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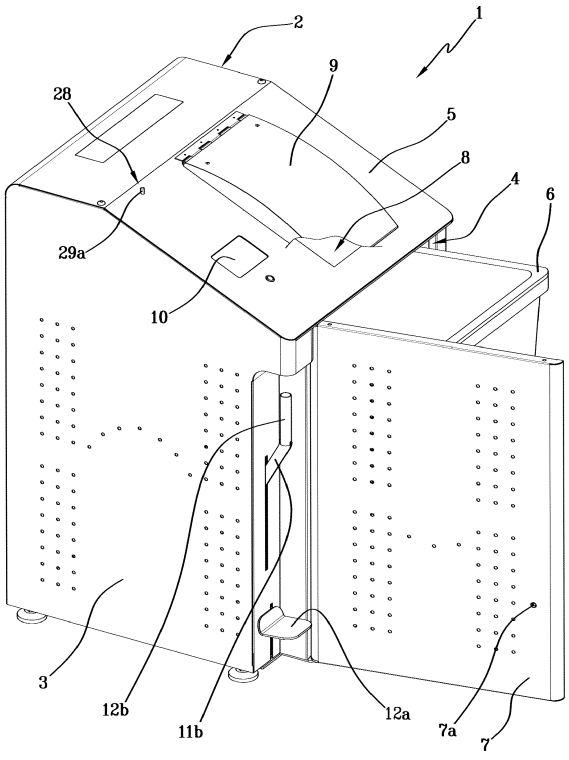
(54) **DEVICE FOR THE COLLECTION OF URBAN WASTE**

(57) A containment structure (2) defines a containment chamber (4) and comprises a top wall (5) having a conferring mouth (8) provided with a shutter (9) movable towards an opening condition, to enable the introduction of waste into the containment chamber (4). At least one swinging arm (17) engaged in the containment chamber (4) is movable between a raised position and a lowered position in which it is respectively brought closer to and moved away from the top wall (5). A link mechanism (20) moves the swinging arm (17) between the raised position and the lowered position following a movement of at least one control lever (11a, 11b) between a rest position and a working position. A signalling device (28) indicates occurrence of a maximum filling degree when the translation of the swinging arm (17) towards the lowered position is prevented by the presence of the waste accumulated in the containment chamber (4).

Fig.1



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Description

[0001] The present invention relates to a device for the collection of urban waste. In particular, the invention is conveniently usable in collection devices which include the use of containers, for example bags or bins including or not including wheels to facilitate the movement thereof, enclosed in a containment structure.

[0002] For the purpose of waste collection in urban environments, the use of special containers is known which, at least where separate collection is required, can each be configured for the conferment of a certain type of waste by the user.

[0003] Some embodiment examples of waste containers which can incorporate measures to overcome one or more of the issues listed below are described in EP 3 476 769 A1, WO 2016/126802 A1, and AT 342 509 B.

[0004] To preserve waste from atmospheric agents, from scattering due to, for example, animal incursions or vandalism, etc., as well as to improve public decency, it is known to prepare containers in special containment structures which conceal them from view and protect them from external agents. The introduction of the waste takes place through at least one special conferring opening arranged in the upper part of the containment structure, possibly accessible through a closure door.

[0005] In order to regulate and/or promote the correct use of the collection devices, it may be provided that they are equipped with user identification devices by entering a code assigned thereto, so as to enable the waste disposal only for authorized users by way of the release of the access door and/or to record the disposal conferred for statistical purposes and/or for the purpose of awarding credits.

[0006] The control of the conferment can also be carried out from a volumetric point of view. This leads to proposals for containers equipped with geometric limiters of the waste size, increasingly inducing the user to carry out a preliminary manual compaction to save space and to differentiate waste for economic and ecological reasons.

[0007] In order to allow cleaning and maintenance operations, as well as allow the periodic extraction of the container and the emptying thereof by the personnel assigned to the urban collection service, at least one access door is provided on one of the lateral walls of the containment structure, which can be opened by means of a key lock.

[0008] A typically recurring problem with the use of the known devices is the need to promptly report to the user the non-usability of a device when it exceeds a predetermined maximum filling degree. Solutions are also required to optimize and simplify the logistical organization of the container emptying operations, for example to avoid the unnecessary emptying of only partially full containers and/or the delayed intervention on filled containers with the consequent deposit of waste on the ground by the user.

[0009] Currently, the implementation of technical solutions able to signal the maximum filling degree outside the device typically involves the use of appropriate sensors able to detect the filling degree achieved inside the container. For example, EP 1818281 describes a system in which each bin is provided with a detection device adapted to acquire information regarding the status of the waste present in the container, by means of an ultrasonic sensor able to detect the filling degree of the container itself.

[0010] The applicant has noted, however, that the need for a power supply in such devices limits the practical applicability thereof in cases where the device is equipped with a stand-alone power supply system or connected to an urban power supply line.

[0011] In order to improve the state of the art, the applicant considers it appropriate to implement the waste collection device with a mechanically operated detection system, so as to make the signalling possible without necessarily requiring the aid of a power supply.

[0012] In other words, the object of the present invention is to overcome the limitations of the prior art by providing a collection device which is suitable for immediately and effectively detecting the achievement of a maximum filling degree inside the container enclosed in the containment structure, without necessarily requiring the presence of electronic type sensors.

[0013] It is also intended to propose a device which is easily adaptable to the urban context of installation to allow easy access to the individual containers for the purpose of periodic emptying and/or replacement operations by the assigned personnel.

[0014] A further object of the invention is that such a device has a high flexibility of use. In particular, a device is proposed which can easily be set up to operate both in a completely mechanical way, so as not to require units or connections to power supply networks, or in the presence of electrically powered auxiliary devices.

[0015] Another object of the invention is to obtain a device which favours a correct distribution of the material inside the container, freeing the inlet of the material coming from the conferring opening.

[0016] These and other objects, which will become apparent in the course of the present disclosure, are substantially achieved by an urban waste collection device, according to claim 1.

[0017] Such a device is in fact suitable to promptly signal the maximum filling degree when the internal volume of the containment chamber dedicated to receiving the waste has been filled with the last conferring operation carried out by the user. Furthermore, the use of the swinging arm as a sensor for detecting the level of waste makes it possible to obtain a device with entirely mechanical operation.

[0018] In at least one preferential embodiment, the device of the invention also comprises one or more of the following preferred features.

[0019] Preferably, there is also a return mechanism

operatively interposed between the control lever and the shutter, to move the latter from the lowered condition to the raised condition following a movement of the control lever towards the working position.

[0020] The movement of the arm is therefore obtained in conjunction with the opening and closing operation of the shutter in a structurally simple and reliable mechanical way, without requiring the aid of actuators and motors. Preferably, the link mechanism comprises a support arm rotatably constrained according to a hinging axis parallel to an oscillation axis of the swinging arm and carrying a slider slidably guided along a guide slot obtained longitudinally in the swinging arm.

