



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.01.2008 Bulletin 2008/02

(51) Int Cl.:
A47L 15/42 ^(2006.01)

(21) Application number: **07108124.4**

(22) Date of filing: **14.05.2007**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(72) Inventor: **Blackburn, Derek Farnham Surrey GU9 9PQ (GB)**

(30) Priority: **03.07.2006 GB 0613202**

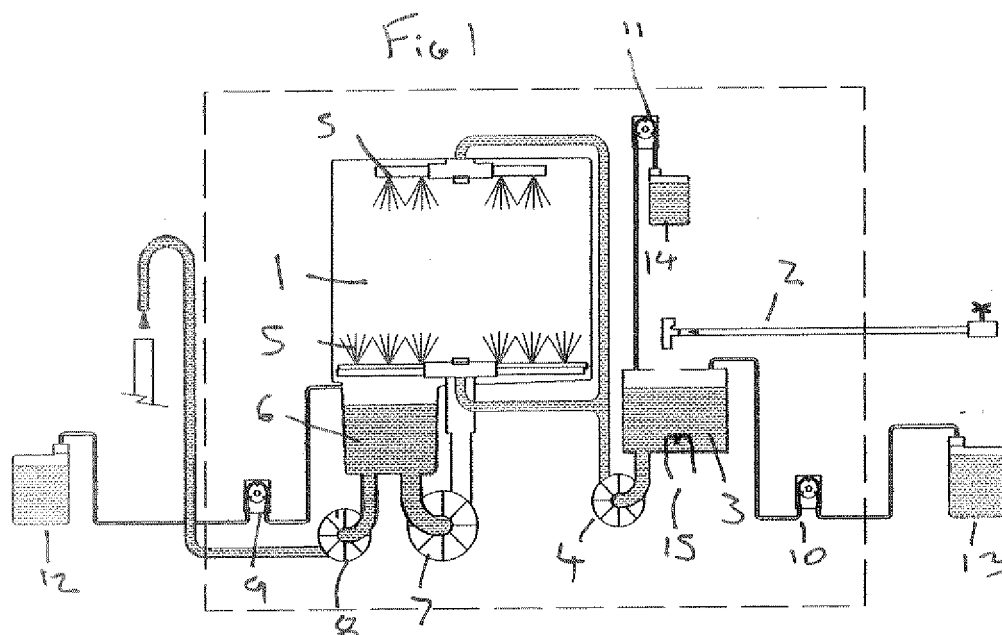
(74) Representative: **Haley, Stephen Gill Jennings & Every LLP Broadgate House 7 Eldon Street London EC2M 7LH (GB)**

(71) Applicant: **Clenaware Systems Ltd. Farnham, Surrey GU9 9PQ (GB)**

(54) **Automated washer with de-scaling**

(57) An automated washer for washing dishes and/or glasses. The washer comprises a wash tank (1) and a drain tank (6) for receiving, in use, water draining from the wash tank; a rinse tank (3), for controllably supplying water to the wash tank. De-scaling fluid supply means

(11,14) controllably supply de-scaling fluid to the rinse tank and control means, is arranged to monitor the operating cycle of the washer and to selectively control the supply of de-scaling fluids to the rinse tank and the supply of water therefrom to the wash tank and drain tank upon detection of a shut-down of the washer.



Description

[0001] The present invention relates to an automated dish/glass washer.

[0002] Automated dish and glass washers are well known in the art. Such washers are readily available both for commercial and domestic applications and are popular because of their increased speed and convenience, as well as their ability to minimise the amount of water used during the dish and/or glass washing process.

[0003] Whilst such washers are convenient, there are a number of problems associated with them. One such problem relates to the need for the washer to be able to manage a build-up of lime scale and other deposits that occur on the internal components of the washer during use. If the washer is unable to handle such build-up then the washer can, itself, become extremely inefficient and unreliable as internal components fail due to build up of such deposits.

[0004] One approach to overcoming the problems associated with the build-up of deposits has been to instruct users of the washer either run through a de-scaling process on a regular basis, or to introduce, on a regular basis, de-scaling chemicals in order to remove or reduce such build-up. However, such an approach has problems associated with it. Firstly, it requires a user to remember to perform the operation or add the required chemicals. Furthermore, even if the system is operated properly by a user, there is a risk that the user may insert inappropriate chemicals, leading to contamination. There is also a problem that insertion of the chemicals into a region which is readily accessible to a user still does not mean effective de-scaling in that such chemicals do not reach deposits which buildup in areas of the dishwasher not so readily accessible.

