Jan. 11, 1944. E. P. SCHREYER 2,338,739

STEAM IRON

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Fig. 1.

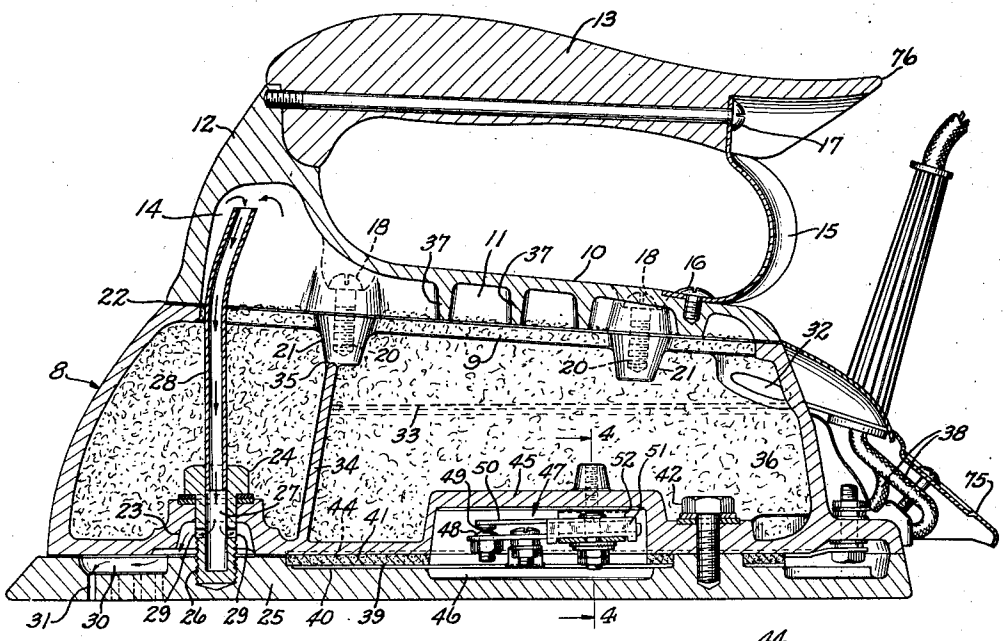


Fig. 2.

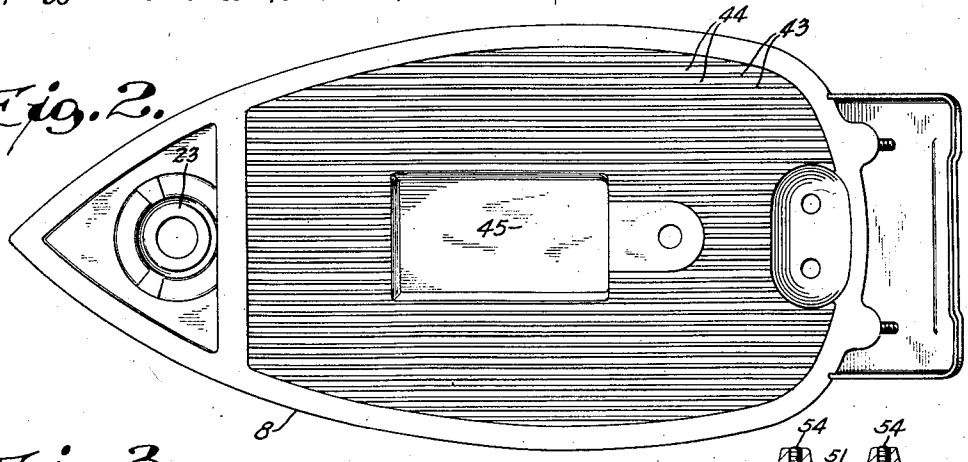
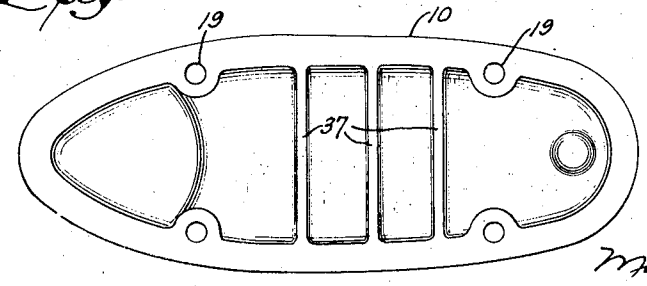


Fig. 3.



