July 11, 1944. E. O. MORTON 2,353,426

STEAM IRON

Filed Aug. 5, 1941

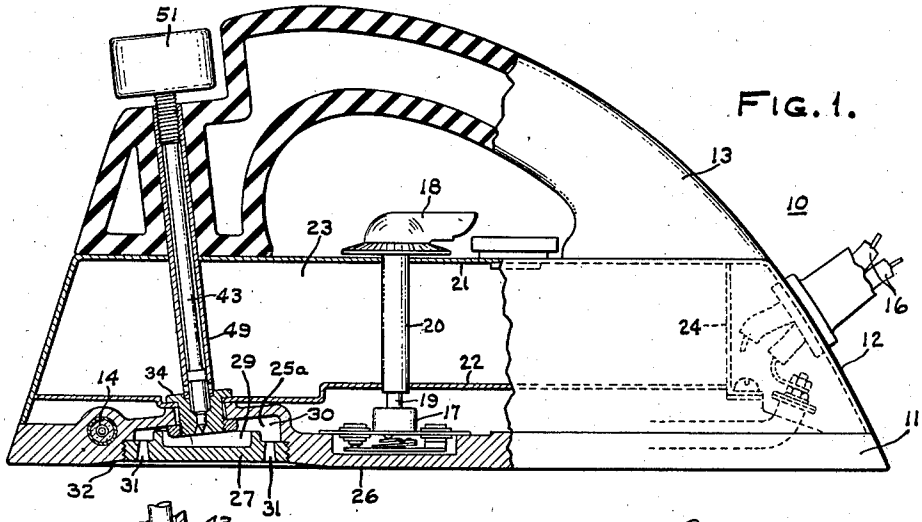


FIG. 1.

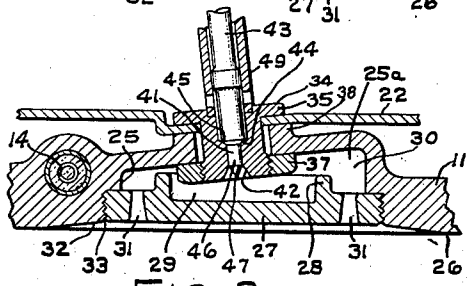


FIG. 2.

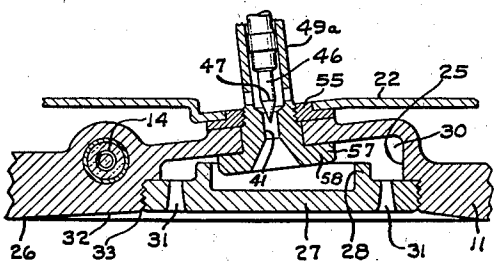


FIG. 4.

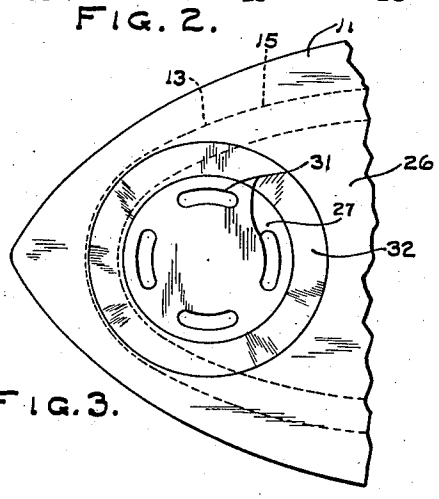


FIG. 3.

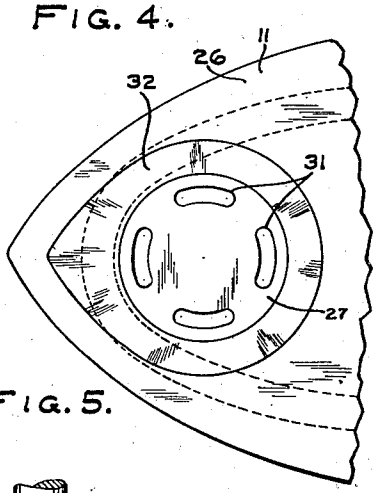


FIG. 5.

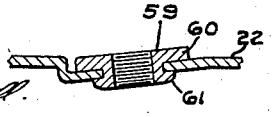


FIG. 6.

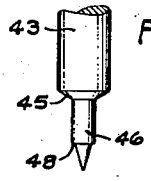


FIG. 7.

WITNESSES:

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STEAM IRON

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5 Claims. (Cl. 38—77)

This invention relates to steam irons and particularly to that type of steam iron having a steam generator and means for supplying water thereto, and it has for an object to provide an improved steam iron of the character set forth.

