Oct. 4, 1949. R. H. EDWARDS 2,483,816

FLASH TYPE STEAM IRON CONSTRUCTION

Filed March 21, 1945 4 Sheets-Sheet 1

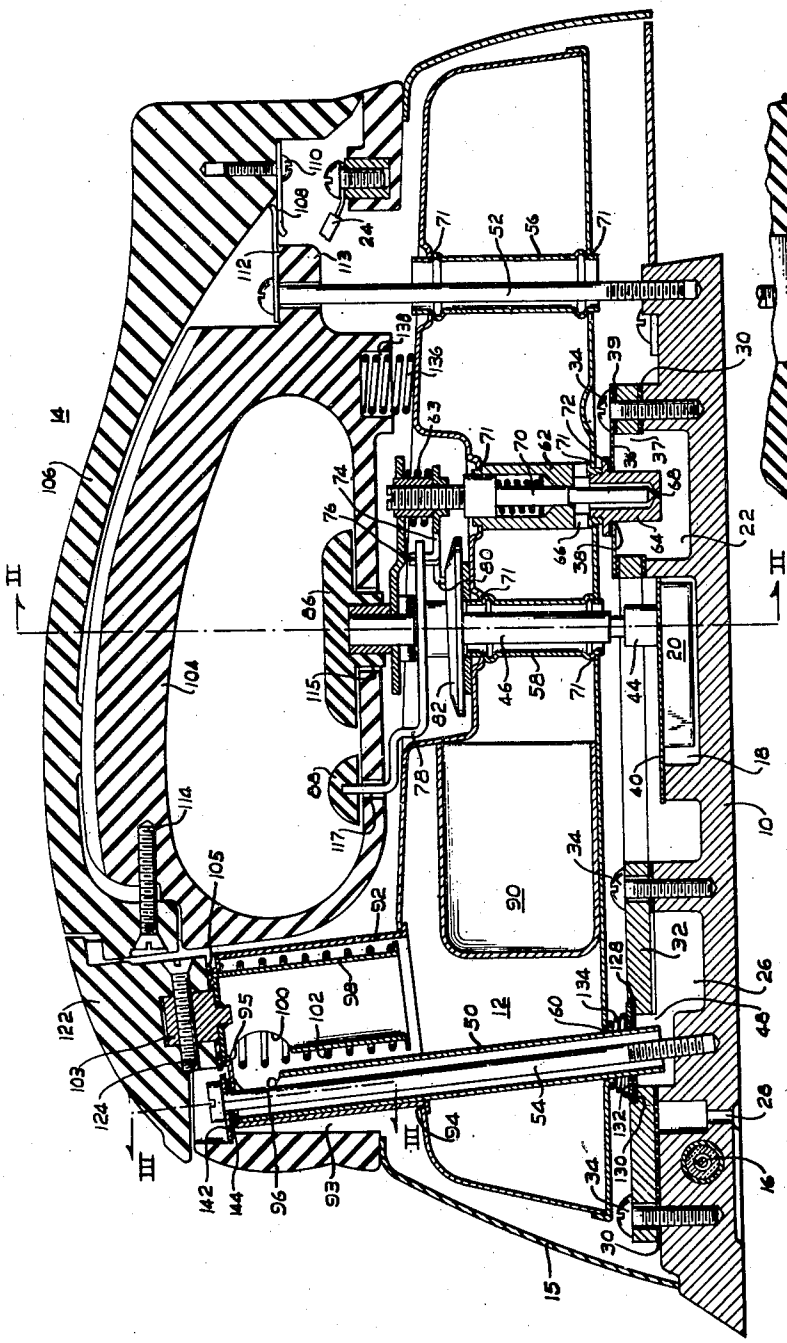

FIG. 1.

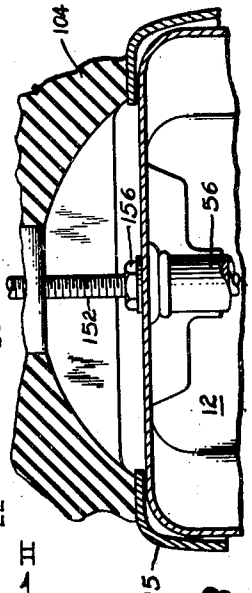

FIG. 8

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FLASH TYPE STEAM IRON CONSTRUCTION

