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STEAM IRONING DEVICE

ABSTRACT

A steam clothes ironing device that includes a clothes iron (1) containing a sole plate (2; 202) that contains a front portion (21; 221) fitted with steam outlet holes (20; 220) and a back portion (22; 222) lacking steam outlet holes, the steam outlet holes (20; 220) being supplied by a diffusion chamber (30; 230) that covers the front portion (21; 221) of the sole plate, wherein the diffusion chamber (30; 230) is supplied by a steam distribution circuit that is located in a heating element (4; 204) at the thermal contact of the back portion (22; 222) of the sole plate and the diffusion chamber (30; 230) is adapted to lower the temperature of the steam coming from the steam distribution circuit so that the steam temperature at the steam outlet holes (20; 220) is between 100°C and 120°C.

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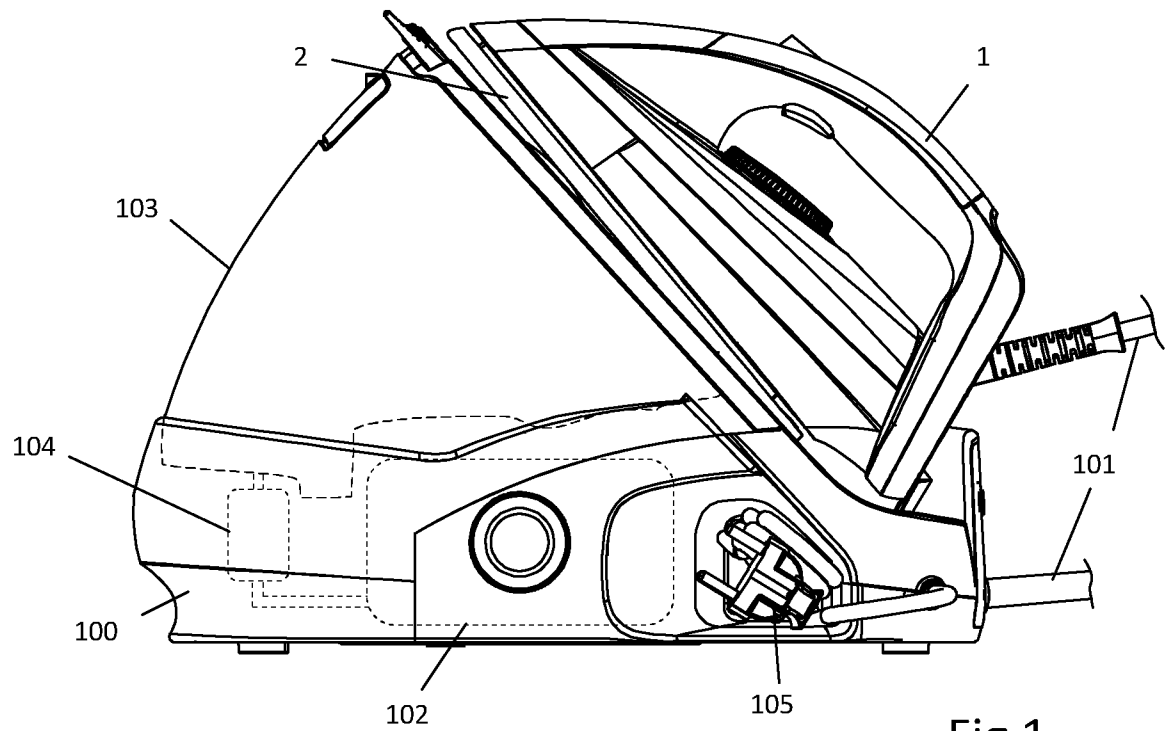


Fig 1

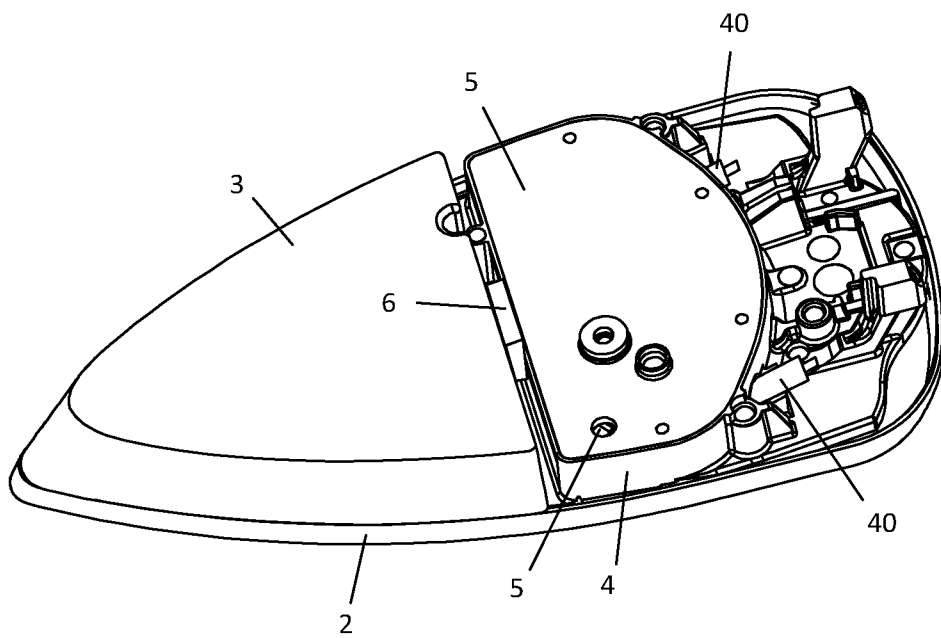


Fig 3

STEAM IRONING DEVICE

[0001] This disclosure relates to a steam clothes ironing device.

