

HAIR STYLING APPLIANCES HEATING DEVICE

Field of the Invention

[0001] The present invention relates to hair styling appliances. In particular, it relates to a hair styling appliance heater or heating device.

Background

[0002] Induction heating of the hair styling appliances has been getting more common, as it provide efficient heating of the appliances operationally as a relatively low power. Currently, the induction-heating devices are configured in a pot form, wherein the appliances are placed or inserted into the pot for heating up.

[0003] The sizes and types of the hair styling appliances are however limited by the size and configuration of these pots. Therefore, an induction-heating device that is capable of heating up the hair styling appliances of any types and shapes is desired.

Summary

[0004] The present invention seeks a hair styling appliance heating device for heating up hair styling appliances. The hair styling appliance heating device comprises an induction heating coil and a controller therefor; a heating surface having a channel defined thereon, wherein the induction heating coil is embedded beneath the heating surface; and a spring-loaded sensor disposed within the channel, wherein the spring

loaded sensor is connected to the controller for operationally detecting temperature of the hair styling appliances loaded thereon.

[0005] In one embodiment, the spring-loaded sensor comprises a spring-loaded thermistor. The thermistor may be a negative temperature coefficient (NTC) thermistor.

[0006] Alternatively, the spring-loaded sensor may further include a presence sensor for detecting presence of appliances loaded on the heating surface. It is possible that the presence sensor include a switch for detecting presence of load. It is also possible that the presence sensor include a weight sensor for detecting weight of load.

[0007] In another embodiment, the induction coil is embedded beneath the channel.

Brief Description of the Drawings

[0008] This invention will be described by way of non-limiting embodiments of the present invention, with reference to the accompanying drawings, in which:

[0009] **FIG. 1** illustrates a perspective view of a hair styling appliance heating device in accordance with an embodiment of the present invention;

[0010] **FIG. 2** illustrates a construct of the temperature sensor of a hair styling appliance heating device in accordance with an embodiment of the present invention; and

[0011] **FIG. 3** illustrates an induction-heating mat for heating up hair styling appliance in accordance with an embodiment of the present invention.

Detailed Description

[0012] In line with the above summary, the following descriptions of a number of specific and alternative embodiments are provided to understand the inventive features of the present invention. It shall be apparent to one skilled in the art, however that this invention may be practiced without such specific details. Some of the details may not be described at length so as not to obscure the invention. For ease of reference, common reference numerals will be used throughout the figures when referring to the same or similar features common to the figures.

[0013] **FIG. 1** illustrates a perspective view of a hair styling appliance heating device **100** in accordance with an embodiment of the present invention. The hair styling appliance heating is configured generally as a desktop operable unit with a top-loading surface for loading the hair styling appliance and heated it up thereon. One major advantages of such desktop configuration is that it can adapt to many different types and sizes of hair styling appliances. Further, unlike other conventional design, that has a pot for heating it up therein, the hair styling appliance heating device **100** can

be made more portable and easily stored. The hair styling appliance heating device **100** includes a housing **101**, a heating surface **102**, a control panel **104** and a display panel **106**.

[0014] The housing **101** is a base for holding the heating surface **102** and for housing the components therein. The heating surface **102** can be made up of any suitable flexible material, semi-flexible material or rigid material. Under the heating surface **102**, the induction-heating coil (not shown) is embedded therein. The induction-heating coil can be configured in any known method and materials, which will not be discussed herein.

[0015] As can be seen from the side profile of the device **100**, where the center of the heating surface **102** is downwardly curved defining a shallow channel **112**. This shallow channel is adapted for holding the hair styling appliances in place. Preferably, the induction coil is also curved in a similar manner in conformance with the curved channel of the heating surface **102**. The curvature of the shallow channel **112** is preferably configured to accommodate the largest possible hair styling appliances to be placed thereon. The shallow channel provides a relatively larger surface coverage when a hair styling appliance is loaded thereon for higher heating efficiency as compared with a flat one. It is because the bottom surface of the shallow channel is curved around the hair styling appliance allowing relatively more even distribution of the magnetic field over at the bottom of the hair styling appliance, which gives a better heating performance. Further, the shallow channel **112** also strategically allows the hair styling appliance to be guided to the center of the heating surface **102**, so as to ensure

that a temperature sensor **114** disposed at the bottom surface is able to detect the temperature of the hair styling appliances operationally.

[0016] Part of the housing is adapted with the control panel **104** and the display panel **106**. The control panel provides controls over at the amount of electric current flowing to the induction coil. The display panel mounted on the side provides some operating state of the device **100**. It is understood to a skilled person that any form of control panel or display panel can be used.

[0017] The control panel **104** includes buttons for controlling the device **100**. The buttons may include any one or more of power button, heating level control buttons, temperature controller buttons, operating mode control buttons, and etc.

[0018] Having regarded it as a desktop operable unit, it is understood to a skilled person that it is suitably configured for used at an ordinary desk, and all other surfaces without limitations.

[0019] Operationally, a hair styling appliance to be heated up is placed on the heating surface of the hair styling appliance heating device **100**. The hair styling appliance will fall onto the bottom of the shallow channel **112** depressing the temperature sensor **114**. Once the hair styling appliance is in place, user switches the heating device **100** on via the available control buttons of control panel **104**. The user may select an appropriate mode, heating or power level, or if available, leaving the heating device **100** to operate automatically.

