Sept. 2, 1952 F. E. FINLAYSON 2,608,773

STEAM IRON HAVING IMPROVED WATER RESERVOIR AND STEAM GENERATOR

Filed Jan. 18, 1951

Fig. 1.

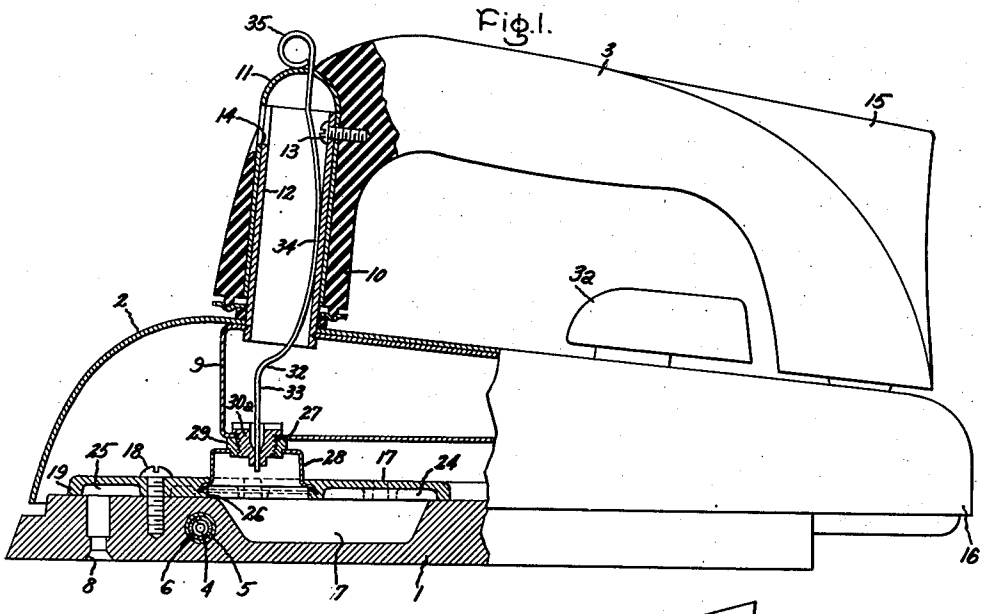


Fig. 2.

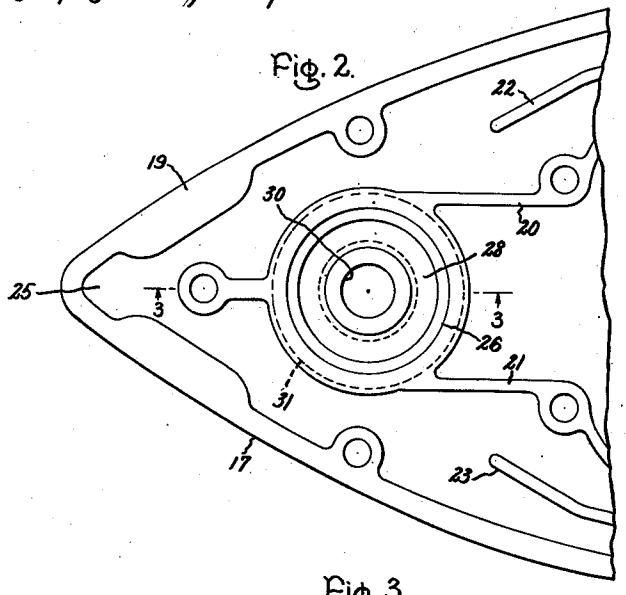
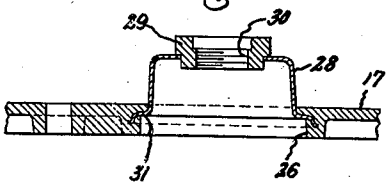


Fig. 3.



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STEAM IRON HAVING IMPROVED WATER RESERVOIR AND STEAM GENERATOR

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Application January 18, 1951, Serial No. 206,555

2 Claims. (Cl. 38—77)

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This invention relates to electrically heated steam pressing irons of the hand type having an instantaneous steam generator, and is directed particularly to an improved construction of the water supply reservoir and steam generating means.