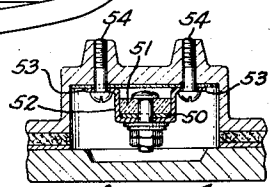


Fig. 4.

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Fig. 6.

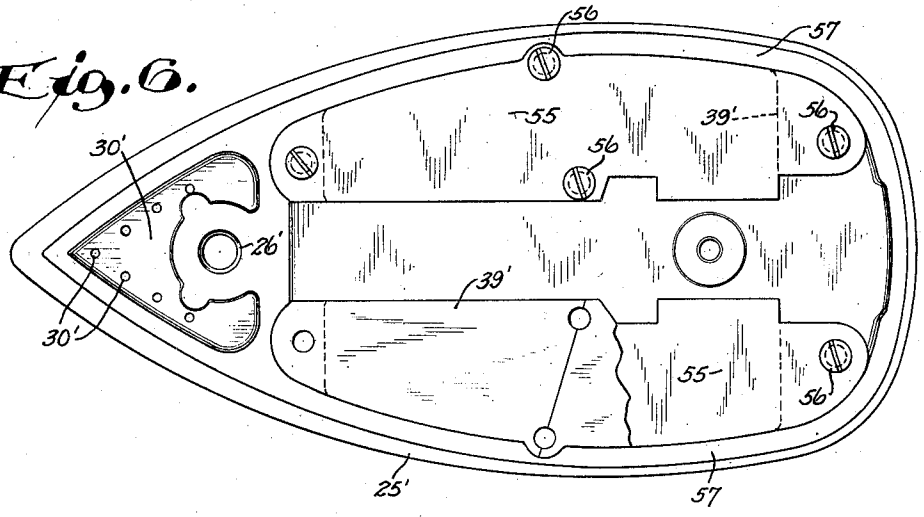


Fig. 5.

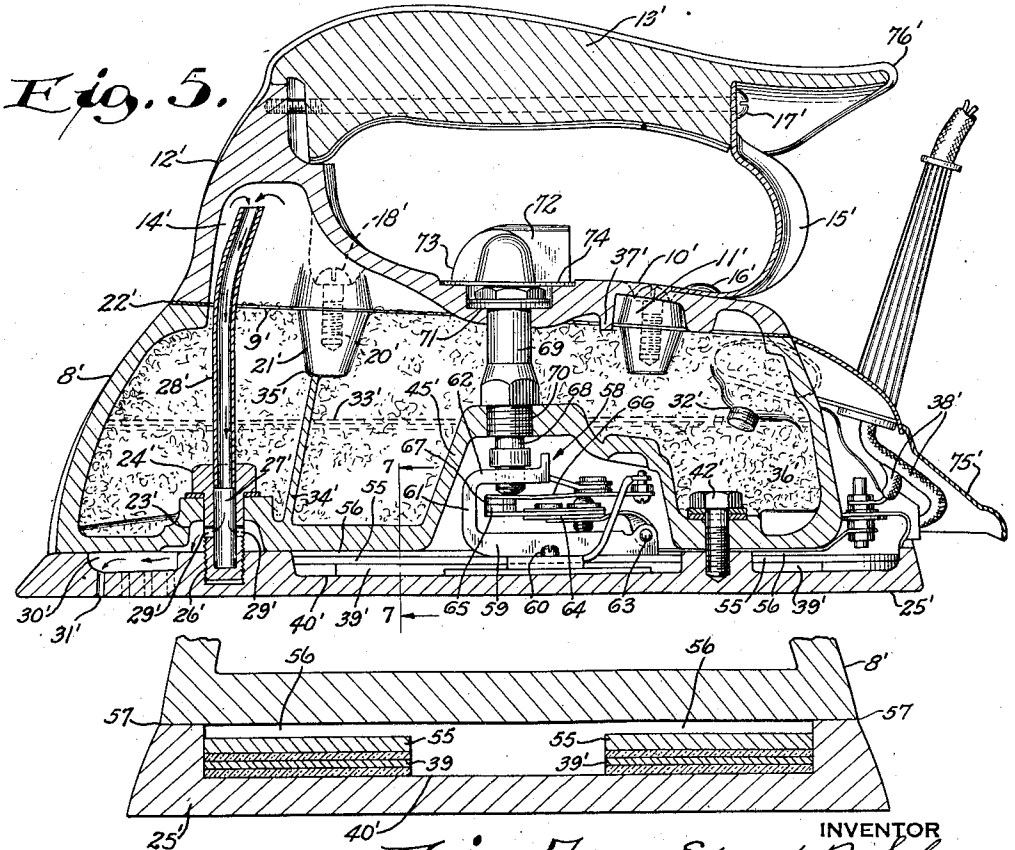


Fig. 7.

