



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
11.05.2016 Bulletin 2016/19

(51) Int Cl.:
B65F 1/14 (2006.01)

(21) Application number: **15192399.2**

(22) Date of filing: **30.10.2015**

(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
Designated Extension States:
BA ME
Designated Validation States:
MA

(30) Priority: **04.11.2014 IT MI20141889**

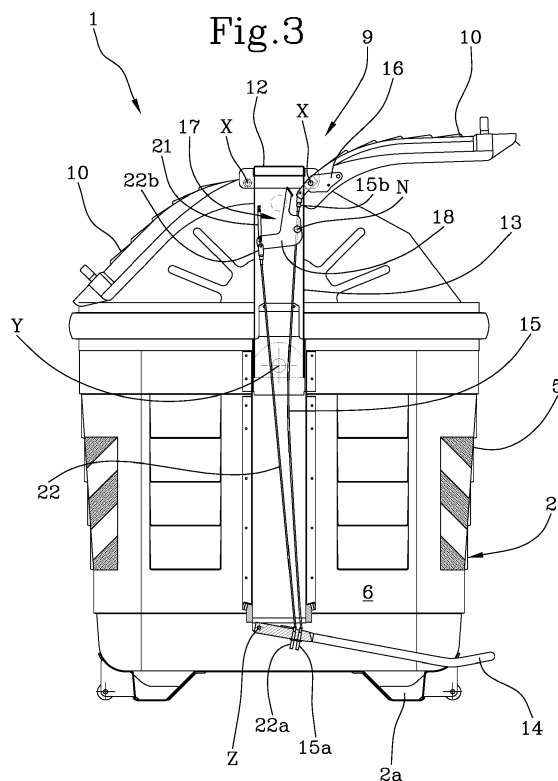
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(54) **WASTE CONTAINER**

(57) A waste container comprises a containment tank (2) defining at least one collecting compartment (3) for wastes. A door (10) oscillatably hinged to said containment tank (2) is movable between a closing condition in which it is approached to the containment tank (2) for closing the collection space (3) and an opening condition in which it is raised relative to the containment tank (2) to enable introduction of waste into the collection space (3). A locking device (17) is selectively activatable as a result of an action of lifting of the door (10) away from the containment tank (2), over the opening condition, to retain the door (10) in the opening condition.



Description

[0001] The present invention relates to a container for the collection of waste.

[0002] The present invention is particularly suitable to be applied to so-called containers for the collection of waste, of the type normally positioned at the side of roads, squares or other public places to allow the introduction of waste by the citizens.

[0003] The known containers of the aforementioned type essentially comprise a containment tank defining at least one collecting compartment for wastes and having an upper covering element having one or more doors operable by a user.

[0004] In a typical known container, the covering element comprises two hinged doors along the respective opposite sides of a bridge beam shaped as an inverted "U", having its terminal arms hinged to the respectively opposite sides of the tank.

[0005] The bridge beam is provided to interact with the gripping and tilting devices typically installed on vehicles used for the waste collection service, which perform the emptying of the containers by means of a gripping and tilting action in conjunction with the opening of the covering element. When the container is placed on the ground in the normal conditions of use, each of the doors is suitable to be opened by means of the lifting action exerted manually by the user on the door itself. Once the transfer operation is complete, the user releases the door that is repositioned in the closing condition by a downward movement by gravity slowed by suitable cushioning devices.

[0006] In many cases, at least one of the doors is also suitably connected to a control pedal hinged to the base of the tank, so as to allow the opening of the door itself by means of a thrust action exerted by the user on the control pedal. In this way the transfer of heavy and/or bulky waste, which require the use of both hands, is facilitated.

[0007] It has been found, however, that even where the control pedal is available, some users manipulate the covering element by interposing elements of various kinds, such as wooden laths or fruit boxes between the door and the edge of the tank, on order to lock one or both doors in the opening condition, presumably to prevent to having to lift the door several times when the amount of waste to be introduced within the container requires multiple, repeated transfer operations. Once the transfer operation is complete, lack of civic sense leads to leave the container with the door locked in the opening condition.

[0008] In this circumstance, in addition to obvious problems in terms of hygiene and tidiness of urban spaces and of preventing rain water infiltrations and the possible entry of animals, major negative consequences arise when the container is emptied.

[0009] In fact, the emptying operation typically takes place by means of an automatic cycle activated by a driv-

er, which controls the operating cycle from the driving seat of the waste collection vehicle.

[0010] Despite the presence of one or more cameras that allow the operator to see on a monitor what is happening on the ground and during the emptying cycle, sometimes the operator does not realize the presence of the door artificially locked in the open position by a foreign body. In this case, the electrohydraulic emptying device causes a crushing action between the door and the tank when it brings them in mutual rotation, and then attempts to compress the foreign body located therebetween. Sometimes the foreign body falls to the ground or inside the container, in other cases causes a rupture of the door and/or a damage of the tank. In any case, overloads and abnormal stress arise on the components of the container and the gripping and tilting device installed on the vehicle.

[0011] The object of the present invention is to overcome the limits of the known art as set forth above. In particular, it is an object of the invention to reduce or eliminate the potential that a container will be left with the door locked in the opening condition. It is a further object of the invention to introduce technical solutions that can significantly eliminate the risk of damaging the containers or the equipment used for their emptying.

[0012] In this respect, the applicant considers advantageous to associate with the container door a locking device, which is easily activated in cases of needs, to keep the door in the lifting condition, so as to discourage contrived tampering actions to lock the doors of the containers in an opening condition.

[0013] More particularly, the object of the present invention is a waste container, comprising: a containment tank defining at least one collecting compartment for wastes; at least one door oscillatably hinged to said containment tank and movable between a closing condition in which it is approached to the containment tank for closing the collection space and an opening condition in which it is raised relative to the containment tank to enable introduction of waste into the collection compartment; characterized in that it further comprises a locking device selectively activatable for retaining the door in the opening condition.

[0014] The applicant considers that the use of this locking device can advantageously discourage tampering actions on the container in order to retain the door in the opening condition. In this way, it is minimized the risk of damaging the container or the devices used for the automatic emptying thereof, due to foreign bodies artificially interposed between door and containment tank.

[0015] In accordance with the present invention, the present container may also have one or more of the following preferred characteristics.

