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[54] **SPRAY IRON**
9 Claims, 2 Drawing Figs.

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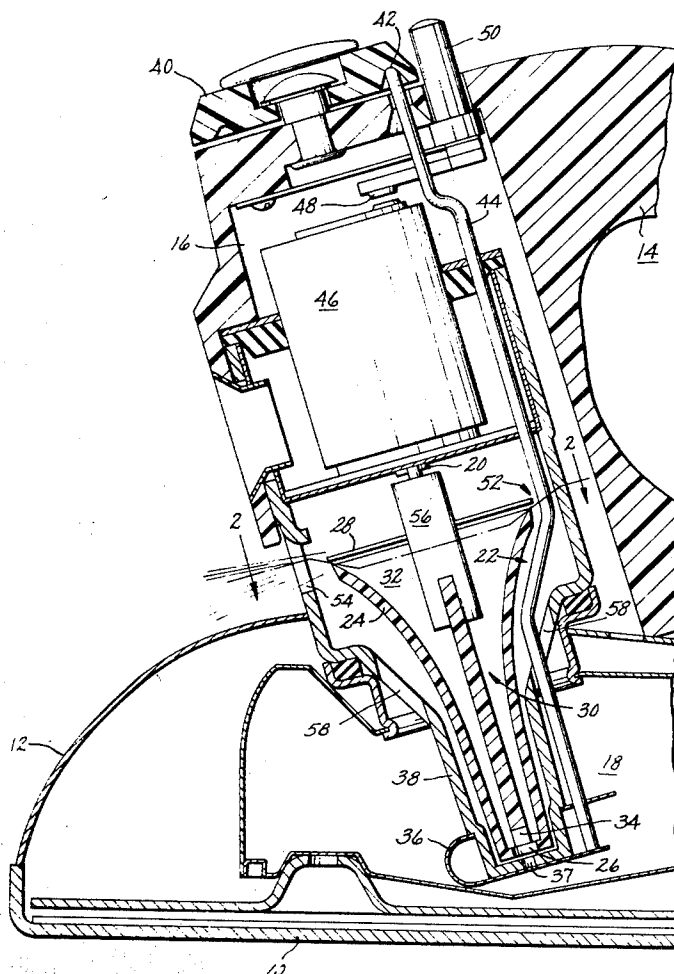
[50] Field of Search..... 38/77.1,
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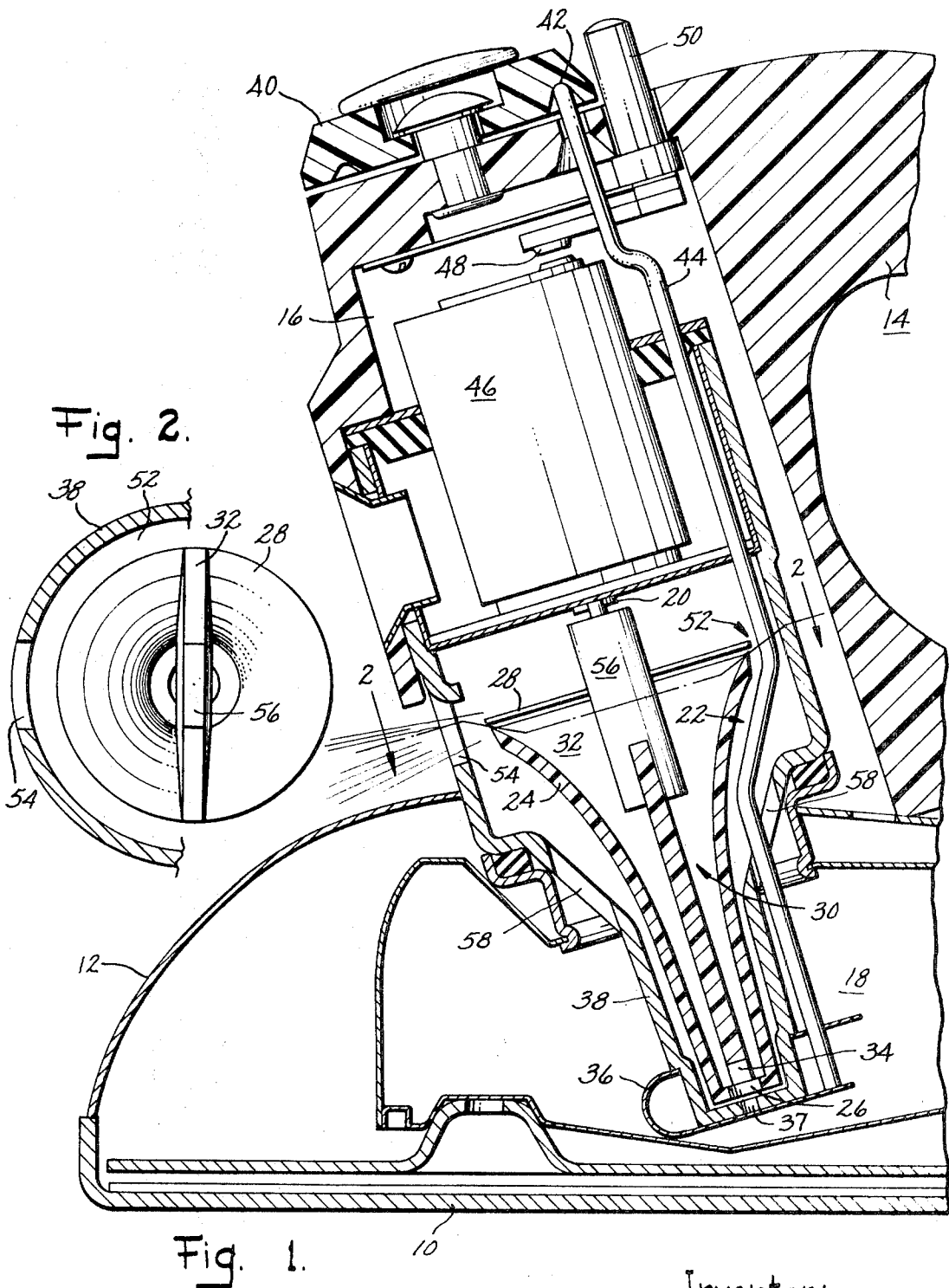
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ABSTRACT: The disclosure shows a spray iron that uses a disc-like slinger to spray water on the surface to be ironed. The water is directed to the slinger by an inclined hollow tube which dips into a water reservoir and rotates to lift water to the slinger.





