

Nov. 23, 1965

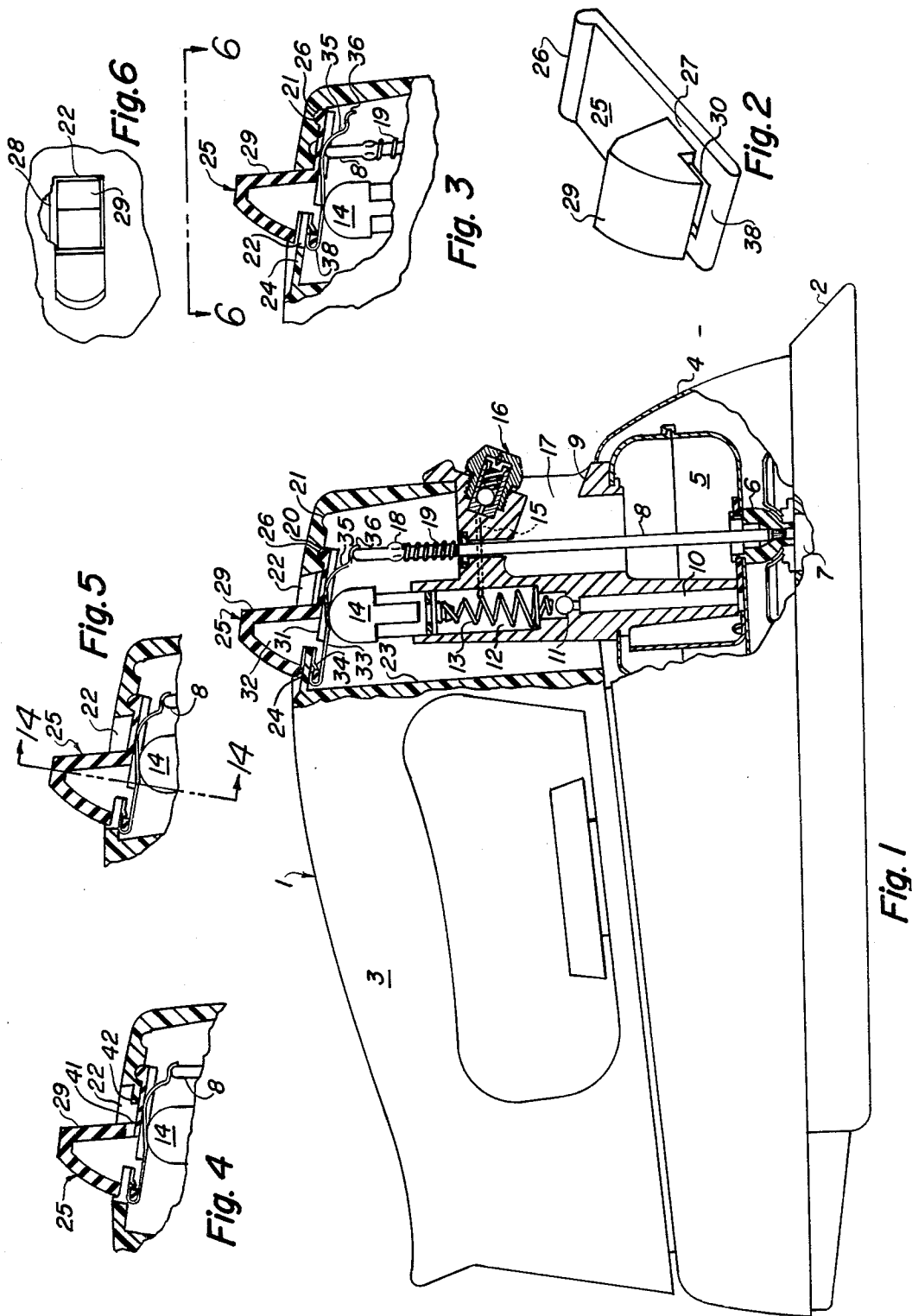
G. F. CARABET ETAL

3,218,742

CONTROL MEANS FOR A STEAM AND SPRAY IRON

Filed Sept. 17, 1964

2 Sheets-Sheet 1



Nov. 23, 1965

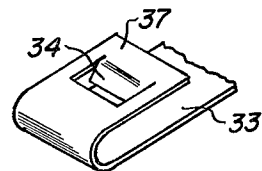
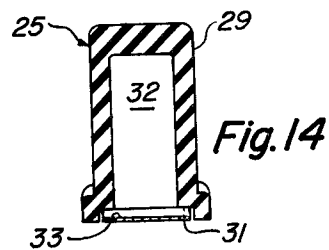
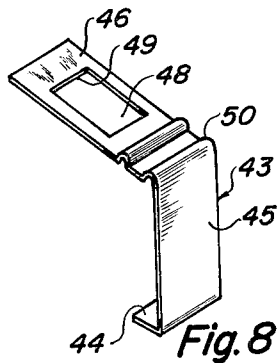
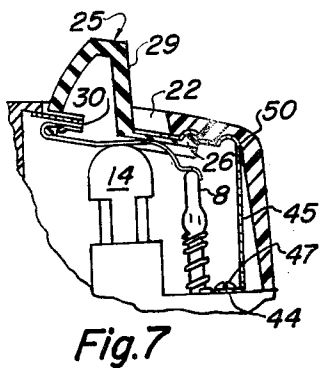
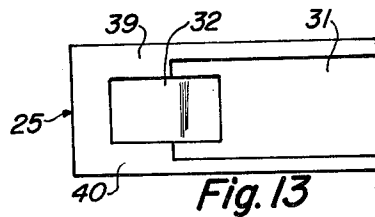
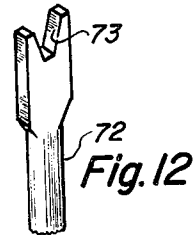
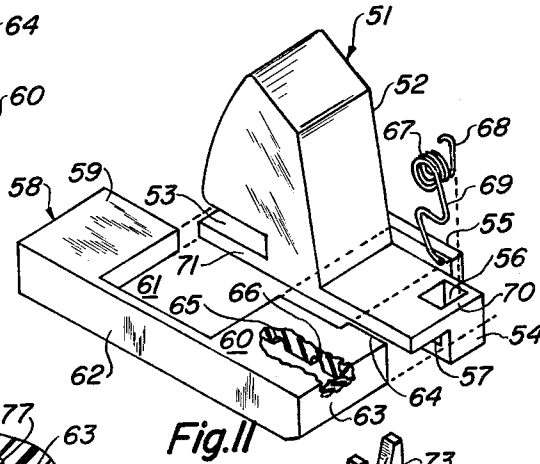
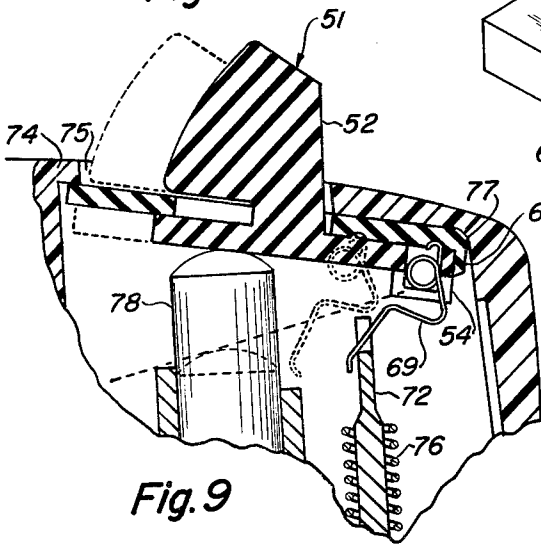
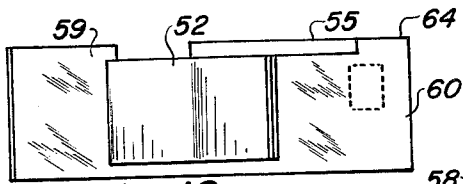
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CONTROL MEANS FOR A STEAM AND SPRAY IRON

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2 Sheets-Sheet 2



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3,218,742

CONTROL MEANS FOR A STEAM AND SPRAY IRON

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14 Claims. (Cl. 38—77)

The present invention relates to an improvement in a steam iron of the flash boiler type having a manually actuatable spray pump incorporated therein. The improvement is embodied in a single control member for selectively operating both the spray pump and the valve rod for the flash boiler.

