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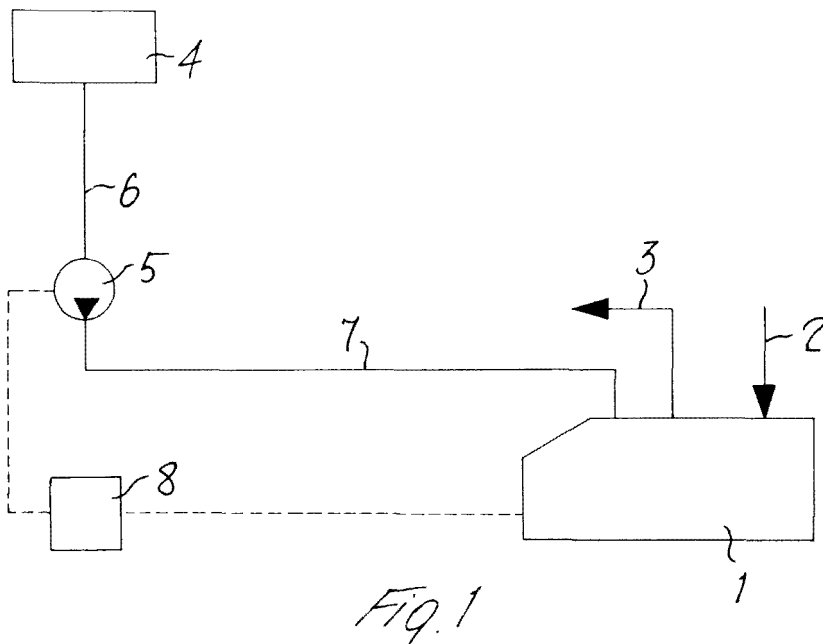
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(54) Device for metering liquid water softeners for household steam appliances

(57) Device for metering liquid water softener for household steam appliances provided with steam generating means (1, 1', 13), characterized in that it comprises: a liquid water softener storage tank (4) provided with a line (7, 17) for delivering this liquid to these steam generating means (1, 1', 13); means (5, 16) for supplying

and regulating the amount of liquid water softener drawn off via a suitable intake line (6) from this tank (4), and electronic means (8) for automatically metering the amount of liquid water softener to be supplied, cooperating with these supplying and regulating means (5, 16) and with these steam generating means (1, 1', 13).



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Description

[0001] The present invention relates to a device for metering liquid water softeners into the water contained in the tank of household steam appliances such as, for example, ironing systems, steam cleaners or the like.

[0002] As is known, these household appliances comprise steam generating means which may be, for example, a manually filled water boiler, a self-filling water boiler or an instantaneous steam generator. In all these steam generating means, depending on the degree of hardness of the water used and/or with the passing of time and therefore execution of the respective operating cycles, the formation of calcareous encrustations is inevitable and the latter, in addition to negatively influencing the performance of the appliance, may result in the need to replace these steam generating means or part of them.

[0003] The object of the present invention is to provide a device for metering liquid water softener into the water contained in the tanks of such household steam appliances which allows the supplying, in an automatic manner and at predetermined time intervals, into the water present in said steam generating means, of a certain amount of liquid water softener, metered depending on the hardness of the said water, so as to ensure constantly efficient operation of the household steam appliance and prevent or at least limit in a significant manner the formation of calcareous encrustations.

[0004] This object is achieved by the present invention by means of a device for metering liquid water softener into the water of the household steam appliances provided with steam generating means, characterized in that it comprises: a storage tank containing a liquid water softening agent provided with a line for delivering this liquid into the water tank of the steam generating means; means for supplying and regulating the amount of liquid water softener drawn off via a suitable intake line from this tank, and electronic means for automatically metering the amount of liquid water softener to be supplied, co-operating with these supplying and regulating means and with these steam generating means.

[0005] Further characteristic features and advantages of the present invention will be understood more clearly during the course of the following description considered by way of a non-limiting example with reference to the accompanying drawings in which:

- Fig. 1 shows a schematic diagram of a device for metering liquid water softeners for household steam appliances according to a first embodiment of the present invention, applied to a manually filled water boiler;
- Fig. 2 shows a schematic diagram of a metering device according to another embodiment of the invention which supplies the liquid water softener to the exhaust line of a pump for feeding a self-filling water boiler;
- Fig. 3 shows a schematic diagram of a metering de-

vice according to still another embodiment of the invention which supplies the liquid water softener to the intake line of a pump for feeding a self-filling water boiler; and

- Fig. 4 shows a schematic diagram of still another embodiment of the metering device according to the invention which supplies the liquid water softener to the intake line of a pump feeding an instantaneous steam generator.

