Feb. 14, 1950 K. M. HAMMELL 2,497,452

CORDLESS ELECTRIC IRON

Filed May 17, 1945 2 Sheets-Sheet 1

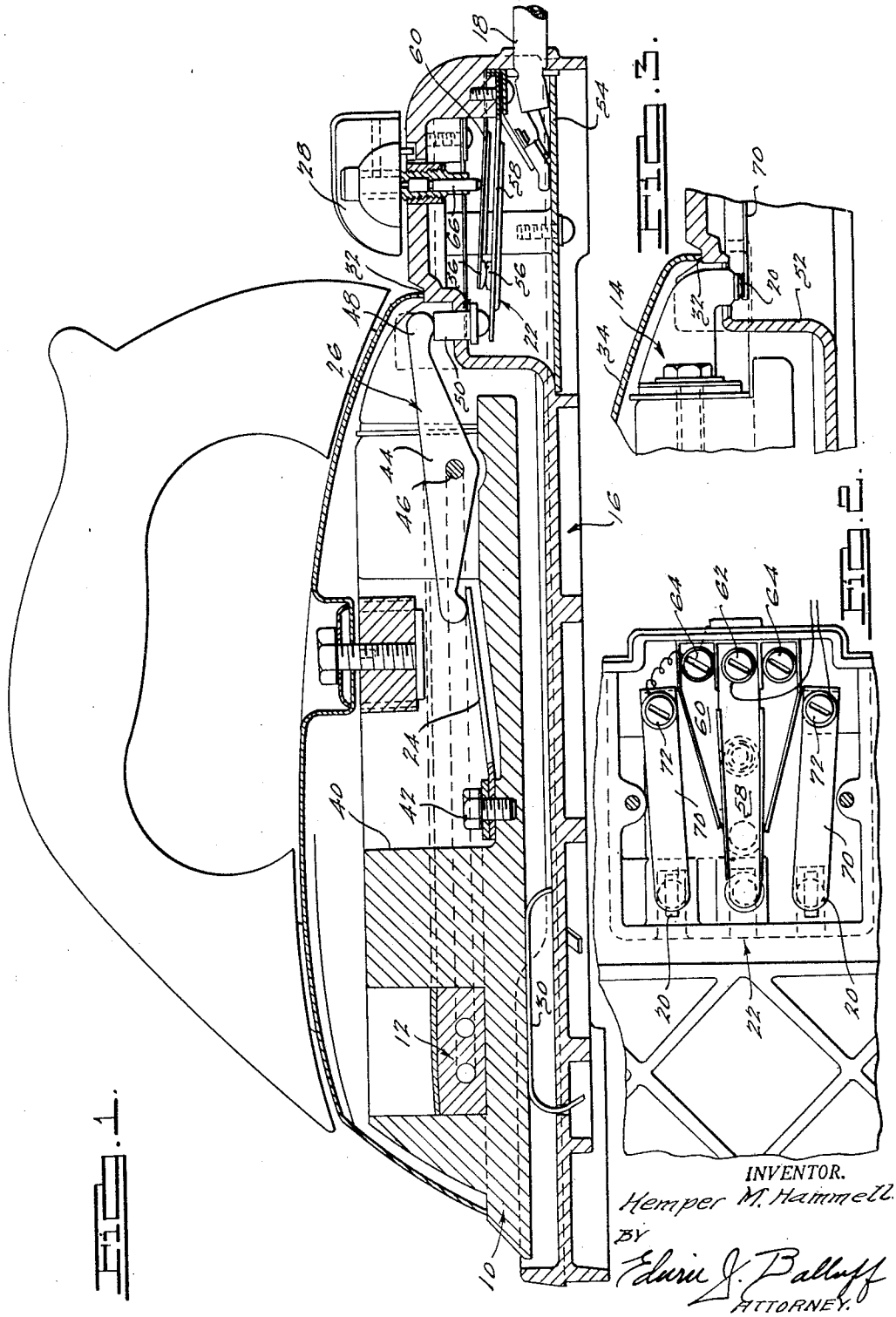

Fig. 1.

Fig. 3.

Fig. 2.

