



(11) **EP 2 239 367 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
15.02.2012 Bulletin 2012/07

(51) Int Cl.:
D06F 75/26 ^(2006.01)

(21) Application number: **10157182.6**

(22) Date of filing: **22.03.2010**

(54) **Electric iron with a synchronizing temperature display**

Elektrisches Dampfbügeleisen mit einer Synchronisierungstemperaturanzeige

Fer électrique avec un affichage de température synchronisé

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL
PT RO SE SI SK SM TR**

(30) Priority: **08.04.2009 US 167865 P**

(43) Date of publication of application:
13.10.2010 Bulletin 2010/41

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Description

FIELD OF PATENT APPLICATION

[0001] The present patent application relates to an electric iron with a synchronizing temperature display.

BACKGROUND

[0002] Conventional electric irons have rotatable temperature-setting dials for setting different temperatures for ironing clothing made of different materials. When an ironing temperature needs to be set either from low to high or from high to low during ironing, a user can rotate the dial from one position to another position. However, these conventional electric irons are not provided with any means for showing the user exactly how long it would take for the soleplate to reach the set temperature. The user does not have any clue what is the actual current temperature at the soleplate and whether it is ready to start ironing. Hence, the user may tend to start ironing when in fact the soleplate temperature may be still too high or too low. Ironing with inappropriate soleplate temperature can definitely cause damage to the clothing to be ironed.

[0003] There is a need to provide an improved electric iron that can show the actual current temperature at the soleplate and allow the user to immediately start ironing once the set temperature is reached.

[0004] The above description of the background is provided to aid in understanding the electric iron with a synchronizing temperature display disclosed in the present patent application, but is not admitted to describe or constitute pertinent prior art.

[0005] The patent application US 2006/081588A1 describes an interface for an iron has a graphic display indicating the current temperature selection, user controls for adjusting the current temperature selection, and a ready indicator adapted to indicate when the iron is at the currently selected temperature.

SUMMARY

[0006] According to the invention, there is provided an electric iron including the features of claim 1.

[0007] In one embodiment, the heating element includes a first section extending between a first edge of the soleplate and one side of the collar, and a second section extending between a second edge of the soleplate and an opposite side of the collar, and wherein a middle portion of each of the first and second sections of the heating element bends towards the collar.

[0008] In one embodiment, the collar is generally oval in shape.

[0009] In one embodiment, the electric iron further includes a circuit board connecting between the temperature display and the temperature sensor.

[0010] In one embodiment, the circuit board comprises

a microcontroller unit for controlling the temperature at the soleplate and the synchronous display of the temperature on the temperature display.

[0011] In one embodiment, the electric iron further includes a control panel which includes a temperature setting button for setting a plurality of temperature ranges, and a plurality of temperature setting indicators for indicating the modes of the temperature setting.

[0012] In one embodiment, the plurality of temperature ranges includes a temperature range of about 90-120°C suitable for ironing silk, a temperature range of 120-150°C suitable for ironing polyester, a temperature range of about 150-200°C suitable for ironing cotton, and a temperature range of about 200-230°C suitable for ironing linen.

[0013] In one embodiment, the temperature sensor is a negative temperature coefficient temperature sensor.

[0014] In one embodiment, the temperature display is a LED display.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Specific embodiments of the electric iron with a synchronizing temperature display disclosed in the present patent application will now be described by way of example with reference to the accompanying drawings wherein:

FIG. 1 is a perspective view of an electric iron with a synchronizing temperature display;

FIG. 2 is a cross sectional view of a soleplate of an electric iron with a synchronizing temperature display according to an embodiment disclosed in the present patent application;

FIG. 3 is a top plan view of the synchronizing temperature display of the electric iron;

FIG. 4 is a top plan view of the synchronizing temperature display of the electric iron, similar to FIG. 3, showing a different setting of temperature;

FIG. 5 is a perspective view of a soleplate with a temperature sensor and the synchronizing temperature display;

FIG. 6 is a perspective view of a soleplate with the temperature sensor; and

FIG. 7 is a perspective view of a soleplate with a heating element.

