Dec. 10, 1957 J. R. GOMERSALL 2,815,592

STEAM IRON

Filed Feb. 24, 1954 2 Sheets-Sheet 1

Fig. 1.

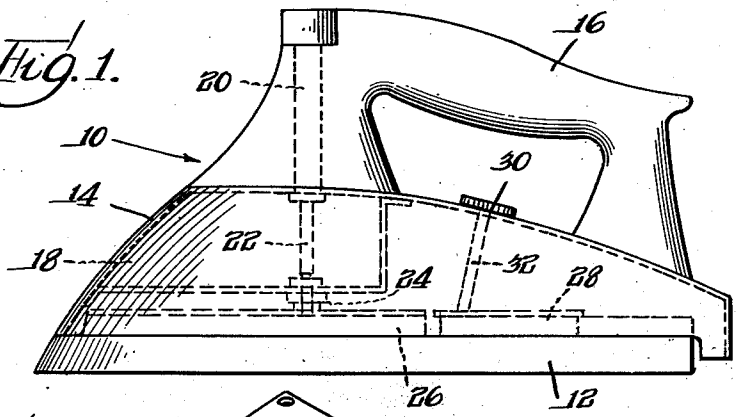


Fig. 2.

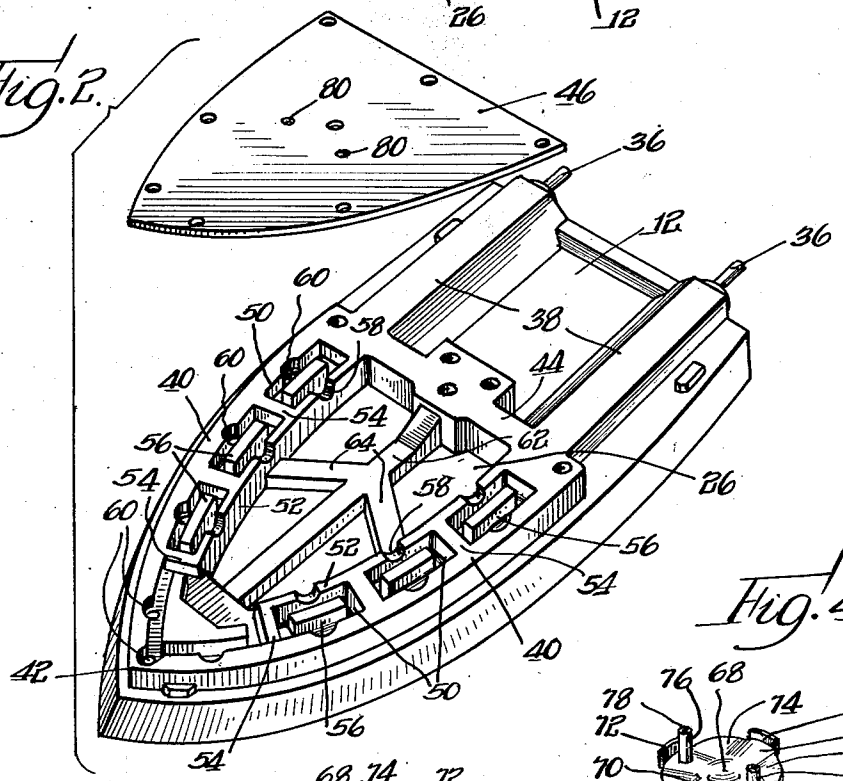


Fig. 3.

