Oct. 30, 1951 A. BATE 2,573,174

FOLDING ELECTRIC STEAM IRON

Filed Oct. 22, 1947 3 Sheets-Sheet 1

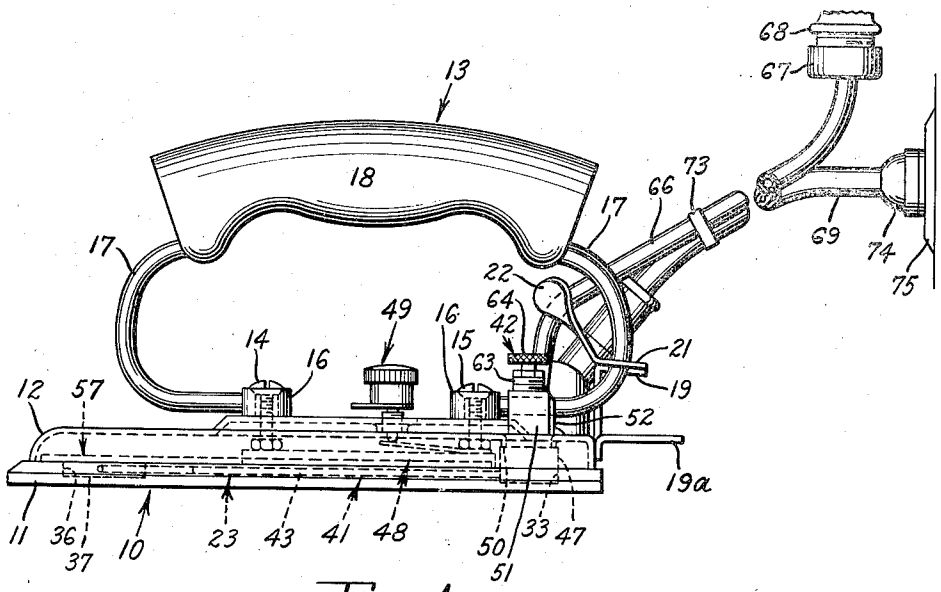


Fig. 1

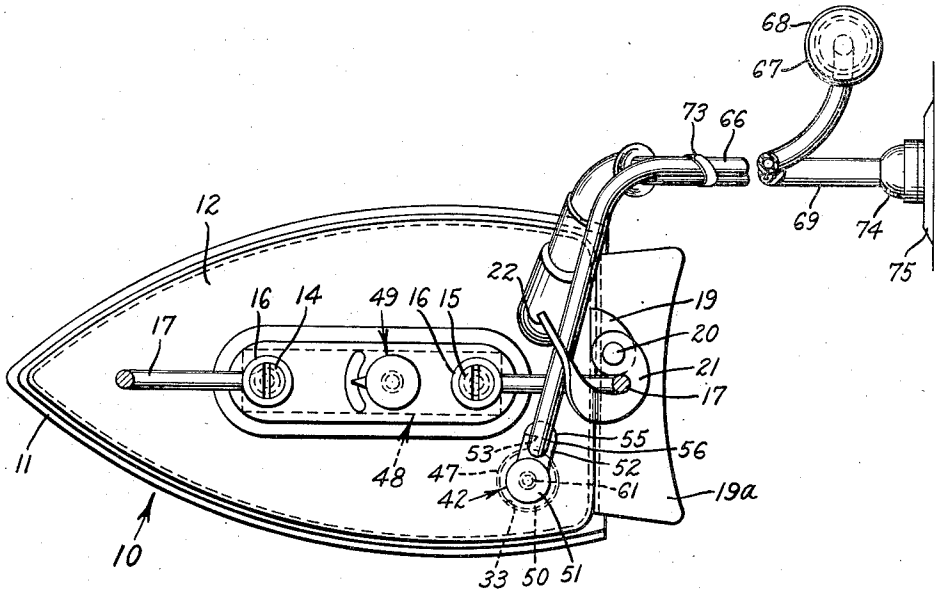


Fig. 2

INVENTOR.
ALAN BATE
BY
John J. Kanaban
ATTORNEY

Oct. 30, 1951 A. BATE 2,573,174

FOLDING ELECTRIC STEAM IRON

Filed Oct. 22, 1947 3 Sheets-Sheet 2

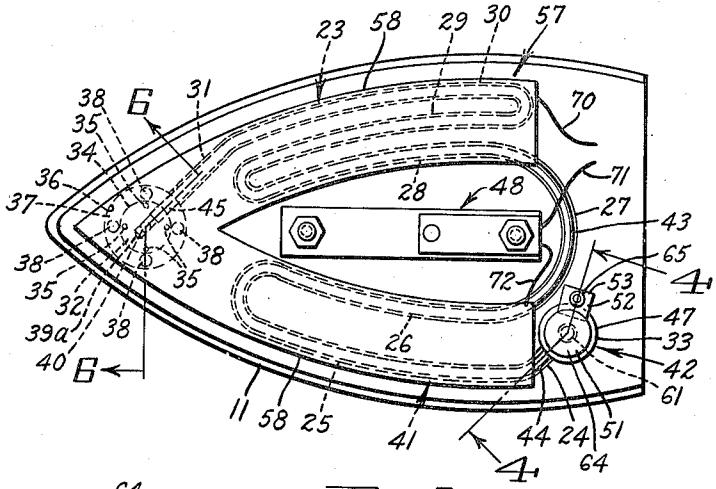


Fig. 3

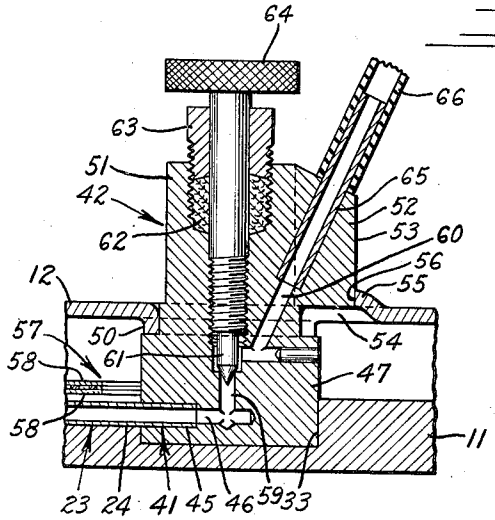


Fig. 4