[0021] Preferably, the slider is movable along the slot between a first and a second end-stroke position to move the swinging arm between the raised position and the lowered position.

[0022] Preferably, a control tie kinematically connects the control lever with the support arm to rotate the latter about said hinging axis, causing a translation of the slider from the first to the second end-stroke position in consequence of a translation of the control lever from the rest position to the working position.

[0023] The movement of the arm is therefore obtained in a structurally simple and reliable mechanical way, without requiring the aid of actuators and motors.

[0024] Preferably, the slider is movable between a first and a second end-stroke position passing through a dead-point condition in which an alignment direction between the slider and said hinging axis is perpendicular to the longitudinal development of the slot.

[0025] The passage through the dead-point condition allows to obtain a double movement of the arm forward and backward, in consequence of a single translation of the slider from one to the other of the end-stroke positions.

[0026] Preferably, each translation of the slider from one to the other of said first and second end-stroke positions determines a forward movement and a return movement of the swinging arm between the raised position and the lowered position.

[0027] Following a complete forward and backward cycle of the control lever, the slider is advantageously translated to the second end-stroke position and the subsequent return thereof to the first end-stroke position. Each of these forward and backward strokes determines a cycle of lowering and raising the swinging arm. It follows that each waste conferment operation by the user causes two lowering movements of the swinging arm towards the lowered position: the first movement allows to move any objects in precarious balance onto the accumulation of waste previously created, so as to free the falling path of the waste from the conferring mouth; the second lowering movement allows to detect the possible filling of the useful conferment volume following the introduction of the waste.

[0028] Preferably, at least one elastic return element operating on the support arm is also provided to return the slider from the second end-stroke position to the first end-stroke position following the release of the control lever from the working position.

[0029] The direct return action on the support arm facilitates an effective return of the mechanism to the starting condition.

[0030] Preferably, the signalling device comprises a movable body movable through the top wall between a rest condition and an operative condition, indicative of the occurrence of the maximum filling degree.

[0031] The exposure of the movable body through the containment structure allows the signalling to be achieved exclusively mechanically, without the aid of light signals which require an electrical power source.

[0032] Preferably, the signalling device further comprises a return tie which connects the movable body to the support arm to retain the movable body in the rest condition when the slider is in the first end-stroke position, and a contrast spring operating on the movable body in antagonism with the return tie to push the movable body towards the operative condition.

[0033] The failure to return the slider to the first end-stroke position at the end of the conferment cycle therefore causes the signalling of the filling status.

[0034] Preferably, the return tie comprises a traction spring engaged to an attachment wing carried by the support arm.

[0035] Thus, a distancing of the attachment seat from the movable body during the rotation of the support arm is supported, maintaining the return action on the movable body itself.

[0036] Preferably, the attachment wing extends on the continuation of the support arm beyond the hinging axis thereof, and translates at a minimum distance from the movable body when the slider reaches near the dead-point condition.

[0037] Since with the occurrence of the maximum filling degree, the waste interferes with the swinging arm, preventing it from lowering to the lowered position, the slider is stopped near the dead-point condition without completing the return cycle to the first end-stroke position. In this condition, the minimum distance of the attachment seat from the movable body causes the amount of traction exerted by the return tie on the movable body to be reduced or zero, such as to allow the contrast spring to bring the movable body to the outside of the containment structure, signalling the filling state.

[0038] Preferably, the signalling device comprises a proximity sensor, a micro-switch, an optical sensor and/or another type of sensor, operatively connected with the swinging arm or with the link mechanism, and an electronic control unit configured to control the switching on of a light signalling device when the swinging arm stops in a position distant from the raised position.

[0039] This solution requires a power supply and can be conveniently used in the presence of user dialogue interfaces, shutter release electrolocks and/or other electrical or electronic units used as an accessory to the col-

lection device.

[0040] Preferably, further provided are reset means configured to bring the swinging arm retained by the waste in the lowered position to the raised position.

[0041] By returning the swinging arm to the raised position, the action of the reset means can facilitate the extraction of the full container from the containment chamber.

[0042] Preferably, the reset means comprise an auxiliary tie rod connected to the support arm and activatable from inside the containment chamber to rotate the support arm itself about the hinging axis thereof.

[0043] The accessibility from the inside of the containment chamber reserves the intervention on the reset means only for the personnel assigned to the collection and/or maintenance service, authorized to access the inside of the device, inhibiting the unwanted activation of the reset means by unauthorized persons.

[0044] Preferably, the auxiliary tie rod has an end, opposite the support arm, constrained to an access door arranged in a lateral wall of the containment structure, to rotate the support arm following the opening of the access door.

[0045] It is thus possible to automatically cause the activation of the reset means following the opening of the access door by the authorized personnel.

[0046] Preferably, the swinging arm lies on a plane external to a vertical projection of the perimeter of the conferring mouth.

[0047] Thereby, the presence of the swinging arm does not hinder the fall of the waste from the conferring mouth.

[0048] Preferably, the swinging arm carries, on the side opposite the oscillation axis thereof, a thrust element protruding lower with respect to the arm itself.

[0049] The swinging arm may thus operate on the waste within the upper portion of a container arranged in the containment chamber.

[0050] Preferably, there is also provided at least one electronic control unit operatively connected with a user interface, configured to enable the release of the shutter from the closure condition following the entry of a recognition code assigned to a user.

[0051] Further features and advantages will become more apparent from the detailed description of a preferred, yet not limiting, embodiment of an urban waste collection device, in accordance with the present invention. Such description will be set forth hereinafter with reference to the accompanying drawings given only for illustrative and, therefore, nonlimiting purpose, in which:

- figure 1 shows a perspective view of an urban waste collection device in accordance with the present invention, with an open access door and a partially extracted container;
- figure 2 shows a perspective view of an inner part of the device of figure 1, with some parts omitted to make others more relevant for the purposes of the description visible;
- figure 3 is an enlarged view of a detail of figure 2;
- figure 4 shows a perspective view of an inner part of the device of figure 1, seen from a different angle with respect to figure 2;
- figure 5 is an enlarged view of a detail of figure 4;
- figure 6 shows in front view a swinging arm present in the device in object and a part of the link mechanism associated therewith, in a raised position with a slider arranged in a first end-stroke position;
- figure 7 shows the swinging arm of figure 4 in the lowered position with the slider positioned in a dead-point condition of the stroke thereof;
- figure 8 shows the swinging arm of figure 4 in the raised position with the slider positioned in a second end-stroke position.

[0052] With reference to the figure 1, the number 1 globally indicates an urban waste collection device, according to the present invention.

