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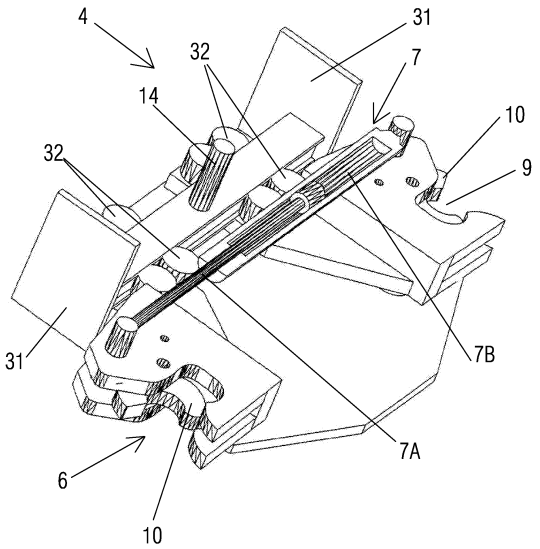
(54) DRAWBAR, AND SYSTEM FOR OPENING/CLOSING THE DOORS OF A CONTAINER WHICH CAN BE ACTUATED BY SAID DRAWBAR

(57) The invention relates to a drawbar (1) for handling waste containers, including a housing (2) that can be coupled to a vehicle and an attachment means for coupling to an element of a mechanism for operating the container doors, the attachment means including at least one assembly (4) provided with two coupling members (6) that move linearly and axially by means of a piston unit, one of the coupling members (6) being attached to the piston of the piston unit (7), and the other, opposite coupling member (6) being attached to the liner of the piston unit (7), each coupling member having a grooved portion into which the element of the mechanism associated with the container is inserted, each coupling member (6) including a retaining means that actuate when the element of the mechanism associated with the container is placed in the grooved portion.

FIG.3



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Description

OBJECT OF THE INVENTION

[0001] The purpose of the invention patent application herein is to register a drawbar and system for opening/closing the doors of a container which can be actuated by said drawbar and that incorporates significant innovations and advantages.

[0002] More specifically, the invention proposes the development of a drawbar for handling waste containers, as defined in claim 1, of the type including a housing adapted for coupling to a waste collection vehicle and an attachment means for coupling to an element of a mechanism for operating the waste container doors.

BACKGROUND OF THE INVENTION

[0003] Currently, devices are known that make it possible to handle waste collection containers located in streets and/or non-urban areas by means of a head fitted on a vehicle for waste collection, such that the time required and the personnel necessary to collect and empty the container are reduced.

[0004] One well-known type of system for collecting and handling of containers is the system that is provided with a mushroom-shaped head on the upper part, vertically movable for opening and closing the doors of the container, and which is handled by means a head connected to the collection vehicle.

[0005] However, a first drawback is the fact that this system requires a high degree of accuracy and precision for attaching the head with the movable head given the small dimensions of the head, therefore any dimensional error in the parts of the system make both automated and manual operations difficult.

[0006] Furthermore, in the case of working the system manually, the operator, if inexperienced, requires considerable time to couple both two parts of the system due to the small dimensions of the head.

[0007] Another drawback encountered in the above handling system is the fact that it requires a number of additional reinforcement elements, as when not present, due to the actual weight of the filled container and the relatively small dimensions of the head and possible dimensional imperfections, there is a considerable risk of accidentally uncoupling the head from the container relative to the head in an operating condition.

[0008] Another drawback encountered in the above handling system, is related to handling, in other words, opening the doors where the error occurs when the operator works manually, i.e. by means of remote control, this can trigger an erroneous operation due to the presence of more than one hydraulic and/or pneumatic activation.

DESCRIPTION OF THE INVENTION

[0009] This invention has been developed with the aim of providing a drawbar that resolves the abovementioned drawbacks, further providing other additional advantages that will be apparent from the description detailed hereinafter.

[0010] It is therefore an object of this invention to provide a drawbar for handling waste containers including a housing adapted for coupling to a waste collection vehicle and an attachment means for coupling to an element of a mechanism for operating the waste container doors.

[0011] More specifically, the invention is characterised in that the attachment means comprise:

> At least one assembly provided with two coupling members that move linearly and axially by means of a piston unit, one coupling member being attached to the piston of the piston unit and the other coupling member being attached to the liner of the piston unit; wherein each coupling member has a grooved portion into which the element of the mechanism associated with the container is inserted.

[0012] Each coupling member includes retaining means that actuate by automated and mechanical means when the element of the mechanism associated with the container is placed in the grooved portion.

[0013] Thanks to said features, a system to facilitate container handling in either automatic or manual operating mode is achieved, wherein the operator must direct the head to the fastening point associated with the container.

[0014] Furthermore, another advantage lies in the fact that it is safer when the container is being handled, particularly lifting and lowering, since the risk of falling is reduced as the bar of the actuating mechanism rests on the coupling members.

[0015] Unlike the systems known in the art, by means of a single hydraulic operation the system causes the coupling of the container, opening and closing of the swinging doors of the container, lifting and transporting to the emptying point and its subsequent return to the container collection site.

[0016] In a particularly preferred embodiment, the retaining means comprise a locking cam that pivots on one point of the coupling means and a ratchet associated with the locking cam, said ratchet actuating by the rotation action of the cam on contact with the element of the mechanism associated with the container.

[0017] Additionally, guide means are provided to facilitate the movement of the coupling members.

[0018] Preferably, the guide means includes an elongated guide bar on which rolling and sliding elements slide which are coupled in each of the coupling members.

[0019] Advantageously, said guide bar has grooves on the upper and lower side onto which rolling and sliding elements are coupled and slide along.

[0020] According to another aspect of the invention, the assembly includes a support body that can be attached to the housing, having a substantially "U" shape defined by two side walls, each of said side walls having grooved portions at both opposite ends which coincide in position with the grooved portion of the coupling members.

[0021] Preferably, the guide bar includes a dowel which can be coupled in an orifice made in the support body.

[0022] In a particularly preferred embodiment, the housing is comprised of a plate with a substantially "U" shape that includes at least a pair of separation walls parallel to the side fins defined in said plate, which form housings for positioning coupling assemblies.

[0023] The drawbar of the invention includes two assemblies arranged in parallel which are coupled in the housing.

[0024] Advantageously, the grooved portion of the coupling member comprises a narrowing in the outermost area that decreases in the direction towards the inside of the grooved portion.

[0025] Also advantageously, the grooved portion of the coupling member comprises a contour curved on the lower part thereof.

[0026] In yet another aspect of the invention, the housing has rotation means at the upper part thereof that can be coupled to a crane of the vehicle for rotation of the assembly relative to its vertical axis.

[0027] In a preferred embodiment, the coupling member comprises a body formed by two wings and an intermediate portion, each of the wings having a grooved portion.

[0028] It is another object of the present invention to provide a system for opening/closing the doors of a waste container, in which a container is arranged on the lower part of the doors comprising an actuating mechanism associated with the doors, characterised in that the actuating mechanism comprises a pair of movable bars that can be arranged in a horizontal plane on upper part of the container, which move when coupled by the drawbar actuating, as that described above, such that a torque or rotation is transmitted to end bars hinged in each of the two ends of the bar by linear movement, whose hinged end bars are coupled to movement means for opening and/or closing the doors of the container.

[0029] Preferably, the bars are housed inside the receiving tray that can be fitted into the container.

[0030] In particular, said receiving tray may be formed by a base and side walls, having two side walls facing each other with orifices through which said bars pass.

[0031] Additionally, the receiving tray includes means for draining rainwater, for example, a plurality of orifices placed along the edges defined by the intersection of the base with the side walls.