[0016] Preferably, the locking device is selectively activatable in consequence of an action of lifting the door away from the containment tank, over the opening condition.

[0017] In this way, the activation of the locking device

can be obtained in an extremely simple and intuitive manner, with the natural continuation of the same lifting action exerted by the user for the purpose of opening the door. Preferably, the locking device comprises a coupling element carried by an oscillating support hinged with respect to the tank and movable with respect to the door for causing disengagement of the coupling element by an engagement seat carried by the door.

[0018] The locking of the door is therefore suitable to be achieved by a device that is structurally simple, which can be manufactured at low costs and that can be easily integrated also in other traditional bins or containers. Preferably, the coupling element is movable, in response to oscillation of the oscillating support, between an off condition in which it is moved away from the engagement seat and a activation condition in which it is able to engage the engagement seat for retaining the door in the opening condition.

[0019] Preferably, the locking device further comprises resilient means acting on the oscillating support for pushing the coupling element towards the activation condition.

[0020] In this way, the automatic insertion of the coupling element in the engagement seat is attained.

[0021] Preferably, the activation condition the coupling element engages the engagement seat substantially in a condition of unstable equilibrium, so as to determine disengagement of the engagement seat and consequent movement of the door toward the closing condition in response to the shaking actions of the waste container and/or of said door.

[0022] Preferably, in the activation condition the coupling element mechanically interferes with the engagement seat according to a linear extent less than 3mm along the movement direction of the coupling element.

[0023] The substantially unstable balance condition allows the release of the system, and the consequent repositioning of the door in the closing condition following a minimum effort by the user, or also as a result of oscillations occasionally induced to the container, for example due to the wind or the interaction of users during subsequent transfer actions, and in any case during the taking and the lifting of the container upon the action of automatic emptying devices. It thus ensures that the door is led back into the closing condition during the emptying operation.

[0024] Preferably, the coupling element has a working surface which, during movement of the door between the closing condition and opening condition, interacts in a sliding relationship against a shaped edge presented by the door in the proximity of the engagement seat.

[0025] The interaction with the shaped edge drives properly the coupling element to be inserted in the engagement seat.

[0026] In addition, one control pedal is preferably provided, which is oscillatably engaged to the containment tank and operable to determine movement of the door from the closing condition to the opening condition by at least one primary transmission element.

[0027] It is thus possible to bring the door in the opening condition without having to use the hands.

[0028] In addition, one auxiliary transmission member is preferably provided, which is operatively interposed between the control pedal and said oscillating support for disengaging said coupling element from the engagement seat in response to operation of the control pedal.

[0029] Therefore, by acting on the control pedal, the opening and the unlocking of the door from the opening condition can be obtained.

[0030] Preferably, the auxiliary drive member causes disengagement of the coupling element from the engagement seat in response to operation of the control pedal according to a stroke less than that required to bring the door in the opening condition.

[0031] In this way, the unlock of the door and the descent of the same toward the closing condition can be assured, even following a slight pressure on the control pedal.

[0032] Preferably, said oscillating support and said door are hinged to a bridging element oscillatably hinged to the side walls 6 respectively opposite of the tank.

[0033] Further characteristics and advantages of the present invention will become more apparent from the description of a exemplary, but not exclusive, and therefore non-limiting preferred embodiment of a container for the collection of waste, as illustrated in the appended figures, in which:

- Figure 1 shows indicatively a perspective view of a waste container in accordance with the present invention, with one of the doors in the opening condition;
- Figure 2 is a partially sectional side view of the container of Figure 1, with the doors in the closing condition;
- Figure 3 shows the container of Figure 2 with one of the doors in the opening condition;
- Figure 4 shows a detail of Figure 2 in enlarged scale.
- Figure 5 shows the detail of Figure 4 during an intermediate stage of movement of the door performed manually;
- Figure 6 shows the detail of Figure 4 during an intermediate stage of movement of the door performed with the aid of the control pedal;
- Figure 7 shows the detail of Figure 6 in the opening condition of the door, corresponding to Figure 3;
- Figure 8 shows the detail of Figure 4 with the door locked in the opening condition.

[0034] In accordance with the annexed figures, numeral 1 generally refers to a container for the collection of waste according to the present invention.

[0035] In the illustrated example, the container 1, made in the form of a bilateral symmetrical garbage container, comprises a containment tank 2 that forms internally a collection space 3 for wastes, for example municipal solid waste. The containment tank 2 is provided at the bottom

with a plurality of bearing elements 2a, some of which may include rollers, for the stable support of the container on the ground.

[0036] The containment tank 2 is made for example of metallic material and has a substantially parallelepiped, box-shaped configuration, which is preferably counter-sunk starting from a bottom wall 4. At the bottom wall 4 there are two respectively opposite front walls 5, and two side walls 6 carrying respective gripping elements 7, operatively engageable by devices (of a substantially known type) for automatic gripping and emptying the container 1, usually mounted on a waste collection vehicle.

[0037] In the illustrated example, the gripping elements 7 comprise pins projecting laterally from the respective side walls 6, in correspondence of a vertical plane of symmetry of the container 1.

[0038] The tank 2 has at the top an upper opening 8 for waste transfer, accessible to the users for the introduction of waste into the collection space 3.

[0039] A covering element 9, suitably hinged to the side walls 6, superiorly closes the containment tank 2.

[0040] In the illustrated example, the aforementioned covering element 9 comprises two doors 10 hinged according to respective pivotal axes X to the opposite sides of a bridging element 11 arranged at the top. The bridging element 11 preferably comprises a cross member 12 from the opposite ends of which two arms 13 extend, which are each pivoted to one of the side walls 6 of the containment tank 2, according to a common oscillation axis Y. Suitable resilient means, not shown as known per se, operate on the arms 13 so as to maintain a rest condition in which the cross member 12 extends in a longitudinal central plane of the containment tank 2, superiorly closed by the doors 10, preferably acting in abutting relation on the upper edges of the front walls 5.