[0020] As the hair styling appliance is placed onto the shallow channel and depresses the temperature sensor **114**, the temperature sensor **114** measures the temperature of the appliance throughout the operation of the heating device **100**. The temperature sensor **114**, in another embodiment, may be doubled as a presence sensor, which can be good for automation control on the device **100**. The signals from the temperature sensor **114** are feedback to the controller (not shown) for overheat and safety controls.

[0021] Meanwhile, the display panel **106** provides the user of some useful operating information.

[0022] **FIG. 2** illustrates a construct of a temperature sensor **200** of the hair styling appliance heating device **100** in accordance with an embodiment of the present invention. In this embodiment, the temperature sensor **200** used is a thermistor, which measures temperature through conduction. Preferably, a negative temperature coefficient (NTC) thermistor is adapted. The measurements from the thermistor is being sent to the controller or microprocessor of the hair styling appliance heating device as feedback for the necessary operation controls. As shown, the temperature sensor **200** is disposed at a bottom of the shallow channel **112**, which is a curved groove. The temperature sensor **200** is slightly raised up relative to the surface of the shallow channel **112**. Also as shown in the **FIG. 2**, it can be seen that induction heating coil **105** is embedded underneath the heating surface **102** as well as underneath the shallow channel. Preferably, the coil is coiled around the temperature sensor **200**.

[0023] The temperature sensor **200** is facilitated with spring-loaded mechanism for better sensing. The temperature sensor **200** includes a sensing element **201**, a curved panel **202**, spring member **204**, stopper **208** and a switch **206**. The sensing element **201** is disposed at the center of the curved panel **202**. The curvature of the curved panel **202** is substantially the same or in conformity with that as the shallow channel of the hair styling appliance heating device. Preferably, the curved panel **202** is disposed at the center of the shallow channel. The curved panel **202** is support by the spring member **204** on the main housing of the hair styling appliance heating device. It is adapted to be slightly elevated over the curved surface of the shallow channel where the spring member **204** allows the curved panel **202** to bounce up and down as the shallow channel is unloaded and loaded with hair styling appliance. Desirably, the curved panel **202** is leveled or substantially leveled with the curved surface of the shallow channel when a hair styling appliance is loaded to depress the spring-loaded panel. The stopper **208** is simply a means for limiting the movements of the curved panel.

[0024] As the curved panel **202** is loaded with a hair styling appliance, the sensing element **201** may detect its temperature operationally until it is being unloaded. The sensing element **201** is connected electrically to the switch **206**. By default, the switch **206** is opened (i.e. disconnected) when nothing is loaded thereon. Once it is loaded, the curved panel **202** is depressed the switch **206** will be closed (i.e. connected). As the switch **206** is closed, the sensing element **201** can sense the temperature of the hair styling appliance loaded thereon operationally.

[0025] In addition to the temperature sensing, the temperature sensor **200** can also be used as presence detector because the switch **206** is naturally a trigger switch.

[0026] The spring mechanism to detect the load that the appliance is in place for illustrations only. In other embodiment, it can also be a micro-switch, dome switch, scissor switch, buckling spring switch etc. may be desired.

[0027] In another embodiment, a weight sensor may also be adapted thereon for load detection. It is possible that the weight sensor can also be used to measure the weight of the hair styling appliance for purpose of identifying the type of hair styling appliance, so as to provide a proper control over the heating of that hair styling appliance.

[0028] **FIG. 3** illustrates an induction-heating mat **300** for heating up hair styling appliance in accordance with an embodiment of the present invention. The induction-heating mat **300** can be a flexible/foldable mat or a rigid plate. The induction-heating mat **300** is connectable to a induction-heating driver **350** through a suitable connector wire. The induction-heating driver **350** is well known in the art and thus, no further details are provided herein.

[0029] The induction-heating mat **300** comprises a shallow channel **302**, which is an elongated groove, of which, a sensor **320** is disposed at the bottom center of the

channel **320**. Similarly, the sensor **320** includes a temperature sensor and a presence sensor for detecting load and temperature of the appliance loaded thereon.

[0030] While specific embodiments have been described and illustrated, it is understood that many changes, modifications, variations and combinations thereof could be made to the present invention without departing from the scope of the invention.

Claims

1. A hair styling appliance heating device for heating up hair styling appliances, the hair styling appliance heating device comprising:
 - an induction heating coil and a controller therefor;
 - a heating surface having a channel defined thereon, wherein the induction heating coil is embedded beneath the heating surface; and
 - a spring-loaded sensor disposed within the channel, wherein the spring loaded sensor is connected to the controller for operationally detecting temperature of the hair styling appliances loaded thereon.
2. The hair styling appliance heating device according to claim 1, wherein the spring-loaded sensor comprises a spring-loaded thermistor.
3. The hair styling appliance heating device according to claim 2, wherein the thermistor is a negative temperature coefficient (NTC) thermistor.
4. The hair styling appliance heating device according to claim 2, the spring loaded sensor further includes a presence sensor for detecting presence of appliances loaded on the heating surface.
5. The hair styling appliance heating device according to claim 4, wherein the presence sensor further include a switch for detecting presence of load.

6. The hair styling appliance heating device according to claim 4, wherein the presence sensor further include a weight sensor for detecting weight of load.
7. The hair styling appliance heating device according to claim 1, wherein the induction coil is embedded beneath the channel.