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UNITED STATES PATENT OFFICE

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STEAM IRON

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Application August 2, 1940, Serial No. 350,031

5 Claims. (Cl. 38—77)

This invention relates to improvements in steam irons.

In that class of steam iron adapted for household use wherein the steam is generated in a water reservoir in the body of the iron and wherein the same heating element supplies heat simultaneously to the base plate and also to the water in the reservoir, troubles have been encountered in maintaining a proper balance between the sole plate temperature and the amount of steam generated in the water reservoir. Troubles have also been encountered in preventing damage to the iron in cases where the current is carelessly left on after the water is exhausted. In addition, it is highly desirable that a steam iron be suitable for dry ironing as well as for steam pressing, and this involves the delivery of proper heat from the element to both the reservoir and to the base plate and suitable for a variety of fabrics both when there is water in the reservoir and when there is no such water. It is recognized that thermostats have heretofore been suggested for use in controlling the temperature of the body of an iron where steam is delivered to the iron from an outside source. It has not, however, as far as I am aware, heretofore been proposed to utilize a thermostat in an iron wherein the steam is generated in the iron itself and wherein a single heating element controlled by said thermostat is utilized to simultaneously generate a suitable amount of steam and maintain a proper sole plate temperature.

It is therefore one of the objects of the present invention to provide a thermostatically controlled household steam iron having a water reservoir in the iron itself wherein a single heating element is utilized to simultaneously heat the sole plate and the water in the reservoir and wherein said element is thermostatically controlled in a novel manner to maintain suitable and safe sole plate and water temperatures.

A further object is to provide as one adaptation of the invention an iron which can be used for both dry ironing and for steam pressing wherein the single heating element is so controlled as to deliver proper heat to both the reservoir and the sole plate, which heat is suitable for a variety of fabrics both when there is water in the reservoir and when there is no such water.

A further object of the invention is to provide a thermostatically controlled iron as above described including a water container having a bottom, a sole plate fixed to said bottom, and a heating element between said sole plate and container bottom wherein the amount of contact between the sole plate and container bottom is balanced by insulating means above the heating element so that the correct amount of steam will be delivered from the water reservoir for any selected sole plate temperature at which the thermostat is set, whereby the proper balance is obtained between the temperature of the sole plate and the amount of steam delivered to meet the requirements of different types of fabric.

A further object of the invention is to provide in a steam iron having a water container formed with a bottom and having a sole plate secured to said container bottom with a heating element and fibrous pressure plate between said container bottom and sole plate, means such as corrugations or the like on the bottom of the water container to provide depressions into which portions of the pressure plate may be pressed during assembly, whereby a tight and leakproof fit may be obtained between the base plate and the bottom of the water container regardless of perfect accuracy in the milling of said parts.

A further object of the invention is to provide in a steam iron having a water container provided with a hollowed cover, transverse ribs departing from said cover and adapted to bear on the top of metal wool or the like within the iron whereby water which might surge over the top of said metal wool will be prevented by the ribs from entering the steam outlet pipe.

A further object of the invention is to provide an iron wherein there is a metal pressure plate secured to the top of the sole plate above the heating element to press said heating element into intimate contact with the sole plate and wherein there is an air space between the top of the pressure plate and the bottom of the water container serving as insulation, whereby it is unnecessary to utilize an asbestos pressure plate with the attendant difficulties of obtaining a proper fit between the sole plate and bottom of the water container.

With the above and other objects in view, the invention consists of the improved steam iron and all its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawings, illustrating two embodiments of the invention, in which the same reference numerals designate the same parts in all of the views:

Fig. 1 is a longitudinal sectional view through one form of the improved iron;

Fig. 2 is a view looking at the bottom of the iron with the sole plate removed;

Fig. 3 is a view looking at the lower side of the cover for the water container;

Fig. 4 is a fragmentary sectional view taken on line 4—4 of Fig. 1;

Fig. 5 is a longitudinal sectional view through another form or iron suitable for both dry ironing and steam pressing;

Fig. 6 is a plan view of the sole plate alone, part of one of the pressure plates being broken away; and

Fig. 7 is a view on an exaggerated scale taken on line 7—7 of Fig. 5.