[0041] In a per se known manner, each of the doors 10 or at least one of them is suitable to be manually lifted around its own pivot axis X from a closing condition, in which it is approached to the containment tank 2 to occlude the collection space 3, until reaching an opening condition in which it is raised with respect to the containment tank 2 to enable the introduction of waste into the collection space 3. It can be also envisaged that the lifting of at least one of the doors 10 can be obtained, instead of or in addition to direct manual action, via at least one control pedal 14, oscillatably engaged in proximity of the bottom wall 4 of the containment tank 2. Preferably, the control pedal 14 extends along one of the front walls 5 and is preferably pivoted with respect to the side walls 6 in the vicinity of the longitudinal central plane of the containment tank 2.

[0042] At least a first tie rod 15 or another transmission member, for example in the form of cable, has a first end 15a engaged to the control pedal 14 in the vicinity of the pivot axis Z of the same, and a second end 15b secured to one of the doors 10, for example on an attachment plate 16 projecting from the door 10 beyond the pivot axis X of the same on the cross member 12. With the lowering

of the control pedal 14, the first rod 15 causes the progressive lifting of the door 10. Preferably, the door 10 reaches the opening condition in correspondence of the maximum lowering stroke of the control pedal 14. Two first tie rods can be provided, operating on respective opposite sides of the containment tank 2 between the control pedal 14 and the respective attachment plates 16 placed on opposite sides of the respective door 10.

[0043] The emptying of the container 1 takes place with an action of overturning of the same about the oscillation axis Y. Simultaneously with this action, the covering element 9 is angularly rotated about the oscillation axis Y to slide the doors 10 with respect to the containment tank 2 so as to facilitate waste discharge.

[0044] However, the use of the device 1 on containers of different type, for example having only one door 10 and for example pivoted along an axis X next to the edge of the tank 2, is not to be excluded.

[0045] The covering element 9 is also associated to at least one locking device 17, which can be selectively activated when necessary, for retaining at least one of the doors 10 in the opening condition.

[0046] More specifically, the locking device 17 is selectively activatable in consequence of an action of lifting the door 10 away from the containment tank 2, beyond the opening condition.

[0047] To this end, the locking device 17 preferably comprises an oscillating support 18, operatively hinged with respect to the containment tank 2, and cooperating with an engagement seat 19 carried by the respective door 10, for example in correspondence of the attachment plate 16. Preferably, the oscillating support 18 is made in form of plate-shaped bracket. In the illustrated example the oscillating support 18 is rotatably hinged along one of the arms 13 of the bridging element 11, on the side facing the longitudinal central plane of the container, and preferably is movable according to angular oscillations with respect to the door 10 about its own pivot axis N.

[0048] The oscillating support 18 is fitted integrally with a coupling element 20 which, by effect of the angular oscillations carried out in either direction from the oscillating support 18 about its own pivot axis N, is movable between an off condition, in which it is moved away from the engagement seat 19, and a triggering condition, in which it lends itself to engage in the engagement seat 19 to retain the door 10 in the opening condition.

[0049] A return spring 21 or other resilient means operate on the oscillating support 18 to constantly push the coupling element 20 toward the activation condition.

[0050] Preferably, the coupling element 20 is made in the form of a plate having a working surface 20a that, during the movement of the door 10 between the closing condition and the opening condition, lends itself to interact in a sliding relationship against a shaped edge 16a presented by attachment plate 16. As exemplified in Figure 5, the shaped edge 16a therefore lends itself to act as a cam against the coupling element 20 so as to de-

termine, during the lifting of the door 10, the rotation of the oscillating support 18, in contrast with the return spring 21. The engagement seat 19 is preferably formed along said shaped edge 16a. When the engagement seat 19 arrives in correspondence of the coupling element 20, the action of the return spring 21 determines the mutual engagement.

[0051] It is preferably provided that, in the activation condition, the coupling element 20 engages the engagement seat 19 substantially in a condition of unstable equilibrium. In particular, it may be provided that in the activation condition, the coupling element 20 mechanically interferes with the engagement seat 19 according to a linear extent indicated by dimension L in Figure 8, less than about 3 mm along the movement direction of the coupling element 20. It thus becomes possible to determine the disengagement of the engagement seat 19 and the consequent movement of the door 10 towards the closing condition even following shaking of the waste container and/or of said door 10.

[0052] At least one auxiliary drive member 22 can be operatively interposed between the control pedal 14 and the oscillating support 18. The auxiliary drive member 22 may comprise a cable or other type of tie rod, having a first end 22a engaged to the control pedal 14 in the vicinity of the pivot axis Z of the same, and a second end 15b secured to the oscillating support 18. The pivot axis N of the oscillating support 18 is preferably placed in an intermediate position between the coupling element 20 and the second end 15b of the auxiliary drive member 22. The auxiliary drive member 22 is therefore suitable to disengage the coupling element 20 from the engagement seat 19 following the operation of the control pedal 14.

[0053] The waste container 1 is suitable to be used to implement waste delivery in a manner similar to traditional containers. The user has the possibility to raise to at least one of the doors 10 manually and/or with the aid of the control pedal 14 to the opening condition, in order to implement waste delivery within the collection space 3.

[0054] The lowering of the control pedal 14, already in a first portion of its stroke, requires a rotation of the oscillating support 18 in opposition to the return spring 21 and the consequent positioning of the coupling element 20 in the disengaged condition, simultaneously to the lifting of the door 10 from the closing condition. Upon reaching the opening condition, achievable for example with an angular excursion " α " of about 50° of door 10 about its pivot axis X (Figures 3 and 7), the coupling element 20 remains in the disengaged condition until when the control pedal 14 is released.

[0055] When the control pedal 14 is released, the door 10 falls by gravity towards the closing condition, suitably slowed by cushioning devices not shown as known. Any elastic systems can support the resurgence of the control pedal 14 up to its starting position. Simultaneously, the return spring 21 returns the coupling element 20 towards the insertion condition. However, the coupling element 20 can not engage in the engagement seat 19 because

in the meantime the door 10 has already fallen towards the closing condition.

[0056] By acting manually on the door 10, or by pushing it by means of waste during the delivery stage, it is still possible to lift it slightly over the opening condition when the control pedal 14 is released. This action causes the insertion of the coupling element 20 in the engagement seat 19 by the return spring 21. For example, the engagement between the coupling element 20 and the engagement seat 19 can occur as a result of an angular rotation β of approximately 55° accomplished by door 10 about its pivot axis X with respect to the closing condition (Figure 8).

