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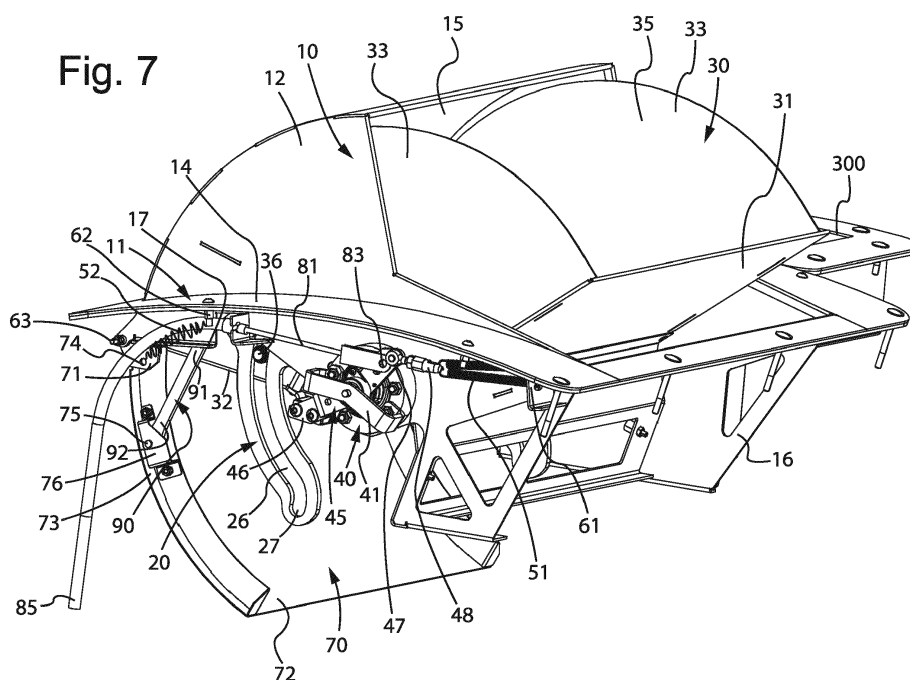
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(54) **OPENING APPARATUS FOR A WASTE CONTAINER**

(57) Opening apparatus (10) separably mountable with a waste container (100) which comprises a containment chamber (103), adapted to pass from a closing position which does not provide accessible openings to said containment chamber (103) to an opening position which provides at least an access opening to the containment chamber (103), comprising a coupling body (11) couplable with said container (100), a drawer (30) with solid dihedral geometrical shape rotatably mounted with said coupling body (11) defining a first rotation axis of said

drawer (30), said drawer (30) and said coupling body (11) defining a chamber (35) of predefined volume for housing a waste bag of said predefined volume, a tilting wall (70) hinged at a point (63) of the coupling body (11) which rotates about said second rotation axis bonded by said at least one spacing bar (90) hinged with another point (65) of at least one guide element (20) and hinged at a point (75) of said tilting wall (70), where said at least one guide element (20) is hinged at a point (25) of the coupling body (11) and defines another rotation axis. (Figure 7).



Description

[0001] The present invention relates to an opening apparatus for a waste container.

[0002] In the state of the art, containers for waste bags are known comprising opening apparatuses which pass from a closing position to an opening position by means of a pedal connected to leverage systems. Pressing the pedal, the opening apparatus passes from the closing position to the opening position in which a user can throw a waste bag inside a chamber of the container through an opening of the opening apparatus. There are containers comprising opening apparatuses mounted with containers and comprising a prehensile lever to be raised by hand to open an inlet opening towards the chamber of the container.

[0003] There are electronic recognition apparatuses adapted to control a lock of the opening apparatus to prevent the opening apparatus from passing from a closing position to an opening position preventing the insertion of waste bags.

[0004] Disadvantageously, it is necessary to touch the container with one hand or foot in order to pass the opening apparatus from a closing position to an opening position.

[0005] Disadvantageously, the opening apparatus during a passage between a closing position to an opening position leaves an opening in the chamber of the container open, allowing the wrong insertion of waste bags.

[0006] Disadvantageously, the insertion of waste bags through the opening of the opening apparatus causes the bags to fall one on top of the other creating a pyramid of bags. The pyramid-arranged bags do not homogeneously fill the chamber of the container, preventing the use of all the space available in the chamber. The pyramid of bags can come into conflict with opening and closing mechanisms of the opening apparatus, leaving the container jammed in an intermediate position, or jammed in the opening or closing position.

[0007] Disadvantageously, the opening and closing mechanisms of the container are energy-inefficient and consume electric batteries in a short time.

[0008] The object of the present invention is to provide an opening apparatus separably mountable with a waste container which overcomes the disadvantages set forth above and which functions without jamming, which is solid, safe and which allows predetermining a defined volume of waste to be thrown through it preventing the delivery of higher volumes of waste than allowed, which in the closing position has no access openings, nor even partial, which allows passing from a closing position to an opening position without any contact with parts of the human body and only if there is an identification of a user authorized to throw waste bags, which is energy efficient, which consumes little electric battery, which cooperates with the elements of the opening apparatus according to claim 1.

[0009] In accordance with the invention, this object is

achieved with an opening apparatus separably mountable with a waste container according to claim 1.

[0010] Other features are envisaged in the dependent claims.

[0011] The features and advantages of the present invention will be more apparent from the following description, which is to be understood as exemplifying and not limiting, with reference to the appended schematic drawings, wherein:

figure 1 is a front view of a container comprising an opening apparatus according to the present invention;

figure 2 is a side view of the container of figure 1;

figure 3 is an axonometric view of the opening apparatus separated from the container and in the closing position;

figure 4 is a side view from the left of the opening apparatus in the closing position;

figure 5 is a side view from the right of the opening apparatus in the closing position;

figure 6 shows an uncovered side view from the left of the opening apparatus in the closing position;

figure 7 is a perspective view of the opening apparatus separated from the container and in the opening position;

figure 8 is a side view from the left of the opening apparatus in the opening position;

figure 9 is a side view from the right of the opening apparatus in the opening position;

figure 10 shows an uncovered side view from the left of the opening apparatus in the opening position;

figure 11 shows an uncovered side view from the right of a detail of the opening apparatus in the closing position comprising a lock in the closing position;

figure 12 shows an uncovered side view from the right of the detail of the opening apparatus in one of the multiple non-return positions and of the lock in the non-return position;

figure 13 shows an uncovered side view from the right of the detail of the opening apparatus in the opening position and of the lock in the opening position;

figure 14 shows an axonometric view of figure 13;

figure 15 shows a detail of the lock in the opening position comprising a cam in contact with an ignition switch of a motor;

figure 16 shows an alternative opening apparatus comprising an alternative guide element in a non-return position;

figure 17 shows the alternative opening apparatus of figure 16 in a closing position;

figure 18 shows a partially uncovered axonometric view of an alternative opening apparatus in the opening position comprising a push element integral with the tilting wall;

figure 19 shows a side view of the alternative opening apparatus of figure 18 in the opening position;

figure 20 shows a section view of the alternative opening apparatus of figure 18 in the closing position;

figure 21 shows a partially uncovered axonometric view of an alternative drawer of the opening apparatus comprising two internal draft walls;

figure 22 shows a projection view of the alternative drawer of figure 21 on a geometric plane which passes from the extreme sides of a chamber of the drawer;

figure 23 shows a projection view of an alternative drawer comprising a multiplicity of strips which protrude upwards with respect to a rear wall of the drawer;

figure 24 shows a section view of the alternative drawer of figure 23.

[0012] With reference to the aforementioned figures and in particular figures 1 and 2, a container 100 for waste divided into predefined volumes where each predefined volume of waste is a bag for waste is shown.

[0013] The container 100 comprises a box-like body 101, a lid 102 and a containment chamber 103 for waste. The lid 102 of the box-like body 101 comprises at least two openable side flaps 111 and 112 and is adapted to pass from a closing configuration to an opening configuration. The opening configuration of the lid 102 provides at least one access opening to the containment chamber 103 for waste by opening the two side flaps 111, 112. The lid 102 passes to the opening configuration when the container 100 is opened, inclined or overturned to be emptied of the waste contained in the containment chamber 103 by means of enabled waste collection means, such as for example waste collection vehicles not shown in the figures.

[0014] Alternatively, the lid 102 can also comprise only an openable flap 111, 112.

[0015] The container 100 comprises an opening apparatus 10 which is separably mountable with the container 100 and is adapted to pass from a closing position which does not provides any access openings to the containment chamber 103 to an opening position which provides at least an access opening to the containment chamber 103. In particular, it is provided that the opening apparatus 10 is separably mountable with at least one of the two side flaps 111, 112 of the lid 102 of the box-like body 101 of the container 100.

[0016] To facilitate the insertion operations of predefined volumes of waste by people, the opening apparatus 10 is separably mounted with a side flap 111 of the lid 102 so that when the opening apparatus 10 is in the opening position it occurs that the access opening to the containment chamber 103 is directed towards one side of the container 100. Advantageously, this ergonomic position of the opening apparatus 10 also facilitates people of short stature to insert the waste bag comfortably and effortlessly in the opening of the opening apparatus 10.

[0017] As shown in particular in figures 3-10, the open-

ing apparatus 10 comprises a coupling body 11 couplable with the side flap 111 of the lid 102 of the container 100. The coupling body 11 comprises a couplable portion 14 with the side flap 111 of the lid 102 whose shape is comparable with that of the side flap 111 and complementary with the side flap 111 so that it can be easily mountable with it 111.

[0018] Advantageously, the shape of the coupling portion 14 is complementary to the shape of the side flap 111 or complementary to another portion of the lid 102 where it is preferable to mount the opening apparatus 10 so that the opening apparatus 10 can be mounted with any type of container 100.

[0019] The coupling body 11 comprises an upper cap 12 which protrudes upwards from the couplable portion 14 of the coupling body 11 and a lower limiting wall 13.

[0020] The cap 12 and the lower limitation wall 13 define an opening 15 of the opening apparatus 10 which leads to the chamber 103 of the container 100.

[0021] The cap 12 protrudes above the opening 15 and is adapted to protect the opening 15 from rain so as not to allow water to drip into the containment chamber 103.

[0022] The coupling body 11 further comprises a lower portion 16 which protrudes downwards starting from the coupling portion 14.

[0023] Advantageously, the elements of the coupling body 11 are made of metal sheet suitable for stiffening the structure of the opening apparatus 10, allowing it to withstand the stresses to which the container 100 is subjected during operations for delivering waste bags and for emptying the container 100 and to allow the opening apparatus 10 to be mounted with any type of container 100.

[0024] The opening apparatus 10 comprises a drawer 30 rotatably mounted with the coupling body 11 defining a first rotation axis of the drawer 30.

[0025] The drawer 30 is mounted at the opening 15 between the cap 12 and the lower wall 13 of the coupling body 11.

[0026] The first rotation axis of the drawer 30 passes through the lower portion 16 of the coupling body 11.

[0027] The drawer 30 is rotatably mounted with the lower portion 16 of the coupling body 11 by means of two hubs 40, one on the left and one on the right of the opening apparatus 10. Each of the two hubs 40 comprises bearings or ball or rolling elements of the sealed and self-lubricating type so as to advantageously avoid getting dirty and avoid the entry of dust, or dirt or water.

[0028] The drawer 30 has a solid dihedral geometrical shape and comprises a transverse section with circular-sector shape which comprises two radial walls 31, 32, a front wall 31 and a rear wall 32, protruding along two different radial directions with respect to the first rotation axis of the drawer 30 defining an angle θ of 135 sexagesimal degrees measured on a geometric plane perpendicular to the first rotation axis, as shown in figures 6 and 10.

[0029] The drawer 30 also comprises two side walls

33 adapted to form together with the two radial walls 31 and 32 a chamber of the drawer 30 for containing the waste bag.

[0030] The walls 31-33 of the drawer 30 together with an internal surface of the cap 12 define a chamber 35 of predefined volume for housing a waste bag when the opening apparatus 10 is in the opening position as shown in particular in figures 7-9. In particular, it is provided that the predefined volume of the chamber 35 as defined above is adapted to contain a 30-litre waste bag.

[0031] Alternatively, it is possible to provide that if a volume of waste bag other than 30 litres is to be housed, then the angle θ between the front wall 31 and the rear wall 35 should vary accordingly so that the walls 31-33 of the drawer 30 together with the internal surface of the cap 12 define a chamber 35 with another predefined volume for housing a waste bag of different volume.

[0032] Alternatively, it is possible to provide that if a volume of waste bag other than 30 litres is to be housed, then the geometry of the cap 12 could be modified without changing the angle θ between the front wall 31 and the rear wall 35.

[0033] The drawer 30 comprises two pins 36 which protrude outwardly from both the side walls 33 of the drawer 30 along a direction parallel to the direction of the first rotation axis.

[0034] The opening apparatus 10 comprises a guide element 20 which is pivoted at a point 25 of the lower portion 16 of the coupling body 11. The guide element 20 rotates about the point 25 defining a fourth rotation axis.

[0035] The guide element 20 comprises a guide slot 26 of curvilinear shape. A lower end of the guide slot 26 comprises a recess 27. The recess 27 of the guide slot 26 is preferably a portion of the guide slot 26 with a curvilinear shape with an inverse curvature with respect to that of the remaining portion of the guide slot 26.

[0036] The first rotation axis of the drawer 30 and the fourth rotation axis of the guide element 20 are parallel.

[0037] Each of the two pins 36 of the drawer 30 slides inside the guide slot 26 of the guide element 20 of the opening apparatus 10. In fact, a guide element 20 is provided both on the left and on the right of the opening apparatus 10.

[0038] The guide slot 26 of the guide element 20 has a curvature such as to allow the drawer 30 to rotate safely about the first rotation axis within maximum two stops, an upper stop which corresponds to an upper end of the guide slot 26 and the recess 27 of the lower end of the guide slot 26 of the guide element 20.

[0039] The curvilinear shape of the guide slot 26 has variable radii of curvature according to angular positions of the drawer 30 so as to open a tilting wall 70 in the closing position of the opening apparatus 10.

[0040] The drawer 30 remains in its seat in an advantageously safe manner rotating about the first rotation axis by means of the two hubs 40 and being guided by the two pins 36 which slide within the guide slot 26.

[0041] The recess 27 of the lower end of the guide slot 26 is reached by the pin 36 of the drawer 30 when the opening apparatus 10 is in a non-return position. The drawer 30 drags the guide element 20 downwards through the pin 36 causing the tilting wall 70 to open until the opening apparatus 10 is in the closing position and the tilting wall 70 is in the opening position.

[0042] The shape of the recess 27 of the guide slot 26 of the guide element 20 is specially made so that the tilting wall 70 can be opened by snap fitting as much as possible in order to better launch the waste bag towards the wall of the containment chamber 103.

[0043] The pin 36 of the drawer 30 and the recess 27 coupled between them advantageously allow to strengthen the closing position of the opening apparatus 10 avoiding it from being opened accidentally or that the opening apparatus 10 can be forced.

[0044] The hub 40 comprises a damping device which is mounted under the bracket 41 in the figures and which allows dampening the opening movement of the drawer 30 during the passage from the closing position to the opening position of the opening apparatus 10.

[0045] Alternatively, it is possible to provide that the damping device can also be used for the passage from the opening position to the closing position of the opening apparatus 10.

[0046] The drawer 30 is adapted to pass from a closing angular position shown in figure 11 which corresponds to the closing position of the opening apparatus 10 to a multiplicity of non-return angular positions one of which positions is shown in figure 12, each of the non-return positions of the drawer 30 corresponds to respective positions that the opening apparatus 10 takes on during a passage step from the opening position to the closing position, up to an angular opening position of the drawer 30 shown in figures 13 and 14 which corresponds to the opening position of the opening apparatus 10.

[0047] The hub 40 comprises a lever 45. The lever 45 is mounted in a single piece with the hub 40 and rotates as a single piece with the hub 40 about the first rotation axis.

[0048] The lever 45 comprises a first portion 46 and a second portion 47 which extend along two different radial directions with respect to the first rotation axis. The two radial directions are substantially opposite to each other. Substantially opposed because an angle between the two radial directions is provided which is adapted to deamplify the ratio of the force lever of the elastic recall element 51.

[0049] The first portion 46 of the lever 45 is a first arm of the lever 45 and is mounted in a single piece with the rear wall 32 of the drawer 30 so that when the lever rotates about the first rotation axis, the drawer 30 also rotates about the first rotation axis.

