

July 4, 1950

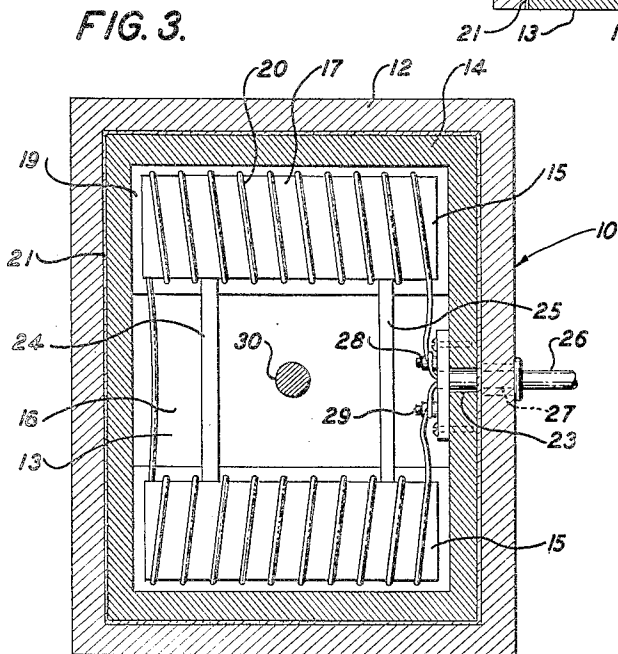
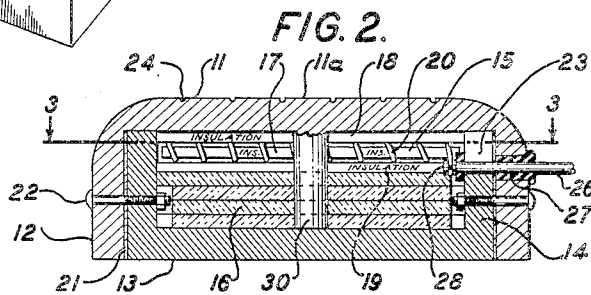
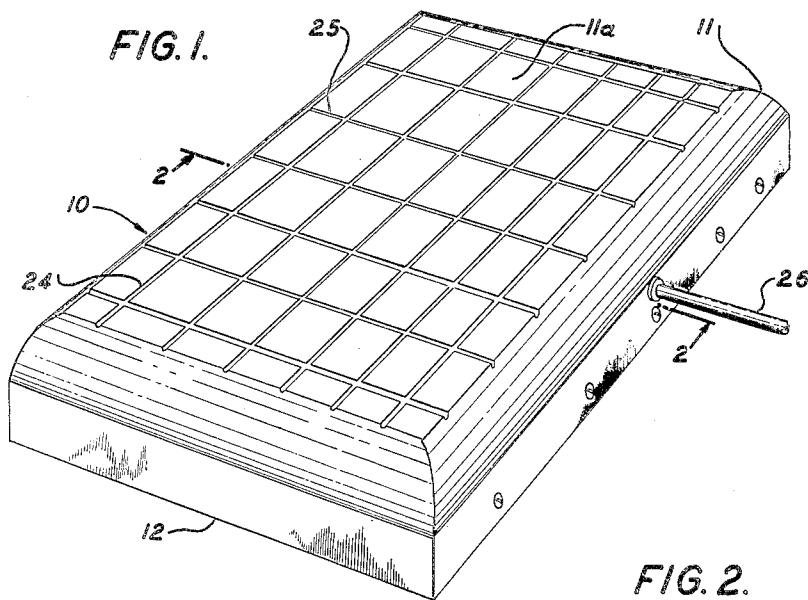
V. J. MORRIS

2,513,733

FOOT WARMER

Filed June 28, 1947

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 4.

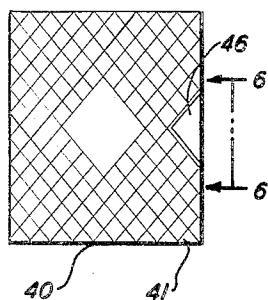


FIG. 5.

