March 30, 1965 H. S. FOSTER ETAL 3,175,316

STEAM IRON

Filed June 4, 1963

FIG. 1

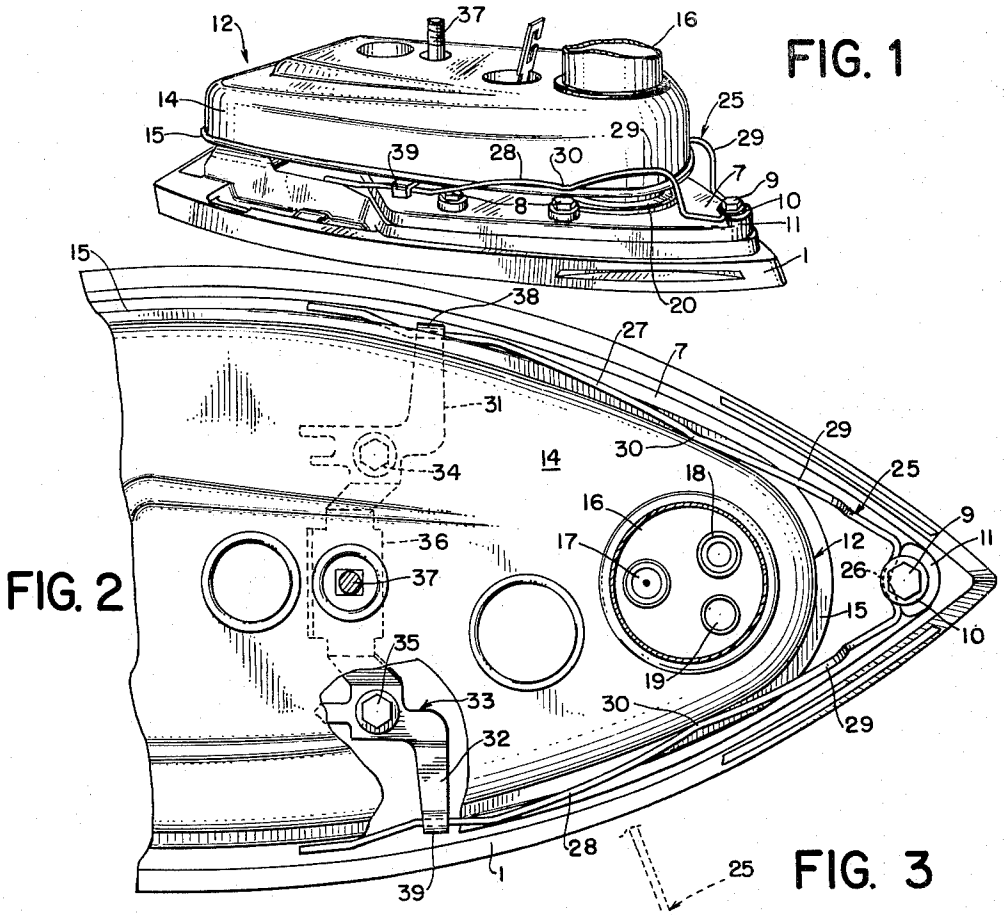
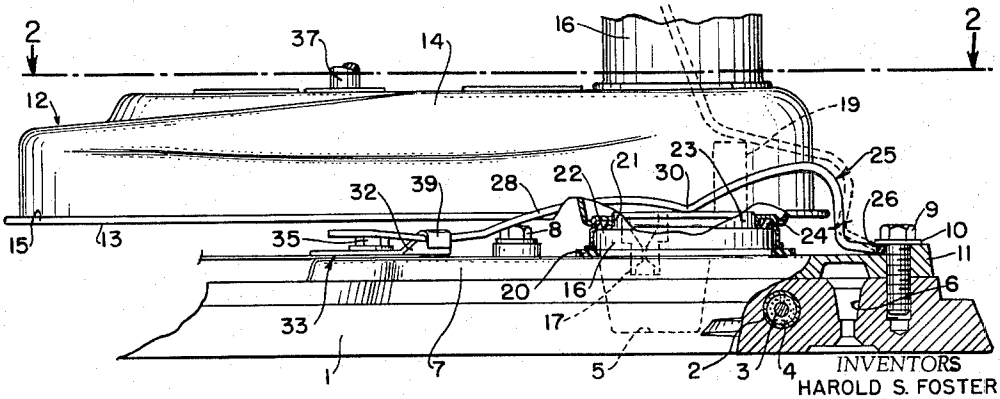


FIG. 2

FIG. 3



INVENTORS
HAROLD S. FOSTER
ROBERT L. LOGG

BY Laurence R. Kaufman

ATTORNEY

United States Patent Office 3,175,316 Patented Mar. 30, 1965

3,175,316

STEAM IRON

Harold S. Foster and Robert L. Logg, Ontario, Calif., assignors to General Electric Company, a corporation of New York

Filed June 4, 1963, Ser. No. 285,262
5 Claims. (Cl. 38—77)

This invention relates to steam irons, and particularly to such irons having a steam generator and a separate reservoir for liquid supply to the generator.

