiles (20a, 20b) du deuxième élément de serrage (20) lorsque le chariot mobile (51) est dans la position d'ouverture de porte.
6. Le dispositif conformément à la revendication 5, **caractérisé en ce que** chacune des mâchoires de la deuxième paire de mâchoires mobiles (20a, 20b) du deuxième élément de serrage (20) sont poussées en permanence vers la position de desserrage par un élément élastique (24).
7. Le dispositif conformément à une quelconque des revendications précédentes, **caractérisé en ce que** ces moyens actionneurs adaptés pour déplacer le chariot mobile (51) comportent un deuxième actionneur (53) assurant la rotation d'au moins un arbre vertical (54) couplé à au moins un élément d'écrou (55) fixé sur le chariot mobile (51).
8. Le dispositif conformément à une quelconque des revendications précédentes **caractérisé en ce que** dans la structure de tête (50) est installée une caméra de capture d'images (58) dont la ligne de visée est dirigée vers le bas entre les mâchoires de cette première paire de mâchoires mobiles (10a, 10b) du premier élément de serrage (10) lorsqu'elles sont dans la position de desserrage, entre les mâchoires de cette deuxième paire de mâchoires mobiles (20a, 20b) du deuxième élément de serrage (20) lorsqu'elles sont dans la position de desserrage et à travers une ouverture (59) du chariot mobile (51), et cette caméra de capture d'images (58) offre des images qui sont utilisées pour positionner la structure de tête (50) par rapport au manche (1) de la benne (3).
9. Le dispositif conformément à la revendication 2, **caractérisé en ce que** la structure de tête (50) a au moins une surface de butée (60) entrant en contact avec une surface supérieure de cette bride périmétrique (1a) du manche (1) de la benne (3) déterminant une position limite d'insertion de la structure de tête (50) dans laquelle ces surfaces planes supérieures (12) des mâchoires de la première paire de mâchoires mobiles (10a, 10b) du premier élément de serrage (10) sont situées à un niveau inférieur à celui de cette surface inférieure de cette bride périmétrique (1a) du manche (1) de la benne (3) et ces surfaces planes supérieures (22) de la deuxième paire de mâchoires mobiles (20a, 20b) du deuxième élément de serrage (20) sont situées à un niveau inférieur à celui de cette surface inférieure de cette bride périmétrique (2a) de l'élément opérateur de porte (2) de la benne (3).
10. Le dispositif conformément à la revendication (9) **caractérisé en ce que** dans la structure de tête (50) est agencé un premier élément détecteur (61) mobile entre une position d'attente et une position de détection et un élément élastique (63) poussant ce premier élément détecteur (61) vers cette position d'attente, le premier élément détecteur (61) étant poussé à cette position de détection par la bride périmétrique (1a) du manche (1) de la benne (3) lorsque la structure de tête (50) est dans cette position limite d'insertion.
11. Le dispositif conformément à la revendication 10, **caractérisé en ce qu'**un premier capteur (31) détectant le premier élément détecteur (61) lorsqu'il est dans la position de détection est agencé dans la structure de tête (50).
12. Le dispositif conformément à la revendication 9, 10 ou 11, **caractérisé en ce qu'**est installé dans le chariot mobile (51) un deuxième élément détecteur (62) mobile entre les positions, supérieure, intermédiaire et inférieure et un élément élastique (64) pousse cet élément détecteur (61) vers cette position inférieure, le deuxième élément détecteur (62) étant poussé à ces positions supérieure et intermédiaire par l'élément opérateur de porte (2) de la benne (3) lorsque la structure de tête (50) est dans la position limite d'insertion et lorsque le chariot mobile est déplacé vers la position de porte fermée, respectivement.
13. Le dispositif conformément à la revendication 12, caractérisé en qu'un deuxième capteur (32) ne détectant que le deuxième élément détecteur (62) lorsqu'il est dans une quelconque des positions intermédiaire et supérieure et un troisième capteur (33) ne détectant que le deuxième élément détecteur (62) lorsqu'il est dans la position supérieure sont agencés dans le chariot mobile (51).
14. Le dispositif conformément à la revendication 1, **caractérisé en ce que** les mâchoires de cette première paires de mâchoires mobiles (10a, 10b) du premier élément de serrage (10) ont des surfaces de préhension configurées pour être extérieurement couplées à une tige creuse ayant une coupe transversale carrée qui fait partie du manche (1) de la benne (3) empêchant la benne (3) de tourner par rapport à la tête lorsque le manche (1) est agrippé par le premier membre de serrage (10).

