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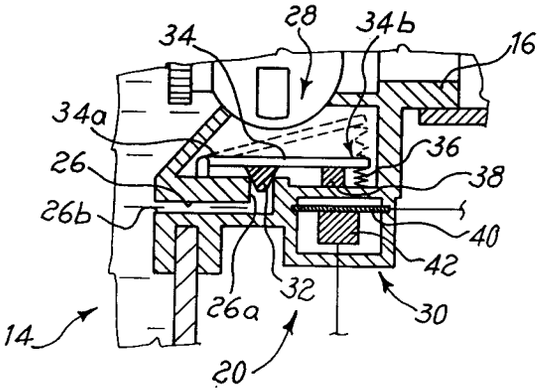
(54) Discharge device for the nozzles of hydromassage baths.

(57) A discharge device (20) for the nozzles of hydromassage baths comprises a discharge valve (28) actuated by an electromagnetic device (30) which exploits the characteristics of special ferromagnetic materials which above the "Curie temperature" assume the properties of paramagnetic materials.

Fig.3



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The present invention relates to a discharge device for the nozzles of hydromassage baths.

This device according to the known art comprises a discharge valve located inside the nozzle body and comprising an obturator, a lever member and resilient means which bias said lever member and said obturator towards the open position of said valve, a duct connecting the interior of the nozzle body and the bath on the wall of which the nozzle is mounted, said discharge valve being designed to intercept in its closed position the flow of water through said duct and being designed to be actuated between said intercepting position and an open position by means of an electromagnetic device.

Usually the electromagnetic devices for actuating the discharge valve consist of a coil or an electromagnet arranged outside the body of the nozzle, which devices when excited electrically, allow the aforementioned valve to be closed or opened respectively when one wishes to take a bath with or without hydromassage or when, after completing a bath with hydromassage, the water contained inside the nozzle delivery pipes must be discharged.

However such a device possesses certain drawbacks. In fact the device, since it consists of various components, such as, for example, ferromagnetic cores, windings and membranes, is of a certain complexity; consequently it is costly, susceptible to malfunctions and also noisy.

In order to overcome these drawbacks it has been thought to perform discharging of the nozzle pipes by means of a small discharge duct which directly connects the interior of the nozzle to the bath. This duct, however, must be suitably calibrated so as to achieve a compromise between the discharge capacity of the pipes and the inevitable lack of power which affects the hydromassage jet. Finally such a solution does not allow the discharge duct to be closed entirely, so that, should the user wish to take a bath only without hydromassage, water inevitably enters the nozzle delivery pipes.

The aim of the present invention, therefore, is to provide a device for discharging the water contained in the body and in the delivery pipes of the nozzle, which is simple, reliable and silent. Another aim of the invention is that of avoiding the loss of power of the hydromassage jet and preventing the bath water from entering the pipes of the nozzle and the hydromassage system.

These aims are achieved by the device of the type indicated initially, characterized in that said electromagnetic device comprises a permanent internal magnet mounted integrally with said lever member inside said body and an external element mounted outside said body in a position facing said permanent magnet and designed to be magnetically attracted by it, said element being made of material which has a ferromagnetic behaviour below a predetermined temperature and a paramagnetic behaviour above said temperature, and heating means associated with said element and designed to heat it to a value higher than said predetermined temperature, the magnetic force of attraction exerted by said external element when it is in the ferromagnetic condition on said internal magnet being such as to overcome the opposing resilient force of said resilient means and keep said lever member and said obturator in the condition for intercepting the flow of water through said discharge duct.

According to a particular application of the invention, the heating means consist of a resistive element supplied by an electrical control and power supply device having the function of heating the external element.

It can be easily understood that, in the conditions where the resistive element does not have electric current passing through it, the external element attracts the internal magnet against the action exerted by the resilient means, keeping the discharge valve closed, while in the condition where the resistive element is supplied with power, the external element is heated to a temperature above the predetermined temperature, thus becoming paramagnetic and allowing the discharge valve to be opened as a result of the action exerted by the resilient means which are no longer opposed by the magnetic attraction exerted by the external element on the internal magnet.

The device therefore has numerous advantages. Firstly, in the case where one wishes to take a bath with or without hydromassage, the discharge valve is in the closed position so that, in the first case there is no loss of power of the hydromassage jet and, in the second case, there is no possibility of the water entering the nozzle delivery pipes. Furthermore the device is very simple, thus being economical and silent as well as reliable. It should be noted moreover that, in order to install the device, holes do not have to be made through the nozzle body and hence no seals of any kind are required.

