

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 854 226 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

22.07.1998 Bulletin 1998/30(51) Int Cl.⁶: **D06F 75/38**(21) Application number: **98500014.0**(22) Date of filing: **21.01.1998**

(84) Designated Contracting States:

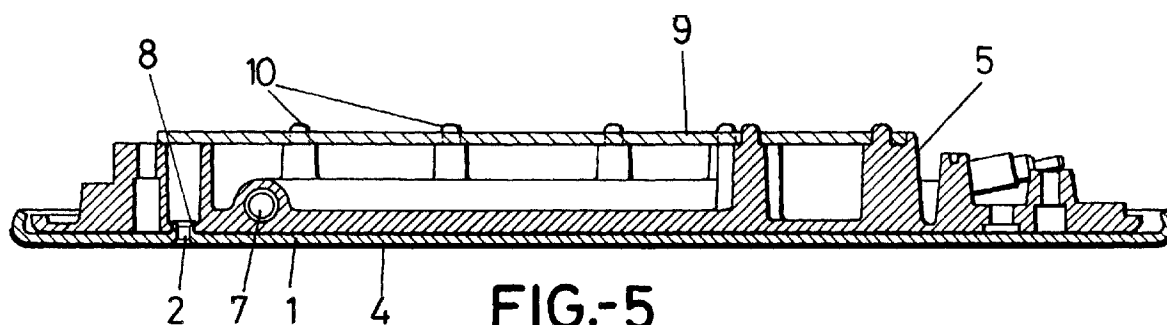
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE**

Designated Extension States:

AL LT LV MK RO SI(30) Priority: **21.01.1997 ES 9700106**(71) Applicant: **OFICINA DE INVESTIGACION****AGRUPADA, S.A.****20600 Eibar (Guipuzcoa) (ES)**(72) Inventor: **Mutiloa Berasaluce, José Francisco****Matxaria 1-1, 20600 Eibar (Guipuzcoa) (ES)**(74) Representative: **Carpintero Lopez, Francisco****HERRERO & ASOCIADOS, S.L.****Alcalá, 21****28014 Madrid (ES)**(54) **Improvements in processes for obtaining steam iron soles**

(57) The improvements apply in processes for obtaining steam iron soles, the soles being made by fixing two plates (1) and (5) to each other, the first of which is a rolled aluminium part with an enamelled outer surface, and the second a moulded aluminium part, both having holes (2) and (6) facing each other in order for coupling to define steam outlet passages. The improvements lie in that the plates (1) and (5) are independently obtained,

the plate (1) being enamelled as appropriate, the enamelling being protected with a sheet of protective paper (4), and wherein the holes (2) of the plate are made by punching, which results in necks (3) that are received in the holes (6) of the plate (5) when they are both coupled to each other, fixing between the two being achieved by flaring (8) such necks (3), the latter acting as rivets. The sole obtained is complemented with a respective lid (9) that closes the iron steam chamber.

**FIG.-5****EP 0 854 226 A1**

Description

OBJECT OF THE INVENTION

The invention relates to a number of improvements to processes for obtaining soles used in steam irons, and in particular to soles of the kind made by superimposing and assembling two parts to each other, one being a rolled aluminium and the other an injected aluminium part, such parts being provided with respective steam outlet holes, the necks obtained from punching the rolled aluminium or bottom part to make the holes being precisely the means interconnecting both parts to make up the sole.

The object of the invention is to achieve a more reasonable, advantageous and practical process for obtaining steam iron soles, considerably reducing the rejection of parts.

BACKGROUND OF THE INVENTION

Systems and/or processes used for obtaining steam iron soles differ, noteworthy among these being processes in which the sole is obtained by means of mainly pressure injection moulded aluminium alloys, although alloys of such kind afford relatively little strength and the iron sole surface may as a result be easily scratched, causing the iron sole to be worn and naturally increasing its friction coefficient, making ironing increasingly difficult.