It is a principal object of our invention to greatly simplify the manufacture and operation of a steam-spray iron by providing a single control member for selectively operating both a spray pump and a valve rod to a flash boiler.

It is another object of our invention to provide a steam-spray iron with a single control member which will operate the spray pump whether the valve rod to the flash boiler is in an open or closed position.

It is a further object of our invention to provide a steam-spray iron with a single control member which will operate the spray pump only when the valve rod to the flash boiler is open.

It is also an object of our invention to provide a steam-spray iron with a single control member which will operate the spray pump only when the valve rod to the flash boiler is closed.

It is a further object of our invention to provide a steam iron with a sliding control member for the flash boiler valve rod wherein the control member presents a variable cam surface to the valve rod to bias it closed.

It is another object of our invention to mount a single control member for a steam-spray iron on the iron subassembly.

Other objects and advantages of our 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 perspective view showing the single control member used in FIGURE 1.

FIGURE 3 is a sectional view showing the single control member in a forward position from that of FIGURE 1.

FIGURE 4 is a sectional view showing a single control member which can operate the spray pump only when the flash boiler valve rod is closed.

FIGURE 5 is a sectional view showing a single control member which can operate the spray pump whether the flash boiler valve rod is open or closed.

FIGURE 6 is a view taken on the line 6—6 of FIGURE 3.

FIGURE 7 is a sectional view showing the single control member of this invention mounted to a bracket on the iron subassembly.

FIGURE 8 is a perspective view showing the mounting bracket of FIGURE 7.

FIGURE 9 is a sectional view showing another embodiment of the present invention.

FIGURE 10 is a top view of the single control member of FIGURE 9.

FIGURE 11 is a perspective view of the single control member of FIGURES 9 and 10 with portions in section for clarity.

FIGURE 12 is a perspective view of the top of the valve rod for use with the control member of FIGURES 9, 10 and 11.

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FIGURE 13 is a bottom view of the control member of FIGURE 2.

FIGURE 14 is a sectional view taken on the lines 14—14 of FIGURE 5.

FIGURE 15 is a perspective view of the rear portion of the spring member used on the control member of FIGURE 2.

Referring now to the drawing, an iron embodying the present invention is indicated generally by reference numeral 1. The iron is of the type which may be selectively used as a dry iron or as a steam iron. When used as a steam iron the steam is generated by causing water to drip from a reservoir into a flash boiler where it is instantaneously converted into steam. In this regard, the iron 1 has a soleplate subassembly 2 which includes steam generating and distributing means, and is of the type disclosed in United States Patent 2,668,378 issued February 9, 1954, to Vance. The iron 1 further includes a handle and cover subassembly comprising handle 3 and cover member 4 which are secured together by screws in a manner described in copending application No. 397,173, filed September 17, 1964, and assigned to the same assignee as the present invention. Mounted on the soleplate 2 beneath cover member 4 is another subassembly which includes a water reservoir 5 having a valve body 6 secured to its bottom to provide a passage to flash boiler 7, and a one-piece casting 9 secured to the top of reservoir 5. The one-piece casting 9 has water dispensing controls mounted thereon in the manner disclosed in the aforesaid copending application. It is to be especially noted that the iron just described includes only three subassemblies. These subassemblies are: (1) a soleplate subassembly; (2) a handle and cover member subassembly; and (3) a water storing and dispensing subassembly. These three subassemblies are rigidly integrated into a unitary whole by only a single bolt as disclosed in the aforesaid copending application. Thus, the iron embodying our invention advantageously comprises three highly simplified subassemblies which are united by a single joining means. This greatly simplifies the manufacture, assembly and repair of the iron because it is not necessary to work on the entire bulky iron to add small parts in the final manufacturing stages or when making repairs. The operation of such an iron is also greatly simplified when it embodies our present invention.

