(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 401 742 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
26.07.2006 Bulletin 2006/30

(21) Application number: **02733739.3**

(22) Date of filing: **24.05.2002**

(51) Int Cl.:
B65F 5/00 *(2006.01)*

(86) International application number:
PCT/SE2002/000993

(87) International publication number:
WO 2002/102686 (27.12.2002 Gazette 2002/52)

(54) **INSERTION CHUTE**

EINWURFSCHACHT

GOULOTTE D'INTRODUCTION

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

(30) Priority: **20.06.2001 SE 0102249**

(43) Date of publication of application:
31.03.2004 Bulletin 2004/14

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EP 1 401 742 B1

Printed by Jouve, 75001 PARIS (FR)

Description

TECHNICAL FIELD

[0001] The present invention relates generally to vacuum operated systems for collecting and transporting refuse or waste from a number of insertion points to a central collecting station, and specifically relates to an insertion point for refuse or waste, generally known as an insertion chute.

BACKGROUND

[0002] Vacuum operated transport systems of the above mentioned general type are well known within the art of handling refuse or waste and have been in use for several years. Whereas some of said prior art systems comprise insertion points in the form of insertion chutes extending vertically through multi-storage buildings and having an insertion opening associated with each story, others comprise so called "separate" insertion chutes normally being positioned outdoors and having one insertion opening - or in some cases several adjacent insertion openings - positioned at a convenient height for inserting waste therein standing on the ground.

[0003] Our earlier U.S. Patent 5,004,377 and International Patent Application WO 97/11013 are both directed to the latter type of "separate" insertion chute, and both provide solutions to the problem of allowing access to a chute discharge valve and its operating means from above the ground level. In accordance with said prior art, said problem is basically solved by dividing the chute into an upper and a lower chute portion, respectively, and by attaching the operating means to the upper chute portion and the valve to the lower chute portion. By providing a releasable connection between the upper and lower chute portions as well as between the operating means and the chute valve - more specifically in a transmission therebetween - and by positioning the releasable connections just above ground level, the upper chute portion with the operating means may be conveniently removed from the lower chute portion. Maintenance and repair work may then be performed at the operating means. Here, the releasable connection between the upper and lower chute portions - as well as a lead-through for the transmission between the operating means and the valve - likewise forms a seal against the subatmospheric suction conveying environment.

[0004] Recently, the latter type of refuse transport system having the "separate" type of insertion chute has become more and more frequently used, both in the traditional outdoor application as well as in the basement or on the first or ground floor of a building or building complex, such as shopping mauls, sports arenas etc. With this increased interest in the "separate" type of insertion chute and the extended field of application has followed a demand for greater flexibility of the general design of the upper chute portion as well as specifically to the length of the lower chute portion. With regard to the upper chute portion, the required flexibility concerns both the aesthetical appearance of the visible portion of the chute and the practical design thereof. In the latter case, it may for instance be a question of providing possibilities for having several insertion openings for receiving different fractions and yet maintaining a relatively slender design. The flexibility of the lower chute portion is mainly concerned with the possibility of varying the storage capacity of the chute, but also involves the capacity to modify the length of the lower chute portion. This may be required to properly connect the chute to a transport pipe laid down at a specific depth in the ground.

[0005] The prior art solutions do not take into account such considerations as the aesthetical appearance or the varying need for storage capacity. In effect, the basic design solution of said prior art chutes makes it quite impossible to provide such flexibility. Thus, due to the positioning of the valve operating means on the upper chute portion, this will inevitably be relatively bulky. As for the lower chute portion, an extension of the length thereof will soon require an unacceptably long transmission between the operating means on the upper chute portion and the chute valve that must be positioned at the free end of the lower chute portion.

[0006] Accordingly, there is a need within this art for an insertion chute of the separate type having an extended flexibility both with regard to an upper chute portion and to a lower chute portion thereof.

SUMMARY

[0007] The invention overcomes the above problems in an efficient and satisfactory manner.

[0008] It is a general object of the invention to provide a solution to the problem of providing a great degree of flexibility for an insertion chute of the separate type. In particular, it is an object of the invention to provide an insertion chute offering such flexibility both with regard to an upper, normally visible chute portion and to a lower chute portion that is normally hidden and that may be used as an expanded temporary storage space.

[0009] Briefly, the above object is achieved by making the upper chute portion at least essentially independent of the chute valve and its operation. Specifically, this is accomplished by directly or indirectly attaching not only the chute valve but also the valve operating means exclusively to the lower chute portion. Accordingly, the invention provides an insertion chute where the upper chute portion may be designed so that it is totally independent of any restrictions set by the chute valve and its operation. At the same time the length of the lower chute portion and accordingly its storage capacity may be varied within reasonable limits without requiring any unacceptable modification to either the operating means or to the chute valve.

[0010] In an embodiment of the invention, the valve operating means controls the chute valve through a

transmission that is likewise supported exclusively by the lower chute portion. Thereby, the transmission need not be affected by any variation of the length of the lower chute portion either. In applications where the length of the lower chute portion is modified it will therefore be optional whether the length of the transmission is changed accordingly or the operating means is moved.

[0011] In another embodiment of the invention, the valve operating means is positioned in a suction conveying environment. This means that no specific sealing arrangements will have to be made for the operating means or - where appropriate - for the transmission, thereby reducing the overall production costs.

[0012] In a further embodiment the operating means is a hydraulic cylinder that is connected to the valve through a linkage serving as the transmission. In accordance with the invention, the linkage is configured such that a piston rod of the hydraulic cylinder is in a retracted position when the chute valve is closed. This greatly reduces the risk of waste being conveyed in the pipe disturbing the operation of the valve operating means.

[0013] In a further embodiment, the valve is operated by an electric motor connected to the valve through a gearing. This provides a very compact valve arrangement that adds even more to the flexibility of the lower chute portion.

[0014] In accordance with yet another embodiment of the invention at least one air inlet channel is provided in association with a central waste feeding channel, said air supply channel/channels serving to supply air essentially at atmospheric pressure during an emptying phase of the chute. Such additional supply of air in the area of the discharge valve will add to the flexibility of the upper chute portion by securing appropriate emptying of the collected refuse even in a case where increased amounts of refuse or refuse/waste of different kinds must be handled. As an example, this allows designing the upper chute portion so that it has several insertion openings for different fractions of waste.

[0015] The air inlet channel/channels are preferably provided at the outer periphery of the lower chute portion, at least partly surrounding the latter, and are in communication with the air outside the upper chute portion through an interface between the upper and lower chute portions and with the branching. Thereby they will communicate with the subatmospheric pressure of the refuse conveying pipe through the operation of the discharge valve. With such a presently preferred configuration of the additional air supply, the dimensions of the lower chute portion can be maintained relatively compact.

[0016] In yet another embodiment of the invention the basic configuration of the chute is such that the lower chute portion is releasably connected to the branching, in order to allow removal of said lower chute portion therefrom for inspection, maintenance and repair. However, in a further embodiment the serviceability is improved even more by providing an access opening allowing inspection of and/or access to the interior of the branching and thus at least to the valve operating means and the transmission. The inspection/access opening is suitably positioned in an interface connecting the upper and lower chute portions as well as the branching, and is provided with a removable cover that in the closed condition provides a gas-tight sealing of the opening. Furthermore, especially in cases where the upper chute portion does not enclose the access opening and its cover a protective interface section with an opening hatch may be provided. Said protective interface section stops rain, sand and dirt from entering the interface. The opening hatch permits access to the access opening and is preferably lockable to stop tampering or vandalism.

[0017] Another object of the invention is to provide an improved method of increasing the flexibility in the design or configuration of waste insertion chutes of the separate type.

[0018] These and further objects of the invention are met by the invention as defined in the appended patent claims.

[0019] Advantages offered by the present invention, in addition to those described above, will be readily appreciated upon reading the below detailed description of embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The invention, together with further objects and advantages thereof, may best be understood by making reference to the following description taken together with the accompanying drawings, in which:

Fig. 1	is a very schematic illustration of a vacuum refuse conveying system of the general type where the invention may be employed;
Fig. 2A	is a partially sectioned side view of a first embodiment of the insertion chute of the invention;
Fig. 2B	is a view corresponding to that of fig. 2A, but with part of a mounting bracket removed to expose a transmission linkage;
Fig. 2C	is a view similar to that of fig. 2A illustrating a chute valve of the insertion chute in its closed position;
Figs. 3A-C	illustrate details of the interface between the upper and lower chute portions as well as the branching of the insertion chute illustrated in fig. 2A;
Fig. 4A	is a partial side view of the upper parts of the branching and of the lower chute portion illustrating a protective interface section of the interface for the insertion chute

illustrated in fig. 2A;

Fig. 4B is a plan view from above of the interface illustrated in fig. 4A;

Fig. 4C illustrates an alternative embodiment of the protective interface section in a view corresponding to that of fig. 4A;

Fig. 5 is a partially sectioned side view illustrating the valve and valve operating means of a second embodiment of the insertion chute of the invention;

Fig. 6A illustrates a third embodiment of the insertion chute of the invention, in a view corresponding to that of fig. 2A;

Fig. 6B is a partial view of the lower chute portion of the insertion chute illustrated in fig. 6A, seen from the right side of fig. 6A;

Fig. 6C is an end view from above of the lower chute portion of the third embodiment of fig. 6A; and

Figs. 7A-B illustrate a superstructure attached to the branching of the insertion chute of the invention.

DETAILED DESCRIPTION OF EMBODIMENTS

[0021] With reference primarily to figs. 1 and 2A-2C the basic principles of the insertion chute of the invention shall now be described by means of a first embodiment illustrated in these figures. At the same time, the differences in comparison with conventional insertion chutes of the separate type will be explained.

[0022] Fig. 1 is a schematical illustration of a vacuum operated refuse collection system 20 of the general kind where the separate insertion chute 1, 1' of the invention may advantageously be employed. Such a system 20 may include both the separate type of insertion chute 1, 1' of the present invention and the type of multi-story insertion chute 26 that is illustrated in the multi-story building 21, such as a residential building, a hospital or an office. Said last mentioned chute 26 normally extends through all stories of the building 21 and has a closable insertion opening 27 on each story, through which refuse or waste may be inserted. It is furthermore provided with an air inlet 30 adjacent the upper end thereof. At its lower end, the chute is connected to an underground transport pipe 2 through a discharge valve 28. Refuse that is introduced into the transport pipe 2 by opening the discharge valve 28 is conveyed by means of subatmospheric pressure through the transport pipe 2 and into a container 24 that is normally arranged in a collecting central 23 that also contains the necessary equipment 25 for generating the subatmospheric pressure, for filtering the air etc. Finally, the filtered air is discharged through an air outlet 29. Conventionally, the collected refuse or waste is transported from the central 23 by means of special trucks, not illustrated.

