

March 14, 1950

G. KASSAB
STEAM IRON STEAM GENERATING MEANS
AND WATER SUPPLY MEANS THEREFOR

2,500,185

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2 Sheets-Sheet 1

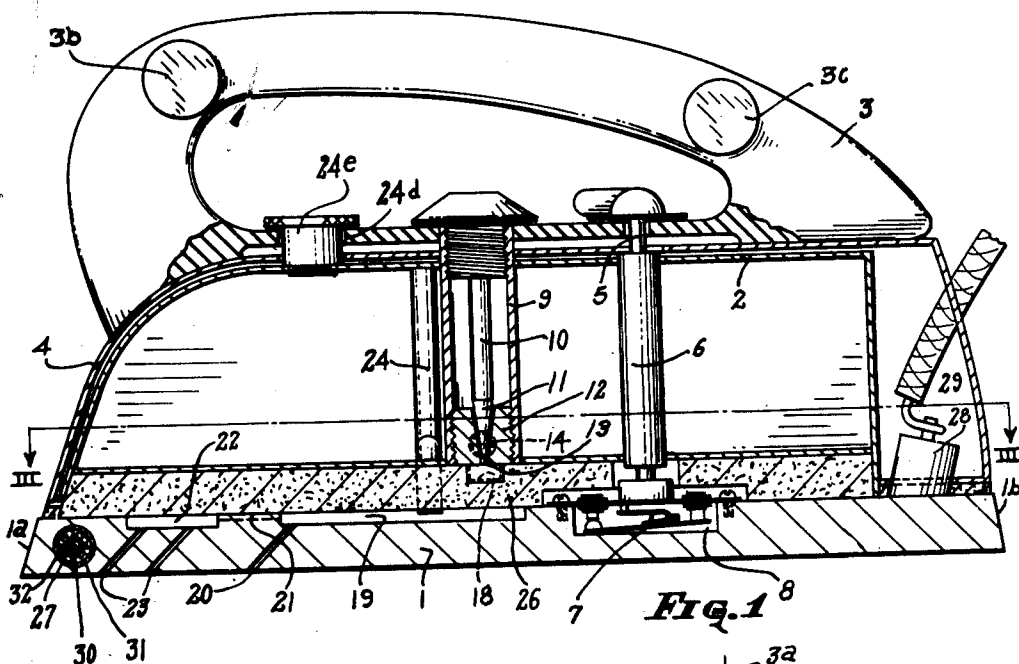


Fig. 1

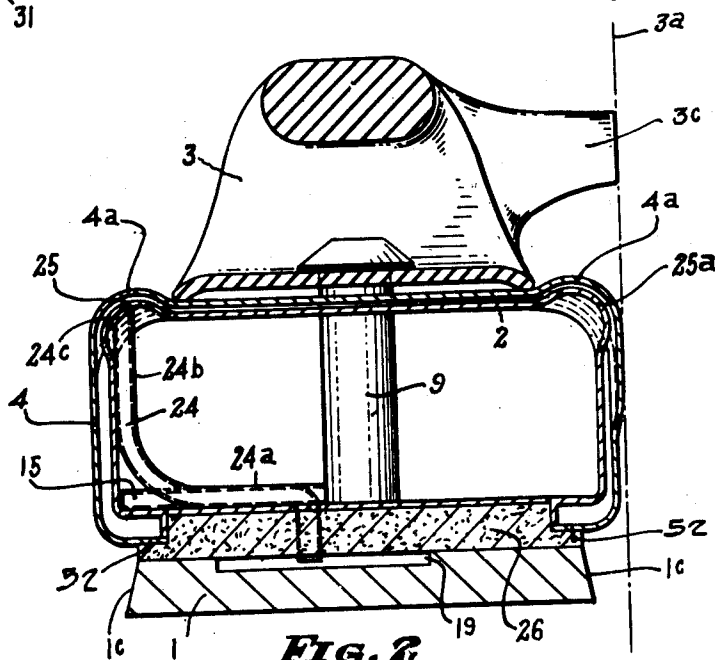


Fig. 2

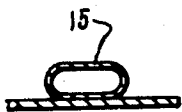


Fig. 6



Fig. 7

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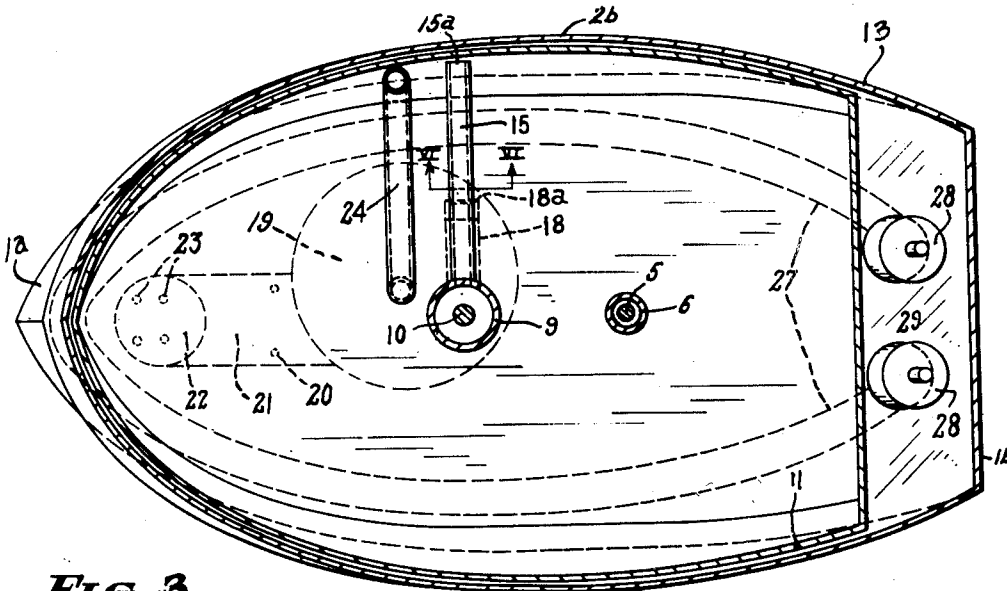


Fig. 3

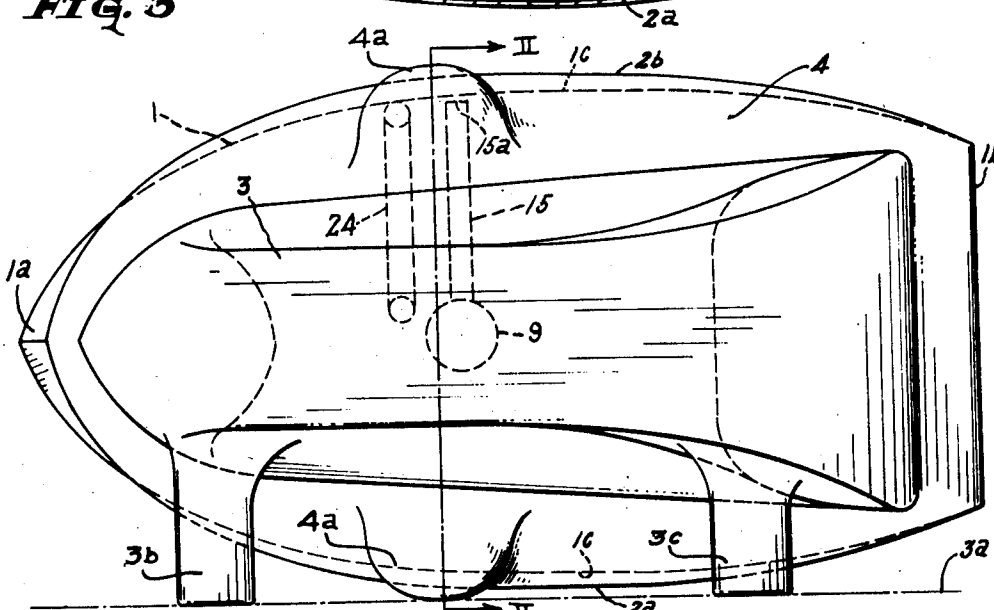


Fig. 4

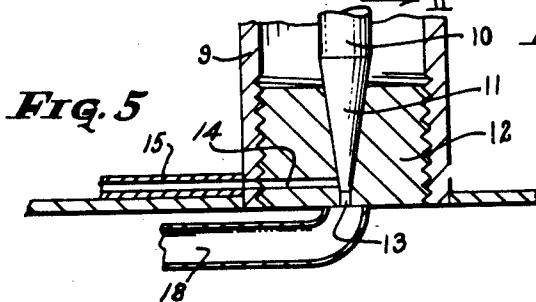


Fig. 5

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UNITED STATES PATENT OFFICE

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STEAM IRON STEAM GENERATING MEANS
AND WATER SUPPLY MEANS THEREFORGeorge Kassab, Wallingford, Pa., assignor to
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4 Claims. (Cl. 38—77)

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This invention relates to a steam iron of the general type described and claimed in my copending application, Serial No. 659,557, filed April 4, 1946. Among other features, that iron comprises a reservoir which may be filled to its full capacity and from which water is fed at a regulated rate to a steam generator. The flow of water to the generator is automatically stopped when the iron is up-ended on its heel to a rest position.