[0005] The present invention seeks to overcome these and other problems.

[0006] According to the present invention there is provided an automated washer for washing dishes and/or glasses, the washer comprising:

- a wash tank;
- a rinse tank, for controllably supplying water to the wash tank;
- de-scaling fluid supply means for controllably supplying de-scaling fluid to the rinse tank; and
- control means, wherein the control means is arranged to monitor the operating cycle of the washer and to selectively control the supply of de-scaling fluid to the rinse tank and the supply of water therefrom to the wash tank and other components of the washer upon detection of a shut-down of the washer.

[0007] With the present invention a predetermined supply of descaling fluid can be provided in the rinse tank and hence to the wash tank, so that build-up of unwanted deposits can be removed to improve washer reliability and economy. Furthermore, because the descaling op-

eration is controlled upon detection of shut-down of the system there is no likelihood of a user either forgetting to perform a de-scaling operation on a regular basis or a descaling operation occurring at an unwanted moment during operation of the washer.

[0008] The washer of the present invention may further comprise a detergent pump for selectively inserting detergent into the wash tank from a detergent supply, such detergent pump also being selectively controlled by the control means. A similar rinse aid supply pump and control may also be provided for selectively inserting rinse aid into the rinse tank.

[0009] The washer of the present invention may further comprise means for heating water in the rinse tank once the de-scaling fluid has been supplied to improve the de-scaling process. The control means may be arranged to empty the rinse tank and wash/drain tank upon completion of the de-scaling process in order to prevent contamination or damage to components of the washer when the washer is not in use.

[0010] One example of the present invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a side schematic view of a washer according to the present invention during use;
Figure 2 is a side schematic view of the washer of figure 1 during initiation of a descaling process; and
Figures 3 to 7 are schematic views of the dishwasher of figures 1 and 2 shown during various stages of a de-scaling operation.

[0011] Referring to Figure 1, a washer according to the invention has a main wash tank 1 that receives, in use, dishes, glasses and other items to be washed. Water for use in the washer is supplied through an inlet 2 to a rinse tank 3. The rinse tank 3 is connected to the wash tank 1 via a rinse pump 4 and inlet jets 5 which ensure that water is sprayed throughout the wash tank 1 to ensure good levels of rinsing and descaling during operation of the washer. A drain tank 6 is provided to collect water from the wash tank 1 so that it can either be recycled as part of the wash process via a wash pump 7 or passed out of the washer to a drain via drain pump 8. Additional pumps 9,10,11 are provided to supply detergent, rinse aid and de-scaling fluid from their respective supply sources 12,13,14. The supply sources may be arranged so that they can be replenished by a user, or in the case of the descaling fluid may be arranged so that they can only be replenished by a service engineer so that supply only of correct fluids can be ensured. A water heater 15 is provided in the rinse tank 3 so that the contents of the rinse tank can be heated if required. The water inlet 2, water heater 15 and all of the pumps are under the control of a control means (not shown) to control operation of the washer by reference to input from a user, to prestored control programs, or a combination of both.

[0012] A user is usually able to select from a number

of washing cycles during normal operation of the washer, depending upon the quality of wash required and the items to be washed. When a user has finished with operation of the washer at end of a day a shut down request is provided by the user and detected by the control means. At this point the washer according to the invention enters, under control of the control means, a de-scaling and shut down operation that is shown sequentially in figures 2 to 7.

[0013] Firstly the drain pump 8 is activated to empty the drain tank 6 then the rinse pump 4 is optionally activated to empty the rinse tank 3 into the drain tank 6 via the wash tank 1, with the drain pump 8 activated to also empty the drain tank 6. As shown in figure 2, De-scaling fluid is then supplied to the rinse tank 3 and fresh water added to the rinse tank 3. Figure 3 shows the rinse tank 3 when full, at which point the contents of the rinse tank 3 are heated to improve the effectiveness of the de-scaling solution. An example heating temperature is 70 degrees Celsius. When at the required temperature the rinse pump 4 is activated to pass de-scaling solution in to the wash tank 1, as shown in figure 4.

[0014] Once the drain tank 6 is full, the wash pump 7 is operated, for example for 30 seconds, to circulate solution to ensure adequate de-scaling throughout the system, and the rinse tank 3 is refilled with fresh water, as shown in figure 5.