[0050] The second portion 47 of the lever 45 is a second arm of the lever 45 and is connected by means of a connection means 48 to a first end of a first elastic recall element 51 of the opening apparatus 10. The first elastic

recall element 51 preferably consists of two springs.

[0051] The elastic recall element 51 comprises a second end connected to a first point 61 of the coupling body 11 so that the first elastic recall element 51 passes from a more elongated position corresponding to the closing position of the opening apparatus 10 as shown in particular in Figure 4 to a less elongated position corresponding to the opening position of the opening apparatus 10 as shown in particular in figures 7 and 8.

[0052] Alternatively, it is provided that the connection means 48 is a means for regulating the first elastic recall element 51 and is mounted with the first point 61 of the coupling body 11.

[0053] The more elongated position of the first elastic recall element 51 provides that the first elastic recall element 51 can recall the lever 45 by rotating the drawer 30 in the opening position of the opening apparatus 10.

[0054] As shown in particular in figures 1, 2, 7 and 8, the opening apparatus 10 comprises leverage means 85 comprising a pedal 80 and at least one pulling cable 81. The pulling cable 81 comprises a first end 83 connected to the second portion 47 of the lever 45 and a second end 84 connected to the leverage means 85 of the pedal 80.

[0055] Starting from the opening position of the opening apparatus 10, the pedal 80 is adapted to pass from a raised position corresponding to the opening position of the opening apparatus 10 to a lowered position corresponding to the closing position of the opening apparatus 10, that is, operating in reverse with respect to the state of the prior art.

[0056] The raised position of the pedal 80 provides that the first elastic recall element 51 is in the less elongated position.

[0057] Passing from the raised position to the lowered position of the pedal 80, the pulling cable 81 is pulled by the leverage means 85 and moves the lever 45 making it rotate about the first rotation axis passing the drawer 30 from the opening angular position to the closing angular position, by passing the opening apparatus 10 from the opening position to the closing position and by passing the first elastic recall element 51 from the less elongated position to the more elongated position. In this way, in the closing position of the opening apparatus 10, the first and second elastic recall elements 51 and 52 are in the most elongated position ready to open the drawer 30 and pass the opening apparatus 10 from the closing position to the opening position without using electric batteries and thus saving electricity.

[0058] When the opening apparatus 10 is instead in the closing position, the pedal 80 can be in any position.

[0059] The opening position of the opening apparatus 10 provides that the drawer 30 is in an opening angular position as shown in figures 7-9, 13 where the waste bag can be inserted inside the drawer 30 through the chamber 35 of predefined volume, passing from the opening position to the closing position of the opening apparatus 10. Subsequently, the drawer 30 rotates about the first rota-

tion axis by closing the chamber 35 directed towards the outside of the container 100 and directing the opening of the chamber 35 of predefined volume towards the inside of the containment chamber 103 as shown in figure 12.

5 The closing position of the opening apparatus 10 provides that the drawer 30 is in the closing angular position as shown in figures 3-6, 11, completely closing the chamber 35 of predefined volume towards the outside of the container 100 and opening it to its utmost extent towards the inside of the containment chamber 103.

10 **[0060]** The opening apparatus 10 comprises the tilting wall 70, a spacing bar 90 and a second elastic recall element 52 adapted to pass from a more elongated position to a less elongated position.

15 **[0061]** The tilting wall 70 comprises an upper portion 71, a median portion 73 and a lower portion 72.

[0062] The tilting wall 70 comprises a transverse section with curvilinear shape which follows the transverse section with circular-sector shape of the drawer 30, so that during the rotation of the drawer 30 from the opening position to the closing position of the opening apparatus 10 the tilting wall 70 does not interfere with the drawer 30 and can close the chamber 35 as long as the opening apparatus 10 is in the closing position with respect to the outside.

20 **[0063]** The upper portion 71 of the tilting wall 70 is hinged at a third point 63 of a rear portion of the coupling body 11 and defines a second rotation axis which is parallel to the first rotation axis about which the drawer 30 rotates.

25 **[0064]** The tilting wall 70 is located under the access opening defined by the chamber 35 of predefined volume formed by the drawer 30 and by the cap 12 when the drawer 30 passes from the angular closing position to one of the multiple non-return angular positions.

30 **[0065]** The tilting wall 70 rotates about the second rotation axis. The tilting wall 70 is bonded in its rotation about the second rotation axis by the spacing bar 90.

[0066] The tilting wall 70 passes from a closing position of an access opening of the chamber 35 of predefined volume which leads to the containment chamber 103 of the container 100 which corresponds to the opening position of the opening apparatus 10 to an opening position of the access opening to the chamber 35 of predefined volume which leads to the containment chamber 103 of the container 100 which corresponds to the closing position of the opening apparatus 10.

35 **[0067]** The spacing bar 90 comprises an upper end 91 and a lower end 92.

40 **[0068]** A median point 75 of the median portion 73 of the tilting wall 70 is hinged at the lower end 92 of the spacing bar 90 so as to bond the rotation of the spacing bar 90 about the second rotation axis.

45 **[0069]** A first pawl 76 mounted above the tilting wall 70 comprises the median point 75. The first pawl 76 is of suitable shape so that the spacing bar 90 can rotate pivoted at the median point 75 within two stop ends and therefore can only rotate within an angle defined by the

shape of the first pawl 76.

[0070] An upper end 91 of the spacing bar 90 is hinged with a fourth point 65 of the guide element 20 as shown in particular in figures 6 and 10.

[0071] A second pawl 66 mounted above the guide element 20 comprises the fourth point 65 of the guide element 20. The second pawl 66 is of a suitable shape so that the spacing bar 90 can rotate pivoted at the fourth point 65 within two stop ends and therefore can only rotate within an angle defined by the shape of the second pawl 66.

[0072] The second elastic recall element 52 comprises an upper end connected with a second point 62 of the coupling body 11 and a lower end connected with an upper point 74 of the upper portion 71 of the tilting wall 70. The upper point 74 is spaced by a predefined space from the third point 63 where the upper portion 71 of the tilting wall 70 is hinged with the coupling body 11.

[0073] The second elastic recall element 52 is adapted to pass from a more elongated position to a less elongated position. As shown in particular in figures 4 and 5, the more elongated position of the second elastic recall element 52 corresponds to the closing position of the opening apparatus 10, to the angular closing position of the drawer 30 and to the multiple non-return positions of the drawer 30.

[0074] As shown in particular in figures 8 and 9, the less elongated position of the second elastic recall element 52 corresponds to the opening position of the opening apparatus 10 and to the opening angular position of the drawer 30. The second elastic recall element 52 in the less elongated position is adapted to keep the tilting wall 70 in position.

[0075] The tilting wall 70 in the closing position advantageously avoids the possibility of forcing the drawer 30 to deliver a higher waste volume than allowed both when the drawer 30 is in the angular opening position and when the drawer 30 is in one of the multiple non-return positions.

[0076] The tilting wall 70 advantageously allows keeping the access opening to the containment chamber 103 of the container 100 closed when the opening apparatus 10 is in the opening position so that only the predetermined volume defined by the walls 31-33 of the drawer 30 and by the cap 12 of the opening apparatus 10 can be delivered.

[0077] Passing from the opening position of the opening apparatus 10 to the closing position of the opening apparatus 10, the pedal 80 is pushed with a user's foot from the raised position to the lowered position, pulling the pulling cable 81 pivoted to the upper portion 47 of the lever 45 and rotating the drawer 30 about the first rotation axis. The drawer 30, by rotating, pushes the guide element 20 to rotate about the point 25 and to open the tilting wall 70 making the tilting wall 70 rotate in a bonded manner and tensioning the second elastic recall means 52 which passes from the less elongated position to the more elongated position.

[0078] The tilting wall 70 opens only when the pin 36 of the drawer 30 arrives in the recess 27 of the guide slot 26 of the guide element 20 and pushes the guide element 20 downwards, making it rotate about the fourth rotation axis about the point 25 of the coupling body 11. The guide element 20, by moving, moves the spacing bar 90 which makes the tilting wall 70 move in turn by rotating it about the third point 63 of the coupling body 11 and passing the tilting wall 70 from the closing position to the opening position which corresponds to the closing position of the opening apparatus 10 and which corresponds to the angular closing position of the drawer 30.

[0079] During this bonded rotary movement of the tilting wall 70, the waste bag which has been inserted in the predefined chamber 35 to house the waste bag, is stopped by the tilting wall 70 which does not drop the waste bag from the chamber 35 of the drawer 30. When the opening apparatus 10 passes to the closing position and the drawer 30 passes to the angular closing position, the tilting wall 70 opens snap-fittingly and the waste bag is pushed towards an internal wall of the containment chamber 103 for waste of the container 100 advantageously preventing the waste bag from falling by gravity forming a pyramid of waste bags with other waste bags.

The opening by snap fit occurs due to the change in curvature of the guide slot 26 when the pin 36 of the drawer 30 reaches the recess 27 of the final portion 27 of the guide slot 26. The elastic recall element 52 has the function of cushioning vibrations. The waste bag is catapulted by means of the kinetic energy accumulated during the rotation of the drawer 30. Advantageously the solid dihedral shape of the drawer 30 allows increasing the kinetic energy of the waste bag since there is an angle between the front wall 31 and the rear wall 32 of the drawer 30. If the tilting wall 70 were not there, the waste bag would first fall into the chamber 103 without acquiring sufficient kinetic energy to be pushed towards the walls of the containment chamber 103. The thrust given to the waste bag by the tilting wall 70 advantageously allows preventing the opening apparatus 10 from being jammed, that no pyramid of waste is formed under the drop point of the waste bag, that the containment chamber 103 for waste of the container 100 is filled homogeneously and as effectively as possible. The lack of the tilting wall 70 would cause the waste bag to fall by gravity immediately under the predefined chamber 35 for housing waste forming a pyramid of waste bags.

[0080] The drawer 30, passing from the closing position of the opening apparatus 10 to the opening position of the opening apparatus 10 passes from the angular closing position to the opening angular position. By rotating the drawer 30, the pin 36 slides inside the guide slot 26. The pin 36 stops before reaching the upper stop and pushes the guide element 20 upwards, making it rotate about the point 25 of the fourth rotation axis. In fact, the curvilinear guide slot 26 has the function of keeping the tilting wall 70 adjacent to the drawer 30 in position and the curvature has an extension of the angle greater

than the rotation of the drawer 30. The centre of the curvature of the guide slot 26 lies in the first rotation axis of the drawer 30. The guide element 20 stops its rotation motion when an upper portion 22 of the guide element 20 abuts against a stop element 122 of the cap 12 of the coupling body 11. The stop 122 removes a degree of freedom when the tilting wall 70 is in the closing position otherwise the friction on the guide element 20 could cause the tilting wall 70 to rub on the drawer 30, which the curvilinear shape of the guide slot 26 advantageously avoids, advantageously preserving the elements of the opening apparatus 10 for a longer time.

[0081] There are spatial distances between the third point 63 of the coupling body 11 in which the upper portion 71 of the tilting wall 70 is hinged and the fourth point 65 of the guide element 20 in which the upper end 91 of the spacing bar 90 is hinged and the second point 62 of the coupling body 11 where the upper end of the second elastic recall element 52 is connected so that the tilting wall 70 can rotate about the second rotation axis and be bonded by the spacing bar 90. Advantageously, the second elastic recall element 52 avoids vibrations and favours the sliding of the drawer 30 and of the pin 36 inside the guide slot 26. The action of the guide slot 26, of the second elastic recall element 52 and of the weight of the tilting wall 70 allows moving the tilting wall 70 without providing electric motors that would consume electric batteries.

[0082] There is a spatial distance between the first point 61 and the second point 62 of the coupling body 11. In particular, the first point 61 is provided to be positioned in a front portion of the coupling body 11, while the second point 62 is provided to be positioned in a rear portion of the coupling body 11 so that the first elastic recall element 51 and the second elastic recall element 52 are in a less elongated position when the opening apparatus 10 is in the opening position as shown in particular in figure 8 and vice versa the first elastic recall element 51 and the second elastic recall element 52 are in a more elongated position when the opening apparatus 10 is in the closing position as shown in particular in figure 4.

[0083] As shown in particular in figures 4-10 there are two spacing bars 90 on the two left and right sides of the opening apparatus 10, respectively.

[0084] As shown in particular in figures 11-15, the opening apparatus 10 of the container 100 comprises a control unit (not shown in the figures) and a lock 200, preferably a latch lock, which passes from an opening position to a closing position adapted to keep the opening apparatus 10 in the closing position.

[0085] The lock 200 of the opening apparatus 10 is mounted on one side, the right one, of the opening apparatus 10, as shown in figures 11-15.

[0086] As shown in particular in figure 13, the lock 200 comprises a toothed flange 201 which comprises a first portion 210 rotatably mounted with the right hub 40 and pivoted with the hub 40 so as to rotate about the first

rotation axis in a single piece with the drawer 30.

[0087] The toothed flange 201 comprises a second portion 220 comprising a first tooth 221 and a second tooth 222.

5 **[0088]** The toothed flange 201 comprises a multiplicity of magnets or other indicators adapted to signal its position relative to at least one position sensor which checks the rotation of the toothed flange 201.

10 **[0089]** The lock 200 comprises a bracket 202 adapted to engage with the teeth 221, 222 of the toothed flange 201 and adapted to pass from an engaged position with the first tooth 221 which corresponds to the closing position of the opening apparatus 10 and to the angular closing position of the drawer 30, to a multiplicity of non-return angular positions where the bracket 202 is engaged in a space between the first 221 and the second tooth 222 of the toothed flange 201 which corresponds to the multiplicity of non-return angular positions of the drawer 30 during the passage between the closing position and the opening position of the opening apparatus 10.

20 **[0090]** Finally, the bracket 202 remains disengaged from the toothed flange 201 when the bracket 202 passes into a disengagement position, leaving the toothed flange 201 free to rotate. The bracket 202 comprises a third elastic recall element 224 adapted to pass from a relaxed position to a tension position.

25 **[0091]** The disengagement position of the bracket 224 provides that the third elastic recall element 224 is in the tension position, ready to recall the bracket 202 in the engagement positions with the teeth 221, 222 or with the space between the teeth 221, 222 of the toothed flange 201.

30 **[0092]** Once the bracket 202 releases the toothed flange 201 of the lock 200, the elastic recall elements 51 and 52 respectively move the rotation of the drawer 30, the rotation of the guide element 20 and the bonded rotation of the tilting wall 70 of the opening apparatus 10 by passing the opening apparatus 10 from the closing position to the opening position without using batteries and thus advantageously saving the charge of the electric battery.

35 **[0093]** The lock 200 comprises a DC motor 205 powered by the electric battery of the opening apparatus 10, a cam 204 pivoted with the motor 205 and rotated according to a third rotation axis by the motor 205.

40 **[0094]** The lock 200 comprises a switch 206 through which the motor 205 is powered. The cam 204 is rotated by the motor 205 and passes from a multiplicity of positions which do not press the switch 206 to a pressure position against the switch 206 adapted to press the switch 206 and switch off the motor 205.

45 **[0095]** As shown in figure 11, the bracket 202 is in the engagement position with the first tooth 221 of the toothed flange 201 keeping the lock 200 in a locked position which does not allow the drawer 30 to pass from the angular closing position to the angular opening position and therefore not to pass the opening apparatus 10

from the closing position to the opening position.

[0096] Once the control unit identifies a person such as the user enabled to deliver a waste bag of predefined volume, the motor 205 rotates the cam 204. The cam 204 pushes the bracket 202 in such a way as to pass the bracket 202 from the engagement position with the first tooth 221 to the multiplicity of engagement positions between the first tooth 221 and the second tooth 222 of the toothed flange 201 as shown in figure 12.

[0097] The motor 205 continues to rotate the cam 204 until the bracket 202 passes to the disengaged position from the toothed flange 201 as shown in figures 13 and 14. In the disengaged position the toothed flange 201 is free to rotate and causes the drawer 30 to rotate in the angular opening position and the opening apparatus 10 in the opening position. In this disengagement position of the bracket 202, the cam 204 pushes the switch 206 causing the motor 205 to switch off. In the disengagement position of the bracket 202, the third elastic element 224 is in the tension position.

