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(54) **SOLEPLATE FOR A STEAM IRON AND IRON COMPRISING SAID SOLEPLATE**

SOHLENPLATTE FÜR EIN DAMPFBÜGELEISEN UND BÜGELEISEN MIT DIESER SOHLENPLATTE
SEMELLE POUR FER À VAPEUR ET FER À REPASSER COMPRENANT LADITE SEMELLE

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(56) References cited:
WO-A1-2012/137095 WO-A1-2017/174947
DE-U1-202016 102 372 GB-A- 2 479 803
US-A1- 2011 107 626

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Description

[0001] . The present invention relates to a soleplate for steam iron, said soleplate having a particular shape allowing a larger efficacy in steam use. The invention is also related to an iron comprising said soleplate.

[0002] . Two fundamental characteristics of a steam iron are the ironing performance and the easiness with which the iron moves on the ironing surface. The iron soleplate plays a fundamental role in reaching these targets.

[0003] . A first relevant aspect relates to steam. In fact, steam during ironing performs two tasks: on the one hand to smooth out fibres and to prepare them for ironing by pressure of the soleplate. On the other hand, steam also performs the function of facilitating the slipping of the soleplate on the fabric by forming a sort of steam buffer, determining the so called aerodynamic levitation effect between iron and fabric.

[0004] . Iron soleplates available on the market present different configurations of holes for steam distribution: on one side there are those soleplates having a limited number of steam holes, normally concentrated near to the iron tip. This choice offers the advantage of allowing a very strong steam stream, which can be used also in particular conditions, e.g. holding the iron at a certain distance from the fabric. Nevertheless, the presence of holes only near to the tip, makes steam distribution on the fabric less uniform.

[0005] . On the contrary, other steam irons are characterized by a soleplate containing a larger quantity of holes normally distributed on a large part of the soleplate, this way allowing a more uniform distribution of steam on the ironing surface to the detriment of steam velocity.

[0006] . WO 2016/011161 discloses a soleplate having a surface characterized by a series of holes for steam emission, and from a series of canals which, starting from the various holes, join in a central canal.

[0007] . US 2011/107626 discloses a steam iron soleplate, said soleplate comprising an external edge touching the ironing surface, and an internal portion which is raised compared to the external edge and comprises holes emitting steam which are distributed on the whole surface. In this way, the pressing part of the iron is just the external one, while the internal part is a sort of steam chamber.

[0008] . US 2009/019737 discloses a steam iron soleplate, wherein the holes are concentrated near to the soleplate tip. Fig. 5 shows a soleplate comprising 7 holes for the emission of steam, and canals matching each hole addressing steam towards the rear of the iron. Said canals, however, cover a very limited part of the soleplate.

[0009] . WO2017/174947 discloses a soleplate comprising a steam area wherein steam holes are concentrated near the tip of the soleplate and a drying area separate from the steam area. The drying area being devoid of steam outlets. In fig.1, the soleplate presents 24 holes.

[0010] . However, there is still the need for a steam iron soleplate which guarantees both a strong steam stream and a good distribution of steam on the fabric, maintaining a good ironing performance. These targets guarantee an optimal slipping of the iron on the fabric, making ironing smooth and easy.

[0011] . It has been surprisingly found that it is possible to solve this problem by combining the presence of a limited number of holes concentrated on the part of the soleplate near to the tip with a particular geometry of the soleplate, i.e. an opportune combination between pressing portion (touching the ironing surface) and raised portion, which has a small height compared to the pressing portion and it is not in touch with the fabric.

[0012] . Particularly, it has been found that a soleplate having a limited number of steam emitting holes, e.g. comprised between 5 and 23, concentrated on the soleplate part near the tip and a percentage of pressing portion to the total surface of the soleplate comprised between 40 and 75%, allows to reach the optimal ironing result.

[0013] . Fig. 1, 2, and 3, show preferred embodiments which allow to reach the invention targets. Particularly, it is noted that in the embodiment of Fig. 1, the percentage of the surface of the pressing portion to the total soleplate surface is 62%, in the embodiment of Fig. 2 it is 52%, in Fig. 3 it is 58% and in Fig. 4 it is 77%.

[0014] . Fig. 5 shows a lateral view of the iron of Fig. 1, wherein the rounded edge of the soleplate is highlighted.

[0015] . The height of the soleplate raised portion can vary through a quite wide range, nevertheless, it was noted that an optimal height is preferably comprised between 0.5 and 3 mm, even more preferably between 1 and 2 mm.

