**Iron comprising a vaporisation chamber connected to a scale recovery cavity comprising a descaling orifice**

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Classifications (2), Legal Events (24)
The present invention relates to an iron comprising a ironing soleplate surmounted by a heating body and a housing having a rear end provided with a heel having a rear surface on which the iron can rest during inactive phases of ironing, the heating body having a steam distribution system comprising a vaporisation chamber connected to a tartar recovery cavity formed at the rear of the iron and more particularly relates to an iron in which the steam chamber comprises a descaling orifice closed by a removable plug accessed from outside the iron.

It is known from FR 2688807 an iron comprising a ironing soleplate surmounted by a heating body and a housing having a heel provided with a removable plug giving access to an orifice for injecting a descaling product in a steam distribution chamber. However, such iron only allows rinsing of the dispensing chamber by means of a descaling agent but does not allow the retrieval and storage in a scale of particle collecting cavity descending by gravity from the vaporization chamber when the iron is placed vertically on its heel.

It is known, from patent EP 0569822 filed by the applicant, an iron comprising a pressing sole topped with a heating element and a housing having a rear end with a heel on which the iron can rest substantially vertically during inactive phases of ironing. The heating body of the iron comprises a steam distribution system comprising a vaporisation chamber for producing steam is connected to a tartar recovery cavity formed at the rear of the iron, tartar recovery cavity being provided a scaling opening closed by a removable plug accessed from outside the iron.

However, in this document, the stopper is arranged under the iron heel board so that the cap is largely masked by the heel of the iron when the iron rests on its soleplate. Thus, such iron has the disadvantage of requiring the lifting of the iron of the sole in order to
remove the cap from the descaling opening, so that this operation is made very
ergonomic.

- **[0005]**

Moreover, such a iron, in which the plug is located in immediate proximity to the sole,
has the disadvantage of greatly increasing the risk of burns from the hand of the user on
the hot soleplate of the iron when the user manipulates the stopper. Finally, close to the
cap and the sole has the disadvantage of generating a high thermal load on the plug so
that it must be made of a heat-resistant material providing good thermal insulation to
prevent the User does burn in contact with the cork.

- **[0006]**

Another object of the present invention to provide an iron overcomes these drawbacks
by proposing an iron comprising a steam chamber connected to a recovery cavity
equipped with a descaling orifice in which the descaling operation is made more
ergonomic, and which is simple and economical to produce.

- **[0007]**

The object of the invention is achieved by an iron comprising a ironing soleplate
surmounted by a heating body and a housing comprising a rear surface placed on the
inside of a heel on which the iron can rest during inactive phases of ironing, the heater
body having a steam distribution system comprising a vaporisation chamber connected to
a tartar recovery cavity formed at the rear of the iron, tartar recovery cavity comprising an
orifice descaling closed by a removable plug accessed from outside the iron,
characterized in that the plug is disposed on the back surface of the housing.

- **[0008]**

Such a characteristic allows to obtain an easily accessible plug when the iron rests on its
soleplate.

- **[0009]**

According to another characteristic of the invention, the rear surface is inclined forward
when the iron rests on its soleplate.

- **[0010]**
Such a characteristic allows to further improve the accessibility of the cap, owing to the inclination of the rear surface to the front.

- [0011]
  According to another characteristic of the invention, the heel comprises two arms extending substantially symmetrically about the midplane of the iron from a handle, the two arms defining therebetween a space in which is formed the cavity that receives the descaling opening.

- [0012]
  According to another characteristic of the invention, the tartar recovery cavity is disposed in a portion of the housing being in cantilever behind the soleplate when the iron rests on its soleplate.

- [0013]
  Such characteristic has the advantage away from the cavity tartar recovery of the heat radiation region of the sole and the heating body, which allows to reduce the contact temperature at the removable cap.

- [0014]
  According to another characteristic of the invention, the removable cap has a scale recovery spoon being introduced into the descaling orifice when the plug closes the descaling orifice.

- [0015]
  Such a characteristic has the advantage of allowing the extraction of the iron scale with the cap without having to lift and transport the iron over a dustbin.

