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(54) **ISOLATED INSERTION CHUTE FOR SUCTION-OPERATED GARBAGE DISPOSAL SYSTEMS**

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GOULOTTE D'INSERTION ISOLEE DESTINEE AUX SYSTEMES D'EVACUATION DES DECHETS FONCTIONNANT PAR ASPIRATION

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EP-A- 0 304 407
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US-A- 3 316 026
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Description

Background of the invention

[0001] The invention relates generally to isolated insertion chutes which at spaced intervals are connected to an underground suction conveying conduit communicating with a refuse suction system, with the upper end above ground of every chute being provided with an insertion opening that may be closed and with the lower end below ground of every chute being connected to the suction conveying conduit, and more specifically relates to such an isolated insertion chute having the features of the preamble of claim 1.

Description of the prior art

[0002] An insertion chute of the above indicated kind is disclosed and illustrated in EP-A-0 304 407. Said prior art insertion chute was developed for facilitating carrying out maintenance and repair work on the insertion chute by providing upper and lower chute portions connected to a branching from the suction conveying conduit by means of connecting flanges being positioned above the ground surface level. However, in the case where a valve means for opening and closing communication between the chute and the conveying conduit is provided, this prior art structure requires a specific arrangement for fluid tight transmission of the operating movement of a valve operating means to the actual valve means. According to said EP-A-0 304 407 a rod for operating the valve means is extended through a through-passage in said flange joint whereby a seal unit is employed for sealing the through-passage of the operating rod during its operation. However, apart from being comparatively expensive said prior art solution employing the seal unit suffers from the drawback that after extended operation the fluid tight transmission of the operating movement may be lost due to wear in the seal unit.

Summary of the invention

[0003] Thus, the object of the present invention is to provide an insertion chute of the above indicated kind, by means of which the above described disadvantages in connection with the prior art insertion chutes may be eliminated, while maintaining the reliable operation of the insertion chute. More specifically the object of the invention is to provide an arrangement for the sealed transmission of the valve operating movement.

[0004] This object is attained by means of an apparatus of the kind indicated in the characterizing portion of the enclosed claim 1.

[0005] Preferred improvements and suitable embodiments of the invention are indicated in the dependent subclaims.

Brief description of the drawings

[0006] With the purpose of exemplifying the invention an embodiment thereof is disclosed more closely below in connection with the enclosed drawings, in which:

Fig. 1 illustrates, partly in section, a prior art insertion chute,

Fig. 2 is a section through the prior art seal unit,

Fig. 3 illustrates, partly in section, the insertion chute according to the present invention, with a valve means in its closed condition, and the arrangement for the fluid tight transmission of the movement of the operating means, and

Fig. 4 illustrates the embodiment of Fig. 2 as viewed in the direction of the arrow C in Fig. 2.

Description of the preferred embodiments

[0007] Fig. 1 illustrates an example of the previously known technique from which the present invention starts - as disclosed in EP-A-0 304 407 - and which will initially be briefly discussed with reference to Figs. 1 and 2. An insertion chute 103 is connected to a collecting conduit 106 which in turn is connected to a refuse suction conduit system in which, at least during certain periods of time, a suction-produced conveying air-stream is flowing. At the lower end of the insertion chute a valve means 116 is provided for selectively closing and opening the lower end of the chute 103.

[0008] The insertion chute 103 is illustrated partially in section in Fig. 1, whereby the valve operating means are not illustrated in section. Fig. 1 illustrates that the prior art insertion chute 103 comprises an upper chute portion 103a and a lower chute portion 103b which through a flange joint 108 are connected to the branching 109 of a T-piece 110 connected to the collecting conduit 106.