This invention contemplates an improved steam iron which is tilted laterally from its ironing position to a rest position, wherein it is supported in a sidewise tilted position, as distinguished from the iron of my aforementioned application wherein the iron is up-ended on its heel to a rest position. And this invention contemplates in such an iron an improved organization of parts whereby the advantages and desirable characteristics of the iron of my aforementioned application are incorporated.

That is, this invention contemplates an improved steam iron having a side rest non-ironing position; which has a water reservoir which may be filled to its full capacity; and which, when tilted laterally to its side rest position automatically stops the flow of water to the steam generator.

These and other objects are attained by my invention as set forth in the following specification and illustrated in the accompanying drawings in which Fig. 1 is a side elevation mainly in section of a steam iron embodying this invention; Fig. 2 is a vertical sectional view taken through the line II—II of Fig. 4 and looking in the direction of the arrows; Fig. 3 is a horizontal sectional view taken through the lines III—III of Fig. 1 and looking in the direction of the arrows; Fig. 4 is an elevation of the iron of Figs. 1 to 3 illustrating the iron in its side rest position; Fig. 5 is a vertical sectional view taken through a portion of the steam iron of Figs. 1 to 4, this figure being drawn to a larger scale than the remaining figures; Fig. 6 is a sectional view taken through the line VI—VI of Fig. 3 and looking in the direction of the arrows, this figure being drawn to a larger scale than is Fig. 3; and Fig. 7 is a view similar to Fig. 6 but illustrating a modified structure.

Referring to the drawings, this invention has been shown in one form in connection with a steam iron comprising a sole plate 1, a water reservoir 2, and a handle 3. The sole plate 1 has the usual form, it being provided with a front pointed end 1a, a substantially straight heel end 1b, and a pair of oppositely positioned curved

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sides 1c. The reservoir in horizontal cross-section has substantially the same shape as has the sole plate; that is, it has a front pointed end, a straight heel end, and curved sides, the latter designated 2a and 2b.

The iron body is shown in its normal horizontal ironing position in Fig. 1. When not in use, between ironing operations, the iron is tilted laterally from its horizontal position in Fig. 1 to a position where it rests on one side on the ironing board 3a, as shown in Figs. 2 and 4. In this rest position the iron is supported by a pair of lateral extensions 3b and 3c, formed on the front and rear parts of the handle as shown, and upon the associated side 2a of the reservoir so that the sole plate is elevated from the ironing board, as shown in Fig. 4. The extensions 3b and 3c may be formed separately and attached by any suitable means to the handle, but preferably they will be formed integrally with the handle and both the handle and the extensions will be molded of a suitable phenol condensation product. It will be understood that to resume ironing the handle will be grasped and the iron shifted back laterally to its horizontal position of Fig. 1.

The reservoir 2 may, and as shown, has an outer cover 4 which is secured to the sole plate and the handle in any well known conventional manner. A stem 5 passes through a sleeve 6 carried by the top and bottom of the reservoir for adjusting or setting a thermostat 7 deposited in a cavity or recess 8 in the upper surface of the sole plate. Another sleeve 9 similarly mounted encloses a stem 10 for adjusting a needle valve 11 which reciprocates in a tapped bore formed in a bushing 12. The bushing 12 is provided with a bottom orifice 13 and a communicating lateral bore 14 (Fig. 4) which forms a continuation of a tube 15. This tube 15 may be made as a separate member and secured to the bottom of the tank as shown in Fig. 6 or it may be provided by making a groove 16 in the bottom of the reservoir and welding a strip 17 to the bottom to close the top of the groove as shown in Fig. 7. The tube 15 extends laterally across the iron in a direction substantially at right angles to the longitudinal central axis of the iron on the side of the iron opposite the two supports 3b and 3c, that is, opposite side 2a, as shown in Figs. 3 and 5, and in case of either tube structure shown in Figs. 6 and 7, the outer end 15a of the tube is open. As shown most clearly in Figs. 3 and 4, this outer end of the tube is located close to the side wall 2b of the reservoir which is formed at the outermost curved side of the iron and hence, when the iron is tilted to its

rest position of Fig. 4, this open end is at the highest point in the reservoir. Thus, when the iron is shifted from its ironing position of Fig. 1 to its non-ironing position of Fig. 4, the flow of the water into the open end 15a of the tube is stopped.

