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### (54) Heated tank for steam-using household appliance

(57) A heated tank (1) for steam-using household appliances, comprising a water reservoir (2) associated with heating means (3) for generating steam and provided with at least one port (4) for the discharge of the steam and with at least one opening (5) for introducing water, and a top-up device (6), which is associated with the

opening and comprises a bushing (7) provided with a first end (7a) and a second end (7b), which are respectively associated with a removable closure (8) which can be accessed from outside and arranged within the reservoir (2) proximate to the maximum filling level, and floating means (9) which are accommodated so that they can slide along the bushing (7).

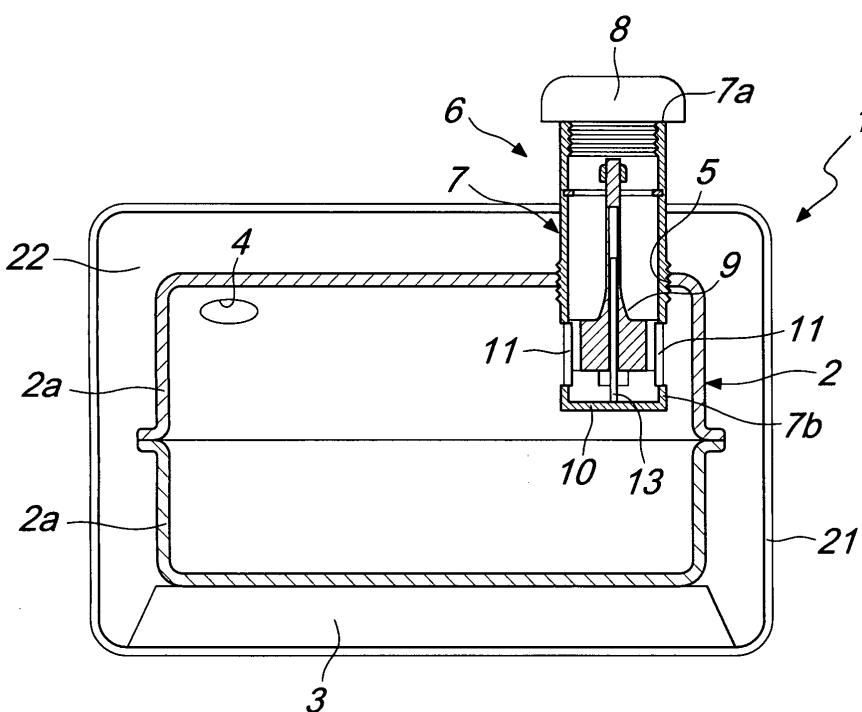


Fig. 1

## Description

**[0001]** The present invention relates to a heated tank for steam-using household appliances, particularly irons with a separate heated tank.

**[0002]** Steam-using household appliances with a separate heated tank are known which use a jet of steam, which is generated inside said heated tank and fed toward tools such as irons with an appropriately perforated soleplate, cleaning guns, or others.

**[0003]** These heated tanks comprise a hermetic and electrically heated reservoir, into which water is introduced in order to generate steam, and an enclosure for said reservoir, which is thermally and electrically insulated, and an empty gap is formed between said reservoir and said enclosure.

**[0004]** The reservoir has a maximum filling level, such as to keep a free volume at its upper portion in order to collect the generated steam.

**[0005]** The reservoir and the enclosure have respective and mutually mating ports for discharging the steam and for feeding it toward the tool and respective likewise mating openings for topping up the water inside the reservoir.

**[0006]** A bushing is inserted through the openings and its length is such as to have a first end and a second end which protrude respectively outside the enclosure and inside the reservoir.

**[0007]** A hermetic closure is removably applied to the first end.

**[0008]** The second end is arranged as the maximum filling level of the reservoir, so that the user, by pouring water into the bushing, should realize that he has reached that level and therefore should stop topping-up as soon as the water starts to rise along the bushing.

**[0009]** These heated tanks are not free from drawbacks, including the fact that excessive filling of the tank may occur during top-up, with consequent accidental leakage of water and malfunction of the heated tank.

**[0010]** The reaching the maximum filling level of the reservoir is in fact difficult to detect for the user, in view of the limited dimensions of the bushing, of limited visibility inside it, and of the mirror effect that is produced on the free surface of the water.

