

Electrically heated steam iron

The invention relates to an electrically heated steam iron comprising a storage body in which are arranged an electrical heating element and a vaporisation chamber, and a soleplate made
5 of a different material from the storage body and secured to a base surface thereof.

Soleplates for electrically heated steam irons are generally made from a single material, preferably aluminium or steel. Aluminium soleplates
10 are intrinsically lightweight and have good heat conducting properties whilst having poor resistance to abrasion, whilst steel soleplates are heavy and have poor heat conducting properties but are highly resistant to abrasion. In order to make
15 use of the advantages and disadvantages of both types of material, it is known to fix a thin-walled steel soleplate to an electrically heated aluminium body (German Gebrauchsmuster 19 39 634). As is well known, steel and aluminium have different
20 coefficients of expansion. When temperature variations occur, as a result of the different coefficients of expansion of steel and aluminium, tensions are produced between the thin walled steel soleplate and the electrically heated aluminium body which
25 stresses the material. Such stresses may exceed the elastic limit of the material, possibly causing deformation particularly of those parts of the steel soleplate in which steam distribution grooves run at right angles to the direction of expansion.

30 The centre of gravity of the surface is the central starting point for the thermally produced stresses, and the stresses run in straight lines from this point outwards. The centre of gravity

of the surface does not alter its position. Plastic deformation occurs in the steel soleplate, particularly in the region of the steam distribution grooves, and this deformation is not reversed as the temperature changes but remains visible. Such deformation not only makes a steam iron of this kind visually unattractive but also renders the steam iron technically unusable since the finished appearance of fabric ironed with an iron deformed in this way is very poor. Furthermore, the deformation on the steel soleplate may cause cracking to a greater or lesser extent in the steel soleplate, which will damage the fabric during ironing.

The main aim of this invention is to provide an electrically heated steam iron having a storage body and a soleplate fixed thereto, in which the storage body and soleplate are made of materials with different compositions but have no permanent plastic deformation of the soleplate caused by different coefficients of expansion of the individual materials.

According to the invention there is provided an electrically heated steam iron comprising a storage body in which are arranged an electrical heating element and a vaporisation chamber, and a soleplate made of a different material from the storage body and secured to a base surface thereof, the storage body being provided with steam escape holes which communicate with respective openings in the soleplate, each such opening communicating with a steam distribution groove on the ironing surface of the soleplate, the storage body having recesses on its base surface each congruent to a respective steam distribution groove, and the longitudinal axes of all the grooves and recesses being directed towards the centre of gravity respectively of the ironing surface of the soleplate and of the base surface of the storage body.

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With such an arrangement, no permanent deformation of the soleplate is produced by thermal stresses. In general, the centre of gravity of the ironing surface of the soleplate or of the base surface of the storage body is the central starting point for the thermally produced expansion on heating or for the thermally produced contraction on cooling. The expansion generally extends in straight lines out from the centre of gravity to the edge of the soleplate, whilst the centre of gravity itself does not alter its position on heating or cooling. The permanent deformation which occurs to a greater extent in the region of the steam distribution grooves in known steam irons does not occur due to the arrangement of the grooves according to the invention.

Preferably, the steam escape holes are arranged in the region of the grooves or recesses remote from the centre of gravity. This ensures that any expansion which may occur is largely deflected into the steam distribution grooves.

In a preferred embodiment of the invention, one or more interconnected channels are provided in the base surface of the storage body, there being at least one hole passing through the storage body and communicating with the channel(s). The cross section of this hole might widen out towards the base surface of the storage body. The hole can be used to introduce heat conducting paste between the soleplate and the storage body so as to improve heat transfer. For example, the heat conducting paste may be forced through the hole into the channel(s) in the storage body to spread uniformly over the entire base surface of the storage body.

Preferably the soleplate has a peripheral portion which extends upwardly and round an outer

thickened edge of the storage body to form a peripheral bead, there being a surface which is substantially parallel to the ironing surface of the soleplate defined inwardly of the bead and providing an abutment
5 for a hood of the iron.

Such an arrangement can ensure that the soleplate is secured to the storage body while providing an abutment surface for the hood of the iron. The hood might be shaped so as to clip positively
10 into position, for example against the inner face of the peripheral bead.

In a preferred embodiment of the invention, before the soleplate, formed e.g. of steel, and storage body are joined together, the openings
15 in the soleplate, in the region of the steam escape holes in the storage body, have an appreciably smaller cross section than the steam escape holes in the storage body. By mechanical widening of the holes in the direction of the storage body, soleplate
20 material is displaced into the steam escape holes of the storage body, bonds to the storage body and thus secures the steel soleplate to the storage body. Consequently, no further fixing means are required.