The control mechanisms comprising part of the water storing and distributing subassembly include a valve rod 8 for selectively opening or closing the passage in valve body 6, and a spray pump of the suction-pressure type for spraying water forwardly of the iron. The upper portion of the flash boiler valve rod 8 has projections 18 formed thereon and the top of coil spring 19 acts thereagainst to bias valve rod 8 upward. A through passageway 10 is formed in one-piece casting 9 and leads from water reservoir 5, past ball check 11 to pump cylinder 12. Pump cylinder 12 receives coil spring 13 and pump piston 14. Coil spring 13 is secured to the bottom of piston 14 and normally biases the piston upward. An exit passageway 15 leads from pump cylinder 12 to a spray head assembly 16. Manual reciprocation of pump piston 14 causes water to be drawn from reservoir 5 to pump cylinder 12 and then out through spray head assembly 16. A through opening 17 leads from the exterior of casting 9 to reservoir 5 for filling the reservoir with water.

As shown, the front portion of handle 3 is hollow to fit over casting 9 and the structure assembled thereon. The top undersurface of the hollow portion of handle 3 has laterally extending arcuate recesses 20 and 21 formed therein and a rectangular opening 22 is formed in the handle to the rear of recesses 20 and 21. The rectangular

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opening 22 is formed substantially centrally of the top of the hollow portion of handle 3 so that opening 22 is forward of rear wall 23 of the hollow portion and a thin portion 24 remains projecting over the hollow portion of handle 3 at the top of rear wall 23. Extending upwardly through opening 22 in handle 3 is a projection 29 which is formed on the control member 25 of FIGURE 2. As best seen in FIGURE 2, control member 25 comprises a substantially flat portion having projection 29 extending upwardly therefrom at its rear and a substantially convex portion 26 extending upwardly therefrom at its front. The sidewalls of projection 29 are spaced inwardly from the sides of the substantially flat portion of control member 25 to form ledges, only one of which is shown at 27 in FIGURE 2 and the other at 28 in FIGURE 6. The rear base of projection 29 on control member 25 is slotted as at 30 in FIGURE 2. A groove 31 is formed in the bottom of control member 25 as best shown in FIGURES 13 and 14. The groove 31 extends from the front of control member 25 to a point substantially centrally beneath projection 29. A hollow portion 32 extends through the bottom of button 25 into projection 29.

A leaf spring member 33 has a reversely bent portion as shown in FIGURE 15 and a tang 34 is bent downwardly from the terminating part 37 of the reversely bent portion. The forward portion of leaf spring 33 curves downwardly as at 35 and terminates at its front end in another more sharply curved portion 36. The leaf spring 33 is secured to the bottom of control member 25 by inserting the rear end 38 of control member 25 in FIGURE 2 into the opening formed by the reversely bent portion of leaf spring 33 in FIGURE 15. Tang 34 moves into slot 30 in control member 25 and snaps down in front of rear end 38. The assembly is shown in FIGURE 1. The leaf spring 33 runs along the bottom of control member 25 and spans opening 32 so that the side edges of spring 33 rest against shoulders 39 and 40 in FIGURE 13. The spring 33 then enters groove 31 as shown in FIGURES 1 and 14 to prevent sideways displacement.

As shown in FIGURE 1, projection 29 on control member 25 extends upwardly through opening 22 in handle 3 and thin cover portion 24 on the handle is received in slot 30 on control member 25. In assembling the iron the control member 25 is placed in position in handle 3 before the handle is positioned over casing 9. In FIGURE 1, control member 25 is in its rearmost position with convex portion 26 received in arcuate recess 20. Sharply curved portion 36 is in contact with the top of flash boiler valve rod 8. In this position the downward force exerted by leaf spring 33 is stronger than the upward force exerted by coil spring 19 and valve rod 8 has its bottom end securely seated in the opening in valve body 6 to prevent flow of water from reservoir 5 to flash boiler 7. Thus, with the control member 25 in a rear position as shown in FIGURE 1, the iron 3 is operating as a dry iron. Also, cover portion 24 prevents control member 25 from being depressed and pump piston 14 cannot be actuated. This prevents the operator from unintentionally applying water to a fabric which is supposed to be ironed dry. Cover portion 24 also firmly supports control member 25 in its position in opening 22.

