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(54) **PLASTIC INSTANT HEATER**

(57) The instant heater in plastic of this invention comprises a housing (1) forming a heating chamber (7), with an inlet provided with a direct connection (3) for pumping means (10) through which cold liquid enters into the heating chamber (7), and an outlet (4) through which hot liquid exits. The housing (1) hosts a rubber gasket (9) which seals on a heating element (2) which in turn is

held together to the housing (1) by a fork (8). The heating element (2) is made with a tubular electric resistance welded to a plate (6) having a second housing (5) for thermo-fuses. Said heating element (2) is disposed within the housing (1) and integrally joined thereto by the fork (8), thus forming a sealed heating chamber (7).

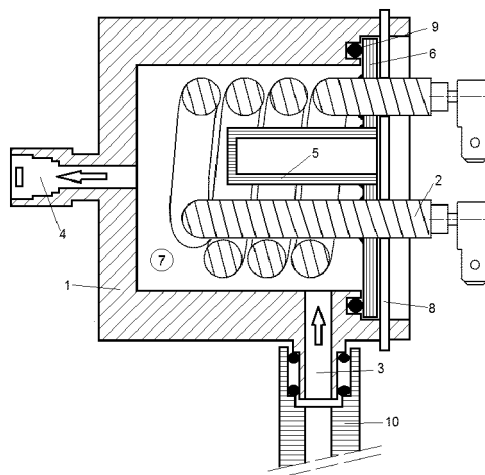


Fig. 1

Description

Subject of the invention

[0001] The present invention relates to an electric instant heater for liquids used in appliances to produce hot drinks like coffee, tea, cappuccino, etc.; comprising one electric heating element housed within a plastic housing forming a heating chamber having an inlet for the cold liquid and an outlet for the hot liquid. The water heater of this invention has features designed to increase the efficiency of the heating systems used in the beverage machines like the ones mentioned before. By the utilization of plastic materials on the body of the heater instead of stainless steel, it is possible to reduce the pre-heating time, the cost of the raw materials and the costs of production.

State of the art

[0002] The increasing pressure of regulations to reduce the power consumption of home appliances and the competitive advantage given by a quickly available hot beverage machine are the target of the new developed beverage machines.

[0003] Currently two main solutions for heating the liquid in hot drinks, notably espresso coffee machines, tea or multi-drinks are known. The most popular are heating systems based on the principle of accumulating energy by heating-up and keeping hot a mass of aluminum or liquid waiting to be available for immediate use, typical examples are boilers and thermo-blocks. This solution is effective but has the disadvantage of not being efficient since lot of energy is consumed to maintain a hot inertial mass just in case the end user decides to prepare a hot drink. Rapid heating solutions, such as mini-boilers or tri-tubes heaters, have a working principle opposite to the previous one and it consists in containing a small volume of liquid inside the heater to achieve a quick to heat-up. Rapid heating devices are both effective in reducing the pre-heating time and efficient from the power consumption point of view, which is zero at stand-by.

[0004] The currently used rapid heating systems, which are of the type to which the present invention refers, are made of stainless steel or aluminum.

[0005] Rapid heaters efficiency can be improved by using plastic material instead of metal to produce the heater body. At the same time, the use of plastic allows costs savings in production and a higher industrial flexibility.

[0006] Therefore, the technical problem posed is the development of an instant heater provided with characteristics that increase the heating efficiency, facilitate manufacturing and reduce costs of existing rapid heaters with bodies in stainless steel or aluminum. In addition, to provide advantages of use and dimensions.

Description of the invention

[0007] Electric instant heater in plastic, object of this invention, comprising: a plastic housing with an inlet and an outlet for the liquid, a heating element composed of a tubular resistance, a metal plate welded to the tubular resistance which includes a housing for the thermal protection fuses, and a fork to fix the heating element inside the plastic housing; has characteristics according to claim 1 that solve the problem explained above and provide a number of advantages both of use and manufacturing.