[0098] To reload the lock 200 and return the bracket 202 to the engagement position first with the second tooth 222 and then with the first tooth 221 of the toothed flange 201, the pedal 80 is lowered by pulling the pulling cable 81 and passing the opening apparatus 10 from the opening position to the closing position.

[0099] The closing position of the opening apparatus 10 corresponds to the engagement position of the bracket with the first tooth 221 of the toothed flange 201.

[0100] The control unit is mounted inside a metal box 300 of the opening apparatus 10. The control unit comprises at least one memory and a processor adapted to control at least the motor 205. The metal box 300 mounts five antennas electrically connected to the control unit which is in communication with a control unit or with vehicles or with other control units of other containers. The control unit advantageously allows preventing the five antennas from interfering with each other and with other radio communication systems.

[0101] In particular, the five antennas can allow LTE, 3G, 4G, LoRaWAN, WI-FI, radio, RFID tag readers, GPS communication.

[0102] The control unit is adapted to read the position of the drawer 30 by means of the magnetic elements of the toothed flange 201 or other angular position sensors.

[0103] The opening apparatus 10 also comprises a position detector, for example a GPS, for communicating the position of the container 100.

[0104] It is possible to communicate with the control unit to transmit information or receive information to and from the container 100 by programming the control unit remotely or closely. For example, from the remote operating centre it is possible to control all the control units of the opening apparatuses 10 by commanding to remain in the opening position or to remain in the closing position.

[0105] The lever 45, the first elastic recall element 51, the lock 200 and the leverage system 85 with pedal 80 cooperate synergistically with the tilting wall 70 with the

spacing bar 90 and the guide element 20 of the opening apparatus 10 so as to make the push movement of the waste bag more effective and efficient by avoiding the creation of a pyramid of waste and that the opening apparatus 10 works without jamming, which is solid, safe and that allows predetermining a defined volume of waste to be thrown through it, preventing deliveries of volumes of waste higher than allowed, which allows passing from the closing position to an opening position without any contact with parts of the human body and only if there is an identification of a user enabled to throw waste bags, which is energy efficient, who consumes little electric battery.

[0106] Advantageously, the opening apparatus 10 according to the present invention allows achieving the requirements and objectives required by the current Emilia Romagna Regional Law relating to the Punctual Fee, the so-called TCP. The TCP aims at monitoring the number of deliveries of each user, in this case limited to a maximum of 30 litres of volume for each delivery, in order to be able to apply a tax proportional to the actual annual uses of the deliverer.

[0107] Alternatively, as shown in figures 16 and 17, an alternative guide element 20 comprises a second slot 28 on the upper portion 22 of the guide element 20. The drawer 30 comprises a further pin 37 adapted to engage inside the second slot 28 of the guide element 20. During the rotation of the drawer 30 from the angular opening position to the multiplicity of non-return angular positions one of which is shown in figure 16 to the angular closing position shown in figure 17, the further pin 37 enters the second slot 28 by pushing the guide element 20 to rotate about the fourth rotation axis identified by point 25 causing the tilting wall 70 to open even more by snap fitting.

[0108] Alternatively, as shown in figures 18-20, the tilting wall 70 integrally mounts a push element 77. The push element 77 is a wall which protrudes the upper portion 71 of the tilting wall towards the chamber 35. As shown in figures 18 and 19 in the opening position of the opening apparatus 10 the push element 77 does not interfere with the waste bag and follows the curvilinear shape of the tilting wall 70. The push element 77 follows the transverse section with circular-sector shape of the drawer 30, so that during the rotation of the drawer 30 from the opening position to the closing position of the opening apparatus 10 the push element does not interfere with the drawer 30. As shown in figure 20 in the closing position of the opening apparatus 10 and in the opening position of the tilting wall 70, the push element 77 which protrudes towards the front wall 31 like a hook advantageously allows pushing towards the rear wall 32 a possible wet or humid waste bag that has adhered to the front wall 31 allowing to increase the kinetic energy of the waste bag pushed towards the containment chamber 103. The same effect of increasing the thrust energy by the push element 77 occurs with the side walls 33, as well as with the front wall 31.

[0109] Alternatively as shown in figures 21 and 22 the

drawer 30 also comprises two internal draft walls 38 arranged coupling with the side walls 33. The volume of the chamber 35 of the drawer 30 for containing the waste bag is restricted by the two internal draft walls 38. Each internal draft wall 38 has a shape that follows that of the respective side wall 33. A rear portion 382 of each of the internal draft walls 38 mates with a rear side of the side wall 33 and with sides of the rear wall 32. The internal draft wall 38 gradually moves away from the corresponding side wall 33. As shown in figure 22, the internal draft wall 38 at rest forms a draft angle φ with the respective side wall 33 which is comprised between 2 and 15 sexagesimal degrees, where the draft angle φ is measured in projection on a geometric plane which passes through the ends of the two radial walls 31 and 32 as shown in figure 22. Advantageously, the internal draft walls 38 are elastic in that they are connected to the drawer 30 only on the side mating between the rear wall 32 and the rear portion 382 of the internal draft wall 38, that is, each internal draft wall 38 can oscillate about the draft angle φ passing from a position of maximum approach with the respective side wall 33 to a position of maximum distance from the respective side wall 33. Advantageously, the internal draft walls 38 allow reducing an engagement angle between the waste bag and chamber 35 with respect to the direction of discharge of the waste inside the chamber 103, reducing the friction between the bag and the walls of the chamber 35 and even more avoiding that a wet or humid waste bag can adhere to the walls of chamber 35. Advantageously, the internal draft walls 38 reduce the inlet opening of the waste bag from the front wall part 31 with respect to the outlet opening of the waste bag from the rear wall part 32.

[0110] Alternatively, the internal draft walls 38 are also fixed to the front wall 31 so that the internal draft walls 38 are rigidly connected to both the front wall 31 and the rear wall 32. In this alternative, the internal draft walls 38 do not oscillate about the draft angle φ . This alternative is advantageous in that it is provided that the curvilinear flaps of the side walls 33 close with the curvilinear side flaps of the internal draft walls 38 so as to completely close every possible interspace between the walls 33 and 38 so that no interspaces accessible from the outside are formed or where dirt accumulates.

[0111] Alternatively, as shown in figures 14, 23 and 24, an internal face of the front wall 31 of the drawer 30 comprises at least two first strips 39 parallel to each other which rise from the surface of the internal face of the front wall 31. Advantageously, the presence of the first strips 39 allows increasing the friction between a waste bag, even wet or humid, which would otherwise get stuck between an edge of the cap 12 and the edge of the front wall 31 of the drawer 30, due to the centrifugal force following the rotation of the drawer 30 in the passage from the opening position to the closing position. The presence of the first strips 39 advantageously allows during the introduction of the waste bag by the user not to slide the bag out of the chamber 35 of the drawer 30 since the first

strips 39 are arranged horizontally, i.e. parallel to the rotation axis of the drawer 30.

[0112] Again alternatively, as shown in figures 23 and 24, the rear wall 32 is provided to comprise a multiplicity of second strips 34. The second strips 34 are arranged parallel to each other and rise from the surface of an internal face of the rear wall 32. The second strips 32 are arranged vertically, i.e. perpendicular to the rotation axis of the drawer 30, so that when the opening apparatus 10 is in the closing position and the drawer 30 is rotated towards the inside of the containment chamber 103, the second strips 34 reduce the adhesion of a waste bag to the rear wall 32 by not decreasing the kinetic thrust. The presence of the second strips 34 advantageously allows not to reduce the thrust of kinetic energy even of a bag of wet or humid waste. As shown in particular in figure 24, the second strips 34 also have a trapezoidal shape, that is, they comprise a first portion 341 close to the internal face of the front wall 31 and a second portion 342 on the opposite side towards the containment chamber 103, wherein the first portion 341 is more raised from the internal face of the rear wall 32 with respect to the second portion 342, so as to facilitate the sliding of the waste bag by increasing an emptying angle.

[0113] Alternatively, the first portion 341 and the second portion 342 are raised with the same height measure with respect to the internal face of the rear wall 32.

[0114] Alternatively, the second strips 34 can be U-shaped folded sheets which rise from the internal face of the rear wall 32. Advantageously, the latter alternative allows decreasing the adhesion surface of the bag to the rear wall 32 of the drawer 30.

[0115] The invention thus conceived is susceptible to many modifications and variants, all falling within the same inventive concept; furthermore, all details can be replaced by equivalent technical elements. In practice, the materials used, as well as the dimensions thereof, can be of any type according to the technical requirements.

Claims

1. Opening apparatus (10) separably mountable with a waste container (100) which comprises a containment chamber (103), said opening apparatus (10) is adapted to pass from a closing position which does not provide accessible openings to said containment chamber (103) to an opening position which provides at least an access opening to the containment chamber (103), said opening apparatus (10) comprising a coupling body (11) couplable with said container (100), said opening apparatus (10) comprising a drawer (30) rotatably mounted with said coupling body (11) defining a first rotation axis of said drawer (30), said drawer (30) and said coupling body (11) defining a chamber (35) of predefined volume for housing a waste bag of said predefined volume, the

opening position of said opening apparatus (10) provides that said drawer (30) is in an opening angular position wherein said waste bag can be inserted through said chamber (35) of predefined volume, said opening apparatus (10) passing from the opening position to the closing position provides that said drawer (30) rotates about the first rotation axis closing the chamber (35) directed towards the outside of the container (100) and directing the opening of the chamber (35) of predefined volume towards the inside of the containment chamber (103), the closing position of the opening apparatus (10) provides that the drawer (30) is in the closing angular position completely closing the chamber (35) of predefined volume towards the outside of the container (100) and opening it to its utmost extent towards the inside of the containment chamber (103), wherein said drawer (30) has a solid dihedral geometrical shape and comprises a transverse section with circular-sector shape which comprises two radial walls (31, 32), a front wall (31) and a rear wall (32), protruding along two different radial directions with respect to the first rotation axis of the drawer (30) defining an angle (θ) measured on a geometric plane perpendicular to the first rotation axis, where said angle (θ) is predefined according to the predefined volume of the chamber (35), wherein said opening apparatus (10) comprises a tilting wall (70), at least a guide element (20) and at least a spacing bar (90), said tilting wall (70) is hinged at a point (63) of the coupling body (11) and defines a second rotation axis, said at least one guide element (20) is hinged at another point (25) of the coupling body (11) and defines another rotation axis, wherein the first, the second and the other rotation axis are parallel, said tilting wall (70) rotates about said second rotation axis bonded by said at least one spacing bar (90) which comprises an upper end (91) hinged with another point (65) of said at least one guide element (20) and a lower end (92) hinged at a point (75) of said tilting wall (70), said tilting wall (70) is adapted to pass from a closing position of an access opening of said chamber (35) of predefined volume to an opening position of said access opening of said chamber (35) of predefined volume which corresponds to the closing position of said opening apparatus (10).

2. Opening apparatus (10) according to claim 1, **characterized in that** it comprises at least one elastic recall element (52) adapted to pass from a more elongated position to a less elongated position, said at least one elastic recall element (52) comprises an upper end connected with a second point (62) of the coupling body (11) and a lower end connected with a point (74) of said tilting wall (70), the more elongated position of said elastic recall element (52) corresponds to the opening position of said tilting wall (70), the less elongated position of said elastic recall

element (52) corresponds to the closing position of said tilting wall (70).

3. Opening apparatus (10) according to any one of claims 1 or 2, **characterized in that** said drawer (30) comprises at least one engagement means (36, 37) slidably engaged with at least one guide slot (26) of said at least one guide element (20), where said at least one guide slot (26, 28) comprises an upper stop portion and a lower stop portion (27), wherein at least one engagement means (36, 37) of the drawer (30) in one of the abutment positions against the two respective stops of said at least one guide slot (26, 28) drags said at least one guide element (20) rotating said guide element (20) about the other rotation axis.
4. Opening apparatus (10) according to claim 3, **characterized in that** said at least one guide slot (26, 28) of said at least one guide element (20) has a curvilinear shape comprising variable radii of curvature according to angular positions of the drawer (30) so that said tilting wall (70) passes from the opening position into the closing position of the opening apparatus (10).
5. Opening apparatus (10) according to any one of claims 1-4, **characterized in that** said tilting wall (70) comprises an upper portion (71) which is hinged with said point (63) of the coupling body (11), where said point (63) of the coupling body (11) is of a rear portion of the coupling body (11).
6. Opening apparatus (10) according to any one of claims 1-5, **characterized in that** said lower end (92) of said spacing bar (90) is hinged at a point (75) of said tilting wall (70) which is of a median portion of the tilting wall (70).
7. Opening apparatus (10) according to any one of claims 1-6, **characterized in that** said opening apparatus (10) comprises at least one lever (45) mounted in a single piece with said drawer (30), said lever (45) rotates about said first rotation axis, said lever (45) comprising an arm (47) which is connected to a first end of at least one first elastic recall element (51) of the opening apparatus (10), said at least one first elastic recall element (51) comprises a second end connected to a first point (61) of the coupling body (11) so that said at least one first elastic recall element (51) is adapted to pass from a more elongated position corresponding to the closing position of the opening apparatus (10) to a less elongated position corresponding to the opening position of the opening apparatus (10).
8. Opening apparatus (10) according to claim 7, **characterized in that** it comprises a leverage system (85) comprising a pulling cable (81) connected with

- said arm (47) of said lever (45) adapted to pull said arm (47) of said lever (45) rotating said drawer (30) about the first rotation axis and passing said opening apparatus (10) from said opening position to said closing position, where said lever (45), said at least one first elastic recall element (51). 5
9. Opening apparatus (10) according to any one of claims 7 or 8, **characterized in that** it comprises a lock (200) which passes from an opening position which allows the rotation of the drawer (30) to a closing position adapted to keep the opening apparatus (10) in the closing position. 10
10. Opening apparatus (10) according to any one of claims 8 or 9, **characterized in that** said leverage system (85) comprises a pedal (80) which is adapted to pass from a raised position corresponding to the opening position of the opening apparatus (10) to a lowered position corresponding to the closing position of the opening apparatus (10), said pedal (80) passing from the raised position to the lowered position is adapted to activate the leverage system (85) which is adapted to pull said pulling cable (81) passing said at least one first elastic recall element (51) from the less elongated position to the more elongated position. 20 25
11. Opening apparatus (10) according to any one of claims 9 or 10, **characterized in that** said lock (200) comprises a motor (205) which passes said lock (200) from the closing position to the opening position, a bracket (202) moved by means of leverage means (204) by said motor (205), a toothed flange (201) mounted in a single piece with said drawer (30) and adapted to rotate about said first rotation axis, said toothed flange (201) comprising at least a tooth (221, 222) adapted to engage with said bracket (202) when said lock (200) is in closing position preventing the toothed flange (201) from rotating about said first rotation axis. 30 35 40
12. Opening apparatus (10) according to claim 11, **characterized in that** said leverage means comprise a cam (204) adapted to be rotated about a third rotation axis by said motor (205), said cam (204) rotating about said third rotation axis passes said bracket (202) from an engagement position with at least one tooth (221, 222) of said toothed flange (201) to a disengagement position where the toothed flange (201) is free to rotate about said first rotation axis. 45 50
13. Opening apparatus (10) according to any one of claims 9-12, **characterized in that** it comprises a control unit comprising at least a processor and at least a memory which is adapted to control said lock (200) passing it from the opening and closing position and vice versa. 55
14. Opening apparatus (10) according to any one of claims 1-13, **characterized in that** said tilting wall (70) comprises a push element (77), wherein said push element (77) is integrally mounted with said tilting wall (70) and said push element (77) protrudes towards said front wall (31). 5
15. Opening apparatus (10) according to any one of claims 1-14, **characterized in that** said drawer (30) comprises two side walls (33) adapted to form, together with the two radial walls (31 and 32), a chamber of the drawer (30) for containing the waste bag, wherein said drawer (30) comprises an internal draft wall (38) for each side wall (33), wherein each internal draft wall (38) forms a draft angle (φ) with the respective side wall (33) which is comprised between 2 and 15 sexagesimal degrees, wherein the draft angle (φ) is measured in projection on a geometric plane that passes through the ends of the radial walls (31, 32) of the drawer (30). 10 15 20 25
16. Opening apparatus (10) according to any one of claims 1-15, **characterized in that** at least one of the two radial walls (31, 32) comprises an internal face from which a multiplicity of strips (34, 39) rise. 30 35 40 45 50 55