Another system which attempts to resolve the above-mentioned drawback relies on enamelling the outer iron sole surface with ceramic materials, the main drawback of which operation is the fact that upon applying the high enamelling temperatures required to the injected aluminium sole, bubbles frequently appear in the enamel, and the parts are consequently rejected.

British Patent number 1,380,415 discloses a process for obtaining an iron sole which attempts to resolve the above-mentioned drawbacks, the process being based on obtaining a first part or member made of a moulded aluminium alloy, in which the tubular heating resistors are embedded, and a second part or member comprising a preferably steel metal plate onto which the enamel layer is applied, wherein this second part or plate is coupled to the first one, thereby for the sole to be obtained.

Although this system obviously resolves the drawbacks referred to hereinbefore, the fact that the sole must be obtained from two parts made of different materials will result in problems arising due to the differing expansions of the materials and moreover the fact that heat transfers between both parts are not uniform.

European Patent number 0 220 647 attempts to provide another solution, relying upon a system or process for obtaining an iron sole, similarly from two parts, one being a moulded aluminium and another one a rolled aluminium part, wherein the moulded aluminium part is

provided with the tubular heating resistors, whilst the rolled aluminium part is fixed to the first part and has the enamel layer applied onto its outer face.

The essential drawback of this technique lies in that enamelling takes place on both aluminium parts together, and therefore if there are any rejections due to a faulty enamelling, both parts must be rejected together, the manufacturing process hence become costlier.

Furthermore, the silicone that is normally used as an intermediate component to transmit the temperature must be capable of withstanding the temperature required for firing the ceramic, i.e. the enamel, and the same goes for the resistor caps, which must be capable of withstanding the required temperatures.

DESCRIPTION OF THE INVENTION

The object of the improvements disclosed herein is none other than using a new process for obtaining enamelled iron soles starting from two parts, namely a moulded aluminium and a rolled aluminium part, in a manner that is both simple and cheap, fully eliminating the above-mentioned drawbacks.

Specifically, the process according to the improvements of the invention relies upon the sole being manufactured by obtaining the two basic parts independently, the rolled aluminium part being provided with the respective enamelling, i.e. the ceramic that is to become the enamel layer is applied at the required firing temperature and said enamelled rolled aluminium part is later assembled with the moulded aluminium part, rejections being thereby reduced and each process being thus simplified.

Furthermore, the insertion of silicone between both parts, which allows temperature transmission to be enhanced, will not undergo the firing process for the enamel layer to be applied.

The different stages of the process for obtaining the iron sole are the following:

- The rolled aluminium part or plate is first obtained and the moulded aluminium part is obtained separately by injection, the tubular heating resistors being thus embedded in the second part;
- The rolled aluminium plate is then provided with holes for the passage of steam when the sole is part of the respective iron, which holes are obtained by punching at a predetermined angle in order for the punched material projections to form a sort of almost perfect cylinders,
- The rolled aluminium plate with the holes already made is then enamelled with ceramic;
- The enamelled face of the rolled aluminium plate is then covered with a sheet of protective paper affixed with special glues;

- The rolled aluminium plate then undergoes a positive deformation that tends to avoid or offset potential deformations of both parts, namely the rolled aluminium plate and the moulded aluminium part, when the latter are interconnected, which might result in then not being perfectly adhered throughout their surface upon being coupled;
- The inner rolled aluminium plate surface is then applied a fine layer of silicone, spread in such a way as to allow the filling of potential gaps remaining and which may remain between both parts, namely the moulded aluminium part and the rolled aluminium plate, when they are connected, thereby enhancing heat transmission between the two;
- Both aluminium parts are then interconnected by superimposing and applying pressure between the two, the flanges or necks of the holes of the first plate being subsequently flared, both parts being connected through such flanges, as if they were rivets;
- Finally, the respective lid closing the steam chamber is also coupled by pressure.

