Oct. 4, 1955 G. A. BRACE 2,719,371

STEAM IRON FILLING FACILITY

Filed Sept. 30, 1952 2 Sheets-Sheet 1

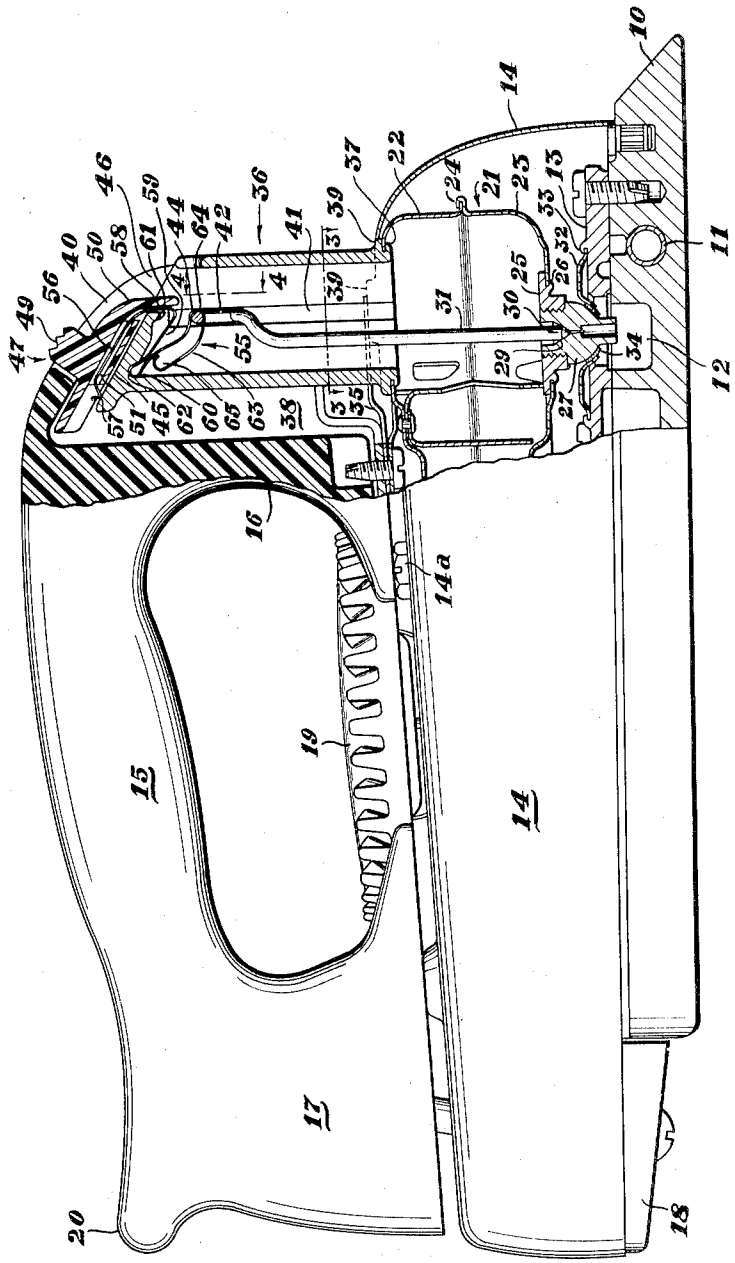

Fig. 1

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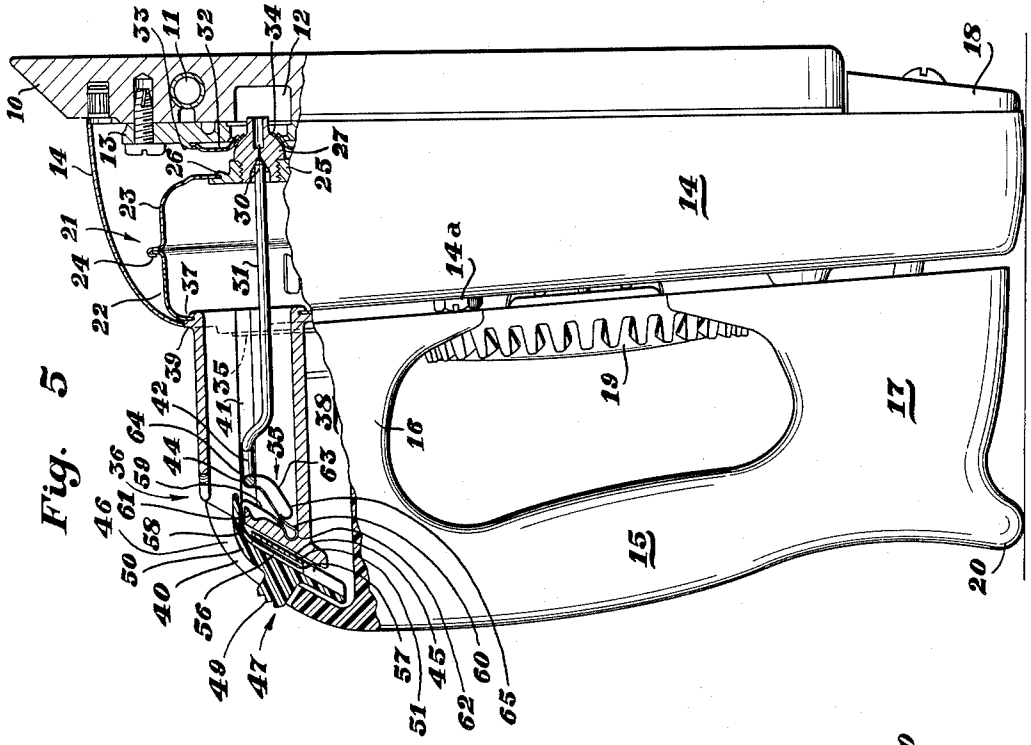

Fig. 5

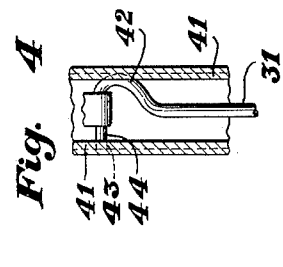

Fig. 4

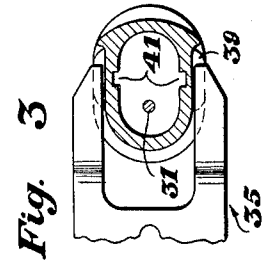

Fig. 3

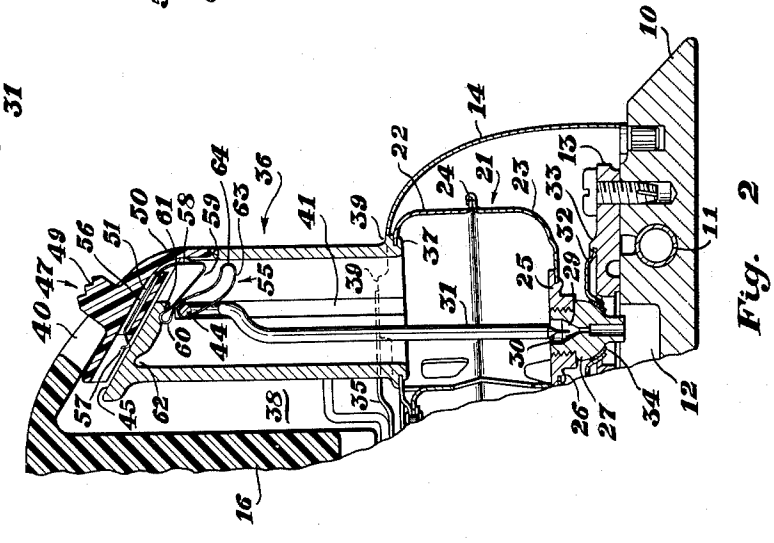

Fig. 2

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STEAM IRON FILLING FACILITY

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Application September 30, 1952, Serial No. 312,305

10 Claims. (Cl. 38—77)

The present invention relates to steam irons and more particularly to a new and simplified reservoir filling facility and water control valve assembly.

