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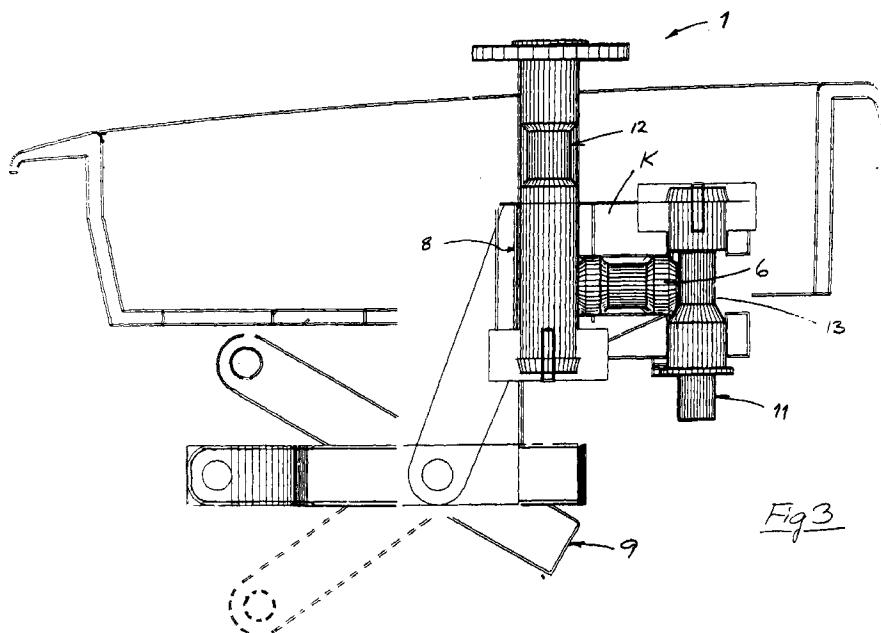
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AL LT LV MK RO SI(30) Priority: **20.04.1998 SE 9801358**(71) Applicant: **Ensto Idealplast AB****503 05 Borås (SE)**(72) Inventor: **Magnusson, Alf****502 78 Ganghäster (SE)**(74) Representative: **Petri, Stellan et al****Ström & Gulliksson AB****Box 41 88****203 13 Malmö (SE)**(54) **Flushing mechanism for water-closets**

(57) Method and arrangement for regulating the emptying of a water closet. The closet comprises a tank (2), at least a manoeuvre mechanism (1), as well as a flushing outlet (3) in a lower portion of the tank (2). At the flushing outlet (3) is a bottom valve (4) as well as means for manoeuvring said valve (4) with the manoeuvre mechanism (1). There is also means for restoring the manoeuvre mechanism (1) into a starting position after a complete flushing. A plunge (6) in the manoeuvre mechanism (1) bear against a manoeuvre rod (8) actuable by a release button (7), under the influence of a passive floater (F) arranged on a lifting peg (11) such

as when the button (7) is actuated for achieving a flushing, the manoeuvre rod (8) is interlocked in a certain position. In this position an essentially vertical pressure is withheld against a lever (9), which affects a lifting rod (10) of the bottom valve (4) in such a way, that the flushing water in the tank (2) is flushed. This may continue until the floater (F) loses its lifting power and consequently releases the pressure from the plunge (6) against the manoeuvre rod (8), so that the manoeuvre rod when a refill of the tank (2) is started, returns the manoeuvre rod (8) and its release button (7) to their respective starting positions.

*Fig 3***EP 0 955 416 A2**

Description

[0001] The present invention relates to a method and an arrangement for achieving a regulated flush at a water closet, which closet comprises a tank, at least one manoeuvre mechanism, a flushing outlet arranged in a lower part of said tank, a bottom valve, means for manoeuvring said bottom valve by using said manoeuvre mechanism, and means for resetting the manoeuvre mechanism to a starting position after a flushing, by refill with water, using means suitable for the purpose.

[0002] One of the most important scarcity resources in our environment is fresh water. In spite of this, fresh water is wasted to a very large extent. This also goes for most water closets. At such closets a flushing volume most often is too high in relation to what normally is required, even if the closet in question is of the kind using a minimum amount of water.

[0003] Sometimes, however, a larger flush volume than what normally is necessary is required also at closets using a minimum amount of water. For this purpose flushing mechanisms of the old days were so designed that the user himself could adapt the flush volume as required. Nowadays, however, a water closet normally has at least a twofold manoeuvre system for different flushing volumes.

