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E. G. FRANKLIN
STEAM AND SPRAY IRON

3,287,837

Filed Sept. 17, 1964

2 Sheets-Sheet 1

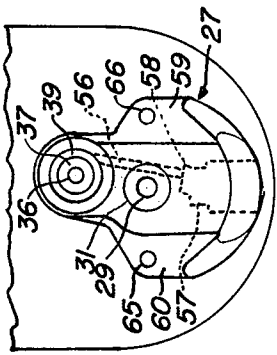


Fig. 3

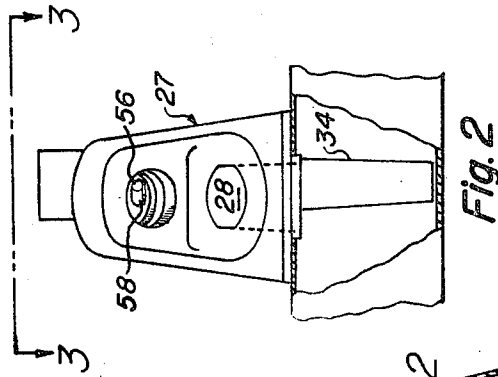


Fig. 2

Fig. 4

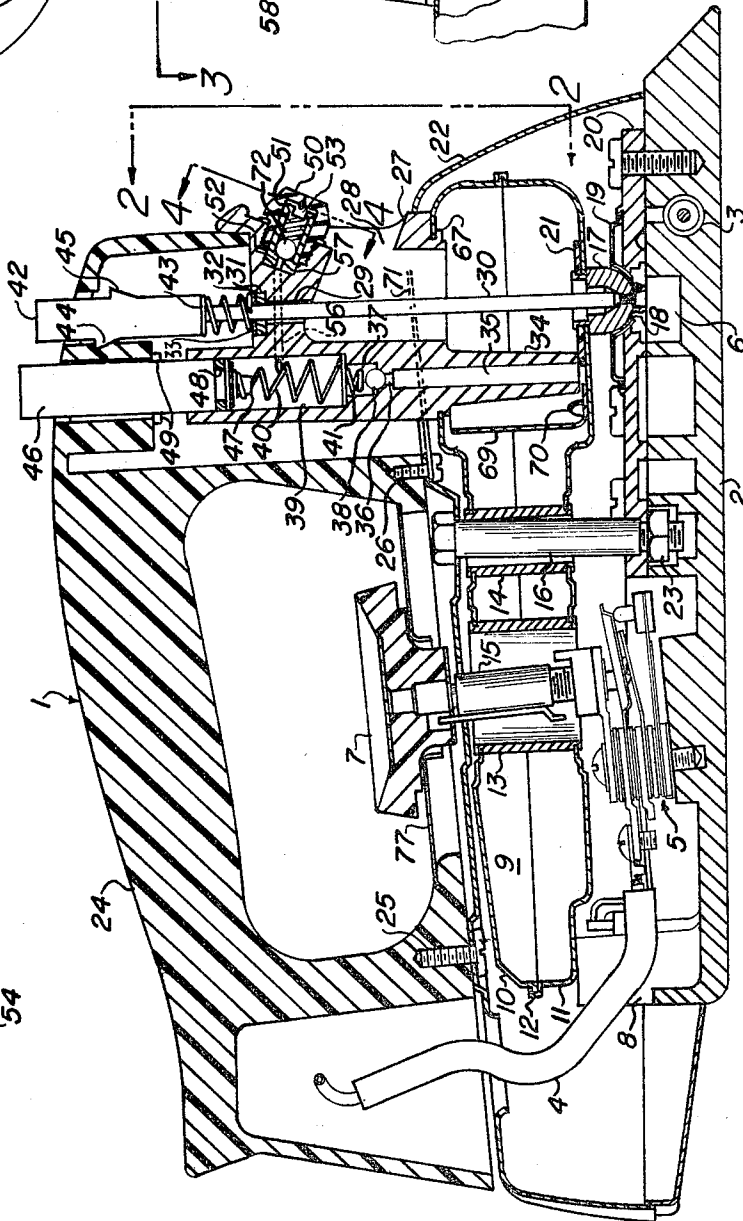
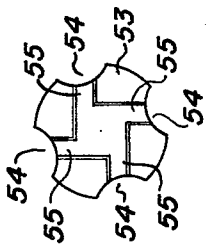


