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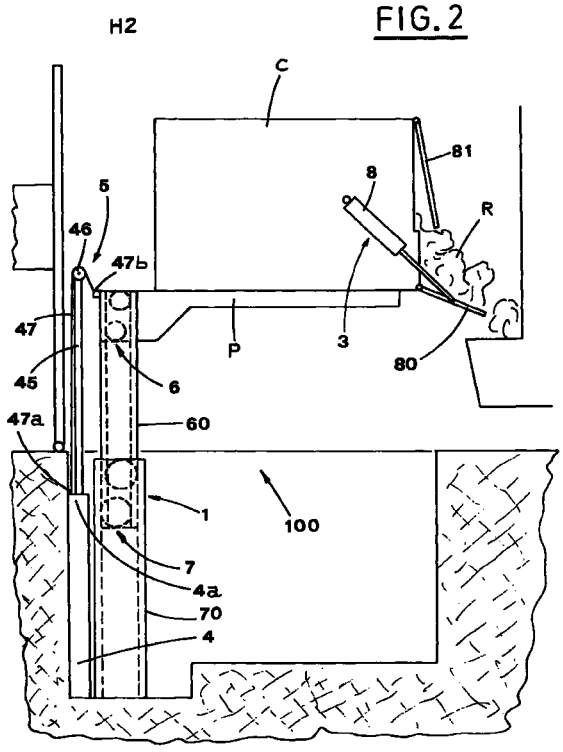
(54) System for lifting a container from a seat embedded in the ground and discharging wastes from the container into a body situated on a vehicle

(57) A system for lifting a container from a seat embedded in the ground and for discharging the wastes contained therein to a body of a vehicle includes a first working unit (1), situated in a recess (10) made in the bottom wall of said embedded seat (S). The first working unit (1) moves the container (C) from a lowered position (H1), in which it disappears inside the seat (S), to a raised position (H2), in which the container (C) is completely lifted from the seat, and vice-versa.

The system includes also a second working unit (2) and a third working unit (3), joined directly to said container (C) and aimed at discharging the wastes contained therein to a wastes collecting body.

FIG. 2



EP 1 074 487 A1

Description

[0001] The present invention relates to collection of solid urban wastes, with particular reference to a system for lifting a container situated in a seat embedded in the ground and discharging wastes contained in the container into a body situated on a vehicle.

[0002] Known containers for collecting solid urban wastes are housed in suitable seats embedded in the ground and equipped with a liftable cover.

[0003] The arrangement of the containers in the seats embedded in the ground and not accessible directly from outside allows to free the street from usual wheeled containers and to avoid bad smell and bacteria originating from the wastes prolonged stay in the containers.

[0004] The containers embedded in the ground are emptied by devices which lift, partially or wholly, the container from the embedded seat.

[0005] The systems for partial lifting the containers, usually allow to access from outside the lifting attachment points of the containers.

[0006] Therefore, in order to empty the container, the wastes collecting vehicle must engage the container at the lifting attachment points, lift the container completely and overturn it, so that the wastes fall into a suitable body, joined to the vehicle.

[0007] These operations are extremely complicated and can be carried out only by skilled operators. Moreover, these operations can be dangerous for the operators if they are not carried out with maximum attention and care.

[0008] The devices which lift completely the containers from the relative seats, prepare the container to be overturned onto the bodies joined to the vehicles.

[0009] Also in this case, the operations necessary to empty the container cannot be promptly carried out and anyway, it is always necessary to overturn the container.

[0010] Moreover, it is to be pointed out that, once emptied into the body of the wastes collecting vehicle, the container must be positioned again in the region of the lifting device, so as to be replaced inside the embedded seat.

[0011] Therefore, special coupling elements must be provided for coupling the container with the lifting device, so as to facilitate repositioning operations.

[0012] This considerably increases design and manufacture difficulties for such types of lifting devices, thus increasing considerably the costs.

[0013] The object of the present invention is to propose a device for lifting a container from a seat embedded in the ground and discharging wastes contained in the container into a body situated on a vehicle, which allows to avoid the above problems.

[0014] More precisely, the object of the present invention is to propose a system, which ensures a complete lifting of a container from the embedded seat and consequently emptying thereof by simple and reliable operations, safe for the operators.

[0015] Another object of the present invention is to propose a system, which allows to discharge the wastes accumulated in the container without using interposed means for coupling with the wastes collecting vehicle.

[0016] A further object of the present invention is to propose a system, which obtains the above objects by a simple, extremely functional solution which is cheap with respect to its operation.

[0017] The above mentioned objects are obtained in accordance with the appended claims.

[0018] The characteristic features of the present invention will be pointed out in the following description of a preferred, but not only embodiment, with reference to the enclosed tables of drawings, in which:

- Figure 1 schematically shows a lateral view of the proposed system in the working position, in which the container is housed inside the embedded seat;
- Figure 2 is a schematic lateral view of the proposed system in the working position, in which the container is completely lifted up and the wastes contained therein are discharged into the body of the wastes collecting vehicle;
- Figure 3 schematically shows a lateral view of an interesting embodiment of the proposed system during a working step, in which the container is emptied and the wastes contained therein discharged into the body of the wastes collecting vehicle;
- Figure 4 is a schematic cross-section view taken along line IV - IV of Figure 3;
- Figures 5a and 5b are schematic lateral views of particularly significant elements of the proposed system, in two distinct working positions;
- Figure 6 is a schematic cross-section view taken along line VI - VI of Figure 5a;
- Figure 7 is a schematic front section view of other significant elements of the proposed system;
- Figure 8 is an enlarged view of the detail K of Figure 1.

[0019] With reference to the above figures, reference numeral S indicates a seat embedded in the ground, in which a container C for collecting solid urban wastes is housed. A closing cover 300, moved in known way around a hinge 301, is associated to the seat S.

