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(54) **Washer/dryer with additional condensing circuit**

(57) A washer/dryer includes a fan (F) connected to a condensing duct (C) so as to create a stream of moist air coming from the tank (T) through an air entrance (A), as well as a load bay (B) for detergent/additives provided with water jets (W), controlled by an electrovalve, that is connected to the tank (T) through a connecting pipe and a vent pipe (V), as well as an expansion chamber (E) connected to the load bay (B) and to the condensing duct (C) through a return pipe (S). In this way, a greater condensing effectiveness is achieved thanks to the additional condensing circuit (V, B, E, S) that operates in parallel with the primary condensing circuit, resulting in a reduction of drying time and power consumption.

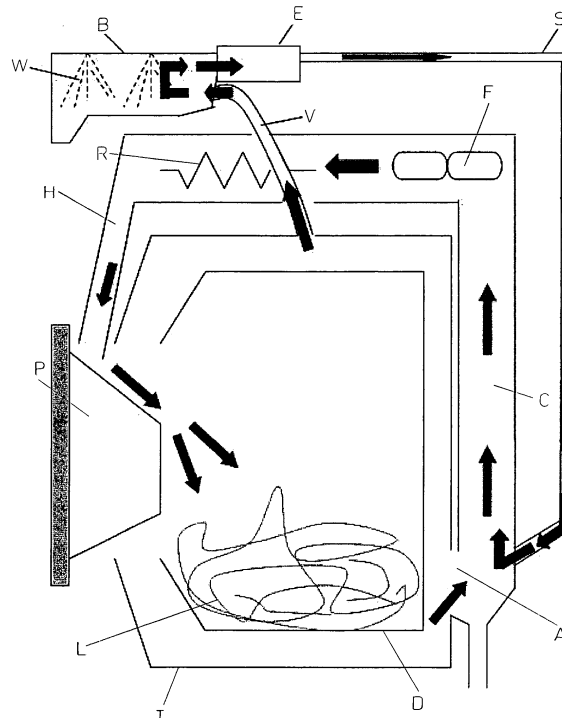


Fig.1

Description

[0001] The present invention relates to washers/dryers, and in particular to a washer/dryer provided with an additional condensing circuit to speed up the drying of the laundry at the end of the washing cycle.

[0002] It is known that in washing machines that also perform the drying of the washed laundry there is provided a circuit to circulate air between the laundry-containing drum and a condensing unit, in which the moisture removed from the laundry is condensed and discharged by means of the drain pump of the machine.

[0003] During the drying step a fan creates an air stream in the circuit and a resistor heats the air circulating in said circuit. After this initial phase, an electrovalve is opened to admit condensing water into a condensing duct, where the condensing water is kept in suspension by the suction created by the fan.

[0004] In this way, the vapor sucked in from the tank encounters the suspended water and partially condenses toward the drain pump through a suitable drain pipe. Therefore, the fan receives partially cooled and dried air that is heated again by the resistor and returned to the tank.

[0005] The most serious drawback of this known arrangement is that the moisture present in the air coming from the tank and passing through the condensing duct is only partially involved in the condensing process, since the suspended water can not come into contact with the whole stream of moist air that therefore reaches the fan with still a certain moisture degree.

[0006] This results in a poor condensing effectiveness and a long drying time, with a subsequently high power consumption due to the long operating period of the fan and resistor.

[0007] Therefore the object of the present invention is to provide a washer/dryer which overcomes said drawbacks. This object is achieved by means of a washer/dryer provided with an additional condensing circuit obtained by connecting the detergent drawer to the condensing duct through an expansion chamber and a return pipe. Other advantageous features of the present washer/dryer are disclosed in the dependent claims.

[0008] The main advantage of the present washer/dryer is that of achieving a greater condensing effectiveness thanks to the additional condensing circuit that operates in parallel with the primary condensing circuit. This results in a reduction of the drying time, with a subsequently lower power consumption.

