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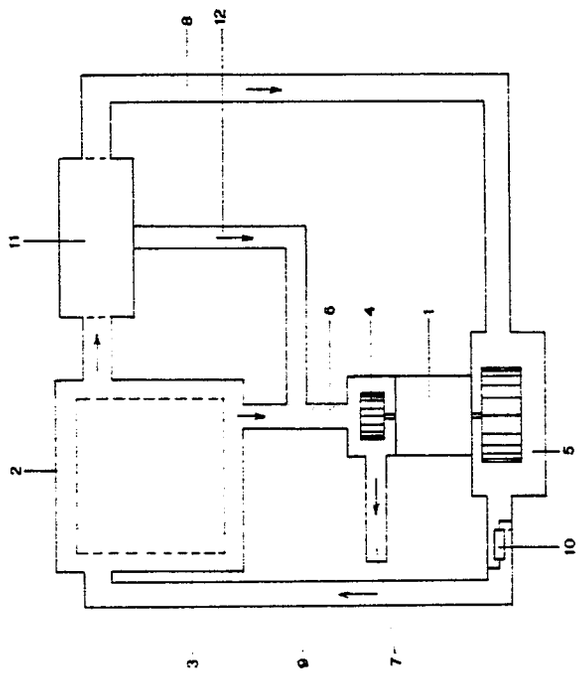
(54) Device for water discharge and ventilation in washing machines.

(57) A device for water discharge and ventilation in washing machines characterised by comprising a wash water discharge circuit (6,7), a turbine (4) inserted into said wash water discharge circuit, a ventilation air circulation circuit (8,9), an impeller (5) inserted into said ventilation circuit, and an electric motor (1) on whose shaft said turbine (4) and said impeller (5) are fixed.



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This invention relates to a device for water discharge and ventilation in washing machines.

In known domestic washing machines, an electric motor-driven pump is provided for removing the water from the washing machine interior at the end of the various wash stages.

Recently, there has been an increasingly widespread use of washing machines which are also provided with a device for drying the laundry after the final spin. This device consists in particular of an electric motor-driven fan located within a casing to circulate a hot air stream through the laundry after it has been washed and possibly spun.

This known drying device has however certain drawbacks, and in particular:

- an additional cost due to the presence of a further electric motor
- overall size problems
- the need for further electrical connections and the consequent arrangements required to ensure their insulation
- somewhat laborious assembly and testing which inevitably affect the final washing machine cost.

According to the invention these drawbacks are overcome by a device for water discharge and ventilation in washing machines characterised by comprising a wash water discharge circuit, a turbine inserted into said wash water discharge circuit, a ventilation air circulation circuit, an impeller inserted into said ventilation circuit, and an electric motor on whose shaft said turbine and said impeller are fixed.

The present invention is further described hereinafter with reference to the accompanying drawing which shows a diagrammatic view of a washing machine provided with a device according to the invention.

As can be seen from the drawing the device according to the invention is mounted in a conventional washing machine.

This device comprises substantially an electric motor 1, preferably of induction type, located in a position below the tub 2 which houses the rotary drum 3. A turbine 4 and an impeller 5 are both fixed to the shaft of the motor 1. The turbine 4 forms the active element of a pump, the casing of which is connected to the base of the tub 2 by a suction pipe 6, and to the discharge outlet by a delivery pipe 7.

The impeller 5 forms the active element of a fan the casing of which is connected to the tub by an intake duct 8 and a delivery duct 9 which open into said tub at a level above the highest level which the water can reach during the washing machine operating cycle.

The fan intake duct 8 is provided internally with a water-operated condenser 11, the condensate collection pipe 12 of which is connected to the pump suction pipe 6.

The operation of the device according to the invention is as follows:

when the actual washing machine wash cycle has finished, the programmer causes the motor 1 to operate. As a result of this operation the turbine 4 draws water from the tub 2 and discharges it to the outside through the pipe 7, and the impeller 5 circulates air through the laundry contained in the drum 3.

During this stage the programmer does not activate the electrical resistance element 10 and consequently the air fed into the drum 3 is at ambient temperature.

Analogous operation occurs during spinning after the intermediate rinse stages.

When the working program reaches the end of the final spin stage, the programmer activates the electrical resistance element 10 which consequently heats the air fed into the drum 3. During its passage through the laundry the air dries this latter and at the same time absorbs the water removed therefrom.

The moist air leaving the drum 3 enters the water-operated condenser 11, is reduced in moisture content and is again drawn in by the impeller to repeat the cycle.

During this stage the condensation collected in the condenser 11 is transferred into the pipe 6 and then discharged to the outside by the turbine 4.

From the aforegoing it is apparent that the device according to the invention results in numerous advantages, and in particular:

- a lower cost of the entire washing machine because of the use of a single motor for operating the pump and fan. From calculations made it has been shown possible to obtain a saving of about 30% on the cost of a pump and fan operated by separate motors
- a further cost reduction because of the less extensive installation and assembly operations which have to be carried out
- less change of faults developing because of the smaller number of components used.

Claims

1. A device for water discharge and ventilation in washing machines characterised by comprising a wash water discharge circuit (6,7), a turbine (4) inserted into said wash water discharge circuit, a ventilation air circulation circuit (6,9), an impeller (5) inserted into said ventilation circuit, and an electric motor (1) on whose shaft said turbine (4) and said impeller (5) are fixed.