Filed March 21, 1945 4 Sheets-Sheet 2

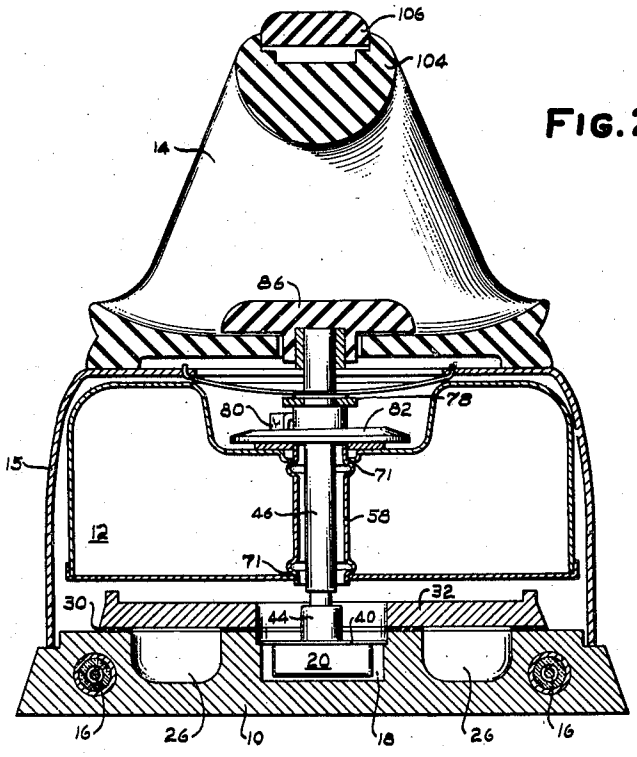

FIG. 2.

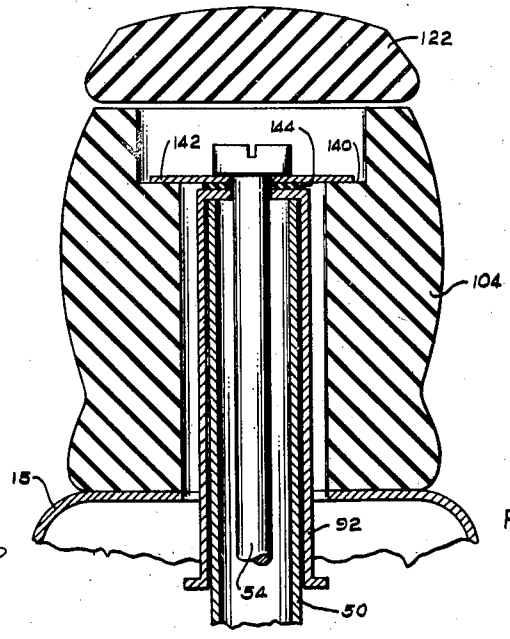

FIG. 3.

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FLASH TYPE STEAM IRON CONSTRUCTION

