June 18, 1935. M. W. McARDLE 2,005,234

SADIRON SOLE PLATE

Filed Sept. 9, 1933

Fig. 1

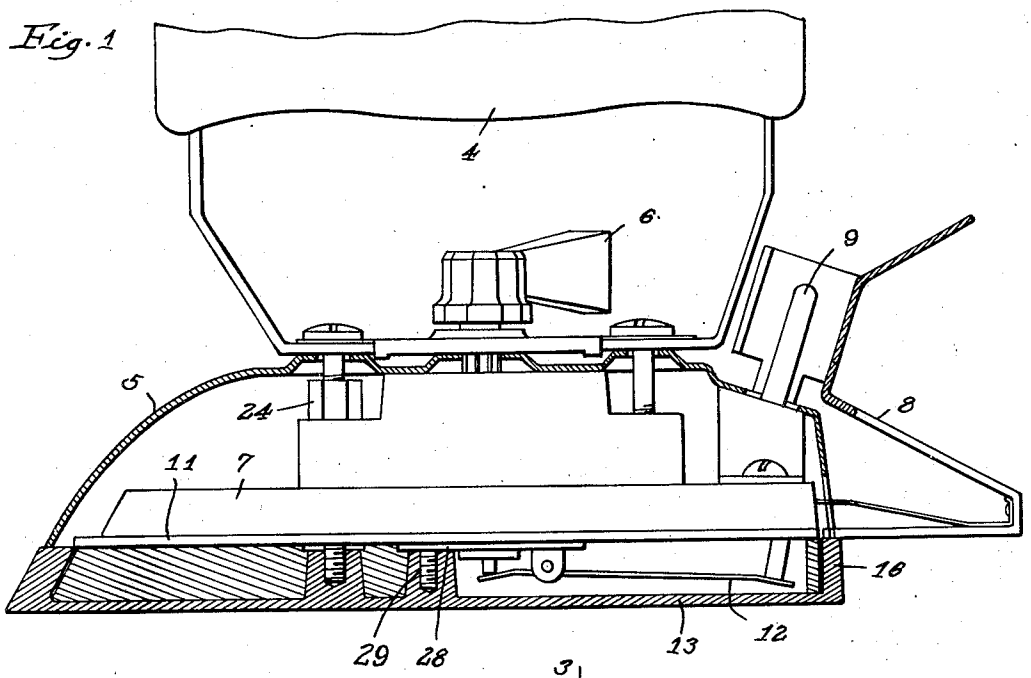


Fig. 2

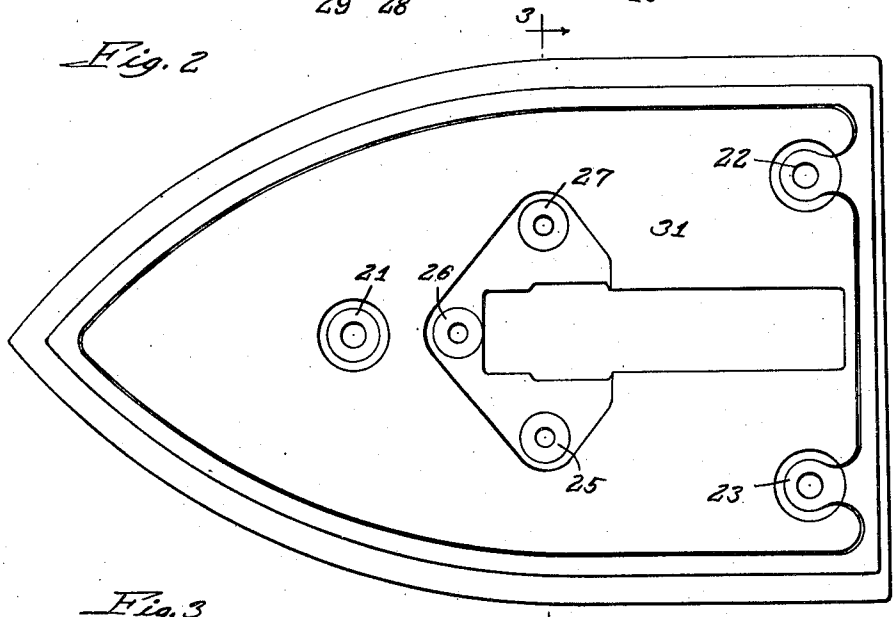
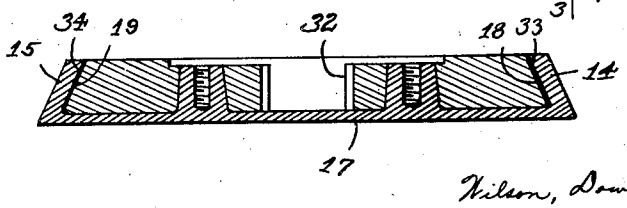


Fig. 3



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SADIRON SOLE PLATE

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6 Claims. (Cl. 68—26)

This invention relates to sadirons and has special reference to a composite sole plate of novel and improved construction.