[0016] . It is clear that the minimum and maximum number of holes present on the soleplate according to the present invention is also related with the diameter of the holes; in fact, a hole having diameter of $2x$ corresponds, in terms of area of the hole surface, to 4 holes of diameter x . Thus, the following values are related to holes of 2 mm of diameter. In this case, the soleplate steam holes according to the present invention are between 5 and 23, preferably between 7 and 21. In fact, a too small number of holes leads to a too concentrated emission of steam and to an insufficient flow rate in terms of g/min of steam. On the contrary, a too large number of holes leads to a steam stream having a too low speed and strength on the surface for certain functions such as vertical ironing.

[0017] . As previously explained, it is also possible to express steam stream velocity as inverse function of the total surface area of steam holes. In such case, the total surface area of the of the holes is preferably comprised between 15 and 80 mm², more preferably between 20 and 70 mm², even more preferably between 35 and 60 mm². Table 1 shows the value of the hole diameter when changing the holes number for a constant total surface area of the holes (56.52 mm²).

Table 1

Hole diameter (mm)	Hole area (mm ²)	Number of holes	Total area (mm ²)
8.49	56.52	1	56.52
6.00	28.26	2	56.52
4.90	18.84	3	56.52
4.24	14.13	4	56.52
3.79	11.30	5	56.52
3.46	9.42	6	56.52
3.21	8.07	7	56.52
3.00	7.07	8	56.52
2.83	6.28	9	56.52
2.68	5.65	10	56.52
2.56	5.14	11	56.52
2.45	4.71	12	56.52
2.35	4.35	13	56.52
2.27	4.04	14	56.52
2.19	3.77	15	56.52
2.12	3.53	16	56.52
2.06	3.32	17	56.52
2.00	3.14	18	56.52

[0018] . As previously stated, holes are arranged on the part of the soleplate near to the tip. Defining with A the length of the soleplate measured from the tip to the rear end, and with B the length measured on the iron axis from the tip of the soleplate to the hole farther from the tip, the ratio B/A it is preferably lower or equal to 0.5. more preferably lower or equal to 0.4. even more preferably lower or equal to 0.3.

[0019] . To further enhance the soleplate slipping on the fabric, it is preferred to have a soleplate of conventional shape towards the tip, while, starting from a point not exceeding about the middle of the soleplate, the soleplate itself, preferably, has, next to the edge, a radius of curvature large enough to produce an uplift of the soleplate itself with reference to the ground plane (and thus with reference to the fabric during ironing) extremely gradual and which would allow smoothing of the fabric, and to avoid the involuntary formation of folds. Traditionally, these folds are caused by the fact that the soleplate edge, meeting a not well stretched fabric, pushes it in the direction of the iron movement till the creation of a fold on the fabric. This leads to a result that is the very opposite of the desired one, that is, folds are created that, being ironed, are much more difficult to be deleted. This occurrence produces a significant loss of time during ironing of clothes or linen.

[0020] . The soleplate according to the invention, preferably has a rounded edge shape, this way allowing an easy ironing. Said effect is due not only to a better iron slipping on the fabric thanks to the above defined ratio between pressing surface and total surface in combination with a limited number of steam holes, but also to the soleplate rounding allowing a 360° movement of the iron very easily and without the risk of creating folds during ironing.

[0021] . The soleplate rounding can be determined in several ways. For example, if the radius of curvature is homogeneous on the whole stretch, the radius of curvature is preferably of at least 4 mm, more preferably of at least 7 mm and even more preferably of at least 10 mm. With increased radius of curvature, the desired effect, that is to avoid the creation of folds during the lateral movement of the iron, becomes more effective.

[0022] . Generally, it is preferred that the soleplate presents on at least 50% of its perimeter, more preferably on at least 60%, even more preferably on at least 70% of its perimeter, a radius of curvature larger than 4 mm, preferably larger than 7 mm.

[0023] . Alternatively, the radius of curvature can be variable, e.g. smaller on the first stretch close to the pressing part of the soleplate, preferably comprised between 1 mm and 10 mm, and larger on a second stretch farther from the pressing part of the soleplate, till it becomes plane ($r = \infty$). Or, the radius of curvature can be more uplifted at the beginning

to then decrease by moving away from the pressing part of the soleplate.

[0024] . Generally, at a distance of 5 mm from the start of the curved stretch of the soleplate, measured on the horizontal projection of the soleplate, the height of the same from the ironing plane will be preferably lower or equal to 5 mm, more preferably lower or equal to 3 mm.