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SPRAY IRON

BACKGROUND OF THE INVENTION

1. Field of the Invention.

This invention relates to a spray iron that employs a disclike slinger structure that is fed with water from a rotating hollow tube which dips into a water reservoir.

2. Description of the Prior Art.

With the advent of irons using water for either steam or spray purposes or both, a water tank or reservoir is generally provided in the iron above the soleplate and water valve structure provides controlled water drippage into a steam generator where it is evaporated and directed out steam holes in the soleplate to steam the article. Mechanical spray attachments have been added to such irons to supply a fine spray from the water tank to spray onto the garment. While slingers, per se, are known, they have not been successfully applied to irons, although other structures have been used for spraying. Such spray attachment may be manual where each actuation of a suitable button pumps a spurt of water; or the spray attachment may be powered where, by suitable valving, the steam pressure is raised and directed to the spray nozzle where it aspirates and pressurizes the water so that a single depression of the button provides a continuous spray until the button is released. A typical powered sprayer of this type is shown in U.S. Pat. No. 3,041,257 of common assignment. Generally, it has been preferable to use distilled water in such steam irons because of the fineness of the various water passages and orifices which are subject to clogging due to the mineral deposits from the water. Distilled water, which is pure, creates no problems; but in the hostile hard water localities, the tap water contains minerals which produce loose flakes and deposits on the iron components and can clog the fine passages in the spray structure. These deposits vary from the water in various areas of the country and generally consist of solids of calcium carbonate as well as other chemicals that are in solution in the water or may be in relatively large flake form in the water. Various cleaning mechanisms including screens and cleanout structures have been designed to prevent the deposits or flakes from clogging the water passages. However, while the flakes may be screened out, various fine and complex screening structure is required and the minerals in solution in the water may still reach the sprayer through the water tube which connects the water reservoir with the sprayer and lime deposits may be formed therein. The buildup of a coating or deposits then causes a restriction in the flow rate of water to the sprayer and a reduction in the spray rate. Prior art constructions have generally provided sprayers, either powered or manual, that contain the fine passages which are subject to clogging.