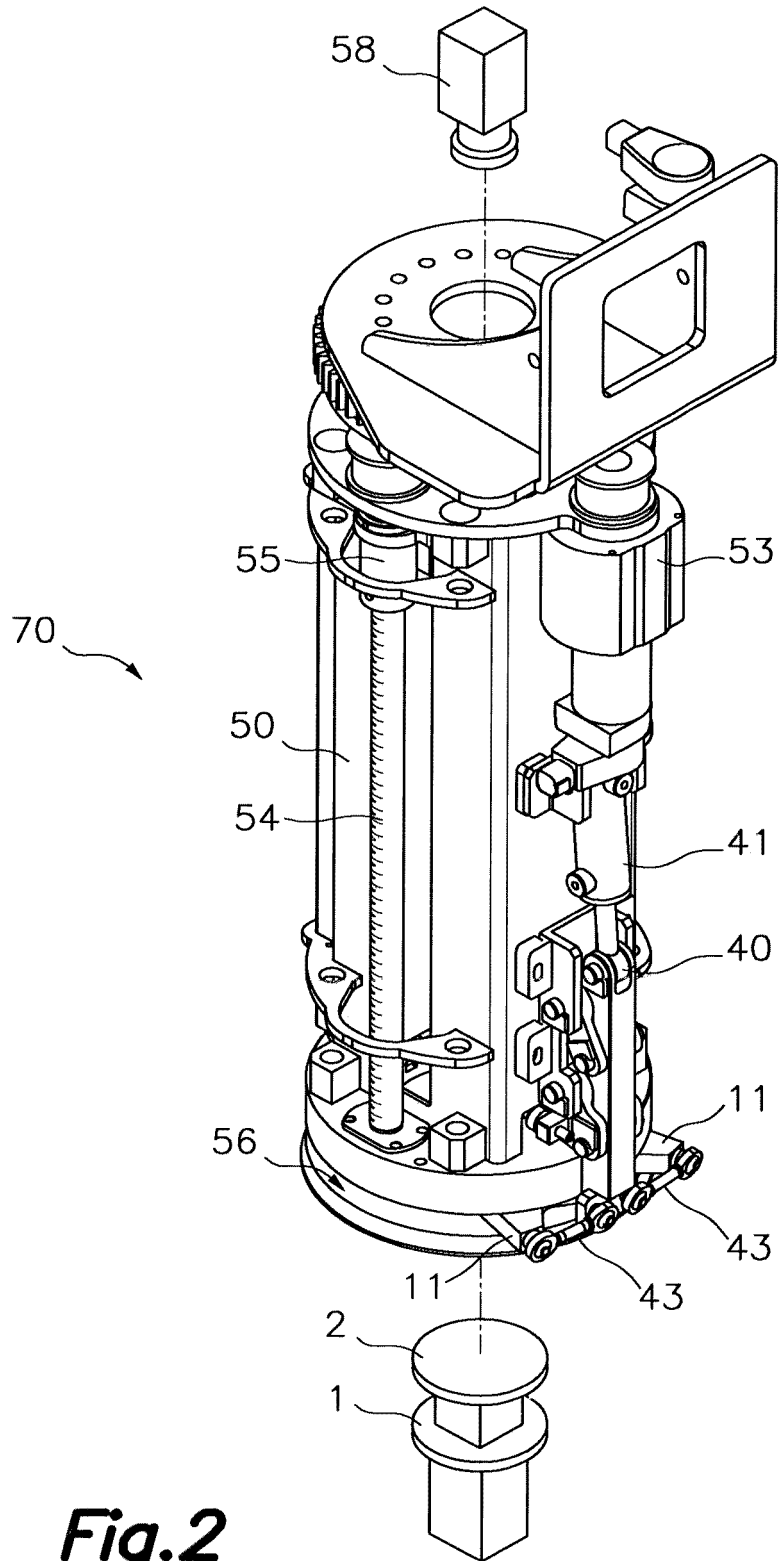


Fig.2

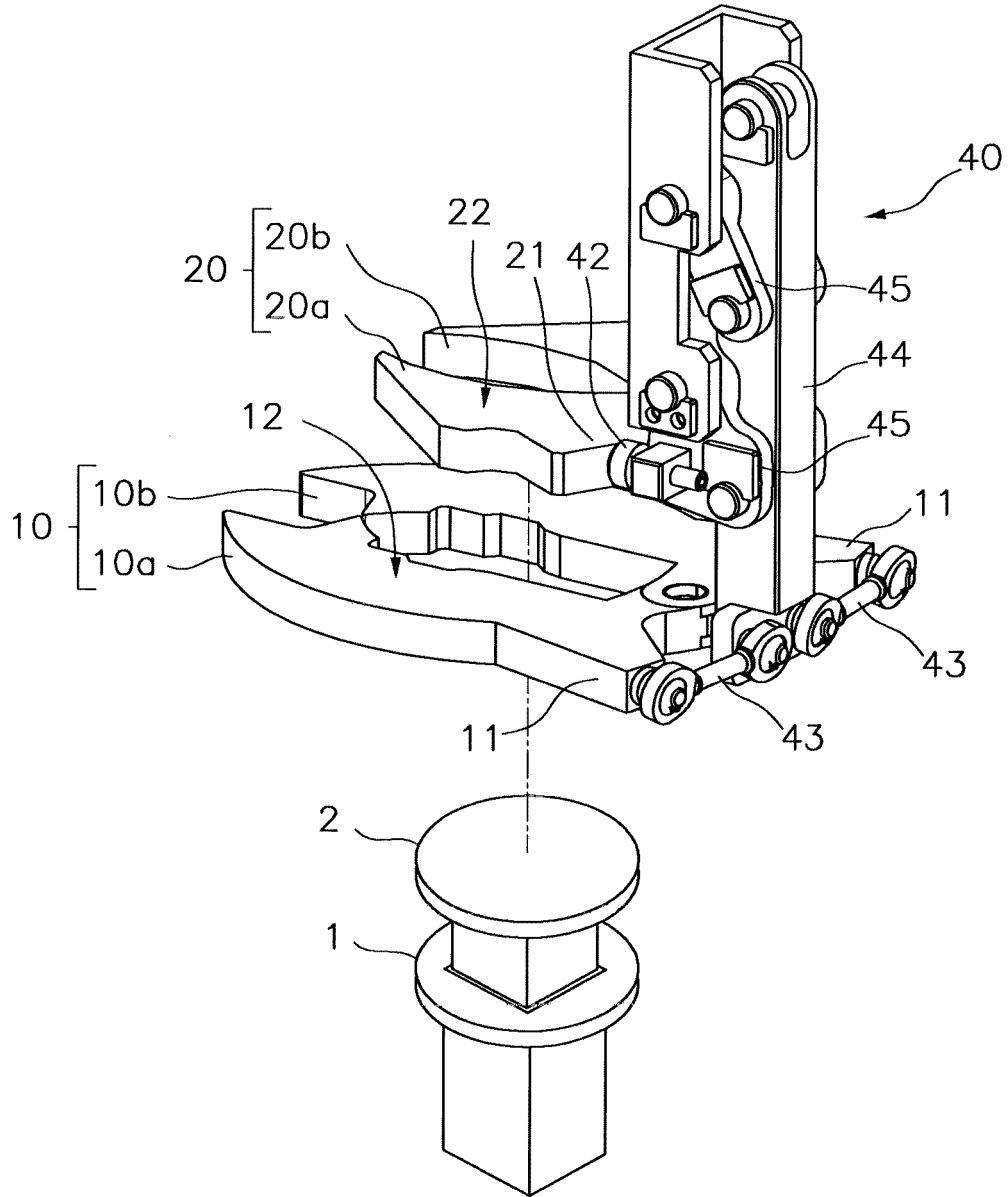


Fig.3

