E. H. RICHARDSON.

THERMOSTAT FOR ELECTRIC HEATERS.

APPLICATION FILED JAN. 2, 1908.

903,319. Patented Nov. 10, 1908.

Fig. 1.

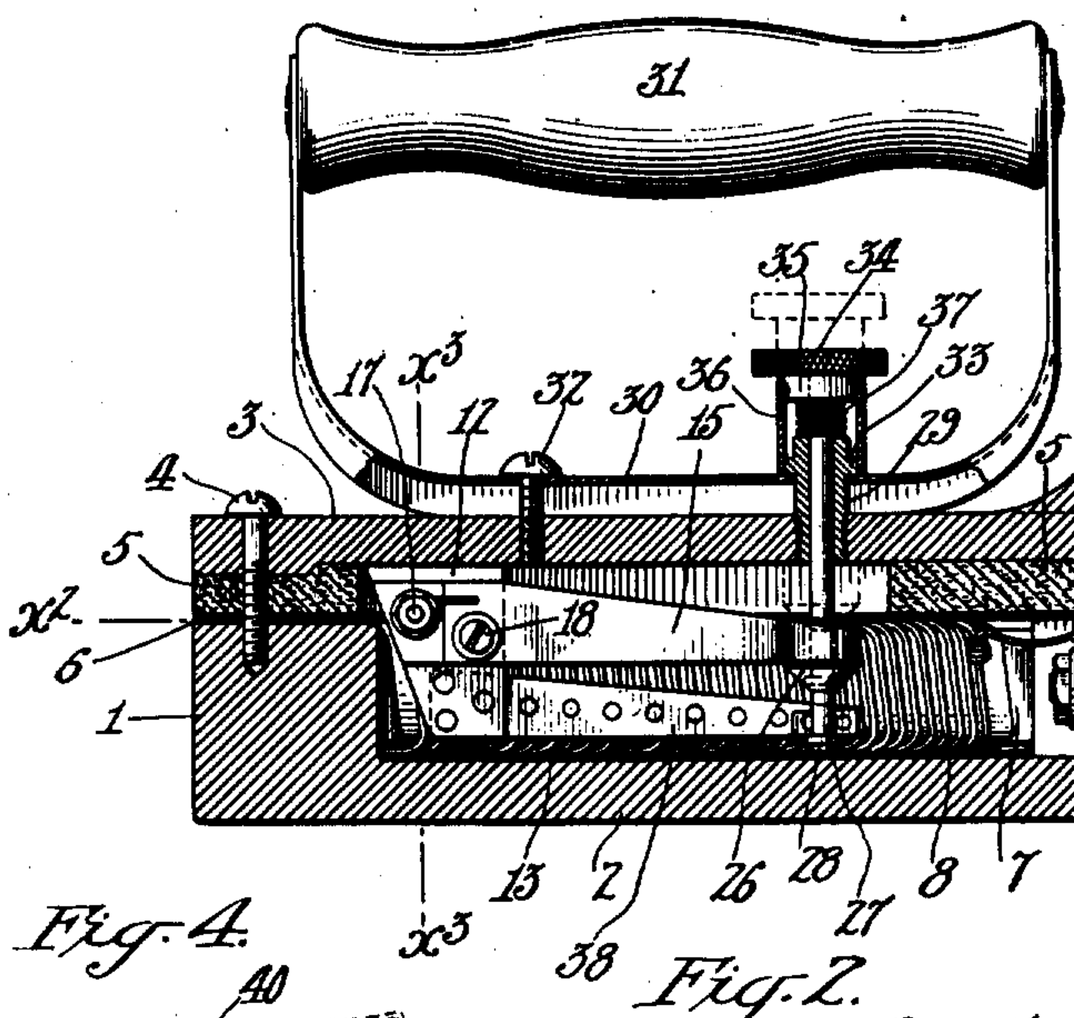


Fig. 4.

Fig. 2.

