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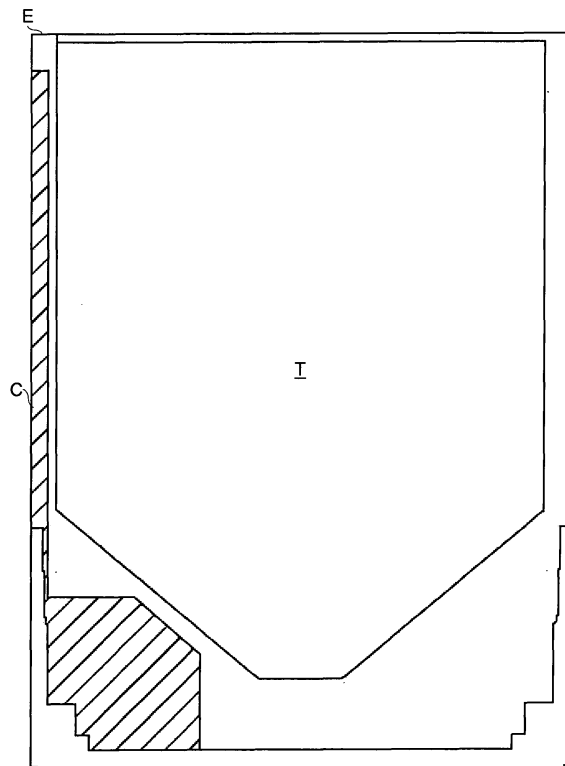
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(54) **Dishwasher with heat-recovery device**

(57) A dishwasher includes a wash tank (T) enclosed inside an external casing (E), as well as a container (C) arranged between the wash tank (T) and the external casing (E) and operatively connected through pipings to the network water feed and the wash tank (T). The container (C), used to store the water to be used in the following wash phase, extends over at least one side of the wash tank (T) but is not in contact therewith so as to capture the heat radiated from the wash tank (T) during the wash phase without directly absorbing heat therefrom by contact.



**Fig.1**

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## Description

**[0001]** The present invention relates to dishwashers, and in particular to a dishwasher provided with a device for recovering the heat dissipated during the wash phase.

**[0002]** It is known that in a dishwasher, prior to each wash phase, there is loaded a suitable amount of water from the hydraulic network, that has an average temperature of 15°C, which is then circulated by the wash pump, heated by an electrical resistor and sprayed onto the dishes by the sprinklers. During the wash phase, the water and the wash tank are hot (up to 70°C) and therefore a natural radiation of heat occurs outside the tank that leads to a heating of the dishwasher sides and of the adjacent furniture.

**[0003]** In order to recover this heat radiated from the tank walls it is already known to arrange a container on the external side of the tank so as to heat the water load required for the following wash phase. However, also this arrangement does not prevent the dissipation of heat since the container, being in direct contact with the tank, rapidly reaches the same temperature of the tank and in turn radiates heat outwards.

**[0004]** Moreover, the direct contact implies that the water stored in the external container immediately absorbs heat as soon as the tank starts to heat up, whereby in practice the dishwasher resistor has to heat not only the water loaded in the tank for the present wash phase but also that for the following phase. This results in an extension of the time required to reach the temperature set for the wash, and in a greater dissipation of heat from the external container during the waiting phase before the water stored therein is used.

**[0005]** Therefore the object of the present invention is to provide a dishwasher which overcomes the above-mentioned drawbacks. This object is achieved by means of a dishwasher provided with a container, for the water to be used in the following wash phase, arranged outside the wash tank and extending at least over one side of the tank yet not in contact therewith. Other advantageous features of the present dishwasher are disclosed in the dependent claims.

**[0006]** The main advantage of this dishwasher stems from the fact that the water stored in the external container is not heated by contact with the tank but only by capturing the heat radiated therefrom, so that it does not affect the duration and consumption of the present wash phase yet recovering heat that would otherwise be wasted.

**[0007]** A further advantage of the present dishwasher is that the heat recovery is achieved by means of a simple and inexpensive device, which can be arranged in spaces around the tank that would otherwise remain unused.

**[0008]** These and other advantages and characteristics of the dishwasher 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 annexed drawings wherein:

**Fig.1** is a diagrammatic front view showing the arrangement of the external container with respect to the wash tank;

**Fig.2** is a diagrammatic side view showing the extension of the external container with respect to the wash tank; and

**Fig.3** is a diagram showing the arrangement of the external container between the wash tank and the water softener.

**[0009]** With reference to said figures, there is seen that a dishwasher according to the present invention is provided with a container C arranged outside the wash tank T between the latter and the external casing E of the machine.

