

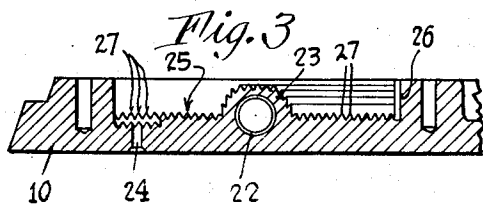
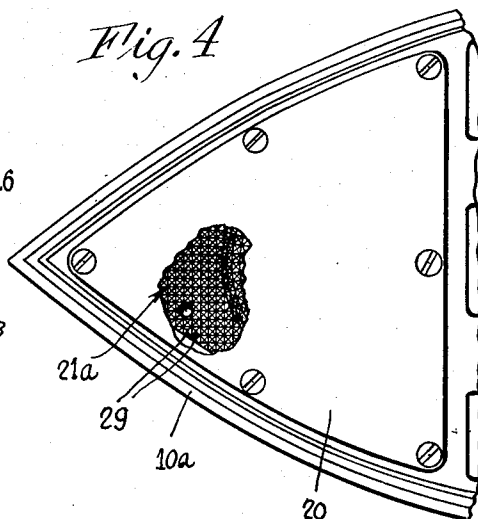
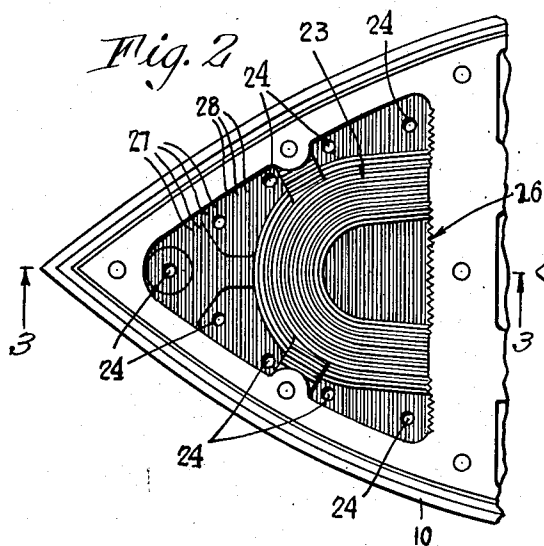
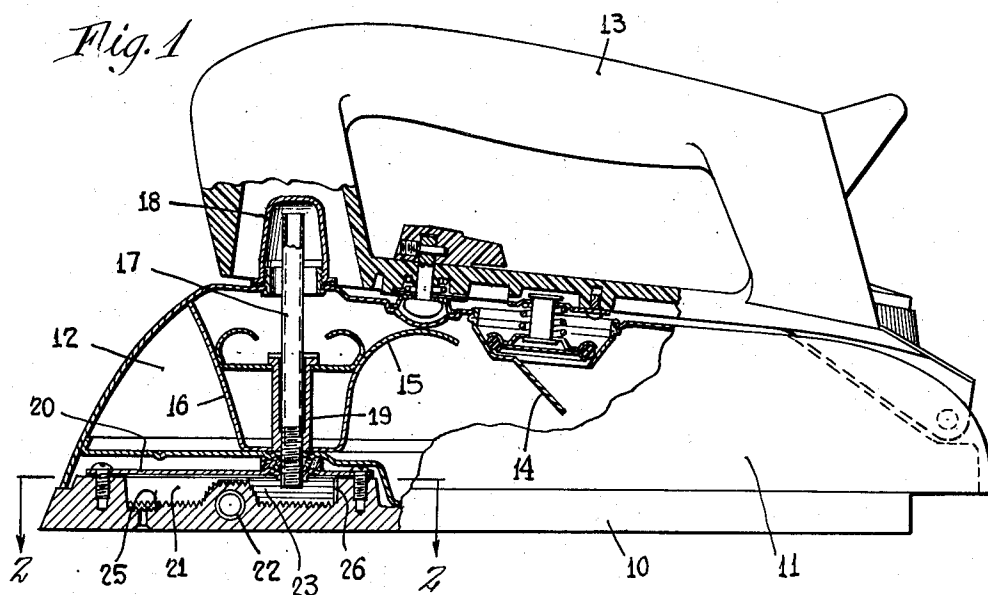
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STEAM FLATIRON

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STEAM FLATIRON

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6 Claims. (Cl. 38—77)

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This invention relates to steam flatirons of the type having heated sole plates and steam chambers associated with the sole plates.

