Nov. 17, 1942. M. A. SCHWARTZ 2,302,264

STEAM GENERATING ATTACHMENT FOR ELECTRIC IRONS

Filed April 9, 1940

Fig. 1

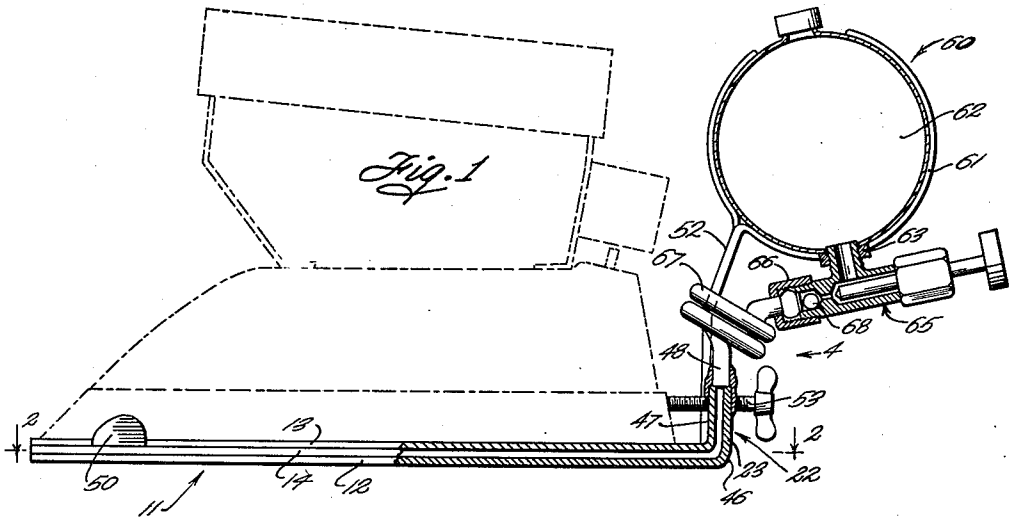


Fig. 2

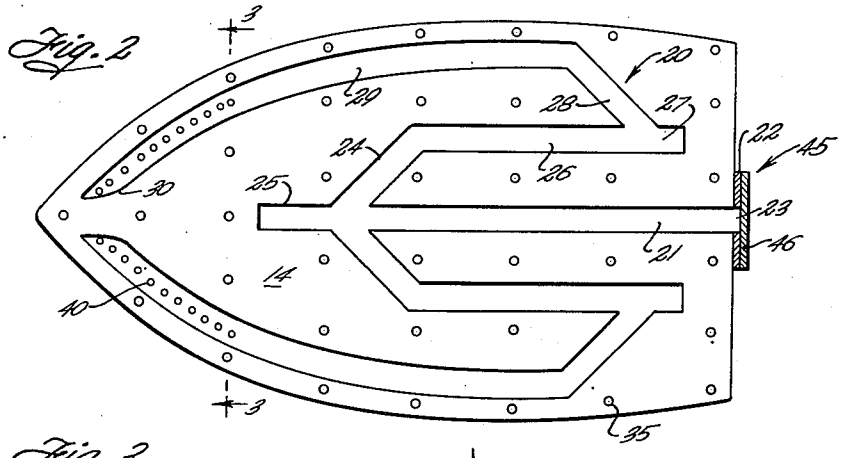


Fig. 3

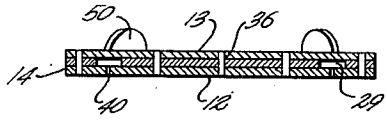
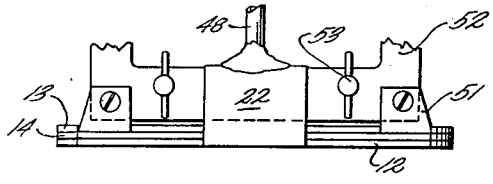


Fig. 4



Inventor
MORRIS A. SCHWARTZ
By Hazard and Miller
Attorneys

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STEAM GENERATING ATTACHMENT FOR ELECTRIC IRONS

Morris A. Schwartz, Los Angeles, Calif.

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5 Claims. (Cl. 38—77)

My invention relates to an attachment for an electric iron for the purpose of generating steam, the steam being discharged on the fabrics being subject to ironing. In view of the fact that the construction of steam generating electric irons are more or less complicated especially the type in which the generator is built into the iron and more or less directly heated by a steam heating element or by the heating unit of the iron. My invention pertains to a steam generator separate from the iron and which may be used with a conventional electric iron, the heat of the iron causing a transference to the generator and sufficiently heating an ironing surface thereof. This transference of heat also generates steam from water supplied to the attachment, the steam being distributed to the fabrics being ironed through perforations in a surface of the generator. In making a steam generator of this type it must be kept comparatively light in order not to add much additional weight to that of the electric iron as well as provide a satisfactory smooth surface for ironing fabrics or the like. The materials of the generator must be of such quality and characteristics that they readily transfer the heat mainly by conduction to the ironing surface of the attachment.