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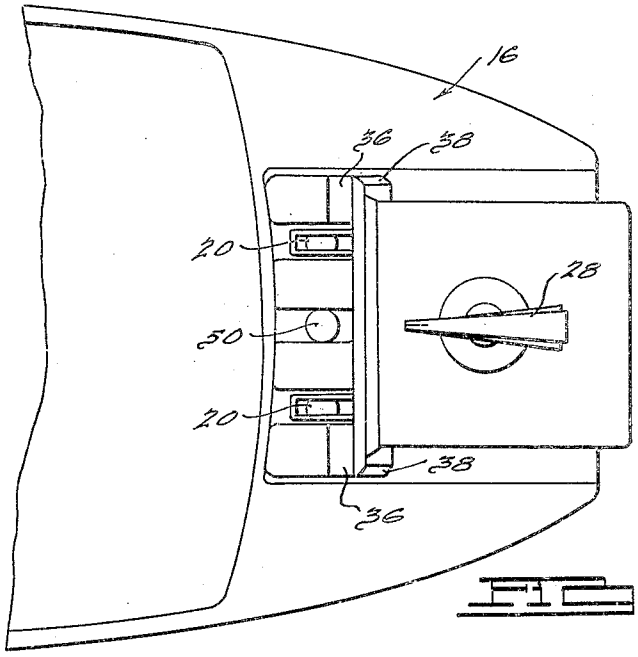

FIG. 4.

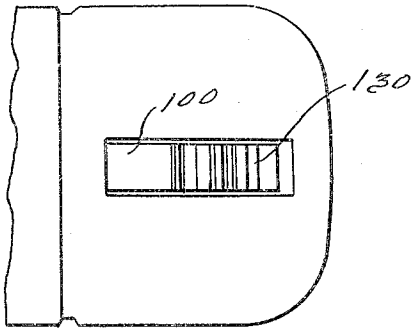

FIG. 5.

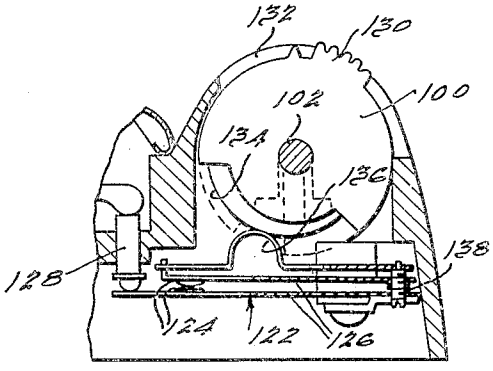

FIG. 6.

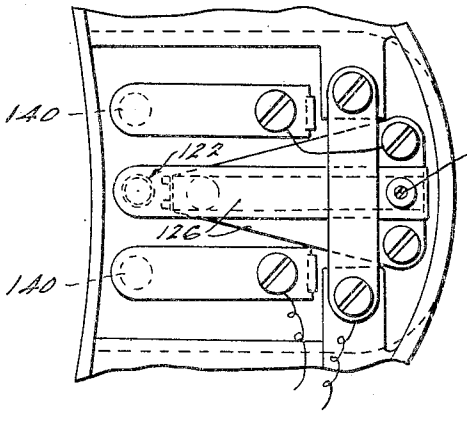

FIG. 7.

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CORDLESS ELECTRIC IRON

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Application May 17, 1945, Serial No. 594,303

12 Claims. (Cl. 219—25)

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This invention relates to laundry irons and has particular reference to one of the cordless type.

As illustrated in the embodiments of the invention selected for purposes of illustration, a laundry iron comprises a sole plate, a heating element therefor, electric terminals for said heating element, a base for supporting said iron and having a current conducting cord connected therewith and provided with terminals arranged to be engaged by said terminals on the iron when the iron is supported on its base, said base terminals forming part of a current supply circuit for said heating element which includes a normally closed switch arranged on the base in the circuit ahead of at least one of said base terminals, a thermally responsive element on said iron arranged to be deflected by changes in the temperature thereof ensuing from the operation of said heating element, a connection between said element and said switch when said iron is arranged on said base operable for opening the switch in response to deflection of said element, and means for adjusting the switch so as to change the temperature at which the switch is opened and closed in response to the deflection of said element.

Principal objects of the invention are to provide:

A new and improved laundry iron;

A new and improved cordless laundry iron;

A new and improved thermostatic switch control for a cordless laundry iron;

A new and improved cordless laundry iron and base assembly provided with a thermostatic control for the iron and in which the thermally responsive element is arranged in the iron while the switch actuated by the thermally responsive element and the adjusting means for the switch are mounted on the base.

Other and further objects of the invention will be apparent from the following description and claims and will be understood by reference to the accompanying drawings, of which there are two sheets, which, by way of illustration, show preferred embodiments and the principles thereof and what I now consider to be the best mode in which I have contemplated applying those principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims. I also contemplate that of the several different features of my invention, certain ones thereof may be advantageously employed in some applications separate and apart from the remainder of the features.