[0057] After insertion, the door 10 can then be released and remain locked in the opening condition, in order to allow repeated operations of transfer for the introduction of large amounts of waste without having to lift the door 10 multiple times.

[0058] The disengagement of the engagement seat 19 requires a minimum displacement of the coupling element 20 from its coupling condition, still lower than the required displacement for the attachment plate 16 to bring the door 10 from the closing condition to the opening condition.

[0059] The auxiliary drive member 22 may therefore cause the disengagement of the coupling element 20 from the engagement seat 19 in response to the operation of the control pedal 14 according to a very short stroke or in any case less than that required to bring the door 10 in the opening condition. More in particular, a slight touch of the control pedal 14 can be advantageously sufficient to determine unlocking of the door 10 from the opening condition. This condition can encourage closure of the door 10 even by people who are less likely to do so when using traditional containers.

[0060] In any case, the condition of precarious balance with which the insertion of the coupling element 20 in the engagement seat 19 occurs for the purposes of locking door 10 in an opening condition allows the spontaneous closure of the door 10 even following vibrations or occasional stress induced to the container 1 when it is put on the ground or during the operation of withdrawal from the ground through the action of gripping and emptying devices typically installed on vehicles used for the waste collection service.

Claims

1. A waste container comprising:

a containment tank (2) defining at least one collecting compartment (3) for wastes;
at least one door (10) oscillatably hinged to said containment tank (2) and movable between a closing condition in which it is approached to the containment tank (2) for closing the collection space (3) and an opening condition in which it

is raised relative to the containment tank (2) to enable introduction of waste into the collection space (3);

characterized in that it further comprises a locking device (17) selectively activatable for retaining the door (10) in the opening condition.

2. A container according to claim 1, wherein said locking device (17) is selectively activatable in consequence of an action of lifting the door (10) away from the containment tank (2), over the opening condition. 10
3. A container according to claim 1 or 2, wherein the locking device (17) comprises a coupling element (20) carried by an oscillating support (18) hinged with respect to the containment tank (2) and movable with respect to the door (10) for causing disengagement of the coupling element (20) by an engagement seat (19) carried by the door (10). 15
4. A container according to claim 3, wherein said coupling element (20) is movable, in response to oscillation of the oscillating support (18), between an off condition in which it is moved away from the engagement seat (19) and a activation condition in which it is able to engage the engagement seat (19) for retaining the door (10) in the opening condition. 20 25
5. A container according to claim 3 or 4, wherein the locking device (17) further comprises resilient means acting on the oscillating support (18) for pushing the coupling element (20) towards the activation condition. 30
6. A container according to claim 4 or 5, wherein in the activation condition the coupling element (20) engages the engagement seat (19) substantially in a condition of unstable equilibrium, so as to determine disengagement of the engagement seat (19) and consequent movement of the door (10) toward the closing condition in response to the shaking actions of the waste container and/or of said door (10). 35 40
7. A container according to one or more of claims 4 to 6, wherein in the activation condition the coupling element (20) mechanically interferes with the engagement seat (19) according to a linear extent less than 3mm along the movement direction of the coupling element (20). 45 50
8. A container according to one or more of claims 3 to 6, wherein the coupling element (20) has a working surface (20a) which, during movement of the door (10) between the closing condition and opening condition, interacts in a sliding relationship against a shaped edge (16a) presented by the door (10) in the proximity of the engagement seat (19). 55

9. A container according to one or more of the preceding claims, further comprising at least one control pedal (14) oscillatably engaged to the containment tank (2) and operable to determine movement of the door (10) from the closing condition to the opening condition by at least one primary transmission element.

10. A container according to claims 3 to 9, further comprising at least one auxiliary transmission member (22) operatively interposed between the control pedal (14) and said oscillating support (18) for disengaging said coupling element (20) from the engagement seat (19) in response to operation of the control pedal (14).

11. A container according to claim 10, wherein the auxiliary drive member (22) causes disengagement of the coupling element (20) from the engagement seat (19) in response to operation of the control pedal (14) according to a stroke less than that required to bring the door (10) in the opening condition.