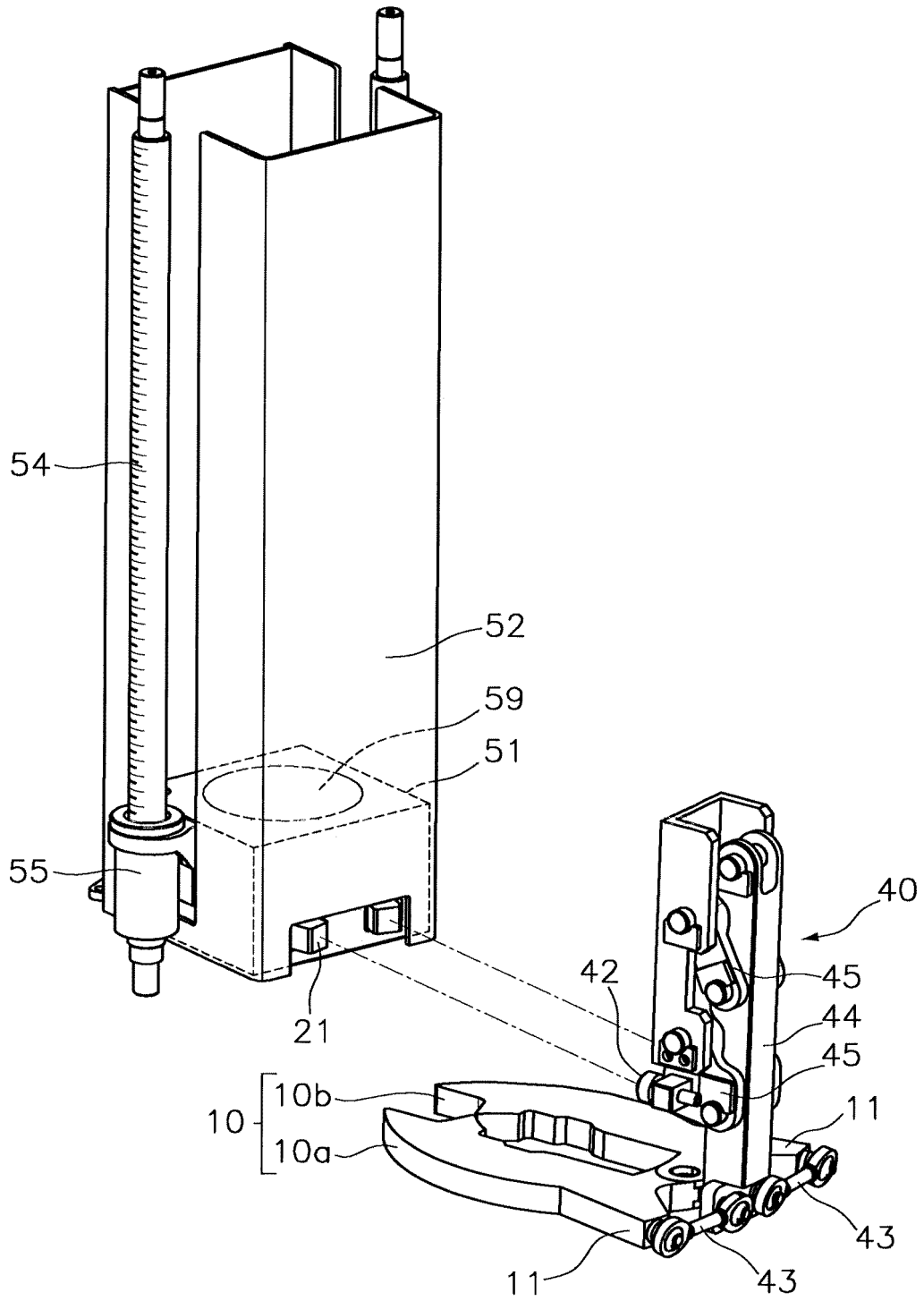


Fig. 4

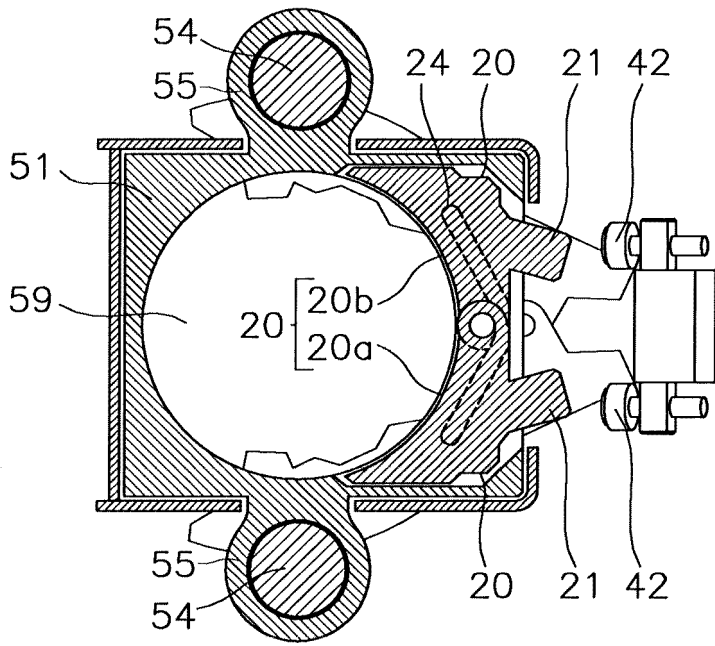


Fig. 5a

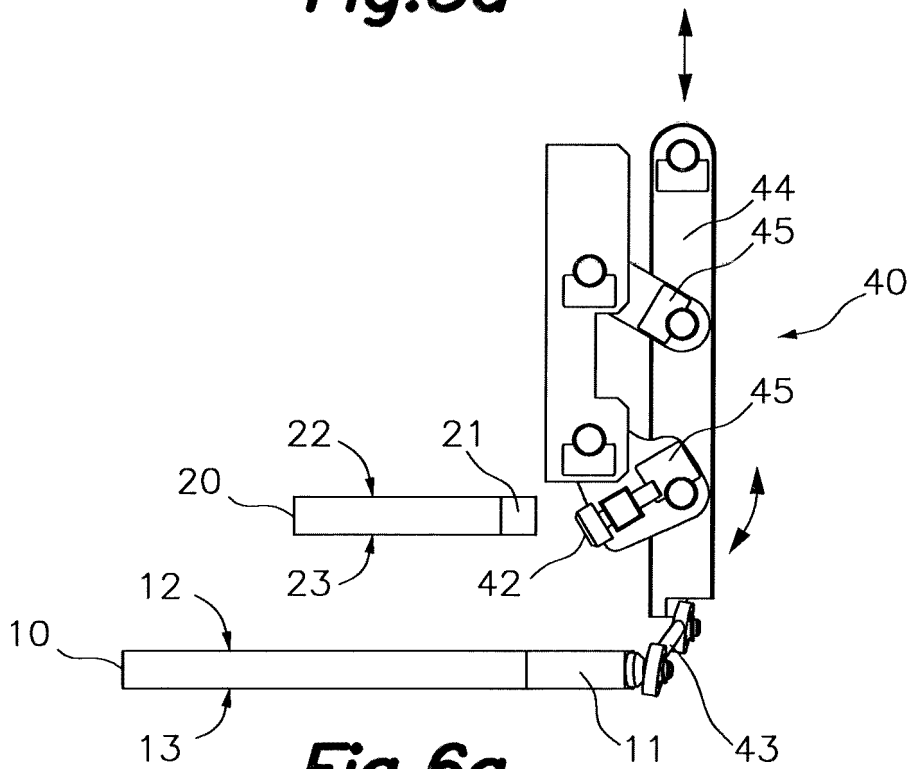