[0032] Other features and advantages of the drawbar which is the subject matter of this invention will become obvious from the description of a preferred, though non exclusive, embodiment, which is illustrated by means of a non-limiting example in the attached drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0033]

Figure 1.- Elevation view of an embodiment of the drawbar in accordance with the invention herein;

Figure 2.- Perspective view of an assembly that forms part of the drawbar of the invention;

Figure 3.- Detailed perspective view of the assembly wherein some parts have been omitted and the piston unit has been sectioned to facilitate comprehension;

Figure 4.- Detailed perspective view of the support body wherein the coupling members are housed;

Figure 5.- Enlarged detailed perspective view corresponding to a coupling member that forms part of the coupling member according to the invention;

Figure 6.- Detailed elevation view of the locking cam of the retaining means;

Figure 7.- Detailed elevation view of the ratchet of the retaining means;

Figure 8.- Detailed perspective view corresponding to the housing of the drawbar;

Figure 9.- Perspective view of the receiving tray mounted on a waste container, that forms part of the system for opening/closing according to the invention;

Figure 10.- Perspective view of the structure of the system for opening/closing the doors of the container;

Figure 11.- Perspective view of a partially shown container which includes the operating mechanism installed;

Figure 12.- Schematic elevated view in an operating position of the system according to the invention in an initial condition;

Figure 13.- Schematic elevated view in a second operating position of the system according to the invention;

Figures 14 and 15.- Schematic elevated views in a third and fourth operating position, respectively, and

the drawbar and actuation means mounted on the container according to the invention; and

Figure 16.- Schematic elevated view of a fifth operating position of the system according to the invention wherein the doors of the container doors are fully open;

DESCRIPTION OF A PREFERRED EMBODIMENT

[0034] As shown in the figures, an embodiment of a drawbar will be described, generally indicated by reference (1), of the type that can be coupled into the end of a crane mounted on a vehicle for loading and transporting waste for collecting containers.

[0035] Handling the drawbar (1) can be carried out in a completely automated manner wherein the operator (or driver of the vehicle) only has to give the operating command from inside the vehicle by using a computer or can work manually using a remote control, this actuation system being currently well known therefore it is not necessary to go into greater detail in the description thereof.

[0036] In particular, as seen in figures 1 and 6, the drawbar (1) comprises a housing (2) adapted for coupling to a waste collection vehicle (not shown) and an attachment means for coupling to an element of a mechanism for operating the waste container doors.

[0037] Henceforth, said element corresponds to a bar, whose arrangement and functionality will be explained later in the present embodiment.

[0038] The upper part of the housing (2) has a rotating element (3) called a rotator that can transmit a rotational movement to the housing (2) to facilitate the correct positioning and attachment of the drawbar (1) during the gripping operation to f a waste container.

[0039] The rotator is coupled to the crane arm by means of a mounting bracket (19) having a substantially Y-shape cross section (see Figure 1), which is fixed to the rotating element (3) by means of a bolting element (20).

[0040] With reference to the attachment means, they comprise a pair of assemblies (4), each provided with two coupling members (6), which can move linearly and axially by means of a piston unit (7), a coupling member being attached to a piston (7A) of the piston unit (7) and the other coupling member being attached to the liner (7B) of the piston unit.

[0041] Each coupling member (6) includes retaining means (explained hereinafter) that actuate by automated and mechanical means when the bar of the mechanism associated with the container is placed in the grooved portion.

[0042] The housing (2) is made of a metallic material and has a substantially "U" shaped profile, which includes at least one pair of housings defined by separation walls (perpendicular extensions), wherein respective assemblies (4) are fitted, as shown in Figure 8.

[0043] These separation walls are formed by a single piece in the shape of a "U" (5) that is welded in the centre of the underside of the housing (2).

[0044] Each of the abovementioned coupling members (6) is formed by a metal body which has two wings (8) facing each other and joined through one of their ends by an intermediate portion (80) that connects them.

[0045] These coupling members (6) include a number of grooved portions (9) on the edge of the free ends wherein a portion of the bar is positioned.

[0046] Each coupling member (6) further includes a locking cam (10) pivotally articulated (see figure 6) that actuates, in an operating condition of the drawbar, on the grooved portion (9) and is attached to the coupling member (6) by means of a dowel that passes through an orifice (11) made in the body of the locking cam (10).

[0047] The grooved portion (9) of the coupling member has a curved lower contour that can be adapted to the contour of the bar of the container, such that both parts can be coupled securely in a simple and practical manner.

[0048] Also, the rim of the free end of each of the fins (8) includes a narrowing (8), whose section is reduced in the direction of the grooved portion (9) which facilitates the positioning of the bar of the container inside said grooved portion (9), thus acting as a guide means.

[0049] Additionally, a ratchet (22) is provided that is associated with the locking cam (10) intended for locking said locking cam (10) when opening the swinging doors of the container.

[0050] This ratchet (22) is located above the locking cam (10), being fixed by means of a cable or the like to the housing (2), such that when members facing each other move away by the piston of piston unit actuating, the ratchet yields such that the locking cam (10) is unlocked.

[0051] The shape of this ratchet (22) is shown in Figure 7.

[0052] All these elements described above are housed in a support body (12), that are shown in greater detail in Figure 4.

[0053] Said supporting body (12) further includes two grooved portions (13) located at the two opposite ends which allow a section of the bar that forms part of the actuation means of the container for waste collection to pass through.

[0054] The supporting body (12) is fixed to the housing (2) by means of a plurality of bolts or the like.

[0055] The locking cam (10) pivots by means of a shaft supported in the through-holes (23) made in the wings facing one another and is held in an operating position (stressed) by means of an elastic spring (not shown).

[0056] Advantageously, guide means are provided to facilitate the linear movement of the coupling members (6).

[0057] In this case, such guide means comprise an elongated guide bar(30) in the form of a rail (see Figure 3) which is arranged parallel to the piston unit, whose

ends are coupled to the support body (12) by means of rectangular plates (31) and the dowel (14), in which the two coupling members (6) (a set of members) are housed. As further illustrated the members (6) have rolling means (32) that can be coupled to move along the elongated guide bar (30), in particular, they move through a pair of longitudinal grooves located on the upper and lower part of the elongated guide bar (30).

[0058] It should be noted that the elongated guide bar (30) is further fixed by using a dowel(14) which prevents the elongated guide bar (30) from bending when this is in tension, wherein the dowel further passes through the orifice (15) provided in the support body (12).

[0059] Now, in respect of the container for waste collection, it comprises a main body internally hollow with a given exterior shape and dimensions, which includes a pair of swinging doors (39) located at the bottom thereof.

[0060] The main body of the container has a housing on the top wherein a receiving tray (24) is fixed, which is traversed by the bars (16) by means of through-holes (25), wherein the receiving tray (24) is formed by a rectangular base (24A) and four side walls (24B) extending superiorly, as shown in Figures 9 and 11.

[0061] A rim (24C) formed by a fold protrudes from the top of the side walls making it easy to adjust the receiving tray (24) on the housing provided in the container to be assembled.

[0062] The main body or housing of the container has been removed from Figure 11 to facilitate comprehension of the mechanism for operating the lower doors.

The receiving tray (24) described above is provided with drainage means which facilitate the flow of water that may accumulate, for example, from rainwater.

[0063] These drainage means consist essentially of a plurality of orifices (26) formed in the intersecting edge of the base with the side walls of the receiving tray (24), as can be seen more clearly in Figure 9.

[0064] Referring to Figures 10 and 11, it can be seen how each of the doors of the container is linked to the operating mechanism by substantially vertical bars (28) which are hinged at one end on opposite edges of the door (39) at point (P1) and at the opposite end they are rotably hinged at point (P2) to bars (29) by means of a shaft (33).

[0065] Such bars (29) are located at the upper part which are coupled to a number of connecting rods (40) which, in turn, are attached to a number of cams (17) by means of a dowel (41), the bars (46) conveying the movement of the cams (17) of the operating mechanism.

[0066] It further comprises at least one pair of horizontal profiles (27) arranged transversely to the bars (29) which are fixedly secured to the receiving tray (24).

[0067] The horizontal profiles (27) have a rectangular cross section and are internally hollow, as clearly seen in Figure 10.

[0068] These horizontal profiles (27) are connected with the orifices (26) of the receiving tray (24) thereby allowing the water to pass from the receiving tray (24) outside the container to which it is mounted easily and quickly.

[0069] A system for handling containers using a drawbar as described above operates as follows:

The drawbar moves closer to a corresponding container assisted by the crane arm installed in the vehicle;

The bottom of the coupling head abuts the top surface of the base of the receiving tray positioned in the container;

The piston unit operates in such a way that the coupling members facing each other move away linearly in opposite directions such that the bars are inserted into the grooved portions provided on the coupling members, the locking cam then automatically rotating around the bar, such that the bar is fixed on the drawbar;

The drawbar is lifted by the action of the crane arm lifting and therefore the container is lifted, such that the weight of the container is largely supported by the coupling members, and wherein the bottom of drawbar no longer makes contact with the base of the receiving tray;

The container is then emptied by opening the lower doors of the container such that the piston of the piston unit retracts resulting in the two coupling members moving towards each other axially and linearly.

