Dec. 29, 1959 J. F. CLEARMAN 2,918,739

FLATIRONS

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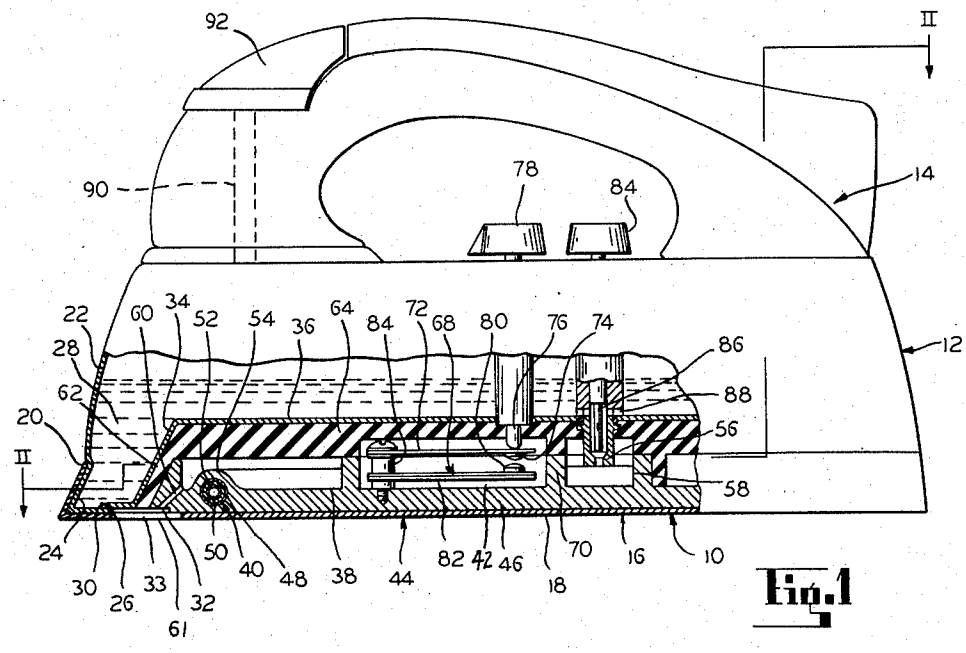


Fig. 1

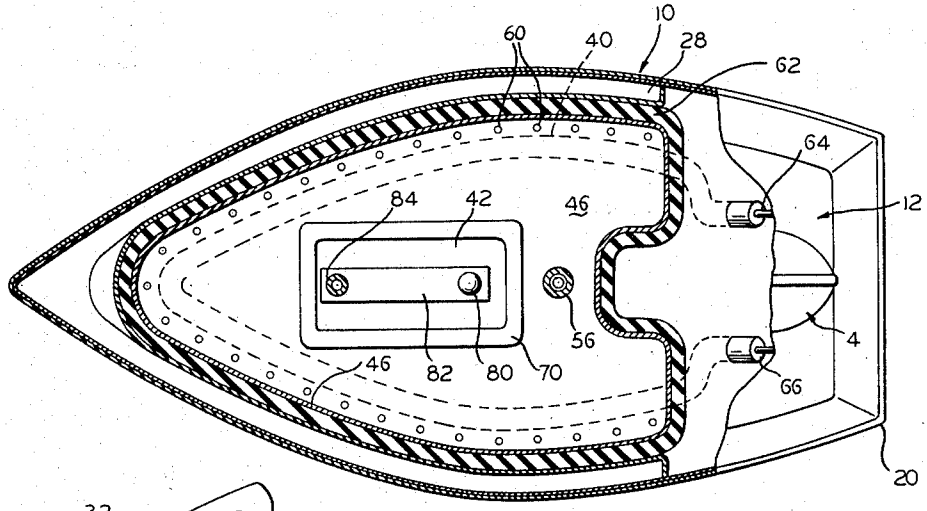


Fig. 2

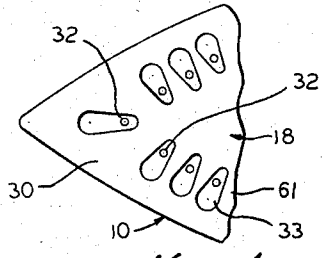


Fig. 3

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FLATIRONS

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The present invention relates to improvements in sadirons or flatirons and more particularly to a pressing iron with improved means for moistening the material which is being pressed.