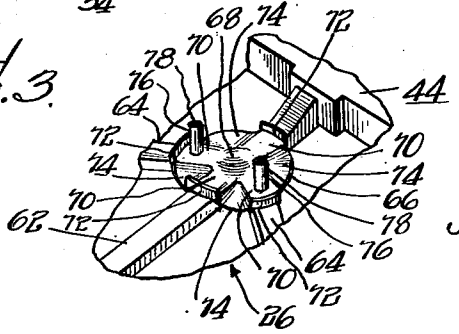
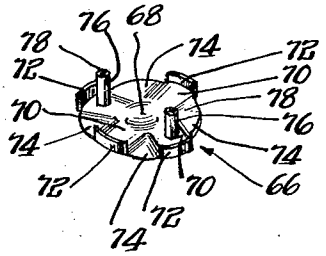


Fig. 4.



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Fig. 5.

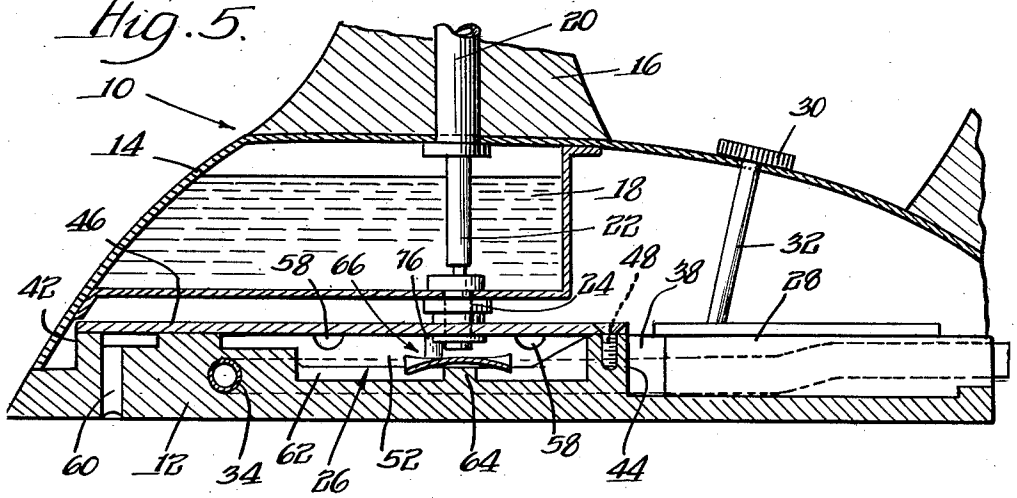


Fig. 6.

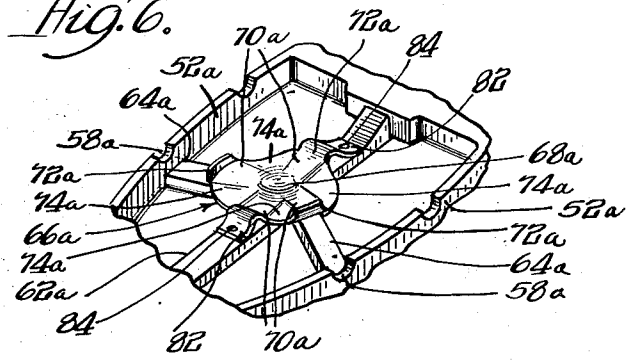
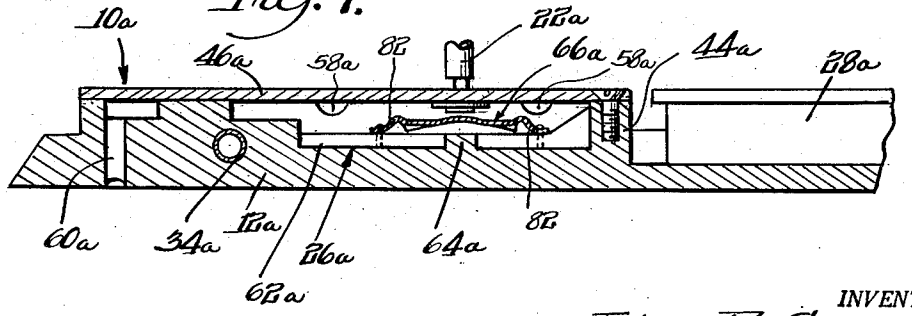


Fig. 7.



