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(54) Water level regulator in a dishwaser

(57) The regulator device makes a dynamic regulation of the water, operating when the spray and the dishwasher impeller pump are running, and it comprises a float (3) inside a flotation chamber (4) connected to the dishwasher tub, a lever (8) which pivots on an end shaft (8a), an electric microswitch (6) which is operated by said lever (8) when the float (3) rises, a mechanism (9, 10) which pushes said lever (8) to snap switch two stable positions of said lever (8) in relation to the microswitch (6), and a support plate (12) for the regulator device (1). The rod (3a) of the float does not affect the lever (8) in a prior run between two water levels (2, 2b).

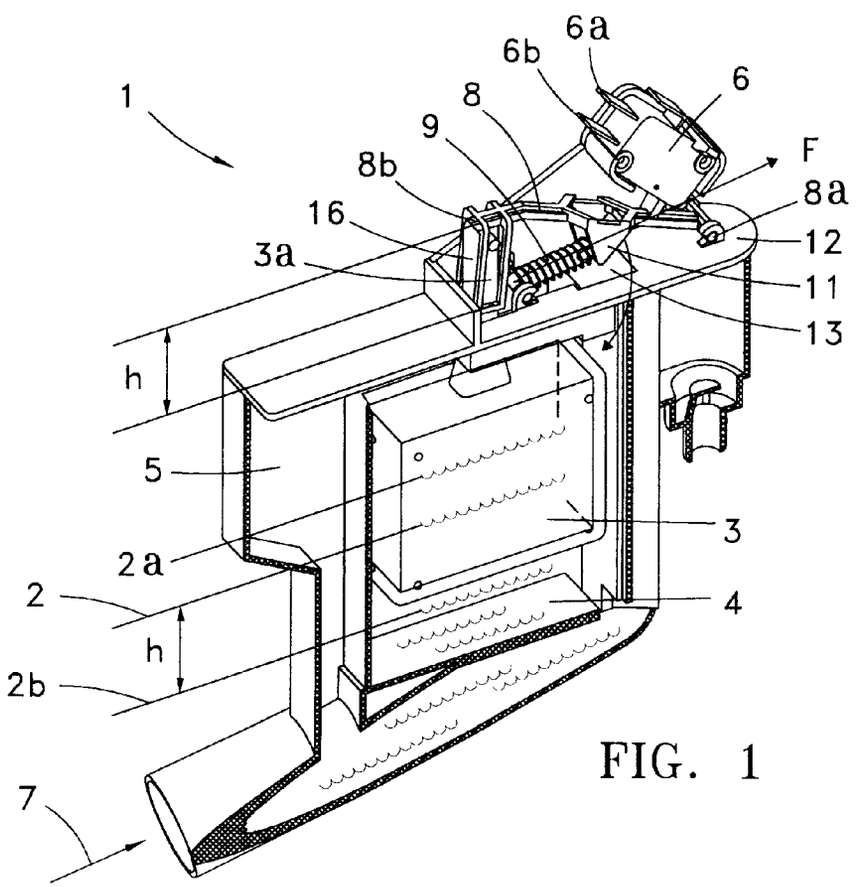


FIG. 1

EP 0 958 777 A1

Description

[0001] This invention relates to the regulation of the water level in the tub of a clothes washer or dishwasher, using a float.

PRIOR ART

[0002] FR-2202285 discloses a device to limit the water level in the dishwasher tub, which has a float inside an auxiliary chamber, an external electrical switch and a lever moved by a float to operate the switch. The auxiliary float chamber is above the regulation level and the switch cuts off supply from the electrical water valve should the level in the tub exceed a pre-set level and enter the auxiliary chamber. To prevent intermittences of the switch due to small fluctuations of level, the switch actuator has a long stroke and, to start the pump operation cycle, a third electrical contact.

DISCLOSURE OF THE INVENTION

[0003] The object of the invention is a device to regulate the water level in the tub of a dishwashing machine, as defined in claim 1.

[0004] The device according to the invention resolves the problem of the dynamic regulation of the water level in the tub during washing, acting together with the programmer on the water feed electrical valve while the wash motor is running.

[0005] The formation of foam, principally, and water turbulence in the tub during the dishwasher's dynamic functioning cause fluctuations in the water level which should not affect the operation of the electrical switch. The device according to the invention also resolves this specific problem by regulating the level dynamically, using a mechanism connected to the switch operating lever, which keeps the lever in just two stable positions in relation to said switch, depending on the height of the float, and which are snap switched from a water input setting when the float is low and the microswitch is at standstill, to a setting where the microswitch is on, to keep the electrical valve closed, when the water exceeds a predetermined level. The mechanism impelling the lever is connected to the lever so that the float line which is unstable because of the surface turbulence of the water does not cause the lever to oscillate, thus avoiding intermittences in the switch.

[0006] A further beneficial characteristic of the regulation device is the use of a single microswitch and the simplicity of the float guide and the sliding joint of the lever to a rod of the float, making the device economical in cost.

DESCRIPTION OF DRAWINGS

[0007] Figure 1 is a general view of an embodiment of the level regulation device according to the invention.

