

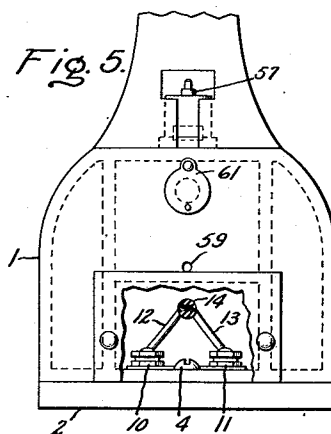
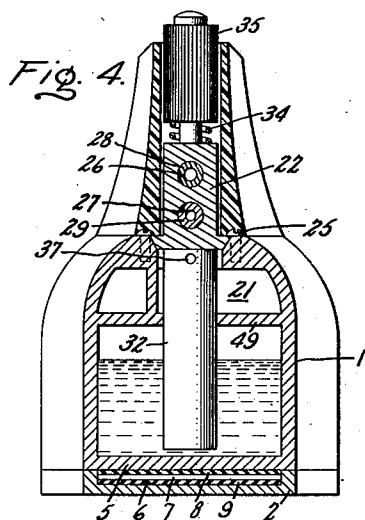
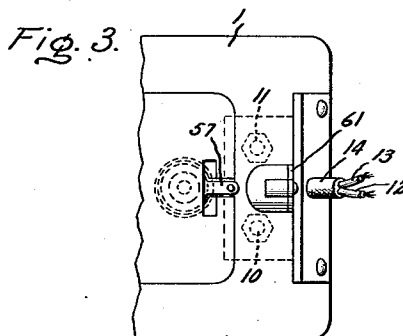
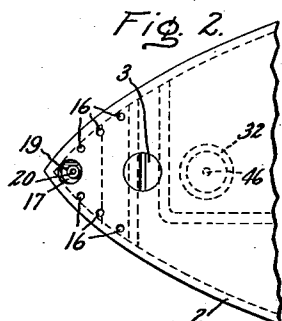
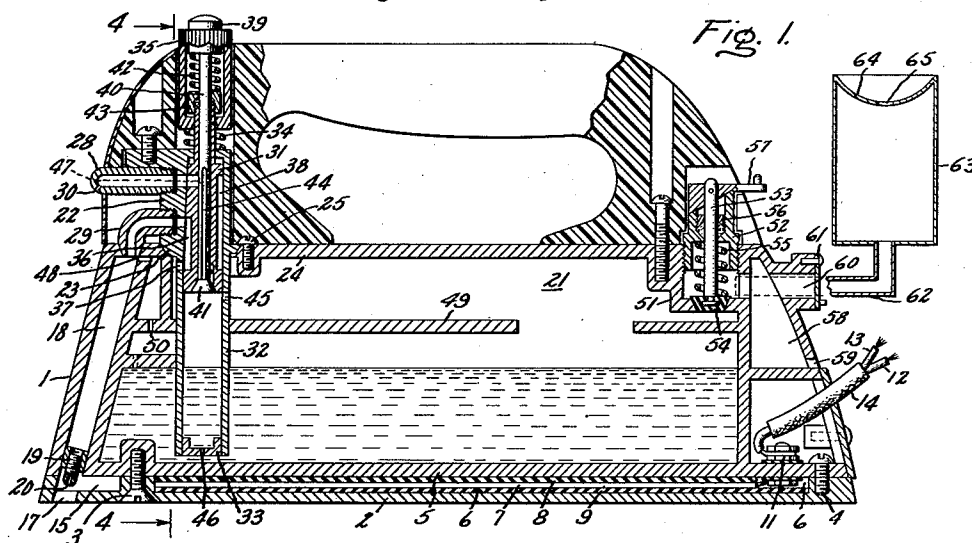
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STEAM AND DAMPENING IRON

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STEAM AND DAMPENING IRON

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5 Claims. (Cl. 38—77)

This invention relates to steam and dampening irons, and is a continuation of my co-pending application Serial No. 222,105, filed April 20, 1951, now abandoned, and assigned to the General Electric Company, assignee of this application.