[0023] In one and the same system 20, separate insertion chutes 1, 1' may be connected to the same transport pipe 2 as the discussed multi-storage chutes 26 or to separate branches thereof, not illustrated. Said separate insertion chutes may be employed in different applications, of which two are illustrated in fig. 1, namely as a free standing chute 1, 1' positioned outdoors and likewise being connected to the underground transport pipe 2, and as a likewise free standing chute 1', 1' being positioned for instance on the ground floor of a larger public building complex 22, such as a maul, a sports arena etc. In the illustrated example, a branch 2' of the transport pipe is in this case laid in the basement of the building complex 22, said branch having a separate air inlet generally indicated at 31. In this case, the separate insertion chutes 1, 1' are extended through the floor F of the ground floor and directly connected to the branch 2' in the basement, so that no excavation work will be required therefore. Fig. 1 also illustrates that the separate insertion chutes may be "stripped", chute 1', or designed, chute 1, for aesthetical or other reasons.

[0024] A first embodiment of the separate insertion chute 1 of the invention will now be described with specific reference to figs. 2A, 2B and 2C, which contain detailed views of parts of an insertion chute 1 for use in the type of refuse collection system 20 illustrated in fig. 1. The insertion chute 1 basically consists of an upper chute portion 3 or 103, see further below, and a lower chute portion 4 that are connected to each other through an interface 8. The upper portion 3 or 103 of the insertion chute 1 is only outlined in fig. 2A, and in effect, the configuration of details thereof is not part of this invention other than indirectly. In particular, as a result of the invention the upper chute portion 3, 103 may be designed very freely, and optionally with its aesthetical appearance in mind and/or mainly for practical reasons, such as with several insertion openings 5, only one indicated, for different fractions of refuse. Therefore, said upper chute portion 3, 103 is only shown with a schematically illustrated insertion opening 5 and a likewise schematical upper refuse feeding channel 5A for connection to a corresponding lower refuse feeding channel 4A in the lower chute portion 4. To further exemplify this flexibility in design that is obtained by employing the invention, two alternative designs 3 and 103, respectively, of the upper chute portion are outlined in fig. 2A. In the first example 3, the upper chute portion is designed being very slim, so that it in effect only covers part of the interface 8 and exposes an inspection hatch 50. In the second example, the upper chute portion 103 is of a wider design covering the entire interface 8.

[0025] The upper 3, 103 and lower 4 chute portions and in particular their respective refuse feeding channels

5A and 4A are interconnected through an interface 8 that will be described further below, in association with figs. 3A-C and 4A-C. In particular, the connection between the feeding channels 5A, 4A includes a joint 8A, such as a flange type joint, between the respective refuse feeding channels 5A and 4A and optionally a fluid tight seal (not illustrated). When installed the insertion chute 1 is located with an upper end 4B of the lower chute portion 4 and the interface 8 positioned just above the level of the ground G, or alternatively, of the floor F in the embodiment of the building complex 22 of fig. 1.

[0026] The lower chute portion 4 is received in a branching 6 of a transport pipe 2, said branching 6 extending substantially perpendicular to the pipe 2. In the illustrated embodiment the branching 6 has a generally rectangular upper end 6B (see fig. 3A) that is wider than the diameter of the transport pipe 2. In particular, the lower chute portion 4 is releasably connected to the branching 6, see further below, at the upper end 4B thereof so that the lower chute portion 4 is in effect surrounded by the branching 6. At the opposite lower end 4C thereof the lower chute portion 4 is provided with a chute discharge valve 7. Said valve 7 is of the conventional flap type having a pivotal flap 7A that in a closed position CP, see fig. 2C, engages a valve seat 7B at the lower end 4C of the lower chute portion 4 and sealingly closes said lower end. The movement of the valve 7 between its open and closed positions OP and CP, respectively, is controlled by means of an operating means 9 through a transmission 10.

[0027] The lower chute portion 4 is smaller in cross section than the branching 6 and is eccentrically positioned in the branching, so that there is provided room for mounting the discharge valve 7 as well as the operating means 9 therefore and the transmission 10. The discharge valve 7, the operating means 9 therefore and the transmission 10 are all supported exclusively by the lower chute portion 4. In particular, in the illustrated embodiment they are all pivotally supported on a mounting assembly 11 that is fixed to the exterior of the lower chute portion 4. The mounting assembly 11 is preferably attached to the lower chute portion by means of screws or bolts 11A, thereby permitting easy removal of the valve and its operating means as a unit. However, within the scope of the invention the mounting assembly 11 could likewise be welded to the lower chute portion 4. Specifically, the mounting assembly 11 consists of a mounting plate 11B pivotally supporting the operating means 9 and a mounting bracket consisting of two spaced plates 11C and 11D, see fig. 6B, pivotally supporting the transmission 10.

[0028] All of the moving parts of the valve as well as of the valve operating means 9 and the transmission 10, that is the means for controlling the movement of the valve, are therefore positioned in the space between the branching 6 and the lower chute portion 4. Accordingly, they are all positioned in the refuse conveying environment of subatmospheric pressure. No specific sealed lead-through is required for transmitting movement between any of said moving parts, which not only lowers the costs but also adds to the flexibility of the upper as well as the lower chute portions 3, 103 and 4, respectively. In other words, they may both be optimally designed for their respective purposes without having to consider any sealing problems or other problems relating to the control of the valve operation.

[0029] In the illustrated embodiment, the operating means 9 is a fluid cylinder that is pivotally supported at its rear end. The transmission 10 is a linkage that is best visible in fig. 2B where one of the plates of the bracket 11C, 11B, namely the plate 11C, has been removed. The linkage 10 consists of a first angular link 10A pivotally connected at one of its ends to a piston rod 9A of the fluid cylinder 9 and at the opposite end to one end of a second straight link 10B. The first link 10A is pivotally supported in the bracket plates 11C, 11D at a position between its ends. At its other end the second link 10B is pivotally connected to one end of a third link 10C that at its other end carries the valve flap 7A and that is pivotally supported in the bracket plates 11C, 11D at a position between its ends. With the illustrated configuration of the linkage 10, the advantageous effect is achieved that the piston rod 9A of the fluid cylinder 9 is extended only during the short duration of the emptying of the associated chute 1, that is when the valve 7 is open as in figs. 2A and 2B. In other words, the piston rod is retracted into the cylinder and thereby protected from the presumably harmful refuse conveying environment of the transport pipe 2 during all other phases of the system cycles, namely when the valve 7 is closed as is illustrated in fig. 2C.

[0030] Details of the interface 8 between the upper 3 and lower 4 chute portions will now be described with reference specifically to figs. 3A-C and 4A-B. As was mentioned above, the purpose of the interface 8 is mainly to provide a sealed releasable connection between the upper and lower chute portions 3, 103 and 4 and between the lower chute portion and the branching 6. Said releasable connections are provided in order to permit removal of said upper chute portion 3 from the lower chute portion 4 and to permit lifting off the lower chute portion 4 from said branching 6. Specifically, with reference to fig. 3A-B and also to fig. 7A-B, the upper end 6B of the branching 6 is provided with an upper cover plate 42 that is hermetically connected to a part of the branching that is subjected to the refuse conveying environment of the transport pipe 2. This part of the branching 6 is specifically emphasized in fig. 3B with the thick dashed line RCE that marks the outline thereof as seen from above. The remaining part of the branching 6, as seen from above, consists of a superstructure 40, see figs. 7A-B, that is fixed to the branching 6 and that forms a space 40A that is open towards the interface and which is therefore at atmospheric pressure. This superstructure 40 and its purpose will be described further below in association with figs. 7A-B. The top cover plate 42 is provided with an aperture 42A through which the lower chute portion 4 is

introduced into the branching 6. A seal 43 (illustrated in fig. 3A, but removed in fig. 3B) surrounds the aperture 42A to provide a gas tight seal between the cover plate 42 and a mounting flange 44 provided at the upper end 4B of the lower chute portion 4, see fig. 3C.

[0031] The mounting flange 44 is secured to the top cover plate 42 by means of releasable fasteners, such as the bolts 47 indicated in fig. 3C. Furthermore, an access opening 45 is provided in the mounting flange 44, in an area thereof that in the assembled condition is positioned substantially vertically above the valve operating means 9, to provide access thereto. A cover 46 is releasably fastened to the mounting flange 44 by means of fasteners such as the illustrated bolts 48. When attached to the mounting flange 44 the cover 46 completely seals the access opening with regard to the refuse conveying environment inside the branching 6. On the other hand, when removed it permits access to at least the valve operating means 9 for less complicated maintenance and repair work from a position above the lower chute portion 4 and the branching 6.

[0032] In figs. 4A and 4B is illustrated a protective interface section 49 covering the branching top plate 42 and the mounting flange 44 with its access opening 45 and cover 46 therefore, that is the lower interface parts. The purpose of said interface section 49 is to stop water, sand and dirt from entering the area of said lower interface parts and the atmospheric pressure space 40A of the superstructure 40. The interface section 49 is therefore not required to form any hermetic or gas tight seal with either the lower interface parts or the branching. In effect, it can be attached to the upper end of the branching 6 in any appropriate releasable manner, such as bolted or clamped. The protective interface section 49 consists of a stationary part 51 and an opening hatch 50 that is pivotally mounted on the interface section 49 by means of hinges 50A, so that it may be swung open (illustrated with dash-dot lines in fig. 4A). Thereby, access is provided to the access opening 45 and its cover 46, as well as to the space 40A with its later described control equipment box 41 and to a releasable connection unit 38 for fluid lines and electric lines 39, 39' that will all be described further below in connection with figs. 7A and 7B. Instead of the illustrated pivotally opening hatch 50, another type of completely removable hatch may be provided. The hatch 50 is preferably provided with a locking means (not illustrated) that in its simplest form may be a padlock and that protects the internal parts of the interface 8 from tampering, especially in combination with the slimmer embodiment of the upper chute portion 3 that does not cover the area of the access opening 45.

[0033] In fig. 4C is illustrated an alternative embodiment of the upper protective interface section 49' that is here formed integral with the upper chute portion 3' and that is pivotally attached to the branching 6 by means of hinges 50A'. Thus, the entire unit consisting of the upper chute portion 3' and the protective interface section 49' may be swung aside as illustrated with dash-dot lines in fig. 4C. The hatch 50' is here attached by means of a kind of snap-in connection, so that it is lifted slightly at one edge and then pulled out, as is likewise indicated in fig. 4C. The upper and lower chute portions 3' and 4 respectively, may simply be pushed together since they are not required to form any specifically tight or sealed connection. The main requirement is that such a connection shall form no edges upon which refuse may gather. Naturally, the unit consisting of the upper chute portion 3' and the protective interface section 49' may also in this case be designed without the hinge 50A' so that it is simply lifted off the branching 6 when the appropriate fasteners have been loosened.

[0034] In fig. 5 is illustrated an alternative embodiment of the valve operating means. Here, a very schematically illustrated electric motor 109 is employed for operating the valve 7 between its open OP and closed CP positions. Advantageously, the electric motor 109 is in this case positioned immediately in connection with a pivot 112 upon which the valve flap is supported for its pivoting between said positions OP, CP. In a presently preferred design the valve flap would be fixed to the pivot 112 which would in turn be pivoted in a bearing, not illustrated, by the electric motor 109 through a transmission 110 consisting of a likewise very schematically illustrated gearing 110.

