

April 2, 1968

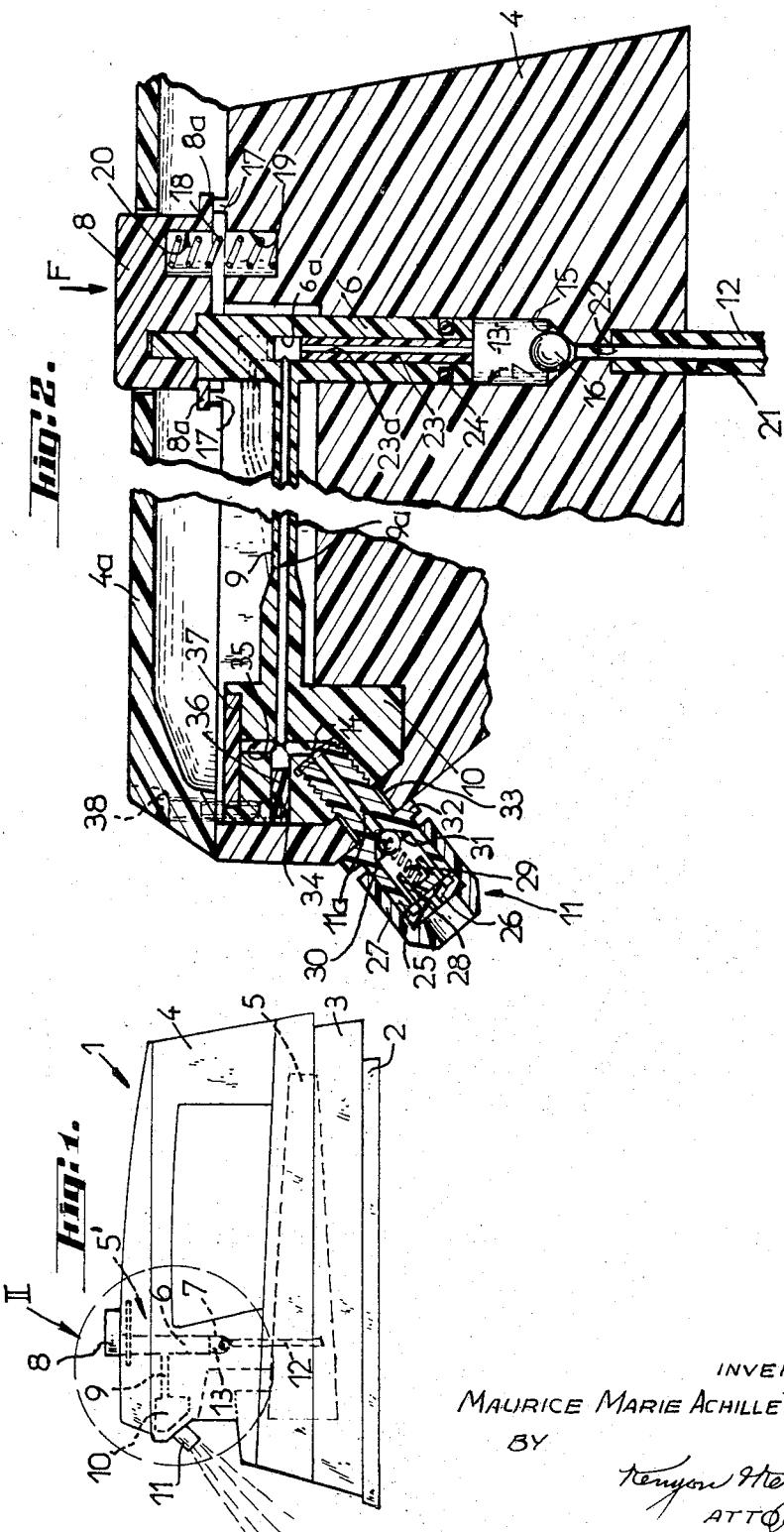
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3,375,599

