(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 153 655**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **85101498.5**

(22) Date of filing: **12.02.85**

(51) Int. Cl.⁴: **A 47 L 15/42**
D 06 F 39/08

(30) Priority: **13.02.84 IT 3400884 U**

(43) Date of publication of application:
04.09.85 Bulletin 85/36

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

(71) Applicant: **INDUSTRIE ZANUSSI S.p.A.**
Via Giardini Cattaneo 3
I-33170 Pordenone(IT)

(72) Inventor: **Furlan, Livio**
via Anello del Sole 10
I-33074 Fontanafredda Pordenone(IT)

(74) Representative: **Patentanwälte Grünecker, Dr. Kinkeldey, Dr. Stockmair, Dr. Schumann, Jakob, Dr. Bezold, Meister, Hilgers, Dr. Meyer-Plath**
Maximilianstrasse 58
D-8000 München 22(DE)

(54) **Dishwashing machine having liquid level-control means of the overflow type.**

(57) Liquid level control for a dishwashing machine; a first chamber (10) of said level control means contains a hood member (19) or the like disposed in facing relationship to a mains water inlet (11) at a level between that of an intake duct (8) of a discharge pump (7) and a predetermined overflow level (1).

EP 0 153 655 A1

Croydon Printing Company Ltd

Dishwashing Machine Having Liquid Level Control Means of the Overflow Type

Description

The present invention relates to a dishwashing machine having washing liquid level control means of the overflow type.

More particularly, the invention concerns a dishwashing machine having liquid level control means of the type described in French Patent 1,385,971, in which a first chamber adapted to be supplied with mains water communicates via an overflow partition with a second chamber associated with a pressostat adapted to control a solenoid valve itself adapetd to control the supply of the mains water. The first chamber also communicates through the intake duct of a discharge pump with the washing tub of a washing machine. In operation, the mains water is supplied to the washing tub, and at the same time to the first chamber until the water level has risen to the height of the overflow partition, whereupon the water overflows from the first chamber into the second chamber, thereby actuating the pressostat for causing the solenoid supply valve to close. The second chamber is connected to the intake side of the discharge pump through a siphon-type conduit, so that both chambers of the level control means are effectively emptied when the washing liquid is discharged from the tub.

This control means is of simple construction and reliable and accurate operation, because the pressostat (in contrast to other known constructions) is not actuated by a gradually increasing pressure, but by a sudden pressure variation (occurring when the water overflows from the first into the second chamber), so that its control function is very accurately timed. This level control means presents certain drawbacks, however, when employed in a dishwashing machine,

as in the preferred embodiment.

This is because during certain phases of the operating cycle of a dishwashing machine (for instance a water supply phase following a discharge phase of the used washing liquid, or a temporary stoppage of the circulation pump with water present in the tub), water containing suspended particulate matter may enter the first chamber of the level control means from the intake duct of the discharge pump. As a result, the used washing liquid containing the suspended particulate matter may overflow from the first into the second chamber, in which the particulate matter may form deposits interfering with the proper operation of the pressostat or clogging the siphon-type conduit so as to prevent the second chamber from being completely emptied.

It is thus an object of the present invention to provide a dishwashing machine having liquid level control means of the overflow type, in which the problems arising from the formation of particulate matter deposits are minimized.

This object is attained by a dishwashing machine provided with means for controlling the level of a liquid in a washing tub adapted to be supplied with such liquid via a supply tube provided with an actuatable supply valve. The level control means comprises at least one first chamber connected to the tub through the intake duct of a discharge pump and provided with a liquid inlet connected to the supply tube, said first chamber cummunicating with at least one second chamber via at least one overflow arrangement by way of which said liquid overflows from the first chamber to the second chamber when the liquid in the tub reaches a predetermined elevel. Pressure-sensitive means is provided for controlling the closing operation of the supply valve when the liquid overflows into the second chamber.

According to the invention, a dishwashing machine of the type defiend above is characterized in that the first chamber is provided with at least one hood member for intercepting particulate matter suspended in the liquid to be controlled. The hood member is positioned so as to substantially face said inlet at a level between that of the intake duct of the discharge pump and the predetermined overflow level.

The characteristics and advantages of the invention will become more clearyl evident from the following description, given by way of example with reference to the accompanying drawing, the only figure of which shows a diagrammatical representation of a preferred embodiment of a dishwashing machine according to the invention.

With reference to the drawing, a dishwashing machine comprises a washing tub 4 (only partially shown), the bottom of which is formed with a well 5 for collecting a liquid the level of which is to be controlled. Tub 4 is adapted to be supplied with mains water through a supply tube 6 provided with a supply valve 13 controlled in a per se known manner. Tub 4 is further adapted to be emptied in a conventional manner by means of a discharge pump 7 and a discharge conduit 17. To this purpose the bottom of well 5 is connected to discharge pump 7 through an intake duct 8. A circulation Pump 9 is provided for spraying the dishes and the like (not shown) to be cleaned with water collected in well 5.