**[0011]** Moreover, the leakage of water causes substantial inconvenience for the user, who must collect it and dry the heated tank as well as any items that are in its vicinity, with significant waste of time and annoyance, and can compromise the safety of the user if, for example, electrically conducting elements make contact with the leaked water.

**[0012]** The aim of the present invention is to eliminate the drawbacks mentioned above of known heated tanks, by providing a heated tank for steam-using household appliances that allows to detect easily and assuredly when the maximum filling level of the reservoir is restored during water top-up.

**[0013]** Within this aim, an object of the present invention is to ensure optimum operation of the heated tank in complete safety for the operators.

**[0014]** A further object of the present invention is to be easy to use for users.

**[0015]** A still further object of the present invention is to provide a heated tank that is simple, relatively easy to provide in practice, safe in use, effective in operation, and has a relatively low cost.

**[0016]** This aim and these and other objects that will become better apparent hereinafter are achieved by the present heated tank for steam-using household appliances, which comprises a water reservoir which is associated with heating means for generating steam and is provided with at least one port for the discharge of said steam and with at least one opening for introducing water, and a top-up device, which is associated with said opening and comprises a bushing provided with a first end and a second end, which are respectively associated with a removable closure which can be accessed from outside and arranged within said reservoir proximate to the maximum filling level, characterized in that said top-up device comprises floating means which are accommodated so that they can slide along said bushing.

**[0017]** Further characteristics and advantages of the present invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of a heated tank for steam-using household appliances, illustrated by way of non-limiting example in the accompanying drawings, wherein:

30 Figure 1 is a schematic sectional view of the heated tank according to the invention;

Figure 2 is a perspective view of the top-up device according to the invention;

35 Figure 3 is a plan view of the top-up device according to the invention;

Figure 4 is a sectional view, taken along the line IV-IV of Figure 3;

40 Figure 5 is a sectional view, taken along the line V-V of Figure 3.

**[0018]** With reference to the figures, the reference numeral 1 generally designates a heated tank for steam-using household appliances, particularly irons with a separate heated tank.

**[0019]** The heated tank 1 comprises a hermetic water reservoir 2, which is associated with heating means 3, shown schematically, for example of the electrical type, for generating steam, and is provided with at least one port 4 for the discharge of said steam and with at least one opening 5 for introducing water.

**[0020]** The reservoir 2 is generally constituted by two mutually sealed half-shells 2a.

**[0021]** The port 4 is formed in the upper portion of the enclosure 2, where the generated steam collects, and is conventionally connected to a tool, such as a steam iron or a cleaning gun, by means of a duct which is not shown.

**[0022]** The opening 5, formed in the upper part of the

enclosure 2, is generally threaded and the bushing 7 is threaded externally at a central portion associated with the tank 2, so that it can be screwed into the opening.

**[0023]** Insulating means, not shown, are generally provided between the tank 2 and the outer wall of the bushing 7.

**[0024]** The heated tank 1 further comprises a top-up device 6, which is constituted by a bushing 7 which has a first end 7a, which is detachably associated with a hermetic closure 8 that can be accessed from the outside, and a second end 7b, which is arranged inside the reservoir 2 and determines the maximum filling level of said heated tank.

**[0025]** The bushing 7 is threaded at the first end 7a, internally or externally depending on whether the closure 8 is respectively a plug or a cap.

**[0026]** Conventionally, the closure 8 accommodates a maximum-pressure valve, the sensitive membrane of which is exposed to the pressure inside the reservoir 2 by means of an opening formed in said stem, the end part of which is generally tubular.

**[0027]** According to the invention, the top-up device 6 comprises floating means 9, which are accommodated so that they can slide along the bushing 7.

**[0028]** Preferably, the floating means 9 protrude partially from the first end 7a when the water inside the tank 2 reaches the maximum filling level.

**[0029]** In this manner, the user is considerably facilitated in recognizing the moment when the maximum filling level is restored and therefore topping-up must be stopped.

**[0030]** Otherwise, the presence of the floating means 9 in any case facilitates the top-up step, since the user detects that the maximum filling level has been reached by way of the movement of said floating means, which is much more detectable than the rise of the free surface of the water.

**[0031]** After filling, the user presses the floating means toward a wall 10, applying the closure 8 to the first end 7a.

**[0032]** Advantageously, the top-up device 6 comprises the wall 10 for closing the second end 7b and the bushing 7 is provided with at least one slot 11 proximate to said second end for the passage of water.