[0008] According to the invention, the instant heater has the peculiarity that the housing is made in a plastic material eliminating then the need for welding or stamping processes to produce the heater.

[0009] Also several features can be integrated at low costs to the heater, like a direct connection to the pump means, quick or barb shape inlet / outlet, or different kind of valves as self-priming or safety valves to mention some.

[0010] The characteristics of the invention would be more easily understood in view of the embodiments shown in the accompanying figures.

Description of the diagrams

[0011] To complete the description made, and in order to make easier to understand the features of the invention, this report is accompanied by a set of drawings, which are merely illustrative and not restrictive, representing the following:

- Figure 1 shows a schematic view of an embodiment of the electric instant heater in plastic according to the invention, sectioned along a vertical plane and with a direct connection to the pump means; and
- Figure 2 shows a schematic view of an embodiment of the electric instant heater in plastic according to the invention, sectioned along a vertical plane and with a quick connector for the inlet and outlet; and
- Figure 3 shows a schematic view of an embodiment of the electric instant heater in plastic according to the invention, sectioned along a vertical plane and with a barb shape connector for the inlet and outlet; and
- Figure 4 shows a schematic view of an embodiment of the electric instant heater in plastic according to the invention, sectioned along a vertical plane and with a safety valve integrated; and
- Figure 5 shows a schematic view of an embodiment of the electric instant heater in plastic according to the invention, sectioned along a vertical plane and with a self-priming valve integrated; and

- Figure 6 shows a schematic view of an embodiment of the electric instant heater in plastic according to the invention, sectioned along a vertical plane and with a safety and a self-priming valve integrated; and
- Figure 7 shows a schematic view of an embodiment of the electric instant heater in plastic according to the invention, sectioned along a vertical plane and with the heating element joined to the plastic body by screws.

Preferred version of the invention

[0012] In the embodiment shown in Figure 1, the instant heater in plastic comprises the housing (1) provided with the direct connection (3) to the pumping means (10) from where it enters the cold liquid into the heating chamber (7) and the outlet (4) where it exits the hot liquid. The housing (1) hosts the rubber gasket (9) which seals on the heating element (2) which in turn is held together to the housing (1) by the fork (8).

[0013] The instant heater in plastic comprises the heating element (2) made with a tubular electric resistance welded to the plate (6) which has the housing (5) for thermo-fuses.

[0014] According to the invention and as shown in Figure 1 the heating element (2) is disposed within the housing (1) and integrally joined thereto by a fork (8), thus forming a sealed heating chamber (7).

[0015] In the embodiment shown in figure 2 the inlet / outlet connections are provided with quick fittings (10) for high-pressure pipes.

[0016] In the embodiment shown in Figure 3 the inlet / outlet connections are provided with barb shape fittings (11) for low pressure tubes.

[0017] In the embodiment shown in Figure 4 the housing (1) is provided with the safety valve (12) to protect the heater from burst due to over-pressures.

[0018] In the embodiment shown in Figure 5 the housing (1) is provided with the self-priming valve (13) to allow purging the hydraulic circuit.

[0019] In the embodiment shown in Figure 6 the housing (1) is provided with the safety valve (12) to protect the heater from burst due to over-pressures and the self-priming valve (13) to allow purging the hydraulic circuit.

[0020] In the embodiment shown in Figure 7 the heating element (2) is assembled to the housing (1) by screws (14).

[0021] Having described the nature of the invention sufficiently, as well as a preferred version, it is stated for the appropriate purposes that the shape, size and arrangement of the elements described can be changed, provided this does not involve an alteration of the essential features of the invention claimed below.