[0002] Patent application GB 2437283 discloses a steam clothes ironing device that contains a clothes iron that includes a sole plate fitted with a front portion supplied with steam outlet holes and a back portion lacking steam outlet holes, the steam outlet holes of the sole plate being supplied by a diffusion chamber that covers the front portion of the sole plate.

[0003] A clothes ironing device fitted with such a clothes iron presents the advantage of having a sole plate supplied with a steam emission area that is separate from a pressure application and clothes drying area, made up by the back portion of the sole plate, for greater ironing efficiency.

[0004] However, such a clothes ironing device presents the disadvantage of producing steam that is too dry, which does not provide optimal ironing quality.

[0005] It may be desirable for at least one embodiment of this disclosure to remedy this disadvantage by offering an ironing device provided with a clothes iron that provides high ironing efficiency. It may be desirable for at least one embodiment of this disclosure to offer a device that is simple and economic to use.

[0006] In an embodiment, the appliance includes a clothes iron containing an ironing sole plate that contains a front portion supplied with steam outlet holes and a back portion lacking steam outlet holes, the steam outlet holes being supplied by a diffusion chamber that covers the front portion of the sole plate. An embodiment of the disclosure provides a steam clothes ironing device that includes a clothes iron containing a sole plate that comes into contact with the item to be ironed and that contains a front portion fitted with steam outlet holes and a back portion lacking steam outlet holes, the steam outlet holes being supplied by a diffusion chamber that covers the front portion of the sole plate, wherein the diffusion chamber is supplied by a steam distribution circuit that is located in a heating element at the thermal contact of the back portion of the sole plate and the diffusion chamber is adapted to lower the temperature of the steam coming from the steam distribution circuit so that the steam temperature at the steam outlet holes is between 100°C and 120°C, inclusive.

[0007] The disclosure provides a steam ironing appliance comprising an iron with a soleplate for ironing, comprising a front part (e.g. front portion) equipped with steam outlets and a back part (e.g. back portion) without steam outlets, the steam outlets being supplied by a diffusion chamber that covering the front part of the soleplate, the diffusion chamber being supplied by a steam distribution circuit housed in a heating body in thermal contact with the back part of the soleplate, said heating body being equipped with a heating element to increase its temperature, wherein the diffusion chamber is housed in a non-heating body, not provided with any heating element, positioned on the front part of the soleplate, the non-heating body being separate from the heating body positioned on the back part of the soleplate, the diffusion chamber is adapted to lower the temperature of the steam coming from the steam distribution circuit so that the steam temperature at the steam outlet holes is between 100°C and 120°C at the steam outlets.

[0008] The disclosure may provide an embodiment with a steam flow with a temperature and a moisture level that may be optimised to ensure good moistening of the laundry.

[0009] Preferentially, the back portion of the sole plate may be heated solely by the thermal exchanges that occur with the heating element that receives the steam distribution circuit, and the sole plate may lack any additional heating component.

[0010] According to an embodiment, the diffusion chamber of the front portion of the sole plate may be located in a housing that has a temperature under 120°C under normal conditions of operation of the device.

[0011] Such a feature may make it possible that the diffusion chamber that does not overheat the steam.

[0012] In some embodiments, the diffusion chamber may be located in a non-heating housing, located on the front portion of the sole plate, while the non-heating housing is distinct from the heating housing located on the back portion of the sole plate.

[0013] Non-heating housing may be defined as a housing (e.g. body) lacking any heating component designed to increase the temperature of the housing. Heating housing may be defined as a housing equipped with a heating component, such as a heating resistor, which may make it possible to increase the temperature of the housing.

[0014] According to another feature, the heating housing may contain a heating component located only above the back portion of the sole plate.

[0015] According to another feature, the heating component may have a power of 500 – 800W.

[0016] According to another feature, the distribution circuit may contain a moisture removal system (e.g. a device to eliminate condensates).

[0017] According to another feature, the heating element may be a cast object (e.g. a casting) including a shielded electric resistor (e.g. a sheathed electrical element), and the steam distribution circuit may contain an overheat channel for moisture to be vaporised.

[0018] According to another feature, the heating element may be made from aluminium.

[0019] According to another feature, the heating element may contain a flat screen-printed heating component, above which a device for separating moisture, advantageously cyclonic in nature, may be located.

[0020] According to another feature, the moisture separation system may include a moisture collection container, the moisture collection container may be in thermal contact with the flat heating component and may include an outlet hole linked to a steam inlet hole of the moisture separation system.

[0021] According to another feature, the surface of the sole plate that is covered by the diffusion chamber may represent at least 30% of the entire surface of the sole plate.

[0022] According to another feature, the sole plate may be a single element and may advantageously be made out of a stainless steel sheet or an aluminium sheet no thicker than 5 mm.

