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(72) Inventor: **Guerini, Walter**  
**I-25065 Lumezzane S.S. (Brescia) (IT)**

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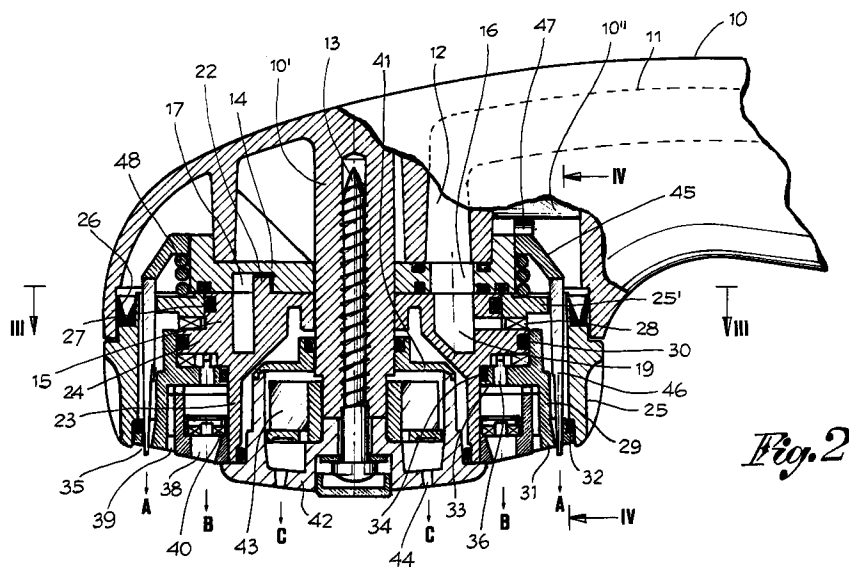
(74) Representative: **Manzoni, Alessandro**  
**MANZONI & MANZONI,**  
**UFFICIO INTERNAZIONALE BREVETTI,**  
**P.le Arnaldo 2**  
**25121 Brescia (IT)**

(71) Applicant: **GUERINI DOCCE S.n.c. di Guerini**  
**Walter & C.**  
**I-25066 Lumezzane Pieve(Brescia) (IT)**

(54) **Shower with pin descaler**

(57) The present invention pertains to a shower with a built-in pin device (45, 46) that can be positively moved from a non-operating position with the pins away from said ring of holes (35). The pin device (45, 46) is constantly kept in the non-operating position by a recovery spring (48), and is moved into the operating position

after breaking off the delivery of any one jet of water, by means of a final additional rotation in one direction or the other of an element used to divert the water towards any one ring of holes of the shower.



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## Description

The present invention pertains generally to shower heads composed of concentric elements, assembled as a pack and defining one, two, or more passages, in combination, to supply an equal number of different jets of water, and in which at least one of the elements is in the form of a knob and may be turned by hand to selectively divert the incoming water through a hole leading towards each of the supply passages according to the form of the desired jet.

A distribution valve and shower of this type has been described, for example, in a previous Italian patent application N.7073-B/86.

More specifically, the invention pertains to a shower head of the above mentioned type and incorporating pin devices destined to be introduced into set of water outlet holes to keep them clean and prevent the formation of scale that could lead to the holes getting clogged.

It is an object of the present invention to propose a shower with a pin cleaning unit designed to unclog at least one set of water outlet holes, which is operated by rotating, either in one direction or in the opposite one, the jet selection knob close to the ends of the admitted rotation for this knob.

Another object of this invention is to propose a shower with several jets in which the pin cleaning unit remains inoperative while water is being delivered through any set of holes.

Yet another object of this invention is to propose a shower with a pin cleaning unit designed to prevent the formation of encrustations of scale in at least one set of holes; this unit may be activated voluntarily and only after stopping the passage of water from all the sets of holes.

It is again an object of this invention to propose a shower which keeps all the features and operation of a similar conventional shower and in which the cleaning unit acts when the shower is no longer supplying water, thereby always being able to stay in the active position until the shower is used again, that is when it is no longer necessary to prevent the formation of encrustations of scale in the holes.