The conventional sole plate is cast of gray iron in a single piece and then appropriately finished. Such a sole plate has in the past been quite satisfactory, but with the development of the art it has been found that this type of plate possesses several very material disadvantages. It has been found that the smoothening effect in ironing is largely a matter of supplying sufficient heat to the surface of the sole plate and with the development of automatic thermostat means for controlling the temperature, it has been possible to safely utilize much higher wattages in the iron. However, even though the greater amount of heat can be generated in the iron, the old type of gray iron sole plate is incapable of transferring this heat from the heating element to the ironing surface at a sufficiently rapid rate. With the knowledge that the amount of heat is the principal factor in ironing has come the realization that the weight of the iron could be greatly reduced without loss in ironing efficiency, thus materially reducing the labor of the operation. Cast aluminum sole plates have been used in an attempt to increase this rate of heat transfer and to lighten the iron, but this metal is so soft that it has proven incapable of withstanding the usual mechanical abuse to which the iron is subjected, as a result of which buttons and other hard objects produce indentations and otherwise mar the ironing surface, and the sole plate soon becomes badly battered.

A primary object of the present invention is to provide a sole plate having a hard metal shell capable of withstanding hard usage and a filler cast into the shell, the metal of the filler of light weight and having a relatively high thermal conductivity with respect to that of the shell.

Another object of the invention is the provision of a composite sole plate consisting of a shell and a filler of different metals so arranged as to compensate for the difference in expansion between the filler and the shell.

A still further object of the invention is the provision of a shell having inclined side walls forming a top cavity into which is cast a metal filler having a higher coefficient of expansion and a higher heat conductivity, the metal of the filler contracting upon cooling so as to provide space between the shell and the filler for the normal expansion of the filler at operating temperatures.

Another object of the invention is to provide a composite sole plate having a hard shell and a soft metal filler and means for carrying the upper portions of the iron on the shell.

I have also aimed to provide a composite sole plate having an outer shell of ferrous metal capable of taking a smooth polish and metal plate, and of withstanding hard usage, and a filler of light weight metal of high thermal conductivity, the filler being cast into the shell so as to assume every detail of the contour thereof for rapid heat transfer between the filler and shell, and so as to compensate for the difference in thermal expansion between the shell and filler.

Other objects and attendant advantages will become apparent to those skilled in the art from the following description and the accompanying drawing, in which—

Figure 1 is a vertical section through a sadiron embodying my invention;

Fig. 2 is a top view of a sole plate constructed according to my invention, and

Fig. 3 is a section on the line 3—3 of Fig. 2.

Referring to Figure 1, my improved sole plate is shown in connection with a conventional type of iron having the usual handle 4, cover 5, temperature regulating handle 6, pressure plate 7, heel rest 8, and electrical terminal points 9 leading to the heating element 11, the circuit thereto being controlled by a thermostat designated generally by 12. These elements form no part of the present invention, and, consequently, are not being described in detail.

The present embodiment of the invention contemplates a shell designated generally by the numeral 13 having marginal upstanding side walls or edges 14 and 15 and an upstanding rear wall 16, the side walls being inwardly inclined as shown in Fig. 3 and forming with the rear wall 16 a top cavity in the shell. This shell forms the outer or exposed surface of the sole plate, the bottom surface 17 thereof constituting the ironing surface. The marginal walls 14, 15 and 16 project upwardly defining the limits of the ironing surface 17. The outer surface of the side walls 14 and 15 are sloped inwardly as shown in Fig. 3 for the purpose of permitting the sole plate to slip under buttons and other obstructions on surfaces being ironed, and the inner surface of the side walls 14 and 15 slope outwardly from top to bottom, as shown at 18 and 19, whereby the side walls 14 and 15 are of substantially uniform thickness throughout their height. In the preferred embodiment of the invention, the shell 13 is formed of gray cast iron through the usual casting operations, though I do not intend to limit myself to this particular

material or method of formation. Cast iron produces a rigid shell which has the requisite characteristics of hardness and which takes a ready polish for the purpose of plating. Lugs 21, 22 and 23 are formed on the bottom of the shell 13 and project upwardly to a plane slightly below the upper edge of the marginal walls and serve to receive bolts such as shown at 24 for the purpose of securing the super-imposed portions of the iron, such as the handle 4, cover 5, pressure weight 7 and heating element 11 against the upper surface of the sole plate. Likewise, lugs 25, 26 and 27 are also formed on the bottom of the shell and project upwardly to substantially the same plane as the previously mentioned lugs for the purpose of supporting a plate 28 carrying the thermostatic mechanism 12, the plate being secured thereto by means of screws 29 received in the lugs.

