

Oct. 31, 1950

O. B. SUTTON

2,527,775

ELECTRIC IRON WITH SIGNALING MEANS

Filed Sept. 4, 1948

2 Sheets-Sheet 1

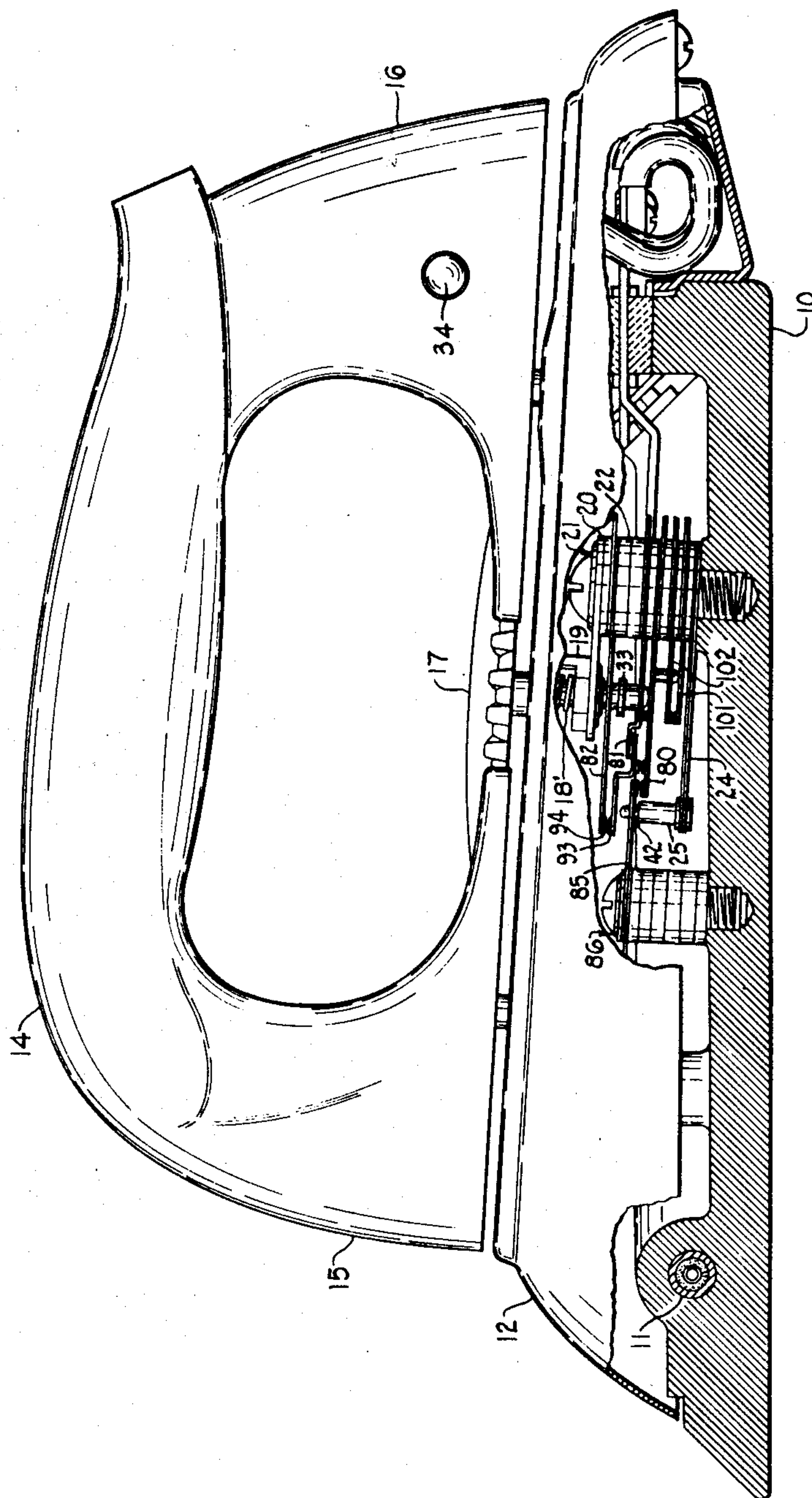


Fig. 1

INVENTOR.
Otis B. Sutton
BY
Harry S. Duessler
ATTORNEY.