The shower according to this invention is basically in conformity with claim 1. However, further details of the invention will become apparent from the continuation of the description made with reference to the attached drawings, in which:

Figure 1 is an exploded view of the components of a shower according to the invention;

Figure 2 is an axial sectional view of the assembled shower;

Figure 3 is a partial sectional view according to line III-III in Fig. 2, with the distributor in a first position and with a first embodiment of the stopping devices at the limit stop of the distributor;

Figures 3a, 3b, 3c and 3d are various analogous views to Fig. 3 but with the distributor in several different positions;

Figure 4 is a partial and schematic view according to line IV-IV in Fig. 2;

Figure 4a is a partial and schematic view according to line IVa-IVa in Fig. 3b;

Figures 5 and 5a are two views corresponding to Figs. 3a and 3b, but showing a variant of the distributor limit stop devices; and

Figures 6 and 6a are two views corresponding to Figs. 3a and 3b as well, but showing to another variant of the distributor limit stop devices.

The shower head comprises a body 10 having a longitudinal pipe 11, which at one end is connected to a pipe -not shown- supplying the water and which at the opposite end has an outlet 12 open towards elements designed to create and supply different jets of water.

This outlet 12 is placed parallel to a central leg 10' around which wings 10'' are located spaced at 120°, for example. The leg 10' is integral with the shower body and designed to support the functional elements that control and channel the jets of water. These elements are fitted in a pack on or concentrically around said leg 10' held axially by a single screw 13 screwed onto the leg.

The body 10 comprises a fixed plate 14 at the level of the outlet 12 and a rotating distributor element 15 both centred on the leg 10'. The plate 14 is provided with a through inlet hole 16 coinciding with the outlet 12 and designed for the passage of the water from said outlet towards the adjacent distributor element 15. The through hole 16 is surrounded by seals both on the side towards the outlet 12 and on the side of the distributor 15.

The fixed plate 14, on its face turned towards the distributor, is provided with an arc slot 17 concentric to the leg 12 and a O-ring 18 close to the periphery, however outside the through hole 16. The element 15 rests on said O-ring 18, and the seal around the through hole 16 on the side of the distributor 15 rests on a surface facing the latter in which some (three) distribution holes 19 --see Fig. 3--are provided spaced angularly on an arc concentric to the leg 12, which can be selectively positioned in coincidence with the inlet hole 16. The distributor element 15 has, moreover, at a distance from said distribution holes 19, a stop tab 22 designed to engage in the slot 18 of the plate 14 to limit the maximum rotation of the distributor in both directions. On its opposite face to the face in contact with the plate 14, the distributor has a cylindrical neck 23 surrounded by a peripheral flange 24.

The distributor 15 is placed concentrically in, and turns together with, a control knob 25 which is guided in rotation peripherally in the shower body 10 with a seal 26 placed in between. The distributor and knob are coupled and constrained radially to turn together, besides being watertight thanks to a seal 27 placed at an inter-

mediate level between the plate 14 and the peripheral flange 24 of the cylindrical neck 23.

The knob 25 has an internal flange 25' which is joined peripherally to the distributor 15 and which rests on the peripheral flange 24 by means of spacer ribs to define a water passage 28.

A first diffuser 29 is fitted inside the knob, between it and the distributor 15, and is designed to turn together with the knob and with the distributor. The diffuser 29 has: a cylindrical portion that is joined with the periphery of the flange 24 of the distributor through a seal 30; on the outside, a flange 31 turned towards and coupled with the inside of the knob 25 through a seal 32; and, on the inside, a flange 33 turned towards and coupled with the neck 23 of the distributor through an additional seal 34.

The outer flange 31 of the diffuser is provided with a first ring of holes 35 distributed on a circle and designed to deliver a first set of jets of water according to the arrow A --see Fig. 2--. On the other hand, the inner flange 33 of the diffuser has a number of holes 36 which permit the passage of water towards a ring element 37, placed in an ensuing compartment between the diffuser 29, the peripheral flange 24 and the neck 23 of the distributor and having a second ring of holes 38 for the delivery of a second set of jets of water according to arrow B --see Fig. 2--.