SUMMARY OF THE INVENTION

Briefly described, the present invention is directed to a spray iron, that may or may not include steaming structure, that has a hollow front handle support and a water reservoir extending under the support. Bearing means is provided in the support and a motor driven slinger assembly is disposed at one end in the bearing for rotation on one side of the bearing in the handle support. The slinger assembly comprises a hollow round elevator tube that is inclined from the vertical and communicates at its lower end with the bottom of the reservoir to draw water therefrom. The tube is closed at its lower end except for a preferably single central aperture. A round disc is floatingly supported on the tube to close its upper end and is carried by the tube at right angles thereto or in a plane perpendicular to the rotational axis so that it is adjacent one side of the bearing and the disc rotates with the tube. Preferably, the tube increases in diameter nonlinearly from the lower central aperture to the disc. Baffling means is disposed in the tube in the form of a plate extending lengthwise of the tube and bisecting the tube and the baffle means may be connected to the bearing or driving shaft to support the slinger assembly.

The baffling means interrupts the inner periphery of the tube and, with the hollow portion of the tube, provides a connecting means between the tube and disc to direct water to the disc. A controlled driving means is disposed on the upper portion or other side of the handle support and is connected through the bearing to the assembly to rotate the assembly about the axis of the tube. The structure is further provided with a passage means around the slinger assembly to permit reciprocating motion of the disc and to permit return of excess water around the disc to the reservoir. A valve means is movably disposed to cover a central inlet aperture and there is means connected to the valve to variably control the water flow through the central aperture by operation of the valve. A slot means is provided in the front of the iron support structure and is aligned with the disc at its low horizontal inclination to discharge a spray of water downwardly to the ironing surface. Thus, the main object of the invention is to provide the slinger-disc spray assembly of a particular type which is an improvement on the basic slinger spray assembly of copending application Ser. No. 882,835 filed Dec. 8, 1969 for a spray iron that is not subject to clogging and may use any tap water available.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevation, partially in section, showing the location of the invention in a spray iron; and

FIG. 2 is a view taken on the line 2-2 of FIG. 1 showing the slinger disc and baffle.

Referring to FIG. 1, an iron embodying this invention typically includes a soleplate 10, connected cover 12 and operating handle 14. In accordance with conventional practice, soleplate 10 may be cast from a material, such as aluminum, with an electrical heating element cast into position. The heating element generally is of the sheathed-type in which the electrical resistance element extends through an outer tubular protective sheath with the heating element separated from the outer sheath by an electrical insulating compound resistant to heat such as a mass of granulated and compressed magnesium oxide as well-known in the art. In the usual manner, the heating element extends in a loop from the rear of the iron along one side to the forward or pointed end and then rearwardly along the other side. Thus, a substantially uniform heat distribution is provided, especially when an aluminum soleplate is employed. The iron may include structure for controllably generating steam for use as a steam or dry iron as desired, and such iron structures are well known, a typical example being shown in U.S. Pat. No. 2,991,572 of common assignment. Since the structure for generating and distributing the steam is well-known, no reference or illustration is shown herein. In such irons, a water tank or reservoir is provided to supply water to the soleplate 10 for steam generation as shown in the above-referenced patents.

In accordance with the invention, it is desired to use ordinary tap water for spray purposes and this is simplified by avoiding any fine passages or orifices that are subject to clogging by flakes or mineral deposits. To provide a simple water sprayer attachment, handle 14 is formed with a hollow front portion 16 that acts as a support as will become apparent. In order that the hollow front handle support may be used for a spray slinger assembly to be described, a water reservoir 18 is extended forward under the support and is secured thereto in fluidtight sealing engagement. To support the slinger assembly, a bearing means 20 is provided in the support in a suitable partition extending across the hollow portion. As part of the spray slinger assembly, generally indicated at 22, there is provided a preferably round hollow lifting tube 24 that is inclined from the vertical as shown, the tube communicating with the bottom of the reservoir for removing the maximum amount of water from the reservoir. Support of the entire slinger assembly 22 is from bearing means 20 carried by the partition in the hollow front handle support so that the assembly is supported at its top for rotation in the support handle lengthwise of the tube.