The orifice 13 empties into one end of the enlarged pipe 18, the other end of which pipe empties into a steam generating recess or chamber 19 formed in the upper surface of the sole plate. The pipe 18, as shown, extends laterally toward the side 2b of the iron opposite the rests 3b and 3c and lies directly under the conduit 15. The generator 19 has one or more openings 20 leading directly to the underside of the sole plate, that is, to the pressing surface thereof, and it may be connected by passage 21 to a distributing chamber 22 from which openings 23 lead to the pressing surface of the sole plate. The manner in which steam is conducted from the chamber 19 to the cloth being ironed is optional, as it forms no part of the present invention.

The steam generating cavity 19 which, as shown in Fig. 3, is circular in shape, is offset somewhat from the longitudinal center of the iron toward the side 2b of the iron but it does coextend with the area under the orifice 13.

In order to equalize the pressure between the steam generator cavity 19 and the reservoir 2, a pipe 24 leads from the generating cavity to a dome 25 which communicates with the water reservoir. The pipe 24 has a section 24a extending laterally across the iron along its bottom wall toward the reservoir side 2b and a joining section 24b extending up along this side into the dome 25. The upper end 24c of the section 24b is open and preferably this end is inclined downwardly and outwardly, as shown, so that the lower edge of the opening is substantially at the level of the inner surface of the upper wall of the reservoir which, as shown in Fig. 2 is substantially flat. At this point attention is called to the fact that when the iron shown in Fig. 1 is tilted laterally so as to rest on its side as shown in Figs. 2 and 4, the opening 24c in the upper end of the vent pipe will be above the water level in the upper part of the reservoir and the adjacent portion of the dome 25 even though the reservoir is initially filled to capacity.

The reservoir 2 is provided with a fill opening 24d which is closed by a cover or plug 24e. The reservoir is filled with water through the opening and it will be observed that it may be filled completely to its upper wall because the lower edge of the opening 24c is at about the level of the lower surface of this wall.

Preferably, a second dome 25a will be provided similar to the dome 25 but positioned at the same location at the opposite side of the iron; when the iron is tilted to its rest position of Figs. 2 and 4, water will flow into the dome 25a to insure that the open ends of the conduits 15 and 24 are below the upper level of the water in the reservoir, the volumetric capacity of the dome 25a being sufficient for this purpose. As shown most clearly in Fig. 3, the outer cover of Fig. 4 will be provided with blisters 4a opposite the domes 25 and 25a, and this blister 4a over dome 25a may be used as the rest means for the iron, along with the legs 3b and 3c, as shown in Fig. 4.

Between the sole plate 1 and the reservoir 2 is a thick layer of thermal insulating material 26 for effectively sealing the reservoir and particularly the orifice 13 and a major portion of the pipe 18 from the heat of the sole plate. The

chambers 8, 19 and 22, and the passage 21 may be closed by this sheet of insulating material 26 or they may be closed by a separate cover if so desired.

The sole plate 1 is heated by means of a heating element 27, the nature and shape of which may be conventional, except that according to this invention the terminals 28 of the heating element are segregated in a rear compartment 29 which is made as small as possible so as to take up as little as possible of the volumetric space of the reservoir. While the heating element 28 may have any suitable structure, it is preferable to use a heating element of the sheathed type which in brief comprises a helical conductor 30 housed within a metallic sheet 31 and embedded in and supported in spaced relation to the sheath by a compacted mass 32 of insulating material such as magnesium oxide.

In the operation of the iron, the reservoir 2 is filled with water to complete capacity through the opening 24d, and the opening closed by plug 24e. The thermostat 7 is then adjusted to maintain the sole plate at the desired temperature value, and when the iron is to be used as a steam iron the valve 11 is adjusted to permit the flow of the water from the reservoir at the desired rate through the tube 15 to the steam generator 19. When the iron is in its ironing position of Fig. 1, with the sole plate thereof resting on the ironing board, the water will enter the tube 15 through the open end 15a and will flow out through the inner end of the bore 14 and the orifice 13 to the pipe 18 from the open end 18a (Fig. 3) of which the water will drop into the steam generator 19 to be flashed into steam.

