

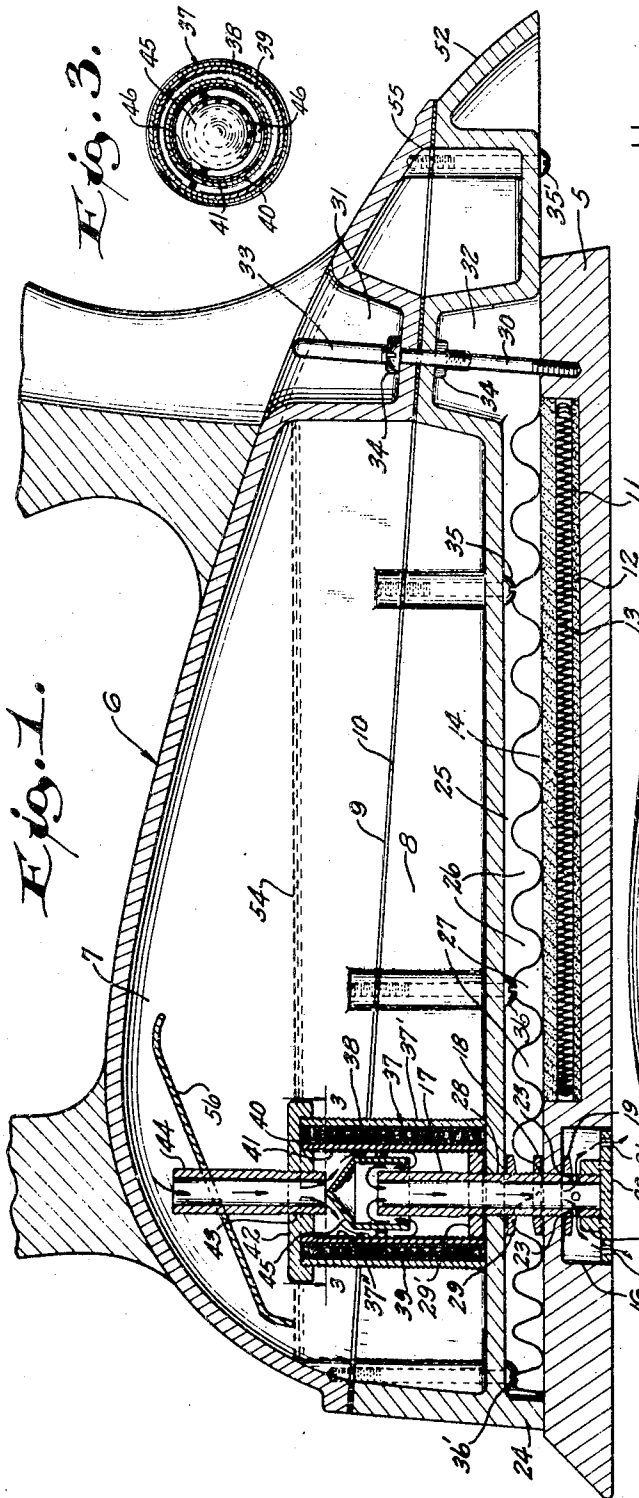
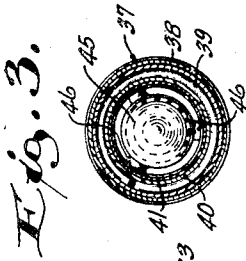
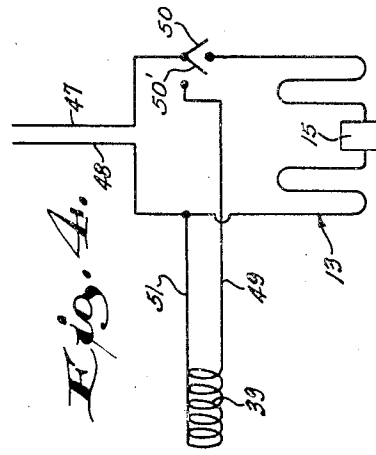
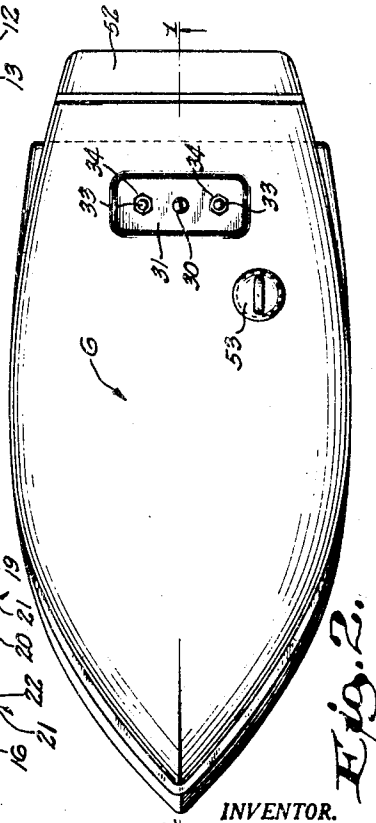
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STEAM IRON