[0009] The upper portion 103a of the insertion chute 103 is substantially cylindrical and is provided at its lower end with a connecting flange 108a having bores 108b provided therein for receiving mounting bolts 108c. The upper end of the upper chute portion 103a is intended to communicate with a sluice-like receiving means (now shown). A substantially rectangular, box-like superstructure 111 is welded to the exterior of the upper chute portion 103a, and this superstructure is intended to receive the valve operating means 112 which consists of a cylinder, preferably a pneumatic cylinder. The rear end wall of the cylinder 112 is pivotally journalled to the upper chute portion 103a and its free piston rod end is pivotally connected to a rotary transmission link 113 which is also rotatably journalled in the upper chute portion 103a. A valve operating rod 114 is also pivotally connected to the rotary transmission link. The superstructure 111 is

provided with a lid 115 at one of its sides, and through this lid it is possible to get access to the valve operating means for maintenance and repair thereof and of the control equipment for the valve means which is also provided in the superstructure 111. A projecting portion 108d of the flange 108a of the upper chute portion 103a forms the bottom of the superstructure 111 and is also provided with a recess 111a through which the operating rod 114 is extended and through which wires may also be passed. The recess also serves to ventilate the interior of the superstructure to the environment.

[0010] The lower portion 103b of the chute is also, at its upper end, provided with a connecting flange 108e having bores 108b coinciding with those of the connecting flange of the upper chute portion 103a, so that the mounting bolts 108a may be passed through said bores. At a position corresponding to that of the projecting portion 108d of the flange 108a of the upper chute portion 103a the flange 108e of the lower chute portion 103b is also provided with a projecting portion 108f having an elongated groove 111b through which the operating rod 114 may be passed, whereby the length of the groove at least corresponds to the movement of the operating rod 114 when operating the valve means 116 consisting of a flap 117 pivotally journalled at the lower end of the lower chute portion 103b. The lower end of the operating rod 114 engages a lever 118 attached to the flap, for manoeuvering the flap 117 between its closed and opened conditions. A rubber sealing ring 119 is provided around the lower end of the lower chute portion 103b, and the flap 117 sealingly engages this sealing ring when the flap is in its closed condition.

[0011] Fig. 1 illustrates that the lower portion 103b of the chute, the valve 116 and the operating rod 114 are received in the branching 109 of the T-piece 110 having a diameter which is so much larger than that of the lower chute portion that the lower chute portion 103b may be inserted therein. The branching is also provided with a portion 109a being substantially rectangular in cross-section and projecting from the cylindrical portion for receiving the operating rod 114 and the valve means 116. Like the chute portions the branching 109 comprises, at its upper end, a flange 108g having bolt bores 108b and a projecting portion 108h, said projecting portion 108h being provided with a groove 111c being open into the cylindrical portion of the branching and serving as a passage for the operating rod 114.

[0012] A seal unit 120 is attached by means of screws to the upper side of the flange 108e and is intended to seal the passage of the operating rod 114 through the groove 111b in the flange 108e of the lower chute portion 103b against the conveying air-stream in the collecting conduit. Fig. 2 illustrates that the seal unit 120 consists of a plate 121 which at its underside is provided with a gasket 122 which is bonded thereto and which is provided with a groove 123 corresponding to and in the assembled condition coinciding with the groove 111b of the flange 108e. On the upper side of the plate 121, on each side of the groove 123, two rubber mouldings 124 are clamped by means of flat bars 125 and mounting screws 126, said rubber mouldings each having a width substantially exceeding half the width of the plate 121 so that the free edges of the rubber mouldings 124 sealingly engage each other to form an inverted V. In order to seal the space between the rubber mouldings 124 at their short edges filling members 127, for instance of epoxy cement, are provided which may suitably be attached by bonding or screwing from below and in a manner not illustrated in detail. The seal unit 120 is attached to the flange 108e by means of mounting screws which simultaneously provide additional clamping of the rubber mouldings 124.

[0013] The function or further detailed design of the insertion chute is not discussed in detail herein, but in this regard reference is made to the above mentioned prior art EP-A-0 304 407.