It is to be understood that a hole will be cut through the insulating sheet 26 in registration with the opening 18a so as to permit passage of water from the pipe 18 to the steam generator 19, while at the same time shielding all but the opening 18a of the pipe from the heat of the sole plate. Due to this heavy insulation the orifice 13 is kept relatively cool and water evaporation in and around the orifice is eliminated or greatly reduced. This prevents and greatly retards sedimentation, and therefore retards deterioration of the orifice. As for the pipe 18, it will be noted that due to its large diameter, and due to the fact that it is insulated from the heat it will take a very long time before it will be clogged up by sedimentation. The opening 18a is also so big that it will not clog, or at most it will take an extremely long time for it to do so. Furthermore, the pipe 18 may be readily cleaned by merely detaching the reservoir from the sole plate. The passage of relatively cool water down the pipe 18 serves to preheat the water prior to its entrance into the steam generator and keeps the pipe itself and hence, the orifice relatively cool.

When the iron is tilted laterally to its side rest position of Figs. 2 and 4, the end 15a of the tube 15 will be higher than the level of the water in the reservoir and the opening 24c in the upper end of the vent pipe 24 will be higher than the level of the water in the dome 25, even though the reservoir is filled to its complete capacity, all as explained previously; therefore, no water will enter the tube 15 or the vent pipe 24 when the iron is tilted laterally even in the beginning of the operation when the reservoir is completely full and no steam will be generated even though the valve 11 is left open.

In order to prevent the water contained in the tube 15 from being evaporated and wasted while

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the iron is in its side rest position, the tube 18 has a much greater diameter than the tube 15 so that all the water contained in tube 15 at the moment the iron is tilted laterally will not quite fill the portion of the tube 18 between the orifice 13 and the tube opening 18a. In other words, when the iron is laterally tilted and the tube 15 and the pipe 18 substantially vertical, the tube 18 serves as a temporary storage reservoir for the water drained from the tube 15. This arrangement prevents excessive heating at pipe 18 while the iron is in its side rest position, which would happen if the pipe were empty; preheats the water collected in the pipe 18, and provides a temporary supply of water to the steam generator when ironing is resumed, thus furnishing ample steam at the instant of resumption of the ironing operation and during the time it takes for a new supply of water to reach the orifice 13.

While the pipe 18 is made large enough so as to have a capacity equal to the volumetric capacity of the longer tube 15, it is pointed out that this is not necessary because when the iron is laterally tilted, water in the tube 15 will stop flowing into the tube 18 when the water level in both tubes is the same. In other words, not all of the water in the tube 15 is drained into the tube 18 so that the amount of water which is thus stored in the pipe 18 and which is rapidly discharged into the steam generator when the ironing is resumed will not be excessive, but will be enough to keep the pipe 18 and hence the orifice 13 relatively cool and it will be enough also to provide an instantaneous and somewhat larger steam volume at the resumption of the ironing operation so that there will be no lapse of time while waiting for water from the distal side of the orifice to reach the steam generator.

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

1. A steam iron comprising a body having forward and rear ends lying in the longitudinal axis of the body and said body having a sole plate upon which it rests when in ironing position, and also a handle attached to said sole plate, support means on said body for supporting it in a rest position on one selected side only, said body further including a steam generator carried by said sole plate, means for heating said sole plate and generator, a reservoir for storing water to be converted into steam in said generator, an orifice for discharging water from said reservoir to said generator, a valve operatively associated with said orifice for controlling the flow of water through the said orifice, said orifice being spaced laterally from the side portions of said reservoir, means to admit water to said reservoir, and a closed conduit extending along the bottom of said reservoir from said orifice to the vicinity of the other side of the said reservoir opposite said side upon which said body rests, and having at its said other side an opening whereby when said iron is in its ironing position the water in the reservoir will enter the opening and flow through said conduit into said orifice, and whereby when said iron is laterally tilted to said one side to rest thereon, the opening will be above the level of the water in said reservoir, and a second conduit extending laterally toward said other side from said orifice to conduct water therefrom to said generator.