[0020] The reference numeral 100 indicates the system for lifting the container C from the embedded seat S and for discharging the wastes R contained therein into a body placed on a vehicle.

[0021] The system 100 includes three separate working units: first 1, second 2 and third 3.

[0022] The container C is rigidly supported by a platform P, which is controlled by the first working unit 1 housed in a recess 10 made in the bottom wall of the embedded seat S near a side wall S3.

[0023] The first working unit 1 includes hydraulic lifting means 4 fastened, e.g. as shown in Figure 1, to the wall S3 of the embedded seat S.

[0024] The lifting means 4 include e.g. a pair of hydraulic pistons 45, only one of which is shown, moving vertically inside the relative cylinders.

[0025] Each of the pistons 45 supports, at its upper end, a pair of rotating sprocket wheels 46, only one of which is shown, which engage with chains 47.

[0026] The chains 47 are fastened, with their first end 47a, to a wall 4a of the actuators 4, and with their second end 47b, to the platform P.

[0027] The engaging of the chains 47 with the sprocket wheels 46 defines mechanisms 5, which cooperate with the hydraulic lifting means 4, so as to allow the platform P to translate alternately in a vertical direction.

[0028] First sliding means 6 are supported for rotation by the platform P in the region of two lateral ends.

[0029] The first sliding means 6 include two pairs or rollers, first 61 and second 62, each of which includes lower rollers 61b and upper rollers 61a.

[0030] The lower rollers 61b and the upper rollers 61a roll inside a groove 59 made in first vertical guides 60.

[0031] The lower ends of the first vertical guides 60 are equipped with second sliding means 7, including a two pairs or rollers, third 71 and fourth 72, each of which includes lower rollers 71b and upper rollers 71a.

[0032] The lower rollers 71b and the upper rollers 71a roll inside a groove 69 made in second vertical guides 70.

[0033] The second vertical guides 70 are fastened to the opposite side walls S1 and S2 of the seat S.

[0034] Thus, the platform P slides alternately with respect to the first vertical guides 60, while the first vertical guides 60 slide alternately with respect to the second vertical guides 70.

[0035] The platform P moves between two separate working positions: a lowered position H1 and a raised position H2, operated by the above first working unit 1 and by the sliding of the first sliding means 6 inside the first vertical guides 60 and the sliding of the second sliding means 7 of the first vertical guides 60 with respect to the second vertical guides 70.

[0036] When the platform P is in the lowered position H1 (Figure 1), the container C disappears completely inside the embedded seat S, and when the platform P is in the raised position H2 (Figures 2, 3), the container C is completely lifted up and positioned near a vehicle and the relative body for discharging wastes.

[0037] In its inside, the container C is equipped with an inclined bottom 11, which extends from a first head 12 to a second head 13, opposite to the first one; the latter is constituted by putting an active panel 80 over a passive panel 81.

[0038] The above mentioned second working unit 2, joined to the container C in the region of the first head 12, includes an actuator 20 connected to driving means 30 situated in the region of the inclined bottom 11 and extending from the first head 12 to the second head 13.

[0039] The driving means 30 include a worm screw 31, connected to an actuator 20, and a lead nut 32, which is fastened, by a strip 33, to a pushing surface 40, situated inside the container C, parallel to the first head 12 and to the second head 13.

[0040] The strip 33 passes through a slot 35 made in the inclined bottom 11 and equipped with a protection seal 34.

[0041] The driving means 30 are aimed at moving, in cooperation with supporting and guiding means 39, the pushing surface 40 from the first head 12 to the second head 13, and vice-versa.

[0042] The translation of the pushing surface 40 from the first head 12 to the second head 13 allows to push and compact the wastes inside the container C toward the second head 13.

[0043] The above mentioned supporting and guiding means 39 include upper wheels 42 and lower wheels 41, fastened rotatably to the pushing surface 40.

[0044] The upper wheels 42 and the lower wheels 41 are equipped, as shown in Figure 7, with relative grooves 410 aimed at coupling with corresponding upper section bars 43 and lower section bars 44, fastened to the opposite inner lateral walls 48 and 49 of the container C.

[0045] The above mentioned upper section bars 43 and lower section bars 44 extend from the first head 12 to the second head 13 parallel to the inclined bottom 11, thus having the same inclination.

[0046] The above mentioned active panel 80 is fastened rotatably to the lower edge of the second head 13 and is connected to the above mentioned third working unit 3, which includes a pushing actuator 8 situated near the second head 13.

[0047] The passive panel 81 is freely hinged to the upper edge of the second head 13.

[0048] The above mentioned panels forms a discharge way for the wastes contained in the container.

[0049] According to an interesting embodiment, the recess 10 housing the first working unit 1 can be made in the region of the central area S4 of the pavement of the embedded seat S.

[0050] Some technical-functional precautions are taken, so as to avoid spreading outside of possible miasma generated by the wastes, as shown in Figure 8.

[0051] With reference to Figure 8, the reference numeral 302 indicates a tubular element which surrounds the upper part of the seat S.

[0052] A base 303 of a section bar 304 with a substantially U-like vertical section, is fastened to the tubular element.

[0053] The outer wing 305 touches the ground and has an upper part 305A which is inclined outwards and joins a horizontal part 305B flush with the upper part of the cover 300, when the latter is in the closing position

of the seat S.

[0054] The inner wing 306, whose height is smaller than the thickness of the cover, receives a permanent gasket 307.

[0055] The cover 300 includes a beam 400 and a covering sheet 401.

[0056] When the cover is in closing position, the head 400A of the beam 400 leans against the tubular element 302, but is inner with respect to the inner wing 306, while the dimensions of the covering sheet 401 allow it to be placed near the inclined part 305A.

[0057] The part 401A of the covering sheet 401 extending from the head 400A of the beam 400 is stiffened by a section bar 405, which is situated below it and fastened to the head 400A and to which the part 401A is fastened.