Fig. 1

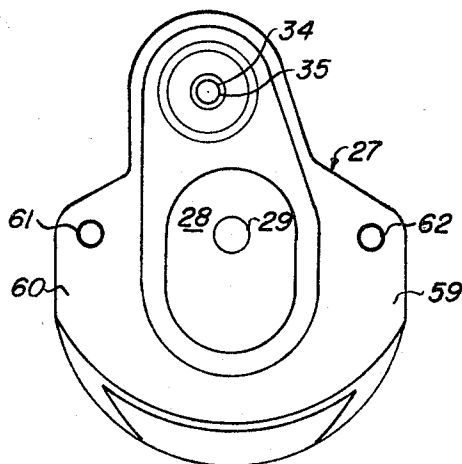
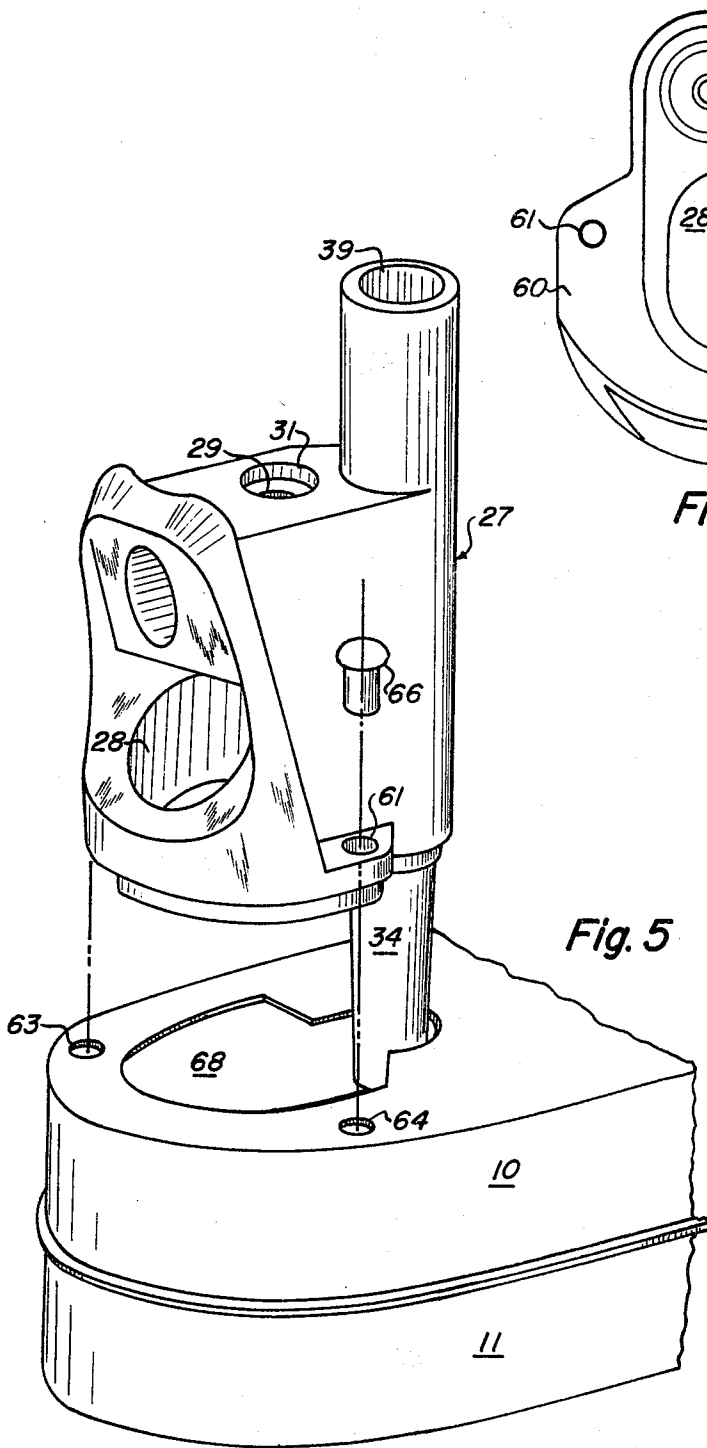
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STEAM AND SPRAY IRON

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The present invention relates to a steam iron of the flash boiler type having a manually actuable spray pump incorporated therein. The mounting structure for both the pump and the flash boiler valve mechanisms constitutes a single integral casting which is mounted directly on the water reservoir of the iron to structurally integrate the various elements into a unitary assembly.

It is a principal object of my invention to provide a steam and spray iron having a minimum number of elements to greatly simplify the manufacture and repair of an iron.