[0070] At this stage, the ratchet begins to actuate and locks the coupling lever, such that it prevents the bars from leaving the grooved portion in a practical and safe way without needing to use additional operating equipment.

[0071] It should be noted that at this point, the space between the bottom of the gripping clamp and the base of the receiving tray is at a maximum distance;

The locking cams are secured by the ratchet, wherein the piston continues retracting such that the swinging doors open fully;

Once the container has been emptied, the piston of the piston unit expands again, such that the bars make a linear distancing movement relative to each other, the swinging doors closing when the bars (29) move, while the ratchets are released;

The container is returned to its position on the ground such that the lower part of the drawbar comes into contact with the base of the receiving tray again;

Upon release of the ratchets, the coupling members are retracted by means of the piston unit such that the locking cam on being unlocked from the ratchet, allows the bars of each grooved portion to be separated; and

The drawbar is lifted by the crane arm to a rest position and is ready to repeat the operating cycle again for the

next container to be handled.

[0072] The details, shapes and dimensions and other accessory elements as well as the materials used in the manufacture of the drawbar of the invention may be conveniently replaced by others which are technically equivalent and do not depart from the essential nature of the invention or from the scope defined by the claims provided hereinafter.

Claims

1. A drawbar (1) for handling waste containers including a housing (2)adapted for coupling to a waste collection vehicle and an attachment means for coupling to an element of a mechanism for operating the waste container doors, on which said attachment means comprise:

   at least one assembly(4) provided with two coupling members (6) that move linearly and axially by means of a piston unit, one of the coupling members (6) being attached to the piston of the piston unit (7) and the other, opposite coupling member (6) being attached to the liner of the piston unit (7), wherein each coupling member has a grooved portion into which the element of the mechanism associated with the container is inserted, **characterised in that**, each coupling member (6) includes retaining means that actuate by automated and mechanical means when the element of the mechanism associated with the container is placed in the grooved portion, wherein said retaining means comprise a locking cam (10) that pivots on one point of the coupling member (6) and a ratchet associated with the locking cam (10), said ratchet actuating by the rotation action of the locking cam (10) on making contact with the element of the mechanism associated with the mechanism of the container, such that when operating the movement of the locking cam (10) is locked and in a second operating condition the locking cam freely pivots.

2. A drawbar (1) according to claim 1, **characterised in that** it comprises guide means for moving the coupling members.

3. A drawbar (1) according to claim 2, **characterised in that** the guide means include an elongated guide bar (30) along which rolling or sliding elements slide which are coupled in each of the coupling members (6).

4. A drawbar (1) according to claim 3, **characterised in that** the guide bar (30) has longitudinal grooves on the upper and lower side onto which rolling and sliding elements are coupled and slide along.

5. A drawbar (1) according to claim 1, **characterised in that** the assembly includes a support body (12) that can be attached to the housing (2), having a substantially "U" shape defined by two side walls and a connecting portion, each of said side walls having grooved portions (13) at both opposite ends which coincide in position with the grooved portion of the coupling members (6).

6. A drawbar (1) according to claims 3 and 5, **characterised in that** the guide bar (30) includes a dowel protruding perpendicular from this and which can be coupled in an orifice made in the support body (12).

7. A drawbar (1) according to claim 1, **characterised in that** the housing (2) is comprised of a plate with a substantially "U" shape that includes at least a pair of separation walls parallel to the side fins defined in said plate, which form housings for positioning coupling assemblies.

8. A drawbar (1) according to claim 1, **characterised in that** it has two sets (4) arranged in parallel coupled to the housing (2).

9. A drawbar (1) according to claim 1, **characterised in that** the grooved portion of the coupling member comprises a narrowing in the outermost area that decreases in the direction towards the inside of the grooved portion.

10. A drawbar (1) according to claim 1, **characterised in that** the grooved section of the coupling member (6) comprises a curved contour on the lower part thereof.

11. A drawbar (1) according to claim 1 , **characterised in that** the housing has rotation means at the upper part thereof that can be coupled to a crane of the vehicle for rotation of the assembly (4) relative to its vertical axis.

12. A drawbar (1) according to claim 1, **characterised in that** the coupling member (6) comprises a body formed by two wings (8) parallel to one another and an intermediate connecting portion (80), each wing having the corresponding grooved portion.

13. A system for opening/closing the doors of a waste container, wherein a container is arranged on the lower part of the doors which comprises operating means associated to the doors, the operating means comprising a pair of linearly movable bars that can be arranged in a horizontal plane on the upper part of the container, **characterised in that** said pair of bars (16) which move when coupled by the drawbar

actuating according to claim 1, such that a torque or rotation is transmitted to end bars hinged in each of the two ends of the bar by linear movement, whose hinged end bars are coupled to movement means for opening and/or closing the doors of the container, the bars (16) being housed inside the receiving tray that can be fitted into the container.

14. A system for opening/closing according to claim 13, **characterised in that** the moving means comprise substantially vertical bars (28) which are hinged at one end on opposite edges of the door (39) and hinged to connecting rods (40) at the opposite end joined to bars (29) located on the upper part onto which a number of cams (17) are coupled, the bars (46) transmitting a rotary movement to said cams (17) and; at least one pair of horizontal profiles (27) parallel to each other which are arranged transversely to the bars (29) which are fixedly secured to the receiving tray (24).

15. A system for opening/closing according to claim 13, **characterised in that** the receiving tray is formed by a base and side walls, having two side walls facing each other with orifices through which said bars pass.

16. A system for opening/closing according to claim 13, **characterised in that** the receiving tray comprises drainage means for the outflow of water.

17. A system for opening/closing according to claims 10 and 16 **characterised in that** the drainage means consist of a plurality of orifices placed along the edges defined by the intersection of the base with the side walls.

18. A system for opening/closing according to claim 13, **characterised in that** the linearly moving bar is connected to the hinged end bar which performs a rotational movement by means of a plate provided with two through-holes.

