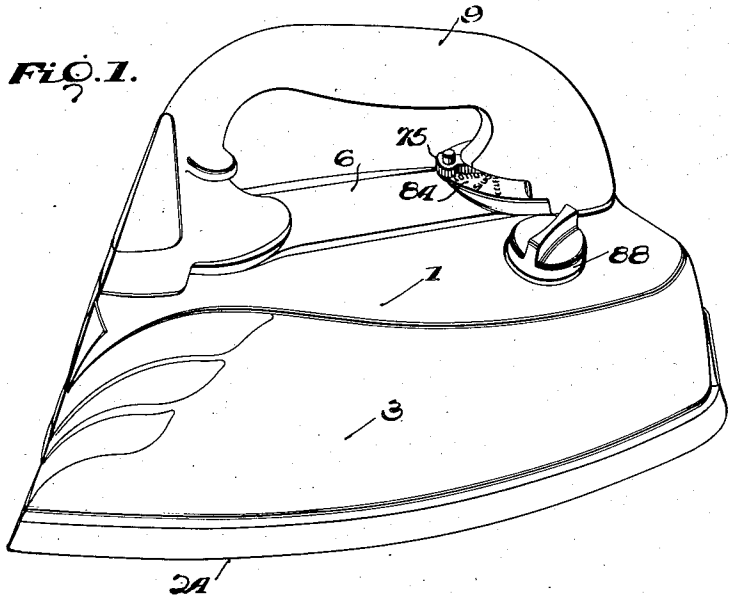
Feb. 16, 1943. H. V. EKSTEDT 2,311,164

ELECTRIC STEAMING IRON

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FIG. 1.



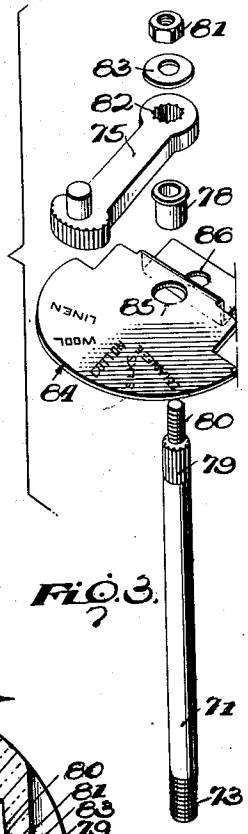
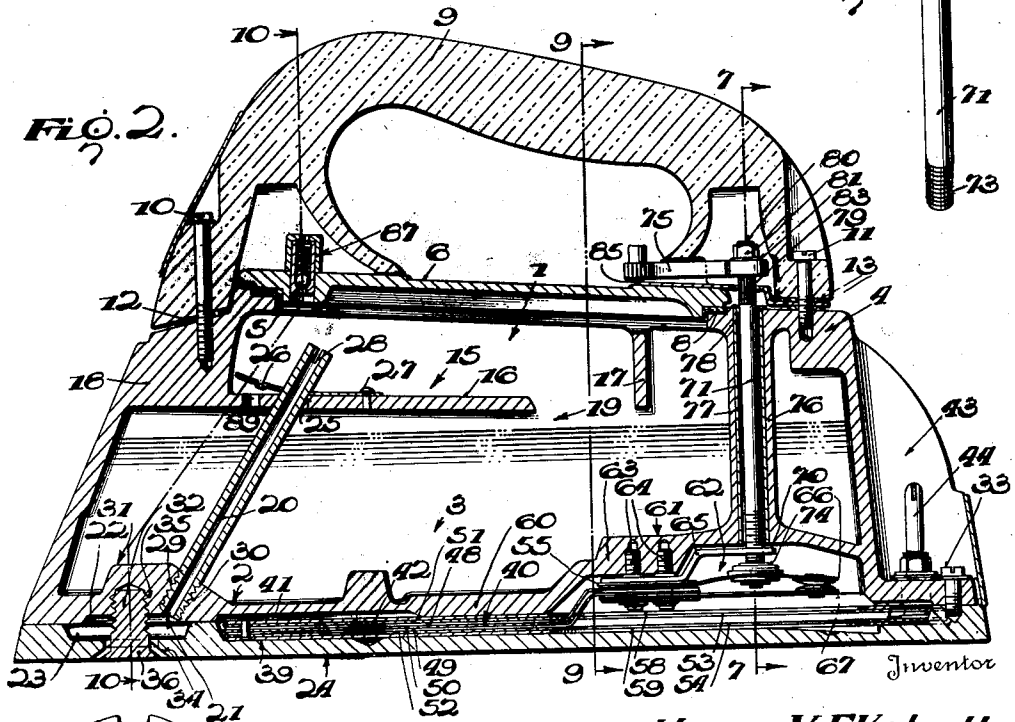


FIG. 3.