More specifically, between the ring element 37 and the diffuser 29 there are passages 39 for air suction, and inside said ring element there may be a flow-breaking element 40.

In the neck of the distributor 15, on the central leg 10' of the shower body, a disc 41 and a second diffuser 42 are fitted, which together define a chamber housing a blade impeller or turbine 43 having radial water inlet passages and a third ring of holes 44 on its bottom to supply a third set of jets of water according to arrow C.

Around the fixed plate 14, a ring 45 is provided which carries a crown of through pins 46 in corresponding holes obtained in the inner flange 25' of the control knob 25 and extending to the first ring of holes 35 designed to deliver the first set of jets of water (arrow A). On the edge of the ring 45 opposite the pins 46 there are some (three) protrusions or cams 47, turned towards, and designed to interact with, the radial wings 10" around the central leg 10' of the body 10 after the rotation of the ring with the knob. A recovery spring 48 between the inner flange 25' of the knob 25 and the ring 45 tends to keep the latter moved towards the wings 10 in such a position that the pins 46 are normally moved towards the inside of the shower, away from the respective ring of holes 31. The interaction of the protrusions or cams 47 with said wings 10" determines an axial movement of the ring 44 in opposition to the action of the spring 48, that is towards the outside of the shower, so that the pins enter the respective ring of holes 35 (see Figs. 4, 4a).

In practice, the rotation of the distributor 15 corresponds to the rotation of the knob 25. This permits to

selectively position each of the distribution holes 19 in coincidence with the inlet hole 16 of the fixed plate 14 and correspondingly the delivery of a type of jet of water A, B or C as preferred, as occurs in the shower of the above mentioned Italian Patent application N.7073-B/86.

On the other hand, the ring 45 bearing the pins 46 also turns with the knob 25. However, while the knob is rotating for the selection of the type of water jet A, B or C to be delivered, the pins always remain inoperative, away from the holes 35. During such rotation, the protrusions or cams 47 are inserted between the radial wings 10" without ever engaging with them, and the spring 48 keeps the ring 45, and with it the pins 46, away from the holes 35.

The ring is moved axially so that the pins are inserted in the holes 35 only when the knob 25 is turned, in one direction or the other, to reach a limit stop defined by the arc slot 17 of the fixed plate 14 in co-operation with the tab 22 on the distributor. In this limit stop position, the distribution holes 19 of the distributor are all far from the water inlet hole 16 so all delivery of water through the shower ceases. Only at this stage do the protrusions or cams 47 of the ring with pins engage with the wings 10" --see fig. 4a--causing the pins to advance into their operating position.

