

Dec. 14, 1948.

F. BUSCH ET AL
STEAM-PRESS IRON AND STEAM BAFFLE
AND SEPARATOR THEREFOR

2,456,490

Filed Nov. 10, 1945

3 Sheets-Sheet 1

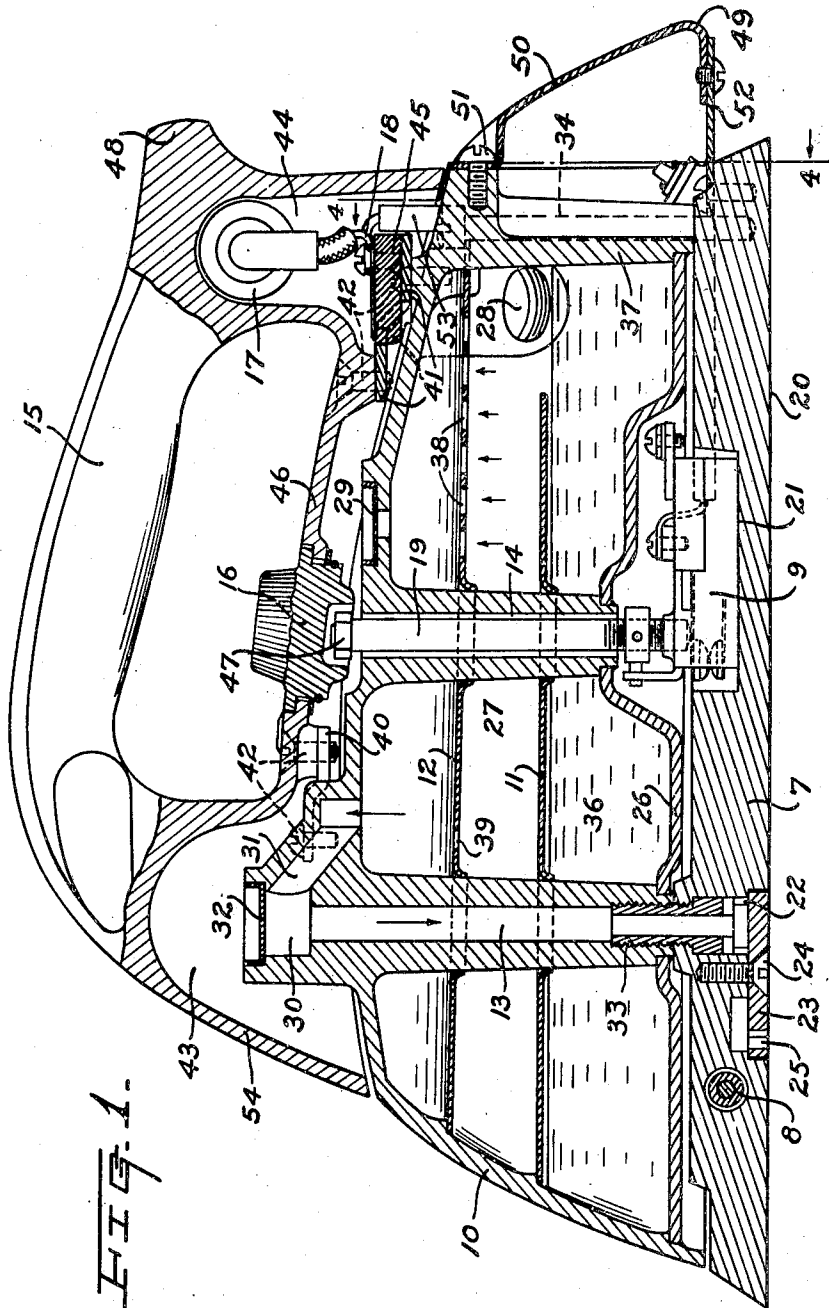


FIG. 1.

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FIG. 2.

