Nov. 9, 1943. A. SUSSMAN 2,333,693

STEAM IRON

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Fig. 1.

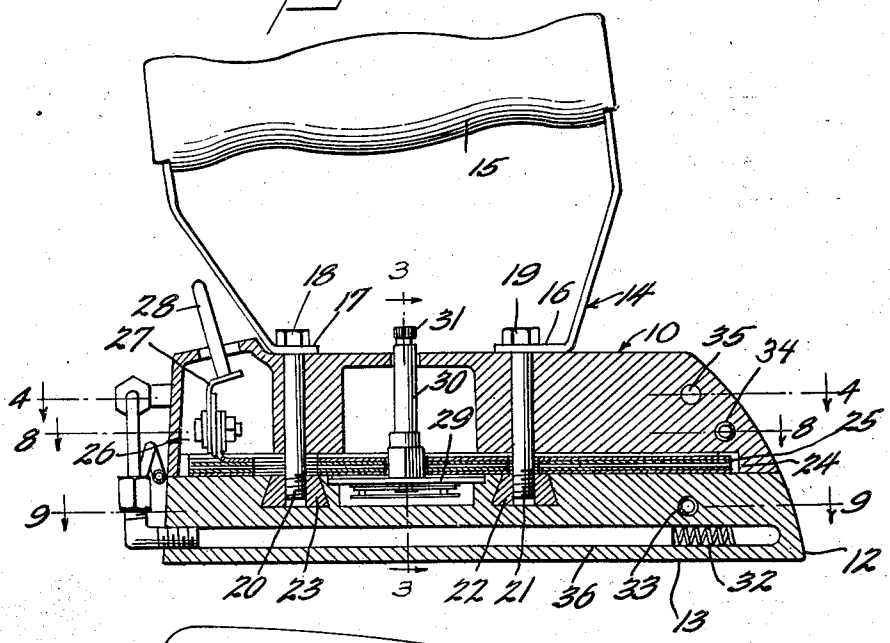
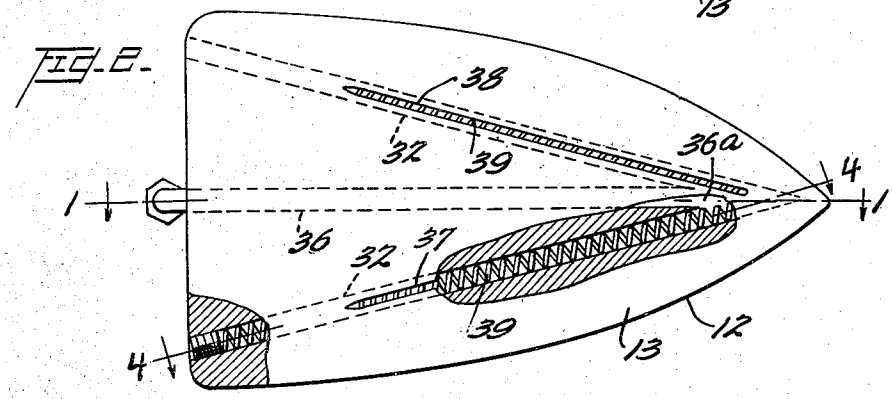



Fig. 2.




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FIG. 4.

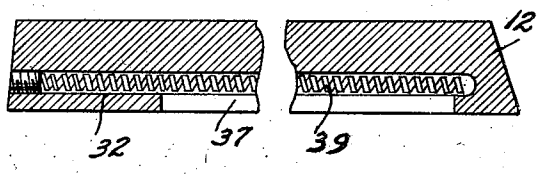



FIG. 8.

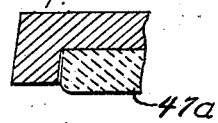



FIG. 10.

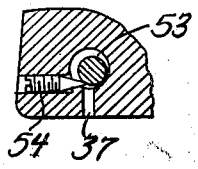



FIG. 3.

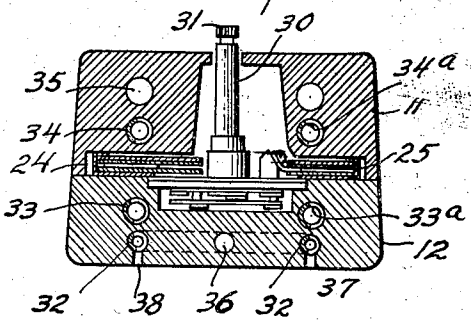



FIG. 9.