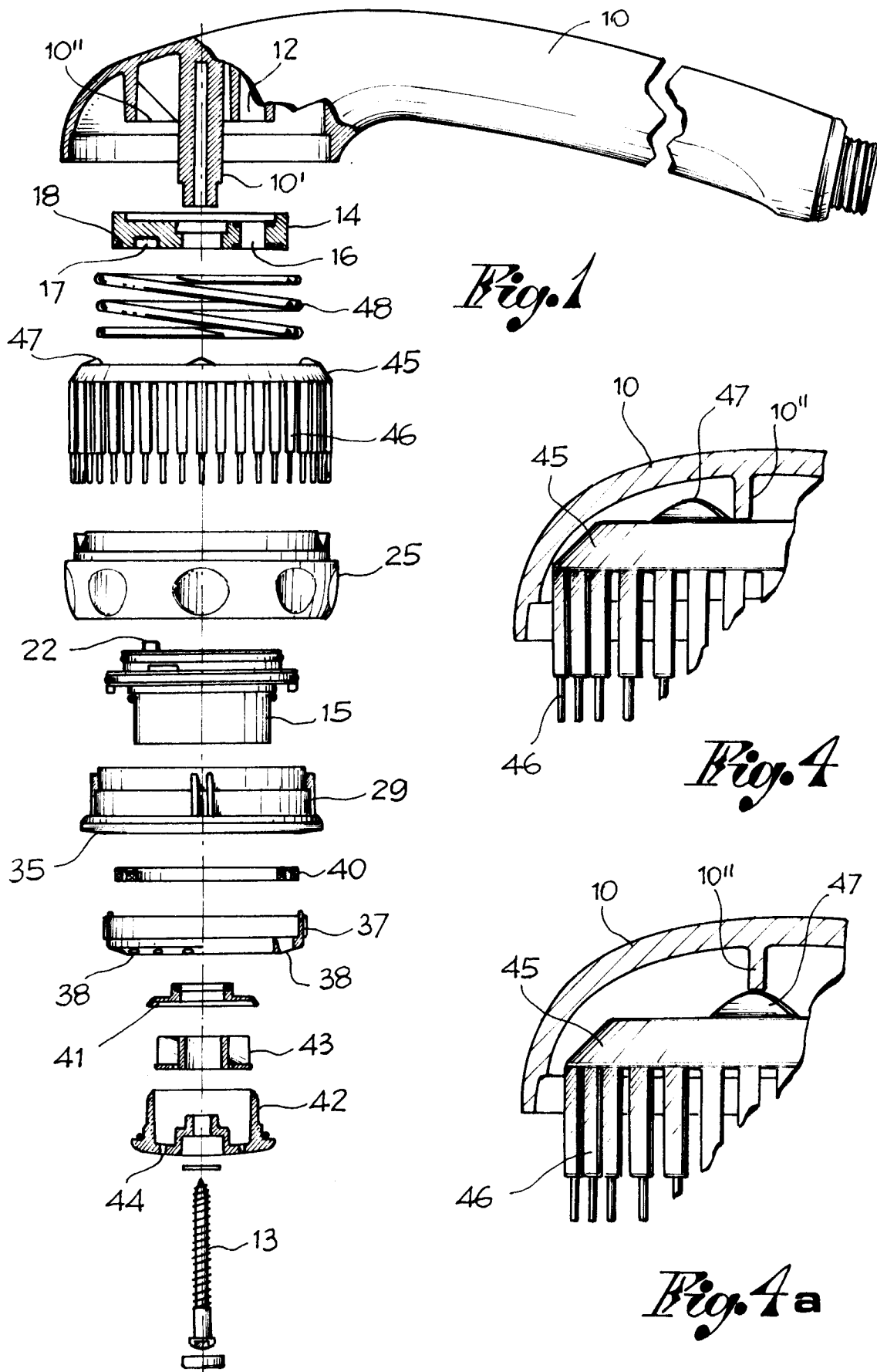
To give a sensation of the knob reaching the limit stop, either in one direction or in the other, and the pins 46 coming into operation, prongs 49 may be provided at the opposite ends of the arc slot 17 stopping the distributor stop tabs 22 by friction, i.e. by force. This embodiment is shown in Figs. 3 and from 3a to 3d, which illustrate several conditions of rotating and stopping the distributor (of which only the stop tab is visible) in various positions.