FIG. 2.



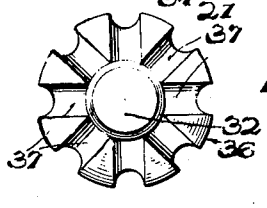
Inventor

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By

Attorney

FIG. 4.



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Fig. 5.

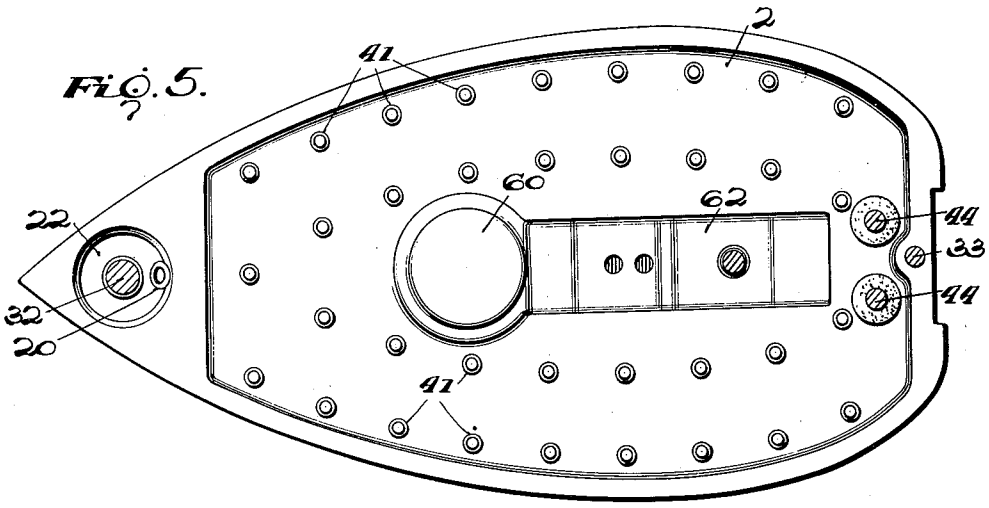


Fig. 6.

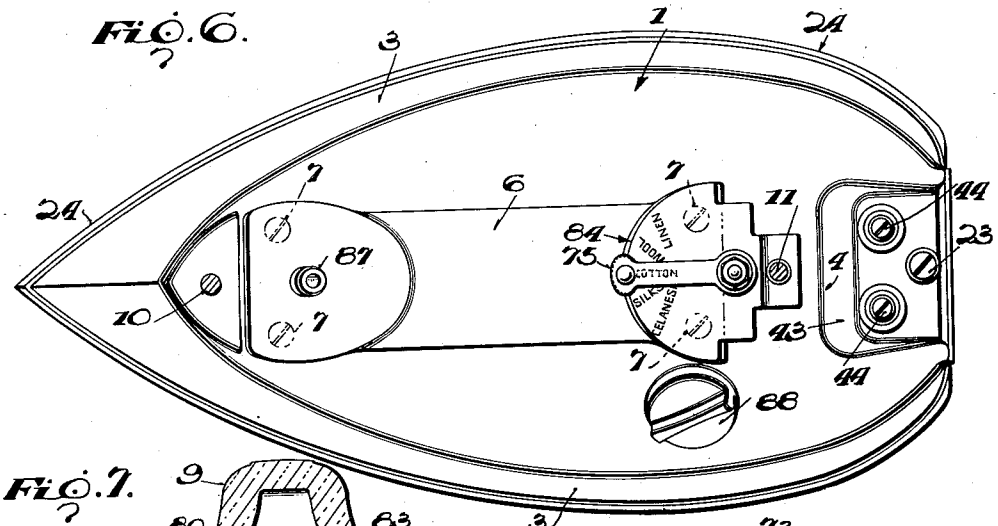


Fig. 7.