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STEAM IRON

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Application February 24, 1954, Serial No. 412,340

11 Claims. (Cl. 38—77)

This invention is concerned generally with a steam iron, and more particularly with a steam iron of the flash boiler type.

Flash boiler type steam irons as are well known in the art introduce water drop by drop from a water storage tank to a heated boiler or steam generating or evaporating chamber wherein the water quickly flashes into steam.

Various difficulties have attended the operation of prior flash boiler steam irons which have tended to reduce their usefulness. Occasionally water would be introduced faster than it could be evaporated so that water accumulated in the steam generating chamber. This difficulty would occur when water was introduced before the iron had become sufficiently hot, or when heavy, or excessively damp material being ironed reduced the temperature of the iron. Furthermore, many prior art steam irons have been incapable of purging themselves of excess water by boiling it away, and still others have been incapable of purging themselves without carrying over with the steam, and as is well known many fabrics are susceptible to water spotting.

In prior irons the water entering the steam generating chamber has dropped on to a more-or-less restricted area for flashing into steam. Since most housewives will not bother to obtain and use distilled water, the tap water generally used builds up lime deposits on this steam generating area, and may eventually clog the iron.

The general object of this invention is to provide a new or improved flash boiler type steam iron construction that provides efficient, rapid, and thorough evaporation of the water, and that is reliable in operation.

A further object of this invention is to provide, in a flash boiler type steam iron, an improved boiler consruction which inhibits the tendency of excess water to splash into the steam ducts.

A further object of this invention is to provide a boiler construction in a flash boiler type steam iron wherein the heat distribution is markedly improved and all surfaces are kept hot for efficient purging and steam generation and for reducing temperature differences between water in the boiler and the heating element to reduce the danger of excessive temperatures adjacent the heating element and to preclude the opening of the thermostat while there is excess water in the boiler.

An additional object of this invention is to provide a boiler in a flash boiler type steam iron wherein the boiler construction reinforces the sole plate against warping and buckling.

A further object of this invention is to provide a flash boiler type steam iron construction wherein the water is distributed over a large area in its impingement against the floor of the steam generating chamber to distribute the lime formation.

Other and further objects and advantages of the present invention will be apparent from the following description when taken in connection with the accompanying drawings wherein:

Fig. 1 is a side elevational view of an iron constructed in accordance with the principles of my invention;

Fig. 2 is an exploded perspective view of the sole plate and boiler;

Fig. 3 is a detail perspective view illustrating the spreader plate for distributing the water in the steam generating chamber;

Fig. 4 is a perspective view of the spreader plate alone;

Fig. 5 is a longitudinal sectional view through the iron illustrating the placement of the spreader plate in the boiler;

Fig. 6 is a perspective view showing a modification of the spreader plate; and

Fig. 7 is a fragmentary longitudinal sectional view showing the modified spreader plate.

Referring now more specifically to the drawings, and first to Figs. 1 through 5, there will be seen a steam iron constructed in accordance with the principles of my invention and generally identified by the numeral 10. The iron comprises a sole plate 12 and a sheet metal case or body 14 suitably secured thereon. The sole plate preferably is made of aluminum or aluminum alloy, while the case or body can be made of any suitable sheet metal such as aluminum or stainless steel. A handle 16 is provided on the iron and is made of a heat insulating material; preferably it is molded of plastic.

A water storage tank 18 is provided within the iron case or body and a filler tube 20 extends through the handle into the water tank or reservoir for supplying water thereto. A water valve control member 22 extends through the filler tube 20 and also through the water storage tank or reservoir 18 to a valve 24 at the bottom thereof leading into a boiler, or steam generating or evaporating chamber 26. A thermostat 28 is provided in the iron and is settable by means of an indicator 30 on top of the iron case, and a shaft 32 interconnecting the center and the thermostat.