Oct. 31, 1950

O. B. SUTTON

2,527,775

ELECTRIC IRON WITH SIGNALING MEANS

Filed Sept. 4, 1948

2 Sheets-Sheet 2

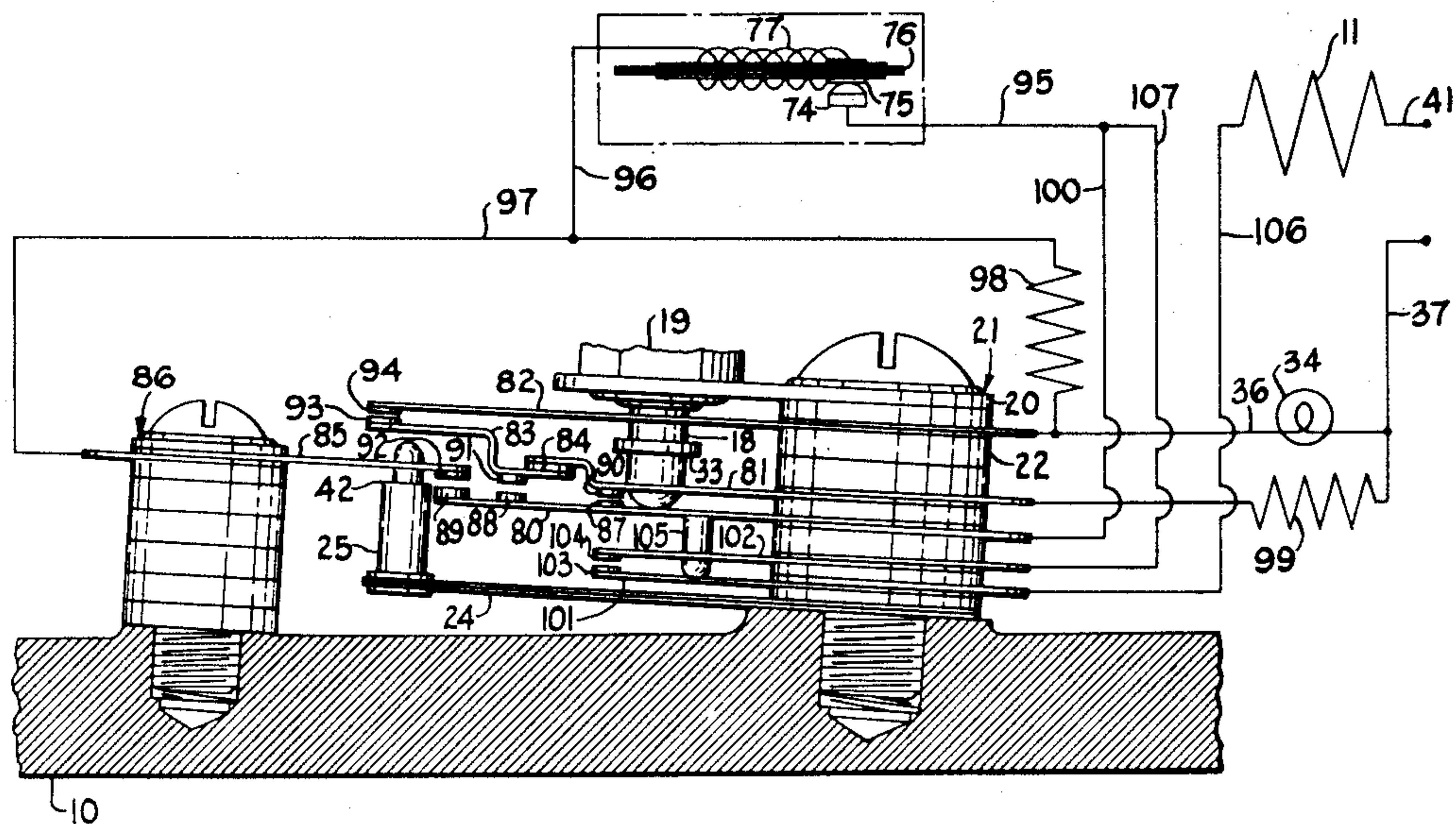


Fig. 2

INVENTOR.

Otis B. Sutton

BY

Harry S. Edwards

ATTORNEY.