Filed March 21, 1945 4 Sheets-Sheet 3

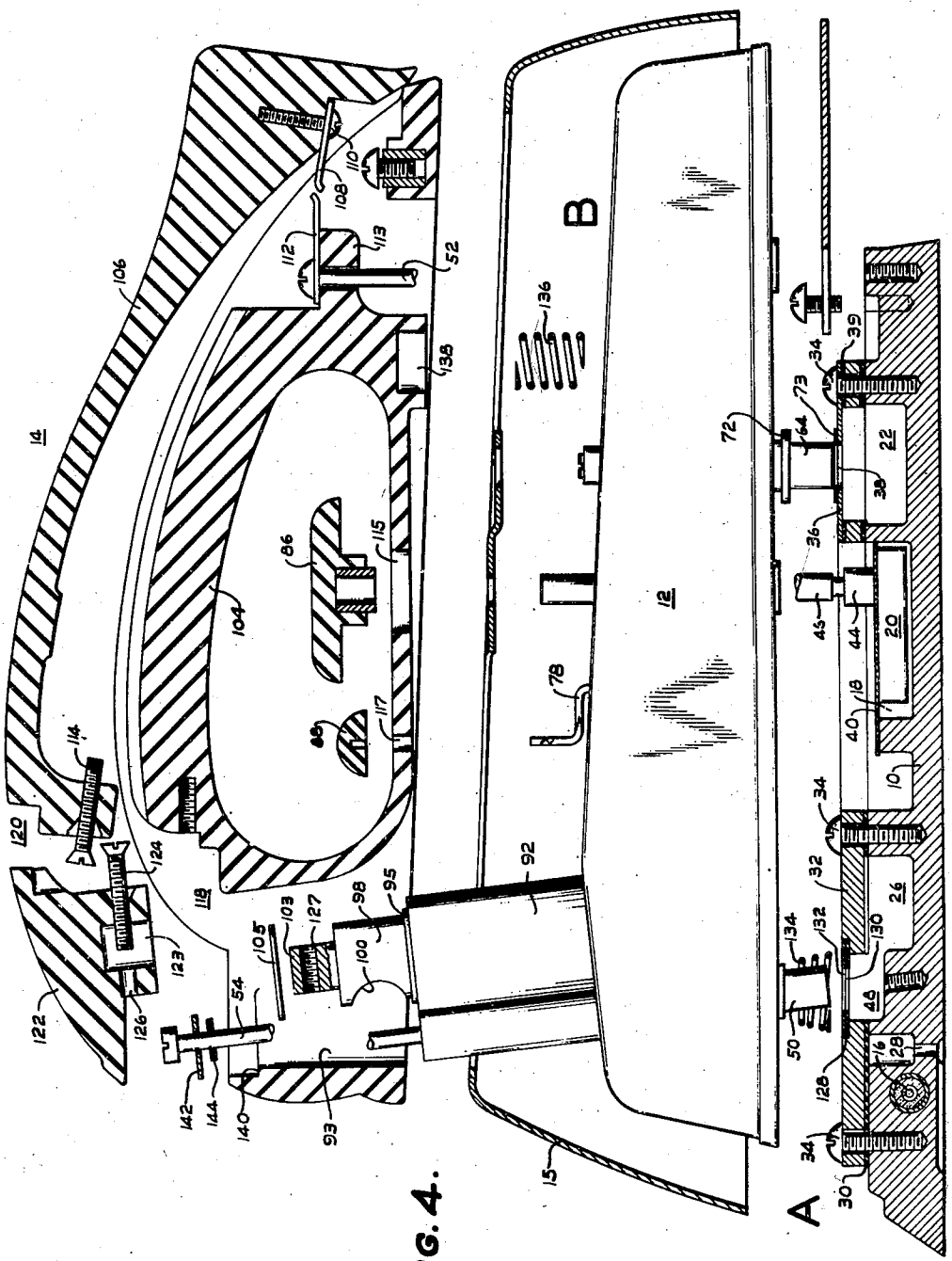

FIG. 4.

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FLASH TYPE STEAM IRON CONSTRUCTION

