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STEAM IRON VAPORIZING CHAMBER

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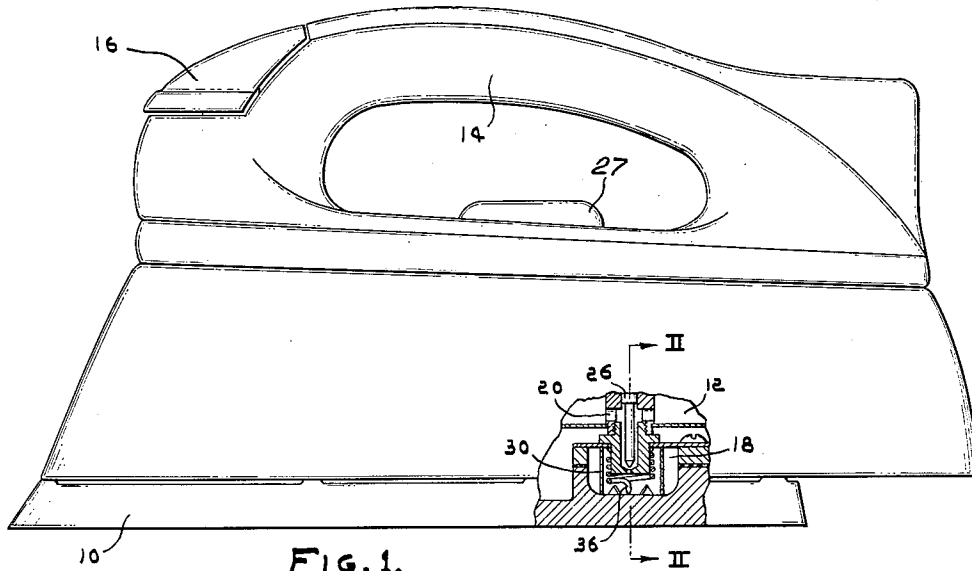


FIG. 1.

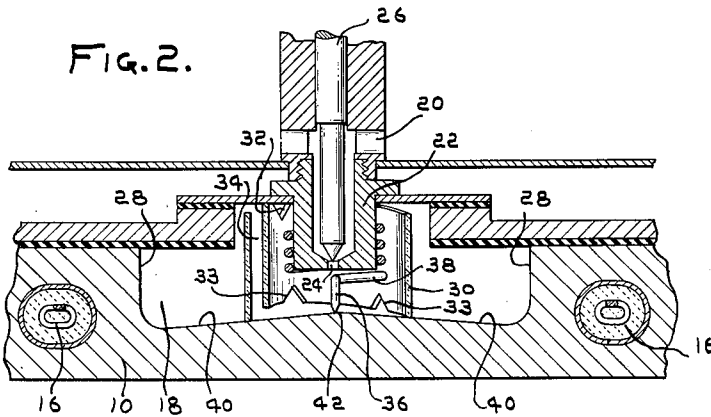


FIG. 2.

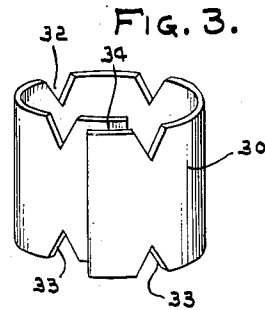


FIG. 3.

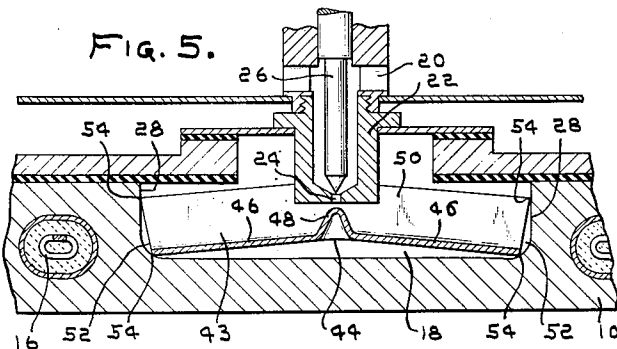


FIG. 5.

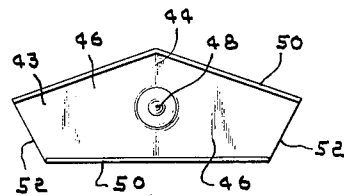


FIG. 6.

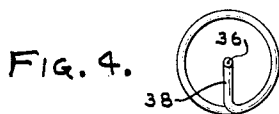


FIG. 4.