In steam irons having a steam generator and a water reservoir built into the upper part or cover of the iron, it is desirable to use sheet metal, preferably aluminum, to form the reservoir walls in order to reduce the dead weight of the iron and to facilitate its manufacture. Steam irons of this type are usually provided with a valve for controlling the flow of water from the reservoir to the steam generator, and it has been necessary in assembling and adjusting the valve parts of some steam irons to either work through an opening in the top wall of the reservoir or to thread a hole in the bottom wall of the reservoir and screw the valve parts, such as the valve seat, into this threaded hole. However, to obtain a simple, efficient and attractive design, it is not always desirable to have a large opening in the top of the reservoir. Also, a reservoir wall of relatively thin sheet metal does not furnish sufficient material for strong, durable threads to support the valve parts. This is particularly true in the case of aluminum sheet, which is very weak under shearing stress.

The manufacturer of steam irons is faced also with the ever present problem of preventing clogging of the water and steam passages by the deposit of mineral salts and the like which are precipitated from the water as it is converted into steam. The problem of preventing clogging of the water passage leading to the steam generator is particularly acute in that any change in the water-carrying capacity of this passage prevents accurate control of the amount of steam supplied to the work being pressed.

The present invention has for an object to provide an improved steam iron construction of efficient and practical design which may be readily assembled and serviced.

It is a further object of the invention to provide an improved steam iron construction in which the water flow to the steam generator may be maintained at a substantially uniform rate.

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 drawing, forming a part of this application, in which:

Fig. 1 is a side elevation, partly broken away substantially along the longitudinal center, of a steam iron made in accordance with the present invention.

Fig. 2 is a fragmentary sectional view of a portion of Fig. 1, shown on an enlarged scale;

Fig. 3 is a bottom plan view of the toe or front portion of the iron shown in Fig. 1;

Fig. 4 is a view similar to Fig. 2, illustrating a slightly modified form of the invention;

Fig. 5 is a bottom plan view corresponding to Fig. 3, illustrating a modified form of the invention;

Fig. 6 is a longitudinal section of a portion of the bottom wall of the reservoir of the iron shown in Fig. 1 and illustrating another modification of the invention; and

Fig. 7 is a side view of a valve stem adapted to be used with the construction illustrated in Figs. 2 and 4.

Referring to the drawing and particularly to Figs. 1, 2, and 3, there is shown an electrically-heated steam iron generally indicated 10, which comprises a base or soleplate 11, a cover member 12 and a handle 13. The handle may be made of any suitable heat-insulating material while the cover 12 is preferably made of metal sheet, such as aluminum, copper or the like. The soleplate 11 is heated by means of an armored heating element 14 carried by or cast in the soleplate. The heating element is preferably U-shaped as shown in Fig. 3 providing a bight or looped portion 15 in which the steam generator, to be hereinafter described, is located, whereby a maximum amount of heat is available for the generation of steam.

The heating element 14 is adapted to be connected to an electric outlet (not shown) by means of a cord 16, the conductors of which are connected to the ends of the heating element in series with an adjustable thermostat generally indicated 17 (Fig. 1). The thermostat 17 is adapted to be adjusted manually by means of a knob 18 fixed to the upper end of the thermostat adjusting rod 19. This rod extends through a sleeve 20 which is brazed, soldered or otherwise suitably secured in fluid-tight relation to the upper and lower walls 21 and 22, respectively, of a water reservoir 23 provided in the cover 12. The lower wall 22 and the end wall 24, like the cover 12, are preferably made of relatively thin sheet metal such as aluminum, copper, or the like.

The soleplate 11, as mentioned above, carries a steam generator. This steam generator is formed by means of a recess 25 preferably cast in the soleplate and opening on the ironing surface 26. The lower end of this recess is closed by means of a removable plug or disc 27 which may

be screw threaded to engage threads formed in the lateral wall of the recess. This disc or plug together with the walls of the recess 25 defines a chamber 25a.

The upper surface of the plug 27 is provided with an annular rib or baffle member 28 which divides the chamber 25a into a steam-generating compartment 29 and a steam distributing compartment 30. The steam distributing compartment 30 communicates with the ironing surface of the soleplate through steam ports 31 provided in the plug 27. The steam ports 31 also serve as tool receiving openings whereby the plug may be readily removed for cleaning or servicing of the iron.

It will be noted that the lower surface of the plug 27 is raised above the plane of the ironing surface 26 and that the surface of the soleplate adjacent the plug flares outwardly from the plug to provide a shallow steam pocket or recess 32. The pocket 32 aids in distributing the steam, emitted from the ports 31, over a substantial area of the material being pressed. The body of steam in the pocket 32 has the added function of serving as a cushion to facilitate movement of the iron over the material being pressed. Another important advantage in providing the pocket 32 is that close tolerances in the formation of the recess 25 and the plug 27 need not be maintained since the lower surface of the plug is above the plane of the ironing surface 26 of the iron and will not catch on the material being pressed. To further protect the material being ironed it is preferred to round the edge of the soleplate at the recess 25 and also the lower edge of the plug as shown at 33 in Figs. 2 and 4.

