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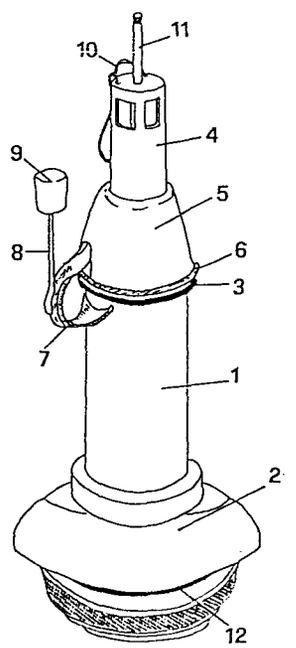
(54) System for differential discharge of suspended toilet tanks.

(57) System for suspended toilet tanks consisting of a cylindrical body (1) and an upper structure which can be raised with respect to said body (1) with a known rod, to cause the tank (13) to discharge a small amount of water, and equipped with a hook lever (7) with a float (9) attached, which joins body (1) and structure (4) so as to effect complete discharge of the water in the tank (13).



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System for differential discharge of suspended toilet tanks

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The invention concerns a system for discharge of suspended toilet tanks, whether incorporated in the toilet or on the wall, able to effect differential water discharges.

The current applicant has a previous patent, deposited in Italy as no. 48198 A/82, which claims the realization of a siphon system for high toilet tanks characterized by the fact that pressing the pneumatic button cuases only a few liters of water to be discharged first, sufficient for cleaning the toilet by removing urine only, and that pressing said button again causes complete discharge of the entire tank, in case a complete cleaning is required.

The aim of this invention is to realize the same function of differential discharge so as to achieve a considerable saving of water for any type of suspended tank system, characterized by a structure completely different from that of the siphon system and so unable to make use of the typical functional solutions of the siphon systems.

This aim is achieved with a system consisting of a preferably cylindrical body, equipped at the base with a float ring or the like, in correspondence to the opening for water discharge to the toilet, said body having mounted on it a structure, with its own float ring, which can block the upper opening of the cylindrical body itself and is equipped with a hook lever or the like, operated by a float so that on pulling up the discharge cord typical of suspended systems, following the floating of said hook lever, operated by the float on the water filling the tank, only the upper structure is raised and so water is discharged only from the filling level of the tank at the upper edge of the cylindrical body, corresponding to only a few liters; however letting said cord fall back allows the upper structure to be joined to the cylindrical body, with the result that a successive discharge operation performed by another pull up on the cord, cause both componenets to be raised up and so the water outlet to be opened on the bottom of the tank, with consequent discharge of the entire contents.

Said pulling up of the cord may be effected, in low suspended tanks, that is incorporated in the toilet, with a known knob or button system, and in high wall tanks, with a nylon cord device or the like, operated by a lever, which can advantageously replace the

traditional pneumatic system, which has a button which is too rigid and so difficult to operate.

In one variation, the added float may act on a two component multiple lever instead of the hook lever, so as to cause the direct differential opening of the seal plug of the tank, causing in succession first the discharge of a few liters of water and then the total discharge, with no need for the presence of said cylindrical body and said upper structure.

The invention is shown in two exemplificative and non-limiting embodiments in the attached figures, which show:

- figure 1, the complete axonometric view of the embodiment with the hook lever float;
- figures 2, 3 and 4 axonometric views of the operational phases of the embodimetn in figure 1;
- figure 5, the schematic view of the embodiment in the previous figures, with a button to operate a nylon pull cord;
- figures 6, 7, 8 and 9, side views of the operational phases of the embodiment with the multiple lever float.

Figures 1, 2, 3, 4 and 5 show in detail the cylindrical body 1 with float ring 2 or other structure, equipped with upper edge 3, closed with an internal

seal, from the corresponding lower edge of structure 4, with float ring 5, to which is attached the hook lever 7, connected to rod 8 of float 9; the cord 10 allows elements 1 and 4 to be pulled up, sliding vetically around central axis 11, in order to discharge water, in succession, through the upper edge 3 and the discharge outlet 12 on the bottom of the tank 13.

By means of a linear shift or of rotation, the outer lever 14 causes a nylon steel or similar cord to be pulled down, sliding in sheath 15, allowing the cord 10 to be raised and so the system bo be operated in the high tank 13 variant.

In the embodiment in figures 6, 7, 8 and 9, the float 9 is connected to linear lever 16 which, by means of its shaped end 17, regulates the position and operation of the coupled l near lever 18, which with its end groove 19 acts on ball 20, at the top of the vertical rod 21 for raising and lowering the top with cord 10 or the like, in order to close the discharge outlet 12 of the tank 13.