In sadirons and flatirons such as used by tailors and used in the home, pressing irons have been known which moisten the material without necessitating manual sprinkling and flatirons in the form of combination steam and dry irons have been known to the art. The pressing irons and the steam and dry irons, which contain provisions for automatically moistening the cloth as they are operated, commonly are provided with a steam generator wherein the steam is directed at the material. The steam, upon engaging the cooler material, will, at least in part, condense to moisten the fibers of the material whereupon the heated iron will press the dampened fibers to complete the pressing of the material.

Moistening the material by steam is not wholly satisfactory as much as this operation depends on the satisfactory condensation of the steam in the material. Frequently the steam is superheated and will not satisfactorily condense on the material but escape into the air or pass through the material. This undesirable effect is compounded in that the cloth or material ironed is heated in some areas to a high temperature by the flat iron first passing over the material. In the portions of the material that are heated and receive superheated steam, little or no actual condensation occurs to dampen the material. Further, in many materials there is insufficient mass to provide a cooling effect to condense the superheated steam. In an attempt to achieve sufficient moistening of the fabric, the pressing iron may be set to deliver an abundance of steam which requires increasing the temperature of the iron thereby merely increasing the superheat of the steam and the heat of the fabric to decrease condensation of moisture on the fabric and endangering the fabric from scorching by excessive heat.

Some advantages are attained in the direct application of moisture such as by sprinkling but this requires the inconvenience of an additional manual operation and the attention which must be given to the materials in advance of the ironing operation. Attempts have been made to achieve a direct application of moisture to the material by spraying devices but this has not proven satisfactory and this still requires an additional operation. Where the spray devices are mounted on the flatiron, the addition of cumbersome equipment is required and this does not always provide an even or desirable distribution of the moisture with respect to the travel of the sole plate of the flatiron. Further, such equipment frequently will deposit water in large droplets which may stain the material and which are difficult to evaporate.

Accordingly, it is an object of the invention to provide an improved pressing flatiron which will automatically apply moisture to the material being pressed and apply the moisture in a uniform distribution in a desired pattern and the proper location with respect to the area covered by the sole plate and which will avoid the

disadvantages present in methods and devices heretofore used.

It is a further object of the invention to provide a pressing flatiron which does not require the generation of an excessive amount of steam.

It is a further object of the invention to provide an improved form of pressing flatiron which can be used for either dry ironing or damp ironing with the automatic application of moisture.

Another object of the invention is to provide an improved pressing iron which will automatically apply moisture to the upper surface of the material being pressed in a uniform and selected pattern and which is capable of obtaining improved pressing operations.

A still further object of the invention is to provide an improved pressing iron with means for moistening the material being pressed wherein steam is emitted from the lower surface of the iron sole plate and condensed in a selected cooled outer area of the sole plate with the condensed droplets deposited on the surface of the material and wherein the condensing areas of the sole plate are cooled with water which is also used for the generation of steam.

Other objects and advantages will become more apparent with the teachings of the principles and advantages of the invention in connection with the disclosure thereof in the specification, claims and drawings in which:

Figure 1 is a side elevational view of the flatiron embodying the features of the invention and with portions broken away to illustrate the interior construction;

Figure 2 is a horizontal sectional view taken along line II—II of Figure 1; and

Figure 3 is a fragmentary plan view of the front end of the inverted sole plate illustrating the bottom surface thereof.

The flatiron or sadiron, as shown in Figure 1 includes a sole plate **10** shown generally with a housing or body portion **12** rising therefrom and carrying a heat insulating handle **14** for manual manipulation of the iron.

More specifically, the sole plate **10** may take various forms such as a casting, but is shown as formed of a thin sheet of material **16** which is preferably formed of a material such as stainless steel. Now one of the advantages of stainless steel in this application is its low heat conductivity which functions in cooperation with the other elements in a manner which will become apparent with the description of the cooperating arrangement of these elements.

The sole plate **10** has a smooth lower flat ironing surface **18** which is shown as having an elongated generally oblong shape in Figure 2. The edges of the material **16** forming the sole plate **10** are turned upwardly in a flange **20**.