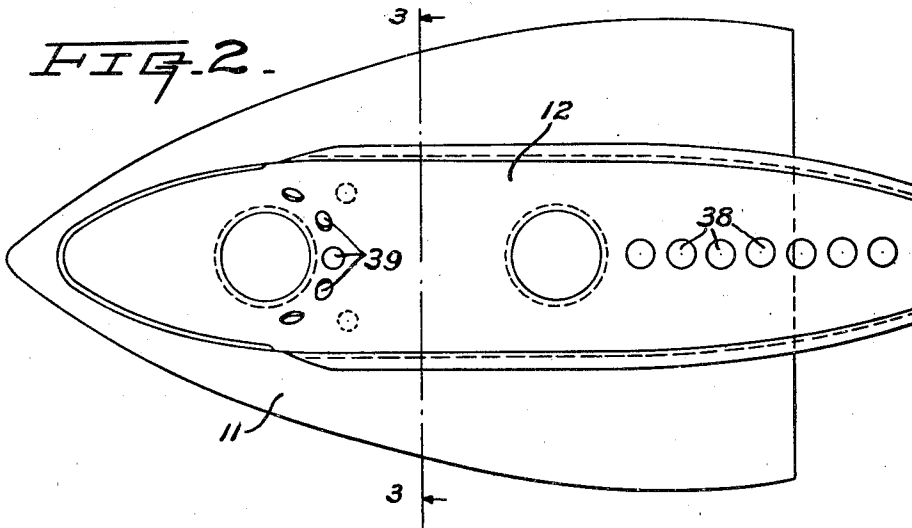


FIG. 3.

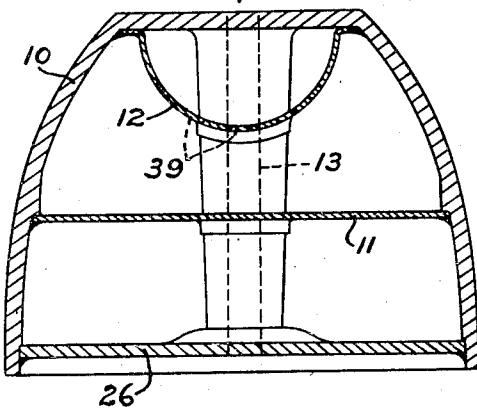
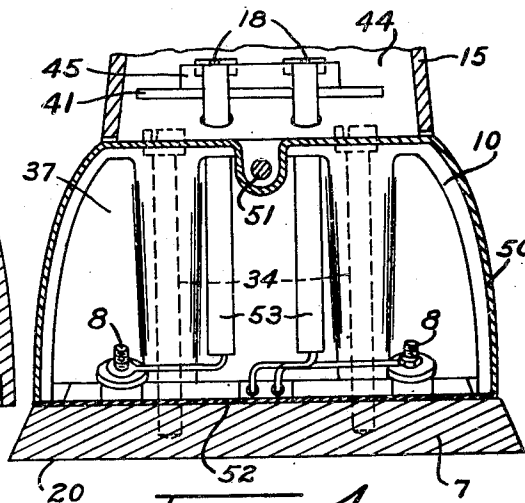
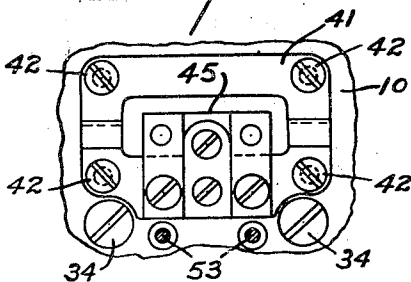


FIG. 5.