Claims

1. Electric instant heater, applicable for heating liquids in beverage machines; comprising a housing (1) provided with the direct connection (3) to the pumping means (10) through which the cold fluid enters into the heating chamber (7) and the outlet (4) where it exits the hot liquid; the heating element (2) welded to the plate (6) which has the housing (5) for thermal fuses and it is sealingly assembled over the seal (9) into the housing (1) using the fork (8); **characterized in that** the housing (1) is manufactured in plastic material and the heating element (2) is disposed within the housing (1) and integrally joined thereto by a fork (8), thus forming a sealed heating chamber (7).
2. Electric instant heater, applicable for heating liquids in beverage machines, according to claim 1; **characterized in that** the inlet and outlet are provided with the quick connection fitting (10) for high pressure pipes.
3. Electric instant heater, applicable for heating liquids in beverage machines, according to claim 1; **characterized in that** the inlet and outlet are provided with the barb shape fitting (11) for low pressure pipes.
4. Electric instant heater, applicable for heating liquids in beverage machines, according to claim 1; **characterized in that** the housing (1) is provided with the safety valve (12) to protect the heater from burst due to over-pressures.
5. Electric instant heater, applicable for heating liquids in beverage machines, according to claim 1; **characterized in that** the housing (1) is provided with the self-priming valve (13) to allow purging the hydraulic circuit.
6. Electric instant heater, applicable for heating liquids in beverage machines, according to claim 1; **characterized in that** the housing (1) is provided with the safety valve (12) to protect the heater from burst due to over-pressures and the self-priming valve (13) to allow purging the hydraulic circuit.
7. Electric instant heater, applicable for heating liquids in beverage machines, according to claim 1; **characterized in that** the heating element (2) is sealingly assembled over the seal (9) into the housing (1) by the screws (14).