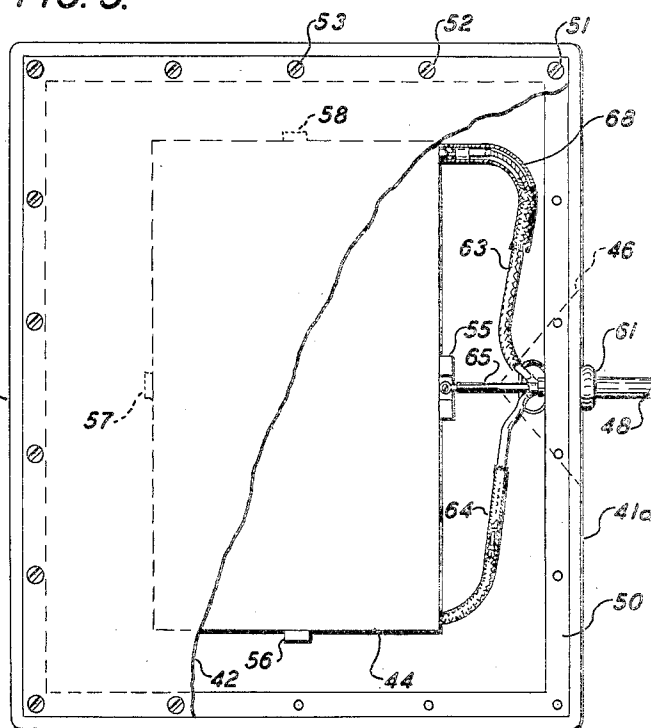


FIG. 10.

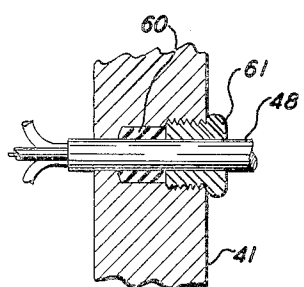


FIG. 6.

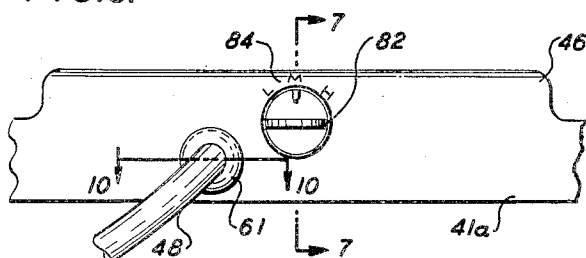


FIG. 7.

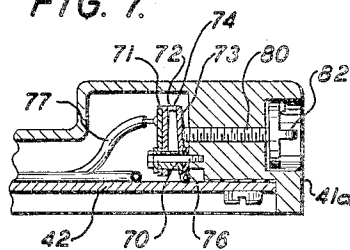


FIG. 8.

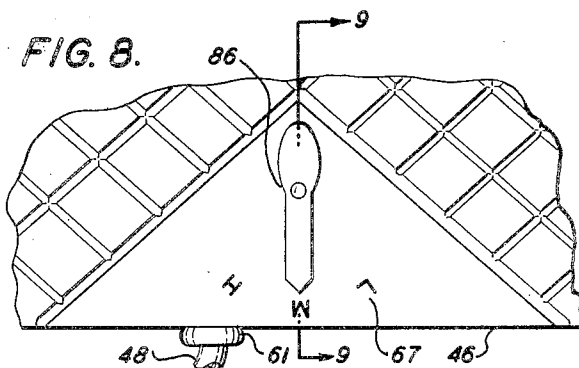
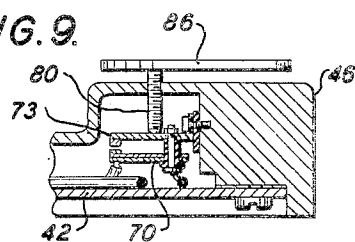


FIG. 9.



