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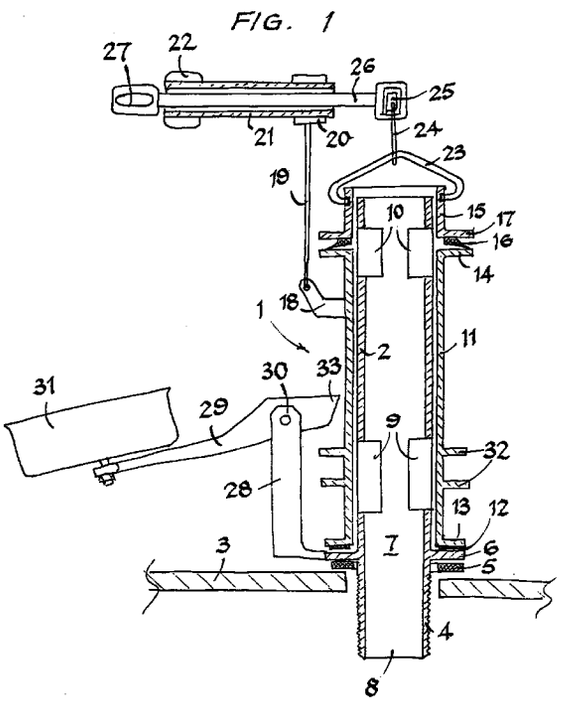
(54) Toilet flush mechanisms

(57) A toilet cistern flushing mechanism based on the principle of two inlets at two levels for flushing water. Each of the two inlets may be selected for either a full flush or a smaller flush by choosing to actuate one of two flushing handles, one for the full flush and the other for the smaller flush. A primary characteristic of the mechanism is an upright inner pipe communicating with the flush outlet having flush inlets at two levels and two concentric outer pipes slidable on the outside of the upright inner pipe, with seals at the lower ends of the two outer pipes; one or other of the outer pipes are lifted to provide either a full or a smaller flush.

FIG. 1



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Description

BACKGROUND OF THE INVENTION

Field of the Invention

This invention lies in the field of mechanisms for the flushing of a toilet cistern and the mechanism may be adapted for certain other analogous purposes.

Description of the Prior Art

As is well known the flushing of toilets is a long-standing problem in areas where water is not in ample supply, a condition which pertains in essentially all areas of Southern Africa, for example. The toilet flushing problem arises because of two mutually contradictory constraints, namely on the one hand the necessary requirements for sewerage pipes that a certain minimum volume of water flushes the stools at a certain minimum rate of supply of the flushing water. In essence there must be a sufficient flush to entrain and carry the stools along the sewer pipes. Unless this condition is met the stools will not be carried along the sewerage pipes and blockages will tend to develop. On the other hand, of course, each flush results in a significant usage of water and the public water supply authorities have a strong motivation to minimise the water requirements including in particular for toilet flushing purposes.

In this context it has also been recognised that if the toilet bowl is being used only for urination there is not the same requirement for the same quantity of flushing water as in the case of defecation.

Despite the long standing knowledge of these problem areas it is remarkable that there has not yet entered the market a widely accepted solution and toilet flush mechanisms widely sold on the market are still based on the relatively simple designs of many years ago. One of the reasons for this perhaps the relative unreliability of more complicated mechanisms which seek to provide the facility for dual flushes, that is a selectable option between a large flush and a small flush resulting in a tendency to leakages which themselves constitute unacceptable wastage of water.

SUMMARY OF THE INVENTION

An object of the invention is to provide a dual flush mechanism which is not prone to leakage.

A further object is to provide one which is of robust and simple construction, which will be durable.

A further object is to provide one which presents the user with a clear and simple means of effecting a choice between a large flush and a small flush.

