Feb. 12, 1957 T. D. LANE 2,781,439

UNDERFOOT FOOT WARMER

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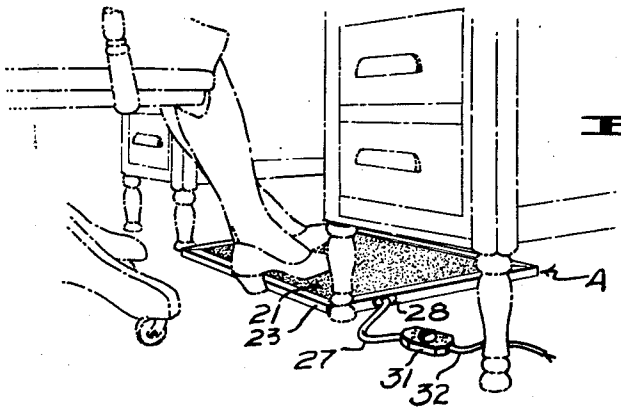


FIG_1

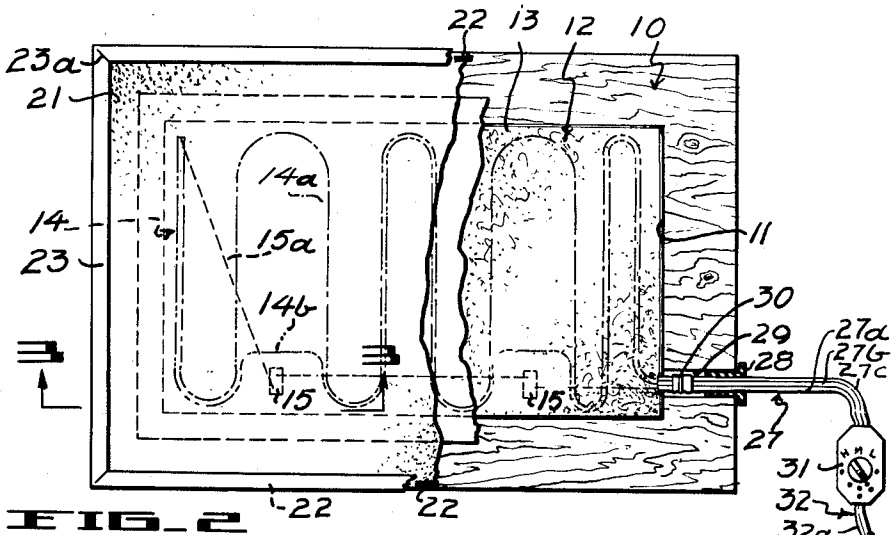


FIG_2

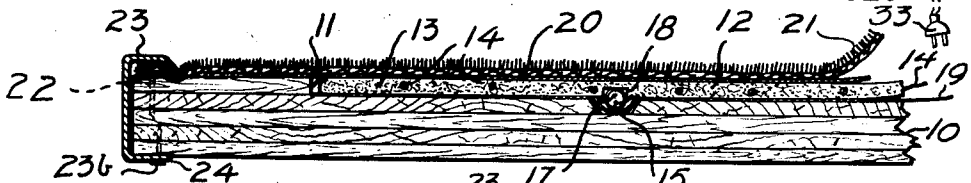


FIG_3

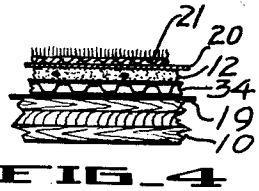


FIG_4

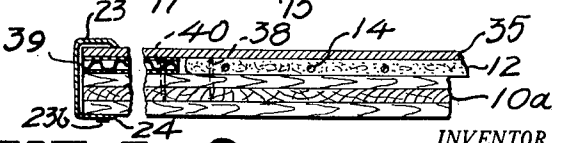


FIG_5

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UNDERFOOT FOOT WARMER

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3 Claims. (Cl. 219—19)

The present invention relates to a foot warmer, and pertains more particularly to a portable foot warmer which may be used under foot, on the floors of buildings such as offices, stores, factories or homes.

It is a matter of common knowledge that in cold weather even in the same room, some employees will be too warm, while others will complain of being too cold. This is a problem which is incapable of solution by ordinary heating systems, since it is a matter of individual reaction. Some people prefer a warmer room while others are more comfortable in cooler rooms. Furthermore, many people suffer from poor circulation in the feet and legs. This may be due in part to the sedentary habits which have been acquired by a large number of people, particularly office, store and factory employees. As a result, the feet of such people frequently are cold in rooms which are otherwise adequately heated.

Some attempts have been made in the past to provide individual foot warmers for use underfoot, but most of such prior heaters are not adequately insulated so as to protect the floor from overheating when placed thereon, and some do not protect against overheating of the feet, with the result that they frequently cause chilblain and other discomforting effects.

