Removable Heating Element for Pressing-Iron Sole Plate and Methods of Removably Mounting Such Heating Element Therein


Figure 1

Figure 2

Drawings signed by W. K. Tavender, Leonard J. McCormack, Jr., with attorney signature present.
Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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REMOVABLE HEATING ELEMENT FOR PRESSING-IRON SOLE PLATE AND METHODS OF REMOVABLY MOUNTING SUCH HEATING ELEMENT THEREIN


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This invention relates to removable heating elements for a pressing-iron sole plate and methods of removably mounting a heating element within and removing such element from a sole plate.

One of the objects of this invention is to provide a sheath casting having a heating element embedded within the same and to mount said sheath casting in the usual depression in the conventional sole plate of a pressing-iron in such manner that it will, by unskilled manual labor, be readily removable therefrom and will be replaceable by a new sheath casting so as to make it unnecessary to return the iron base to the factory in order to obtain a replacement of such sheath casting and element, and will furthermore in such removable and replaceable construction produce a highly efficient heat transmission or heat flow between the sheath casting and element on the one hand and the sole plate on the other.

Another object of our invention is to enable the use of a sole plate having a depression with internal or sheath-abutted surfaces that are unevenly cast and not machined or smoothed, also to utilize a sheath casting having un-machined, rough and uneven surfaces that are intended to abut the surfaces of the sole plate depression and to provide between the uneven surfaces of such sole plate and sheath casting a contact or connection that will produce therebetween a good and efficient transmission or flow of heat.

Still another object of our invention is to combine in a removable connection between a sheath casting having a heating element embedded therein and a depression in a conventional sole plate a cementitious joint and pressure-applying means in such manner that the heat transmission or flow of heat between the sheath casting containing the heat element and the sole plate will be highly efficient.

Still another object of this invention is to provide a method of removably mounting of the character specified which will utilize a sheath casting of suitable cast metal having a heating element embedded therein and which is formed such sheath casting in soft cement with the use of as little cement as is possible inside the depression in the sole plate or base of an iron; then will provide screws to force by screw-pressure such sheath casting down into the softly cemented depression so as to have as close a contact as is possible between the parts and to retain the assembled parts in close contact; also will close up and fill with cement all empty spaces between the sheath casting and the depression in the sole plate; will dry the cementitious joint thoroughly and preferably overnight, and finally will heat the sole plate or base member through the element in the sheath casting until the joint is thoroughly dry.

Still another object of this invention is to produce and utilize a cement that will provide a highly efficient heat flow between the sheath casting with its embedded element and the base or sole plate.

Another object of our invention is to provide for a highly efficient method of ready removal of the sheath casting with its embedded heating element from the sole plate, so as to enable a new sheath casting embodying a new element which is to be furnished by the manufacturer, to be applied by an unskilled person in the sole plate or base with a new mixture of cement.

With these and other objects in view, the invention comprises the combination of members and arrangement of parts so combined as to co-operate and work together in the performance of the functions and the accomplishment of the results herein contemplated, and comprises in one of its adaptations the species or preferred form illustrated in the accompanying drawings, in which:

Fig. 1 is a three part bracketed view in perspective showing a sole plate or base member embodying a pair of internally screw threadable posts, a sheath casting having a heating element embedded therein and disposed above the sole plate, and fastening screws for extension through holes in the sheath casting and for mounting in the internally screw threadable posts to apply pressure on the sheath casting through the nuts and washers shown above the bolts;

Fig. 2 is an assembled view in perspective of the sole plate, sheath casting, screw and bolt elements shown in Fig. 1;

Fig. 3 is a view in plan of the sole plate or base member embodying a sheath casting with a wire heating element cast therein and assembled in the sole plate as shown in Fig. 1 and also cemented therein by a layer of our novel cement;

Fig. 4 is a section on the line 4—4 of Fig. 3, looking in the direction of the arrows;

Fig. 5 is a view in plan of a modified form of sheath casting having a tubular type heating element cast into a sheath casting instead of the wire type heating element shown in Fig. 4; and

Fig. 6 is a section on the line 6—6 of Fig. 5, looking in the direction of the arrows.

