April 13, 1954 T. S. ZASTROW ET AL 2,674,819

STEAM ATTACHMENT FOR FLATIRONS

Filed Oct. 11, 1948 2 Sheets-Sheet 1

FIG. 1

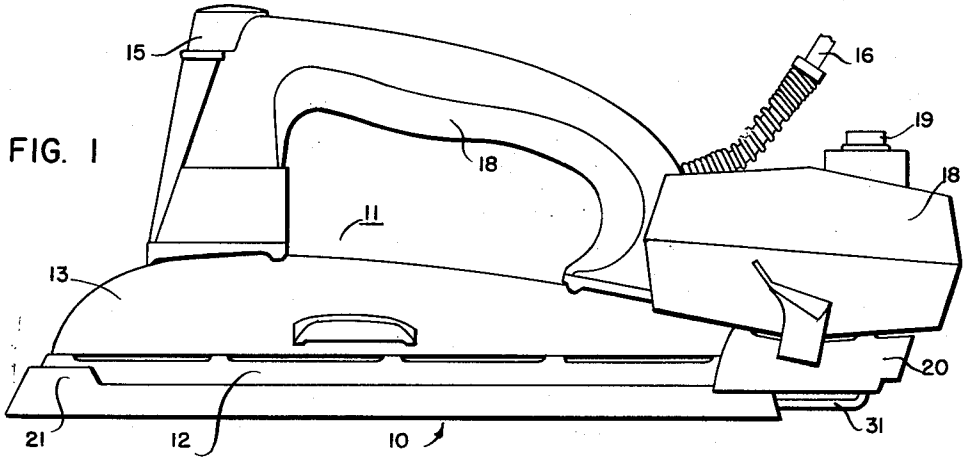


FIG. 2

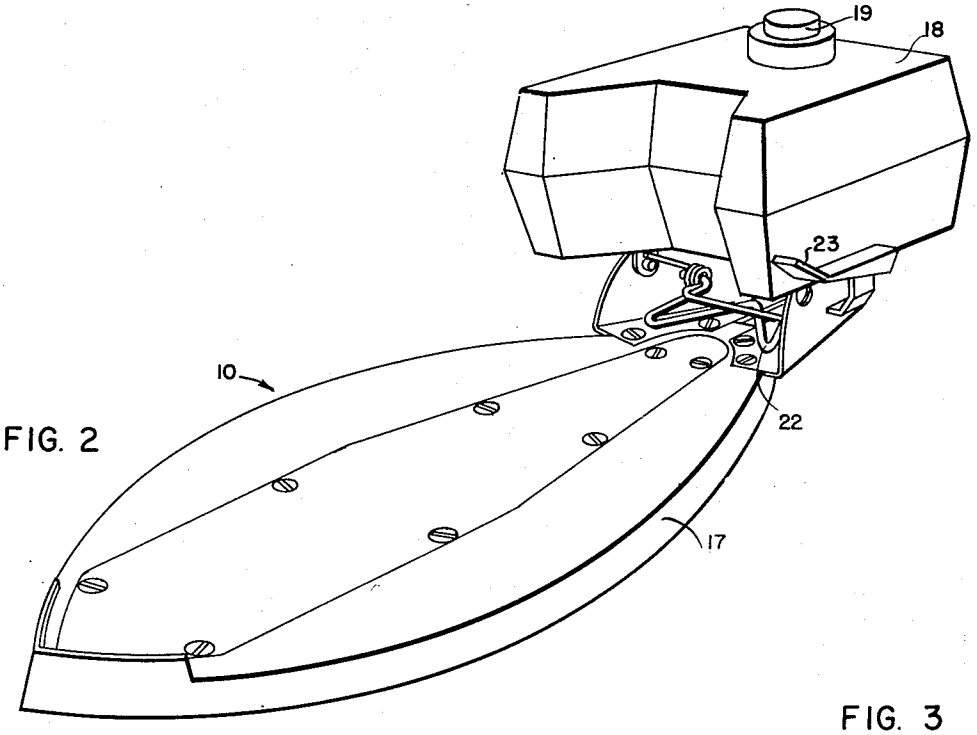
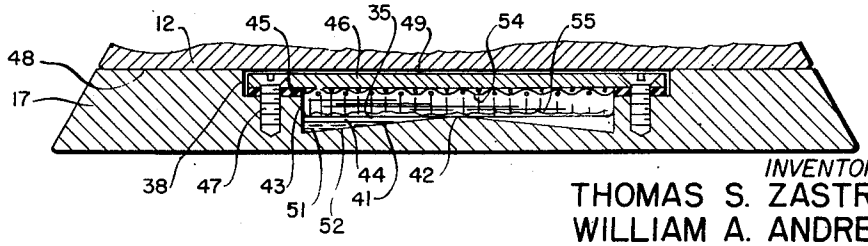