[0015] Figure 6 shows both the rinse tank 3 and drain tank 6 full and the start of an emptying stage where the rinse pump 4 and drain pump 8 are activated to drain away used descaling solution and flush through with clean water so that no potentially contaminating de-scaling solution is retained in the system. Once empty the washer is shut down as shown in figure 7.

[0016] With the arrangement of the present invention a de-scaling operation is provided on a regular and reliable basis but at a time when it does not cause inconvenience to a user by interrupting the normal operation of the user. What is more an operation is provided which can ensure effective descaling with heated solution and that can be arranged to be tamper proof so that it can only be supplied by a service engineer providing the correct descaling fluids at the correct concentrations, preventing user-related problems occurring.

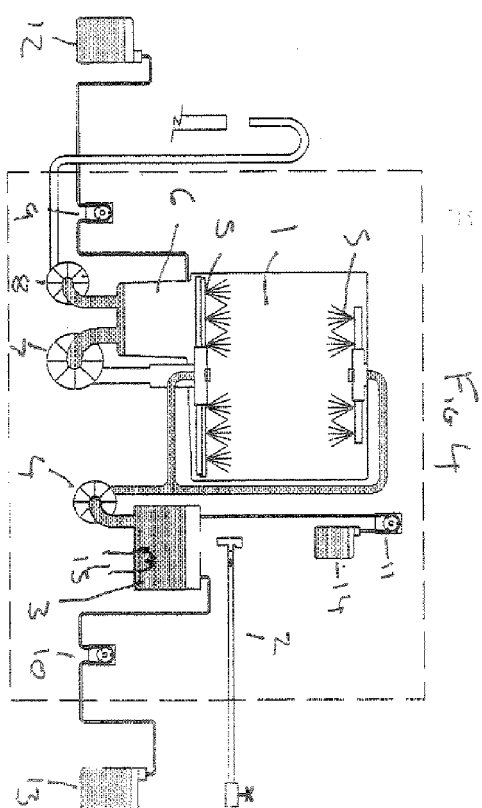
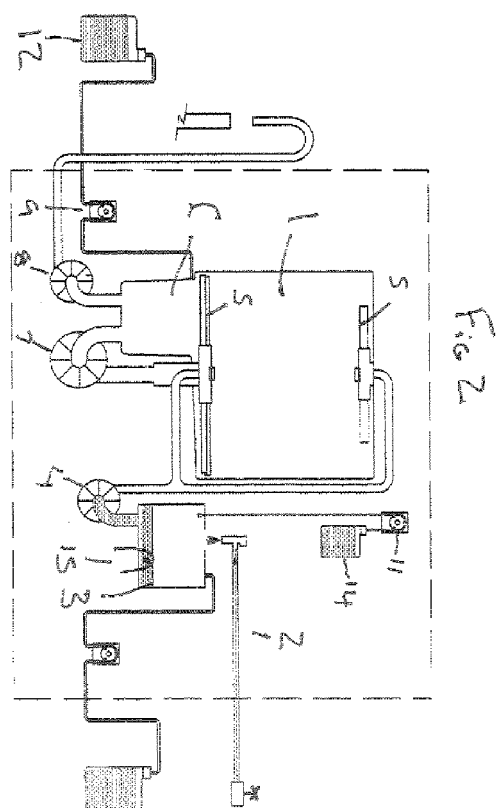
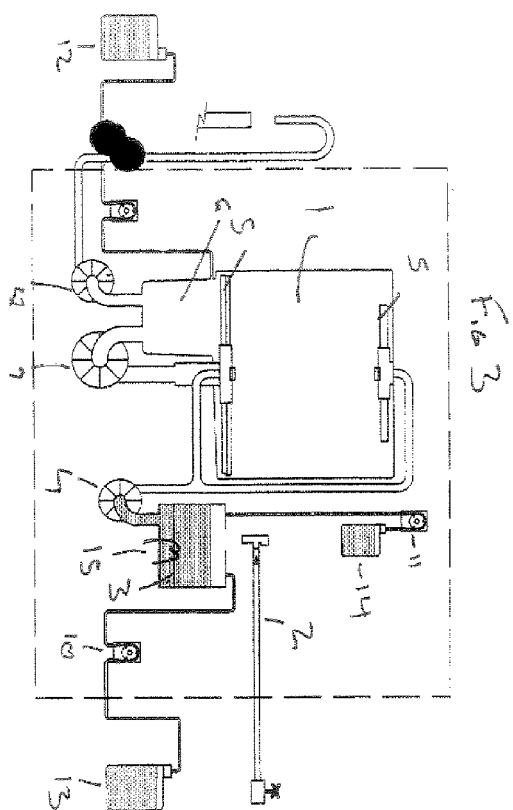
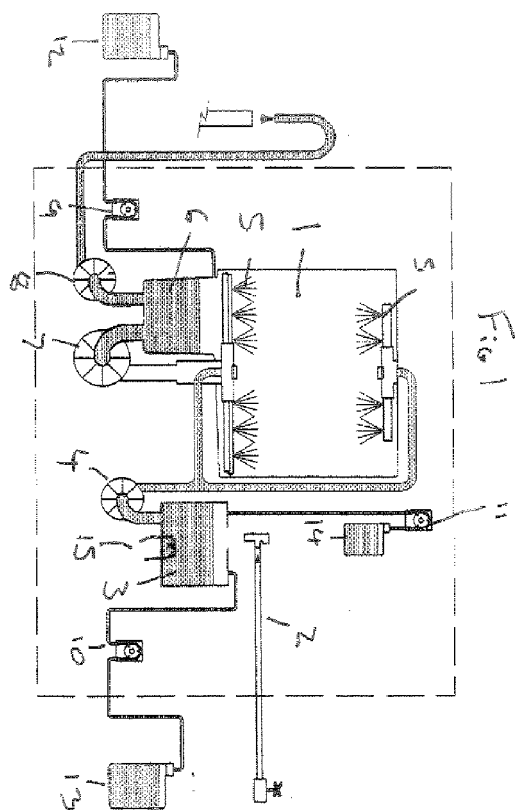
ranged to monitor the operating cycle of the washer and to selectively control the supply of de-scaling fluids to the rinse tank and the supply of water therefrom to the wash tank and drain tank upon detection of a shut-down of the washer.