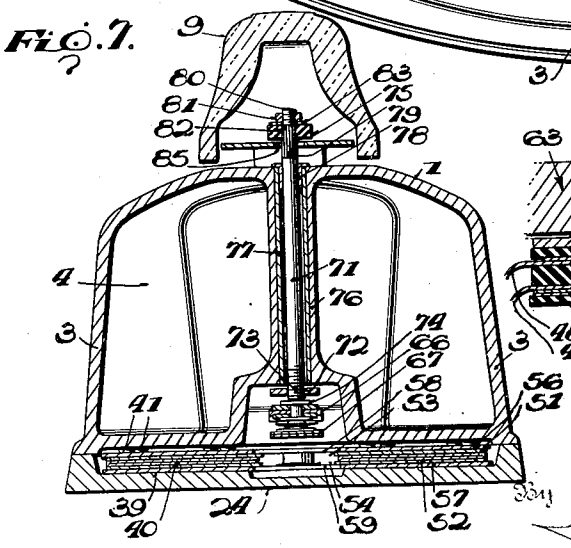
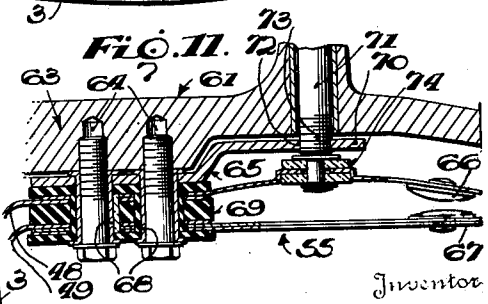


Fig. 11.



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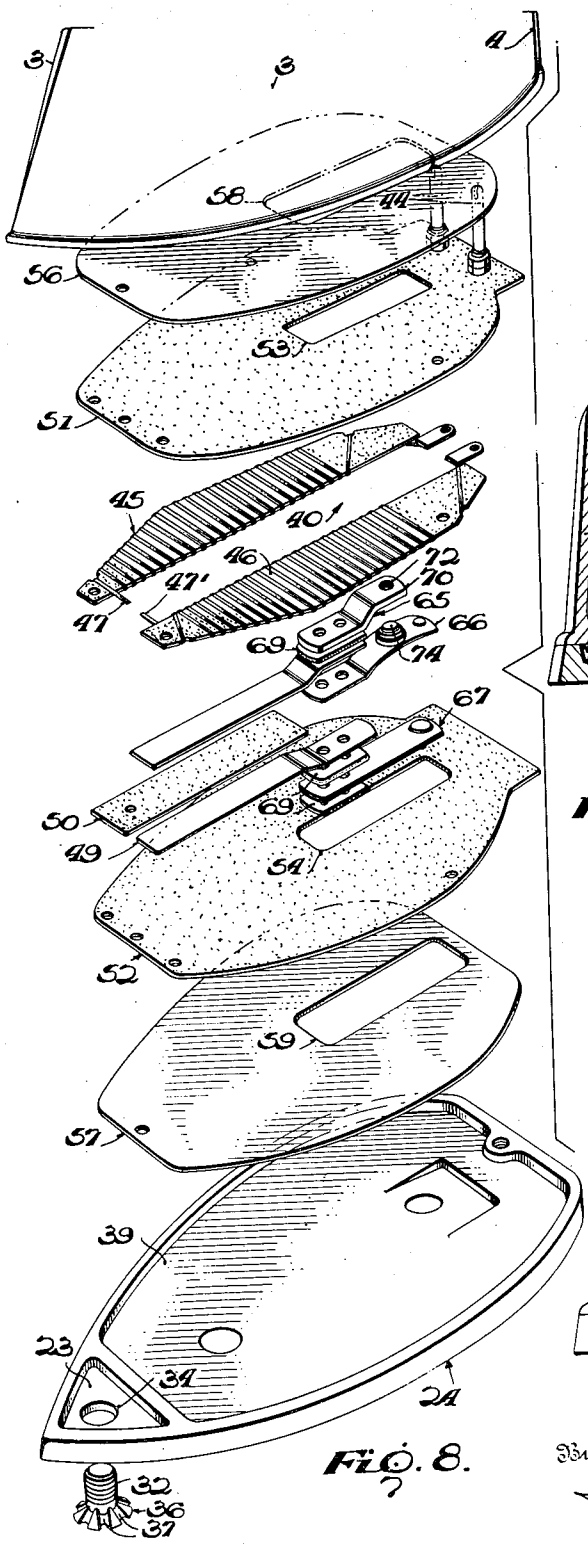


Fig. 8.