FIG.1

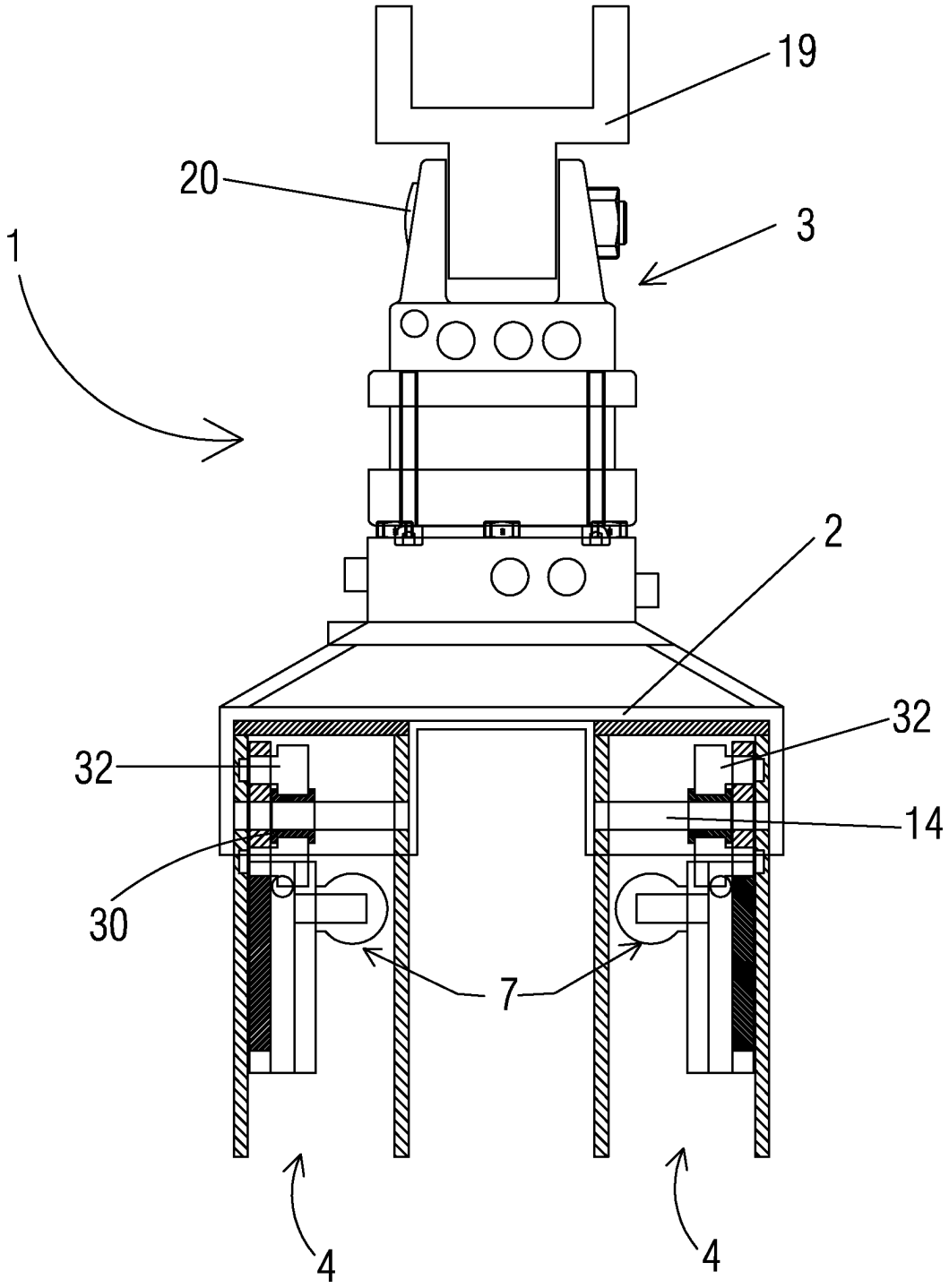


FIG.2

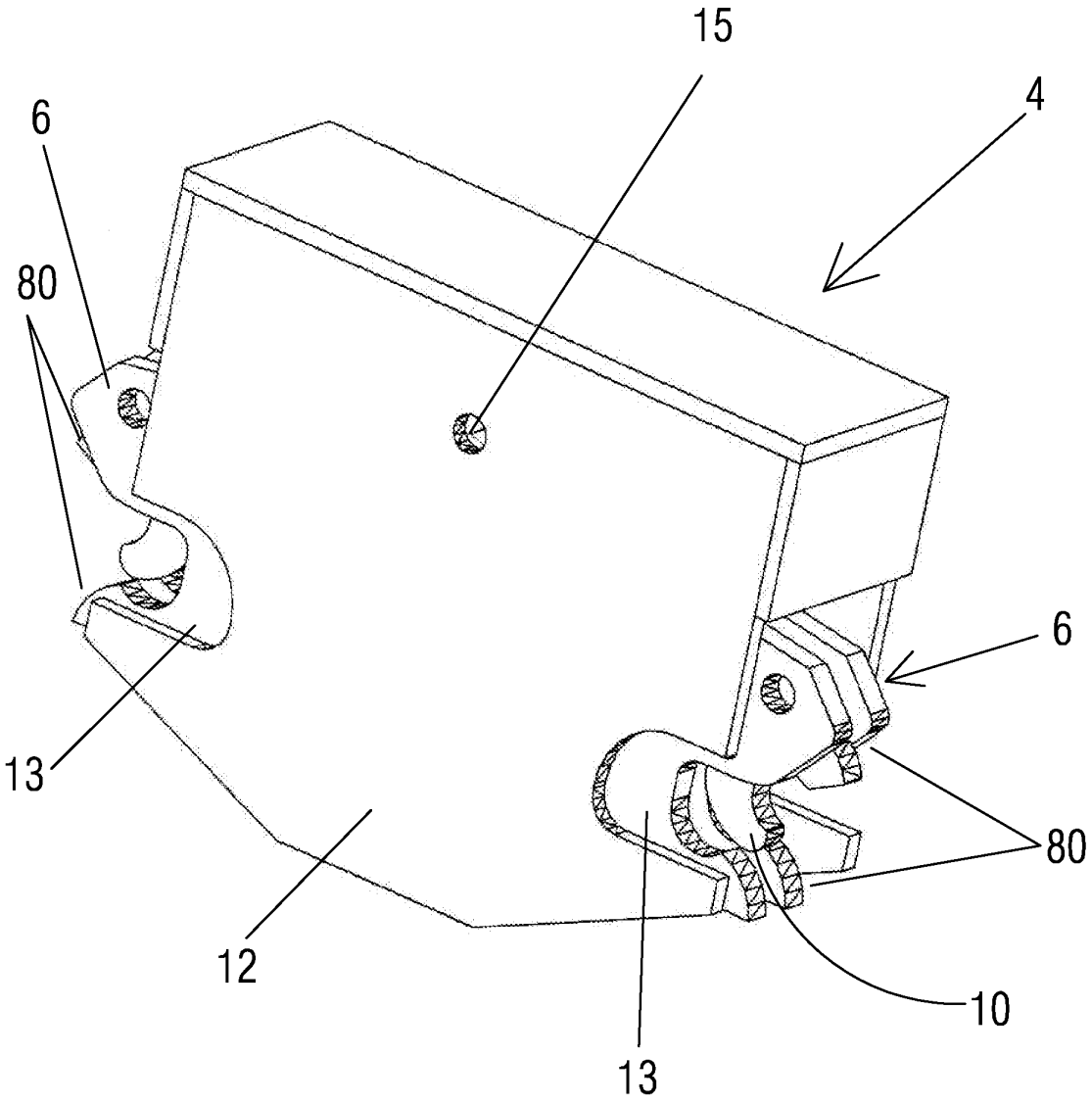


FIG.3

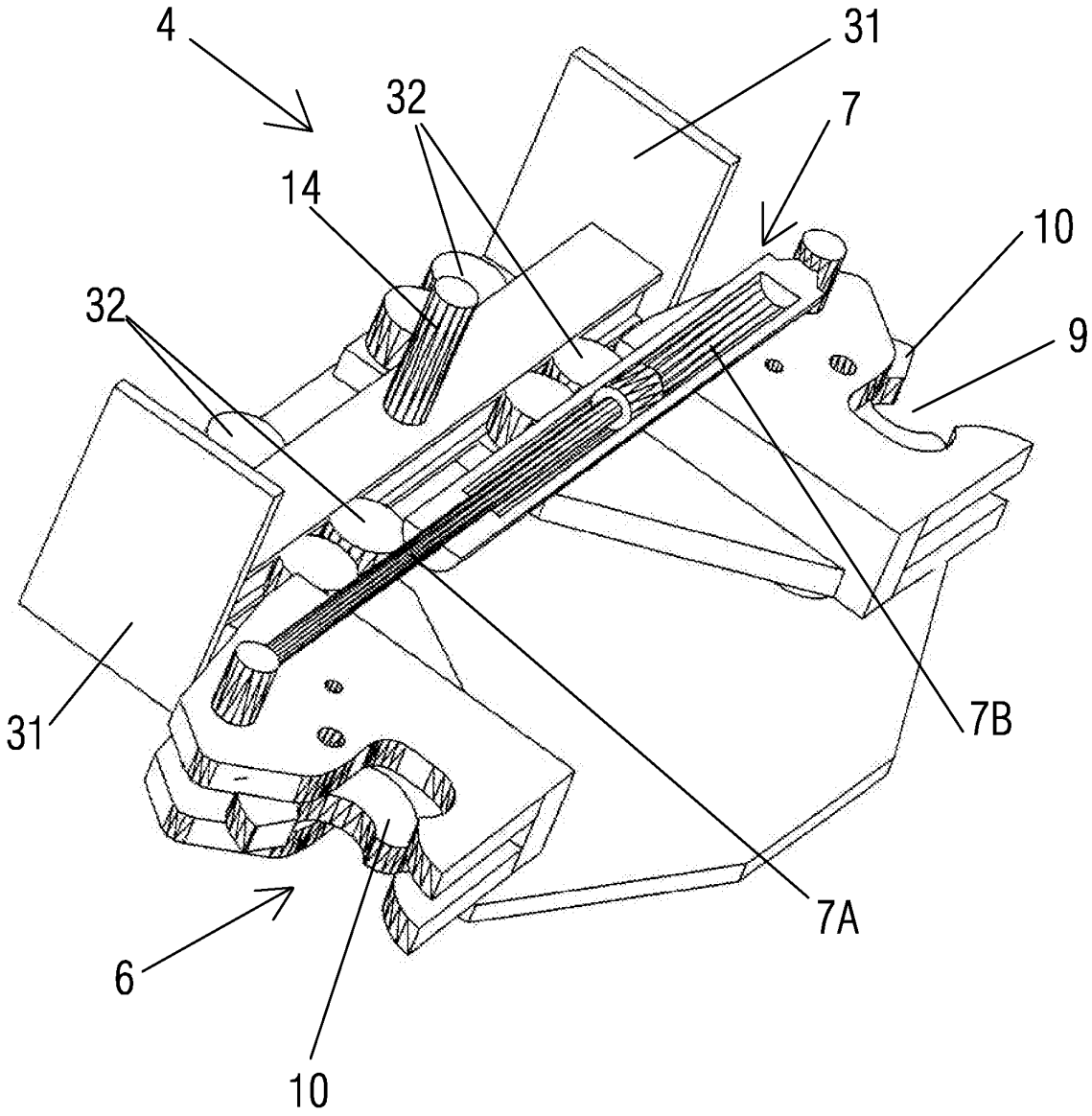