[0035] In the embodiment of the insertion chute 1 of the invention that is illustrated in figs. 6A, 6B and 6C, the lower chute portion 204 comprises a number of air inlet channels 15, 16 in addition to the refuse feeding channel 204A. Here, the lower chute portion 204 comprises two air inlet channels 15, 16 (see fig. 6B) that are provided on the outer periphery of the lower chute portion 204, spaced from each other around the circumference thereof and each partly surrounding the refuse feeding channel 204A. Specifically, the inlet channels 15, 16 are positioned on either side of the valve operating means 9 and its transmission 10. This positioning is mainly chosen in order to minimize the additional space required by the channels 15, 16 in the branching 6.

[0036] The air inlet channels 15, 16 extend from the upper 204B to the lower 204C end of the lower chute portion 204 and serve to supply air at atmospheric pressure to the area of the discharge valve 7. Specifically, air at atmospheric pressure is taken from inside the upper chute portion 3, 103 (see fig. 2A) through channel openings 15A, 16A in the interface 8. The channels 15, 16 exit inside the refuse feeding channel 204A of the lower chute portion 204, at the lower end 204C thereof immediately upstream of the discharge valve 7. In this manner, the air inlet channels 15, 16 communicate with the branching 6 and thereby with the suction conveying pipe 2 through the valve 7, and specifically the supply of air at atmospheric pressure to the branching 6 and thus to the conveying pipe 2 is controlled by the discharge valve 7.

[0037] In other words, the supply of additional air is associated with the opening of the valve 7 for emptying refuse that has been collected in the chute 1. Such a

supply of additional air during an emptying phase of the chute has proven to be advantageous in securing appropriate emptying of the collected refuse even in a case where increased amounts of refuse or waste of different kinds must be handled.

[0038] Although two air inlet channels 15, 16 are provided in the example, it should be emphasized that the number of channels may be varied as is appropriate for different applications, from one and upward. Likewise, the positions of said channels 15, 16 may be varied as appropriate.

[0039] The insertion chute 1 is preferably provided with a space 40A for receiving control equipment for controlling the operation of the discharge valve 7. In figs. 7A-B is therefore illustrated an embodiment of an insertion chute 1 according to the invention that comprises a superstructure 40 that accommodates a box 41 containing control equipment in a space 40A that is open at the top and is at atmospheric pressure. Said superstructure 40 and the space 40A formed therein have been specifically emphasized by means of thick dashed lines in figs. 7A and 7B. The superstructure 40 is part of the branching 6 and is specifically formed by an intermediate wall 6D of the branching - the shape of said intermediate wall 6D is clearly indicated in fig. 3B and specifically forms the required space for receiving the operating means 9, the transmission 10 and the valve 7 - outer walls 6C, 6E and 6F of the branching and a base plate 37. The base plate 37 is formed of an upper portion and a lower portion connected by an inclined portion, as is illustrated in fig. 7B. This is mainly to provide a smooth bend for supply lines 33, 34 that are introduced into the space through the lower portion of the base plate, as will be described below. The base plate 37 closes the space 40A downwardly and should be water-tight in order to prevent ground water from entering the space 40A through the lower portion of the base plate that is exposed to the surrounding ground G.

[0040] The above mentioned control equipment is not specifically illustrated in the drawings but ordinarily comprises valves for supplying and discharging fluid, normally pressurized air, to and from, respectively, the operating means 9 for the discharge valve 7. Furthermore, the equipment comprises a simple control system for regulating opening and closing of the valve 7 during an emptying phase as well as for determining the interval between such emptying phases of the chute 1 in the system. Details of such control equipment are omitted from this description and from the drawings since they are in themselves no part of the invention.

[0041] The emptying phases may be performed based on the elapsed time since the previous emptying phase or based on a sensed refuse level in the chute 1. Control signals may also be supplied through lines (not specifically illustrated) in the protective conduits 32 for electric supply lines 33 as well as for fluid lines 34 that are frequently laid along the transport pipe 2. Said conduits 32 contain the electric supply lines 33 for feeding for instance electric limit switches (not illustrated) that are normally employed for controlling the stroke of the valve 7 and the fluid supply lines 34 for feeding pressurized air to the operating means 9.

[0042] The supply conduits 32 are laid along the transport pipe 2 and enter the branching 6 through the above described lower portion of the base plate 37 adjacent one side thereof, as indicated by 6A. In said lower portion of the base plate 37 are provided releasable connections or an individual lead-through 36 for each conduit 32. Electric supply lines 33 as well as fluid supply lines 34 laid in the conduits 32 are extended further from the releasable connections 36 and into the space 40A where they connect to the control equipment box 41. The internal connections to the control equipment in the box 41 are not illustrated since they are specific to each application and are also performed in the way that is known by the man skilled in the art. The supply lines 33, 34 enter the electronic equipment box 41 through an individual sealed lead through or by means of likewise sealed connections that are generally indicated by the reference number 35. Fluid output lines and electric control lines, both generally indicated by the reference number 39, from the control equipment then exit the box 41 in an equally sealed manner for providing working fluid to the cylinder 9 and for supplying limit switches, respectively.

[0043] With the above described shape of the intermediate wall 6D the control equipment space 40A is in effect divided in two main compartments, one for receiving the control equipment box 41 and the other for connecting the protective conduits 32. Between said two main compartments is formed a narrow connection in which the supply lines 33, 34 are extended from the connections 36 to the box 41. This is best seen in fig. 3B.

[0044] There must be provided an easily accessible and releasable connection somewhere in the fluid lines and electric lines in order to permit removal of the lower chute portion 4 from the branching 6 for service and repair purposes. In the embodiment of figs. 7A-B where the superstructure 40 is fixed to the branching 6 the invention provides a specific solution consisting of a releasable connection unit 38 that is schematically illustrated in said drawing figures. Said connection unit 38 is used to make the lines 39 releasably bridge the joint between the separable upper mounting flange 44 of the lower chute portion 4 and the upper cover plate 42 of the branching 6. Specifically, the fluid output lines and electric control lines 39 exiting from the box 41 pass through the open upper side of the space 40A, see specifically fig. 3A, and are releasably connected to the connection unit 38. Continuation lines 39' of said fluid output lines and electric control lines 39 are in turn likewise releasably connected to the opposite side of the connection unit 38. From there they are passed through the mounting flange 44 of the lower chute portion 4 and down to the cylinder 9 and to the limit switches respectively. It will now be understood that by disconnecting the fluid output lines and electric control lines 39 from the continuation lines 39' thereof at

the connection unit 38, the lower chute portion 4 is free to be removed from the branching 6 once the relevant fasteners have been released. Placing the connection unit 38 in the described manner, underneath the removable or opening hatch 50 will make it easy to perform such disconnection.

[0045] Although a separate connection unit 38 has been discussed above, it should be emphasized that the essential thing is to provide an easily accessible and releasable connection in the fluid lines and electric lines between the control box and the operating means. Therefore the invention is not restricted to the use of such a specific connection unit, but comprises the use of any type of appropriate releasable connections provided in the fluid lines and electric lines respectively, so as to be easily accessible from above and to functionally effect a disconnectable bridging between the branching and the lower chute portion.

[0046] With the above described design of the superstructure 40 and its space 40A for receiving control equipment, these are accommodated exclusively in the branching. Therefore, the flexibility with regard to the design of the upper chute portion is improved even further by completely separating not only the valve with its operating means and the transmission but also the control equipment therefore from the upper chute portion.

[0047] The valve operating means 9 as well as the transmission 10 and the valve 7 have been illustrated and described herein in a practical embodiment where they are all indirectly supported by the lower chute portion 4 through the mounting assembly 11. It should be emphasized though that the invention is not restricted to such a specific mounting thereof. It falls within the scope of the invention to attach the valve operating means 9, the transmission 10 and the valve 7 separately directly to the lower chute portion.

[0048] The above description of the insertion chutes of the invention has referred solely to applications by the type of refuse collecting systems that comprise a relatively large number of insertion chutes that by means of transport pipes and branches thereto are collected in a central collecting station. Such systems are frequently called "stationary vacuum systems". It shall be emphasized though, that the insertion chutes of the invention may likewise be incorporated in the so called "mobile vacuum systems" where one or a small number of chutes are directly connected to a storage tank that is emptied by means of a "vacuum truck".

[0049] It will be understood by those skilled in the art that various modifications and changes may be made to the present invention without departure from the scope thereof, which is defined by the appended claims.

Claims

1. An insertion chute (1) for connection to a suction conveying pipe (2) of a refuse conveying system (20) and comprising separate upper and lower chute portions (3; 103; 3', 4; 204) that are releasably interconnected through an interface (8), the upper portion (3; 103; 3') of the chute having at least one insertion opening (5), the lower portion (4; 204) of the chute having a valve (7) supported thereby for controlling the communication between the insertion chute (1) and the suction conveying pipe, said valve being connected to a valve operating means (9; 109) and said lower chute portion (4; 204) being at least partially received in and surrounded by a branching (6) extending from the suction conveying pipe, whereby the valve is situated in a suction conveying environment inside the branching, **characterized in that** the valve operating means (9; 109) is likewise positioned in the refuse conveying environment inside the branching (6) and is directly or indirectly supported exclusively by the lower chute portion (4; 204).

2. The insertion chute (1) according to claim 1, **characterized in that** the valve (7) is connected to the valve operating means (9; 109) through a transmission (10; 110) that is likewise supported exclusively by the lower chute portion (4; 204).

3. The insertion chute (1) according to claim 2, wherein the valve operating means (9) is a fluid cylinder operating the valve (7) between an open (OP) and a closed (CP) position through the transmission (10), **characterized in that** the fluid cylinder (9) is connected to the valve (7) through a linkage (10) consisting of links (10A, 10B, 10C) that are pivotally interconnected so that in the closed position (CP) of the valve (7) a piston rod (9A) of the fluid cylinder is in a retracted position.

4. The insertion chute (1) according to claim 3, **characterized in that** the valve operating means is an electric motor (109) operating the valve (7) between an open (OP) and a closed (CP) position through a transmission consisting of a gearing (110).

5. The insertion chute (1) according to any of claims 1-4, **characterized in that** the lower chute portion (204) in addition to a refuse feeding channel (204A) comprises at least one air inlet channel (15, 16).

6. The insertion chute (1) according to claim 5, **characterized in that** the air inlet channel or channels (15, 16) partly surrounds or surround the refuse feeding channel (204A).

7. The insertion chute (1) according to claims 5 or 6, **characterized in that** the air inlet channel or channels (15, 16) at one end thereof opens/open into the upper chute portion (3; 103; 3') via the interface (8) and at another end thereof opens/open into the refuse feeding channel (204A).

8. The insertion chute (1) according to claim 7, **characterized in that** the air inlet channel/channels (15, 16) communicates/communicate with the suction conveying pipe (2) and **in that** said communication is likewise controlled by the valve (7).

9. The insertion chute (1) according to any of claims 1-8, **characterized in that** the lower chute portion (4; 204) is releasably connected to the branching (6) in order to permit lifting off said lower chute portion from said branching.

10. The insertion chute (1) according to any of claims 1-9, **characterized in that** the interface (8) is provided with an access opening (45) for allowing inspection of and/or access to the operating means (9; 109) from a position above the lower chute portion (4; 204).