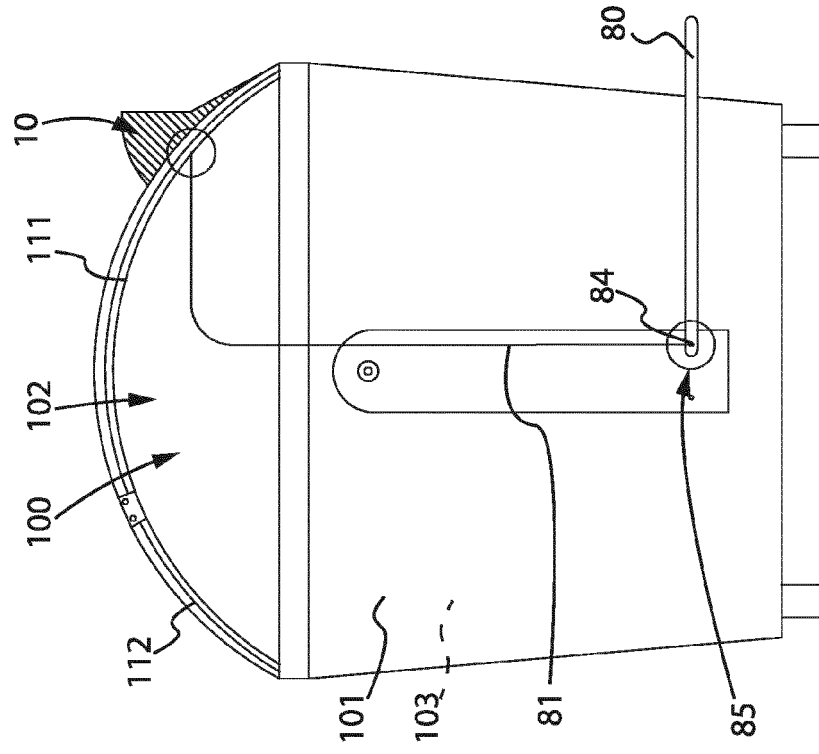


Fig. 2

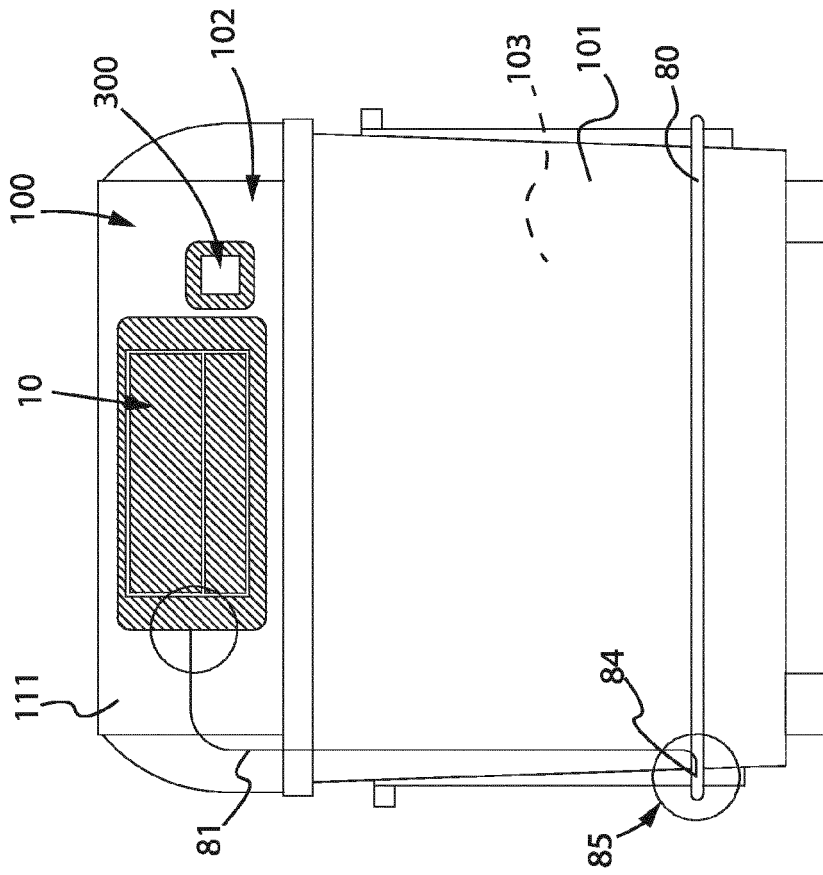


Fig. 1

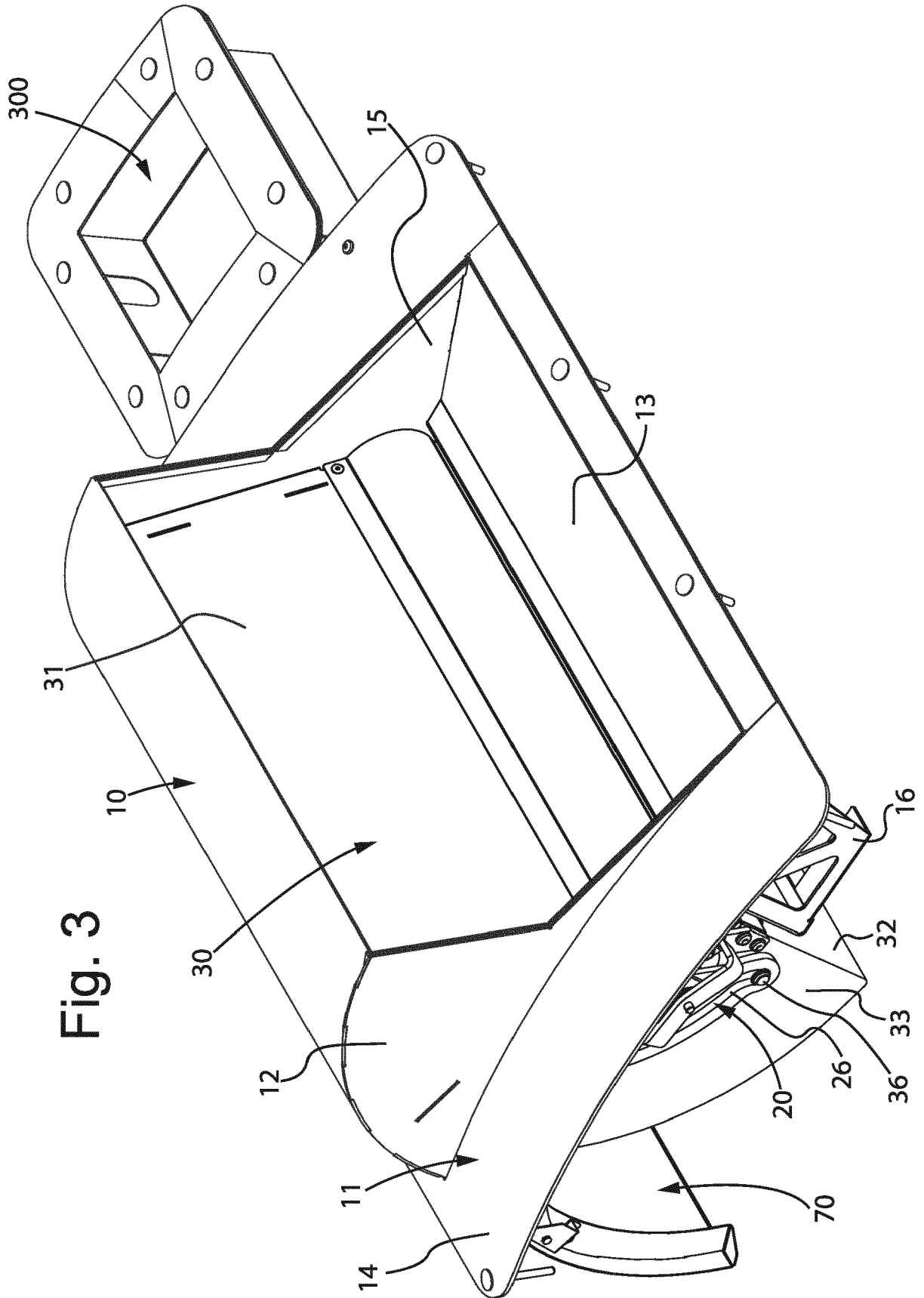


Fig. 3

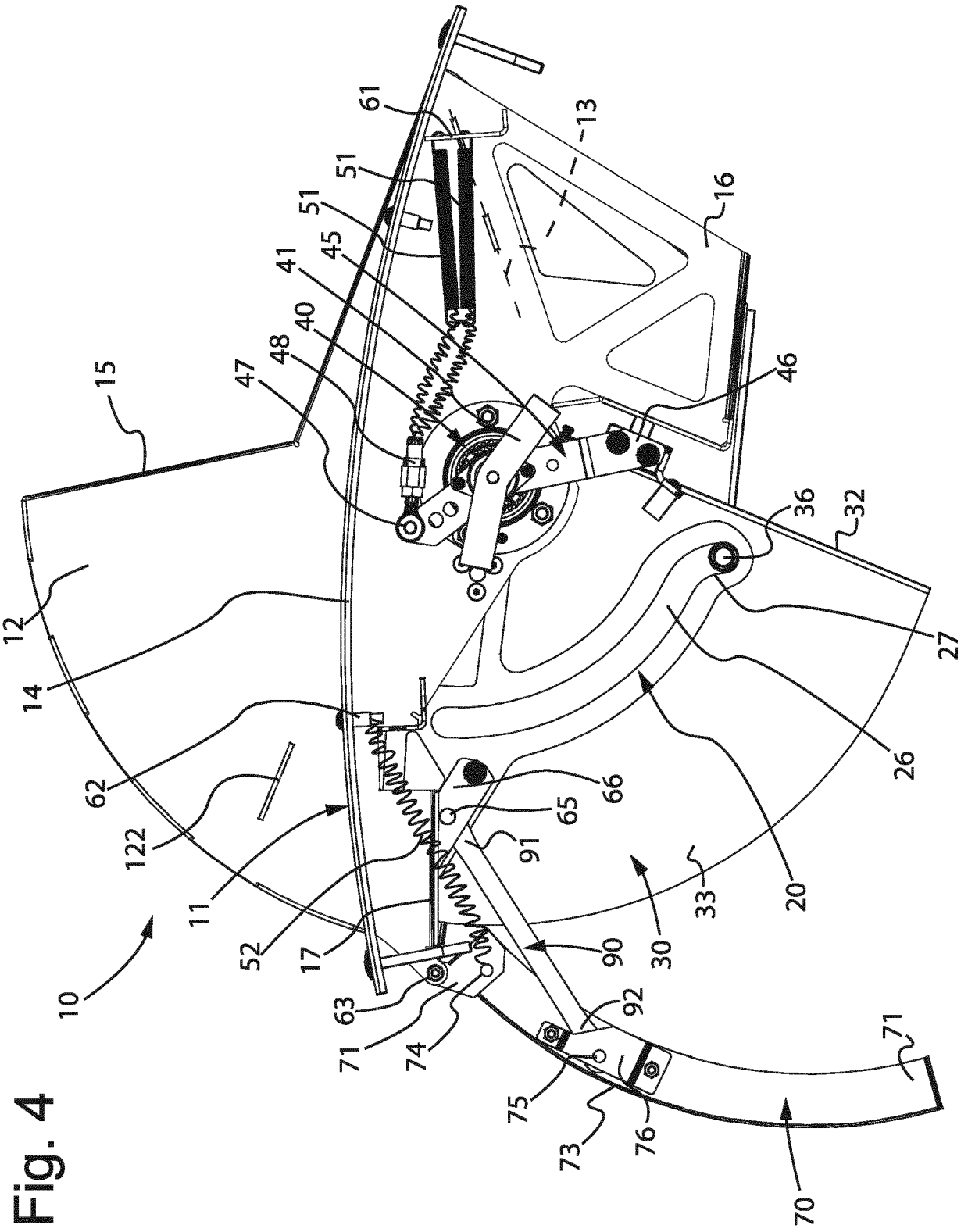


Fig. 4

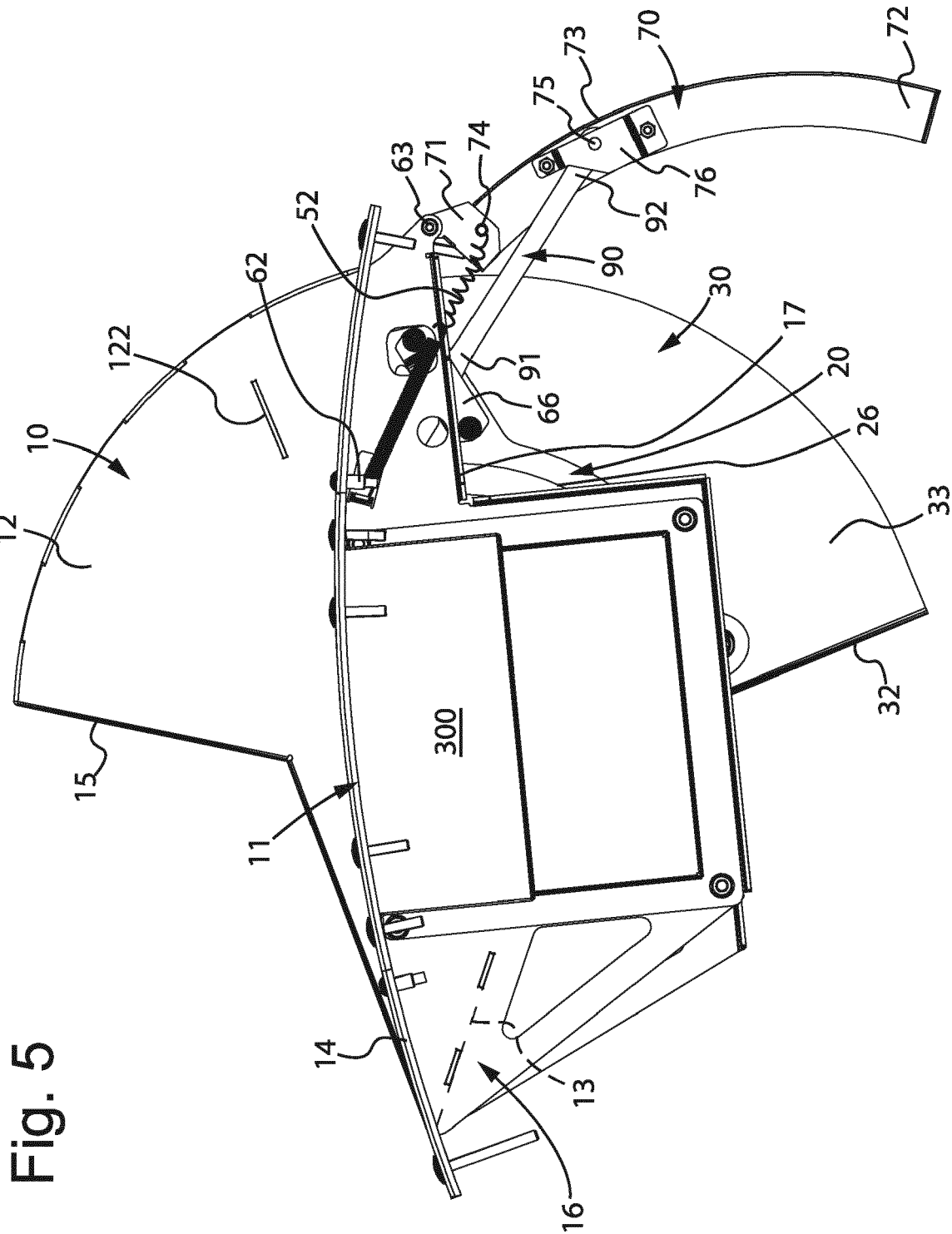
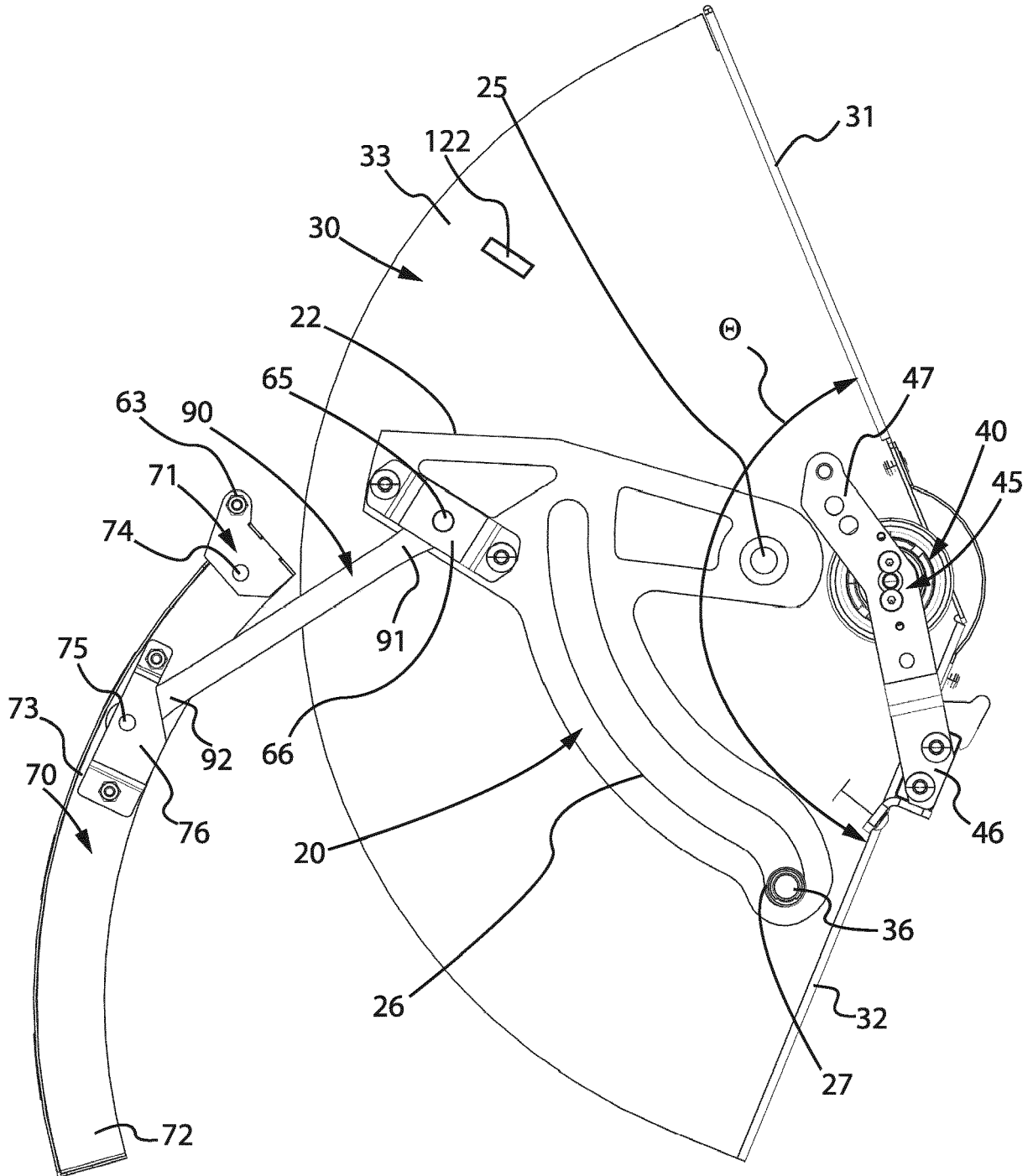