Fig. 6a

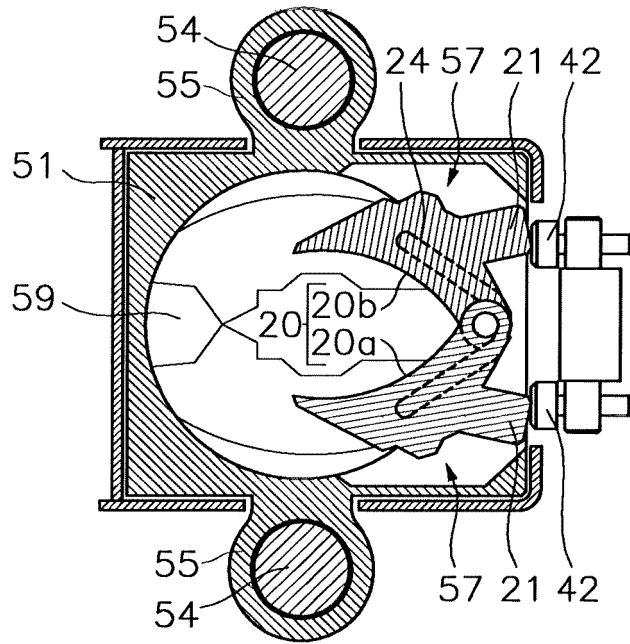


Fig. 5b

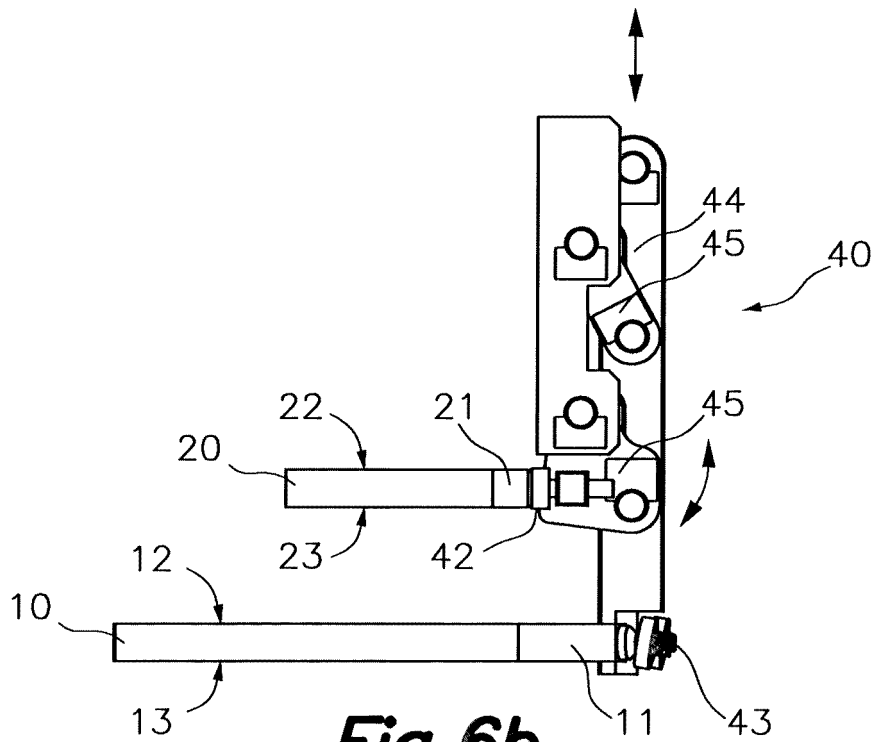