UNITED STATES PATENT OFFICE

2,527,775

ELECTRIC IRON WITH SIGNALING MEANS

Otis B. Sutton, Canton, Ohio, assignor to The Hoover Company, North Canton, Ohio, a corporation of Ohio

Application September 4, 1948, Serial No. 47,842

10 Claims. (Cl. 177—311)

1

This invention relates to electric smoothing irons and more particularly to a control therefor which will automatically indicate to the user whether the iron is at the proper temperature for ironing the particular fabric for which the control is set.

The invention is particularly useful when a plurality of different types of fabrics are being ironed in succession. It is also useful in informing the user when the iron has reached its proper temperature at the beginning of any ironing operation.

The normal household ironing may consist of silks, rayons, cottons, wools, and linens. Controls have been provided which can be set so that the iron will be held at the proper temperature for ironing any of the foregoing fabrics. However, if an attempt is made to iron any particular fabric before the iron is hot enough futile effort is expended by the user. If the control is set at the proper temperature for ironing one particular fabric and is changed to the proper temperature for ironing another fabric some time will elapse before the iron temperature will reach the proper temperature corresponding to the new setting.

If the control is changed from a high temperature setting to a low temperature setting while the iron is hot, immediate use of the iron will scorch the fabric having a lower ironing temperature.

Conversely, if the control is moved from a low temperature setting to a high temperature setting, immediate use of the iron will result in wasted effort by the user because the iron is not immediately hot enough for ironing the higher temperature fabric.

In either case, according to this invention, the user is constantly informed as to whether or not the iron is at the proper temperature for ironing any particular fabric for which the control is set.

More particularly according to this invention a single signal light is provided which is off or unilluminated when the iron is at too low a temperature for ironing the particular fabric for which the control is set. When the temperature of the iron is at the proper temperature for which the control is set the signal light will be illuminated in a distinctive manner to indicate that the iron is at the proper temperature. However, if the control is moved from a high temperature setting to a lower temperature setting while the iron is still hot the signal light will be illuminated in another distinctive manner to indicate to the user that the iron is too hot for ironing the fabric for which the control is set.

2

This application is a species of the generic invention disclosed and claimed in an application by Edward A. Weiland, Serial No. 47,876, filed concurrently herewith. In the Weiland application a single signal light is provided which is so controlled as to signal whenever the iron temperature is below that indicated by the control setting, to give one type of active distinctive signal when the iron temperature is at the temperature indicated by the control setting and to give another type of distinctive active signal when the iron temperature is above that indicated by the control setting.

According to the present invention a signal light is so connected with the control circuit to remain off when the iron temperature is below the temperature indicated by the control setting, to be on steadily when the iron temperature corresponds to that indicated by the control setting and to blink rapidly when the iron temperature is above that indicated by the control setting.

According to this invention, movement of the control from its off position to any particular setting or movement of the control from a low temperature setting to a higher one will close three pairs of contacts to close two circuits, the third circuit remaining open because a fourth pair of contacts are open. One circuit will connect the heater directly across the line, the second circuit includes a resistance in shunt circuit so that little current will flow therethrough as long as the first circuit remains closed. The iron will then heat up until it approaches the temperature for which the control is set. The thermostat will then operate to close the fourth pair of contacts to close the third circuit which will connect a signal light in shunt with the heater. The arrangement is such that sufficient current will flow through the heater to maintain it active and current will flow through the light to illuminate it. The thermostat will continue to be heated until it opens the first and third circuits. The light will then be connected across the line in series with the heater and a resistance. The resistance values are such that the light will be illuminated but the heating rate of the heater will be materially reduced. The thermostat will then oscillate back and forth to maintain the iron at its proper temperature and the signal light will remain continuously on to indicate that the iron is at its proper temperature.

If the control is moved from a high temperature setting to a lower one the first three pairs of contacts will be open and the signal light will be connected across the line in series with a blinker

which will cause the light to blink rapidly to indicate that the iron is too hot for ironing the fabric for which the control is set. The light will continue to blink rapidly until the iron cools and the thermostat again will oscillate back and forth to maintain the proper iron temperature and the light will be on steadily to indicate that the iron temperature is proper.

Other objects and advantages of this invention will become apparent as the description proceeds when taken in connection with the accompanying drawings in which:

Figure 1 shows a skeleton view of an iron with the parts broken away to show one modification of the control and signal light of this invention; and

Figure 2 shows how the control and signal light of Fig. 1 are connected in circuit.