Rising upwardly from the sole plate is the body or housing portion **12** which is formed of shaped sheet metal **22** such as aluminum which has a higher coefficient of heat conductivity than the stainless steel of the sole plate. The upwardly turned flange of the sole plate overlies the lower portion **24** of the body **12** to firmly connect the parts. The shaped metal which forms the housing is turned inwardly at the base to form a floor **26** of a water tank **28**.

The floor **26** is in good heat transferring relationship with the material **16** of the sole plate so that the sole plate area **30** will remain cool and substantially at the temperature of the water within the tank **28** to form a condensing area or zone **30**. This condensing area or zone **30** extends peripherally around the outer edge of the sole plate outwardly from the steam emitting openings or passageways **32** which will be later described in detail.

The metal which forms the housing **22** is turned up-

wardly from the floor 26 of the tank 28 in a flange 34 which completes the peripheral portion of the water tank 28. The flange 34 has an integral flat upper portion 36. The flange 34 and the flat portion 36, combined with the flat sheet 16 of the sole plate form a hollow cavity in which is located the steam generating chamber 38 the heating element 40 the thermostatic control chamber 42 and the related operational elements.

The central portion of the sole plate 10 forms the heated ironing area or zone 44. The thin sheet material 16 of the sole plate 10 is heated by a heat transferral casting 46. This casting is formed of good heat transmitting material and receives heat from an embedded heating element 40.

The heating element 40 is preferably cast into place in the casting 46 and may be of the sheath type such as a Calrod element having an outer tube or sheath 48 housing a coiled resistance element 50 which is centrally disposed and spaced from the outer sheet by a refractory insulating material 52.

The metal in which the heating element 40 is embedded forms a raised flange 54 which surrounds a steam generating chamber 38. To generate steam within this chamber, water is controllably fed such as by drops of water dripping from the needle valve 56 onto the floor 58 of the chamber 38. The generated steam fills the chamber 38 and is forced out through the steam emitting passageways 60 outside of the flange 54 at the edge of the steam generating chamber 38 whereby the steam is emitted beneath the sole plate 10 through the openings 32.

The openings emit steam in the steam emission area or zone 61 which is located between the steam condensing zone 30 and the heated ironing zone 44.

The steam emission openings 32 open in the steam emission area of the sole plate 10. As may be seen in Figure 3, means are provided to distribute the steam and to direct it generally outwardly toward the condensing area or zone 30 around the peripheral edge of the sole plate 10. For this purpose, each steam emission opening 32 leads into a shallow fan-shaped channel or cavity 33 formed in the flat lower surface 18 of the sole plate. This causes the steam to flow outwardly and to be distributed over a broader flow path to evenly distribute the steam condensate along the condensing zone 30 at the outer edge of the sole plate 10.

As the steam is forced out beneath the sole plate it tends to pass outwardly past the condensing zone 30 whereupon it condenses in droplets which are wiped onto the surface of the fabric or material being ironed as the iron is moved. The material is then pressed as the heated ironing area 44 passes over it. This heated ironing area further generates steam by re-evaporating the moisture and some of this regenerated steam flows outwardly past the condensing zone 30 whereupon it is recondensed to be used for further moistening the material being ironed.

Insulating means are provided to prevent the moisture from condensing in the steam passageway 60 before it reaches the condensing zone 30. Insulating means are also provided to insulate the steam generating chamber from the water tank 28 and to maintain the water as cool as possible. The insulating means, plus the fact that the water is separated from the ambient air only by a thin outer shell 22 of good heat conductive material, maintains the water in a relatively big cool condition to maintain the temperature of the condensing area 30 and at a low steam condensing temperature.

An insulation wall 62 is shown extending between the steam emitting passageways 60 and the water tank 28. This wall 62 extends completely around the outer edge of the casting 46 separating the water tank 28 therefrom. The flat insulating wall 64 extends above the steam generating chamber 38 and above the entire casting 46 separating the water tank 28 therefrom to reduce heat transmission from the generating chamber 38 to the water tank 28.

The heating element is energized through electrical leads 64 and 66 which connect to suitable prongs to be inserted into a jack at the end of an extension cord to plug into the electrical circuit. Between the prongs, which are not shown, and the leads 66 and 64, a thermostatic control switch 68 is electrically connected. This switch is mounted in the thermostat chamber 48 which is surrounded by the upstanding flange 70 of the casting 46 which meets the insulating plate 64 to close the thermostat chamber 24.