For a purpose to be described, the tube is closed at its lower end except for a preferably single central aperture 26 or equivalent that acts as a water inlet from water reservoir 18 while preventing a complete open lower tube end. In order to supply an evenly dispersed spray, a slinger member preferably in the form of a round disc 28 is floatingly supported on and closes the upper end of tube 24 substantially as shown. Any suitable means of supporting the disc will suffice, it being important only that the disc rotate with the tube and be floatingly supported to allow up-and-down movement with respect to the tube to open and close the upper end of the tube.

To improve on the pumping and lifting capacity over the structure of the aforementioned copending application, it is advantageous to increase the diameter of the tube from bottom to top to utilize the radius function of the centrifugal force formula of $F=mv^2/r$, where F is the centrifugal force, v is the angular velocity and r is the radius. Thus, as the water rises, its motion is accelerated outward to a higher velocity to make room for additional water faster at the lower intake end of the tube. It has been found that a highly efficient tube form is somewhat parabolic where the diameter of the tube increases nonlinearly from the lower end to the disc as shown in FIG. 1. With this arrangement, it is possible to use a very small driving motor to overcome the head of water necessary to lift the inch or 2 from the reservoir to the slinging disc 28. Thus, a small horsepower constant r.p.m. motor efficiently pumps with the tube structure described. While the diverging and parabolic shape is not necessary, but is preferred, it is important that the lower end of the tube be substantially closed to prevent the water running the wrong direction back into the tank. This is the purpose of the closed lower end with the aperture means 26 for the water inlet. Thus, a cup is formed to prevent the water from reverse flow into the tank except through aperture 26 which is subject to water flowing in as it is rapidly expelled from disc 28 during operation.

To assist in pumping through tube 24, it is desirable to provide a baffling means generally indicated at 30 disposed in the tube and interrupting the inner periphery of the tube so that the water cannot slip on the inner surface and will thus move upwardly towards disc 28. While any suitable baffling that interrupts the inner periphery is suitable, a convenient and efficient form is a flat plate 32 that bisects the tube substantially lengthwise thereof from its lower inlet end to the disc and as shown in FIG. 2. Because the baffle extends to the bottom of the tube, it is necessary to provide an opening 34 in the plate to permit water entry to each side of the plate as seen in FIG. 1.

In order to control the amount of water to the slinger assembly and thus the density of the spray, there is provided a valve means 36 of any suitable form and conveniently, as shown in FIG. 1, comprised of a flat leaf-spring that is movable and disposed to control water entry to aperture 26 either directly or through an intermediate aperture 37 that may be formed in stationary housing structure 38. The valve may be variably controlled as, for example, by spray control knob 40 that may be suitably calibrated and, with an internal cam 42 connected to operate control rod 44 secured to the valve to variably control the inlet water flow through aperture 37 to the slinger assembly as will be apparent.

In order to operate the spray assembly, any suitably controlled driving means, such as motor 46, may be carried on the other side of the partition or support and connected through a shaft rotating in bearing 20 to the slinger assembly to rotate the assembly on the axis of tube 24. It will be appreciated that motor 46 may be located elsewhere and the box is merely representative of a driving means that could take the form of the motor suggested or it may represent a pulley structure as driven from a motor in another portion of the iron. A suitable switch structure 48 actuated by button 50 is connected to driving means 46 for control thereof.

To permit the rising water to exit, a discharge opening 54 in the handle support is provided. For return of excess water to the reservoir 18, there is provided passage means, generally indicated at 52, around the disc 28 and extending above the

disc to permit it to rise vertically and provide an annular opening between tube 24 and disc 28. The passage means 52 thus serves two functions, i.e., it permits the disc to rise a small distance vertically for exit of the water and it permits the excess flowing around the disc to drain back into water reservoir 18 through slots 58. Because the closed tube 24 may open in an upward direction as shown, it is convenient to connect the slinger assembly to drive means 46 by sleeve 56 and baffle 32, since there is no central support otherwise for the slinger assembly.

For directing the spray to the ironing surface, the entire assembly is inclined as described and oriented so that the rotating disc is in a downwardly inclined plane and aligned at its low horizontal inclination with slot means 54 in the front of the iron. The slot is in the form of a segment in the front of the handle support of any arc length, depending on the spray characteristics desired and any suitable adjustment, not shown, may be provided on the front of the iron to vary the arc length of the slot and direct the spray to the ironing surface as shown by the spray lines. Additionally, suitable drippage preventing means, such as lips, as indicated in said copending application, may be provided along the slot edges and turned inwardly so that water striking the slot edges is trapped and directed back to the reservoir directly below.