The operation of the invention in the embodiment shown in figures 1, 2, 3, 4 and 5 may be described as follows: in rest conditions, the float 9 is raised by the level to which the tank 13 is filled, as in figure 2, and since it is connected by rod 8

to the hook lever 7 it causes rotation around the fulcrum and so the release of structure 4 with respect to cylindrical body 1, so that raising the cord 10, directly in low tanks or by means of button or external lever 14 and the nylon cord in high ones, causes only structure 4 to be raised, as in figure 3, effecting discharge of the liquid present from the level to which the tank 13 is filled to the upper edge 3 of the cylindrical body 1, corresponding to a few liters sufficient for the elimination of urine from the toilet.

When said cord 10 is released, the known device for filling the tank 13 restores the maximum level i a few seconds, preparing the system for a new discharge of limited size.

On the other hand, a second pull on the cord 10 after the first causes the hook lever 7, no longer supported and inclined by the float 9, to fall vertical by the force of gravity, leading to attachment to the edge 3 of the cylindrical body 1, and to coupling with the upper structure 4 so that both are raised, uncovering the opening of discharge outlet 12 through which all the water is discharged, while floats 2 and 5 support said elements 1 and 4 during the fall of the water.

In the embodiments shown in figures 6, 7, 8 and 9, raising rod 21 in a known and traditional way causes the ball 20 to strike the end groove 19 of lever 18 and rotate around the fulcrum of lever 18 itself, which is in contact on the other end with the end 17 of lever 16, which however, having float 9 on the other side comprising a ball moveable around a lower rotation point, when the water level drops as it is discharged from opening 12 which is no longer closed by top 22, at a certain point falls by the force of gravity, since it is no longer supported by the water, and causes by means of lever 16 and coupled lever 18, a violent impulse downwards of ball 20 and so of rod 21, which pulling the top 22 closes the discharge opening 12 after having allowed the outlet of a small quantity of liquid.

A second pull of rod 21, before the float 9 rises with the level of the water up to the maximum value as in figure 8, causes complete discharge as in figure 9, when required.

A further characteristic of the invention 8 consists of the possibility of adjusting the body 1 with respect to the float ring 2, and analogously of that of structure 4 with respect to float 5, or the position of lever 16 with respect to its support, in order to vary the height with respect to the

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Claims

1. System for differential discharge comprising two hollow structures sliding around a central axis so that a first pull upwards raises only the upper portion to cause discharge of the water present in the tank up to the upper edge of the lower portion, and the consequent fall of a hook lever, no longer supported by its float so that a subsequent pull after a short time, causes the coupled rise of the two portions, connected by said hook, to allow complete discharge.

2. System for differential discharge according to claim 1 characterized by the presence of the cylindrical body 1 with float ring 2 or other structure, equipped with upper edge 3, closed with an internal seal, from the corresponding lower edge of structure 4, with float ring 5, to which is attached the hook lever 7, connected to rod 8 of float 9; the cord 10 allows elements 1 and 4 to be pulled up, sliding vertically around central axis 11, in order to discharge water, in succession, through the upper edge 3 and the discharge outlet 12 on the bottom of the tank 13.

level to which the tank 13 is filled and so the quantity of water to be discharged, during the first pull of cord 10 and rod 21.

3. System for differential discharge according to the preceding claims characterized by the presence of the outer lever 14 which by means of rotation, causes a nylon steel or similar cord to be pulled down, sliding in sheath 15, allowing the cord 10 to be raised and so the system to be operated in the high tank 13 variant.

4. System for differential discharge according to the preceding claims characterized by the fact that the float 9 is connected to linear lever 16 which, by means of its shaped end 17, regulates the position and operation of the coupled linear lever 18, which with its end groove 19 acts on ball 20, at the top of the vertical rod 21 for raising and lowering the top with cord 10 or the like, in order to close the discharge outlet 12 of the tank 13.