[0014] Turning now to Figs. 3 and 4 an embodiment of the insertion chute according to the invention will be described, said insertion chute in its general design being based on an alternative embodiment of the above discussed prior art, i.e. the insertion chute 303 is basically of a unitary structure with integral upper and lower portions 303a and 303b and with a single connecting flange 308a provided on the exterior of the insertion chute 303 at the transition between the upper and lower portions of the insertion chute. Said single connecting flange 308a forms the flange joint 308 in cooperation with the connecting flange 308g of the branching. The portion of the single flange 308a forming the bottom of the superstructure 311 is provided with a box-like upwardly projecting extension 330, that is consisting of four upstanding walls 331 covered by a firmly connectable but removable lid 332 which, as will be understood, is provided for maintenance and/or repair purposes. In the illustrated embodiment the flange 308a is also, in its portion not forming the bottom of the superstructure 311, extended upwardly so as to form an outer housing 340 being substantially level with the outer surface of the branching 309, mainly for aesthetical purposes.

[0015] According to Figs. 3 and 4 the pivot transmission link 313 is operationally identical to the transmission link according to the prior art, but consists of two more distinct levers 313a, 313b which are furthermore displaced from each other in the direction of the axle journal 333 carrying said transmission link levers. More specifically a first end of said axle journal 333 is pivotally journalled in a suitable bearing 334 - preferably a slide bearing - provided on the inner surface of one of the upstanding walls 331 of the flange extension 330 whereas a midportion of the axle journal 333 is pivotally journalled in a further bearing 335 - likewise preferably a slide bearing - provided in the opposing, upstanding side wall 331 of the flange extension 330. The other end of the axle journal 333, that is the end opposite to the first end journalled in the bearing 334, extends through and beyond said last mentioned side wall 331 and carries fixed

thereto said one transmission link lever 313a in turn connected to the valve operating means 312.

[0016] In its portion between the upstanding side walls 331, and therefore between said bearings 334, 335 the axle journal 333 carries said other transmission link lever 313b connected to a conventional connecting or operating rod 314, i.e. there is no need for any specifically configurated operating rod as in the prior art design. With respect to the transmission link described above it should also be emphasized that the levers 313a, 313b are fixed to the axle journal 333 which in turn is rotatable in its bearings.

[0017] It is clear from the above description and is specifically illustrated in Fig. 4 that the connecting rod 314 is positioned in the centre plane of the insertion chute 303, as viewed in Fig. 4, but that the operating means 312 is displaced to one side of said centre line CL.

[0018] It is obvious that by employing suitable bearings and or supplementary gaskets or stuffing boxes an extremely fluid-tight transmission of the operating movement from the operating means 312 to the valve 316 may be obtained for providing a silent and effective operation of the insertion chute as well as of the entire refuse collecting system.

[0019] Mainly for aesthetical reasons it is also preferable to provide a pipe 336 leading from inside the superstructure to a position below the ground surface 130, for the purpose of passing electrical wires, cables, pressurized-air tubes etc. necessary for controlling and operating the valve, into the superstructure. Such wires, cables and tubes are in most cases laid in the ground and by employing the pipe 336 no such wires, cables and tubes will have to be drawn on the exterior of the chute. Finally it should also be noted that with minor modifications the embodiment according to Figs. 3 and 4 may be likewise applicable to the basic prior art configuration of the insertion chute according to Fig. 1, whereby the flange extension would preferably likewise be provided in the flange of the upper chute portion but could be provided in either of the connecting flanges, with the remaining flanges having corresponding cutouts for accomodating the extension or the connecting rod and the transmission lever.

[0020] Although a preferred embodiment of the present invention has been illustrated and disclosed herein it should be obvious that further modifications may be carried out by men skilled in the art without departing from the scope of the invention. Thus, the scope of the invention shall only be determined by the enclosed patent claims.