**[0010]** The novel aspect of the present invention resides in the fact that the external container C is not in contact with tank T, so as not to absorb heat therefrom by contact. On the other hand, container C extends over the side and bottom portions of the dishwasher so as to obtain a high-capacity container (even 8-10 litres indicatively, depending on the available room) inside which there is stored water intended for the following wash phase.

**[0011]** At the first start of the dishwasher, the water is loaded from the network through a first pipe P1 and after passing through the air-break A and the softener S it goes through a second pipe P2 to build up in container C, from where it passes then to tank T through a third pipe P3. From the following cycle, the water entering tank T will no longer come directly from the network but it will be the water stored in container C. Therefore, its temperature will not be 15°C but at least 23°C, assuming said temperature as room temperature, and this increase in temperature will be at no cost.

**[0012]** During the wash phase the water is heated in tank T and due to the heat radiated from the tank the temperature in the spaces of the dishwasher surrounding the tank increases. Said increase in temperature leads to a heating of the water stored in container C thanks to the captured heat, that would otherwise be wasted. At the following load, the water will have a temperature higher than the 23°C assumed as room temperature because it will have benefited from the heat coming from the tank.

**[0013]** In this way, a lower consumption with respect to a conventional machine will be achieved at the end of the cycle, in that in the various phases the water fed to the tank has a temperature higher than the network water.

**[0014]** It is clear that the above-described and illustrated embodiment of the dishwasher according to the invention is just an example susceptible of various modifications. In particular, the circuit diagram of container C with the rest of the components of the dishwasher is purely indicative since it is possible, for example, to connect container C upstream from softener S and/or air-break A while still retaining the energy recovery, and obviously the water inlet and outlet positions of container C may be changed according to the machine layout.

**[0015]** Similarly, the exact shape and arrangement of container C may change according to the required capacity and to the room available between tank T and the external casing E. For example, container C could even extend over multiple sides of tank T until it substantially completely encloses it so as to maximize the heat recovery, possibly being divided into several separate containers that each feed tank T.

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## Claims

1. Dishwasher including a wash tank (T) enclosed inside an external casing (E), as well as at least one container (C) arranged between said wash tank (T) and said external casing (E) and operatively connected through pipings to the network water feed and the wash tank (T), **characterized in that** said at least one container (C) is not in contact with the wash tank (T) and extends over at least one side thereof.
2. Dishwasher according to claim 1, **characterized in that** the container (C) extends in the side and bottom portions of the dishwasher.
3. Dishwasher according to claim 1 or 2, **characterized in that** the container (C) has a capacity of at least 8 litres.
4. Dishwasher according to one of the preceding claims, **characterized in that** the container (C) extends over multiple sides of the wash tank (T).
5. Dishwasher according to the preceding claim, **characterized in that** the container (C) substantially completely encloses the wash tank (T).
6. Dishwasher according to one of the preceding claims, **characterized in that** it includes several separate containers (C) that each feed the wash tank (T).
7. Dishwasher according to one of the preceding claims, **characterized in that** the container (C) is arranged between a softener (S) and the wash tank (T).