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STEAM IRON

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5 Claims. (Cl. 38—77)

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This invention relates to improvements in steam irons.

With the usual type of household steam iron, wherein the same heating element, located adjacent the sole plate, is used both to generate steam and to heat the pressing face, difficulties have been encountered. The sole plate element is usually between 600 and 1000 watts, and is therefore capable of generating considerably more heat than is necessary to produce steam. As a result, the water in the water container of the iron is oftentimes agitated so violently, while steam is being generated, that drops of water escape with the steam. Furthermore, such overheating of the water exhausts the water supply too quickly, and makes refilling necessary. The conventional steam iron is also subject to the objection that when it is placed on its heel rest, steam continues to be generated. This uses up the water unnecessarily, and discharges undesired quantities of steam into the room.

It is a general object of the present invention to provide a steam iron which is designed to obviate the above-mentioned objectionable features while still retaining a construction which is simple to manufacture and assemble, which is efficient, and which is well adapted for the purpose described.

A further object of the invention is to provide in a steam iron having a sole plate and having a water container over the sole plate an electric heating element for the sole plate and a separate electric heating element for the water container, the latter being so located, designed and arranged as to generate steam in an efficient manner without exhausting the water supply too rapidly.

A further object of the invention is to provide in a construction as above described, novel means for preventing the boiler temperature from being affected by the heating of the sole plate.

A further object of the invention is to provide a steam iron as above described, wherein the heel rest extension at the rear of the shell is maintained at a safe temperature by the water in the water container so that there is no fire hazard when the iron is placed on its heel in a position of rest.

A further object of the invention is to provide in a construction as above described, having a heel rest, a heating element for the water container which is so located in a forward portion of the iron that when the iron is placed on its heel, the heating element is above the level of

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water in the iron so that the steam is not generated when the iron is temporarily out of use, the said heating element, however, being so located that efficient generation of steam takes place whenever the iron is in the normal horizontal position of use.

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 drawing illustrating one complete embodiment of the preferred form of the invention, in which the same reference numerals designate the same parts in all of the views:

Fig. 1 is a longitudinal vertical sectional view through the improved iron, taken approximately on the line 1—1 of Fig. 2, the upper portion of the handle being broken away;

Fig. 2 is a plan view of the iron with the handle omitted;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1; and

Fig. 4 is a diagrammatic view showing the electrical circuit.

Referring more particularly to the drawing, the numeral 5 designates a sole plate, and the numeral 6, a water container which forms the main body, or shell, of the iron. The shell is formed of an upper section 7 and a lower section 8, which are suitably secured together along a line of meeting 9 with a suitable gasket 10 therebetween.

The upper surface of the sole plate 5 has its rear portion recessed, as at 11. This recess occupies the major portion of the width of the sole plate, and contains a bottom layer of refractory cement 12, an electric heating element 13, and a top layer of refractory cement 14. The heating element may comprise a plurality of lengths of coil extending longitudinally back and forth in the recess 11. In Fig. 4 the heating element is shown as comprising six lengths with a thermostat 15 of any suitable type interposed therebetween.

Forwardly of the heating element recess 11, the sole plate is recessed in its lower face, as at 16. A steam outlet tube 17 has its lower end portion extending through the portion of the sole above the recess 16 and projecting into the recess. The tube is clamped in a desired position by means of nuts 18 and 19.

A steam discharge plate 20, having steam discharge openings 21 therein, has its upper face formed with a boss 22 which is threaded onto

the lower end of the steam outlet tube 17. The steam discharge plate 20 has its lower face in the plane of the lower face of the sole plate. The shape of the member 20 is the same as the shape of the recess 16, and this is preferably circular. Between the upper end of the boss 22 and the nut 19 the steam tube 17 is formed with ports 23. Thus, steam traveling downwardly in the outlet tube 17 will emerge from the ports 23 into the sole plate recess 16. The steam will then pass out of the holes 21 in the plate 20 and onto the garment being pressed.