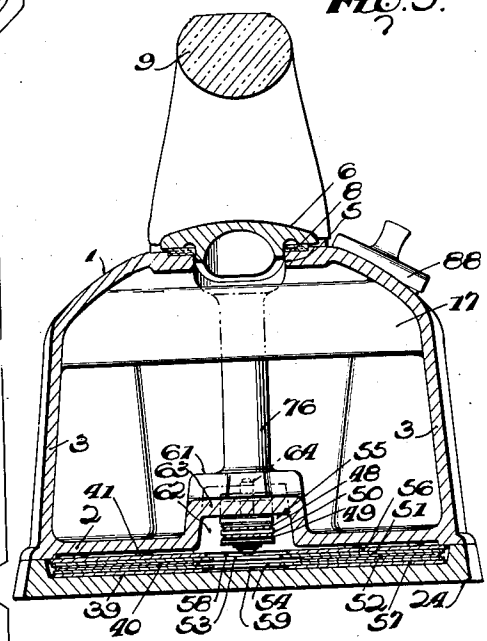


Fig. 9.

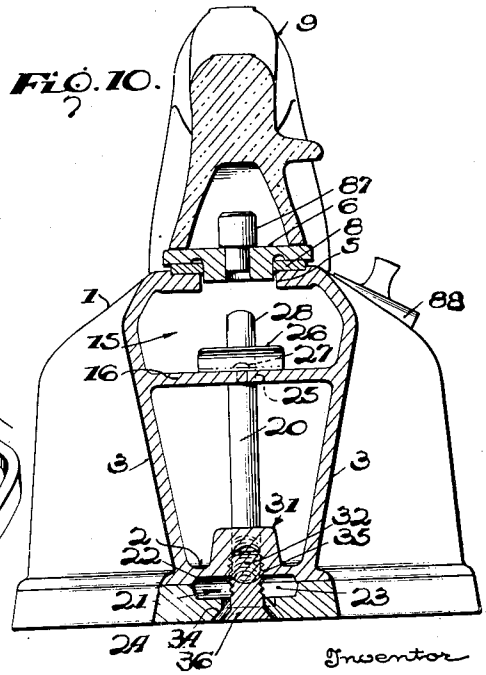


Fig. 10.

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Patented Feb. 16, 1943

2,311,164

UNITED STATES PATENT OFFICE

2,311,164

ELECTRIC STEAMING IRON

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Application February 24, 1941, Serial No. 380,357

3 Claims. (Cl. 38—77)

This invention relates to an electric steaming iron.

The object of the present invention is to improve the construction of electric steaming irons and to provide a simple, practical and comparatively inexpensive steaming iron equipped with a tank or water reservoir and having an electric heating unit for converting the water into steam and provided with means for preventing the electric heating unit from being checked by water within the tank or reservoir as is the case when the heating unit is in contact or substantially in contact with the bottom wall of the tank or reservoir and is capable of raising the temperature of the pressing surface of the iron to substantially 412° F. whereby the electric heating unit will be rendered capable of increasing the temperature of the pressing surface to at least 610° F. so that the iron may be advantageously employed for ironing the heavier class of fabrics such as cotton, woolen goods and linen.

A further object of the invention is to provide an electric steaming iron of this character equipped with adjustable conveniently operated current controlling means adapted to enable the temperature of the pressing surface of the iron to be varied to adapt the iron for ironing lighter materials such as celanese, silks and the like and also for said heavier class of goods.