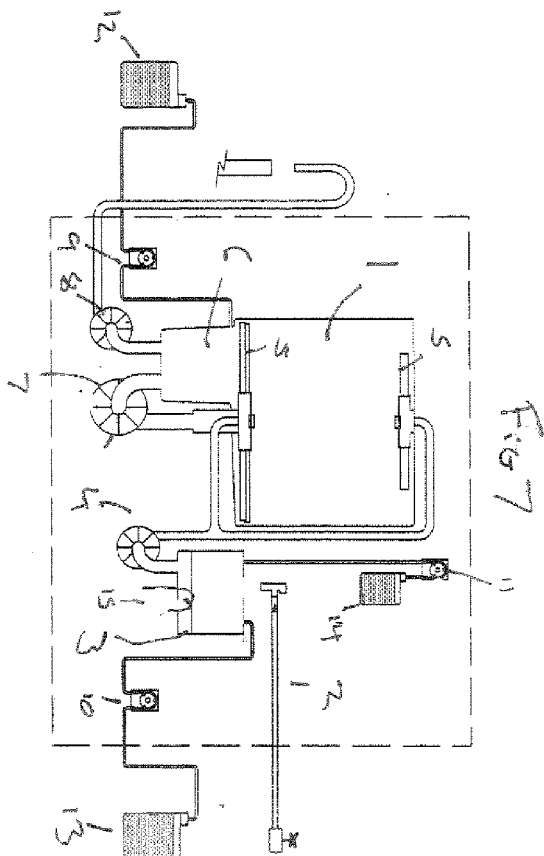
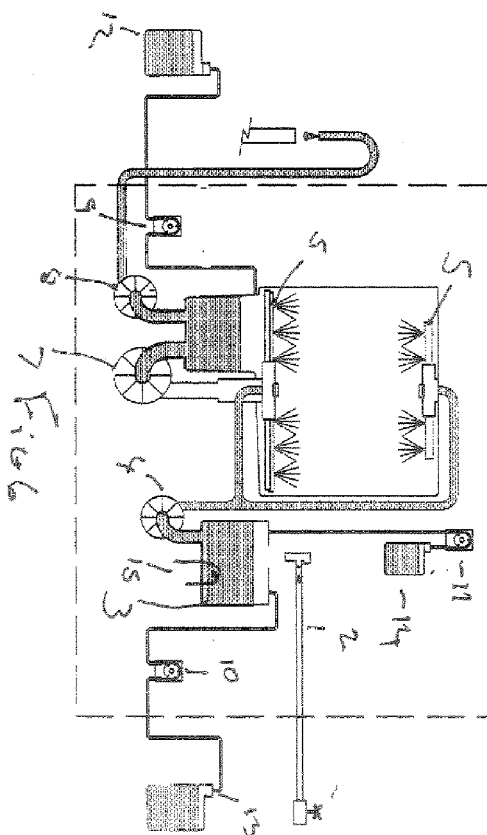
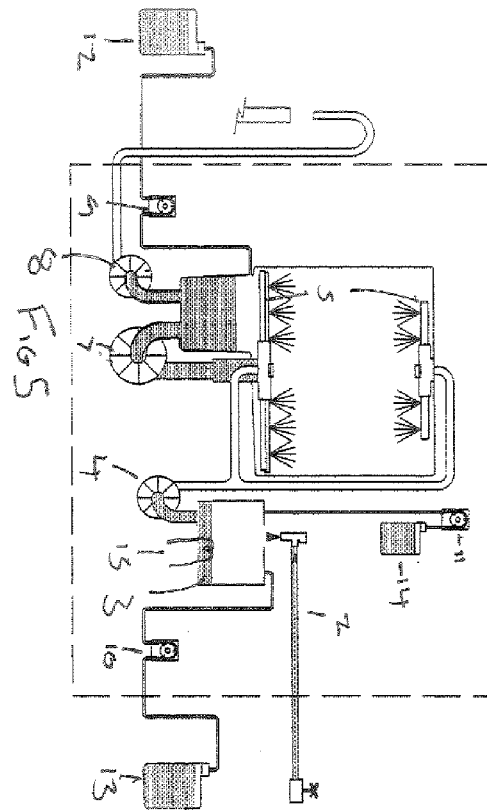
2. A washer according to claim 1, further comprising a heating element positioned within the rinse tank, the heating element being controllable by the control means to heat water in the rinse tank once descaling fluid has been applied thereto.
3. A washer according to claim 1 or claim 2, wherein the de-scaling fluid supply means is located entirely within the washer such that, in use, it is only accessible by a service engineer.
4. A washer according to any preceding claim, wherein the control means is configured to drain the rinse tank, via the wash tank, when it has determined that a de-scaling operation is finished.