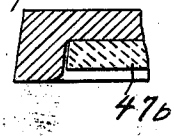



FIG. 6.

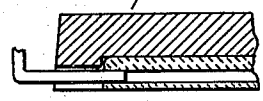


FIG. 5.

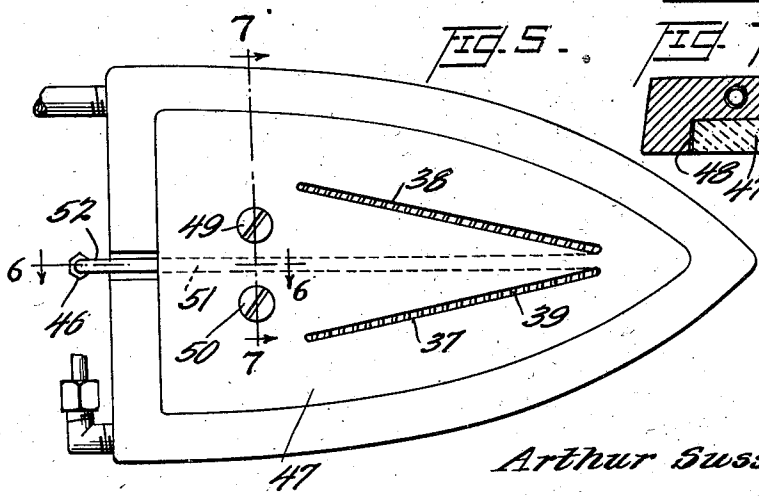
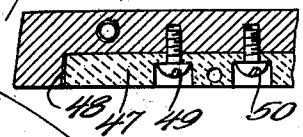



FIG. 7.




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# UNITED STATES PATENT OFFICE

2,333,693

## STEAM IRON

Arthur Sussman, New York, N. Y.

Application November 22, 1939, Serial No. 305,724

8 Claims. (Cl. 38—77)

The present invention relates to steam irons. More particularly, the present invention relates to a steam iron which is especially suited to the treatment of relatively fragile materials, said iron being provided with means for feeding steam to such materials so as to prevent injury thereof.

In the glazing of furs and similar materials, it is desirable that steam applied to the fur be as damp as possible. Although this objective has long been recognized as desirable, it has not been attained in an iron containing a heating unit. When steam is generated outside of the iron and the steam used for the sole heating means, the operator can generate any suitable quality of steam, that is, steam that is wet or dry and suitable for the purposes for which it is used. Since the steam itself furnishes the heating means for the iron in an iron of the steam heating type, the steam will not be superheated nor will the quality thereof be appreciably changed. If anything, the amount of heat extracted from the steam will serve to cool the same and the quality thereof will be decreased. In other words, the amount of free moisture in the steam will be increased. However, in an iron which has its own steam generating unit and in irons of the type which although supplied with steam, contain a heating unit of some character such as a gas or electrical heating unit, the steam supplied or generated is superheated by the relatively hot iron body.

This superheating may take place in a separate steam channel or chamber or it may take place as the steam is ejected from the iron through the pressing surface, this being particularly true since the pressing surface itself is normally metal and furnishes a source of heat which is effective both on the steam being ejected as well as on the material being treated.

Another problem which is peculiar to steam irons wherein steam is ejected through a surface and which are adapted to the treatment of furs, silks, either synthetic or natural and other delicate materials, is the problem of the even distribution of steam through the pressing face.

In the conventional steam iron, the steam is ejected through the pressing face by means of a plurality of relatively minute perforations. These perforations are objectionable in as much as they are likely to become clogged during use by deposition from the steam passing through the perforations. At the same time, the steam is only applied to the object being treated in local zones corresponding to the orifice no matter how minute. This uneven application of steam to a delicate material, as for example, of fur of the character of Moutan fur, will result in streaking the surface. The use of relatively small orifices is also undesirable, because such an orifice results in a very great decrease in steam pressure and since the pressure of the steam is thus sharply decreased, the steam will become dryer in the passage through the minute perforations.

It is one of the objects of this invention therefore to provide a steam iron either of the self generating or steam supplied type having a pressing face which will be incapable of superheating the steam.

Another object of the present invention is to provide in an iron of the character described, a pressing face which is capable of cooling or desuperheating the steam passing therethrough.