[0023] According to another feature, the sole plate may be made of enamel-coated aluminium or out of stainless steel.

[0024] According to another feature, the heating element may contain an electric resistor that is embedded in a cast element that covers the back part of the sole plate.

[0025] According to another feature, the back portion of the sole plate that comes into contact with the heating element may represent at least 30% of the total surface of the sole plate and preferentially at least 50% of the total surface of the sole plate.

[0026] Such a technical feature may provide good thermal exchange between the heating element and the back portion of the sole plate intended to dry the laundry.

[0027] According to another feature, the device may include a steam-generating base that includes a container for steam generation under pressure and may be linked to the clothes iron via a line.

[0028] The purposes, aspects, and advantages of the present disclosure will be made clear from the following description of a specific embodiment of the disclosure, given by way of non-limiting example, with reference to the accompanying drawings in which:

[0029] Figure 1 is a side view of a clothes ironing device according to an embodiment.

[0030] Figure 2 is a perspective view of the bottom of a first embodiment of the subassembly comprising the sole plate, the steam diffusion chamber and the heating element that equips the clothes iron of the clothes ironing device of Figure 1, the sole plate being represented separated from the heating element and the steam diffusion chamber

[0031] Figure 3 is a perspective view of the top of the subassembly shown in Figure 2 assembled.

[0032] Figure 4 is an exploded perspective view of the subassembly of Figure 2.

[0033] Figure 5 is a perspective view of a second embodiment of the subassembly comprising the sole plate, the steam distribution chamber and the heating element that equips the clothes iron of Figure 1.

[0034] Figure 6 is an exploded perspective view of the subassembly of Figure 5.

[0035] Figure 7 is a view of the top of the subassembly of Figure 5.

[0036] Figure 8 is a cross-section view according to line VIII-VIII of Figure 7.

[0037] Only the elements necessary for understanding the disclosure have been shown. To facilitate the reading of the drawings, like elements bear the same reference numbers from one figure to another.

[0038] Figure 1 represents a clothes ironing device containing a steam-generating base 100 and a clothes iron 1 linked together by a line 101, the clothes iron 1 containing in classic form an ironing sole plate 2 with a plastic box on top that include a grip handle.

[0039] The base 100 contains a ramp on which the clothes iron 1 can be placed during inactive ironing phases and encloses, in a known manner, a container 102 for the production of steam under pressure of the order of 4 to 6 bars, the container 102 being supplied with water coming from a reservoir 103 via a pump 104.

[0040] The base 100 is linked to a domestic electricity network via an electric cord 105 which provides both electricity supply to the heating system of the container 102, which is not represented on the figures, and electricity supply to the clothes iron 1 via the line 101.

[0041] In accordance with Figure 2, the sole plate 2 of the clothes iron contains a front portion 21 fitted with steam exit holes 20 and a back portion 22 lacking steam exit holes, the front portion 21 of the sole plate 2 being covered by a non-heating element made up of a cover 3 that defines a steam diffusion chamber 30 above the steam exit holes 20 of the sole plate 2, while the back portion 22 of the sole plate 2, the back portion 22 of the sole plate 2 which is covered by a heating element 4 that has a flat lower surface that comes in contact with the upper surface of the sole plate 2 which is in contact with the heating element 4, which advantageously represents at least 50% of the total surface of the sole plate 2.

[0042] Preferentially, the sole plate 2 is made out of stainless steel or an aluminium sheet covered by enamel on its interior face, while the cover 3 is made by moulding in a cast aluminium component or in a plastic.

[0043] In accordance with figures 3 and 4, the heating element 4 contains a U-shaped electric resistor 40 that is embedded in a cast aluminium element and contains a steam distribution circuit leading into the vicinity of the electrical resistor 40, the steam distribution circuit being

limited by a back wall 41 and side walls 42 in the heating element 4 and which is sealed in its upper portion by a cover plate 5 inserted into the heating element 4.

[0044] The cover plate 5 includes a steam inlet hole 50 to which a steam tube, not shown in the figures, is attached, which is included in the line 101 that connects the steam-generating base 100 to the clothes iron 1, this steam tube being able to supply the distribution circuit with steam under pressure produced by the container 102.

[0045] Preferentially, the steam distribution circuit includes a settling chamber 43 into which the inlet hole 50 ends, and an overheat channel 44 arranged as an extension of the settling chamber 43, the overheat channel 44 twisting in the heating element 4 by going around a raised pad 45 intended to take a heating resistor control thermostat 40 and which presents a reduced diameter, which is constant.

[0046] The heating resistor 40 presents advantageously a power of between 500 and 800 W, which controls the temperature of the lower surface of the heating element 4 around a set-point temperature of the thermostat between 100°C and 210°C during an ironing session. Such a power is suited to ensure that all the moisture that may be in the steam flow coming from the line 101 is vaporised in the overheat channel 44.

[0047] The overheat channel 44 ends in the front wall of the heating element 4 at the place of an outlet hole 46, visible in figure 4, with regard to a rear lateral wall of the lid 3. The cover contains an inlet hole 31 in regard to the outlet hole 46 of the heating element 4, a gasket 6, shown only on figure 3, being interposed between the heating element 4 and the lid 3 to provide a watertight connection between the outlet hole 46 and the inlet hole 31.