11. The insertion chute (1) according to any of claims 1-10, **characterized in that** a removable cover (46) is provided for closing and gas-tight sealing of the access opening (45).

12. The insertion chute (1) according to claims 10 or 11, **characterized in that** the interface (8) comprises a protective section (49; 49') covering an upper end of the branching (6) and having a removable or alternatively opening hatch (50; 50') covering the access opening (45).

13. The insertion chute (1) according to claim 12, **characterized in that** the protective section (49') covering an upper end of the branching (6) is formed integral with the upper chute portion (3') and is pivotally or alternatively removably attached to an upper end (6B) of the branching (6).

14. The insertion chute (1) according to any of claims 1-3 and 5-13, **characterized by** a mounting assembly (11) attached to the lower chute portion (4; 204) for supporting the valve operating means (9), the transmission (10) and the valve (7) that is positioned at a lower end (4C; 204C) of the lower chute portion (4; 204).

15. The insertion chute (1) according to any of claims 1-14, **characterized in that** the branching (6) comprises a superstructure (40) forming a space (40A) that is open towards the interface (8) and that houses a control equipment box (41) for controlling the operation of the discharge valve (7).

16. A method of increasing the flexibility in association with designing an insertion chute (1) for connection to a suction conveying pipe (2) of a refuse conveying system (20), said chute having a valve (7) for controlling the communication between the insertion chute (1) and the suction conveying pipe, said valve being connected to a valve operating means (9; 109), and a lower chute portion being at least partially received in and surrounded by a branching (6) extending from the suction conveying pipe, whereby the valve is positioned in a suction conveying environment inside the branching, **characterized by** arranging the valve operating means (9; 109) in the refuse conveying environment inside the branching (6), supported directly or indirectly exclusively by the lower chute portion (4; 204).

17. The method of claim 16, **characterized by** transmitting the operation of the valve operating means (9; 109) to the valve (7) through a transmission (10; 110) likewise being supported exclusively by the lower chute portion (4; 204).

18. The method of claim 17, wherein the chute valve (7) is operated between open (OP) and closed (CP) positions by means of a fluid cylinder (9), **characterized in that** a piston rod (9A) of the fluid cylinder is operated to assume a retracted position in a closed position (CP) of the valve (7).

19. The method of any of claims 16 -18, **characterized by** operating the chute valve (7) between an open (OP) and a closed (CP) position by means of an electric motor (109).

20. The method of any of claims 16 -19, **characterized by** supplying air at essentially atmospheric pressure through at least one air inlet channel (15, 16) and by extending said at least one inlet channel from an upper end (204B) of the lower chute portion (204) to a lower end (204C) thereof, separated from refuse feeding channel (204A) therein.

21. The method of claim 20, **characterized by** introducing said air at essentially atmospheric pressure into the branching (6) and thereby into the suction conveying pipe (2) during an emptying phase of the chute (1) and by controlling said introduction of air at essentially atmospheric pressure by means of the chute valve (7).

22. The method of any of claims 16-21, **characterized by** releasably connecting the lower chute portion (4; 204) to the branching (6) in order to permit lifting off said lower chute portion from said branching.

23. The method of any of claims 16-22, **characterized by** inspecting and/or accessing the operating means (9; 109) from a position above the lower chute portion (4; 204), through an access opening (45) in the interface (8).

Patentansprüche

1. Einwurfschacht (1) zur Verbindung mit einem Saugförderrohr (2) eines Abfallfördersystems (20) und umfassend separate obere und untere Schachtabschnitte (3; 103; 3', 4; 204), die durch eine Übergangsstelle (8) lösbar miteinander verbunden sind, wobei der obere Abschnitt (3; 103; 3') des Schachts zumindest eine Einlassöffnung (5) aufweist, der untere Abschnitt (4; 204) des Schachts eine durch diesen abgestützte Klappe (7) zur Steuerung der Verbindung zwischen dem Einwurfschacht (1) und dem Saugförderrohr aufweist, wobei die Klappe mit einem Klappenbetätigungsmittel (9; 10) verbunden ist und der untere Schachtabschnitt (4; 204) von einer sich von dem Saugförderrohr erstreckenden Abzweigung (6) zumindest teilweise aufgenommen und umgeben ist, wobei die Klappe in einem Saugförderumfeld innerhalb der Abzweigung gelegen ist,
dadurch gekennzeichnet,
dass das Klappenbetätigungsmittel (9; 109) ebenfalls in dem Abfallförderumfeld innerhalb der Abzweigung (6) positioniert ist und ausschließlich unmittelbar oder mittelbar durch den unteren Schachtabschnitt (4; 204) abgestützt ist.

2. Einwurfschacht (1) gemäß Anspruch 1,
dadurch gekennzeichnet,
dass die Klappe (7) mit dem Klappenbetätigungsmittel (9; 109) durch einen Kraftübertrager (10; 110) verbunden ist, der ebenfalls ausschließlich durch den unteren Schachtabschnitt (4; 204) abgestützt ist.

3. Einwurfschacht (1) gemäß Anspruch 2, wobei das Klappenbetätigungsmittel (9) ein die Klappe (7) über den Kraftübertrager (10) zwischen einer offenen (OP) und einen geschlossenen (CP) Position betätigender Fluidzylinder ist,
dadurch gekennzeichnet,
dass der Fluidzylinder (9) mit der Klappe (7) verbunden ist durch eine Verbindung (10), bestehend aus Verbindungsgliedern (10A, 10B, 10C), die schwenkbar miteinander verbunden sind, so dass sich in der geschlossenen Position (CP) der Klappe (7) eine Kolbenstange (9A) des Fluidzylinders in der eingezogenen Position befindet.

4. Einwurfschacht (1) gemäß Anspruch 3,
dadurch gekennzeichnet,
dass das Klappenbetätigungsmittel ein elektrischer Motor (109) ist, der die Klappe (7) über einen Kraftübertrager bestehend aus einem Getriebe (110) zwischen einer offenen (OP) und einer geschlossenen (CP) Position betätigt.

5. Einwurfschacht (1) gemäß einem der Ansprüche 1-4,
dadurch gekennzeichnet,
dass der untere Schachtabschnitt (204) zusätzlich zu einem Abfallzuführkanal (204A) zumindest einen Lufteinlasskanal (15, 16) umfasst.

6. Einwurfschacht (1) gemäß Anspruch 5,
dadurch gekennzeichnet,
dass der Lufteinlasskanal oder die Lufteinlasskanäle (15, 16) teilweise den Abfallzuführkanal (204A) umgibt oder umgeben.

7. Einwurfschacht (1) gemäß Anspruch 5 oder 6,
dadurch gekennzeichnet,
dass der Lufteinlasskanal oder die Lufteinlasskanäle (15, 16) sich an einem Ende davon via der Übertragungsstelle (8) in den oberen Schachtabschnitt (3; 103; 3') öffnet/ öffnen und an einem anderen Ende davon in den Abfallzuführkanal (204A) öffnet/ öffnen.

8. Einwurfschacht (1) gemäß Anspruch 7,
dadurch gekennzeichnet,
dass der Lufteinlasskanal/ die Lufteinlasskanäle (15, 16) mit dem Saugförderrohr (2) in Verbindung steht/ stehen und dass diese Verbindung ebenfalls durch die Klappe (7) gesteuert wird.

9. Einwurfschacht (1) gemäß einem der Ansprüche 1-8,
dadurch gekennzeichnet,
dass der untere Schachtabschnitt (4; 204) lösbar mit der Abzweigung (6) verbunden ist, um ein Hochziehen des unteren Schachtabschnitts aus der Abzweigung zuzulassen.

10. Einwurfschacht (1) gemäß einem der Ansprüche 1-9,
dadurch gekennzeichnet,
dass die Übergangsstelle (8) mit einer Zugriffsöffnung (45) versehen ist, um aus einer Position oberhalb des unteren Schachtabschnitts (4; 204) eine Inspektion des und/ oder Zugriff auf das Betätigungsmittel (9; 109) zuzulassen.

11. Einwurfschacht (1) gemäß einem der Ansprüche 1-10,
dadurch gekennzeichnet,
dass ein abnehmbarer Deckel (46) zum Verschließen und gasdichten Abdichten der Zugriffsöffnung (45) vorgesehen ist.

12. Einwurfschacht (1) gemäß einem der Ansprüche 10 oder 11,
dadurch gekennzeichnet,
dass die Übergangsstelle (8) einen Schutzabschnitt (49; 49') umfasst, der ein oberes Ende der Abzweigung (6) bedeckt und eine entfernbare oder alternativ öffnende die Zugriffsöffnung (45) bedeckende Luke (50, 50') aufweist.

13. Einwurfschacht (1) gemäß Anspruch 12, **dadurch gekennzeichnet,** **dass** der ein oberes Ende der Abzweigung (6) bedeckende Schutzabschnitt (49, 49') integral mit dem oberen Schachtabschnitt (3') ausgebildet ist und schwenkbar oder alternativ entfernbar an ein oberes Ende (6B) der Abzweigung (6) befestigt ist.

14. Einwurfschacht (1) gemäß einem der Ansprüche 1-3 und 5-13, **gekennzeichnet durch** eine Montageanordnung (11), befestigt an dem unteren Schachtabschnitt (4; 204) zur Abstützung des Klappenbetätigungsmittels (9), des Kraftübertragers (10) und der Klappe (7), die an einem unteren Ende (4C; 204C) des unteren Schachtabschnitts (4; 204) positioniert ist.

15. Einwurfschacht (1) gemäß einem der Ansprüche 1-14, **dadurch gekennzeichnet,** **dass** die Abzweigung (6) einen Oberbau (40) umfasst, der einen Raum (40A) bildet, der in Richtung Übergangsstelle (8) offen ist, und der ein Steuerungsgerätgehäuse (41) zur Steuerung der Betätigung der Auslassklappe (7) beherbergt.

16. Verfahren zur Verbesserung der Flexibilität in Verbindung mit der Entwicklung eines Einwurfschachts (1) zur Verbindung mit einem Saugförderrohr (2) eines Abfallfördersystems (20), wobei der Schacht eine Klappe (7) aufweist zur Steuerung der Kommunikation zwischen dem Einwurfschacht (1) und dem Saugförderrohr, wobei die Klappe verbunden ist mit einem Klappenbetätigungsmittel (9; 109) und einem unteren Schachtabschnitt, der von einer sich von dem Saugförderrohr erstreckenden Abzweigung (6) zumindest teilweise aufgenommen und umgeben ist, wobei die Klappe in einem Saugförderumfeld innerhalb der Abzweigung gelegen ist, **gekennzeichnet durch** Anordnen des Klappenbetätigungsmittels (9; 109) in dem Abfallförderumfeld innerhalb der Abzweigung (6), abgestützt ausschließlich unmittelbar oder mittelbar **durch** den unteren Schachtabschnitt (4; 204).

17. Verfahren nach Anspruch 16, **gekennzeichnet durch** Übertragung der Betätigung des Klappenbetätigungsmittels (9; 109) zu der Klappe (7) **durch** einen ebenfalls ausschließlich **durch** den unteren Schachtabschnitt (4; 204) abgestützten Kraftübertrager (10; 110).