One of the objects of this invention is to provide a steam iron that will dampen the material to be ironed with improved control means permitting selective operation as a dampening iron, a steam iron, or a dry iron.

A further object of this invention, in connection with a steam and dampening iron, is to provide valves and valve control means of simplified construction arranged for convenient assembly, maintenance, and operation.

In carrying out this invention in one form, I provide a steam and dampening iron with a first valve and valve control means adjustable to control discharge of steam selectively through the soleplate or through an elevated nozzle directed toward the material being ironed. A second valve and valve control means, arranged for example, coaxially with the first valve, controls discharge of a mixture of steam and atomized water through the elevated nozzle. In accordance with a further aspect of the invention, both valve control means are located at the top forward portion of the iron for convenient operator adjustment.

The subject matter which I regard as my invention is particularly pointed out and distinctly claimed in the concluding portion of this specification. My invention, however, both as to organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawing in which:

Fig. 1 is a vertical sectional view of the iron;

Fig. 2 is a fragmentary bottom view of the soleplate of the iron;

Fig. 3 is a fragmentary top view of the rear end of the iron;

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 1; and

Fig. 5 is an end elevation of the rear of the iron.

Referring to the drawing, an exemplary embodiment of this invention is illustrated as including a main body 1 forming a water reservoir and steam boiler, to which is secured a soleplate 2 by means of fastening devices such as screws 3 and 4. Between a lower wall 5 of the boiler and the soleplate is a recess 6 for the reception of a conventional heating element 7 spaced from the soleplate and boiler on opposite sides thereof by insulating plates 8 and 9. The heating element is provided with appropriate terminal structures 10 and 11 to which may be connected electrical conductors 12 and 13 of an electrical supply cord 14. The forward end of soleplate 2, as shown in Fig. 1, is provided with a steam distributing channel 15 having a series of small outlet ports 16 (Fig. 2) and a large steam outlet aperture 17 through the soleplate for conducting steam to the material to be ironed.

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To conduct steam from the steam boiler or generator, the forward end of body 1 is provided with an upwardly extending steam channel or duct 18. The lower end of channel 18 is provided with a nozzle 19, said nozzle having a restricted discharge orifice 20 through which steam, or a mixture of steam and atomized water, may be directed to the material being ironed. Orifice 20 is restricted in order to retain sufficient steam pressure within the boiler to atomize any water passing through nozzle 19. It may be noted that nozzle 19 is located centrally above the enlarged aperture 17 in the soleplate, whereby steam, or a mixture of steam and atomized water, discharging through the nozzle has a direct path to fabrics being ironed. This is especially important when the iron is being used as an atomizing and dampening iron, for which application direct discharge from the nozzle to the fabric is essential. With this arrangement as shown by Fig. 1, even distribution to the fabrics can be achieved, especially if the toe of the iron is lifted above the fabric during use of the device as a liquid spray dampening iron.

In accordance with this invention, a valve structure is provided for controlling steam discharge from a steam space 21 within the iron. As shown, this valve structure may include a valve body 22 having a tapered flange 23 receivable in a correspondingly tapered opening in upper wall 24 of the boiler. This tapered flange may be secured positively in position against the boiler top wall by one or more fastening devices 25. Two steam discharge outlets 26 and 27 (Fig. 4) are provided in the valve body or casing. A first or upper discharge nozzle 28 is threaded into valve outlet 26; while a second or lower nozzle 29 is similarly secured in the valve body outlet 27. The lower nozzle 29, in the form of an elbow, has a tapered outlet engageable in a tapered opening in the top wall of the boiler for discharge into the conduit or channel 18. Thus, steam discharging through nozzle 29 is conducted to nozzle 19 for discharge through the soleplate. The other nozzle 28 includes a minute discharge opening 30 directed downwardly toward the ironing surface. Nozzle 28 is located a substantial distance above the soleplate, with the orifice so arranged that steam, or a mixture of steam and atomized water may be discharged toward the fabric being ironed. Steam discharge from nozzle 28 is useful, for example, to fluff the pile of fabrics such as velvet. Also, discharge of steam and atomized water from nozzle 28 is of value since moisture may be added to the fabric for ironing without lifting the iron from the ironing surface.

