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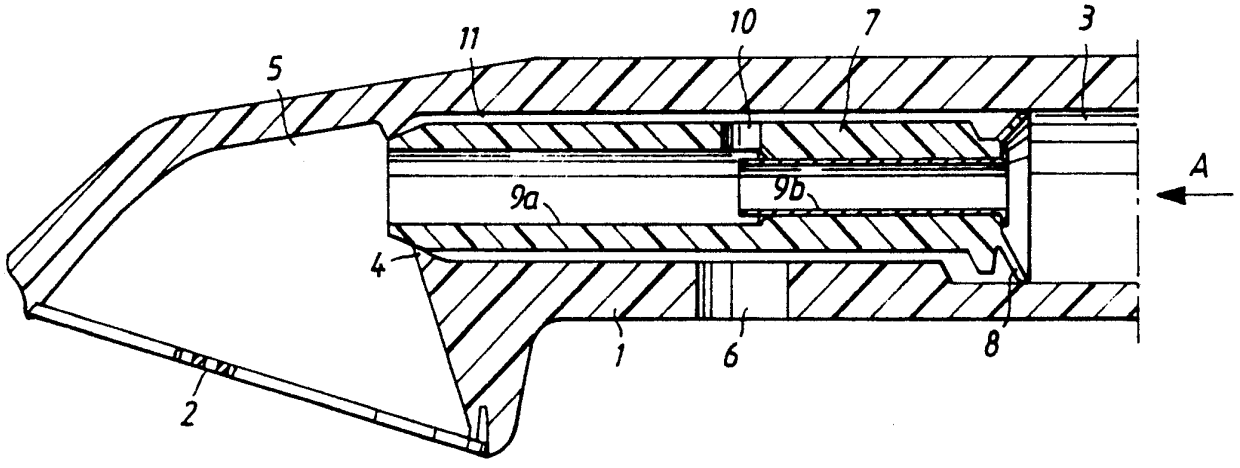


(57) Abstract

A device limiting the amount of water flowing through a shower head (1) comprises an ejector valve (7) integrated in the shower head, which ejector valve admixes air to the water flow fed to the outlet (2) of the shower head.

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# A DEVICE FOR SHOWER HEADS

## DESCRIPTION

### Technical field

The present invention relates to a device in shower heads and, more particularly, a device for limiting the amount of water flowing through the shower head. In the present context, by shower head is meant a device transforming a uniform flow of water into a shower, which device may consist, for instance, of a so called hand shower.

### Prior art

It is desirable, in various situations, to limit water consumption in order to save water and energy, and this also applies to showering of, for instance, the human body. Such a limitation may be made by shutting off or reducing the supply of water to the shower head, for example, during soaping, or by providing the shower head sprayer with very small holes. In the first instance, the water tap has to be manipulated repeatedly, which is troublesome, or the speed of the jet of shower water will be too low to permit effective showering. In the second instance, the speed of the jet of shower water will be too high for showering to be reasonably effective, which is experienced as unpleasant.

### Description of the invention

It is an object of the present invention to eliminate, at least partly, the disadvantages of prior art shower heads and to provide a shower head by means of which water consumption may be limited without the water having to be shut off and without showering becoming ineffective.

This object is achieved by the device of the invention being provided with the features stated in the characterizing portion of claim 1.

Other objects and advantages of the invention appear more clearly in the dependent claims and in the following detailed description of a preferred embodiment of the device of the invention.

Description of the figures

The single figure of the drawing is a schematic sectional side view of a portion of a shower grip comprising the device of the invention.

The rear end of the shower grip 1, not shown in the figures, is provided in the usual way with a connection for a hose which in turn is connected to a water conduit provided with a tap. The front end of the shower grip 1 is provided with a sprayer 2.

The shower grip 1 is provided with a duct 3 through which water is intended to flow in the direction of the arrow A. The duct 3 suitably has a circular cross section and at its left end has a restriction 4 before terminating in a substantially cone-shaped space 5. In the side wall of grip 1 there is a circular hole 6.

An ejector valve 7 with a substantially circular cross section is integrated in or, alternatively, detachably inserted in the duct 3 and is prevented from turning therein owing to the restriction 4 and the front end of the valve 7 interacting therewith not being circular in shape. The rear end of the valve 7 is provided with an annular resilient flange 8 which sealingly bears on the side walls of the duct 3. The valve 7 may be provided with means for retaining same axially in the duct 3, however, usually this is not required, since the water pressure acting on the flange 8 urges the valve against the restriction 4.

The ejector valve 7, which has no movable parts, is provided with an axial duct consisting of coaxial subducts 9a and 9b, the cross sections of which are smaller than that of the duct 3, thereby limiting the water flow passing through the valve. The duct 9b is delimited by a metal tube attached in the valve 7 which is suitably made of plastic, the left-hand end of the metal tube protruding into the subduct 9a having the larger cross section.