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STEAM IRON VAPORIZING CHAMBER

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6 Claims. (Cl. 38—77)

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My invention relates to a steam iron of the type in which liquid, such as water, is flashed into steam and discharged onto the fabric being ironed.

One object of the invention is to produce an improved iron of the type set forth.

In the type of iron referred to, water is delivered to a steam generating chamber, formed in or carried by the soleplate of the iron, through an orifice which may be controlled by an adjustable valve so that the rate of delivery of water to the chamber may be varied according to the requirements of the fabric being ironed. The orifice is usually located immediately above the steam generating chamber where it is subjected to the intense heat of the soleplate. Due to the small size of the orifice, and due to surface tension of the water, the water flowing through the orifice spreads over, and adheres to the surface surrounding the discharge end of the orifice until there is sufficient water to form a drop large enough to fall off. In other words, water is delivered in a succession of drops which gradually form at, and when large enough, fall from, the discharge end of the orifice onto the portion of the steam generating chamber immediately below the orifice.

Due to the fact that the orifice is subjected to the intense heat of the adjacent portions of the soleplate, and due to the fact that the water, between successive drops, is spread out over the surfaces surrounding the orifice, a substantial amount of water evaporates from, and leaves a deposit of lime salts, or the like, on said surfaces. The deposit, depending on the character of the water, may clog the orifice in a relatively short time.

Also, the constant evaporation of water from the portion of the bottom surface of the steam generating chamber immediately below the orifice, leaves a similar deposit which gradually builds up, and, in time, may also clog the orifice.

It is, therefore, a further object of the invention to produce an improved iron structure by which formation of a deposit on the surfaces defining the orifice, or on the surface of the steam generating chamber immediately below the orifice, is retarded, thereby prolonging the interval during which the iron may be used without the necessity of being cleaned.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

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Fig. 1 is a view in side elevation of an iron embodying my invention, certain parts being shown in section;

Fig. 2 is an enlarged sectional view on line II—II of Fig. 1;

Fig. 3 is an enlarged perspective view of the means used in the structure of Figs. 1 and 2 to shield the orifice from the heat of the soleplate;

Fig. 4 is a fragmentary plan view of the means used in the structure of Figs. 1 and 2 for accelerating separation of the drops of water from the discharge orifice;

Fig. 5 is a view similar to Fig. 2 showing another embodiment of the invention; and

Fig. 6 is a plan view of the means used in the structure of Fig. 5 for shielding the discharge orifice and accelerating separation of water drops from the discharge orifice.

In the drawings, there is shown a steam iron including a soleplate 10, a tank 12 for receiving the liquid to be flashed into steam, and a handle 14. The tank 12 may be filled with water through an opening which is accessible upon removing a plug 16 formed in, or carried by, the front part of the handle. The manner in which the tank is filled forms no part of the present invention and, therefore, is neither shown nor described in detail.

The soleplate is heated by a conventional electric heating element 16 which is regulated by a thermostat, not shown. The soleplate is also provided with a steam generating chamber 18 for receiving water to be flashed into steam. Steam from the chamber 18 is discharged through ports in the underside of the iron. These ports, and the manner in which they communicate with the steam generating chamber 18, form no part of the invention and are, therefore, neither shown nor described.

Water is delivered from the tank 12 to the steam generator 18 through apertures 20 which communicate with the interior of a hollow bushing 22. The bushing 22 projects into the steam generating chamber and is provided with an orifice 24 which is controlled by a valve 26. The valve 26 and the thermostat regulating the heat of the soleplate may be concomitantly adjusted by a single knob 27 in a manner which forms no part of the present invention and which, therefore, is neither shown nor described.

Figs. 1 to 4

In order to minimize the evaporation of water around the orifice 24, the bushing 22 is shielded from radiant heat of the adjacent portions 28

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of the soleplate, in which the heater is embedded, by an annular shield 30 which is best shown in Fig. 3. The shield 30 is preferably made of thin sheet material, so as to have limited mass. Also, the sheet material from which the shield is made preferably has poor thermal conductivity. The shield is provided with notches 32 in its upper edge to permit egress of steam and with notches 33 in its lower edge to permit egress of steam and water and to minimize contact of the shield with the hot bottom wall of the steam generating chamber, thus reducing the transmission of heat to the shield. The free edges of the shield preferably overlap, as shown, the overlapping portions being spaced from each other to provide a passage 34 therebetween.

In order to secure the shield in position, without the use of special fastening means, the shield is skewed so that the upper edge of one end portion thereof will bear against the top wall of the steam chamber and the bottom edge of the other end portion of the shield will bear against the bottom of the steam chamber, as clearly shown in Fig. 2.