[0025] . In one embodiment, the invention is directed also to a steam iron comprising the above defined soleplate. Particularly, the soleplate of the invention is particularly useful in a steam boiler iron, as steam boiler irons are those which guarantee the best quality of steam, normally providing steam at a pressure of at least 3 bar, preferably at least 4 bar.

[0026] . Moreover, the soleplate of the invention is suitable for the use with steam irons in general, with a steam flow rate generally larger than 80g/min. More preferably said steam flow rate is provided at a pressure of at least 3 bar, even more preferably higher than 4 bar, since a lower pressure leads to the largely unwanted effect of wet ironed clothes which cannot be stored immediately after ironing.

Claims

1. Soleplate for a steam iron comprising a number of holes for the emission of steam, which holes are concentrated in the area of the soleplate near to the tip, **characterized in that:**

the number of holes is comprised between 5 and 23;

being A the length of the soleplate measured from the tip to the rear end, and B the distance from the tip to the hole for the emission of steam which is further away from the tip, the ratio B/A is equal to or lower than 0.4; and the soleplate presents a pressing portion which is in contact with the ironing surface, and a raised portion, such that the ratio between the pressing portion and the total surface of the soleplate is comprised between 0.40 and 0.75

2. Soleplate according to claim 1. wherein the depth of the raised portion from the ironing plane is comprised between 0.5 mm and 3 mm.

3. Soleplate according to claims 1-2. wherein the number of holes for the emission of steam is comprised between 7 and 21.

4. Soleplate according to claims 1-3, wherein, the ratio B/A is equal to or lower than 0.3.

5. Soleplate according to claims 1-4. wherein the area of total surface of the holes is comprised between 15 and 80 mm². preferably between 20 and 70 mm².

6. Soleplate according to claims 1-5. wherein the soleplate has a rounded edge shape.

7. Steam iron comprising a soleplate according to claims 1-6.

8. Steam iron according to claim 7. wherein steam iron is capable of delivering steam at a pressure of at least 3 bar, preferably at least 4 bar.

9. Steam iron according to claims 7-8. wherein steam iron comprises a boiler.

10. Steam iron according to claims 7-9. wherein steam iron is capable of delivering steam at a rate equal to or larger than 80 g/min.

Patentansprüche

1. Bügelsohle für ein Dampfbügeleisen mit einer Anzahl von Löchern für den Austritt von Dampf, wobei die Löcher im Bereich der Bügelsohle nahe der Spitze konzentriert sind, **dadurch gekennzeichnet, dass:**

die Anzahl der Löcher zwischen 5 und 23 liegt;

wobei A die Länge der Bügelsohle, gemessen von der Spitze bis zum hinteren Ende, und B der Abstand von der Spitze zu dem Loch für den Dampfaustritt ist, das weiter von der Spitze entfernt ist, und das Verhältnis B/A gleich oder kleiner als 0,4 ist; und

die Bügelsohle einen in Kontakt mit der Bügelfläche stehenden Druckbereich und einen erhabenen Bereich aufweist, wobei das Verhältnis zwischen dem Druckbereich und der gesamten Fläche der Bügelsohle zwischen 0,40 und 0,75 liegt.

- 5 2. Bügelsohle nach Anspruch 1, wobei die Tiefe des erhabenen Bereiches, gesehen von der Bügelfläche, zwischen 0,5 mm und 3 mm liegt.
3. Bügelsohle nach einem der Ansprüche 1 bis 2, wobei die Anzahl der Löcher für den Dampfaustritt zwischen 7 und 21 liegt.
- 10 4. Bügelsohle nach einem der Ansprüche 1 bis 3, wobei das Verhältnis B/A gleich oder kleiner als 0,3 ist.
5. Bügelsohle nach einem der Ansprüche 1 bis 4, wobei die Gesamtoberfläche der Löcher zwischen 15 und 80 mm², vorzugsweise zwischen 20 und 70 mm², liegt.
- 15 6. Bügelsohle nach einem der Ansprüche 1 bis 5, wobei die Bügelsohle eine abgerundete Kantenform aufweist.
7. Dampfbügeleisen mit einer Bügelsohle nach einem der Ansprüche 1 bis 6.
- 20 8. Dampfbügeleisen nach Anspruch 7, wobei das Dampfbügeleisen eingerichtet ist, Dampf mit einem Druck von mindestens 3 bar, vorzugsweise von mindestens 4 bar, abzugeben.
9. Dampfbügeleisen nach einem der Ansprüche 7 bis 8, wobei das Dampfbügeleisen einen Kessel umfasst.
- 25 10. Dampfbügeleisen nach einem der Ansprüche 7 bis 9, wobei das Dampfbügeleisen eingerichtet ist, Dampf mit einer Menge von oder mehr als 80 g/min abzugeben.

