Household ironing appliance comprising a case including a tank and a pump supplied with liquid by the tank

English Abstract:
The appliance has a case (1) comprising a tank (2) and a high pressure pump (4) i.e. electromagnetic pump, supplied with a liquid e.g. water, by the tank. The pump is mounted to be suspended on an independent rigid support (5) by an elastic part (6), where the support is connected to the case. The support is positioned on the case using positioning fingers, where the fingers are engaged into guiding rings. The elastic part includes a central portion supporting the pump and elastic arms extended radially from the central portion. The arm is stretched between anchoring studs of the support. An independent claim is also included for a method for assembling a household ironing appliance.
The present invention relates to a household appliance ironing comprising a housing including a reservoir and a pump fluid is delivered by the reservoir.

It is known, Patent THE EP 0,843 039 deposited by the applicant, a steam generator comprising a vessel for producing steam under pressure which is supplied with water from a reservoir by a pump. Such a pump, usually of the electromagnetic type, housing for delivering water at a pressure of around 15 bar into the vessel for producing steam, the latter being provided with heating means generally regulated to produce steam at a pressure of around 5 bar.

Such an apparatus has the advantage of enabling the generation of steam under pressure which achieves a high efficiency during ironing.

However, such an apparatus includes a high pressure pump which has the drawback of being relatively noisy, particularly because of the transmission of vibrations produced by the pump to the casing and the reservoir which is then as crates of resonance.

NC 101,864 662 A2 disclosed a household appliance with the features of the preamble of claim 1. It is known prior to attempt this disadvantage by mounting the pump on a metal spring to damp the vibratory movements of the pump. However, such mounting on spring complicates the mounting of the pump in the housing, the pump being generally disposed within a built housing accessible for reasons of compactness of the housing. In addition, the mounting of the pump in the housing also requires the connection of a suction circuit of the pump, and optionally a purging circuit, with the reservoir. Gold, the presence of such a damping spring, if it is incorrectly positioned in the housing during assembly, can generate constraints cause noises. On the other hand, the connections of the suction circuit and the bleeding circuit are manual operations that can generate additional operational defects if they are improperly performed.

Also, an object of the present invention is to overcome these drawbacks by proposing an ironing apparatus, comprising a housing having a reservoir adapted to be connected to a pump disposed in the housing, wherein the pump operating noise is attenuated and the mounting of the pump is facilitated.

To this end, the invention concerns a domestic ironing comprising a housing including a reservoir and a pump fluid is delivered by the reservoir, characterized in that the pump is suspended on an independent carrier which is inserted into the housing.

By pump mounted suspended, is meant a flexible installation of the pump on the support for damping vibrations generated by the pump.

By independent carrier, is meant a carrier which is constructed by an independent part of the housing, c'est to say which is not directly integrated with the casing but which is affixed thereto such that the mounting of the pump on the support can take place outside the housing.

According to another feature of the invention, the support is rigid.
According to another feature of the invention, the holder is positioned on the casing by means of locating pins engaging in the guide rings.

According to another feature of the invention, the pump is mounted suspended on the bracket by means of an elastic piece.

According to another feature of the invention, the elastic piece has a central portion that supports the pump and includes resilient arms extending radially from the central portion, wherein the spring arms are stretched between anchoring pins of the carrier.

According to another feature of the invention, the housing includes a lower shell and an upper shell which are joined to one another, the support being fixed in the housing by being sandwiched between the upper shell and the lower shell.

According to another feature of the invention, the pump comprises a suction circuit has an inlet fitting for connection to an outlet of the reservoir, the inlet connection is carried by said carrier.

According to another feature of the invention, the pump comprises a purge circuit comprising a connection member for connecting to a lower end of a pipe carried by the housing, the connecting member is carried by said carrier.

According to yet another feature of the invention, the pump is an electromagnetic pump generates a pressure above ten bar and has a discharge pipe which is connected to a vessel for the generation of steam under pressure.

According to another feature of the invention, the vessel for the generation of steam under pressure is connected to an iron by a cord.

The invention also relates to a method of assembling a domestic ironing as hereinbefore described, comprising a housing for enclosing a pump supplied with liquid by a reservoir supported by the housing, characterized in that the pump is, in a first assembly phase, mounted suspended on an independent carrier and that, in a second assembly phase, the pump subassembly/support thus obtained is mounted in the housing.