A first valve stem 31 is provided within valve body 22. As clearly shown by Fig. 1, valve body 22 includes a downwardly depending tubular portion 32, the bottom end of which is closed by a plug 33. Prior to insertion of plug 33, the valve stem assembly may be inserted upwardly within valve body 22.

Valve body 22 is internally tapered approaching the upper end thereof, and valve stem 31 has a corresponding taper. Valve stem 31 is held in engaged position within the valve body by means of a compression spring 34. The upper end of valve stem 31 is provided with a section of reduced diameter to which may be secured, in any desired manner, an operating knob 35. As shown, knob 35 is externally serrated to permit easy rotation thereof by the operator. Since knob 35 is secured to valve stem 31, the entire valve stem may be rotated within valve body 22.

For controlling steam flow, valve stem 31 is provided with a first longitudinally extending slot 36, which in one rotary position of valve 31 provides communication from a steam inlet 37 to discharge nozzle 29. Thus, with the components in the position illustrated by Fig. 1, steam is conducted from steam space 21 through inlet 37 into

the longitudinal passageway 36 in valve 31, and thus to nozzle 29, which in turn discharges into duct 18 for eventual discharge through nozzle 19 and the aperture in the soleplate. Valve stem 31 is provided with a second longitudinally extending passageway 38, angularly disposed with respect to passageway 36, so that in another rotary position of valve stem 31, steam may be conducted again through inlet 37 into passageway 38. As clearly shown, passageway 38 is of sufficient length to conduct steam both to nozzle 29 and also to nozzle 28. Thus, when valve stem 31 is adjusted to the proper rotary position, steam is supplied for discharge simultaneously through the soleplate from nozzle 19 and from a point elevated from the soleplate through nozzle 28. Obviously, valve stem 31 may be adjusted to other rotary positions wherein steam flow to either nozzle will be blocked.

To provide liquid spray from nozzle 28, a second valve stem is provided for operation by a push button 39. In the illustrated embodiment, push button 39 is connected to an elongated valve stem 40 extending coaxially of valve stem 31. The lower end of valve stem 40 is provided with an outwardly flared valve member 41 cooperatively associated with a correspondingly tapered valve seat in valve stem 31. Valve member 41 is normally held in its closed position by means of a compression spring 42 acting between the lower surface of push button 39 and the upper surface of a packing gland assembly 43. Additionally, a substantial portion of the lower end of valve stem 40 is fluted as shown at 44, thus providing a series of internal passageways between valve stem 40 and valve stem 31. It may be noted further that the valve body is provided with a steam inlet opening 45. Additionally, plug 33 in the lower end of the depending tubular portion 32 of the valve body is provided with a small water inlet orifice 46. With this arrangement, when push button 39 is depressed, assuming steam pressure exists within the boiler, steam immediately flows through opening 45 and the inlet passageways through the interior of valve stem 31 for discharge through nozzle 28. Flow of steam through this passage at high velocity results in a pressure drop within conduit 32 of the valve body, whereupon steam pressure within the boiler forces water in through the restricted water inlet opening 46. Thus, water also flows through the interior passageways to nozzle 28. Water discharging from nozzle 28 is broken up into fine particles by the high pressure steam upon passage through orifice 30 in the nozzle. It may be noted that orifice 46 is restricted so that only a limited quantity of water is admitted into the valve assembly. This restricted liquid supply is desirable to insure proper atomization of the water upon passage through orifice 30 in nozzle 28.

With the rotary valve stem 31 adjusted to the position shown by Fig. 1, it is obvious that liquid will spray from nozzle 28 whenever push button 39 is depressed. However, with valve stem 31 in this position, steam discharges at the same time through nozzle 19 and the opening in the soleplate. Since for some operations it may be desirable to discharge only a liquid spray through nozzle 28, an additional radial opening through valve stem 31 may be provided, located at a different angular position from longitudinal passageways 36 and 38. Such an additional opening has been shown in dotted lines at 47 in Fig. 1.