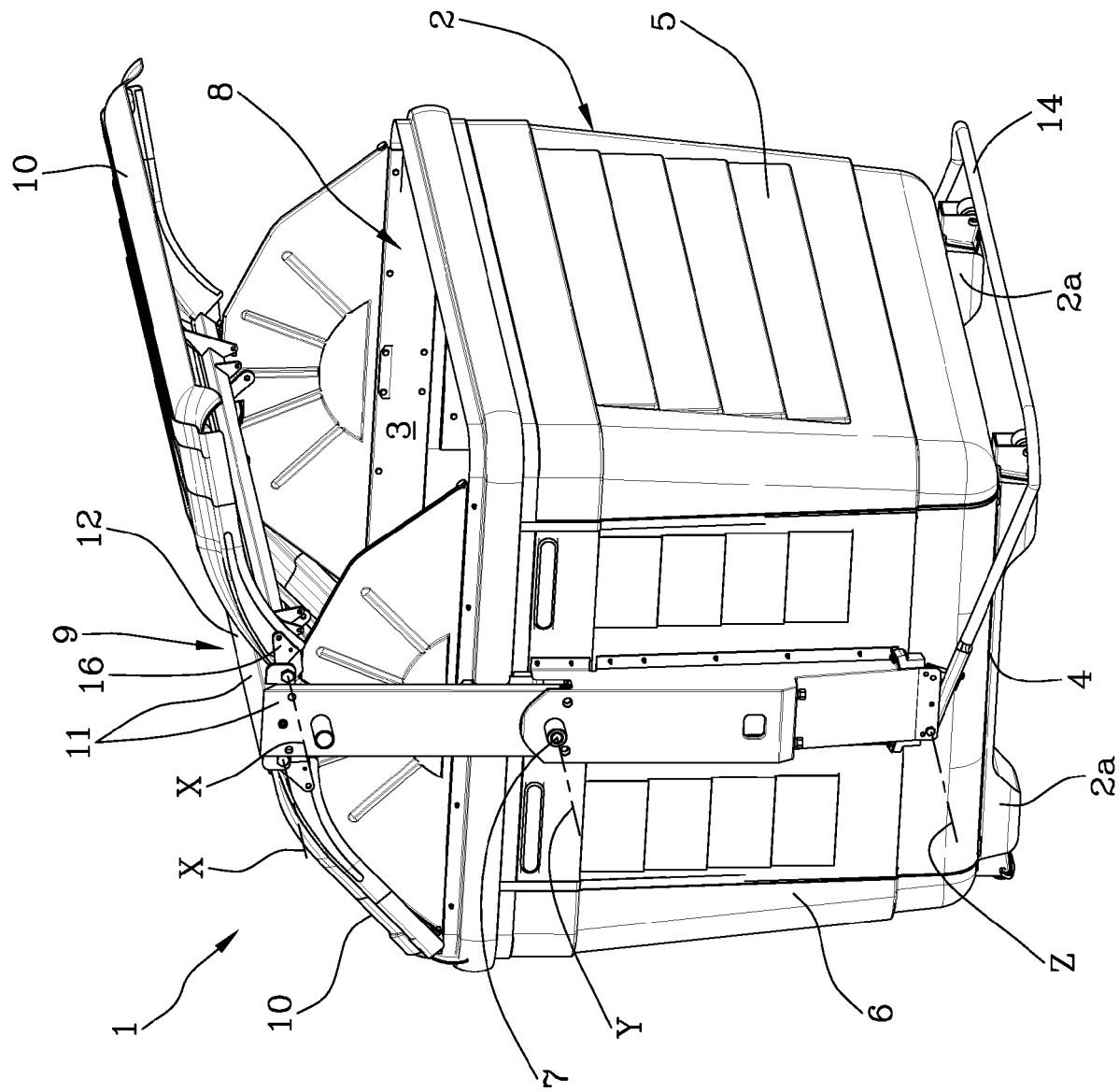


Fig. 1

Fig.2

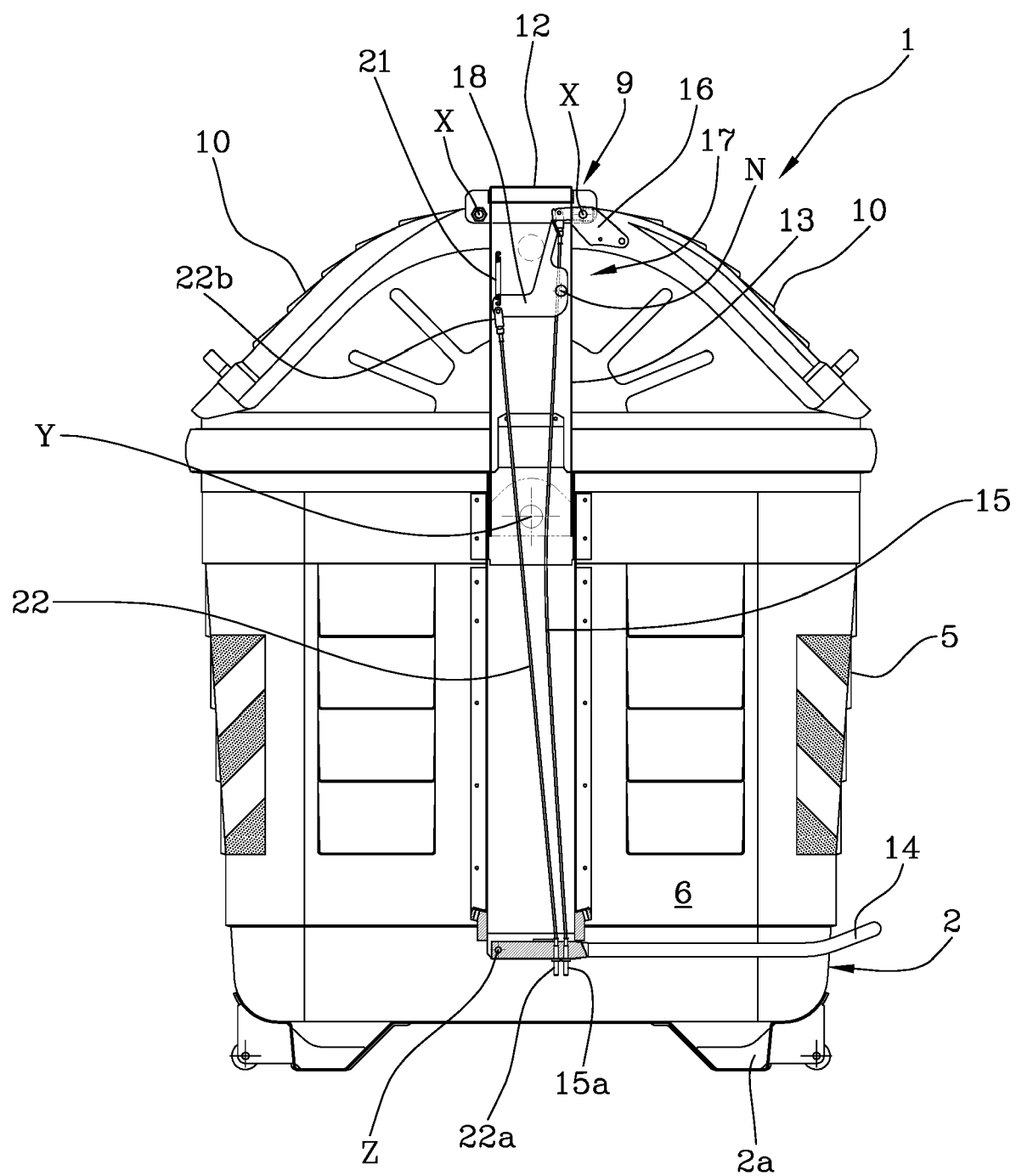
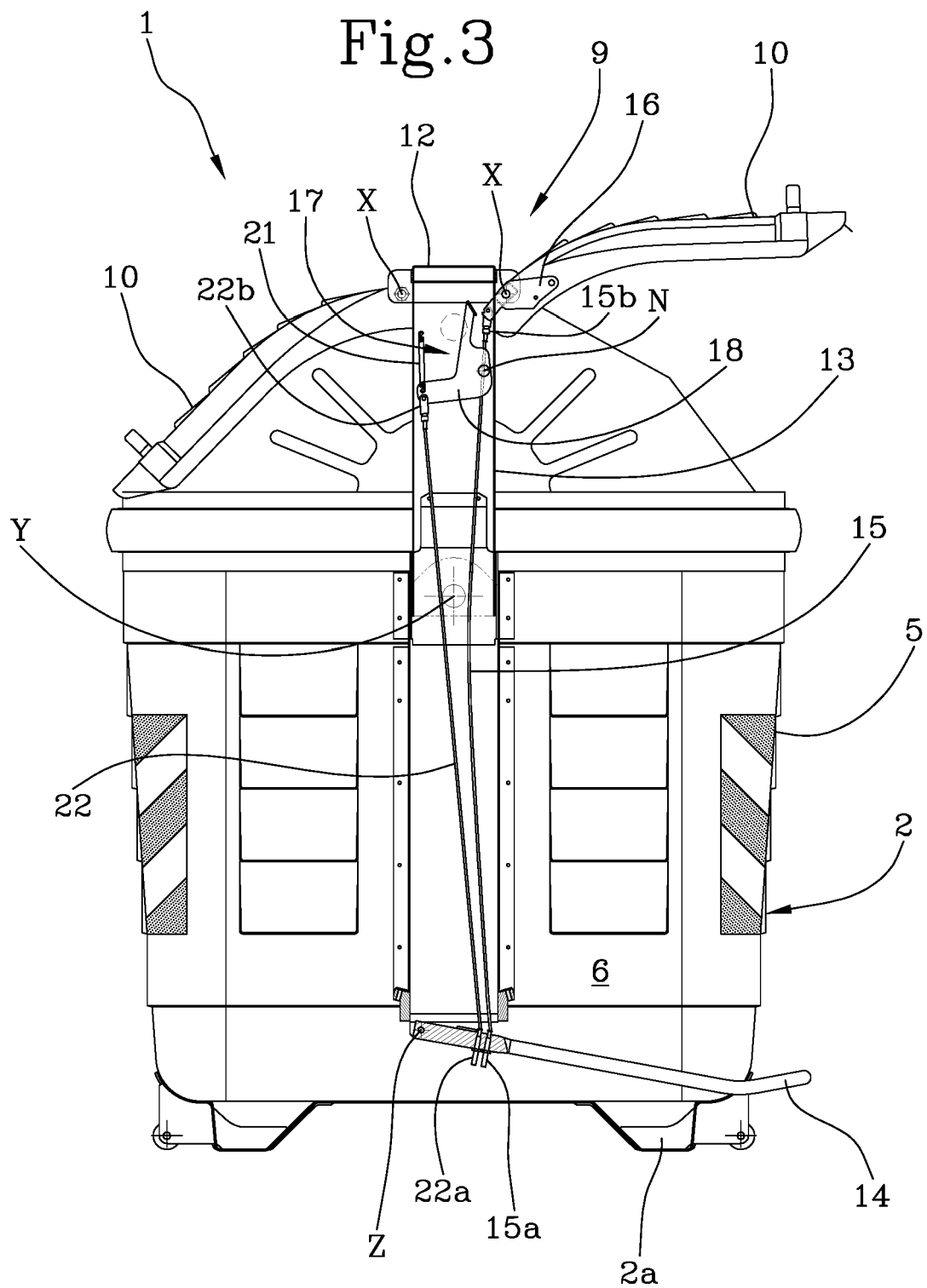