Fig. 6b

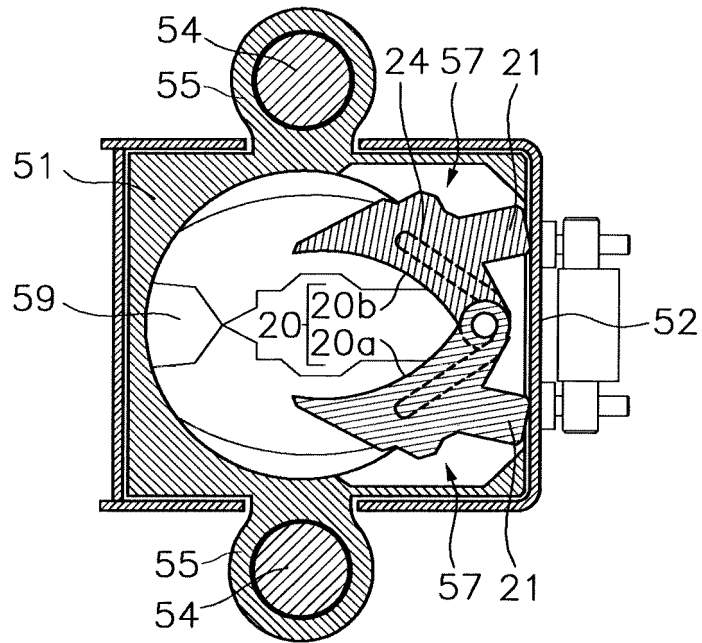


Fig. 5c

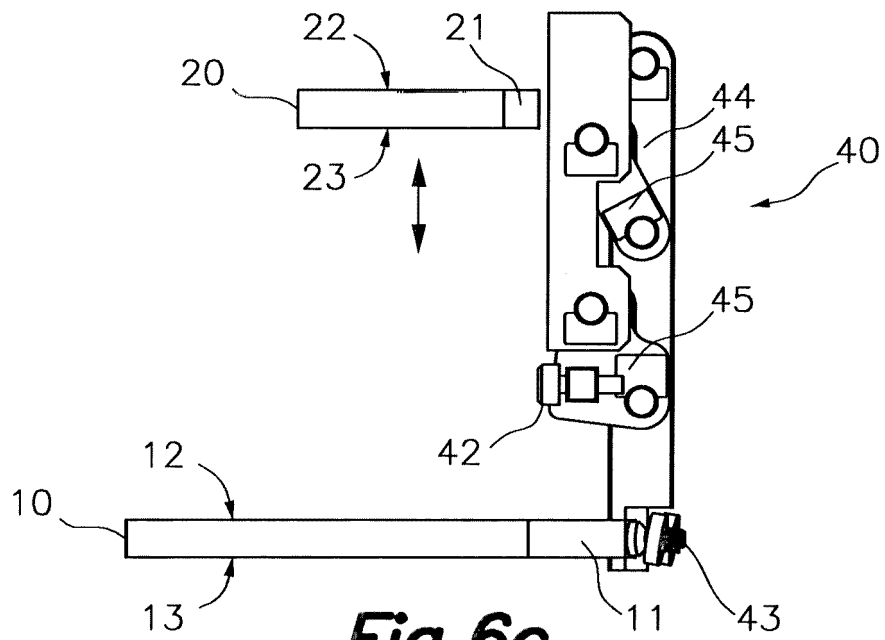


Fig. 6c