In order further to minimize evaporation from the surfaces defining the orifice, I provide means to accelerate separation of the drops of water from the orifice. As shown in Fig. 2, this means is in the nature of a guide member 36 which is positioned in close proximity to the orifice and extends towards, or into contact with, the bottom surface of the steam generator. The upper end of the guide is spaced from the orifice a distance less than the diameter or thickness that a drop of water, gradually forming at the orifice, will assume before it becomes large enough to fall off, so that, as a drop of water begins to form, its lower portion will come into contact with the upper end of the guide. When this happens, the surface tension between the drop of water and the guide neutralizes the surface tension between the drop and the walls of the bushing, and the force of gravity causes the water to run rapidly down the guide. The water thus flows in a substantially continuous stream, or a relatively rapid succession of small drops, instead of spreading out over, and clinging to, the lower surface of the bushing until each drop becomes large enough to fall off by itself.

A guide member which will serve the function stated may be formed and secured in position in any suitable manner. In the drawing, I have illustrated a convenient and preferred manner of forming and securing the guide in position. As shown, the guide is formed of wire which is wound around the lower portion of the bushing 22, with a portion 38 of the wire extending across the orifice and terminating in the guide 36.

In order to retard the deposit of salts immediately below the orifice, I provide means for minimizing evaporation of water from the portion of the surface of the steam generating chamber immediately below the orifice. As shown, the bottom surface 40 of the chamber 18 is convexed to provide a peak or high point 42 in vertical alignment with the orifice. Therefore, a drop of water running down the guide 36 will, upon reaching the lower end of the guide, flow down the inclined surface 40 and away from the high point 42 immediately below the orifice.

If desired, the guide 36 may slope somewhat instead of being vertical, as shown, so that it contacts the surface 40 at a point not immediately below the orifice. If the guide 36 is so sloped, I prefer to slope it forwardly or rearwardly rather than laterally.

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While I have shown the iron as including a tank or water reservoir, it is within the scope of this invention to supply the steam generating chamber with water or other liquid from an external source suitably connected to the bushing 22.

Operation—Figs. 1 to 4

When the iron is used for steam ironing, the guide 36 accelerates separation of the drops of water from the surfaces defining the orifice and the shield keeps said surfaces at a relatively low temperature. This greatly reduces evaporation of water from, and deposit of lime salts and the like upon, said surfaces and retards clogging of the orifice. Convexing the bottom surface of the chamber 18, or providing it with a ridge, causes the water drops delivered by the guide 36 to run down the inclined surfaces 40, thus reducing evaporation of water from, and retarding the deposit of salts on the portion of the steam generating chamber immediately below the orifice.

By providing the passage 34, which extends the entire height of the shield, water and steam can continue to pass from the space enclosed by the shield, even after the bottom notches 33 and the lower portion of the passage are completely clogged by the deposit of salts and the like.

It will thus be seen that, by providing the extremely simple and inexpensive shield 30 and guide 36, and by convexing the bottom surface of the steam generating chamber or providing it with a ridge, I greatly prolong the period during which the iron may be used before it becomes necessary to clean the same. It will also be seen that the guide 36 and the shield 30 are secured in position against movement or rattling, without the use of special fastening devices, thus reducing the cost of manufacture as well as of servicing. It will also be noted that the shield 30 and guide 36 may be incorporated in an iron of the type described without any modification of, or interference with, the structure or assembly of the iron.

Figs. 5 and 6

In Figs. 5 and 6 I have shown another embodiment of my invention which accomplishes the same results obtained by the structure described in connection with Figs. 1 to 4. In the structure illustrated in Figs. 5 and 6, the shield 30 and guide 36 are omitted and a single, combined shield and guide member 43 is employed. The member 43, which is best shown in Fig. 6, is in the nature of a trough having a bottom wall and side walls extending upwardly from the bottom wall. The bottom wall of the trough is bent transversely at about its center to form a ridge or raised portion 44 and two oppositely sloping bottom wall portions 46. The raised portion 44 of the trough is further provided with a central, raised nipple or projection 48, which may be a separate element secured to the trough, or which may be struck up from the bottom of the trough.

The trough 43 is preferably made of thin sheet material of low thermal conductivity and its side walls 50 and ends 52 are so formed that they will frictionally engage the walls of the steam generating chamber, as at 54, to secure the combined shield and guide against free movement or rattling. As will be clearly seen from Fig. 5, the bottom of the trough is spaced 75 from the surface of the steam generating cham-

ber to minimize heat transmission from the soleplate to the shield.