FIGURE 3 shows control member 25 in a forward position with convex portion 26 received in arcuate recess 21. The top of pump piston 14 serves as a support for control member 25 to keep it from falling down into the hollow portion of handle 3. The coil spring 13 on pump piston 14 applies a small upward force against control member 25 through pump piston 14.

As shown in FIGURE 6, ledge 28 and ledge 27 (FIGURE 2) abut the bottom sides adjacent opening 22 in handle 3 to prevent upward displacement of control member 25. In the forward position of the control member as shown in FIGURE 3, convex portion 26 is received in arcuate recess 21 and the sharply curved por-

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tion 36 at the front end of leaf spring 33 is free from the top of valve rod 8 so that leaf spring 33 is applying no downward force on valve rod 8. Thus, coil spring 19 applies an upward force on valve rod 8 to move the bottom of valve rod 8 free of its seated position in valve body 6 and the passage from reservoir 5 to flash boiler 7 is open. In its upper position the top of valve rod 8 still engages the bottom of control member 25 and aids the pump piston in supporting the control member. With the control member 25 in a forward position as shown in FIGURE 3, iron 1 is operating as a steam iron. It is to be noted in FIGURE 3 that the rear base portion of projection 29 on control member 25 is within the outline of opening 22. This permits the operator to alternately depress and release control member 25 which pivots about convex portion 26 in recess 21. The alternate depression and release of control member 25 reciprocates pump piston 14 to spray water from reservoir 5 through spray head assembly 16 to the front of the iron. Thus, with control member 25 in the forward position of FIGURE 3 iron 1 is operating as a steam iron and can also be operated as a spray iron.

It will be noted that when control member 25 is moved backward from the position of FIGURE 3 to the position of FIGURE 1 leaf spring 33 will bend upward and meet the top of valve rod 8 at a varying angle as the control member moves backward. By providing for a variable angle of contact a greater part of the force exerted on valve rod 8 by leaf spring 33 is in a downward direction. Leaf spring 33 and coil spring 19 are designed so that the vertically downward component of force applied to valve rod 8 by leaf spring 33 will be greater than the upward force applied to valve rod 8 by coil spring 19. This makes movement of control member to the rear position very easy when changing from steam to dry ironing by closing valve rod 8. While the leaf spring 33 is very advantageous it is not absolutely necessary and it could be omitted by forming a cam surface integrally with the front bottom of control member 25. With a constant angle of contact a great deal of the force applied to the top of valve rod 8 when moving control member 25 backward will act in a substantially horizontal direction and greater force is necessary to move the control member 25 in order that the vertical component of force being applied against the top of valve rod 8 will be great enough to move valve rod 8 downward. Thus, while an integrally formed cam surface would be operative, our device which provides a variable cam angle is much better.

FIGURE 5 shows the same control member as previously described with reference to FIGURES 1-3, 6 and 13-15, and with cover portion 24 on the handle of FIGURE 1 removed. Thus, the control member of FIGURE 5 may be depressed in either its forward or backward position and the spray pump may be operated whether the flash boiler valve rod is open or closed.

FIGURE 4 shows the same control member as previously described with reference to FIGURES 1-3, 6 and 13-15, and with cover portion 24 on the handle of FIGURE 1 removed. Thus, the control member of FIGURE 4 may be depressed in its backward position and the spray pump operated when the flash boiler valve rod is closed. In addition, a slot 41 is formed in the front base of projection 29 on control member 25 and a front cover portion 42 is provided at the forward end of opening 22. When the control member of FIGURE 4 is moved forward front cover portion 42 is received in slot 41 and depression of control member 25 is prevented. Thus, the pump cannot be operated when the flash boiler valve rod is open.