- [0016]
  According to another characteristic of the invention, the tartar recovery cavity extends obliquely relative to the plane of the sole.

- [0017]
  According to another characteristic of the invention, the spoon is arranged in a hollow body having an open front end and a rear end closed.
Such characteristic has the advantage of allowing the retention of scale in top of the cap body when the cap is tilted so that the spoon is oriented vertically with its open end upwards. This position allows easy transportation cap without risk of overturning tartar.

According to another characteristic of the invention, the body carries a seal coming in contact with the calculus recovery cavity.

According to another characteristic of the invention, the stopper has fastening means which are rotatably mounted relative to the spoon.

According to another characteristic of the invention, the fastening means allow the establishment of a bayonet type of connection between the removable cap and the descaling orifice.

According to another characteristic of the invention, the cap supports a sealing gasket which abuts the edge of the descaling orifice.

According to yet another characteristic of the invention, the descaling orifice is disposed in a recess formed on the back surface, the removable plug carries a piece of trim mask from the recess.

According to another characteristic of the invention, the removable cap has a pull tab which is rotatable relative to the plug.
Be better understood the objects, features and advantages of the present invention, from the description given below of a particular embodiment of the invention given by way of nonlimiting example, with reference to the accompanying drawings in which:

- the figure 1 is a perspective view of an iron according to a particular embodiment of the invention when the stopper of the descaling orifice is in the closed position;
- the 2 is a perspective view of a portion of the heating body of the iron of the figure 1;
- the 3 is a side view, in partial section, the iron of the figure 1;
- the 4 is a perspective view of the iron of the figure 1 when the cap of the descaling orifice is removed;
- the 5 is a sectional view of the stopper shown on its own;
- the 6 is an exploded perspective view of the stopper of 5;
- the Figures 7 and 8 are perspective views of the plug of the descaling orifice when its locking member respectively occupies a locking position and an unlocking position.

Only those elements necessary to the understanding of the invention have been represented. To facilitate reading of the drawings the same elements have the same references from one figure to another.

The figure 1 illustrates irons steam 1 comprising a sole 2 ironing plane provided with a set of steam outlet holes, not visible in the Figures, the sole 2 being surmounted by a housing 3 made of plastic, composite type of BMC, comprising a water tank 30, the housing comprising a handle grip 31 connected to the front of the iron in a known manner by a foot 32 extending a front end of the handle.

Advantageously, the foot 32 at the front of the handle 31 is hollow to contain iron bodies, and the housing 3 has a rear surface 33 placed on the inside a bead 4 on which the iron can rest substantially vertically during inactive phases of ironing, the heel comprising two arms 40 extending from the handle 31 by moving away, and then narrowing down to reach the rear surface of the housing 33 so that the resulting structure is substantially triangular.
The arms 40 define between them a space where the posterior surface 33 of the housing includes a passage for a power cord 5 supported by a flexible sleeve 50 pivotally mounted on the housing 3 and able to occupy a storage position, shown in figure 1. Wherein the sheath 50 is inserted into a groove 41 formed between the two arms 40 at the rear end of the handle 31.

[0030]

Preferably, the posterior surface 33 of the housing is inclined forward when the iron 1 rests horizontally on its soleplate 2 so that the space between the heel of the arm 40 is easily accessible in this position.

[0031]

In accordance with the 2, the sole 2 of the iron is thermally and mechanically connected to an integrated heating element 6 in the lower housing part 3, below the reservoir 30, the heating element 6 comprising an aluminum casting comprising a resistive element 61 bent iron horse and a boss 62 for receiving a control thermostat of the temperature of the soleplate 2.

[0032]

The heating body 6 has a peripheral wall 63 projecting from the upper face of the casting and which laterally delimits a space comprising a main vaporization chamber 64, a survapeur chamber 65 and a steam distribution system. The main steam chamber 64 is disposed at the center of the upper face of the heater 6 and the steam distribution system comprises lateral channels 67 extending from either side of the main vaporisation chamber 64, the lateral channels 67 conventionally having holes through the heater 6 to lead to the underside of the heating element 6, at steam distribution cavity, not visible in the figures, disposed opposite the steam outlet holes of the sole.