FIG. 3



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Filed Oct. 11, 1948 2 Sheets-Sheet 2

FIG. 4

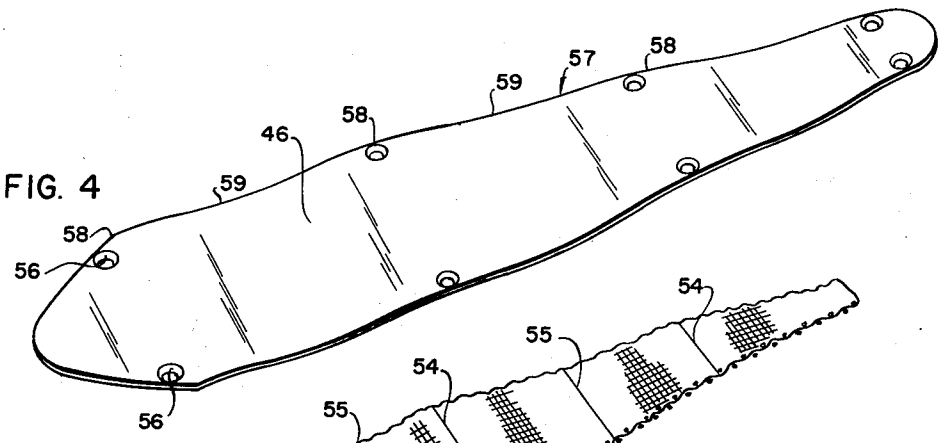


FIG. 5

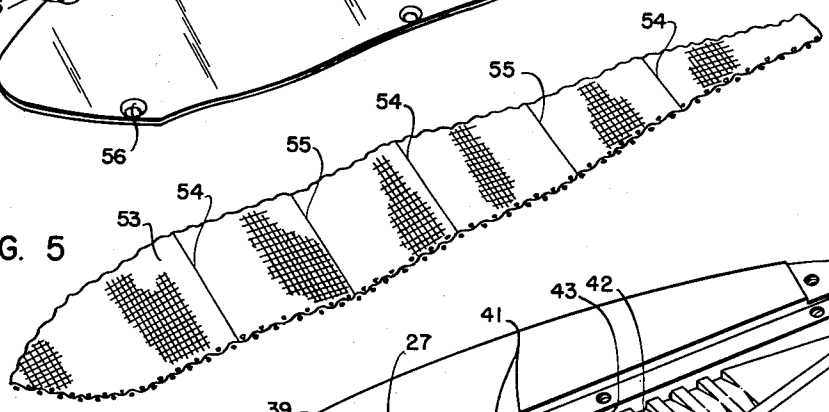


FIG. 6

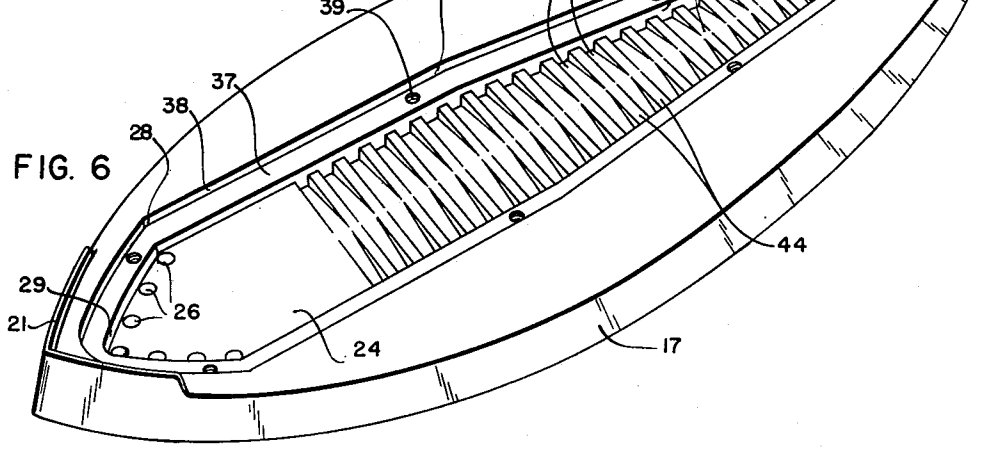
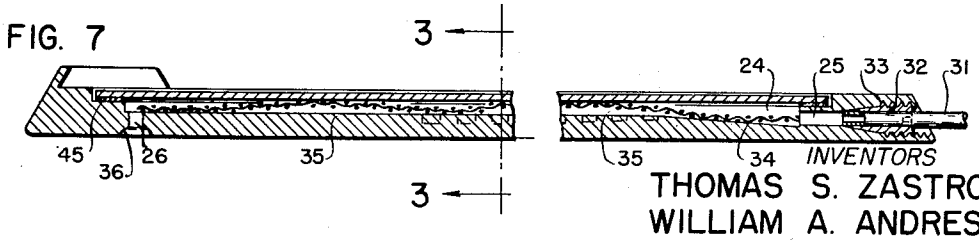


FIG. 7



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STEAM ATTACHMENT FOR FLATIRONS

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9 Claims. (Cl. 38—77)

1

The present invention relates to steaming devices and more particularly to a steaming device for use in combination with a regular flatiron or similar heated member.

Various devices have been proposed for attachment to a customary type of flatiron in order to convert the flatiron temporarily into a steam iron. None of these prior devices has been developed commercially to any substantial extent. Some of the earlier steaming attachments are unreliable and inefficient in operation in that they fail to provide for complete vaporization of the moisture. Thus drops of liquid are ejected which spot or damage the goods being ironed. In other cases no provision is made for efficient heat transfer from the flatiron heating element to the steam generating chamber of the steaming device with the result that steam generation is neither dependable nor complete.

With these and other defects of the prior art in view, it is accordingly one object of the present invention to provide an improved steaming device.

It is another object to provide a steaming device in which complete vaporization of the liquid will be obtained.

Still another object is the provision of a steam ironing device for use with an ordinary flatiron in which the attachment has a steam chamber therein, the cover or top of the chamber being downwardly recessed relative to the remaining upper surfaces of the attachment.

A further object of the invention is to provide a steam generating attachment for use below a flatiron, in which there is a steam chamber with a plurality of transverse pockets sloping downwardly toward the edges of the chamber.