It will be appreciated better goals, aspects and advantages of the present invention, based on the description given below of a particular embodiment of the invention, described by way of non-limiting example, with reference to the accompanying drawings in which:

- the fig. 1 is a perspective view of an ironing apparatus according to a particular embodiment of the invention;
- the fig. 2 is a perspective view, partially broken away, of the housing steam generator of the ironing apparatus of the fig. 1;
- the fig. 3 is a sectional view of the ironing machine according to the line III III of the fig. 2 wherein the pump body is however not shown in section for clarity;
- the fig. 4 is a view in exploded view of the pump subassembly shown in isolation;
- the fig. 5 is a perspective view of the subassembly of the pump fig. 4 when it is assembled in a phase prior to its being mounted in the housing;
• the fig. 6 is a perspective view of the housing steam generator disposed upside down and lacking its lower shell, during the assembly phase pump subassembly in the housing,

• the fig. 7 is a sectional view of the ironing machine according to the line VII-a-VII of the fig. 2. ;

• the fig. 8 is a perspective view of a housing steam generator according to a variant embodiment of the invention, the housing being disposed upside down and lacking its lower shell, the pump subassembly being represented in the mounting phase on the housing;

• the fig. 9 is an exploded perspective view of the subassembly of the pump fig. 8 represented in isolation;

• the fig. 10 is a similar view to the fig. 8 with the subset represented in mounted position within the housing.

Only the elements necessary for the understanding of the invention have been represented. To facilitate reading of the drawings, the same elements bear the same references at the other Figures.

The fig. 1 represents an ironing apparatus comprising a housing 1 steam generator connected to an iron 100 101 by a cord comprising, in per se known manner, a conduit for conveying the steam and electrical cables for supplying power to a resistive heater embedded in the sole of the iron 100.

As can be seen in this fig., the housing 1 includes a lower shell and an upper shell 1a 1b plastic, such as polypropylene, joined to one another, the upper shell 1 b of the housing including a tank 2 cock provided with a filling orifice closed by a retractable funnel 20, the tank wall 2 is preferably made of a transparent or translucent material to reveal the level of water in the tank 2.

According to the fig. 2, the housing 1 comprises a vessel 3 for the generation of steam under pressure which is maintained in a cavity 10 of the housing 1 by being sandwiched between the lower shell and the upper shell 1a 1 b., the vessel 3 including a lateral opening 30 communicating with a rigid conduit 31 having an axial end with a drain aperture closed by a plug 32, a visible especially on the fig. 6. The rigid conduit 31a 31 also includes a connector for connection to a discharge pipe 40 of a high-pressure pump 4, advantageously constituted by an electromagnetic pump providing a pressure of the order of 15 bar, the pump 4 being vertically disposed outside the tank 2, in a housing 11 of the upper shell 1 B forming an indentation in the bottom of the tank 2.

According to the fig. 3, the pump 4 has an inlet port 41 at its upper end which is connected to a suction circuit connected to an outlet 21 of the reservoir 2, the latter being surrounded by a connection tube 22 projecting from the lower face of the upper shell 1 b.. The pump 4 includes a discharge opening 43 at its lower end which is connected to an output connector 44 comprising a first outlet 44a communicating with a drain circuit and a second output 44b communicating with the discharge pipe 40 leading to the tank 3.
As can be seen in this fig., the purging circuit comprises a pipe connection 45 elbow having one end which is connected to a connecting pipe 23 projecting from the lower face of the upper shell 1 and b, the connecting tube 23 communicating with a pipe 24 extending vertically within the tank 2 to near the top of the tank 2. The bleed thus produced also has, as is known in the, 46 a valve which opens when the pressure downstream of the discharge port 43 is low, so as to enable the discharge of potential air bubbles present in the pump 4 to facilitate ignition thereof, and which closes when the pressure increases so that pumped water is sent towards the discharge pipe 40.

According to the figure 4 to 7, the pump 4 is supported by a support independent rigid 5 is attached in the housing 1 and on which the pump 4 is mounted suspended by the elastic piece 6 being interposed between the pump 4 and the support 5.

The holder 5 is advantageously made of plastic material, such as polyamide 6 - 6, and preferably comprises four arms 50 extending radially from a central portion 51 annular, for free passage of the lower portion of the pump 4, up to guide rings 53 provided with a cylindrical bore 53a.