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In the drawings

Fig. 1 is a longitudinal sectional view through an iron and stand therefor embodying the invention;

Fig. 2 is a bottom plan view of the switch mechanism, the cover therefor having been removed;

Fig. 3 is a fragmentary sectional view of the iron and stand taken in a plane beyond that illustrated in Fig. 1 and showing the separable connection between the current conductors on the iron and the stand;

Fig. 4 is a fragmentary plan view of part of the stand;

Fig. 5 is a plan view of a modified form of stand;

Fig. 6 is a fragmentary view, similar to Fig. 1, of the adjustable thermostatically operated switch mechanism; and

Fig. 7 is a bottom plan view of the device as illustrated in Fig. 6.

In general an iron embodying the invention comprises a sole plate 10, a heating element 12 therefor, a pair of electric terminals 14 for the heating element 12, a stand 16 having a current conducting cord 18 connected therewith and provided with terminals 20 arranged to be engaged by the terminals 14 on the iron when the iron is supported on the stand 16, said base or stand terminals 20 forming part of a current supplying circuit for the heating element 12 of the iron, said circuit including a switch 22 arranged on the stand in the circuit ahead of one of the stand terminals 20, a thermally responsive element 24 on the iron arranged to be deflected by changes in the temperature of the sole plate 10 ensuing from the operation of the heating element 12, a connection 26 between the thermally responsive element 24 and the switch 22, and means actuated by a control knob 28 for adjusting the switch so as to change the temperature at which it is opened and closed by the element 24.

The stand or base 16 may be made of any suitable material, such as metal or plastic, and is provided on its upper face with a rest 30 for contacting and supporting a forward portion of the iron. In the embodiment disclosed, the stand is formed from a plastic molding, so the rest 30 may be provided to prevent contact between the sole plate of the iron and the stand, as well as to provide one point of a three-point support for the iron. The other two points of support are provided by a pair of spaced abutments 32 formed

on the shell 34 of the iron at the sides of the heel thereof. These abutments 32 are adapted to engage and rest upon shoulders 36 formed on the stand 16 for positively and accurately supporting the iron on the stand, the heel end of the shell 34 being hollow and arranged to cooperate with the side shoulders 38 on the stand for properly locating the iron relative to the stand so that the contacts of the iron will properly engage the contacts on the base or stand and so that the connection 26 between the element 24 and the switch 22 will function properly.

The heating element 12 may be embedded in the upper portion of the sole plate 10, which is formed to provide a cavity 40 for the thermally responsive element 24. This element 24 may comprise a strip of bimetal anchored at one end thereof to the sole plate 10 by a bolt 42, the other end of the bimetal 24 being arranged to deflect vertically for actuating the switch on the base which controls the supply of current to the heating element 12 so as to maintain the temperature of the iron within predetermined limits.

The connection 26 between the thermally responsive element 24 and the switch 22 when the iron is arranged on the stand 16 comprises a lever 44 pivoted at 46 for rocking movement in a vertical plane in response to deflection of the element 24, one end of the lever being arranged to bear against the free end of the element 24. The other end 48 of the lever 44 is exposed on the under side of the heel end of the shell 34 of the iron and arranged, when the iron is on the stand 16, to react against a plunger 50 which is vertically slidable in the base.

The thermostatically actuated switch 22 and the stand terminals are arranged in a housing provided by a downwardly opening cavity 52 formed in the base at the rear thereof, such cavity being closed by a removable plate 54. The plunger 50 is slidably mounted in a guide formed in the upper wall of the cavity 52 and positioned so that when the iron is properly assembled on the base 16, the end 48 of the lever 44 will be in a position to react thereagainst, the plunger 50 and lever 44 forming the connection 26 between the thermally responsive element 24 and the switch 22.

The switch 22 comprises a pair of contacts 56 mounted upon flexible spring members 58 and 60, the member 58 being secured to the base by a screw 62 while the member 60 is independently secured by means of screw 64. The members 58 and 60 are insulated relative to each other except when connected through the contacts 56. The member 58 projects beyond the contact 56 and forms a support for the plunger 50.

The switch 22 is illustrated in closed position in Fig. 1 and normally is in this position; that is, when the iron is cold or below the temperature called for by the thermostat adjustment or off the stand, the switch 22 will be closed as illustrated. It will be apparent, however, from the previous description that upward deflection of the bimetallic element 24 will through the connection 26 (comprising the lever 44 and the plunger 50) depress the member 58 so as to separate the contacts 56, thereby opening the switch.