Water is supplied to the steam generating compartment 29 through a valve-controlled outlet provided in the bottom wall 22 of the reservoir. This outlet comprises a bushing member 34 extending through an opening in the reservoir wall 22 and having a flange 35 engaging the upper or inner surface of this wall. This bushing is preferably furnace-brazed to the wall 22 to insure a fluid-tight joint. The bushing projects through an opening provided in the upper wall of the soleplate which defines the top of the recess 25. The lower end of the bushing is threaded and receives a clamp-nut 37. This clamp-nut together with the flange 35 permits the wall 22 to be drawn tightly against the boss 38 formed on the soleplate to prevent water or steam from leaking into the space between the wall 22 and the top surface of the soleplate.

The bushing 34 is provided with a central water passage 41 which is flared at its lower end as indicated at 42. The upper end of the passage 41 is enlarged and loosely receives the valve stem 43. The inclined portion between the central passage 41 and the enlarged passage provides a valve seat 44 adapted to be engaged by the tapered portion 45 of the valve stem for closing the passage 41. A cylindrical extension 46 on the lower end of the valve stem, which terminates in a relatively long tapered end, is snugly but slidably and rotatably received within the central passage 41 when the valve stem engages the seat 44.

This cylindrical extension 46 is preferably at least as long as the passage 41 and serves to ream or scrape out any salt deposits or dirt, which may accumulate on the walls of this passage, each time the valve stem is moved downwardly to close the valve. When the valve stem is forced downwardly to closed position, the relatively sharp edge 47 of the extension 46 will scrape any deposits or dirt on the walls of the central passage, thus insuring a passage of uniform cross section. If desired, the scraping edge 47 on the cylindrical extension may be accentuated as shown in Fig. 7 by slightly undercutting the pointed end as indicated at 48 to provide a right-angle shoulder. The tapered end portion of the extension 46 cooperates with the inner edge of the valve seat 44 to provide the desired throttling of the water flow to the steam generator, as will be clear from Fig. 4 wherein the valve is shown in partly open position.

The valve stem extends upwardly through a guide sleeve 49 which is preferably fixed at its lower end to the bushing 34 and brazed or soldered in liquid-tight relation to the upper wall 21 of the reservoir 23. The guide sleeve 49 and valve stem 43 extend through the upper wall 21 of the reservoir and through the front portion of the handle. The upper end of the valve stem carries an adjusting knob 51 and is externally threaded to engage the internal threads provided in the upper end of the guide sleeve 49. It will be understood that by turning the knob 51 in one direction or another, the valve stem may be raised or lowered to vary the annular space between the inner edge of the valve seat 44 and the tapered end portion of the extension 46 whereby the rate of flow of water to the steam generator may be regulated.

To close the valve, the knob 51 is turned to move the valve stem down from the position shown in Fig. 4 to the closed position shown in Fig. 2. During this downward movement of the valve stem, the extension 46 enters the passage 41 to substantially shut off the flow of water therethrough and simultaneously scrape any salt deposits from the wall of the passage. When the valve stem reaches the position shown in Fig. 2, the shoulder 45 engages the valve seat 41 to provide a liquid-tight seal and prevent water from flowing into the steam generator.

By flaring the lower end of the water passage in the bushing 34, the drops of water flowing through the passage 41 will tend to spread out over this flared surface and distribute the water over a wide area of the steam generator and thereby facilitate evaporation of the water.

In Fig. 4, there has been illustrated a slightly modified arrangement for coupling the steam generator to the water reservoir. Thus, in Fig. 4, a washer or grommet 55 is furnace brazed to the lower wall of the reservoir. This grommet may be made of brass or the like and is internally threaded to receive external threads formed on a bushing 57. The bushing 57 is provided with a flange 58 which engages the inner wall of the recess 25 and when turned into the threads formed in the grommet will draw the grommet 55 into water-tight and steam-tight relation with the soleplate to prevent leakage of water or steam into the space between the reservoir and the soleplate. As shown in Fig. 4 the valve stem guiding sleeve 49a may be made integral with the bushing 57. The sleeve 49a may terminate short of the upper wall 21 of the reservoir 23 or may extend through the handle in the manner shown in Fig. 1 if desired.

