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## (54) Operating device for a flushing installation

(57) The invention relates to an operating device (1) for a flushing installation (2) with a plurality of different flushing volumes, which is provided with a lying transmission element (4) connected to lifting means (3) of the flushing installation (2) and two elements (5L,5R) connected to the transmission element (4) for operation thereof with a different stroke (SL,SR). The transmission element (4) can herein be a pulling element, while each operating element (5L,5R) is pivotable on a shaft (6) directed transversely of the pulling element, is connected on one side of the shaft (6) to the pulling element and on the other side of the shaft (6) has a pressing part (7). The operating elements can herein co-act with a collective, stepped stop (8).

The invention further relates to a flushing installation provided with such an operating device, which flushing installation is placed behind a wall on which the operating device is arranged.

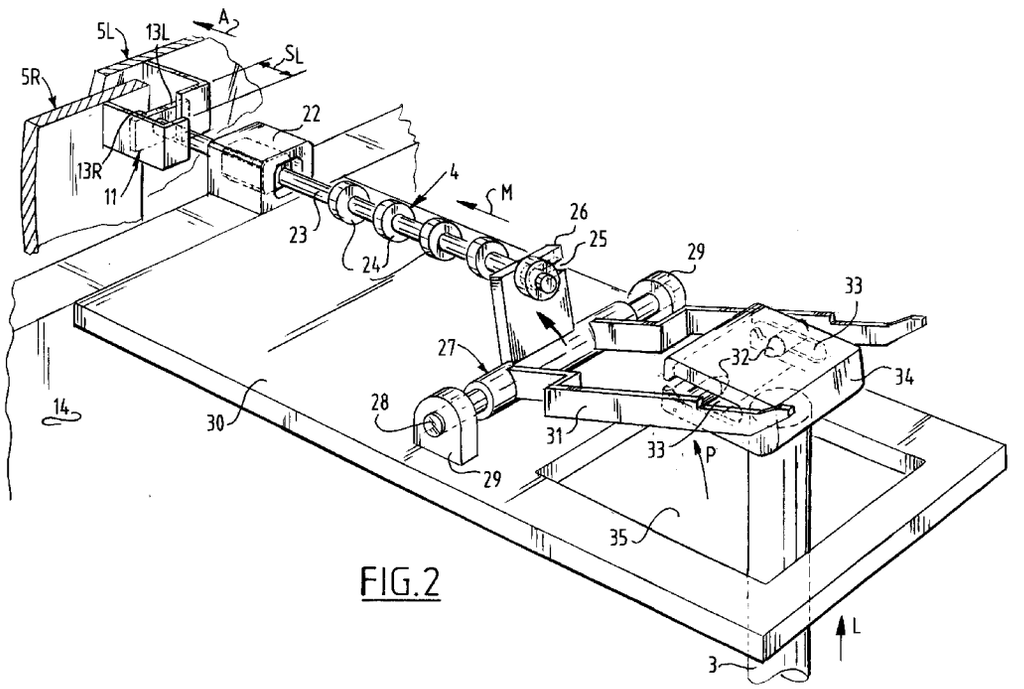


FIG.2

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## Description

The invention relates to an operating device for a flushing installation, which can deliver a plurality of different flushing volumes.

Flushing of a water closet contributes significantly to the water consumption of an average household. Since the supply of sufficient water for consumptive as well as other domestic use has required increased effort in recent years and the cost of water supply is rising ever more sharply, attempts are being made to reduce the water consumption per household. A search has therefore already been underway for a long time for water closets which have a lower water consumption per flush than conventional water closets. This has resulted inter alia in the advent of water closets with flush interruption, wherein a user can discontinue flushing once it has initiated by repeated operation of a control button or lever, whereby a valve in the flushing installation is returned more quickly to its closing position. Although in theory a considerable water-saving is possible in this manner because each user only needs to flush as much water as is necessary to empty and clean a toilet bowl, it has been found in practice that the extra action required for this purpose is in most cases overlooked, so that a full flush is still performed each time.

Flushing installations have therefore already been proposed whereby two separate flushing operations can be performed, wherein different quantities of flushing water are delivered. An example of such a flushing installation, which is designated in practice as a flushing installation for a full or half flush, is for instance known from applicant's earlier patent application EP-A-0 727 533. The flushing installation is herein embodied as a so-called close-coupled toilet suite, wherein a cistern is fixed onto the toilet bowl at the rear. Two push buttons are herein arranged in the upper wall of the cistern for operation of the flushing installation.