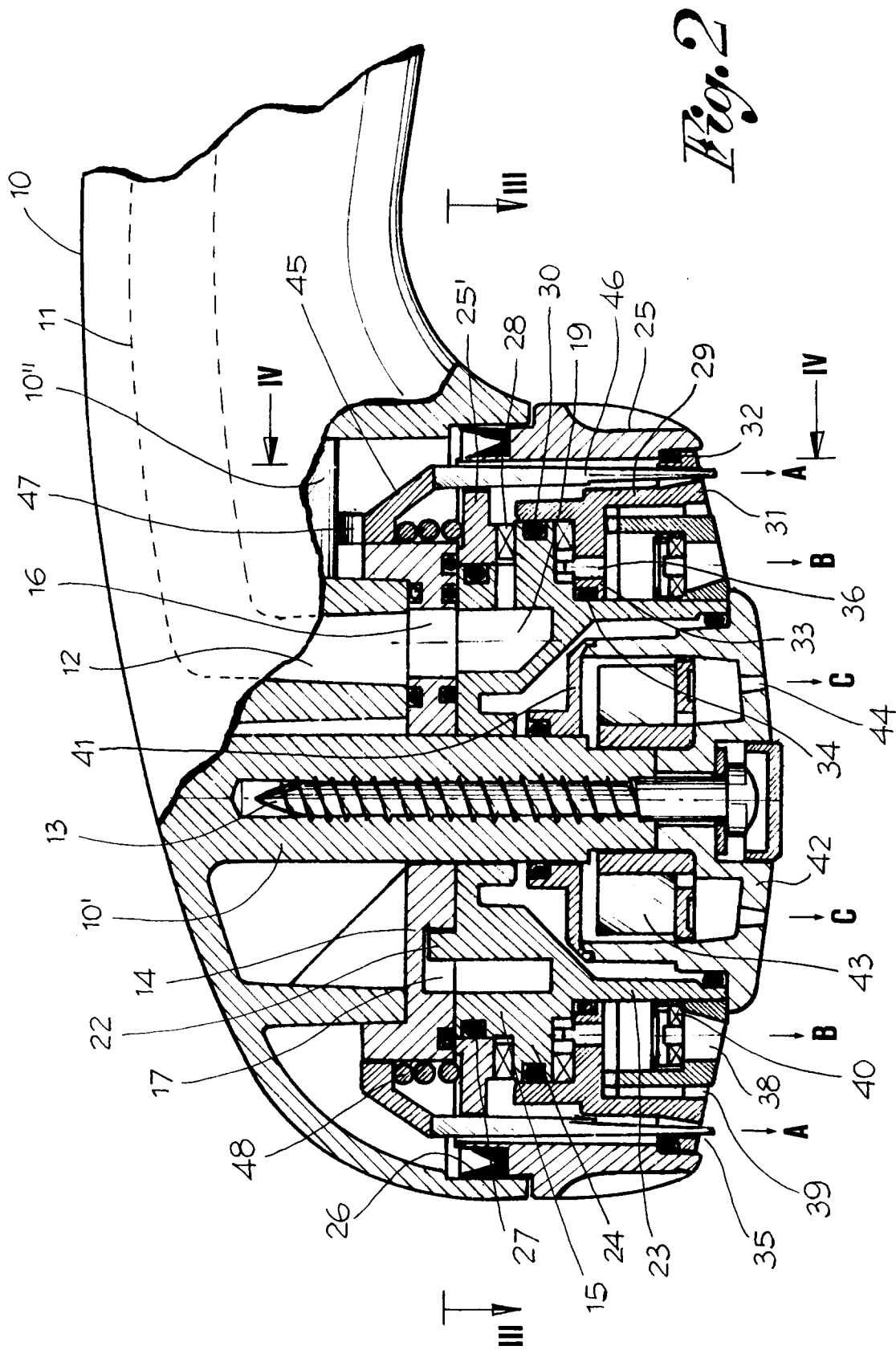
The knob reaching the limit stop and the pins coming into operation can likewise be indicated by means of a spring 50 located at each end of the arc slot 17 and designed to be compressed by the stop tab 22 when it reaches this limit stop as shown in Figs. 5 and 5a. Figs. 6 and 6a lastly show an embodiment with a limit stop with a spring 51 similar to the one of Figs. 5, 5a, but also with a positive stop ledge 52.