FIG.4

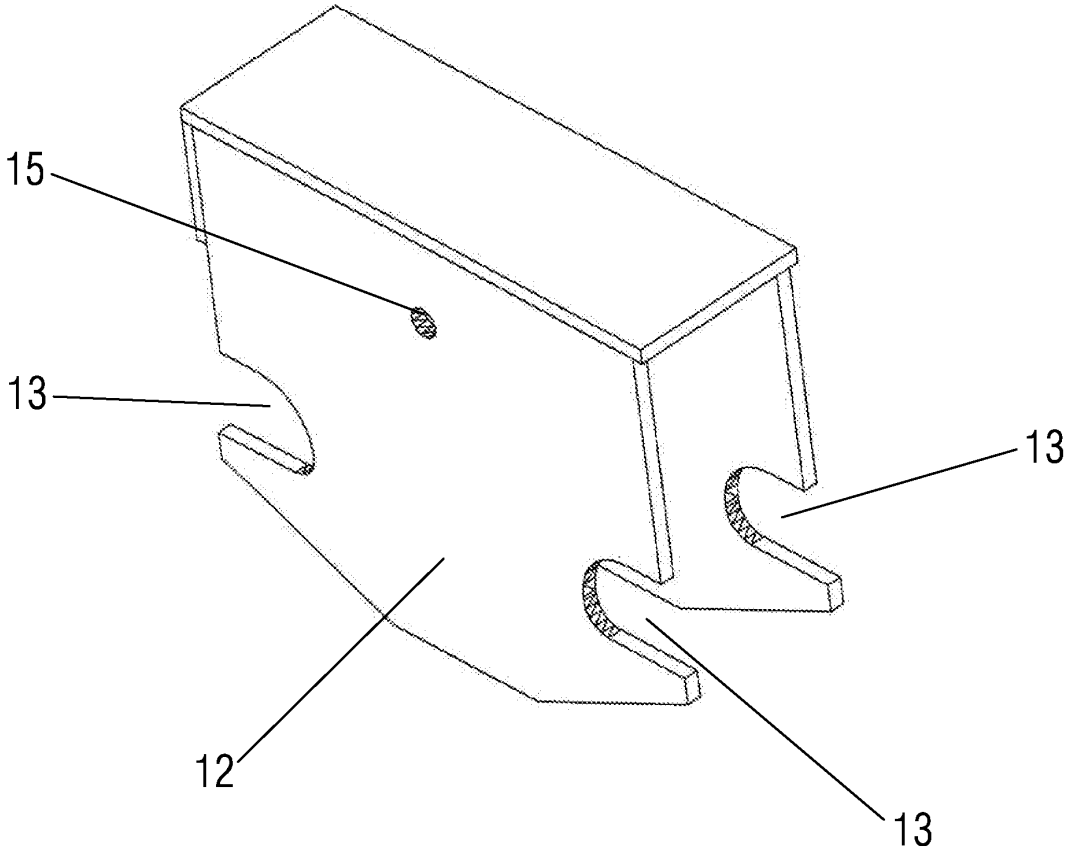


FIG.5

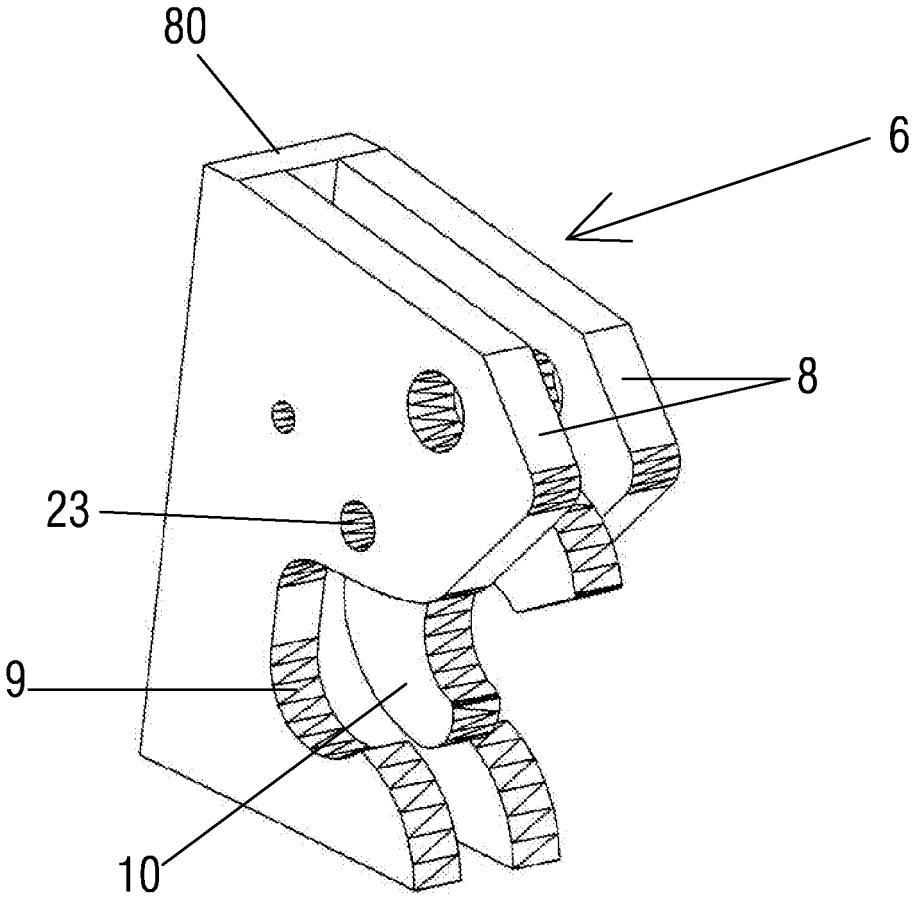


FIG.6