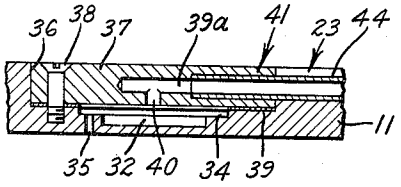


Fig. 6

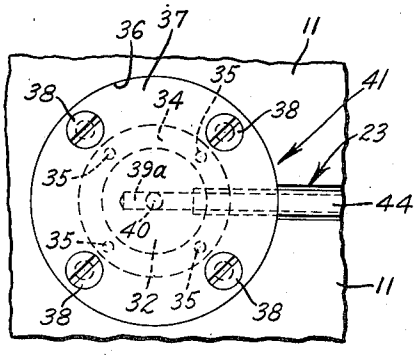


Fig. 7

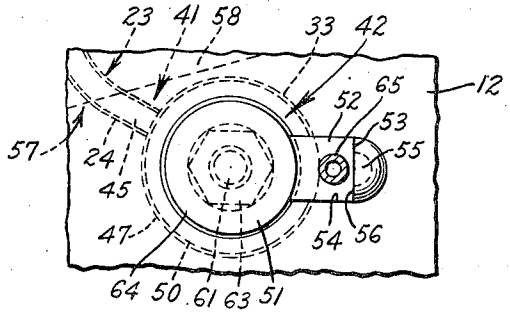


Fig. 5

INVENTOR.
ALAN BATE
BY
John J. Kanaban
ATTORNEY

Oct. 30, 1951 A. BATE 2,573,174

FOLDING ELECTRIC STEAM IRON

Filed Oct. 22, 1947 3 Sheets-Sheet 3

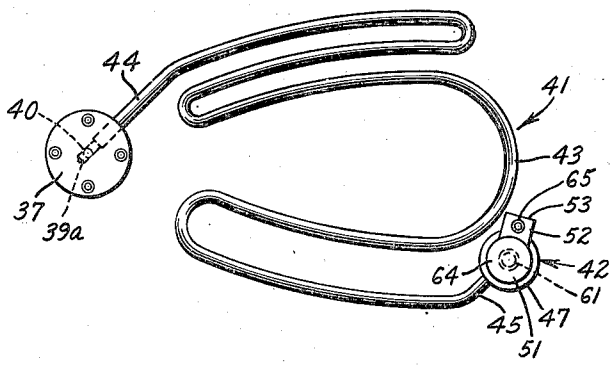


Fig. 8

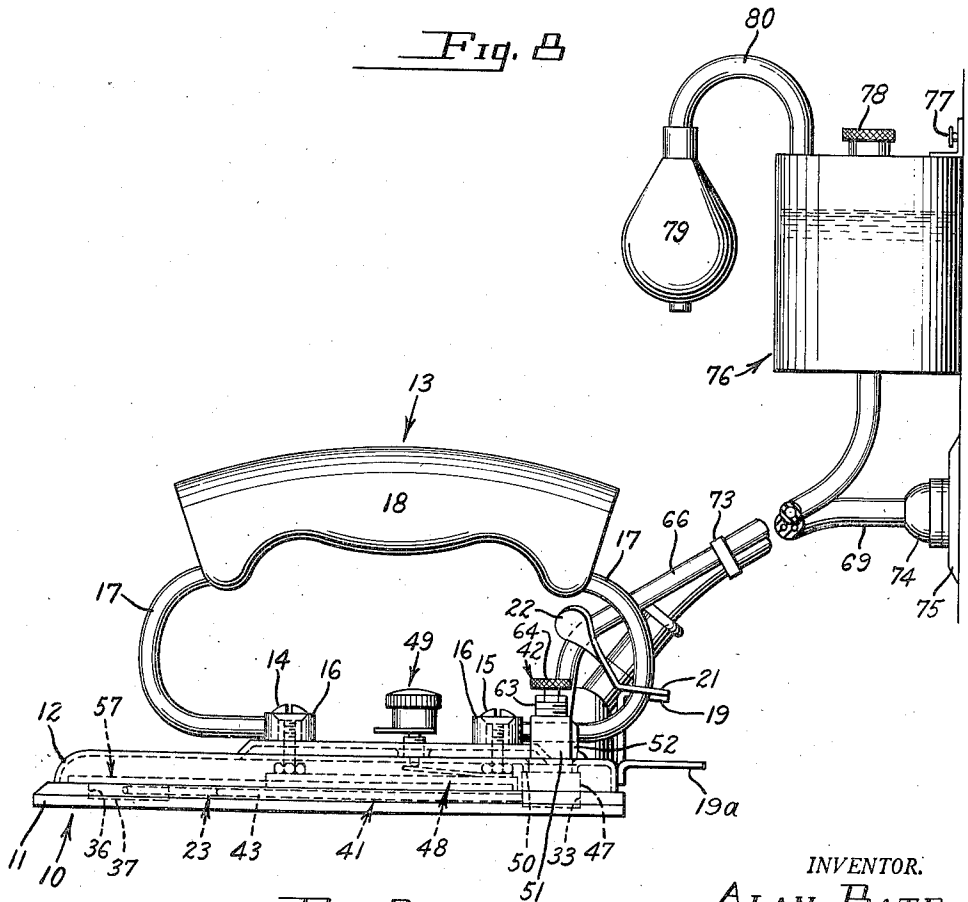


Fig. 9

INVENTOR.
ALAN BATE
BY
John A. Hanahan
ATTORNEY

Patented Oct. 30, 1951

2,573,174

UNITED STATES PATENT OFFICE

2,573,174

FOLDING ELECTRIC STEAM IRON

Alan Bate, Riverton, Conn., assignor to The Winsted Hardware Manufacturing Company, Winsted, Conn., a corporation of Connecticut

Application October 22, 1947, Serial No. 781,442

2 Claims. (Cl. 38—77)

1

This invention relates to new and useful improvements in flatirons or sadirons and has particular relation to steam irons and more especially electric steam irons.