Operation—Figs. 5 and 6

The small mass of the member 43, the low thermal conductivity of the material from which it is made, the spacing of its bottom wall from the bottom of the steam generating chamber, the limited contact of its end and side walls with the adjacent walls 28 of the soleplate, and the constant evaporation of water from its surface, all serve to maintain the member 43 at a relatively low temperature. The bottom of the member 43 protects the bushing against heat radiated by the portion of the soleplate therebelow, and the side walls 50 protect the bushing from a major portion of the heat radiated by adjacent vertical walls of the soleplate. The bushing is thus maintained at a relatively low temperature, thereby reducing evaporation from the surfaces defining the orifice and retarding the deposit of salts and the like to retard clogging of the orifice.

The nipple 48, being very slightly spaced from the discharge end of the orifice, accelerates separation of the drops of water from the lower surface of the bushing in the same manner as that described in connection with the guide 35 of Figs. 1 to 4. The sloping portions 46 of the bottom of the trough guide water delivered there-to away from the central raised portion 44, thus retarding the accumulation of deposits on the portion of the trough directly below the orifice.

While I have shown my invention in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof.

What I claim is:

1. A steam iron comprising a soleplate having an ironing surface, a steam generating chamber above said soleplate, heating means for heating said soleplate and said steam generating chamber, a water reservoir disposed above said soleplate and said steam generating chamber, said steam generating chamber having an inlet opening communicating with said reservoir for conveying water from the latter to said chamber, and a water conducting member for accelerating the flow of water from the inlet opening and thereby minimizing the evaporation of water and the deposition of salts at said inlet opening, said water conducting member being other than a wall of said steam generating chamber and extending downwardly within said chamber from a point spaced from said inlet opening a distance less than the dimension that a drop of water forming at the inlet opening will assume before it becomes large enough to fall off.

2. A steam iron including a wall structure defining a steam generating chamber, a heating element for heating said chamber, means for supplying water to said chamber including a wall structure defining an orifice for delivering the water to said chamber, said orifice being so restricted that the flow of water therethrough is in the nature of a succession of drops which form relatively slowly upon, and fall relatively slowly from, the surface of the wall structure defining said orifice onto the portion of said chamber immediately below said orifice, a shield interposed between the wall structure defining said orifice and the wall structure defining said chamber, and means for accelerating the separation of said drops from said surface, thereby reducing evaporation of water from, and deposit of salts

or the like on, said surface, said means including a member extending downwardly from a point adjacent said orifice.

3. The structure recited in claim 2 in which said shield is made of thin sheet material of relatively poor thermal conductivity and in which said shield is spaced from said orifice and has only a small portion of its surface area in contact with said chamber wall structure, thereby restricting the heat path between said shield and said chamber wall structure.

4. The combination with an iron including a wall structure defining a steam generating chamber, a heating element for heating said chamber, and means for supplying water to said chamber including a wall structure defining an orifice disposed above said chamber for delivering the water to said chamber, said orifice being so restricted that the flow of water therethrough is in the nature of a succession of drops which form relatively slowly upon, and fall relatively slowly from, the surface of the wall structure defining said orifice, of means for reducing evaporation of water from, and thus retarding deposit of salts or the like on, said surface, said means including a heat shield interposed between said orifice and the wall structure defining said chamber, and means for conducting drops of water falling from said orifice away from the region immediately below said orifice.

5. A steam iron having a steam generating chamber, a heating element for heating said steam generating chamber, said steam generating chamber having an inlet opening for admitting water thereto, and a water-conducting member extending downwardly from a point sufficiently close to said inlet opening to contact water collecting at said inlet opening before the same attains the size of a drop which will fall therefrom and to conduct such water from said inlet opening, said water conducting member extending downwardly a substantial distance below the lowermost part of the opening or passage for admission of water to the chamber, thereby reducing the evaporation of water and the deposition of salts at said inlet opening.

6. A steam iron having a steam generating chamber, said chamber having a bottom wall and an inlet opening for admitting water thereto, a heating element for heating said steam generating chamber, and a sheet metal member disposed within said chamber and extending over said bottom wall to shield said inlet from the heat of said bottom wall, said sheet metal member having a part disposed at a point sufficiently close to said inlet opening to contact water collecting at said inlet opening before the same attains the size of a drop of water which will fall therefrom, said part extending downwardly from said point to conduct such water from said inlet opening, thereby reducing the evaporation of water and deposition of salts at said inlet opening.

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