DESCRIPTION OF THE DRAWINGS

In order to provide a fuller description and contribute to the complete understanding of the characteristics of this invention, in accordance with a preferred embodiment thereof, a set of drawings is attached to the specification as an integral part thereof which, while purely illustrative and not fully comprehensive, shows the following:

Figure 1. - Is a representation of a longitudinal sectional view of the rolled aluminium plate obtained in accordance with the object of the invention.

Figure 2.- Is a view identical to that of the preceding figure, albeit with the plate already provided with the enamel, although the latter is not to be seen, with the enamelled layer about to be protected with the respective sheet of protective paper.

Figure 3.-Is a longitudinal sectional view of the two aluminium parts about to be coupled to each other, the bottom one of which parts already has the sheet of protective paper affixed, whereas the top part is provided with the respective heating resistor.

Figure 4.- Shows the two parts shown in the preceding figure fixed to one another, and at the top the lid that is to close the chamber defined in the top part.

Figure 5.- Is a longitudinal sectional view of the steam iron sole made in accordance with the object of the invention, i.e. with the two aluminium parts interconnected, the connection having been made with the cylindrical necks resulting after punching the bottom plate to obtain its holes, and with the lid closing the steam chamber mounted.

Figure 6.- Is a sectional close-view of the shape of the holes obtained upon punching the rolled aluminium plate.

Figure 7.- Is finally a close-view showing how the two aluminium parts are fixed to each other, which connection takes place by flaring the cylindrical necks defined by the steam outlet holes.

PREFERRED EMBODIMENT OF THE INVENTION

With reference to the aforesaid figures, the steam iron sole made according to the improvements of the invention is based upon the two constituent parts of the actual sole being independently obtained, and thus figure 1 shows a rolled aluminium plate (1) with respective holes (2) that are to define the steam outlets in constructing the respective iron sole, which holes (2) are obtained by punching, resulting in largely cylindrical inwardly projecting necks (3), as may be clearly observed in figure 1. Having obtained this rolled aluminium plate (1) and punched the holes (2), the plate surface is enamelled with ceramic, namely its outer face, the enamelled face then being covered with a sheet of protective paper (4) that is affixed to it using special glues.

After protecting the enamelled rolled aluminium plate (1) surface the plate undergoes a positive deformation in order that when the plate is coupled to a moulded aluminium part (5) it is slightly convex in the coupling direction, i.e. its central area is dished, the edges of the plate (1) being more separated than its central part. This deformation tends to avoid or offset potential deformations of both parts (1) and (5) which may result in their being imperfectly adhered throughout their surface upon being coupled.

For its part, the protective sheet (4) allows the plate (1) to be positively deformed without the enamel cracking or snapping, and further acts as a protection for the plate, allowing risk-free handling throughout the sole assembling and mounting process.

The moulded aluminium part (5) includes respective walls and holes (6) for the necks (3) of the respective holes (2) of the plate (1) to pass when the plate and part are assembled, which part (5) moreover has the appropriate heating resistors (7) embedded in its constituent material.

Before proceeding to couple parts (1) and (5) to each other, a fine layer of silicone is applied onto the inner rolled aluminium plate (1) surface, which silicone is not designed to provide an adherent effect but is rather useful to fill the gaps that may remain between parts (1) and (5) to improve heat transmission between the two.

The parts (1) and (5) are coupled to each other by superimposing and applying pressure between the two, then flaring (8) the cylindrical necks (3) of the holes (2), both parts being connected to one another through such flarings (8), as shown in figure 7, the above in order that when both parts (1) and (5) are perfectly joined to one

another, as noted above, the respective lid (9) is mounted to delimit the steam chamber, which lid (9) is also coupled by pressure onto positioning spigots (10), as shown in figure 5.