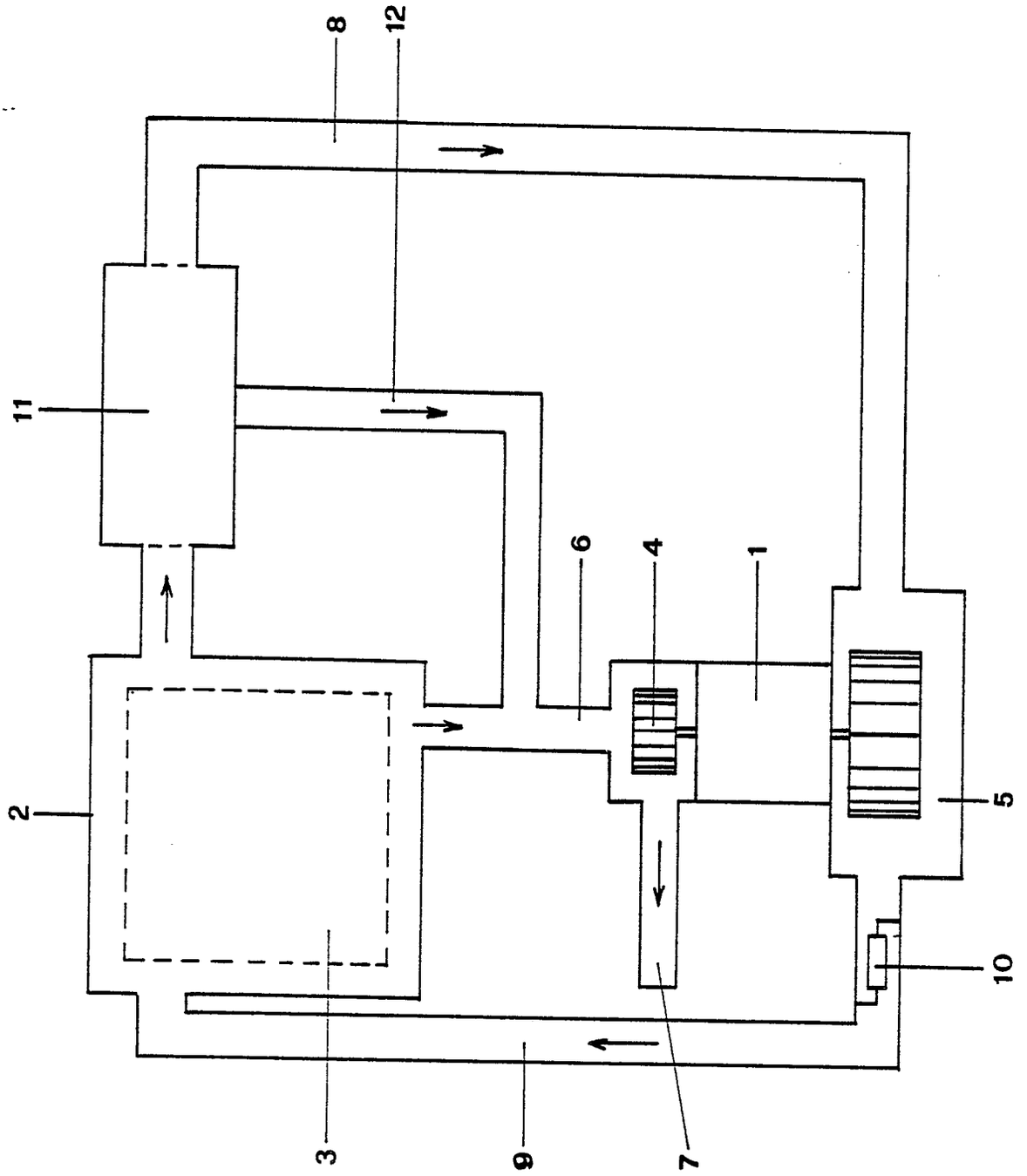
2. A device as claimed in claim 1, characterised in that the motor (1) is located in a position below the base of the tub (2) which houses the rotary drum (3).

3. A device as claimed in claim 1, characterised in that the two ventilation air circulation ducts (8,9) open into the tub (2) at a level higher than the maximum level which the water can reach within said tub.

4. A device as claimed in claim 1, characterised by comprising an electrically powered resistance element in the delivery duct (9).

5. A device as claimed in claim 1, characterised in that the motor (1) is of induction type.

6. A device as claimed in one or more of the previous claims, characterised by comprising:
- a tub (2) housing the rotary drum (3), in the interior of which the laundry to be processed is placed
- a pipe (6) connecting the base of said tub (2) to a pump (4)
- a pipe (7) connecting the pump to the discharge outlet
- a ventilation air intake duct (8) connecting to a fan (5) a point of the tub (2) situated higher than the maximum level which the wash water can reach
- a condenser (11) inserted into said intake duct (8)
- a pipe (12) connecting the condenser (11) to the pump (4) for condensate discharge
- an electric motor (1) located below the tub (4) to operate said pump (4) and said fan (5) simultaneously
- a ventilation air delivery duct (9) connecting the fan (5) to a point of the tub (2) situated at a level higher than the maximum level which the wash water can reach, and
- a heater element (10) inserted into said duct (9).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EUROPEAN SEARCH REPORT

Application Number

EP 88 10 7436

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)
X	US-A-2 881 609 (GENERAL MOTORS CORP.) * Figures 3-5,10,12; column 2, lines 5-33 *	1-6	D 06 F 25/00
X	FR-A-2 292 797 (ZALLAS) * Figures 1,4; page 4, lines 22-25 *	1,2,5	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

D 06 F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18-08-1988	COURRIER,G.L.A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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