[0033]

The heating body 6 also comprises a closing plate 7 which rests on the upper edge of the peripheral wall 63 of the main casting and the vaporization chamber 64 is bounded laterally by a partition up to the closing plate 7, in being sealingly connected therewith, so that the steam produced in the main vaporisation chamber 64 may escape only through a steam outlet opening 70, shown in dashed lines in 2, formed in the closing plate 7. The steam outlet opening 70 opens into a steam distribution duct arranged above the cover plate 7 which is delimited in its upper part by a cover 73 and laterally by a 72 lateral rib, the closure plate 7 also comprising two side openings 74, shown in dashed lines in 2,
Communicating between both ends of the distribution channel with the lateral channels 67 in the steam distribution system.

• [0034]

Preferably, the main steam chamber 64 is flash type and for this purpose comprises a base having a plurality of pyramid studs for increasing the heat exchange surface, the water tank 30 arriving drip drop in the main vaporisation chamber 64 through an orifice 75 of the closing plate 7 surmounted, in known manner, of a drop-by-drop valve not shown in the figures, allowing the production of a vapor flow continuously in the order of 40 g/min.

• [0035]

More particularly according to the invention, the vaporization chamber 64 is connected to a cavity 80 for recovering the scale, this connection is preferably effected by an opening 68 provided in the peripheral wall 63 at the rear end of the chamber vaporisation 64.

• [0036]

In accordance with the 3 The opening 68 opens on a duct 69 of substantially rectangular section, made in the foundry of the heater 6, this duct 68 extending obliquely with respect to the sole 2 plane over a length of about 4 cm, at an angle of about 20°, and being extended by a collector 8 of plastic material, for example of the type PPS (phenylene polysulphide), integrated in the housing 3 of the iron and defining the cavity 80 of recovery of tartar.

• [0037]

The manifold 8 has a front end 81 fitted into the rectangular pipe 69 and extends axially in the extension of the conduit 69 along a length of the order of 5 cm, the manifold 8 having a flange covered with a seal 82 resting against the edge of an opening 34 made in the bottom of a recess 33A present on the posterior surface 33 of iron, best seen 4.

• [0038]

The manifold 8 has a rear end extending through the aperture 34 and defining an attachment flange 83 protruding in the bottom of recess 33A, the mounting flange 83 surrounding a descaling orifice 84 opening into the cavity 80 of recovery of tartar and receiving a removable cap 9 fixed to the fixing flange 83 by a bayonet catch, the cap 9
having for this purpose a ring 90 comprising claws 90A which engages by rotation on the locking ramps 83A formed on the periphery of the fixing flange 83.

- **[0039]**

  Preferably, the removable cap 9 is completely integrated into the volume of the recess 33A and is secured to a piece of trim cover 91 from the recess 33A, the cover part being rotatable relative to the plug 9 so to permit rotation of the plug 9 rotated without the cover part 91. The cover part 91 is in the extension of the wall defining the posterior surface 33 of the housing bordering the recess 33A and is advantageously made of plastic material, polycarbonate type.

- **[0040]**

  The cavity 80 of the recovery scale formed in the manifold 8 advantageously has an oblong section and comprises a reduced section near its forward end, forming a step 80A in the lower portion of the cavity 80 so that the scale recovered by gravity into the cavity 80 when the iron is placed on its heel 4, tends to remain in the cavity 80 recovery tartar when the iron 1 is rested horizontally on its soleplate 2.

- **[0041]**

  In accordance with Figures 4 to 8 The removable cap 9 includes an elongated body 92 that is inserted in the cleansing port 84 when the removable plug 9 is mounted on the mounting flange 83, the body 92 of the cap 9 having a shape complementary to the cavity 80 of recovering the tartar and having an open front end.

- **[0042]**

  The body 92 of the plug is advantageously made of plastic material, the polyamide PA-6,6 reinforced with glass fiber to 30%, and supports a first silicone gasket 93A coming into contact with the inner wall of the cavity 80 for recovering tartar when the elongated body 92 is inserted therein, the plug having a second silicone seal 93B which is sandwiched between the edge of the descaling orifice 84 and the plug 9 when the latter is screwed onto the mounting flange 83.