An object of the invention is to provide an electric steam iron which is relatively small and light in weight and which is yet extremely efficient in the conversion of water into steam.

Another object is to provide a foldable electric steam iron.

A further object is to provide an electric steam iron including means for the production of steam under water pressure.

A further object is to provide an electric steam iron including means capable of translating the electric energy available in the iron into heat of vaporization.

Other objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings wherein satisfactory embodiments of the invention are shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawings:

Fig. 1 is a side elevational view showing the iron of the invention as connected with an electrical outlet and a water faucet;

Fig. 2 is a plan view of the device as shown in Fig. 1;

Fig. 3 is a top plan view of the iron with the cover casing, handle and connections removed;

Fig. 4 is an enlarged detail sectional view taken as along the line 4—4 of Fig. 3 showing a valve construction;

Fig. 5 is an enlarged detail plan view of the valve and associated portions of the cover casing;

Fig. 6 is an enlarged detail sectional view taken as along the line 6—6 of Fig. 3;

Fig. 7 is an enlarged plan view of a detail of the steam chamber and the connection of a tube thereto;

Fig. 8 is a plan view of an assembly comprising the needle valve, tubing and the steam chamber cover; and

Fig. 9 is a view similar to Fig. 1 but showing the iron as supplied with water from a tank.

Referring in detail to the drawings and at first more particularly to Figs. 1–8, at 10 is generally indicated an electric iron including a sole plate 11, a cover casing 12 and a handle generally designated 13. Generally, this iron is of the con-

2

struction shown in Patent No. 2,119,964 of June 7, 1938. Basically, the present invention resides in the providing of means whereby a folding electric iron of the type shown in said patent is converted into a folding electric steam iron.

In the present instance, as in the above identified patent, the handle 13 is secured to the sole plate 11 and the cover casing 12 is secured over the sole plate by means of a pair of screws or bolts 14 and 15. Such screws or bolts pass through the cover casing and are attached to the sole plate and between the cover casing and the heads of the respective screws are bearing posts 16 having openings in their outer sides receiving the ends of the respective bail portions 17 of the handle 13. The actual grip portion 18 of the handle may be made of plastic, wood, or the like, and is secured to and between the bail portions 17, which may be integral, in any desired manner.

With the mounting of the handle on the bearing posts as described, it will be appreciated that the handle may be swung from the vertical, operative position shown to a position against or substantially parallel with the upper side of the cover casing 12 of the iron. A bracket-like portion 19 on the cover casing has pivoted thereto at 20 a latch device 21 which is somewhat in the form of a hook and includes a finger portion 22. When the handle is in a position of use or a vertical position as shown, the latch device 21 is swung about one of the bail portions 17 of the handle and acting with a sort of cam action when the latch device is pushed fully home, it serves to secure the handle in the vertical position or in a position for use against accidental folding. Thus, as the operator uses the iron, the handle will not casually fold or collapse so as to bring the fingers of the operator into engagement with heated portions of the iron.

When the iron is not to be used, the catch device is swung the other way on the pivot 20, releasing the handle so that it may be folded over against the cover casing into an out-of-the-way position leaving the iron substantially flat whereby it will occupy a small space and so may be packed in a bag or the like for travel. Bracket 19 may be an integral part of a heel plate or rest device 19a.