Referring now to these drawings which illustrate a preferred embodiment of our invention, it will be understood that a conventional base or sole plate is employed having the usual depression which, because of the fact that the sole plate is formed of cast metal, often has surfaces that are uneven or rough and that a casting having cast therein a heating element w of the wire type as shown in Figs. 3 and 4 or a heating element t of the tubular type as shown in Figs. 5 and 6 is mounted in the depression of the sole plate and is also somewhat rough and uneven. In the case of each heating element so mounted, the heating elements are first embedded into a metal casting to form what we shall call a "sheath casting" and this sheath casting with its embedded element is by the use of a novel cement having a high degree of heat flow or heat conductive properties then fastened into the sole plate or base. This fastening is accomplished primarily by carefully cementing into the depression within the sole plate of the pressing iron, the sheath casting, and secondarily applying screw pressure to said sheath casting during the cement operation. The sheath casting may be of any suitable metal and the heating element whether of the tubular type or of the wire type will be suitably insulated and mounted therein.

In the accompanying drawings, the sole plate has
a usual conventional depression 11 which is substantially co-extensive in length and width with the sole plate, extends downwardly within the body portion of the sole plate and is surrounded by upright edges 12 of a height that is substantially equal to the thickness or depth of the depression 11, which is to be fitted into said depression. The sole plate 10 has at its outside bottom a smooth ironing surface 13 and is provided within and adjacent to the edges of the casting with the conventional fluid channel 14 for steam irons. Between the channel 14 and the outer surface 13 there are a series of steam-emitting outlets. Bores 15 and 17 are fed to the channel 14 and bores 15 through the inlet 14.

The internal surface 16 of the depression is somewhat uneven and rough due to the fact that the sole plate comprises a casting and that this surface is usually not smoothed and polished like the outer surface 13 and adjacent surfaces 12. Said depression 11 has extending upwardly therefrom a pair of short internally screw-threaded posts 17—17a of less height than the upright edges 12 and the thickness of the sheath casting to be fitted into the depression. Said posts 17, 17a are at least partially surrounded by apertures 17b, 17c in the sheath casting and are adapted to receive bolts 18—18b which are at least partially of lesser diameter than posts 17—17a. On the bolts 18, 18b are mounted nuts 19—19a for the purpose of providing sufficient screw pressure to force the sheath casting 22 downwardly into the depression 11 into and into a cementitious material 20, a pair of washers 21—21a preferably being employed between the nuts 19—19a and the edges of the apertures 17b, 17c in the sheath casting 22. The cement is used to fill in all empty spaces between the sheath casting 22 and the bottom and side, respectively, of the depression in the sole plate 10.

The cementing in is accomplished by a cement having high heat flow properties. A thin film of such cement is applied upon the bottom and side walls of the said depression in the sole plate and a thin film may also be applied on the walls of the sheath casting that abut the bottom and side walls of the depression. We have employed for cementing a novel cement comprising:

- One part sodium silicate grade 42 Baumé.
- Four parts water by volume.
- Mix with atomic powdered aluminum to a soft putty consistency.

In the preferred embodiment of our invention, the sheath casting 22 is formed of aluminum and is embedded in said cementitious material 20 applied to the said sheath casting in the base or sole plate 10 of the iron and said sheath casting 22 is forcibly pressed down to the bottom of the depression so as to provide a close contact as is possible between the aluminum casting sheath 22 embodying the heating element and the said internal surface or bottom 16 and side edge walls 12 of the depression 11 in said base member.