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FOOT WARMER

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Application June 28, 1947, Serial No. 757,827

2 Claims. (Cl. 219—19)

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This invention relates to a foot warmer. More particularly, the invention relates to an apparatus in the form of a platform the upper surface of which may be maintained at any desired temperature. The foot warmer of the invention is adapted to permit a person to warm his feet either while standing thereon or while sitting on a chair or the like.

The harmful effects of prolonged exposure of one's feet to cold or dampness are well known. Yet there are many occupations in which a person must sit or stand for long periods in places which, in cold or wet weather, make difficult the prevention of this undesirable exposure of the feet. For example, in open-air markets, service stations, drive-ins, and other semi-exposed places there has heretofore been no adequate means for protecting clerks, attendants, or the like from this unhealthy condition.

Accordingly, it is an object of the present invention to provide a foot warmer which will permit a person while standing or sitting to keep his feet at a uniformly warm temperature, without interfering with the carrying on of his regular duties, even though such duties involve exposure to adverse weather conditions.

Correlatively, it is an object of my invention to provide a foot warmer which may be conveniently moved about and may thus be positioned in the most desirable location to furnish protection to one whose duties alternately call him from place to place.

The above-contemplated objects are accomplished according to the invention by means of an apparatus comprising a platform member containing a heating element disposed beneath the horizontal face thereof. As base member is affixed to the platform member. In one embodiment of the invention, the base member is adapted to hermetically seal the heating element within the confines of the base member and the platform. By sealing the heating elements within the closure, the foot warmer is unaffected by water and will operate even while standing in a puddle of water. The necessary electrical energy is supplied to the heating element which is preferably of the resistance wire type, by means of wires introduced through the vertical sides of the platform member.

Other features and advantages of the foot warmer of the present invention will become apparent from the following description thereof taken in relation to the accompanying drawing in which:

Fig. 1 is an isometric view of the foot warmer;

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Fig. 2 is a sectional elevation on the line 2—2 of Fig. 1;

Fig. 3 is a plan view on the line 3—3 of Fig. 2 showing the inside of the foot warmer with the horizontal portion of the closure member cut away;

Fig. 4 is a plan view of another embodiment of the invention;

Fig. 5 is a bottom view of the foot warmer of Fig. 4 with the bottom closure plate partially cut away.

Fig. 6 is a side elevation taken on the line 6—6 of Fig. 4 showing a modified form of the foot warmer of Figs. 4 and 5;

Fig. 7 is a sectional elevation taken on the line 7—7 of Fig. 6;

Fig. 8 is a partial plan view of another modification of the foot warmer;

Fig. 9 is a sectional elevation taken on the line 9—9 of Fig. 8; and

Fig. 10 is a section taken on the line 10—10 of Fig. 6.

In Figs. 1 and 2, the foot warmer 10 is shown to include the closure member 11 which is in the form of a platform the horizontal surface of which is supported by the sides 12. In the embodiment here shown the horizontal surface 11a of the platform or closure 11 and the sides 12 are shown making smooth continuous curves with each other. The horizontal surface and the sides 12 may form right angles with each other without affecting the operation of the foot warmer and the more streamlined construction shown in Figs. 1 and 2 is rather for the purposes of increased mechanical strength than to aid in the operation of the foot warmer.

As seen in Fig. 2, the closure member or platform 11 is fitted over a base member 13 which is in the form of a box, the sides 15 of which are, in the preferred embodiment, lower than the sides 12 of the closure member 11 in order that the sides 12 will rest on the ground or floor when the closure is superimposed over the base 13 and will in this manner provide a smooth bottom surface with the bottom of the base member 13.

In the upper portion of the chamber formed by the base member 13 and the closure member 11 there is located one or more heating elements 15. The heating elements 15 are spaced from the bottom of the base 13 by means of a quantity of insulation 16 shown in Fig. 2 as a plurality of layers of insulation. In the preferred embodiment this insulation comprises asbestos, Transite or the like and acts to prevent downward heat loss from the heating element 15.