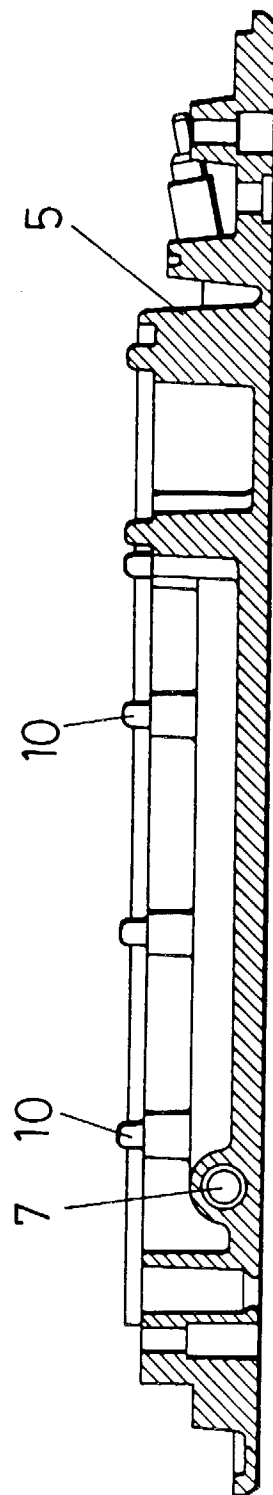
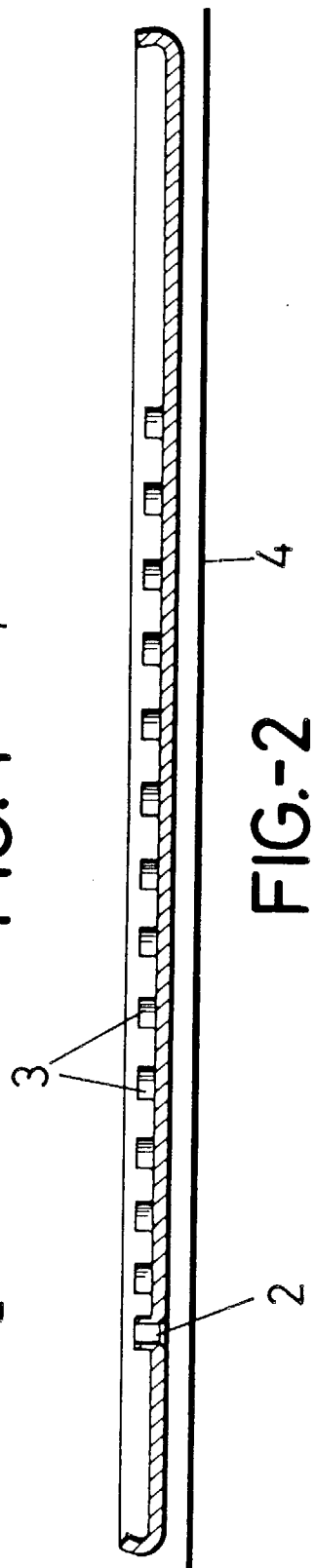
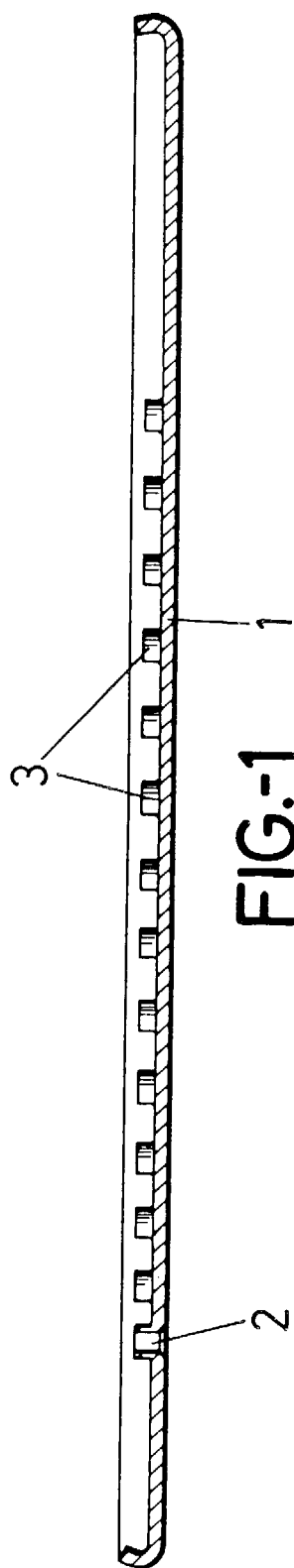
The aforesaid process for obtaining an iron sole based upon two aluminium parts, one being a rolled aluminium and another a moulded aluminium part, is obviously successful in interconnecting or fixing these parts (1) and (5) to each other simply and efficiently, for such connection is based upon flaring (8) the cylindrical necks (3) resulting from punching the holes (2) in the rolled aluminium plate (1), the role played by the sheet of protective paper (4) being also noteworthy, for it allows the rolled aluminium plate (1) to be positively deformed and thereby ensure a tight contact between such plate and the moulded aluminium part (5) and, consequently, a good heat transmission to be achieved, being particular in that such tight connection is achieved due to the peripheral connection obtained by means of the riveted (8) cylindrical necks, whereas the positive deformation of the plate (1) provides an assurance that the latter will not tend to become detached from part (5) due to constructive deformations.