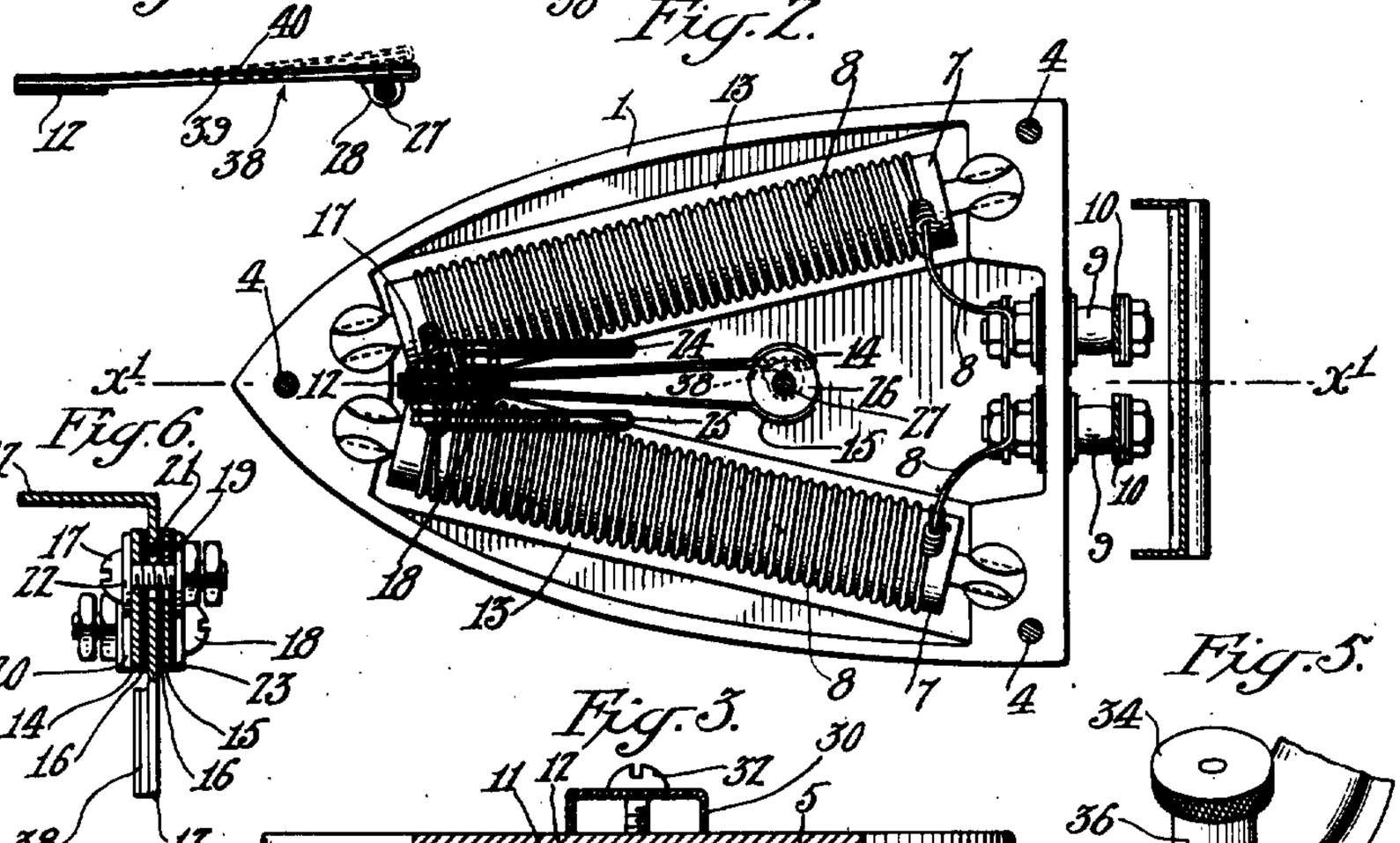


Fig. 6.

Fig. 3.