18. Verfahren nach Anspruch 17, wobei die Schachtklappe (7) zwischen offenen (OP) und geschlossenen (CP) Positionen durch einen Fluidzylinder (9) betätigt wird, **dadurch gekennzeichnet,** **dass** eine Kolbenstange (9A) des Fluidzylinders betätigt wird, um eine eingezogene Position in einer geschlossenen Position (CP) der Klappe (7) anzunehmen.

19. Verfahren nach einem der Ansprüche 16-18, **gekennzeichnet durch** Betätigung der Schachklappe (7) zwischen einer offenen (OP) und einer geschlossenen (CP) Position mittels eines elektrischen Motors (109).

20. Verfahren nach einem der Ansprüche 16-19, **gekennzeichnet durch** Zuführung von Luft bei im Wesentlichen atmosphärischem Druck **durch** zumindest einen Lufteinlasskanal (15, 16) und **durch** Verlängerung des zumindest einen Lufteinlasskanals von einem oberen Ende (204B) des unteren Schachtabschnitts (204) zu einem unteren Ende (204C) davon, getrennt vom Abfallzuführkanal (204A) darin.

21. Verfahren nach Anspruch 20, **gekennzeichnet durch** Einströmung der Luft bei im Wesentlichen atmosphärischem Druck in die Abzweigung (6) und **dadurch** in das Saugförderrohr (2) während einer Entleerungsphase des Schachts (1) und **durch** Steuerung der Lufteinströmung bei im Wesentlichen atmosphärischem Druck **durch** die Schachtklappe (7).

22. Verfahren nach einen der Ansprüche 16-21, **gekennzeichnet durch** lösbares Verbinden des unteren Schachtabschnitts (4; 204) mit der Abzweigung (6), um ein Herausziehen des unteren Schachtabschnitts aus der Verzweigung zuzulassen.

23. Verfahren nach einen der Ansprüche 16-22, **gekennzeichnet durch** Inspektion des und/ oder Zugriff auf das Betätigungsmittel (9; 109) von einer Position oberhalb des unteren Schachtabschnitts (4; 204), **durch** eine Zugriffsöffnung (45) in der Übergangsstelle (8).

Revendications

1. Goulotte d'introduction (1) pour la connexion à une canalisation de transport par aspiration (2) d'un système de transport de déchets et comprenant des parties de goulotte inférieure et supérieure séparées (3 ; 103 ; 3', 4 ; 204) qui sont interconnectées de façon détachable à travers une interface (8), la partie supérieure (3 ; 103 ; 3') de la goulotte ayant au moins une ouverture d'insertion (5), la partie inférieure (4 ; 204) de la goulotte ayant un obturateur (7) supporté par celle-ci pour commander la communication entre

la goulotte d'insertion (1) et la canalisation de transport par aspiration, ledit obturateur étant connecté à un moyen de commande d'obturateur (9 ; 109) et ladite partie inférieure (4 ; 204) de la goulotte étant au moins partiellement reçue dans et entourée par un branchement (6) s'étendant à partir de la canalisation de transport par aspiration, en conséquence de quoi l'obturateur est situé dans un environnement de transport par aspiration à l'intérieur du branchement, **caractérisée en ce que** le moyen de commande de l'obturateur (9 ; 109) se trouve de la même façon positionné dans l'environnement de transport de déchets à l'intérieur du branchement (6) et est directement ou indirectement supporté exclusivement par la partie inférieure de la goulotte (4 ; 204).

2. Goulotte d'introduction (1) selon la revendication 1, **caractérisée en ce que** l'obturateur (7) est connecté au moyen de commande de l'obturateur (9 ; 109) par l'intermédiaire d'une transmission (10 ; 110) qui est de la même façon supportée exclusivement par la partie inférieure de la goulotte (4 ; 204).

3. Goulotte d'introduction (1) selon la revendication 2, dans laquelle le moyen de commande de l'obturateur (9) est un cylindre hydraulique actionnant l'obturateur (7) entre une position ouverte (OP) et une position fermée (CP) par l'intermédiaire de la transmission (10), **caractérisée en ce que** le cylindre hydraulique (9) est connecté à l'obturateur (7) par l'intermédiaire d'une liaison (10) composée de bielles (10A, 10B, 10C) qui pivotent en interconnexion de telle sorte que dans la position fermée (CP) de l'obturateur (7) une tige de piston (9A) du cylindre hydraulique soit en position rentrée.

4. Goulotte d'introduction (1) selon la revendication 3, **caractérisée en ce que** le moyen d'actionnement de l'obturateur est un moteur électrique (109) actionnant l'obturateur (7) entre une position ouverte (OP) et une position fermée (CP) par l'intermédiaire d'une transmission composée d'un train d'engrenages (110).

5. Goulotte d'introduction (1) selon l'une quelconque des revendications 1 à 4, **caractérisée en ce que** la partie inférieure de la goulotte (204) comprend en plus d'un canal d'alimentation en déchets (204A) au moins un canal d'entrée d'air (15, 16).

6. Goulotte d'introduction (1) selon la revendication 5, **caractérisée en ce que** le canal ou les canaux d'entrée d'air (15, 16) entoure ou entourent partiellement le canal d'alimentation en déchets (204A).

7. Goulotte d'introduction (1) selon les revendications 5 ou 6 , **caractérisée en ce que** le canal ou les canaux d'entrée d'air (15, 16) s'ouvre/s'ouvrent à une extrémité de celle-ci dans la partie supérieure de la goulotte (3 ; 103 ; 3') via l'interface (8) et à une autre extrémité de celle-ci s'ouvre/s'ouvrent dans le canal d'alimentation en déchets (204A).

8. Goulotte d'introduction (1) selon la revendication 7, **caractérisée en ce que** le canal/les canaux d'entrée d'air (15, 16) communique/communiquent avec la canalisation de transport par aspiration (2) et **en ce que** ladite communication est de la même façon commandée par l'obturateur (7).

9. Goulotte d'introduction (1) selon l'une quelconque des revendications 1 à 8, **caractérisée en ce que** la partie inférieure de la goulotte (4 ; 204) est connectée de façon détachable au branchement (6) de façon à permettre de soulever dudit branchement la dite partie inférieure de la goulette.

10. Goulotte d'introduction (1) selon l'une quelconque des revendications 1 à 9, **caractérisée en ce que** l'interface (8) est munie d'une ouverture d'accès (45) pour permettre l'inspection de et/ou l'accès au moyen d'actionnement (9 ; 109) depuis un emplacement au dessus de la partie inférieure de la goulette (4 ; 204).

11. Goulotte d'introduction (1) selon l'une quelconque des revendications 1 à 10, **caractérisée en ce qu'**un couvercle amovible (46) est prévu pour la fermeture et l'obturation étanche aux gaz de l'ouverture d'accès (45).

12. Goulotte d'introduction (1) selon les revendications 10 ou 11, **caractérisée en ce que** l'interface (8) comprend une section de protection (49 ; 49') couvrant une extrémité supérieure du branchement (6) et présentant une trappe d'accès (50 ; 50') pouvant se retirer ou alternativement s'ouvrir, ladite trappe recouvrant l'ouverture d'accès (45).

13. Goulotte d'introduction (1) selon la revendication 12, **caractérisée en ce que** la section (49') couvrant une extrémité supérieure du branchement (6) est faite d'une seule pièce avec la partie supérieure (3') de la goulotte et est fixée de façon pivotante ou alternativement amovible à une extrémité supérieure (6B) du branchement (6).

14. Goulotte d'introduction (1) selon l'une quelconque des revendications 1 à 3 et 5 à 13, **caractérisée par** un ensemble de montage (11) fixé à la partie inférieure de la goulotte (4 ; 204) pour supporter le moyen d'actionnement de l'obturateur (9), la transmission (10) et l'obturateur (7) qui est positionné à l'extrémité inférieure (4C ; 204C) de la partie inférieure de la goulotte (4 ; 204).

15. Goulotte d'introduction (1) selon l'une quelconque des revendications 1 à 14, **caractérisée en ce que** le branchement (6) comprend une superstructure (40) formant un espace (40A) qui est ouvert en direction de l'interface (8) et qui abrite une boîte d'équipement de commande (41) pour commander le fonctionnement de l'obturateur d'évacuation (7).

16. Procédé destiné à accroître la souplesse en association avec la conception d'une goulotte d'insertion (1) pour la connexion à une canalisation de transport par aspiration (2) d'un système de transport de déchets (20), ladite goulotte ayant un obturateur (7) pour commander la communication entre la goulotte d'insertion (1) et la canalisation de transport par aspiration, ledit obturateur étant relié à un moyen d'actionnement d'obturateur (9 ; 109), et une partie inférieure de la goulotte étant au moins partiellement logée dans et entourée par un branchement (6) s'étendant à partir de la canalisation de transport par aspiration, en conséquence de quoi l'obturateur est positionné dans un environnement de transport par aspiration à l'intérieur du branchement, **caractérisé par** une disposition du moyen d'actionnement de l'obturateur (9 ; 109) dans l'environnement de transport de déchets à l'intérieur du branchement (6), supporté directement ou indirectement exclusivement par la partie inférieure de la goulotte (4 ; 204).

17. Procédé selon la revendication 16, **caractérisé par** la transmission de l'action du moyen d'actionnement de l'obturateur (9 ; 109) à l'obturateur (7) par l'intermédiaire d'une transmission (10 ; 110) supportée de la même façon exclusivement par la partie inférieure de la goulotte (4 ; 204).

18. Procédé selon la revendication 17, dans lequel l'obturateur de goulotte (7) est actionné entre les positions ouverte (OP) et fermée (CP) par le moyen d'un cylindre hydraulique (9), **caractérisé en ce qu'**une tige de piston (9A) du cylindre hydraulique (9) est manoeuvrée pour prendre une position rentrée pour une position fermée (CP) de l'obturateur.

19. Procédé selon l'une quelconque des revendications 16 à 18, **caractérisé par** l'actionnement de l'obturateur de goulotte (7) entre une position ouverte (OP) et une position fermée (CP) par le moyen d'un moteur électrique (109).

20. Procédé selon l'une quelconque des revendications 16 à 19, **caractérisé par** une alimentation en air à une pression essentiellement atmosphérique par au moins un canal d'entrée d'air (15 ; 16) et par l'extension dudit au moins un canal d'entrée depuis une extrémité supérieure (204B) de la partie inférieure de goulotte (204) jusqu'à une extrémité inférieure (204C) de celle-ci, séparé du canal d'alimentation en déchets (204A).

21. Procédé selon la revendication 20, **caractérisé par** l'introduction d'air à une pression essentiellement atmosphérique à l'intérieur du branchement (6) et par conséquent à l'intérieur de la canalisation de transport par aspiration (2) pendant une phase de vidage de la goulotte (1) et par la commande de ladite introduction d'air à une pression essentiellement atmosphérique par le moyen de l'obturateur de goulotte (7).

22. Procédé selon l'une quelconque des revendications 16 à 21, **caractérisé par** une connexion détachable de la partie inférieure de goulotte (4 ; 204) au branchement (6) de façon à permettre de soulever dudit branchement ladite partie inférieure de goulotte.