In recent years however, there has been a tendency toward concealing a large part of the toilet from view. Known for this purpose are wall-mounted toilets, the toilet bowl of which is as it were freely suspended on a wall, behind which the actual flushing installation is concealed. Although an attractive toilet is hereby obtained, such an arrangement has not been suitable heretofore for use of a flushing installation with full and half flush.

The present invention therefore has for its object to provide an operating device for a flushing installation with a plurality of different flushing volumes, whereby it becomes possible to apply such a flushing installation in combination with a wall-mounted toilet. According to the invention this is achieved in that the operating device is provided with at least one lying transmission element connected to lifting means of the flushing installation, and at least two elements connected to the or each transmission element for operation thereof with a different stroke. By making use of lying transmission elements a flushing installation with full and half flush can be operated in a wall-mounted toilet by operating elements arranged on the wall.

Preferred embodiments of the operating device according to the invention are described in the dependent claims 2-8.

The invention further relates to a flushing installation provided with an operating device as described above. Such a flushing installation is preferably placed behind a wall on which the operating device is arranged.

The invention is now described on the basis of an embodiment, wherein reference is made to the annexed drawing, in which:

fig. 1 is a partly cut-away, perspective front view of a flushing installation with an operating device according to the invention, and
fig. 2 shows a perspective rear view of a part of the operating device according to the arrow II in fig. 1.

An operating device 1 for a flushing installation 2, which is suitable for delivering a plurality of different flushing volumes, is provided with a lying transmission element 4 which is connected to a lifting tube 3 of flushing installation 2 (fig. 1). The transmission element 4 is in turn connected to two separate operating elements 5L, 5R, which have different strokes $S_L$, $S_R$. These operating elements 5L, 5R are pivotable on a horizontal shaft 6 and have a part 7 situated above shaft 6 which forms the actual operating part, while each operating element 5 is connected under shaft 6 to transmission element 4 by a connection 10. Transmission element 4 is herein a pulling element which is connected to lifting tube 3 via a lever mechanism 27 to be described hereinbelow.

Via their pivot shaft 6 the operating elements 5 are received in or connected to an operating panel 16, which has an arcuate opening 15 in which the semi-arcuate operating elements 5 are arranged. Operating panel 16 is in turn fixed to a mounting edge 17, for instance by means of a snap connection, which edge is arranged round an opening 18 in a wall 14 behind which flushing installation 2 is concealed. Both operating elements 5L, 5R co-act with a collective stepped stop 8 which is connected to mounting edge 17 and which has a relatively short leg 8L and a longer leg 8R. The pivoting movement of the parts 7 of operating elements 5L, 5R are thus bounded by the legs 8L, 8R of stop 8. As a result of the different lengths of the legs 8L, 8R the operating elements 5L, 5R each have a different stroke $S_L$, $S_R$.

Operating elements 5L, 5R are each connected to spring means 9, whereby they are urged back to their starting position after they have been operated. These spring means 9 herein take the form in each case of a torsion spring which is wound round pivot shaft 6 and which engages with one leg on a connection part 21 of operating panel 16 running through behind operating elements 5L, 5R and which engages with its other leg on operating elements 5L, 5R. Pivot shaft 6 is herein

mounted in sleeves 20 arranged on connecting wall 21, while operating elements 5L, 5R are connected to pivot shaft 6 by means of ears 19 engaging round shaft 6. As a result of the presence of torsion spring 9 each operating element 5L, 5R will, once it has been depressed, be returned immediately to its starting position. In order to prevent the transmission element 4 and therewith the flushing installation 2 thereby also being returned to the starting position, the connection 10 between operating elements 5L, 5R and transmission element 4 has a clearance corresponding with the larger stroke $S_L$ or $S_R$ which operating elements 5L, 5R can make.