Steam irons of the type to which this invention is directed include an electrically heated sole plate provided with an instantaneous or flash steam generating cavity formed in the sole plate to receive water at a relatively slow rate from a water reservoir mounted within the iron. Obviously, such an iron requires a suitable cover plate extending over the sole plate to confine and direct the generated steam through discharge ports extending through the sole plate to the pressing surface of the iron. To insure complete vaporization of the water particles, the cover plate preferably is of a material having a high thermal conductivity so that it is heated to substantially the same temperature as the sole plate.

For convenience of operation, the water reservoir is mounted within the body of the iron, that is, between the upper surface of the sole plate and the inside of the outer enclosing shell of the iron. However, with this construction it is desirable to limit to a minimum the heat transfer from the sole plate or its cover plate to the reservoir. Otherwise, water stored within the reservoir is unnecessarily evaporated at the expense of heat drawn from the sole plate. Correspondingly, it has been found desirable to interconnect the reservoir with the cover plate of the steam generating chamber by a member having a low thermal conductivity. This member, or boiler cover, as hereinafter referred to, also serves as a mounting means for the apertured port controlling water flow between the reservoir and the steam generating cavity. With respect to normal ironing position, the boiler cover preferably extends upwardly in order to space the reservoir from the cover plate.

Since the cover plate which extends over the steam generating chamber and the boiler cover interconnecting the cover plate with the reservoir are normally of different materials, it has heretofore been customary to manufacture these components as separate parts, which upon assembly, are attached together in a steam-tight fashion through the use of a suitable gasket and fastening means. With such a construction, I have found that the gasket presents the very unsatisfactory tendency of supporting corrosion between these parts. Furthermore, it has been found difficult

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in mass production to achieve an effective seal between the boiler cover and the cover plate. Furthermore, assembly is relatively expensive due to the requirement for the gasket and a plurality of fastening screws to fasten securely the boiler cover to the cover plate.

It is an object of the present invention to eliminate the above-mentioned difficulties while providing an effective seal at a lower production cost.

Another object of my invention is to provide a steam iron construction reducing manufacturing and assembly costs.

In accomplishment of the foregoing objectives, a feature of my invention consists in employing a cover plate for the steam generating chamber of material having a high thermal conductivity and having integrally cast therein a boiler cover of relatively low thermal conductivity extending outwardly from the cover plate. The boiler cover additionally serves as a means for supporting a water reservoir and for mounting a water discharge port between the reservoir and the steam generating chamber.

The features of my invention which I believe to be novel are set forth with particularity in the appended claims. My invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawing, in which Fig. 1 is a side elevation of an iron embodying my invention, partially sectionalized on the longitudinal center line of the iron; Fig. 2 is a bottom plan view of the cover plate and boiler cover; and Fig. 3 is a partial cross sectional view taken on the line 3—3 of Fig. 2.

Referring to the drawing, in Fig. 1 I have shown my invention as embodied in a steam iron having a sole plate 1, and an enclosing body or shell 2, to which may be attached a suitable operating handle 3. The sole plate may be heated by a suitable element, preferably consisting of a helically coiled resistor 4 completely enclosed within an outer sheath 5 and held in spaced relation with respect to the sheath by a heat-transmitting, electrically insulating substance 6, such as highly compressed granulated magnesium oxide. The heating element may be controlled by a suitable automatic thermostatic mechanism (not shown) adjustable by means of a temperature controlling knob 3a. Preferably, the sole plate is formed from light-weight thermally conductive material, such as cast aluminum, with the tubular heating element embedded therein.

The bottom surface of the sole plate as shown in Fig. 1 is formed with a highly polished finish to provide a suitable pressing surface. The upper face or top of the sole plate includes a suitable depression or cavity 7 centrally thereof presenting a highly heated surface during operation and functioning as a flash or instantaneous steam generator. Thus, water discharged at a relatively slow rate into cavity 7 will be quickly converted into steam, which then may be conducted over the sole plate for discharge onto the pressing surface through suitable apertures such as 8 extending through the sole plate to the pressing surface.