FIGURES 7 and 8 show a steel support member 43 having a horizontal mounting portion 44, upstanding portion 45 and control member mounting portion 46. Portion 44 is secured to the casing 9 by a screw 47 or in any other suitable manner. As shown, the control

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member mounting portion 46 of support 43 is formed to the same contour as the top underside of the hollow portion of the handle in FIGURE 1. The operation of the device in FIGURE 7 is the same as that described with reference to FIGURE 1 and the variations described with reference to FIGURES 4 and 5 may also be made to the structure of FIGURE 7. In addition, support 43 may be made of spring steel and opening 48 may be short enough so that the rear edge will always be within slot 30 in control member 25 whether the control member 25 is in a forward or backward position. The control member 25 would then always have a firm position on support 43 and instead of pivoting the control member 25 about convex portion 26 the control member mounting portion 46 of support 43 would bend at recess forming portion 50 to actuate the pump piston. With support 43 the control member 25 may be mounted directly to the water storing and distributing sub-assembly.

Referring now to FIGURES 9-12 there is shown another embodiment of our invention. A control member 51 has a projection 52 thereon and the rear base of the projection is slotted as at 53. As shown in FIGURE 9, the bottom of control member 51 is substantially flat and a rectangular projection 54 extends downwardly from a front corner thereof. One side of control member 51 has an upstanding wall 55 formed integrally therewith. A spring mounting opening enters the control member 51 at the top of rectangular projection 54 as at 56 and exits through the side of projection 54 as at 57. A control member mounting structure 58 has substantially flat top portions 59 and 60 separated by space 61 and joined at one side by a downwardly extending sidewall 62. Top portion 60 has a downwardly projecting frontwall 63 and a side projection 64. The underside of front portion 60 has laterally extending arcuate recesses 65 and 66 formed therein. A coil spring 67 has an upstanding end portion 68 terminating in a reverse bend as shown and a downwardly extending end portion 69 which is bent as shown in FIGURE 9. The coil portion of coil spring 67 is sized so as to be a tight fit in the opening formed in projection 54 and this prevents the coil spring from twisting or wobbling when it is in place. To assemble the control button assembly coil spring 67 is dropped into entrance opening 56. Downwardly extending end 69 on coil spring 67 projects downwardly from exit 57 and upwardly extending end 68 projects slightly above the top surface 70 of control member 51 as shown in FIGURE 9. Mounting structure 58 is then moved sideways toward control member 51 and at least a part of top portion 59 is received in slot 53. Top portion 60 on mounting structure 58 slides over top surface 70 on control member 51 and the reversely bent terminus on upstanding end 68 of coil spring 67 is received in either arcuate recess 65 or 66. The inner surface of sidewall 62 on mounting structure 58 abuts the side 71 of control member 51 and front wall 63 overhangs the front edge of control member 51 and a portion of projection 54 as shown in FIGURE 9. With the control assembly so arranged the control member 51 can be moved forward and backward with respect to mounting structure 58 and is frictionally retained in either position by the presence of the reversely bent terminus on end 68 of coil spring 67 in either arcuate recess 65 or 66.

FIGURE 12 shows the top of the flash boiler valve rod 72 for use with the control of figures 9-11. The top of rod 72 is flattened and has a V-shaped groove 73 formed therein as shown. The control assembly is shown in position on an iron in FIGURE 9. Iron handle 74 has a rectangular opening 75 formed therein and through which projection 52 extends. The top periphery of top portion 59, the top surface of top portion 60 and the top of sidewall 62 on mounting structure 58 abut the under-surface of handle 74 adjacent opening 75 to keep the control assembly in place. As shown in FIGURE 9, the mounting structure 58 is trapped be-