The solution proposed in accordance with the present invention provides a toilet flushing mechanism for a toilet cistern which comprises an inner upright pipe fixed to the cistern flushing outlet so that the bore of the inner pipe communicates with the flushing outlet, this pipe thus providing an outlet for flushing water at its lower end and comprising two inlets for flushing water at two different heights in the inner pipe, one a lower height and the other a higher height, together with a lower outer pipe or sleeve loosely slidable upwards and downwards on the inner pipe and having a sealing seat at its lower end which can seal on to a flange at the bottom of the inner pipe when the lower sleeve is in its lower most position thereby occluding the lower flushing inlet on the inner pipe but the upper end of the lower sleeve in this position not occluding the upper flushing inlet on the inner pipe, together with a second and upper outer pipe or sleeve again loosely slidable upwards and downwards on the inner pipe and located above the lower sleeve, having a sealing seat at the lower end of the upper sleeve adapted to seal on to a flange at the upper end of the lower sleeve when the upper sleeve is at its lower most position resting on the upper end of the lower sleeve and then adapted to occlude the upper flushing inlet of the inner pipe, the two sleeves each having connection means to a flushing actuator, a first flushing actuator thus adapted to lift the lower sleeve and a second flushing actuator adapted to lift the upper sleeve.

The effect of this arrangement is that if the second flushing actuator is actuated it lifts only the upper sleeve therefore opening only the upper flushing inlet of the inner pipe to the water in the cistern and allowing a flush to proceed only to the point at which the level of the water in the cistern drops to the lower most level of the upper flushing inlet on the inner pipe. This will then be a small flush. Alternatively, the first flushing actuator can be actuated and this will then lift the lower sleeve (and incidentally simultaneously also upper sleeve) and the lifting of the lower sleeve will then allow water from the cistern to enter the lower flushing inlet into the inner pipe and the flush will then continue for a longer period until the water level of the cistern has dropped to the lower flushing inlet on the inner pipe. This will, of course, then be a large flush.

Thus the levels of the two flushing apertures in the inner pipe can be determined in order to determine the volume of each of the flushes, in relation to the cistern size. The size of the inlet apertures and the bore of the inner pipe will, of course, determine the rate of flushing and this can be set in accordance with required good practice as mentioned in the introductory parts of this specification.

This flushing mechanism then requires only two sealable seats on the concentrically arranged sleeves which are conveniently located in appropriate positions by their loose slidable fit over the inner pipe. These two sealing seats can thus utilise a rubber sealing washer or gasket to seat on to a suitable flange on the base of the inner pipe in the case of the lower sleeve and on to a suitable flange at the top end of the lower sleeve in the case of the upper sleeve.

It is an advantage of this mechanism that there can also be provided a small locking float near the base of

the toilet cistern analogously to existing practice to retain the lower sleeve which has been lifted by the actuating mechanism in the lifted position until the water has drained out of the cistern so as to ensure a complete large flush produced by actuating the lower sleeve.

The actuating mechanisms may conveniently comprise two handles fixed on to coaxial shafts, the first handle on an inner shaft for the large flush and the second handle on an outer hollow shaft co-axial with the first for the small flush. Each of these shafts can then have a bell crank or the like with suitable linkages to link into each of the sleeves.

This has the advantage that the user is clearly presented with two alternative handles which easily can be marked clearly to indicate a small flush or a large flush and this is important to avoid confusion by the user and as a result correct selection of appropriate flushes so that the whole objective of the flushing mechanism is well served. Furthermore it is possible to make such mechanism quite robust in its construction and relatively insensitive to rough usage. Accordingly durability of the mechanism can be assured. By providing a sufficiently loose sliding fit of the two sleeves on the inner pipe adequate assurance can be given that even over a long life time there is no significant risk of the sleeves sticking or jamming on the inner pipe so that the correct operation can be assured and hence a freedom from leaks. Rubber seals or gaskets can be utilised which are already well established in toilet cistern practice. The designs implemented in accordance with the invention also have the important advantage that they can be applied to most existing toilet cisterns with little or no modification being required.

The designs also have a basic simplicity which makes them simple to install.

The small flush can be actuated by the small handle (e.g. 27 in figure 2) and the large flush by the large handle (e.g. 22 in figure 2) which is a logical and obvious selection for the user. This can obviate any need for marking the handles, providing it is not confusing.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will b more fully described by way of an example with reference to the accompanying drawings in which :

Figure 1 is a cross sectional elevation indicating the main features of a simple form of the mechanism,

Figure 2 is an orthogonal view on to the flushing handles,

Figures 3 to 9 are views of a production prototype of the invention and its main components,

Figure 3 is an elevation,

Figure 4 is a plan,

Figure 5 is an isometric projection,

Figure 6 is an isometric projection of the inner pipe of the mechanism,

Figure 7 is an isometric projection of the bottom of the inner pipe,

Figure 8 is an isometric projection of the lower sleeve,

Figure 9 is an isometric projection of the upper sleeve, and

Figure 10 is an isometric projection of a seal.