For convenience in operation it is obviously desirable that the steam iron carry a supply of water for operation over an extended period of time without refilling. For this purpose, I provide within shell 2 an enclosed chamber or water reservoir 9. As a means for filling the reservoir, I utilize a front handle support 10 which is apertured to receive a liner 11 having a rounded outer end as shown in Fig. 1. A fill tube 12 is secured in any suitable manner to reservoir 9 and shell 2 and extends outwardly therefrom through liner 11 and handle portion 10 to a point adjacent the outer end of the liner. The liner and fill tube may be secured in position with respect to the handle by a suitable fastening means such as screw 13. The upper portion of both the fill tube and liner, as well as the handle, are apertured at 14, with this aperture facing forwardly when the iron is in its normal ironing position. The iron is provided with a conventional heel rest formed by a protuberance 15 on the handle and a rear portion 16 of the body of the iron, so that the iron may be up-ended to a rest position. In such rest position it may be seen that aperture 14 faces upwardly permitting water to be poured into the fill tube whereupon it flows into reservoir 9. Such a construction has been disclosed and claimed in my copending application Serial No. 69,756, filed January 7, 1949, assigned to the General Electric Company, assignee of the instant application, now Patent Number 2,587,608, patented March 4, 1952.

To confine steam generated within cavity 7, I employ a cover plate 17 overlying the upper surface of the sole plate and attached thereto by suitable fastening means such as screws 18. As shown more clearly in Fig. 2, cover plate 17 includes an outer depending flange 19 extending entirely around its outer edge for sealing engagement with the upper surface of sole plate 1. Additionally, and as shown in the bottom view of Fig. 2, the cover plate includes a plurality of depending ribs to define in cooperation with the sole plate a tortuous passage through which the steam must pass before being discharged through the apertures 8 in the sole plate. For example, a pair of ribs 20 and 21 may direct the steam rearwardly over the highly heated surface of the sole plate, and additional ribs 22 and 23 may be provided for defining forwardly extending passages. While in Fig. 2 I have shown only two sets of such ribs, obviously any number may be employed to direct the steam in sufficiently extended passages to insure that all entrained water particles have been converted into dry steam. For example, a rearwardly extending passage is shown at 24 in Fig. 1, which ultimately connects with a steam passage 25 at the forward end of the iron permitting discharge of the steam through port 8. Additionally, the passage 25 may be in communication with other steam discharge ports extending through to the pressing surface of the iron.

To provide a means for interconnecting the steam generating chamber 7 with water reservoir 9, cover plate 17 is centrally apertured at 26; similarly, water reservoir 9 is apertured as at 27, in substantial vertical alignment with the aperture through the cover plate and the steam generating cavity 7. In accordance with the present invention, I provide a boiler cover 28 extending over the cover plate aperture 26. This construction is shown clearly in Fig. 3. Preferably boiler cover 28 is fabricated in an inverted cup-shape from a material such as stainless steel having relatively low thermal conductivity. In addition, I have found it desirable to fabricate boiler cover 28 with a minimum cross-sectional thickness, commensurate with the required mechanical rigidity. As explained above, cover plate 17 preferably has a high thermal conductivity so that its temperature closely approaches the temperature of the sole plate. This is an aid in achieving complete vaporization of water discharged into the steam generating cavity before discharge through the pressing surface. By utilizing a low conductivity material for boiler cover 28, along with fabrication with a minimum cross sectional area, heat transfer to the reservoir from the sole plate may be greatly reduced. Secured to the outer or upper end of boiler cover 28 is a bushing 29 internally threaded as at 30. Bushing 29 may be secured and sealed in position with respect to the boiler cover by brazing or welding. For attachment of the boiler cover to the cover plate, I provide an annular curled flange 31 which is adapted to be placed as an insert in a mold for the cover plate. Thus, when the cover plate casting is poured, the molten metal flows around both surfaces of the flange 31 on the boiler cover to anchor it in position with a steam-tight seal. It may be seen that by this manner of interconnecting the boiler cover to the cover plate, assembly is greatly facilitated, since separate fastening means for the boiler cover have been eliminated, and no gasket is required to provide a steam-tight seal.