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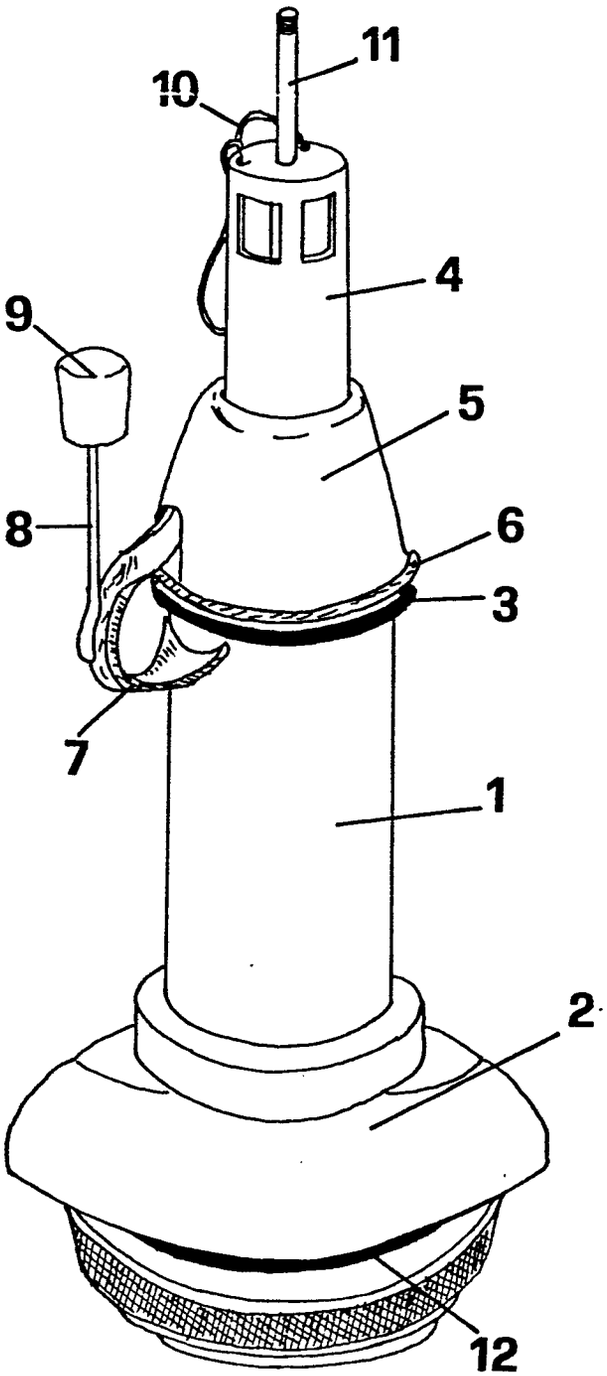

FIG. 1

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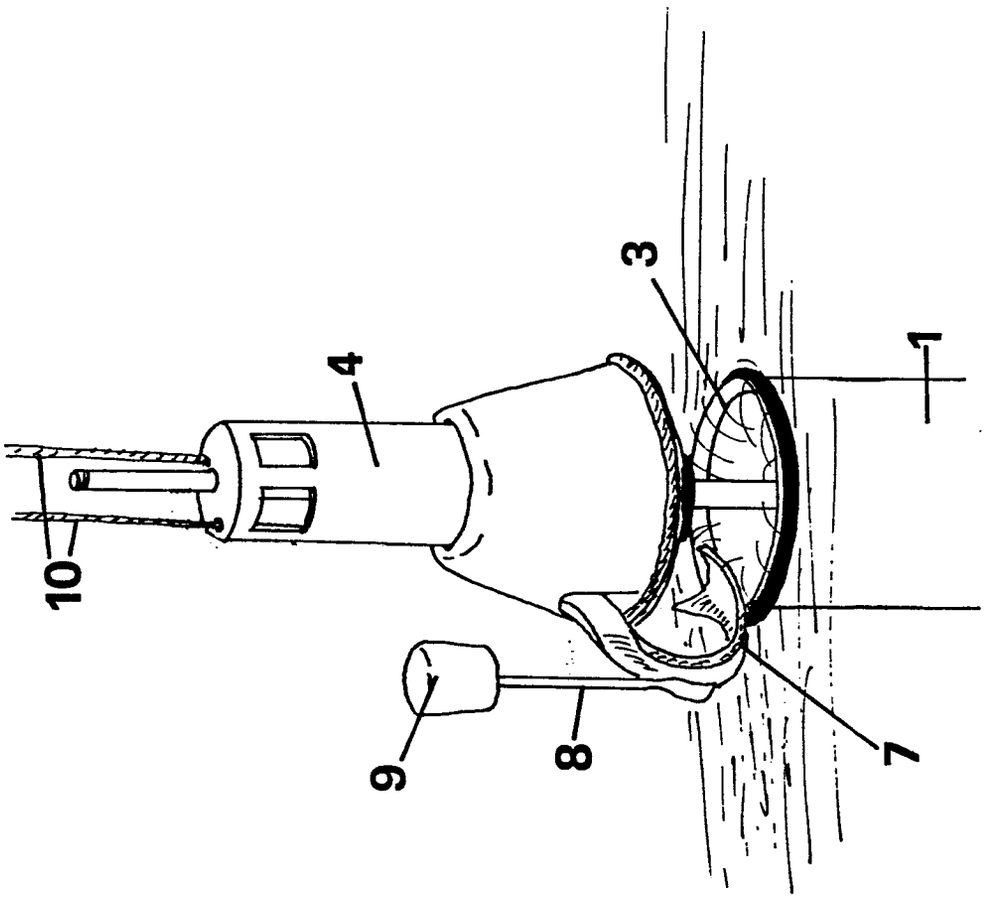