A third object of the present invention is the provision in a steam iron of a pressing face formed of a non-hygroscopic heat insulating material which is incapable of transmitting heat from the heating unit of the iron to the steam passing therethrough.

A fourth object of the present invention is to provide in a steam iron, a surface material which is capable of being inserted into the conventional pressing face and is composed of a non-hygroscopic material having a low thermal conductivity.

A fifth object of the present invention is to provide in a steam iron, a relatively long and large steam outlet which will be incapable of substantially diminishing the steam pressure while at the same time evenly distributing the steam over the material being treated.

A sixth object of the present invention is to provide a steam outlet in the pressing face of the steam iron comprising a relatively long slot which is provided with a member constituting a baffle for the steam being emitted and capable of evenly dividing the steam thus emitted and applied to a material.

A seventh object of the present invention is the provision in a steam iron of a non-hygroscopic, low thermal conductivity pressing surface provided with a relatively long and large steam outlet suitably baffled to insure even distribution of steam.

Other objects and advantages will become apparent from the accompanying drawings and description.

In the drawings:

Figure 1 is a vertical section taken along the line 1—1 of Figure 2.

Figure 2 is a bottom plan view of the base

plate of the iron partially broken away to show the steam feeding channels.

Figure 3 is a vertical section taken on the line 3—3 of Figure 1.

Figure 4 is a section taken on the line 4—4 of Figure 2.

Figure 5 is a bottom plan view of the pressing surface of a modification containing an insert of a suitable non-hygroscopic material of low thermal conductivity.

Figure 6 is a section taken along the line 6—6 of Figure 5.

Figure 7 is a section taken along the line 7—7 of Figure 5.

Figure 8 is a broken away vertical section illustrating a modified pressing surface.

Figure 9 is a broken away vertical section illustrating still another modification of the pressing surface.

Figure 10 is a vertical sectional detail illustrating a modification of the steam baffling means.

Referring to Figure 1, there is illustrated a steam iron provided with a body indicated in general by the reference numeral 10, and provided with an upper portion 11, which may be cast integrally of any suitable metal and a lower portion 12, provided with a pressing surface or sole 13. The iron proper is provided with a handle 14 of any suitable type, which is provided with a wooden or plastic portion 15 shaped to be grasped by the palm of the user, and a pair of ears 16 and 17, which are adapted to be fastened by bolts 18 and 19 to the iron 10. It is to be noted that the bolts 18 and 19 are provided with suitable heads and with threaded portions 20 and 21, which are adapted to cooperate with suitable nuts 22 and 23, fastened into the lower portion 12. The bolts 18 and 19 thus serve to not only retain the handle on the base of the iron, but also to hold together the portions 11 and 12. The upper portion of the iron 11 is preferably provided with a hollowed-out section 24 in its base, which is adapted to form a chamber closed by the upper surface of the lower iron portion 12. Within the chamber thus formed there is provided a heating element 25 of the usual type consisting of a plurality of flat strips of resistance material wound upon a suitable insulating core and separated from the remainder of the iron by a suitable insulating material, such as mica. At the rear end of the portion 11 there is provided another hollow portion 26, which is adapted to contain a pair of terminals 27 of the usual type. The ends of these terminals project through the upper surface of the iron at 28 and are adapted to fit into the usual connecting plug. A hollow portion is provided in the upper surface of the member 12, which is adapted to contain a thermostatic unit, indicated in general at 29. The thermostatic unit is provided with a shaft 30, which passes through the heating element and is insulated therefrom. The shaft 30 forms a control shaft for the thermostat and is provided at its upper end with a knob 31. The manual operation of this knob is adapted to set the thermostatic control in a manner well known in the art, so that the heating unit 25 may be operated at a plurality of heating temperatures. It is to be understood that the thermostat is connected in circuit between the terminals 27 and the heating unit 25, so that it serves to regulate the flow of current through the heating unit and when the thermostat is subjected to a temperature in excess of the upper heating limit, as regulated by the knob 31, it serves to shut off the flow o current to the heating element 25. When th thermostat cools down it also serves to once agai supply current to the heating unit 25.