The machine is also provided with level control means comprising at least one first chamber 10 having a calibrated mains water inlet 11 connected to an upwards extending branch conduit 12 of supply tube 6. Chamber 10 is provided with at least one overflow arrangement 14 disposed at a predetermined level 1, by way of which first chamber 10 communicates with at least one second chamber or overflow chamber 15, the latter being associated with a pressostat

16 or the like adapted to be actuated in response to the liquid overflowing from first chamber 10 into second chamber 15 for causing supply valve 13 to close in a per se known manner.

The bottom portion of first chamber 10 is connected to tub 4 via intake duct 8 of discharge pump 7. Overflow chamber 15 is likewise connected to intake duct 8 through a siphon device 18 and a branch portion of first chamber 10 in a per se known manner.

The first chamber 10 of the level control means is provided with a hood member 19 or the like disposed substantially in facing relationship to inlet 11 and preferably formed integrally with the remainder of the described structure.

In particular, hood member 19 is disposed at a level between that of intake duct 8 of discharge pump 7 and the predetermined overflow level 1.

In operation, supply valve 13 is open during the water supply phase, so that the mains water simultaneously flows into well 5 and first chamber 10, gradually rising to the predetermined overflow level 1, as described above.

On actuation of circulation pump 9, water is withdrawn from well 5 and sprayed onto the dishes and the like to be cleaned, whereby the water remaining in well 5, and thus also in first chamber 10, drops to a second level 2, the so-called dynamic level.

Stoppage of corculation pump 9 causes the water to rise again to the overflow level 1 resulting in water flowing from tub 4 into chamber 10 in accordance with the law of communicating tubes. As a result, particulate matter suspended in the water flowing back from the discharge circuit of the machine may enter first chamber 10 from intake duct 8.

A similar phenomenon may occur for example towards the end of a supply phase following a discharge phase, i.e. at a time when there may be a particularly high concentration of particulate matter in intake duct 8.

In any case, the particulate matter having entered first chamber 10 in suspension would tend to rise to the overflow level 1, but is prevented from doing so by hood member 19 so as to collect on the interior surface thereof.

Operation of discharge pump 7 in the known manner causes the liquid to be evacuated from tub 4, first chamber 10 and, thanks to siphon device 18, from overflow chamber 15.

At the beginning of each supply phase the interior of hood member 19 is automatically cleaned by the jet of fresh water produced by branch conduit 12 of supply tube 6. This jet impinges on the interior surface of hood member 19, so that particulate matter possibly adhering thereto is carried away by gravity towards intake duct 8 and tub 4 which had previously been emptied.

In this manner hood member 19 is self-cleaning and highly efficient in intercepting suspended particulate matter, so that the latter is prevented from overflowing into second chamber 15 and thus from interferring with the proper operation of the level control means, in accordance with the stated object of the invention.

The described dishwashing machine may obviously be modified in various manners within the scope of the invention. There may thus be provided flooding prevention safety means comprising for instance a further overflow arrangement 20 disposed at a level 3 above overflow level 1.

By way of overflow arrangement 20 first chamber 10 communicates with a further overflow chamber 21 associated with a pressure-sensitive element 22 adapted to be actuated for

instance for closing supply valve 13 in a per se known manner, preferably by mechanical means. Element 22 may thus intervene, for instance, during a water supply phase when pressostat 16 fails to operate.

In this case, as the water reaches the higher level 3, it overflows from first chamber 10 into chamber 21, actuating element 22 in the process. Chamber 21 may then be manually emptied by means of a drain valve 23 or the like.

GRUNECKER. KINKELDEY. STOCKMAIR & PARTNER

PATENTANWÄLTE

A GRUNECKER
DR H KINKELDEY
DR W STOCKMAIR
DR K SCHUMANN
P H JAKOB
DR G BEZOLD
W MEISTER
H HILGERS
DR H MEYER PLATH
DR M BOTT-BODENHAUSEN
DR U KINKELDEY