A still further object is the provision of a steam iron in which the steam generating chamber is readily accessible for cleaning purposes.

Other objects and advantages of the present invention will be readily apparent from the following specification in which a preferred embodiment of the invention is described by way of example, with particular reference to the accompanying drawings. In these drawings, which form a part of this application,

Figure 1 is a side elevation of a steam ironing attachment according to the present invention mounted below and in contact with a regular flatiron.

Fig. 2 is a perspective view of the attachment of Fig. 1.

Fig. 3 is a transverse sectional view of the attachment taken on line 3—3 of Fig. 7.

Fig. 4 is a perspective view of a removable cover for the steam chamber of the attachment of the previous figures.

2

Fig. 5 is a perspective view of a suitable baffle member for use in the attachment.

Fig. 6 is a perspective view of the soleplate of the attachment with the cover and baffle means removed to show details of the steam generating chamber, and

Fig. 7 is a sectional view taken on the longitudinal center line of the attachment.

In Fig. 1 of the drawings, one form of steam attachment according to the present invention, designated generally as 10, is mounted immediately below and in heat conductive relation with a regular flatiron 11. Flatiron 11 includes the usual heated bottom plate 12 in combination with a cover shell 13, an operating handle 14, a control knob 15, and an electric supply cord 16. The supply cord 16 provides current for an electrical heating element (not shown) within the iron. Control knob 15 may be connected to a control device within the iron, in order to adjust the temperature settings which will be maintained in the bottom plate 12 by the electric heating element in known manner.