Claims

1. Isolated insertion chute (303) of the kind wherein several chutes at spaced intervals are connected to an underground suction conveying conduit communicating with a refuse suction system, the upper end of each chute above ground comprising a closable insertion opening and the lower end of each chute below ground being connected to the suction conveying conduit communicating therewith through a valve means (316) provided in the insertion chute, said insertion chute (303) comprising an upper chute portion (303a) and a lower chute portion (303b), and at least one connecting flange (308a) in the transition area between the upper chute portion (303a) and the lower chute portion (303b) the lower chute portion (303b) being received in a branching (309) extending from the suction conveying conduit and at its upper end also having a connecting flange (308g), said at least one connecting flange (308a) of the insertion chute (303) being releasably connected to the connecting flange (308g) of the branching (309) and the branching (309) having such a length in relation to the depth of the suction conveying conduit below the ground surface that the flange joint (308) formed by the connecting flanges (308a, 308g) is positioned above the ground surface (130), a box-like superstructure (311) being welded to the upper chute portion and in the box-like superstructure a valve operating means (312) being journalled, said valve operating means (312) being connected to a transmission link (313) to which is likewise connected one end of an operating rod (314) which at its other end is connected to the valve means (316) mounted at the lower end of the lower chute portion (303b), **characterized in that** one of the connecting flanges is provided with an upwardly projecting extension (330) in which an axle journal (333) of the transmission link (313) is pivotally journalled, one lever (313b) of the transmission link (313) being fixed to said axle journal inside the extension (330) and another transmission link lever (313a) being fixed to the axle journal (333) outside said extension (330).

2. Insertion chute according to claim 1, **characterized in that** the axle journal (333) at one of its ends is journalled adjacent the inner surface of one side wall (331) of the extension (330) and with its other end extends through and past an opposite side wall (331) of the extension, said transmission link levers (313b and 313a respectively) being fixed to the axle journal (333) on opposite sides of said other side wall (331) of the extension (330) and said axle journal (333) being journalled in said other side wall (331) through a fluid tight bearing.

3. Insertion chute according to claim 1 or 2, **characterized in that** the insertion chute (303) is designed as a unit with the upper chute portion (303a) and the lower chute portion (303b) integral with each other and **in that** a connecting flange (308a) is provided externally on the insertion chute (303) at the

transition between the upper and lower chute portions.

4. Insertion chute according to claim 1 or 2, **characterized in that** the insertion chute consists of a separate upper chute portion which at its lower end is provided with a connecting flange, and a separate lower chute portion which at its upper end is provided with a connecting flange, and **in that** the connecting flange of the lower chute portion is releasably clamped between the connecting flange of the upper chute portion and the connecting flange of the branching.

Patentansprüche

1. Freistehender Einwurfschacht (303) der Art, dass mehrere Schächte in regelmäßigen Abstandsintervallen mit einer unterirdischen Saugförderleitung verbunden sind, welche mit einer Abfallsauganlage kommuniziert, wobei das obere Ende jedes Schachts überirdisch eine verschließbare Einwurföffnung umfasst und das untere Ende jedes Schachts unterirdisch mit der Saugförderungsleitung verbunden ist, die mit diesem durch ein in dem Einwurfschacht vorgesehenes Ventilmittel (316) kommuniziert, wobei der Einwurfschacht (303) einen oberen Schachtabschnitt (303a) und einen unteren Schachtabschnitt (303b) umfasst, und zumindest einen Verbindungsflansch (308a) in dem Übergangsbereich zwischen dem oberen Schachtabschnitt (303a) und dem unteren Schachtabschnitt (303b), wobei der untere Schachtabschnitt (303b) in einer Verzweigung (309) aufgenommen wird, welche sich von der Saugförderleitung erstreckt und in ihrem oberen Ende ebenfalls einen Verbindungsflansch (308g) aufweist, wobei der zumindest eine Verbindungsflansch (308a) des Einwurfschachts (303) lösbar mit dem Verbindungsflansch (308g) der Verzweigung (309) verbunden ist und die Verzweigung (309) in Relation zu der Tiefe der Saugförderleitung unterhalb der Bodenfläche eine solche Länge aufweist, dass die von den Verbindungsflanschen (308a, 308b) gebildete Flanschverbindung (308) oberhalb der Bodenfläche (130) positioniert ist, wobei ein gehäuseartiger Aufbau (311) an den oberen Schachtabschnitt angeschweißt und in dem gehäuseartigen Aufbau ein Ventilbetätigungsmittel (312) gelagert ist, wobei das Ventilbetätigungsmittel (312) mit einem Übertragungsglied (313) verbunden ist, mit dem ebenfalls ein Ende einer Betätigungsstange (314) verbunden ist, welche an ihrem anderen Ende mit dem am unteren Ende des unteren Schachtabschnitts (303b) befestigten Ventilmittel (316) verbunden ist,
dadurch gekennzeichnet,
dass einer der Verbindungsflansche mit einer aufwärtsgerichteten Verlängerung (330) versehen ist, in der ein Achsgelenk (333) des Übertragungsgliedes (313) drehbar gelagert ist, wobei ein Hebel (313b) des Übertragungsgliedes (313) an dem Achsgelenk im Inneren der Verlängerung (330) befestigt ist und ein anderer Übertragungsgliedhebel (313a) an dem Achsgelenk (333) außerhalb der Verlängerung (330) befestigt ist.