[0048] As can be seen on figure 2, the steam diffusion chamber 30 is made of a cavity, the lower wall of which is limited by the front portion 21 of the sole plate and the upper and side walls of which are limited by the cover 3. The cover 3 contains projecting walls inside the diffusion chamber 30 which form a circular distribution channel 32 equipped with side slits 32A providing even distribution of the steam above the front portion 21 of the sole plate 2.

[0049] We will now describe the operation of such an ironing device.

[0050] When the device is started, the container 102 is heated and the water that it contains is brought to the boil, the steam under pressure produced by the container 102 being sent via the line 101 to the clothes iron 1. When the steam is sent through the line 101, the steam's temperature falls so that moisture may form in the steam flows that arrive in the clothes iron 1, particularly when the line 101 is cold when the device is started.

[0051] Any such moisture is eliminated when the steam flows go into the distribution circuit of the heating element 4 by being vaporised in the overheat channel 44, then the overheated steam is sent into the steam settling chamber 30 provided in the lid 3 that covers the front portion 21 of the sole plate 2.

[0052] The passage of the flow of steam in the diffusion chamber 30 is accompanied by a lowering of the steam temperature, because of the low temperature in the diffusion chamber 30 since there is no heating component on the cover 3. The temperature of the steam then falls to arrive at a temperature that is between 100°C and 120 °C, when it reaches the steam outlet holes 20 of the sole plate. The result of such a drop in temperature of the steam is to increase the level of humidity of the steam by raising the number of small droplets of water, with diameters of less than 10 µm, contained in the steam flow.

[0053] The distribution of this humid steam flow guarantees an excellent moistening of the item being ironed, without having any visible drops of water forming on the item. The front portion 21 of the sole plate 2 covered by the diffusion chamber 30 also presents the advantage of being at a low temperature, advantageously lower than 110°C, which does not overheat the fabric and contributes to a better condensation of the steam in the item to be ironed.

[0054] The ironing device produced in this way therefore presents a sole plate 2 fitted with a front portion 21, not heated, supplied with steam outlet holes 20 which provides excellent moistening of the fabric, which is guaranteed to provide good ironing results, whereas the back portion 22 of the sole plate, which is heated and lacking steam outlet holes, rapidly evaporates any moistness contained in the fabric when the clothes iron 1 is moved forward.

[0055] In this way, we have an ironing device that presents optimal ironing performance.

[0056] Figures 5 to 8 represent a sole plate subassembly 202, a heating element 204 and a steam diffusion chamber 230 according to a second embodiment, this sub-assembly being intended to equip the clothes iron 1 shown in figure 1.

[0057] In accordance with these figures, the sole plate 202 contains a front portion 221 fitted with steam outlet holes 220 and a back portion 222 lacking steam outlet holes, the front portion 221 of the sole plate 202 being covered by a non-heating element made up of a lid 203 which defines a steam diffusion chamber above the steam outlet holes 220, the back portion 222 of the sole plate 202 being covered by a heating element 204 that presents a flat lower surface that comes into contact with the upper surface of the sole plate 202.

[0058] In accordance with figure 6, the heating element 204 contains a flat screen-printed heating component 240, that comes into contact with the back portion of the sole plate 202, this flat screen-printed heating component 240 presenting advantageously a power of between 500 and 800 W.

[0059] In accordance with figures 7 and 8, the flat heating component 240 has on top of it a cyclone device 206 to eliminate moisture that contains a frustoconical cavity 260 supplied with a steam inlet hole 261 that arrives tangentially at the wall of the frustoconical cavity 260 and includes a steam outlet hole 262 located in the centre, in the upper part of the frustoconical cavity 260.

[0060] The steam inlet hole 262 is connected to a steam arrival tube, not shown in the figures, which is included in the link cord 101 that connects the clothes iron to the base 100, and the outlet hole 262 is connected by a conduit 263 to an inlet hole 231 in the upper side of lid 203.

[0061] The cyclonic device also contains a moisture collection vat 264 located in the frustoconical cavity 260. This collection vat 264 connects with the frustoconical cavity 260 via an opening 265 located in the bottom of the frustoconical cavity 260 and which comes directly into contact with the flat screen-printed heating component 240. The collection vat 264 is advantageously fitted with an outlet hole 266 that is connected to the inlet hole 261 of the frustoconical cavity 260 by a tube 267.

[0062] The lid 203 according to this second embodiment is similar to the cover 3 described previously in figures 2 – 4, its difference from the cover 3 being the location of the inlet hole.

[0063] In this embodiment, the cyclonic device 206 separates from the steam any moisture that is in the steam flow by the effect of centrifugal force. This moisture then flows along the wall of the frustoconical cavity 260, then falls into the collection vat 264 before being vaporised under the effect of the heat generated by the flat heating component 240. The steam produced from this process is reinjected by the tube 267 into the entrance of the frustoconical cavity 261.

[0064] The flow of steam that has been relieved of its moisture goes through the conduit 263, then is sent into the diffusion chamber 230 in which the temperature of the steam falls to arrive at a temperature that is between 100°C and 120 °C, when it reaches the steam outlet holes 220 of the sole plate.