DETAILED DESCRIPTION

[0016] Reference will now be made in detail to a preferred embodiment of the electric iron with a synchronizing temperature display disclosed in the present patent

application, examples of which are also provided in the following description. Exemplary embodiments of the electric iron with a synchronizing temperature display disclosed in the present patent application are described in detail, although it will be apparent to those skilled in the relevant art that some features that are not particularly important to an understanding of the modular tool system may not be shown for the sake of clarity.

[0017] Furthermore, it should be understood that the electric iron with a synchronizing temperature display disclosed in the present patent application is not limited to the precise embodiments described below and that various changes and modifications thereof may be effected by one skilled in the art without departing from the scope of the appended claims. For example, elements and/or features of different illustrative embodiments may be combined with each other and/or substituted for each other within the scope of the appended claims.

[0018] FIG. 1 is a perspective view of an electric iron 1 with a synchronizing temperature display 2 provided on a handle 3. FIG. 2 is a cross sectional view of a soleplate 10 of the electric iron 1, a control panel 12 and a circuit board 14 according to an embodiment disclosed in the present patent application. The control panel 12 may be provided on the handle 3 or a body of the electric iron readily visible by a user during ironing. The soleplate 10 can be provided with a negative temperature coefficient (NTC) temperature sensor 16 or other suitable temperature sensors. The NTC temperature sensor 16 is disposed in a bore formed on an inner surface of the soleplate 10 at a center thereof. The NTC temperature sensor 16 can be electrically connected to the circuit board 14 by electrical wires 15, which is in turn electrically connected to the control panel 12.

[0019] The control panel 12 may include a synchronizing temperature LED display 18 or any other suitable display, a power indicator 20, a temperature setting button 22, and a plurality of temperature setting indicators 24, 26, 28, 30. The synchronizing temperature LED display 18 is employed to indicate to the user the actual current temperature at the soleplate 10 during ironing. The temperature setting button 22 can be employed to set a desired temperature range at the soleplate 10. According to the illustrated embodiment shown in FIGS. 3 and 4, there are four temperature setting indicators 24, 26, 28, 30 for indicating four temperature ranges respectively.

[0020] When power is supplied to the electric iron 1, the electric iron is in a stand-by mode. At this stand-by mode, the power button 20 is lit and the word "OFF" may be displayed on the LED display 18.

[0021] A user can press the temperature setting button 22 in order to set a desired temperature range. For example, when the temperature setting button 22 is pressed once, the first temperature setting indicator 24 may start blinking and the temperature can be set at a range of 90-120°C suitable for ironing silk. When the temperature setting button 22 is pressed one more time, the second

temperature setting indicator 26 may start blinking and the temperature can be set at a range of 120-150°C suitable for ironing polyester. When the temperature setting button 22 is pressed again, the third temperature setting indicator 28 may start blinking and the temperature can be set at a range of 150-200°C suitable for ironing cotton. When the temperature setting button 22 is pressed one more time, the fourth temperature setting indicator 30 may start blinking and the temperature can be set at a range of 200-230°C suitable for ironing linen. When the temperature setting button 22 is pressed one more time, the first temperature setting indicator 24 may start blinking again and the temperature can be set at a range of 90-120°C suitable for ironing silk, and so on.

[0022] After the desired temperature range is set, a microcontroller unit (MCU) on the circuit board 14 may start detecting the temperature at the NTC temperature sensor 16 on the soleplate 10. It is understood that the NTC temperature sensor 16 is located at a lower portion of the soleplate 10 such that the temperature of the NTC temperature sensor 16 can be the same as the temperature on the lower surface of the soleplate 10 on which the clothing to be ironed is contacted.

[0023] When the temperature of the NTC temperature sensor 16 is lower than the set temperature range, the temperature setting indicator 24, 26, 28 or 30 corresponding to the set temperature range may start blinking slowly. The actual current temperature at the soleplate 10 can be displayed on the synchronizing temperature LED display 18. Electric circuit of a heating element 40 can be connected, and heat can be generated by the heating element 40 to heat up the soleplate 10.

[0024] When the temperature at the NTC temperature sensor 16 reaches the set temperature range, the temperature setting indicator 24, 26, 28 or 30 corresponding to the set temperature range may stop blinking and remains lit, and the actual current temperature at the soleplate 10 can be displayed on the synchronizing temperature LED display 18.

