July 13, 1954 E. O. MORTON 2,683,320

STEAM IRON

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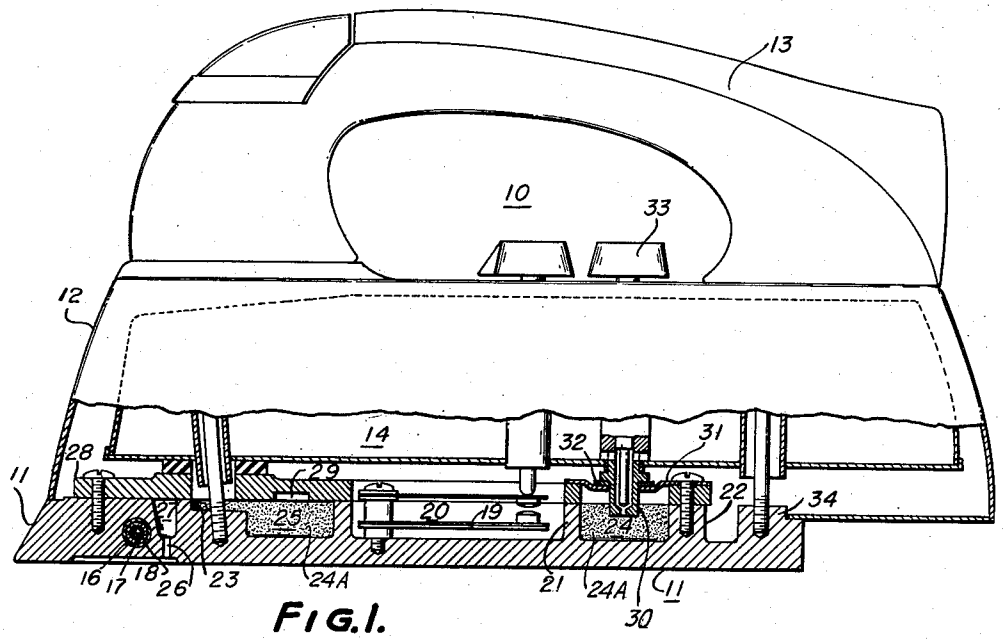


FIG. 1.

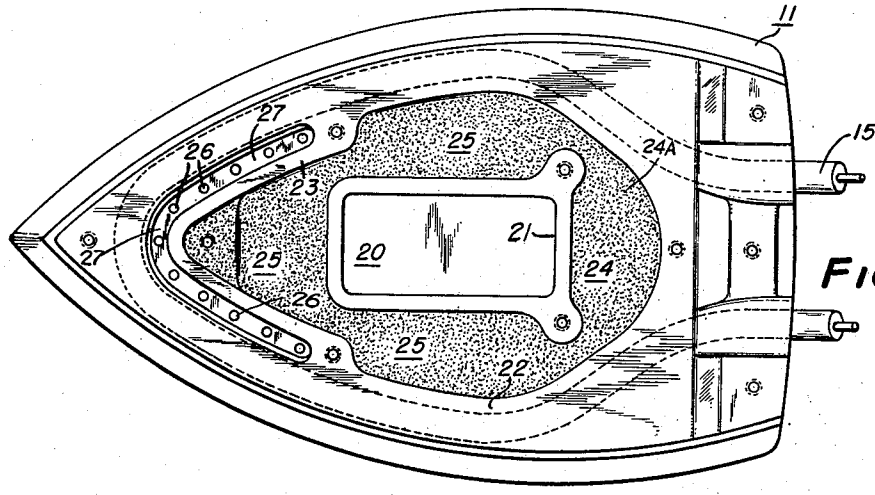


FIG. 2.

WITNESSES:-

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STEAM IRON

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2 Claims. (Cl. 38—77)

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This invention relates to pressing irons of the type providing steam for moistening material being pressed and has for its object an improved iron of this type.

A further object of this invention is to provide a steam iron of the type generally known as the "flash" type, with improved steaming qualities.

Another object of this invention is to eliminate "spitting" of water particles from the soleplate during the pressing operation.

In domestic steam irons of the "flash" type, the space available for steam generation is very limited; therefore, if the water does not wet the steam-generating chamber surface, it forms globules or droplets that "float" around over the hot surface. This phenomenon retards complete evaporation with the result that droplets of water are carried by the steam to the soleplate of the iron, causing spotting of delicate fabrics.

To overcome this problem, I coat the steam-generating chamber surface with a hydrophilic material which provides a wettable surface and causes the incoming liquid to spread over the surface, thus providing a greater area of contact between the liquid and the steam generating surface. Such materials come within the class known as wetting as capillary agents. There are several hydrophilic materials which can be used, but I prefer to use a sodium silicate solution. Under these conditions a high rate of heat transfer is obtained, the water is quickly converted to steam and the possibility of water particles being entrained with the steam and carried to the soleplate is eliminated or minimized.

Although sodium silicate is preferable for commercial application at low cost, the steam-generating chamber may be coated with any of a number of hydrophilic materials to condition the steaming surfaces. The following materials are given by way of example: sodium carbonate, calcium carbonate, calcium acid carbonate, magnesium carbonate, magnesium acid carbonate, sodium bicarbonate, sodium chloride and sodium sulphate. Any one or more of these materials may be used to condition the steaming surfaces. These materials may be carried in solution in water or other liquids or may merely be carried in suspension in any appropriate liquid vehicle to facilitate application to the steam-generating surface. The concentrations of the above materials in the liquid vehicle is not considered to be important since a mixture of high concentration will require a smaller amount than a mixture of low concentration to provide the required coverage.