The sole plate is provided with suitable heating means, preferably in the form of a cast-in-place heating element 34 having electrical connectors 36 thereon extending from the rear end of the sole plate. The heating element is housed in ridges 38 adjacent the rear end of the sole plate. The ridges 38 continue into converging ridges 40 meeting adjacent the front of the sole plate at 42, and connected at the rear ends by a transverse ridge 44 to define the steam generating chamber 26 except for the top thereof. The top of the steam generating chamber takes the form of a thin aluminum plate 46 suitably mounted on the ridges 40 and 44 by means such as screws 48.

The ridges 40 have formed along their inner edges a series of pockets 50 defined by generally longitudinally curved walls 52, and by transverse walls 54. The pockets are provided with upstanding intermediate walls or baffles 56, and steam inlets are provided on the inner or steam generating chamber side of the baffles by means of semicircular notches 58 in the walls 52. Steam vents 60 are provided in the sole plate 12 from the pockets 50 on the outside of the iron and opening at the bottom of the iron. Opposite ones of the steam vents preferably are connected by arcuate grooves in the plate for optimum steam distribution. The disposition of the steam vents 60 opposite to the steam inlets 58 insures drying of the steam as it passes the baffles 56 and elimination of moisture from the steam. It will be appreciated that the pockets and the baffles are located substantially directly above the heating element and accordingly are maintained at a high temperature at all times.

The steam generating chamber 26 is divided into four parts by a low rib 62 extending along the longitudinal center line of the steam generating chamber and upstand-

ing from the floor thereof. A pair of oblique ribs **64** of the same height as the rib **62** branch out from the rib **62** to the walls **52**. The ribs **64** join the rib **62** substantially directly beneath the water inlet valve **24**.

A spreader plate **66** is located directly beneath the water inlet valve **24** and above the junction of the ribs **62** and **64**. As will be seen in Figs. 3–5, this spreader plate comprises a substantially circular sheet aluminum disc having a central circular portion **68** which is somewhat convex upwardly. Four substantially flat ridges **70** radiate from the central portion **68** in alignment with the ribs **62** and **64**, and are terminated in upturned tips **72**. Between the substantially flat ribs **70**, the spreader **66** is provided with valleys **74** running down-hill as they move outwardly from the central portion **68**.

A pair of aluminum posts **76** is provided on the diagonal ridges **70** extending therefrom. These posts are provided with tapped apertures **78** at their upper ends, and screws (not shown) extend through suitable holes **80** in the boiler cover plate **46** and are threaded into these holes for supporting the spreader plate from the boiler cover.

The boiler cover is thin and consequently conducts very little heat from the sole plate to the supporting posts **76**. These posts are rather small, and the spreader plate also is thin. Accordingly, the conduction of heat to the spreader plate is poor so that the water keeps the plate cool. Consequently there is substantially no evaporation or steam generation there, and no lime deposits are formed on the spreader plate. The water dropping on to the spreader plate will flow from the central portion **68** through any one or more of the valleys **74** depending on the movement of the iron. The water generally will drop on to the floor of the steam generating chamber from the valleys several drops at a time. The exact position of the water drops impinging on the floor of the steam generating chamber will vary in accordance with the speed and rapidity of change in direction of the iron. Consequently, lime deposits on the floor of the steam generating chamber will be spread out more or less at random and therefore uniformly, and the iron will be capable of generating steam efficiently for a much longer period of time.

A modification of the spreader plate is shown in Figs. 6 and 7. The iron in these two figures remains identical with the one previously disclosed, and the spreader plate is similar to that previously disclosed, with the exception of the means for mounting the spreader plate on the iron. To avoid prolixity of description, similar numerals are used in these two figures to identify parts similar to those previously described, the suffix *a* being applied for purposes of distinction.