Another object of the invention is to provide in the hollow shell an integral hollow column adapted to form a passage or housing for a thermostat controlling shaft extending through the hollow shell from the bottom thereof to the top of the same and provided at the upper end with a conveniently arranged readily operated handle and having at the lower end means for engaging and varying the effectiveness of the thermostat for heating the sole plate and the pressing surface thereof different temperatures to suit the character of the fabrics to be ironed.

Another object of the invention is to case in the hollow column a tube of a different metal from the casting adapted to operate as a chill to prevent shrinkage of metal and formation of gas holes and capable of maintaining the hollow column in a predetermined position with relation to the exterior of the iron and of obviating the necessity of drilling the column for the reception of the thermostat controlling shaft or member.

With these and other objects in view, the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion, and minor details of construction within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any advantages of the invention.

In the drawings:

Figure 1 is a perspective view of an electric steaming iron constructed in accordance with this invention.

Figure 2 is a central longitudinal sectional view.

Figure 3 is an exploded view illustrating the construction of the thermostat controlling means.

Figure 4 is an enlarged detail plan view of the sole plate attaching screw having means for discharging and spreading steam.

Figure 5 is an inverted plan view of the hollow shell illustrating the arrangement of the thermostat, the fastening means for securing the sole plate to the hollow shell being shown in section.

Figure 6 is a plan view of the electric steaming iron, the handle being removed.

Figure 7 is a transverse sectional view taken substantially on the line 7—7 of Figure 2.

Figure 8 is an exploded view of the electric heating unit including the thermostat.

Figure 9 is a transverse sectional view taken substantially on the line 9—9 of Figure 2.

Figure 10 is a similar view taken substantially on the line 10—10 of Figure 2.

Figure 11 is an enlarged detail sectional view illustrating the means for attaching the thermostat to the bottom of the hollow body.

In the accompanying drawings in which is illustrated the preferred embodiment of the invention the electric steaming iron comprises in its construction a hollow shell consisting of a single casting of aluminum or other suitable material and comprising integral top and bottom walls 1, 2, side walls 3 and a rear end wall 4. The top wall 1 is provided with a central longitudinal opening 5 which is normally closed by a cover plate 6 secured to the top wall by suitable fastening devices 7 and having a packing 8 of suitable material interposed between it to form a steam and water-tight connection between the top wall of the hollow body or shell and the cover plate.

A handle 9 of Bakelite or other suitable non-heat conducting material is secured to the top wall of the hollow body by screws 10 and 11 or other suitable fastening means and washers 12 and 13 are arranged on the screws 10 and 11 and are interposed between the hollow body and the handle 9 to provide air spaces between the handle and the hollow body to prevent heat-

ing of the handle by direct contact with the hollow body.

The hollow body or shell is provided in its upper portion above the normal water level 14 with a steam feed chamber 15 including a horizontal bottom wall 16 and a rear transverse wall 17. The horizontal bottom wall 16 which is arranged at the front portion of the hollow body extends entirely across the same and rearwardly from an interiorly arranged enlargement 18 of the front end of the body. The rear wall which also extends entirely across the hollow body is located between the ends of the same and in spaced relation with the rear end of the horizontal wall 16 to provide an entrance space or opening 19 which permits passage of steam to the steam chamber 15.

An inclined steam feed pipe 20 extends downwardly and forwardly from the upper steam feed chamber 15 to a lower front steam discharge chamber 21 formed by coinciding recesses 22 and 23 in the opposed faces of the bottom wall of the hollow body and the upper face of a sole plate 24. The steam feed pipe 20 extends through a close fitting opening 25 in the front portion of the bottom wall 16. A guard 26 consisting of a plate of resilient sheet metal or other suitable material is riveted or otherwise secured at 27 to the upper face of the bottom wall 16 and is closely fitted around the steam feed pipe 20. The front portion of the plate 26 is arranged at an angle to the upper face of the bottom wall 16 and the opening 89. Opening 89 forms a vent for equalizing the pressure between the pressure of the steam chamber and the water reservoir or tank and thereby prevents pressure from building up within the front portion of the steam chamber interfering with the passage of steam through the pipe 26 or creating a suction or siphoning of water through the steam pipe. The plate 26 forms a guard for preventing water from splashing through the opening 89 into the steam collecting chamber 15.