It will be apparent that rotation of hollow tube 24 causes the water in reservoir 18 to rise in the tube and the water is always assured of being in the tube by reason of the closed lower end except for aperture 26. The inclination of the tube from the vertical has two functions; e.g., it meets the space limitations which would prohibit a vertical tube while also enhancing the lifting characteristics of the rotating tube 24 with its internal baffling. The inclination additionally permits the spray to be directed to the ironing surface and the slinger effect drives the water into the cloth, which is preferred to normal spraying on the surface, since it then directly relaxes the cloth. The relaxing is a relieving of the imposed tensions and the cloth assumes a substantially flat plane resulting in easier ironing. The novel slinger assembly structure permits adjustable sprays by control of the water flow by means of valve 36 from a heavy through to a light spray as determined by cam 42. Disc 28, of course, lifts to open an annulus between it and tube 24 depending on the volume of water flow as determined by the valve means setting. Small amounts of water may enter between tube 24 and housing 38 and to prevent this the space is purposely kept minimal although any water returns directly to reservoir 18.

This slinger structure in a spray iron provides a simple and highly effective and selective finely divided spray that is driven forcibly into the material. Tap water from substantially any locality may be used and the sprayer is not subject to obstruction since there are no small passages or apertures subject to clogging. Of course, the sizes of the aperture, the disc and the change in tube diameter as well as the speed of driving means 46 all determine the volume and penetration and these are selected to create the characteristics desired.

While there has been described a preferred form of the invention, obvious equivalent variations are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced, otherwise than as specifically described, and the claims are intended to cover such equivalent variations.

I claim:

1. In a spray iron,
 - a hollow front handle support,
 - a water reservoir,
 - a slinger assembly disposed for rotation in said support, said assembly comprising:
 - a hollow tube inclined from the vertical and communicating at one end with said reservoir,
 - said tube having an apertured bottom on said one end,
 - a disc member floatingly supported on and closing the other end of said tube, and
 - baffling means disposed in said tube to interrupt the inner periphery thereof,

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motor and control means connected to rotate said assembly, and

slot means in the front of said support aligned with said disc member at its low horizontal inclination to discharge a spray of water downwardly to the ironing surface.

2. Apparatus as described in claim 1 wherein passage means is provided around said slinger assembly and extending above said disc member to permit vertical movement thereof and for return of excess water to said reservoir.

3. Apparatus as described in claim 2 wherein valve means is disposed at said apertured tube bottom, and means connected to said valve to control water flow through said apertured end.

4. Apparatus as described in claim 3 wherein said baffling extends across said tube substantially lengthwise thereof from the valve to the disc, and

an opening in said baffle at the apertured end to permit water entry on each side of said baffle.

5. In a spray iron,

a hollow front handle support,

bearing means in said support,

a water reservoir extending under said support,

a slinger assembly disposed at one end in said bearing for rotation on one side thereof in said support, said assembly comprising;

a hollow round tube inclined from the vertical and communicating at its lower end with the bottom of said reservoir,

said tube being closed at the lower end except for a single central aperture,

a round disc floatingly supported on and closing the

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upper end of said tube at right angles thereto, said tube increasing in diameter from said aperture to said disc, and

baffling means disposed in said tube to interrupt the inner periphery thereof,

controlled driving means on the other side of said bearing and connected through said bearing to said assembly to rotate said assembly about the axis of said tube, and

slot means in the front of said support aligned with said disc at its low horizontal inclination to discharge a spray of water downwardly to the ironing surface.

6. Apparatus as described in claim 5 wherein passage means is provided around said slinger assembly and extending above said disc to permit vertical movement thereof and for return of excess water to said reservoir.

7. Apparatus as described in claim 6 wherein said baffle means is connected to said driving means for support of said assembly by said bearing,

valve means movably disposed to cover said central aperture, and

means connected to said valve to variably control water flow through said central aperture.

8. Apparatus as described in claim 7 wherein said baffle means is a flat plate bisecting said tube substantially lengthwise thereof from the valve to the disc, and

an opening in said plate at said aperture to permit water entry to each side of said plate,

9. Apparatus as described in claim 8 wherein the diameter of said tube increases nonlinearly from said valve to said disc.

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