

LIQUID HEATING VESSEL

5 The present invention relates to a liquid heating vessel and in particular but not exclusively, to an electric kettle or jug or to an appliance incorporating a liquid heating vessel.

10 It is generally advisable when making coffee not to use boiling water since boiling water adversely affects the flavour of the beverage. Therefore it is usual to allow a boiled kettle or jug to stand for some time before pouring it onto the coffee. Alternatively cold water may be added to the water in the kettle or jug
15 prior to pouring. Both these methods are however inconvenient and cannot reliably produce water at the ideal temperature for coffee making.

 Coffee making appliances are known which attempt to control the temperature of the water before it is
20 dispensed from a water heating vessel onto the coffee grounds. However in practice these controls often do not function well and the quality of the coffee produced by such appliances suffers in consequence.

 According to the present invention there is
25 provided a liquid heating vessel defining a space for containing a liquid to be heated, said space being divided into two chambers, and comprising means for heating liquid within said vessel, the arrangement of said chambers and said heating means being such that, in
30 use, the liquid in one chamber is heated less quickly than that in the other chamber, and outlets from said chambers which result in liquid from said chambers being discharged together from said vessel so that the temperature of the discharged liquid is intermediate
35 those of the liquid within said chambers.

 Although heating means could be provided for both chambers, it is preferred that heating means are

provided for only one chamber so that only liquid in one chamber is directly heated. This leads to a particularly simple and convenient arrangement, for example when heating water in a kettle or jug, when
5 water can be boiled in one chamber while the water in the other chamber remains relatively cool, with the resulting poured mixture being at a temperature below boiling.

10 The temperature of the liquid discharged from a vessel according to the invention will depend not only upon the relative temperatures of the liquid in both chambers but also on the relative volumes of the liquid discharged from both chambers.

15 For producing water for coffee, a suitable final temperature for the water is in the region of 90°C. This may be achieved by the volume of cooler water supplied from the second chamber being in the range 10% to 15% of the volume of the boiling water supplied from the first chamber.

20 In a simple embodiment, the chambers have a substantially constant relative cross-sectional area over their height so as to maintain the ratio of hot liquid to cooler liquid substantially constant during discharge, provided that the liquids are discharged from
25 the respective chambers at equal rates.

In a particularly preferred embodiment, a vessel, preferably having a constant cross sectional area is divided into two chambers by a partition which extends upwardly from the base of the vessel preferably
30 substantially parallel to the vessel wall. Of course, the vessel could be divided into chambers by other means.

The chambers of the vessel are preferably interconnected, so as to allow filling of one chamber
35 from the other and so that the level of the liquid in the respective chambers remains the same. This interconnection is, in a preferred embodiment formed as

a relatively small opening or conduit which, while performing the above functions, substantially prevents mixing of hot and cold liquid through the opening or conduit whilst the liquid in one chamber is being heated when it boils. In the embodiment referred to above, the conduit may simply be an aperture formed in a low part of the partition.

A closable relatively large opening may be provided between the two chambers, so as to allow mixing of the liquids therein by convection and turbulence. This is of application when it is desired to produce un-cooled liquid from the container. When it is desired to produce cooler liquid, the aperture is simply closed to prevent the mixing taking place.

Conveniently the outlets from the chambers are adjacent one another. In a particularly preferred arrangement such as in kettles or hot water jugs the outlets may discharge into a common pouring spout where mixing takes place. Of course other outlet arrangements can easily be envisaged.

Means may be also provided in a vessel in accordance with the invention to promote mixing of the liquids during discharge. This will result in a discharged liquid with an even temperature distribution.

An embodiment of the invention will now be described, by way of example only, with reference to the following schematic drawings in which:

Figure 1 is a partial cut-away view of a kettle in accordance with the invention; and

Figure 2 is a horizontal section through the kettle of Figure 1.

The kettle comprises a vessel 1 which is divided into a first chamber 2 and a smaller, second chamber 3, by a partition 4 which extends vertically upwardly from the base 5 of the vessel 1. The partition 4 extends over substantially the whole height of the vessel 1 and also extends into the pouring spout 6 of the vessel 1.

The first chamber 2 comprises at its base an electrical immersion heating element 7 for heating the water contained in the first chamber 2. The element 7 is in this embodiment recessed in the base of the vessel

5 1. The second chamber 3, however contains no such element whereby the water in that chamber will not be heated directly but mainly by transmission of heat through the partition 4. This heating effect is, however relatively slow with the result that the water
10 in the second chamber 3 heats up very slowly and thus remains relatively cool while the water in the first chamber 2 will quickly reach boiling point.