The configuration of the spreader plate in Figs. 6 and 7, generally identified by the numeral **66***a*, is similar to that previously described including the upwardly convex central section **68***a*, the substantially flat ribs **70***a* terminating in upstanding tips **72***a*, and the valleys **74***a* intermediate the ridges. The structural modification is found in a pair of supports **82** curving downwardly from the upstanding tips **72***a* of the diametrically opposite upstanding ridge tips **72***a*. These supports are of the same thin sheet metal as the remainder of the spreader and rest on the longitudinal rib **62***a* to which they are secured by means such as screws **84**. These supports **82**, although resting on the rib **62***a*, are sufficiently small and transfer so little heat to the spreader plate that the spreader plate still remains sufficiently cool to serve its purpose of spreading water about the steam generating chamber without the formation of lime deposits on the spreader plate.

In the event that the boiler or steam generating chamber should become flooded, the compartmentation afforded by the ribs reduces the tendency of the water to splash around in the steam generating chamber and into the steam ducts. The ribs are of heavy section so as to provide good heat conduction. This, coupled with the fact that the ribs provide a larger heating area for water flooding the boiler or steam generating chamber, helps bring the heat to the water quickly for efficient evaporation of the water and purging of the iron. These factors also reduce the temperature difference between water flooding the boiler and the heating element for reducing the danger of excessive temperatures at the parts of the sole plate nearest the heating element, and substantially eliminating any possibility of the thermostat opening while there is still water in the boiler.

It will be observed that the ribs dividing the boiler into compartments are substantially lower than the inlet passageways **58** to the distributing pockets **50**. Consequently, if one of the compartments of the boiler or steam generating chamber should flood, water from this compartment would spill into the other compartments rather than into the steam outlet ducts. Furthermore, the ribs serve to strengthen and brace the sole plate against warping or buckling if it should be over-heated, or if a severe temperature gradient were to be established by the introduction of a large quantity of cold water into the steam generating compartment while it is hot.

As previously noted, the low temperature at which the spreader is maintained by its mounting, and also by the dropping of relatively cool water thereon, prevents the depositing of lime on the spreader plate. The even distribution of the water impingement against the floor of the steam generating chamber is occasioned by the spreader plate and the movement of the iron effects a relatively even distribution of the lime formation over a large area, so that the iron can be retained in service without cleaning longer than is possible with previous irons.

The particular disposition of the ribs, with the two ribs **64** diagonal, allows the steam generating chamber to be divided into compartments of substantially equal size while having the water inlet located at a convenient position. The alignment of the ridges of the spreader with the ribs assures depositing of the water on the floor of the steam generating chamber.

The specific examples of the iron as herein shown and described will be understood as being by way of illustration only. Other and further structural modifications doubtless will occur to those skilled in the art, and it is to be understood that such modifications form a part of this invention insofar as they fall within the spirit and scope of the appended claims.

I claim:

1. A steam iron comprising a sole plate, means associated with said sole plate forming a steam generating chamber having a floor on which water impinges for steam generation, means for heating said steam generating chamber and said sole plate, means providing steam vent means from said steam generating chamber to the bottom surface of said sole plate, a water reservoir, means providing a water passage from said reservoir to said steam generating chamber, a spreader substantially smaller than said steam generating chamber and disposed above said floor and having a high portion substantially directly beneath said water passage and a plurality of ridges radiating outwardly therefrom and separated by valleys sloping downwardly away from said high portion, and means for supporting said spreader with said high portion substantially directly beneath said water passage for distributing water through said valleys over a large area of said steam generating floor to preclude concentrated lime formation.

2. A water spreader for a steam iron comprising substantially a disc of sheet material having a high central portion with a plurality of ridges radiating outwardly therefrom substantially on a level with said central high portion, and valleys interposed between adjacent ridges and sloping downwardly and outwardly from said central high portion.