Formed in the body of the iron 10 are a plu rality of heating channels. These channels ar vertically spaced one from the other and are o general V-shape. As shown in Figure 1, ther are four sets of channels 32, 33, 34 and 35. Th channel 32, which is shown in detail in Figure 2 has a feed or supply channel 36, communicatin with its forward end, as at 36a. The forwar end of this channel is open to the pressing sur face 13 as by a pair of slots 37 and 38. The chan nel 32 is also provided with a spring membe 39, for a purpose to be hereinafter described Located in the lower portion 12 of the iron, an just above the channel 32, is a channel 33, whic functions to heat the water fed to the iron. It may be noted that the channel 33 surrounds an is in close proximity to the thermostat 29. Tw sets of channels are provided in the upper portion 11 of the iron, which are designated by the reference numerals 34 and 35. The channel 34 i located just above the heating unit and is the main steam-producing channel of the iron whereas the channel 35 is a dead end or pressure equalizing channel. It may be noted that both channels 33 and 34 are provided with metal springs 33a and 34a throughout their length. The metal springs in these channels serve to promote a better heat transfer to the steam and water passing therethrough. The channel 35 does not contain a spring, since the function of this channel is to act merely as a pressure equalizing chamber, as best described in applicant's Patent No. 2,263,532. The steam generated in the other channels is conducted to the supply channel 36 by suitable connecting means and passes through the slots 37 and 38 out of the pressing face 13 of the iron. It is to be noted that the springs 39 in the channel 32 serve to subdivide the steam and, therefore, enables the use of relatively wide slots 37 and 38. In the irons of the prior art, relatively small perforations are used, which are subject to many disadvantages. The slot of the present iron is preferably of approximately one-sixteenth of an inch in width and is provided with a spring having convolutions approximately one-sixteenth of an inch apart.

The slots 37 and 38 are shown in detail in Figures 2, 4 and 5. In Figure 5 a modification is shown wherein the slots are formed in a suitable insulating member which is formed of a suitable material such as "Transite" and indicated by reference numeral 47. The insulating member 47 may be held in a suitable depression 48 in the pressing face or sole of the iron and is held in position as by screws 49 and 50. The "Transite" plate 47 is provided with a supply channel 51 which performs a similar function to the supply channel 36 of Figure 2. The elbow 46 in this modification communicates with a short duct or conduit 52 which is suitably held in the channel 51 of the "Transite" insert. The insert is also provided with springs 39 which are entirely similar to springs 39 disclosed in Figure 2. As previously stated, the slots are approximately one-sixteenth of an inch wide and the distance between the convolutions of the springs are approximately one-sixteenth of an inch apart. It is to be understood that the "Transite" insert may extend over any portion of the pressing face. In lieu of an insert, the

entire pressing face or lower section of the iron may be formed of a suitable insulating material.

By providing a long continuous slot in the bottom surface of the iron or in the insert portion, the steam issues from the spaces between the convolutions of the spring which thus functions as a baffle. As the steam issues, it is evenly divided into increments, giving the steam the effect of having passed through a series of exceedingly small holes or openings. By providing a device of this character therefore, the steam is more evenly distributed over the area to be treated and substantially eliminates the production of streaks. It is to be noted that the use of such an arrangement will not only avoid streaking but is materially cheaper to manufacture as the necessity for drilling a number of individual holes is eliminated. The longitudinal slots **37** and **38** may be cast in the bottom member of the iron or in the insert portion where the material used lends itself to such an operation or it may be cut by means of a suitable tool. Various other materials may be substituted for the "Transite" which is a trade-marked material manufactured by the Johns-Manville Corporation comprised of a fibrous material such as asbestos incorporated in a suitable binder such as Portland cement. As an example of a suitable material, the insert may be of glass or of a suitable mineral composition. Another example is porcelain or a similar ceramic material. In some instances it may be desirable to use as an insulating material a relatively inert resin of a natural or synthetic nature such as the phenol condensation product known generally under the name of "Bakelite." In general, any synthetic or natural material may be used which has a low thermal conductivity and which will not rapidly deteriorate by the action of the steam. It is also necessary that the material used does not exert any deleterious action upon the fur or the material which is to be treated by the iron. It is within the broad province of the invention to use a rubber insulating material which is capable of withstanding a temperature in the neighborhood of 300° F. to 350° F.

Having once set forth the proposition that the insert should be one of relatively low heat conductivity as compared to a metallic member and particularly of the characteristics of the materials hereinbefore set forth, it is obvious that those skilled in the art can provide other materials other than those specifically mentioned such as fiber compositions and the like. It is obvious however, that materials which are incapable of maintaining their low thermal conductivity in usage are not suitable. For example, a hygroscopic material such as cloth which takes up moisture is not suitable for use in the iron of the present invention. The taking up of moisture impairs the low thermal conductivity of material of this character soon after the steam treatment has been started. It is also obvious that those materials are not suitable even before they have absorbed moisture in as much as the absorption of moisture prior to saturation tends to dry the steam being used.