The elastic piece 6 is advantageously made of silicone and includes a central portion 62 that supports the pump 4 and four spring arms 60 extending radially from the central portion 62 to anchoring pins 52 carried by the arms 50 of the holder 5.

The ends of the spring arms 60 have holes 61 in which the anchor studs 52 are engaged so that the elastic piece 6 becomes taut between the anchor studs 52, the central portion 62 which has an orifice 62a wherein the lower portion of the body of the pump 4 is fitted such that a shoulder 4a of the pump body, visible on the fig. 3, lies at the border of the opening of the central portion 62 62a.

Advantageously, the anchor studs 52 comprise lugs 52a at their upper end which engage above holes 61 of the elastic piece 6 for holding the resiliently flexible 6 on the carrier 5 and thereby form a subset of operating parts, formed by the support 5, the elastic piece 6 and the pump 4, forming a module easy to assemble in the housing 1.

Preferentially, the underside of the upper shell 1 b of the housing is provided with locator pins 13 projecting, visible on the figure 6 and 7, that engages in the guide rings 53 of the gripper during placement of the support subassembly 5/6/pump elastic piece 4 in the housing 1, the carrier 5 is immobilized in a final assembly position by being sandwiched between the top shell 1 b and bottom 1a of the housing, the latter having flanges 14 is positioned to face the locating pins to 13.

The top of the pump 4 advantageously comprises a pad 7 made of flexible material, such as an elastomer type of EPDM (ethylene propylene diene monomer), having a disk shape intended to rest on the edge region of a cavity 11 has formed at the bottom of the housing 11 so as to form an axial stop flexible contributing to damp movements of the pump 4.

As can be seen on the figure 4 and 5, the suction circuit of the pump 4 has a pipe 42 made of flexible material, preferably molded of the same material and at the same time that the pad 7, this pipe 42 is connected firstly to the inlet 41 of the pump and to one end of a rigid tube 54 is integrated with the holder 5, the other end of the rigid tube 54, visible on the fig. 3, being connected to an inlet fitting 8 made of flexible material, such as an elastomer of EPDM type.

The inlet connection 8 is advantageously retained in position on the support 5 by means of holding claws 55, carried by the support 5, engaging in lateral grooves 80 of the inlet connection 8, the inlet fitting 8 having a shape designed to automatically connect, and sealed, with the connecting tube 22 when the holder 5 is placed in the final assembly position.
Preferentially, the support 5 also includes, opposite the holding claws 55, 56 holding claws engaging in a groove 45a of the pipe connection 45 to maintain the latter in position, the pipe connection 45 being made of flexible material, such as EPDM, and having a shape designed to automatically connect, and sealingly, with the connecting tube the bleeding circuit 23 projecting from the lower face of the upper shell 1 b of the housing when the holder 5 is placed in the final assembly position.

The apparatus thus constructed has the advantage of simple assembly, reliably and fast of the pump 4 in the housing 1 of the apparatus, this arrangement providing excellent damping of vibrations generated by the pump 4, by the suspended mounting of the pump 4 on the support 5, and reduces the likelihood of improper assembly of the parts, due to the excellent ergonomics offered during different stages of assembly.

In effect, the pump subassembly 4/5/6 elastic piece holder shown in the fig. 5 can be assembled simply, such an independent module, in a phase of pre-assembly, and then be easily disposed in the housing 1 by placing the upper shell 1 b to the back, as seen on the fig. 6, and by engaging the locating pins 13 projecting from the rim of the housing 11 through bores 53a of four guide rings 53 of the holder 5.

The operator need only push against the support 5 until the pad 7 damper abuts against the bottom of the housing 11 so that the inlet connection 8 of the suction circuit 45 and the pipe connecting the bleeding circuit are automatically connected respectively to the connecting tube 22 defining the outlet of the tank 2 and the connecting tube 23 extends in the pipe 24.

Then, the operator only has to manually connect the discharge piping 40 of the pump 4 with the vessel 3, and assembling the lower shell 1a on the upper shell 1 b to that the holder 5 is fixed vertically in the housing 1 by the flanges 14 of the lower shell 1a.