It is further desirable to prevent frequent occurrence of overpressure conditions within steam space 21 of the boiler. For this purpose, a restricted steam discharge port 48 is provided between the steam space and the steam duct 18. This passageway is constantly open, and therefore, a small quantity of steam may constantly discharge through nozzle 19 and the opening in the soleplate. However, to prevent water from splashing into opening 48 during normal operation of the iron on an even keel, a baffle 49 preferably is provided within the boiler sep-

arating the water compartment from the steam space. Since on occasion it may be desired to dampen clothing by raising the iron from the ironing surface and tipping the toe of the iron downwardly, a water inlet 50 may be provided sufficiently restricted in size to limit the quantity of water which may enter duct 18 along with steam. Any small quantities of water discharged into duct 18 will be atomized readily upon passage through nozzle 19.

With a steam boiler-type iron of the type illustrated, it is further desirable to provide a safety valve. In the illustrated embodiment, such a valve is provided at the rear of the iron, the safety valve body 51 being cast or otherwise formed as an integral part of the boiler. The safety valve housing is completed by a valve plug member 52 threaded into the upper wall of the boiler. Plug 52 guides a valve stem 53 having secured to the lower end thereof a tapered valve plug 54 of resilient material, such as rubber or the like. Valve plug 54 is normally biased into engagement with a correspondingly tapered valve seat in housing portion 51 by means of a compression spring 55. An appropriate valve stem seal 56 may be provided in the usual manner to permit axial movement of the valve stem within plug 52. The upper surface of plug 52 is in the form of a cam cooperatively associated with a valve operating arm 57 functioning as a cam follower. When valve operating arm 57 is rotated, the cam surface lifts valve stem 53 and thus retracts the valve member 54 from the valve seat to permit exhaust of steam into an exhaust chamber 58. Exhaust chamber 58 has a restricted outlet 59 through which steam may discharge without serious risk of injury to the operator. Furthermore, with the construction as shown, an excessive pressure within the boiler will force valve member 54 off of its valve seat by overcoming the force of compression spring 55.

This safety valve structure may also function as the valve through which the boiler is filled with water. As the first step in filling the boiler, safety valve operating handle 57 is rotated to retract valve member 54 from its valve seat. When this is done, any steam within the boiler escapes as previously described through exhaust outlet 59. A filling passage 60, provided with a pivoted cover 61, provides access for a filling tube 62. For convenience, filling tube 62 may be associated with a filling device in the form of a small container 63 having a concave top 64 forming a funnel, concave top 64 further being provided with a small aperture 65. Container 63 may be filled by sealing the end of fill tube 62 manually, while introducing water through the funnel top member 64. When the container has been filled, the operator manually closes the opening in the funnel by placing a finger over aperture 65, and thus, water may not run out through tube 62. However, when tube 62 has been inserted to the position shown by dotted lines in Fig. 1, the operator may remove his finger from opening 65, whereupon the contents of container 63 discharge into the boiler. After the boiler is filled with water to approximately one inch from baffle plate 49, lever 57 is returned to the position shown in Fig. 1, thus closing the safety valve.

With the boiler filled and electrical connection established to the heating element, water in the boiler will be converted into steam, and at the same time, the soleplate will be heated to ironing temperature. Steam thus generated will collect in steam chamber 21. If the operator of the iron desires discharge of steam through the soleplate, knob 35 is rotated to the position shown in Fig. 1, whereupon steam will pass from the boiler into steam inlet 37, through slot 36 in valve stem 31 to nozzle 29. From nozzle 29, the steam is conducted downwardly through conduit 18 for eventual discharge through nozzle 19 and the aperture in the soleplate. To dampen fabric with a mixture of steam and atomized liquid, button 39 is depressed, admitting steam from the boiler through aperture 45 into the central and internal passageway

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through valve stem 31 to nozzle 28. At the same time, water enters through aperture 46 into the valve casing and through the same passageways into the nozzle for mixing water and steam and to produce atomized liquid upon discharge of the mixture through the restricted orifice 30. If knob 35 is rotated, for example, 180° from the position shown in Fig. 1, steam may be supplied both through the soleplate and from nozzle 28, since communication is established from steam inlet 37 through the elongated passageway 38 in valve stem 31 to both nozzles. A quarter turn of valve stem 31 and knob 35 may align aperture 47 and the discharge outlet 26 of the valve body. At the same time, both steam passageways 36 and 38 are oriented out of communication with inlet 37. However, in this adjusted position, a liquid spray may be provided by depressing button 39 in the manner previously described.