Referring to the drawings the reference numeral 10 represents a sole plate heated by an electric heater 11 of any suitable character. A cover shell 12 is secured to the sole plate 10 in any suitable manner such as by a bolt. A handle 14 has front and rear legs 15 and 16 and is secured to the cover shell 12 in spaced relationship thereto as shown in Fig. 1. A control knob 17 is positioned over the cover shell 12 between the front and rear legs of the handle 14.

Drivingly attached to the dial 17 is a control shaft 18 screw threaded into the nut 19 secured to a bracket 20, supported from the sole plate 10 by a post 21 made up of a plurality of insulating washers 22. The control shaft 18 is held against inadvertent rotation by a compression spring 18'.

Positioned against the sole plate 10 by the washers 22 is a bimetallic thermostat 24 carrying an insulated button 25 at its free end. A signal light 34 is positioned in the rear leg 16 of handle 14.

The post 21 carries three spring arms 80, 81, and 82 and in addition the spring arms 101 and 102 which carry coacting contacts 103 and 104. An insulating button 105 extends downwardly from spring 80 through spring 102 into contact with spring 101. The spring arm 81 has an extension 83 separated therefrom by an insulating connection 84. A spring arm 85 is carried by an insulating post 86. The spring arm 80 carries contacts 87, 88, and 89 which cooperate with contacts 90, 91, and 92 carried by the spring arm 81, the extension 83 and the spring arm 85 respectively. The spring arm 81 also carries a contact 93 which cooperates with a contact 94 carried by the free end of spring arm 82. The shaft 18 extends through openings in the spring arms 82 and 81 so as to contact the spring arm 80. The button 25 extends through an opening in the spring arm 85 so as to contact with extension 83 under certain conditions and the shoulder 42 contacts with the spring arm 85 under certain conditions.

One side of heater 11 is connected to one side of a power line by a conductor 41 and its other side to spring 101 by conductor 106. The spring 102 is connected to the spring 80 by conductors 107 and 100. The spring 81 is connected to the other side of the power line by a conductor 37 which includes a low resistance 99. The spring 82 is connected to the light 34 by a conductor 36 and the light 34 to the other side of the power line by conductor 37.

A blinker bimetal 76 is suitably insulated from the sole plate 10. The bimetal 76 carries a contact 75 which coacts with a fixed contact 74 con-

nected to the juncture of conductors 100 and 107 by conductor 95. Contact 75 is connected to a heater 77 wrapped about the bimetal 76 and heater 77 is connected to spring 85 by conductors 96 and 97. A high resistance 98 is connected between the junction of conductors 96 and 97 and the conductor 36.

The nut 19 and shaft 18 have cooperating stops whereby rotation of the shaft 18 and the dial 17 is limited to less than a complete revolution. The arrangement is such that when the dial 17 rotates to its limit in one direction the lower end of the shaft 18 will press the spring arm 80 downwardly to completely separate the contacts 87 and 90 when the dial is in its off position and the iron is cold. This action will also press the button 105 into contact with the spring arm 101 and separate the contacts 103 and 104. The dial 17 carries indicia about its edge such as "off," "rayon," "silk," "cotton," "wool," and "linen" in the order named so that when the dial 17 is rotated near its maximum extent from the "off" position the dial will indicate a "linen" setting and the lower end of the shaft 18 will be positioned near its upper limit.

Operation

The control is in its off position as shown. Suppose it is moved to a high temperature setting. The lower end of shaft 18 will move upwardly and the spring arm 80 will follow it to close contacts 87, 90 and 88, 91 and 89, 92 and also contacts 103, 104. The heater 11 will be energized as follows: Conductor 41, heater 11, conductor 106, spring arm 101, contacts 103, 104, spring arm 102, conductors 107, 100, spring arm 80, contacts 87, 90, spring arm 81, low resistance 99, and conductor 37. Little current will flow through lamp 34 or blinker 76 because the contacts 93, 94 are open and because of the high resistance 98.