The connection 10 is formed for this purpose by two hook-shaped members 12L, 12R which protrude to the rear from operating elements 5R and which co-act with a T-shaped end part 11 of transmission element 4. Each hook-shaped connecting member 12L, 12R herein co-acts with one of the legs 13L, 13R of T-shaped end part 11 (fig. 2). If one of the operating elements, in the shown example the left-hand operating element 5L, is now operated by pushing the upper operating part 7 into the wall, the part thereof lying beneath pivot shaft 6 will then move forward from the wall 14 as according to the arrow A, whereby the T-shaped end part 11 is pulled along therewith. This movement is bounded when the upper part 7 of operating element 5L contacts the leg 8L of stop 8. The T-shaped end part 11, and therewith transmission element 4, has then been pulled outward through a stroke $S_L$. The length over which hook-shaped member 12R herein protrudes from the right-hand operating element 5R must of course be at least as great as the stroke $S_L$ in order to prevent T-shaped end part 11 hereby being inhibited in its movement. When operating element 5L is subsequently released, it is urged back to its starting position by spring 9, so that the left-hand hook-shaped member 12L must also protrude from operating element 5L over at least the stroke length $S_L$ in order to prevent the T-shaped end part 11 being pressed inward again by this return to the starting position.

As stated, the T-shaped end part 11 is connected to transmission element 4 which is mounted slidably in a bearing 22. Transmission element 4 is in turn connected to lifting tube 3 of flushing installation 2 via a knee lever 27. For this purpose the transmission element 4 is constructed from a rod-like part 23 with a plurality of spacing rings 24 formed integrally therewith, with which the transmission element 4 can be snapped fixedly into a slot 25 of an arm 26 of lever 27. Lever 27 is herein pivotable on a shaft 28 which is received in bearing blocks 29 fixed on a plate 30 protruding above the cistern 36. The lying arm 31 of knee lever 27 takes a divided form, wherein the parts 31 are each provided with mutually facing pins 32 which can be hooked into a slot 33 of a cover 34 connected to flushing tube 3.

By operating one of the operating elements 5L or 5R the transmission element 4 is thus pulled in the direction of the arrow M, whereby knee lever 27 pivots in the direction of arrows P and the lifting tube 3 of flushing installation 2 is raised as according to arrow L. A valve 40 connected to lifting tube 3 is thereby moved clear of an outflow opening 41 in the underside of cistern 36, so that the water 37 can run as according to arrow F out of cistern 36 into a discharge tube 38 leading to the toilet bowl. Once the flushing process has been set into action the valve 40 is further held up by the float elements 39 which are connected to flush tube 3 and which float in the water 37 in cistern 36. As more water 37 runs out of cistern 36, the float elements 39 and thereby the flush tube 3 and the valve 40 will drop further back, whereby eventually the outflow opening 41 is closed off once again. Herein the knee lever 27, transmission element 4 and T-shaped end part 11 will therefore also move slowly back to their starting position.

The quantity of water which finally leaves cistern 36 per flush is therefore determined solely by the distance over which flush tube 3 is carried upward, this distance being determined in turn by the stroke of the operating element 5L or 5R. The user can thus opt for a full or half flush simply by depressing one of the two operating elements 5L or 5R, without extra operations being required for this purpose, as in the case of a flush interruption. It is anticipated that in practice more users will hereby opt for a half flush, whereby the total water consumption of the flushing installation is reduced.

## Claims

1. Operating device (1) for a flushing installation (2) with a plurality of different flushing volumes, provided with at least one lying transmission element (4) connected to lifting means (3) of the flushing installation (2), and at least two elements (5L, 5R) connected to the or each transmission element (4) for operation thereof with a different stroke ($S_L$, $S_R$).

2. Operating device (1) as claimed in claim 1, **characterized by** a single transmission element (4) to which the operating elements (5L, 5R) movable through a different stroke ($S_L$, $S_R$) are each connected.

3. Operating device (1) as claimed in claim 1 or 2, **characterized in that** the or each transmission element (4) is a pulling element and each operating element (5L, 5R) is pivotable on a shaft (6) directed transversely of the pulling element (4), is connected on one side of the shaft (6) to the pulling element (4) and on the other side of the shaft (6) has a pressing part (7).

4. Operating device (1) as claimed in claim 3, **characterized in that** the operating elements (5L, 5R) are pivotable on a collective shaft (6) and co-act with a collective, stepped stop (8).

5. Operating device (1) as claimed in claim 3 or 4, **characterized in that** each operating element (5L, 5R) is connected to spring means (9) for urging thereof back to its starting position, and the connection (10) between the operating element (5L, 5R) and the transmission element (4) has a clearance corresponding with the larger stroke ($S_L$, $S_R$).

6. Operating device (1) as claimed in any of the claims 3-5, **characterized in that** the transmission element (4) has a substantially T-shaped end part (11) and each operating element (5L, 5R) has a hook-shaped connecting member (12L, 12R) for receiving one leg (13L, 13R) of the T-shaped end part (11).