[0004] In the actual use the flushing volume, however, normally varies depending on local rules and regulations regarding an allowed flushing volume and/or the local resources of water. Solutions for obtaining different flushing volumes available today, are often characterised by complex mechanisms, that for instance relies on different kind of air leak holes principles. Air leakholes of this kind have a tendency to tighten and even get stuck due to for instance calcium deposits as a consequence of the adverse environmental conditions present. The consequence is more or less serious function disruptions. The presently available solutions also often get an enhanced complexity when mechanisms using a minimum amount of water are being integrated with normal flushing mechanisms.

[0005] It is therefor desirable to have a method and an arrangement of the present kind, which in a simple way allows an exact and reliable adjustment of the flushing volume where the water closet is mounted. From a manufacturing point of view this would be extremely favourable, since the manufacturer in such cases could rationalise, or simplify the production towards one simple kind of mechanism for the purpose. It would simultaneously be desirable with a mechanism which in only a few variants would be able to be arranged solely or combined in order to satisfy a varying need of different flushing volume, thus depending on the application and of course depending on the situation.

[0006] It is therefore an object with the present invention to achieve a flushing mechanism for tanks of water closets, which admit a widely controllable volume (within several litres).

[0007] Another object is to achieve such a controllable adjustable mechanism, which may be arranged separately or redundantly, to thereby satisfy the requirement that the required flushing volume is not always constant, implying that water might be saved.

[0008] It is simultaneously an object to try to minimise the dimensions of such an arrangement as far as possible.

[0009] The objects are achieved with the method and arrangement according to the invention, whereby the method is characterised in that the manoeuvring mechanism, having a substantially horizontally oriented plunge, under the influence of a passive floater arranged on a lifting rod bear against a manoeuvre rod which in turn is actuatable by a release button, such that when actuating the button the manoeuvre rod is locked in such a position that it retains in mainly vertical pressure against a lever, in turn aimed at affecting a lifting rod for the bottom valve such, that a flushing of the water in the tank is affected until the floater loses its lifting power and releases the press force from the plunge against the manoeuvre rod, so that this at a refill of the tank, returns the manoeuvre rod and its release button to the starting positions respectively.

[0010] In the present case it is advantageous that the regulating mechanism according to the invention always is situated above the water level of the tank of the water closet, maybe even outside the tank in the separate compartment. By arranging the passive floater on a sluggish thread, the flushing volume will become extra ordinary easy to adjust.

[0011] Furthermore the whole arrangement may be built together into a unit complete with a lid or a frame and with one or more buttons.

[0012] At flushing mechanisms on which more than one predetermined flushing volume is available, an arrangement according to the invention makes it easy to design and arrange the buttons at suitably chosen and preferably separate places on a flushing tank.

[0013] In the following the invention will be described in detail with reference to an embodiment shown on the enclosed drawings, in which:

Figs. 1a-d are schematical views showing parts of a flushing mechanism for a tank of a water closet in different positions during a flushing cycle,

Fig. 2 is a schematic view showing a cross-section through a tank of a water closet with a bottom valve and its manoeuvre rod arranged therein,

Fig. 3 is a schematic view showing a portion of a tank of a water closet with its mechanism shown in the upper part of Fig. 1a-d shown in detail.

[0014] Figs. 1a-1d show a sequence of different positions of a manoeuvre mechanism 1 for the emptying and refilling respectively of a tank 2 (see Fig. 2) of a

water closet (not shown).

[0015] According to Fig. 1a the mechanism is in the position in which the tank 2 is completely filled, and neither flushing by emptying thereof nor filling thereof is at hand. The dash-dot line L shown in Figs. 1a-1d, schematically depicts water level at hand in the tank in each of the cases. From Fig. 3 the position and geometry of the details co-operating with each other as well as the details of the portion M of the construction according to Fig. 1a is shown more in detail.

[0016] Below a description of the sequence according to Fig. 1a-1d is given. The position of the part of the manoeuvre mechanism 1 of interest in this context shown in Fig. 3, is the same in this picture as in Fig. 1a. Thus, a plunge 6 is shown, which in an unactuated condition would be freely horizontally movable in a cylindrical recess in a console K, which is fixedly arranged in the tank 2. In the position shown, the plunge 6 is, however, fixed in its axial direction, by being bent between a recess 13 in a lifting peg 11 of a passive floater F and a manoeuvre rod 8. The manoeuvre rod 8 is connected to a release button 7. When this button is actuated from the outside, the movement thereof is transferred to a lever 9 (see Fig. 2 and Fig. 3), which actuates a bottom valve (see Fig. 2) for emptying the water of the tank through a flushing outlet 3 in the water closet.