The invention is illustrated in connection with a boiler-type steam flatiron having an electrically-heated sole plate and boiler disposed above the sole plate, the latter feeding steam through a steam pipe to a steam chamber on the sole plate, from whence the steam is discharged through ports in the forward portion of the plate. It should be understood, however, that the invention is not limited to this particular type of iron, since it has utility and advantage in connection with flash-boiler or other type irons.

Steam-electric irons of the types mentioned are currently in widespread use, in homes, etc., and when in service these irons may be operated at temperatures which substantially exceed 350° F. Also, they are often abruptly and rapidly moved or manipulated, either during normal ironing operations or when the iron is being set on end. Under these conditions of heat and/or movement, it has been found that spluttering, i. e., discharge of hot water droplets from the steam openings in the sole plate of the iron, often occurs.

An object of the present invention is to provide an improved steam iron of the type having a heated sole plate and a steam chamber, the said iron being so constructed and arranged that virtually no spluttering or discharge of water droplets occurs from the steam openings in the sole plate despite temperatures in the steam chamber substantially in excess of 350° F., and despite rapid or abrupt movements of the iron, either during the ironing operations or when the iron is suddenly set on end.

Another object of the invention is to provide an improved steam iron according to the foregoing, which is of extremely simple construction, and is economical to fabricate and reliable in operation at all times.

To accomplish the above objects I provide a unique and novel steam chamber in the iron, which is characterized by being irregular or broken up as by the presence of many, small, closely spaced projections or ridges on the lower and rear walls thereof whereby water droplets in the chamber are dispersed on the walls and are broken down and quickly converted into steam.

In boiler-type steam irons, the steam chamber usually has a steam inlet from the boiler, and steam outlets discharging at the bottom of the sole plate. I have found that heretofore, when the steam chamber of such a steam iron is op-

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erated at high temperatures, for example over 350° F., water droplets inadvertently discharged into the chamber during sudden or abrupt manipulation of the iron, are not normally quickly converted into steam and discharged as such from the chamber. Instead, these water droplets bounce around inside the steam chamber in the form of globules because of their sudden contact with the high heat of the surfaces of the chamber, and are discharged from the steam outlets as droplets of water. This is a serious drawback since it causes water spots on the fabric being ironed, and is a potential source of water burns to a user if the iron is suddenly stood on end.

I have discovered that my novel steam chamber construction as set forth herein virtually completely prevents the said discharge of water droplets from the steam ports in the sole plate. By the use of this improved steam chamber construction, wall temperatures in the steam chamber may be as high as 475° F., which is a desirable, high steam-ironing temperature for linen, without resulting in spluttering or discharge of water from the steam ports in the sole plate because of the non-dispersion characteristic of the water globules mentioned above.

In one embodiment of the invention shown and described herein, walls of the steam chamber are provided with a multiplicity or plurality of relatively sharp, closely spaced ridges which are so located as to be contacted by the water droplets which pass into the chamber from the steam pipe connected with the boiler. In another embodiment of the invention the walls of the steam chamber have pyramidal nibs or points, closely spaced. I not only provide these projections on the bottom surfaces of the steam chamber, where globules of water are apt to be deposited during the normal movements of the iron when used for ironing, but also on the rear walls of the steam chamber which are apt to receive the droplets of water when the iron is stood on its end.

In the embodiments of the invention illustrated herein the heating element is embedded in the sole plate and extends adjacent the steam chamber through an inwardly exposed, bulbous or raised portion of the bottom wall thereof. This wall portion as a consequence becomes very hot as compared to the rest of the sole plate, since it is isolated from any heat-removing parts. The provision of the above protuberances or ribs on this bulbous portion of the steam chamber wall, effectively overcomes the effect of the higher temperatures of said wall, causing the water drop-

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lets to disperse themselves over the wall surface, and to be quickly converted into steam.

Other features and advantages of the invention will hereinafter appear.

In the accompanying drawings:

Figure 1 is a side elevational view of an improved steam iron made in accordance with the invention, the front portion of the iron body being broken away and shown in vertical section to reveal the details of the improved steam chamber.