7. Operating device (1) as claimed in claims 5 and 6, **characterized in that** each hook-shaped member (12L, 12R) protrudes over a length corresponding with the larger stroke ($S_L$, $S_R$) of the operating elements (5L, 5R).

8. Operating device (1) as claimed in any of the foregoing claims, **characterized in that** the or each transmission element (4) is connected to the lifting means (3) of the flushing installation (2) via a knee lever (27).

9. Flushing installation (2) provided with an operating device (1) as claimed in any of the foregoing claims.

10. Flushing installation (2) as claimed in claim 9, **characterized in that** the flushing installation (2) is placed behind a wall (14) on which the operating device (1) is arranged.

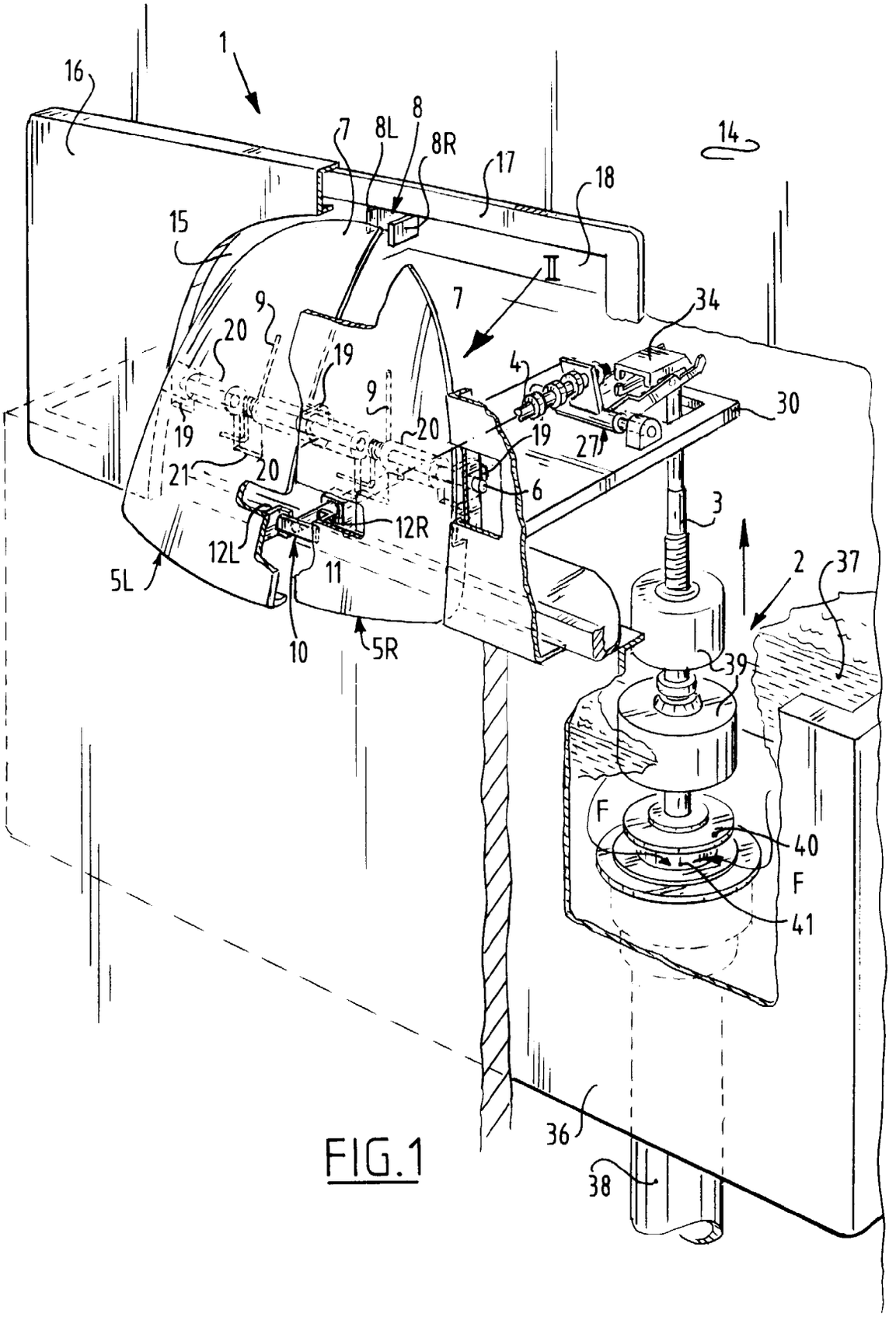
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FIG.1