23. Procédé selon l'une quelconque des revendications 16 à 22, **caractérisé par** une inspection et/ou un accès au moyen d'actionnement (9 ; 109) depuis un emplacement au dessus de la partie inférieure de goulotte (4 ; 204), à travers une ouverture d'accès (45) dans l'interface (8).

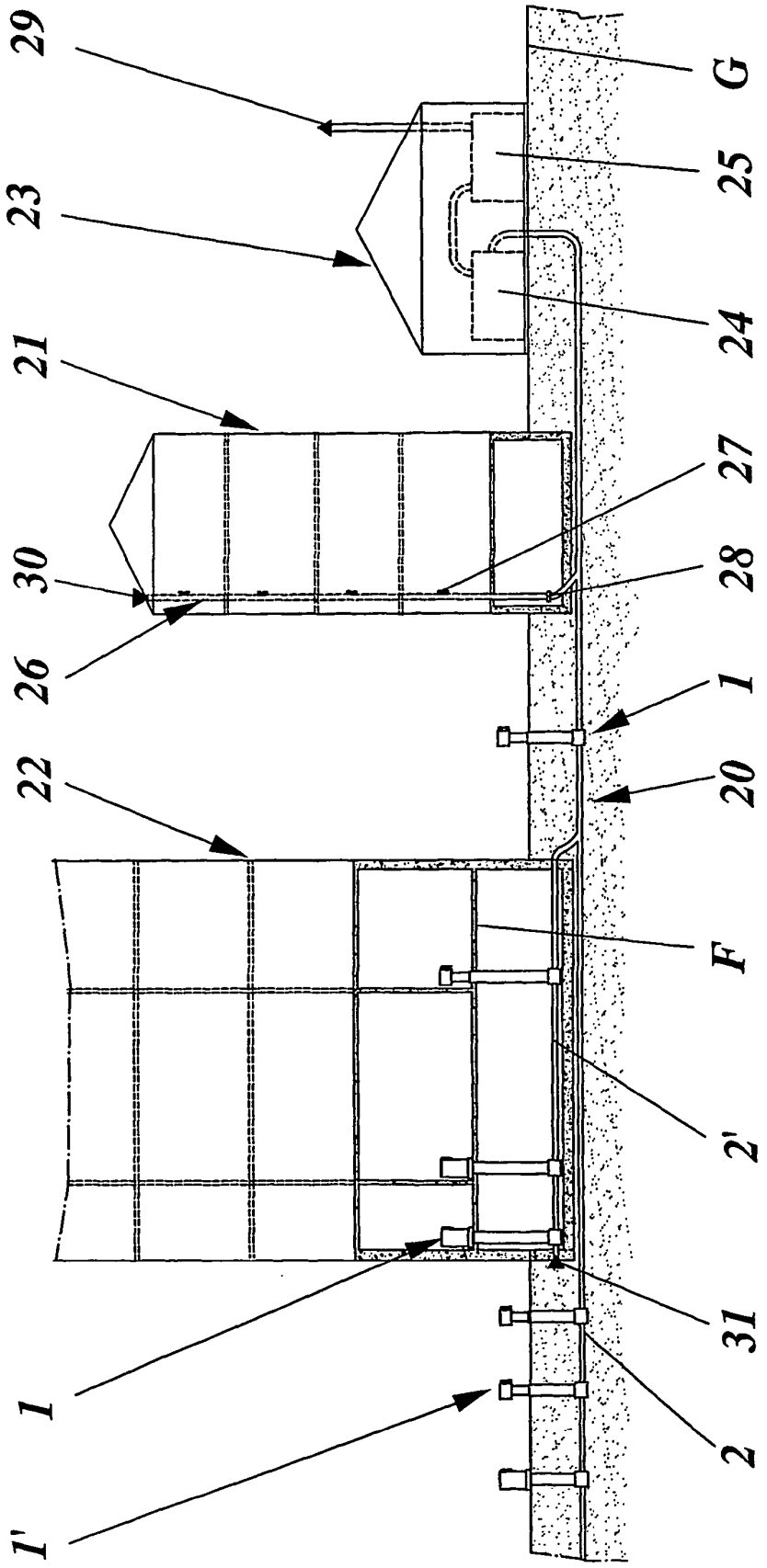


FIG. 1

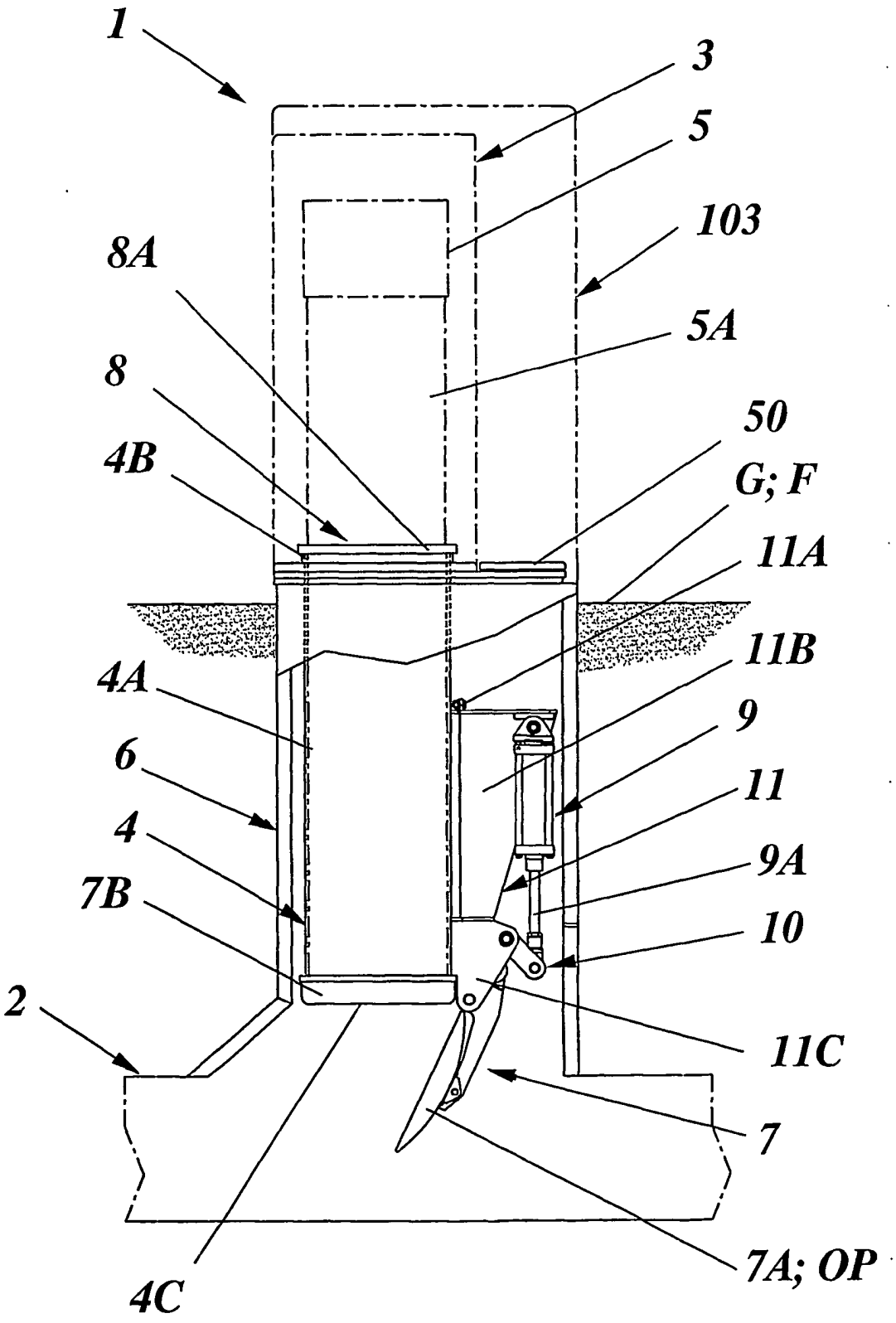