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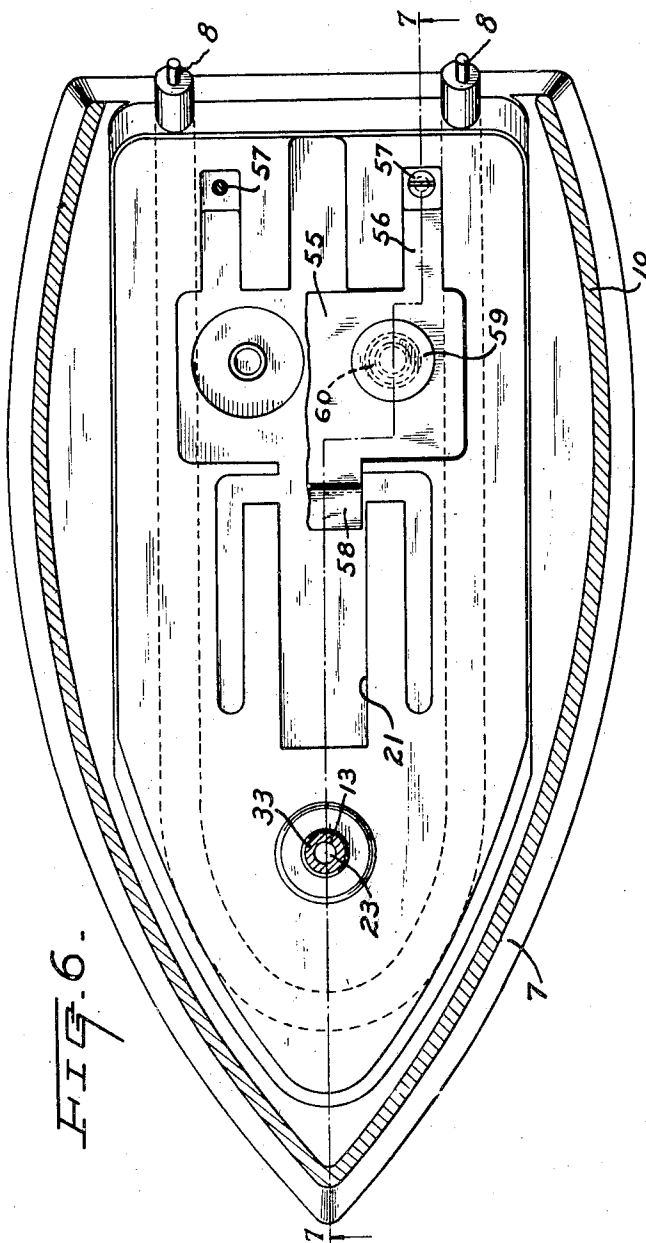
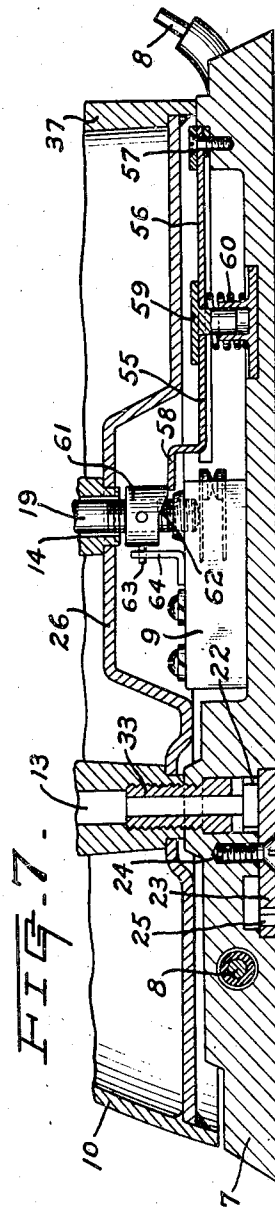
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UNITED STATES PATENT OFFICE

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STEAM-PRESS IRON AND STEAM BAFFLE
AND SEPARATOR THEREFOR

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2 Claims. (Cl. 38-77)

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The present invention relates generally to improvements in flatirons or the like, and relates more specifically to improvements in the construction and operation of combination steaming and pressing irons.

The primary object of our invention is to provide an improved steaming and pressing flatiron which is simple and compact in construction, and highly efficient in operation.

Many different styles and types of flatirons for simultaneously pressing and steaming the articles being ironed, have heretofore been proposed and used, and some of these prior steam iron assemblages were also adapted for electric heating. In an effort to control the vapor or steam delivery in these irons and in order to prevent excessive moisture from being deposited upon the articles, some of these previous irons having been provided with relatively complicated steam superheaters associated directly with the ironing shoes or sole plates, while others have been provided with partitions or walls of diverse shapes disposed within the steam generating chambers thereof. While a few of the prior steam-electric flatirons have proven relatively safe and satisfactory to the users, most of them are quite complicated and difficult to manufacture and are also dangerous and do not embody efficient steam separating controls.