It is a further object of my invention to provide a single casting for mounting the spray pump and flash boiler valve mechanisms into a unitary assembly.

It is a further object of my invention to provide a single casting for a steam and spray iron to perform a threefold function of serving as the fill opening to a water reservoir; serving as the mount for a pump mechanism; and serving as the mount for a flash boiler valve mechanism.

It is a further object of my invention to provide a single casting for a steam and spray iron which serves all of the above functions and in addition serves as a part of a spray pump mechanism.

It is a further object of my invention to provide a single casting, in which a water reservoir fill opening is formed and on which spray pump and flash boiler valve mechanisms are mounted, and secure it directly on the water reservoir of a steam and spray iron and thereby rigidify and simplify the entire iron.

Other objects and advantages of my invention will become apparent to those skilled in the art from the following description wherein:

FIGURE 1 is a side elevation of an iron embodying the present invention with parts in section for clarity.

FIGURE 2 is a front view of the single casting mounted on a reservoir taken in the direction of the arrows 2-2 of FIGURE 1 with parts removed for clarity.

FIGURE 3 is a top view of the single casting mounted on a reservoir taken in the direction of the arrows 3-3 of FIGURE 2.

FIGURE 4 is a view of the spray plate only taken on the line 4-4 of FIGURE 1.

FIGURE 5 is a perspective view showing the single casting in position for assembly to the reservoir.

FIGURE 6 is a bottom view of the single casting.

Referring to the drawing, the iron of the present invention is generally indicated by numeral 1. The iron is selectively usable either as a steam or dry iron and generates steam by means of a flash boiler. The iron 1 is provided with a soleplate 2 which is preferably of cast aluminum. The soleplate 2 has an electrical heating element 3 embedded therein which is supplied with current by conductor 4 through a control thermostat assembly 5. Recess 6 in the upper surface of soleplate 2 serves as a steam generator or flash boiler and steam is distributed through bores in the soleplate in a manner well known in the art. Reference is made to U.S. Patent 2,668,378, issued February 9, 1954, to Vance, for a detailed description of the steam distribution structure.

Adjustment of the soleplate temperature is made by rotating knob 7 to vary the setting of control thermostat assembly 5. The rear of soleplate 2 is formed with a

pair of spaced apart integral projections, only one of which is shown at 8, for supporting the rear end of water reservoir 9. The reservoir 9 is formed of upper and lower halves 10 and 11 which are secured together by deforming a flange on the lower half over a flange on the upper half as at 12. Spacer tubes 13 and 14 provide watertight bores through reservoir 9 for thermostat control shaft 15 and iron assembly bolt 16. The forward portion of lower half 11 of reservoir 9 has a valve body 17 secured thereto and provides a discharge opening from reservoir 9 to steam generator recess 6. Valve body 17 rests on sealing gasket 18 and a circular support member 19 which is staked to steam channel cover plate 20. Metal washer 21 reinforces the lower portion 11 of reservoir 9 in the area of attachment to valve body 17.

A cover member 22 is secured to the soleplate over the reservoir and is held in place by assembly bolt 16 and trapped nut 23. Handle 24 is secured to cover member 22 by screws 25 and 26. Openings are formed in the top of cover member 22 for screws 25 and 26, and for cord 4, shaft 15, bolt 16 and casting 27.

Casting 27 is a solid block of material, preferably aluminum, having selective bores formed therein. A large through opening 28 extends from the front of casting 27 to the bottom thereof. Through opening 28 provides access to the reservoir for filling with water. Also formed in casting 27 above opening 28 is a bore or through opening 29 which receives flash boiler valve rod 30. The top portion of bore 29 is countersunk at 31 to receive felt washer 32 and metal washer 33. The top of valve rod 30 has a button 42 secured thereto and a coil spring 43 is positioned around rod 30 between the bottom of button 42 and washer 33. Spring 43 biases rod 30 upward to a position in which the passageway from reservoir 9 to flash boiler 6 is open. In FIGURE 1 the valve rod is shown in closed position with protrusion 44 on button 42 caught in a notch in the handle. To open the valve rod the button 42 is pushed forward releasing protrusion 44 and spring 43 urges the rod upward until protrusion 45 catches beneath the handle.