Fig. 5

Fig. 6



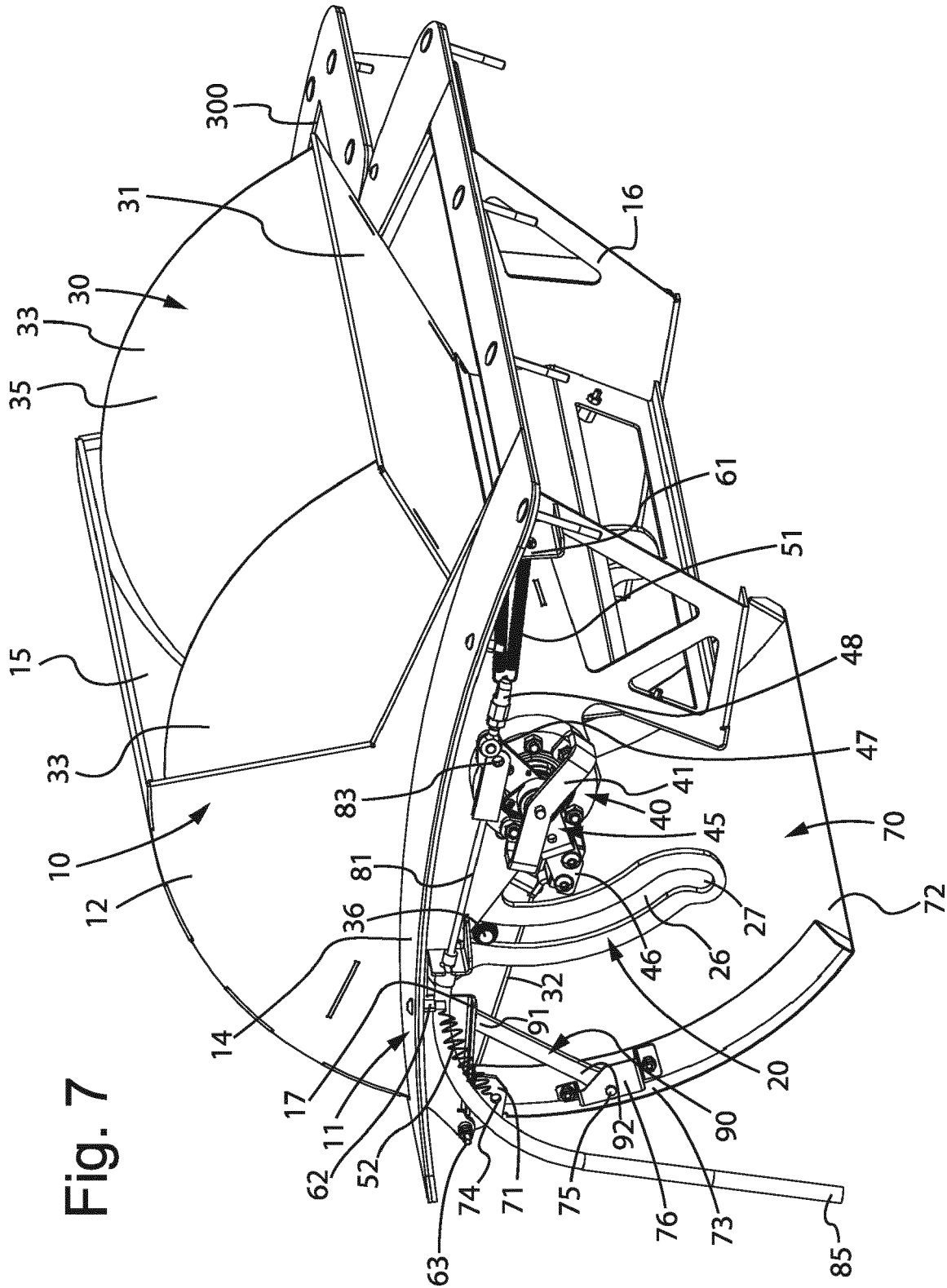


Fig. 7

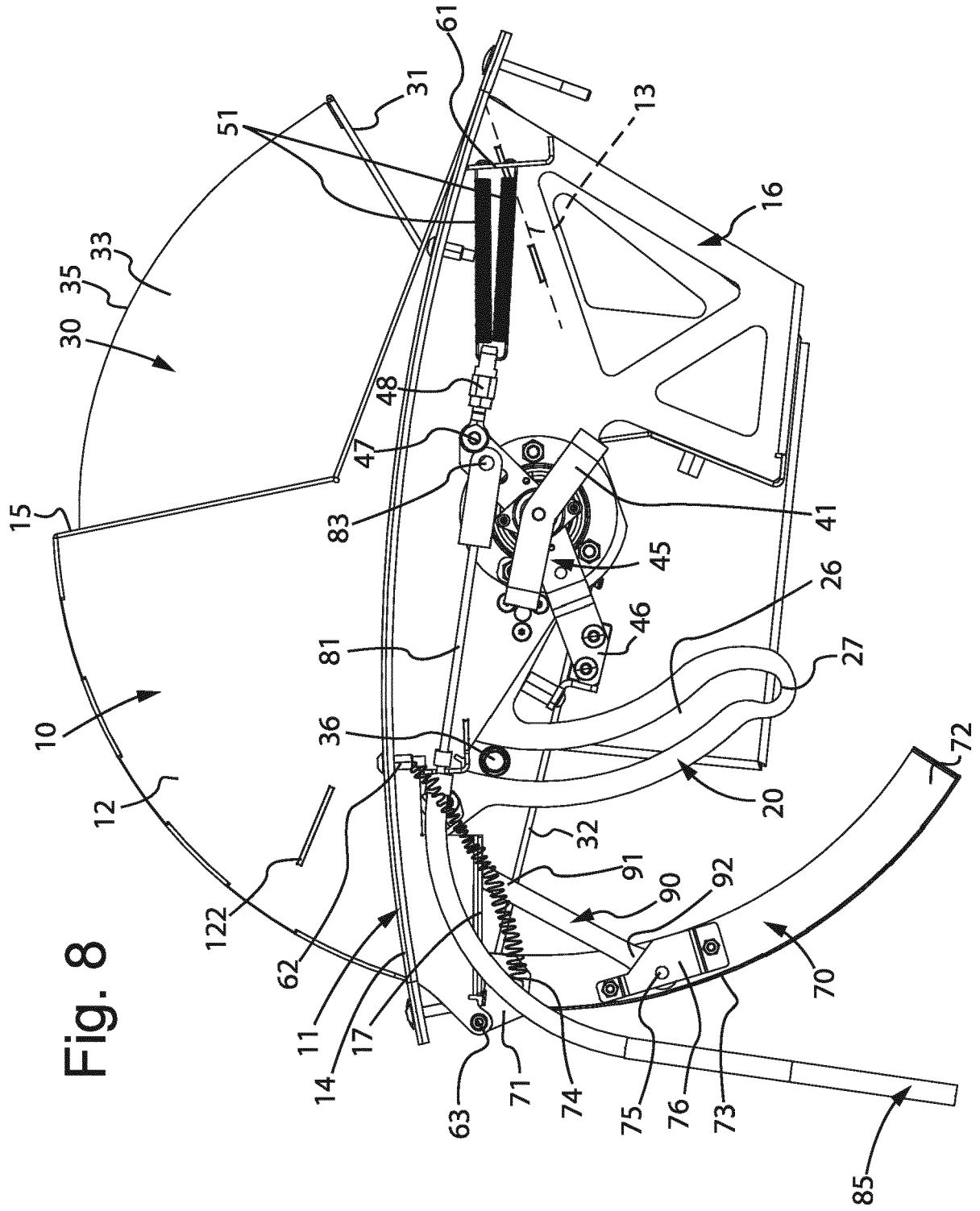


Fig. 8

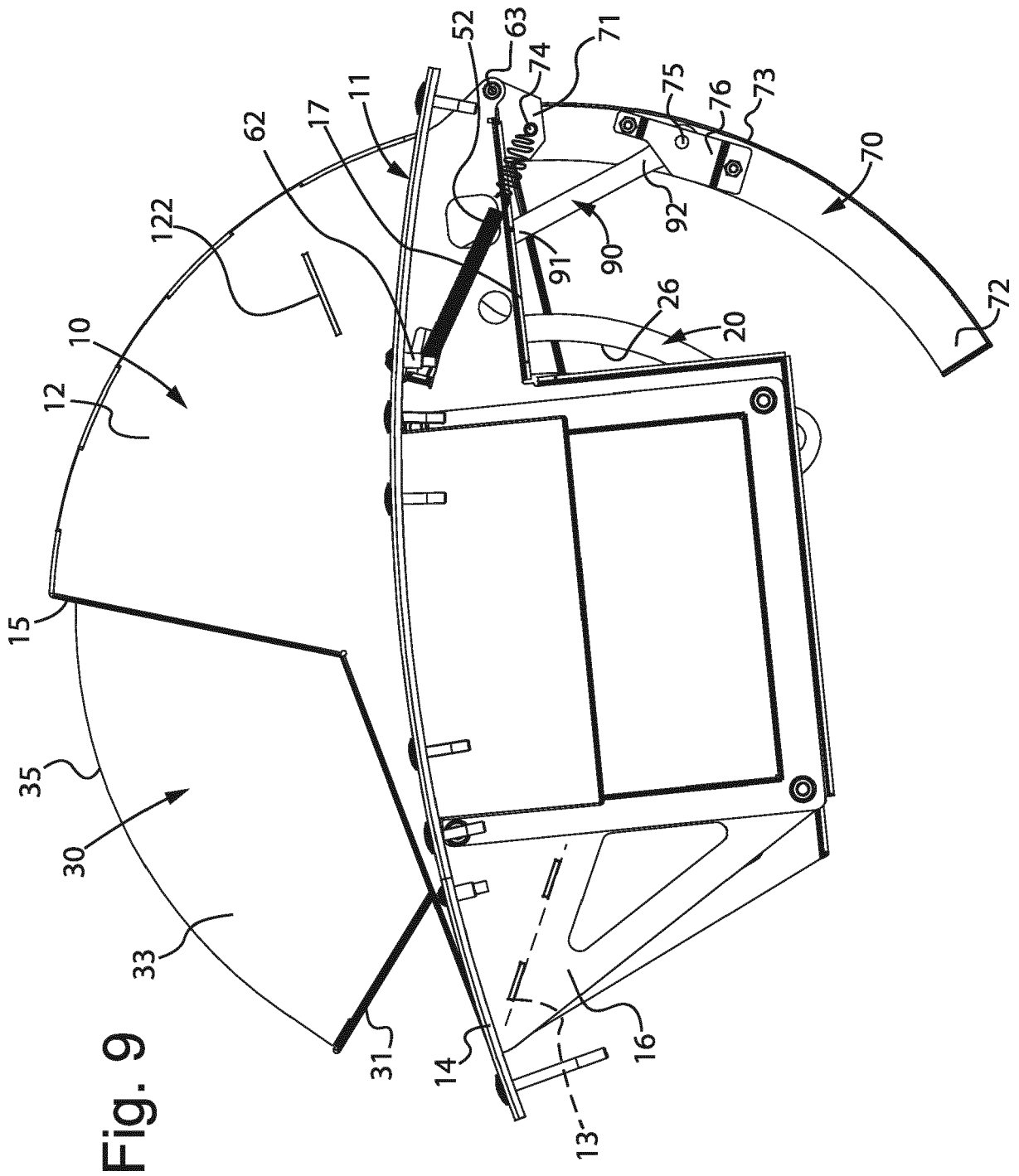


Fig. 9

