

STEAM IRON

5 The invention relates to a steam iron having a shell, a sole plate, a heating element, a water reservoir, a steam chamber, a steam needle for the inflow of water from the water reservoir into the steam chamber, and a pump mechanism comprising a pump piston, a piston chamber in which the piston can move, inlet and outlet ports for the piston chamber, a return spring and a control element for moving the piston in the opposite direction
10 so as to pump water from the pump reservoir.

US-3,165,843 discloses a steam iron having a pump mechanism by means of which a quantity of water can rapidly be pumped into a steam chamber so as to obtain a high steam production. The object thereof is to enable appropriately smooth ironing of very
15 crinkled materials. The pump mechanism includes a piston which is rigidly secured to the steam needle. A piston chamber is positioned at the lowest point in the bottom of a water reservoir. The steam needle has such a profile that it combines
20 a normal controllable steam function with a function to obtain extra steam. This means that the requirements as regards accuracy, particularly for the steam needle, are extra high, more specifically as regards a properly controllable steam production during the normal steaming operation.

25 The invention has for its object to provide a simple pump mechanism for a steam iron.

According to the invention there is provided a steam iron having a shell, a sole plate, a heating element, a water reservoir, a steam chamber, a steam needle for the inflow of water from the water reservoir into the steam chamber, and a pump
30 mechanism comprising a pump piston, a piston chamber in which the piston can move, inlet and outlet ports for the piston chamber, a return spring, a control element for moving the piston in the opposite direction so as to pump water from the pump reservoir, and a cup-shaped valve member of a resilient material accomodated
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in the piston chamber, the cup-shaped valve member providing a suction valve formed by a flexible peripheral wall portion which bears on a wall of the piston chamber but which separates from that wall when there is an underpressure in the piston chamber to allow water to be sucked in from the water reservoir and a delivery valve formed by two abutting flexible wall portions which separate to form a slit-like aperture when there is an overpressure in the piston chamber to allow delivery of water from the piston chamber.

If the pump mechanism is to be used to obtain an additional quantity of steam, the pump mechanism may be incorporated in the steam needle, which is provided with a bore constituting the piston chamber, and with two channels, one of which is a pressure channel between the piston chamber and the steam chamber, the other one is a suction channel between the piston chamber and the water reservoir. In contrast with the construction disclosed in US-A-3,165,843 it is indeed possible in the present design to remove the steam needle in its totality from the iron to remove any scale.

The pump mechanism can alternatively be used as a pump for a spraying device of an iron.

The invention will now be described in greater detail by way of example with reference to an embodiment shown in the accompanying drawings.

Figure 1 is a partly cross-sectional view of a part of a steam iron, and

Figure 2 shows the pump mechanism of Figure 1 to a larger scale.

The steam iron is comprised of a shell 1, which at the bottom side is closed by a sole plate 2. At its interior side the sole plate is provided with positive ribs 3 to which a plate 4 is fastened such that a steam chamber 5 is formed between the interior side of the sole plate and the plate 4. The sole plate is further provided with a heating element 6 for heating the sole

plate and also the steam chamber. The iron is further provided with a water reservoir 7.

5 A water inlet system 8 for controlling the flow from the water reservoir 7 to the steam chamber 5 includes a steam needle 9 which at its bottom side is provided with a channel 10, the channel having an outlet 11 to the steam chamber 5 and an inlet 12 to the water reservoir 7. The flow of water in the channel 10 is controllable by means of an adjusting ring 13 connected to the steam needle. The steam needle can be removed from the iron for
10 cleaning.

The water inlet system 8 is further provided with a pump mechanism 14, by means of which an additional quantity of water can rapidly be pumped into the steam chamber 5 in order to obtain a high steam production (denoted as a steam surge). This
15 pump mechanism includes a portion 15 which can move in a piston chamber 16. The piston chamber 16 has an inlet port 17 which is connected via a channel 18 to the water reservoir 7, and an outlet port 19 which is connected to the steam chamber 5 via a channel 20. The piston chamber is in the form of a bore 21 in the steam needle 9 and the channels 18 and 20 are also
20 incorporated in the steam needle.