The upper end of the steam pipe is provided with a slot 28 adapted to receive the blade of a screw driver or other tool for rotating the steam pipe to screw its threaded lower end 29 into a threaded opening 30 of an enlargement 31 of the bottom wall of the hollow body. The threaded opening 30 extends entirely through the bottom wall of the hollow body and steam is adapted to pass through the steam pipe 20 into the chamber 21 and any excess moisture carried by the steam into the chamber 21 will be converted into steam prior to its discharge from the pressing surface of the sole plate of the iron.

The sole plate is secured to the hollow body at the bottom thereof by fastening means including a front screw 32 and a rear screw 33. The front screw preferably consists of a drop forging and it extends through an opening 34 in the front portion of the sole plate and engages a threaded socket 35 formed in the lower portion of the enlargement 31 and terminating short of the interior of the hollow body. The rear screw is located beyond the interior of the hollow body so that the fastening means for securing the sole plate to the hollow body does not require any packing. The opening 34 which receives the head 36 of the screw 32 is tapered or conical and the head of the screw is also tapered or conical and is provided in its beveled edge with a plurality of radial grooves 37 arranged at an inclination and formed in making the drop forging and adapted to provide discharge passages for the steam and to spread the steam as it is discharged from the pressing surface of the iron.

The formation of the discharge passages by grooves during the forging process is materially less expensive and less troublesome than boring holes in the head of the screw around the stem or shank thereof to provide discharge passages for steam. The grooves 37 as clearly illustrated in Figure 4 of the drawings provide an annular series of discharge passages surrounding the screw and leading from the pressing surface of the sole plate of the iron to the interior of the chamber 21 for the discharge of steam.

As clearly shown in Figure 2 of the drawings the opening 34 is of greater diameter than the stem of the screw to permit free passage of steam into the grooves 37. The sole plate is provided in its upper face with a recess 39 extending over the major portion of the area of the sole plate and receiving an electric heating unit 40 which is arranged in substantial horizontal contact with the sole plate and is spaced from the lower face of the bottom wall 2 of the hollow body by rounded or substantially semi-spherical protuberances 41 formed integral with the bottom wall of the hollow body and located within a recess 42 in the lower face of said bottom wall 2 of the hollow body and disposed over substantially the entire area of the electric heating unit and spacing the same from the bottom wall 2 to provide an intervening air space between the electric heating unit and the hollow body for preventing water within the hollow body from checking the heating of the sole plate and interfering with the operation of the heating unit.

It has been found by experience that when a heating unit is arranged in contact with or substantially in contact with a water reservoir that the water within the reservoir checks the heating unit and renders it impossible for the heating unit ordinarily employed in electric irons to raise the temperature of the sole plate above 412° F. By spacing the electric heating unit from the bottom wall of the hollow body and thereby preventing the water from checking the heating unit the latter with the ordinary type and construction of electric heating unit is enabled to raise the temperature of the sole plate to at least 610° F. which is ample for ironing the heavier class of fabrics such as cotton goods, woolen goods and linens.

The recess 39 formed in the upper face of the sole plate for the reception of the heating unit extends rearwardly beneath the rear end of the hollow body which is provided with an inset portion 43 which receives suitable electric cord plug connectors 44. The electric heating unit which may be of any desired construction is composed of two side sections 45 and 46 having windings of nichrome wire electrically connected at their rear ends to the connectors 44 and having their front ends 46 and 47 connected respectively to upper and lower plates 48 and 49 of copper or other suitable material of high conductivity. The plates or strips 48 and 49 are insulated from each other by an interposed strip 50 of mica or other suitable material. The sections 45 and 46 are spaced apart to receive the conductors 48 and 49 and are covered by upper and lower insulating sheets 51 and 52 of mica or other suitable material which also extend over the conductors 48 and 49. The mica sheets which are riveted or otherwise se-

cured together are cut away at their rear portions to provide openings 53 and 54 to receive a thermostat 55.

The heating element is also covered and protected by upper and lower plates 56 and 57 of metal which are also provided with openings 58 and 59 corresponding in configuration to the openings 53 and 54 and arranged to provide sufficient lateral clearance to prevent the thermostat from coming in contact with either of the metal plates 56 and 57. The metal plates 56 and 57 are riveted or otherwise connected together and to the heating unit.