**[0033]** The bushing 7 and the wall 10 can be formed monolithically.

**[0034]** There is at least one aperture 12 for the passage of water, which is formed between the floating means 9 and the internal wall of the bushing 7.

**[0035]** The top-up device 6 comprises means for guiding the sliding of the floating means 9 along the bushing 7, which comprise a stem 13, which protrudes from the wall 10 inside said bushing and is inserted with play in a corresponding hole 14 formed in the floating means 9.

**[0036]** In the illustrated embodiment, the floating means 9 comprise a disk 15, above which an elongated stem 16 is associated which has a free end which protrudes from the first end 7a when the water inside the reservoir 2 reaches the maximum filling level.

**[0037]** The free end of the stem 16 is associated with colored wings 17 in order to make it more visible.

**[0038]** Preferably, the free end of the stem 16 and any wings 17 are sized so as to have transverse dimensions by virtue of which they abut against the closure 8 during its application, so as to avoid interfering with the membrane of the maximum-pressure valve accommodated inside it.

**[0039]** The disk 15 is shaped so as to form one or, more preferably, a plurality of apertures 12.

**[0040]** The disk 15, for example, can be shaped so as to form a sort of cross, in which the tips are connected by curved portions so as to delimit four apertures 12 between each one of said curved portions and the internal wall of the bushing 7.

**[0041]** The tips of the disk 15 are preferably substantially in contact with the internal wall of the bushing 7, so as to prevent the disk 15 from becoming wedged within said bushing.

**[0042]** However, alternative embodiments of the disk 15 and of the means for guiding the sliding of the floating means 9 are not excluded.

**[0043]** Finally, the top-up device 6 comprises stroke limiting means for stopping the sliding of the disk 15 toward the first end 7a, which comprise a shoulder 18 for the abutment of the disk, which protrudes inside the bushing 7.

**[0044]** The shoulder 18 is formed, for example, by a ring 19, which is accommodated so that it protrudes partially within an annular slot 20 formed on the internal wall of the bushing 7.

**[0045]** The heated tank 1 comprises generally an enclosure 21 for the reservoir 2, which is open at the port 4 and at the opening 5.

**[0046]** A thermal insulation gap 22 is formed between the enclosure 21 and the reservoir 2.

**[0047]** The first end 7a generally protrudes outside the enclosure 21.

**[0048]** It should be noted that the top-up device 6 can be mounted both during the production of new heated tanks and on existing traditional heated tanks.

**[0049]** In practice it has been found that the described invention achieves the intended aim and objects.

**[0050]** In particular, the heated tank according to the invention allows to detect reliably when the maximum filling level of the reservoir is restored during top-up, avoiding wasted time for users and malfunctions of said heated tank.

**[0051]** The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

**[0052]** All the details may further be replaced with other technically equivalent ones.

**[0053]** In practice, the materials used, as well as the dimensions, may be any according to the requirements without thereby abandoning the scope of the protection of the appended claims.

**[0054]** The disclosures in Italian Patent Application No.

M02004A000281 from which this application claims priority are incorporated herein by reference.

**[0055]** Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

## Claims

1. A heated tank for steam-using household appliances, comprising a water reservoir associated with heating means for generating steam and provided with at least one port for the discharge of said steam and with at least one opening for introducing water, and a top-up device, which is associated with said opening and comprises a bushing provided with a first end and a second end, which are respectively associated with a removable closure which can be accessed from outside and arranged within said reservoir proximate to the maximum filling level, **characterized in that** said top-up device comprises floating means which are accommodated so that they can slide along said bushing.
2. The heated tank according to claim 1, **characterized in that** said floating means protrude partially from said first end when the water inside said reservoir reaches the maximum filling level.
3. The heated tank according to one or more of the preceding claims, **characterized in that** said top-up device comprises a wall for closing said second end, said bushing being provided, proximate to said second end, with at least one slot for the passage of water.
4. The heated tank according to one or more of the preceding claims, **characterized in that** it comprises at least one aperture for the passage of water which is formed between said floating means and said bushing.
5. The heated tank according to one or more of the preceding claims, **characterized in that** said floating means comprise a disk above which an elongated stem is associated which is provided with a free end, which protrudes from said first end when the water inside said reservoir reaches the maximum filling level.
6. The heated tank according to one or more of the preceding claims, **characterized in that** said disk is shaped so as to form said at least one aperture.