WATER-ATOMIZATION IRONS

Filed Oct. 25, 1966

2 Sheets-Sheet 1



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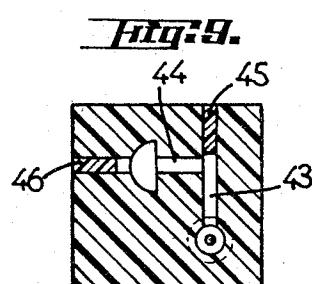
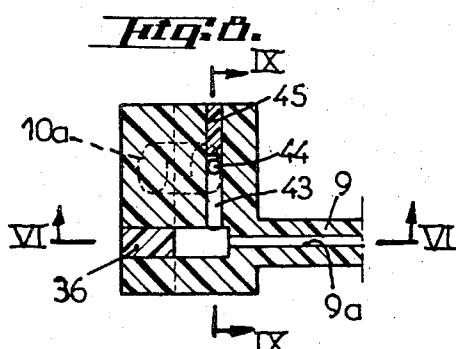
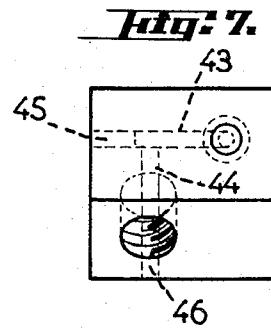
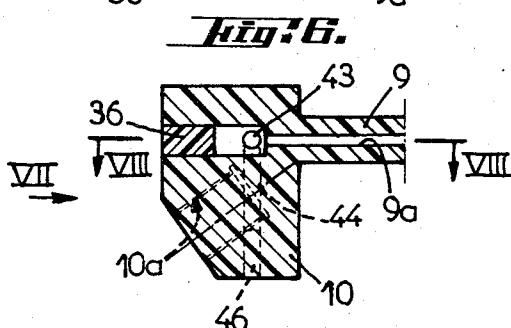
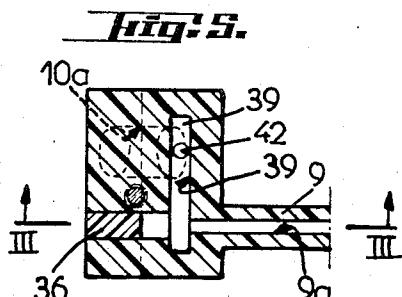
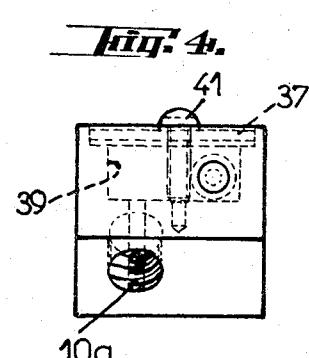
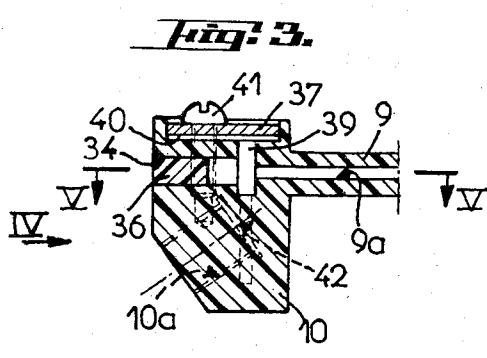
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WATER-ATOMIZATION IRONS

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2 Sheets-Sheet 2



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WATER-ATOMIZATION IRONS

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7 Claims. (Cl. 38—78)

Laundry irons of the so-called steam-spray type are well-known nowadays. In irons of this type water contained in a reservoir is converted by adequate means into steam emerging through holes formed in the lower surface of the ironing or base plate.

However, the resulting humidification of the fabric thus ironed is generally still assumed to be insufficient for certain textile materials require a real water spray to be suitably ironed.

Therefore, irons equipped with a water dispensing device have been proposed. This device consists of a small pump housed as a rule in the iron handle and capable of drawing water from the reservoir and spray it in the form of a fine atomized jet ahead of the iron.

These atomizers consist as a rule of a conventional pump body connected to a rigid pipe welded to a spray nozzle. A first valve is disposed at the lower portion of the pump body for drawing water from the reservoir, and another valve is disposed before the spray nozzle for forcing the water therethrough.