[0058] A first seal 415 is fastened to the inner edge of the beam 400 and is aimed, with the cover 300 in the closing position, at going in abutment on the tubular element 302, while a second seal 416 is aimed at going in abutment on the permanent gasket 307 and a third seal 417 goes in abutment on intercepting the inclined part 305A.

[0059] When the cover is in the closing position, the combined action of the first seal 415, second seal 416, third seal 417 cooperating respectively with the tubular element 302, the permanent gasket 307 and the inclined part 305A, creates tightness between the inside and outside, as well as between outside and inside.

[0060] The base 303 of the section bar 304 features an aperture 303A communicating with a discharge and/or drainage duct 420: thus possible liquids which for any reason are present in the section bar 304, are immediately moved away therefrom.

[0061] The operation of the above described system will be explained in the following.

[0062] When the wastes accumulated in the container are collected, the operator activates, by a suitable command given from outside, the first working unit 1, so as to lift the container situated in the lowered position H1; in step relation with this operation, the cover 300 is rotated, so as to be arranged vertical (Figure 2).

[0063] The lifting means 4 raise the pistons 45 allowing the chains 47 to turn around the sprocket wheels 46 thus raising the ends 47b fastened to the platform P.

[0064] The platform P begins to slide upwards due to the translation of the first sliding means 6 inside the first vertical guides 60.

[0065] The first vertical guides 60 begin to slide upwards inside the second vertical guides 70 in step relation with reaching, by the first sliding means 6, of the stop of the first vertical guides 60.

[0066] It is to be pointed out that the height of the pistons 45 and of the length of the chains 47 allow to raise further the first vertical guides 60 with respect to the second vertical guides.

[0067] This advantageously allows to lift the container C with respect to the embedded seat S, so as to place it in adjacency of the body of the wastes collecting vehicle.

[0068] The second working unit 2 is operated in step relation with reaching, by the container C, of the raised position H2, in which the container is completely lifted.

[0069] The actuator 20 activates the driving means 30, which begin, cooperating with the supporting and guiding means 39, to translate the pushing surface 40, situated in correspondence to the first head 12 of the container, toward the second head 13.

[0070] The translation of the pushing surface 40 toward the second head 13 causes the shift and compacting of the wastes contained in the container toward the second head 13.

[0071] The advantageous presence of the inclined bottom facilitated the compacting operation.

[0072] The third working unit 3 is operated in step relation with the beginning of the pushing surface 40 translation.

[0073] The pushing actuator 8 acts on the active panel 80 making it rotate outwards and the passive panel 81 oscillates and rotates freely.

[0074] The rotation of the active panel 80 creates the opening necessary to discharge the wastes and to empty the container.

[0075] The passive panel 81, free to oscillate, slows down the wastes movement outward, orienting them toward the body situated below.

[0076] When the container is completely emptied, or anyway, when the pushing surface 40 has reached the second head 13, the actuator 20, through its driving means 39, withdraws the pushing surface 40 back to the first head 12.

[0077] In step relation, the third working unit 3 operates the device 8 for repositioning the active panel 80 to closing configuration.

[0078] While closing, the active panel 80 overlaps the passive panel 81.

[0079] Meanwhile, also the first working unit 1 is operated, so as to reposition the container, ready to collect new wastes, inside the embedded seat.

[0080] One of the major advantages of the system proposed by the present invention is that it allows to lift completely the container from a seat embedded in the ground and to discharge the wastes contained therein without lifting again or overturning the container.

[0081] The three working units of the proposed system allow the wastes collecting operators to work in whole security by performing completely automated and extremely fast operations.

[0082] It is to be pointed out that two pairs of vertical guides, one pair sliding with respect to the other, allow advantageously to lift the container on different levels, in relation to different body dimensions.

[0083] Moreover, the inclined bottom, together with the pushing surface situated inside the container facili-

tates the wastes discharging operations.

[0084] The container can be lifted in a continuous, fast and regular way, due to the chains 47 turning around the sprocket wheels 46 lifted by the pistons 45.

[0085] Further, the particular arrangement of the pairs of rollers inside the grooves of the vertical guides assures best balance and distribution of effort, thus making the whole structure advantageously stable.

[0086] Besides, it is to be pointed out that the fundamental elements of the proposed system are very few and simple to produce, which results in lower costs.

Claims

1. System for lifting a container from a seat embedded in the ground and for discharging the wastes from the container into a body situated on a vehicle, characterized in that it includes:

   a first working unit (1) housed in a recess (10) made in the bottom wall of the embedded seat (S), the working unit (1) being aimed at translating alternately a platform (P) in vertical direction, said platform (P) supporting rigidly said container (C) for wastes collecting and being positioned in two separate working positions: a lowered position (H1), in which the container (C) disappears completely inside said embedded seat (S), so as to accumulate wastes, and a raised position (H2), in which the container (C) is completely lifted and positioned near a body of a wastes collecting vehicle;
   a second working unit (2), joined to said container (C), which includes an inclined bottom (11) extending from a first head (12) to an opposite second head (13), said container (C) including an actuator (20), situated adjacent to said first head (12), so as to operate driving means (30), joined thereto and situated in the region of said inclined bottom (11), said actuator (20) aimed at, together with supporting and guiding means (39), moving a pushing surface (40) from said first head (12) to said second head (13), so as to compact and push the wastes towards the latter, and vice-versa, said second head (13) including a first active panel (80), hinged along the lower edge of said second head (13), and a second passive panel (81), hinged along the upped edge of said second head (13) and disposed over said first panel (80);
   a third working unit (3), situated near said second head (13) and including at least one pushing actuator (8) aimed at acting, in step relation with the translation of said pushing surface (40) from said first head (12) to said second head (13), on said first active panel (80), opening it, so as to make said second passive panel (81) rotate freely, said pushing actuator (8) being also aimed at acting, when the container (C) has been completely emptied, on said first active panel (80), so as to close it, which causes closing of said second passive panel (81).