8000 MUNCHEN 22
MAXIMILIANSTRASSE 58

EP 2098

Febr. 12, 1985

INDUSTRIE ZANUSSI S.p.A.
via Giardini Cattaneo 3
33170 Pordenone
Italy

Dishwashing Machine Having Liquid Level Control Means of the Overflow Type

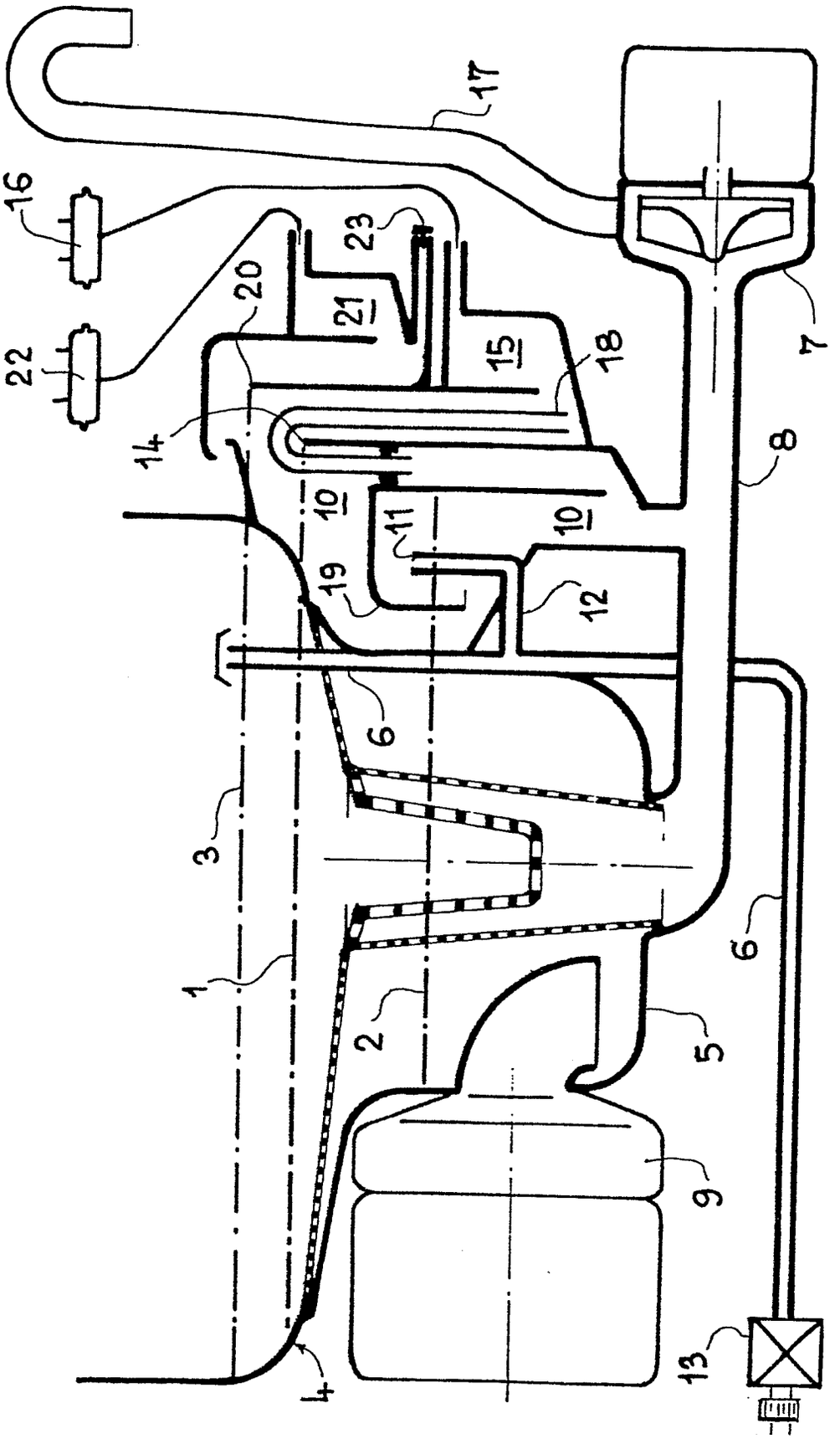
Patent Claim

1. A dishwashing machine having means for controlling the level of a liquid in a washing tub adapted to be supplied with said liquid through a supply tube provided with an actuatable supply valve, said level control means comprising at least one first chamber connected to said tub through the intake duct of a discharge pump and provided with an inlet for said liquid connected to said supply tube, said first chamber communicating with at least one second chamber via at least one overflow arrangement by way of which the liquid overflows from said first chamber into said second chamber in response to reaching a predetermined liquid level in said tub, pressure-sensitive means being provided for causing said supply valve to close

in response to said liquid overflowing into said second chamber,

characterized in that said first chamber (10) is provided with at least one hood member (19) for intercepting particulate matter suspended in the liquid the level of which is to be controlled, said hood member being disposed in substantially facing relationship to said inlet (11) at a level between that of said intake duct (8) of said discharge pump (7) and said predetermined overflow level (1).

0153655



European Patent Office

EUROPEAN SEARCH REPORT

0153655

EP 85 10 1498

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl 4)
D,A	FR-A-1 385 971 (HOOVER LTD.) * Whole document * -----	1	A 47 L 15/42 D 06 F 39/08

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

A 47 L
D 06 F
G 01 F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10-05-1985	SCHARTZ J.

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

EPO Form 1503. 03.82