Filed March 21, 1945 4 Sheets-Sheet 4

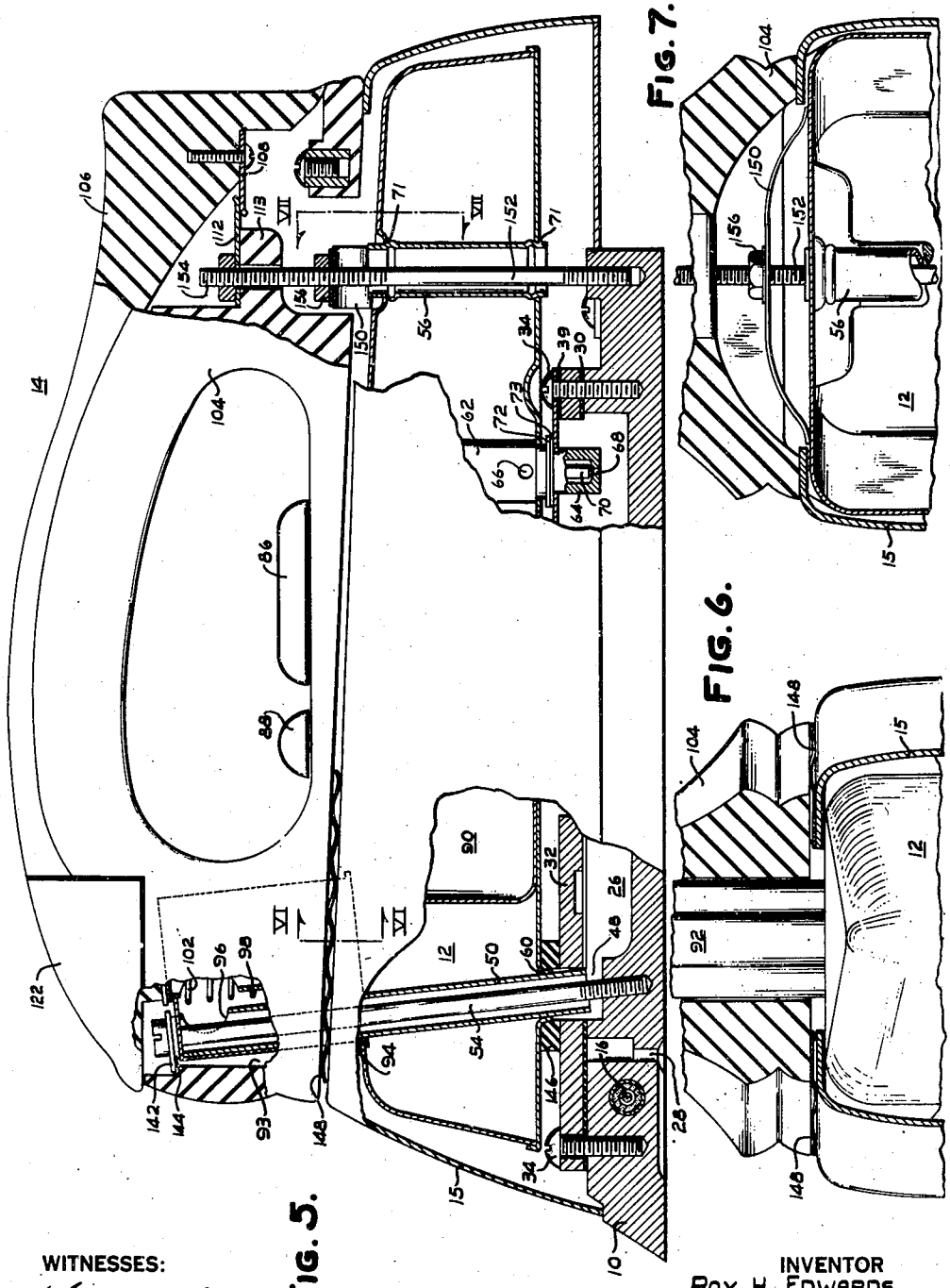

FIG. 5.

FIG. 7.

FIG. 6.

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Patented Oct. 4, 1949

2,483,816

UNITED STATES PATENT OFFICE

2,483,816

FLASH TYPE STEAM IRON CONSTRUCTION

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Application March 21, 1945, Serial No. 583,903

7 Claims. (Cl. 38—77)

1

My invention relates to a steam iron of the type in which a liquid, such as water, is adapted to be flashed into steam and discharged onto a fabric being ironed.

One object of the invention is to produce an improved iron of the type set forth.

An iron of the kind referred to includes, as main component elements thereof, a soleplate, a tank for containing the water to be flashed into steam, and a handle for manipulating the iron.

A further object of the invention is to produce improved means for assembling the main component parts of such iron.

A still further object of the invention is to produce improved means for assembling an iron of the type set forth which will compensate for slight dimensional variations of the various parts of the iron, thus eliminating the necessity for working to close tolerances in fabricating or machining the parts of the iron.

A still further object is to produce improved means for assembling the various parts of the iron which is adapted to take up any play between the parts that may initially exist, or which may develop while the iron is in use, to prevent rattling of such parts.

A still further object of the invention is to produce improved means for assembling the soleplate, the tank containing the water to be flashed into steam and the handle of the iron in such a manner as to insure fluidtight connections between the soleplate and the tank, regardless of slight variations in the sizes of the coacting parts.

A further object of the invention is to produce improved means for assembling an iron whereby the handle, tank and soleplate are tensioned against each other to prevent loosening of the means interconnecting said parts.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a vertical sectional view of a steam iron embodying my invention;

Fig. 2 is a section on line II—II of Fig. 1;

Fig. 3 is a fragmentary sectional view, on an enlarged scale, taken along line III—III of Fig. 1;

Fig. 4 is an exploded view of the iron shown in Fig. 1 to better illustrate the manner of assembling the various parts of the iron;

Fig. 5 is a view, partly in vertical section and partly in side elevation, of another embodiment of my invention;

2

Fig. 6 is a fragmentary section taken on line VI—VI of Fig. 5;

Fig. 7 is a fragmentary section taken on line VII—VII of Fig. 5; and

Fig. 8 is a fragmentary section similar to Fig. 7 but showing a further modification.

As illustrated, the iron includes a soleplate 10, a tank 12, a handle 14, and a finished cover 15 positioned between the handle and the soleplate and enclosing the tank and the upper portion of the soleplate. As clearly shown in Fig. 1, the lower portion of the cover 15 seats on or engages a marginal portion of the soleplate and the upper portion of the cover forms a support for the handle 14.

The soleplate is heated by a heating element 16 and is provided with a well 18, for receiving a thermostat 20, and a steam generating chamber 22, for receiving water from the tank 12 to be flashed into steam. The heating element and the thermostat are connected by conductors 24 to a source of electrical energy in any well-known manner. The soleplate is also provided with passages 26 leading from the steam generating chamber to ports 28 through which steam is discharged onto the fabric being ironed. The steam passages 26 and the discharge ports are defined by the soleplate 10 and a gasket 30 and a cover plate 32 which are secured to the soleplate by screws 34. The steam generating chamber 22 is provided with a cover 36 overlying an opening 37 in the cover plate 32 which is aligned with the chamber 22. The cover plate 36 has an opening 38 therein for receiving means for admitting water to the chamber 22. A gasket 39 is positioned between the cover plate 36 and the cover plate 32 to effect a fluidtight seal. The cover plate 36 is secured to the soleplate by the screws 34.

The thermostat 20, which is shown only diagrammatically, is preferably of the unitary type which may be assembled and calibrated before it is positioned in the well 18. The thermostat is carried by a disc or plate 40 which is secured in position by any suitable means. The plate 40 forms a closure for the thermostat well and carries a sleeve or bushing 44 in which a thermostat-adjusting stem 46 is threaded. The stem 46 extends through an opening in the cover 40 to contact the adjusting lever of the thermostat.

