

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 878 577 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
18.11.1998 Bulletin 1998/47

(51) Int. Cl.⁶: D06F 39/08

(21) Application number: 98105372.1

(22) Date of filing: 25.03.1998

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(72) Inventor: Klingenstein, Dieter
V.1e G. Borghi 27, 21025 Comerio (IT)

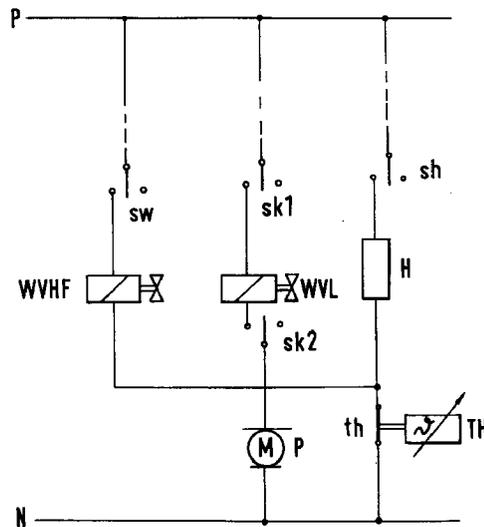
(74) Representative:
Guerci, Alessandro
Whirlpool Europe S.r.l.
Patent Department
Viale G. Borghi 27
21025 Comerio (VA) (IT)

(30) Priority: 25.04.1997 DE 19717449

(71) Applicant: WHIRLPOOL CORPORATION
Benton Harbor Michigan 49022 (US)

(54) Control for the hot water supply for an automatic washing machine

(57) The invention relates to a control for the hot water supply to an automatic washing machine with a hot water and a cold water valve and a thermostat which may be adjusted to different switching temperatures. Monitoring of temperature is obtained with simplified power circuits, with reduced outlay on parts, for the hot water and cold water valve by means of the adjustable thermostat.



EP 0 878 577 A1

Description

The invention relates to a control for the hot water supply to an automatic washing machine with a hot water and a cold water valve and a thermostat which may be adjusted to different switching temperatures.

A control for the hot water supply of this type is used in the automatic washing machines WA 9430 and WA 9437 by the applicant. In this known control for the hot water supply, a switch relay and a break contact on the thermostat are connected in series with the hot water valve. The switch relay switches from the cold water valve to the hot water valve. The arrangement is such here that, when the thermostat is adjusted to a lower switching temperature of e.g. 35°C at the beginning of the operation to supply the hot water; the contact of the switch relay opens the circuit of the cold water valve and closes that of the hot water valve. When the adjusted switching temperature is achieved, the contact of the thermostat opens the circuit for the switch relay, with the result that the circuit for the cold water valve is switched back on again. When the thermostat is adjusted to a higher switching temperature of e.g. 60°C, then, even after reaching the temperature, the circuit of the relay remains closed, since a switch contact overrides the contact of the thermostat. As before, the circuit for the hot water valve remains switched on.

This known control for the hot water supply requires, besides the switch relay, a contact switch on the adjustable thermostat and a thermostat with a fixed temperature as well.

The object of the invention is to simplify a control for the hot water supply of the type mentioned at the outset in such a way that the outlay on parts is reduced and that the temperature can be monitored and regulated during the filling stages.

This object is achieved according to the invention in that, during the operation of supplying hot water, the cold water valve is brought into the opening position independently of the switching state of the thermostat, in that, until the switching temperature preset by the thermostat is reached, a contact of the thermostat directs the hot water valve into the open position and in that, in bypassing the preset switching temperature the thermostat reacts and, with its contact, interrupts the controlling current of the hot water valve.

The switch relay and the contact switch on the thermostat are inactivated and the adjustable thermostat controls the temperature in the filling stage so that temperature excesses are avoided in the heating stages.

According to one development, the cold water valve can also be controlled independently of the operation for supplying the hot water. For this purpose, control contacts of the program control unit, which can be adopted without alteration from known automatic washing machines, can be used in an already known manner.

Since the cold water valve is now opened during

every hot water supply, according to a further development, subsequent heating can be introduced if higher mixing temperatures are desired. The invention is described in greater detail with the help of an embodiment given by way of example and represented in the drawing as a circuit diagram.

The circuit diagram does not go into the details of the program control unit, of which only the control contacts sw, sk1, sk2 and sh are shown in the circuits. The control contact sw is closed, if hot water is desired. A circuit for the hot water valve WVHF is thus closed, in which circuit a break contact th of the thermostat TH, which can be adjusted to various temperatures, is also included. The circuit for the cold water valve WVL leads via the pump P and is controlled by the control contacts sk1 and sk2, which are likewise part of the program control unit. The cold water supply can be introduced thus independently of the hot water supply as well as in parallel with the latter. This presetting is taken on by the program control unit. The thermostat TH may be adjusted to various switching temperatures. The circuit for the hot water valve WVHF remains closed until the contact th of the thermostat TH opens. The hot water supply is stopped when the mixing temperature, which is preset by the adjustment of the thermostat, is exceeded, since, when the mixing temperature is reached, the thermostat TH reacts, opens its contact th and thus switches off the hot water valve WVHF. The hot water valve WVHF closes and stops the hot water supply. The cold water valve WVL remains under the control of the program switching unit and therefore in its open position. The cold water supply takes place then, during the entire operation for supplying the hot water, parallel to the hot water supply. When higher mixing temperatures, e.g. 60°C are desired, it can become necessary to heat the water subsequently in the filling stages. For that purpose, the heating element H is correspondingly controlled via control contacts sh in the program control unit.