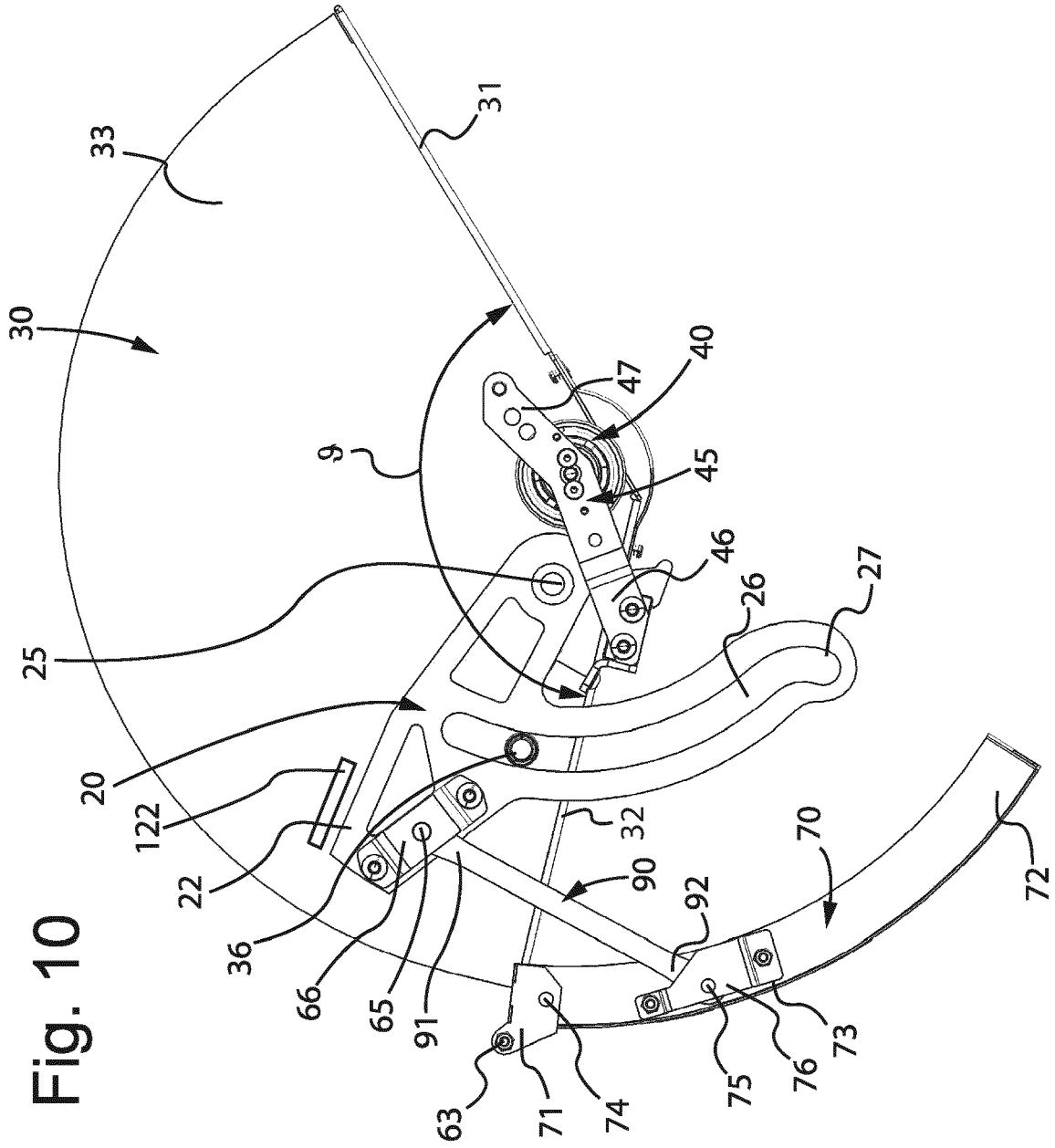


Fig. 10

Fig. 11

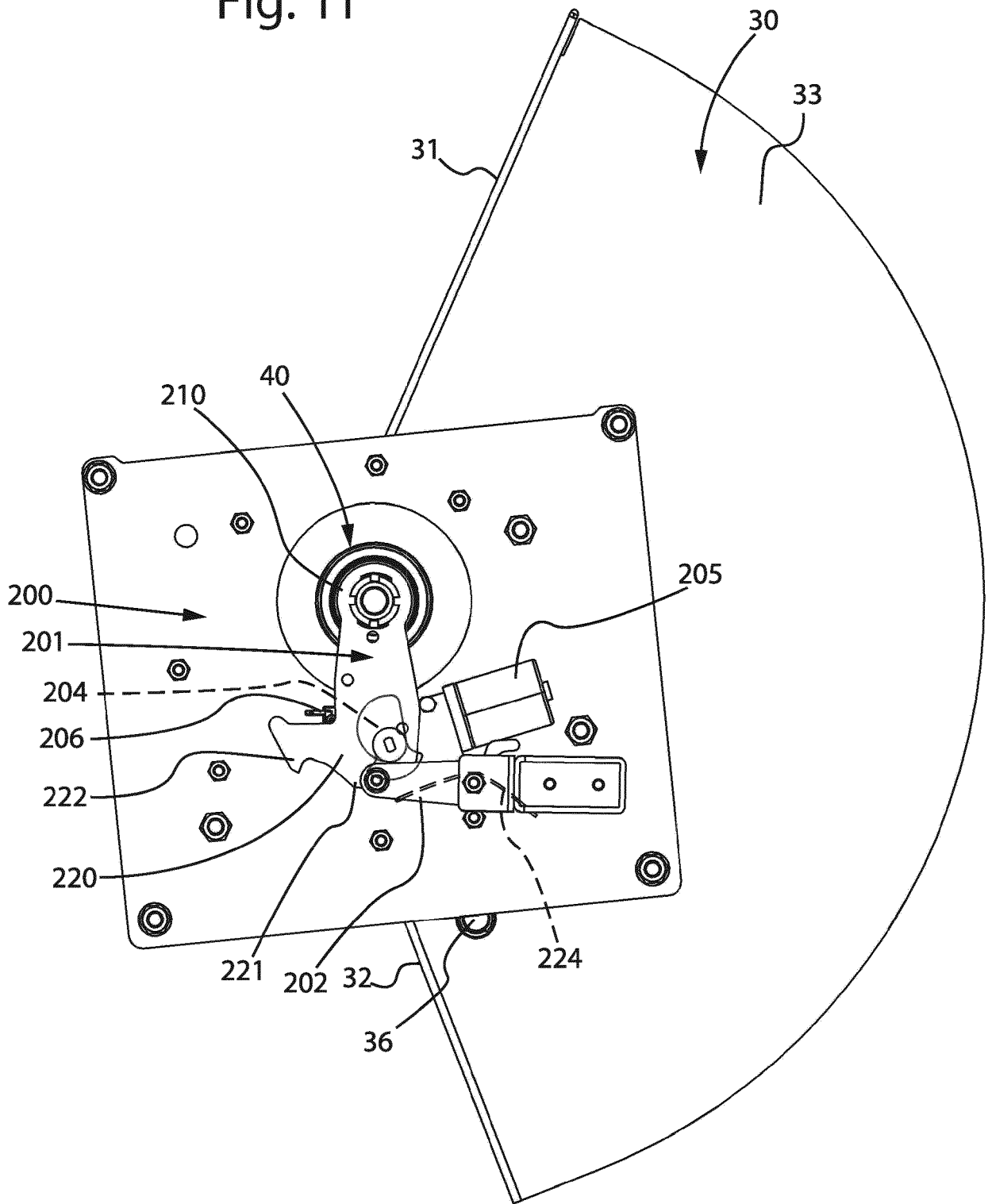
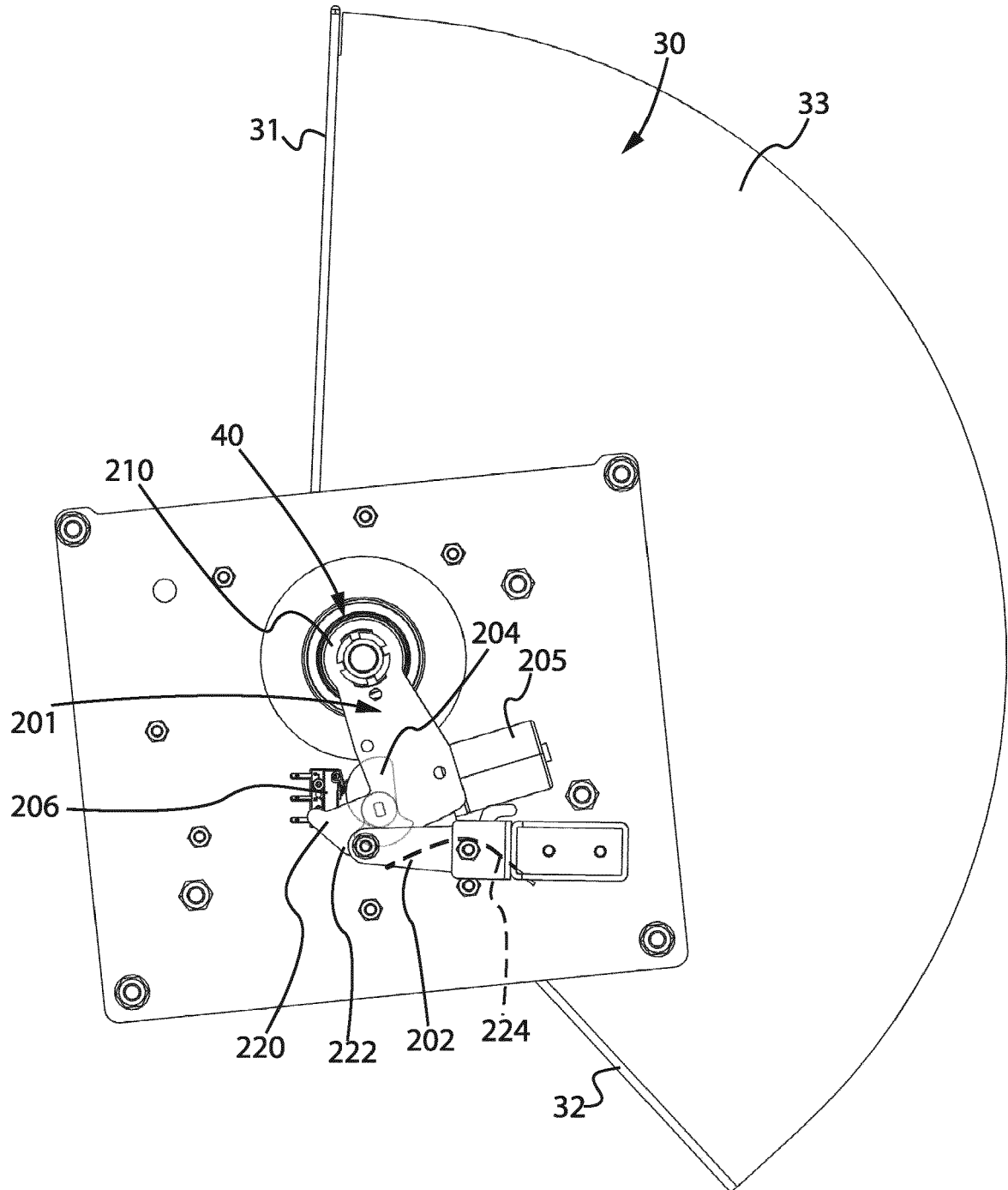
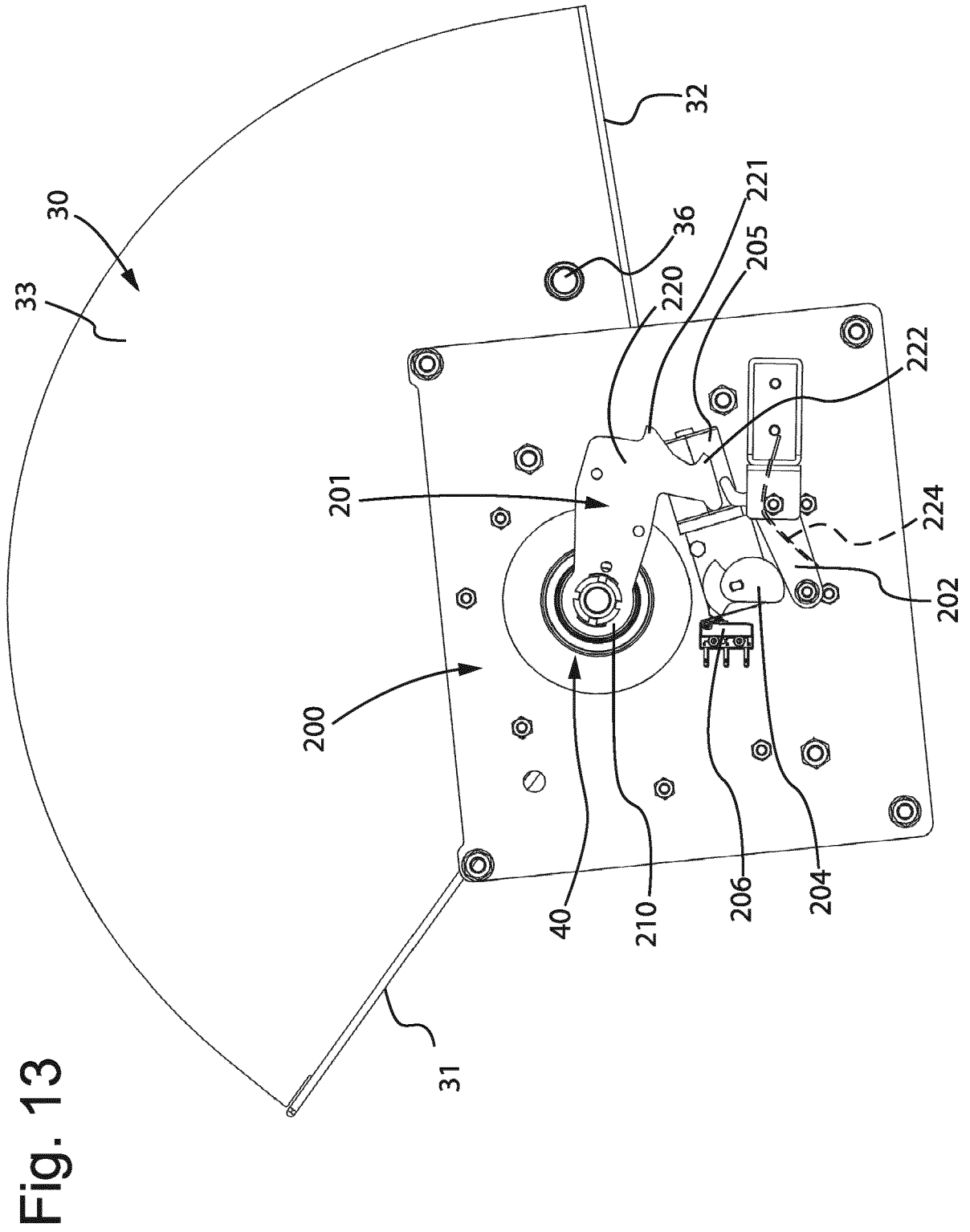