[0025] When the temperature at the NTC temperature sensor 16 is higher than the set temperature range, the temperature setting indicator 24, 26, 28 or 30 corresponding to the set temperature range may start blinking quickly. The actual current temperature at the soleplate 10 can be displayed on the synchronizing temperature LED display 18. Electric circuit of the heating element 40 is disconnected and the generation of heat can be stopped.

[0026] For example, as illustrated in FIG. 3, the temperature range is set at 120-150°C for ironing polyester. Since the actual current temperature at the soleplate 10 is 106°C, as indicated on the synchronizing temperature LED display 18, the temperature setting indicator 26 starts blinking slowly. This tells the user that the soleplate temperature is not hot enough for ironing polyester. Until the heating element heats the soleplate 10 up to a temperature of 120°C, then the temperature setting indicator 26 stops blinking and remains lit. This tells the user that

the soleplate temperature is hot enough for ironing polyester and ironing can be commenced.

[0027] FIG. 4 shows that the temperature range is set at 200-230°C for ironing linen, and the actual current temperature at the soleplate 10 is 208°C which is within the set temperature range hot enough for ironing.

[0028] The benefit of using an electric iron with a synchronizing temperature display disclosed in the present application is that it can show the actual temperature of the soleplate at any time during an ironing process. This ensures that a user can iron clothing of different materials at the right temperature. For example, after setting a high temperature at a range of 150-200°C for ironing cotton, a user may want to lower the temperature of the soleplate to a range of 90-120°C for ironing silk. With the electric iron having a synchronizing temperature display, the user can set the temperature to a range of 90-120°C suitable for ironing silk and start ironing only after the actual soleplate temperature appearing on the synchronizing temperature LED display drops to 90-120°C. This can avoid the possibility of ironing silk when the actual temperature at the soleplate is still too high. On the contrary, a conventional electric iron with only a rotatable temperature-setting dial does not have a synchronizing temperature display for displaying the actual temperature at the soleplate. After turning the dial at a high temperature for ironing cotton, a user can only turn the dial at a lower temperature suitable for ironing silk. However, the user would not be able to tell whether the temperature at the soleplate has actually dropped to the desired low temperature suitable for ironing silk or not. Hence, there exists the chance that the user will iron clothing made of silk at too high a temperature that causes damage to the clothing being ironed.

[0029] As illustrated in FIGS. 5-7, the soleplate 10 may be provided with an integrally formed collar 50 extending upwardly from the inner surface 52 of the soleplate 10 and encompassing the temperature sensor 16. The collar 50 may be generally oval in shape.

[0030] The heating element 40 is mounted on the soleplate 10. At least a portion of the heating element 40 is bent inwardly and disposed proximate to the collar 50. According to the illustrated embodiment, the heating element 40 includes a first section 40a extending between a first edge 10a of the soleplate 10 and one side 50a of the collar 50, and a second section 40b extending between a second edge 10b of the soleplate 10 and an opposite side 50b of the collar 50. Middle portions 40c, 40d of the first and second sections 40a, 40b of the heating element 40 respectively may bend towards the collar 50 into a generally neck-shaped portion.

[0031] The heating element 40 and the collar 50 can prevent the temperature at the center of the soleplate 10 from dropping too fast causing a difference between the temperature at the soleplate 10 and the temperature displayed on the temperature LED display 18. The inwardly bending portions of the heating element 40 can heat up the center of the soleplate 10 where the NTC temperature

sensor 16 is located so that the temperature at the center of the soleplate can be substantially equal to the temperature at the rest of the soleplate. Furthermore, the collar 50 can absorb more heat from the heating element 40 thereby preventing the temperature at the center of the soleplate 10 from dropping too fast causing a difference between the temperature at the soleplate 10 and the temperature displayed on the temperature LED display 18.

[0032] Although it has been shown and described that the collar 50 is generally oval in shape, it is understood by one skilled in the art that the collar 50 can be in any other appropriate shape such as circle.

[0033] While the electric iron with a synchronizing temperature display disclosed in the present patent application has been shown and described with particular references to a number of preferred embodiments thereof, it should be noted that various other changes or modifications may be made without departing from the scope of the appended claims.