5. The heated tank according to one or more of the preceding claims, **characterized in that** said disk is shaped like a cross in which the corresponding tips are connected by curved portions, so as to form four of said apertures between each curved portion and the internal wall of said bushing.
10. The heated tank according to one or more of the preceding claims, **characterized in that** said bushing comprises at least four of said slots, each arranged at one of said apertures.
15. The heated tank according to one or more of the preceding claims, **characterized in that** said tips are substantially in contact with the internal wall of said bushing.
20. The heated tank according to one or more of the preceding claims, **characterized in that** said top-up device comprises means for guiding the sliding of said floating means.
25. The heated tank according to one or more of the preceding claims, **characterized in that** said guiding means comprise a stem, which protrudes from said closure wall inside said bushing and is inserted with play along a corresponding hole associated with said floating means.
30. The heated tank according to one or more of the preceding claims, **characterized in that** said top-up device comprises stroke limiting means for stopping the sliding of said floating means toward said first end.
35. The heated tank according to one or more of the preceding claims, **characterized in that** said stroke limiting means comprise at least one shoulder for the abutment of said floating means, said shoulder protruding inside said bushing.
40. The heated tank according to one or more of the preceding claims, **characterized in that** said bushing is threaded at said first end for coupling to said closure.
45. The heated tank according to one or more of the preceding claims, **characterized in that** it comprises an enclosure for said reservoir which is open at said opening and at said port.
50. The heated tank according to one or more of the preceding claims, **characterized in that** said bushing is threaded externally at said reservoir.
55. The heated tank according to one or more of the preceding claims, **characterized in that** said first end protrudes from said enclosure.