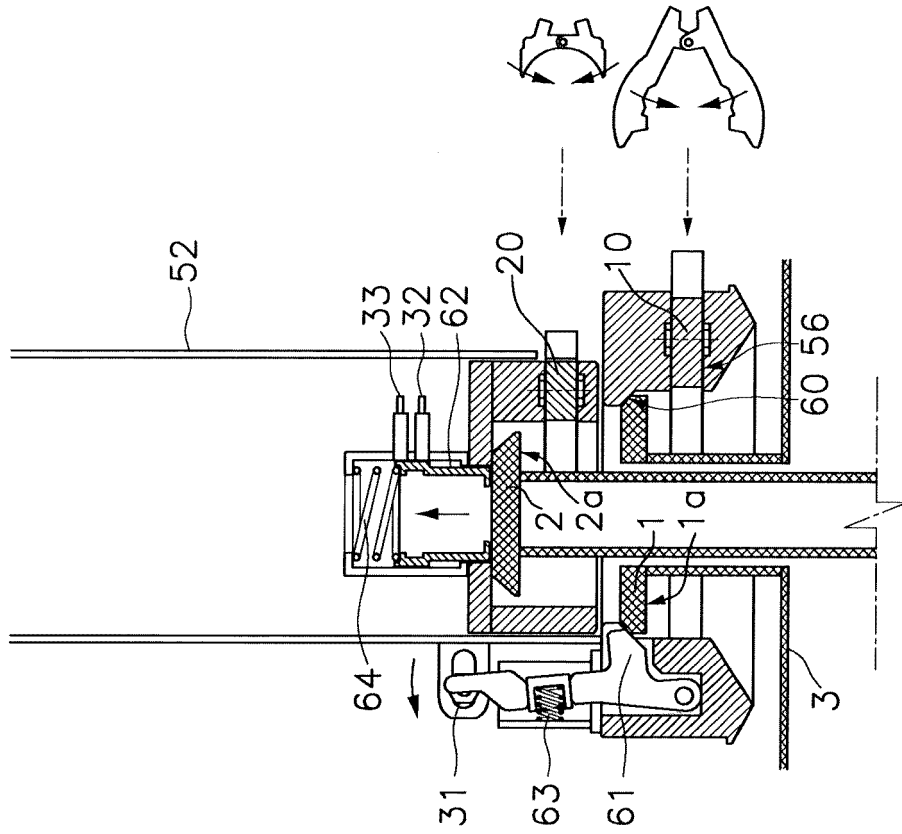


Fig. 7a

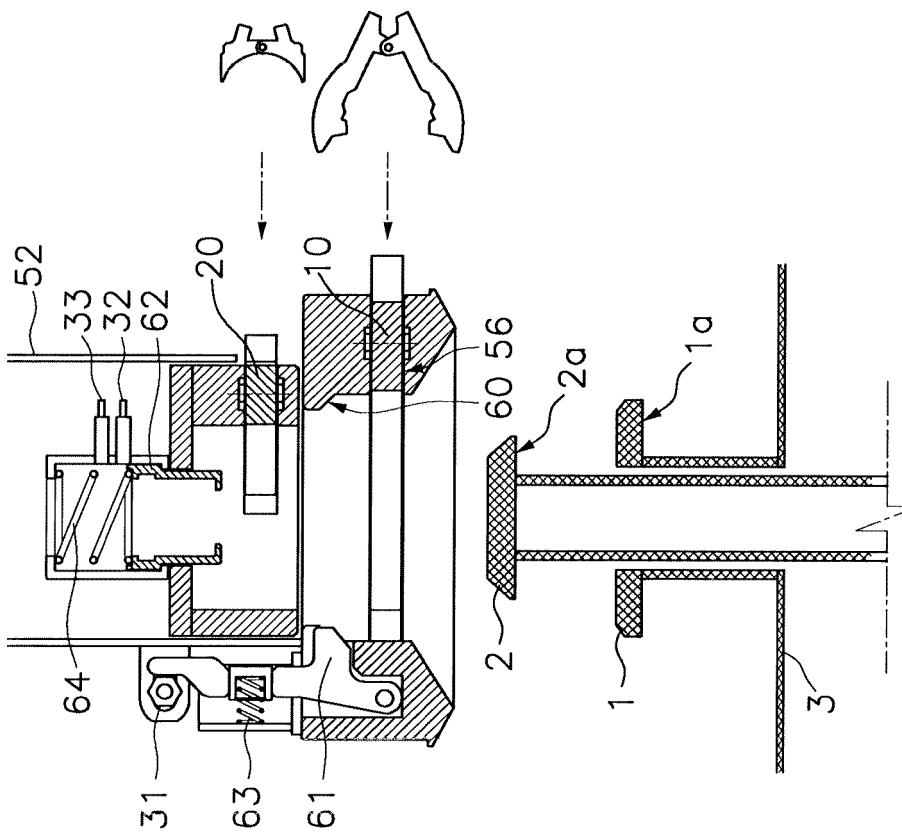


Fig. 7b