Referring again to Fig. 1, bushing 30 is internally threaded to receive an apertured port member 30*a*. The upper portion of member 30*a* is of greater diameter than its threaded portion, so that as it is threaded into bushing 30, the walls surrounding the aperture in the reservoir are securely clamped between port member 30*a* and the upper surface of bushing 30. If desired, suitable gasket material may be employed to obtain a water and vapor-tight seal, although this is unnecessary with the depicted embodiment.

Water flow from reservoir 9 to steam generating cavity 7 is controlled by a flow control member 32, here shown as fabricated from a suitable spring steel wire. A lower straight portion 33 of the flow control member is adapted to extend through the port in member 30*a* to prevent flow of water to the steam generating cavity. The upper intermediate portion of the flow control member is bowed at 34 for frictional engagement with the inside wall of fill tube 12. The extreme upper portion of the flow control member extends out through an opening in the rounded outer end of liner 11 and includes a finger operating means 35 conveniently positioned for manual operation from handle 3. With this arrangement, the flow control member may be moved longitudinally of the fill tube to either permit or cut off water flow through port member 31 into the steam generating cavity. As shown in Fig. 1, it is preferred to have a portion

of the flow control member extend through the port in member 31 when in its flow cut-off position, so that scale or dirt particles which might accumulate in this flow passage may be cleaned or forced out by the flow control member. This particular construction of the means for controlling water flow from the reservoir to the steam generating cavity forms no part of the present invention, but is disclosed and claimed in the copending application Serial No. 69,774 of Alfred G. Swenson, filed January 7, 1949, and assigned to the General Electric Company, assignee of this application, now Patent Number 2,587,665, patented March 4, 1952.

From the foregoing disclosure it may be seen that I have provided a steam iron construction having an improved relation of the components to facilitate steam generation while minimizing heat loss to the water storage chamber. By the construction here presented with the boiler cover integrally cast as an insert with the cover plate extending over the steam generating means, I have improved both the operability and the life, while at the same time providing a construction of decreased manufacturing cost. A device in accordance with the foregoing disclosure may be fabricated without the use of gasket materials which tend to support corrosion and develop vapor leaks. Furthermore, no separate fastening means are required for securing the boiler cover to its associated cover plate.

While the present invention has been described by reference to a particular embodiment thereof, it is to be understood that numerous modifications may be made by those skilled in the art without actually departing from the invention. I, therefore, aim in the appended claims to cover all such equivalent variations as come within the true spirit and scope of the foregoing disclosure.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a steam pressing iron, an electrically heated sole plate comprising metal having high thermal conductivity and having a steam generating cavity therein, a cover plate of similar metal positioned on the sole plate over said cavity

in thermal contact therewith to define a steam generating chamber, said cover plate having an opening in line with said cavity, a water reservoir positioned in the iron above and in spaced relation to said sole plate and cover plate, and walls including a boiler cover cast integral with said cover plate and covering the opening therein which connect the reservoir to said cover plate and define a passage for flow of water from the reservoir to said chamber, said boiler cover being formed of metal of thin cross section and relatively low thermal conductivity compared to the metal of said cover plate whereby it serves to minimize the transfer of heat from the cover plate to the reservoir.

2. In a steam pressing iron, an electrically heated sole plate comprising metal having high thermal conductivity and having a steam generating cavity therein, a cover plate of similar metal positioned on the sole plate over said cavity in thermal contact therewith to define a steam generating chamber, said cover plate having an opening in line with said cavity, a water reservoir positioned in the iron above and in spaced relation to said sole plate and cover plate, an inverted cup-shaped boiler cover positioned over said cover plate opening and having its rim cast integral with said cover plate, said boiler cover being formed from thin metal of low thermal conductivity compared to the metal of said cover plate, and means connecting the boiler cover to the reservoir which defines a passage for flow of water from the reservoir to said chamber, said boiler cover serving to minimize the transfer of heat from the cover plate to the reservoir.

FRANK E. FINLAYSON.

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