[0006] With reference to the accompanying drawings and with particular reference to Fig. 1 thereof, 1 denotes a manually filled water boiler of a household steam appliance, such as, for example, an ironing system, a steam cleaner or the like. This boiler comprises an intake which is supplied with water through a water supply line 2, and a steam delivery outlet 3. Numeral 4 denotes a tank containing a liquid water softener, which is drawn off from this tank 4 by means of a volumetric micropump 5 provided upstream of a first intake line 6 connected to said tank 4 and downstream of a second delivery line 7 connected to the boiler 1. The operation of the volumetric micropump 5 and the operating cycle of the boiler 1 is controlled by an electronic board 8.

[0007] When a user uses the household appliance provided with the boiler 1, this electronic board 8 detects the operating time of the boiler 1 which produces steam and, after lapsing of a certain operating time interval previously programmed on this board, depending also on the hardness of the water used, the volumetric micropump 5 is activated and draws off a certain amount of liquid water softener from the tank 4 by means of the intake line 6 and supplies it to the boiler 1 via the delivery line 7.

[0008] Fig. 2 illustrates the present device applied to a self-filling water boiler 1'. The line 2 for feeding the water into this boiler 1' is connected by means of a pump 9 to a water tank 10. This pump 9 is provided upstream of an intake line 11 and downstream of an exhaust line 12. The delivery line 7 of the volumetric micropump 5 of the present metering device is connected to the water tank 10 and intercepts the exhaust line 12 of the pump 9 for feeding the water to the boiler 1'. The electronic board 8 controls the operating cycles of this pump 9 and the volumetric micropump 5.

[0009] This electronic board 8 activates the volumetric micropump 5 which propels the liquid water softener drawn off from the tank 4 into said exhaust line 12 of the pump 9 until it reaches the water tank 10 and then the liquid water softener is mixed with the water contained in said tank 10. The cycle for automatic metering of the liquid water softener is, as seen above, determined by said electronic board 8 which measures the number of cycles of the pump 9: once a certain number of operating cycles programmed on said board has been reached, said pump 9 stops and the volumetric micropump 5 is activated for a certain number of seconds. In this case, therefore, the pump 9 draws a mixture of water and liquid water softener and supplies it into the boiler 1' via the

line 2.

[0010] Fig. 3 illustrates the device according to the invention applied to the intake line 11 of the pump 9 for automatically filling the boiler 1'. In this case the line 7 for delivery of liquid water softener intercepts the water intake line 11 upstream of the pump 9 and the latter therefore draws off water from the tank 10 mixed with liquid water softener: the mixture of water and liquid water softener is then supplied into the boiler 1' via the line 2. The electronic board 8 again controls the volumetric micropump 5 and the operating cycles of the pump 9, and the cycle for automatic metering of the liquid water softener is determined in a manner entirely identical to that described with reference to Fig. 2.

[0011] The present device for metering liquid water softener may be applied to any steam generating means for household appliances, for example an instantaneous steam generator 13 with an automatic water filling system as shown in Fig. 4. As for the boilers 1 and 1' seen above, this instantaneous steam generator 13 comprises a line 14 for feeding the water to an outlet 15 for the steam produced. The device for metering the liquid water softener has a constructional variation: an electrovalve 16 is envisaged in place of the volumetric pump 5. This electrovalve 16 is in fact inserted along a line 17 supplying the liquid water softener drawn off from the tank 4 to the intake line 11 of the pump 9 for feeding the water to the instantaneous steam generator 13 and is controlled by the electronic board 8. This electronic board 8 also controls the number of operating cycles of said pump 9.

[0012] In the present variation metering of the liquid water softener is performed by means of opening of the electrovalve 16 operated by said electronic board 8: the liquid water softener is drawn off by the pump 9, making use of the vacuum which is created inside the latter. As described above, the number of operating cycles of the pump 9 is programmed on said electronic board 8.