It is therefore a more specific object of the present invention to provide a new and useful electrically heated steaming iron, which besides being exceedingly simple and durable in construction, is adapted to automatically control the production and flow of relatively dry steam to the working face of the ironing shoe or sole plate.

Another object of this invention is to provide an improved steam iron assemblage which may be manufactured and sold at moderate cost, and the various parts of which may be readily assembled and dismantled.

A further object of our invention is to provide an improved combination steaming and pressing iron which will function to prevent delivery of excessive moisture to the articles being ironed, and wherein the applied heat is most economically and effectively utilized to generate steam both at low and high temperatures.

These and other objects and advantages of the invention will be apparent from the following detailed description.

A clear conception of the features specifically constituting our present improvement, and of the construction and operation of a typical electric steam iron embodying the invention, may be had

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by referring to the drawings accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a central longitudinal vertical section through one of our improved steam press irons having a standard thermostatic switch applied thereto;

Fig. 2 is a top view of the steam separating and flow controlling partitions removed from the body of the iron;

Fig. 3 is a transverse vertical section through the body and partitions of the improved steam iron, taken along the line 3-3 of Fig. 2;

Fig. 4 is another transverse vertical section through the flatiron assembly, taken along the irregular line 4-4 of Fig. 1;

Fig. 5 is a fragmentary top view of the rear fastenings for attaching the body to the sole plate and for also attaching the electric current conductors to the unit;

Fig. 6 is a top view of a modified sole plate having an automatic heat control; and

Fig. 7 is a section through the modification of Fig. 6, taken along the line 7-7.

While our invention has been shown and described herein as being advantageously applicable to a portable electrically heated steaming and pressing flatiron of the household type, it is not our desire or intent to thereby unnecessarily restrict the utility of the improved features by virtue of this specific embodiment.

Referring to the drawings, the typical improved electrically heated steam iron shown therein by way of illustration, comprises in general a lower shoe or sole plate 7 having an electric coil type of heating element 8 embodied therein and being provided with a thermostatic control switch assembly 9 coacting directly therewith; a hollow body 10 resting upon and detachably secured to the sole plate 7 and having therein two superimposed vertically spaced elongated partitions 11, 12, the body 10 also being provided with a steam conducting passage 13 leading downwardly toward the medial forward portion of the work engaging shoe, and with a central hole 14 extending upwardly therethrough from the switch assembly 9; and a manipulating handle 15 detachably secured to the top of the body 10 and having mounted thereon a manipulating and indicating element or dial 16 and a conductor confining bushing 17 for the heater energizing wires 18, the dial 16 being operatively connected to the switch by a rod 19 extending through the central hole 14 and having threads coacting with the switch casing.

The lower shoe or sole plate 7 is preferably formed of suitable heat retaining metal and has a smooth and flat lower work engaging face 20, and the heating coil 8 is of well known construction and may be embedded in the shoe 7 either during casting thereof, or otherwise. The thermostatic switch assembly 9 is also of well known construction adapted to be set to cut-off the energizing current for the heating coil 8 when a predetermined temperature of the sole plate has been attained; and this switch is preferably located in a central depression 21 formed in the top of the shoe, in order to subject the assembly 9 to uniform heat and to reduce the overall height of the unit to a minimum. The lower forward portion of the sole-plate 7 near the heating element 8 is provided with a circular recess 22 disposed beneath and communicating with the steam passage 13, and this recess 22 is covered by a distributing plate 23 secured to the shoe by a screw 24 and having steam outlet ports 25 therein terminating flush with the work engaging face 20.