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tween the front and rear walls of the hollow portion in the forward part of handle 74 and cannot move forward or backward any appreciable distance. Likewise, the mounting structure is trapped against sideways displacement by the sidewalls of the hollow portion in the forward part of handle 74. As seen in FIGURE 9, forward and backward motion of control member 51 acts to close or open valve rod 72 through coil spring 67. The terminal part of downwardly extending end 69 on coil spring 67 engages the edge of rod 72 at the bottom of V-shaped groove 73. Continued forward movement of control member 51 causes the coil spring 67 to twist thereby exerting a torsional force through end 69 on rod 72. As the control member 51 approaches its forward position a steadily increasing portion of the force being exerted on rod 72 by end 69 is in a downward direction. The varying angle of the applied force finally overcomes the upward force of coil spring 76 and rod 72 is moved downward to close the passage from the reservoir to the flash boiler. The operator may depress control member 51 by exerting a force on projection 52 whereupon mounting structure 58 and control member 51 will pivot as a unit about a point near 77 in FIGURE 9 and in this manner pump piston 78 may be reciprocated. The control of FIGURE 9 is operative to actuate the pump piston whether the valve rod 72 is in an open or closed position. However, those skilled in the art will readily be aware that the variations of FIGURE 1 or 4 could be added to the control of FIGURE 9 simply by forming additional slots at the base of projection portion 52 and suitable cover portions as those at 24 and 42 in FIGURES 1 and 4. Also, mounting structure 58 could be formed of steel as is the support 43 of FIGURE 8 and mounted to the iron sub-assembly.

It will be understood that when our novel control member is used in an iron without a spray pump the cover portion 24 in FIGURE 1 and the slot 30 in the control member of FIGURE 2 would be related so as to be engaged in both the forward and backward positions of the control member. That is, cover portion 24 is always received in slot 30 to give firm support to the control member in any position.

From the foregoing description it may be appreciated that we have provided a new and advantageous control arrangement for a steam-spray iron. The operation of our improved iron, as well as the manufacture and assembly thereof, is much simplified over prior art devices. Our single control member performs the dual function of operating a spray pump and a flash boiler valve rod. The operator need not fumble around for a plurality of controls which perform only one function each. The appearance of the iron handle incorporating our invention is much improved because there is only one control member in view as opposed to prior art devices having two or more control members projecting through the handle.

It will be appreciated that our control member, which applies a force at a constantly varying angle to the flash boiler valve rod, is an improvement in itself and can be used in steam-dry irons which do not have a spray pump. Thus, the parts for both steam-spray and steam-dry irons can be the same and it is unnecessary to manufacture and stock separate control members for each type of iron.

The variations where operation of the spray pump is possible only with the control member in a forward or backward position provides a firm supporting arrangement for the control member and offers a variety of choices to users who do not wish to accidentally spray while dry ironing, and to users who do not wish to unintentionally spray while steam ironing.

Mounting the control member on the iron sub-assembly provides an iron wherein all of the working parts are structurally integrated into a compact unitary assembly, and manufacture and assembly of the iron handle is greatly simplified.

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 few embodiments of the present invention have been shown and described it is to be understood that these embodiments are only illustrative and are not to be taken in a limiting sense. The present invention includes all equivalent variations of the disclosed embodiments and is limited only by the scope of the claims.

We claim:

1. In an iron including a flash boiler, a water reservoir communicating with said flash boiler through a valve, a valve closure member movable between a valve open and a valve closed position, and a pump having a manually operable actuating means, the improvement comprising; a single control member movably mounted on said iron for selectively controlling the position of said valve closure member and operating said pump actuating means, and means on said iron for holding said control member against operating said pump actuating means when said valve closure member is in one of said positions.

2. In an iron including a flash boiler, a water reservoir communicating with said flash boiler through a valve, a valve closure member movable between a valve open and a valve closed position, and a pump having a manually operable actuating means, the improvement comprising; means mounting a control member pivotally and slidably on said iron, said control member having means engaging said valve closure member to move said valve closure member to one of said positions upon sliding movement thereof, and said control member having means engaging said pump actuating means upon pivotal movement thereof.

3. The improvement of claim 2 and further including cooperating stop means formed on said control member and said iron for holding said control member against pivotal movement when said valve closure member is in one of said positions, said control member being free to pivot when said valve closure member is in the other of said positions.

4. In a steam iron having a handle with a hollow front portion, said hollow portion having a top wall, said hollow portion receiving a flash boiler valve rod and an actuating member for a pump, means mounting said valve rod and said actuating member so that the tops thereof are spaced from said top wall to define a mounting space, said top wall having an opening therein, a control member slidably and pivotally mounted in said mounting space and having a portion extending through said opening, said control member including means engaging with said valve rod and said pump actuating member, said control member being slidable between a position in which it closes said valve rod and a position in which said valve rod is opened, and means releasably retaining said control member in each of said positions, said control member being pivotal in at least one of said positions to operate said pump actuating member.