The aluminum sheath casting 22 is pressed in and held in close contact with the walls of the depression 11 of the sole plate 10 and by the use of power applied through the nuts 19, 19a on said posts a downward pressure forces the sheath casting 22 against the bottom 16 of the depression 11 and into the cementitious material 20, thus producing a good thermal connection between the surfaces of the sheath casting 22 and the bottom of the sole plate 11 which actually contact each other and also providing contact with the cement at all places where there is a gap of contact. This screw pressure and cement thus provide good heat conducting contact at all points of the internal surface of the depression, including those surface portions where there is unevenness.

These bolts also compress the cement between such sheath casting and side-edge surfaces of the depression and make the same in firm condition to provide a good cemented joint. The bolts 18, 18b being of lesser diameter than the internally-screw-threaded posts 17, 17a project upwardly above such posts 17, 17a and being of less height than the top surface of the edge of the apertures 22 in the sheath casting 22 when the same is inserted permit screw pressure to be applied to the casting, and we preferably employ washers 21, 21a between the nuts 19, 19a and said edge of the aperture 17b. In the sheath casting 22 so that pressure by the nuts 19, 19a through the washers 21, 21a against the sheath casting 22 will force the same downwardly against the bottom surface of the depression 11 in the sole plate 10 and also against the side walls thereof.

An important feature of our invention comprises the use of the cement having high heat-transmission properties and it will be understood that as little of such cement as possible should be used, but such cement must be of sufficient quantity to provide close contact and fill up all spaces between the bottom and side surfaces of the sheath casting and the uneven abutting bottom and side surfaces of the depression in the sole plate.

The sheath casting is thus by the use of this cement bonded into the sole plate and all empty spaces, as above indicated, are completely filled with such cement. Such filling is for the purpose of not only getting the best heat contact with the embedded sheath casting and element therein but also to bond down the lower surface of the sole plate, but also to get such contact through the cement with the side walls of the casting and the side walls of the depression.

After a sheath casting is thus applied, the cement is allowed to dry overnight and thereafter the iron is heated to a low heat through its heating element for a time period preferably comprising 10 hours and until the cement is thoroughly dried; whereupon the sole plate is ready for the application of the other parts of the iron and the subsequent use or selling thereof on the market.

Our method of providing for ready removal of the sheath casting with its embedded heating element comprises first removal of the holding screws which are always retained as a part of the structural characteristic of the iron; second, soaking the sheath casting with its embedded element in water for preferably at least one hour; third, hammering or otherwise suitably vibrating the sheath casting around its peripheral edges; fourthly, gripping the sheath casting out of the base with any suitable tool, and finally a new sheath casting embodying a new element which is furnished by the manufacturer is applied in the sole plate or base with a new mixture of cement. A large part of the servicing requirements for the iron manufacturer is thus eliminated while new parts only may be provided.

Having described our invention, we claim:

1. In a removable heating element for pressing iron, a pressing-iron sole plate having an unmachined, uneven depression, a sheath casting provided with an uneven depression-abutting surface and having embedded and cast therein a heating element, means for removably mounting said sheath casting in the depression within the sole plate comprising means for applying screw pressure from the depression in the sole plate to the sheath casting and a cement having high heat flow properties and releasable by a soaking operation combined with vibration and being disposed between the sheath casting and the surface of the depression in the sole plate, said cement being capable upon removal of the screw means of complete removal from the sole plate to enable a renewal by an unskilled person of a new sheath casting having a new heating element embedded therein.

2. In a removable heating element for pressing iron, a pressing-iron sole plate having a conventional depression, a sheath casting provided with an uneven depression-abutting surface and having embedded and cast there-in a heating element, means for removably mounting said sheath casting in the depression within the sole plate comprising screw means for applying screw pressure to the sheath casting and a cement releasable by a soaking opera-
tion combined with vibration and comprising one part sodium silicate grade 42 Baumé, four parts volume by water, said silicate and water being mixed with atomic powdered aluminum to a soft putty consistency, whereby said cement will possess suitable heat conduction properties to enable proper use of the sole plate in a pressing iron and will be capable upon removal of the screw elements of complete removal from the sole plate to enable a renewal by an unskilled person of a new sheath casting having a new heating element embedded therein.

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