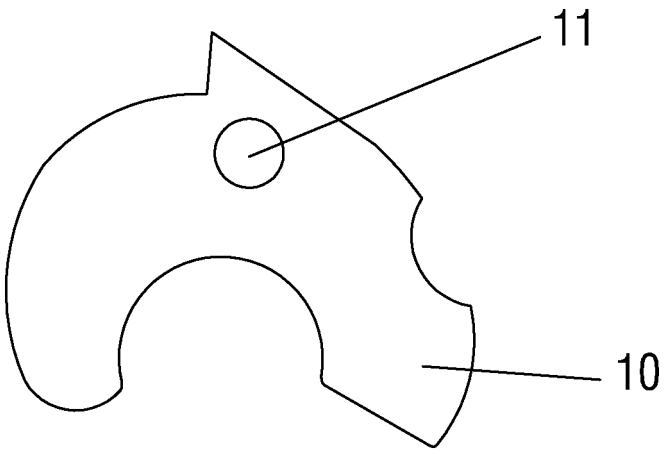


FIG.7

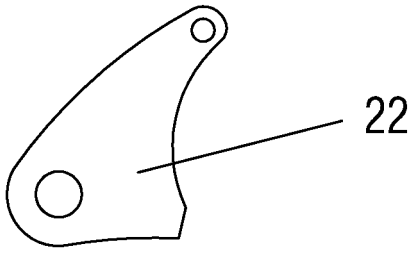


FIG.8

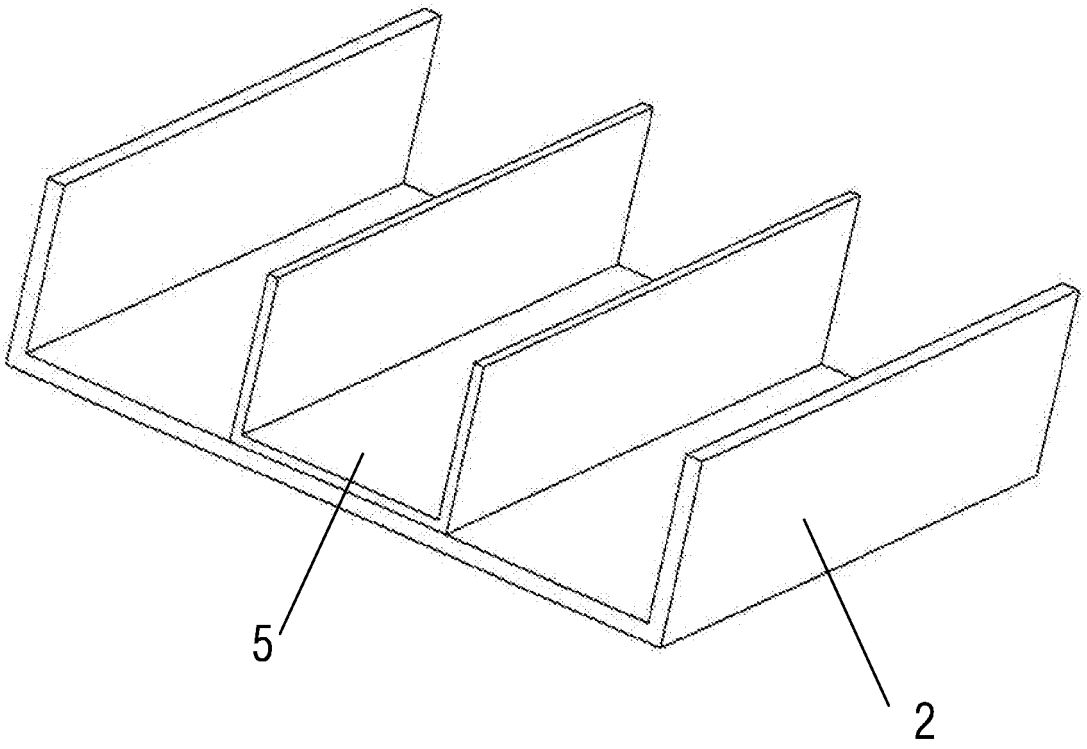


FIG.9