Claims

1. An electric iron comprising:

a soleplate (10);
a heating element (40) mounted on the soleplate (10);
a temperature sensor for measuring temperature of the soleplate (10); and
a temperature display (2) coupled to the temperature sensor (16) for synchronously displaying the temperature at the soleplate (10);
characterizing in that said temperature sensor (16) is disposed in a bore formed on an inner surface of the soleplate (10) at a center thereof, the soleplate (10) having a collar (50) extending upwardly from an inner surface (52) of the soleplate (10) and encompassing the temperature sensor (16), and the heating element (40) is extending on the soleplate (10) between an edge of the soleplate (10) and the collar (50), wherein at least a portion of the heating element (40) is disposed proximate to the collar (50).

2. The electric iron as claimed in claim 1, wherein the heating element (40) comprises a first section (40a) extending between a first edge (10a) of the soleplate (10) and one side (50a) of the collar (50), and a second section (40b) extending between a second edge (10b) of the soleplate (10) and an opposite side (50b) of the collar (50), and wherein a middle portion (40c, 40d) of each of the first and second sections (40a, 40b) of the heating element (40) bends towards the collar (50).

3. The electric iron as claimed in claim 1, wherein the collar (50) is generally oval in shape.

4. The electric iron as claimed in claim 1, further comprising a control panel (12) which includes a temperature setting button (22) for setting a plurality of temperature ranges, and a plurality of temperature setting indicators (24) for indicating the modes of the temperature setting.
5. The electric iron as claimed in claim 4, wherein the plurality of temperature ranges includes a temperature range of about 90-120°C suitable for ironing silk, a temperature range of 120-150°C suitable for ironing polyester, a temperature range of about 150-200°C suitable for ironing cotton, and a temperature range of about 200-230°C suitable for ironing linen.
6. The electric iron as claimed in claim 1, wherein the temperature sensor (16) is a negative temperature coefficient temperature sensor.

Patentansprüche

1. Elektrisches Bügeleisen, umfassend:

eine Sohlenplatte (10);
 ein Heizelement (40), das auf der Sohlenplatte (10) montiert ist;
 einen Temperatursensor zum Messen einer Temperatur der Sohlenplatte (10); und
 eine Temperaturanzeige (2), die mit dem Temperatursensor (16) verbunden ist, um synchron die Temperatur an der Sohlenplatte (10) anzuzeigen;
dadurch gekennzeichnet, dass
 der Temperatursensor (16) in einem Loch angeordnet ist, das auf einer inneren Oberfläche der Sohlenplatte (10) an einem Zentrum davon gebildet ist,
 wobei die Sohlenplatte (10) einen Kragen (50) aufweist, der sich von einer inneren Oberfläche (52) der Sohlenplatte (10) aus nach oben erstreckt und den Temperatursensor (16) umgibt, und
 wobei das Heizelement (40) sich auf der Sohlenplatte (10) zwischen einem Rand der Sohlenplatte (10) und dem Kragen (50) erstreckt, wobei mindestens ein Teil des Heizelements (40) in der Nähe des Kragens (50) angeordnet ist.

2. Elektrisches Bügeleisen gemäß Anspruch 1, wobei das Heizelement (40) einen ersten Abschnitt (40a), der sich zwischen einem ersten Rand (10a) der Sohlenplatte (10) und einer Seite (50a) des Kragens (50) erstreckt, und einen zweiten Abschnitt (40b) umfasst, der sich zwischen einem zweiten Rand (10b) der Sohlenplatte (10) und einer gegenüberliegenden

Seite (50b) des Kragens (50) erstreckt, und wobei ein mittlerer Teil (40c, 40d) sowohl des ersten als auch des zweiten Abschnitts (40a, 40b) des Heizelements (40) sich in Richtung des Kragens (50) krümmt.

3. Elektrisches Bügeleisen gemäß Anspruch 1, wobei der Kragen (50) eine allgemein ovale Form aufweist.

4. Elektrisches Bügeleisen gemäß Anspruch 1, weiter umfassend ein Bedienfeld (12), das ein Temperatureinstellknopf (22) zum Einstellen mehrerer Temperaturbereiche und mehrere Temperatureinstellungsanzeiger (24) zum Anzeigen der Modi der Temperatureinstellung einschließt.