At the rear of casting 27 projection 34 extends below the bottom terminus of through opening 28. Projection 34 preferably reaches the bottom of the reservoir and rests on washer 21. Projection 34 is provided with a bore 35 which extends upward into casting 27 to a point above the bottom terminus of opening 28. A slightly restricted bore 36 extends from bore 35 to a larger bore 37. The bottom periphery of bore 37 is sloped as shown in FIGURE 1 to afford a seat for ball check valve 38. A larger pump piston receiving bore 39 extends from the top of the casting 27 to bore 37. The shoulder between bores 37 and 39 affords a seat for coil spring 40. The bottom portion 41 of spring 40 extends down into bore 37 and terminates slightly above the normal rest position of ball check 38. Thus, ball check 38 is free for limited vertical movement and lower portion 41 of spring 40 serves as a stop against extensive vertical movement of ball check 38. Secured to the top of spring 40 is a pump piston 46. Piston 46 is preferably formed of a suitable synthetic plastic material and has a projection 47 at its bottom end around which the top of spring 40 is tightly coiled. A circumferential groove in projection 47 receives a coil of the top portion of spring 40. The lower portion of piston 46 also has a circumferential recess formed therein for receiving ring gasket 48 of rubber material. Protrusions 49 on piston 46 engage beneath a portion of handle 24 to prevent displacement of piston 46 from bore 39.

The front of casting 27 above the entrance opening 28 is bored to receive spray head 50 and valve cylinder 51. Valve cylinder 51 receives a ball check and coil spring

and has a central opening 52 formed in its rear wall as shown in FIGURE 1. The front of valve cylinder 51 is open and abuts disc 53. As shown in FIGURE 4, disc 53 has arcuate recesses 54 formed in its periphery and channels 55 in its face running from the apertures to the center of the disc. The channels 55 run tangentially to the center of the disc as shown. The front inside periphery of valve cylinder 51 is tapered as shown in FIGURE 1 so that a through passageway is formed from the interior of cylinder 51 through recess 54 to channels 55.

A bore 56 is formed in casting 27 and extends from bore 39 to bore 57. Bore 56 comes into bore 39 substantially tangentially and into bore 57 at one side thereof in order to by-pass valve rod receiving bore 29 as shown in FIGURE 3. At the rear of bore 56 is a horizontally extending recess 58 which affords a through passageway from bore 56 to opening 52 in valve cylinder 51.

Horizontal flanges 59 and 60 are provided with holes 61 and 62, and the top portion 10 of reservoir is provided with corresponding holes 63 and 64 as shown in FIGURE 5. Rivets 65 and 66 are received in the holes to aid in securing casting 27 to top portion 10 of reservoir 9. The bottom periphery of casting 27 is also deformed as at 67 in FIGURE 1 to clamp it onto the periphery of opening 68 (FIGURE 5).

As seen in FIGURE 1 reservoir 9 has a baffle plate 69 secured therein and extending completely across the reservoir to prevent water from surging out of opening 28 in casting 27 when the iron is being used. Openings as at 70 in the baffle plate allows water to enter the front portion of the reservoir from behind the baffle.

Secured to the front portion of the handle 24 by screw 26 is a U-shaped leaf spring 71. This type of spring is fully disclosed in U.S. Patent 2,719,371, issued October 4, 1955, to Brace. The base of the U-shaped spring is secured by screw 26 and the legs extend outward on opposite sides of casting 27. The legs press against flanges 59 and 60 on casting 27 and firmly seat valve body 17 against gasket 18.

In assembling the casting 27 to the reservoir the casting 27 is first inserted through opening 68 in top portion 10 of reservoir 9. The bottom periphery of casting 27 is then deformed as at 67, and rivets 65 and 66 are attached. Lower portion 11 of reservoir 9 is then attached to top portion 10 by deforming flange 12.

In operation of the spray pump the piston 46 is depressed by the thumb of the operator. Releasing piston 46 allows spring 40 to raise piston 46 to create a negative pressure in bore 39. While bore 56 is closed by ball check 72 the negative pressure raises ball check 38 and draws water from reservoir 9 through bores 35, 36 and 37 into bore 39. With water in bore 39 depression of piston 46 by the operator forces water through bore 56, recess 58, opening 52, past ball check 72, through valve cylinder 51, through apertures 54 in disc 53, along channels 55 in disc 53 and through the central opening in spray head 50. Forming channels 55 in disc 53 tangentially to the center thereof causes the water to swirl when leaving spray head 50 and produces a finer spray.

Projection 34 on the bottom of casting 27 preferably rests partly on washer 21 in order to increase the bearing area and prevent deformation of the periphery of opening 68 in portion 10 of reservoir 9 from repeated force being applied through operation of pump piston 46.