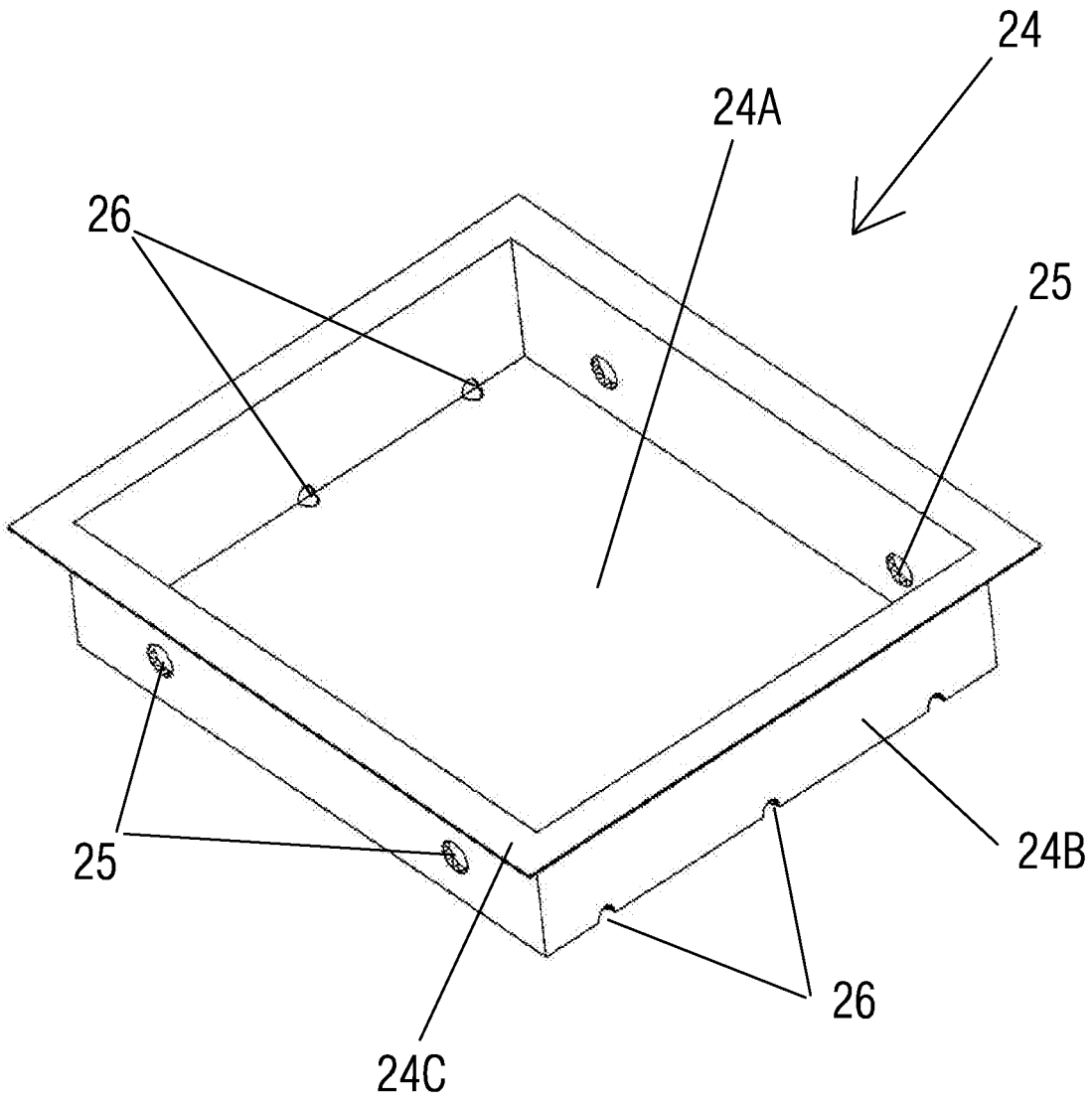


FIG.10

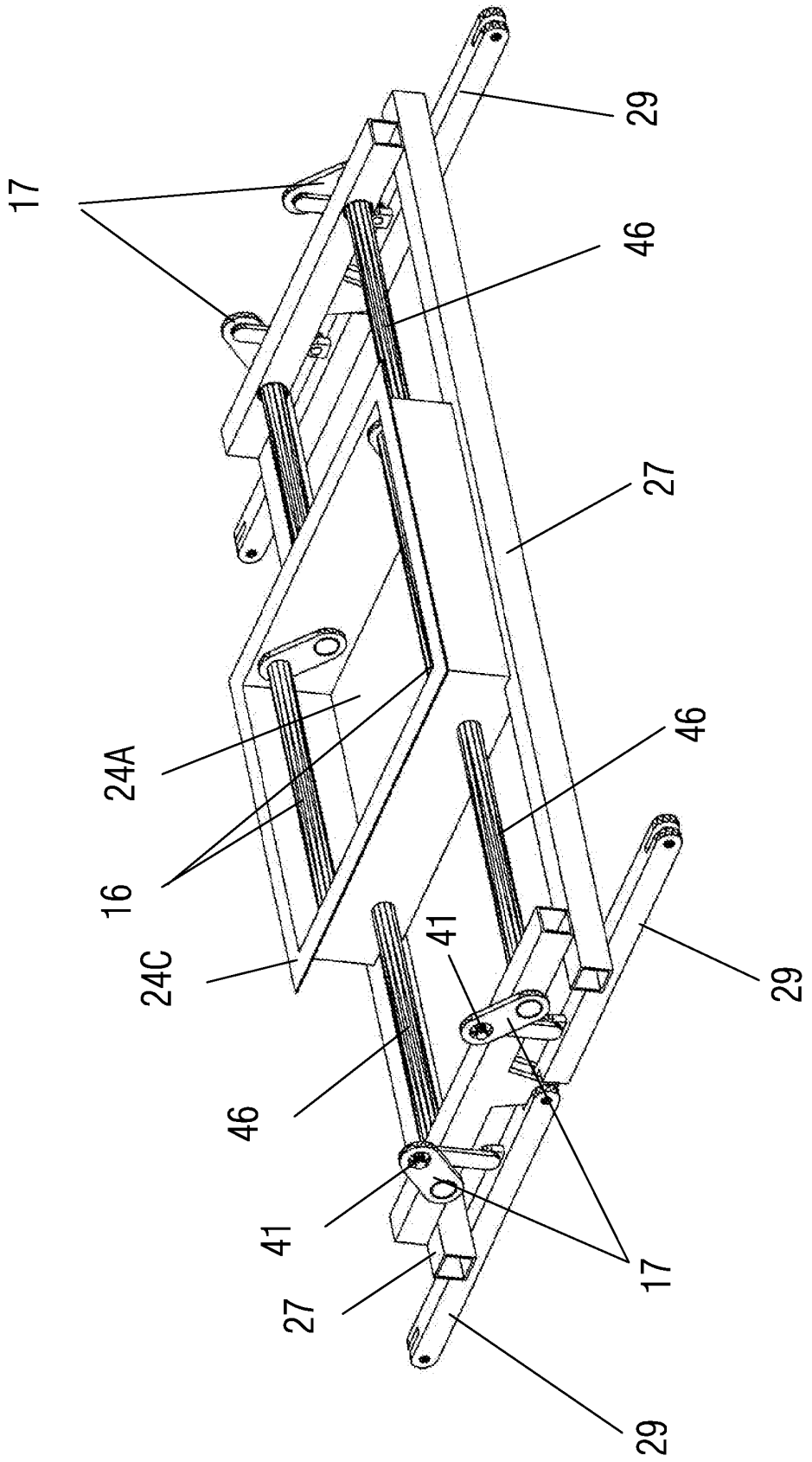
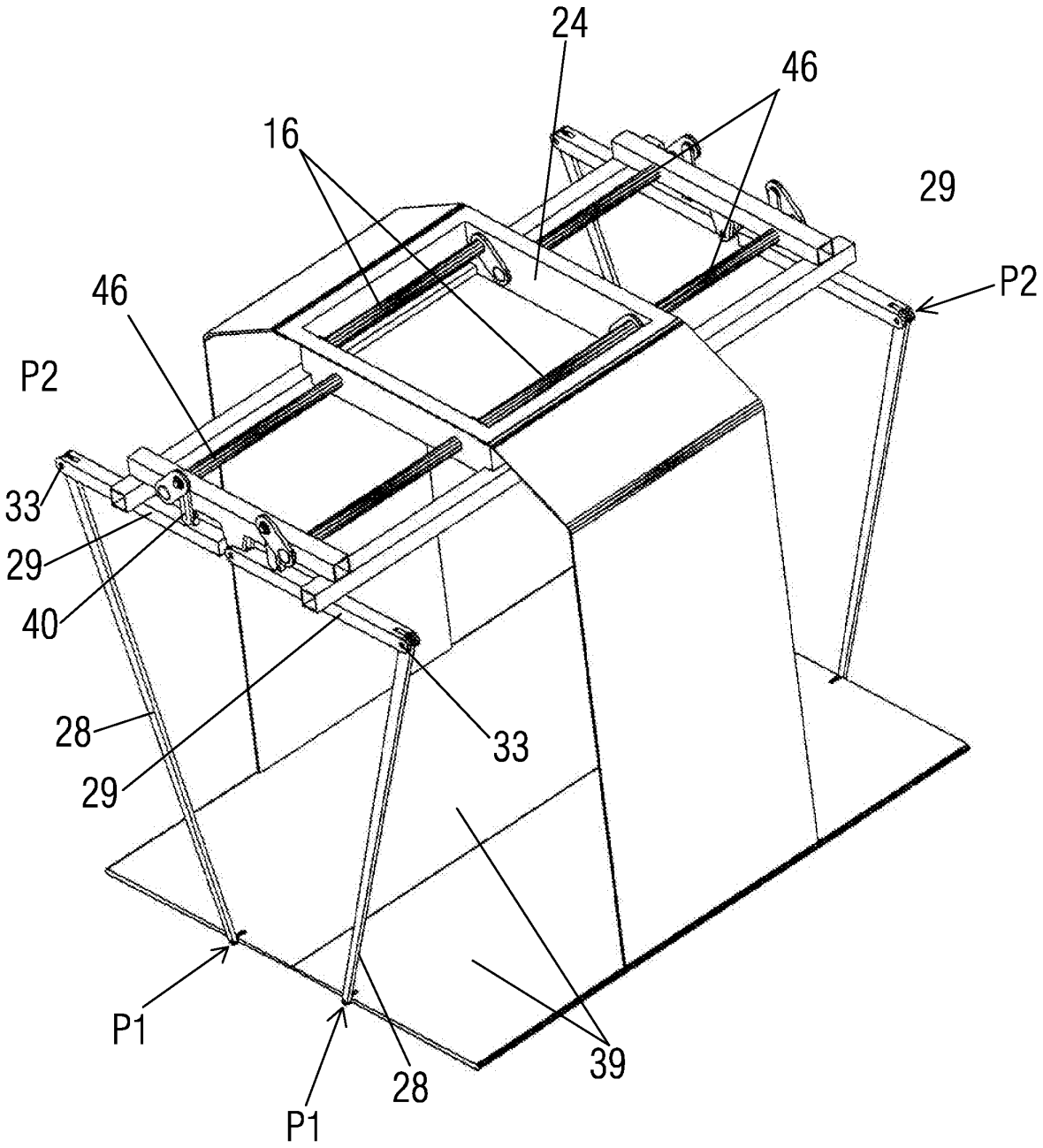