The invention has application to steam irons having a water reservoir located above a flash type steam generator. In the present novel construction the steam generator, the valve controlling flow to the generator, the reservoir fill tube, and the combined closure and valve actuator are all located in vertical alignment at the forward end of the iron with the fill tube being housed in the front handle leg. The invention features a simple, low-cost fill tube casting to which the valve, valve actuator and closure member for the fill opening can be assembled quickly and without the use of tools. Another particularly advantageous and unique feature of the construction is that the combined valve actuator and closure for the fill opening is so arranged that when the closure for the fill opening is in open position the valve between the reservoir and steam generator is closed. This arrangement provides a simple and positive safeguard against the escape of water to the generator during the filling of the reservoir and makes it unnecessary for the operator to take the precaution of closing the valve as in prior steam irons. This is for the reason that in the present construction the movement of the fill opening closure to open position is employed to close the water valve.

Accordingly, it is an object of the present invention to provide a new steam iron construction featuring simplicity, low cost, ease of assembly, greater convenience in replenishing the water supply and a positive safeguard against the filling of the reservoir while the water valve is open.

Another object is the provision of an improved one piece fill tube as well as a fill tube to which the combined valve actuator and fill opening closure can be assembled without the use of tools.

A further object is the provision of a steam iron having a filling capacity by which the reservoir can be filled with equal convenience while the iron is in its normal ironing position or in its upended rest position.

Yet another object is the provision of a spring connector between the actuator and valve which has a number of functions including the compensation of manufacturing tolerances between the valve seat and the valve actuator, a resilient means for holding the valve either in its closed or open position, and a positive assembly connection for holding the valve, the valve actuator and the fill closure assembled to the fill tube.

Other objects and advantages of the invention will become apparent as the description proceeds when taken in connection with the accompanying drawings in which:

Figure 1 is a plan view of a steam iron, partly in section and resting on its sole plate, showing how the present invention is applied thereto and with the water valve closed and the fill opening uncovered.

Figure 2 is a fragmentary sectional view of the iron of Figure 1 showing the water valve open and the fill opening closed.

Figure 3 is a sectional view taken from line 3—3 of Figure 1 and looking in the direction of the arrows.

Figure 4 is a sectional view taken on line 4—4 of Figure 1 and looking in the direction of the arrows, and

Figure 5 is a side elevational view of reduced size showing the iron of Figure 1 resting on its heel and in its alternate water reservoir filling position.

Referring to the drawings, reference numeral 10 represents a sole plate heated by an electric heater 11 of known construction. The heater 11 is U-shaped having its bight or nexus adjacent the toe of the sole plate and its legs extending backwardly along and adjacent the sides of the sole plate.

To the rear of the bight or nexus of the heater, the sole plate is provided with a steam boiler or generating chamber 12 which is connected, by suitable steam superheating and distributing passages, to steam emitting openings extending through the sole plate to its ironing surface. The steam boiler 12 and steam passages are closed by a removable cover plate 13 secured to the sole plate as by screws or the like. The construction of the sole plate proper forms no part of the present invention and for a more detailed description thereof, reference is made to an application for U .S. Letters Patent of John E. Vance, Serial No. 295,950, filed June 27, 1952, now Patent No. 2,668,378, issued February 9, 1954.