FIG.3

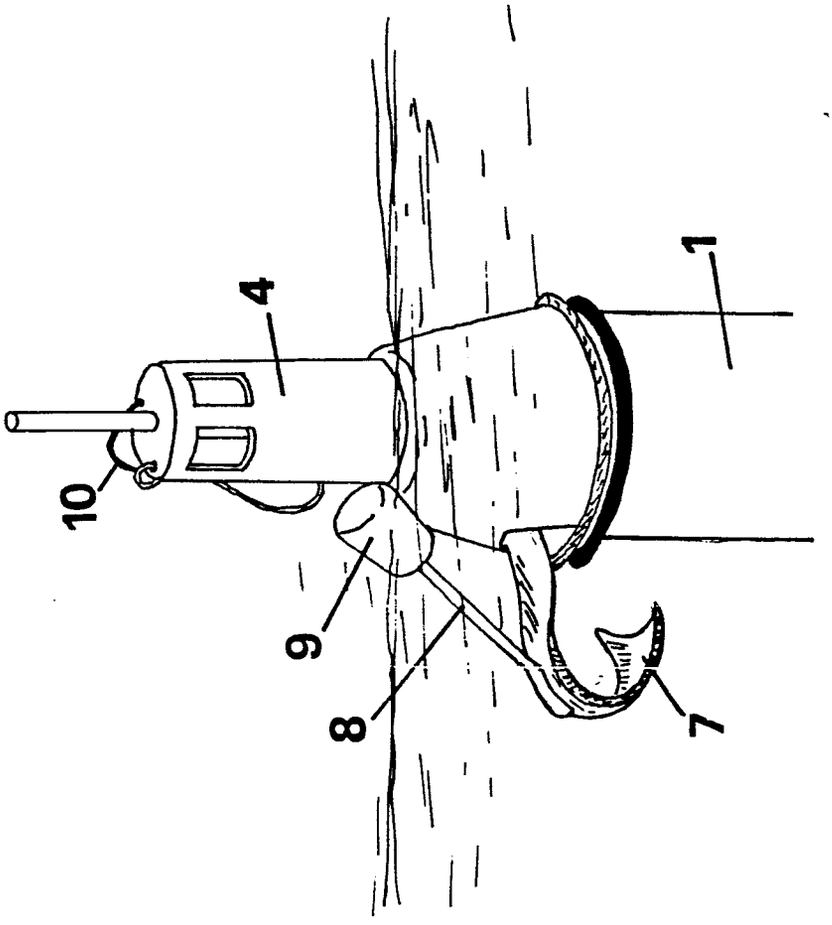

FIG.2

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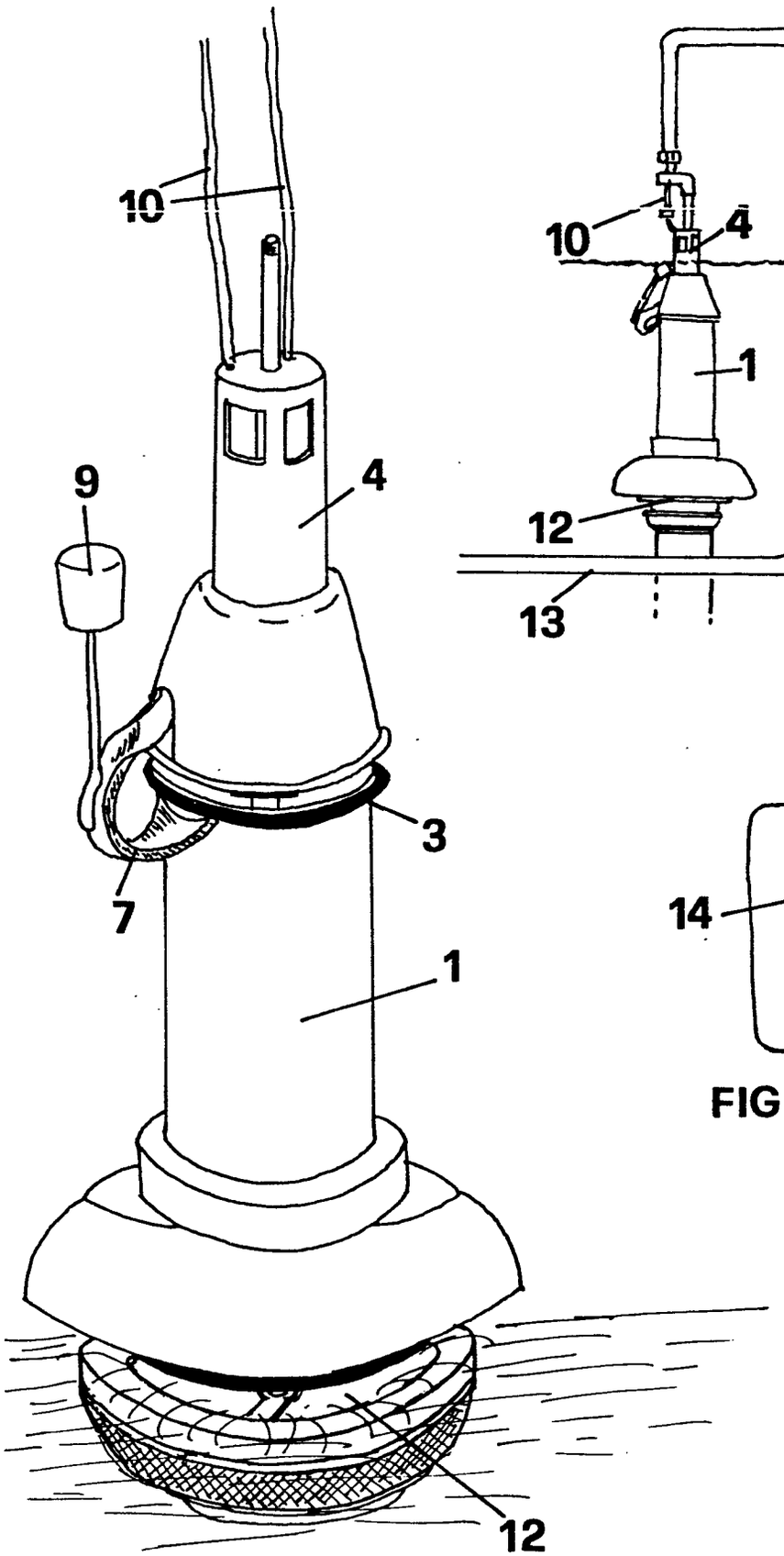