The sole plate temperature rises and the bimetal 24 flexes upwardly until the end of abutment 25 contacts the extension 83 to bend it upwardly and close contacts 93, 94. The other contacts will remain closed. The heater 11 will still be energized in the same circuit as before and the light 34 will be in shunt with the resistance 99 in the following circuit: Contacts 88, 91, extension 83, contacts 93, 94, spring arm 82, conductor 36, and light 34. The resistance of the light 34 is such that the current will be satisfactory to light the lamp. The blinker heater 77 will remain shunted out of circuit.

As the sole plate temperature rises the button 25 will flex both the spring arms 81 and 82 upwardly and open the contacts 87, 90 and 88, 91. The contacts 89, 92 remain closed as do the contacts 93, 94. The light 34 and the heater 11 will remain in the following circuit: Conductor 41, heater 11, conductor 106, spring arm 101, contacts 103, 104, spring arm 102, conductor 107, conductor 100, spring arm 80, contacts 89, 92, spring arm 85, conductor 97, high resistance 98, conductor 36, light 34, and conductor 37. The light 34 will remain illuminated but the heating rate of the heater 11 will be very small because of the high resistance 98.

The bimetal 24 will then oscillate back and forth to maintain the sole plate temperature at the proper value while the light 34 will remain on to indicate that the sole plate is at the proper temperature.

If now the control is moved to a lower temperature setting the bottom end of the shaft 18 will

move the spring arm 80 downwardly and open the contacts 88, 91 and 87, 90. The spring arm 85 will engage the shoulder 42, contacts 89, 92 will be opened and the following circuit will be established: Conductor 41, heater 11, conductor 106, spring arm 101, contacts 103, 104, spring arm 102, conductors 107, 95, blinker heater 77, conductor 96, resistance 98, light 34, and conductor 37. The blinker 76 will operate to open and close the foregoing circuit so that the signal light 34 will blink rapidly to indicate that the sole plate is too hot.

This action will continue until the bimetal 24 moves downwardly sufficient to remove its button 25 out of contact with the extension 83 and permit the spring arm 81 to move downwardly and reclose the contacts 88, 91, and 87, 90. At the same time the downward movement of the shoulder 42 will permit the closure of contacts 89, 92. The bimetal 24 will then oscillate back and forth to maintain the sole plate at the new temperature setting and the light 34 will be on continuously to indicate that the sole plate is at its proper temperature.

If the control is again moved to a higher temperature setting, contacts 87, 90 and 88, 91 will remain closed. The collar 33 on shaft 18 will operate to open contacts 93, 94 and the light 34 will remain out to indicate that the sole plate temperature is too low.

If the control is turned to its off position the end of the shaft 18 will force the spring arm 80 downwardly to a position in which the insulating button 105 will engage the spring arm 101 to open the contacts 103, 104 and deenergize the entire iron. The spring arms 101 and 102 may be omitted, if desired, in which case the cord plug should be removed from its socket when the control is moved to its off position.

The value of the resistances 98 and 99 is so chosen that when the light is connected in shunt circuit therewith the light will be illuminated and when the heater is connected in series circuit therewith its heating rate will be materially reduced so as to be substantially inactive.

From the foregoing it can be seen that this invention provides a control and signal light in which the signal light is off when the iron temperature is too low, is on steadily when the iron temperature is correct and blinks rapidly when the iron temperature is too high to continuously inform the user of the condition of the iron relative to the control setting.

While I have shown but one modification of my invention it is to be understood that this modification is to be taken as illustrative only and not in a limiting sense. I do not wish to be limited to the particular structure shown and described but to include all equivalent variations thereof except as limited by the scope of the claims.

I claim:

1. An electric iron comprising: a sole plate; an electric heater therefor; a signal light; switching means; a blinker switch; conductors connecting said heater, light, blinker switch and switching means to a power line in such manner as to form a plurality of circuits; said switching means being connected in said circuits to connect said heater directly across the line in one position with said light and auxiliary current control means out of circuit, to simultaneously connect said heater and light in circuit in a second position with said blinker switch out of circuit and to simultaneously connect said light and blinker switch in circuit in a third position with

said heater being inoperative and thermostatic means positioned to actuate said switching means to control current flow through said circuits so as to continuously activate said heater when the sole plate temperature is below a set value, to intermittently activate said heater when the sole plate temperature reaches said value so as to maintain said sole plate at said value, to simultaneously continuously activate said light so that said light burns steadily when the sole plate is maintained at said value and to deactivate said heater and activate and deactivate said light rapidly when the sole plate temperature is above said value.