In all cases the piston consists of a simple cylindrical rod having at one end a seal member or packing engaging the pump body, said rod being adapted to be actuated by means of a push-button emerging from the top of the iron handle.

It is the chief object of the present invention to provide improvements in an iron of this general type, that is, comprising a device adapted to spray water from a water suction duct communicating with a reservoir housed in the iron and a pump comprising a piston reciprocally movable in a cylinder to form therein a chamber of variable cubic capacity, a first water-retaining valve opening under suction conditions and preventing the return of water to said reservoir during the atomization strokes, a second valve opening as the water forced out from the pump is atomized by a nozzle-forming element disposed for example ahead of the iron, said last-named valve preventing the suction of external air when water is being drawn from the reservoir.

A laundry iron constructed according to this invention is remarkable notably in that a blind hole is provided in said piston and that a flexible duct of reduced cross-sectional section connects said blind hole in the vicinity of its closed end to said nozzle fixedly mounted in the handle of the iron.

According to another feature characterizing this invention, the piston and flexible duct are moulded integrally from flexible synthetic material.

According to a further feature characterizing this invention, said cylinder consists of an orifice formed in a fixed portion of the iron handle and connected through a duct to said reservoir; resilient piston-return means are provided and the piston consists of a solid rod formed with the aforesaid blind hole coaxially thereto. Thus, the upper portion of the piston is solid. With these features a particularly simplified construction of the laundry iron and its water-atomizing device is obtained while affording a much more reliable operation. Notably, the piston-forming sealing member engaging the pump body in prior art devices of this character was objectionable on account of its very rapid wear, hardening and aging. Therefore, the operation of the atomizing or spray device rapidly

2

became unsatisfactory. Now, none of these inconveniences is observed with the arrangement constituting the subject matter of the present invention.

Other features and advantages of this invention will appear as the following description proceeds with reference to the accompanying drawings given by way of example and wherein:

FIGURE 1 is a diagrammatic sectional and elevational view showing the manner in which the spray device is mounted in the handle of a laundry iron;

FIGURE 2 is a sectional view with parts broken away showing on a larger scale the detail denoted II in FIGURE 1, that is, concerning the atomizer proper;

FIGURE 3 is a sectional view showing a detail of the device illustrated in FIGURE 2, according to a modified form of embodiment, the section being taken substantially upon the line III—III of FIGURE 5;

FIGURE 4 is a view from outside of the device shown in FIGURE 3, as seen substantially in the direction of the arrow IV;

FIGURE 5 is a section taken substantially along the line V—V of FIGURE 3;

FIGURE 6 is a view similar to FIGURE 3 but showing another modification, this view being taken substantially in section taken upon the line VI—VI of FIGURE 8;

FIGURE 7 is a view from outside of the arrangement of FIGURE 6, as seen substantially in the direction of the arrow VII;

FIGURE 8 is a sectional view taken substantially upon the line VIII—VIII of FIGURE 6, and

FIGURE 9 is a section taken substantially along the line IX—IX of FIGURE 8.

Reference will first be made to FIGURE 1 of the drawings. In the arrangement shown diagrammatically in this figure a laundry iron 1 comprises essentially an ironing or base plate 2, a cover 3 and a handle 4 overlying this cover. Of course, all the conventional component elements of a laundry iron are enclosed in the cover 3. Within this cover a reservoir 5 adapted to contain an adequate reserve of water is disposed. This iron is for example of the steam spray type, that is, comprising a suitable water-vaporization device (not shown) together with duct means directing the water steam to suitable locations of the underface of the ironing or base plate 2.

A water atomizing device 5' constituting the subject matter of the present invention is housed in the handle 4. This device comprises essentially a piston 6 reciprocally and slidably movable in a cylinder 7 consisting of a bore formed in one portion of said handle 4, a push-button 8 for actuating the piston 6 a flexible duct 9 rigid with said piston 6 and connecting a blind hole 6a formed in the piston 6 (FIGURE 2) to an outflaring end portion 10 having suitably mounted therein the nozzle 11 for spraying water in front of the iron. A suction duct 12 connects the chamber 13 formed between the piston 6 and cylinder 7 to the water reservoir 5.