2. Einwurfschacht nach Anspruch 1,
dadurch gekennzeichnet,
dass das Achsgelenk (333) an einem seiner Enden angrenzend an der inneren Oberfläche einer Seitenwand (331) der Verlängerung (330) gelagert ist und sich mit seinem anderen Ende durch und hinter einer gegenüberliegenden Seitenwand (331) der Verlängerung erstreckt, wobei die Übertragungsgliedhebel (313b bzw. 313a) an dem Achsgelenk (333) auf gegenüberliegenden Seiten der anderen Seitenwand (331) der Verlängerung (330) befestigt sind und das Achsgelenk (333) in der anderen Seitenwand (331) durch eine flüssigkeitsdichte Lagerung gelagert ist.

3. Einwurfschacht nach Anspruch 1 oder 2,
dadurch gekennzeichnet,
dass der Einwurfschacht (303) als eine Einheit ausgebildet ist, zusammen mit dem oberen Schachtabschnitt (303a) und dem unteren Schachtabschnitt (303b) als integralem Bestandteil, und dass ein Verbindungsflansch (308a) außerhalb an dem Einwurfschacht (303) an dem Übergang zwischen den oberen und unteren Schachtabschnitten vorgesehen ist.

4. Einwurfschacht nach Anspruch 1 oder 2,
dadurch gekennzeichnet,
dass der Einwurfschacht aus einem separaten oberen Schachtabschnitt besteht, der an seinem unteren Ende mit einem Verbindungsflansch versehen ist, und einem separaten unteren Schachtabschnitt, der an seinem oberen Ende mit einem Verbindungsflansch versehen ist, und dass der Verbindungsflansch des unteren Schachtabschnitts lösbar eingespannt ist zwischen dem Verbindungsflansch des oberen Schachtabschnitts und dem Verbindungsflansch der Verzweigung.

Revendications

1. Goulotte d'insertion isolée (303) du type dans lequel plusieurs goulottes à intervalles séparées sont reliées à un conduit souterrain d'évacuation par aspiration communiquant avec un système d'aspiration de déchets, l'extrémité supérieure de chaque goulotte au-dessus du sol comprenant une ouverture d'insertion pouvant être fermée, et l'extrémité infé-