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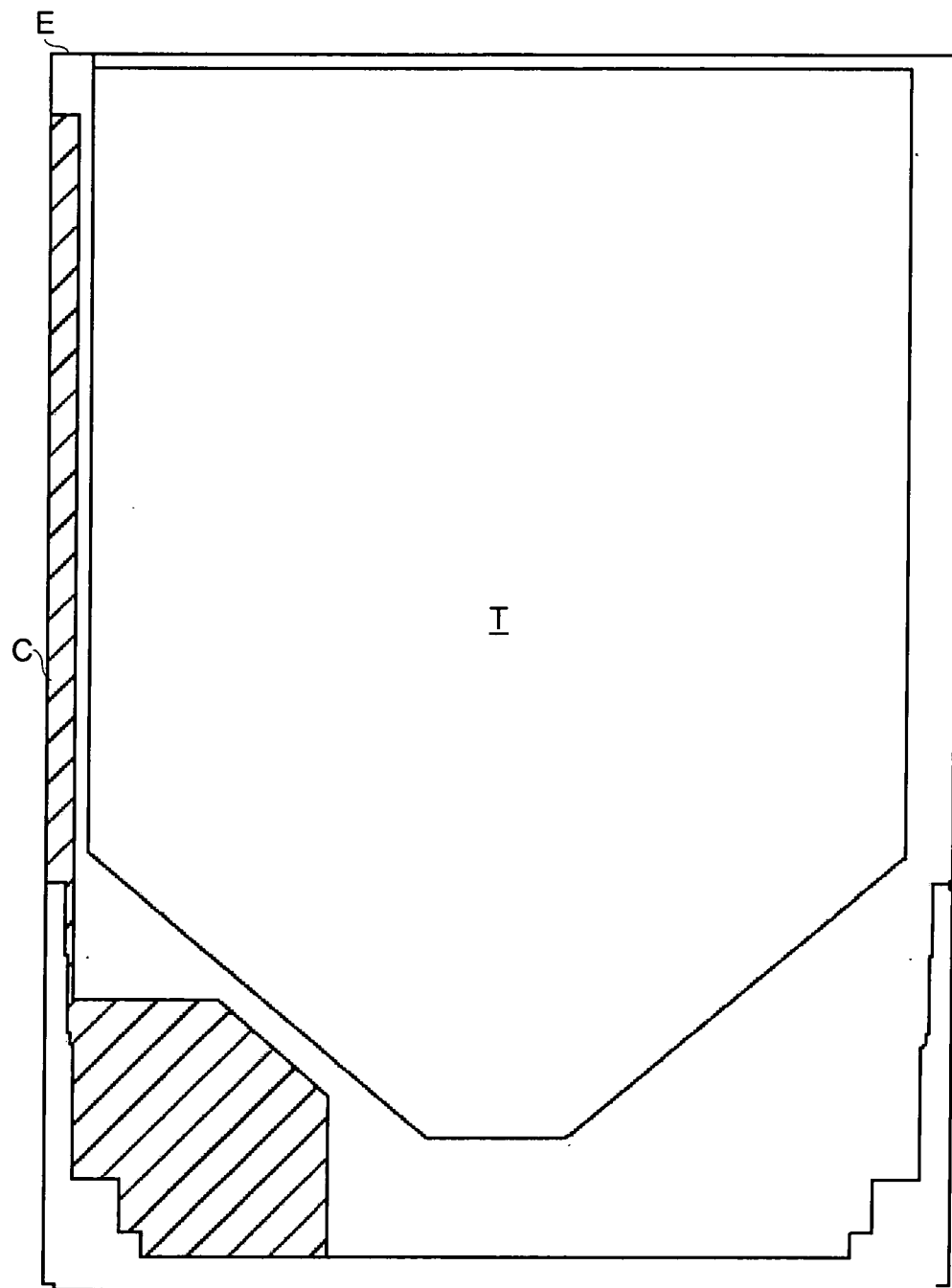