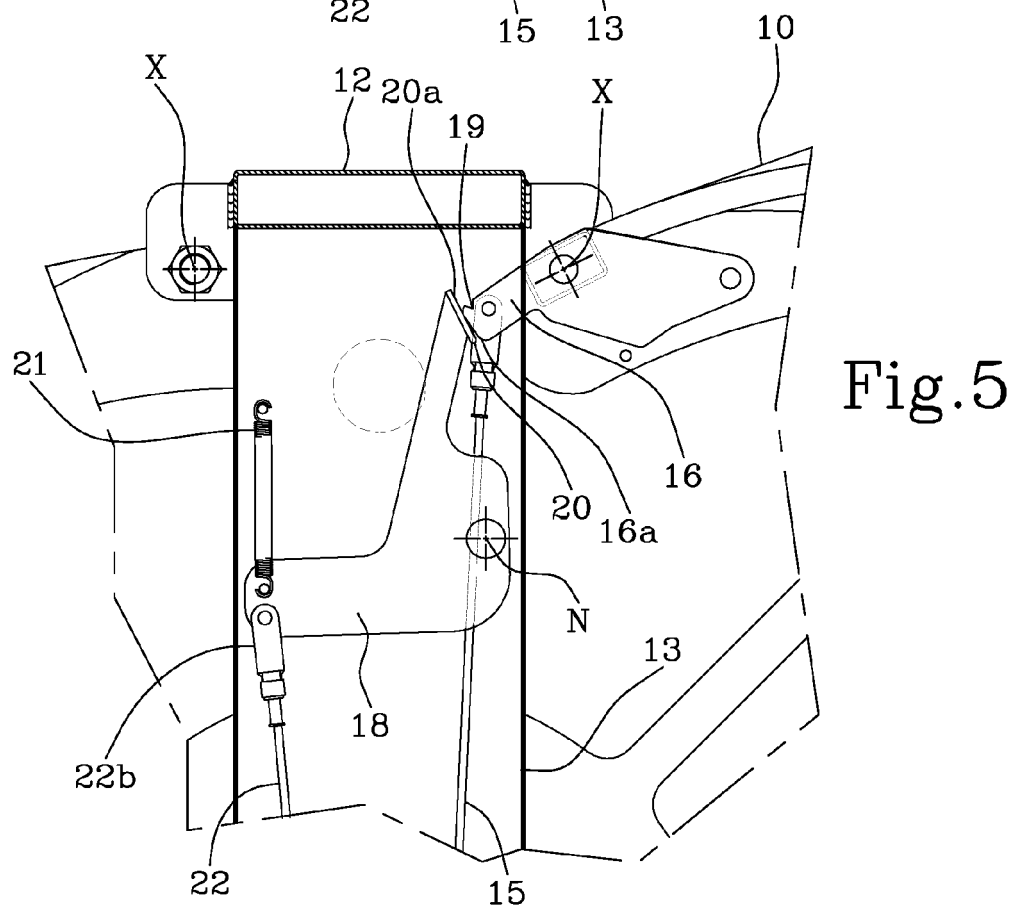
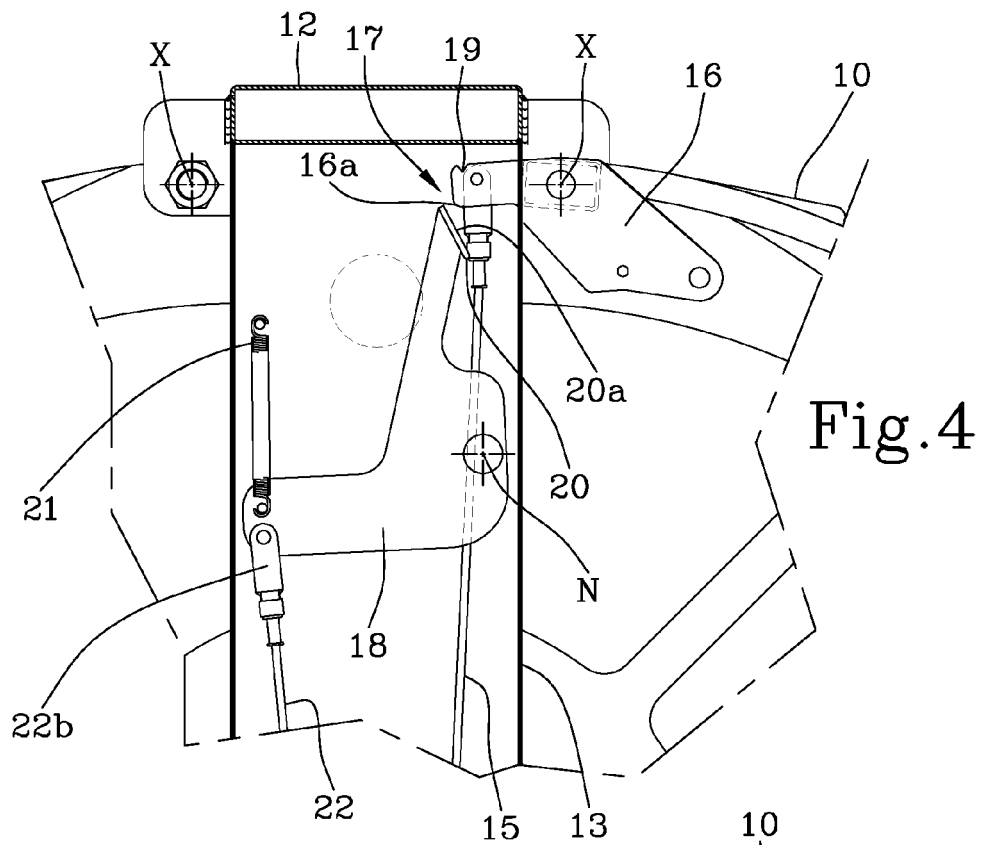
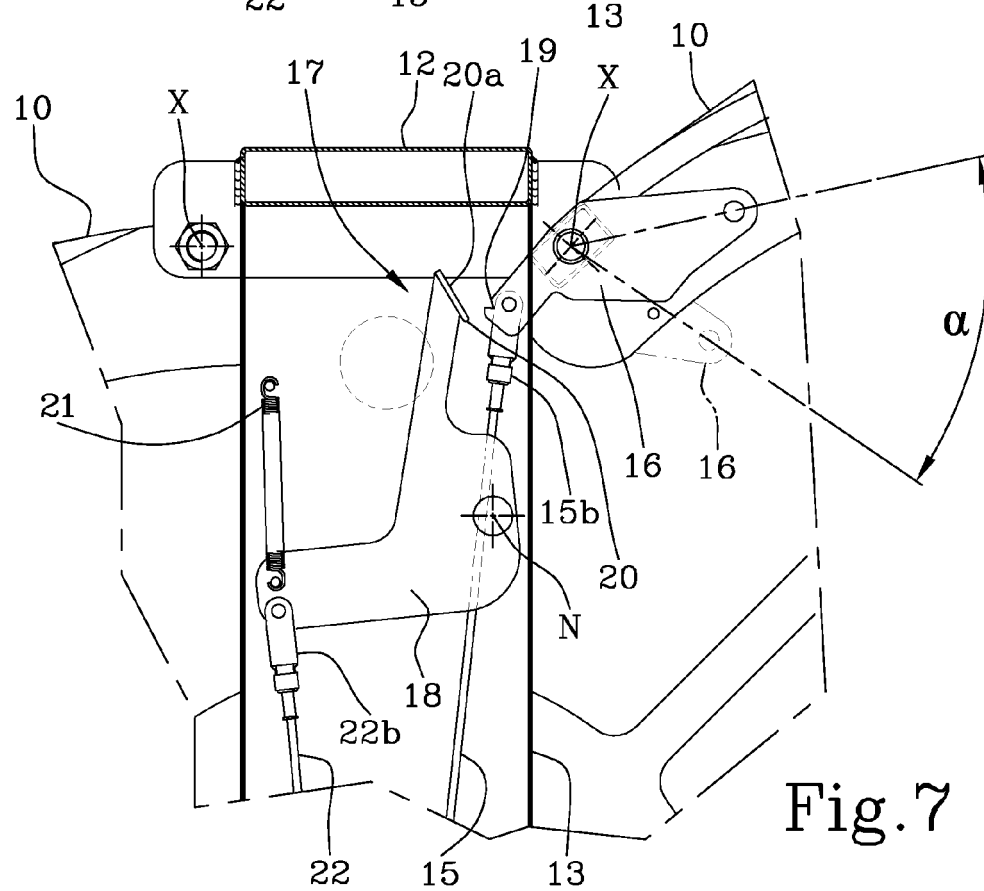
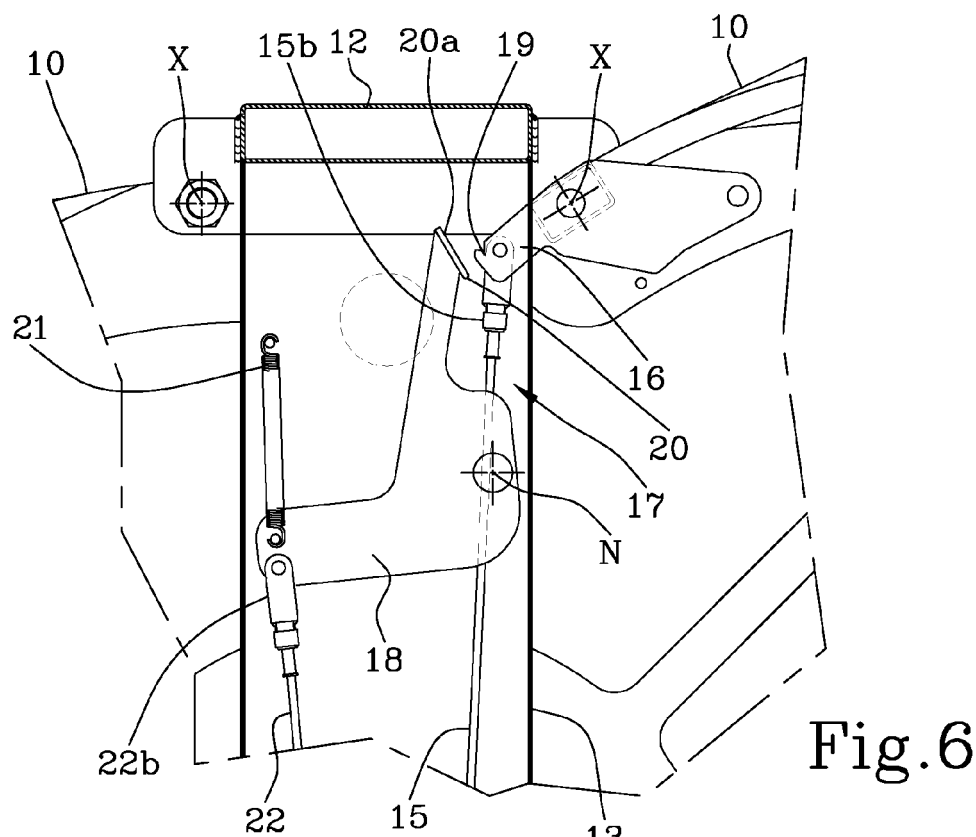