The single casting of the present invention serves as a pump cylinder and provides a passage from the pump cylinder to the spray head. This is much more advantageous than devices requiring pump cylinders and piping which are separate elements and must be assembled and secured to various parts of the iron.

Also, once the iron is assembled ready access to the pump and flash boiler valve mechanisms are obtained simply by removing knob 7, cover plate 77 and bolt 16. The handle and cover member 22 can then be lifted free from the rest of the iron and inspection of repair of the

pump mechanism is greatly simplified. In other devices the pump cylinder is usually sealed at both the top and bottom and has a fragile connection to a small tube leading to a spray head. As a practical matter it is often necessary to replace the entire pump in other devices even when only a ball check or piston ring have ceased to function properly because the cylinder is ruined in attempting to take it apart.

Also, in other devices the pump mechanism and flash boiler valve rod are mounted in the handle of the iron. Thus, when it is necessary to replace an iron handle the repairman has the onerous task of remounting all these mechanisms in the handle or the consumer will have to pay a premium price for a handle with these mechanisms factory installed. In the present invention the handle is merely a handle and does not mount any mechanisms. Therefore, replacement of the handle is greatly simplified.

In other devices with separate pump cylinders, flash boiler valve mountings and piping, the parts are not rigidly integrated into a unitary whole as they are in the present invention employing a single casting. Other devices also require an additional element in an operating rod extending from the thumb operated button to the pump piston. Such an operating rod is eliminated in the present invention wherein the pump piston and thumb button are one and the same element. Elimination of piping employed in other devices also reduces the number of fluid tight joints that are normally required and eliminates the possibility of leakage from such joints.

From the foregoing it will be apparent to those skilled in the art that the present invention and its advantageous features represent a substantial improvement over prior art devices.

While only a single embodiment of the present invention has been shown and described it is to be understood that this embodiment is only illustrative and is not to be taken in a limiting sense. The present invention includes all equivalent variations of the embodiment disclosed and described, and is limited only by the scope of the claims.

I claim:

1. In a block of homogeneous material defining a unitary one-piece member adapted to be mounted on an iron having a water reservoir therein, said member having a reservoir filling through opening formed therein, a vertical bore formed in said member and extending completely therethrough, a portion of said bore defining a pump cylinder and the remainder of said bore defining an inlet to said cylinder, said bore being spaced from said through opening and having a check valve seat formed therein, and a passageway formed in said member, said passageway extending from a point above said check valve seat in said bore to the front wall of said member.

2. The member of claim 1 and including a spray head receiving recess formed in the front wall of said member at the point where said passageway exits through said front wall.

3. The member of claim 1 and including a projection extending downwardly from the bottom of said member, said bore being formed through said projection.

4. The member of claim 3 wherein said member is mounted on the top of a water reservoir with said projection extending downward into said reservoir.

5. The construction of claim 4 wherein the bottom of said projection is in bearing contact with the bottom of said reservoir.

6. The member of claim 1 and including a pump piston mounted in said pump cylinder portion of said bore, and a check valve in said bore adjacent said check valve seat.

7. In a block of homogeneous material defining a unitary one-piece member adapted to be mounted on a flash boiler type steam iron which has a water reservoir, said member having reservoir filling, and flash boiler valve receiving through openings formed therein, a vertical bore formed in said member, said bore being

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spaced from said through openings and having a check valve seat formed therein, the top portion of said bore defining a pump cylinder and the remainder of said bore defining an inlet to said cylinder, a spray head receiving recess formed in the front wall of said member, and a passageway formed in said member and extending from a point above said check valve seat in said bore to said recess in said front wall.

8. A member as in claim 7 wherein said member has a projection extending downwardly from the bottom thereof, said bore being formed through said projection, the diameter of said bore below said check valve seat being substantially smaller than the diameter of said bore above said check valve seat.

9. A spray-steam iron of the flash boiler type, said iron having a water reservoir, a one piece casting mounted on the top wall of said reservoir, said casting having a projection extending downwardly from the bottom thereof into said reservoir, a reservoir filling through opening formed in said casting and extending from the front wall thereof to the bottom wall thereof, a first substantially vertical bore formed in said casting and receiving a flash boiler valve rod, a second bore formed in said casting

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and extending through said projection, said second bore having a check valve seat formed therein, the portion of said second bore above said check valve seat being of a larger diameter than the portion below said seat and defining a pump cylinder, a pump piston received in said pump cylinder and a check valve received in said bore adjacent said seat, a spray head receiving recess formed in the front wall of said casting and a spray head received therein, and a passageway extending from a point above said seat in second bore to said spray head receiving recess.

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