As previously indicated, a means is provided for adjusting the switch to change the temperature at which it is opened and closed by the thermostatic element 24, and this means comprises the knob 28 which is mounted upon the upper end of a control shaft 66 which is threadedly mounted in the upper wall of the housing for

the switch mechanism, so that rotation of the shaft 66 about its axis will function to elevate or lower the shaft.

The lower end of the shaft 66 is arranged to bear against the member 60 carrying one of the switch contacts 56. The members 58 and 60 are biased upwardly against the lower end of the shaft 66 so that as the shaft is raised by rotating the same, the members 58 and 60 will rise, thereby lowering the temperature at which the switch 22 will be opened to open the circuit for the heating element, while lowering of the shaft 66 will depress the members 58 and 60 so as to raise the temperature at which the thermostatic element 24 will function to open the switch 22. In this way the switch 22 may be set to open at any predetermined temperature within the range of the adjustment provided.

While the switch 22 is positively opened by the bimetallic element 24, its closing is controlled by the cooling of the element 24, as this releases the force applied through the connection 26 to the switch 22, the latter as previously described being closed when free from pressure through the plunger 50.

As illustrated in Fig. 2, it will be observed that the switch 22 is in the circuit ahead of one of the contacts 20, such contacts being carried by spring members 70 which are in turn secured by screws 72 to the wall of the cavity 52.

As will be apparent from Fig. 4, the contacts 20 are exposed through slots in the top wall of the housing for the switch mechanism, and are positioned so as to be engaged by the downwardly projecting ends of the terminals 14 in the manner as illustrated in Fig. 3.

In the modification as illustrated in Figs. 5, 6 and 7, a modified form of adjusting means for the thermostatically operated switch mechanism is provided. In this embodiment the back end of the stand is provided with a downwardly opening cavity arranged to receive a wheel 100 which is rotatably mounted upon a shaft 102 suitably journaled for rotation in the side walls of the cavity. While the actual shape of the parts of the switch and contacts are specifically different, their function is the same and their construction is functionally the equivalent of that illustrated in the previous embodiment.

The switch 122 corresponding to the switch 22 includes the contacts 124 carried by the spring members 126. The plunger 128, similar to the plunger 50, is arranged to cooperate with the lower switch member for opening the switch under the influence of the thermostatic element in the iron. The switch 122, like the switch 22, is normally closed. It is adapted to be adjusted by turning of the wheel 100 by means of the projection 130 thereon which extends through a slot 132 in the top wall of the switch cavity.

The wheel includes an eccentric or cam surface 134 which is arranged to bear against an adjusting member 136, one end of which is carried by the upper of the spring members 126 at the front thereof, while the rear end of the adjusting member 136 is positioned by means of a set screw 138 threadedly secured in suitable threaded means in the cavity. By vertical adjustment of the screw 138, the adjusting member 136 may be moved so as to move it towards or away from the cam surface 134 on the wheel 100 so as to alter the movement of the member 136 and the switch members 126 in response to turning of the wheel 100. In other words, the wheel 100 acts to adjust the position of the con-

tact carrying members 126 through the adjusting member 136 and the control of the position of the members 126 by the rotation of the wheel may be limited or effected by the position of the adjusting member 136.

The construction and operation of the base including the contacts 140 for cooperation with the contacts on the iron may otherwise be as illustrated in the previous embodiment.

While I have illustrated and described preferred embodiments of my invention, it is understood that these are capable of modification and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations which fall within the purview of the following claims.

I claim:

1. In a device of the class described, an iron including a sole plate, a heating element for said sole plate and electrical terminals for said element, a stand for supporting said iron and having a current conducting cord connected therewith and provided with terminals arranged to be engaged by said terminals on said iron when said iron is supported on said stand, said stand terminals forming part of a current supplying circuit for said heating element which includes a switch arranged on said stand in the circuit ahead of at least one of said stand terminals, a thermally responsive element on said sole plate arranged to be deflected by a rise in the temperature thereof ensuing from the operation of said heating element, and a connection between said thermally responsive element and said switch, when said iron is arranged on said stand with said stand and iron terminals engaged, operable for opening the switch in response to deflection of said thermally responsive element by a rise in the temperature thereof ensuing from the operation of said heating element.