The cover 32 is provided with an opening 48 for receiving the lower end of an open-ended vent tube 50 for equalizing the pressure between the steam passages 26 and the tank 12. The soleplate is also provided with tapped holes for en-

gaging the threaded ends of fastening bolts 52 and 54. The parts thus far described, except for the bolts 52 and 54, are secured together to form a self-contained subassembly which is generally designated by the letter A in Fig. 4.

The tank 12 is provided with a sleeve 56, through which the fastening bolt 52 passes, and a sleeve 58 through which the thermostat-adjusting stem 46 extends. The second fastening bolt 54 passes through the vent tube 50, the lower end of which is soldered, or otherwise secured in fluidtight relation, to the bottom of the tank at 60. The tank is also provided with a sleeve 62, the lower end of which threadedly engages a hollow bushing or nipple 64. The interior of the bushing communicates with the tank through one or more openings 66 in the sleeve 62 and with the steam generating chamber 22 through an orifice 68. The orifice 68 is adjusted, or completely closed, by a needle valve 70 which extends upwardly through the sleeve 62. The valve 70 is biased downwardly by a spring 63. It will be understood that the upper and lower ends of the sleeves 56, 58 and 62 are soldered, or otherwise secured, in fluidtight relation to the top and bottom walls of the tank as at 71. The nipple 64 extends into the steam generating chamber through the opening 38 in the cover 36 and is provided with a flange 72 which engages or rests on a gasket 73 placed on top of the cover, as best shown in Fig. 4.

The upper end of the valve is provided with an arm 74 having an upwardly-projecting lug 76 which is adapted to be engaged by a lever 78, rotatably mounted on the thermostat-adjusting stem 46, and a downwardly-projecting lug 80 adapted to ride on a cam 82 carried by, and rotatable with, the thermostat-adjusting stem. When the thermostat stem is turned to increase the temperature of the iron, the lug 80 rides on a high portion of the cam 82, thus raising the needle valve 70 and increasing the flow of water through the orifice 68. By rotating the lever 78 about the vertical axis of the thermostat-adjusting stem, the lug 80 of the arm 74 may be made to ride on a low portion of, or may be completely disengaged from, the cam 82, thus permitting the spring 63 to move the needle valve 70 downwardly to completely close the orifice 68. The thermostat-adjusting stem and the valve-actuating lever are provided with operating knobs 86 and 88, respectively.

The tank is also provided with a baffle 90, which, for the purpose of the present application, need not be described in detail, and with a tubular extension or dome 92 which is secured in fluidtight relation to the tank at 94. The dome 92 extends upwardly into an opening 93, formed in the front end of the handle, and communicates with the steam passages 26 through a side opening 96 formed in the upper portion of the vent tube. Within the dome 92 is a spout 98, having a closed top and an open bottom and provided with a side inlet opening 100. The spout 98 is adapted to be pulled outwardly through an opening 95 in the top of the dome so that water may be poured into the tank through the inlet opening 100, as shown in Fig. 4. This is done with the iron in up-ended position or resting on its heel. The spout is biased back into position within the dome by a spring 102. The top of the spout is provided with a lug 103 which will be further referred to. A gasket 105 prevents leakage through the opening 95.

The tank and the parts associated therewith may all be secured together to form a subassembly which is designated by the letter B in Fig. 4.

The handle 14 includes a lower portion 104 and an upper portion 106 which are secured together in a concealed and easily detachable manner. As shown, the rear end of the upper portion is provided with an inwardly-projecting plate 108 which is secured in position by a screw 110. The plate 108 is adapted to engage the underside of a plate 112 secured, by the screw 52, to a lug 113 carried by the lower handle portion 104. The front ends of the inner and outer portions of the handle are secured together by a screw 114.

The bottom of the lower handle portion is provided with an opening 115 and a slot 117 through which the thermostat-adjusting stem 46 and the lever 78, respectively, project to receive the operating knobs 86 and 88.

The handle also includes a knob 122 which is adapted to seat in recesses 118 and 120 in the front end of the lower and upper handle portions, respectively, so that, when it is in the position as shown in Fig. 1, the knob merges with, and forms a continuation of, the handle portions 104 and 106.

The knob 122 serves as a grip by means of which the spout 98 may be pulled out when it is desired to introduce liquid into the tank. To this end, the knob 122 is provided with a bottom recess 123 adapted to receive the lug 103 of the spout 98. A screw 124 extends through an opening 126 formed in the lower portion of the knob, and is threaded into an opening 127 formed in the lug 103 to secure the knob 122 to the top of the spout 98.