2. System, according to claim 1, characterized in that said first working unit (1) includes lifting means (4) cooperating with mechanisms (5) capable of raising/lowering said platform (P) with respect to said seat (S), said platform (P) being made to translate alternately by first sliding means (6) along corresponding first moving vertical guides (60), the latter being made to translate alternately by second sliding means (7), along corresponding second fixed vertical guides (70).

3. System, according to claim 2, characterized in that said lifting means (4) include at least one pair of pistons (45) moving vertically, and in that said mechanisms (5) include at least one pair of sprocket wheels (46), supported rotatably by the ends of said pistons (45) and engaging with a relative pair of chains (47), with a first end (47a) of said chains (47) being fastened to a wall (4a) of said lifting means (4) and with a second end (47b) of said chains (47) being fastened to said platform (P).

4. System, according to claim 2, characterized in that said first sliding means (6) include at least two pairs, a first pair (61) and a second pair (62), respectively, of upper rollers (61a) and lower rollers (61b), fastened rotatably to said platform (P) and aimed at rotating inside a groove (59) made in said first moving vertical guides (60), and in that said second sliding means (7) include at least two pairs, a third pair (71) and a fourth pair (72), respectively, of upper rollers (71a) and lower rollers (71b), fastened rotatably to said first moving vertical guides (60) and aimed at rotating inside a groove (69) made in said second fixed vertical guides (70), the latter being fastened to opposite walls (S1,S2) of said seat (S).

5. System, according to claim 1, characterized in that said recess (10) for housing said first working unit (1) is made in adjacency of a lateral wall (S3) of said embedded seat (S).

6. System, according to claim 1, characterized in that said recess (10) for housing said first working unit (1) is made in the region of a central area (S4) of the bottom wall of said embedded seat (S).

7. System, according to claim 1, characterized in that said driving means (30) include a worm screw (31), extending parallel to and below said inclined bottom

(11), from said actuator (20) to said second head (13), and coupling with a lead nut (32), which is fastened rigidly, by a strip (33), to the lower part of said pushing surface (40).

8. System, according to claim 7, characterized in that said strip (33) passes, by interposing a protection seal (34), through a slot (35) made in the inclined bottom (11).

9. System, according to claim 1, characterized in that said supporting and guiding means (39) include upper wheels (42) and lower wheels (41), fastened rotatably to said pushing surface (40) and equipped with relative grooves (410), so as to couple with corresponding upper section bars (43) and lower section bars (44), which are fastened to the opposite inner lateral walls (48) and (49) of the container (C) and which extend from said first head (12) to said second head (13) parallel to said inclined bottom (11).

10. System, according to claim 1, in which said seat (S) features, joined thereto, a cover (300) moving from a horizontal closing position to a vertical opening position, obtained by rotation of said cover with respect to a horizontal hinge (301), the upper part of said seat (S) being surrounded by a tubular element (302), which carries fastened thereto, a section bar (304) with a substantially U-like vertical section and relative wings (306,305) turned upwards, said tubular element (302) and section bar (304) carrying, fastened thereto, a beam (400) forming a bearing structure of said cover and a covering sheet (401), characterized in that the lower edges of said beam (400) and covering sheet (401) are equipped with relative seals (415, 417), which are aimed, with the cover (300) in the closing position, at going in abutment on said tubular element (302) and said section bar (304), respectively.

11. System, according to claim 10, characterized in that it includes a second seal (416) situated between the inner wing (306) of said section bar (304) and the part (401A) of said sheet outer to the beam (400).

12. System, according to claim 10, characterized in that the base (303) of said section bar (304) features an aperture (303A) communicating with a discharge and/or drainage duct (420).