[0013] This electrovalve 16 could also be envisaged for the boiler 1' according to Fig. 3, where obviously the line 7 supplying the liquid water softener is connected to the intake line 11 of the pump 9, so as to make use of the vacuum inside the latter.

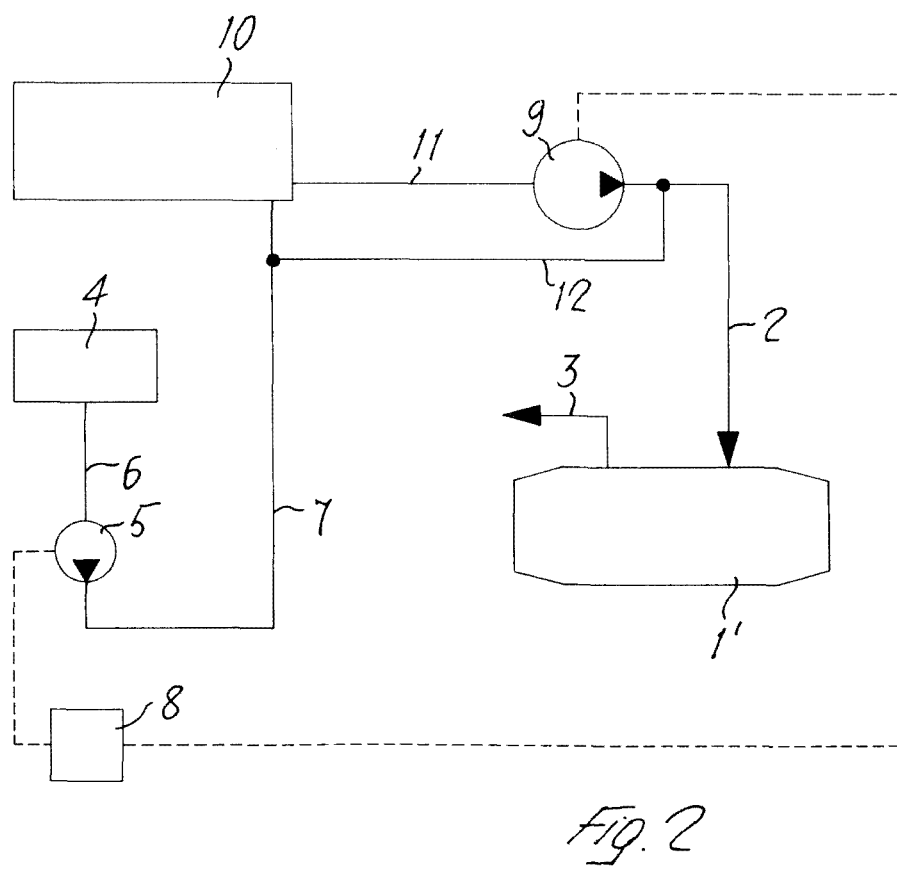
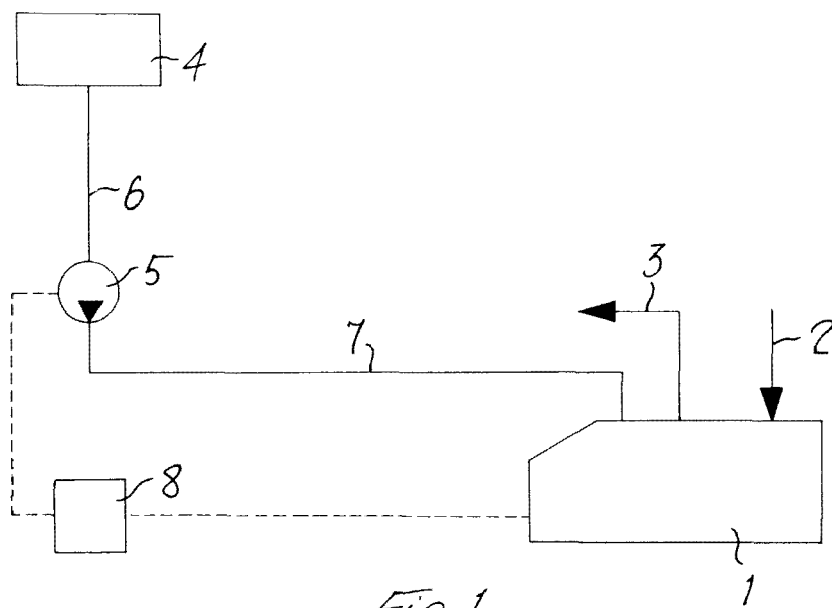
[0014] Similarly, in the case of the instantaneous steam generator 13 shown in Fig. 4, a volumetric micropump could be envisaged in place of the electrovalve 16, and this volumetric micropump would envisage, as seen for the boiler 1' according to Figs. 2 and 3, an liquid water softener delivery line 7 which could be connected to the exhaust line 12 or to the intake line 11 of the pump 9 for feeding water to this instantaneous steam generator 13.