and the moulded aluminium part (5);

- Applying a fine layer of silicone onto the inner plate (1) surface that receives the moulded aluminium part;
- Superimposing and coupling both aluminium parts (1) and (5) to each other, flaring (8) the cylindrical necks (3), thereby for both parts to be fixed to one another;
- Pressure coupling the respective lid (9) that closes the steam chamber, the bottom and periphery of which are delimited by the moulded aluminium part (5), the lid (9) being coupled by centring the same on spigots (10).

Claims

1. Improvements in processes for obtaining steam iron soles, wherein the sole as such is made by interconnecting and fixing two aluminium parts (1) and (5) to each other, the first of which is a rolled aluminium part and the second an injection moulded aluminium part, both parts having steam outlet holes; characterised in that said sole is obtained according to the following operative stages:
 - Separately obtaining the rolled aluminium part or plate (1) and the moulded aluminium part (5), the latter carrying the respective heating resistors (7),
 - Punching the holes (2) in the rolled aluminium plate (1), cylindrical inwardly projecting necks (3) being obtained upon the holes (2) being punched;
 - Enamelling the outer or bottom face of the rolled aluminium plate (1) with ceramic;
 - Covering the face onto which the enamel was applied with a sheet of protective paper (4) that is affixed to said rolled aluminium plate (1) by means of special glues;
 - Positively deforming the rolled aluminium plate (1) to render the same slightly convex in the coupling direction in order to ensure a tight contact between said rolled aluminium plate (1)