Revendications

- 30 1. Semelle pour fer à vapeur comprenant un certain nombre de trous pour l'émission de vapeur, lesquels trous sont concentrés dans la zone de la semelle à proximité de la pointe, **caractérisée en ce que** :

le nombre de trous est compris entre 5 et 23 ;

étant A la longueur de la semelle mesurée de la pointe à l'extrémité arrière, et B la distance de la pointe au trou pour l'émission de vapeur qui est plus éloignée de la pointe, le rapport B/A est égal ou inférieur à 0,4 ; et

la semelle présente une partie de pression qui est en contact avec la surface de repassage, et une partie surélevée, de telle sorte que le rapport entre la partie de pression et la surface totale de la semelle est compris entre 0,40 et 0,75.
- 35 2. Semelle selon la revendication 1, dans laquelle la profondeur de la partie surélevée à partir du plan de repassage est comprise entre 0,5 mm et 3 mm.
3. Semelle selon les revendications 1 à 2, dans laquelle le nombre de trous pour l'émission de vapeur est compris entre 7 et 21.
- 40 4. Semelle selon les revendications 1 à 3, dans laquelle le rapport B/A est égal ou inférieur à 0,3.
5. Semelle selon les revendications 1 à 4, dans laquelle la zone de la surface totale des trous est comprise entre 15 et 80 mm² de préférence entre 20 et 70 mm².
- 50 6. Semelle selon les revendications 1 à 5, dans laquelle la semelle présente une forme de bord arrondi.
7. Fer à vapeur comprenant une semelle selon les revendications 1 à 6.
- 55 8. Fer à vapeur selon la revendication 7, dans lequel le fer à vapeur est capable de fournir de la vapeur à une pression d'au moins 3 bars, de préférence d'au moins 4 bars.

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9. Fer à vapeur selon les revendications 7 à 8, dans lequel le fer à vapeur comprend une chaudière.
10. Fer à vapeur selon les revendications 7 à 9, dans lequel le fer à vapeur est capable de fournir de la vapeur à un débit égal ou supérieur à 80 g/min.

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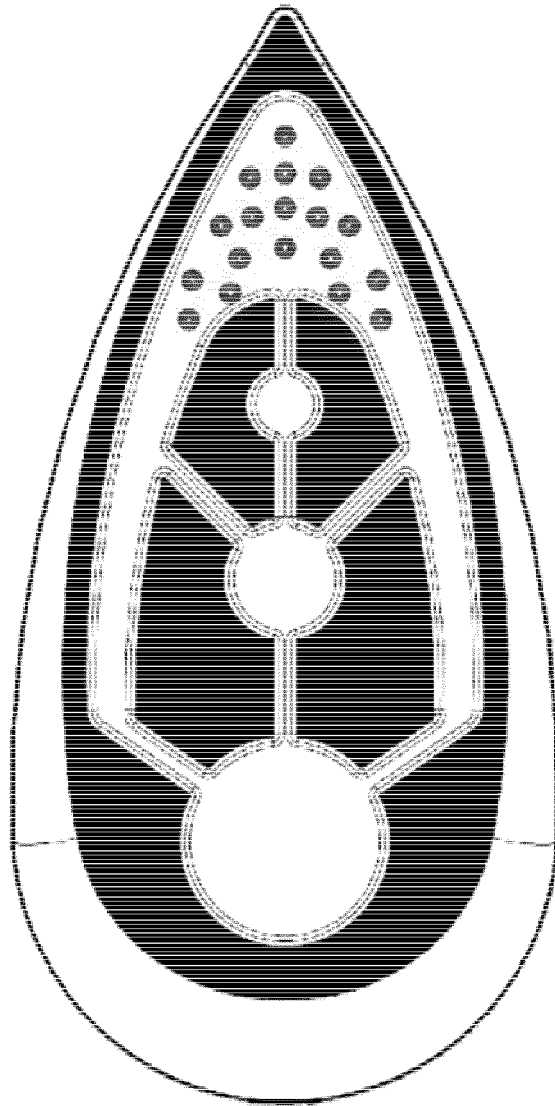