The protuberances 41 bear against the upper metallic plate 56 and the lower metallic plate 57 rests upon the bottom of the recess 39 and the upper face of the sole plate. The recess 39 is of sufficient length to extend rearwardly beneath the inset portion of the rear wall of the hollow body and enable the rear ends of the nichrome wires of the sections of the heating element to be readily connected with the posts or connectors 44. The posts or connectors 44 extend through and are suitably clamped to the upper mica sheet 51. The bottom wall 2 of the hollow body is provided at its lower face with a central circular boss 60 which supplements the protuberances 41 in spacing the heating unit from the tank or water receptacle. The bottom wall 2 is also provided at its rear portion with a central upwardly offset portion 61 forming a lower longitudinal recess 62 located in vertical alignment with the longitudinal thermostat receiving opening in the heating unit.

The top wall of the recess 62 is thickened or enlarged at 63 and has a horizontal lower surface located at a lower elevation than the lower face of the top wall of the rear and intermediate portions of the recess 62 and having the thermostat rigidly secured to it by fastening devices 64 preferably consisting of screws suitably insulated from the members of the thermostat. The thermostat comprises a bracket 65 and upper and lower members 66 and 67 rigidly secured to the attached portion of the bracket and to the conductor strips 48 and 49 by tubular rivets 68 through which the screws 64 pass, suitable insulation 69 of mica or other suitable material being interposed between the bracket and the upper member of the thermostat and between the members of the thermostat. The insulation 69 also insulates the conductor strips 48 and 49 from each other. The openings in the conductor strips and the upper and lower members of the thermostat are of sufficiently greater diameter than the tubular rivets to space them from the rivets so that the members of the thermostat and the conductor strips 48 and 49 will be completely insulated at the points of attachment of the thermostat to the bottom wall of the hollow body.

The bracket 65 is angularly bent intermediate of its ends to offset its projecting portion 70 from the attached portion. The lower member of the thermostat is bi-metallic and the upper member 66 of the thermostat is bowed as clearly shown in Figures 2 and 8 of the drawings and is adapted to be engaged by the lower end of an adjusting screw 71 for increasing the tension of the said upper member 66 so that a greater amount of heat will be required to separate the free terminal portions of the members of the thermostat. By this operation the temperature to which the sole plate and the lower pressing surface thereof are raised may be controlled and varied to suit the character of the fabrics to be operated on by the electric steaming iron. The free terminals of the members of the thermostat are provided with suitable contacts which may be of any desired formation.

The bracket or support 65 fits against and conforms substantially to the configuration of the top wall of the recess 62 in the lower face of the bottom wall of the hollow body and it is provided with a threaded opening 72 which is engaged by the lower threaded portion 73 of the screw 71. The bowed upper member 66 of the thermostat is provided centrally of its bowed portion with a sheet 74 riveted or otherwise secured to the said upper member 66 and arranged to be engaged by the lower end of the screw 41. When the screw is rotated by a handle 75 it is moved upwardly or downwardly according to the direction of movement of the handle of the screw for varying the pressure on the bowed portion of the upper member 66 of the thermostat.

The screw extends through a tubular column 76 cast integral with the hollow body or shell and extending through the tank or water reservoir from the top to the bottom thereof for permitting the screw to extend from the top of the iron into the recess 62 without necessitating any packing for preventing leakage of water from the tank or reservoir. In order to prevent shrinkage of metal and the formation of gas holes in the casting of the hollow column and the adjacent parts of the hollow shell or body, a tube 77 of brass or other suitable material is arranged within the hollow column and the metal thereof is cast around the brass tube which is secured in the mold in the usual manner. The tube or brass or other suitable material operates as a chill and enables the hollow column 76 to be accurately positioned with relation to the exterior of the iron and prevents shrinkage and the formation of gas holes and at the same time obviates the necessity of boring a cast column to provide an opening for the screw 71. A tubular bushing 78 is pressed into the upper end of the brass tube to form a bearing from the upper portion of the screw 71, the lower portion of the screw being mounted in the bracket which cooperates with the bushing in maintaining the screw in proper position.