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The heating element 15 is comprised in one embodiment of a core 17 of refractory non-conductive material such as, for example, mica, around which the resistance wire 20 is wrapped. Two layers 18 and 19 of a similar refractory non-conductive material serve to insulate the resistance wires 20 from the metallic or conducting portions of the foot warmer.

In order to make the foot warmer of the invention particularly suitable where it is liable to come in contact with atmospheric moisture or actual pools of water, it has been so constructed in the embodiment shown in Figs. 1-3 that the heating element 15 is hermetically sealed from the atmosphere by the closure or platform member 11. This is simply accomplished by so proportioning the member 11 and the base member 13 that the vertical sides 12 of the member 11 fit snugly around the vertical sides 14 of the member 13. To further insure the hermetic sealing, a coating 21 of a heat-resistant high temperature adhesive is employed to join the sides of the closure member 11 to the sides of the base 13. Any heat-resistant adhesive may be employed for this purpose. Adhesives which are waterproof under a wide range of temperature conditions and which are resistant to water, oil, gasoline and other chemicals are to be preferred. Adhesives possessing these properties are available commercially. To further insure the waterproof joint of the closure member 11 to the base 13 a plurality of bolts or screws 22 may be employed bolting together the sides of the two members and thus exerting a compression force on the adhesive layer 21.

The required electrical energy is supplied to the heating elements 15 through a water-tight and air-tight conduit projecting through the wall 12 of the platform member 11 and the wall 14 of the base 13 which conduit carries a two or three wire power supply into the windings 20 of the heating element 15. To facilitate assembly of the apparatus, the wall 14 of the base member, through which the power cable 26 projects, may be provided with a vertical slot 23 to receive the cable as the platform member 11, with the cable inserted therein is placed on the base. The cable may thus be sealed in the platform member by the grommet 27, prior to the assembling of the apparatus.

In the foot warmer as shown in Figs. 1 and 2, the exposed horizontal surface 11a of the platform member 11 is criss-crossed longitudinally and transversely with the grooves 24 and 25 respectively which provides for drainage of water or the like so as to render the major portion of the surface more efficient as a heating medium.

Looking downwardly on the foot warmer with the horizontal surface of the platform 11 removed, one means of placement of the heating elements 15 is shown in Fig. 3. In the embodiment shown in Fig. 3 the foot warmer is provided with a pair of similar heating elements constituting resistance wire 20 wound in a spiral fashion around the core 17 which as disclosed above, may be mica or other suitable substance.

The preferred wire for making these heating elements is Nichrome resistance wire of a gauge sufficiently heavy to result in a temperature approximately of that desired. Use of a heavy gauge wire such as, for example, 8, 10 or 12 gauge, has the advantage of providing greater durability and longer life, besides that of automatically controlling the temperature within certain limits. It is to be understood of course, that the appa-

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ratus may be conveniently hooked in circuit with a rheostat or other variable resistance device in order to vary the temperature of the upper plate face of the platform 11 over wide limits. However, the use of a rheostat may be obviated by the selection of a proper gauge size of Nichrome or other resistance wire in order to produce a correct temperature at the prevailing voltage of the electric energy source. Thus, if the foot warmer were to be employed in the absence of a rheostat it would be desirable to employ a different gauge wire if the electric energy were supplied from a 220 volt source than if the energy were to be supplied from a 110 volt source. However, by the proper selection of the size resistance wire, the desired temperature could be obtained regardless of the voltage of the source. Alternatively a thermostat may be employed in the manner hereinafter described.