Referring more particularly to Figs. 1 to 4 of the drawings, the numeral 8 designates a water reservoir forming the main body of the iron, which reservoir has a top opening 9. A cover 10 is formed with a dished interior as at 11, and the front of the cover stands upwardly as at 12 to provide a support for one end of the handle 13. The portion 12 of the cover is recessed as at 14 to form a steam dome in the front of the iron.

A rear handle bracket 15 has its lower end secured to the rear of the cover as at 16, and has its upper end secured to the rear of the handle by a bolt 17 which extends entirely through the handle to simultaneously connect the front of the handle to the cover extension 12.

The cover is connected to the top of the container by bolts 18 on each side which extend through holes 19 in the cover into tapped openings 20 formed in projections 21 on the inside of the casting, there being a gasket 22 between the cover and the top of the water container.

The bottom of the water container is recessed as at 23, and threaded into said recess is a cap screw 24 which also threads into the base plate 25 as at 26 to secure the forward portion of the base plate to the bottom of the water container. The cap screw has a longitudinal duct 27 therein, and projecting from the upper end of said duct up into the steam dome 14 is a steam pipe 28. Steam generated from water in the water container 8 will pass into the upper end of the pipe 28, into the cap screw duct 27, out of said duct through openings 29, into the recess 23, as indicated by the arrows in Fig. 1. Inasmuch as the recess 23 overlaps the steam channel 30 of the base plate, the steam will pass into said channel and out through the bottom of the base plate by way of steam perforations 31 which communicate with the channel 30.

The iron is adapted to be filled with water through an opening 32, which opening has a suitable closure, and said opening is at such a level that when water runs out of the opening 32 there is a proper level within the iron as indicated by the water level line 33.

In the forward portion of the iron is a rearwardly inclined baffle 34 extending transversely across the iron. The top 35 of the baffle terminates short of the top of the water container but well above the water level 33. Thus when the container is being filled with water the baffle will prevent said water from entering the forward portion of said iron with the possibility of splashing into the top of the steam pipe 28.

It is preferred to utilize aluminum for the water container, cover and base plate, and aluminum wool 36 substantially fills the entire water container. In order to eliminate the necessity of packing the dished portion 11 of the cover 10 with wool, said portion is provided with transverse ribs 37 which press against the top of the aluminum wool when the cover is in place. The aluminum wool prevents undesirable sloshing of water into the steam dome 14, and any water in the rear portion of the iron which might surge above the metal wool will be stopped by the cover ribs 37.

Wires 38 leading from a source of current are connected with a two section heating element 39 positioned in a recess 40 on top of the sole plate. Above the heating element is an asbestos pressure plate 41 which, when the base plate is tightened to the bottom of the water container by the cap screw 24 and by rear bolt 42, fills the space between the heating element and the bottom of the water container and presses the heating element into intimate contact with the top of the sole plate.

In making said connection between the sole plate and the bottom of the water container there would normally be trouble encountered in making a suitable fit at the edges unless the cooperating parts had been milled with perfect accuracy.

However, by providing corrugations 43, or other projections on the bottom of the water container with recesses 44 therebetween, the top of the asbestos pressure plate 41 can be squeezed into the depressions 44 if there are any inaccuracies in the castings or in the fit, to compensate for said inaccuracies. In addition the groove 44 between the corrugations 43 normally provides air spaces between the asbestos and the bottom of the water container, which air spaces have insulating value.

Intermediate its length the bottom of the water container is formed with a depression 45, and the sole plate may be formed with a cooperating depression 46 to accommodate a thermostat 47. The thermostat is connected in the circuit to the heating element 39 and comprises an adjustable contact member 48 and a contact member 49 carried on the end of a bimetallic strip 50. The rear end of the bimetallic strip 50 is supported between a block of porcelain 51 and a bridge 52. The bridge 52 is preferably formed of aluminum and has attachment flanges 53 which are secured by bolts 54 in direct contact with the bottom of the water container.