- **[0043]**

  The body 92 of the stopper includes a lower portion with a spoon 94 retention tartar, preferably made of the same material as the body 92 of the plug, the spoon 94 comprises a hollow portion in which the scale is stored and a front end 94A equipped with a march
to avoid tartar recovered in the spoon 94, when the iron is placed vertically on its heel 4, returns by gravity to the steam chamber when the iron 1 is disposed again his sole 2.

- [0044]

In accordance with Figures 5 and 6 The removable cap 9 comprises a locking member 95 comprising a tongue 96 pivotally mounted gripping around an axis 97 between a rest position, illustrated in Figures 1 and 5. Wherein the tongue 96 is integrated into a cavity 91A adapted to the cover part 91 and an actuating position, shown in particular in Figures 4 and 6; in which the tongue 96 protrudes to 90° relative to the cover part, the tongue 96 being restrained in the operating position by an elastic blade 98 having a projection 98A which is inserted in a complementary shaped portion of the tongue 96.

- [0045]

The locking member 95 is rotatably mounted on the cover part 91 of the plug and to this end has three pads 95A through 91B of the grooves formed on the cover part and engaging in adapted holes 90B of the ring so that the ring 90 is rotationally fixed to the locking member 95, the grooves 91B allowing a rotation of about 30° of the locking member 95 counterclockwise with respect to the cover part 91. The body 92 of the cap is preferably fixed to the covering part 91 by a screw 99, seen in Figures 3 and 5, so that the body 92 of the cap is rotationally fixed relative to the cover part 91, the spoon 94 is preferably constituted by an insert within the body 92 of the cap and secured thereto by the screw 99.

- [0046]

Thus, a cap 9 having a movable ring 90 in rotation being able to occupy a locking position, shown in 7. Wherein a first stopper 90C of the ring is in abutment against a rib 91C projecting at the back of the trim part 91 and the claws 90A of the ring are arranged such that they are engaged behind ramps 83A locking of the mounting flange when the cap is placed on the descaling orifice 84, thus ensuring the immobilization plug 9 of the fixing flange 83.

- [0047]

The movable ring 90 can also occupy an unlocking position, illustrated in 8. Wherein a second abutment, not shown in the figures, is abutting against a second rib 91 projecting to the back D of the covering part 91, the claws 90A of the ring being disposed in this position so that they are disengaged from the locking ramps 83A of the mounting flange.
when the cap 9 is placed on the descaling orifice 84, thus allowing the removal of the stopper 9 of the descaling orifice 84.

- **[0048]**
  
The iron thus produced has the advantage of having a long life and provide great ergonomics of use.

- **[0049]**
  
  Indeed, such a iron has the advantage of offering good ironing performance, comprising a vaporization chamber for producing a strong steam flow, and allow the user easy removal of particles scale produced during vaporization.

- **[0050]**
  
  In particular, when cleaning the steam chamber is necessary, that is to say after several sessions of steam ironing, the user can easily extract the major part of the scale present in the vaporization chamber by placing the iron on its heel vertically so that the particles of scale present in the vaporization chamber descend by gravity through the conduit and then into the scale recovery cavity and especially in the scale recovery spoon. The iron can then be repositioned horizontally on its soleplate, so as to allow easy access to the plug disposed on the rear side of the housing. It then suffices for the user to unscrew the cap by grasping the bottom edge of the tab that is flush with the edge of the box to bring the tongue into the operating position, then turn the tab counterclockwise to bring the body lock in the unlocked position in which the claws are disengaged from the locking ramps, then the plug can be extracted from the descaling orifice by axially sliding the spoon outside this orifice.

- **[0051]**
  
  During this extraction spoon, tartar recovered in the spoon is stored in the latter through the hollow of the spoon and the presence of the step near the front end of the spoon which prevents the particles tartar fall by gravity into the duct so that the spoon is inclined 20° downward.

- **[0052]**
  
  Such extraction operation of this scale advantage to proceed without risk of burning by contact with the hand on the sole as this scaling operation is performed while the iron rests on its soleplate so that it is inaccessible.
• [0053]

In addition, the location of the calculus recovery cavity in a part of the housing located in cantilever behind the sole allows the radiation away recovery cavity of the heating body and thus lowers the temperature of the housing in the cork environment and its gripping tab.