It is necessary with the present construction to have insulating means between the top of the sole plate and the bottom of the water container. As one method of accomplishing this, the bottom of the water container is formed with a depending marginal skirt 24. The lower edge of the skirt contacts the upper surface of the sole plate to maintain the bottom of the water container in a position spaced above the upper surface of the sole plate. This space may, if desired, be filled with asbestos. However, with the present invention, it is preferred to utilize air as the insulating medium and to provide for the circulation of air through the space 25. Accordingly, the skirt 24 has its side and front portions scalloped, as at 26, so that air from the exterior may pass into the openings 27 between the scallops on one side and out of similar openings on the opposite side.

The steam outlet tube 17 projects upwardly through a hole 28 in the bottom of the water container, and a nut 29 on the lower side of the water container bottom, together with a nut 29' forming the bottom of the heating unit 37, which nuts are cooperable with suitable sealing gaskets, are threaded on the tube 17 and secure the tube in proper position. It is thus apparent that the forward portion of the water container is secured to the sole plate by means of the steam outlet tube 17 and cooperating nuts. The rear portion of the water container is secured to the rear portion of the sole plate by means of a bolt 30 which has its head positioned in an outlet plug recess 31 of the top half 7 of the water container 6. The bolt extends downwardly through a matching recess 32 in the bottom half 8 of the water container, and the lower end of the bolt is threaded into the sole plate. The bolt 30 is positioned midway between a pair of terminal prongs 33. These prongs are electrically connected with the electric circuit and are adapted to cooperate with a plug on the end of an outlet cord. The lower ends of the prongs 33 have nuts 34 threaded thereon, and these nuts serve to lock the upper and lower sections of the water container together at the rear of the iron. These two sections of the water container are also secured to each other by other bolts, such as the bolts 35, 35', 36 and 36'.

Located in the forward portion of the iron and adjacent the upper surface of the bottom of the water container in a position surrounding the upper end of the steam outlet tube 17 is a cylindrical heating unit 37. This unit comprises an outer layer 38 of suitable material, such as aluminum, a heating coil 39 positioned within the portion 38, a layer of refractory material 40, which may also extend between the convolutions of the heating coil and on both sides of said coil, and an inner cylinder 41 of aluminum or other suitable material. The outer and inner surfaces of the unit 37 are formed with coarse threading 37'

and 37" to give more radiating surface to take heat away from the element.

A sealing cap 42 which is threaded in position on top of the unit has a central hole 43 for threadedly receiving the lower end of a steam tube 44. Below the lower end of the steam tube 44 is an inverted baffling cup 45 which is supported on the inner layer of the heating unit by means of spider extensions 46. The top of the baffling cup 45 is conical in shape with the apex of the cone located centrally of the lower end of the steam tube 44. The open bottom of the member 45 overlaps and surrounds the upper end of the steam outlet tube 17. The heat radiating threading may be used to secure the cap 42 and the bottom nut 29' in position on the unit 32.

Referring to Fig. 4, one type of possible electrical circuit is illustrated. The wires 47 and 48 connect with the terminal prongs 33 of the iron. The wire 47 then extends to one side of the sole plate heating element 13 and the wire 48 to the other side. The thermostat 15 may control the flow of current through the sole plate heating element 13. There may also be a manual switch 50. A wire 49 leading to one side of the steam generating coil 39 may be connected to the line 47 by means of a suitable switch 50'. The other side of the coil 39 may be connected by a wire 51 with the line 48. If desired, the circuits leading to the two different heating elements may be controlled by a combination electric switch of the type disclosed in my Patent No. 2,054,147, issued September 15, 1936.

It is preferred to have the steam generating heating coil 39 of the self-regulating type. With this type of coil, the hotter the coil gets, the more the resistance to the flow of electricity increases, and consequently, the wattage goes down. The coil 39 is preferably about 300 watts. The sole plate heating element may be between 600 and 1000 watts.

Preferably formed as an integral part of the lower section 8 of the water container is a heel rest extension 52. This extension has a straight rear edge portion in plan view, as is illustrated in Fig. 2, and is cooperable with the usual rear projection at the top of the rear leg of the handle to support the iron in a position of rest on its heel.