vided with a line (7, 17) for delivering said liquid to the water tank of said steam generating means (1, 1', 13); means (5, 16) for supplying and regulating the amount of liquid water softener drawn off via a suitable intake line (6) from said tank (4), and electronic means (8) for automatically metering the amount of liquid water softener to be supplied, cooperating with said supplying and regulating means (5, 16) and with said steam generating means (1, 1', 13).

2. Device according to Claim 1, **characterized in that** said delivery line (7, 17) of said supplying and regulating means (5, 16) is connected to an intake line (11) of a pump (9) able to supply water to said steam generating means (1', 13).
3. Device according to Claim 2, **characterized in that** said delivery line (7) is connected to the exhaust line (12) of said pump (9).
4. Device according to Claim 1, **characterized in that** said supplying and regulating means comprise a volumetric pump (5).
5. Device according to Claim 1, **characterized in that** said supplying and regulating means comprise an electrovalve (16).
6. Device according to Claim 1, **characterized in that** said electronic means comprise a programmable electronic board (8).
7. Device according to Claim 1, **characterized in that** said electronic board (8) detects the operating cycles of said steam generating means (1, 1', 13).
8. Device according to Claim 2, **characterized in that** said electronic board (8) detects the operating cycles of said pump (9) for feeding the water to said steam generating means (1, 1', 13).

Claims

1. Device for metering liquid water softener for household steam appliances provided with steam generating means (1, 1', 13), **characterized in that** it comprises: a liquid water softener storage tank (4) pro-