In the area in which the duct 9b transforms into the duct 9a there is provided a radial air duct 10 in the side wall of the valve 7. The extension of the central axis of the

duct 10 is located in the same plane as, or at a short distance from, the left-hand end of the tube 9b. The inlet of the duct 10 is located at a great distance from the hole 6 in the side wall of the grip 1, suitably diametrically opposed to same, as appears from the figure. The inlet of the duct 10 communicates with the annular space 11 formed between the valve 7 and the side wall of the duct 3, which space is filled with air and extends between the restriction 4 and the flange 8.

The operation of the device according to the invention will now be briefly discussed.

The water flow fed through the duct 9b in the direction of the arrow A is mixed with the air flow induced through the duct 10 by means of the ejector effect in the area immediately after the left-hand end of the tube 9b. The water/air flow passes through the duct 9 and further into the space 5 and is then pressed out through the sprayer. By appropriate dimensioning of the valve 7 and the grip 1 a desired admixture of air of 20 - 30% to the water is achieved. This essentially gives the same showering effect as with water only as well as softer sprays, while reducing water consumption by 20 - 30%. Owing to the duct 9b having a substantially smaller cross section than duct 3, water consumption is further reduced, and totally more than 50% and as much as 70% of water consumption may be saved as compared to conventional shower grips with substantially retained showering effect.

On induction of air into the duct 10, air is induced in the space 11 through the hole 6. The air induced through hole 6 must pass around the valve 7 before it is induced in the duct 10, which prevents or substantially reduces the noise which could arise, if the hole 6 and the inlet of the duct 10 were located close to each other.

Should a lower admixture of air be desired than that for which the device of the invention is adapted, like when rinsing hair, the hole 6 is covered by a finger of the hand holding the shower grip 11. If the hole 6 is covered completely, no air at all will be admixed, and the admixture

of air may be adjusted between 0 and 20 - 30% by partly covering the hole.

As appears from the figure, the valve 7 is located as close to the sprayer as possible. The reason is that the ejector effect of the valve 7 will be better, since the point of mixture between water and air is located near the outlet for the water/air mixture, and that on shutting off the water flow to the shower grip 1 there will be a small amount of water therein downstream of the valve, which reduces the risk of water being spilt.

While only one embodiment of the device of the present invention has been described above and shown in the drawing, it will be appreciated that the invention is not limited to said embodiment but only by what is stated in the claims.

CLAIMS

1 A device for limiting the amount of water flowing through a shower head, characterized by a valve (7) disposed immediately adjacent the shower head, which valve admixes air to the water flow fed to the outlet (2) of the shower head.

2 A device as set forth in claim 1, characterized in that the valve (7) is operable to limit or prevent air admixture to the water flow.

3 A device as set forth in claim 1 or 2, characterized in that the valve is formed as an ejector valve (7) integrated in the shower head (1).

4 A device as set forth in claim 3, characterized in in that the ejector valve (7) has no movable parts and is provided with an axial water duct (9b) and a substantially radial air duct (10) communicating therewith.

5 A device as set forth in claim 4, characterized in that the inlet of the air duct (10) terminates within the shower head (1).

6 A device as set forth in claim 4 or 5, characterized in that the inlet of the air duct (10) terminates between the inner wall of the shower head and the exterior of the ejector valve (7).

7 A device as set forth in any of claims 4 - 6, characterized by a hole (6) formed in the wall of the shower head (1), which hole communicates with the air duct (10).

8 A device as set forth in claim 7, characterized in that the hole (6) is spaced apart from the inlet of the air duct (10) and preferably in such a way that air has to pass the exterior of the valve (7) before being induced in the air duct.

9 A device as set forth in claim 7 or 8, characterized in that the shower head consists of a hand shower (1) and the hole (6) is located on the shower grip in such a way that it may be covered by one of the fingers of the hand holding the shower grip.

10 A device as set forth in any of the preceding claims,

characterized in that the valve (7) is disposed at the portion of the shower head (1) formed as a shower grip, which portion is provided with a sprayer (2).

## AMENDED CLAIMS

[received by the International Bureau on 1 June 1992 (01.06.92);
original claims 1,3,4 and 5 replaced by amended claim 1;
claims 6-8,2 and 9 amended and renumbered as claims 2-4,5 and 6;
claim 10 unchanged and renumbered as claim 7 (1 page)]

1 A device for limiting the amount of water flowing through a shower head, comprising an ejector valve (7) disposed immediately adjacent the shower head, which valve admixes air to the water flow fed to the outlet (2) of the shower head and is provided with an axial water duct (9b) and a substantially radial air duct (10) communicating therewith, characterized in that the inlet of the air duct (10) terminates within the shower head (1).

2 A device as set forth in claim 1, characterized in that the inlet of the air duct (10) terminates between the inner wall of the shower head (1) and the exterior of the ejector valve (7).