In the piston chamber 16 a cup-shaped valve member 22 made of a resilient material is located opposite the piston 15. The bottom 23 of this valve member (see Figure 2) accomodates a
25 delivery valve 24 formed by two facing wall portions 25 and 26, which, because they are made of a resilient material, only separate when there is an overpressure in the piston chamber (working stroke), then forming a slitted aperture 27. The delivery valve 24 is positioned opposite the outlet port 19 of the piston chamber. The upright wall portion 28 of the
30 cup-shaped valve member 22 bears flexibly against the interior wall of the piston chamber 16. To that end, the wall portion 28 becomes increasingly thinner towards its free end. When there is an underpressure in the piston chamber, the flexible wall portion gets loose from the interior wall, so that an aperture is formed
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between the piston chamber 16 and the inlet port 17.

Consequently, the wall portion 28 acts as a suction valve 30.

5 A return spring 31 extends between the piston 15 and the valve member 22. The piston is connected to a control knob (push button) 33 by means of a piston rod. Depressing the button 33 causes the piston to move down against the action of the spring 31. When the button 33 is released, the spring pushes the piston up again which produces an underpressure in the piston chamber 16 and water is sucked into the piston chamber from the water reservoir 7 via channel 18, inlet port 17 and suction valve 30. 10 During the upward stroke the delivery valve 24 remains closed. When the button is depressed again, an overpressure is produced in the piston chamber and the quantity of water previously sucked into the piston chamber via the suction valve 30 is pumped to the steam chamber 5 via the delivery valve 24, the outlet port 19 and channel 20. Thus, each time the button 33 is pushed, a quantity of water is pressed into the steam chamber, the water being immediately converted into steam provided the heat capacity of the sole plate has been chosen adequately high. The steam reaches the material to be ironed via outlets (not shown) in the sole plate 2. 15 20

It will be obvious that such a pump mechanism can also be used to spray water directly onto the material to be ironed. In the iron shown in Figure 1 a second pump mechanism for spraying water directly onto the material to be ironed is provided in addition to the pump mechanism 14. In the second pump mechanism the outlet port 34 of its piston chamber 35 is connected to a channel 36 of a sprayer 37. The inlet port 38 of the piston chamber 35 is connected to a pipe 39 projecting into the water reservoir. 25 30 35

CLAIMS

1. A steam iron having a shell, a sole plate, a heating element, a water reservoir, a steam chamber, a steam needle for the inflow of water from the water reservoir into the steam chamber, and a pump mechanism comprising a pump piston, a piston chamber in which the piston can move, inlet and outlet ports for the piston chamber, a return spring, a control element for moving the piston in the opposite direction so as to pump water from the pump reservoir, and a cup-shaped valve member of a resilient material accomodated in the piston chamber, the cup-shaped valve member providing a suction valve formed by a flexible peripheral wall portion which bears on a wall of the piston chamber but which separates from that wall when there is an underpressure in the piston chamber to allow water to be sucked in from the water reservoir and a delivery valve formed by two abutting flexible wall portions which separate to form a slit-like aperture when there is an overpressure in the piston chamber to allow delivery of water from the piston chamber.

2. A steam iron as claimed in Claim 1, characterised in that the pump mechanism is incorporated in the steam needle, which is provided with a bore constituting the piston chamber, and with two channels, one of which is a pressure channel between the piston chamber and the steam chamber and the other one is a suction channel between the piston chamber and the water reservoir.

3. A steam iron as claimed in Claim 1, characterised in that the outlet port of the piston chamber is connected to a sprayer via a channel.

4. A steam iron as claimed in any one of the preceding Claims, characterised in that the return spring is arranged between the piston and the valve member.

5. A steam iron substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.