3. A steam iron comprising a sole plate, means associated with said sole plate forming a steam generating chamber having a floor on which water impinges for

steam generation, means for heating said steam generating chamber and said sole plate, means providing steam vent means from said chamber to the bottom surface of said sole plate, a water reservoir, means providing a water passage from said reservoir to said steam generating chamber, a plurality of partitions upstanding from the floor of said steam generating chamber to divide said chamber into a plurality of compartments, said partitions being of lesser height than said steam generating chamber whereby all of said compartments are connected at the top thereof, and means positioned to receive water from said water passage and providing separate flow paths for water to each compartment.

4. A steam iron as set forth in claim 3 wherein the means providing the separate flow paths comprises a spreader positioned above the partitions and overlying portions of all of the compartments whereby to direct water into all of said compartments.

5. A steam iron as set forth in claim 3 wherein entrances are provided to said steam vents at a higher position from said floor than the stops of said partitions whereby flooding of one of said compartments will effect passage over a partition to an adjacent compartment rather than into a steam vent.

6. A steam iron as set forth in claim 3 wherein the partitions comprise a substantially central longitudinal partition, and a pair of partitions branching diagonally outwardly therefrom.

7. A steam iron comprising a sole plate, means associated with said sole plate forming a steam generating chamber on which water impinges for steam generation, said chamber being provided with a top, means for heating said steam generating chamber and said sole plate, means providing steam vent means from said steam generating chamber to the bottom surface of said sole plate, a water reservoir, means providing a water passage from said reservoir to said steam generating chamber, a spreader, and means depending from the top of said steam generating chamber for supporting said spreader in said steam generating chamber beneath said water passage for distributing water from said passage over a large area of said steam generating chamber floor to avoid concentrated lime formation, said spreader being in poor thermal contact with said heating means, sole plate, and steam generating chamber.

8. A steam iron comprising a sole plate, means associated with said sole plate forming a steam generating chamber on which water impinges for steam generation, said chamber being provided with a top, means for heating said steam generating chamber and said sole plate, means providing steam vent means from said steam generating chamber to the bottom surface of said sole plate, a water reservoir, means providing a water passage from said reservoir to said steam generating chamber, a spreader, and means depending from the top of said steam generating chamber for supporting said spreader in said steam generating chamber beneath said water passage for distributing water from said passage over a large area of said steam generating chamber floor to avoid concentrated lime formation, said spreader being in poor thermal contact with said heating means, sole plate, and steam generating chamber and being provided with a high portion substantially directly beneath the water passage and slopes downwardly in a plurality of directions therefrom.

9. A steam iron comprising a sole plate, means associated with said sole plate forming a steam generating chamber having a floor on which water impinges for steam generation, said steam generating chamber further having a top, a plurality of ribs on said floor for dividing said steam generating chamber into a plurality of compartments, said ribs being of lesser height than said steam generating chamber whereby said compartments connect above said ribs, means providing steam vent means from said compartments to the bottom surface of said sole plate, a water reservoir, means providing a water passage from said reservoir to said steam generating chamber, a spreader, and means depending from said chamber top for supporting said spreader in said steam generating chamber.

10. A steam iron as set forth in claim 9 wherein the spreader has a high portion positioned substantially directly beneath said water passage for receiving water therefrom, a plurality of ridges overlying the ribs in said steam generating chamber, and a plurality of valleys lying between said ribs and sloping downwardly away from said high portion for distributing water substantially uniformly into said compartments.

11. A steam iron comprising a sole plate, means associated with said sole plate forming a steam generating chamber and having a floor on which water impinges for steam generation, means providing steam vent means from said steam generating chamber to the bottom surface of said sole plate, a water reservoir, means providing a water passage from said reservoir to said steam generating chamber, a spreader positioned beneath said water passage and having less area than said floor, and supports extending from said spreader and supporting said spreader in said steam generating chamber with said spreader disposed above said floor and free from contact therewith whereby said spreader is maintained at a lower temperature than the floor of said steam generating chamber.

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