5. The iron of claim 4 wherein said control member is mounted on a bracket which is secured to a sub-assembly of said iron.

6. In an iron including a flash boiler, a water reservoir communicating with said flash boiler through a valve, a valve closure member movable between a valve open and a valve closed position, and spray means for applying moisture from said reservoir forwardly of said iron onto a fabric to be ironed, said spray means including a pump having a manually operable actuating means, the improvement comprising; a single control member movably mounted on said iron for selectively controlling the position of said valve closure member and operating said pump actuating means, and means on said iron for holding said control member against operating said pump

actuating means when said valve closure member is in one of said positions.

7. An iron including a flash boiler, a water reservoir communicating with said flash boiler through a valve, a valve closure member movable between a valve open and a valve closed position, a pump having a manually operable actuating member, a control member movably mounted on said iron for selectively controlling the position of said valve closure member and operating said pump actuating means, said control member having contact means for engaging said valve closure member, said contact means providing an automatically continuously variable angle of contact with said valve closure member whereby the direction of the force applied to said valve closure member through said contact means is automatically continuously variable.

8. In an iron including a flash boiler, a subassembly structure including a water reservoir having water distributing means mounted thereon, said water distributing means including a valve communicating with said flash boiler and a valve closure member movable between a valve open and a valve closed position, said water distributing means further including spray means for applying moisture from said reservoir forwardly of said iron onto a fabric to be ironed, said spray means including a pump having manually operable actuating means, and a single control member movably mounted on said sub-assembly for selectively controlling the position of said valve closure member and operating said pump actuating means.

9. In an iron including a flash boiler, a water reservoir communicating with said flash boiler through a valve, a valve closure member movable between a valve open and a valve closed position, and spray means for applying moisture from said reservoir forwardly of said iron onto a fabric to be ironed, said spray means including a pump having a manually operable actuating means, the improvement comprising; a single control member movably mounted on said iron for selectively controlling the position of said valve closure member and operating said pump actuating means.

10. In an iron including a flash boiler, a water reservoir communicating with said flash boiler through a valve, a valve closure member movable between valve open and valve closed positions, and a suction-pressure type pump, said pump having manually operable actuating means, the improvement comprising; mounting means mounting a single control member on said iron for reciprocatory movement and for movement between first and second locations, said control member having means engaging said pump actuating means upon reciprocatory movement thereof to operate said pump, and said control member having means engaging said valve closure member upon movement thereof between said first and second locations to selectively set said valve closure member in either of said open and closed positions.

11. In an iron including a flash boiler, a water reservoir communicating with said flash boiler through a valve, a valve closure member movable between a valve open and a valve closed position, resilient means normally biasing said valve closure member to one of said positions, and spray means for applying moisture from said reservoir forwardly of said iron, said spray means including a pump having manually operable actuating means, the improvement comprising; a single control member movably mounted on said iron for selectively controlling the position of said valve closure member and operating said pump actuating means, said control member being movable between a first location in which said resilient means biases said valve closure member to said one position and a second location in which means on said control member engages said valve closure member to move said valve closure member to the other of said positions, said control member being selectively operable in both of said locations to operate said pump actuating means.

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12. In an iron including a flash boiler, a water reservoir communicating with said flash boiler through a valve, a valve closure member movable between valve open and valve closed positions, resilient means normally biasing said closure member to one of said positions, control means movably mounted on said iron for controlling the position of said valve closure member, said control member being movable between a first location in which said resilient means biases said valve closure member to said one position and a second location in which yieldable means on said control member engages said valve closure member to move said valve closure member to the other of said positions, said yieldable means contacting said valve closure member at an automatically continuously variable angle and the force applied to said valve closure member through said yieldable means being automatically continuously varied in a direction tending to move said

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valve closure member to the other of said positions with progressive movement of said control member from said first location to said second location.
13. The iron of claim 12 wherein said control member is mounted for horizontal sliding movement.
14. The iron of claim 13 wherein said yieldable means comprises a leaf spring secured to said control member.

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