FIG.4

FIG.5

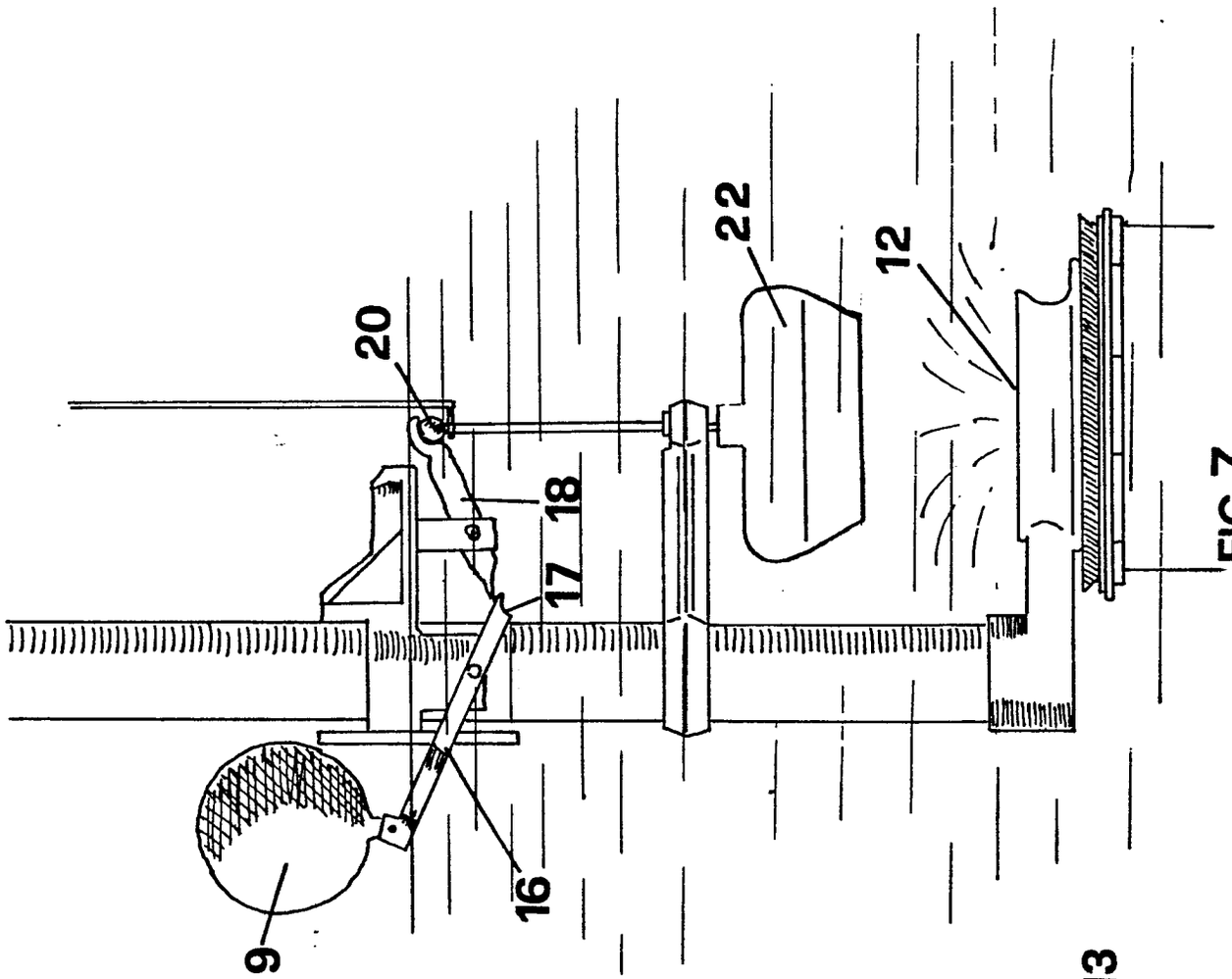

FIG.7

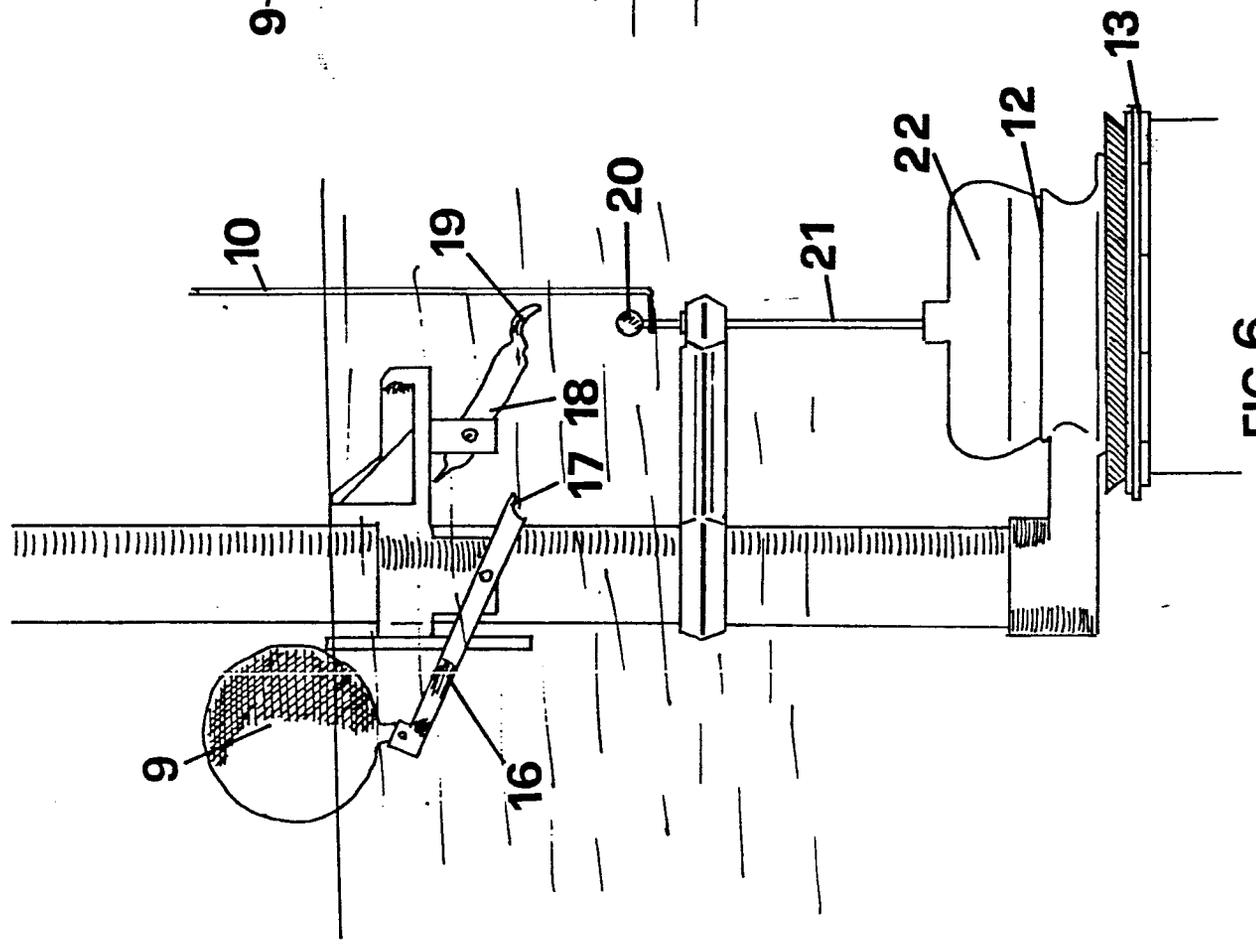

FIG.6

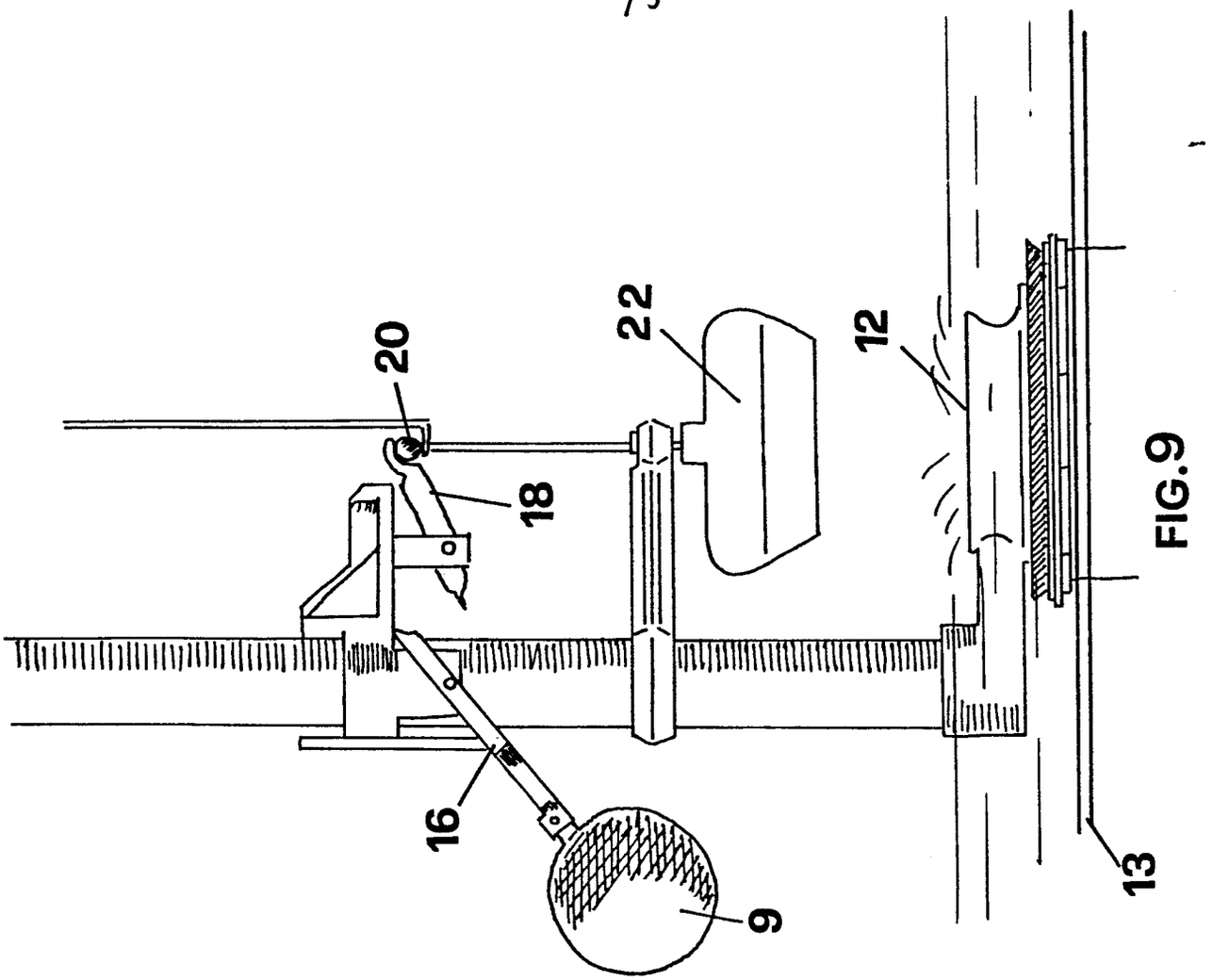

FIG.9

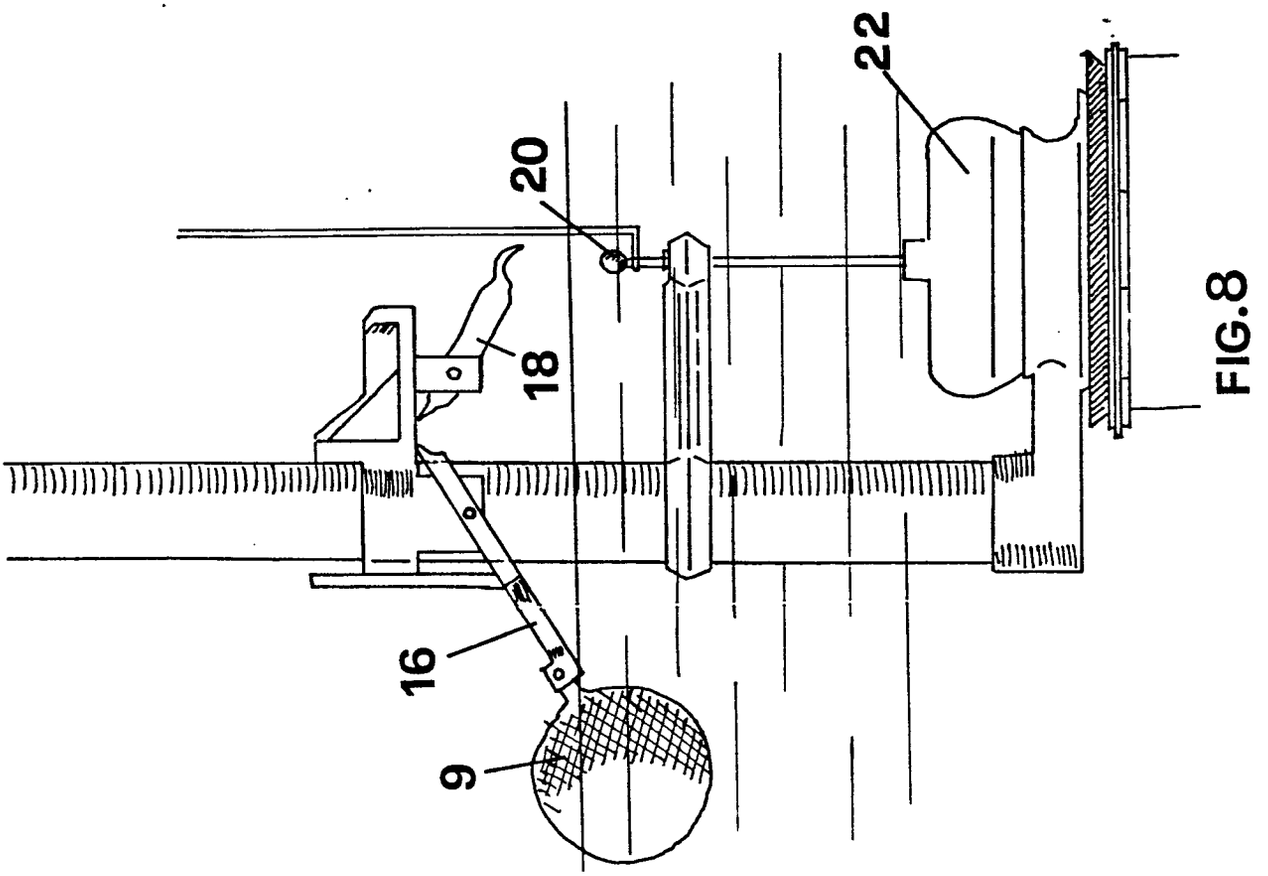

FIG.8

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EUROPEAN SEARCH REPORT

0175042
Application number
EP 84 83 0251

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.4)
A	DE-A- 3 120 074 (MECHLING) * Whole document *	1,2	E 03 D 1/14
A	US-A- 3 839 747 (CLARK) * Column 2, lines 40-68; column 3, lines 1-49; figures 1,3 *	1,2	
A	GB-A- 2 047 301 (LEE CHEN-YUAN) * Page 1, lines 57-123; figures 1,3 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

E 03 D

Place of search	Date of completion of the search	Examiner
The Hague	16-05-1985	HANNAART

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.

☐ Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid,

namely claims:

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

X LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions,

namely: 1) Claims 1-3
2) Claim 4

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid,

namely claims:

☒ None of the further search fees has been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims,

namely claims: 1-3