[0065] The sub-assembly made up in this way of sole plate, heating element and steam diffusion chamber thus provides ironing performance similar to that obtained with the first embodiment, with the advantage, however, or greater responsiveness of the back portion of the sole plate to the set-point temperature changes of the thermostat, and the flat screen-printed component presents the advantage of having very low thermal inertia.

[0066] Of course, the disclosure is not limited to the embodiment described and illustrated which has been given only as an example. Modifications remain possible, particularly in terms of the constitution of the various elements or by substitution of technical equivalents, without however departing from the scope of protection of the disclosure.

[0067] Thus, in an embodiment version that is not represented, the vat for the production of steam could be located directly inside the clothes iron and/or be formed by an instant vaporisation chamber.

[0068] It is to be understood that, if any prior art publication is referred to herein, such reference does not constitute an admission that the publication forms a part of the common general knowledge in the art, in Australia or any other country.

[0069] In the claims which follow and in the preceding description, except where the context requires otherwise due to express language or necessary implication, the word “comprise” or variations such as “comprises” or “comprising” is used in an inclusive sense, i.e. to specify the presence of the stated features but not to preclude the presence or addition of further features in various embodiments of the appliance.

CLAIMS

1. Steam ironing appliance comprising an iron with a soleplate for ironing, comprising a front part equipped with steam outlets and a back part without steam outlets, the steam outlets being supplied by a diffusion chamber that covering the front part of the soleplate, the diffusion chamber being supplied by a steam distribution circuit housed in a heating body in thermal contact with the back part of the soleplate, said heating body being equipped with a heating element to increase its temperature, wherein the diffusion chamber is housed in a non-heating body, not provided with any heating element, positioned on the front part of the soleplate, the non-heating body being separate from the heating body positioned on the back part of the soleplate, the diffusion chamber is adapted to lower the temperature of the steam coming from the steam distribution circuit so that the steam temperature at the steam outlet holes is between 100°C and 120°C at the steam outlets.
2. Ironing appliance of claim 1, wherein the diffusion chamber of the front part of the soleplate is housed in a body that has a temperature less than 120°C under normal operating conditions of the appliance.
3. Ironing appliance of claim 1 or 2, wherein the heating body comprises a heating element extending only above the back part of the soleplate.
4. Ironing appliance of claim 3, wherein a power of the heating element is between 500 – 800W.
5. Ironing appliance of any one of claims 1 to 4, wherein the distribution circuit comprises a device to eliminate condensates.
6. Ironing appliance of claim 5, wherein the heating body is a casting enclosing a sheathed electric element, said steam distribution circuit comprising an overheating channel to vaporise the condensates.
7. Ironing appliance of claim 5, wherein said heating body comprises a flat screen-printed heating element which is surmounted by a device to separate the condensates.
8. Ironing appliance of claim 7, wherein the device to separate the condensates is of a cyclonic type.

9. Ironing appliance of claim 7 or 8, wherein the device for separating the condensates comprises a container for collecting the condensates, said container being in thermal contact with the flat heating element and comprises an outlet hole which is connect to a steam inlet hole of the device to separate the condensates.

10. Ironing appliance of any one of claims 1 to 9, wherein the area of the soleplate covered by the diffusion chamber represents at least 30% of the total area of the soleplate.

11. Ironing appliance of per any one of claims 1 to 10, wherein the appliance comprises a steam-generating base containing a tank for generating pressurised steam connected by a card to the iron.

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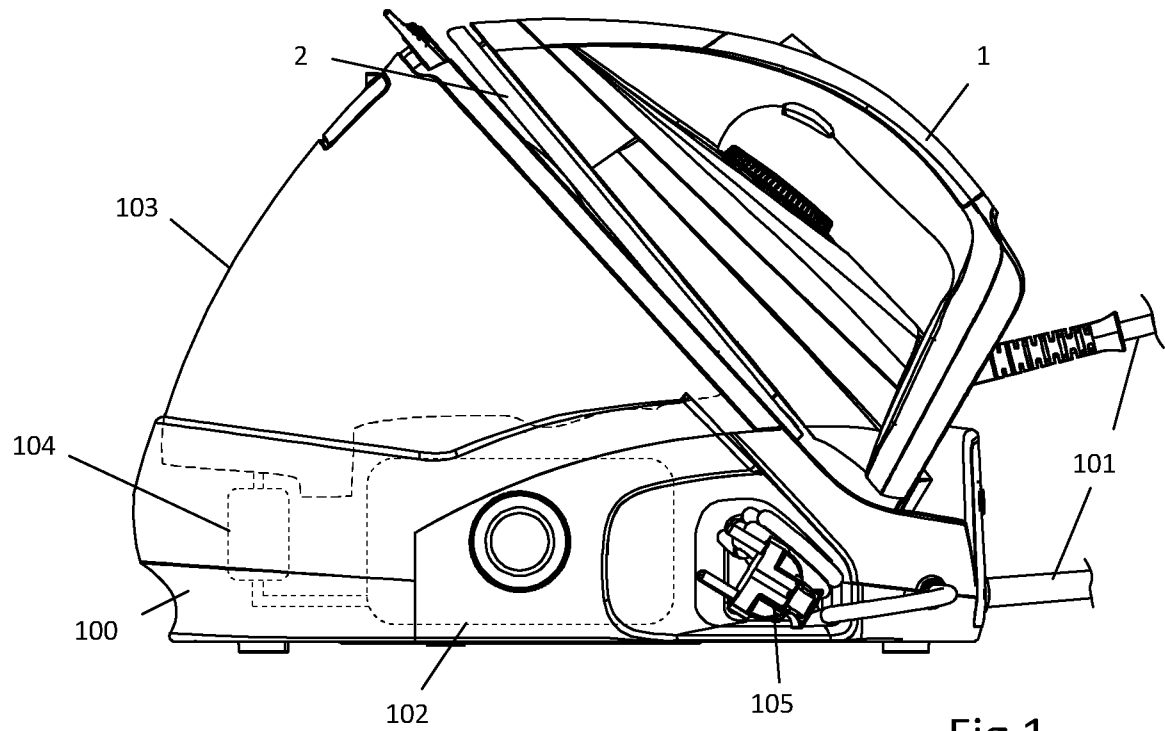