With this arrangement the bimetallic strip 50 is effected directly by heat of conduction from the bottom of the water container. In this form of the invention the contacts 48 and 49 of the thermostat are normally in circuit-making position, as illustrated in Fig. 1. However, if during use the water in the reservoir becomes exhausted, the temperature of the metal forming the bottom of the water container will rise to such a point as to cause opening of the thermostat and cutting-off of the current to the heating element 39. Thus there is no danger of overheating from lack of water, which might cause burning out of the gasket 32 and other damage to the iron.

Referring now more particularly to Figs. 5, 6 and 7 of the drawings, the structure of the iron therein illustrated is generally similar to that herein described in connection with the form of Fig. 1, and corresponding parts are designated by the same reference numerals primed. In this form of the invention, however, the heating element sections 39' in the top of the sole plate are not covered by asbestos pressure plates which are squeezed between the heating element and the bottom of the water container. Instead metal pressure plates 55 are secured by bolts 56 which extend into the sole plate, and when said bolts are tightened the pressure plates press the heat-

ing elements 39' into intimate contact with the sole plate, the upper surface of each metal pressure plate 55, however, being spaced from the bottom of the water container as at 56 to provide an insulating air space. Due to the use of the air space 56 in lieu of the asbestos shown in the form of the invention of Fig. 1, it is only necessary to obtain a proper fit between the edges 57 of the water container and the sole plate, and the obtaining of a tight leakproof joint at said edges is simplified because the bottom of the water container does not have to exert pressure on a pressure plate of asbestos or the like.

In this form of the invention the thermostat recess 45' in the bottom of the water container is enlarged to accommodate a special form of thermostat 58. Said thermostat includes a metal arm 59 secured to the upper surface of the sole plate as at 60, which arm has an upwardly extending part 61 and a reversely bent part 62. To the other end of the arm 59 there is pivoted at 63 one contact arm 64 of the thermostat carrying a contact member 65. The other contact arm 66 is supported from the part 62 and carries a contact 67. An adjustment rod 68 extends rotatably into an opening in the top of the recess 45' and has its lower end threaded into the part 62. The rod 68 extends upwardly through the water container and through the top of the cover and is surrounded by a protecting sleeve 69, the lower end of which is threaded into the top of the container recess 45', and the upper end of which is in sealed connection as at 71 with the opening in the cover. The sleeve 69 therefore provides a watertight shield for the rod 68; the upper end of the rod 68 has an operating handle 72 rigidly mounted thereon which handle has a pointer end 73 cooperable with indications on a dial 74. The dial may contain designations for various types of material, such as artificial silk and silk, requiring a relatively low heat; wool, requiring a medium heat; and linen and cotton requiring a relatively high heat. When the operating rod 72 is turned in one direction it will engage the contact arm 66 to force the same downwardly toward the contact 65. When the operating handle 72 is turned in the opposite direction the lower end of the rod 68 will be threaded upwardly allowing the contact arm 66 to spring back upwardly under its own tension.

This type of iron is suitable for either a dry ironing or for steam pressing and has a 1,000 watt heating element, and the iron is specially designed in conjunction with the thermostat to cause a correct amount of steam to be delivered for each sole plate temperature. If too much of the heat from the heating element 39' were permited to go to the water reservoir, then too much steam would be delivered for a given sole plate temperature. The iron is, however, so worked out that the contacting areas 57 between the sole plate and the bottom of the water container as well as the areas open for radiation bear such a relationship to the amount of insulating air space 56 that when the sole plate temperature is between 250° F. to 280° F., and when the iron has started to steam, and when the iron contains approximately one pint of water, it will generate an amount of steam equivalent to the evaporation of not less than three ounces of water in one-half hour. When the sole plate temperature is between 500° F. and 530° F., and when the iron has started to steam, and when the iron contains approximately one pint of water, it will generate an amount of steam equivalent to the evaporation of not more than twenty ounces in one-half hour. The above is assuming that tests are made at approximately sea level conditions. When sole plate temperatures are between the above maximums and minimum to which the control handle for the thermostat has been set this will cause the evaporation of amounts of water somewhere between three ounces and twenty ounces, depending upon the sole plate temperature setting.

This form of iron can, therefore, be used either with or without water, and the same thermostatically controlled heating element will maintain any desired sole plate temperature when the iron is being used dry and will maintain any desired sole plate temperature when the iron is used for steaming and at the same time cause the delivery of just the right amount of steam for each particular sole plate temperature.