The steaming device or attachment 10, as shown in perspective in Fig. 2, includes a steam generating soleplate 17 in combination with a suitable source of liquid. While it would be possible to connect the soleplate 17 to a remote liquid supply tank by means of a flexible conduit, we prefer to provide a self-contained liquid supply tank 18 which is mounted on the steam generating soleplate 17 by brackets 20 and which may be filled from time to time through a plug member 19. Thus when the attachment 10 is mounted on the flatiron 11, it may be operated as a completely self-contained unit with no external connections except the electric supply cord 16 of the flatiron itself. Operation of the steaming attachment and flatiron in combination is accordingly just as convenient from the standpoint of external attachments as the operation of the flatiron alone.

Any desired mechanism may be provided for attachment of the steaming unit to the flatiron. In the present case, the forward end of the steam soleplate 17 is provided with a toe boxing or flange 21, the inner surface of which is sloped rearwardly and upwardly for engagement with the corresponding portion of the bottom of the iron 12. A pivoted spring latch 22 on the steaming device is adapted to engage the rear portion of the flatiron plate 12 and is controlled by an operating handle 23. Thus the handle 23 may be

raised while the forward end of the iron 12 is placed under the flange 21, after which handle 23 is released so that the spring latch 22 pushes downwardly and forwardly against the rear portions of plate 12 to hold the steaming device 10 and flatiron 11 in assembled position. It will be understood that any equivalent mechanism for maintenance of the parts in assembled relation could also be used as long as close contact is provided between the bottom of the flatiron plate 12 and the top of the steam generating plate 17. The steam soleplate 17 is preferably made of aluminum or other highly thermal conductive material to facilitate distribution of heat for ironing and steam generation.

As best shown in Fig. 6, the steam soleplate 17 is provided in its upper surface with a recess 24 which serves to provide a steam generating chamber. In the embodiment shown, this steam chamber 24 extends longitudinally of the iron.

At one end of the chamber, an opening or passageway 25 is provided for connection to the source of liquid. Thus passage 25 serves as a moisture supply inlet for the chamber 24.

At the other end of the steam chamber 24, a series of openings 26 is provided, extending from the recess or steam chamber downwardly through the bottom of steam soleplate 17. These openings may be arranged in any desired pattern and provide an outlet for the steam from recess 24 to the bottom of the soleplate.

In general, the steam generating soleplate 17 is designed to receive liquid through the supply inlet 25 and to vaporize that liquid so that steam may escape through the outlets 26. The plate might also be used with a separate steam generating unit in which case the supply inlet 25 would bring steam to the chamber 24 and this steam would be superheated and any particles of moisture would be completely vaporized during the passage toward steam outlets 26.

To facilitate the generation of steam from the particles of moisture entering from the supply inlet 25, and to prevent surging or intermittent operation due to back pressure of the generated steam, the recess or chamber 24 is of increasing width from the supply inlet 25, toward the steam outlets 26. Thus the width increases gradually as far as the widest portion of the plate 17, indicated at 27, in order to encourage forward flow of the expanding steam. The remaining portion of recess 24 from point 27 to point 28 may be of constant width. The forward portion of the recess is then gradually tapered to a point at 29 in order to conform to the shape of the forward end of the iron. Preferably, the steam outlets 26 are located at this forward tapered portion of the chamber 24.

To bring the liquid from the tank 18 (or other source) to the soleplate 17, a pipe or tube 31 is provided (Fig. 7). Tube 31 carries a standard compression fitting 32 which is threaded into the rear end of the soleplate 17 to obtain a liquid-tight and steam-tight fitting. Thus any liquid which is carried by the tube 31 from tank 18 will be brought to supply inlet 25 of chamber 24.

The generation of steam from drops of liquid is facilitated by arranging the bottom of recess 24 so that it slopes upwardly away from the supply inlet 25 as shown at 34 in Fig. 7. Portion 34 slopes smoothly upward until it meets the remaining flat portion of the bottom of the recess, said flat portion being designated generally as 35.

This level 35 is maintained throughout the remainder of recess 24 to the forward end where the steam outlets 26 are located.

The steam outlets themselves may open downwardly into an enlarged groove 36 which facilitates the distribution of the steam across the bottom of the soleplate in known manner.