[0017] When, as is the case according to Fig. 1b, the release button 7 has been pressed down in order to obtain a flushing, the plunge has - as a consequence of the lifting effect from the passive floater F and the chamfered or angled lower edge of the recess 13 - been transferred to the left into a recess 12 in the manoeuvre rod 8. As is seen the water level L in the tank 2 has already sunk a bit. In this condition, which constitutes a flushing condition, in which the plunge 6 is locked, the manoeuvre rod 8 and thereby the release button 7 is kept in a fix position by the recess in the manoeuvre rod 8. The reason that this position is a flushing position is that a manoeuvre rod 8 directly effects the lever 9 (see Fig. 2 and Fig. 3), which consequently is actuated as long as the manoeuvre rod 8 is locked. The flushing position is withheld as long as the lifting force from the passive floater remains. It is withheld until the water level L in the tank 2 has sunk so far that the vertical load on the lifting peg 11 from the floater F has ceased to be or has at least almost ceased to be and thereby also the locking effect from the plunge 6. As a consequence the floater F and the lifting peg 11 falls down a corresponding short distance as they were lifted earlier in connection with the flushing. This admits a transfer of the plunge 6 to the right in Fig. 1 out of the recess 12 such, that the release button 7 and its rod 8, under the influence of the refill pressure on the bottom valve 4 may return to their starting positions (return spring 14 not shown in Fig. 3). To assist the release button return to the starting position a return spring 14 may be arranged against a fixed counter-stay 15. The reason for this is that the chamfered angle of the recess 13 and the lifting peg 11 is less than

the angle of chamfer in the corresponding recess 12 in the manoeuvre rod 8.

[0018] The position according to Fig. 1c has now been reached. Since the influence of the lever 9 has ceased, the tank 2 may by means not shown be refilled until the position according to Fig. 1d, corresponding to the starting position, has been reached.

[0019] The process described may of course be repeated as many times as required.

[0020] An important feature is that the passive floater F is arranged on the lifting peg 11 with the use a sluggish thread, for instance a trapezoid thread G. Since the floater maybe adjusted vertically, the flushing volume may be adjusted according to requirement. Should a twofold release mechanism be arranged, both floater bodies are adjusted such that they admit flushing volumes suitably separated from each other. The invention described has according to the above completely been related to a water closet. It should, however, be realised that the flushing regulating arrangement in question may be used and adapted to any other suitable use where flushing of a carefully fixed fluid volume from a tank is to be made.

Claims

1. Method for regulation of a water closet flushing, which closet comprises a tank (2), at least one manoeuvre mechanism (1) a flushing outlet in a lower portion of the tank (2), a bottom valve (4), means for manoeuvring of the bottom valve (4) with said manoeuvre mechanism (1), and means for restoring the manoeuvre mechanism (1) to a starting position after a flushing, **characterized** in that, an essentially horizontal oriented plunge (6) in the manoeuvre mechanism (1) bear against a manoeuvre rod (8), actuatable by a release button (7), under the influence of a floater (F) arranged on a lifting peg (11) in the water, until the manoeuvre rod (8), when the button (7) is actuated for flushing, is being locked by the plunge (6) in such a position that the manoeuvre rod (8) keeps a substantially vertical pressure against a lever (9), which actuates a lifting rod (10) of the bottom valve (4), in such a way that a flushing of the water in the tank (2) is made, until the floater (F) loses its lifting force and the plunge (6) cease to bear against the manoeuvre rod (8), so that the plunge may retake its starting position.
2. Method according to claim 1, **characterized** in that the movement of the plunge (6) is achieved by the lifting peg (11), having a chamfered contact surface relative to the plunge (6), which implies that a substantially vertical axial force in the lifting rod is transferred to the substantially perpendicular thereto mechanically controlled plunge (6).

3. Method according to claim 2, **characterized** in that the manoeuvre rod (8) has a design comparable to that of the lifting peg (11) with a recess (12), though with a different steeper operating angle, such that the plunge (6), when the release button (7) is actuated, is forced into the recess (12) whereby the lifting rod (10) is locked. 5

4. Method according to anyone of the preceding claims, **characterized** in that the position of the floater (F) is adjusted by screwing the same along a thread (G) on the lifting peg. 10