A cover shell 14 is secured to the sole plate in any suitable manner such as by a single bolt 14*a*. A manipulating handle 15, having front and rear legs 16 and 17 respectfully, is secured to the cover shell 14 in any suitable manner, such as that shown and described in the above mentioned Vance application. The cover shell 14 extends rearwardly of the sole plate 10, as shown, the extension being closed by a removable closure 18 to afford access to the wiring connections which extend downwardly from the rear leg of the handle. The temperature of the sole plate is controlled by a conventional thermostatic switch connected in series with heater 11. The temperature setting of this switch is controlled by a dial 19 which occupies the space between handle legs 16 and 17.

The rear end 20 of the handle cooperates with the rear end of the cover shell to form a support upon which the iron may be supported in the inclined rest position shown in Figure 5. A water reservoir 21 is housed within cover shell 14 and comprises upper and lower stampings 22 and 23 joined together in any suitable manner such as by the rolled seam joint 24 illustrated.

An internally threaded fitting 25 is staked at 26 to the lower stamping 23. Threaded into fitting 25 is a valve seat 29 adapted to be closed by a valve 30 formed on the lower end of a valve stem 31. The latter will be described in more detail later. Valve body 27 has a semi-spherical lower end which cooperates with a semi-spherical depression in a wafer like stainless steel member 32 which is staked to cover plate 13 at 33. A sealing gasket 34, of glass wool, forms a water and steam seal between valve body 27 and member 32, tight contact being maintained by a cantilever spring 35 having its free end pressing downwardly on top of the reservoir 21 in a manner to be presently described.

The reservoir filling facility generally indicated by numeral 36 is preferably a one piece casting having the general configuration illustrated. Its lower end is flanged as cast so that one flange can be beaded over as indicated at 37 to stake the tube in place in an opening in top half 22 of the reservoir before the reservoir halves are joined together. The fill tube is positioned at the foremost end of the reservoir so that the latter can be substantially completely filled when the iron is upended and so that the fill opening 46 at the upper forward corner is conveniently accessible for the reception of water

whether the iron is in its horizontal or upended rest positions. Moreover, this arrangement makes it a simple matter to conceal the fill tube in a forwardly opening cavity or recess **38** in the front leg of handle **15**.

A flange **39** surrounding the base of the fill tube serves as a bearing for the free, forked end of a cantilever spring **35** having its rear end anchored to the cover shell and handle assembly. Hence, it will be clear that when this assembly is secured to the sole plate, as by bolt **14***a*, spring **35** acts resiliently through the reservoir to hold valve body **27** firmly seated in the cupped portion of plate **32**.

The valve control assembly includes a valve stem **31** extending vertically through the water tank and fill tube **36**. Its upper end is formed with a return bend **42** and an end **43** positioned to slide in guide grooves **41**, **41** cast in the opposite side walls of the fill tube and open at their lower ends to receive the stem during assembly. Horizontal portion **44** of the stem serves as a cross-head to which the valve actuator is connected as will be described presently.

The upper end of the fill tube slopes downwardly toward the toe end of the iron and its rear half is closed by an integral end wall **45** which acts as a support and glide surface for the combined valve actuator and fill opening closure generally designated **47**. The forward corner of the fill tube is provided with a fill opening **46** through which the reservoir can be filled with water. Preferably, the upper end of the front side wall of the fill tube is cut away to provide a somewhat larger opening and to facilitate the filling of the reservoir particularly when the iron is in its upended position as illustrated in Figure 5.

Actuator **47** includes a serrated finger piece **49** which projects through opening **40** at the corner of the handle and a closure member **50** shaped to completely close fill opening **46** when the actuator is in its forward position as shown in Figure 2. When the actuator occupies the upper position shown in Figure 1, closure **50** is open and water may be added through opening **46**. An open ended passage **51** on the under side of the actuator receives one end of the assembly or connector spring as will be described now.