Fig 1

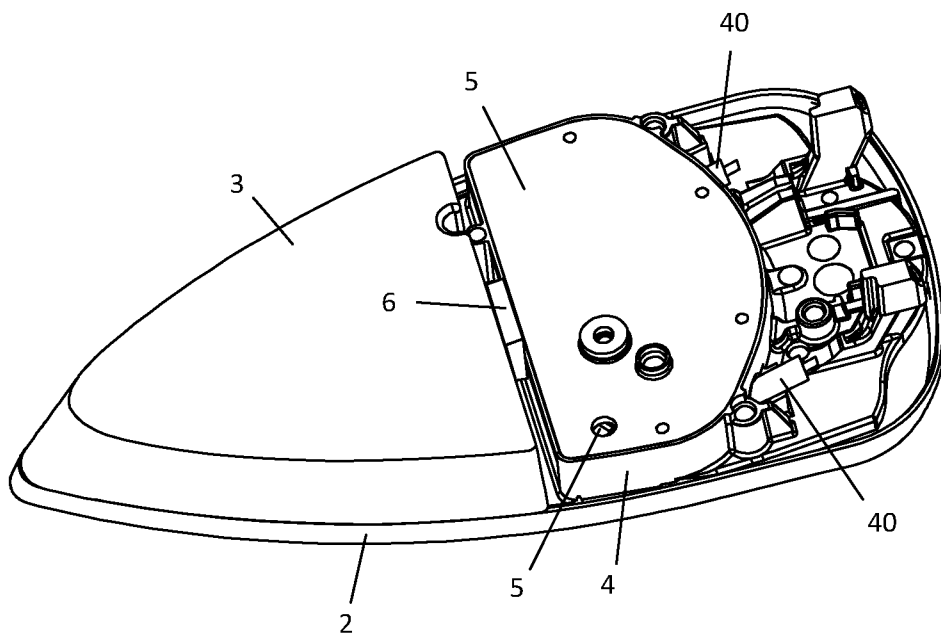


Fig 3

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Fig 2

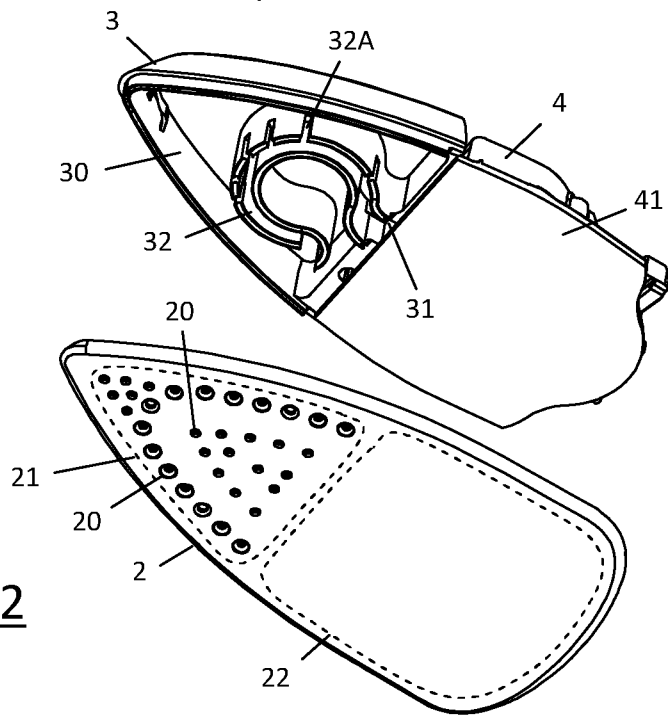
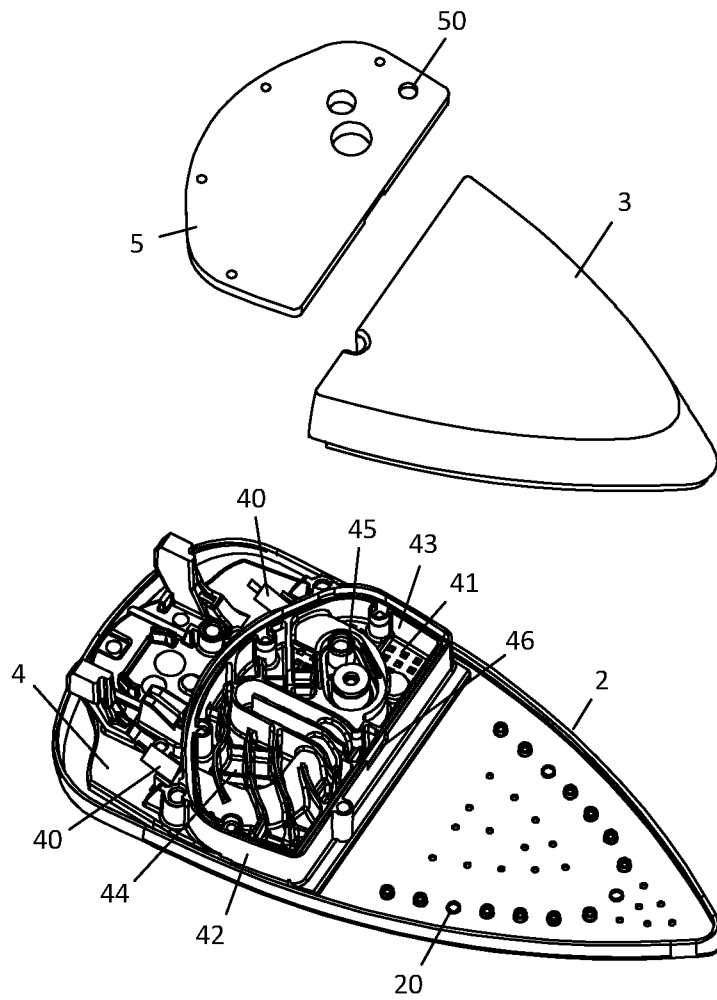