[0053] The device 1 comprises a containment structure 2 which, in the illustrated example, has a substantially prismatic shape whose peripheral extension is defined by lateral walls 3 rising vertically from the road floor or other support surface, and circumscribing a containment chamber 4 closed above by a top wall 5. The containment chamber 4 is suitable for receiving at least one waste container 6, preferably removable after opening an access door 7 obtained in one of the lateral walls 3. In a manner known per se, the access door 7 can be provided with a lock 7a which can only be opened by authorized personnel in possession of a special key, for the purpose of performing periodic emptying operations of the container 6 and/or other maintenance operations.

[0054] In the top wall 5 there is a conferring mouth 8 provided with a shutter 9, for introducing waste into the container 6. In the illustrated example, the shutter 9 is obtained in the form of a hinged door on the top wall 5 itself, and is movable about a horizontal axis between a lowered closure condition of the conferring mouth 8 and a raised opening condition of the conferring mouth itself, to enable the introduction of waste into the containment chamber 4.

[0055] The movement of the shutter 9 can be enabled through an electromechanical release device (not shown), the operation of which is managed through a user interface 10 which enables the release of the shutter 9 following the entry of a recognition code assigned to the user. The recognition code may be entered in a number of different ways, such as by keyboard, touchscreen, reading a magnetic card, RFID, or wirelessly querying a smartphone or remote memory unit.

[0056] Preferably, the movement of the shutter 9 is obtainable through at least one control lever 11 a, 11b hinged to the containment structure 2. In the example shown, a first control lever 11 a and a second control lever 11b are provided, each of which is hinged inside one of the lateral walls 3 of the containment structure 2 and has an end protruding externally from the latter. The

protruding end of the first control lever 11a, positioned at the base of the containment structure 2, carries an operating pedal 12a, while the second control lever 11b carries an operating handle 12b positioned higher than the pedal 12a, suitable for use also by disabled people.

[0057] Each of the control levers 11a, 11b is movable between a rest position, raised, and a working position, lowered. At least one return mechanism 13 is operatively interposed between the control levers 11a, 11b and the shutter 9, to move the latter from the closure condition to the opening condition in consequence of a movement of the one or the other control lever 11a, 11b towards the working position. In the illustrated example, the return mechanism 13 comprises at least one traction cable 14 connected to the control levers 11a, 11b, possibly engaged through one or more guide sheaths 15 for at least a part of the extension thereof and operating on the shutter 9 to control the rotation thereof about the hinging axis thereof. A protective elastic element 16 may be interposed along the traction cable 14 to allow the lowering of one or both of the control levers 11a, 11b without transmitting excessive stresses to the shutter 9, as the latter is locked in the closure condition.

[0058] In the upper part of the containment chamber 4, at least one swinging arm 17 further operates, having one end rotatably engaged, according to a substantially horizontal oscillation axis X, to a bracket 18 fixed against one of the lateral walls 3. The end of the swinging arm 17 opposite the oscillation axis X thereof preferably carries a thrust element 19 protruding lower with respect to the arm itself.

[0059] The swinging arm 17 is movable between a raised position in which it is brought closer to the top wall 5, and a lowered position in which it is moved away from the top wall 5. Preferably, in the raised position, a lower end of the thrust element 19 is higher than the upper edge of the container 6 enclosed in the containment chamber 4, so as not to hinder the movement of the latter for the purpose of extraction from the containment structure 2. In the lowered position, however, the thrust element 19 at least partially occupies the internal volume of the container 6.

[0060] The swinging arm 17 is substantially arranged according to a vertical lying plane close to the centre line of the container 6 and the containment structure 2. Preferably, this lying plane is external to a vertical projection of the perimeter of the conferring mouth 8, so that the swinging arm 17 and the components constrained thereto do not interfere with the fall of the waste towards the container 6 itself.

[0061] The collection device 1 further comprises a link mechanism 20 operatively interposed between each of the control levers 11a, 11b and the swinging arm 17, to move the latter from the lowered position to the raised position in consequence of a movement of the one or the other control lever 11a, 11b from the respective working position to the rest position. More particularly, the link mechanism 20 is configured to transmit to the swinging arm 17 a downward and upward motion following the lowering of the operating pedal 12a or the operating handle 12b from the respective rest position to the working position, and a new downward motion and upward motion to the raised position when the control lever 11a, 11b is released to return to the rest position.

[0062] The link mechanism 20 may comprise a support arm 21 rotatably constrained according to a hinging axis Z parallel to the oscillation axis X of the swinging arm 17. At an end thereof suitably spaced from the hinging axis Z, the support arm 21 carries a slider 22 slidably engaged along a guide slot 23 obtained longitudinally in the swinging arm 17.

[0063] A rotation of the support arm 21 about the hinging axis Z thereof corresponds to an oscillation of the swinging arm 17 about the oscillation axis X thereof, with a sliding of the slider 22 along the guide slot 23 between a first end-stroke position A and a second end-stroke position B, respectively shown in figure 6 and figure 8.

[0064] More particularly, with reference to figures 6 to 8, suppose that the support arm 21 rotates anticlockwise from the condition of figure 6 in which the slider 22 is in the first end-stroke position A. In an initial section of the movement of the slider 22 along the guide slot 23, a lowering of the swinging arm 17 is caused, until reaching the lowered position at a dead-point condition C in which, as best seen in figure 7, the direction of alignment between the slider 22 and the hinging axis Z is perpendicular to the longitudinal extension of the guide slot 23. When the dead-point condition C is exceeded, the translation of the slider 22 away from the first end-stroke position A causes a new raising of the swinging arm 17, preferably until it again reaches the raised position when the slider 22 reaches the second end-stroke position B.

[0065] A rotation of the support arm 21 in the opposite direction to the above will produce a new lowering and raising of the swinging arm 17, returning the slider 22 to the first end-stroke position A.

[0066] At least one control tie 24, for example in the form of a cable suitably guided about any returns, kinematically connects each of the control levers 11a, 11b with the support arm 21, so as to rotate the latter about the hinging axis Z following the movement of the one or the other of the control levers 11a, 11b from the rest position to the working position. In the example illustrated, a control tie 24 is provided for each of the control levers 11a, 11b, and both control ties 24 converge, preferably at a common attachment point, on a first constraint wing 25 protruding from the support arm 21. The lowering of at least one of the control levers 11a, 11b towards the respective working position transmits a traction to the respective control tie 24, which forces the support arm 21 to perform a consequent angular rotation, counterclockwise in the illustrated example.

[0067] Such rotation is preferably counteracted by the action of a traction spring or other elastic return element 26 operating on an attachment wing 27 extending from the support arm 21, beyond the hinging axis Z. The elastic

return element 26 tends to rotate the support arm 21 clockwise, that is to say in the opposite direction to the rotation imposed by lowering the control lever 11a, 11b. Therefore, following the release of the control lever 11a, 11b from the working position, the action of the elastic return element 26 returns the slider 22 from the second end-stroke position B to the first end-stroke position A, determining a new cycle of lowering and raising the swinging arm 17.