The hollow main casing or body 10 is preferably formed of an upper casting having its lower portion enclosed by a base plate 26 to provide an enclosed liquid confining and steam generating chamber 27 extending substantially throughout the length of the shoe 7 and within which the elongated partitions 11, 12 are permanently confined. The lower body closure plate 26 is preferably formed of good heat conducting material and may be welded to the upper body portion both along its periphery and at the bosses through which the passage 13 and hole 14 extend, and the partitions 11, 12 may be formed of sheet-metal and may also be welded in place within the body 10. One side of the body 10 is provided with a liquid inlet or admission plug 28 located near the rear of the chamber 27, while the medial upper portion of the body is provided with a safety pressure release diaphragm or disc 29, and the front upper part of the body is provided with a small steam dome 30 communicating directly with the passage 13 and in open communication with the uppermost portion of the chamber 27 through a conduit 31 and also being exposed to another safety pressure release disc 32. The casing or body 10 is firmly but detachably secured to the shoe or sole-plate 7 near the front portions thereof, by means of a threaded bushing 33 which is accessible through the recess 22 and forms part of the passage 13; and at the rear of these elements, by a pair of elongated cap screws 34 shown in Figs. 1, 4 and 5.

The partition assemblage which is confined within the liquid confining and steam generating chamber 27 of the body 10, constitutes an important feature of our present invention, and is shown in detail in Figs. 1, 2 and 3. The lower partition 11 is preferably disposed horizontally or parallel to the working face 20 of the sole plate 7, slightly above the maximum level of the liquid 36 confined within the chamber 27 and as determined by the liquid supply opening, and this partition 11 is flat and terminates short of the rear transverse wall 37 of the body 10. The upper partition 12 which extends throughout the entire length of the chamber 27 above the partition 11, is slightly inclined downwardly toward the rear, and is trough shaped or semi-circular in transverse cross-section being provided with a rectilinear series of drain openings 38 at its lowermost rear portion and with several steam

openings 39 at its forward portion near the conduit 31. These partitions obviously divide the chamber 27 into three superimposed sections the lower of which confines the liquid 36, while the upper section is a relatively dry steam confining chamber in open communication with the steam outlet conduit 31, and the intermediate section constitutes a moist steam and liquid drainage space.

The manipulating handle 15 is preferably formed of any suitable material which will not readily conduct excessive heat, and is of streamlined design, being firmly but detachably secured to the top of the body 7 by means of front straps 40 and a rear attaching plate 41, and screws 42 coacting therewith. The forward portion of the handle 15 is provided with a recess 43 within which the dome 30 is housed and concealed, and the rear handle portion is provided with a similar recess 44 into which the conductor confining bushing 17 extends and which also provides a housing for the terminal attaching block or element 45 for the wires 18. The indicator dial 16 is journaled for rotary adjustment within the lower medial bridge portion 46 of the handle 15, and coacts with the upper flattened headed end 47 of the thermostat adjusting stem or rod 19 in a manner whereby rotation of the dial 16 will cause the rod to rotate and to vary the setting of the switch assembly 9, and the dial 16 is calibrated and cooperable with a pointer on the handle bridge 46 so as to facilitate proper adjustment and setting thereof by the operator while gripping the handle 15. The rearmost upper part of the handle 15 is also provided with a projection 48 which is cooperable with the lower rear ridge 49 of a housing 50 to provide a support for the flatiron when not in actual use and while resting idly upon its end in a well known manner.

The rear casing or housing 50 is formed of sheet metal being detachably secured to the rear end of the body 10 by one or more screws 51, and this housing casing 50 coacts with a sheet metal lower rear plate 52 to provide an enclosure for the electrical connections 53 leading from the wires 18 and from the attaching element 45 to the switch assembly 9 and heating coil 8. The switch 9 and heater 8 are connected in series in a well known manner, as illustrated generally in Fig. 4; and the end housing 50 besides providing a rear support for the iron assemblage, also encloses and protects the connections 53 while permitting rapid and convenient access thereto. This housing 50 also protects the user against possible contact with the electrical connections; and it is also to be noted that the operator is protected against possible injury due to blowing-out of the safety release diaphragms 29, 32, by the bridge portion 46 and the front nose portion 54 of the handle 15.