The thermostatic switch includes a first contact carrying leaf 72 with a contact 74 at its end which is positionally varied by a plunger 76 that is controlled by rotation of the temperature control knob 78. Contact 74 is intermittently engaged by a circuit making contact 80 carried on a bi-metal leaf 82, with both of said contact carrying leafs mounted on the post 84.

The amount of steam generated is controlled by rotation of the knob 84 which connects to the movable valve member 86 of the needle valve 56. Water enters through the lateral openings 88 to drop downwardly onto the floor 58 of the steam generating chamber in accordance with the position of the movable needle valve member 86. This needle valve member may be turned down upon its seat to prevent passage of water whereupon the iron may be used for dry ironing.

Replacement water is filled into the tank 28 through the filler conduit 90 leading up through the handle 14. A filler cap 92 is removably attached to the handle for filling.

The handle 14 is suitably mounted at the top of the housing or body portion 12 by means, not shown.

Although the operation of the pressing flatiron will be apparent from the detailed description of the individual elements, a brief summary of operation will be given. Water drips from the water tank 28 down through the needle valve 56 onto the floor 58 of the steam generating chamber 38. The steam is forced out through the steam emitting passageways 60 and through the steam emitting openings 32 which open in the steam emitting zone 61 at the lower surface of the sole plate 10. The steam tends to flow outwardly beneath the lower smooth surface of the iron passing into the condensing zone 30, whereupon droplets are formed on the cool surface. This surface is maintained at steam condensing temperature by the water in the water tank 28 which is in good heat transferral relationship with the thin floor of the sole plate. The steam generating chamber 38 and the central portion 44 of the iron sole plate 10 are maintained hot by the embedded heat element 40. As the iron is moved back and forth, the central portion 44 presses the material re-evaporating the moisture with the condensed droplets of moisture which are deposited on the surface of the material by the condensing area 30.

Thus it will be seen that I have provided an improved pressing iron which automatically applies moisture to the surface of the material being pressed and which meets the objectives and advantages hereinbefore set forth. It will be seen that the moisture is applied in an even well distributed pattern which is located ideally in accordance with the location of movement of the ironing portion of the sole plate.

The outer condensing zone is maintained cool so as to rapidly condense the steam which flows against the surface, by the water in the tank. This water is also utilized for producing the steam in the steam generator. An excess of steam need not be provided since substantially all the steam is utilized and is condensed for application to the material being pressed. It will be seen that the construction is simple and rugged and well adapted for continual operation without adjustment or attention from the operator.

I have, in the drawings and specification presented a de-

tailed disclosure of the preferred embodiment of my invention, but it is to be understood that I do not intend to limit the invention to the specific form disclosed, but intend to cover all modifications, changes and alternative constructions and methods falling within the scope of the principles taught by my invention.

I claim as my invention:

1. A flatiron adapted for hand operation and comprising in combination a sole plate having a smooth surface for sliding engagement with the fabric to be pressed, a handle means operatively attached to manually move said sole plate relative to the fabric, said sole plate having a plurality of steam outlets formed therein opening from the smooth surface of the sole plate and spaced inwardly from the outer edge thereof, steam supply means connected to said outlets, and cooling means operatively connected to the sole plate outwardly of the steam outlets and maintaining the temperature thereof at the condensation temperature of steam whereby droplets of moisture will be formed as the steam escapes toward the outer edge of the sole plate surface and the droplets will be wiped onto the material.

2. A flatiron comprising in combination a cover portion, a handle attached to said cover portion, a flat smooth faced sole plate attached to the base of the cover portion for smoothing material in an ironing or pressing operation, said plate having downwardly facing openings for the emission of steam for the application of moisture for pressing material, a steam generator having steam discharging passageways connected to the openings, a controllable water supply means operatively connected to the steam generator for the continued formation of steam, and cooling means operatively connected to the sole plate in selected areas adjacent said openings in the sole plate whereby external areas of the plate are maintained at a steam condensation temperature and the steam trapped between the material and sole plate is converted into water droplets which are rubbed off the moving sole plate onto the surface of the material.