[0068] The collection device 1 further comprises at least one signalling device 28 operatively connected with the swinging arm 17, and configured to indicate a maximum filling degree. In a preferred embodiment, the signalling device 28 comprises a movable body 29, movable through the top wall 5 of the containment structure 2, between a rest condition indicated in figure 6, and an operative condition indicated in figure 7. In the rest condition, the movable body 29, for example in the form of a cylindrical stem, is concealed inside the containment structure 2, or may have the end portion 29a thereof, for example of green colour, which protrudes slightly from the top wall 5 to indicate the normal operative state of the collection device 1. In the operative condition, the movable body 29 protrudes significantly from the top wall 5 by the longitudinal portion 29b thereof, possibly red, to indicate that the maximum filling degree has been reached inside the container 6.

[0069] A contrast spring 30 operates between the movable body 29 and an abutment bracket 31 fixed internally to the top wall 5, to push the movable body 29 itself towards the operative condition.

[0070] A lower end of the movable body 29 traverses the abutment bracket 31 to connect to a return tie 32 in turn connected to the support arm 21. In the example described and illustrated herein, the return tie 32 is formed by a traction spring engaged to the attachment wing 27. When the support arm 21 is rotated anticlockwise with the slider 22 in the first end-stroke position A, the return tie 32 is tensioned so as to retain the movable body 29 in the rest condition, overcoming the action of the contrast spring 30, as shown in figure 6.

[0071] During the rotation of the support arm 21, the attachment wing 27 translates passing at a minimum distance from the movable body 29 when the slider 22 reaches near the dead-point condition C. Consequently, when the swinging arm 17 is near the lowered position, the return tie 32 is loose and therefore allows the return spring to push the movable body 29 into the operative condition, as shown in figure 7.

[0072] In a possible embodiment variant not illustrated, the signalling device 28 may comprise a proximity sensor, a micro-switch, an optical sensor and/or another type of sensor, operatively connected with the swinging arm 17 or with the link mechanism 20. This sensor will be interconnected with an electronic control unit, for example integrated into the same user interface 10, configured to control the switching on of a light-type signalling device when the swinging arm 17 stops in a position distant from the raised position.

[0073] For the purposes of conferring the waste, the user identifies himself by means of the user interface 10 which, upon recognition of the code, commands the release of the shutter 9 to enable the conferment. By acting on the operating pedal 12a or the operating handle 12b, the user can then cause the opening of the shutter 9 and insert the waste into the conferring mouth 8.

[0074] The translation of the control lever 11a, 11b towards the working position also determines the rotation of the support arm 21 and the consequent movement of lowering and raising of the swinging arm 17, while the slider 22 passes from the first end-stroke position A to the second end-stroke position B. The consequent lowering of the thrust element 19 towards the inside of the container 6 can advantageously cause the displacement or crushing of any light waste, for example pieces of cardboard or the like, which invade the falling path of the waste from the conferring mouth 8, freeing the descent of the waste which is about to be conferred by the user.

[0075] Once the transfer is complete, the user releases the control lever 11a, 11b and the support arm 21 is returned to the initial position by the action of the elastic return element 26. The swinging arm 17 consequently performs a new downward movement and raises to stabilize again in the raised position with the first end-stroke position A reached by the slider 22.

[0076] If the introduction of the waste has caused the occurrence of the maximum filling degree envisaged for the container 6, the lowering movement of the swinging arm 17 during the movement of the slider 22 away from the second end-stroke position B will be stopped due to the interference of the thrust element 19 against the waste itself, stopping the translation of the slider 22 near the dead-point condition C.

[0077] Consequently, the movable body 29 of the signalling device 28 will stabilize in the operative position thereof, signalling to the next users the non-usability of the collection device 1.

[0078] The movable body 29 in the operative condition also signals the need for an emptying of the container 6 to the waste collection personnel, who can promptly intervene to remove the container 6 and empty or replace it.

[0079] In order to prevent the swinging arm 17 which may be retained near the lowered position from hindering the extraction of the container 6, reset means 33, which can be activated by the maintenance or collection service personnel, may be advantageously provided to return the swinging arm 17 itself to the raised position.

[0080] Such reset means may comprise an auxiliary tie rod 33 connected to the support arm 21 and activatable from inside the containment chamber 4, to rotate the support arm 21 itself about the hinging axis Z thereof so as to force the completion of the stroke of the slider 22 towards the first end-stroke position A.

[0081] In a possible embodiment not depicted, the auxiliary tie rod 33 may be operated by a lever or a handle located inside the containment structure 2, near the ac-

cess door 7.

[0082] In a preferred embodiment, the auxiliary tie rod 33 has an end 33a thereof, opposite the support arm 21, constrained to the access door 7 so as to be put into traction directly upon opening the door itself. The support arm 21 is therefore rotated in consequence of the opening of the access door 7, freeing the outlet of the container 6.

[0083] Of course, the possibility of equipping the delivery device 1 with electronically operated units, for example an ultrasonic sensor 34, to detect almost continuously the filling status of the container 6 is not excluded. The mechanical operation of the swinging arm 17 nevertheless offers the advantage of also allowing the preparation of a delivery device with entirely mechanical operation.

Claims

1. Device for the collection of urban waste, comprising:

a containment structure (2) defining a containment chamber (4) arranged to receive at least one waste container (6), wherein the containment structure (2) comprises a top wall (5) having a delivery mouth (8) provided with a shutter (9) movable between a closure condition of the delivery mouth (8) to an opening condition of the conferring mouth (8), to enable the introduction of waste into the containment chamber (4);
at least one control lever (11a, 11b) hinged to the containment structure (2) and movable between a rest position and a working position;
at least one swinging arm (17) engaged in the containment chamber (4) and movable between a raised position in which it is brought closer to the top wall (5) and a lowered position in which it is moved away from the top wall (5);
a link mechanism (20) operatively interposed between the control lever (11a, 11b) and the swinging arm (17) to move the latter between the raised position and the lowered position in consequence of a movement of the control lever (11a, 11b) between the rest position and the working position;
a signalling device (28) operatively connected with the swinging arm (17) and configured to indicate occurrence of a maximum filling degree when the translation of the swinging arm (17) towards the lowered position is prevented by the presence of the waste accumulated in the containment chamber (4).

2. Device according to claim 1, wherein the link mechanism (20) comprises:

a support arm (21) rotatably connected according to a hinging axis (Z) parallel to an oscillation axis (X) of the swinging arm (17) and carrying a slider (22) slidably guided along a guide slot (23) formed longitudinally in the swinging arm (17), the slider (22) being movable along the slot between a first end-stroke position (A) and a second end-stroke position (B) to move the swinging arm (17) between the raised position and the lowered position;
a control tie (24) kinematically connecting the control lever (11a, 11b) with the support arm (21) to rotate the latter about said hinging axis (Z), causing translation of the slider (22) from the first end-stroke position (A) to the second end-stroke position (B) in consequence of a translation of the control lever (11a, 11b) from the rest position to the working position.