DESCRIPTION OF THE EMBODIMENTS

As shown in figures 1 and 2 of the drawings the toilet flushing mechanism generally indicated by the numeral 1, comprises an inner upright pipe 2 which is fixed to the cistern of which only the floor 3 is partially shown, by screwing the spigot 4 of the pipe 2 to the flushing outlet of the cistern by means of a nut (not shown) and using a sealing washer 5. The sealing washer 5 bears against an integral flange 6 of the pipe 2. The bore 7 of the inner pipe 2 thus communicates with the flushing outlet 8 of the inner pipe 2 which in turn leads of course to the flushing of the toilet bowl. The inner pipe 2 has two inlets for flushing water at two different heights, an inlet 9 at a lower level and an inlet 10 at a higher level. A lower loosely slidable sleeve 11 is provided so that it can slide upwardly and downwardly on the inner pipe 2, it has a sealing seat at its lower end constituted by a sealing washer 12 provided at a lower flange 13 of the pipe 11. This seal can seal onto the bottom end of the inner pipe. When in this position the upper end 14 of the lower sleeve 11 which is constituted by a flange does not occlude the upper flushing inlet 10 of the inner pipe. An upper sleeve 15 is provided also loosely slidable on the inner pipe 2 and having a seal 16 at the lower end of the upper sleeve 15 which is constituted by a flange 17 and which can then seal in the lower most position of the upper sleeve onto the flange 14 of the lower sleeve 11. In this position the upper flushing inlet 10 of the inner pipe 2 becomes occluded. A bracket 18 is provided so that a link 19 can lead to a crank 20 fixed on an outer hollow concentric shaft 21 which is operable by a handle 22. This allows for the lifting of the lower sleeve 11 so as to initiate a large flush. The upper sleeve 15 is provided with a yoke 23 to which a link 24 connects to a crank 25 which is fixed on an inner concentric shaft 26 operable by a handle 27 so as to lift the upper sleeve 15 thereby initiating a small flush.

The mechanism is also provided with a bracket 28 on to which an arm 29 is pivoted at the pin 30, the distal end of the arm 29 carrying a float which is lifted when the cistern is full. When the lower sleeve 11 is lifted one of its flanges 32 then lock into the catch 33 of the arm 29

and this holds the sleeve 11 in the upwards position therefore maintaining the flush until sufficient water has run out of the cistern for the float 31 to drop whereupon the catch 33 releases the flange 32 and the flush is terminated.

The flushing mechanism shown in figures 3 to 9 has analogous components to those in figures 1 and 2. Accordingly the same reference numerals are used and the description with reference to figures 1 and 2 is referred to.

One difference of construction is that the spigot 4, which is shown in figure 7 is connected to the inner pipe 2 which is shown in figure 6, instead of being integrally formed.

The inner pipe 2 has three vertically extending ridges, of which one, 40, is visible in figure 6; these ridges ease the sliding of the sleeves on the inner pipe.

The lower sleeve 11, which is shown in figure 8, has a ridge 40 of double tapering shape, (see also figure 3), instead of two flanges, to provide a smoother action with the catch 33.

Two flanges 41 and 42 are provided to hold between them the rubber seal 12 which is shown in figure 10.

The upper sleeve similarly has two flanges 44 and 45 to hold between them the rubber seal 16, which is the same as the seal 12, shown in figure 10.

The seats for the rubber seals are the upper edge 46 of a circular wall 47 on the lower sleeve and the upper edge 48 of a circular wall 49 on the spigot 4 of the inner pipe.