Fig. 2 is a fragmentary top or plan view of the steam chamber and front portion of the sole plate of the iron of Fig. 1, the cover or top of the steam chamber being removed.

Fig. 3 is a fragmentary sectional view taken on line 3—3 of Fig. 2, and

Fig. 4 is a view like Fig. 2 but showing a modification of the invention wherein the protuberances on the walls of the steam chamber are in the form of small ribs or pyramidal projections.

Referring to Figs. 1 through 3, the present improved steam-electric flatiron comprises a sole plate 10 and a body or housing 11 disposed above the sole plate, said body including a tank or boiler 12 over which a handle structure 13 is mounted.

The boiler 12 of the iron has baffles 14, 15 and 16, the latter two extending on opposite sides of a vertical steam pipe 17 the upper end of which is enclosed in a steam dome 18 carried on the top of the boiler 12. The steam pipe 17 extends downward through a threaded collar 19, and at its lower end is threaded into a cover plate 20 which is attached to the sole plate 10 over a cavity 21 thereof, of said cavity thus constituting a steam chamber to which steam is fed from the boiler 12.

The iron shown in Figs. 1 through 3 is similar in many respects to that shown in the copending application of Joseph O. Thibault, Serial No. 103,437, filed July 7, 1949, and entitled Steam Electric Iron, and reference may be had to this copending application for details of construction which are not completely described herein.

Considering Fig. 1, the sole plate 10 has embedded in it a heating element 22 which, adjacent the steam chamber 21, extends in the form of a U, being enclosed in a protuberant wall portion 23 in the bottom of the chamber. Steam ports 24 are provided in the sole plate 10, communicating with the steam chamber 21 to enable steam to be discharged therefrom, to the material being ironed.

The steam chamber 21 has bottom walls 25 and rear walls 26, and according to the present invention the said walls, including a bulging wall portion 23 of the bottom wall, are constructed and formed in a novel manner by the provision of many, closely-spaced high and low portions or irregularities, to greatly quicken and facilitate the conversion into steam of water droplets deposited on said walls, especially during heating of the walls above temperatures at which a droplet would normally tend to disperse itself over a smooth heated surface. Thus there is prevented, for the said temperatures, the presence of water globules in the steam chamber for any appreciable time, and the discharge of said globules through the steam ports 24 of the sole plate, either onto the material being ironed or into the air, as the case may be.

I have found that, in steam-electric irons as heretofore constructed, when the temperatures of the walls of the steam chamber 21 went be-

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yond 350° F. water droplets which were deposited on said walls would bounce around and not disperse themselves over the wall surfaces for conversion into steam. Instead, these droplets of water would be forcibly ejected or discharged from the steam ports in the sole plate, and would cause spotting of the fabric being ironed or constitute a potential burn hazard if the iron is set on its end. However, by the provision of many closely spaced irregularities on the wall surfaces of the steam chamber, the water droplets will be caused to quickly disperse themselves over the surfaces, and be quickly transformed into steam, which will then be discharged from the ports in the intended manner.

The irregularities on the wall surfaces of the steam chamber may have various forms or shapes. For example, in Figs. 1, 2 and 3, I provide a plurality of closely spaced ribs 27, forming grooves 28 between them, on the bottom surfaces 25 of the steam chamber and on the rear wall surfaces 26 thereof. I also provide the said ribs and grooves on the bulging wall portions 23 of the bottom of the chamber. The ribs 27 may be advantageously made from $\frac{1}{8}$ " to $\frac{3}{4}$ " high, and may be advantageously spaced apart $\frac{5}{16}$ ". The grooves 28 thus are from $\frac{1}{2}$ " to $\frac{3}{4}$ " deep. Preferably, the ribs are relatively sharp, that is, they have pointed crests with small radii on the order of .010", and the roots of the grooves are also similarly sharp. In other words, the grooves 28 are V grooves formed in the wall surfaces of the steam chamber. It is also preferable that the surfaces of the ribs or grooves be rough, and this may be accomplished, if the sole plate is an aluminum casting, by providing roughened surfaces in the dies, as effected by certain types of rough machining operations. With the above construction, the wall temperatures in the steam chamber may be brought as high as 475° F. and yet water droplets on the wall surfaces will be quickly dispersed over the surfaces and converted into steam.