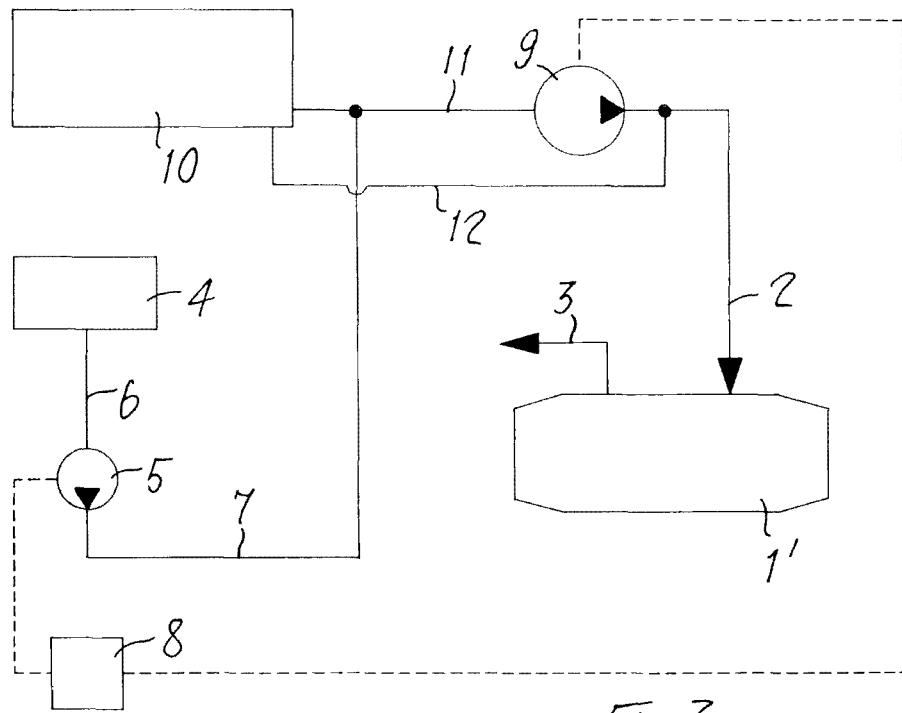


Fig. 3

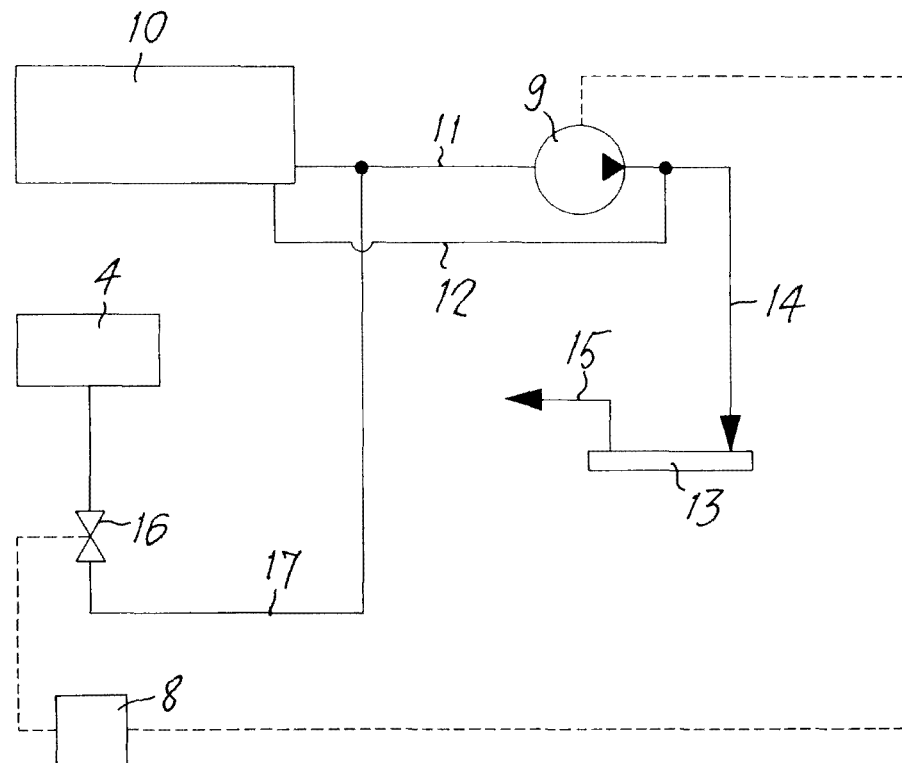


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 06 10 0398

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	FR 2 686 629 A (SEB SA) 30 July 1993 (1993-07-30) * page 6, line 28 - page 7, line 27; claims 3,4; figures 1,3 *	1-8	INV. D06F75/10 D06F75/06
A	US 6 380 522 B1 (BOCHUD ERIC) 30 April 2002 (2002-04-30) * column 2, line 28 - line 59 * * column 4, line 32 - line 41; figures 1,3 *	1-8	
A	ES 2 168 891 A1 (KRAINEL, S.A) 16 June 2002 (2002-06-16) * the whole document *	1-8	
A	GB 2 309 071 A (* NGAI SHING DEVELOPMENT LIMITED) 16 July 1997 (1997-07-16) * page 5, line 10 - line 13; figures 4-6 *	1-8	
A	WO 2004/085732 A (KONINKLIJKE PHILIPS ELECTRONICS N.V; JIANG, YONG; VALIYAMBATH KRISHNAN) 7 October 2004 (2004-10-07) * the whole document *	1-8	TECHNICAL FIELDS SEARCHED (IPC) A47L D06F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 May 2006	Examiner Lodato, A
CATEGORY OF CITED DOCUMENTS 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 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			

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EPO FORM 1503 03.82 (P04C01)

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

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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
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08-05-2006

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2686629	A	30-07-1993	NONE	
US 6380522	B1	30-04-2002	EP 1098138 A1 JP 2001173902 A	09-05-2001 29-06-2001
ES 2168891	A1	16-06-2002	NONE	
GB 2309071	A	16-07-1997	NONE	
WO 2004085732	A	07-10-2004	EP 1613806 A1	11-01-2006