Fig. 1

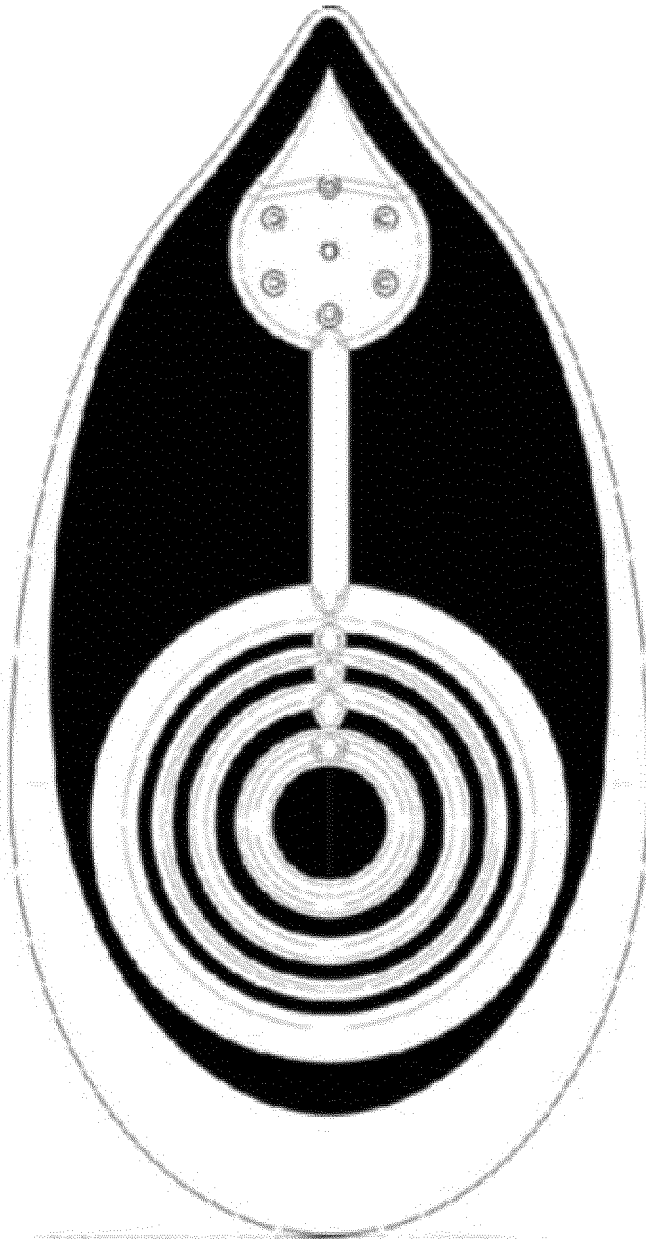


Fig. 2

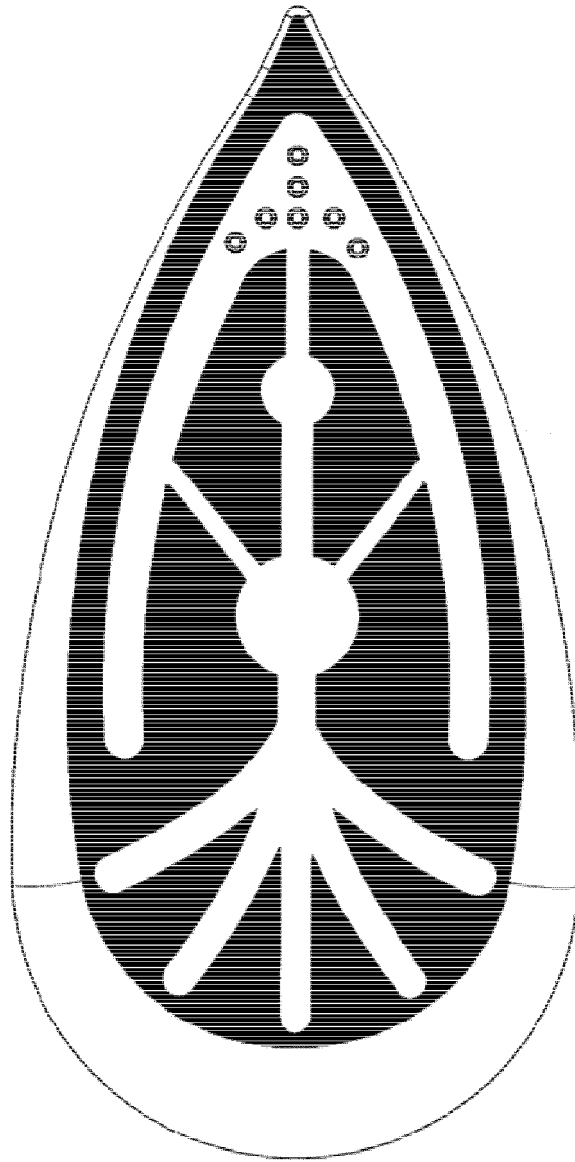


Fig. 3

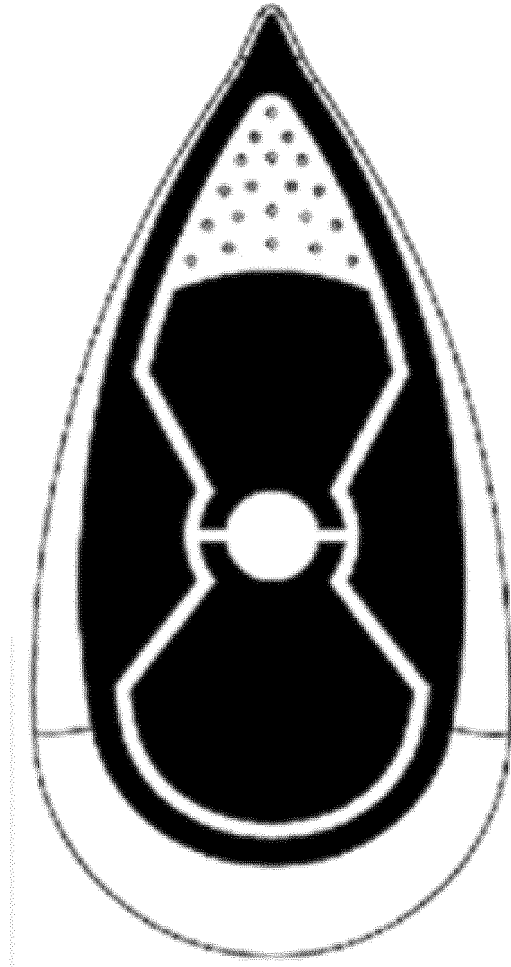


Fig. 4