When a steam iron is constructed in accordance with the above, as shown in Figs. 1 through 3, it may be quickly or abruptly moved during the ironing operations or when being stood on end, and the sole plate may be operated at relatively high temperatures, for example, up to 475° F. without resulting in the undesirable discharge of water droplets from the steam ports, heretofore experienced.

Referring to Figs. 1 and 2, the provision of the ribs 27 and grooves 28 on the rear wall 26 of the steam chamber greatly facilitates and quickens the conversion of water droplets into steam when the iron is stood on its end, and thus there is obviated any spluttering or discharge of water through the steam ports 24, which might be uncomfortable or injurious to a user.

While I have shown in Figs. 1 through 3 a plurality of ribs and grooves, which are special forms of protuberances and cavities, other irregular surface configurations may be provided. For example, in Fig. 4 I show a sole plate 10a having a steam chamber 21a closed by a cover plate 20, the bottom and rear walls of the steam chamber being provided with small, pointed projections 29 of pyramidal shape, formed by cutting series of intersecting V grooves in the wall surfaces, extending at right angles to each other. This construction is also very advantageous in facilitating the dispersion of water globules over the wall surfaces of the steam chamber, and quickening their conversion into steam.

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While I have shown, and have described above, two steam chambers having different types or shapes of protuberances, it should be understood that my invention is not limited to this specific disclosure since other shapes and surface configurations may be employed without departing from the spirit of the invention, and variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. In a steam iron having a boiler, a soleplate under the boiler, an electric heating element between the boiler and the soleplate, a steam-collecting chamber, the floor of which is formed by the soleplate, a steam tube leading from the boiler and conducting steam and vapor to the steam-collecting chamber, and steam-escape passages through the soleplate communicating with the steam-collecting chamber and spaced from the outlet of said steam tube: the improvement which comprises the provision of a rough surface on at least the portion of the soleplate under the outlet of the steam tube, said rough surface comprising a plurality of peaks extending upwardly from and covering the floor of the steam-collecting chamber under the steam tube outlet, the distance between peaks being not substantially greater than the height of the peaks, said peaks breaking-up water particles entering the steam-collecting chamber and preventing the same from balling-up on contact with the hot soleplate and passing as droplets through said steam-escape openings.

2. The invention as defined in claim 1, in which there is a raised barrier on the soleplate between said portion thereof under the steam tube outlet and the steam-escape openings, said barrier also having a plurality of upwardly extending peaks.

3. The invention as defined in claim 2, in which the portion of the floor of the steam-collecting chamber having said steam-escape openings has a plurality of upwardly extending peaks.

4. In a steam iron having a boiler, a soleplate under the boiler, an electric heating element between the boiler and the soleplate, a steam-collecting chamber, the floor of which is formed by the soleplate, a steam tube leading from the boiler and conducting steam and vapor to the steam-collecting chamber, and steam-escape passages through the soleplate communicating with

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the steam-collecting chamber and spaced from the outlet of said steam tube: the improvement which comprises the provision of a rough surface on at least the portion of the soleplate under the outlet of the steam tube, said rough surface comprising a plurality of peaks extending upwardly from and covering the floor of the steam-collecting chamber under the steam tube outlet, said peaks breaking-up water particles entering the steam-collecting chamber and preventing the same from balling-up on contact with the hot soleplate and passing as droplets through said steam-escape openings; and a raised barrier of the soleplate between said portion thereof under the steam tube outlet and the steam-escape openings, said barrier also having a plurality of upwardly extending peaks, and the portion of the floor of the steam-collecting chamber having said steam-escape openings having a plurality of upwardly extending peaks.

5. The invention as defined in claim 1, in which the peaks are formed by parallel ribs in the order of $\frac{3}{8}$ of an inch high and spaced in the order of $\frac{1}{8}$ of an inch.

6. A soleplate for a steam iron having a cavity, the bottom of which forms the floor of a steam-collecting chamber, and a steam-escape passage from the steam-collecting chamber to the working surface of the soleplate, at least a portion of the cavity floor which is spaced from the steam-escape openings having a plurality of peaks extending upwardly from and covering said portion, the distance between said peaks being not substantially greater than the height of the peaks.

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