Fig.1

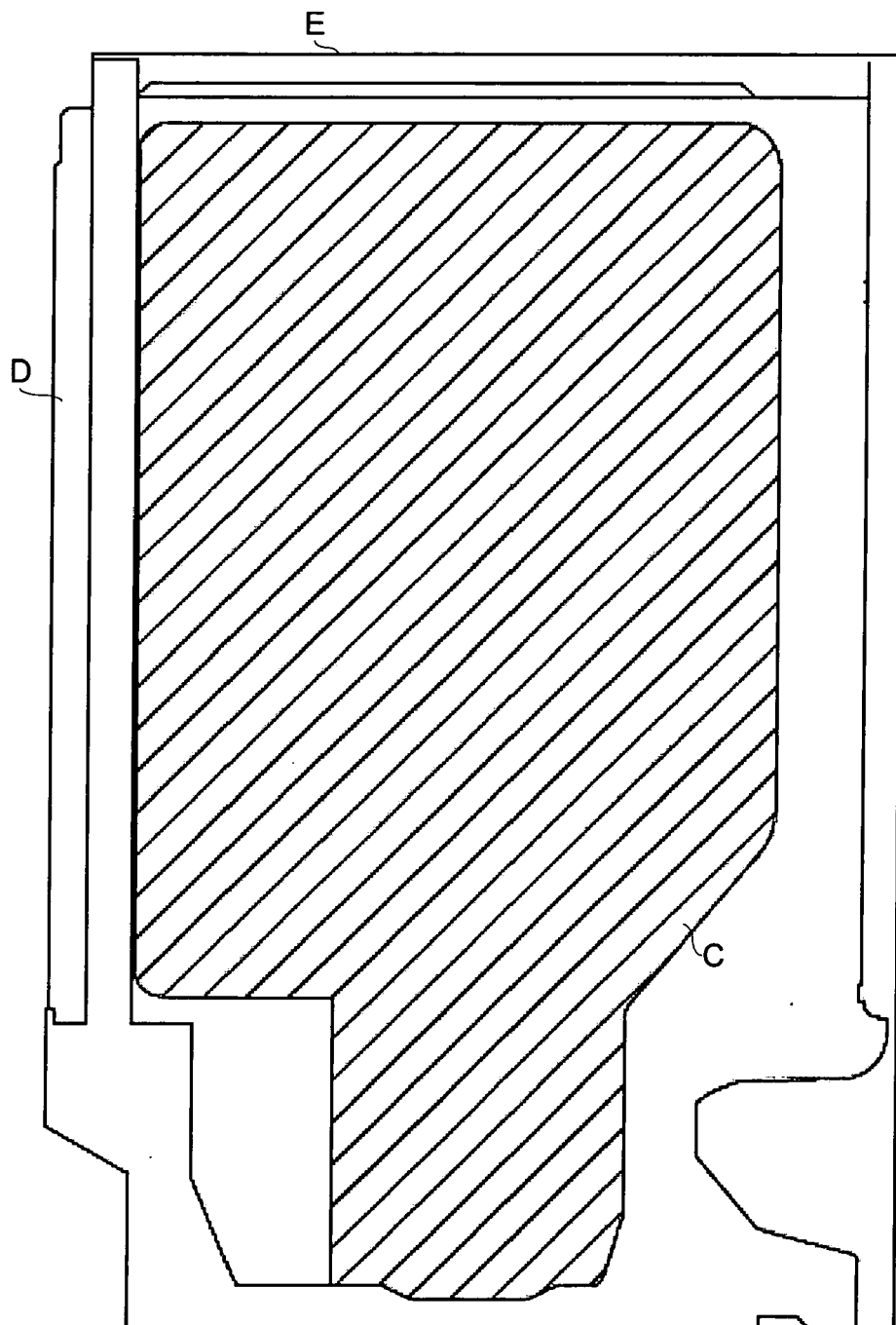


Fig.2

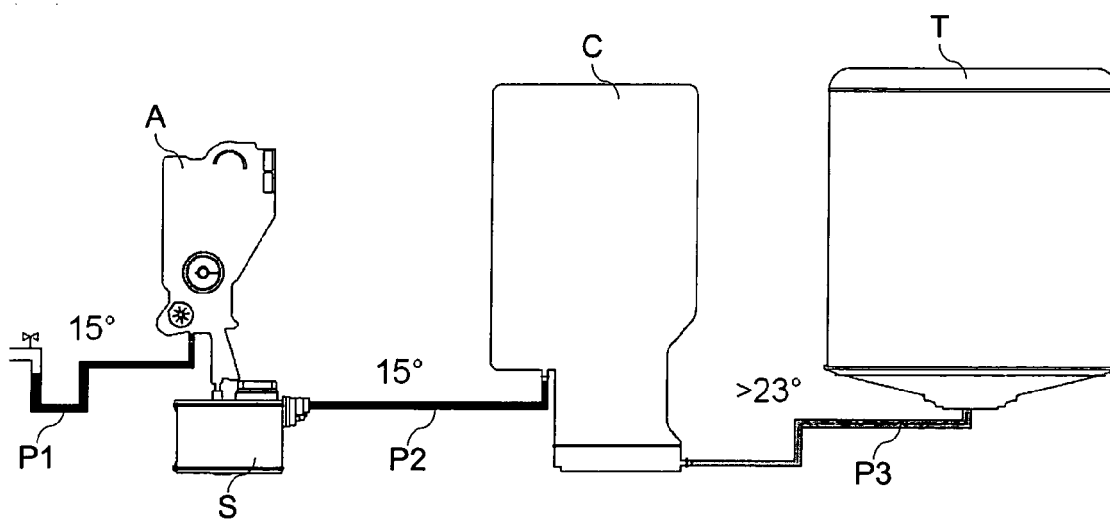


Fig.3



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Office

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Application Number  
EP 07 42 5574

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                      |                                                             |                                         |
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| Place of search<br><b>Munich</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                      | Date of completion of the search<br><b>15 February 2008</b> | Examiner<br><b>Hubrich, Klaus</b>       |
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