Instead of using the grommet 55, one like that illustrated in Fig. 6 may be employed. The grommet 59 (Fig. 6) initially comprises a cylindrical portion having a flange 60 which is adapted to engage the inner or upper surface of the reservoir wall 22. The cylindrical portion which pro-

jects through the opening in the wall 22 is spun or turned over as indicated at 61 to securely clamp the grommet to the wall 20; this operation being best performed on bottom plate 22 before brazing to reservoir shelf. To insure a water-tight joint between the grommet and wall 20, these parts may be furnace brazed, if desired.

While the steam pocket or recess 32 in the soleplate has been shown as circular in the iron illustrated in Figs. 1, 2, and 3, it will be understood that this recess may take various forms. For example, in Fig. 5 the recess has been shown extending toward the pointed end or toe of the iron.

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 changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. A steam iron comprising a soleplate, a body secured to said soleplate, said body having a water storage chamber therein, a steam generator carried by said soleplate, means for heating said soleplate and steam generator, means including a substantially vertical passage for conveying water from said chamber to said steam generator, the lower end of said passage flaring outwardly and downwardly, whereby water flowing through said passage tends to spread out over the surface of the flared lower end to distribute the water over a wide area of said steam generator, said passage having a valve seat therein, and a valve stem having a portion adapted to engage said valve seat for closing said passage, said valve stem having an extension thereon adapted to be received in said passage between said seat and said generator when said valve stem engages said seat, the free end of said extension being adapted to cooperate with said valve seat to regulate the rate of flow of water through said passage when said valve stem portion is out of engagement with said valve seat.

2. A valve for regulating the flow of water in a steam iron of the type having a steam generator to which water is fed at a rate providing substantially instantaneous conversion of the water into steam, said valve comprising a member having a passage therethrough and adapted to be mounted in the steam iron with the passage opening into the steam generator and extending vertically therefrom, said passage including a cylindrical portion having a valve seat at its upper end and opening at its lower end on an outwardly and downwardly flared portion, whereby, water flowing downwardly through said passage tends to spread out over the surface of the flared portion, and a valve stem having a shoulder thereon adapted to engage said seat for closing said passage, said valve stem having a cylindrical extension extending downwardly from said shoulder, said extension being of slightly less diameter than said cylindrical portion of said passage, said extension being located in said cylindrical portion of said passage when said shoulder is in engagement with said valve seat, said extension terminating in a tapered end portion which cooperates with said valve seat for throttling the downward flow of liquid through said passage when said shoulder is out of engagement with said valve seat, said tapered end portion being disposed in the lower flared end of said passage when said shoulder is in engagement with said valve seat.

3. A valve for use in a steam iron comprising, a member having a passage therethrough, said passage including a cylindrical portion and a flared conical portion serving as a valve seat, a valve stem having a conical shoulder at one end thereof adapted to engage said valve seat for closing said passage, and a cylindrical extension on said one end of said stem receivable in said cylindrical portion when said shoulder is in engagement with said valve seat, said cylindrical extension being of but slightly less diameter than said cylindrical portion and having a tapered end portion, the junction of the surface of said tapered end portion with the cylindrical surface of said extension being undercut to provide a substantially right angle shoulder adapted to scrape deposits from the wall of said cylindrical portion as said extension is moved into said cylindrical portion, the tapered end portion of said extension being adapted to cooperate with the valve seat for throttling the flow of liquid through said passage when said shoulder is out of engagement with said valve seat.

4. A steam iron comprising a body including a soleplate, a steam generator carried by said soleplate, means for heating said soleplate and steam generator, means including a valve for supplying water to said steam generator, said valve including a member having a vertical passage therethrough opening at its lower end into said steam generator for conveying water to said steam generator, the lower end of said passage flaring outwardly and downwardly to distribute the water over a wide area of the steam generator, said member having a valve seat and a valve stem having a portion adapted to engage said valve seat for closing said passage, said valve stem having an extension thereon of a size but slightly less than said passage, said extension being located in said passage when said valve stem portion is in engagement with said seat, said extension having an edge portion adjacent the end remote from said seat-engaging portion to scrape any deposits or the like from the wall of said passage as said extension is moved into said passage when closing said valve, the end of said extension cooperating with said valve seat to regulate the rate of flow of water through said passage when said valve stem portion is out of engagement with said valve seat.

5. A steam iron comprising a body including a soleplate, a steam generator, means for heating said soleplate and steam generator, and means for supplying water to said steam generator, said last-mentioned means including a member mounted above said steam generator and having a vertical passage therethrough opening at its lower end into said steam generator for discharging the water by drops into said steam generator, the lower end of said passage flaring outwardly and downwardly, whereby water flowing through said passage tends to spread out over the surface of the flared lower end to distribute the drops of water over a wide area of said steam generator.

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