[0009] Another significant advantage of this arrangement comes from its structural simplicity that allows to achieve the above-mentioned improvement in effectiveness without affecting the overall size of the machine and with only a minimum increase in manufacturing cost.

[0010] These and other advantages and characteristics of the washer/dryer according to the present invention will be clear to those skilled in the art from the following detailed description of an embodiment thereof,

with reference to the only drawing, annexed as fig. 1, that shows a diagrammatic side view of a machine with double condensing circuit.

[0011] With reference to said figure, there is seen that a washer/dryer includes a tank T, closed by a door P, that houses a rotating drum D containing the laundry L to be dried.

[0012] The drying circuit conventionally includes a fan F connected to a condensing duct C where the stream of moist air, coming from the tank through an air entrance A, flows in a direction opposite to the condensing water introduced in duct C through a relevant water entrance (not shown). A resistor R is arranged downstream from fan F in a return duct H to heat the air prior to returning it to tank T, while the water condensed in duct C is conveyed to the drain pump through a bottom drain.

[0013] The washer/dryer is also provided with a load bay B where the user can load detergent and/or additives (e.g. softener) that are then taken to tank T by water jets W, controlled by an electrovalve, that wash away said products toward a connecting pipe (not shown). The load bay B is connected to tank T also through a vent pipe V usually located at the top of tank T.

[0014] The novel aspect of the present invention is the presence of an expansion chamber E connected to the load bay B, and preferably adjacent thereto, as well as connected to the condensing duct C through a return pipe S.

[0015] In this additional condensing circuit the air coming from tank T enters bay B through the vent pipe V, since bay B is at a pressure lower with respect to tank T due to the effect of the air stream in the condensing duct C, that is connected to bay B through the return pipe S and the expansion chamber E.

[0016] Since the walls of bay B are cold, the air coming from tank T releases by condensation a portion of the moisture that is then discharged through the connecting pipe and the drain pump. Preferably, the above-mentioned electrovalve periodically re-activates the water jets W in bay B for some seconds, whereby the wetted walls are kept at a temperature lower than that of the moist air coming from tank T.

[0017] The moist air, after passing through bay B and releasing a portion of its moisture, proceeds to the expansion chamber E where it releases further moisture that condenses and flows down the return pipe S to the condensing duct C. Obviously, also the air proceeds along the return pipe S to the condensing duct C and joins the air coming from tank T through the relevant aperture A.

[0018] Therefore it is evident that the additional condensing circuit operates in parallel with the primary one, exploiting the same air circulation created by fan F, and the air passing through said additional circuit passes then also through the primary circuit prior to returning to the tank.

[0019] It is clear that the above-described and illustrated embodiment of the washer/dryer according to the in-

vention is just an example susceptible of various modifications. In particular, the exact shape and arrangement of the expansion chamber E and of the return pipe S can be freely changed as long as a connection between the load bay B and the condensing duct C is retained.

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Claims

1. Washer/dryer including a fan (F) connected to a condensing duct (C) so as to create a stream of moist air coming from the tank (T), as well as a load bay (B) for detergent/additives provided with water jets (W), controlled by an electrovalve, said load bay (B) being connected to the tank (T) through a connecting pipe and a vent pipe (V), **characterized in that** it further includes an expansion chamber (E) connected to the load bay (B), said expansion chamber (E) being also connected to said condensing duct (C) through a return pipe (S).
2. Washer/dryer according to claim 1, **characterized in that** the expansion chamber (E) is adjacent to the load bay (B).
3. Washer/dryer according to claim 1 or 2, **characterized in that** the electrovalve that controls the water jets (W) in the load bay (B) can be programmed to re-activate periodically said water jets (W) during the drying step.