In use of the iron, the water container may be charged with water by removing a filling opening plug 53. The container should be filled with water to approximately the level indicated by the dot and dash line 54. With the terminal prongs 33 connected to the plug of an electric outlet cord and with the switch 50 closed, both the sole plate heating element 13 and the steam generating coil 39 will be energized. The thermostat 15 will control the heating element 13 to keep the sole plate at a desired temperature. The temperature of the sole plate is usually substantially higher than is necessary to generate steam. However, air circulating through the openings 27 in the scalloped skirt 24 will prevent the temperature of the sole plate from affecting the boiler temperature. The generation of steam, therefore, is entirely under the control of the coil 39. This coil has proper wattage to efficiently generate steam without creating excess heat which would cause too violent agitation of the water or cause exhausting of the water supply too rapidly. When the iron is placed on its heel, the level of the water in the water container 6 will be below the heating unit 38, and the generation of steam will practically stop. Furthermore, the water which is always present

in the rear chamber 55 near the heel rest extension 52 will always keep the heel rest extension at a safe temperature.

While the iron is at rest on its heel with the heating unit 37 above the water level, the temperature of the coil 39 will immediately rise to increase the resistance so that the wattage of this self-regulating coil goes down.

During normal use of the iron, steam from the water in the water container will rise and pass into the upper end of the steam tube 44. The pressure in the boiler will cause the steam to pass downwardly through the tube 44 to be discharged against the conical top of the baffling cup 45. Steam will then pass downwardly against the outer sides of the baffling cup and any water of condensation will fall to the bottom of the cylinder 38. The steam will then rise again, as indicated by the arrows, to enter the top of the steam outlet tube 17. From the tube 17 the steam will be discharged through the ports 23 into the sole plate chamber 16 and out of the holes 21 in the steam plate 20. The chamber within the heating unit 37 is, of course, suitably sealed against the entry of water from the water container, except of course such water as may accidentally splash into the upper end of the tube 44. Such small quantities of water, however, cannot enter the steam tube 17 and will be quickly flashed into steam within the heating unit chamber. In order to minimize the possibility of water gushing into the tube 44, a baffle plate 56 extending entirely across the iron and supported on the steam tube 44 may be used.

Various changes and modifications may be made without departing from the spirit of the invention, and all of such changes are contemplated as may come within the scope of the claims.

What I claim is:

1. In a steam iron having a sole plate and having a container for water positioned over the sole plate, a heel rest, a heating element adjacent the sole plate for heating the latter, and a heating unit located in the forward end of the water container adjacent the bottom thereof to be submerged when the iron is in a normal position of use and to be above the normal level of water in the container when the iron is at rest on its heel.

2. In a steam iron having a sole plate and having a container for water positioned over the sole plate, a steam outlet tube extending through the bottom of the water container toward the sole plate, means for directing steam from said outlet tube out of the bottom of the sole plate, a heating unit in the water container having a chamber which is sealed against the entry of water within which the upper end of said outlet tube is positioned, and means projecting above the normal water level for directing steam from

the water container into said chamber of the heating unit.

3. In a steam iron having a sole plate and having a container for water positioned over the sole plate, a steam outlet tube extending through the bottom of the water container toward the sole plate, means for directing steam from said outlet tube out of the bottom of the sole plate, a heating unit in the water container having a chamber which is sealed against the entry of water within which the upper end of said outlet tube is positioned, means projecting above the normal water level for directing steam from the water container into said chamber of the heating unit, and steam baffling means within said chamber of the heating unit positioned to protect the upper end of the steam outlet tube from the entry of water.

4. In a steam iron having a sole plate and having a container for water positioned over the sole plate, a steam outlet tube extending through the bottom of the water container toward the sole plate, means for directing steam from said outlet tube out of the bottom of the sole plate, a heating unit in the water container having a chamber which is sealed against the entry of water within which the upper end of said outlet tube is positioned, means projecting above the normal water level for directing steam from the water container into said chamber of the heating unit, and an inverted cup-shaped baffle positioned in said chamber of the heating unit and surrounding the upper end of the steam outlet tube to protect said upper end from the entry of water.

5. In a steam iron having a sole plate and having a container for water positioned over the sole plate, a heel rest, thermal insulation between said container and said sole plate, a heating element adjacent the sole plate for heating the latter, and a second heating element located in the forward end of the water container adjacent the bottom thereof to be submerged when the iron is in a normal position of use and to be above the normal level of water in the container when the iron is at rest on its heel.

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