25 Certain embodiments of the invention will now be described by way of example and with reference to the accompanying drawings in which:-

Figure 1 shows part of an iron according to the invention, partly in section;

30 Figure 2 shows a soleplate in plan view;

Figure 3 shows a storage body in plan view; and

Figure 4 shows part of an iron including a modification.

35 The part of the steam iron shown comprises, in Fig. 1, part of a handle 1, a hood 2, a storage body 4 and a steel soleplate 3. The steel soleplate

3 is secured to the aluminium storage body 4. In the storage body 4 are provided the vaporisation chamber 5 and the steam escape holes 6. The vaporisation chamber 5 is sealed off by a cover 7. In the Figure 1 embodiment, the steel soleplate 3 is secured to the storage body 4 by means of hollow rivets 8 which pass through the steam escape holes 6 in the storage body 4 and by fitting the peripheral portion 9 of the steel soleplate 3 around the outer edge of the storage body 4 as shown in Fig. 1. The encircling peripheral portion 9 of the steel soleplate 3 is drawn around the edge of the storage body, which has a thickened portion 18, so as to form a bead 15. In the region of the hood 2 the steel soleplate 3 has a bent portion with a surface 10 serving as an abutment for the hood 2, which is positively secured thereto.

The soleplate is formed with openings 14 and with steam distribution grooves 11 each in the region of a respective opening 14, and each corresponding to a congruent recess 12 provided in the storage body 4. The longitudinal axes of the grooves 11 are directed towards the centre of gravity "S" of the surface (the centroid) of the steel soleplate 3 (as shown in Figure 2), while the recesses 12 are directed towards the centre of gravity of the base surface 13 of the storage body 4.

Figures 3 and 4 show interconnected channels 16 provided in the base surface 13 of the storage body 4, these channels being connected to a hole 17 passing through the storage body 4, the cross section of this hole 17 widening out towards the base surface 13. On assembly, a heat conducting paste is forced through the hole 17 between the steel soleplate 3 and the storage body 4. The paste is uniformly distributed over the entire base surface 13 through the channels 16.

In the embodiment of Figure 4, the steel soleplate 3 is secured to the storage body 4 by deformation, rather than by using rivets. The holes 14 in the steel soleplate 3, in the region of the steam escape holes 6 in the storage body 4, have an appreciably smaller cross section than the steam escape holes 6 before the steel soleplate 3 and storage body 4 are joined together. The holes 14 in the steel soleplate 3 are mechanically widened in the direction of the storage body 4. As a result, material from the region of the holes in the steel soleplate 3 is displaced into the steam escape holes 6 in the storage body 4. The bearing pressure of the displaced material exerts a holding force on the inner wall of the steam escape holes 6, by means of which the steel soleplate 3 is secured to the storage body 4. Hollow rivets 8 for fixing the steel soleplate 3 to the storage body 4 are thus no longer necessary.

Modifications to the broad aspects of the steam iron and to the specific embodiments thereof referred to or suggested herein may be apparent to those skilled in the art and this disclosure is intended to encompass any such modifications.



CLAIMS:

1. An electrically heated steam iron comprising a storage body in which are arranged an electrical heating element and a vaporisation chamber, and a soleplate made of a different material from the storage body and secured to a base surface thereof, the storage body being provided with steam escape holes which communicate with respective openings in the soleplate, each such opening communicating with a steam distribution groove on the ironing surface of the soleplate, the storage body having recesses on its base surface each congruent to a respective steam distribution groove, and the longitudinal axes of all the grooves and recesses being directed towards the centre of gravity respectively of the ironing surface of the soleplate and of the base surface of the storage body.
2. A steam iron as claimed in claim 1, wherein the steam escape holes are arranged in the region of the grooves or recesses remote from the centre of gravity.
3. A steam iron as claimed in claims 1 or 2, wherein one or more interconnected channels are provided in the base surface of the storage body, there being at least one hole passing through the storage body and communicating with the channel(s).
4. A steam iron as claimed in claim 1, 2 or 3, wherein the soleplate penetrates through the storage body in the region of the steam escape holes so as to secure the soleplate to the storage body.



5. A steam iron as claimed in claim 1, 2 or 3, wherein the soleplate is secured to the storage body by means of rivets in the region of the steam escape holes.

5 6. A steam iron as claimed in any preceding claim, wherein the soleplate has a peripheral portion which extends upwardly and round an outer thickened edge of the storage body to form a peripheral bead, there being a surface which is substantially parallel
10 to the ironing surface of the soleplate defined inwardly of the bead and providing an abutment for a hood of the iron.

7. An electrically heated steam iron substantially as hereinbefore described with reference to the
15 accompanying drawings.