5. Elektrisches Bügeleisen gemäß Anspruch 4, wobei die mehreren Temperaturbereiche einen Temperaturbereich von ungefähr 90-120°C, der zum Bügeln von Seide geeignet ist, einen Temperaturbereich von 120-150°C, der zum Bügeln von Polyester geeignet ist, einen Temperaturbereich von ungefähr 150-200°C, der zum Bügeln von Baumwolle geeignet ist, und einen Temperaturbereich von ungefähr 200-230°C einschließen, der zum Bügeln von Leinen geeignet ist.

6. Elektrisches Bügeleisen gemäß Anspruch 1, wobei der Temperatursensor (16) ein Temperatursensor mit negativem Temperaturkoeffizienten ist.

Revendications

1. Fer à repasser électrique comprenant :

une semelle de repassage (10) ;
 un élément de chauffage (40) monté sur la semelle de repassage (10) ;
 un capteur de température pour mesurer la température de la semelle de repassage (10) ; et
 un affichage de température (2) couplé au capteur de température (16) pour afficher de manière synchrone la température à la semelle de repassage (10) ;
caractérisé en ce que ledit capteur de température (16) est disposé dans un alésage formé sur une surface intérieure de la semelle de repassage (10) à un centre de celle-ci, la semelle de repassage (10) ayant un collier (50) s'étendant vers le haut à partir d'une surface intérieure (52) de la semelle de repassage (10) et entourant le capteur de température (16), et l'élément de chauffage (40) s'étend sur la semelle de repassage (10) entre un bord de la semelle de repassage (10) et le collier (50), dans lequel au moins une partie de l'élément de chauffage (40)

est disposée à proximité du collier (50).

2. Fer à repasser électrique selon la revendication 1, dans lequel l'élément de chauffage (40) comprend une première section (40a) s'étendant entre un premier bord (10a) de la semelle de repassage (10) et un côté (50a) du collier (50), et une deuxième section (40b) s'étendant entre un deuxième bord (10b) de la semelle de repassage (10) et un côté opposé (50b) du collier (50), et dans lequel une partie centrale (40c, 40d) de chacune des première et deuxième sections (40a, 40b) de l'élément de chauffage (40) s'incurve vers le collier (50). 5
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3. Fer à repasser électrique selon la revendication 1, dans lequel le collier (50) est généralement de forme ovale. 15

4. Fer à repasser électrique selon la revendication 1, comprenant en outre une face de commande (12) qui comprend un bouton de réglage de température (22) pour régler une pluralité de plages de températures, et une pluralité d'indicateurs de réglage de température (24) pour indiquer les modes de réglage de température. 20
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5. Fer à repasser électrique selon la revendication 4, dans lequel la pluralité de plages de températures comprend une plage de températures d'environ 90 à 120°C permettant de repasser de la soie, une plage de températures de 120 à 150°C permettant de repasser du polyester, une plage de températures d'environ 150 à 200°C permettant de repasser du coton, et une plage de températures d'environ 200 à 230°C permettant de repasser du linge. 30
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6. Fer à repasser électrique selon la revendication 1, dans lequel le capteur de température (16) est un capteur de température à coefficient de température négatif. 40