Referring to FIGURE 2 of the drawings it will be seen more in detail that the piston 6 has formed therein a substantially axial bore 6a forming a blind hole therein its upper end being spaced from that of piston 6. The bore 9a of duct 9 opens at one end into the bore 6a formed in piston 6 in the vicinity of the closed end of said hole and at its opposite end into a slot or duct 14 communicating in turn with the inner bore 11a of nozzle 11.

The base of said chamber 13 or, in other words, of cylinder 7 constitutes a frusto-conical valve seat 15 engageable by a ball valve 16 to prevent the water from being forced back through the suction passage 12 into the reservoir 5.

The push-button 8 is rigid with the upper end of piston 6, for example by being force-fitted or cemented thereon.

In FIGURE 2 this button 8 is shown in its fully depressed position in which its peripheral portion 8a abuts against suitable projections 17 of handle 4. This push-button 8 is normally urged to its uppermost or inoperative position by a return spring 18 engaging on the one hand a cavity 19 of handle 4 and on the other hand a recess 20 of push-button 8.

The duct 12 providing the communication between the chamber 13 and reservoir 5 is for example force-fitted in a bore 21 concentric to bore 22 interconnecting the passage 12 and chamber 13.

Mounted in turn in the hole 6a is a pipe 23 having a bore 23a of reduced cross-sectional dimension for the purpose of reducing, as a matter of fact, the diameter of bore 6a. The reference numeral 24 designates a packing for sealing the joint between the piston 6 and cylinder 7.

The nozzle 11 constitutes an insert for example screwed in the outflared portion 10, and may consist of several component elements suitably assembled with one another for example by gluing or cementing. Thus, in the example illustrated the nozzle 11 comprises in succession a main cylindrical body 25, a grid 26 through which the atomized water is dispensed, and a socket 27 for mounting this grid on the body 25. Mounted in this body 25 and bearing against the grid 26 is a disk 28 engaged by one end of a coil compression spring 29 constantly urging a ball valve 30 against a frusto-concical seat 31 to seal the access to the bore 11a. The body 25 further comprises a flange 32 whereby, when the nozzle 11 is screwed in said portion 10, said nozzle and said portion 10 can be rigidly secured to the handle 4 about the orifice 33 provided for the passage of the screw-threaded end of the nozzle.

Advantageously, the piston 6, pipe 9 and portion 10 form an integral moulded unit of suitable relatively flexible synthetic material. The cylinder-forming orifice or bore 7 provided in the handle 4 is suitably bored in this handle or formed by moulding, the handle 4 consisting as a rule of a material such as thermosetting resin, for example the one known under the trade name of "Bakelite."

To permit the moulding of the piston 6, pipe 9 and portion 10 as a unitary structure, the bore 9a and slot 14 lead through adequate orifices to the outside of said portion 10. These orifices are subsequently properly sealed by using plugs 36 and 37 or the like.

The mode of operation of the device described hereinabove is clearly apparent from the drawings.

Assuming firstly that the atomizing device is not primed when the user depresses the push-button 8 in the direction of the arrow F, the air contained in the device is expelled through the nozzle 11, the valve 16 reclosing to prevent the ingress of air into the reservoir 5 while valve 30 opens (by overcoming the resistance of spring 29). The user then releases the push-button 8 which rises under the action of return spring 18. As the volume of chamber 13 increases and valve 30 is seated at 31, valve 16 opens and water is allowed to flow into the device from the reservoir, that is, into chamber 13, through duct 12. Another depression of push-button 8 in the direction of arrow F will cause the water contained in chamber 13 to be forced out through the outlet nozzle 11, since valve 16 is closed. Thus, the device is primed and will operate each time the user exerts a pumping action thereon. Of course, the smaller the cross-sectional dimension of passage 23a in duct 23, the easier the priming, since a minimum amount of air will be trapped initially in the device.