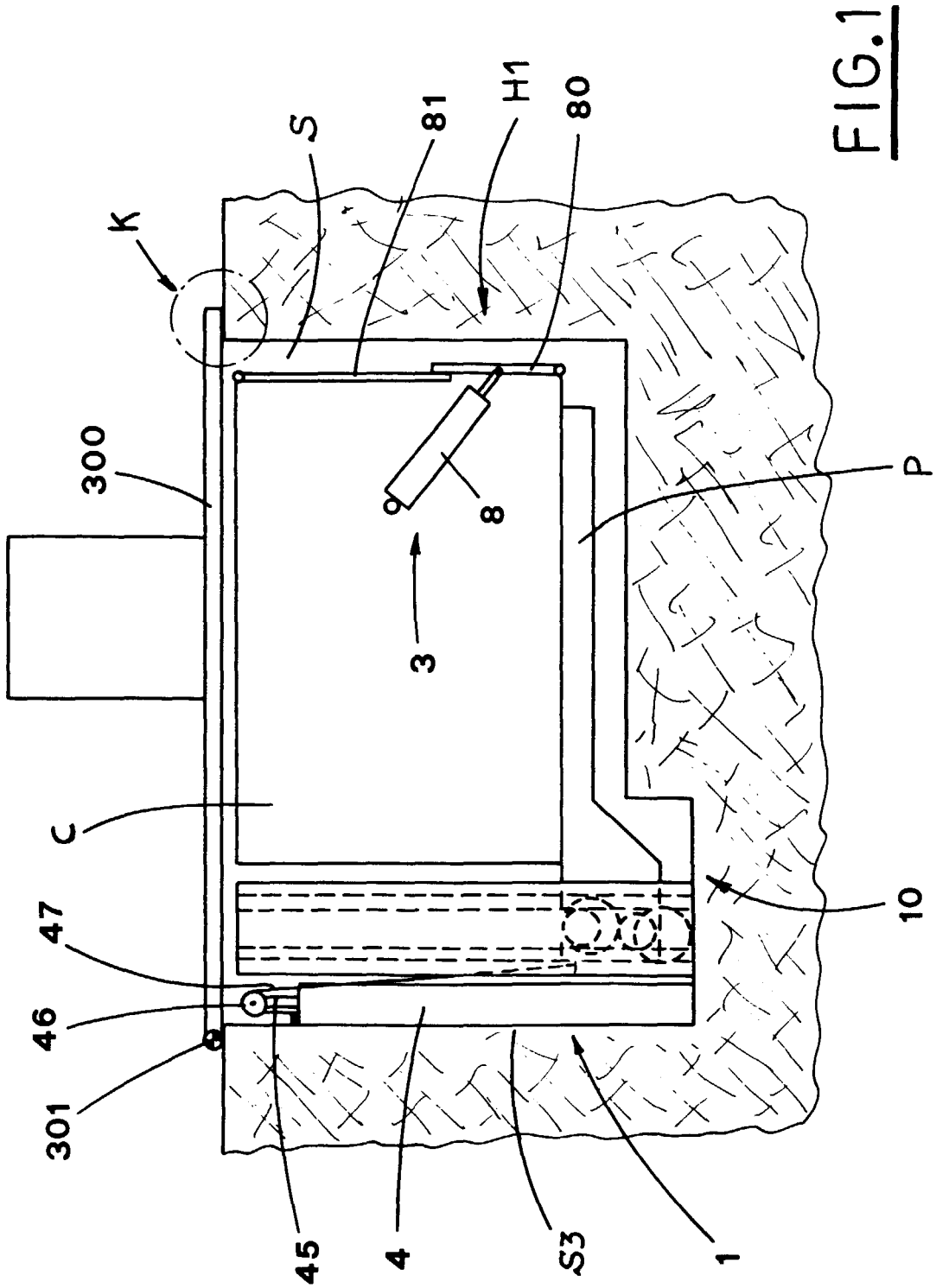
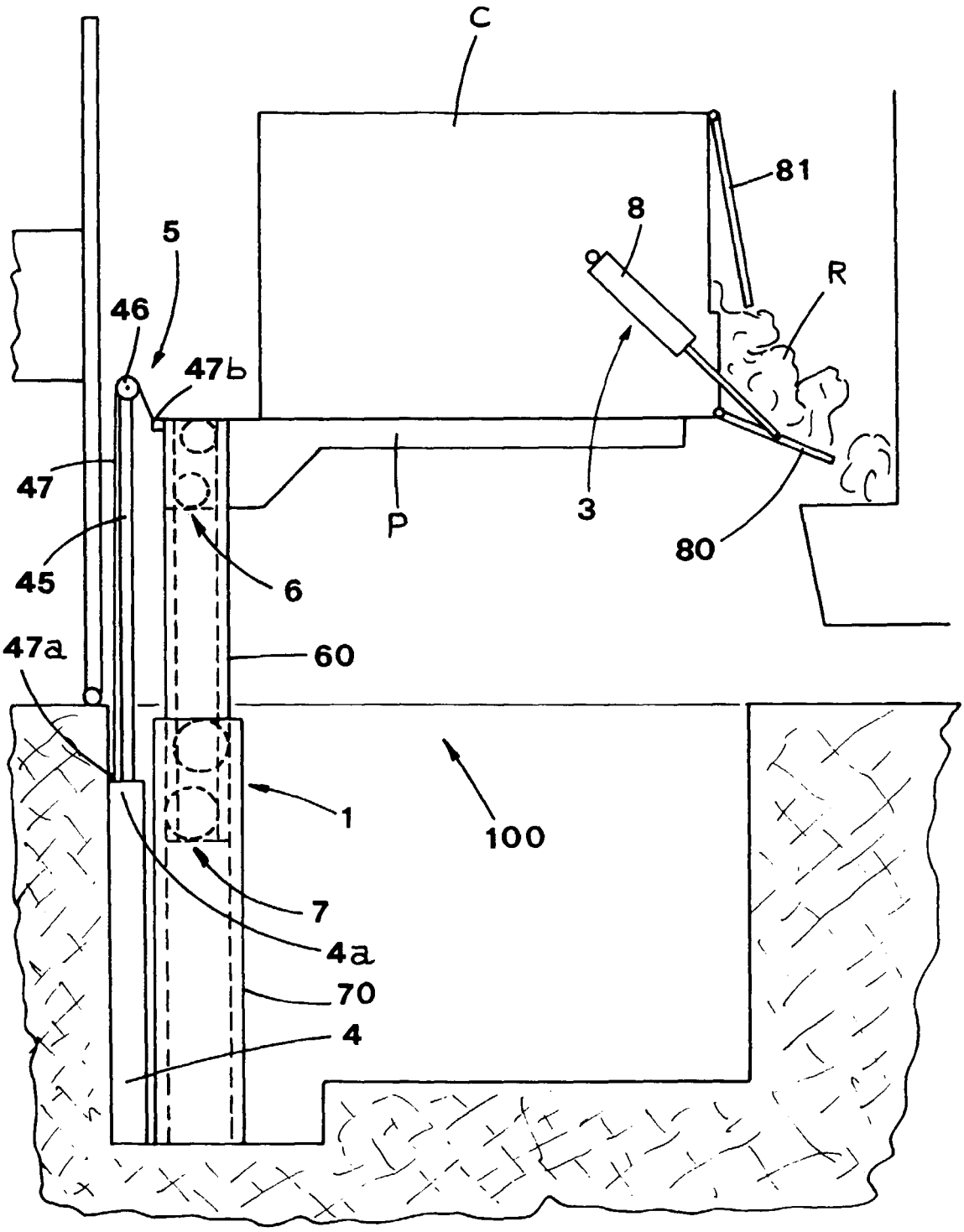