When the various parts of our improved steaming and pressing iron have been properly constructed and the partitions 11, 12 and the base plate 26 have been permanently attached to the body 10, the unit may be conveniently assembled in an obvious manner with the aid of the various fasteners provided. The sole plate 7 and body 10 may be firmly but detachably united with the aid of the threaded bushing 33 and screws 34 after the switch assemblage 9 has been properly initially set and confined within the depression 21, and the steam distributing recess 22 may subsequently be closed by the plate 23. The plate 41 and the straps 40 may then be secured to the

body 10 with the aid of screws 42, whereupon the wires 18 and connections 53 may be attached to the block 45 carried by the plate 41. After the dial 16 has been rotatably mounted in the bridge portion 46 of the handle 15, the handle may be applied to the plate 41 and straps 40 and firmly but detachably secured thereto by means of other screws 42 with the dial 16 in coaction with the stem head 47; and when the connections 53 have been properly associated with the switch and heater assemblages at the lower rear portion of the body 10 and shoe 7, the rear housing 50 and lower plate 52 may be finally applied and fastened in position with the aid of the screws 51, thus placing the unit in condition for normal use.

During normal operation and use of the improved steam electric flatiron, the steam generating chamber 36 should first be supplied with liquid 36 by removing the plug 28. The cord or wires 18 may then be plugged in to a power line, and the dial 16 may thereafter be set or adjusted by the operator to either shut-off the current, or to effect proper heating of the sole plate 7 to conform with the specific articles which are to be ironed. As the sole plate 7 becomes heated by the heating coil 8, heat is conducted to the liquid 36 confined within the steam generating chamber 27 beneath the lower flat partition 11, and quickly converts some of the liquid into steam which rises through the rear gap and fills the intermediate section of the chamber 27, that is, the space between the partitions 11, 12. The steam thus generated subsequently rises into the upper section of the chamber 27 above the upper trough shaped partition 12, through the front openings 39, and excess liquid deposited from the accumulation of steam in this upper chamber section will flow rearwardly along the inclined upper partition 12 and will eventually drop through the drain openings 38 into the intermediate and lower chamber sections.

Relatively dry steam from within the uppermost portion of the upper chamber section will gradually pass through the conduit 31 to the steam dome 30, and will flow from this dome through the passage 13 into the distribution recess 22 formed in the sole plate 7. From this recess 22, the steam will eventually be delivered outwardly in relatively dry condition and in the form of a series of small jets, through the ports or orifices 25 formed in the disc 23, thus subjecting the articles being ironed to steaming while they are being pressed. If for any reason, the ports 25 or the passage 13 should become clogged so as to cause an accumulation of excessively high pressure within the steam dome 30, the safety release disc 32 may blow out, thereby promptly relieving the pressure; and in the event that the conduit 31 should become clogged, then the safety release disc 29 may also blow out in order to relieve excess pressure from within the chamber 27. Sudden rise of pressure within the body 10 may also be released by simultaneous blowing out of both safety discs 29, 32, or either of them in case the other fails to operate; and these discs 29, 32 may be quickly and conveniently replaced by merely removing the handle 15 from the body 10, in order to again place the iron in condition for normal use.

While the construction and operation of the typical improved flatiron shown in Figs. 1 to 5 inclusive is quite satisfactory, we have found that unless some means are provided for preventing such action, all electric steam irons generate an over-abundance of high pressure steam at high

temperature settings of the control dial 16, and insufficient steam at low temperature settings of this dial. In order to eliminate this difficulty, the modified construction of Figs. 6 and 7 is provided with improved automatically functioning mechanism for transferring more heat from the electrically heated sole plate 7 during low temperature settings of the dial 16, and less heat during higher temperature settings. This improved mechanism consists of a flat resilient metal plate 55 having integral rear spring fingers 56 secured to the rear end of the sole plate 7 by screws 57 and also having a front off-set 58, while its mid-portion is provided with relatively large upper heat transferring contact buttons 59; a coil spring 60 interposed between each button 59 and the sole plate 7; and a cam collar 61 secured to the rod 19 and having a lower cam surface 62 cooperable with the plate off-set 58 to cause the spring 60 to either be compressed sufficiently to move the buttons 59 out of contact with the body base plate 26, or to expand so as to bring these buttons into direct contact with the plate 26. The dial 16 can only be adjusted through one revolution by virtue of the fact that the collar 61 is pinned to the rod 19 and carries a radial stop pin 63 which is cooperable with a fixed stop 64 secured to the casing of the switch 9; and in order to provide sufficient space for the plate 55 and springs 60, the recess 21 in the sole plate 7 has been enlarged in the modification, and the position of the control switch 9 has been reversed. The formation of the cam surface 62 of this modified assemblage, and its relation to the dial 16, are such, that when the dial is set for low temperature operation the buttons 59 will contact the body base plate 26 and will conduct more heat to the liquid 36, whereas at high temperature setting of the dial 16 the buttons 59 will be moved out of contact with the plate 26 thereby reducing the heat transfer.