These and further advantageous features of the invention will emerge more clearly from the following detailed description with reference to the accompanying drawings which illustrate, in diagrammatic form, an example of embodiment thereof.

In the figures:

Figure 1 is a side elevation cross-section of a nozzle mounted on a wall of a bath containing the discharge device according to the invention shown in the closed position;

Figure 2 is a figure similar to Figure 1 showing only the nozzle with the discharge device shown

in the open position;

Figure 3 is a enlarged detail of Figure 1.

In the figures, 10 denotes in its entirety a hydromassage nozzle mounted on the side wall 12 of a hydromassage bath 14.

The nozzle 10 comprises a body 16 housing internally a device for forming and delivering the hydromassage jet, denoted overall by 18, and a discharge device 20 for the water contained in the nozzle 10. The interior of the body 16 of the nozzle communicates with a first duct 22 for delivery of the water and a second duct 24 for delivery of the air which, being suitably mixed together inside the device 18, produce in a known manner the hydromassage jet.

If we now consider the subject of the invention, it can be noted, in particular from Figure 3, that the discharge device 20 comprises a discharge duct 26 formed in the body 16 of the nozzle 10 with ends 26a, 26b. The end 26a communicates with the interior of the body 16, while the end 26b communicates with the interior of the hydromassage bath 14. The discharge device 20 comprises moreover a discharge valve 28 arranged inside the body 16 and an electromagnetic device 30 for actuation thereof.

More precisely, the discharge device 28 comprises an obturator 32 designed to open or close the end 26a of the discharge duct 26. The obturator 32 is mounted on a lever member 34 hinged at one of its ends 34a with the body 16 of the nozzle 10. Between the obturator 32 and the free end 34b of the lever member 34 there is arranged a helical spring 36 which, in the rest condition, as a result of its resilient action, keeps the end 34b of the lever member 34 raised and thus keeps the obturator 32 raised from the end 26a of the duct 26.

The elctromagnetic device 30, on the other hand, comprises a permanent internal magnet 38 mounted on the lever member 34 in an intermediate position between the obturator 32 and the helical spring 36 and an external element 40 located outside the body 16 of the nozzle 10; the external element 40 has applied to it a resistor 42 with a positive temperature coefficient, electrically connected to an electrical device 44 for controlling and supplying the said resistor. The external element 40 is made of a material possessing ferromagnetic properties which, when heated above a predetermined temperature - known as the "Curie temperature" - acquires the characteristic properties of paramagnetic materials.

It has been found, moreover, that it is particularly advantageous to use iron-nickel alloys with a percentage composition of iron and nickel such that the "Curie temperature" is approximately 100 °C, as for example occurs with the alloy commercially known as "INVAR".

Operation of the discharge device 20 is as follows. Under normal conditions, i.e. with no activation of the electrical device 44 controlling and supplying the resistor 42, the external element 40 is not heated, so that it retains its ferromagnetic properties, attracting towards it the internal magnet 38 and hence the free end 34b of the lever member 34 against the resilient action exerted by the helical spring 36. In this way, the obturator 32 closes the end 26a of the discharge duct 26 preventing any communication of the flow between the interior of the body 16 of the nozzle 10 and the interior of the hydromassage bath 14. Consequently, if the user wishes to take only a bath, i.e. keeping the hydromassage function deactivated, the water contained in the hydromassage bath 14 is unable to penetrate, via the discharge duct 26, into the body 16 of the nozzle 10 nor, consequently, into the delivery pipes thereof.

At the end of the hydromassage cycle, the user must simply activate the electrical device 44 controlling and supplying the resistor 42; in doing so the external element 40 is heated to a temperature above the "Curie temperature", losing its ferromagnetic properties and acquiring instead the properties typical of paramagnetic materials. The magnetic force which attracts the internal magnet 38 towards the external element 40 diminishes considerably so that the resilient action of the helical spring 36 prevails and moves away the free end 34b of the lever member 34, raising the obturator 32 from the end 26a of the discharge duct 26. The water contained in the nozzle 10 and hence in the delivery pipes of the same nozzle is discharged via the discharge duct 26.

For optimum operation of the discharge device 20, the electrical device 44 controlling and supplying the resistor 42 must be programmed such that, once activated, the external element 40 retains the characteristics of paramagnetic materials for a sufficient period of time to achieve complete emptying of the nozzle delivery pipes.

From the above description the advantages which are obtained using such a device are obvious. In particular the device is simple and easy to manufacture, economical and extremely reliable as well as very silent. Furthermore there are no risks associated with the use of electrical conductors in the presence of water or humidity.