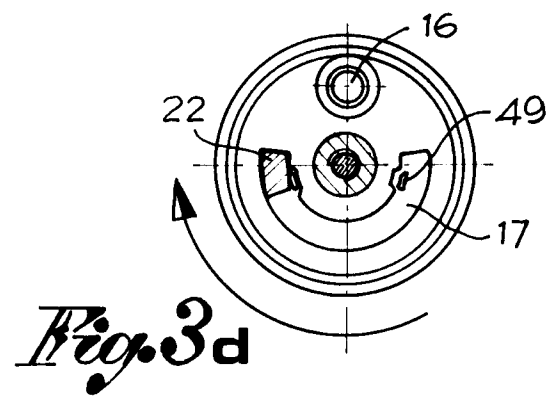
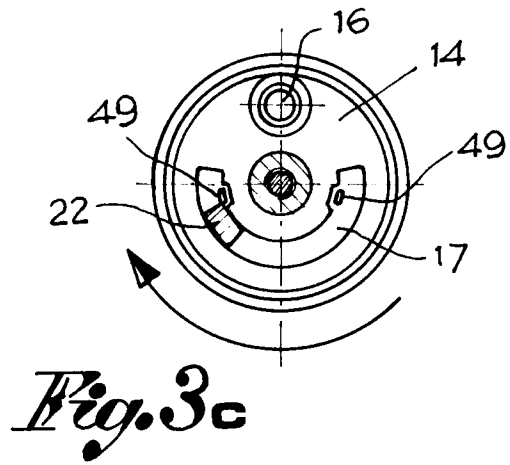
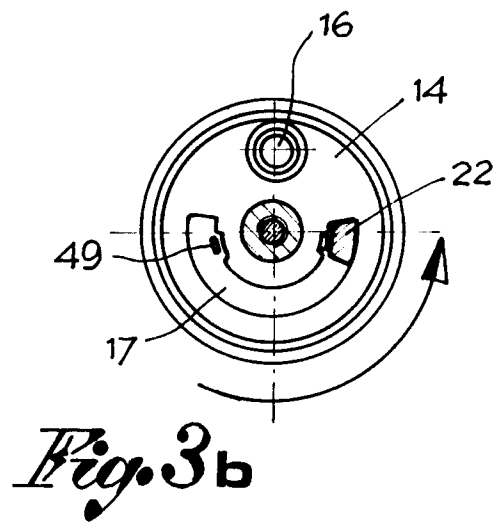
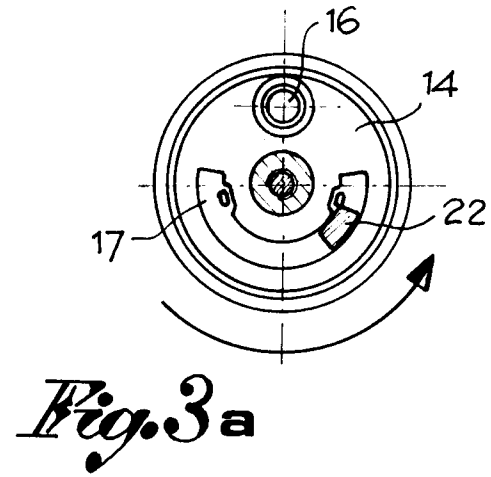
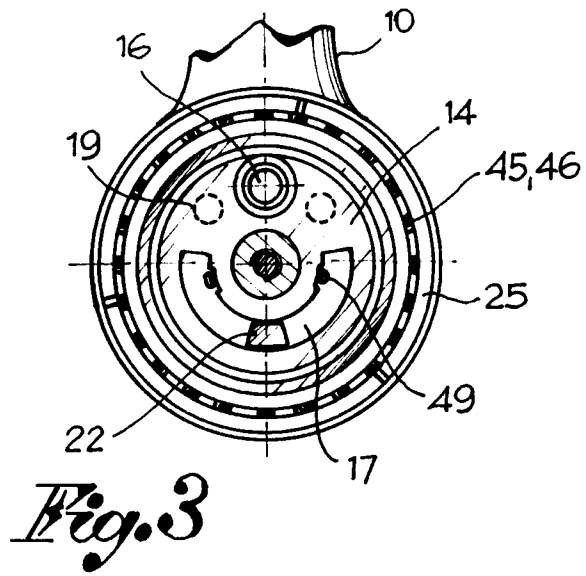
Basically, the cleaning pins always stay in an inactive position while any jet of water is being delivered through the shower. They are moved into an active position only after an additional rotation, either in one direction or in the opposite direction, of the control knob that first causes the water being delivered through the shower to be stopped and then forced introduction of the pins into the respective holes. When the knob is again turned for a fresh delivery of water, the pins automatically go back into the operating position as a result of the action of the recovery spring combined with the ring 44 bearing the pins.