3 A device as set forth in claim 1 or 2, characterized by a hole (6) formed in the wall of the shower head (1), which hole communicates with the air duct (10).

4 A device as set forth in claim 3, characterized in that the hole (6) is spaced apart from the inlet of the air duct (10) and preferably in such a way that air has to pass the exterior of the valve (7) before being induced in the air duct.

5 A device as set forth in any of the preceding claims, characterized in that the valve (7) is operable to limit or prevent air admixture to the water flow.

6 A device as set forth in claim 3, 4 or 5, characterized in that the shower head consists of a hand shower (1) and that the hole (6) is located on the shower grip in such a way that it may be covered by one of the fingers of the hand holding the shower grip.

7 A device as set forth in any of the preceding claims, characterized in that the valve (7) is disposed at the portion of the shower head (1) formed as a shower grip, which portion is provided with a sprayer (2).

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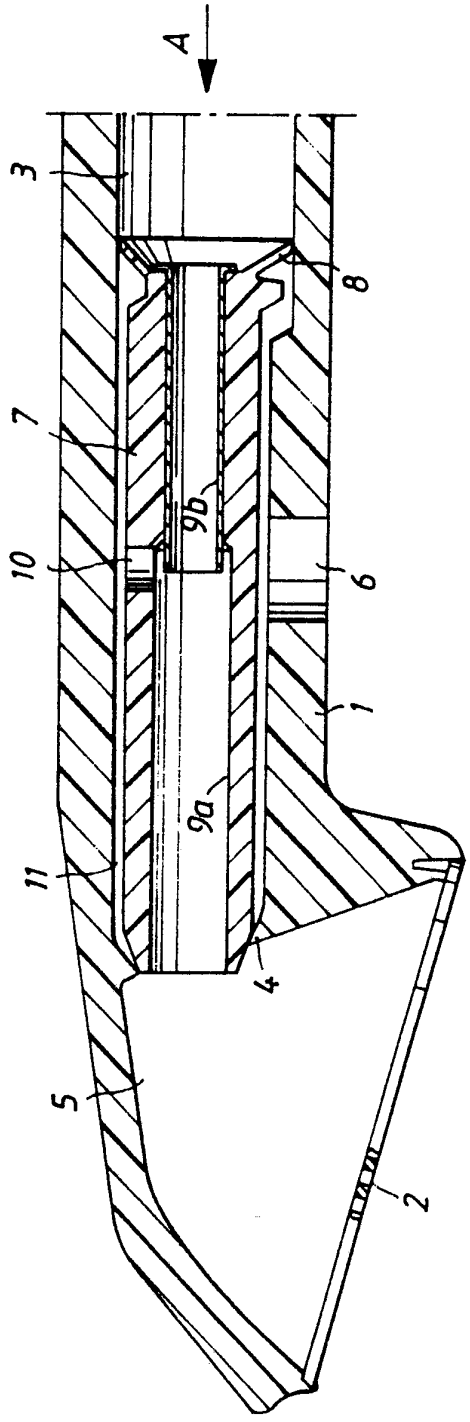
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# INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 91/00919

## I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: B 05 B 1/18

## II. FIELDS SEARCHED

Minimum Documentation Searched[7]

| Classification System | Classification Symbols |
|---|---|
| IPC5 | B 05 B |

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched[8]

SE,DK,FI,NO classes as above

## III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

| Category * | Citation of Document,[11] with indication, where appropriate, of the relevant passages[12] | Relevant to Claim No.[13] |
|---|---|---|
| X | US, A, 4573639 (MURL F. LOGUE) 4 March 1986, see the whole document -- | 1-10 |
| X | US, A, 4072270 (HARMONY) 7 February 1978, see the whole document -- | 1-2 |
| X | US, A, 3322352 (J. M. A. ALCANTARA) 30 May 1967, see the whole document -- | 1-2 |
| X | US, A, 2565554 (J. J. GOODRIE) 28 August 1951, see the whole document -- | 1-2 |
| X | US, A, 2316832 (E. AGHNIDES) 20 April 1943, see the whole document -- | 1-2 |
| | -------- | |

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## IV. CERTIFICATION

| Date of the Actual Completion of the International Search | Date of Mailing of this International Search Report |
|---|---|
| 26th March 1992 | 1992 -04- 01 |
| **International Searching Authority** | **Signature of Authorized Officer** |
| SWEDISH PATENT OFFICE | Ivar Andréasson<br>Ivar Andréasson |

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# ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 91/00919

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the Swedish Patent Office EDP file on 28/02/92
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| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US-A- 4573639 | 86-03-04 | CA-A- 1216613<br>JP-A- 58214369 | 87-01-13<br>83-12-13 |
| US-A- 4072270 | 78-02-07 | US-A- 4134548 | 79-01-16 |
| US-A- 3322352 | 67-05-30 | NONE | |
| US-A- 2565554 | 51-08-28 | NONE | |
| US-A- 2316832 | 43-04-20 | NONE | |