It may be noted when proceeding in accordance with the present invention that the steam is generated or superheated and is then fed to a pressing face which is of such a nature that the steam in passing through the face will not be raised in temperature so that the free moisture content thereof will be maintained. Another feature in the increase of the free moisture content is the fact that the steam in passing through the relatively low resistant slots will not be subjected to "throttle effect" which would tend to decrease the free moisture thereof.

In Figures 8 and 9 modified inserts of "Transite" or other suitable material as hereinbefore set forth are shown. The insert **47***a* in Figure 8 protrudes from the bottom face of the iron so that during the pressing operation the metal ide of the iron would not ordinarily come in contact with the material being treated. Obviously in the type of insert as shown in Figures 5 to 7, the edge of the sole plate surrounding the insert **47** functions as a pressing surface; whereas, in the modification shown in Figure 8, since this surface is below the level of the "Transite" insert **47***a*, it would not normally come in contact with the material although it could be placed in contact with the material by the operator tilting the iron during use and may be suitably rounded off to effect this purpose.

In Figure 9 a further modification is disclosed wherein the insert **47***b*, which may be also made of a suitable material having low thermal conductivity is countersunk into the pressing face of the iron. In this modification, the sole of the iron surrounding the insert is adapted to function as a pressing surface and the insert itself does not come in contact with the material while still performing its function as hereinbefore disclosed. Although in the preferred embodiment, screws **49** and **50** are shown for removably fastening the insert **47** to the iron, other means may be employed. For example, the insert may be cemented in place or the screws may be covered with a suitable cement to prevent removal of the insert. Instead of pre-forming an insert and fastening the same to the iron, the insert material may be cast or molded in place by any of the well known methods. For example, a plastic mass of cement and asbestos may be placed in the recess of the iron and allowed to set in order to form an insert equivalent to the "Transite."

As has been previously set forth in the preferred embodiment, the steam feeding means consists of a relatively long steam outlet slot of a relatively great width as compared to the slots of the prior art; the width of the slot being preferably of the order of one sixteenth of an inch. Preferably a slot of this character is used with a suitable baffling means which would be effective to prevent the unrestricted outlet of steam and water from the iron while introducing a minimum of resistance to steam flow. Although this baffling means is preferably a spring such as spring **39**, other suitable means may be used such as a screen provided with relatively large openings of the order of one sixteenth of an inch or spaced rods or a loose fibrous material such as steel wool. Preferably in all these instances, the baffling material is easily removable so that it may be replaced and/or cleaned when necessary. Although in the preferred embodiment two slots in general triangular positioning are shown, additional slots may be used and these slots arranged in any suitable position.

The channels may also be provided with baffling means which consist of angularly disposed metal ribbons such as shown in my prior Patent No. 1,942,579. These ribbons may be used both in the channels in the iron and for baffling the slots.

While it has been stated that the slots present in the sole of the iron are approximately one sixteenth of an inch wide, it is obvious that this may be departed from and still come within the spirit of the present invention. The slots may be considerably wider or somewhat less than one sixteenth of an inch in width, the criterion being that no fine openings, perforations or the like are present which may become clogged because of the deposition of scale, and that preferably, although not absolutely necessary, baffling means are provided in combination with the slot, said baffling means functioning to prevent a large volume of steam issuing from the broad slots, and in the preferred form of the invention the baffling means serve to subdivide the steam.

It is to be noted further that it is desirable, in order to promote the smooth, even feed of steam of known characteristics, i. e., steam of a given quality, that the means, for feeding the steam to the material being treated, desirably does not restrict the flow of steam to any great extent. Restriction of the flow of steam tends to produce relatively dry steam in accordance with the well known throttle effect. The use of relatively wide, preferably suitably baffled slots in combination with the cushioning means or dead end chamber results in a smooth even flow of steam of a desired quality to the materials undergoing treatment. This smooth even flow will not vary during the life of the iron since the orifice is of a sufficient width to prevent clogging with a resultant change in orifice size and outlet pressure.