The figure 8 to 10 illustrate a variant embodiment of the invention wherein the housing of the apparatus includes an upper shell 101b on which a pump 104 is disposed horizontally, in a housing 111 of the upper shell 101b forming an excrescence in the bottom of the tank.

The pump 104 includes a suction pipe 142 connected to an outlet port 122 of the tank and a discharge pipe leading to the tank 140 of the steam generator, the pump 104 being supported by a support 105 rigid thermoplastic material which is fitted onto the top shell 101 b..

According to the fig. 9, the pump 104 is mounted suspended by two elastic pieces 106 being interposed between the pump and the carrier 104 105, 106 the elastic pieces being disposed at each longitudinal end of the pump 104 and having a central portion 162 and engages around the body of the pump 104 and four radially extending spring arms 160 star of the central portion 162 to anchor rods 161 engaging in inking pads 152 carried by the support 105.

Advantageously, the rods inking 161 152 project axially guides such that their ends form viennant positioning fingers engage guide rings 113 carried by the upper shell 101 B when placing the support subassembly 105/106/elastic piece 104 in the pump housing.

This variant embodiment, the advantage of a horizontal mounting of the pump 104 reduces the vertical space of the housing, the mounting remaining reliably and quickly and which provides excellent damping of vibrations generated by the pump.

Of course, the invention is in no way limited to the embodiment described and illustrated which has been given as example. Modifications are possible, especially with regard to the constitution of various elements or by substitution of technical equivalents, without exiting for as many of the protection domain of the invention.

Thus, in an alternative embodiment not shown, the carrier will also support a filler neck connection providing a automatic connection of the outlet of the pump to a discharge pipe to the vessel.
Thus, in an alternative embodiment not shown, the reservoir may be removably mounted on the housing.

**Number of Claims:** 10

**ENGLISH CLAIMS:**

Household ironing appliance comprising a case (1) including a tank (2) and a pump (4; 104) supplied with liquid by said tank (2), **characterised in that** said pump (4; 104) is mounted on a supporting member (5; 105) consisting of a part which is assembled in said case (1) and **in that** said pump (4; 104) is mounted on the supporting member (5; 105) by means of an elastic part (6; 106) inserted between the pump (4; 104) and the supporting member (5; 105).

Household ironing appliance according to claim 1, characterised in that said supporting member (5; 105) is rigid.

Household ironing appliance according to claim 2, characterised in that the supporting member (5) is positioned on the case (1) by means of positioning pins (13) engaged in guide rings (53; 113).

Household ironing appliance according to claim 3, characterised in that said elastic part (6; 106) comprises a central part (62; 162) supporting the pump (4; 104) and includes elastic arms (60; 160) extending radially from the central part (62; 162), said elastic arms (60; 160) being stretched between anchoring studs (52; 152) of the supporting member (5; 105).

Household ironing appliance according to any one of claims 1 to 4, characterised in that the case (1) comprises a lower shell (1A) and an upper shell (1B) which are assembled together and in that the supporting member (5) is immobilised in the case (1) by being sandwiched between the upper shell (1B) and the lower shell (1A).

Household ironing appliance according to any one of claims 1 to 5, characterised in that said pump (4) includes a suction circuit comprising an intake coupling (8) intended to be connected to an outlet orifice (21) of the tank and in that said intake coupling (8) is borne by the supporting member (5).

Household ironing appliance according to any one of claims 1 to 6, characterised in that the pump (4) comprises a bleeding circuit including a connection member (45) intended to be connected to a lower end of a pipe (24) borne by the case (1), the connection member (45) being borne by the supporting member (5).

Household ironing appliance according to any one of claims 1 to 7, characterised in that said pump (4) is an electromagnetic pump generating a pressure greater than ten bar and comprises a discharge pipe (40) which is connected to a tank (3) for generating pressurised steam.

Household ironing appliance according to claim 8, characterised in that said tank (3) for generating pressurised steam is connected to an iron (100) by a lead (101).

**Method for assembling a household ironing appliance according to any one of claims 1 to 9 including a case (1) intended to contain a pump (4) supplied with liquid by a tank (2) supported by the case (1), characterised in that said pump (4) is, in a first assembly phase, mounted suspended on an independent supporting member (5), and in that, in a second assembly
phase, said pump (4)/supporting member (5) subassembly obtained thereby is mounted in the case (1).