Hence my invention comprehends a built up assembly of plates shaped to conform approximately to that of the bottom of a typical pressing iron and providing passages between the plates for the flow of water, the generation of steam and the discharge of the steam. In order to simplify the construction and manufacture, I preferably use a lower and upper plate of the same contour both being flat and quite thin and these being separated in the assembly by a center plate which is in the form of a gasket. This latter plate is cut prior to assembly with various slots in a more or less zig-zag manner, one of the slots connecting to the end of the center plate or gasket, therefore in the assembly there is provided by these slots a circuitous passage for the water and steam and the steam is discharged through perforations in the bottom plate adjacent the remote ends of the slots. A further detail feature of my invention is in the provision of dead ends in the zig-zag slots which form water and steam passages in which at the reverse turns of the flow, water enters the dead ends and the steam passes in a more or less direct line of the passages. Further detail features of my invention relate to the mounting of the water reservoir, the valve control thereof and a back pressure check valve restricting a back flow of steam to the reservoir.

My invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a side elevation taken in the direction of the arrow 1 of Fig. 2 showing part of the generator in vertical section as well as part of the reservoir and valve connections therefrom in vertical section, the electric iron being illustrated dotted.

Fig. 2 is a horizontal section on the line 2—2 of Fig. 1 in the direction of the arrows showing the assembly of plates with the top plate removed indicating the middle or gasket plate with the slots and passages therein.

Fig. 3 is a vertical transverse section on the line 3—3 of Fig. 2 in the direction of the arrows.

Fig. 4 is an end elevation taken in the direction of the arrow 4 of Fig. 1 illustrating the bracket support for the reservoir.

In my invention the steam generator attachment indicated by the numeral 11 is made up of an assembly of flat plates having a bottom plate 12, a top plate 13 and an intermediate plate 14. These are preferably substantially the same contour except for minor changes at the rear end and approximate the outline of the bottom of a conventional electric iron. In manufacture of the plates the center plate 14 has a series of slots designated 20 formed therein of which preferably there is a central slot 21 leading from a bent-up end 22 and this end has a vertical slot 23. There are two angular branches 24 diverting rearwardly from a forwardly projecting dead end slot 25. Slots 26 parallel to 21 lead rearwardly and have a dead end 27 adjacent which is a forwardly directed slot 28. From this there is a marginal slot 29 spaced inwardly slightly from the edge of the plate and leading towards the front or converging points of the iron. This slot terminates at 30. The slots are similar and symmetrical as to the center slot 21. This makes a balanced passage considered as to the axial center of the iron, the terminal ends 30 being spaced apart. These passages are thus quite evenly distributed and on account of being quite wide compared with their heighth, provide for a large heating surface for development of steam from the water and heating such steam until it is sufficiently dry.

In the assembly the three plates are provided with rivet receiving holes or perforations 35 and the plates are thus assembled by a series of rivets 36. These rivets may be countersunk as to the bottom plate if desired and are thus finished flush with both the bottom surface of the bottom plate and the top surface of the upper plate.

The bottom plate has a series of steam outlet perforations 40, these being located near the point of the structure and the iron and are located in the marginal slot or passages 29 extending from the terminal end 30 a sufficient distance towards the rear end of the structure for satisfactory discharge of steam. The top and bottom surfaces and preferably the whole assembly of plates is plated with a suitable metal and polished thus giving a smooth surface for ironing purposes. I find it satisfactory to make the upper and lower plates of aluminum and the center slotted or template plate of copper. This forms a gasket and may be compressed sufficiently tight to give a leak-proof joint between the plates.

The water inlet passage 45 at the slot 23 is formed by an upward bend or flange 46 in the lower plate and a parallel upwardly bent flange 47 on the upper plate, this confining the upwardly bent end portion 22 of the center or gasket plate. This produces the vertical slot 23 which has a pipe connection 48 soldered or welded to form an inlet water connection. The upper plate has a pair of iron gripping tabs or fingers 50 turned upwardly on each side of the front portion and has a pair of ears 51 bent upwardly at the rear end. These ears form a support for the reservoir bracket 52 which bracket may be secured by screws or welding thereto. It is obvious that this bracket could be made integral with at least the top plate 13 if desired. Through the bracket there are threaded clamping screws 53 utilized to engage the rear end of the electric iron shown in Fig. 1 and clamp this between the tabs or gripping fingers 50, this being sufficient to attach the equipment to the bottom of the heating iron.

The reservoir assembly 60 includes a bracket 61 attached to and supported at the upper portion of the reservoir bracket 52 and in this cradle there is supported a reservoir 62 illustrated as cylindrical. This reservoir is provided with a filler opening with a conventional cap at the top. The outlet 63 at the bottom is shown as connected directly to a needle valve assembly 65. From this valve there is a union 66 to which is connected a pipe coil 67 continuing and forming the pipe connection 48. This union is illustrated as having a ball check valve 68 constructed therein in that in the needle valve construction there is a seat, the ball engaging therewith on the development of a back pressure of steam sufficient to force the ball against its seat. Otherwise the ball allows free passage of a slow drip of water from the reservoir.