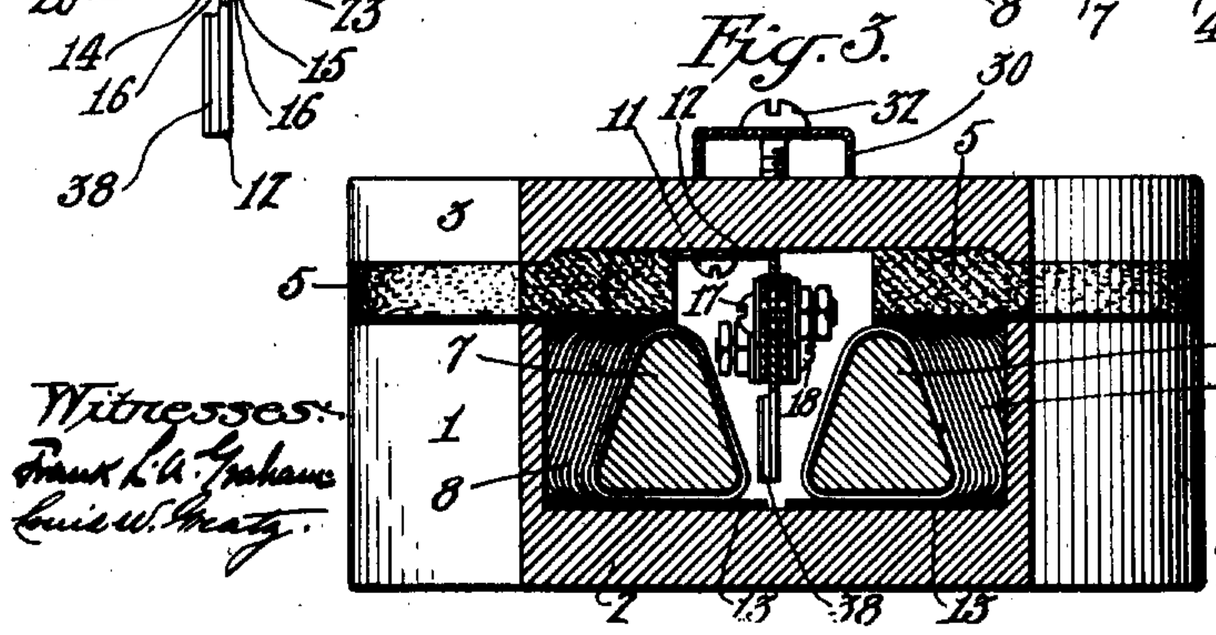
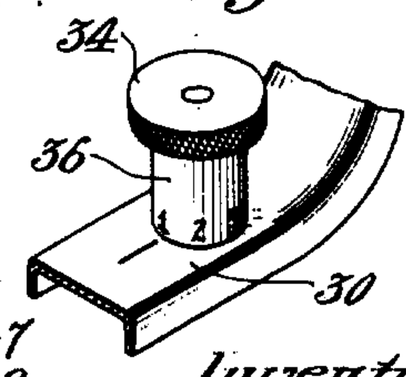


Fig. 5.



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UNITED STATES PATENT OFFICE.

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THERMOSTAT FOR ELECTRIC HEATERS.

No. 903,319. Specification of Letters Patent. Patented Nov. 10, 1908.

Application filed January 2, 1908. Serial No. 409,066.

To all whom it may concern:

Be it known that I, EARL H. RICHARDSON, a citizen of the United States, residing at Ontario, in the county of San Bernardino and State of California, have invented a new and useful Thermostat for Electric Heaters, of which the following is a specification.

This invention relates to electric heaters and particularly to a device for automatically opening the circuit through the heating element of the heater when the temperature rises to a certain point, whereby damage from overheating the parts of the heater or articles in contact with the heater is avoided.

One object of the invention is to dispense with extra circuits and provide a simple and direct acting device for automatically opening the main or heating circuit at any desired degree of temperature within the capacity of the device.

Another object is to provide means for regulating the device from without the walls of the heater.

Another object is to provide a novel form of temperature operated controller.

Another object is to arrange the temperature operated controller out of the circuit so that it is unaffected by the current.

Another object is to compel the closing of the circuit by hand after the automatic opening thereof.

The device is of especial advantage for use in electric laundry irons and in the accompanying drawings I have shown the device in such capacity.

Referring to the drawings; Figure 1 is a vertical, longitudinal section through a laundry iron, the view being taken on line x^1—x^1 of Fig. 2. Fig. 2 is a sectional view taken on line x^2—x^2 of Fig. 1. Fig. 3 is a vertical, sectional view on line x^3—x^3 of Fig. 1. Fig. 4 is a plan view of the temperature operated detent. Fig. 5 is a perspective view of the manual switch controlling and regulating device. Fig. 6 is an enlarged cross section taken on the same plane as Fig. 3, showing the manner of attaching the contact blades to the bracket.

The walls of the laundry iron comprise a bottom portion 1 provided with a sole 2 and a cover 3 which is removably secured by screws 4 to the bottom portion 1. A heat insulating material, comprising asbestos 5, is arranged between the lower portion 1 and cover 3, as shown, and a layer of mica 6 is also preferably employed directly underneath the asbestos 5. The lower portion 1 is hollow as shown and arranged therein are two heating elements, each comprising a core 7 with its ends secured in any desired manner to the lower portion 1, and each core is wound with resistance wire 8. As clearly shown in Fig. 2, the two heating elements are angularly disposed to each other, their front ends being arranged close together and the heating elements diverging toward the rear. The rear ends of wires 8 are connected with terminals 9 which extend through the rear wall of the lower portion 1, and which may be of any preferred construction. As shown, the terminals are provided with contact blades 10 for the attachment of the switch plug, not shown.