Claims

1. A toilet cistern flushing mechanism which comprises -

   an upright inner pipe fixed to a cistern flushing outlet so that a bore of the inner pipe communicates with the cistern flushing outlet, the inner pipe thus providing an outlet for flushing water at its lower end and having two nets for flushing water at two different heights in the inner pipe, a lower flushing inlet at a lower height and an upper flushing inlet at a higher height,

   an outer lower sleeve loosely slidable upwards and downwards on the inner pipe and having a sealing seat at the lower end of the outer pipe which can seal onto a flange at the bottom of the inner pipe when the lower sleeve is at its lower most position thereby occluding the lower flushing inlet on the inner pipe but the upper end of the lower sleeve in this position not occluding the upper flushing inlet of the inner pipe,

   an outer upper sleeve loosely slidable upwards and downwards on the inner pipe, located above the lower sleeve, having a sealing seat at the lower end of the upper sleeve adapted to seal onto the upper end of the lower sleeve when the upper sleeve rests on the lower sleeve thereby occluding the upper flushing inlet of the inner pipe,

   the lower sleeve having connection means to a first manual flushing actuator adapted to lift the lower sleeve when actuated, and

   the upper sleeve having connection means to a second manual flushing actuator adapted to lift the second sleeve when actuated.

2. A toilet cistern flushing mechanism as claimed in claim 1, in which the lower sleeve has a yoke on its outer surface, in which the first manual flushing actuator is a fist handle on a first shaft with a first crank on the first shaft connected by a link to the yoke, in which the upper sleeve has a harness on it, in which the second manual flushing actuator is a second handle on a second shaft connected by a link to the harness and in which the first and second shafts are concentric with one another.

3. A toilet cistern flushing mechanism as claimed in claim 1, in which the inner pipe has a bracket pivotally mounting an arm the distal end of which has a float and the proximal end of which has a catch, the lower sleeve having a formation on which the catch engages when the lower sleeve is raised to initiate a flush and buoyancy of the float holds the float up, so that the catch holds the sleeve up until the float drops upon completion of the flush.

4. A toilet cistern flushing mechanism as claimed in claim 1, in which the inner pipe has vertically extending ridges on its outer surface which ease upwards and downwards sliding of the sleeves.

5. A toilet cistern flushing mechanism as claimed in claim 1, which include seals which seal onto the upper edges of circular walls at the upper end of the lower sleeve and at the lower end of the inner pipe.

6. A toilet cistern flushing mechanism as claimed in claim 1, in which a spigot is fixed to the lower end of the inner pipe, the spigot is fixed to the cistern flushing outlet and the spigot is fixed to the inner pipe.