3. Device according to claim 2, wherein the slider (22) is movable between the first end-stroke position (A) and the second end-stroke position (B) passing through a dead point condition (C) in which an alignment direction between the slider (22) and said hinging axis (Z) is perpendicular to the longitudinal development of the guide slot (23).

4. Device according to claim 2 or 3, wherein each translation of the slider (22) from one to the other of said first end-stroke position (A) and second end-stroke position (B) causes a forward movement and a return movement of the swinging arm (17) between the raised position and the lowered position.

5. Device according to one or more of the claims from 2 to 4, further comprising at least one elastic return element (26) operating on the support arm (21) to return the slider (22) from the second end-stroke position (B) to the first end-stroke position (A) in consequence of release of the control lever (11a, 11b) from the working position.

6. Device according to one or more of the previous claims, wherein the signalling device (28) comprises a movable body (29), movable through the top wall (5) between a rest condition and an operative condition, indicative of the occurrence of the maximum filling degree.

7. Device according to claim 6 and one or more of claims 2 to 5, wherein the signalling device (28) further comprises a return tie (32) which connects the movable body (29) to the support arm (21) to retain the movable body (29) in the rest condition when the slider (22) is in the first end-stroke position (A), and a contrast spring (30) operating on the movable body (29) in antagonism with the return tie (32) to push the movable body (29) towards the operative condition.

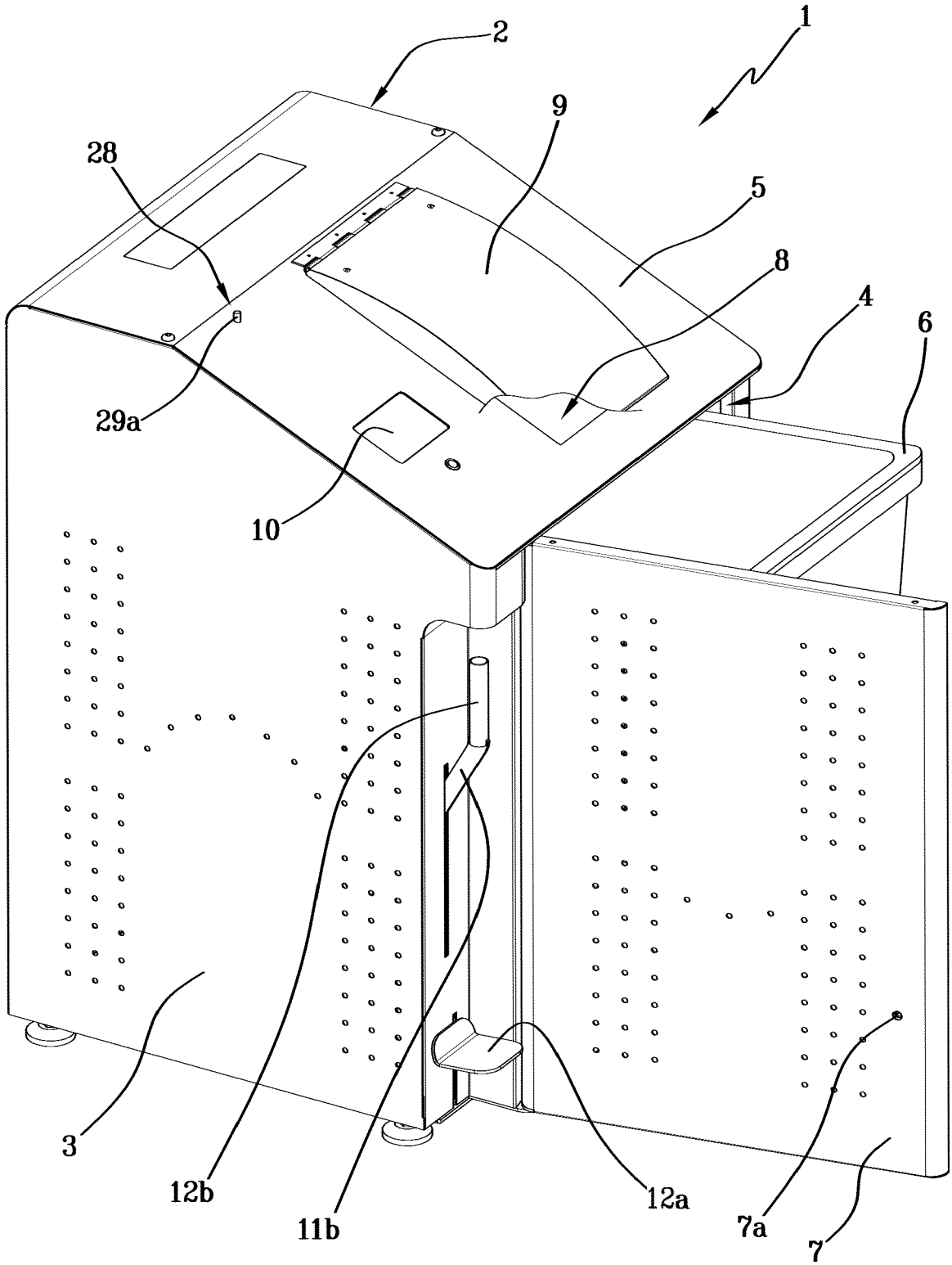
8. Device according to claim 7, wherein the return tie (32) comprises a traction spring engaged to an attachment wing (27) carried by the support arm (21).

9. Device according to claim 8 when dependent on one or more of the claims from 3 to 7, wherein the attachment wing (27) extends on the continuation of the support arm (21) beyond the hinging axis (Z) of the same, and moves at a minimum distance from the movable body (29) when the slider (22) reaches the dead-point condition (C).

10. Device according to one or more of claims 2 to 9, further comprising reset means (33) for bringing to the raised position the swinging arm (17) retained in the lowered position by the waste, said reset means (33) comprising an auxiliary tie rod (33) connected to the support arm (21) and being activatable from inside the containment chamber (4), to rotate the support arm (21) itself around its own pivoting axis (Z), wherein the auxiliary tie rod (33) has an end, opposite the support arm (21), secured to an access door (7) arranged in a lateral wall (3) of the containment structure (2), to rotate the support arm (21) in consequence of opening of the access door (7).

11. Device according to one or more of the preceding claims, further comprising at least one electronic control unit operatively connected to a user interface (10), configured to enable the release of the shutter (9) from the closure condition, in consequence of entry of a recognition code assigned to a user.