2. In a device of the class described, an iron including a sole plate, a heating element for said sole plate and electrical terminals for said element, a stand for supporting said iron and having a current conducting cord connected therewith and provided with terminals arranged to be engaged by said terminals on said iron when said iron is supported on said stand, said stand terminals forming part of a current supplying circuit for said heating element which includes a switch arranged on said stand in the circuit ahead of at least one of said stand terminals, a thermally responsive element on said sole plate arranged to be deflected by a rise in the temperature thereof ensuing from the operation of said heating element, a connection between said thermally responsive element and said switch, when said iron is arranged on said stand with said stand and iron terminals engaged, operable for opening the switch in response to deflection of said thermally responsive element by a rise in the temperature thereof ensuing from the operation of said heating element, and means for adjusting said switch to change the opening thereof relative to the temperature of said iron.

3. In a device of the class described, an iron including a sole plate, a heating element for said sole plate and exposed electrical terminals for said element, a base for supporting said iron and provided with terminals arranged to be engaged by said terminals on said iron when said iron is supported on said base, said base terminals forming part of a current supplying circuit for said heating element which includes a normally closed switch arranged on said base in the circuit ahead of at least one of said base terminals, a thermally responsive element on said sole plate arranged to be deflected by changes in the temperature thereof, and a connection between said thermally responsive element and said switch, when said iron is arranged on said base with said base and iron terminals engaged, operable for opening the switch upon deflection of said thermally responsive element in response to a predetermined rise in temperature of said iron and to permit said switch to close upon a subsequent predetermined drop in temperature of said iron.

4. In a device of the class described, an iron including a sole plate, a heating element for said sole plate and exposed electrical terminals for said element, a base for supporting said iron and provided with terminals arranged to be engaged by said terminals on said iron when said iron is supported on said base, said base terminals forming part of a current supplying circuit for said heating element which includes a normally closed switch arranged on said base in the circuit ahead of at least one of said base terminals, a thermally responsive element on said sole plate arranged to be deflected by changes in the temperature thereof, a connection between said thermally responsive element and said switch, when said iron is arranged on said base with said base and iron terminals engaged, operable for opening the switch upon deflection of said thermally responsive element in response to a predetermined rise in temperature of said iron and to permit said switch to close upon a subsequent predetermined drop in temperature of said iron, and means for adjusting said switch to change the opening and closing thereof relative to the temperature of said iron.

5. In a device of the class described, an iron including a sole plate, a heating element for said sole plate, and electrical terminals for said element, a base for supporting said iron and having a current conducting cord connected therewith and provided with terminals arranged to be engaged by said terminals on said iron when said iron is supported on said base, said base terminals forming part of a current supplying circuit for said heating element which includes a normally closed switch arranged on said base in the circuit ahead of at least one of said base terminals, a thermally responsive element on said iron arranged to be deflected by changes in the temperature thereof ensuing from the operation of said heating element, and a connection between said thermally responsive element and said switch when said iron is arranged on said base operable for opening the switch in response to deflection of said thermally responsive element, said switch comprising a pair of spring contacts engaged whenever said iron is separated from said base, one of said contacts having a portion forming a part of said connection and arranged to be engaged by another part of said connection carried by said iron when said iron is supported on said base and means for changing the position of said portion of said one of said contacts relative to said part of said connection carried by said iron so as to change the temperature at which said switch is opened and closed by said thermally responsive element.

6. In a device of the class described an iron including a sole plate, a heating element for said sole plate and electrical terminals for said element, a stand for supporting said iron and having current conductors connected therewith and provided with terminals to which the current

conductors are connected, said terminals on said stand being arranged to be engaged by said terminals on said iron when said iron is supported on said stand, said stand terminals forming part of a current supplying circuit for said heating element which includes a normally closed switch arranged on said stand in the circuit ahead of at least one of said stand terminals, a thermally responsive element on said sole plate arranged to be moved by changes in the temperature thereof, and a connection between said thermally responsive element and said switch, when the iron is arranged on the stand with said terminals on the iron engaged with those on the stand, and operable for opening said switch in response to a predetermined rise in temperature of said iron, said switch including at least one spring biased contact which is constructed and arranged for closing said switch upon a subsequent predetermined drop in temperature of said iron and also upon removal of said iron from said stand.