In order to produce and maintain the desired fit and the necessary fluidtight connections, without having to work to extremely close tolerances in manufacturing or in assembling the parts, in order to prevent rattling of the parts which may result from liberal manufacturing tolerances, and in order that the iron may be easily dismantled for servicing, if necessary, without disturbing the calibration of the thermostaat or the adjustment of the water valve, I have devised improved means for detachably securing the handle, tank and soleplate subassemblies together.

As shown in Figs. 1 and 4, the cover plate 32 of the soleplate is provided with a recess 128 forming a seat for an annular gasket 130 and a washer 132 through both of which the lower end of the vent tube 50 extends. The gasket 130 is compressed between the soleplate and the washer 132, by a coil spring 134, confined between the washer and the bottom of the tank. This provides and maintains a fluidtight seal around the vent tube and yieldably supports the front end of the tank.

The rear portion of the tank is likewise cushioned by a spring 136, the lower end of which rests on top of the tank, and the upper end of which is seated in a pocket 138 formed in the underside of the lower handle portion 104. The yielding pressure of the spring 136 causes the flange 72 of the bushing 64 to maintain a fluidtight seal against the gasket 73.

The rear end of the handle is fastened to the soleplate by the rear screw 52 which passes through the apertured plate 112 and lug 113, and through the sleeve 56 to engage the soleplate.

The front end of the handle is secured to the soleplate by the screw 54 which passes through an opening in the top of the dome 92 and through the vent tube 50 to engage the soleplate. As will

be best seen from Fig. 3, the front end of the handle is provided with a shoulder 140 adapted to receive, or to be engaged by a portion of, an apertured washer 142 through which the screw 54 passes so that the front end of the handle is clamped between the head of the screw 54 and the soleplate of the iron.

The screws 52 and 54 are tightened until the cover 15 is firmly clamped between the handle and the soleplate. This eliminates the necessity of machining the cover to very close tolerances and thus reduces the cost of manufacture.

The opening in the top of the dome through which the screw 54 passes is provided with a gasket 144. The spring 134, by exerting a following upward pressure against the tank, compresses the gasket 144 to maintain a fluidtight seal around the stem of the screw 54.

The springs 134 and 136, in addition to maintaining a fluidtight seal at the lower end of the vent pipe, at the upper end of the screw 54, and at the lower end of the water valve, also take up any looseness or play resulting from variable tolerances in the manufacture of the handle, the tank or the soleplate, or any of them, properly to locate the tank with reference to the soleplate and the handle. This eliminates the necessity of working to very close tolerances and thus reduces the cost of manufacture.

Assembly

The gasket 130 and the washer 132 are placed in the seat 128 in the cover 32 of the soleplate, the gasket 73 is placed on top of the cover plate 36 of the steam generating chamber, and the spring 134 is slipped over the lower end of the vent tube 50. The tank sub-assembly B is now placed on top of the soleplate subassembly A, with the lower end of the vent tube 50 projecting into the steam passage 26 through the opening 48 and with the nipple 64 projecting into the steam generating chamber through the opening 38. The flange 72 of the nipple 64 now rests on the gasket 73, the thermostat-adjusting stem 46 passes upwardly through the sleeve 58, and the valve 70 extends through the sleeve 62.

The cam 82 is now slipped over the upper end of the thermostat-adjusting stem and the follower arm 74 is threaded onto the upper end of the valve 70. As shown, the cam 82 rests on a thrust washer seated in a depression formed in the top wall of the tank, but it will be understood that the cam may be otherwise supported. It is only necessary that the cam 82 be rotatable with, but longitudinally slidable with respect to the stem 46. This may be accomplished by axially splining the stem or by any other keying arrangement as is well understood in the art. The cam 82 and follower arm 74 are next so adjusted relative to each other that, when the cam is in an "off" position, or when the cam is so adjusted as to maintain the iron at a temperature at which water will not evaporate rapidly, the lug 80 of the arm 74 will ride on a low portion of the cam, which will permit the spring 63 to bias the valve 70 into a position completely closing the orifice 68. Conversely, when the lug 80 rides on the highest portion of the cam, the valve 70 is raised fully to open the orifice 68. The arm 74 is then suitably locked in position relative to the valve 70 to prevent any change in its adjustment relative to the cam 82. The actuating lever 78 is then placed in position, with the forked end thereof engaging the lug 76 of the arm 74.

The finished cover or shell 15 is next placed

in position and the lower handle portion is placed on top of cover 15, with the spring 136 engaging the pocket 138, with the end of the thermostat-adjusting stem projecting through the opening 115, and with the end of the water valve actuating lever 78 projecting through the slot 117. With the lower handle portion in position, the plate 112 is placed on the lug 113, and the screw 52 is passed through the plate 112, lug 113 and sleeve 56 to engage the soleplate. The outer handle portion is now moved towards the inner handle portion in a manner to cause the plate 108 to engage the underside of the plate 112 whereupon the outer handle portion is swung from the position shown in Fig. 4 to the position shown in Fig. 1, for application of the screw 114.