In the embodiment shown in Fig. 3, the two heating elements 15 are spaced at opposite ends of the foot warmer and are separated by suitable separators 24 and 25 and are continuously wound so as to be supplied from one power source 26. As above described, the conducting wires from the external source are introduced to the foot warmer by means of the sealed conduit 27 and are connected to the heating elements at the contact points 28 and 29. Although the two heating elements 15 are shown to be connected in series, such is not a necessary feature of the invention inasmuch as they may be operated with equally satisfactory results in parallel or independently. Further it is to be understood that although in the preferred embodiment of the invention two heating elements are employed, it is within the contemplation of the invention to employ only one heating element containing the same or greater footage of resistance wire or to employ in excess of two heating elements. In any case the temperature obtainable can be easily controlled by the control of the total footage of resistance wire and of the gauge size of the wire as well as by the proper selection of the type of wire employed which, as stated above, may preferably consist of Nichrome resistance wire.

Whereas the invention has been described with relation to Figs. 1-3 as a sealed unit, which may be employed in the presence of water, chemicals or the like, in another embodiment of the invention the platform member is fitted loosely over the base member. This embodiment possesses the desirable feature of reduced manufacturing costs and ease of replacement of parts. A foot warmer of this type of construction is shown in Figs. 4 and 5.

In the embodiment of the invention as shown in Figs. 4 and 5 the foot warmer 40 comprises the platform member 41 and the bottom plate 42 which together inclose the heating element (not shown), the insulation 44 and the necessary wiring. The top of the platform 41 is cross hatched as in the embodiment shown in Fig. 1 with the exception of a smooth surfaced section in the center which is convenient for a name or trademark or the like and a triangular elevated portion 46 on the edge thereof directly above the conduit 48 leading into the foot warmer. The bottom plate 42 is affixed to the interior flange 50 of the platform member 41 by means of the screws 51, 52, 53, etc. Suitable waterproof sealing material is preferably used for sealing the bottom plate; and the sealing material may be of the character heretofore described. When so affixed the plate 42 serves to hold the insulation in the

position established by the guide members 55, 56, 57 and 58 projected downwardly from the underneath surface of the platform member 41. Disposed between the insulating sheet 44 and the underneath surface of the platform member 41 is a heating element such as the heating element shown in Figs. 2 and 3.

In this embodiment of the invention I may use either a single heating element or a plurality of heating elements. As shown in Fig. 10, which is a section taken on the line 10—10 of Fig. 6, the conduit 48 is introduced through the side 41a of the platform member and is sealed therein by the packing 60 and the packing gland 61. Modifications of this sealing arrangement may be made if desired. For example the electrical conduit may be sealed through the wall by a suitable sealing material of the character described heretofore. Preferably the conduit 48 carries three wires 63, 64 and 65. The wires 63 and 64 serve to supply electric energy to the heater and the wire 65 constitutes ground wire which is connected at the end shown in Fig. 5 to the guide 55 and at the opposite end of the conduit 48 to ground.

In the embodiment of the invention shown in Fig. 5 a bimetallic thermostat 68 is disposed between the wire 63 and the heater and serves to make and break the contact therebetween responsive to the effects of temperature on the bimetallic elements.

A modified form of thermostatic control is shown in Figs. 6 and 7. Fig. 6 is an elevation on the line 6—6 of Fig. 4 showing a section of the side 41a of the platform member and the triangular elevated portion 46 which is formed integrally with the side. Fig. 7 is a sectional elevation on the line 7—7 of Fig. 6 showing an alternative means of thermostatic control.

In Fig. 7 the thermostat 70 comprises the bimetallic element 71 provided with the contact point 72 and the adjustable contact arm 73 provided with the contact point 74.

The power supply is fed to the adjustable contact 73 by means of the wire 76 and the circuit is completed to the heater by means of the wire 77 connected to the bimetallic element 71. The position of the adjustable contact arm 73 is controlled by the screw 80 passing through the side 41a of the platform. To facilitate adjustment of the shaft 80 a wing nut 82 is affixed thereto.

As shown in Fig. 6 an indicating scale 84 may be provided on the side member 41a adjacent the wing nut 82 so as to provide visual means for gauging the adjustment of the contact arm 73.