Fig 4



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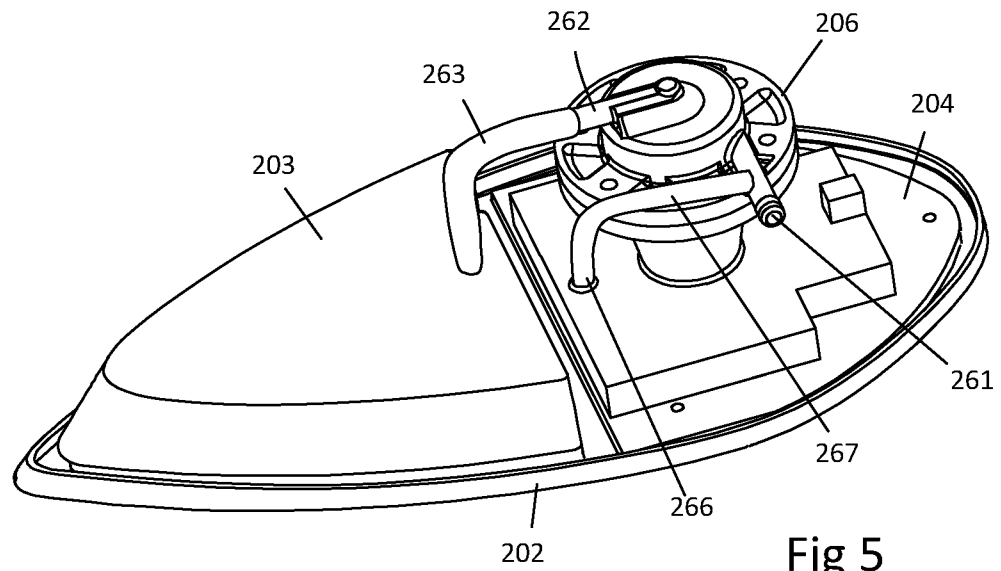