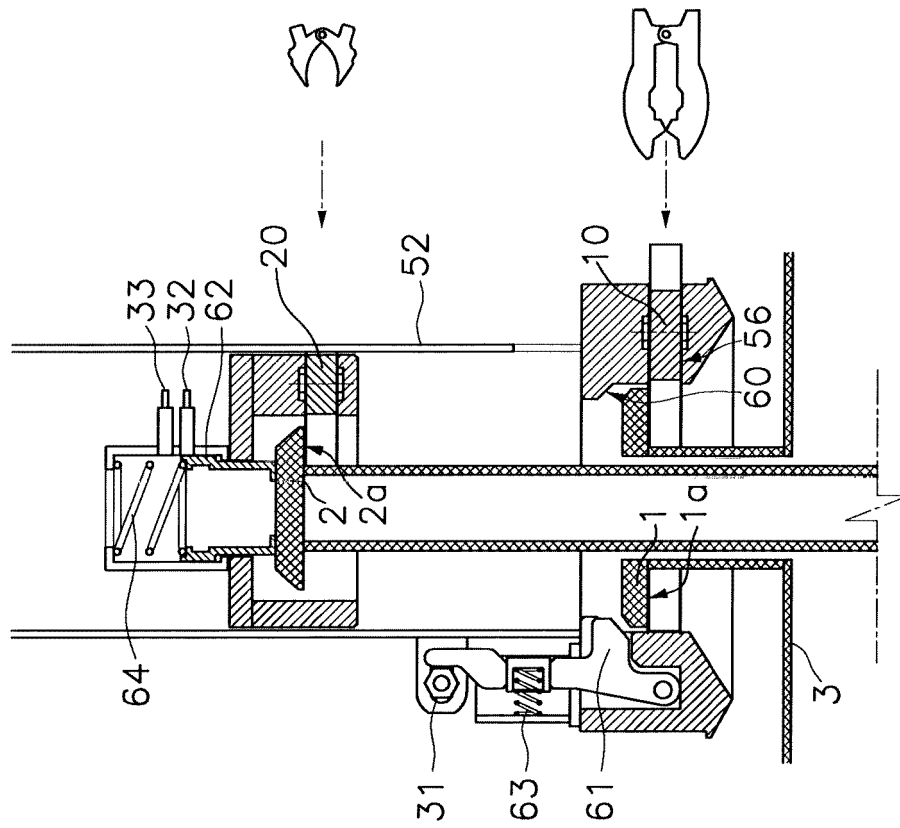


Fig. 7c

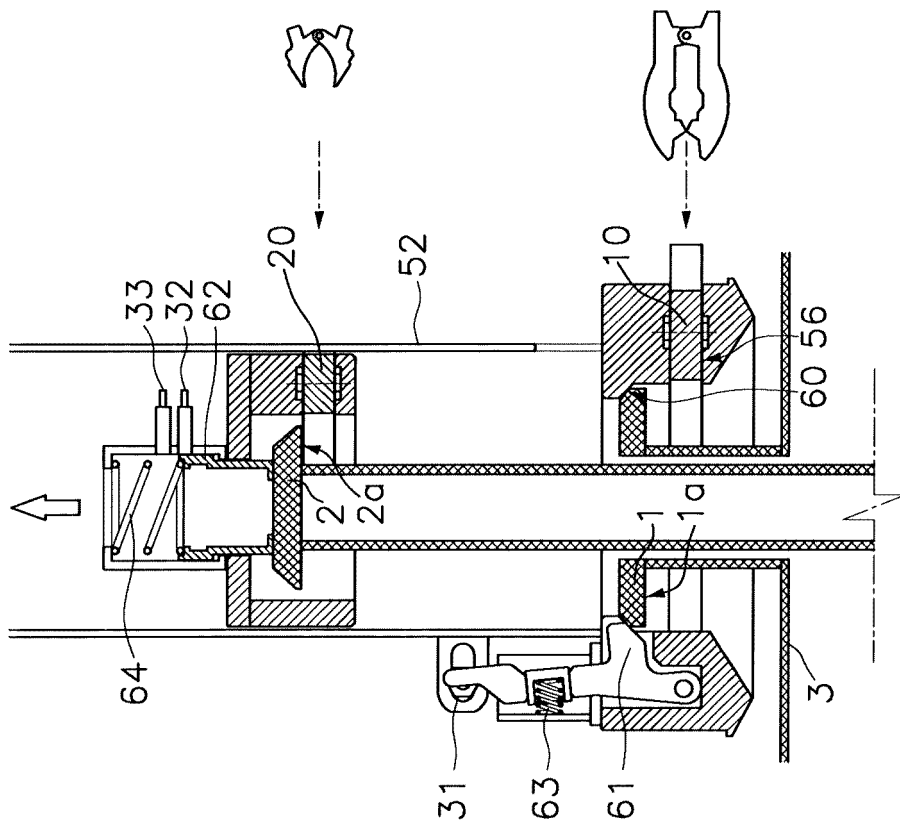


Fig. 7d