It is desired to point out that the basic concept of one form of the invention is to use a slot wide enough to inhibit any tendency for clogging and combine therewith a means which will prevent a stream of steam the size of the slot from issuing therefrom. Instead of using a perforated member as typified by a coil spring or by a screen having large openings therein, there may be used an imperforate member spaced from the interior wall edges bounding the slot so that steam may issue from the aperture formed between the solid member and the edges of the slot.

The imperforate solid member may take the form of a rod disposed in general parallelism with the slot and spaced therefrom so as to allow the exit of steam between the rod and the walls of the slot. By providing a rod which may be adjusted in position relative to the slot and which is of somewhat larger diameter than the slot, the effective size of the openings between the rod and the edges of the slot can be varied, thus providing a variable outlet for the steam.

A variable outlet is illustrated in Figure 10 wherein the rod **53** is shown as supported by a set screw **54**. Inward movement of the screw **52** will serve to raise the rod **53** and thus increase the effective width of the slot **37**. Outward movement of the screw **54** will allow the rod **53** to drop and partially close the slot **37**.

In place of a rod, other baffling members may be used to produce a variable outlet; for example, a solid strip of material either spaced from the slot or provided with suitable openings may be placed in a suitable position so as to baffle and vary the effective size of the outlet.

It is desired to further point out that although in the preferred embodiment a spiral baffling member having spaced convolutions is spoken of as a spring, it is to be understood that the term spring is to be used in a broad sense, i. e. any suitable spiral member having spaced convolutions is to be deemed the full equivalent thereof and that where the term "spring" is used in the specification and claims, such a member is intended whether or not the member possesses resilient and/or spring-like qualities.

The relatively wide steam feeding orifice herein set forth, as typified by slots, the latter preferably being used in combination with baffling means, may be incorporated in an iron fed with live steam generated extraneously of the iron, or may be used as feeding means in any suitable pressing and/or steam treating implements, as typified by pressing and steaming machines provided with movable platens or rolls.

It is to be also noted that the provision of a pressing face composed at least in part of a non-hygroscopic material of low heat conductivity, as for example "Transite," may also be used in steam treating and/or pressing implements, as well as in the iron disclosed in the specific form of the present invention.

I claim:

1. In a steam iron including a steam generating means, a pressing face, an insert in said face composed of a non-hygroscopic material of low thermal conductivity, means to retain said insert in said face and a steam feeding orifice in said insert.

2. In a steam iron including a steam generating means, a pressing face, an insert in said face composed of a non-hygroscopic material of low thermal conductivity, means to retain said insert in said face, an elongated feeding means of sufficient width to prevent clogging in said insert and means to retard the flow of steam within said insert and baffle the steam emitted from said feeding means, said means including spaced portions extending transversely of the feeding means to divide the flow through the feeding means into a plurality of increments.

3. In a steam iron including a steam supply source, a pressing face at least in part composed of a non-hygroscopic material of low thermal conductivity and an elongated steam feeding means of sufficient width to prevent clogging in said pressing face and means to retard the flow of steam within said insert and baffle the steam emitted from said feeding means, said means including spaced portions extending transversely of the feeding means to divide the flow through the feeding means into a plurality of increments.

4. In a steam iron including a steam supply source, a pressing face at least in part composed of a non-hygroscopic material of low thermal conductivity, a channel in said iron, elongated steam feeding openings leading from said channel to said face and baffling means within said channel including spaced portions extending transversely of the openings cooperating with said openings to emit the steam in the form of small evenly divided increments, said baffling means also functioning to retard the flow of steam.

5. In a steam iron including a sole plate having a pressing surface, a steam distributing channel extending substantially horizontally through the sloe plate adjacent to the pressing surface, a slot extending longitudinally of the iron and communicating with both the channel and pressing face throughout its length, and means positioned adjacent the slot to baffle the steam emitted from said slot.

6. In a steam iron including a steam supply source, a pressing face, said face being in part composed of non-hygroscopic material of low thermal conductivity, said part of said pressing face being vertically offset from the remainder of the face and steam feeding means in said part of said pressing face.

7. In a steam iron including a steam supply source, a pressing face, said face being in part composed of a non-hygroscopic material of low thermal conductivity protruding from the remainder of the face and steam feeding means in said part of said pressing face.

8. In a steam iron including a steam supply source, a pressing face, said face being in part composed of a non-hygroscopic material of low thermal conductivity countersunk from the remainder of the face and steam feeding means in said part of said pressing face.

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