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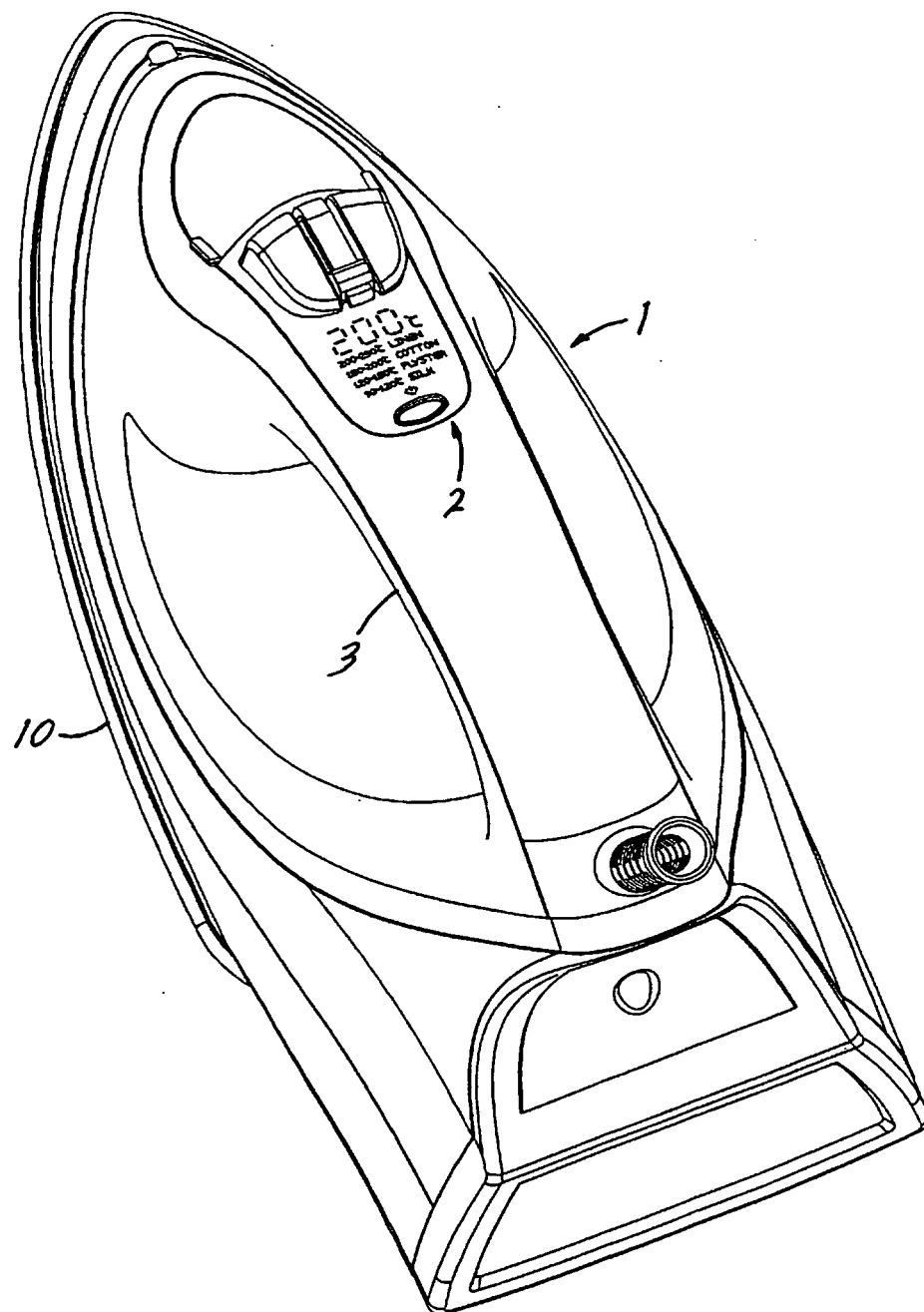