Fig. 12





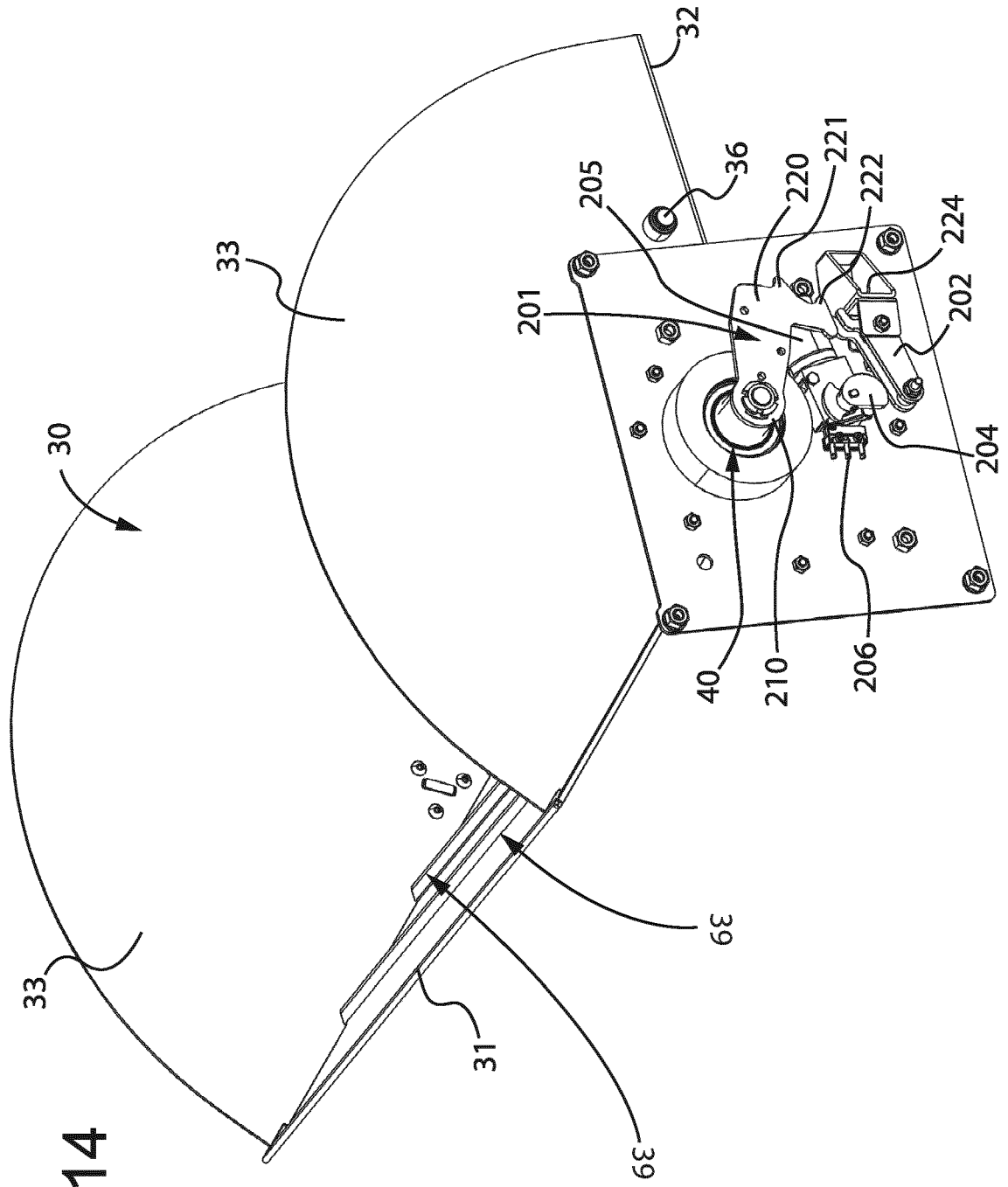


Fig. 14

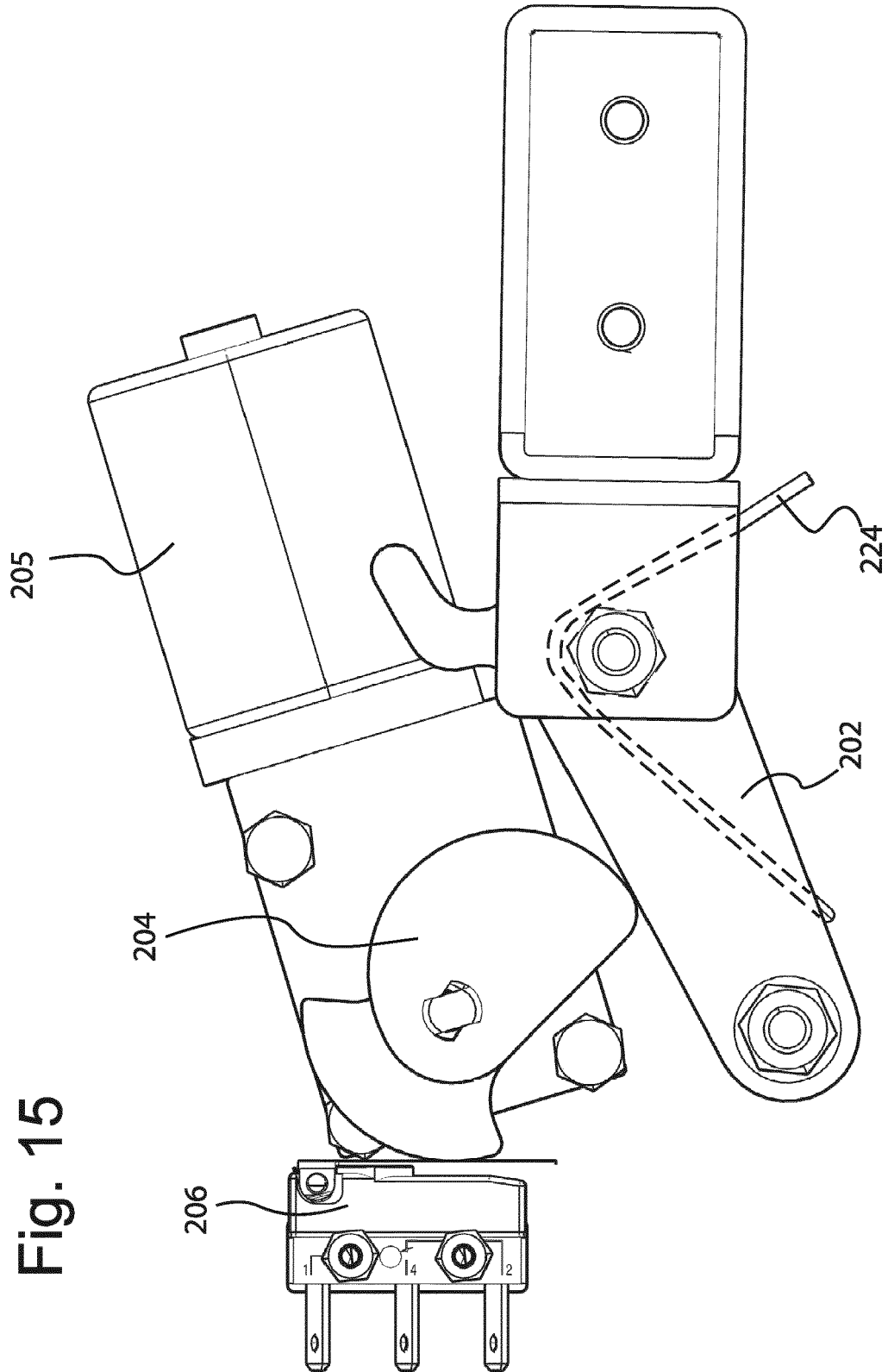


Fig. 15

Fig. 16

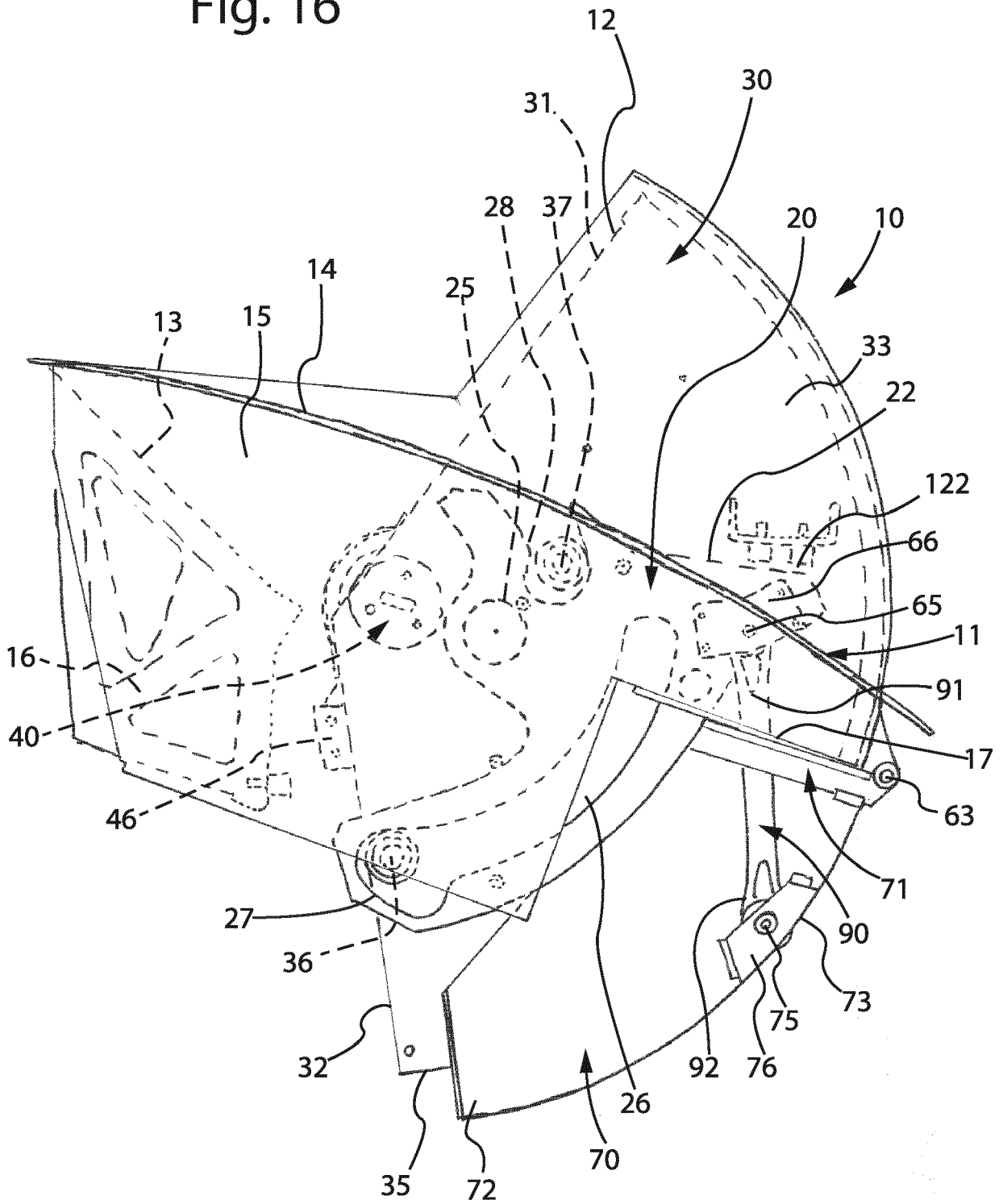
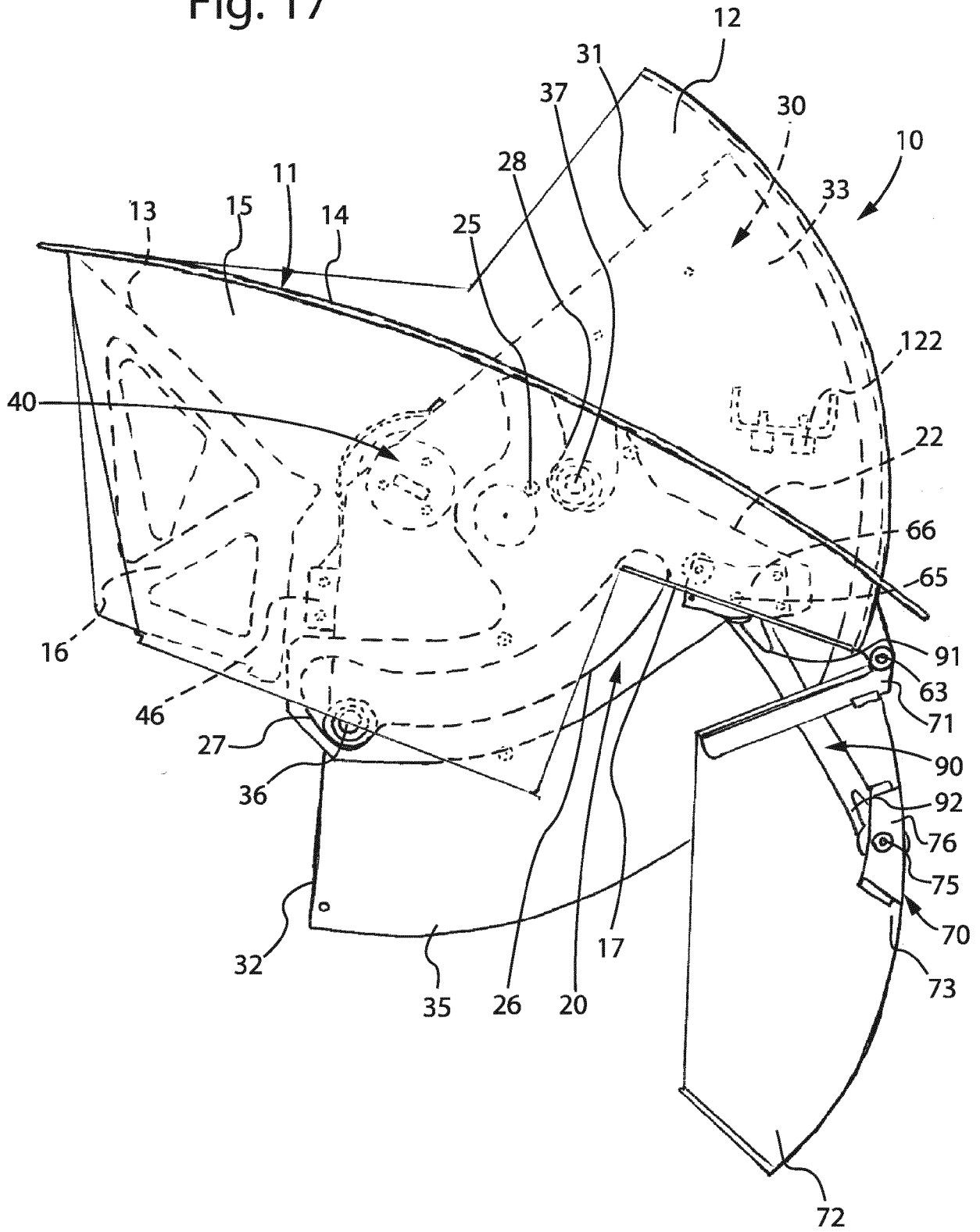