Secured to the under side of the cover 3 by a screw 11 is a supporting bracket 12. The supporting bracket 12 extends down between the two heating elements near their front ends. Each core 7, as shown in Fig. 3, is triangular in cross section, and at the front ends of the cores 7 sufficient space is afforded between them for the bracket 12 and parts carried thereby, so that the wire on core 7 is out of contact with the bracket 12 and parts carried thereby; this feature is clearly shown in Fig. 3 which is a sectional view taken through the forward ends of the cores. The wire wound cores 7 are insulated from the bottom wall of the lower portion 1 by layers of mica 13.

Secured to both sides of the bracket 12 and extending rearwardly therefrom are two contact blades 14 and 15, the rear ends of each being curved to a circular arc. Each contact blade is insulated from the bracket 12 by a layer of mica 16. Screw bolts 17 and 18 pass through both blades 14 and 15 and secure them to the bracket 12. As clearly shown in Fig. 6, the blade 15 has an enlarged hole 19 through which the bolt 17 passes, and a mica washer 20 insulates the nut of bolt 18 from blade 14, which enlarged hole 19 prevents contact of blade 15 with the shank of bolt 17. The bracket 12 is likewise provided with a large hole 21 which prevents contact of bolt 17 therewith, but the blade 14 has contact with bolt 17, there being a metal washer 22 between the head of the bolt and the blade 15. Blade 15 is in contact with bolt 18 and blade 14 is out of contact with bolt 18 by means of a similar

construction, the blade 14 and bracket 12 each having an enlarged hole, not seen, through which the shank of bolt 18 passes and the head of bolt 18 being in contact with blade 15 through the medium of a washer 23. Bolt 18 is connected by wire 24 with the wire on one of the heating elements, while bolt 17 is connected by a wire 25 with the wire on the other heating element, thus blade 14 is in connection with one of the heating elements and blade 15 is in connection with the other heating element.

Blades 14 and 15 form a part of the switch for controlling the circuit and movable between blades 14 and 15 is a plug 26 mounted on a stem 27. The lower end of the stem 27 has a flange 28 forming an abutment and the upper portion of stem 27 is slidably mounted in a nipple 29 which is screwed to the cover 3. Fastened to the cover 3 is a bail 30 having a handle 31, the front portion of bail 30 being secured to cover 3 by screw 32, while nipple 29 has a flange 33 which serves to secure the rear portion of bail 30. The stem 27 is slidable vertically to move the plug 26 into or out of contact with blades 14 and 15, and the lower portion of plug 26 is beveled, as shown, to enable the plug to be easily slipped down between the blades 14 and 15 in closing the circuit. The blades 14 and 15 are spring blades in order to insure good contact with the plug 26 and upon retraction of plug 26 from the blades they spring together somewhat, thus the beveled portion of plug 26 enables it to be easily pushed down between the blades 14 and 15.

Attached to the upper end of stem 27 is a knurled knob 34 having a hub 35 to which is secured a sleeve 36, the lower end of sleeve 36 resting against the bail 30 when the plug is in its lower postion in contact with blades 14 and 15. A coil spring 37 is arranged between the upper end of nipple 29 and hub 35 and serves to move the stem 27 and plug 26 up when released by the temperature operated detent about to be described.

As clearly shown in Fig. 4, the flange 28 on the lower end of the stem 27 is graduated, being shaped like a cam, and under normal conditions the shoulder 28 is engaged by a temperature controlled detent 38 which comprises two blades 39 and 40 formed of materials having different coefficients of expansion. For example, blade 39 is formed of brass, and blade 40 is formed of steel. The two blades may be fastened together permanently in any desired manner, for example, by riveting, as shown. The rear end of blade 40 is bent over the end of blade 39, as shown, to protect the end of blade 39, and this hooked portion of the steel blade 40 may preferably be hardened as it is the part which directly engages the shoulder 28 and there is wear at this point between the steel and the shoulder. The front end of the detent 38 may be secured by rivets to the lower end of the bracket 12.