FIG. 1

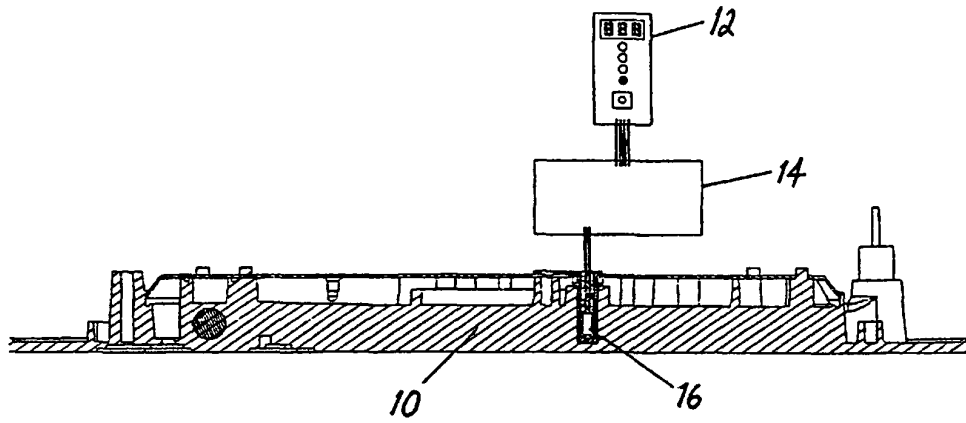


FIG. 2

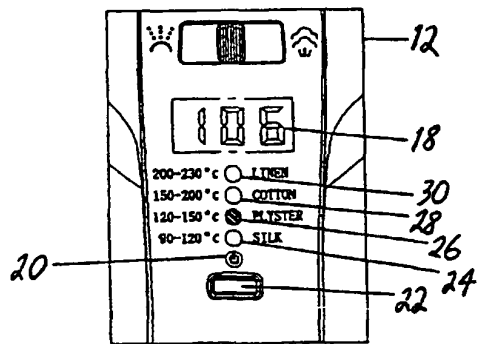


FIG. 3

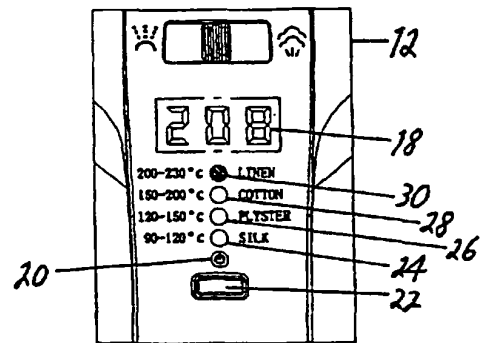


FIG. 4

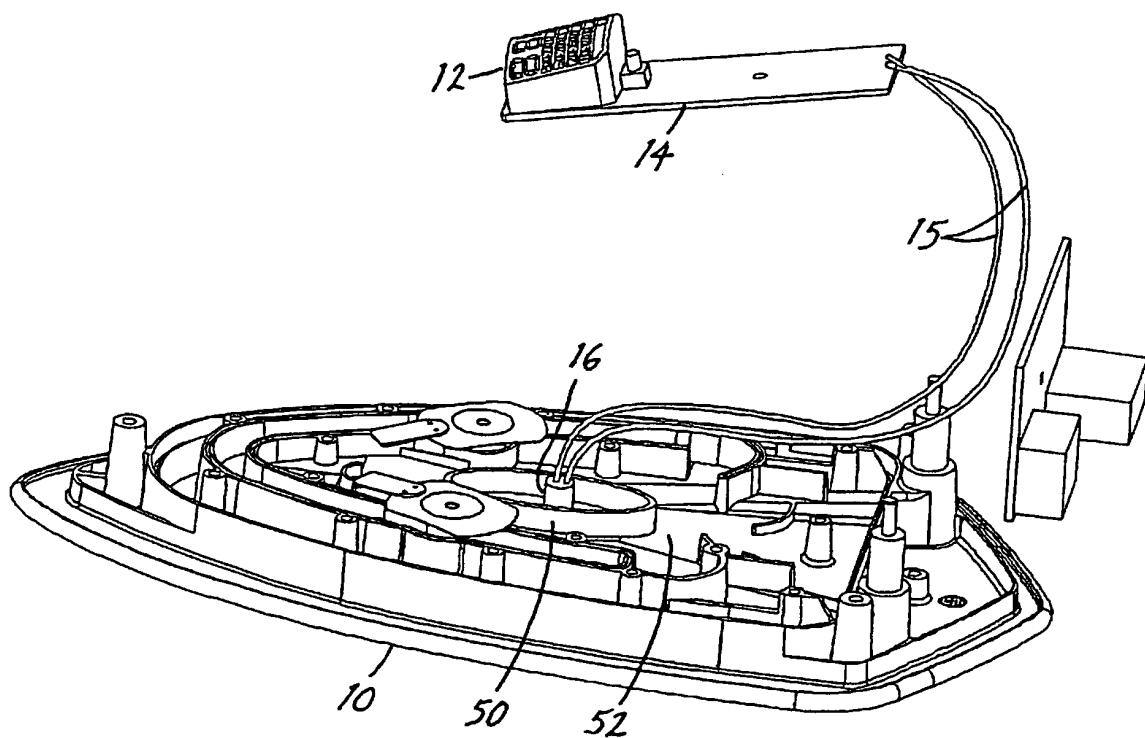