FIG.1

H2

FIG. 2



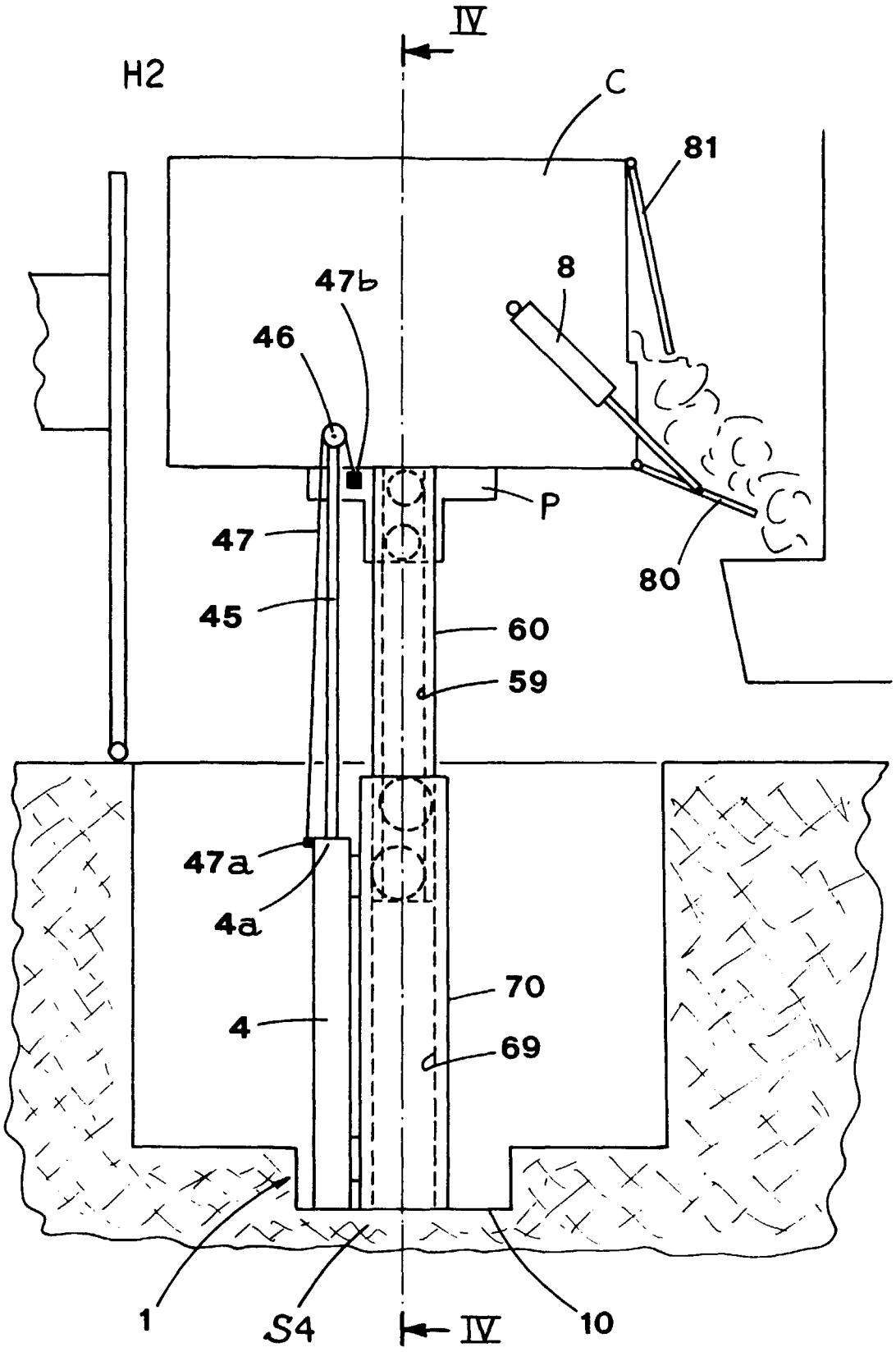


FIG.3

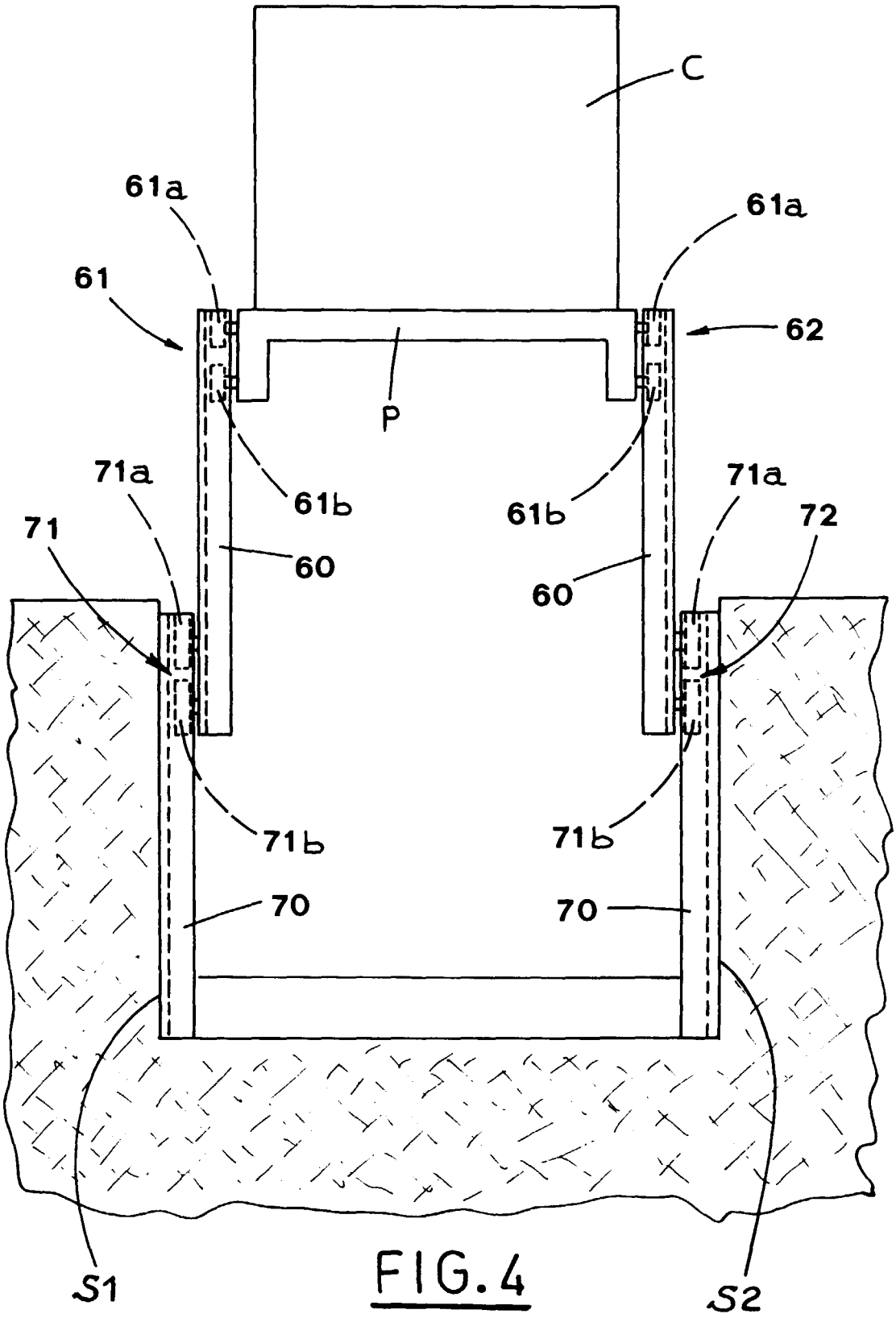


FIG. 4

FIG.5a

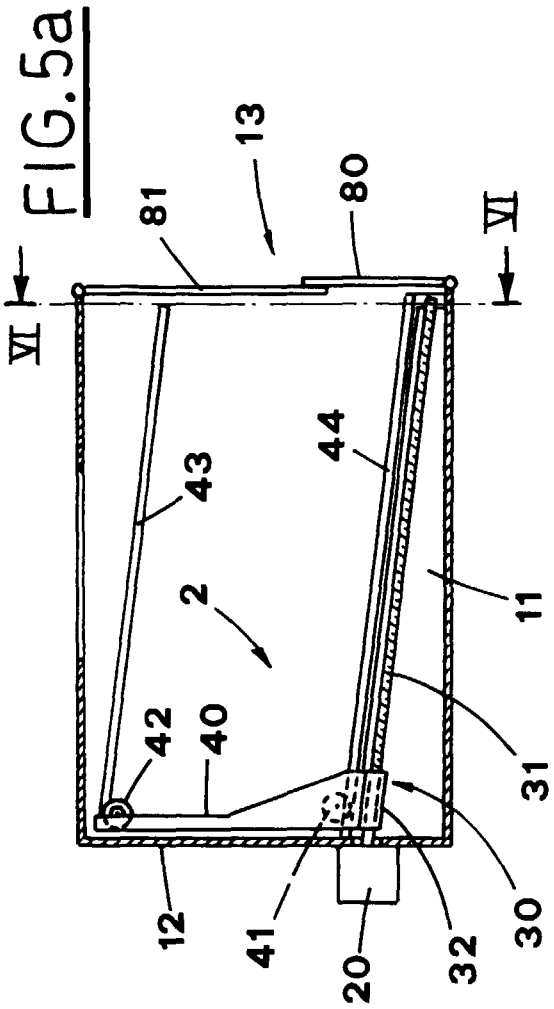


FIG.5b

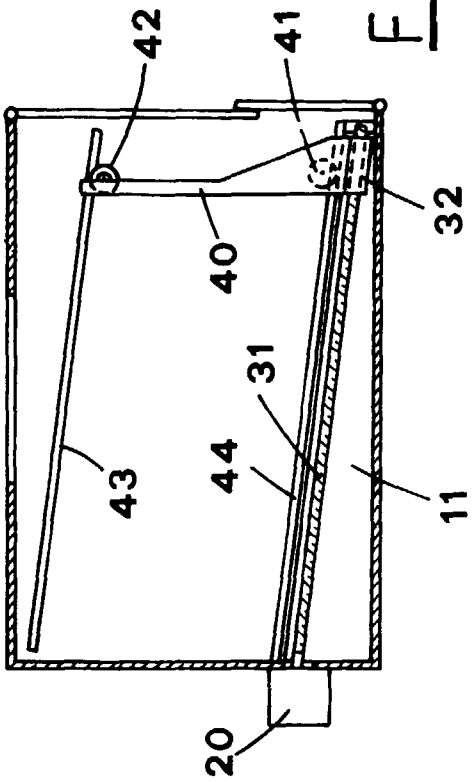


FIG.6

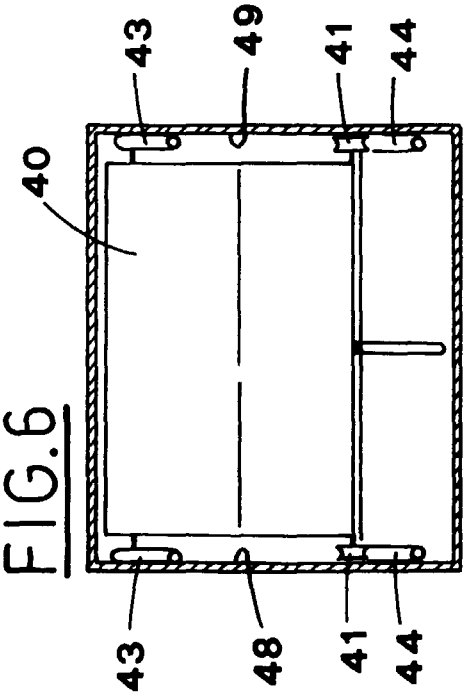
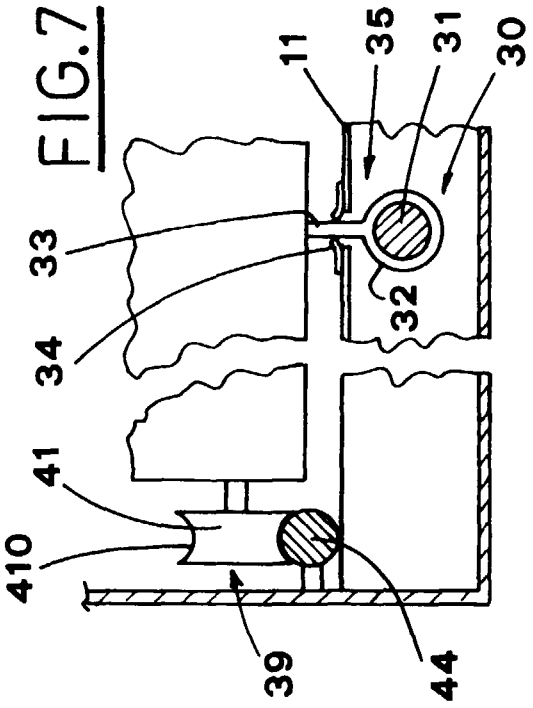