In the manner of action and functioning of my invention as above mentioned the metal structure or plates formed the heat transfer surface from the iron, the bottom ironing surface and the intermediate channel gasket are formed of good heat conducting material as the iron relies mainly on the conduction of heat for transfer from the iron. There will also be a certain amount of convection heat due to that absorbed by the water and developed in the latent heat of steam. Therefore as the water drips slowly from the reservoir into the central passage 21, it becomes heated and as there is a slight hydraulic head, sufficient pressure is developed to cause a flow of the water towards the front of the generator and iron. If in this passage steam is developed or water vapors, they have a tendency to drive the front portions of the water film forwardly and due to the inertia of the minute particles of water, these are carried into the dead end 25. The lighter vapors follow the return directed path in the channels 24 and 26. The water in these passages becomes more highly heated developing more steam, developing a pressure drive towards the outlet and the globules of water are again trapped in the dead end 27. The more completely vaporized water follows the path 28 and 29 becoming quite highly heated and discharged through the perforations 40. It is obvious that the water drops trapped in the dead ends 25 and 27 become heated to such an extent as to develop steam, which steam is directed from the dead end 25 along the path 24 and 26 and from the path 27 along the channels 28 and 29 to the outlet. It will thus be seen that the heat conducted through the attachment is sufficient not only to develop the steam but to provide sufficient heat for ironing fabrics or the like and the device applying a satisfactory amount of steam for this purpose. It is manifest that if a larger amount of water is desired for the iron, that is, the use of wet steam, the valve 65 may be so controlled and a range may be obtained from the use of wet steam to comparatively dry steam.

An important characteristic of my invention is that the channels in the water heating and steam generating unit are of a quite small measurement considered transverse to the plates compared with the measurement in the plane of the plates, thus these may be considered as very flat channels or ducts in the heating element and therefore expose a large surface of the water and steam to the heat conducted through the upper plate 13 for the purpose of quickly generating steam. In addition on account of steam and water being a poor conductor of heat, the thin film still allows a material proportion of the heat to pass across the channels and heat the bottom plate of the iron, therefore such bottom plate is substantially uniformly heated even although there are a number of steam and water channels. In accordance with my invention I make provision for the expansion as water generates steam since the two opposite passages 24 and 26 increase the capacity double of the channel 21. One of the purposes of using a pipe coil 67 connecting between the reservoir and the connection 48 to the generator passage at 23 is in part to take care of expansion and contraction and also these coils form an auxiliary water reservoir, hence if there is a backing up of steam the water is forced back closing the check valve 67 but as soon as the steam pressure decreases the water again immediately flows from these coils to the water and steam passages in the heating unit.

Various changes may be made in the details of the construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. A steam generating attachment for electric irons comprising three plates attached together in superposed relationship, means for attaching the plates to an electric iron, the middle plate having a central slot therein extending forwardly from the back thereof, rearwardly extending branch slots extending toward the back from opposite sides of the central slot and forwardly extending side slots extending forwardly adjacent the side margins of the middle plate from adjacent the rear ends of the branch slots, the bottom plate being perforated beneath the forward ends of the last-mentioned slots, and means for feeding water to the back of the central slot.

2. A steam generating attachment for electric

irons comprising three plates attached together in superposed relationship, means for attaching the plates to an electric iron, the middle plate having a central slot therein extending forwardly from the back thereof, rearwardly extending branch slots extending toward the back from opposite sides of the central slot and forwardly extending side slots extending forwardly adjacent the side margins of the middle plate from adjacent the rear ends of the branch slots, the bottom plate being perforated beneath the forward ends of the last-mentioned slots, and means for feeding water to the back of the central slot, the central plate providing wide areas between the slots in contact with the top and bottom plates for transmitting heat from the iron to the bottom plate by conduction.

3. A steam generating tachment for electric irons comprising means applicable to the bottom of the iron providing a tortuous passage terminating in outlets adjacent the front of the iron, means for feeding water from a main water supply to the entrance to the passage, means providing a sump for maintaining a small supply of water adjacent the entrance to the passage, and a check valve interposed between the sump and the main water supply for preventing reverse flow from beyond said sump to the main water supply.

4. A steam generating attachment for electric irons comprising three plates attached together in superposed relationship, the central plate being slotted to provide a tortuous passageway the entrance to which is at the back of the iron and the outlet from which is arranged in the bottom plate adjacent the front of the iron, the three plates having extensions at their rear ends bent upwardly, the upwardly bent extension in the middle plate having a duct communicating with the entrance to the passage, means for attaching said plates to an iron, a bracket secured to the plates, a reservoir supported on the bracket and a conduit including a check valve leading from the reservoir to said duct in the upwardly bent extension in the middle plate.

5. A steam generator for pressing irons comprising in combination an assembly of flat plates secured together, a center plate having a series of connected slots completely therethrough and connected together forming a circuitous water and steam passage, the lowermost plate having perforations leading to the slots, said plates having an upturned flanged end with a vertical slot forming a water inlet duct, a pipe connecting thereto, a bracket secured to the flanged end, a reservoir supported thereby, an outlet valve from the reservoir and a check valve in the pipe connecting to the said duct.

MORRIS A. SCHWARTZ.