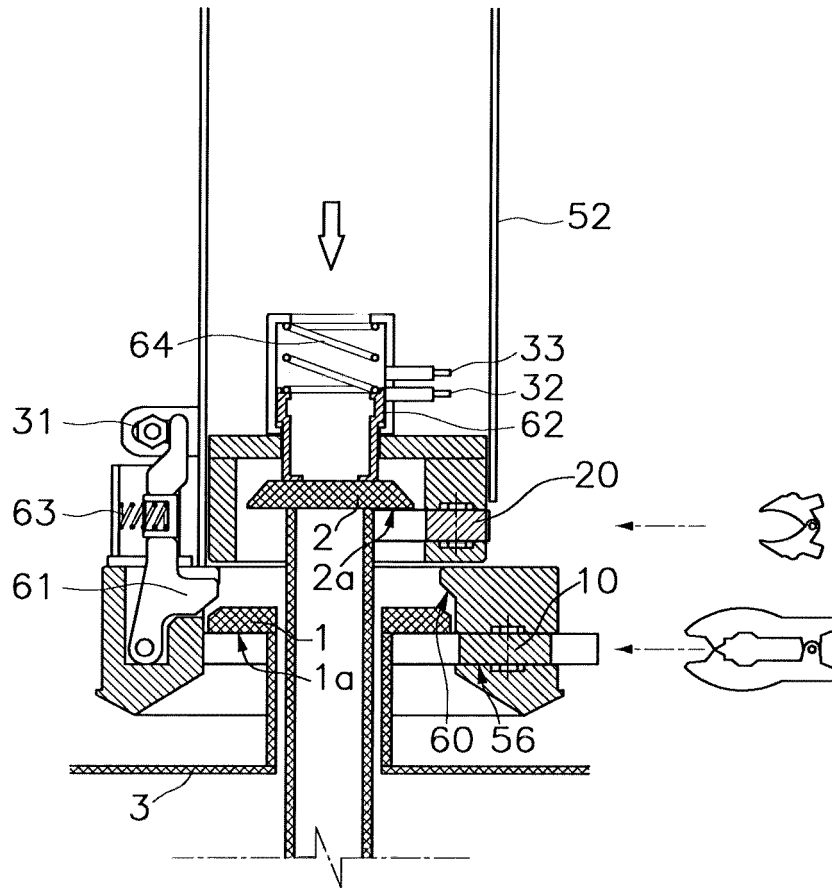


Fig. 7e

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- DE 29905551 U1 [0003] [0004]