FIG.1

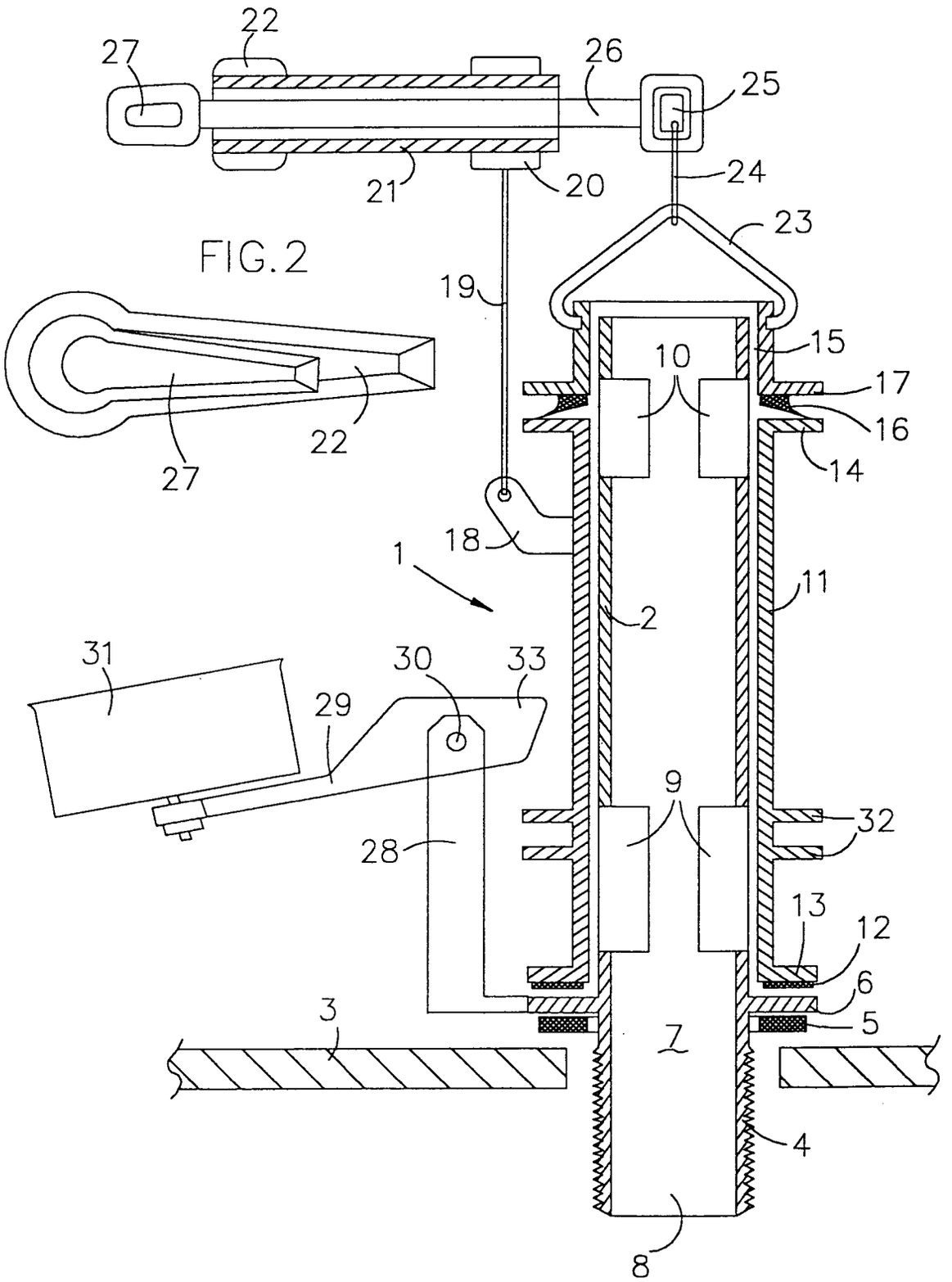
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FIG.2