FIGURES

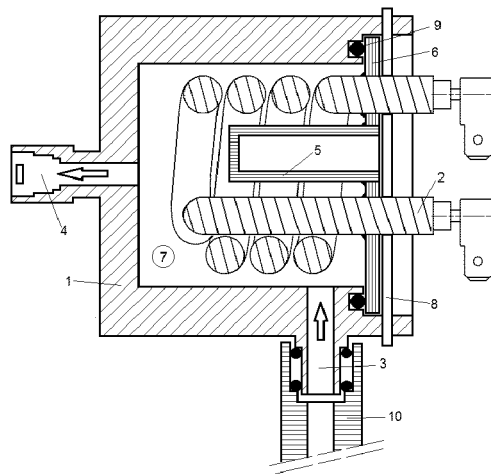


Fig. 1

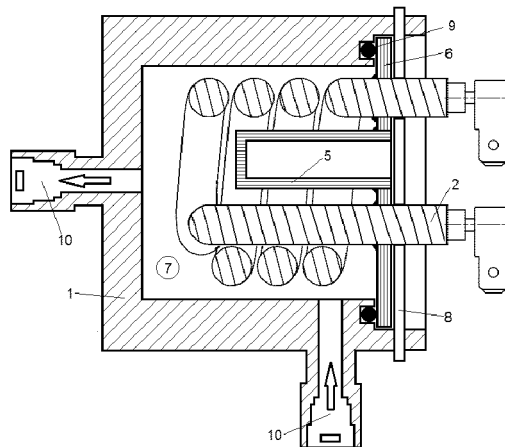


Fig. 2

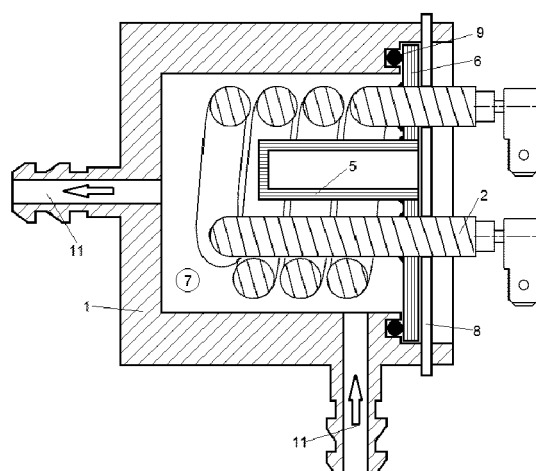


Fig. 3

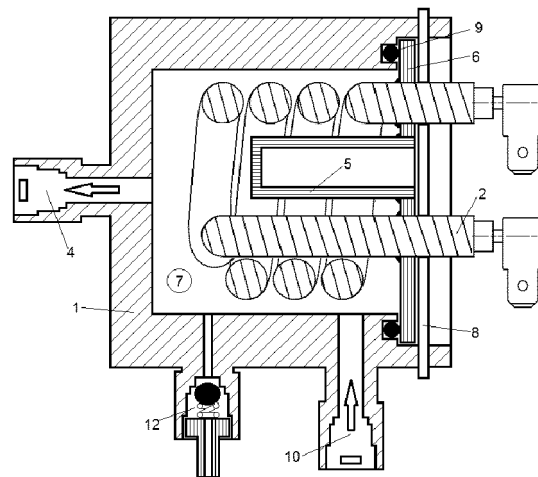


Fig. 4

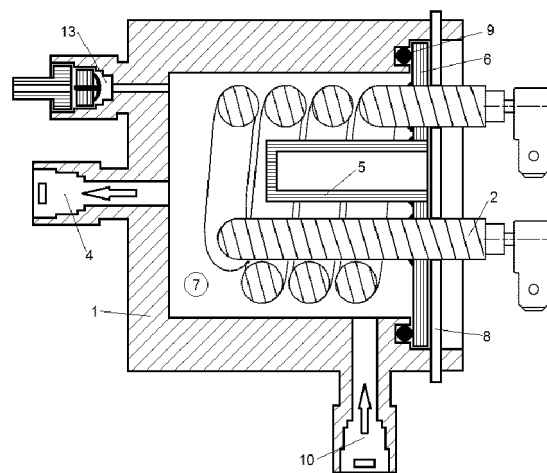


Fig. 5

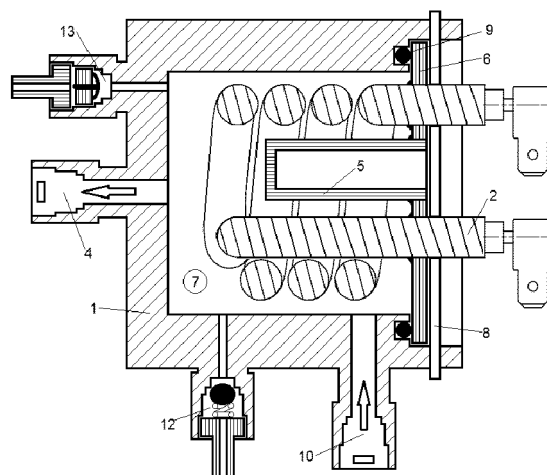


Fig. 6

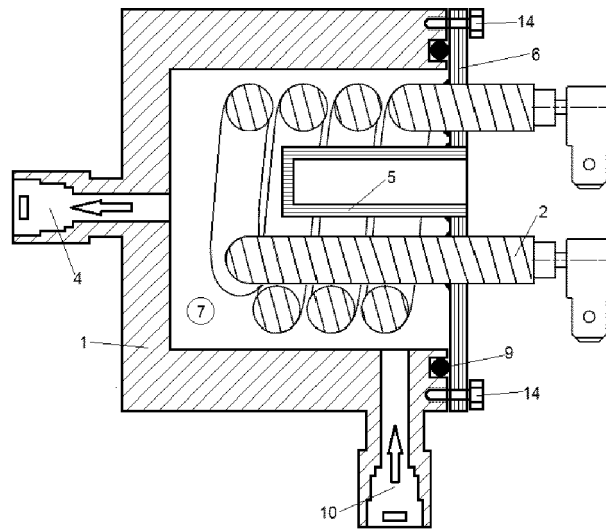


Fig. 7



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 Application Number
 EP 16 38 2203

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 20 September 2016	Examiner Schwaiger, Bernd
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 16 38 2203

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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