3. A flatiron for hand operation comprising in combination a flat smooth faced sole plate for smoothing material in a pressing operation and having steam emitting passageways formed therein, handle means operatively connected to the sole plate for manually moving the sole plate relative to the material, steam generating and emitting means operatively associated with the iron and with said passageways to discharge a supply of steam, and steam condensing means positioned to be engaged by the flow of steam and to condense said steam into water droplets, said condensing means upon manual movement of the sole plate moving relatively in engagement with the material to be smoothed whereby the water droplets condensed thereon will be wiped onto the surface of the material which is pressed by the heated sole plate.

4. A flatiron comprising in combination a flatiron body portion having a flat smooth faced lower ironing surface to be moved across material in an ironing or pressing operation and an upper body portion connecting with said surface and housing the operating mechanism, a handle on the upper housing portion for manually moving said surface of the iron relative to the material to be smoothed, said body portion being formed therein with a row of steam outlets opening from the lower flat surface of the iron and located spaced from the outer edge of the surface, steam supply means connected to said steam outlets, and means outwardly of the steam outlets for maintaining the outer edge of the sole plate at a steam condensing temperature whereby the steam escaping outwardly across the outer surface will be condensed to form droplets of water for transferral to the material being ironed.

5. A flatiron for manual operation comprising in combination a sole plate having a smooth flat downwardly facing ironing surface, a body portion extending above the sole plate and forming a housing for enclosing the upper portion of the sole plate, a handle connected to the housing for manually maneuvering the iron, a steam generator centrally located within the housing, the sole plate having steam emission openings formed therein and opening from the lower smooth surface thereof and connecting to the steam generator whereby steam is forced outwardly to be discharged beneath the sole plate of the iron, an insulating wall surrounding the steam generator and located outside of said steam emission openings, and a cooling water containing tank positioned in heat transfer relationship with the sole plate at locations adjacent and outwardly of said steam emission openings with said insulating wall therebetween whereby the outer edge of the sole plate will remain at steam condensing temperatures and the steam escaping outwardly from the sole plate will be condensed to form droplets of water which are transferred to the surface of the material being ironed.

6. A hand operated flatiron comprising in combination a smooth faced sole plate adapted to be heated for moving across material in an ironing or pressing operation, a housing portion extending upwardly from said sole plate, a water tank defined within said housing and engaging the sole plate whereby the water within the tank will be in heat transfer relationship to the sole plate in selected areas to maintain said sole plate areas at the steam condensing temperature, said sole plate being provided with steam emission openings in the surface thereof closely spaced from said sole plate areas whereby steam will flow across the sole plate areas to form droplets of moisture which are transferred to the material being ironed, said housing defining a steam generating chamber positioned above the sole plate in communication with the steam emission openings, a heating element within said steam generating chamber, said housing further defining a passageway leading from the water chamber to the steam generating chamber, a variable flow control valve in said passageway to permit the limited entrance of water from the chamber to the steam generating chamber and in communication with said water tank whereby the water provides a cooling medium for the selected areas of the sole plate and a supply of water for steam, and insulation means between the water tank and the steam generating chamber.

7. A hand operated flatiron having a smooth downwardly faced sole plate with a housing rising therefrom and carrying a handle at an upper portion, the improvement comprising a very thin heat transfer wall extending along the outer lower face of the sole plate, a water tank incorporating said wall wherein water contained within the tank will maintain the areas of the sole plate adjacent said wall at substantially the temperature of the water within the tank, a steam generating mechanism within the housing and adapted to supply a flow of steam when the iron is to be used for pressing operation, and means connected to said tank and mechanism to conduct water from the tank to the steam generating mechanism, said sole plate being provided with steam emission conduits opening from the lower face of the sole plate at locations adjacent to said areas of the plate whereby the steam will flow across the lower surface of the sole plate to condense on said areas and form moisture droplets which are wiped onto the material as it is pressed.