7. In a device of the class described an iron including a sole plate, a heating element for said sole plate and electrical terminals for said element, a stand for supporting said iron and having current conductors connected therewith and provided with terminals to which the current conductors are connected, said terminals on said stand being arranged to be engaged by said terminals on said iron when said iron is supported on said stand, said stand and iron being provided with interengageable surfaces, other than said terminals, for supporting said iron on said stand with said terminals engaged, said stand terminals forming part of a current supplying circuit for said heating element which includes a switch arranged on said stand in the circuit ahead of at least one of said stand terminals, the contacts of said switch being biased to closed position, a thermally responsive element on said sole plate arranged to be deflected by changes in the temperature thereof, and a connection between said thermally responsive element and said switch, when the iron is arranged on the stand with said terminals on the iron engaged with those on the stand, operable for opening said switch contacts upon deflection of said thermally responsive element in response to a predetermined rise in temperature of said iron and to permit said switch contacts to close upon a subsequent predetermined drop in temperature of said iron.

8. An ironing device comprising an iron including a sole plate, a heating element for said sole plate and a pair of electrical terminals for said element at the rear of the iron, a stand for supporting said iron and having current conductors connected therewith and provided with a pair of terminals to which the current conductors are connected, said terminals on said stand being arranged to be engaged by said terminals on said iron when said iron is supported on said stand, said stand terminals forming part of a current supplying circuit for said heating element which includes a switch arranged on said stand in the circuit ahead of at least one of said stand terminals, the contacts of said switch being biased to closed position, a switch contact separating member arranged between said stand terminals, a thermally responsive element on said sole plate arranged to be deflected by changes in the temperature thereof, said switch contact separating member forming part of a connection between said thermally responsive element and said switch, when the iron is arranged on the stand with said terminals on the iron engaged with those on the stand, operable for opening said switch contacts upon deflection of said thermally responsive element in response to a predetermined rise in temperature of said iron, said connection being constructed and arranged to offer substantially no resistance to the closing of said switch contacts upon a subsequent predetermined drop in temperature of said iron so that said switch contacts may close to close the circuit through said heating element.

9. An ironing device comprising an iron including a sole plate, a heating element for said sole plate and a pair of electrical terminals for said element at the rear of the iron, a stand for supporting said iron and having current conductors connected therewith and a pair of terminals to which the current conductors are connected, said terminals on said stand being arranged to be engaged by said terminals on said iron when said iron is supported on said stand, said stand terminals forming part of a current supplying circuit for said heating element which includes a switch arranged on said stand in the circuit ahead of at least one of said stand terminals, the contacts of said switch being biased to closed position, a switch contact separating member arranged on said stand, a thermally responsive element on said sole plate arranged to be deflected by changes in the temperature thereof, said switch contact separating member forming part of a pressure transmitting connection between said thermally responsive element and one of said switch contacts, when the iron is arranged on the stand with said terminals on the iron engaged with those on the stand, operable for moving said one of said switch contacts to open said switch upon and by deflection of said thermally responsive element in response to a predetermined rise in temperature of said iron, said connection being constructed and arranged to offer substantially no resistance to the closing of said switch contacts upon a subsequent predetermined drop in temperature of said iron so that said switch contacts may close to close the circuit through said heating element.

10. An ironing device comprising an iron including a sole plate, a heating element for said sole plate and electrical terminals for said element, a stand for supporting said iron and having current conductors connected therewith and terminals to which the current conductors are connected, said terminals on said stand being arranged to be engaged by said terminals on said iron when said iron is supported on said stand, said stand terminals forming part of a current supplying circuit for said heating element which includes a switch arranged on said stand in the circuit ahead of at least one of said stand terminals, the contacts of said switch being biased to closed position, a switch contact separating member arranged on said stand, a thermally responsive element mounted on said sole plate so as to be directly responsive to and to be deflected by changes in the temperature thereof, said switch contact separating member forming part of a pressure transmitting connection between said thermally responsive element and said switch, when the iron is arranged on the stand with said terminals on the iron engaged with those on the stand, operable for moving one of said switch contacts to open said switch by and upon deflection of said thermally responsive element in response to a predetermined rise in temperature of said iron and to permit the closing

of said switch contacts upon a subsequent predetermined drop in temperature of said sole plate to close the circuit through said heating element.

11. An ironing device according to claim 10 wherein said connection includes a lever pivoted on said iron, one end of said lever being arranged to be engaged and moved by said thermally responsive element, the other end of said lever being exposed and arranged to engage and move said switch contact separating member upon deflection of said thermally responsive element.

12. An ironing device according to claim 10 wherein an adjusting member is provided on said base and arranged to engage and move at least one of said switch contacts for adjusting the switch to change the opening and closing thereof relative to the temperature of said iron.

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