rieure de chaque goulotte sous le sol étant reliée au conduit d'évacuation par aspiration communiquant avec lui au moyen d'une valve (316) ménagée dans la goulotte d'insertion, ladite goulotte d'insertion (303) comprenant une portion supérieure de goulotte (303a) et une portion inférieure de goulotte (303b), et au moins un flasque de connexion (308a) dans la zone de transition entre la portion supérieure de goulotte (303a) et la portion inférieure de goulotte (303b), la portion inférieure de goulotte (303b) étant reçue dans un embranchement (309) s'étendant depuis le conduit d'évacuation par aspiration et à son extrémité supérieure ayant également un flasque de connexion (308g), ledit au moins un flasque de connexion (308a) de la goulotte d'insertion (303) étant connecté de façon libérable au flasque de connexion (308g) de l'embranchement (309) et l'embranchement (309) ayant une longueur en relation avec la profondeur du conduit d'évacuation par aspiration sous la surface du sol telle que le joint de flasque (308) formé par les flasques de connexion (308a, 308g) est positionné au-dessus de la surface du sol (130), une superstructure de type boîte (311) étant soudée à la portion supérieure de goulotte et, dans la superstructure de type boîte, des moyens (312) de manoeuvre de valve étant disposés sur palier, lesdits moyens de manoeuvre de valve (312) étant connectés à une liaison de transmission (313) à laquelle est également connectée une extrémité d'une tige de manoeuvre (314) qui à son autre extrémité est connectée aux moyens de valve (316) montés à l'extrémité inférieure de la portion inférieure de goulotte (303b), **caractérisée en ce que** l'un des flasques de connexion est doté d'une protubérance se projetant vers le haut (330) dans laquelle un palier d'essieu (333) de la liaison de transmission (313) est disposée dans un palier de façon pivotante, un levier (313b) de la liaison de transmission (313) étant fixé audit palier d'essieu à l'intérieur de l'extension (330) et un autre levier de liaison de transmission (313a) étant fixé audit palier d'essieu (333) hors de ladite extension (330).

2. Goulotte d'insertion selon la revendication 1, **caractérisée en ce que** le palier d'essieu (333) est porté à l'une de ses extrémités par un palier adjacent à la surface intérieure d'une paroi latérale (331) de la protubérance (330) et avec son autre extrémité s'étend au travers de et au-delà d'une paroi latérale opposée (331) de la protubérance, lesdits leviers de liaison de transmission (313b et 313a respectivement) étant fixés au palier d'essieu (333) sur les côtés opposés de ladite autre paroi latérale (331) de l'extension (330) et ledit palier d'essieu (333) étant supporté sur palier dans ladite autre paroi latérale (331) au travers d'un palier serré à fluide.

3. Goulotte d'insertion selon la revendication 1 ou 2, **caractérisée en ce que** la goulotte d'insertion (303) est conçue comme une unité avec la portion supérieure de goulotte (303a) et la portion inférieure de goulotte (303b) qui sont d'une pièce l'une avec l'autre et **en ce qu'**un flasque de connexion (308a) est disposé à l'extérieur sur la goulotte d'insertion (303) à la transition entre les portions supérieure et inférieure de goulotte.

4. Goulotte d'insertion selon la revendication 1 ou 2, **caractérisée en ce que** la goulotte d'insertion se compose d'une portion séparée supérieure de goulotte qui est pourvue à son extrémité inférieure d'un flasque de connexion, et d'une portion séparée inférieure de goulotte qui est pourvue à son extrémité supérieure d'un flasque de connexion, et **en ce que** le flasque de connexion de la portion inférieure de goulotte est serré de façon libérable entre le flasque de connexion de la portion supérieure de goulotte et le flasque de connexion de l'embranchement.