2. A steam iron comprising a body having forward and rear ends lying in the longitudinal axis of the body and said body having a sole plate upon which it rests when in ironing position, and

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also a handle attached to said sole plate extending from front to rear of the body, support means on said body for supporting it in a rest position on one selected side only, said body further including a steam generator carried by said sole plate, means for heating said sole plate and generator, a reservoir for storing water to be converted into steam in said generator, an orifice for discharging water from said reservoir to said generator, a valve operatively associated with said orifice for regulating the flow of water through the said orifice, said orifice being spaced laterally from the side portions of said reservoir, means to admit water to said reservoir, a closed conduit extending along the bottom of said reservoir from said orifice to the vicinity of the other side of the said reservoir opposite said side upon which said body rests, and having at its said other side an opening whereby when said iron is in its ironing position the water in the reservoir will enter the opening and flow through said conduit to said orifice, and whereby when said iron is laterally tilted to said one side to rest thereon, said opening will be above the level of the water in said reservoir, and a heat insulated conduit extending laterally toward said other side from said orifice to conduct water therefrom to said generator, said insulated conduit having a volumetric capacity equal to the volumetric capacity of said first named conduit, whereby when said iron is laterally tilted to its rest position on said other side and the two conduits are in a substantially upright position, the water drains from the first to the second conduit where it is received and stored pending the return of the iron to its ironing position.

3. A steam iron comprising a body having forward and rear ends lying in the longitudinal axis of the body and said body having a sole plate upon which it rests when in ironing position, and also a handle attached to said sole plate extending from front to rear of the body, support means on said body for supporting it in a rest position on one selected side only, said body further including a steam generator carried by said sole plate, means for heating said sole plate and generator, a reservoir for storing water to be converted into steam in said generator, an orifice for discharging water from said reservoir to said generator, a valve operatively associated with said orifice for regulating the flow of water through the said orifice, said orifice being spaced laterally from the side portions of said reservoir, means to admit water to said reservoir, a closed conduit extending along the bottom of said reservoir from said orifice to the vicinity of the other side of the said reservoir opposite said one side upon which said body rests, and having at its said other side an opening whereby when said iron is in its ironing position the water in the reservoir will enter the opening and flow through said conduit into said orifice, and whereby when said iron is laterally tilted to said one side to rest thereon, said opening will be above the level of the water in said reservoir, a pressure equalizing tube connecting said generator with said reservoir extending laterally from the generator to said other side and having an opening entering into an outwardly protruding dome provided on said reservoir in the very upper end of the said side.

4. A steam iron comprising a body having forward and rear ends lying in the longitudinal axis of the body and said body having a sole plate upon which it rests when in ironing position, and also a handle attached to said sole plate extending

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from front to rear of the body, support means on said body for supporting it in a rest position on one selected side only, said body further including a steam generator carried by said sole plate, means for heating said sole plate and generator, a reservoir for storing water to be converted into steam in said generator, an orifice for discharging water from said reservoir to said generator, a valve operatively associated with said orifice for regulating the flow of water through the said orifice, said orifice being spaced laterally from the side portions of said reservoir, means to admit water to said reservoir, a closed conduit extending along the bottom of said reservoir from said orifice to the vicinity of the other side of the said reservoir opposite said one side upon which said body rests, and having at its said other side an opening whereby when said iron is in its ironing position the water in the reservoir will enter the opening and flow through said conduit into said orifice, and whereby when said iron is laterally tilted to said one side to rest thereon, said opening will be above the level of the water in said reservoir, a pressure equalizing tube connecting said generator with said reservoir extending laterally from the generator to said other side and having an opening entering into an outwardly protruding dome provided on said reservoir in the very

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upper end of said side, and said reservoir having a second outwardly protruding dome on the very upper end of said one side, which second dome has a volumetric capacity sufficiently great to receive the water in said first named dome when said iron is laterally tilted to said rest position on said one side, thereby to assure that said opening of said first named conduit and said equalizing tube are above the water level in said reservoir when said body is in said rest position.

GEORGE KASSAB.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,108,747	Greenwood	Aug. 25, 1914
2,237,381	Wallace	Apr. 8, 1941
2,295,341	Finlayson	Sept. 8, 1942
2,425,598	Clum	Aug. 12, 1947

FOREIGN PATENTS

Number	Country	Date
515,202	Germany	Dec. 29, 1930
690,034	France	June 10, 1930