The sole plate 11 may be of aluminum or stainless steel or the like and preferably is of a thickness in the vicinity of ¼". In the upper surface of the sole plate, a groove 23 has been molded or machined and this groove extends from a point 24 (see Fig. 4) toward the rear or heel of the sole

plate forwardly as at 25 and then is doubled and carried back on itself as at 26 and is again doubled on itself in a rather open curve as at 27 and then carried forwardly, rearwardly and again forwardly as at 28, 29 and 30. The forward end of the arm 30 of the groove is extended as at 31 to the immediate vicinity of a steam chamber 32 located toward the toe of the iron and later to be more fully described. At the point of origin 24, the described groove or channel 23 is adjacent an annular chamber or well 33 formed in the sole plate.

Steam chamber 32 is in the form of an annular depression or well in the sole plate 11, which depression through an annular enlargement 34 at its upper side communicates with radially spaced outlets or ports 35 for the escape of steam from the chamber through the underside of the sole plate. Actually, the depression constituting the steam chamber has a rather large counterbore at its outer side, as at 36, and this counterbore receives a closure plate 37 held in place over the steam chamber as by screws 38. If desired, a sealing gasket 39 may be provided at the lower side of the closure.

Closure 37 has a passage 39*a* extending radially therethrough of which the portion toward an outer edge of the closure is of an enlarged diameter for a purpose to be described and which (see Fig. 6) towards its inner end communicates with a laterally or downwardly extending port or outlet 40 placing the passage 39*a* in communication with the steam chamber 32. The well or chamber 33 and the counterbore 36 communicate as through the grove or channel 23.

An assembly, generally designated 41, shown alone in Fig. 8, is adapted to be placed in the described sole plate. This assembly includes a needle valve 42, a piece of properly bent tubing 43, and the closure or cover 37. An extended end portion 44 of the tube is received in the enlarged portion of the passage 39*a* in the cover plate and may be sweated or otherwise secured therein. At the other end of the tube, an extended portion 45 (Fig. 4) of the tube 41 is received in the outer enlarged portion of a passage 46 extending radially of a lower annular portion 47 of the valve 42.

The portion 45 of the tube may be sweated or otherwise secured in the annular body portion 47 of the valve whereby an assembly may be made up, as in Fig. 8. In this figure, the parts will be located by jigs or the like so that the assembly may be fitted into place in the sole plate 11 by locating the lower portion of the valve body 47 in the well 33 and by locating the various portions of the tube 43 in the channel or groove 23 and locating the cover or closure 37 in the counterbore 36. When this is done, the screws 38 are applied to secure the cover in place.

A thermostatic control, such as is disclosed in my application, Ser. No. 715,561, filed December 11, 1946, now Patent No. 2,537,808, dated January 9, 1951, or as disclosed in Patent No. 2,086,240 of July 6, 1937, is mounted on the sole plate and is here generally designated 48. This device is to be controlled or set by hand piece 49 located between the bearing posts 16 at the upper side of the cover casing 12 and operable through the latter. The cover casing 12 is formed of sheet metal and is generally hollow as shown and fits over the sole plate and parts thereon. In the present instance, this cover plate has a downturned flange portion 50 which is generally circular and which, as shown in Fig. 4, bears against the upper edge portion of the valve block or body 47.

Such valve, in addition to the block or body portion 47, includes an upstanding annular portion 51 having a lateral lug-like extension 52 thereon provided on its outer vertical edge with a flat 53. The cover casing is cut away to accommodate the extension 52, the cut away being suggested at 54. Then the casing is offset upwardly as at 55 and provided with a straight edge portion 56 abutting the flat 53. With this construction, it will be clear that the fastening down of the closure 37 by the screws 38 anchors one end of the tube 43 and when the cover casing is in place, its portions 50 acting on the valve body 47 secure the valve in place and thus secure the other end portions of the tube 43. The engagement of the flats 53 and 56 prevents any casual turning of the valve 42 about its vertical axis.

Prior to the application of the cover casing, a heating element generally designated 57 is disposed over the tube 43. This heating element will include the necessary resistance and the latter will be enclosed in or between insulating pieces or sheets 58 and the entire heating element may be held down in any desired manner. It will be understood that the tube 43 constitutes a boiler in which steam is produced and a tube serves to connect the needle valve 42 with the steam chamber 32. Preferably, the tubing is of stainless steel and is of a diameter to have good thermal contact with the groove or channel 23 in the sole plate. It will be apparent from the drawing that there is a considerable length of tubing extending from the valve to the steam chamber and that the heating element extends over the closure 37 of the steam chamber.