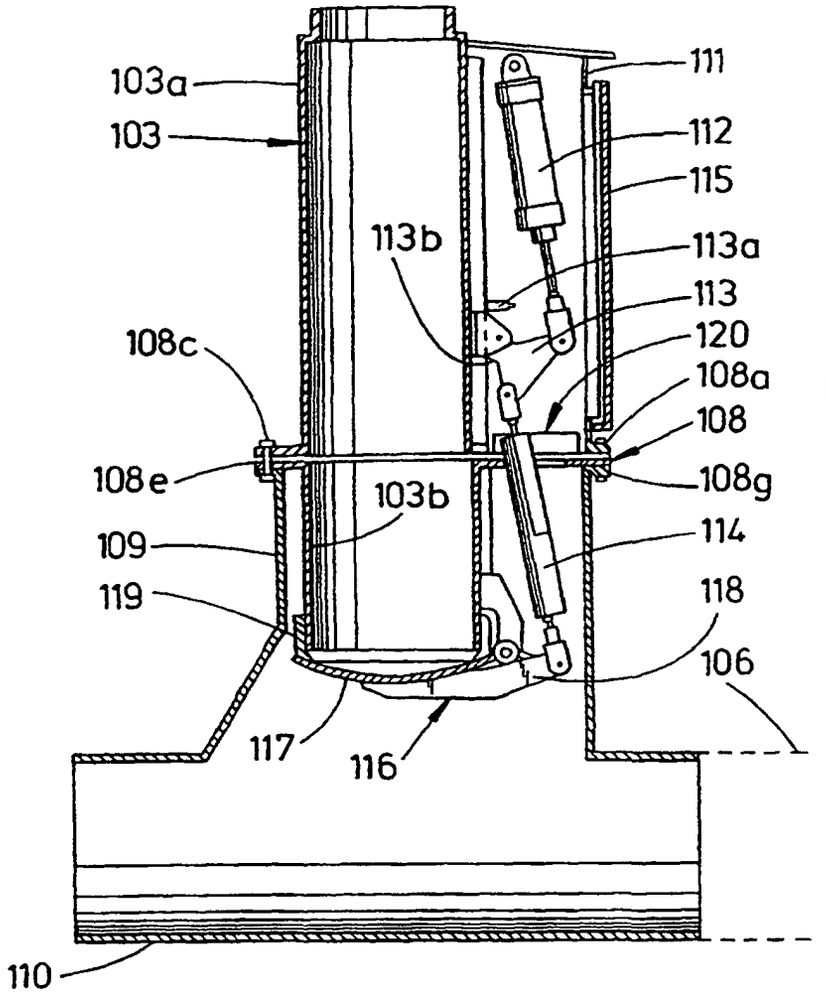

Fig.1
PRIOR ART

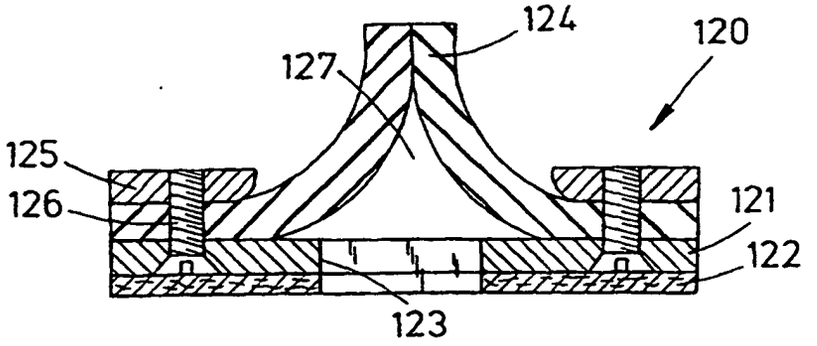

Fig.2
PRIOR ART

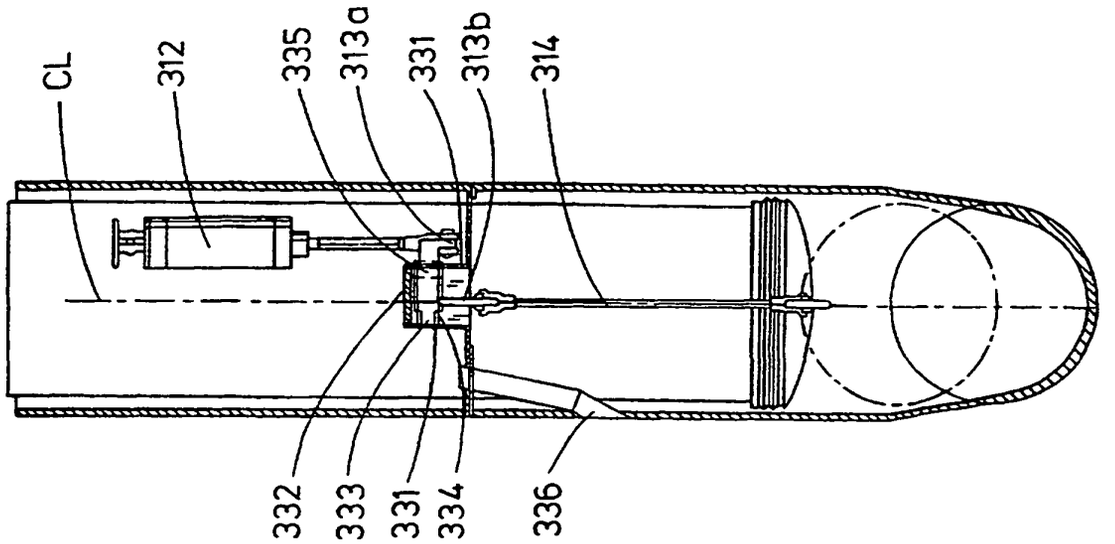
CL
312
335
313a
331
313b
314
332
333
331
334
336