Fig.1



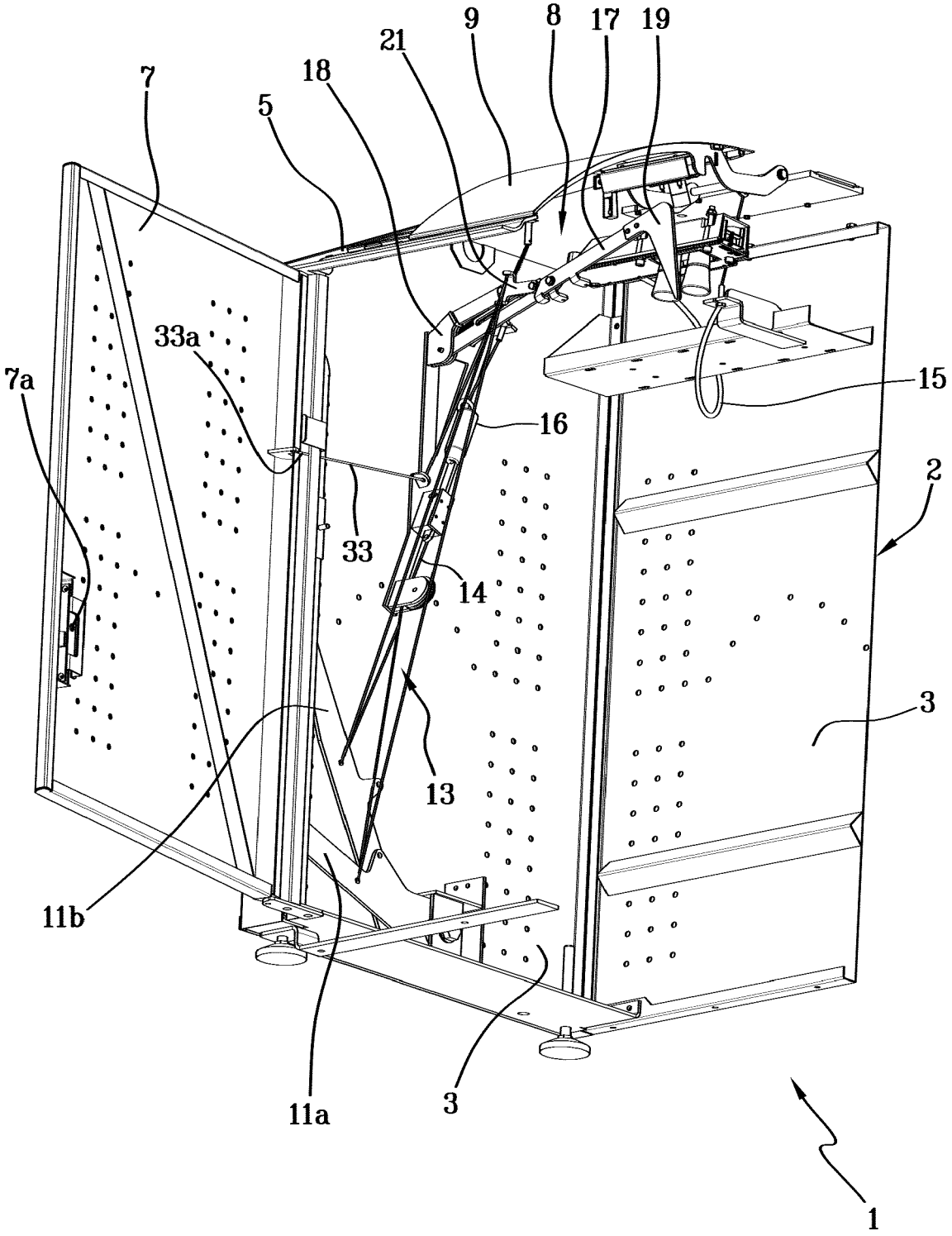


Fig.2

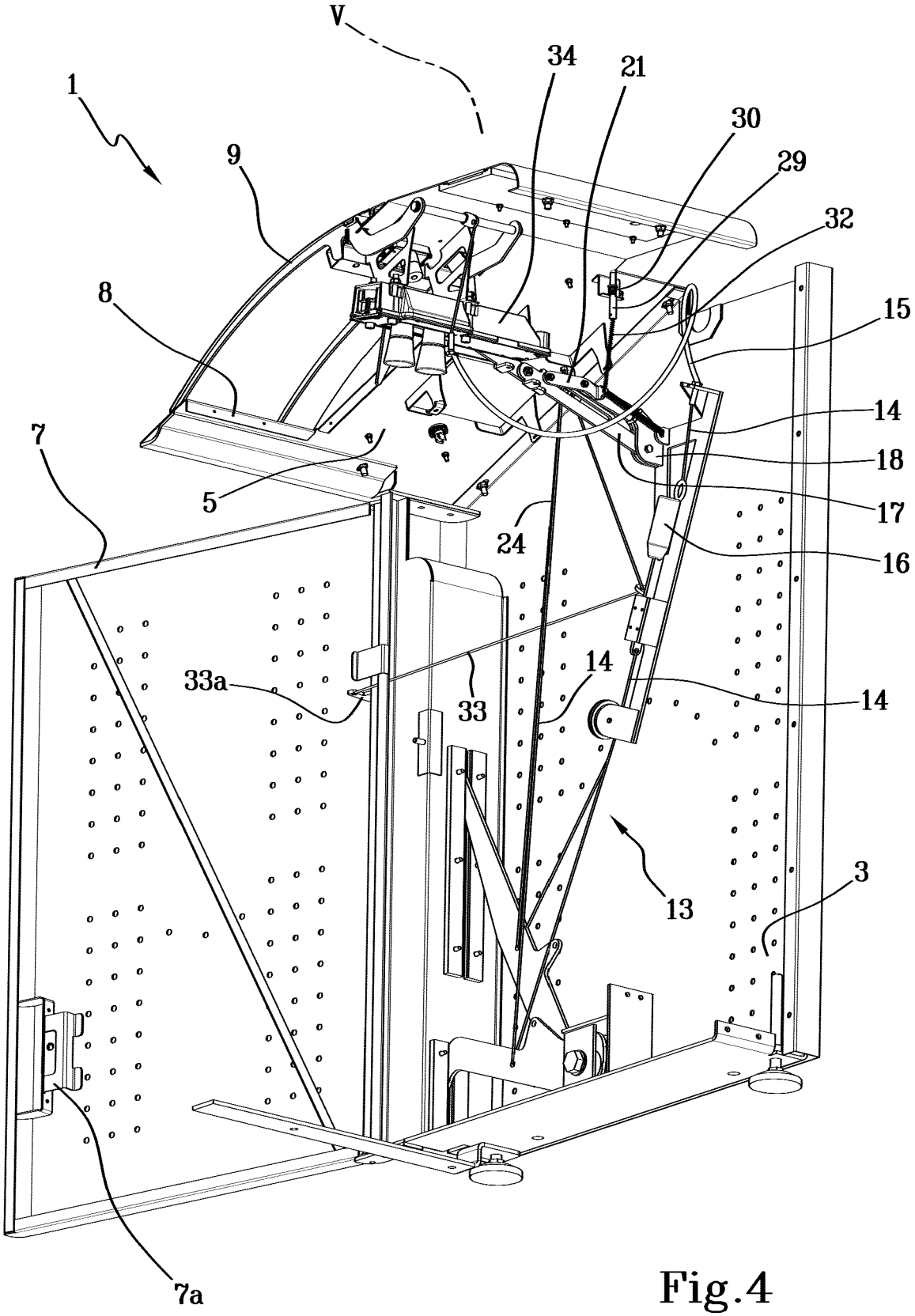
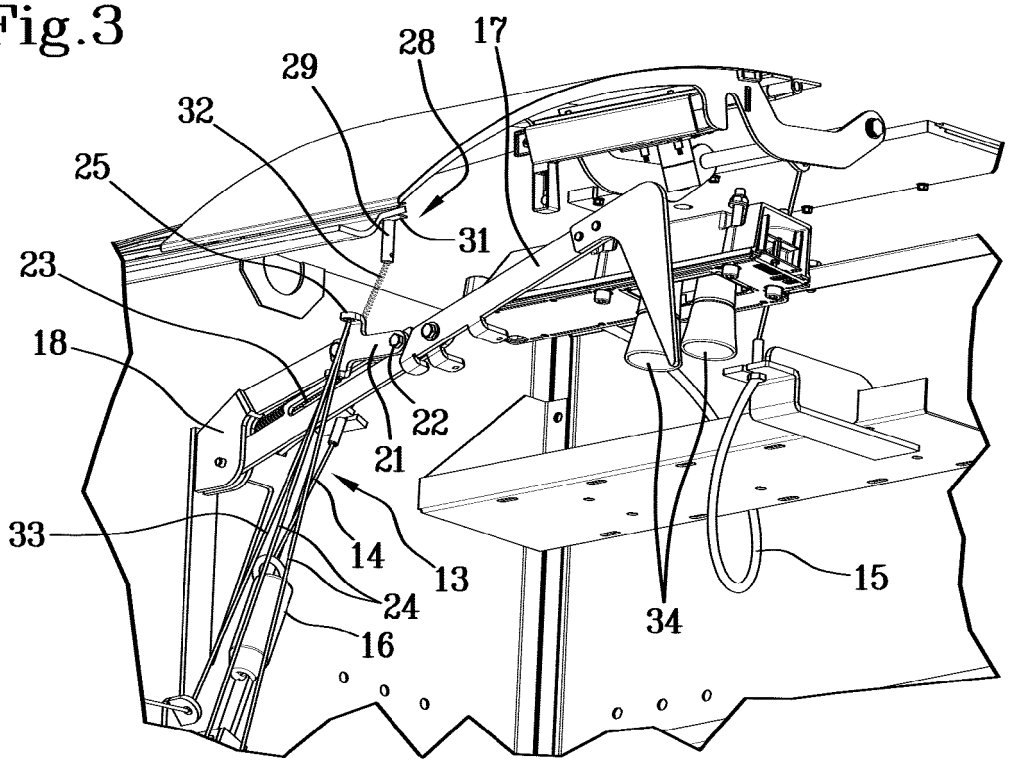