In addition to the passage 46, the valve 42 includes a vertical passage 59 which communicates with a passage 60 in accordance with the setting of a needle valve 61. Needle valve 61 is threaded in the valve body portion 51 and leakage by the needle valve is prevented as by packing 62 held in place by nut or bushing 63. Clearly, on manipulation of the valve 61 by its finger piece or head-like portion 64, setting of the valve is adjusted to provide for greater or lesser communication between the passage 60 and the passage 46 and thus between the passage 60 and the end portion 45 of the tube 43.

A metallic tube 65 is inserted into the valve and communicates with the passage 60 and the portion of the tube extending beyond the valve is adapted to receive one end of a piece of pipe or tubing 66 of rubber or a synthetic elastomer, such as polyvinyl chloride. This tubing must be flexible and is of the desired length and at its opposite end is provided with a fitting or nipple 67 adapted to be connected with a faucet 68 or the like in a city water supply system.

A cord set is also connected with the iron and the same may include a conductor 69, the lead wires 70 and 71 of which are connected, respectively, to the element 57 and the thermostatic control device 48 while a second lead 72 connects the device 48 with the element 57. For ease in ironing or for convenience, the tubing 66 is preferably carried along with the cord set conduit 69 for a distance outwardly from the iron and may be clipped thereto for a part of the distance as at 73. The cord set includes a plug cap 74 adapted to be plugged into a suitable wall receptacle or convenience outlet as suggested at 75.

When the iron of the invention is to be used,

handle 13 is secured in its vertical position and the cord set is connected to an electric outlet while the tubing or hose 66 is connected to a tap or faucet 68 from which water may be provided under city pressure. The thermostatic control device 48 is then dialed to the desired setting by operation of finger piece 49 and the iron is ready for use as a dry iron.

If steam is desired, needle valve 61 is opened by manipulation of the thumb knob or finger piece 64 and the water under pressure of the city mains is forced into the metal tubing 43 located in the sole plate 11. Heat from the heating element 57 just above the tubing 43 and from the heated sole plate itself converts this water into steam which passing through the entire length of the tubing enters the steam chamber 32 and from the latter passes out through the holes or ports 35 in the sole plate. Whenever steam is not desired the valve 61 is simply turned off or closed.

An iron constructed as described has a great many advantages over the tank type of steam iron. In the present iron there is not nearly the bulk to be found in the tank type of steam iron and with the present iron, the supply of steam is practically inexhaustible as there is no occasion for refilling a tank or the like. Additionally, the present iron is capable of supplying copious quantities of steam and the the steam may be supplied wet or dry. Practically instantly the valve 61 may be closed adapting the iron for dry ironing. Then it may be very readily opened again converting the iron for steam ironing.

As soon as the sole plate 11 is hot, the iron is ready for use as a steam iron to instantly convert water into steam. The volume of steam is controlled by the valve 61 and thus the iron may deliver variable quantities of steam. Since either the steam system is open to an inexhaustible supply of water or the iron is being used dry, the present iron includes a safety feature in that there will never be occasion for steam explosion.

The iron of the invention is adapted for the producing of steam when the iron is hot even though the iron is dialed to the higher ranges since contrary to previous structures including flash boiler devices, the steam here is not produced before the water has a change to move away from the valve and so steam in large quantities may be produced. Depending on the volume of water supplied, the steam passing out through the ports 35 may be very wet steam or it may be superheated, that is, dry or invisible steam.