From the foregoing detailed description of the construction and operation of our improved iron, it should be apparent that our invention provides an improved steaming and pressing flatiron which besides being simple, compact and durable in structure, is also highly efficient in use and safely operable. The operator is most effectively protected against possible injury due to blowing out of the safety discs 29, 32 by the handle bridge portion 46 and nose shield 54, and the entire unit may be quickly and conveniently assembled or dismantled by merely manipulating a few screws with the aid of an ordinary screwdriver. The simple partitions 11, 12 confined within the steam generating chamber 27, function to insure normal delivery of an abundance of relatively dry steam to the work, without resorting to the use of complicated superheaters; and the simplicity of this automatic steam flow control structure insures most efficient functioning thereof at all times. By substantially confining the body of liquid 36 beneath the lower flat partition 11 and by utilizing the modified automatic control most efficient steam generation results, while the use of the upper inclined trough shaped partition 12 insures most effective separation and drainage of excess moisture from the steam before it is finally delivered through the orifices 25. The front bushing 33 serves the dual function of providing a steam passage and of clamping the sole plate 7 to the body 10, and cooperates with the long rear screws 34 to produce a firm three-point union between these parts. The switch control dial 16 is also readily manipulable and cooperates with the im-

proved heat transfer control mechanism so as to insure proper heat transfer under all conditions of operation; and the entire assemblage of the flatiron is of such a simple nature that the improved units may obviously be manufactured and sold at relatively moderate cost.

It should be understood that it is not desired to limit this invention to the exact details of construction or to the precise mode of use, herein shown and described, for various modifications within the scope of the appended claims, may occur to persons skilled in the art.

We claim:

1. A steaming and pressing flatiron comprising, a lower sole plate, a body forming a liquid confining and steam generating chamber normally disposed above said sole plate, a manipulating handle for said body and sole plate, a heater for said sole plate and for the liquid in said chamber, means for conducting steam generated by said heater from the upper portion of said chamber to the lower face of said sole plate, means for admitting liquid to the lower portion of said chamber, and a pair of vertically spaced partitions spanning said chamber and dividing the same into a lower liquid confining section and an upper dry steam section and an intermediate drainage section all extending substantially throughout the length of said sole plate and body, the lower of said partitions being relatively flat and approximately parallel to said lower sole plate face and also being imperforate but terminating short of the rear wall of said chamber, and the upper partition being trough shaped and inclined downwardly and rearwardly and having therein front steam passages and rear liquid drainage openings but extending throughout the chamber length.

2. A steaming and pressing flatiron comprising, a lower sole plate, a body forming liquid confining and steam generating chamber normally disposed above said sole plate, a manipulating handle for said body and sole plate, a heater for

said sole plate and for the liquid in said chamber, means for conducting steam generated by said heater from the upper portion of said chamber to the lower face of said sole plate, means for admitting liquid to the lower portion of said chamber, and a pair of vertically spaced partitions spanning said chamber and dividing the same into a lower liquid confining section and an upper dry steam section and an intermediate drainage section all extending substantially throughout the length of said sole plate and body, the lower of said partitions being imperforate but terminating a considerable distance short of the rear wall of said chamber while the upper partition is inclined downwardly and rearwardly and has therein relatively small front steam passages and larger rear liquid drainage openings but extends throughout the entire length and width of the chamber.

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