2. An electric iron according to claim 1 including a manually actuatable control coacting with said switching means and said thermostatic means for varying said set temperature value; the arrangement being such that when said control is moved from a high temperature setting to a lower one said light will be activated and deactivated rapidly to cause said light to blink on and off rapidly until the sole plate temperature drops to the new value and when said control is moved from a low temperature setting to a higher one said light will be deactivated until the sole plate temperature rises to the new value and in either case said light will be activated continuously when the sole plate temperature reaches the new value.

3. An electric iron comprising: a sole plate; an electric heater therefor; a signal light; a blinker switch; switching means; conductors connecting said heater, light, blinker switch and switching means to a power line in such manner as to form a plurality of circuits; said switching means being connected in said circuits to connect said heater directly across the line in one position with said light and blinker switch out of circuit, to simultaneously connect said heater and light in circuit in a second position with said blinker out of circuit, to simultaneously connect said light in circuit in a third position with said blinker switch out of circuit and said heater being inoperative and to simultaneously connect said light and blinker switch in circuit in a fourth position with said heater being inoperative and thermostatic means responsive to sole plate temperature positioned to actuate said switching means to control current flow through said circuits so as to continuously activate said heater and deactivate said light and blinker switch when the sole plate temperature is below a set value, to slowly activate and deactivate said heater, continuously activate said light and deactivate said blinker switch when the sole plate temperature is at said value and to deactivate said heater and activate said light in series with said blinker switch when the sole plate temperature is above said value to cause said light to blink rapidly by the action of said blinker switch.

4. An electric iron according to claim 3 including a manually actuatable control coacting with said switching means and said thermostatic means for varying said set temperature value; the arrangement being such that when said control is moved from a high temperature setting to a lower one said light will be activated in series with said blinker switch so as to blink on and off rapidly until the sole plate temperature drops to the new value and when said control is moved from a low temperature setting to a higher one said heater will be activated and said light deactivated until the sole plate temperature rises to the new value and in either event when the

7

sole plate temperature reaches the new value said heater will be intermittently activated and said light will be continuously activated.

5. An electric iron comprising: a sole plate; an electric heater therefor; a signal light; a blinker switch; a resistance; multiple position switching means for controlling the operation of said light and heater; said switching means being connected to said heater, light, blinker switch and resistance in such manner as to connect said heater directly across the line in one position with said light, blinker switch and resistance out of circuit, to simultaneously connect said heater, light and resistance in circuit in a second position with said blinker switch out of circuit and to simultaneously connect said heater, light, blinker switch and resistance in circuit in a third position; and thermostatic means coacting with said switching means to move it to its various positions; said thermostatic means and switching means being so constructed and arranged as to activate said heater and deactivate said light when the sole plate temperature is below a set value, to intermittently activate said heater when the sole plate temperature reaches said value to maintain the sole plate at said value, to simultaneously activate said light continuously to cause it to be on steadily as the sole plate is being maintained at said value and to completely deactivate said heater and rapidly activate and deactivate said light to cause it to blink rapidly when the sole plate temperature is above said value.

6. An electric iron according to claim 5 including a manually actuatable control coacting with said switching means and said thermostatic means for varying said set temperature value; the arrangement being such that when said control is moved from a high temperature setting to a lower one said light will be activated and deactivated rapidly to cause said light to blink on and off rapidly until the sole plate temperature drops to the new value and when said control is moved from a low temperature setting to a higher one said light will be deactivated until the sole plate temperature rises to the new value and in either event when the sole plate temperature reaches the new value said heater will be intermittently activated and said light continuously activated to cause said light to be on steadily.

7. An electric iron comprising: a sole plate; an electric heater therefor; a signal light; a blinker switch; a resistance; a multiple position switching means for controlling the operation of said heater, light and blinker switch; said switching means being connected to said heater, light, blinker switch and resistance in such manner as to connect said heater directly across the line in one position with said light, blinker switch and resistance out of circuit, to simultaneously connect said heater and light in circuit in a second position with said blinker switch and resistance out of circuit, to simultaneously connect said heater, light and resistance in circuit in a third position with said blinker switch out of circuit and to simultaneously connect said heater, light, blinker switch and resistance in circuit in a fourth position; and a thermostat positioned to be responsive to sole plate temperature coacting with said switching means to move it to its various positions; said thermostat and switching means being so constructed and arranged as to activate said heater and deactivate said light and blinker switch when the sole plate temperature is below a set value, to intermittently activate

8

said heater when the sole plate temperature reaches said value to maintain said sole plate at said value, to simultaneously continuously activate said light and deactivate said blinker switch as the sole plate is being maintained at said value and to completely deactivate said heater and activate said light in series with said blinker switch to cause said light to blink rapidly when the sole plate temperature is above said value.