With the present construction, when the iron is dialed for its highest heat the needle valve 61 may be opened wide to allow the heating element 57 to evaporate as much water as is within tis "continuous-on" power to do so. That is, all of the electric energy can be diverted into evaporating water whereas in other constructions the maximum ability to convert steam into water is limited by the design instead of by the available power. This makes a substantial difference since the iron herein disclosed will evaporate about one ounce of water per minute whereas in constructions previously used, the capacity is about one-third of that of the present iron. Thus, the iron of the invention is capable of producing copious quantities of steam obviating the necessity for the use of a pressing cloth.

With the present construction, it will be seen that steam is produced under water pressure and not steam pressure and that the present construction has the ability to translate all of the available electric energy into heat of evaporation. The described iron, in addition to its use as an iron, has other incidental uses, such as the removal of old wall paper from walls and the steam cleaning of windows, mirrors and the like.

Fig. 9 shows a slight modification and in the figure the modification resides in the source of water under pressure rather than in the construction of the iron itself. Thus, in this figure, the iron 10, previously described, is again shown and all of the parts being of the same construction have been given the same numbers as in the previous figures.

In this modification, the flexible tubing 66 is shown as connected with a small jar or tank 76 shown as suspended from a nail or the like 77. The jar or tank 76 is partly filled with water, as through an inlet which may then have a closure 78 applied thereto. A small hand pump 79 is connected to the upper portion of the jar or tank 76 through a tube or hose 80 and the pump is operated to develop a pressure in the tank. Here the pump is shown in the form of a bulb pump although it will be understood that any type of pump may be provided.

When the iron is to be used as a steam iron, the pump is operated to provide air under pressure in the upper portion of the tank whereby when the needle valve 61 of the iron is open, water under pressure will be supplied to the iron through the flexible tubing 66 and into the metal tubing constituting the boiler of the iron. Preferably, pump 79 is operated so as to develop a pressure of approximately thirty pounds per square inch of the water in the tank. Pressure being developed on the water as described, the iron 10 is used as previously described, either as a dry iron or for steam ironing, depending on the position of the valve 61.

Having thus set forth the nature of my invention, what I claim is:

1. In an electric iron, a sole plate, a steam chamber in said plate, ports from said chamber through said sole plate at the underside thereof, said sole plate having a channel extending back and forth in its upper surface, a length of tubing doubled back and forth upon itself to form a substantially flat grid and laid in said channel, said tubing being of a diameter to have good thermal contact with the walls of said channel, a valve, an electric heating element having an opening therein overlying about the mid-portion in said sole plate and an opening in said grid, a thermostat means mounted on and directly responsive to the temperature of said sole plate for controlling said heating element, said thermostatic means being positioned in the openings in said heating element and said grid, said valve connected with one end of said tubing for controlling the supply of water thereto and said tubing having its other end located to discharge into said steam chamber, a manually operable means for adjusting the valve for the passage of various amounts of water therethrough to said tubing, and an inlet connection to said valve for communication with a source of water under pressure exterior of said iron to supply water continuously to said grid under the control of said valve.

2. In a steam iron, a sole plate having a steam chamber therein and ports extending from said steam chamber to the under surface of said sole plate, a thermostat mounted on said sole plate at about the mid-portion thereof and directly responsive to the temperature of said sole plate,

an electric heating element mounted on and above said sole plate and having an opening therein through which said thermostat extends in spaced relation to the heating element, switch means actuated by said thermostat connected to said heating element for controlling it to regulate the temperature of said sole plate, a steam boiler consisting of a sinuous tube extending back and forth between said heating element and said sole plate substantially parallel to the under surface of said sole plate and in intimate heat conducting relation to said heating element and said sole plate, said tube being spaced outwardly of said thermostat and connected at one end to said steam chamber, a manually operated valve connected to the other end of the tube for controlling supply of water under pressure to said

boiler, and means connected to said valve for supplying water to said boiler under the control of said valve from a source exterior of said iron.

ALAN BATE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,516,923	Hoffman	Nov. 25, 1924
1,991,381	Dickman	Feb. 19, 1935
2,237,034	Huffman	Apr. 1, 1941
2,302,476	Rubinstein	Nov. 17, 1942
2,316,907	Wallace	Apr. 20, 1943