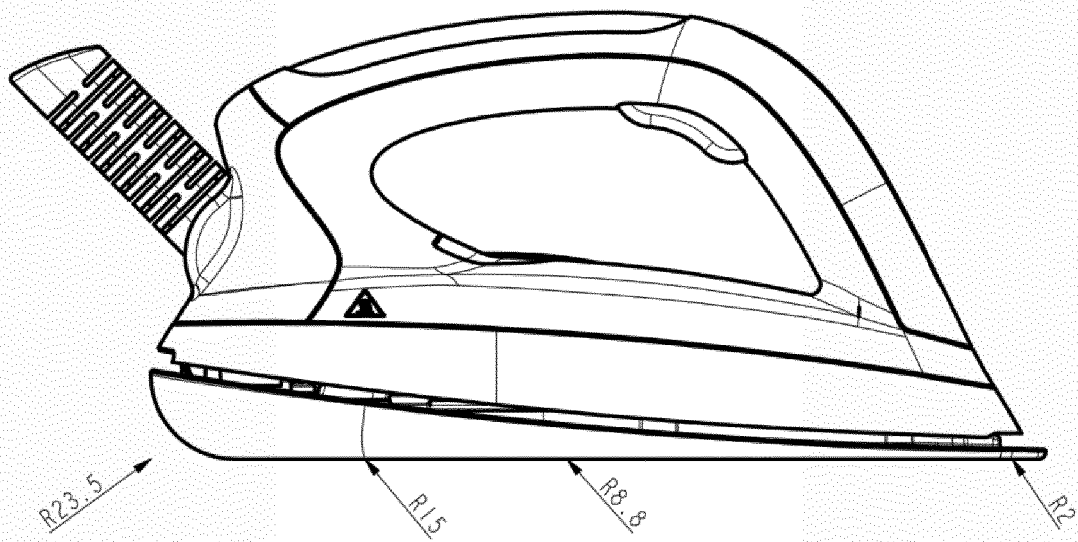


Fig.5

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2016011161 A [0006]
- US 2011107626 A [0007]
- US 2009019737 A [0008]
- WO 2017174947 A [0009]