As the pipe 29 consists of flexible material it will undergo a simple deformation during the reciprocations or strokes of piston 6, from the lowermost position shown in thick lines in FIGURE 2 to the uppermost position shown in dotted lines in the same figure.

Fitting the device in the iron handle is a particularly simple matter if care is taken to provide a portion 4a forming a cap, and adapted to be secured to this handle 4 for example by means of screws such as those shown at 38.

According to a detail modification illustrated in FIGURES 3 to 5 of the drawings and wherein the same reference numerals designate the similar elements of the device shown in FIGURE 2, a slot 39 is formed in the aforesaid portion 10 to provide a communication between the bore 9a of pipe 9 and the nozzle proper. In other words, this slot 39 acts substantially like the slot 14. The upper portion of slot 39 is sealed by means of a member 37 and a gasket 40 suitably maintained on said portion 10 for example by means of a screw 41. The position of this slot 39 can easily be inferred from FIGURES 3 to 5.

With this alternate form of embodiment it is clear that it is not necessary to strictly align the bores 9a and the axis of the tapped portion 10a engaged by the screw-threaded portion of nozzle 11.

Thus, the machining and moulding of member 10 are greatly facilitated. As already explained hereinabove, the purpose of plug 36 is to seal by means of a detachable rod the orifice 34 in front of the bore 9a having permitted the moulding of this bore. Similarly, the plate 37 and gasket 40 seal the orifice having permitted the moulding of the slot 39 and the orifice 42 connecting this slot to the axis of bore 9a.

In the modified form of embodiment shown in FIGURES 4 to 9 of the drawings, the slot 39 connecting the bore 9a to the axis of the tapped portion 10a is replaced by a pair of perpendicular holes 43, 44 sealed by means of plugs 45 and 46 respectively. The positions of these bores is clearly apparent in FIGURES 6 to 9. The other portions constituting the device are identical with those shown in FIGURES 3 to 5; therefore, they are designated by the same reference numerals.

Of course, this invention should not be construed as being limited by the specific forms of embodiment described and illustrated herein which are given by way of example only and to which many modifications and variations may be brought without departing from the scope of the invention as set forth in the appended claims.

What I claim is:

1. Laundry iron of the type including a device for atomizing water by means of a pump from a water-suction duct communicating with a reservoir housed in the iron and for projecting said water through a nozzle located at the front of the iron wherein said pump comprises a piston reciprocally movable in a cylinder, said piston forming in said cylinder a chamber of variable volume, a blind hole being provided in said piston and opening into said chamber, a flexible duct of reduced cross sectional section being connected respectively by one of its ends to said blind hole in the vicinity of its closed end and by the second of its ends to said nozzle which is fixedly mounted in the handle of the iron, a first water-retaining valve being provided at the bottom of said chamber opening for drawing water into said chamber and preventing it from being forced back to said reservoir and a second valve being provided at the output of said nozzle opening for ejecting the water out of said nozzle during the atomization of the water and shutting for preventing the suction of air during the suction of water into said chamber from said reservoir.

2. Laundry iron according to claim 1, wherein said piston and said flexible duct are moulded integrally from flexible synthetic material.

3. Laundry iron according to claim 1 wherein said cylinder consists of an orifice formed in a fixed portion of the iron handle, which orifice is connected through a duct to said reservoir and resilient means are provided for returning the piston consisting of a solid rod formed with said blind hole co-axially thereto.

4. Laundry iron according to claim 1 wherein a small pipe is inserted in said hole reducing the cross-sectional passage section in said hole.

5. Laundry iron according to claim 1 wherein said nozzle is mounted as an insert extending through an orifice formed in a wall of said iron handle and being screwed in an outflared end portion of said flexible duct, said wall of said handle being clamped between said outflared portion of the duct and said nozzle.

6. Laundry iron according to claim 5 wherein the passages formed in said flexible duct and in said nozzle are connected by slots or ducts provided in said outflared end portion. 10

7. Laundry iron according to claim 6 wherein said passages, slots and ducts are obtained when moulding said outflared end portion and said slots and ducts open to the outside by orifices which are sealed by separated plugs.

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