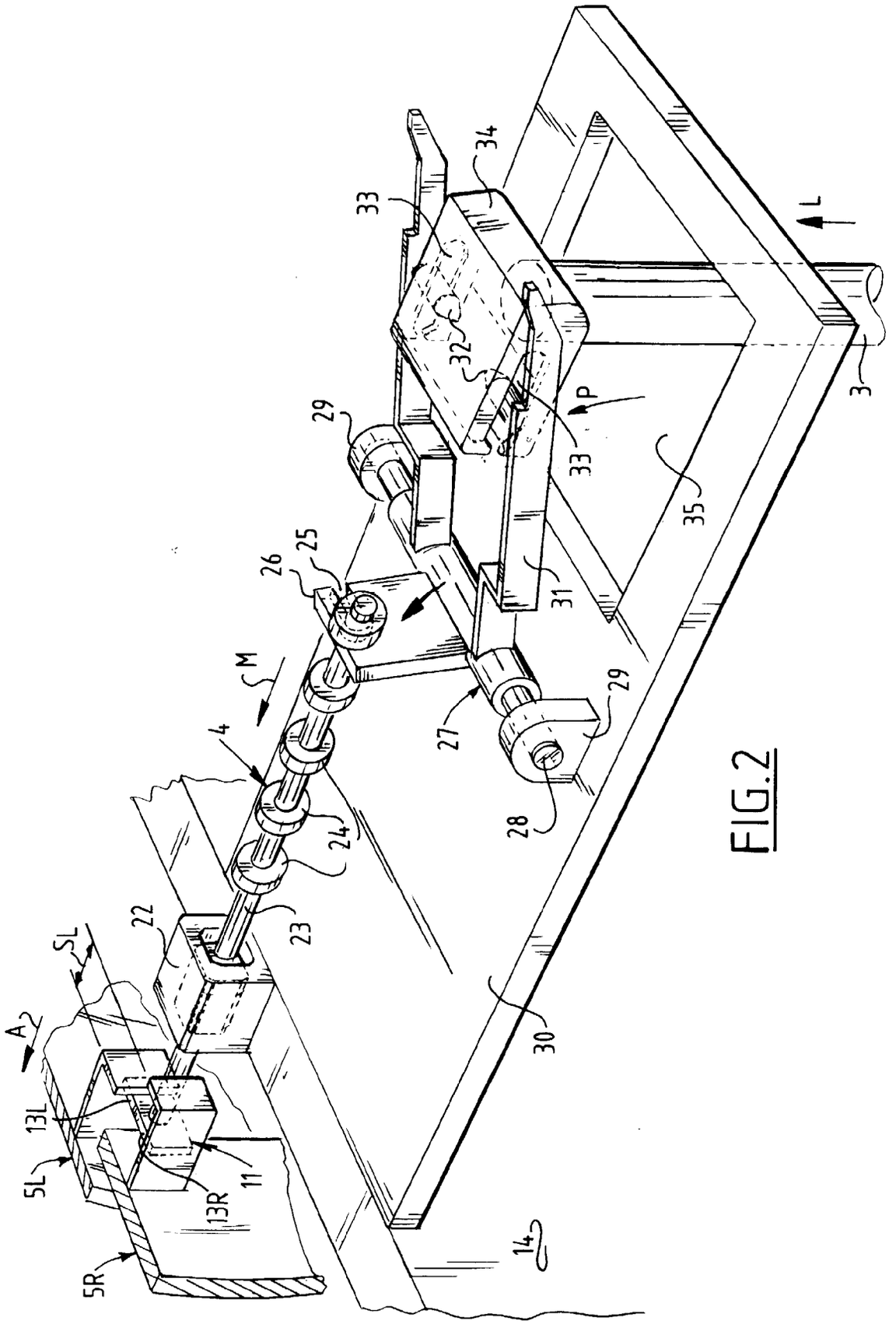
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FIG.2

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# EUROPEAN SEARCH REPORT

Application Number
EP 97 20 3709

## 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) |
|---|---|---|---|
| X | DE 195 08 865 A (KLIMEK)<br>* the whole document * | 1,2 | E03D5/09<br>E03D1/14 |
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| A,D | EP 0 727 533 A (BENTE) | | |

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

E03D

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| THE HAGUE | 20 March 1998 | Hannaart, J |

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