FIG. 2A

FIG. 2C

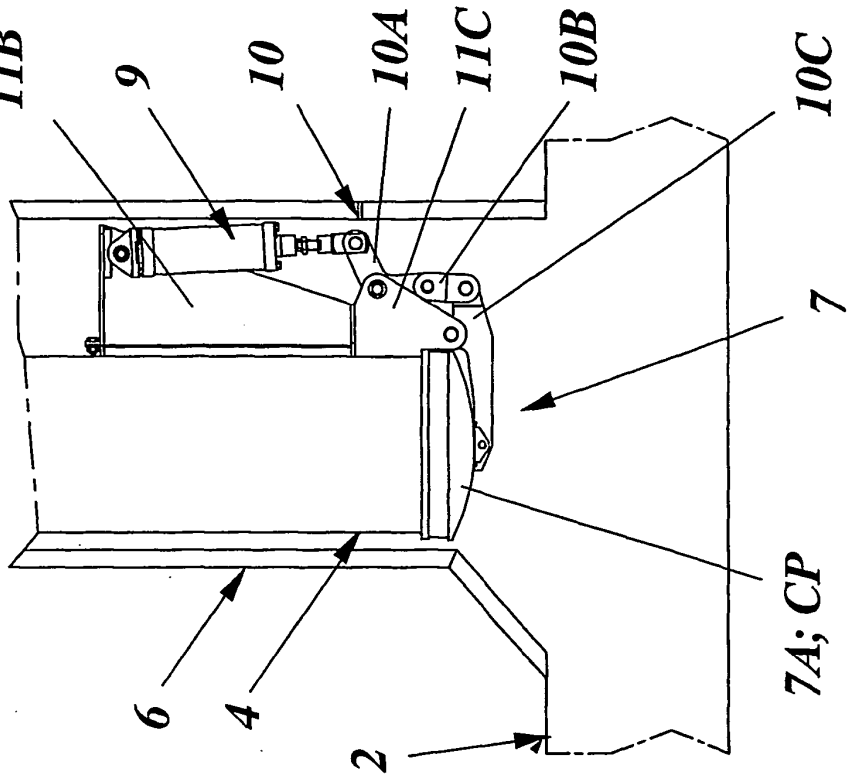


FIG. 2B

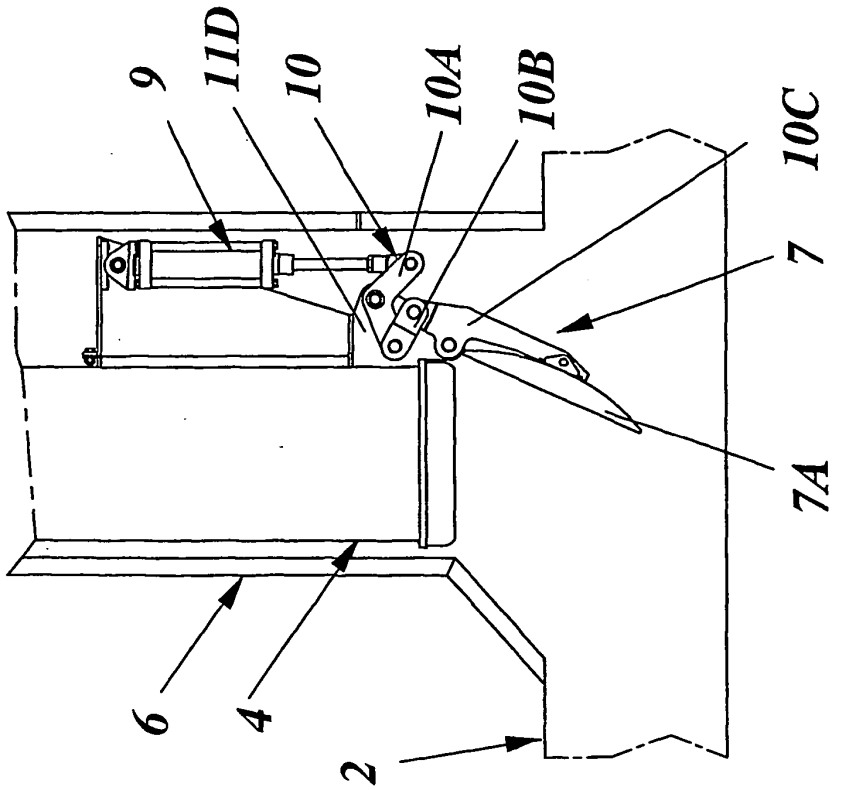


FIG. 3C

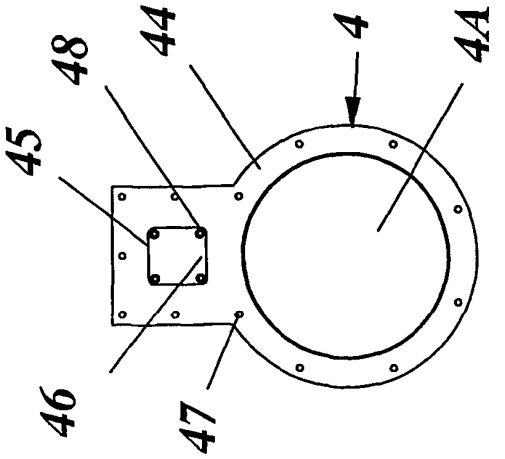


FIG. 3B

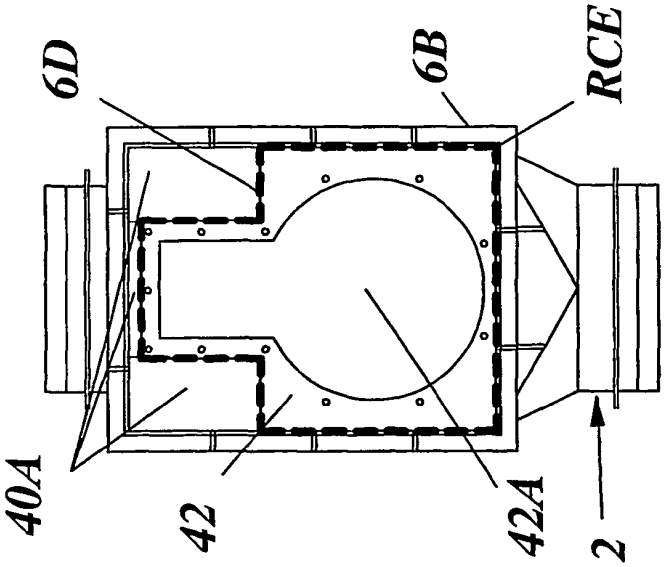


FIG. 3A

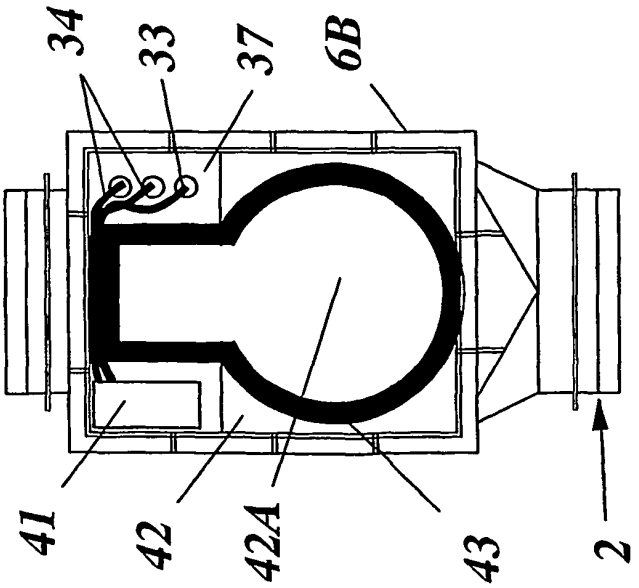


FIG. 4A

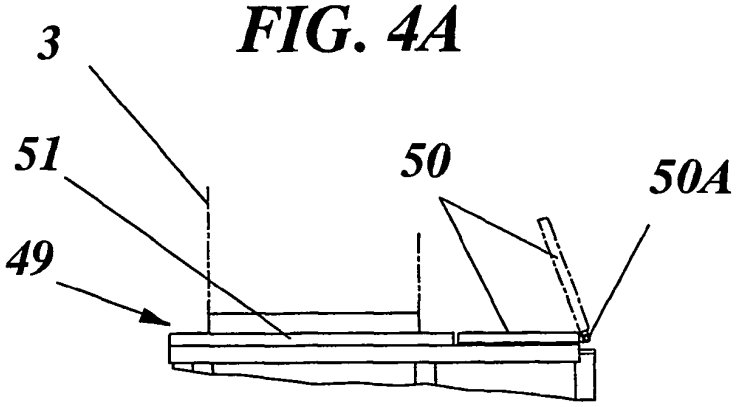
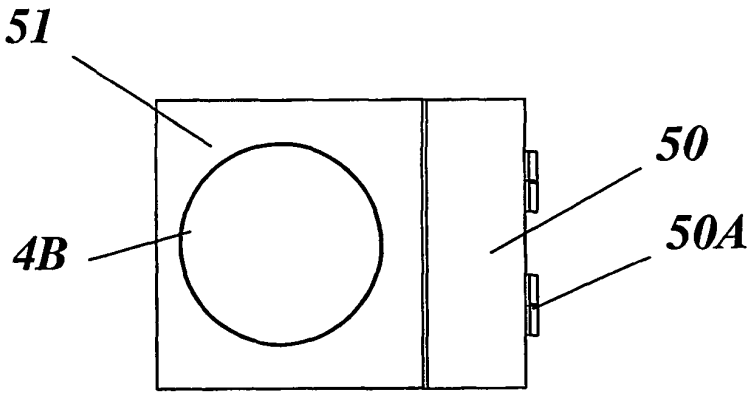