FIG. 5

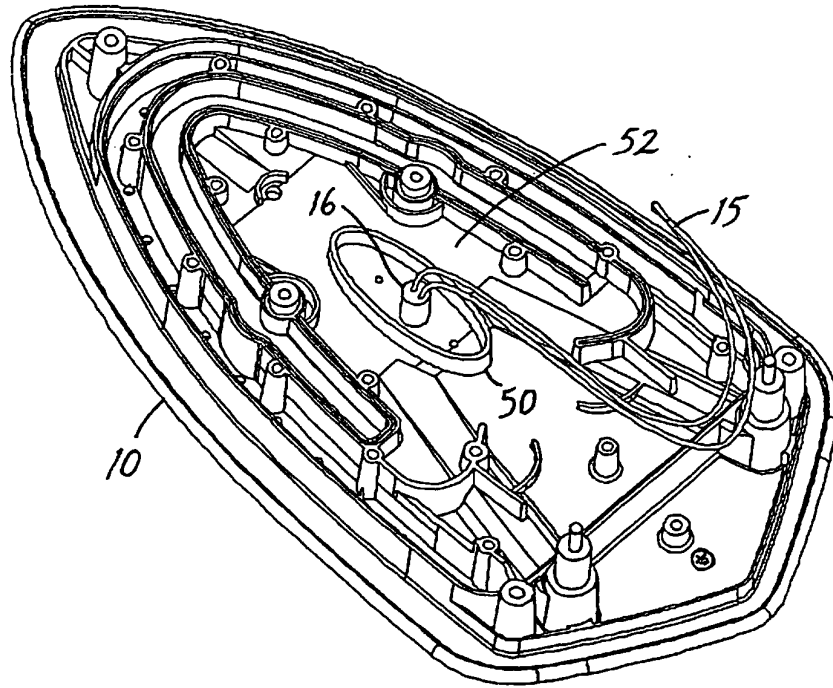


FIG. 6

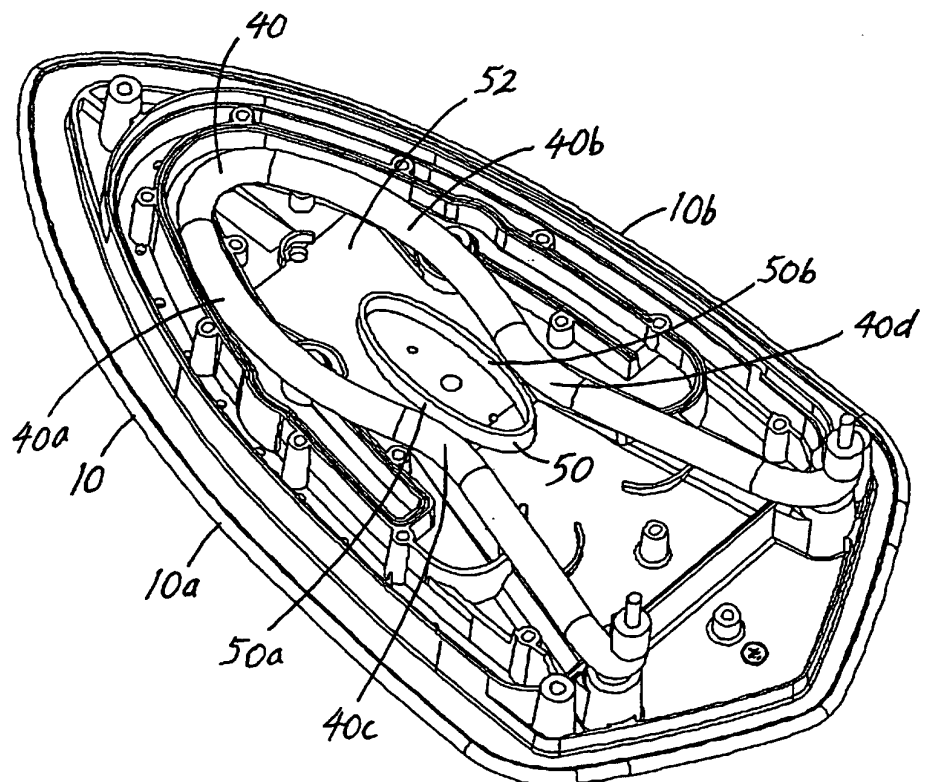


FIG. 7

REFERENCES CITED IN THE DESCRIPTION

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