To secure the front end of the iron, the gasket 144 is placed on top of the dome 92 in registration with the vent tube, and the washer 142 is placed over the gasket 144 and on the shoulder 140 in the front of the handle. The screw 54 is now passed through the washer 142, the gasket 144, the opening in the top of the dome, and through the vent tube 50 to engage the soleplate.

To secure the knob 122 to the spout 98, the spout is pulled outwardly through the opening 95 (see Fig. 4), the gasket 105 is placed on top of the dome, the lug 103 is inserted into the recess 123, and the screw 124 is applied.

From the foregoing, it will be seen that the springs 134 and 136 coact with the fastening screws 52 and 54 to locate the tank and to produce a proper fit between the handle, the tank and the soleplate, even though these parts, or any one or two of them, may not have been fabricated or machined to extremely close tolerances, and that these springs, by taking up any play that may exist, prevent rattling of the parts. Also, the pressure of the springs 134 and 136 minimizes, or altogether prevents, loosening of the screws 52 and 54 while the iron is in use. It will further be noted that the pressure of the spring 136 maintains a fluidtight joint at the top of the steam generating chamber, and that the pressure of the spring 134 maintains a tight joint at the top of the dome 92 around the stem of the screw 54 and around the lower end of the vent tube which extends into the steam passages 26.

Furthermore, when the screws 52 and 54 are disengaged, the soleplate may be detached from the tank without in any way disturbing the calibration of the thermostat or the adjustment of the water valve.

It will further be noted that in the structure above described, the handle 14, the cover 15 and the soleplate 10 are rigidly clamped together by the bolts 52 and 54 and that the tank 12 is located with reference to the handle and the soleplate by means of the springs 134 and 136.

In Figs. 5 to 7, there is shown a preferred embodiment in which the junction of the vent tube 50 with the soleplate 10 is sealed by a resilient gasket positioned between the bottom of the tank and the soleplate, and in which the front portion of the tank is clamped to the soleplate while the cover 15 is located and held in position against the soleplate, by yielding means disposed between the cover and the handle.

As shown, a relatively thick resilient gasket 146 is placed between the bottom of the tank and the soleplate cover, so as to surround the lower end of the vent tube 50, and the front portion of the tank is clamped to the soleplate by the front screw 54. Tightening the screw 54, to clamp the front portion of the tank against the soleplate,

also compresses the gasket 146 and provides the desired seal at the lower end of the vent tube 50.

Also, as shown, a corrugated leaf spring 148 is placed between the front portions of the handle and the cover so as to press the cover downwardly against the marginal portion of the soleplate. The spring 148 may be of any desired form and size.

If desired, the rear fastening screw 52, the pocket 138, and the spring 136 of Figs. 1 to 4 may be replaced by a bowed leaf spring 150 and a fastening bolt 152. As illustrated, the rear portion of the handle is rigidly secured to the corresponding portion of the sole-plate by the bolt 152, and the rear portion of the cover is rigidly clamped in position between the handle and the soleplate. The spring 150, the free ends of which bear upon the rear portion of the tank, may be rigidly secured to the bolt 152 so as to have predetermined pressure, or its pressure may be adjusted by a nut 156 engaging the threaded portion 154 of the bolt 152.

The pressure of the spring 150 against the rear portion of the tank serves to effect a fluidtight joint between the water valve and the steam generating chamber in the same manner as the spring 136 of the embodiment of Figs. 1 to 4.

It will be seen that in the embodiment of Figs. 5 to 7 the front portion of the tank is firmly secured to the soleplate while the cover 15, or at least the front portion thereof, is yieldably pressed against the soleplate.

It will also be seen that, in both of the embodiments illustrated, a tank member and a cover member are interposed between the handle and the sole plate and that, in one embodiment, one of the members, such as the tank, is yieldingly located or positioned and the cover member is rigidly clamped, and that, in the other embodiment, the tank is yieldingly located and the cover member is yieldingly located or positioned at its front portion. In both embodiments, however, the structure is such that the tank, soleplate, the cover and the handle need not be fabricated or machined to very close tolerances, thus reducing the cost of manufacture and assembly without adversely affecting the structural strength or the appearance of the iron.

Also, in both embodiments of the invention, means is provided for effecting and maintaining fluidtight seals at the lower end of the water valve, at the lower end of the vent tube, and at the upper end of the fastening screw 54.

Since, except as hereinabove pointed out, the structure of the embodiment of Figs. 5 to 7 is identical with that shown in Fig. 1, the embodiment of Figs. 5 to 7 is only partly shown in detail and, to the extent that the parts of this embodiment are shown, they are referred to with the same reference characters used in connection with Fig. 1.

If desired, the spring 150 may be omitted and the rear portion of the tank may be adjustably clamped by the nut 156 bearing directly on the top of the tank as shown in Fig. 8.