FIG. 4B



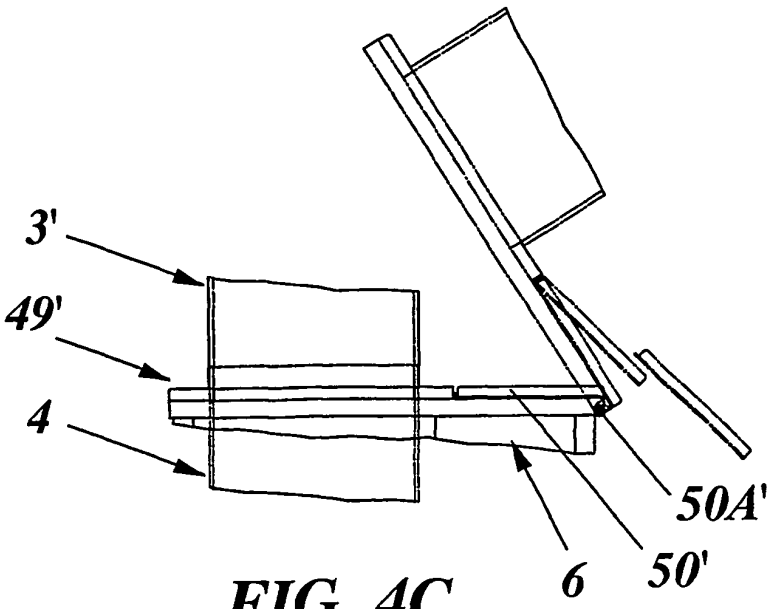


FIG. 4C

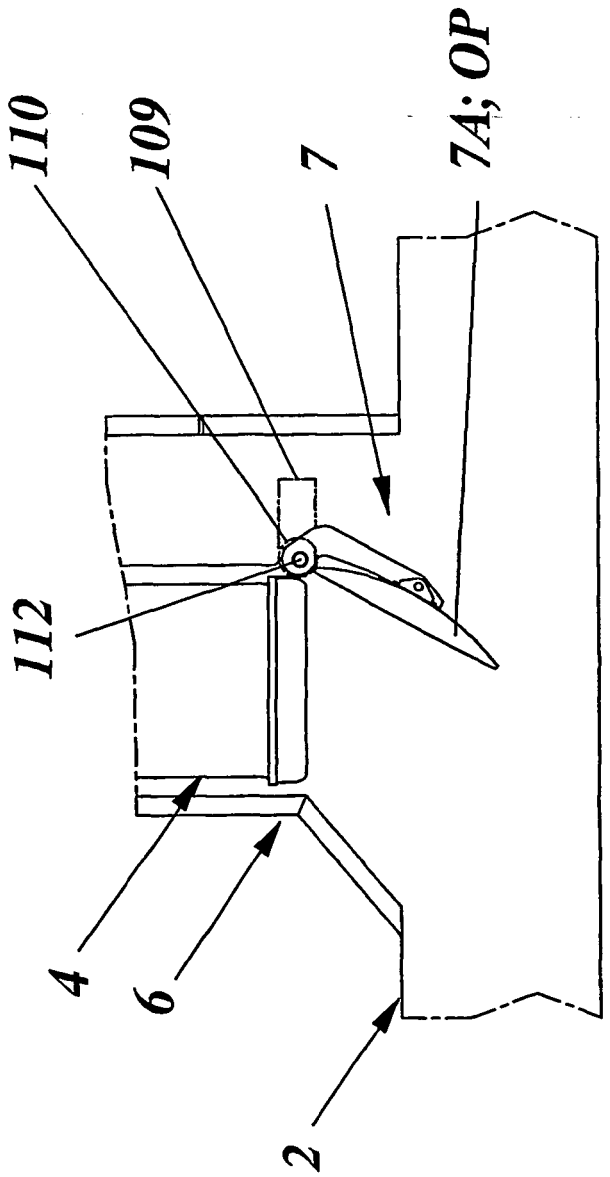


FIG. 5

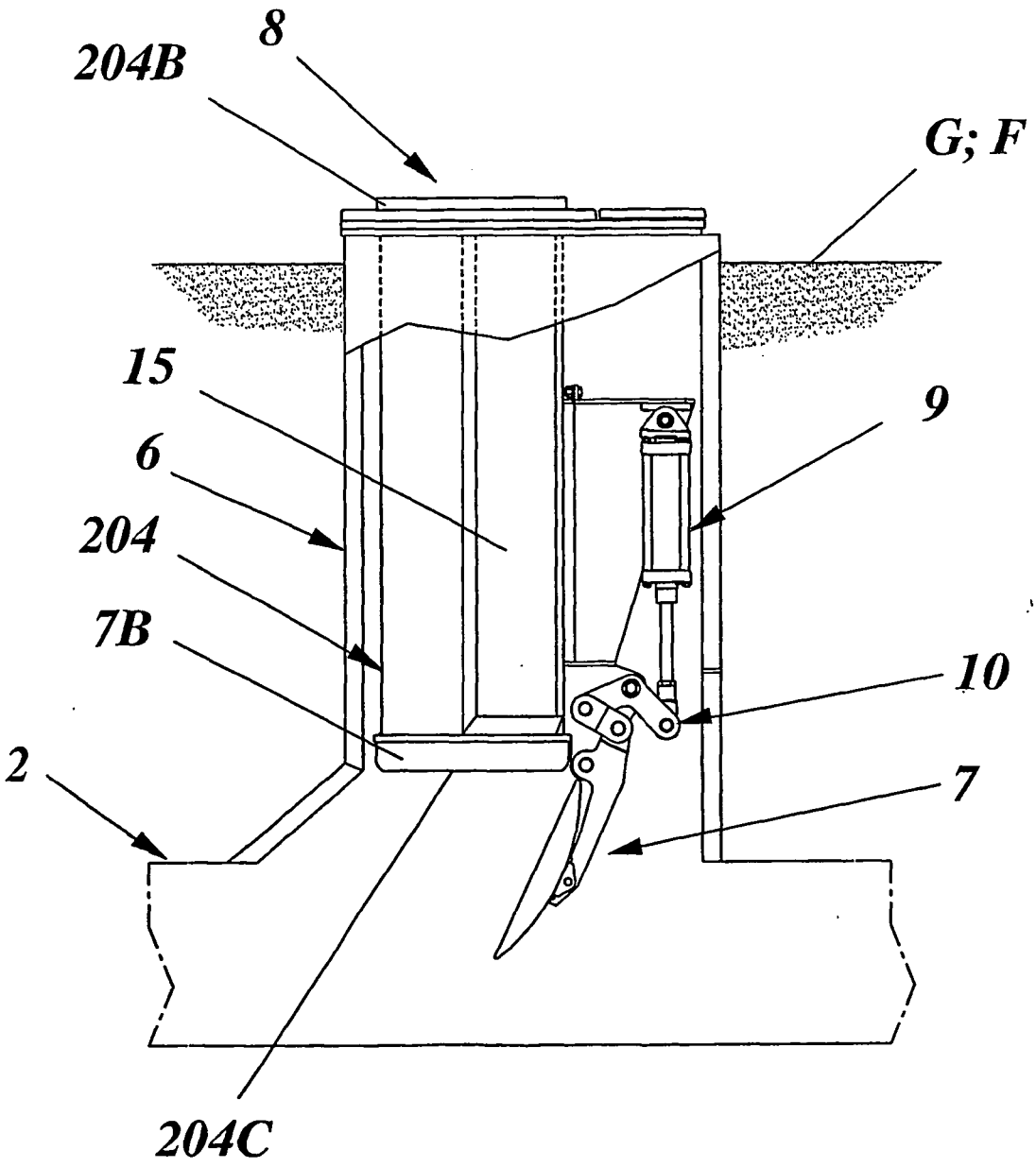


FIG. 6A

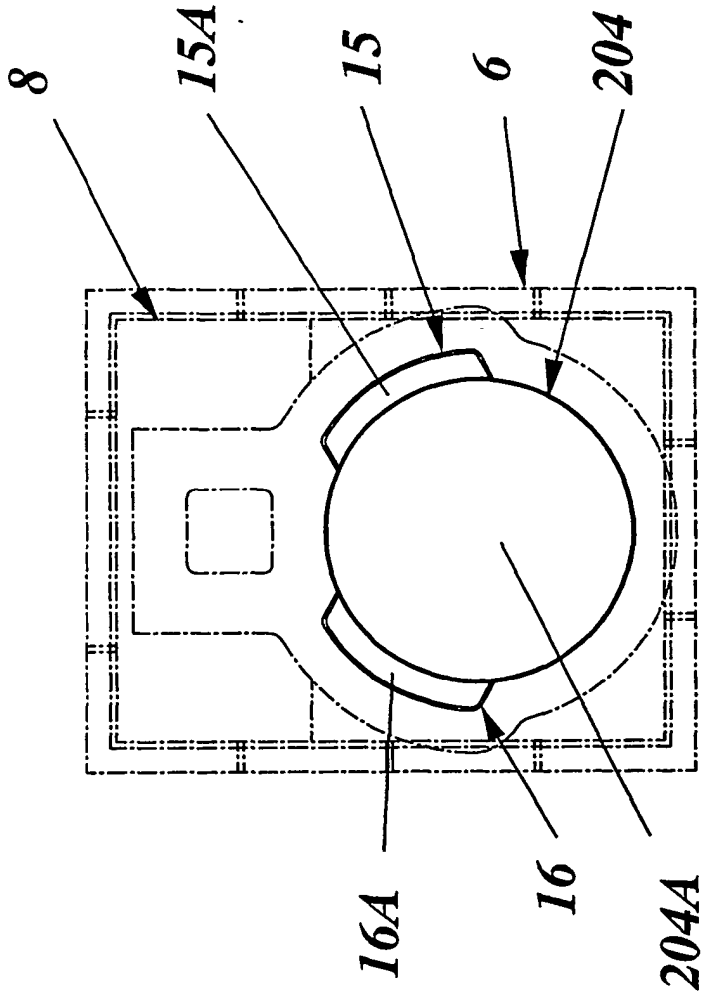


FIG. 6C

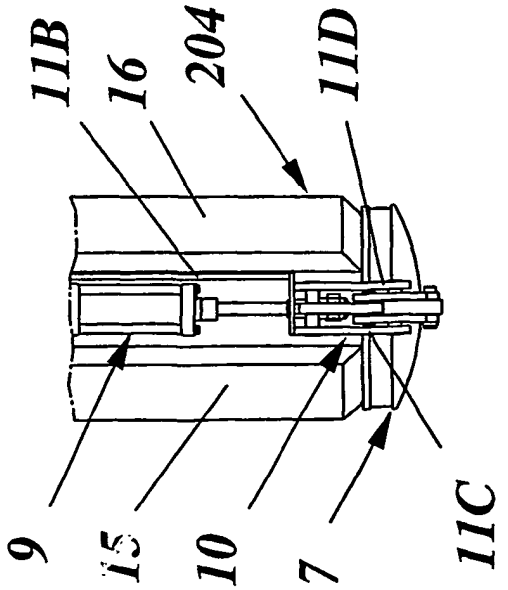
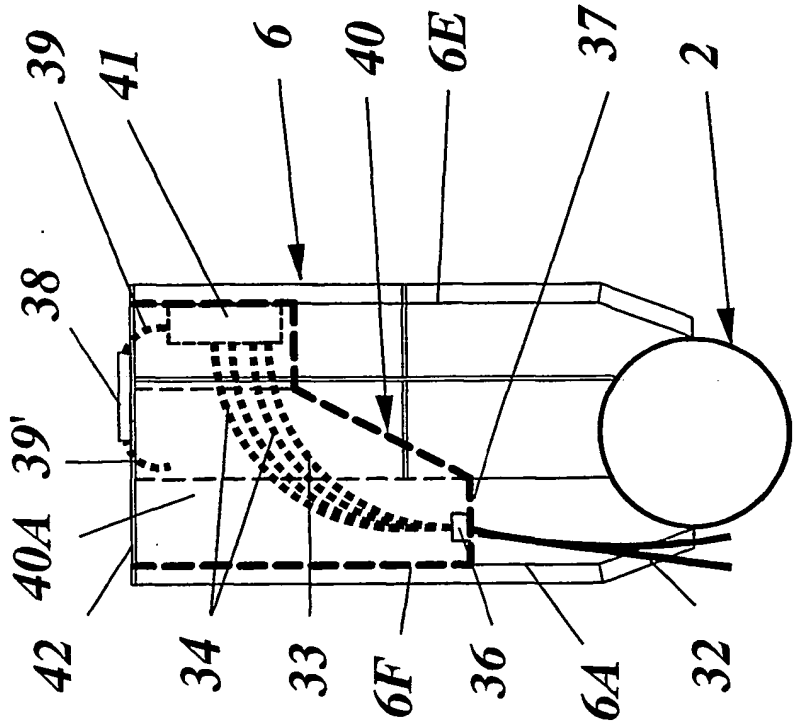


FIG. 6B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6F
36
6A
32

FIG. 7B

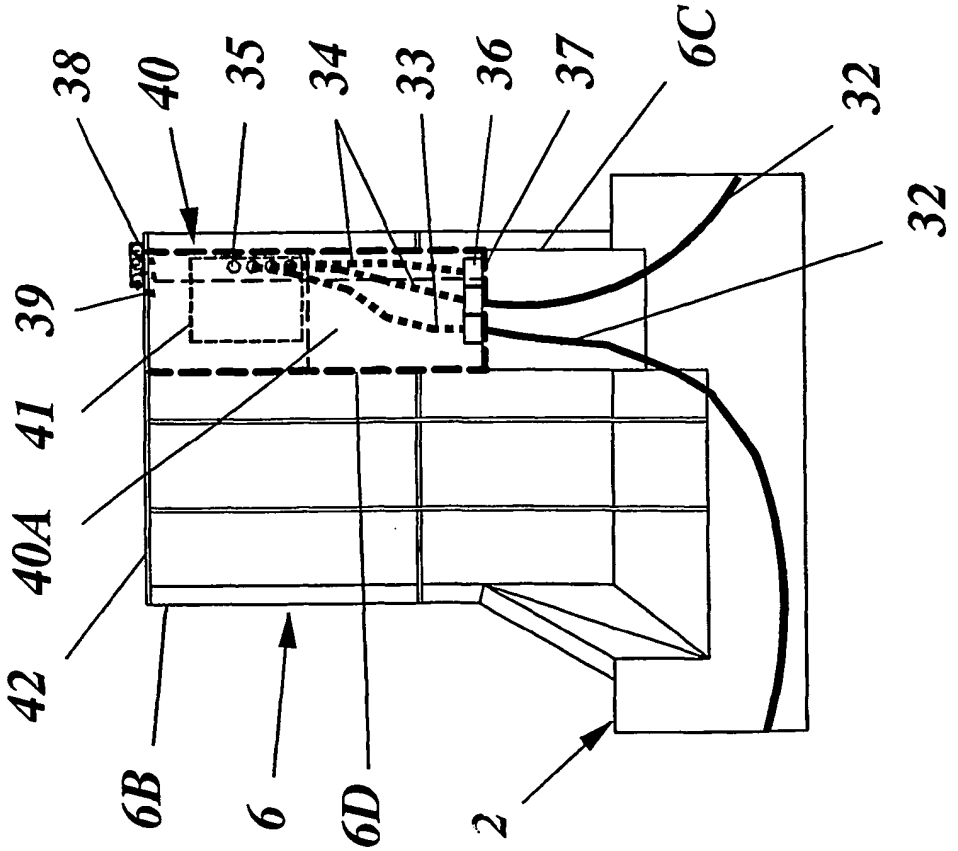
38
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FIG. 7A