In either form of the invention the steam is, of course, produced in the upper portion of the water container above the water level, and when a sufficient steam pressure is generated therein the steam will force itself down into the steam pipe 28 or 28', into the sole plate recess 30 or 30', and out of the steam vents 31 or 31' in the sole plate.

In both forms of the invention there are heel rest extensions 75 and 75' at the rear of the body and cooperating extensions 76 and 76' on the handle whereby the iron may be stood on its rear end and used for the steaming of hats or other objects while so disposed. The position of the steam pipe and steam dome in the forward portion of the iron, together with the aluminum wool, inclined baffle 34', and cover ribs serve to maintain the water in the rear portion of the iron so that there is no danger of the iron spitting water when it is standing on its end or while being used for pressing.

It is to be noted that in the form of the invention in Fig. 5 the thermostat is in thermal contact with the sole plate rather than with the water container, so that the thermostat is responsive to sole plate temperatures. The balance obtained through the ratio between the amount of contact areas between the sole plate and the water container and the amount of insulated areas over the heating element serve to admit just enough heat by conduction and radiation to the water container to deliver the proper amount of steam for each sole plate temperature.

Although only only two forms of the invention have been shown and described, it is obvious that various changes and modifications may be made, and all of such changes are contemplated as may come within the scope of the claims.

What I claim is:

1. An iron comprising a base plate formed with steam perforations, a container for water above the base plate having a bottom the lower surface of which is formed with elongated corrugations, a heating element on the base plate for heating said base plate and for heating water in said container to produce steam, means for conducting said steam to the steam perforations of the base plate, a relatively soft, fibrous pressure plate between the heating element and the bottom of the water container, and means for tightening the water container to the base plate, portions of the upper surface of the pressure plate being pressed into the recesses between corrugations in the bottom surface of the water container.

2. An iron comprising a base plate formed with

steam perforations, a container forming a reservoir for water above the base plate and having a bottom and also having an opening in its top, metal wool in said container substantially filling the same, a cover for the top opening of the container having a recess on its inner side, a rib extending transversely of the cover in said recess which bears against the metal wool when the cover is in place, the forward portion of the iron having a steam space, means for heating water in the container to produce steam, means for conducting steam from the steam space to the steam perforations of the base plate, said cover rib being positioned to baffle water which surges over the top of the metal wool to protect the steam space from surging water.

3. An iron comprising a base plate having openings therein providing steam outlets, a container above the base plate, there being a steam space in an upper portion of said container, a duct leading from said steam space to the outlet openings of the base plate and having an elevated steam inlet end positioned in said steam space, means for heating water in said container to produce steam, and a transverse baffle rearwardly of the steam space and rearwardly of the inlet end of the steam duct and having a watertight connection with the sides and bottom of the container, said baffle terminating below the inlet end of the steam duct and below the top of the container and dividing the container into a front compartment and a rear water compartment, said container having a filling opening in the rear water compartment of a size to permit pouring by hand of a substantial quantity of water into the water compartment, the lower edge of the inner end of the opening being positioned below the top of the baffle whereby when the iron is being filled water will overflow from the opening before flowing over the top of the baffle into the forward compartment of the iron.

4. An iron comprising a base plate having a top recess and formed with steam perforations, a container for water above the base plate having a bottom the lower surface of which is formed with projections and recesses, a heating element in the top recess of the base plate for heating said base plate and for heating water in said container to produce steam, means for conducting said steam to the steam perforations of the base plate, a relatively soft fibrous pressure plate between the heating element and the bottom of the water container, and means for tightening the water container to the base plate to press the pressure plate against the heating element and the latter against the base plate, portions of the upper surface of the pressure plate being accommodated in the recesses in the bottom surface of the water container to compensate for inaccuracies in the fit between the base plate and water container.

5. An iron comprising a base plate, a main body portion superimposed on said base plate and having the lower surface of its bottom formed with projections and recesses, a heating element on the base plate, a relatively soft, fibrous pressure plate between the heating element and the bottom of the main body portion, and means for tightening the main body portion to the base plate, portions of the upper surface of the pressure plate being pressed into the recesses in the bottom surface of the main body to compensate for inaccuracies in the fit between said bottom and the base plate.

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