8. An electric iron according to claim 7 including a manually actuatable control coacting with said switching means and said thermostat for varying said set temperature value; the arrangement being such that when said control is moved from a high temperature setting to a lower one said light is activated in series with said blinker switch to cause said light to blink rapidly until the sole plate temperature drops to the new value and when said control is moved from a low temperature setting to a higher one said light and blinker switch will be completely deactivated until the sole plate temperature rises to the new value and in either event when the sole plate temperature reaches the new value said heater will be intermittently activated and deactivated and said light activated continuously whereby said light will be continuously on while said sole plate is maintained at the new value.

9. An electric iron comprising: a sole plate; a heater therefor; a signal light; a blinker switch; a low resistance; a high resistance; multiple position switching means including a plurality of pairs of coacting contacts; conductors connecting said heater, light, resistances, blinker switch and said coacting contacts to a power line so as to form four circuits across the line, a first in which said heater is connected directly across the line in series circuit with said low resistance and said light is in shunt circuit in series with said high resistance, a second in which said heater is connected in series circuit with said light and said high resistance being in shunt circuit, a third in which said heater is connected in series circuit with said high resistance and light and a fourth in which said heater is connected in series circuit with said blinker switch, high resistance and light; the resistance values being such that in said first circuit said heater is active and said light and blinker switch inactive, that in said second circuit said heater and light are active and said blinker switch inactive, that in said third circuit said heater and blinker switch are inactive and said light active and that in said fourth circuit said heater is inactive and said light and blinker switch active; and a bimetallic element responsive to sole plate temperature for actuating said switching means; the construction and arrangement being such that when the sole plate temperature is below a set value said first circuit will be closed and the light will be inactive, when the sole plate temperature reaches said value said second and third circuits will be intermittently and alternately open and closed and the light will be on steadily and when the sole plate temperature is above said value said fourth circuit will be closed and said light will blink rapidly by the action of said blinker switch.

10. An electric iron comprising: a sole plate; a heater therefor; a signal light; a blinker switch; a low resistance; a high resistance; multiple position switching means including a plurality of pairs of coacting contacts; conductors connecting said heater, light, resistances, blinker switch and said coacting contacts to a power line

9

so as to form four circuits across the line, a first in which said heater is connected directly across the line in series circuit with said low resistance and said light is in shunt circuit in series with said high resistance, a second in which said heater is connected in series circuit with said light and said high resistance is in shunt circuit, a third in which said heater is connected in series circuit with said high resistance and light, and a fourth in which said heater is connected in series circuit with said blinker switch, high resistance and light; the resistance values being such that in said first circuit said heater is active and said light and blinker switch inactive; that in said second circuit said heater and light are active and said blinker switch inactive, that in said third circuit said heater and blinker switch are inactive and said light active, and that in said fourth circuit said heater is inactive and said light and blinker switch are active; a bimetallic element responsive to sole plate temperature for actuating said switching means; a manually actuatable control coacting with said switching means and bimetallic element to vary the set temperature at which said sole plate is to be maintained; the construction and arrange-

10

ment being such that when the sole plate temperature is at the set value the second and third circuits will be intermittently and alternately closed and the light will be continuously active, that when said control is moved from a high temperature setting to a lower one said fourth circuit will be closed and said light will blink rapidly by the action of said blinker until the sole plate temperature falls to the new value; and that when the control is moved from a low temperature setting to a higher one said first circuit will be closed and said light off until the sole plate temperature rises to the new value.

OTIS B. SUTTON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,321,287	Daley et al.	Nov. 11, 1919
1,957,343	Hurxthal et al.	May 1, 1934
2,424,504	Riddington	July 22, 1947
2,433,124	Johnson	Dec. 23, 1947
2,450,450	Schmidinger	Oct. 5, 1948