The screw 71 extends above the top of the hollow body and is provided with a knurled portion 79 which terminates short of the upper end of the screw. The upper terminal portion 80 of the screw is reduced and threaded to receive a nut 81. The handle 75 is designed to be constructed of Bakelite or other suitable material and is provided with an opening 82 for the shaft. In assembling the shaft and the handle the inner end of the handle is placed on the upper portion 80 of the shaft and the nut is applied and is screwed inwardly on the shaft to force the knurled upper portion 79 of the screw into the opening 82 of the handle 75 thereby causing the screw to cut its own knurl into the handle 75 whereby the handle will be rigidly keyed to the screw and is adapted to partially rotate the screw for varying the pressure of the lower end of the screw on the bowed upper member of the thermostat. A metallic washer 83 is preferably interposed between the nut and the upper face of the inner end of the operating handle.

The operating handle moves over an approximately semi-circular dial plate 84 having adjacent its periphery the words "celanese, silks,

cotton, wool, linen" or other suitable designations for enabling the screw to be adjusted for varying the temperature of the pressing surface of the iron with substantial accuracy to suit the character of the fabrics to be ironed. The greater the pressure applied to the upper bowed member of the thermostat and the greater the tension thereof the greater will be the heat required to effect a separation of the initially contacting free terminal portions of the upper and lower members of the thermostat for breaking the current supplied to the electric heating unit.

The dial plate extends beneath the rear end of the handle 9 of the electric steaming iron and is clamped by the same firmly against the upper surface of the top wall of the hollow body, suitable openings 85 and 86 for the passage of the screw 71 and the rear attaching screw 11 of the handle. The electric steaming iron is provided with a suitable relief valve 87 located within the front portion of the handle 9 of the electric steaming iron and adapted to be operated should the pressure within the water reservoir or tank exceed a predetermined degree. The spacing of the front end of the handle from the hollow body will permit the escape of steam under such conditions and the handle will prevent any of such escaping steam from accidentally contacting with the hand of the person holding the iron.

When electric current is supplied to the electric heating unit water within the reservoir or tank will be heated and converted into steam and the electric heating unit will also heat the sole plate and the pressing surface of the iron. Steam will collect within the chamber 15 and will pass downward through the pipe 20 into the steam discharge chamber 21 and will be discharged at the pressing surface of the iron through the grooves of the front attaching screw. The operating handle 75 for controlling the thermostat is located in a convenient position and may be readily actuated by the thumb or finger of the operator without moving the hand from the handle 9 of the electric steaming iron.

The hollow body is provided in its top wall at one side of the handle with a filling orifice which is normally closed by a screw plug 88 of any suitable construction.

What is claimed is:

1. An iron of the character described, including in combination, a shell forming a water reservoir and having an integral hollow column extending through the water reservoir from the top to the bottom of the shell, a tube of a different metal from the metal of the hollow shell arranged within the hollow column and having the metal of the column cast around it, a sole plate attached to the shell and having a pressing surface, an electric heating unit located between the shell and the sole plate for heating the sole plate and for converting water into steam within the reservoir, means for conducting steam from the reserevoir to the pressing surface, a thermostat electrically connected with the heating unit and located between the shell and the sole plate, and means for adjusting the thermostat including an operating member extending through the tube and operable exteriorly of the iron for adjusting the thermostat.

2. An iron of the character described including in combination, a shell forming a water reservoir and having an integral hollow column extending through the water reservoir from the top to the bottom of the shell, a tube of a different metal from the metal of the hollow shell arranged within the hollow column and having the metal of the column cast around it, a sole plate attached to the shell and having a pressing surface, an electric heating unit located between the shell and the sole plate for heating the sole plate and for converting water into steam within the reservoir, means for conducting steam from the reservoir to the pressing surface, a thermostat electrically connected with the heating unit and located between the shell and the sole plate, a bushing forming a bearing and arranged within the upper end of the tube and means for adjusting the thermostat including a screw journalled in said bearing and extending through the tube and operable exteriorly of the iron for adjusting the thermostat.

3. An iron of the class described, including a shell having a water reservoir and provided with an integral hollow column extending through the water reservoir, and a tube of a metal different from the metal of the hollow column arranged within the hollow column and having the metal thereof cast around it.

HENRY V. EKSTEDT.