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FIG. 3

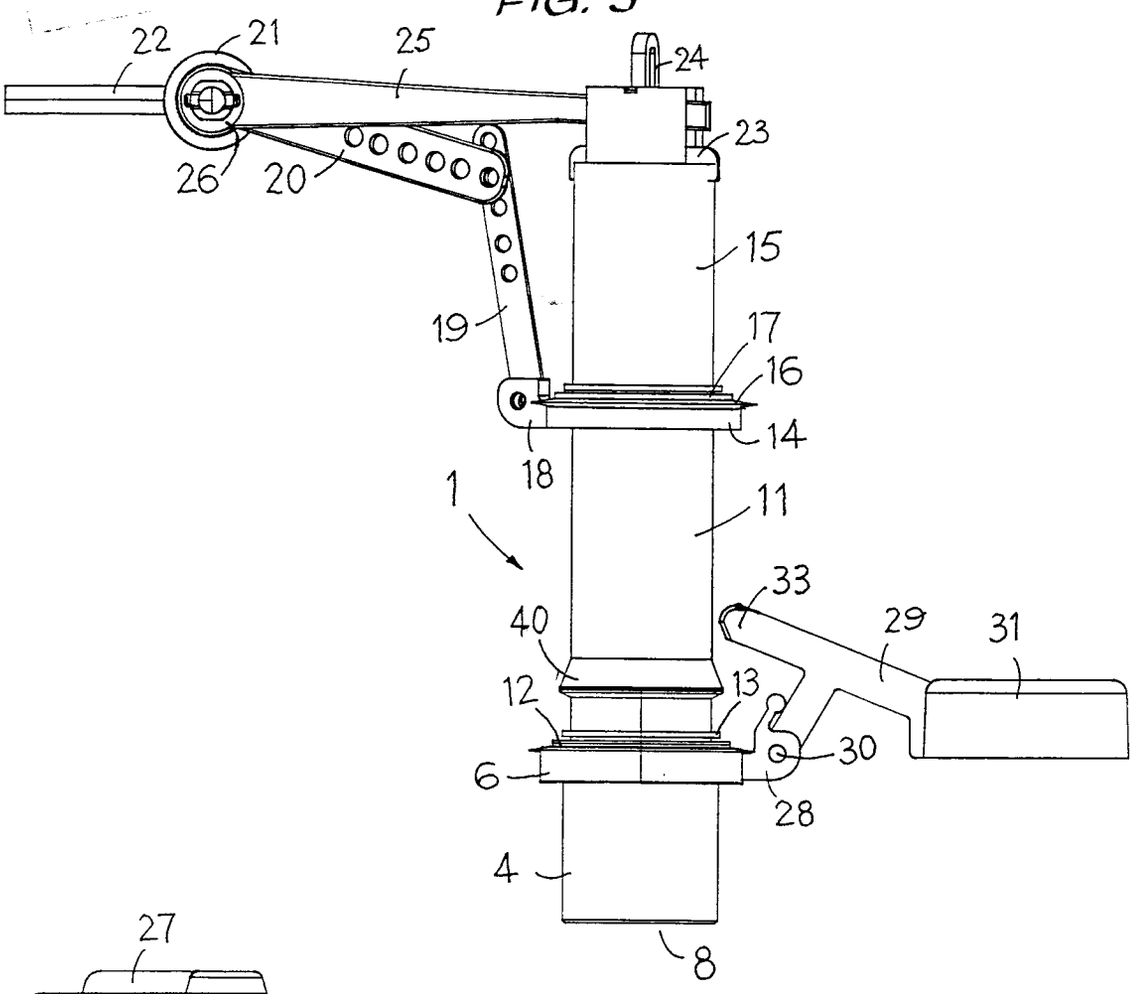
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FIG. 4

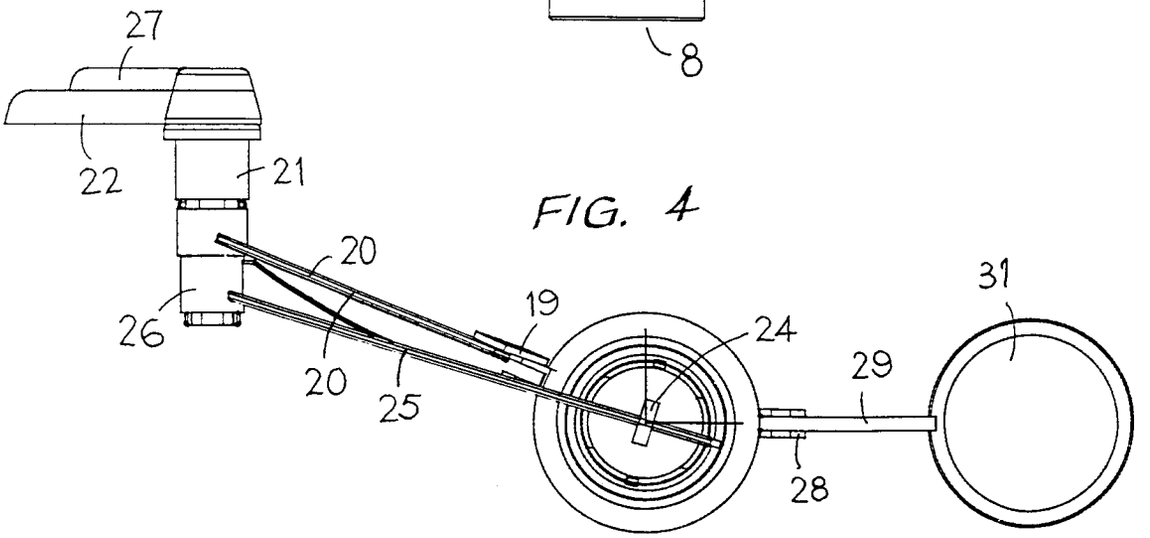
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FIG. 5