Under the influence of heat the detent 38 will bend laterally as indicated in dotted lines in Fig. 4, on account of the difference in the coefficients of expansion of the two metals, the brass blade 39 having a tendency to elongate more rapidly than the steel blade 40 and thus causing a warping action to be given to the detent as a whole. As the detent thus bends its outer end moves away from the stem 27 and closer to the outer rim of the shoulder 28 and at a certain temperature the detent will move entirely free from the edge of the shoulder 28, the release of the shoulder by the detent being determined by the angular position in which the shoulder 28 is set. For example, as shown in Fig. 4, the shoulder 28 is set so that a very high degree of temperature will be required to bend the detent 38 sufficiently to release the shoulder, while by turning the stem 27 a narrower portion of the shoulder will be brought into contact with the detent 38 and release will be effected at a less temperature. By reason of the gradual variation in the width of the shoulder 28 the same may be set to release at any desired degree of temperature within the limits under which the heater is used in practice.

Upon release of the shoulder 28 by detent 38 the spring 37 pressing against the hub 35 forces up the stem 27 and removes the plug 26 from contact with the plugs 14 and 15 thereby breaking the circuit, and the circuit will remain broken and the heater will be inoperative and will gradually cool until the operator again closes the circuit, which is done by simply pushing down on the thumb piece 34. As the stem 27 is thus moved down, the lower beveled portion of flange 28 rides over the edge of the rear end of detent 38 until the detent 38 snaps over the shoulder 28, thereby again locking the switch closed and rendering the heater operative. It should be noted that no current passes through the detent 38 and that its life is thus not impaired. The sleeve 35 may be provided with indicating numerals, as shown in Fig. 5, in order that the knob 34 may be turned to set the shoulder 28 in desired position according to the temperature at which the circuit is to be broken, which temperature will, obviously, in ordinary cases be above the temperature required for work and below the temperature which would be injurious.

What I claim is:—

1. In combination, an electric heating element, a circuit therefor, a pair of terminal blades for the circuit, a plug movable between the blades to close the circuit, the plug

having a graduated shoulder, a temperature operated detent normally engaging the shoulder, and walls inclosing said elements, and means for adjusting the position of the graduated shoulder with respect to the detent.

2. In combination, an electric heating element, a circuit therefor, temperature operated means for breaking said circuit comprising a detent, a graduated shoulder normally engaged by the detent, a stem carrying said graduated shoulder, a knob on the stem for turning the stem, and adjusting the graduated shoulder, the knob having indicating marks.

3. In combination, a pair of rearwardly diverging heating elements, a hollow body inclosing the same, a supporting bracket extending between the forward ends of the heating elements, a pair of contact blades projecting rearwardly from the supporting brackets, each blade being electrically connected with a heating unit, a temperature operated detent blade extending rearwardly from the bracket, a plug normally lying between the contact blades and closing the circuit, a stem carrying the plug and having an abutment engaged by the detent, and spring means exerting longitudinal pressure on the stem to move the plug out of contact when the abutment is released by the detent.

4. In combination, a hollow body, a pair of heating units therein, a removable cover on the body, a supporting bracket depending from the cover, a pair of contact blades between the heating units and supported by said bracket, each blade being electrically connected with a heating unit, a temperature operated detent blade attached to the bracket and extending between the heating units, a stem slidably mounted in said cover, a plug on the stem normally lying between the contact blades, the stem having an abutment normally engaged by the detent blade and spring means supported by the cover and exerting an upward pressure on the stem.

5. In combination, a hollow body, a pair of heating units therein, a removable cover on the body, a supporting bracket depending from the cover, a pair of contact blades between the heating units and supported by said bracket, each blade being electrically connected with a heating unit, a temperature operated detent blade attached to the bracket and extending between the heating units, a nipple in the cover, a stem slidable in the nipple, a sleeve above the cover secured to the stem, a knob on the stem, a coil spring within the sleeve between the nipple and knob, a plug on the stem normally lying between the contact blades, the stem having an abutment normally engaged by the detent blade.

6. In combination, a hollow body, a pair of heating units therein, a removable cover on the body, a supporting bracket depending from the cover, a pair of contact blades between the heating units and supported by said bracket, each blade being electrically connected with a heating unit, a temperature operated detent blade attached to the bracket and extending between the heating units, a nipple in the cover, a stem slidable and revoluble in the nipple, a sleeve above the cover secured to the stem, a knob on the stem, a coil spring within the sleeve between the nipple and knob, a plug on the stem normally lying between the contact blades, the stem having a graduated abutment normally engaged by the detent blade.

In testimony whereof, I have hereunto set my hand at Ontario, California this 24th day of December 1907.

EARL H. RICHARDSON.

In presence of—
T. E. PARKE,
C. V. SMITH.