Connecting actuator **47** to valve stem **31** is a flat connector spring **55** bent into the configuration shown. This spring includes an end portion **56** located in passage **51** and held assembled therein by its shape at the opposite ends of the passage and particularly by the retaining and glide portion **57** which rests on the sloping end wall **45**. Vertical portion **58** extends down through the fill opening and backwardly at **59** to a loop **60**, then downwardly and backwardly in a looped portion **63**. This latter portion forms a cammed guideway for cross-head **44** of the valve stem by means of which the valve can be lifted or lowered as actuator **47** and connector spring **55** are moved along the sloping end of the fill tube. The reversely bent end **65** of the spring rests against the adjacent portion of the spring and opens downwardly to permit the spring to be assembled to cross-head **44** and thereafter locks the parts in assembled relation. The assembly comprises inserting the stem **31** into the guide passages **41** in the fill tube as the lower end of spring **55** is inserted through fill opening **46** in a manner to open loop **65** and snap it into place on the cross-head stem **31**. The upper end of the spring is then fed through passage **51** of the actuator to complete the assembly.

Note that end wall **45** is provided with indentations **61** and **62** into which looped end **60** of the spring seats to hold the actuator and the valve in either the open or the closed position.

Operation

The steam iron of the present invention is readily adaptable for either steam or dry ironing. If the reservoir **21** is empty the iron may be used for dry ironing

purposes and no attention need be paid to the position of the valve actuator or fill opening closure **47**. If the reservoir **21** contains water and it is desired to use the iron for dry ironing the operator checks the position of actuator to determine whether the water valve is open or closed. Obviously, for dry ironing, the valve should be closed and actuator **47** should be in the position illustrated in Figure 1. If it should be open, actuator **47** will be at the lower end of its range of movement as illustrated in Figure 2. To close the valve, the operator merely contacts the serrated projection **49** with her thumb and slides it upwardly. As this occurs, the upper cammed surface of looped section **63** of spring **55** acts on the valve stem and pushes it downwardly until valve **30** seats firmly against seat **29**. The valve is then held firmly seated by the shape of looped section **64** of the spring and additionally by the seating of section **60** in depression **62** in the end wall of tube **36**.

Later, if the operator wishes to use steam, she merely pushes actuator **47** forwardly to the position shown in Figure 2. In moving to this position the lower cammed side of looped section **63** of the spring acts to lift the valve stem and hold the valve open. The valve is held in open position by the engagement of loop **60** in depression **61**.

Before replenishing the water supply in the reservoir it is most desirable that valve **30** be closed so that steam will not be generated if the iron is still hot but more particularly to prevent water flowing to the generator if the iron is cold. Operators frequently forget or neglect to close the valve before filling—especially when starting an ironing operation and before the iron is turned on. The result is that the water fills the generator and overflows through the steam passages and ports before the user is aware of the situation. This creates a nuisance if not in fact damage to the surrounding materials and the supporting surface for the iron.

The foregoing possibilities are safeguarded against by the present construction in which the water valve must be closed before access can be had to the filling opening since lip **50** of the actuator overlies and closes the filling opening so long as valve **30** is in open position. In moving the actuator upwardly to provide access to filling opening **46**, the operator unwittingly closes the water valve.

The reservoir may now be filled expeditiously and with complete assurance that neither steam nor water will escape through the ports in the sole plate. Usually, operators prefer to fill the iron while it is resting in its normal operating position or while it is held horizontally in the hand beneath a faucet. However, other users prefer to fill while the iron is upended as is desirable if filling takes place while the iron is hot. This mode of filling is also equally as convenient with my construction since opening **46** is then presented at the uppermost corner of the handle and in the full view of the operator.

While I have shown and described but a single embodiment of my invention, it is understood that this is to be taken as illustrative only and not in a limiting sense. I do not wish to be limited to the specific structure shown and described but wish to include all equivalent variations thereof except as limited by the scope of the claims.