Fig.4

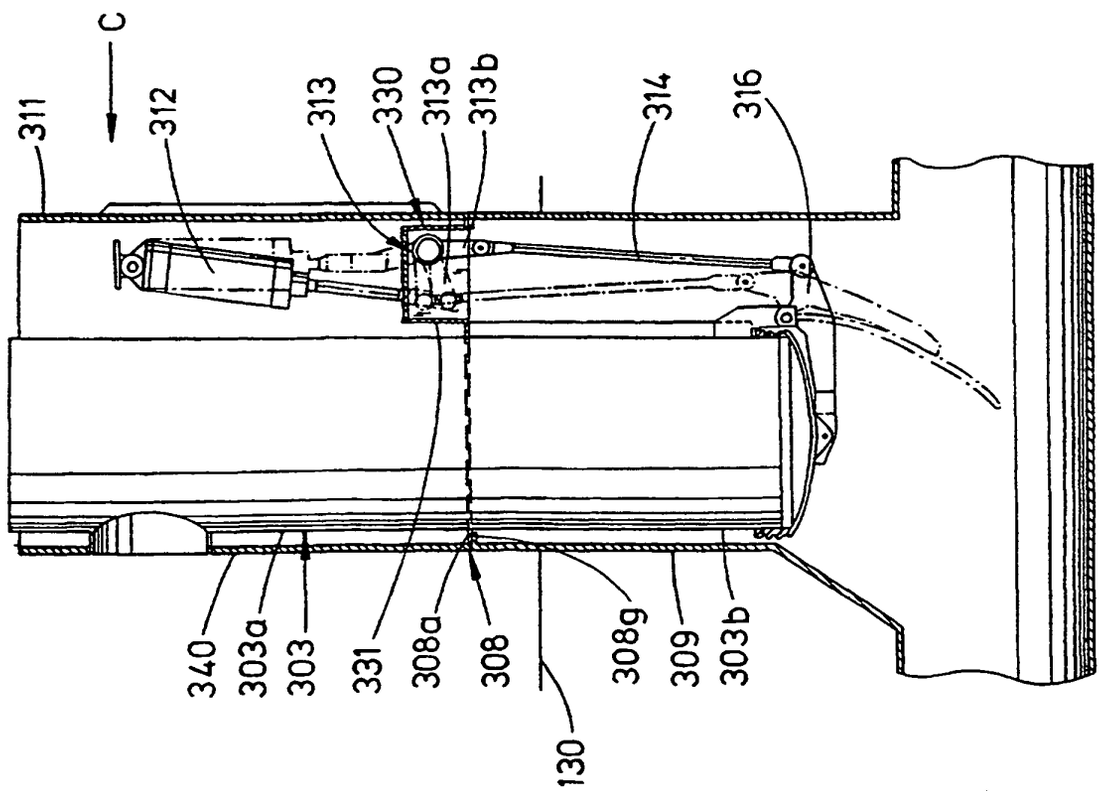
C
311
312
313
330
313a
313b
314
316
340
303a
303
331
308a
308
308g
309
303b
130

Fig.3