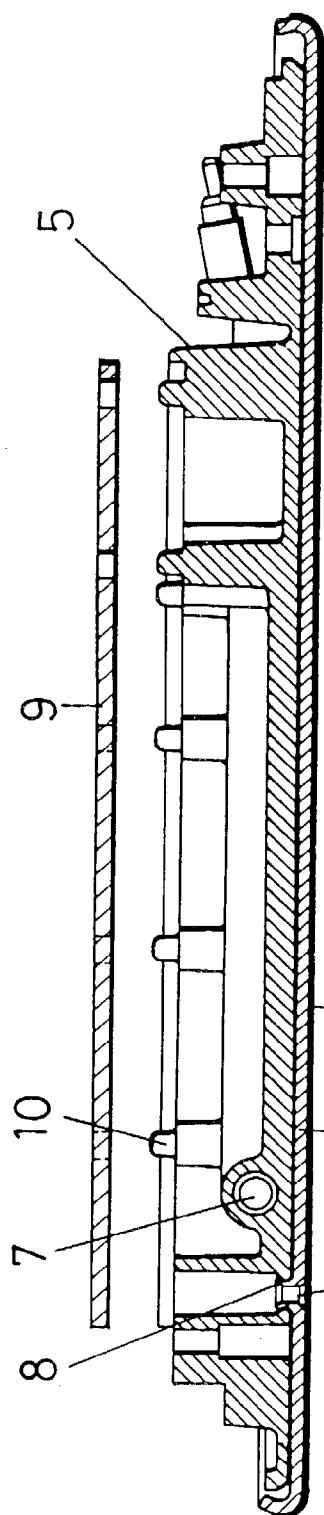


FIG.-4

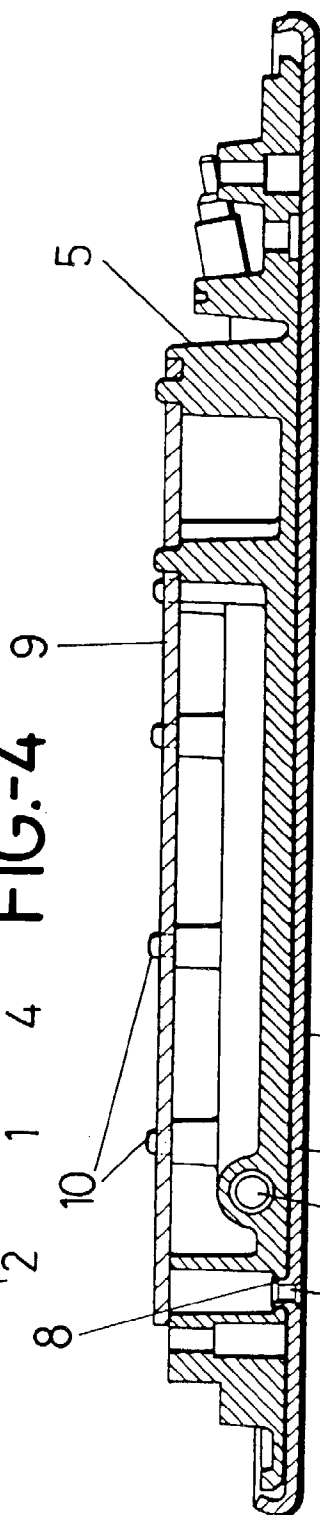


FIG.-5

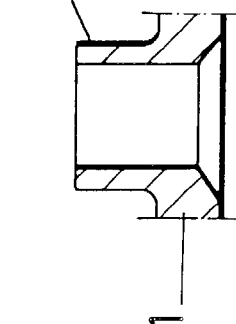


FIG.-6

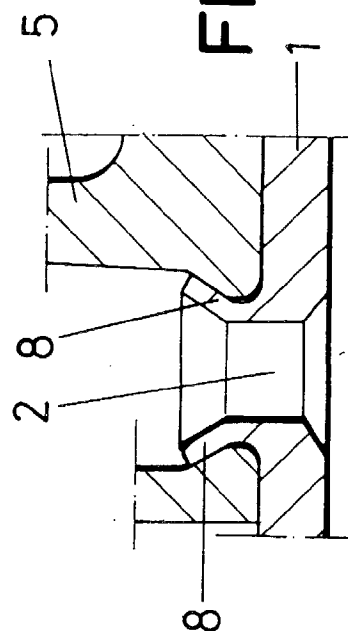


FIG.-7



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 50 0014

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 712 954 A (ARIETE S.R.L.) 22 May 1996 * the whole document *	1	D06F75/38
A	FR 2 648 166 A (SEB S.A.) 14 December 1990 * the whole document *	1	
A,D	EP 0 200 647 A (SEB S.A.) 5 November 1986 * claims; figures *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			D06F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		26 May 1998	Courrier, G
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03/82 (P4/C01)