Claims

1. Discharge device (20) for hydromassage baths, of the type comprising a discharge valve (28) located inside the body (16) of the nozzle (10) and comprising an obturator (32), a lever member (34) and resilient means (36) which bias

this lever member and said obturator towards the open position of said valve, a duct (26) connecting the interior of the body (16) of the nozzle and the bath (14) on the wall of which the nozzle is mounted, said discharge valve being designed to intercept in its closed position the flow of water through said duct (26) and being designed to be actuated between said intercepting position and an open position by means of an electromagnetic device (20), characterized in that said electromagnetic device comprises a permanent internal magnet (38) mounted integrally with said lever member (34) inside said body (16) and an external element (40) mounted outside said body (16) in a position facing said permanent magnet (38) and designed to be attracted magnetically by it, said element (40) being made of material which has a ferromagnetic behaviour below a predetermined temperature and a paramagnetic behaviour above said temperature, and heating means (42) associated with said element (40) and designed to heat it to a value higher than said predetermined temperature, the magnetic force of attraction exerted by said external element (40) when it is in a ferromagnetic condition on said internal magnet (38) being such as to overcome the opposing resilient force of said resilient means (36) and keep said lever member (34) and said obturator (32) in the condition for intercepting the flow of water through said discharge duct (26).

2. Device according to Claim 1, characterized in that said lever member (34) is hinged at one of its end (34a) with the body (16) of the nozzle (10) and said resilient means (36) are located between the lever member (34) and the body (16) of the nozzle (10).

3. Device according to Claim 2, characterized in that said obturator (32) is mounted in an intermediate position between the fixed end (34a) of the lever member (34) and the internal magnet (38).

4. Device according to Claim 3, characterized in that said resilient means (36) are mounted in an intermediate position between the internal magnet (38) and the free end (34b) of the lever member.

5. Device according to any one of the preceding claims, characterized in that said heating means (42) consist of a resistive element.

6. Device according to Claim 5, characterized in that said resistive element (42) is a resistor with a positive temperature coefficient.

7. Device according to Claim 5 or 6, characterized in that said resistive element (42) is supplied by an electrical control and power supply device (44).

8. Device according to any one of the preceding claims, characterized in that said resilient means (36) consist of a helical spring.

9. Device according to any one of the preceding claims, characterized in that said predetermined temperature is substantially equivalent to 100 ° C.

10. Device according to any one of the preceding claims, characterized in that said external element (40) is made of an iron-nickel alloy.

11. Device according to any one of Claims 7 to 10, characterized in that said electrical control and power supply device (44), once activated, keeps the temperature of the external element (40) above said predetermined temperature for a predetermined period of time.