Figure 2 is a partial view of the device in Figure 1, showing a second float position.

A DETAILED DESCRIPTION OF THE INVENTION

[0008] With reference to figures 1 and 2, the preferred embodiment of the device 1 to regulate the water level 2 according to the invention comprises,

- the float 3 guided in the floatation chamber 4 connected to the auxiliary chamber 5 of the tub of a dishwasher,
- the microswitch 6 with two electrical contacts 6a and 6b, in parallel, supplying the dishwasher programmer and the electrical valve for water inlet 7 respectively.
- the lever 8 operating microswitch 6, which pivots on a shaft 8a on one end of the lever, and which has an end 8b being hollow, with a guide groove 16,
- a rod 3a of the float, articulated on the end 8b of the lever, with a vertical to and fro movement 15 depending on the variations in level,
- a mechanism 9, 10 impelling the lever 8, which is pivoting on the end shaft 9a and is connected at the other end to an intermediate element 11 of the lever 8.
- a horizontal support plate 12 covering the float chamber 4, on which the microswitch 6 is fixed along with the pivoting shafts 8a and 9a, respectively for the lever and for the impeller mechanism.

[0009] The hollow end 8b of the lever has a guide groove 16 in which the pin 17 of the rod 3a slips. Said groove 16 is dimensioned for a movement h equal to the difference h in height level 2, regulated during the dishwasher's dynamic operation, and the lower level 2b, with the tub drained.

[0010] The support plate 12 has the opening 13 to allow the pivoting movement 14 of the mechanism 9, 10 in the vertical direction. Said mechanism comprises a connecting rod 9 surrounded by a helical spring 10 which provides thrust force F on the lever 8. For its connection to the lever 8, the connecting rod 9 has an axial opening 9b where the intermediate element 11 of the lever fits, free to move in the pivoting direction 14. The position of the mechanism 9, 10 above or below the support plate 12, depends on the height of the rod 3 so that the connecting rod 9 is pushed by the lever 8 in either direction until coming into the horizontal position, then the spring 10 pushes the lever 8 in the same direction so that it reaches one of the stable positions, at the top, connecting the microswitch 6 shown in Figure 1 and cutting off the water inlet 7, or at the bottom, disconnecting the microswitch 6, shown in Figure 2, to open the water inlet.

[0011] When the float chamber is empty, below level 2b, the float is at the bottom as shown in Figure 2, the mechanism 9, 10 is below the support plate 12 so that

the microswitch 6 is disengaged, and the electrical valve allows the water to enter. Dynamic regulation begins when the water level "h" rises until it is beyond regulation level 2. The rod 3a makes the upward movement 15 without affecting the lever 8, since the pin 17 slips along the groove 16 until coming to the top retaining stopper at end 8b, and it moves the lever 8. The lever 8 pivots in direction 14 and moves the mechanism 9, 10 until the spring 10 is almost horizontal and is no longer able to keep the lever 8 down in the stable position so that it pushes it upward with a force F applied on the intermediate element 11, switching the stable position from bottom to top, where the microswitch 6 is engaged. The contact 6a now disconnects the electrical valve and cuts off the flow of water, while contact 6b drives the programmer to time an interval, e.g. of 5 seconds, prior to switching the wash motor on.