Fig. 17



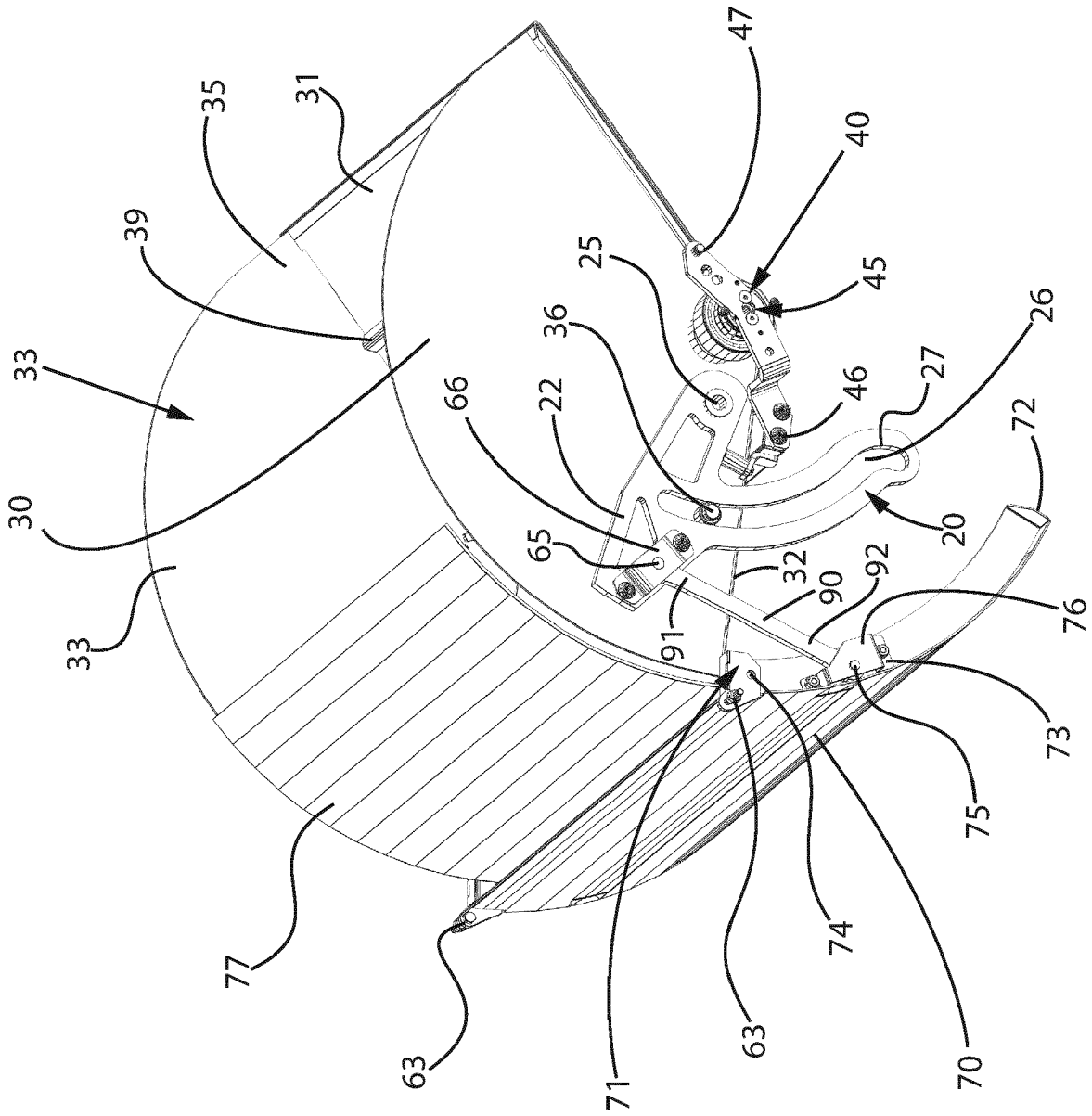


Fig. 18

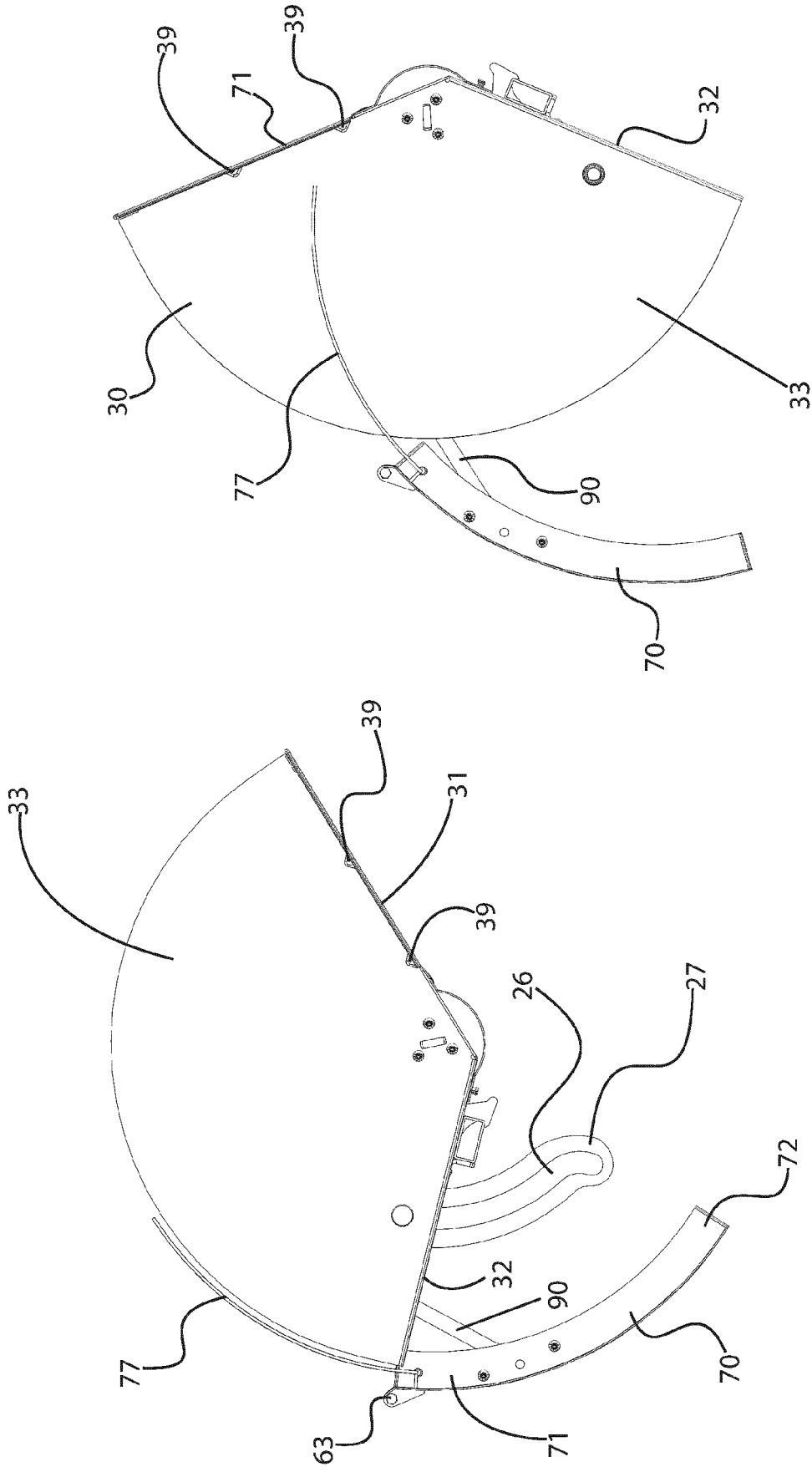


Fig. 19

Fig. 20

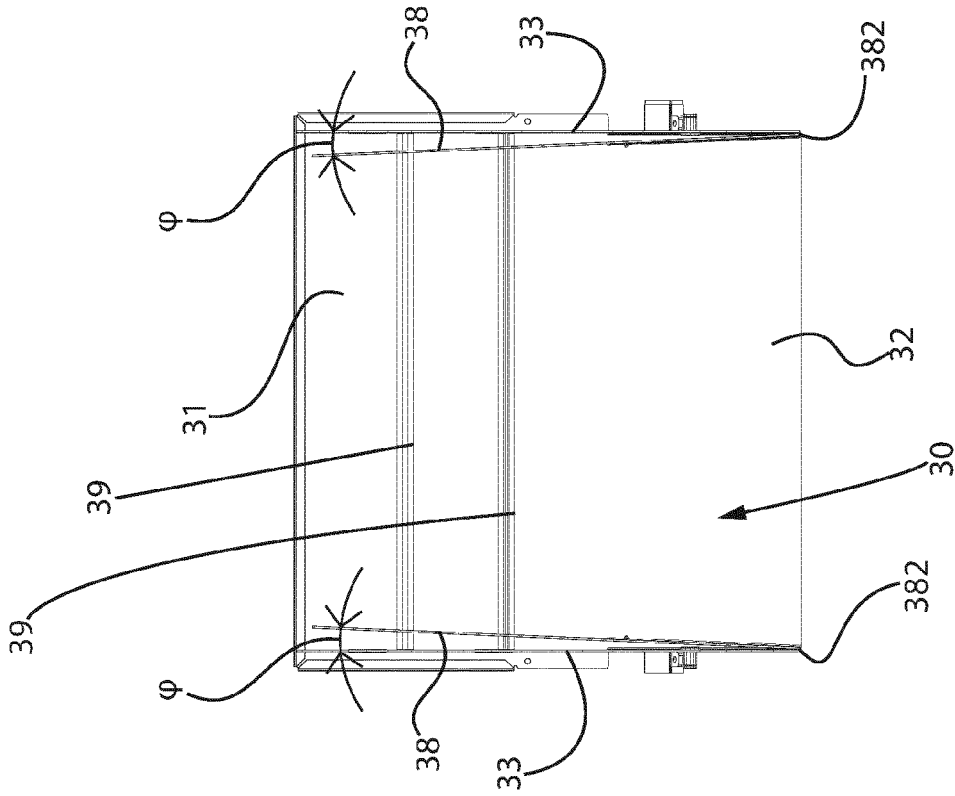


Fig. 22

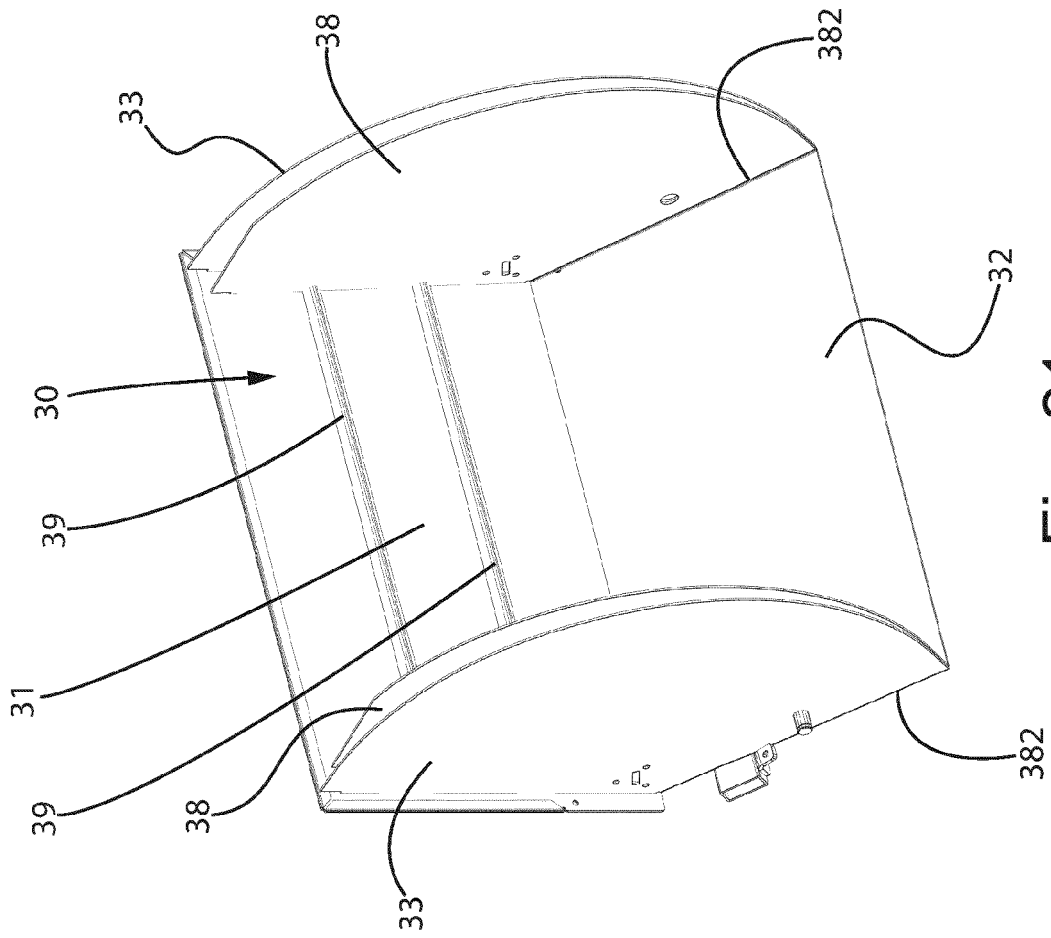


Fig. 21

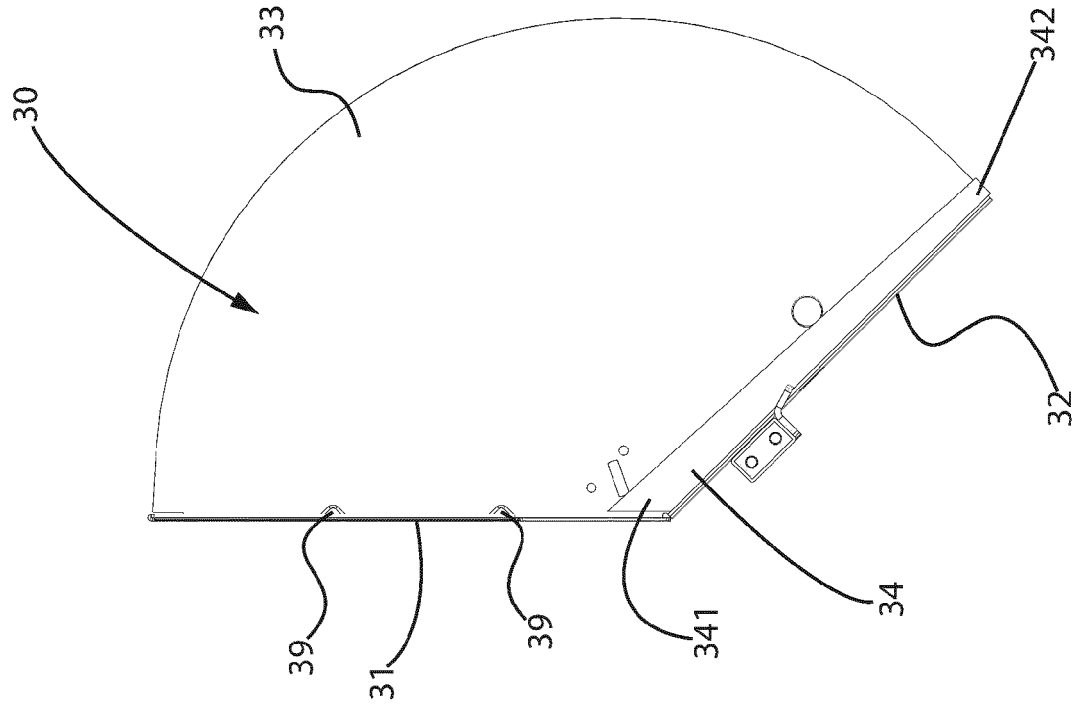


Fig. 24

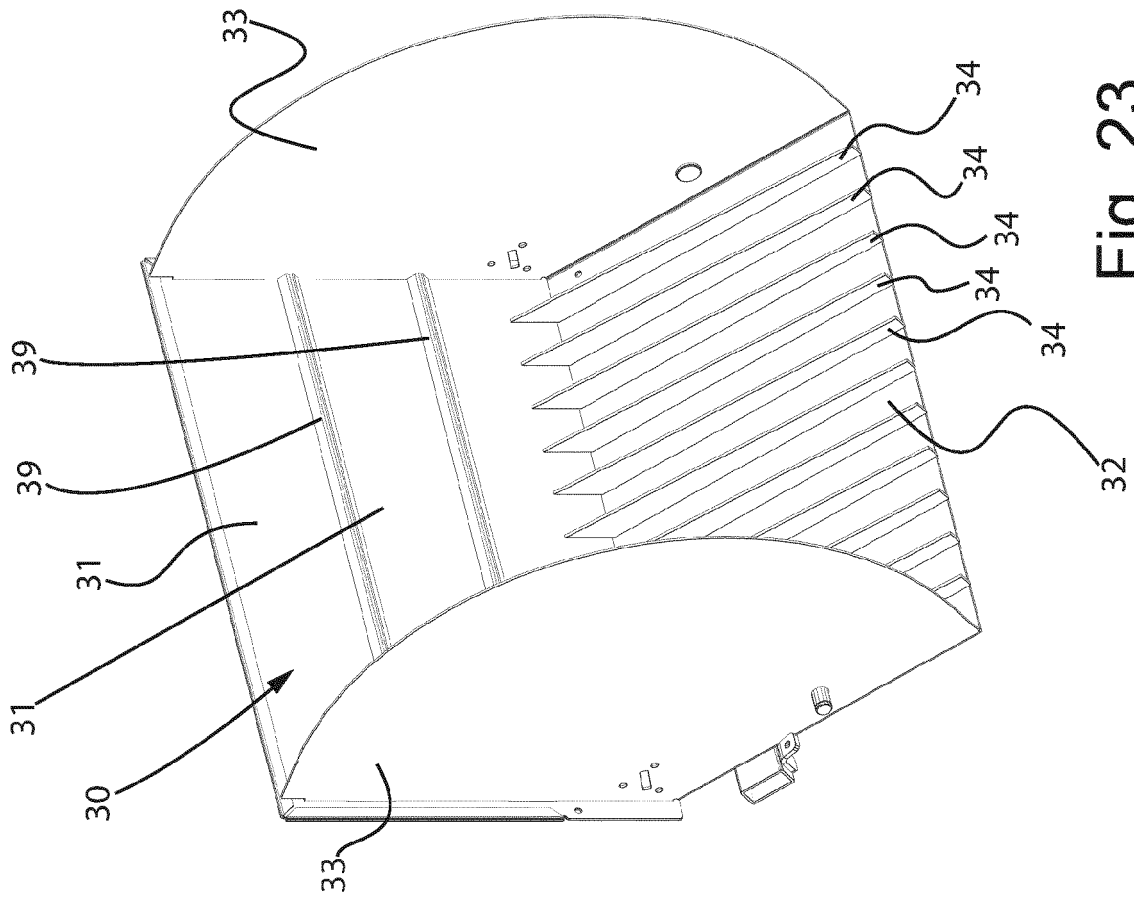


Fig. 23



EUROPEAN SEARCH REPORT

Application Number
EP 20 15 4670

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 0 893 368 A1 (SANTBRINK RONALD BAREND VAN [NL]) 27 January 1999 (1999-01-27) * column 4, line 28 - column 5, line 42; figures 1-5 *	1-16	INV. B65F1/10 B65F1/16
Y	DE 20 2009 005010 U1 (BAUER HEINZ DIETER [DE]) 10 September 2009 (2009-09-10) * paragraph [0025] - paragraph [0026]; figures 1, 2 *	1-16	
Y	ES 2 326 012 A1 (ALBASTROS PROMOTORA EMPRESARIA [ES]) 28 September 2009 (2009-09-28) * page 4, paragraphs 1, 7; figure 5 *	8,10	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 23 June 2020	Examiner Luepke, Erik
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	

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 15 4670

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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23-06-2020

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	ES 2326012 A1	28-09-2009	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82