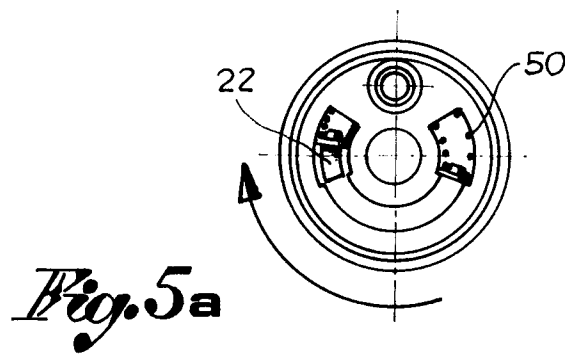
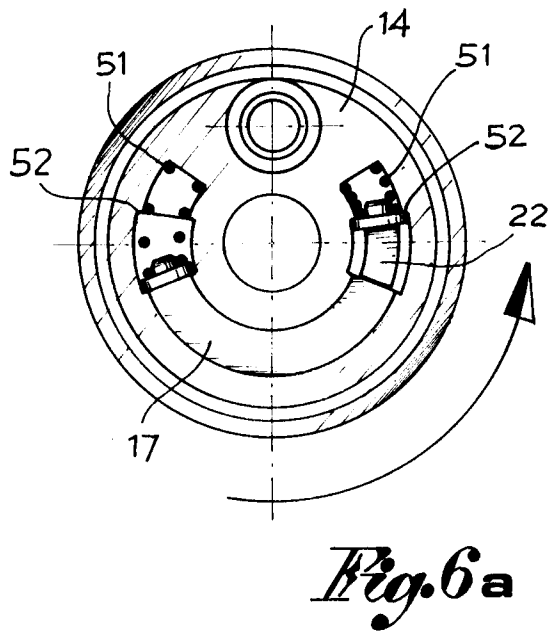
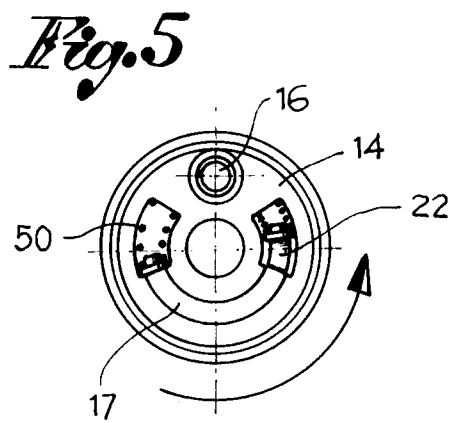
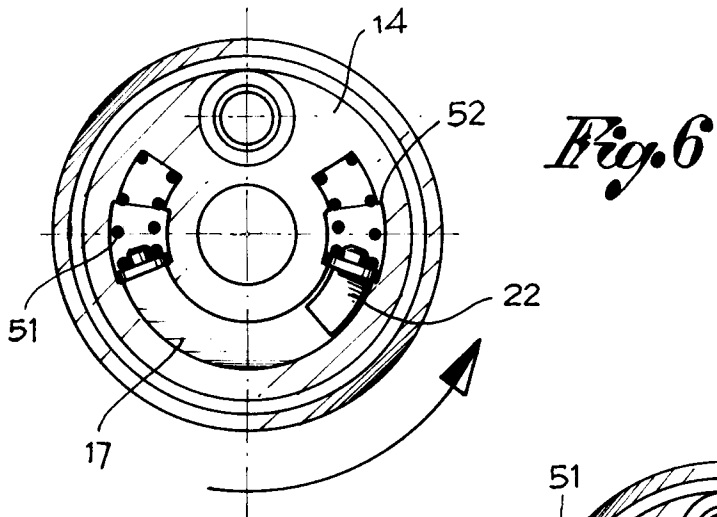
## Claims