A filler, designated generally by the numeral 31, substantially fills the cavity defined by the side walls 14 and 15 and the end wall 16 with the exception of a well 32 positioned and shaped to receive the thermostat 12, as shown in Figure 1. The filler 31 is formed in place by pouring into the cavity molten metal preferably of a melting point lower than the metal comprising the shell. This metal in the preferred embodiment of the invention consists of a light weight aluminum alloy though other metals may be satisfactorily used, such as the metal aluminum and other light weight metals. The molten metal when poured into the cavity of the shell completely fills the same and assumes the exact shape of the cavity taking each indentation and curve of the cavity surface. As the filler cools, however, it gradually contracts and draws away from the walls of the cavity because of its greater coefficient of expansion and its higher temperature, leaving spaces such as indicated at 33 and 34. Since the filler contracts uniformly from all sides there will be a small space completely around the filler between the side walls of the insert and the marginal walls 14, 15 and 16 of the shell. When the sole plate is embodied in an iron and brought to the ironing temperature, the filler, because of its greater coefficient of expansion than the shell expands more rapidly closing the space between the filler and the shell. When the shell is preheated a certain definite amount and the filler cast therein, the relation between the shell and filler becomes such that at the operating temperature of the iron (in the region of 650° C.), the filler firmly abuts the side walls of the shell, establishing firm contact therewith without exerting undue pressure thereon by such contact.

It will be observed that by casting the filler into the shell, I accomplish two distinct results. First, the filler is caused to take an outer surface shape accurately complemental to that of the cavity so that when brought into contact by expansion, a close fit will result. Secondly, when the metal of the filler cools, it draws away from the walls of the shell because of its greater coefficient of expansion in proportion to the difference in the rate of expansion of the two metals and to their respective temperatures, thus leaving an amount of space between the shell and the filler which will be taken up upon reheating the sole plate, thereby compensating for the difference in expansion between the two elements.

Attention is directed to the fact that I have provided a structure wherein the two major problems, that of providing light weight and that of obtaining a high rate of heat conductivity have been given effective solution without introducing other problems common to the art. The structure is rugged, and the surface thereof will stand hard usage commensurate with that of the old cast iron sole plate. At the same time the structure is substantially lighter and has a materially greater rate of heat conductivity.

Another feature of the invention is the manner in which the difference in expansion of the filler and shell is cared for, and the fact that this compensation occurs with any metals wherein the filler has a greater coefficient of expansion than the shell.

Attention is further directed to the simple and inexpensive way in which the structure may be made and the effective manner in which the simplified construction solves the problems presented.

While I have thus described and illustrated a specific embodiment of the invention I am aware that numerous alterations and changes may be made therein without departing from the spirit of the invention, and I do not wish to be limited except as required by the prior art and the scope of the appended claims, in which—

I claim:

1. A composite sole plate for light weight sadirons comprising a shell of hard metal adapted to withstand rough usage having upstanding marginal edges defining the working surface of the iron and forming a top cavity and a cast metal filler having the properties of a body cast into said cavity filling the cavity to substantially the plane of the upper edge thereof, the metal of the filler forming the main body of the sole plate and being of substantially lesser density and of greater coefficient of expansion than the metal of the shell.

2. A sole plate for light weight sadirons comprising a shell of ferrous metal adapted to withstand hard usage and having a top cavity, a filler forming the main body of the sole plate comprised in substantial part of aluminum having the size and shape characteristics of a body cast into the cavity to closely conform to the contour thereof for close contact of the filler and shell and rapid transfer of heat therebetween, the composite structure imparting lasting surface characteristics, and light weight to the sole plate.

3. A sole plate for light weight sadirons comprising a shell of metal of relatively low thermal expansion having upstanding marginal edges defining a top cavity, and a filler of relatively high thermal expansive metal within the cavity closely conforming to the contour thereof, the structure having when cold an annular space between the filler and said marginal edges, said space being of a magnitude such that the filler substantially contacts the same through expansion when the sadiron is brought to the normal operating temperature.

4. A sole plate for light weight sadirons comprising a shell of metal of relatively low thermal expansion having upstanding marginal edges defining a top cavity including outwardly flared walls from top to bottom, and a filler of relatively high thermal expansive metal having the properties of a body cast into the cavity to closely conform to the contour thereof, the structure having when cold an annular space between the filler and said marginal edges, said space being of a magnitude such that the filler substantially contacts the same through expansion when the

sad-iron is brought to the normal operating temperature.

5. A sole plate for light weight sadirons comprising a cast ferrous metal shell having marginal upstanding edges defining a top cavity, and a filler comprised in substantial part of aluminum cast into the cavity to closely conform to the contour thereof, the structure having when cold an annular space between the filler and said marginal edges, said space being of a magnitude such that the filler substantially contacts the same through expansion when the sadiron is brought to the normal operating temperature.

6. A composite sole plate for light weight sadirons comprising a shell having upwardly inclined inwardly sloped marginal edges defining a top cavity having outwardly flared walls from top to bottom, and a cast metal filler in said shell, said filler having the characteristics of a body cast into said shell, the metal of the filler having higher thermal expansion than the shell for contact with the flared walls at the ironing temperature to tighten the filler in the shell.

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