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In the accompanying drawing used for illustration purposes:

Fig. 1 is a side elevation, with parts in section; and

Fig. 2 is a top plan view of the soleplate.

As shown in the above drawing, a steam iron generally indicated 10, is electrically heated and comprises a metallic soleplate 11, a sheet metal cover or shell member 12 and a plastic or wood handle 13 which are fastened together in any suitable manner. The cover houses a water-storage chamber or reservoir 14. The soleplate may be of conventional shape as illustrated in Fig. 2, and is provided with a heating element 15 which is generally U-shaped as shown by the dotted lines in Fig. 2. The heating element is preferably cast into the soleplate, and may be of the sheathed type containing an outer tube or sheath 16 housing a coiled resistance element 17 centrally disposed and spaced from the outer sheath by a highly compacted refractory insulating material 18.

A thermostat 19 is centrally positioned in the soleplate 11 in a well 20 which is defined by a wall 21 preferably formed integrally with the soleplate.

The wall 21 together with an outer wall 22 and a V-shaped rib 23 define a steam-generating chamber 24 and passages 25. A plurality of outlet ports 26 lie in a V-shaped channel 27 adjacent to the V-shaped rib 23 and are shielded from direct communication with passages 25 by the rib.

A cover plate 28 is secured to the soleplate 11 by any suitable means and serves to enclose the steam chamber 24, the passages 25 and the outlet ports 26, thus preventing escape of steam except through the outlet ports in the soleplate. This cover plate has a transverse channel 29 which serves as a connecting passage between passages 25 and the V-shaped channel 27. The steam is thus allowed to flow from the steam chamber 24 through passages 25 to channel 29, through the channel into the V-shaped channel 27, and from the V-shaped channel through the outlet ports 26 to the bottom of the soleplate.

The water reservoir 14 has a needle valve 30 by means of which it communicates with the steam chamber 24. This valve registers with an opening in a plate 31 which overlies an opening in the cover plate 28 and is fastened thereto. The valve and plate 31 are maintained in leak-proof contact by an annular gasket 32. In order to reduce the conductivity from the cover plate to the water reservoir 14, this plate is preferably constructed of light gauge material.

An adjustment knob **33** serves to adjust the valve **30** in order to vary the entry of water into the steam chamber and thus controls the rate of steam generation.

The confining surfaces of the steam chamber **24** and the passages **25** are coated with a hydrophilic material such as, for example, a solution of sodium silicate, in their pre-assembly stage. The hydrophilic material is indicated by stippling **24A**. To insure that these confining surfaces are fully coated when the parts are assembled, it is expedient to coat the upper and edge surfaces of the soleplate **11**. The bottom and edge surfaces of the cover plate **28** and the bottom surface of the plate **31** may also be coated, if desired. The surface of the well **20** need not be coated, since it is sealed against steam or water access. Also, the soleplate has a heel portion **34**, the upper surface of which need not be coated. Although the specific gravity of the silicate solution is not critical and may vary over a fairly wide range, a water solution having a specific gravity of 1.35 is preferred, since it has been found satisfactory for application directly to the evaporating surfaces. The ratio of Na_2O to SiO_2 in the sodium silicate may vary over a wide range such as from 1:2 to 1:3.75, respectively, although I prefer to use sodium silicate having a ratio of 1:3.22. The coated parts are then air dried and assembled into the iron.

Upon completion of the iron assembly a quantity of dilute sodium silicate solution, containing between 5 per cent and 10 per cent sodium silicate in water is passed into the reservoir **14** and through the valve **30** while the iron is energized. This additional treatment coats the valve stem and the orifice of valve **30** with a thin layer of sodium silicate which will cause the water to flow more readily from the water reservoir **14** to the steam-generating chamber **24**. To insure against clogging of the valve **30** a quantity of water is then passed into the reservoir **14** and through the valve **30** in similar fashion. The iron is now fully treated and will operate satisfactorily without the usual "spitting" of partially vaporized water through the soleplate. Steam irons which have not been subjected to the above treatment will "spit" water for a period of time until their steam-generating surfaces become coated with lime deposits left by the evaporating water. This period of time is commonly known as the "breaking in" period; however, irons treated in the manner described need no "breaking in" period since in effect they have been "broken in" by this method of manufacture.

To operate the iron, the reservoir **14** is filled

with water and the iron is energized by connecting to an electrical outlet in the usual way provided for electrical appliances of this type. To operate as a steam iron, the knob **33** is rotated to any steam volume position desired, thus opening the valve **30** to an extent allowing the required flow of water from the reservoir to the steam-generating chamber **24**. This flow is in the nature of a dripping action, and the water drops will be caused to spread by the wetting surface and instantly flash into steam upon contact with the hot steam chamber surface. The steam will then flow along the channels and passages provided until it escapes through the outlet ports **26** to the bottom of the soleplate. There its effect is to dampen the article being pressed, thus eliminating the need for pre-dampening the article as is customary when "dry" ironing. When it is desired to use the iron as a "dry" iron in the conventional manner, the knob **33** is rotated to the "closed" position, thus closing the valve **30** and stopping the flow of water from the reservoir **14** to the steam chamber **24**.

While I have shown my invention in but one form, 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.

What I claim is:

1. A steam iron comprising a soleplate, a vapor-generating chamber of the flash type, means including a valve for admitting water in droplet form to said chamber and means for transmitting vapor from the vapor-generating chamber to the lower surface of said soleplate, said chamber having side wall surfaces and a bottom wall surface, said side and bottom wall surfaces being coated with a hydrophilic material to cause water to spread and thereby to facilitate vaporization.

2. The structure recited in claim 1 in which said hydrophilic material is sodium silicate.

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