FIG.11



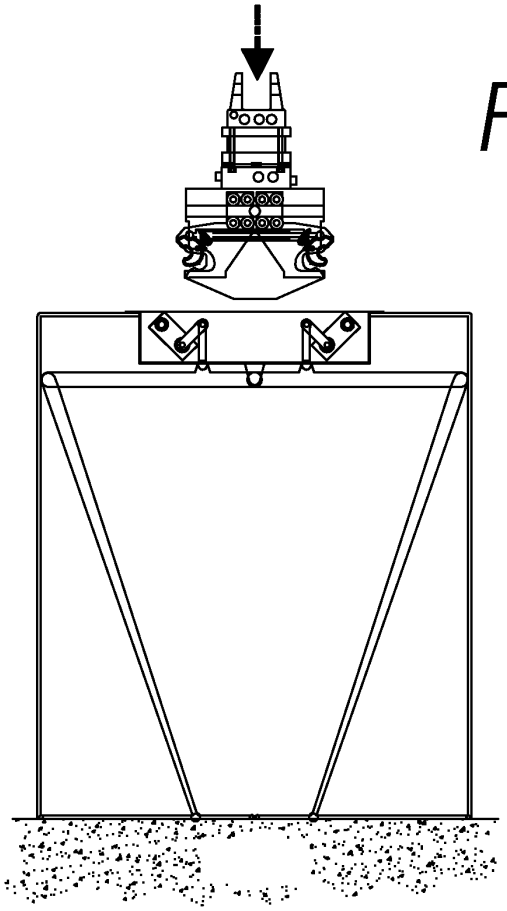


FIG.12

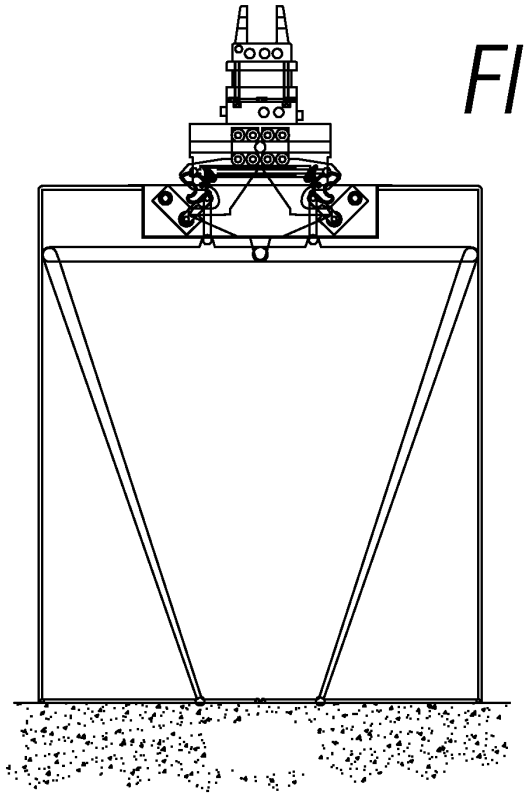


FIG.13

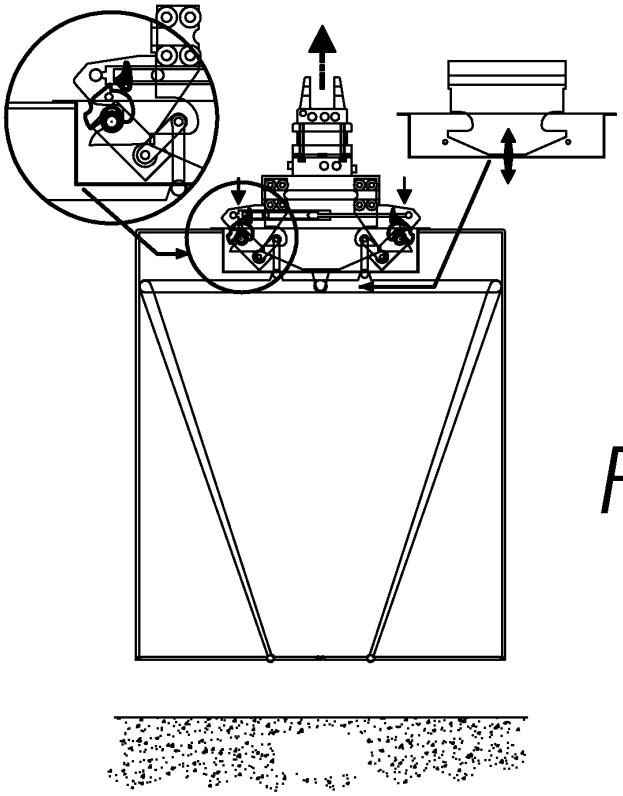


FIG.14

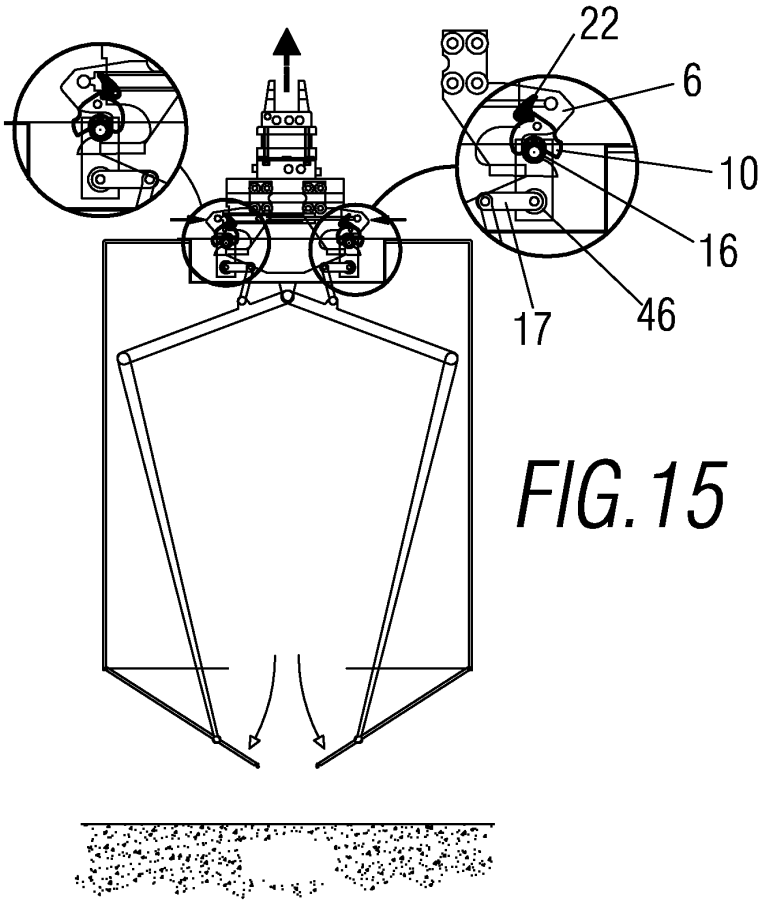


FIG.15

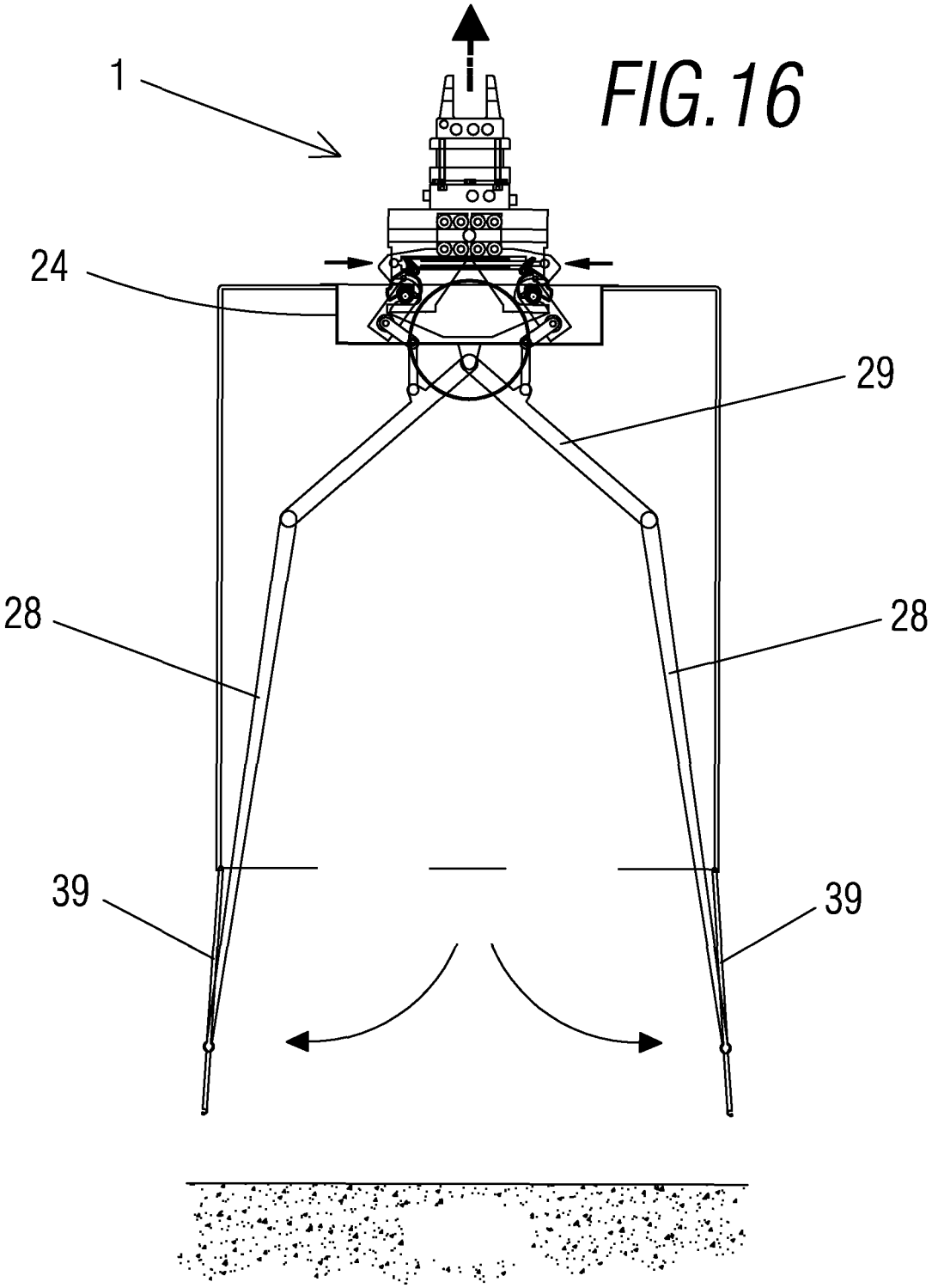


FIG.16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2012/070076

A. CLASSIFICATION OF SUBJECT MATTER

B65F1/12 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0143197 B1 (GRUMBACH HEINZ FA) 04.02.1987, column 8, line 14 – column 9, line 37; figures.	13-15
A		1-4,9-12
Y	DE 9111559 U1 (PETERS, KLAUS-TILMANN) 14.11.1991, pages 2-4; figure 1	13-15
A	DE 9418696 U1 (KINSHOFER GREIFTECHNIK) 29.02.1996, page 13, paragraphs 2,3; figure 5.	1,12
A	ES 2228704 T3 (NORD ENGINEERING DI ARMANDO LO) 16.04.2005, column 4, line 42 - column 12, line 14; figures.	1,13
A	FR 2929933 A1 (ROUSSEL HENRI PIERRE) 16.10.2009, abstract; figures 2,4,5.	1,13

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"O" document referring to an oral disclosure use, exhibition, or other means.
"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents , such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31/05/2012	**(05/06/2012)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer F. Riesco Ruiz Telephone No. 91 3496869

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2012/070076

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