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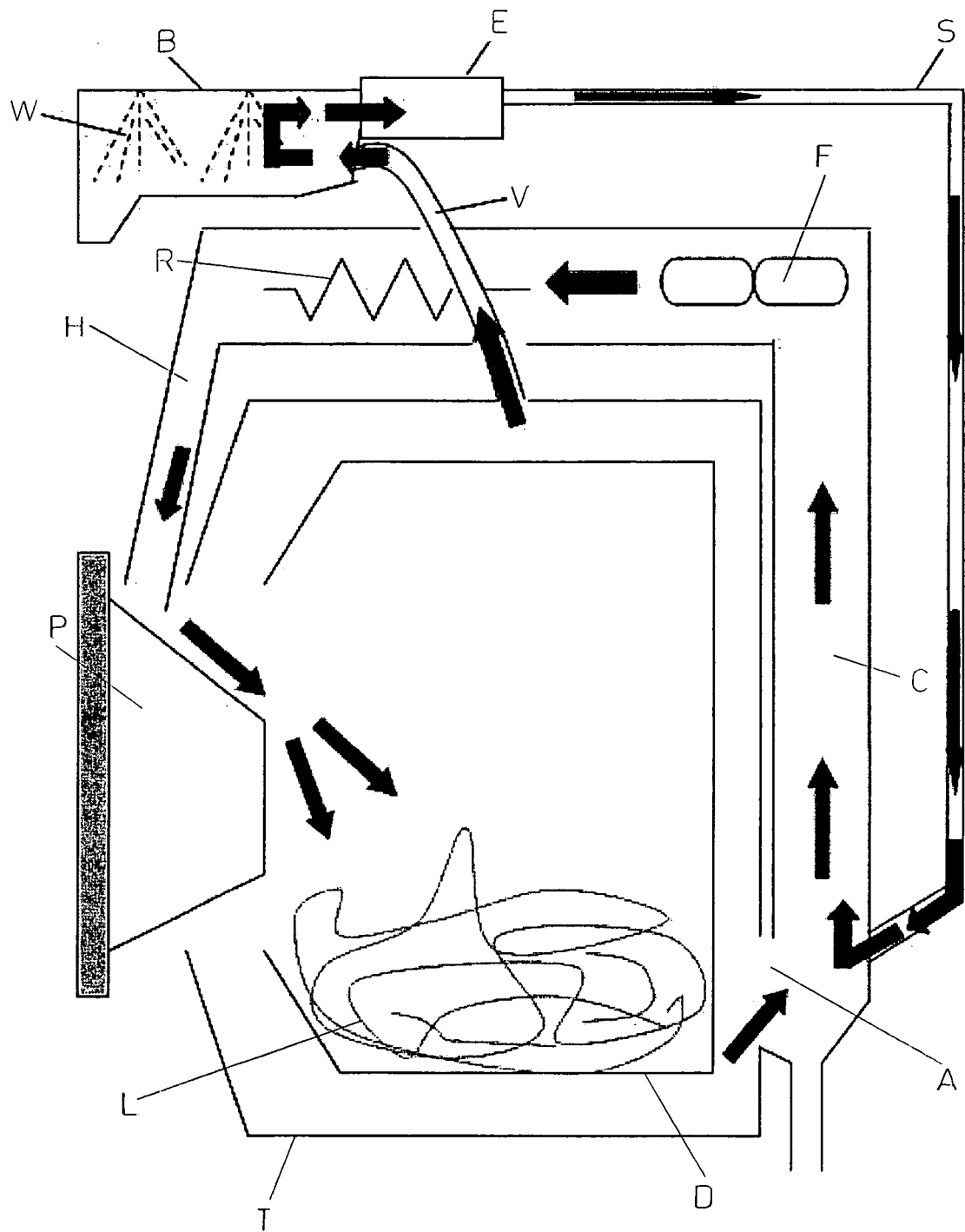


Fig. 1



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 42 5299

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			D06F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		5 October 2006	Courrier, Gilles
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 06 42 5299

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
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