• [0054]

The trim piece integral with the cap also has the advantage of serving as protective guard preventing the fingers of the user from coming into contact with the parts, such as the recovery of the spoon scale, originally contained in the cavity and recovery may have a high temperature. The dressing room also has the advantage of having a lower edge plane on which the cap can come to rest stably when it is extracted from the scaling opening, which limits the risk of improper reversal of the contents of the spoon recovery of tartar.

• [0055]

Finally, the iron thus produced has the advantage of a plug that is aesthetically integrated into the case of iron, thus obtaining an iron with a rewarding aesthetic.

• [0056]

Of course, the invention is not limited to the embodiment previously described and illustrated, which was given as an example. Modifications are possible, especially from the point of view of the constitution of the various elements or by substitution of technical equivalents, without departing from the scope of the invention.

• [0057]

Thus in an alternative embodiment of the invention, the iron may include a scaling indicator warning the user about the need to open the cap of the scale formation hole to perform a chamber cleaning operation vaporization. Such scale formation indicator may be activated as a function of time using iron board or the filling of the tank number and speed activation can be modulated according to the position of an indicator of hardness of the water.
1. Iron (1) comprising a soleplate (2) surmounted by a heating body (6) and a housing (3) comprising a rear surface (33) placed on the inside of a heel (4) on which the iron (1) can rest during inactive phases of ironing, the heating body (6) having a steam distribution circuit comprising a vaporisation chamber (64) connected to a scale recovery cavity (80) formed at the rear of the iron (1) to recover the scale particles falling under gravity when the iron is placed vertically on its heel, the scale recovery cavity (80) comprising a descaling hole (84) closed by a removable plug (9) accessible from outside the iron, characterised in that the vaporisation chamber (64) is connected to the scale recovery cavity (80) by an opening (68) formed in a peripheral wall (63) at the rear end of the vaporisation chamber (64) and in that said plug (9) is arranged on the rear surface (33) of the housing (3).

2. Iron (1) according to claim 1, characterised in that said rear surface (33) is inclined forwards when the iron (1) rests on its soleplate (2).

3. Iron (1) according to claim 1 or 2, characterised in that the heel (4) has two arms (40) extending substantially symmetrically with respect to the midplane of the iron from a gripping handle (3), said two arms (40) defining between them a space in which the cavity (80) receiving the descaling hole (84) is formed.

4. Iron (1) according to any of claims 1 to 3, characterised in that the scale recovery cavity (80) is arranged in a part of the housing (3) overhanging behind the soleplate (2) when the iron (1) rests on its soleplate (2).

5. Iron (1) according to any of claims 1 to 4, characterised in that the removable plug (9) comprises a scale recovery spoon (94) which can be inserted into the descaling hole (84) when the plug (9) closes the descaling hole (84), said spoon (94) having a hollow portion in which the scale is stored and a step (94A) near its front end.

6. Iron (1) according to claim 5, characterised in that said spoon (94) is arranged in a hollow body (92) having an open front end and a closed rear end.

7. Iron (1) according to claim 6, characterised in that the body (92) is fitted with a seal (93A) coming into contact with the scale recovery cavity (80).

8. Iron according to any of claims 5 to 7, characterised in that the plug (9) has fixing means (90A) which are mounted rotatably relative to the spoon (94).

9. Iron according to claim 8, characterised in that said fixing means (90A) allow the creation of a bayonet type connection between the removable plug (9) and the descaling hole (84).
10. Iron (1) according to any of claims 1 to 9, characterised in that the plug (9) is fitted with a seal (93B) which presses against the edge of the descaling hole (84).

11. Iron according to any of claims 1 to 10, characterised in that said descaling hole (84) is arranged in a recess (33A) formed on the rear surface (33) and in that said removable plug (10) supports a trim piece (91) which masks the recess (33A).

12. Iron according to claim 11, characterised in that the removable plug (9) has a gripping tongue (96) which can be rotated around the plug (9).