I claim:

1. In a steam iron, a sole plate, a steam boiler formed on said sole plate for converting water into steam, a water reservoir, a fill tube for said reservoir having a filling opening, a closure for said filling opening movable from a first position in which said opening is uncovered to a second position in which said opening is closed, a valve for controlling the flow of water from said reservoir to said steam boiler and means connecting said closure to said valve, said means including means constructed and arranged to close said valve when said closure is moved to said first position.

2. In a steam iron according to claim 1 in which said connecting means includes spring means constructed to hold said closure in both said first and second positions.

3. In a steam iron, a sole plate, a steam boiler formed on said sole plate for converting water into steam, a water reservoir, valve means for controlling the flow of water from said reservoir to said steam boiler, a fill tube having an upwardly and forwardly facing fill opening whereby said reservoir may be filled when the iron is either in a horizontal or an up-ended substantially vertical position, and a valve actuator operatively connected to said valve means and being movable from a valve opening to a valve closing position, and actuator being constructed and arranged to close said fill opening when in its valve opening position and to uncover said fill opening when in its valve closing position.

4. A steam iron according to claim 3 including spring means connecting said valve actuator to said valve means, said spring means being constructed to bias said valve means open when said valve actuator is moved to its valve opening position and to bias said valve means closed when said valve actuator is moved to its valve closing position.

5. In a steam iron, a sole plate, means for heating said sole plate, a steam boiler formed in said sole plate, a cover shell overlying said sole plate, a water reservoir enclosed within said cover shell, a valve for controlling the flow of water from said reservoir to said boiler, a fill tube extending upwardly from said reservoir and being formed with an upwardly facing fill opening whereby said reservoir may be filled with the iron resting on its sole plate, a valve stem extending upwardly into said fill tube, a valve actuator mounted for sliding movement above said fill tube and operatively connected to said valve stem, said valve actuator being movable from a valve opening to a valve closing position, and closure means carried by said valve actuator constructed to close said fill opening as said actuator is moved to its valve opening position and to uncover said fill opening when said actuator is moved to its valve closing position.

6. In a steam iron according to claim 5 in which said valve stem is mounted for reciprocation in said fill tube, said actuator is mounted for sliding movement across the top of said fill tube and means connecting said actuator to said valve stem, the arrangement being such that said actuator moves across said fill opening as it is moved to its valve opening position.

7. In a steam iron according to claim 5 including a

single spring connecting said valve actuator to said valve stem and constructed to bias said stem downwardly to valve closing position when said valve actuator is in its valve closing position and to bias said valve stem upwardly to valve opening position when said valve actuator is in its valve opening position.

8. In combination, a water reservoir for a steam iron, said reservoir having openings in its upper and lower walls, a valve body in said lower opening having an orifice for controlling the outflow of water to a steam generator, a fill tube having its lower end connected with said upper reservoir opening, a valve in said valve body movable into and out of seating engagement with said orifice and having a stem extending through said reservoir and into said fill tube, said fill tube having a water receiving opening adjacent its upper end, a closure for said fill opening, and means connecting said closure to said valve stem and constructed and arranged to move said valve to closed position across said outlet orifice as said closure is moved to open position.

9. A steam iron comprising, an electrically heated sole plate having a steam generator at its forward toe end, a water reservoir supported above said generator having a valve in its bottom for controlling the flow of water to said generator, an upstanding water fill tube connected to the forward upper end of said reservoir, a cover shell for said sole plate concealing said reservoir, an operating handle for said iron above said cover shell having a hollow front leg for housing said fill tube, the upper end of said fill tube having a water inlet opening accessible through said hollow handle leg, a combined actuator for said valve and closure for said water inlet opening, and means operatively connecting the closure with said valve.

10. A steam iron as defined in claim 9 wherein said water inlet opens through the upper end of said fill tube whereby said reservoir may be filled while said iron is supported on its sole plate, said combined valve actuator and inlet opening closure being movable across the end of said fill tube between a position exposing said opening and a position closing the same and being operable through said connecting means with said valve to actuate the same as said inlet opening is exposed.

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