Fig.4

Fig.3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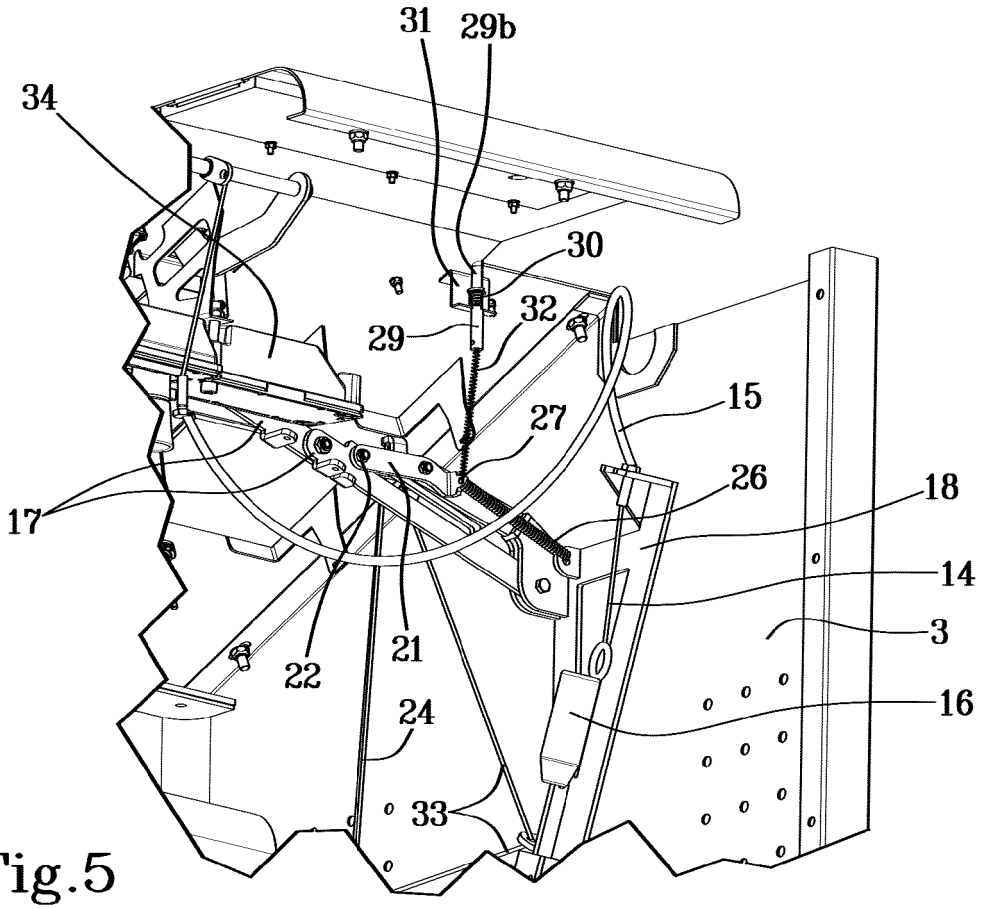
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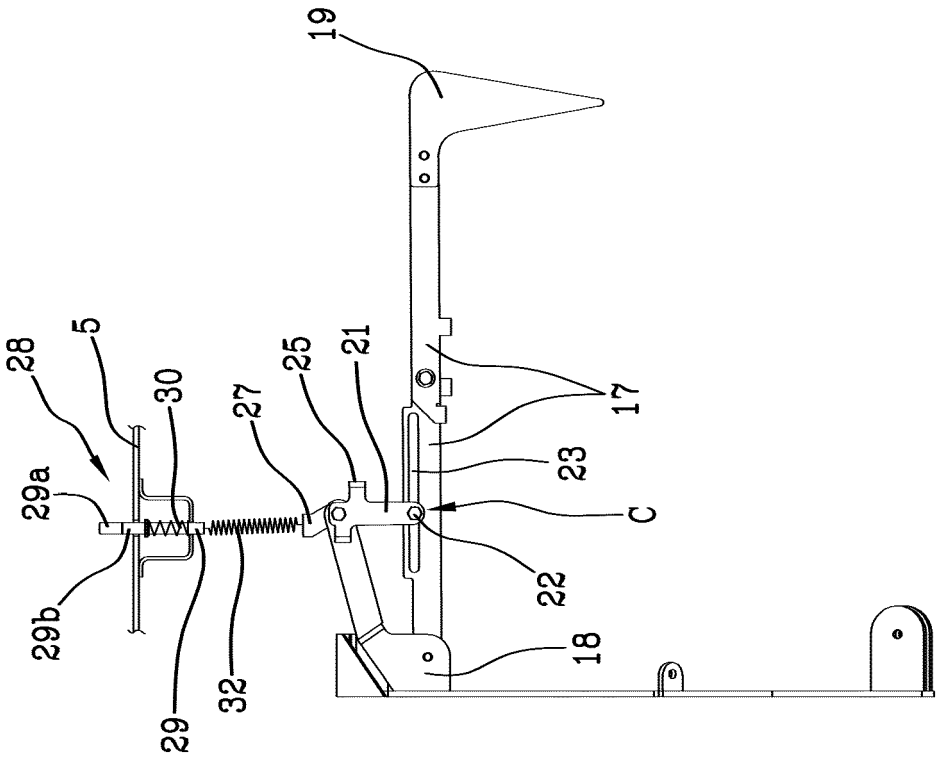
Fig.5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29a
23
C
22
29b
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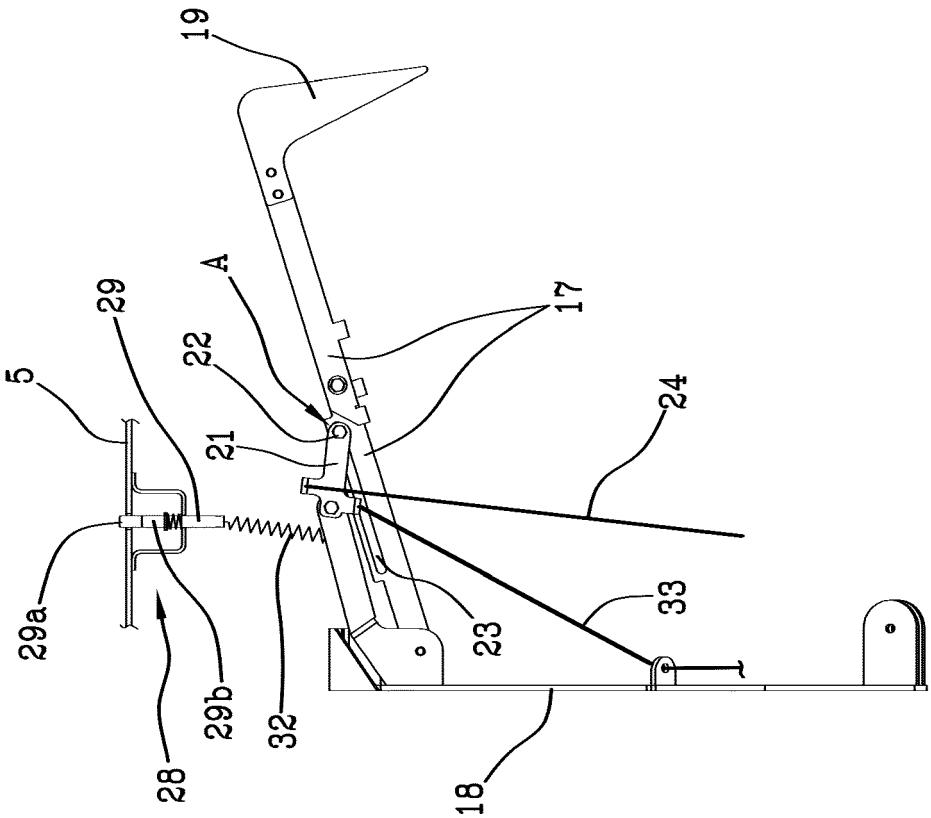
Fig.7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A
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21
29a
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33