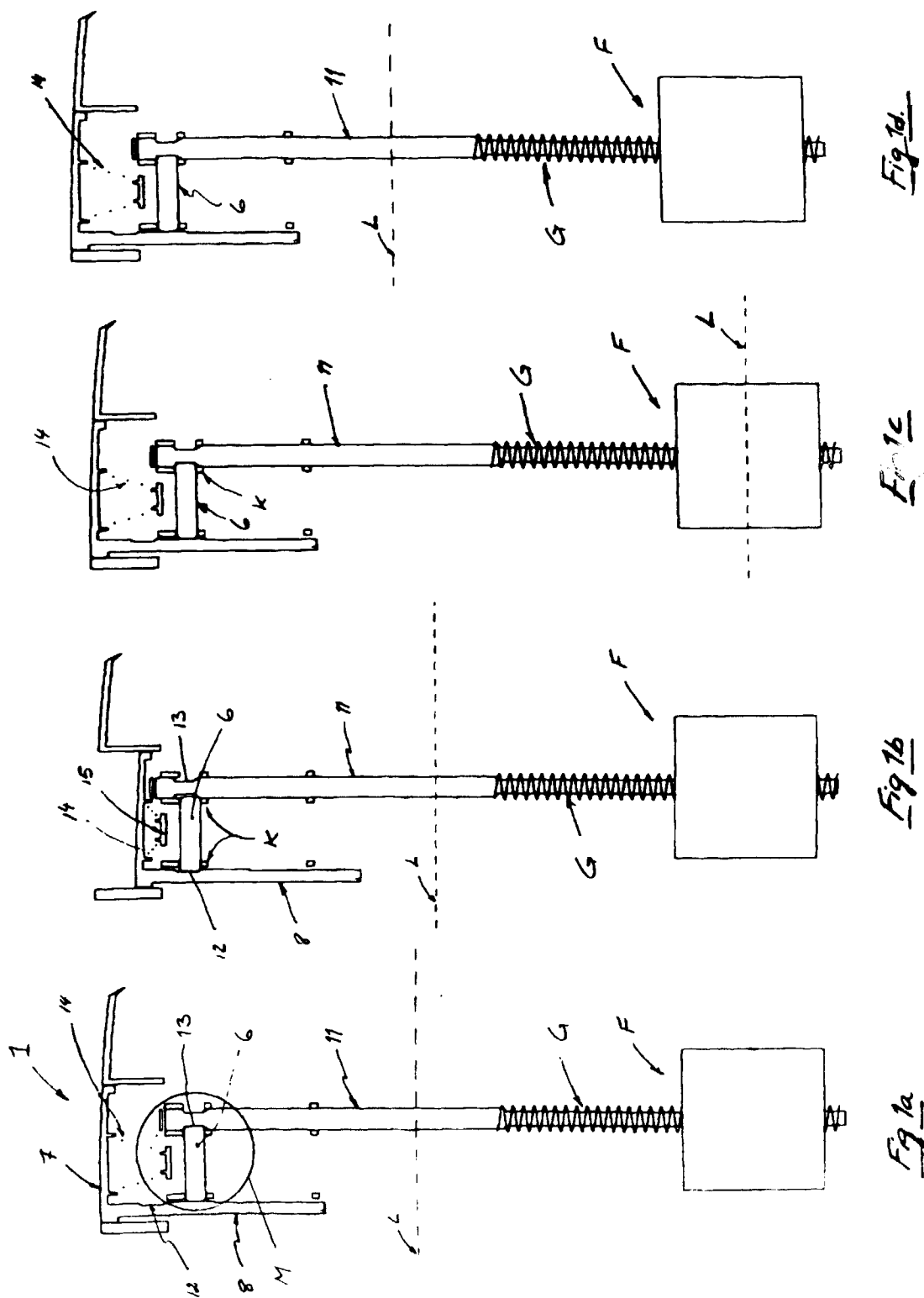
5. Arrangement for regulating the emptying of a water closet, which closet comprises a tank (2), at least a manoeuvre mechanism (1), a flushing outlet (3) arranged in a lower portion of the tank, a bottom valve (4), means (5) for actuation of the bottom valve (4) by using the manoeuvre mechanism (1), and means restoring the manoeuvre mechanism (1) to a starting position after the completion of a flush, **characterized** in that the manoeuvre mechanism (1) comprises a manoeuvre rod (8) connected to a release button (7) for controlling the bottom valve (4), a vertical transferable lifting peg (11) having a floater (F) to be sunk into the water of the tank (2) to produce a lifting force in the lifting peg (11), as well as a plunge (6), horizontally movable between the manoeuvre rod (8) and the lifting peg, whereby the lifting peg has a chamfered surface (4) for transferring the plunge (6) against the manoeuvre rod (8), and the manoeuvre rod (8) has a recess (12), with which the plunge may co-operate in a locking fashion after pressing the release button to open the bottom valve. 15
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6. Arrangement according to claim 5, **characterized** in that the recess in the lifting peg (11) has a chamfered contact surface relative to the plunge (6), to be able to transfer an axial force in the lifting peg (11) to the plunge (6). 40