Claims

1. An automated washer for washing dishes and/or glasses, the washer comprising;

a wash tank;
a drain tank for receiving, in use, water draining from the wash tank; a rinse tank, for controllably supplying water to the wash tank;
de-scaling fluids supply means for controllably supplying de-scaling fluid to the rinse tank; and control means, wherein the control means is ar-







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 10 8124

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 02/056744 A (JOHNSON S C COMM MARKETS INC [US]) 25 July 2002 (2002-07-25) * page 1, lines 15-17 * * page 2, lines 9-12 * * page 5, line 4 - page 6, line 6 * * page 6, line 19 - page 7, line 4 * * page 10, lines 1-13; figure 1 *	1,3,4	INV. A47L15/42
Y	-----	2	
Y	GB 2 204 787 A (STANBRIDGE LIMITED) 23 November 1988 (1988-11-23) * page 4, line 8 - line 17 *	2	
A	----- DE 24 21 809 A1 (PATZNER KG) 20 November 1975 (1975-11-20) * the whole document *	1-4	
A	----- GB 1 219 878 A (ZANUSSI A SPA INDUSTRIE [IT]) 20 January 1971 (1971-01-20) * page 2, lines 4-14 *	1-4	

The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) A47L D06F
Place of search Munich		Date of completion of the search 9 October 2007	Examiner Hannam, Martin
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	

1
EPO FORM 1503 03.82 (P04C01)

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

EP 07 10 8124

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.

09-10-2007

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 02056744	A	25-07-2002	AU 2002239874 A1	30-07-2002
			CA 2433872 A1	25-07-2002
			EP 1351598 A2	15-10-2003
			JP 2004520895 T	15-07-2004
			MX PA03006441 A	22-09-2003
			US 2002096192 A1	25-07-2002

GB 2204787	A	23-11-1988	NONE	

DE 2421809	A1	20-11-1975	AT 332592 B	11-10-1976
			AT 288675 A	15-01-1976
			BE 828411 A1	18-08-1975
			CH 578861 A5	31-08-1976
			ES 436606 A1	01-02-1977
			FR 2269909 A1	05-12-1975
			IT 1036105 B	30-10-1979
			JP 51099866 A	03-09-1976
			NL 7505125 A	10-11-1975

GB 1219878	A	20-01-1971	NONE	