While this invention has been described by reference to a particular embodiment thereof, it is to be understood that numerous modifications may be made by those skilled in the art without actually departing from the invention. It is, therefore, the aim of the appended claims to cover such equivalent variations as come within the true spirit and scope of the foregoing disclosure.

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

1. In a flatiron of the type having a soleplate, heating means, and water supply and steam generation means, that improvement comprising a first nozzle discharging through the soleplate to the ironing surface, a second nozzle discharging toward the ironing surface from an elevated location with respect to the soleplate, first and second discharge passages for respective of said nozzles, a rotatable valve with an inlet in communication with said steam generation means and having a first valve position directing steam through said first discharge passage to said first nozzle, a second valve position directing steam from the steam generating means to said first nozzle and concurrently through said second discharge passage to said second nozzle, and a third valve position in which steam flow to either nozzle is prevented, and a liquid spray control valve having an inlet in communication with both said water supply and said steam generation means and movable axially of said rotatable valve for controlling discharge of a water and steam mixture through said second discharge passage and nozzle when said rotatable valve is in said first position or in said third position.

2. In a flatiron of the type having a soleplate, heating means, and water supply and steam generation means, that improvement comprising a first conduit and nozzle discharging through the soleplate to the ironing surface, a second conduit and nozzle discharging toward the ironing surface from an elevated location with respect to the soleplate, a rotatable valve including an inlet in communication with the steam generation means and having a first valve position directing steam from the steam generating means through said first conduit and nozzle, a second valve position directing steam from the steam generating means through both of said conduits and nozzles, and a third valve position in which steam flow to either nozzle is prevented, and a liquid spray control valve moveable axially within said rotatable valve for controlling discharge of a water and steam mixture through said second nozzle, said liquid spray control

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valve including inlet means communicating with both said water supply and said steam generator and outlet means discharging into second conduit and nozzle.

3. In a flatiron having a soleplate, heating means, a water supply, and steam generation means, that improvement comprising a first conduit and nozzle discharging through the soleplate to the ironing surface, a second conduit and nozzle discharging toward the ironing surface from an elevated position with respect to the soleplate, a valve body having a lateral inlet communicating with the steam generation means, a valve member rotatably associated with said valve body and defining selectively adjustable passageways to said first and second conduits and nozzles, said valve member having an internal passageway therein, an axial inlet into said internal passageway communicating with both said steam generation means and said water supply, an outlet from said internal passageway into said second conduit and nozzle, and an axially movable valve member controlling said internal passageway.

4. In a flatiron having a soleplate, heating means, a water supply, and steam generation means, that improvement comprising a first conduit and nozzle discharging through the soleplate to the ironing surface, a second conduit and nozzle discharging toward the ironing surface from an elevated position with respect to the soleplate, a valve body having a lateral inlet communicating with the steam generation means, a valve member rotatably associated with said valve body to control discharge to said first conduit and nozzle, said valve member having an internal passageway therein, an axial inlet into said internal passageway communicating with both said steam generation means and said water supply, an outlet from said internal passageway into said second conduit and nozzle, and an axially movable valve member controlling said internal passageway.

5. A steam and spray flatiron comprising a soleplate, a water supply tank, steam generation means, heating means, a conduit and nozzle for directing steam through the soleplate, a valve body having an inlet from said steam generation means and an outlet into said conduit and nozzle, a rotatable valve member within said valve body for controlling flow of steam to said nozzle, said valve member including an axial passageway and an axially movable flow control member therefor, a separate inlet for said axial passageway in communication with both said steam generation means and said water supply tank, and a separate outlet from said axial passageway including a spray nozzle.

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