8. A hand operated flatiron comprising in combination a sole plate portion formed of a material having a relatively low coefficient of heat conduction, an upper housing portion rising from the sole plate in the form of material having a higher heat coefficient of conductivity, a handle mounted on the upper portion formed of a heat insulating material for manually moving the iron, a fluid tank within the upper portion having a base in heat transfer relationship with the sole plate over areas extending along the outer edge of the lower sole plate surface to cool said areas, said upper housing portion defining a centrally located steam generating chamber, means provided by the sole plate portion for delivering water to

the steam generating chamber, said sole plate portion having formed therein steam emission passageways opening from the lower surface of the sole plate at a location spaced inwardly from and adjacent to the outer plate surfaces cooled by the water tank, and a heating element located spaced from the water tank and in heat transfer relationship with the central portion of the sole plate and with the steam generating chamber whereby steam is generated and the central portion of the sole plate is heated with a relatively low rate of heat transfer between the heated portion of the sole plate and the cooled sole plate areas and the temperature of the water in the tank remains at a moisture condensing temperature.

9. A manually operated flatiron comprising in combination an ironing sole plate adapted to be moved relative to material for an ironing or pressing operation, a handle means connected for moving the sole plate, said sole plate having steam emission passageways for the ejection of steam, a steam condensing surface adjacent and outwardly of said passageways and connected to be moved with the sole plate, steam supply means in communication with said steam emission openings, and means adjacent the steam emission passageways preventing the condensation of steam within said emission passageways before escaping to contact said condensing surface.

10. In a flatiron having a flat smooth surfaced downwardly facing sole plate with a body housing portion extending upwardly from the sole plate and a handle, the combination comprising means for heating the lower surface of the sole plate for ironing operation, means interiorly of the housing portion maintaining select areas of the sole plate at the steam condensing temperature, said sole plate having steam emission openings therein spaced from and adjacent to said steam condensing areas, a steam generator within said housing portion in communication with the steam emission openings whereby steam is forced from the sole plate through said openings, and insulation means interiorly of the housing portion and adjacent the steam emission openings preventing the condensation of the steam before reaching said condensing areas whereby droplets of moisture form in said areas chosen for the desirable distribution of the moisture over the material as the iron is moved relative thereto.

11. A flatiron for pressing fabrics comprising in combination a housing and a sole plate connecting therewith having an ironing area, said area including a peripheral condensing zone, a steam release zone adjacent thereto, and a central ironing zone, handle means connected to the sole plate for manual manipulation thereof, means within said housing for maintaining the condensing zone of the sole plate at a steam condensing temperature whereby droplets of moisture are formed in the zone to apply moisture in the desired distribution over the fabric to be pressed as the sole plate is moved relative thereto, said sole plate being provided with openings adjacent the last-named means for discharging steam in said steam release zone whereby the steam will flow across the sole plate to form droplets in the condensing zone, and means interiorly of the housing for heating the ironing zone whereby the material moistened by the droplets of water will be pressed and the water evaporated.

12. A flatiron in accordance with claim 11 in which the sole plate is formed of a material having a low coefficient of heat transfer to maintain a high temperature differential between the condensing zone and ironing zone.

13. In a manually operated hand ironing device comprising a steam emission member connected to be moved along the surface of a fabric and provided with openings therein, a cooled steam condensing surface positioned to slidably engage the fabric and located adjacent the openings in the steam emission member whereby steam passing therethrough will condense on the condensing surface, and handle means connected to the emission member and condensing surface and operative to manually simultaneously move them over the surface of a fabric.

14. In a manually operated hand ironing device, comprising a steam emission member connected to be moved along the surface of a fabric and provided with openings therein, a cooled steam condensing surface positioned to slidably engage the fabric and located adjacent the openings in the steam emission member whereby steam passing therethrough will condense on the condensing surface, a heated ironing surface to be moved over the fabric and located inwardly of said openings, and handle means connected to the emission member, condensing surface and ironing surface to simultaneously move them over the surface of the fabric.

15. A flatiron comprising in combination a housing and sole plate connecting therewith having a flat downwardly facing smooth surface, a handle connected to the sole plate for manually moving the iron, cooling means in said housing positioned in heat transfer relationship with condensing areas of the sole plate and operative to maintain said areas at steam condensing temperature, the sole plate having a plurality of steam emission openings in the lower surface thereof adjacent the cooling means to direct steam across the lower face of the sole plate, and steam generating means in said housing connected to said openings for the discharge of steam, the sole plate being further provided with steam disbursing means associated with the steam emission openings to disperse the steam toward the condensing area of the sole plate for the formation of evenly distributed moisture droplets to be brushed onto the surface of the material as the iron is moved.

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