1. A shower comprising coaxial and concentric elements (14, 15, 25, 29) assembled in a pack and defining two or more rings of holes (35, 38, 44) in combination to deliver a like number of different jets of water (A, B, C), in which at least one of the elements (15, 25, 29) may be turned by hand to selectively divert the incoming water from a hole (11, 12) leading towards each ring of delivery holes (35, 38, 44) depending on the shape of the desired jet of water, and in which a pin device (45, 46) is incorporated which can be moved positively from one non-operating position of the pins being far away from said ring of holes (35) to an operating position of the pins being inserted into one of said rings of holes (35) delivering the water, after rotating the water diversion element(s) (15, 25, 29) selectively towards each ring of delivery holes, characterized in that said pin device (45, 46) is constantly kept in the non-operating position by a recovery spring (48), and moved into the operating position after stopping the delivery of any jet of water by an additional final rotation in one direction or the other of the water diversion element(s) towards any ring of holes involving a movement of the device in opposition to the action of said recovery spring (48).
2. A shower according to claim 1, comprising a shower body (10) with a longitudinal pipe (11) supplying water and terminating in an outlet (12), a plate (14) fixed in the shower body and having a water inlet hole (16), a rotating distributor element (15) stopped axially against said fixed plate (14) and provided with holes (19) to distribute water in different directions, which can each be positioned at said inlet hole (16) of the fixed plate, a control knob (25) constrained and rotating with said distributor (15), a first diffusor (29) placed concentrically between said knob and said distributor (15) and defining a first ring of holes (35) for a first set of jets of water (A) and a second ring of holes (38) for a second set of jets of water (B), a second diffusor (42) placed concentrically in said distributor (15) and having a third ring of holes (44) for a third set of jets of water (C), said first diffusor (29) and said second diffusor (42) rotating with said knob and with said distributor and defining the water passages that extend from said distribution holes (19) to said rings of holes (35, 38, 44) for the different jets of water, the selective positioning of each distribution hole corresponding to the rotation of the knob and of the distributor at the water inlet hole (16) for the diversion of the flow of water towards the desired ring of holes (35, 38, 44), and where the pin device comprises a ring (45) bearing a crown of parallel pins (46), with said ring placed around the fixed plate (14) and with said pins that extend longitudinally between said knob and said distributor to said first ring of holes (35) passing in holes made in an inner flange of said knob, wherein the recovery spring (48) is placed between said ring (45) of the pin device (45, 46) and said distributor (15) to keep said device in the non-operating position, and wherein radial wings (10'') are provided spaced angularly inside the shower body (10) and that said ring (45) has head cams or protrusions (47) designed to interact with said wings (10'') to move said pin device axially into the operating position, when the knob is close to a rotation limit stop provided for it and the water inlet (16) into the shower is broken off.
3. A shower according to claim 2, wherein the rotation limit stop of the control knob (25) is defined by an arc slot (17) obtained in the fixed plate (14) and by a stop tab (22) integral with said distributor (15) and carried into said slot (17) being provided with devices interacting with said stop tab (22) to highlight the limit stop.
4. A shower according to claim 3, wherein said devices comprise prongs (49) to brake the tab (22) at the limit stop.
5. A shower according to claim 3, wherein said devices comprise springs (50) that are compressed by the tab (22) at the limit stop.
6. A shower according to claim 3, wherein said devices are composed of springs (51) that are compressed by the tab (22) at the limit stop and by a positive stop ledge (52).













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# EUROPEAN SEARCH REPORT

Application Number  
EP 95 83 0375

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)
P,A	WO-A-95 12456 (NEWTEAM LTD ;CRANE JEREMY LEWIS (GB); SAMWELL CHRISTOPHER JOHN (GB) 11 May 1995 * page 3, line 25 - page 7, line 14; figures 1-7 *	1	B05B15/02 B05B1/16 B05B1/18
A	US-A-4 838 486 (FINKBEINER WERNER) 13 June 1989 * column 3, line 26 - column 4, line 12; figure 1 *	1	
A	EP-A-0 621 081 (GROHE KG HANS) 26 October 1994 * column 4, line 45 - column 5, line 54; figures 1,2 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B05B
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 22 July 1996	Examiner Innecken, A
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>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</p> <p>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 L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

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