In the construction of a preferred type of steam irons, the components and assemblies making up the electrically heated soleplate and steam generator are separate from the liquid tank carried within the iron. In such irons, water is converted to steam as the liquid flows at a restricted rate from the tank to the steam generator. Thus, a liquid tank must be mounted within the body of the iron; and, furthermore, it is necessary to provide liquid-tight seals at one or more locations. Such liquid-tight seals must, of course, be able to withstand the full range of operating temperatures, that is, from room temperature up to temperatures in the order of 500° F. At the same time, the construction must provide a high degree of reliability and minimum manufacturing cost along with ease of assembly.

An object of the present invention is to provide an improved means for securing the liquid tank within the body of a steam iron while providing an effective liquid-tight seal to the other components in the iron.

Another object of this invention is to provide an improved construction for a steam iron with a separate water tank within the iron supported upon and sealed to the steam generating components at a minimum manufacturing cost, and with an arrangement facilitating assembly. A related object is to provide a construction for such a steam iron in which removal of components can be performed with minimum difficulty to permit cleaning of the steam generating cavity.

Briefly stated, in accordance with one aspect of the present invention, a steam iron is constructed with an electrically heated soleplate, which, in combination with a cover plate overlying an area of the soleplate, forms a steam generator and steam discharge passages. One area of the cover plate includes or is formed as a steam dome on which are mounted components such as a liquid orifice through which liquid can be supplied to the steam generator at a controlled rate for generation of steam. A liquid reservoir is provided within the iron having enclosing walls, including a bottom wall in which is located an enlarged opening to receive the steam dome. A sealing gasket is positioned between the reservoir and the steam dome, and the seal between these components is provided by a spring hold-down member which forces the reservoir against the dome and compresses the sealing gasket. This spring hold-down includes a front central portion which can be secured to the soleplate along with a pair of rearwardly extending and diverging arms, each of which has an intermediate reservoir engaging portion and a remote locking end portion. The locking end portions are engageable with bracket arms also secured to the soleplate; and upon deflection of the spring arms downwardly into engagement with the bracket arms, the spring provides the force positioning the reservoir on the steam dome and accomplishing the liquid-tight seal.

The subject matter of this invention is particularly pointed out and distinctly claimed in the concluding portion of this specification. The invention, itself, however, both as to 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 drawings in which:

FIG. 1 is a perspective view of a portion of a steam iron in accordance with this invention showing the principal components making up the present invention;

FIG. 2 is a plan view taken in the direction 2—2 of FIG. 3 with certain surfaces broken away to illustrate details; and

FIG. 3 is a side elevation, partially in section, of the components of a steam iron in accordance with this invention.

This invention is directed particularly to a domestic steam pressing iron of the type used to iron articles of clothing. For the purposes of clarity of illustration, the drawings do not show the iron handle and the outer enclosing cover or shell of the iron. It is to be understood, however, that such items are included in a completed iron in the usual manner.

Referring particularly to the drawings, the iron includes a soleplate 1 in the usual flatiron shape and cast from a material of high heat conductivity, such as aluminum. In the usual manner, an electric heating element is embedded in the soleplate casting, this heating element typically comprising (FIG. 3) an enclosing sheath 2 in which is located centrally a heating or resistance element 3 separated from the outer sheath by a mass of insulating material 4, such as highly compacted magnesium oxide. Electric power is supplied to the heating element by a conventional arrangement (not shown), thus to heat the soleplate to the proper ironing temperature.

In the upper surface of the soleplate, there is a steam generating cavity 5, as shown by FIG. 3, into which liquid can be deposited at a controlled rate for generation of steam, which then is discharged through the ironing surface of the soleplate through one or more discharge ports 6. It is, of course, necessary to confine and direct steam to the discharge ports; and for this purpose a steam chamber cover plate 7 is tightly secured to soleplate 1 by a plurality of fastening devices or screws 8, including a front screw 9 having an outwardly extending flange 10. The forward or pointed end of cover plate 7 includes a partial boss 11 engaged by the screw flange 10 to force the front portion of the cover plate tightly into sealing engagement with soleplate 1. As clearly shown in FIGS. 1–3, the boss 11 extends only part way around the circumference of the flange 10 of the securing screw, leaving the flange exposed at the rear portion for a purpose presently to be described.