As further shown in Fig. 6, a ledge or shoulder 37 is provided which extends substantially all around the edges of the chamber 24. This ledge 37 is spaced a predetermined distance below the top of the remainder of the soleplate 17, this distance being indicated by the height of the vertical wall portion 38 adjacent to the ledge 37. Threaded openings 39 are provided at spaced points along the ledge to accommodate fastening screws for the cover plate described below.

According to the present embodiment of the invention, the bottom surface 35 of chamber 24 is provided with a plurality of pockets 41. In the form shown in Fig. 6, these pockets extend transversely across the bottom of recess 24 from the central longitudinal line of the recess to each of the sides of the chamber. The bottoms of these pockets 41 slope gradually downward from the center 42 of the chamber to the outer walls 43 of recess 24. The portions of the soleplate 17 between pockets 41 thus provide a series of spaced ribs 44 which separate the pockets from each other. As indicated in Fig. 3, the tops of these ribs 44 are horizontal and flat and at the same level as the remaining portion of the bottom surface 35 of recess 24. The function of the spaced pockets 41 and intermediate ribs 44 is described in greater detail below.

A gasket or sealing member 45, shaped to correspond to ledge 37, is mounted upon that ledge. A cover or plate 46 whose outer edge corresponds in shape to the configuration of wall portion 38 at the outer side of ledge 37 is in turn mounted upon the gasket 45 and ledge 37. A plurality of screws 47 passes through the cover 46 and engages the threaded openings 39 which are spaced along ledge 37. Thus the cover 46 is readily removable and replaceable whenever it is necessary to clean the interior of steam chamber 24.

It would ordinarily be expected to be ideal to have the top of the cover or the top portion of the soleplate above the steam chamber absolutely flush with the remaining upper surface of the steam soleplate, in order that heat from the flatiron would flow smoothly and uniformly into all parts of the attachment. We have found, however, that any projection of the cover plate above the level of the remaining upper surface is detrimental to the steaming and ironing operation. In such a case, the cover plate receives most of the heat and is unable to transmit it readily to the rest of the steam soleplate because of the insulating characteristics of gasket 45 and the slight space around the cover edges. In any event, vaporization during ironing is incomplete and the temperature of the bottom of the attachment is too low for satisfactory ironing.

On the other hand, we have also found that the top of the cover may be located as much as forty thousandths (.040) of an inch below the level of the remaining upper soleplate surface, and that satisfactory steam generating and ironing characteristics can still be obtained, particularly where the steam generating chamber is provided with the inclined pockets or tapered ribs described herein. In such a case, the cover still receives sufficient heat to aid materially the generation of steam, while the major flow of heat

takes place downwardly from the flatiron through the sides of the steam soleplate adjacent to the recess. The ribs 44 are available to conduct the heat into the recess, while the inclined pockets 41 urge any particles of liquid to the hot sides of the steam chamber for complete vaporization. At the same time, sufficient heat reaches the bottom of the steam soleplate to maintain proper ironing temperatures, due to the high thermal conductivity of the soleplate.

Normal manufacturing tolerances make it impossible to hold the upper surfaces of the soleplate and cover absolutely flush. Therefore, in the light of our above findings, we have discovered that it is necessary to recess the cover slightly below the adjacent soleplate surfaces to a depth which is greater than the largest allowable cumulative manufacturing variation in the opposite direction. Ordinarily, such variations will not require a depth of more than ten to fifteen thousandths of an inch, although greater depths can be used as indicated above, if needed. Thus in no case will the cover project above the remaining upper surface, with the result that proper heat conduction and steam generation will always be obtained. This construction is illustrated in Fig. 3, in which the top of cover 46 is spaced just slightly below the level of the top surface 48 of the remaining portions of steam soleplate 17. Thus a space 49 is provided between the cover 46 and flatiron bottom 12. The heat from flatiron member 12 will tend to pass downwardly through the outer portions 48 of the steam soleplate 17 rather than across airspace 49 and downwardly through cover 46. The heat will thus be distributed selectively through the sides and bottom of the steam chamber 24 where it will be most effective in vaporization of any remaining liquid to steam.