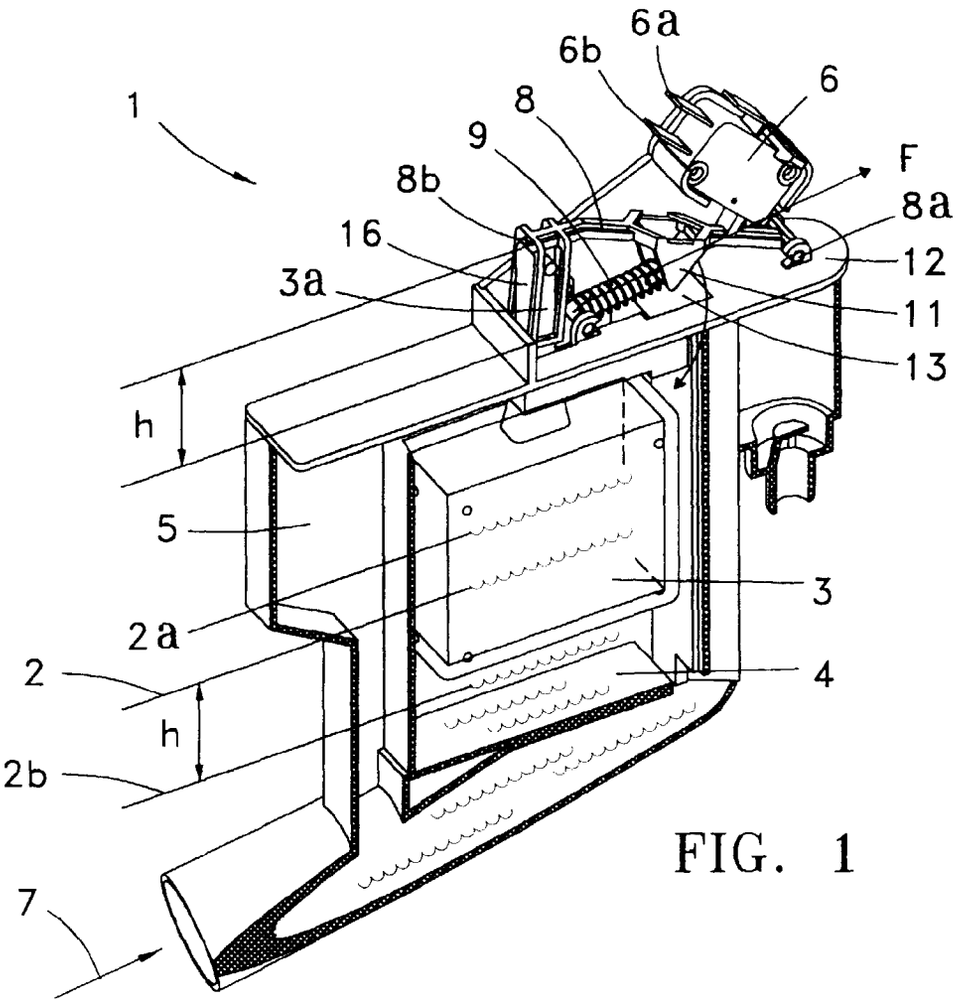
[0012] If the level h drops to height 2b, the downward movement of the rod 3a does not affect the lever 8 until the pin 17 meets the bottom retaining stopper on end 8b of the lever, and lever 8 and spring 10 pivot downward to operate the same as before. When nearly horizontal, the spring 10 cannot keep the lever 8 up and so pushes it toward the stable bottom position, to disconnect the microswitch 6, once more opening up the inlet 7 of water. The water level 2a shown in Figure 1 is a static level which is possible in the tub when the wash motor is stopped.

Claims

1. A device (1) for regulating the level (2) of the water in the tub of a clothes washer or dishwasher during the dynamic washing phase, by means of a float (3) housed in a flotation chamber (4) communicating with an auxiliary chamber (5) of the tub, where a rod (3a) of the float causes the vertical movement (15) of the float between two water levels (2, 2b), pushing a pivoting lever (8) to operate a microswitch (6) and close the flow of water through the electrical inlet valve (7), characterised in that the operating lever (8) is impelled by an intermediate mechanism (9, 10) which is independent of the float (3), to occupy only two stable positions relative to the microswitch (6).

2. The device (1) for the regulation of level (2) of claim 1, in wherein said mechanism (9, 10) comprises a connecting rod (9) pivoting on an end rod (9a) fixed to the support (12) of the device, and a helical spring (10) around the connecting rod (9) which impels the lever (8) in the direction of its pivot movement to snap switch its two stable positions.

3. The device (1) for level regulation of claim 1, wherein a rod (3a) of the float is articulated to one end (8b) of the rod (8), to allow a prior vertical movement (15) between said two levels (2, 2b) without affecting the lever (8).


1
6a
6b
6
8
9
F
8b
8a
16
12
3a
11
13
h
5
3
2a
2
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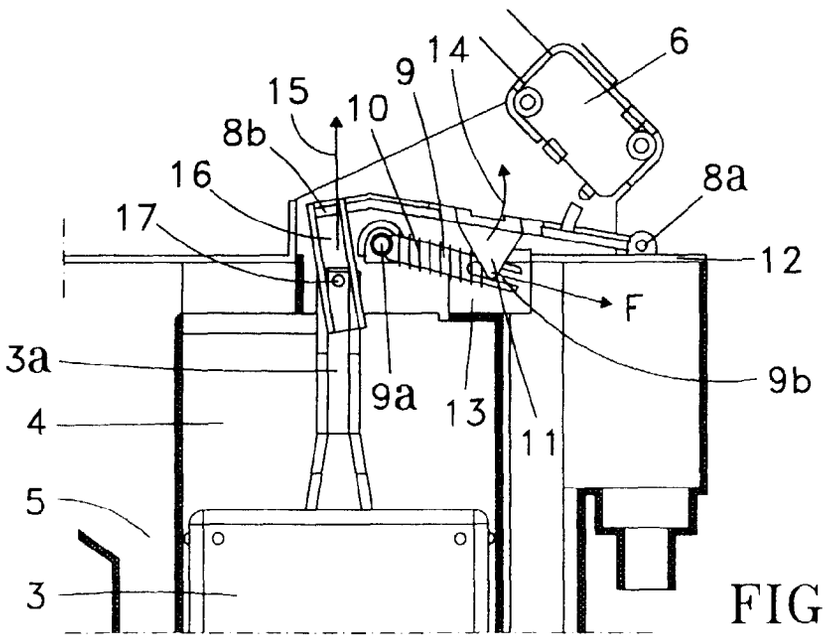
h
2b
7

FIG. 1


6
14
9
15
10
8b
16
8a
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12
F
3a
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13
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FIG. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 99 50 0062

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TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A47L
D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	28 September 1999	Norman, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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