The cross sectional areas of the first and second chambers 2,3 are substantially constant over at least
15 that portion of their height up to the pouring spout 6. At any given height, the cross-sectional area of the second chamber 3 is, in this embodiment, about 15% that of the first chamber 2. Thus, the mixture poured from the kettle will contain hot and cold water in
20 substantially that ratio. Typically when the water is substantially at boiling temperature in the first chamber, the mixture produced will have a temperature in the region of 90°C.

The first and second chambers 2,3 have adjacent
25 respective outlets 9,10 which discharge into the pouring spout 6 of the kettle. Thus when the kettle is tilted for pouring, the hot and cold water discharged from the first and second chambers 2,3 will mingle in the spout during pouring to produce a mixture of an intermediate
30 temperature.

The relative levels of water in the first and second chambers 2,3 are kept substantially the same by virtue of an opening or conduit 8 which is provided in the lower part of the partition 4 and which has a
35 relatively small area so as to minimise mixing of hot water in the first chamber 2 with the cooler water in the second chamber 3 therethrough. Accordingly when two

or three cups of liquid are poured one after the other, there will be little temperature difference between them.

The embodiment described is particularly suited for heating water for coffee making. If the kettle were to be used in tea making, for example, where boiling water is required, then a selectively openable and closeable aperture could be provided in the partition 4 to allow, when open, mixing of the water in both chambers 2,3, due to convection and the turbulence caused by boiling. This aperture could for example be closed when not required by a sliding or pivoting door member mounted on the partition or vessel.

It will thus be seen that, at least in its preferred embodiment, the invention provides an improved kettle for use in making coffee. It will also be apparent to a person skilled in the art that variations and modifications could be made which fall within the scope of the inventive concept. Thus, for example, the discharge spout of a kettle or jug could be provided with means for mixing the streams of liquid at different temperatures being discharged. Furthermore it will be appreciated that the invention can be applied to liquid heating vessels, the contents of which are discharged under gravity through an outlet or a discharge valve in or near the base of the vessel. Such vessels are used, for example, in coffee making appliances and the heating means will usually be disposed externally of the vessel e.g. an electric element brazed to the underside of the base of the vessel. In this case the vessel can be provided with means defining an inner chamber within the main space for the liquid to be heated and in limited communication with said main space to permit liquid to flow from the inner chamber when the vessel is emptied but otherwise prevent substantial mixing of the liquid in the inner chamber with that in the surrounding space. Again the degree of communication can be adjustable

between a restricted state as aforescribed and one enabling mixing of the liquid within the inner chamber and surrounding space to take place as the liquid within the vessel is heated.

Claims

1. A liquid heating vessel defining a space for containing a liquid to be heated, said space being
5 divided into two chambers, and comprising means for heating liquid within said vessel, the arrangement of said chambers and said heating means being such that, in use, the liquid in one chamber is heated less quickly than that in the other chamber, and outlets from said
10 chambers which result in liquid from said chambers being discharged together from said vessel so that the temperature of the discharged liquid is intermediate those of the liquid within said chambers.
- 15 2. A liquid heating vessel as claimed in claim 1 wherein heating means are provided for only one chamber.
3. A liquid heating vessel as claimed in claim 1 or 2 wherein said chambers have a substantially constant
20 relative cross-sectional area over their height.
4. A liquid heating vessel as claimed in any preceding claim wherein said vessel is divided into two chambers by a partition which extends upwardly from the base of
25 the vessel.
5. A liquid heating vessel as claimed in any preceding claim wherein said chambers are inter connected so as to allow filling of one chamber from the other and so that
30 the level of the liquid in the respective chambers remains the same.
6. A liquid heating vessel as claimed in claim 5 wherein said chambers are interconnected by a relatively
35 small opening or conduit which prevents substantially mixing of liquid through the opening when liquid in the vessel heats and boils.



7. A liquid heating vessel as claimed in claim 6 wherein said conduit is provided in a lower part of a partition separating the chambers.

5 8. A liquid heating vessel as claimed in any preceding claim further comprising a relatively large opening between said chambers, said opening being selectively openable and closable.

10 9. A liquid heating vessel as claimed in any preceding claim wherein the outlets of said chambers are adjacent one another.

15 10. A liquid heating vessel as claimed in any preceding claim further comprising means for promoting mixing of the liquids discharged from the respective chambers.

20 11. A liquid heating vessel substantially as hereinbefore described with reference to the accompanying drawings.