As shown, the iron carries its own liquid supply in a suitable reservoir or tank 12 having a bottom wall 13 united with a drawn piece 14 which defines side walls and a top wall for the reservoir. These two pieces are, of course, united with a liquid-tight seal at the outwardly extending flange 15.

The liquid tank 12 must, of course, be joined with the soleplate and cover plate assembly in a liquid-tight manner. We prefer to accomplish this through a steam dome 16 mounted over an opening in cover plate 7. In some applications, steam dome 16 might be permanently joined to the cover plate in order to establish a vapor-tight connection which will confine the steam into the desired passageways. However, in many applications, the steam dome is made as a separate part, drawn from a metal of relatively low heat conductivity, to restrict heat transfer from the soleplate into the liquid tank. For example, stainless steel has been commonly used for steam dome 16. Frequently a number of components are mounted to the steam dome, such as the liquid orifice member 17 and perhaps a pressure regulator assembly 18 and a pressure balance tube 19. For further disclosure of the various components which may be mounted on a steam dome,

reference is made to Patent 3,045,370—Foster, assigned to the General Electric Company, assignee of the present invention. Thus, by manufacturing steam dome 16 as a separate device, the various components such as 17, 18, and 19 can be mounted in advance in a subassembly operation. Steam dome 16 may then be placed in position on cover plate 7 with a suitable gasket 20 interposed so that upon final assembly a fluid-tight seal is accomplished in a manner to be described.

The bottom wall 13 of the reservoir in accordance with this construction is provided with a enlarged flanged opening 21. The flange 21 defining this opening in the bottom wall of the reservoir is positioned opposite the stepped or flanged section 22 of the steam dome with another portion 23 of the steam dome projecting a short distance upwardly into the liquid tank. A liquid sealing gasket 24 of high temperature silicone rubber or equivalent material is interposed between the steam dome and the reservoir, so that upon compression of the reservoir against the steam dome and compression of the steam dome against the cover plate, both gaskets 20 and 24 will be compressed to provide sealed engagement.

A particular feature of this invention involves the arrangement of a formed wire hold-down member 25 to secure the liquid tank to the soleplate and cover plate assembly. This formed wire spring member includes a front re-entrant portion 26 adapted to be positioned under the rear portion of flange 10 of fastening device 9. The diameter of the wire making up spring 25 is slightly less than the elevation of boss 11 on the cover plate so that this wire member can be moved into position under the flange of the fastening device after the cover plate has been assembled with the soleplate. The formed wire hold-down 25 is further arranged with diverging legs 27 and 28, each of which extends upwardly through an arcuate portion 29 to an elevation above flange 15 of the reservoir. Each leg further includes a reservoir flange engaging portion 30, with the portion 30 of each of the two legs being located approximately diametrically with respect to sealing gaskets 20 and 24. Each leg of the wire hold-down member then extends rearwardly a substantial distance for engagement under respective laterally extending bracket arms 31 and 32 located below the bottom wall of the liquid tank.

Referring particularly now to the bracket arms, the arrangement is shown most clearly in FIG. 2. The complete bracket, designated 33, extends transverely across the flatiron and approaches the full width of the soleplate. Bracket 33 is secured to the soleplate by fastening devices 34 and 35 so that the bracket is firmly anchored in position. A central portion 36 of the bracket forms a bridge over the central portion of the soleplate, and centrally of this bridge is mounted a projecting stud 37. As clearly shown by FIG. 1, stud 37 extends upwardly through a passageway formed in the liquid reservoir, which passageway is defined by a cylindrical tube sealed at both ends to the top and bottom walls of the reservoir. Stud 37 thus provides a secure anchoring point on which may be fastened the outer enclosing cover (not shown) of the iron. The outwardly extending arms 31 and 32 of the bracket are turned downwardly at 38 and 39 on the outer ends in order to provide secure locking engagement with the rear end portions of respective arms of the wire hold-down member.

The wire hold-down member in its normal unstressed position is shown in dotted lines in FIG. 3. After the reservoir has been properly positioned on the steam dome and the steam dome has been suitably arranged on the cover plate with the sealing gaskets interposed, the two diverging arms of this wire spring member are pressed downwardly to engage flange 15 of the liquid tank at the respective portions 30. It may be noted that this wire hold-down member not only presses downwardly on flange 15 of the liquid tank; but also there is lateral engagement with the side walls of the tank at opposite points 30 as

clearly shown in FIG. 2. Thus, this wire hold-down member not only forces the reservoir or liquid tank downwardly, but also stabilizes it laterally. As the rearwardly diverging arms of the wire hold-down are pressed downwardly, they are ultimately secured under bracket arms and are securely retained in position by the downwardly extending tabs 38 and 39. In practice, it is found that no other securing force or means for the liquid tank is necessary. Furthermore, the diametric engagement of the wire hold-down member with the liquid tank flanges at points 30 provides an excellent seal through the respective gaskets previously described. In this manner, the liquid tank can be readily secured to the soleplate and cover plate assembly; and yet if it is necessary at any time to disassemble the iron, the entire liquid tank can be readily disconnected, following which the steam dome can be removed, providing access to the steam generating cavity for cleaning, if this should be necessary.