Claims

1. Control for the hot water supply to an automatic washing machine with a hot water and a cold water valve and a thermostat, which may be adjusted to different switching temperatures, characterised in that, during the hot water supply operation (control contact sw) the cold water valve (WVL) is brought into the opening position independently of the switching state of the thermostat (TH) (control contacts sk1, sk2), in that, until the switching temperature (e.g. 30°C or 60°C), which is preset by the thermostat (TH), is reached, a contact (th) of the thermostat(TH) directs the hot water Valve (WVHF) into the open position, and in that,

when the predetermined switching temperature (e.g. 30°C or 60°C) is exceeded, the thermostat (TH) reacts and interrupts the control circuit of the hot water valve (WVHF) with its contact (th).

5

2. Control for the hot water supply according to Claim 1

characterised in that, the cold water valve (WVL) may be controlled independently of the operation for supplying the hot water (control contacts sk1, sk2).

10

3. Control for the hot water supply according to Claims 1 or 2

characterised in that, when higher mixing temperatures (e.g. over 60°C) are desired, subsequent heating may be introduced (control contact sh for heating element H).

15

20

25

30

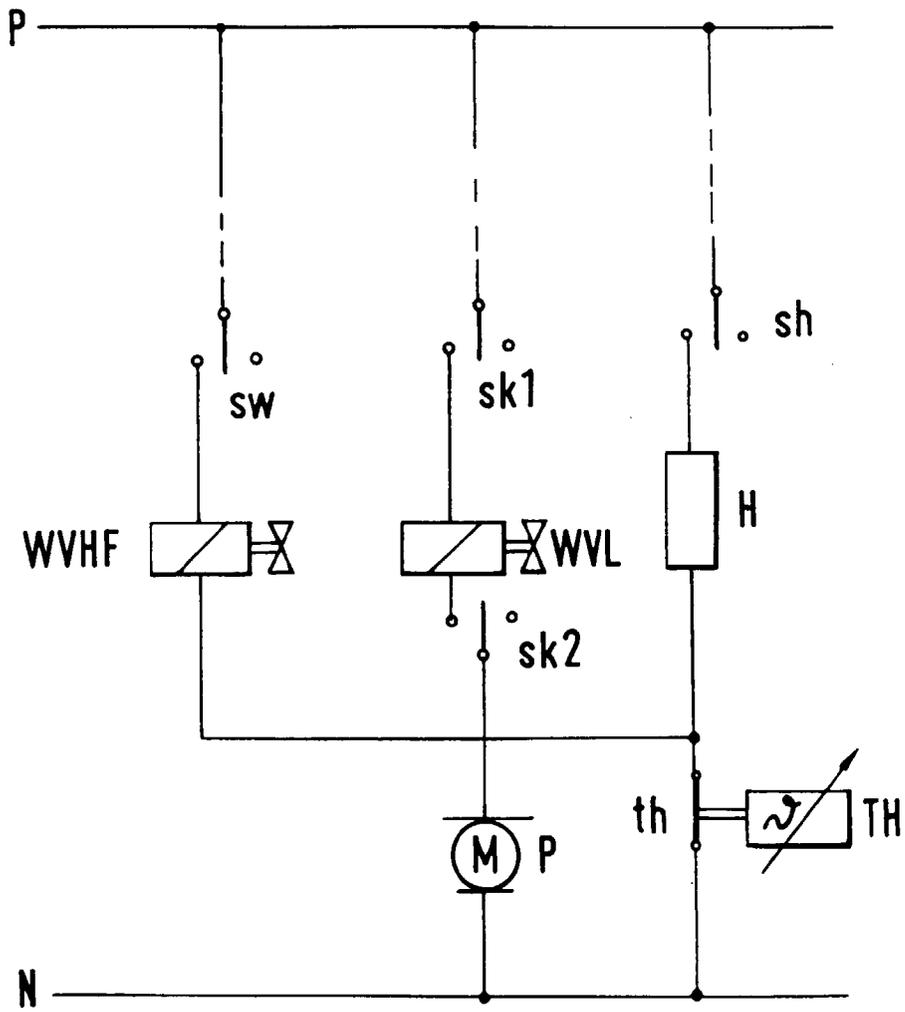
35

40

45

50

55





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 10 5372

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.6)
A	US 4 031 911 A (FRAZAR JOSEPH H) 28 June 1977 * column 2, line 14 - column 2, line 33; figures *	1	D06F39/08
A	EP 0 335 485 A (FISHER & PAYKEL) 4 October 1989 * abstract; claims; figures *	1	
A	US 4 528 709 A (GETZ EDWARD H ET AL) 16 July 1985 * the whole document *	1	
A	EP 0 118 167 A (THORN EMI DOMESTIC APPLIANCES) 12 September 1984 * the whole document *	1	
A	US 4 147 297 A (WORST JOSEPH C) 3 April 1979 * the whole document *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			D06F
Place of search	Date of completion of the search	Examiner	
THE HAGUE	3 September 1998	Madsen, P	
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 (P04C01)