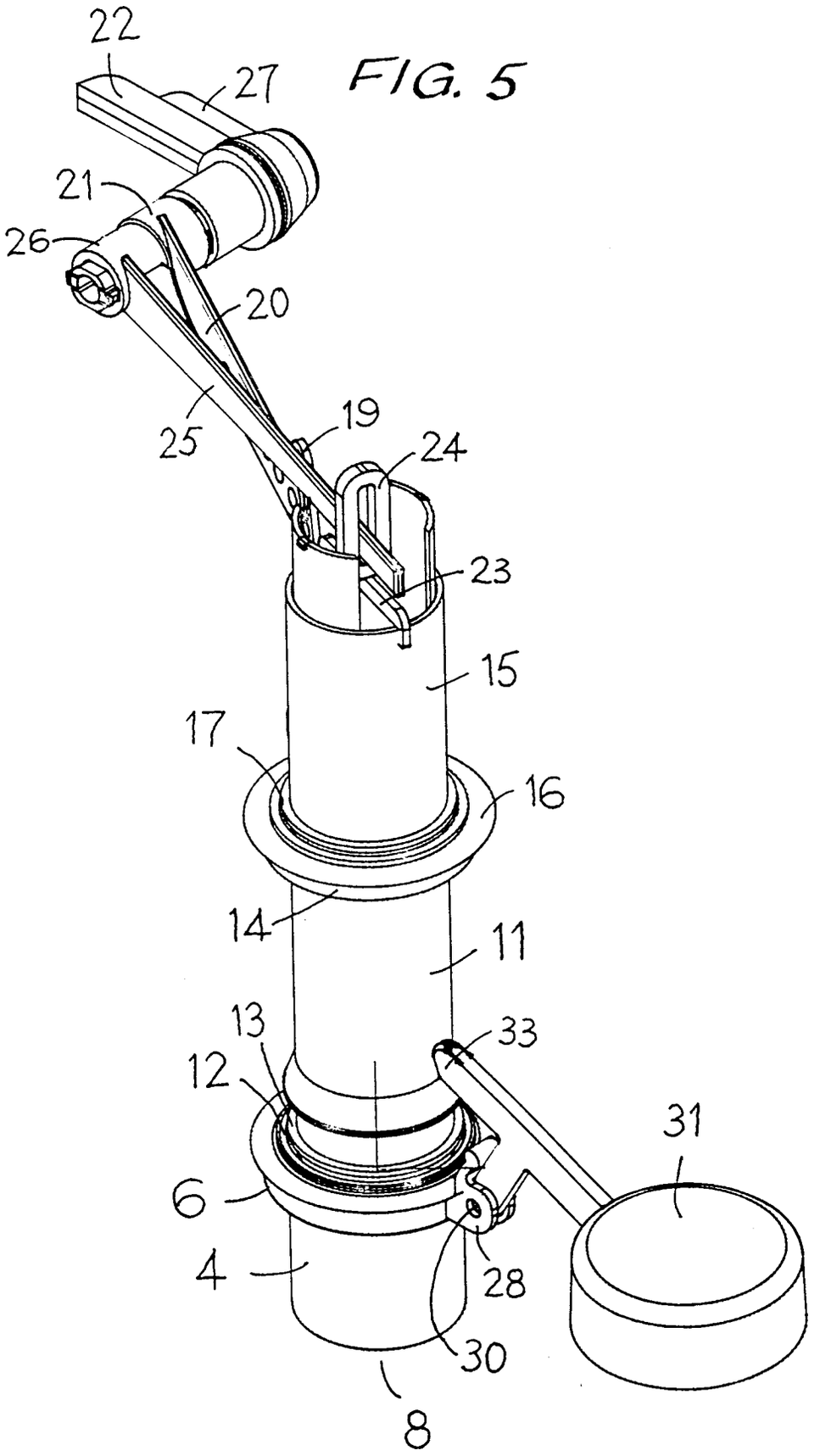


FIG. 6

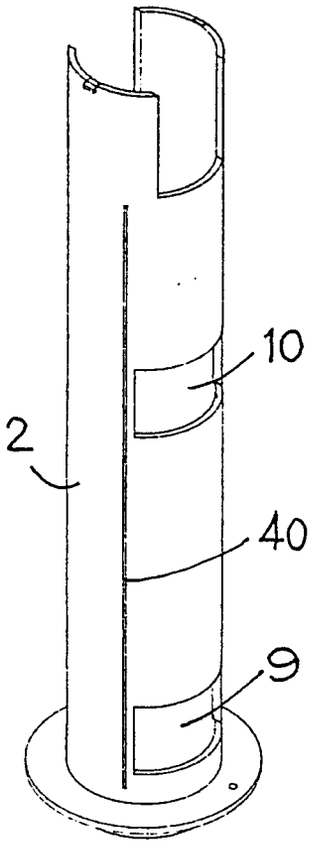


FIG. 8

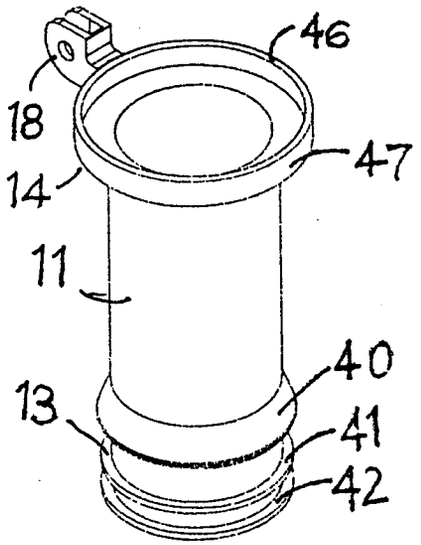


FIG. 9

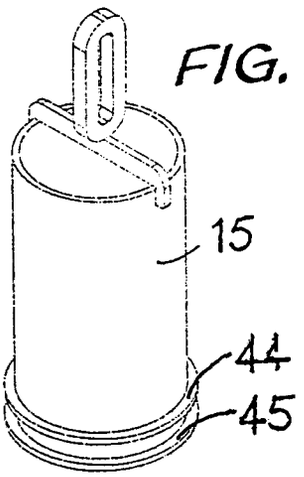


FIG. 7

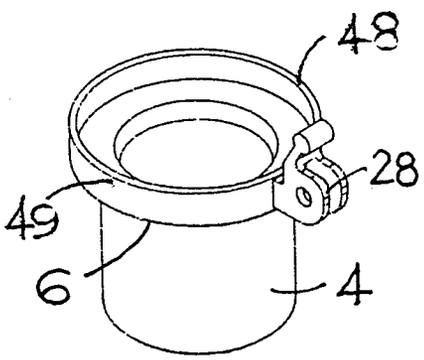
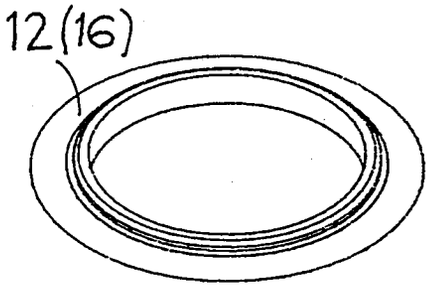


FIG. 10



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 11 1471

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.6)
A	FR-A-2 473 586 (SAUZET RENE) 17 July 1981 * figures 4-6 *	1,5	E03D1/14
A	FR-A-2 701 975 (VERMEEREN CHRISTIAN) 2 September 1994 * abstract; figures 1-3 * * page 3, line 5 - line 16 * * figure 4 *	1,5	
A	FR-A-2 316 583 (ZOLLINGER WERNER) 28 January 1977 * claim 1; figure 3 *	1,3,5	
A	DE-A-28 29 194 (LOHRMANN UDO) 17 January 1980 * figures 1,7 *	1,5	
A	US-A-3 906 554 (JOHNSON ARTHUR L) 23 September 1975 * abstract; figures 1-3 *	1,2	
A	EP-A-0 010 945 (RAZ ZEEV ;UNIV BEN GURION (IL)) 14 May 1980 * figures 6,7 *	3	TECHNICAL FIELDS SEARCHED (Int.Cl.6) E03D
A,P	EP-A-0 685 605 (SIAMP CEDAP REUNIES) 6 December 1995 * figures 1,3,4 *	3	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	3 October 1996	Guthmuller, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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