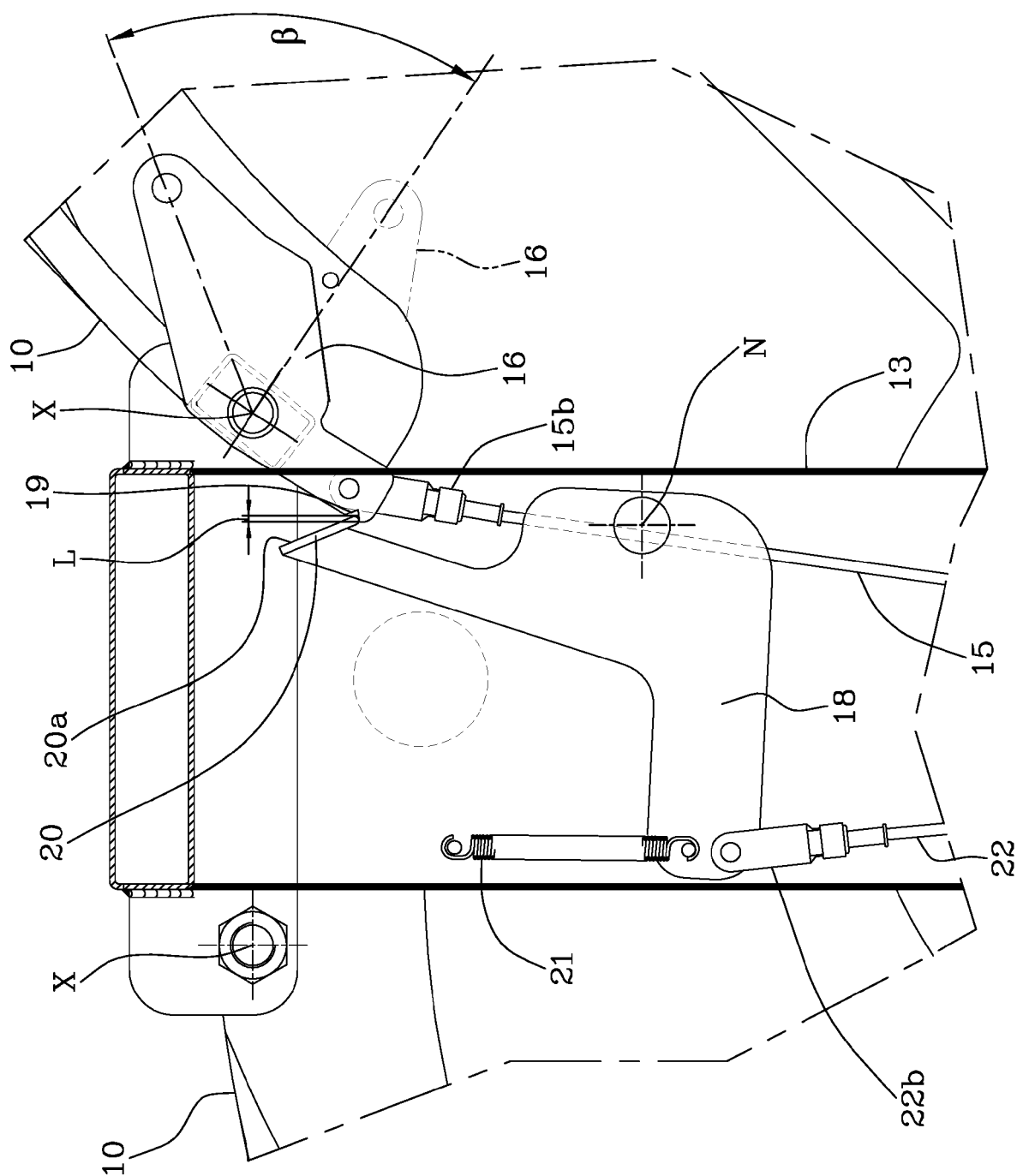


Fig.3









Fi. 8



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Place of search The Hague		Date of completion of the search 26 February 2016	Examiner Pardo Torre, Ignacio
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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