29b
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Fig.6

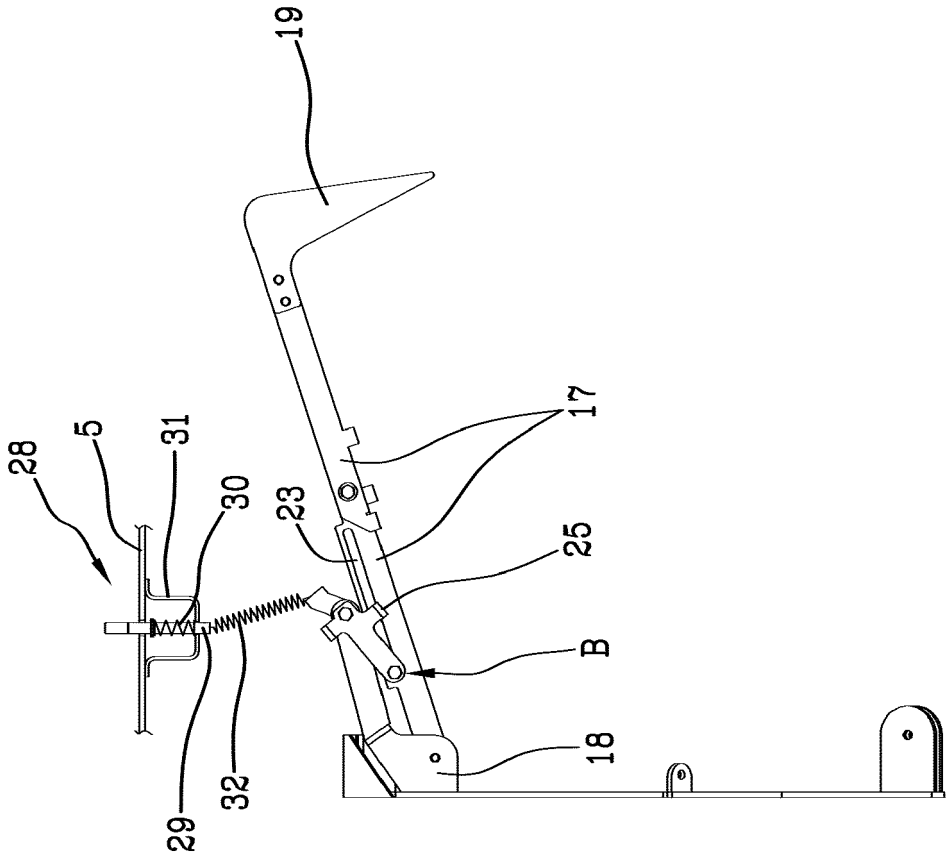

Fig.8

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EUROPEAN SEARCH REPORT

Application Number
EP 20 20 5153

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)
B65F
B67C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 March 2021	Serrano Galarraga, J

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16-03-2021

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