By mounting the thermostat 70 in a horizontal position the adjustment means may be provided on the upper face of the triangular section 46. Such means of mounting the thermostat 70 is shown in the partial plan view of Fig. 8 and the sectional elevation of Fig. 9 which is taken on the line 9—9 of Fig. 8. In this embodiment the adjustment scale 80 projects through the top of the elevated portion 46 and is provided at its outer end with an arm 86 whereby the adjustment of the contact arm 73 is facilitated. As in the embodiment shown in Fig. 6 it is convenient to provide an indicating scale such as the scale 87 adjacent one end of the arm 86 so as to furnish visual means of controlling the adjustment of the thermostat.

The most satisfactory material for construction of the foot warmer is metal because of its high heat conductivity and mechanical strength. Although any materials may be employed for the base, it is substantially essential for efficient op-

eration that the platform member, at least the horizontal portion thereof, be of heat conductive material to provide efficient heat transfer from the heating element through to the heating surface of the platform. For this purpose, as well as for the base member, the light metals such as aluminum, magnesium and alloys of these and other light metals are superior although any metals may be employed and in fact, any structural materials may be employed. For purposes of durability and strength, steel, and particularly stainless steel, may be employed. To provide greater structural strength, one or more vertical support posts may be employed. One such supporting member 30 is shown in Figs. 2 and 3 projecting from the base 13 to the under surface of the platform 11. The load carrying capacity of the platform may be increased to substantially any desired amount by the inclusion of one or more support members. In the simplified embodiments shown in Figs. 4 and 5 such a supporting post is less essential.

For the insulation 16 spacing the heating elements 15 from the bottom of the base 13, in Figs. 1-3 and for the insulation 44 (Fig. 5) sheets of asbestos have been found to be highly satisfactory. If asbestos is employed in the form of sheets, a plurality of these sheets may be cut to the proper size and deposited in the base member 13 (Fig. 2) and thus be built up to the proper height to support the heating element 15 in proximity to the under surface of the horizontal portion of the closure member 11. However, any type of insulation material may be employed which will accomplish the object of reducing the transfer of heat from the heating element 15 downwardly towards the bottom of the base member 13.

Other modifications in the apparatus of the invention will occur from the foregoing description and the following claims without departing from the spirit or scope of the invention which contemplates the provision of a platform type foot warmer which is preferably resistant to moisture, chemicals of any sort and other atmospheric conditions and which will accomplish the desired purpose under all types of adverse conditions.

I claim:

1. An apparatus of the class described, comprising a platform member of light metal, said platform member consisting of a horizontal member supported by continuous vertical sides, a base member of light metal encased by said platform member, said base member consisting of the bottom and four vertical sides held within and adjacent the respective sides of the horizontal member, two heating elements disposed within said base member and supported therein at a horizontal plane in proximity to the undersurface of said horizontal member of said platform and spaced from the bottom of said base member by a quantity of insulating material, said two heating elements being disposed within said horizontal plane at opposite ends of said apparatus and being connected in series and to a power source, means for affixing said platform to said base member in hermetically sealed relationship comprising in combination a plurality of bolts joining the vertical sides of said members and exerting a compression force on a heat-resistant, chemical-resistant adhesive disposed between the adjoining faces of the vertical sides of said horizontal member and of said base member, and a moisture-sealed conduit projecting through one

of the vertical sides of said base member and of said platform member, said conduit furnishing means for supplying power from an external source to said heating element.

2. Apparatus of the class described, comprising a metal platform member, said platform member consisting of a horizontal member supported by depending sides which are substantially continuous, a base member engaged by said platform member, said base member being held within and adjacent to the respective sides of the horizontal member, heating element means disposed within said base member and supported therein in a horizontal plane in proximity to the under-surface of said horizontal member of said platform and spaced from the base member by a quantity of insulating material, means for affixing said platform to said base member in hermetically sealed relationship comprising a plurality of bolts joining the periphery of the base member to the depending sides and exerting a compression force on heat resistant, chemical resistant adhesive disposed between the adjoining surfaces of the base member and said sides, and a moisture-sealed

conduit projecting through one of the depending sides of said platform member, said conduit furnishing means for supplying power from an external source to said heating element.

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