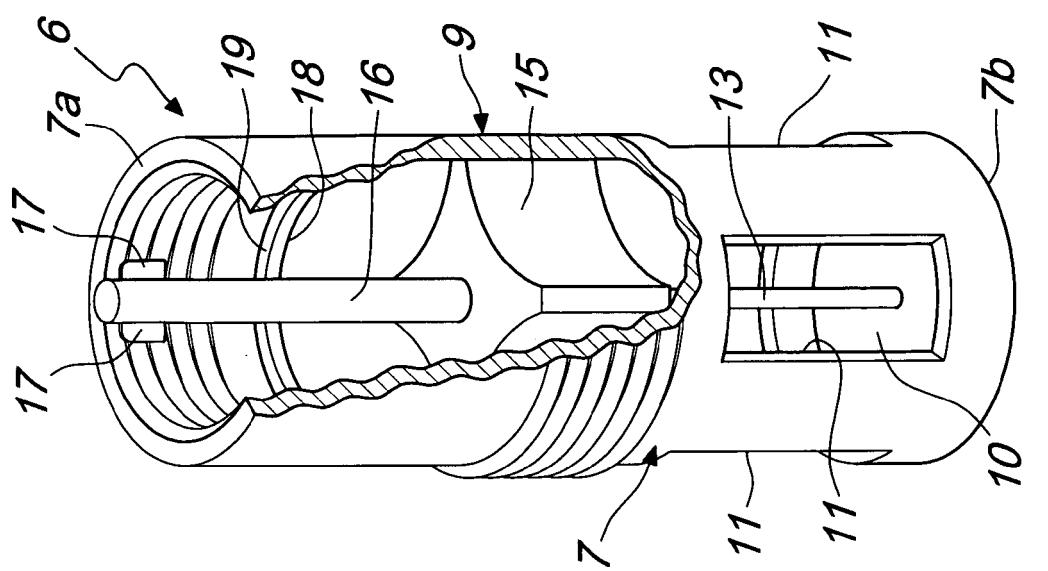


Fig. 2

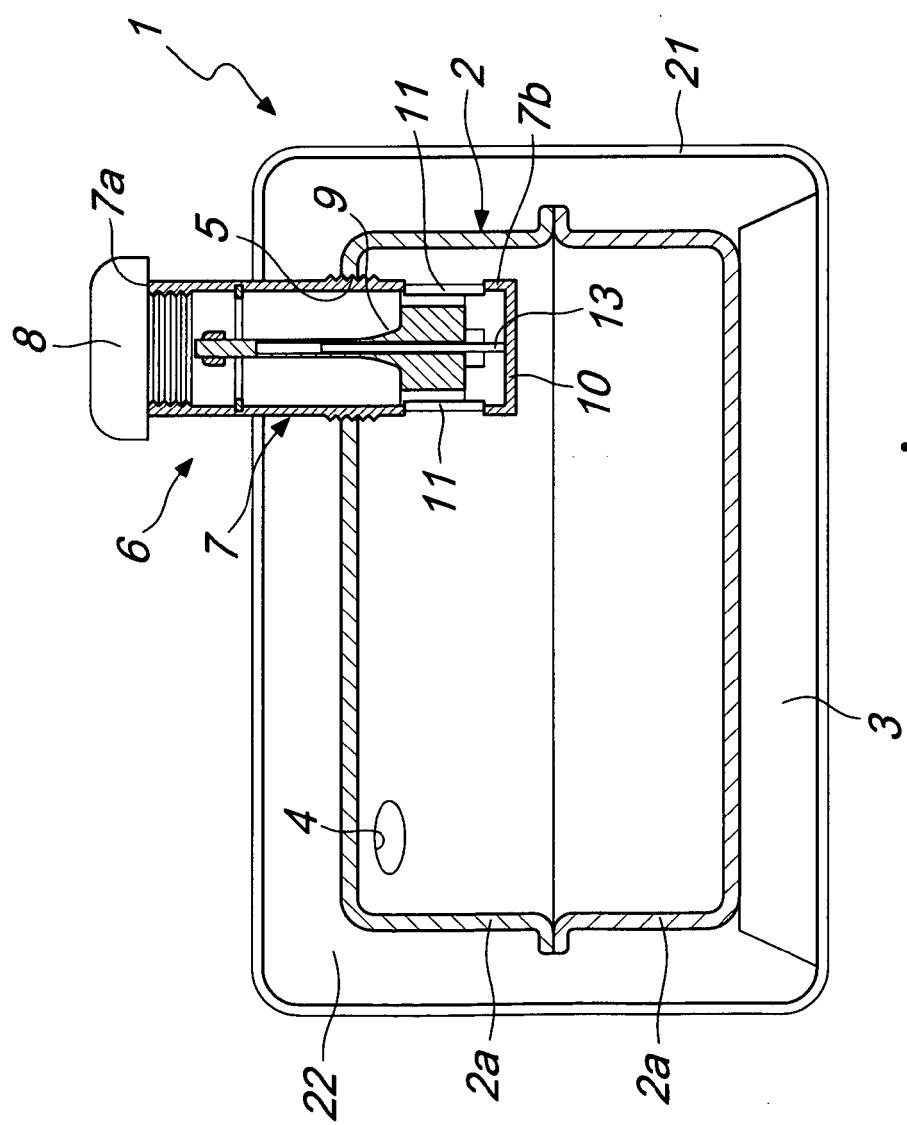


Fig. 1

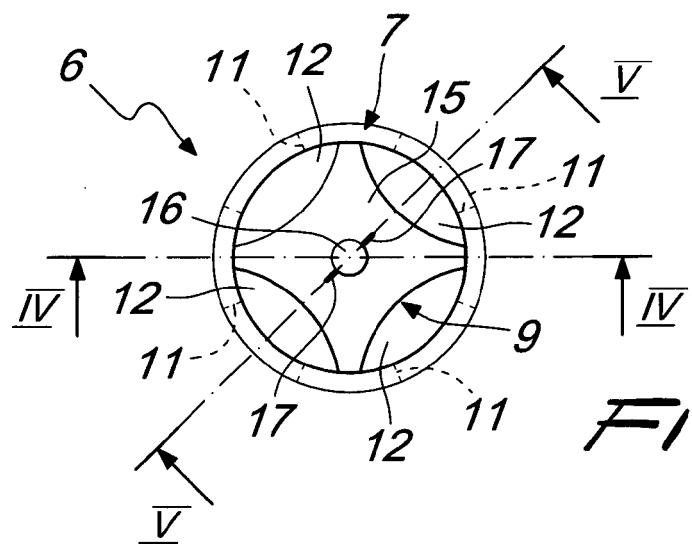


Fig. 3

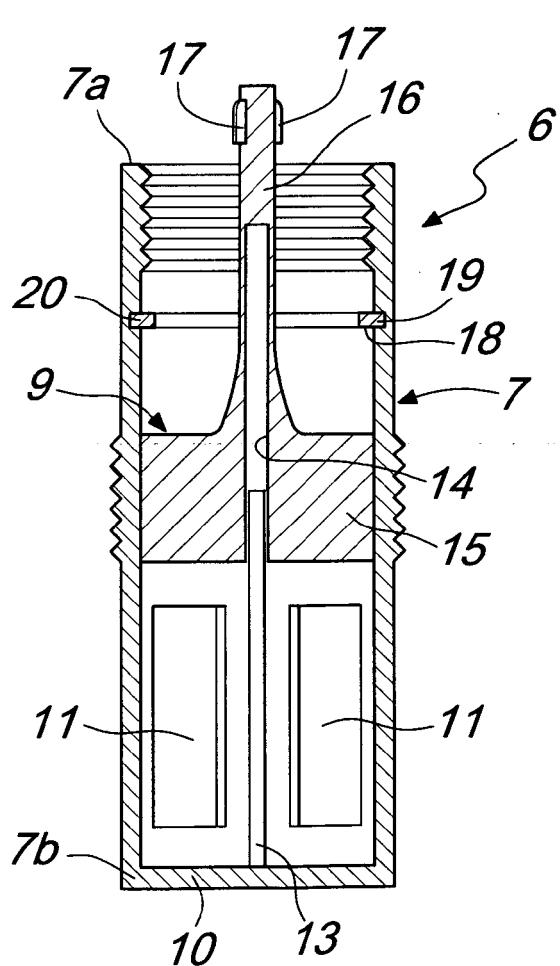


Fig. 4

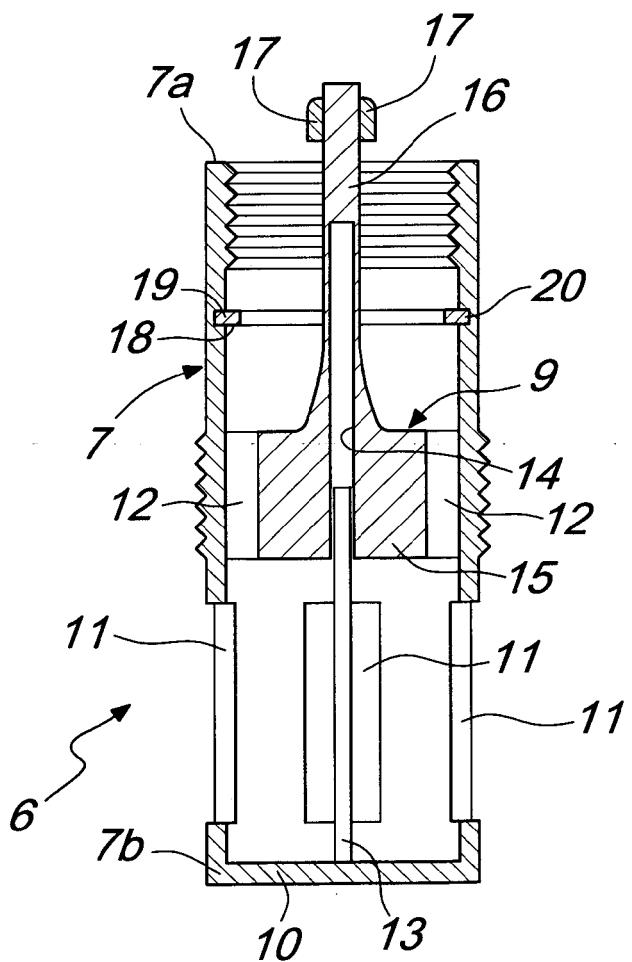


Fig. 5



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	FR 2 512 473 A (MAKSA CHRISTIAN) 11 March 1983 (1983-03-11) * page 3, line 27 - page 6, line 12; figure 1 * -----	1-17	INV. F22B1/28 F22B37/78 D06F75/12
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A	BE 797 637 A1 (BODSON HENRY, 14, RUE BIHET, 4500 JUPILLE,; SERONVEAU GEORGES, 8, SALV) 16 July 1973 (1973-07-16) * the whole document *	1-17	TECHNICAL FIELDS SEARCHED (IPC)
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2 The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		13 April 2006	Zerf, G
CATEGORY OF CITED DOCUMENTS			
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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 ..... & : member of the same patent family, corresponding document			

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 05 02 2218

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-04-2006

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