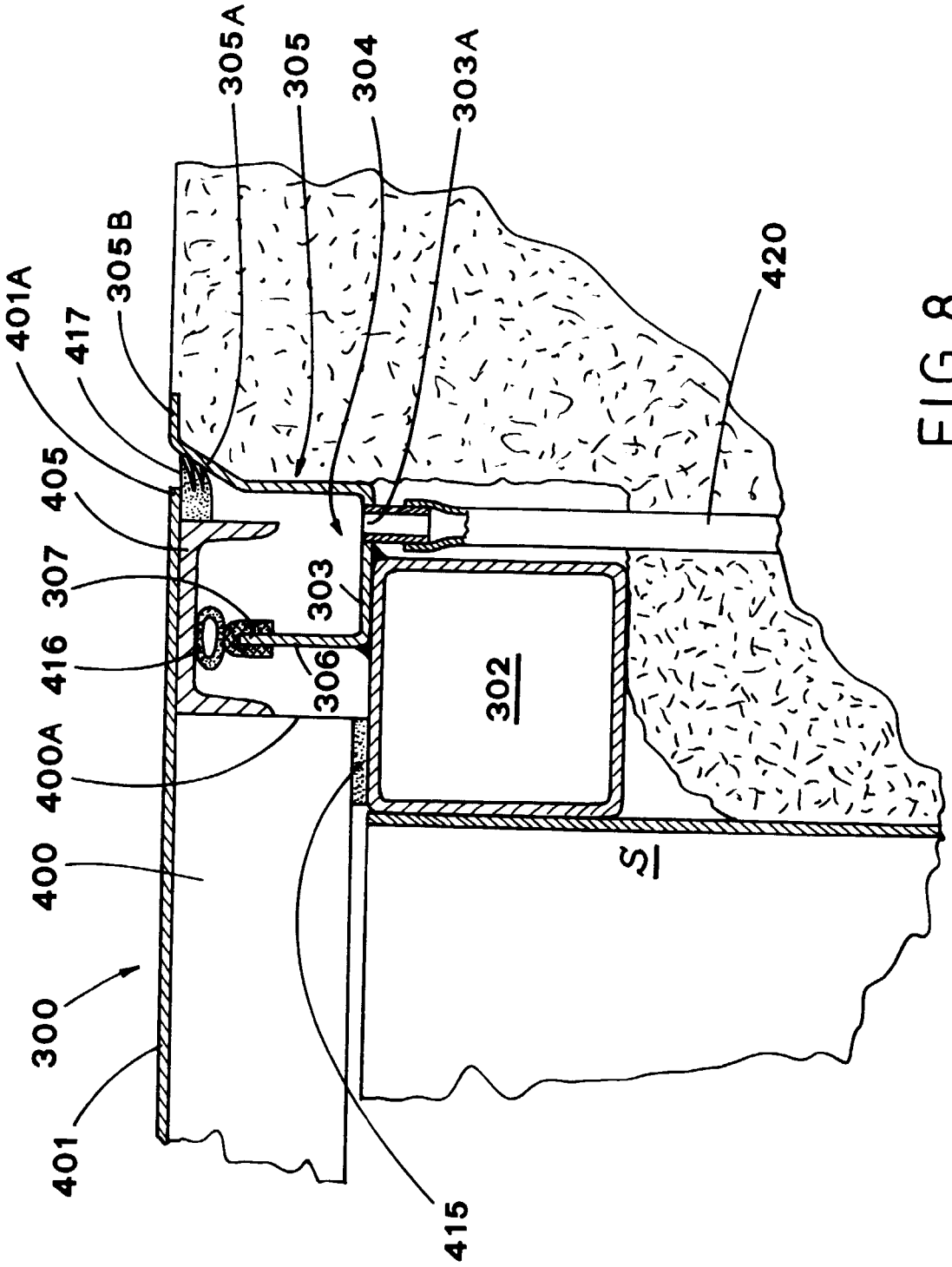


FIG.7




305A
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S

FIG.8

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 11 6202

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	DE 298 14 629 U (J. SCHÄFER) 5 November 1998 (1998-11-05) * page 3, line 4 - line 36 * * figures 1-3,6,7 *	1-5	B65F1/14
A	EP 0 576 405 A (D. BIONDI) 29 December 1993 (1993-12-29) * column 2, line 6 - column 3, line 21 * * figure 1 *	1,10	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	30 October 2000	Smolders, R

CATEGORY OF CITED DOCUMENTS

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82