Fig.1

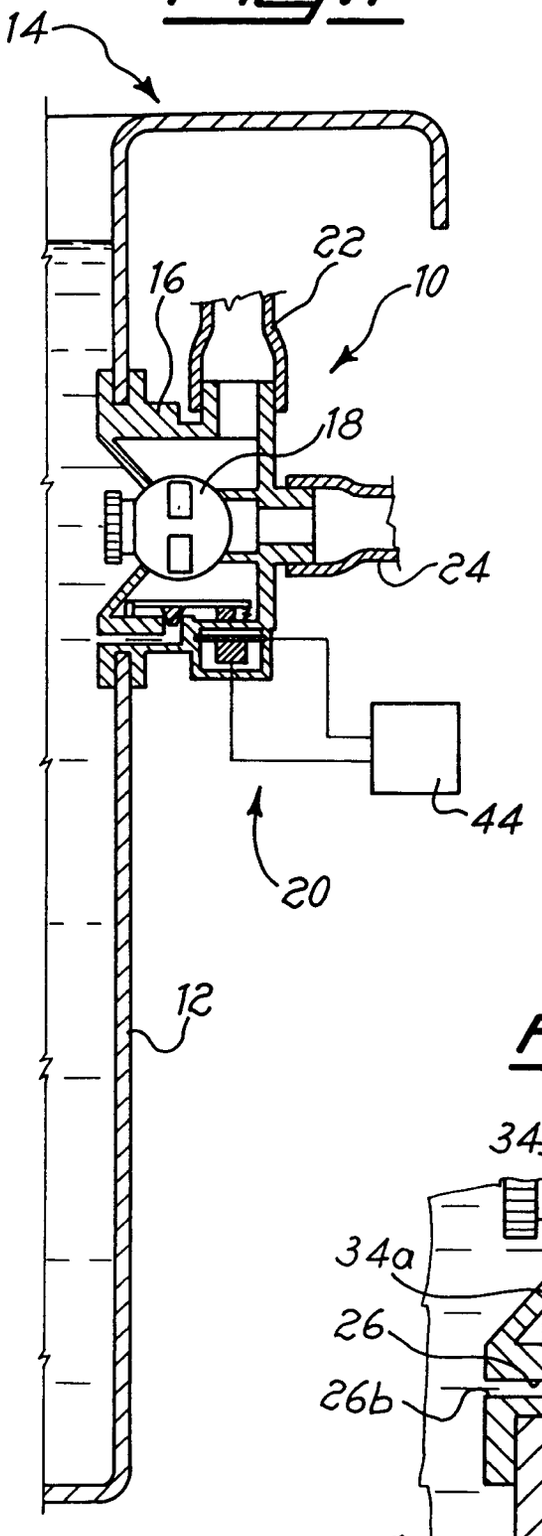


Fig.2

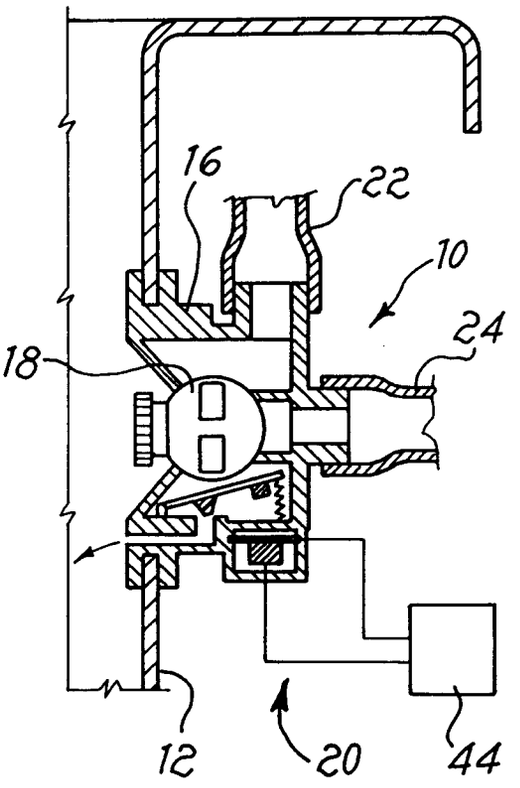
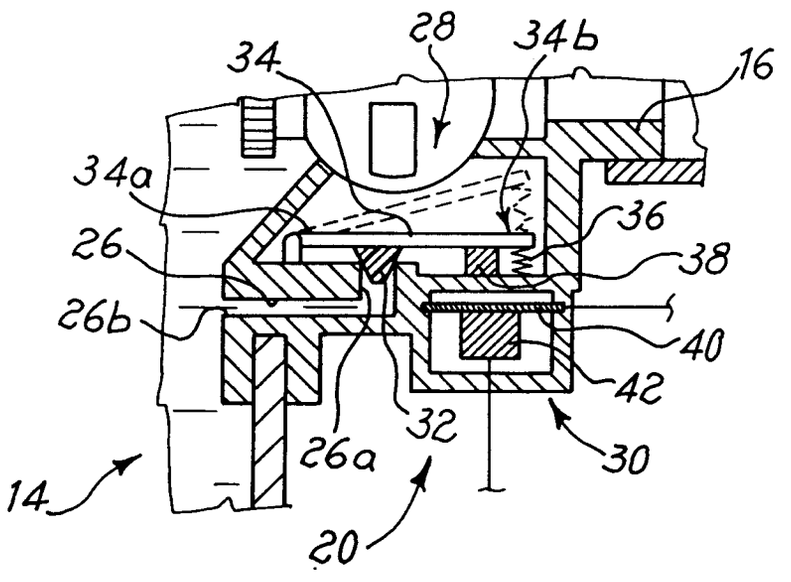


Fig.3



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EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT

EP 95200657.5

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
A	EP - A - 0 351 813 (EISENWERKE) * Abstract; figs. * --	1	A 61 H 33/00
A	EP - A - 0 215 514 (TEUCO) * Abstract; column 5, line 54 - column 6, line 10; fig. 11 * --	1	
A	SOVIET INVENTIONS ILLUSTRATED, PQ section, week A20, June 27, 1978 DERWENT PUBLICATIONS LTD., London; & SU-A-561 828 (ABALAKOV OV) ----	1	

TECHNICAL FIELDS SEARCHED (Int. Cl. 6)

A 61 H
F 16 K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	14-07-1995	NARDAI

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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