Fig 5

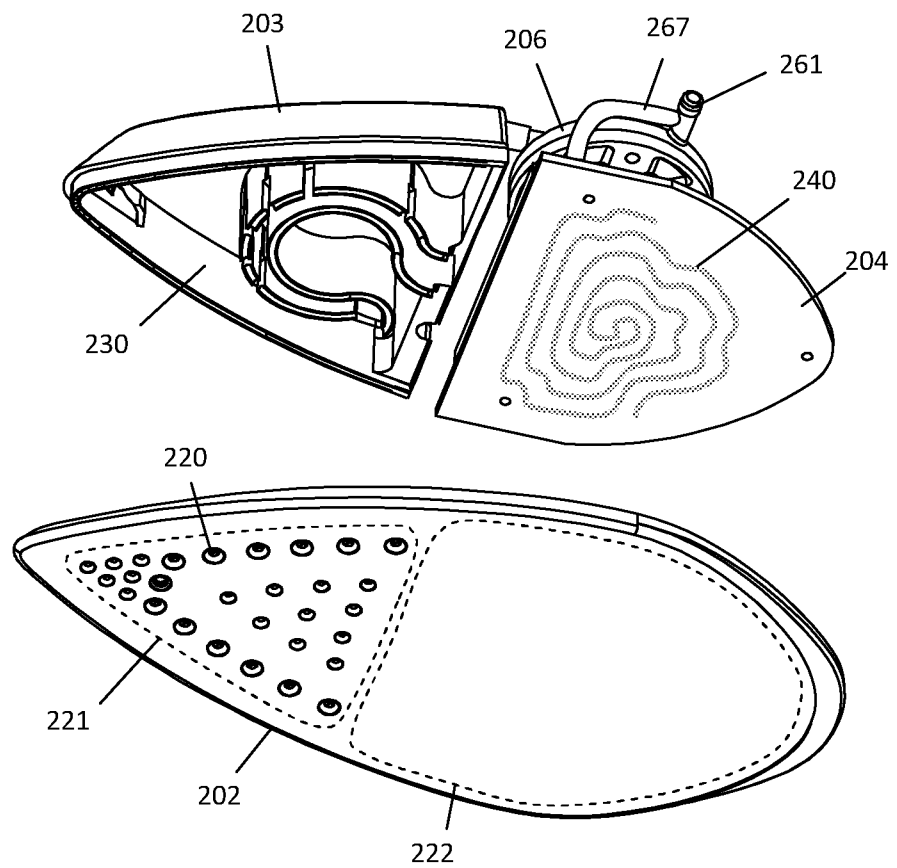


Fig 6

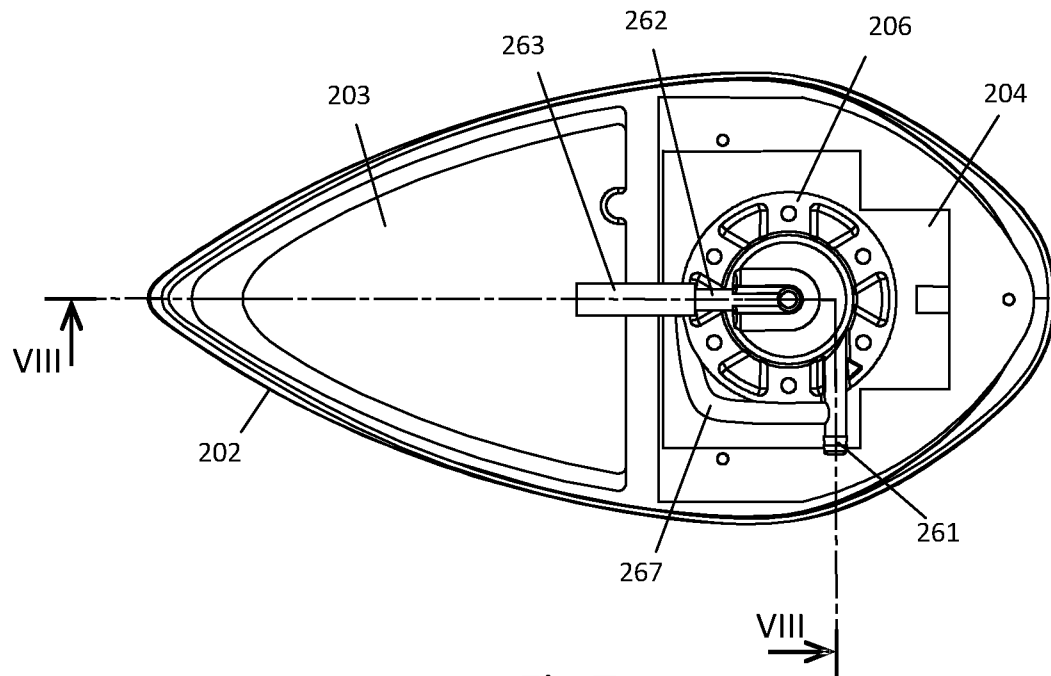


Fig 7

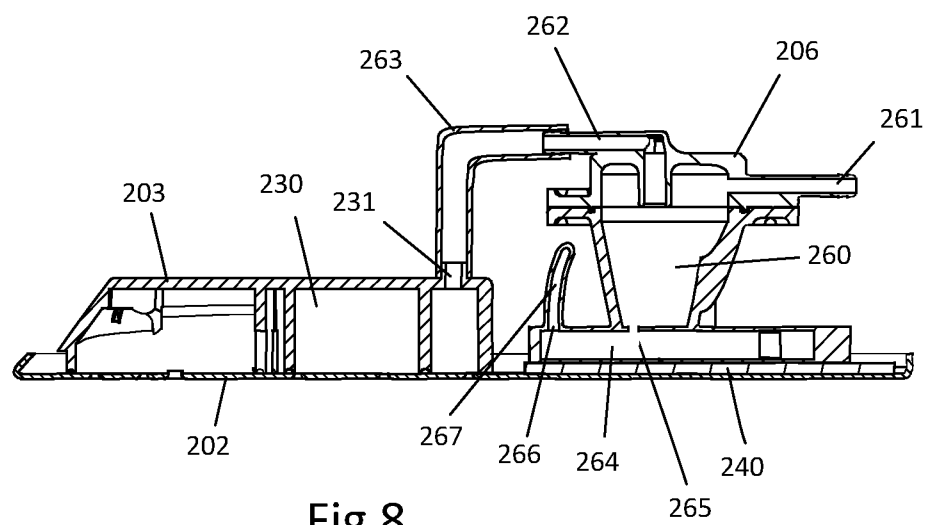


Fig 8