While I have shown my invention in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof.

What I claim is:

1. A steam iron including a handle, a soleplate, a heating element therefor, a tank adapted to contain water to be changed into steam and discharged onto the fabric being ironed, a steam generating chamber carried by the soleplate for receiving water from said tank and converting it into steam, a cover for said steam chamber, there being an opening in said cover, a nipple carried by said tank and adapted to extend into said chamber through said opening, said nipple having a valved orifice for delivering measured quantities of water from said tank to said chamber, a flange carried by said nipple and adapted to seat on the rim of said opening, means securing said handle, said soleplate, and said tank together, and means for exerting a following yielding pressure on said nipple, to produce and maintain a fluidtight joint between said cover and said flange, said means being in the nature of a spring, confined between said handle and a portion of said tank in proximity to the vertical axis of said nipple, to exert downward pressure against said tank in the vicinity of said nipple.

2. A steam iron including a soleplate, a heating element therefor, a steam generating chamber carried by said soleplate, a tank adapted to contain water to be changed into steam in said chamber and to be discharged onto the fabric being ironed through ports formed in said soleplate, there being a passage connecting said ports and said chamber, a cover for said passage having an opening therein, a vent tube carried by said tank and having its lower end extending through said opening into said passage, and its upper end communicating with the interior of said tank to equalize pressure between said tank and said passage, packing means at the junction of the lower end of said tube and said cover, means securing said tank to said soleplate, and a spring confined between said packing and the bottom of said tank for exerting pressure against said packing to produce and maintain a fluidtight joint between the lower end of said tube and said passage.

3. A steam iron including a soleplate, a heating element therefor, a steam generating chamber carried by said soleplate, a tank adapted to contain water to be changed into steam in said chamber and to be discharged onto the fabric being ironed through ports formed in said soleplate, there being a passage connecting said ports and said chamber, a cover for said passage having an opening therein, a vent tube carried by said tank and having its lower end extending through said opening into said passage, and its upper end communicating with the interior of said tank, to equalize pressure between said tank and said passage, packing means at the junction of the lower end of said tube and said cover, a fastening screw passing through an opening in the top of said tank and through said vent tube to engage said soleplate, packing means between the top of said tank and the head of said screw, and a spring confined between the packing at the lower end of said tube and the bottom of said tank for exerting downward pressure against the last-mentioned packing, and upward pressure against the packing between the top of said tank and the head of said screw, to produce and maintain fluidtight joints between the lower end of said tube and said passage, and between the top of said tank and said screw.

4. A steam iron including a soleplate, a handle for manipulating said iron, a tank disposed between said handle and said soleplate, a cover disposed between said soleplate and said handle and enclosing said tank, fastening means securing said soleplate and said handle together, means exerting a yielding pressure, in opposite

directions, against a portion of said cover and a juxtaposed portion of said handle, and means exerting yielding pressure, in opposite directions, against said fastening means and a juxtaposed portion of said tank.

5. A steam iron including a soleplate, a handle for manipulating said iron, a tank disposed between said handle and said soleplate, a cover disposed between said soleplate and said handle and enclosing said tank, a first fastening means securing said soleplate, the front portion of said tank and the front portion of said handle together, means exerting a yielding pressure, in opposite directions, against a front portion of said cover and a juxtaposed front portion of said handle, a second fastening means securing a rear portion of said handle to a rear portion of said soleplate, and means exerting yielding pressure, in opposite directions, against said second fastening means and a juxtaposed rear portion of said tank.

6. A steam iron including a soleplate, a heating element therefor, a steam generating chamber carried by said soleplate, a tank adapted to contain water to be changed into steam in said chamber and to be discharged onto the fabric being ironed through ports formed in said sole plate, there being a passage connecting said ports and said chamber, a cover for said passage having an opening therein, a vent tube carried by said tank and having its lower end extending through said opening in communication with said passage and its upper end communicating with the interior of said tank to equalize pressure in said tank and said passage, and a fastening screw passing through an opening in the top of said tank and through said vent tube and engaging said soleplate for securing said tank and soleplate together.

7. A steam iron including a soleplate, a heating element therefor, a steam generating chamber carried by said soleplate, a tank adapted to contain water to be changed into steam in said chamber and to be discharged onto the fabric being ironed through ports formed in said soleplate, there being a passage connecting said ports and said chamber, a cover for said passage having an opening therein, a vent tube carried by said tank and having its lower end extending through said opening in communication with said passage, its upper end communicating with the interior of said tank to equalize pressure in said tank and said passage, a fastening screw passing through an opening in the top of said tank and through said vent tube to engage said soleplate, a handle member, and means associated with the upper end of said screw for engaging a portion of said handle to secure it in operative relation with said tank and said soleplate.

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