Since the bottom surfaces of pockets 41 slope outwardly toward the edges 43 of recess 24, any particles of liquid which have not been vaporized or which recondense during their passage through chamber 24 will tend to flow to the outer edges of the pockets 41 as indicated at 51 in Fig. 3. The slope of the pockets 41 is designed to urge the liquid over to the sides or hottest portions of the steam soleplate 17 where the liquid can be readily vaporized. This slope at the bottoms of pockets 41 likewise provides a relatively thin or shallow edge indicated at 52 for any pools of liquid which collect in the pocket. Due to the very small amount of liquid present at this edge 52, the moisture is readily vaporized at this point, particularly since the heat from the flatiron plate 12 is carried to the sides and bottom portions of the steam soleplate 17 as described above.

The provision of a relatively large number of pockets 41 or, in other words, the provision of a relatively large sloping area at the bottom of recess 24 improves the steam generating characteristics of the attachment by urging all drops of liquid to the hot sides of the attachment and by distributing the liquid over such a substantial area that vaporization may take place along a large number of shallow edges or lines similar to that designated at 52. In this case, the upward slope of bottom portion 34 away from liquid supply inlet 25 tends to give a similar thin line of vaporization to facilitate the initial conversion of the liquid to steam.

As already noted, the presence of the spaced transverse ribs 44 between the adjacent pockets 41, and the fact that ribs 44 are of decreasing cross section from the sides toward the center of chamber 24, tends to provide a further means of conducting heat from the sides of the soleplate 17 to the intermediate bottom portions of steam chamber 24.

There is sometimes a tendency in steam generators of any type for particles of moisture of liquid to be forced along through the generating chamber by the steam pressure built up behind and beneath such drops. Various baffle members have been used to resist this tendency and to assist in breaking up any drops of liquid which are present in the chamber 24. As shown in Fig. 5, we prefer a baffle member 53 in the form of a screen whose shape corresponds closely to that of the periphery of chamber 24. The screen may have upper and lower portions which are indicated in the drawings by means of transverse lines 54 and 55. The upper portions 54 will lie in substantial contact with the bottom of cover plate 46, while the lower portions 55 will be in substantial contact with the bottom of the recess 24. Thus the screen substantially fills the entire cross section of chamber 24 above the ribs and makes it necessary for any drops of liquid which attempt to pass from the supply inlet 25 to the steam outlets 26 to pass through the screen member 53 one or more times. The progress of such drops of liquid is accordingly impeded and the baffle member 53 increases the tendency for such particles of liquid to follow the sloping bottoms of pockets 41 to the lateral edges of the recess 24 for vaporization by the sides and bottom portions of chamber 24. In some cases, the screen itself may be hot enough to vaporize part of the liquid. At the same time, the baffle member or screen is sufficiently open so that it does not substantially retard the flow of the steam or vapor to the outlets 26.

In order that the cover plate 46 may be made of relatively thin material and may at the same time provide a steam tight seal with reference to gasket 45 and ledge 37, plate 46 has been constructed in one form of the invention as shown in Fig. 4. Here the periphery 57 of cover plate 46 is undulated or wave-like in shape. The holes 56 for the fastening screws 47 are located at the tops or highest points 58 of the respective undulations. In other words, the peripheral edge 57 is deformed downwardly, as indicated at 59, between the respective fastening openings 56. Thus, when the plate 46 is initially placed in position on ledge 37 and gasket 45, the downwardly deformed intermediate portions 59 will first engage the gasket. At the same time, the portions 58 adjacent the openings 56 may be slightly spaced above gasket 45. As screws 47 are tightened, the cover plate 46 will gradually be flattened so that not only the intermediate downwardly deformed portions 59 but also the remaining upper portions of the undulations at 58 will all be forced firmly against the gasket and ledge. The deformation or pre-stressing of the cover plate 46 makes it possible to utilize a smaller number of fastening screws and to space them farther apart around the periphery of plate 46.

The operation and advantages of the present construction are believed to be apparent from the foregoing description. The combination of the various features described results in efficient steam generation and avoids the defects and disadvantages of prior constructions.

Changes and modifications may be made in the specific structure and arrangement of the parts, in the light of the teachings of this application. The present invention is accordingly intended to

include all such modifications and improvements as fall within the spirit and scope of the attached claims.