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

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

1. In a steam iron having a soleplate with a steam generator, a separate liquid reservoir, and a steam dome interposed between the reservoir and steam generator including a flow control orifice through which liquid flows from the reservoir into the steam generator, that improvement comprising: a spring wire hold-down member to secure the reservoir to the steam dome having a central portion and diverging leg portions; anchor means fastened to the soleplate for securing said central portion of said hold-down member, each of said diverging leg portions extending over said reservoir and into contact therewith and including an extension adapted to be deflected downwardly to an engagement position, thereby to apply resilient downward pressure against said reservoir; and bracket means fastened to said soleplate for securing said extension of each leg portion of said wire hold-down in said downwardly deflected engagement position.

2. In a steam iron having a soleplate with a steam generator, a separate liquid reservoir with side walls and a flanged bottom, and a steam dome interposed between said reservoir and said steam generator including a flow control orifice through which liquid flows from said reservoir into said steam generator, that improvement comprising: a spring wire hold-down member to secure the reservoir to the steam dome and having a central portion and diverging leg portions; anchor means fastened to the soleplate for securing said central portion of said hold-down member; each of said diverging leg portions extending over the bottom wall flange of said reservoir and in contact therewith and laterally in engagement with said reservoir side walls, and each leg portion further including an extension adapted to be deflected downwardly to an engagement position, thereby to apply resilient downward pressure against said reservoir; and bracket means fastened to said soleplate for securing said extension of each leg portion of said wire hold-down in said downwardly deflected engagement position.

3. In a steam iron, a heated soleplate having a steam generator therein; a cover plate including a steam dome secured to said soleplate to enclose said steam generator and to define with said soleplate steam discharge passages; a liquid valve orifice mounted in said steam dome; a liquid reservoir having enclosing walls including a bottom wall with an enlarged opening to receive at least a portion of said steam dome in which said liquid orifice is located; gasket means adapted to be positioned in sealing relation between said reservoir and said steam dome portion; a spring hold-down member to force said reser-

voir onto said dome and to compress said gasket means, said spring hold-down member having a front central portion secured to said soleplate and cover plate and a pair of rearwardly extending diverging arms, each of said diverging arms having an intermediate reservoir engaging portion and a remote locking end portion; and means carried by said soleplate to engage with said locking end portions.

4. In a steam iron, a heated soleplate having a steam generator therein; a cover plate secured to said soleplate to enclose said steam generator and to define with said soleplate steam discharge passages, said cover plate including wall portions defining an opening into said steam generator; a steam dome positioned on said cover plate with wall portions extending over the cover plate opening, said steam dome further including a liquid flow control orifice through which liquid may be introduced into said steam generator; a liquid reservoir having enclosing walls including a flanged bottom wall with an enlarged opening to receive at least a portion of said steam dome in which said liquid orifice is located; gasket means adapted to be positioned in sealing relation between said reservoir and said steam dome portion; a spring hold-down member engageable with said flanged bottom wall of said reservoir and laterally engaging the side walls thereof to force said reservoir onto said dome and to compress said gasket means, said spring down-down member having a front central portion secured to said soleplate and cover plate and a pair of rearwardly extending diverging arms, each of said diverging arms having an intermediate reservoir engaging portion and a remote locking end portion; and means carried by said soleplate to engage with said locking end portions.

5. In a steam iron, a heated soleplate including means for generation and distribution of steam thereon; a cover secured to said soleplate by a plurality of fasteners including a front-headed fastener to enclose said steam generation and distribution means, a steam dome removably secured to said cover and having an upwardly facing flange and central upwardly extending portion; a liquid reservoir constructed to overlie said soleplate and cover and having a bottom wall with an enlarged opening therein to receive the upwardly extending portion of said steam dome; a gasket interposed between said liquid reservoir and said upwardly facing steam dome flange; a bracket with laterally extending arms secured to the soleplate and located rearwardly of said steam dome; and a spring wire hold-down member for said reservoir having a central portion engageable under said front-headed fastener and further having diverging rearwardly extending arms, each of said arms having an intermediate reservoir engaging portion and an end portion engageable under a respective bracket arm.

References Cited by the Examiner

UNITED STATES PATENTS

2,755,575	7/56	Herman	38—91
2,786,287	3/57	Swann	38—77
2,812,598	11/57	Wood	38—77.1

JORDAN FRANKLIN, *Primary Examiner.*