7. Arrangement according to claim 6, **characterized** in that the lifting rod (10) has a recess (12) like the one in the lifting peg (11) with the exception that it has a steeper operational angle, for interlocking the lifting rod (10). 45

8. Arrangement according to anyone of the preceding claims, **characterized** in that the floater has an internal thread co-operating with a corresponding screw thread (G) on the lifting peg (11) for adjustment of the vertical position of the floater (F). 50

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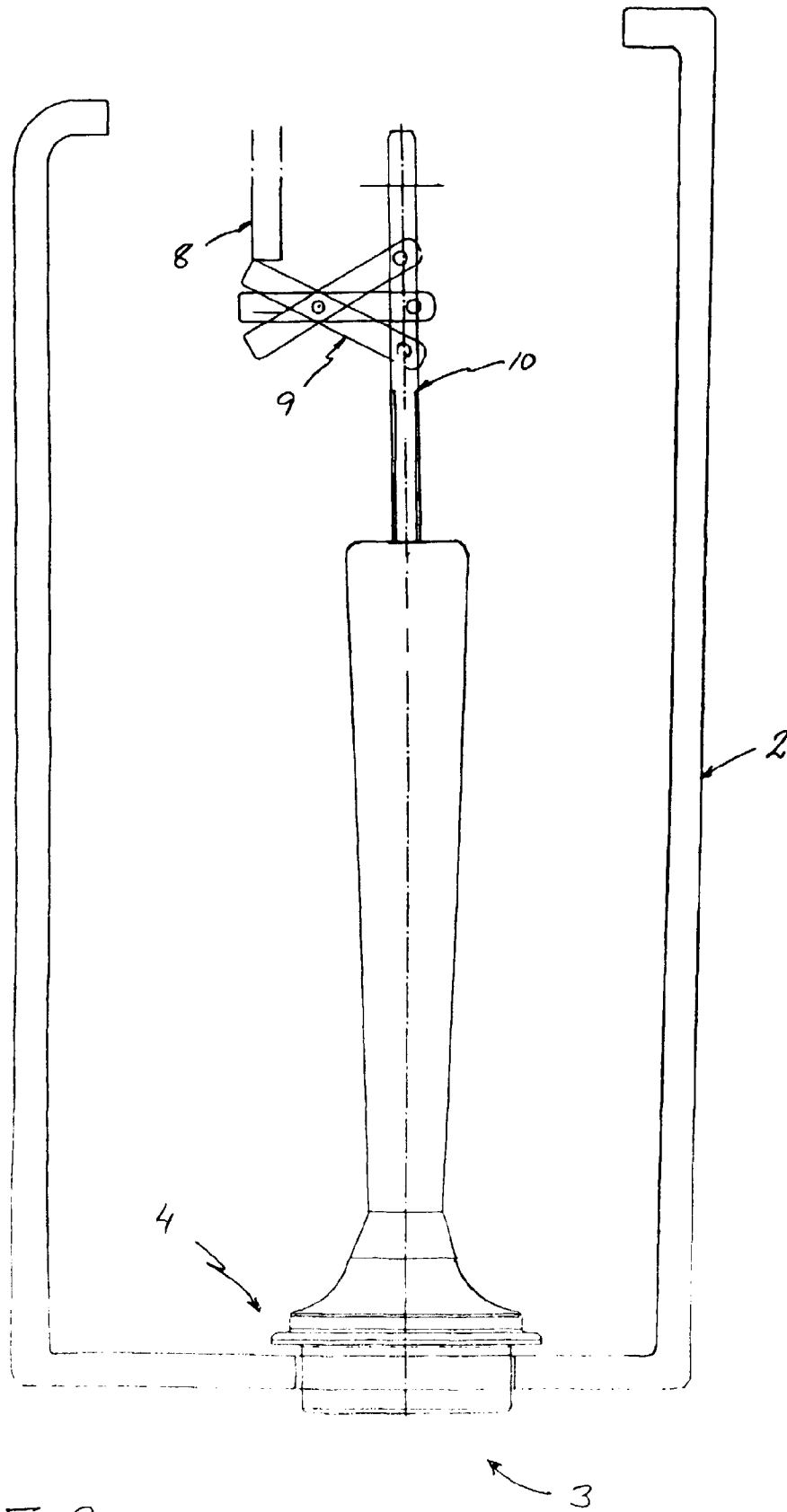


Fig 2