Now, therefore, we claim:

1. A steaming device for attachment to the bottom of a flatiron, comprising a soleplate having a steam chamber therein, a moisture supply inlet and a steam outlet at spaced points in the chamber, the chamber having in its bottom a plurality of spaced ridges providing a plurality of pockets extending transversely with respect to a direct path between the inlet and outlet, the bottom surfaces of the pockets being inclined downwardly in opposite directions toward opposite edges of the chamber between said inlet and outlet.

2. A steaming device for attachment to the bottom of a flatiron, comprising a soleplate having a recess in its upper surface forming a steam chamber, a moisture supply inlet and a steam outlet at spaced points in the chamber, a plurality of transverse ribs in the bottom of the recess extending transversely with respect to a direct path between the inlet and outlet, said ribs extending to the edges of the recess, and a removable cover for the recess, the inner surface of the cover being spaced above said ribs.

3. A steaming device according to claim 2 in which the top of the cover is spaced slightly below the top of the adjacent portions of the soleplate at the edges of said recess, thereby providing a substantial heat conducting path from the flatiron to the portions of the soleplate at the edges of the chamber.

4. A steaming device for attachment to the bottom of a flatiron, comprising a soleplate having a steam chamber therein, a moisture supply inlet and a steam outlet at spaced points in the chamber, the bottom of the chamber having a relatively large area sloping downwardly in opposite directions toward opposite sides of the chamber intermediate the inlet and outlet.

5. A steaming device according to claim 4 having a removable cover closing the top of the chamber, the upper surface of the cover being spaced slightly below the top of adjacent portions of the soleplate, thereby providing a preferential heat conducting path from the flatiron to the soleplate portions at the edges of the chamber.

6. A steaming device for attachment with its upper surface against the bottom of a flatiron, comprising a soleplate having a recess in its upper surface forming a steam chamber, a moisture supply inlet at one end of the recess, a steam outlet at the opposite end of the recess, a plurality of transverse ribs providing intermediate pockets in the bottom of the recess, the bottom surfaces of the pockets being inclined downwardly toward the edges of the chamber, the bottom of the recess also sloping downwardly to said inlet, and the width of the recess increasing from the inlet toward the outlet, and a removable cover for the recess having its top spaced below the top of the adjacent portions of the soleplate.

7. A steaming device for attachment below a flatiron, comprising a soleplate having a recess in its upper surface forming a steam chamber, a moisture supply inlet and a steam outlet at spaced points in said chamber, the bottom of the chamber between said inlet and outlet having a plurality of transverse ribs, the bottom of the chamber between said ribs being inclined downwardly and outwardly in opposite directions toward opposite edges of the chamber between the inlet and outlet, and the height of the transverse ribs decreasing from the edges toward the center of the chamber, and means for attachment of the soleplate with its upper surface engaging the bottom of a flatiron.

8. A steaming device for attachment with its upper surface against the bottom of a flatiron with the flatiron constituting the sole source of heat for the steaming device, comprising a soleplate having a recess in its upper surface forming a steam chamber, a moisture supply inlet and a steam outlet in the chamber, a removable cover closing the top of the recess, and sealing means between said cover and the remainder of the soleplate, said sealing means spacing the cover from the soleplate and thereby preventing rapid and effective heat transmission by conduction from cover to soleplate, the area of the cover being smaller than the total soleplate area with unrecessed portions of the soleplate upper surface adjacent said cover, and the top of the cover being spaced slightly below the level of the top of the adjacent portions of the soleplate thereby providing a preferential rapid heat conducting path from the flatiron directly to the top of the soleplate around the edges of the cover and steam chamber.

9. A steaming device for attachment with its upper surface against the bottom of a flatiron with the flatiron constituting the sole source of heat for the steaming device comprising a soleplate having a recess in its upper surface forming a steam chamber surrounded by unrecessed portions of the soleplate, a ledge extending around the edge of the recess and spaced below the top of the soleplate, a sealing member supported by the ledge, and a removable cover for the recess supported on the ledge and sealing member, said sealing member spacing the cover from the soleplate and thereby preventing rapid and effective heat transmission by conduction from cover to soleplate, and the combined thickness of the cover and sealing member being less than the distance from the ledge to the top of the soleplate, thereby providing a preferential rapid heat-conducting path from the flatiron directly to the top of the soleplate around the edges of the cover and steam chamber.

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