An object of the present invention is to make an improved foot warmer. Another object is to make an electrically energized foot warmer with adequate control and one which will not overheat the feet of the user. Another object is to make a simple and inexpensive foot warmer of attractive appearance and long life. Another object is to make a strong, rigid, well insulated, easily fabricated portable electric foot warmer. These and other objects and advantages of the invention are brought out in the following description and the accompanying drawings, wherein:

Fig. 1 is a perspective view of the heater in use beneath an office desk.

Fig. 2 is a plan view of the heater shown in Fig. 1, portions thereof being broken away and a heating element being shown in broken lines.

Fig. 3 is an enlarged fragmentary sectional view taken along line 3—3 of Fig. 2.

Fig. 4 is a similarly enlarged fragmentary sectional view showing a modified form of construction.

Fig. 5 is a sectional view of a further modified form of the invention.

In the embodiment of the invention shown in Figs. 1 to 3, inclusive, a foot warmer A comprises a base **10** which may be of plywood of suitable thickness, for example ¾". A recess **11** is provided in the upper side of the base **10** of a size to receive a heating pad **12** flush therein.

The heating pad **12** is of a well known type consisting of a body **13** which may be of felt, glass-fibre, cloth or other suitable electrically insulative material, having a heating element **14** consisting of a pair of serpentine lengths of electrical resistance heating element wire **14*a*** and **14*b*** embedded therein. Such wire, as is well known to those versed in the art, may be of suitable nickel and

chromium alloy or other metal or alloy of suitable electrical resistance, and having required heat and corrosion resistant qualities. The resistance wires **14*a*** and **14*b*** are wrapped with asbestos or glass fibre insulation also in a manner well known to those familiar with the art of heating pads.

A pair of conventional thermostats **15, 15** are provided at suitable intervals in the heating element **14** and preferably are buried, partly in recesses **17** (Fig. 3) provided therefor in the base **10** and partly in recesses **18** in the pad **12**. If the thermostats **15, 15** are of small size the recesses **17** in the base **10** may be omitted since the recesses **18** in the material of the pad **11** will be sufficient to embed the thermostats substantially flush therein.

A layer **19** of suitable reflective sheet insulating material such as aluminum foil preferably is placed to cover the bottom of the recess **11** beneath the heating pad **12** to reflect radiant heat from the element **14** upwardly. A second layer **20** of rather heavy aluminum foil, or light gauge tin plate steel of the type from which tin cans are made, is provided to overlie the heating pad **12**. This top foil layer **20** preferably extends as a waterproof shield throughout the entire top surface area of the base member **10**, and preferably is coated with a dull black paint on its under side throughout the area thereof over the heating pad **12** to facilitate the absorption, and reradiation from its upper surface, of radiant heat from the element **14**. A layer **21** of wear-resistant material such as a good grade of carpet is provided over the entire upper area of the base member **10**, and substantially coextensive therewith. This layer **21** of wear resistant material is secured marginally to the base **10** by tacks or staples **22** which may be applied with a conventional type of stapler, not shown.

A frame of channel edging material **23** of suitable material, such as stainless steel, then is mounted marginally around the entire base (Fig. 1). This channel edging material grips the wear resistant material **21** firmly to the base and provides a neat and long wearing trim entirely around the device. The corners **23*a*** of the channel edging material **23** are mitred in a usual manner to provide neat, tight fitting corners; the trim channel **23** is secured against displacement by small nails **23*b*** driven through the bottom flange **24** of the trim channel **23** and into the base **10**.

A usual three-wire lead cord **27** extends from the heating element **14** along a groove **29** provided therefor in the base **10** and through an insulating grommet **28** which is inserted in the outer end of the groove **29** through a hole (not shown) provided therefor in the edging member **23**. An insulated staple **30** spans the cord **27** and is driven into the base **10** to anchor the cord against pulling stresses in the event a user should employ the cord **27** as a handle for moving the device.

A three stage switch **31** of a conventional type is provided at the outer end of the three wire cord **27** and a length of usual two conductor cord **32** is connected to the outer side of the switch **31**. A conventional wall plug **33** is mounted on the outer end of the cord **32** for plugging into a wall receptacle of a usual type connected to an electrical circuit of desired voltage, for example, the usual 115 volt house lighting circuit.

The switch **31** is so connected that one conductor **32** of the two-conductor cord **32** is connected at all times through a conductor **27*a*** of the cord **27** and through a conductor **15*a*** (shown in broken lines in Fig. 2) to the terminal end of the resistance element **14**. The thermostats **15, 15** are connected in series in the conductor **15*a***.

The heating element **14** consists of two resistance wires **14*a***, shown in dash-dot lines in Fig. 2, and a shorter resistance wire **14*b*** shown in dash-two-dot lines in Fig. 2. In the "high" heat position of the switch **31**, the conductor **32*b*** of the two-wire cord **32**, is connected through

a conductor 27*b* of the three-wire cord 27, and through the shorter resistance wire 14*b* to the terminal end of the thermostat conductor 15*a*. In the "medium" heat position of the switch 31, the conductor 32*b* of the two conductor cord 32 is connected through a conductor 27*c* of the three conductor cord 27 to the longer resistance wire 14*a* and thence to the terminal end of the thermostat wire 15*a*. In the "low" heat position of the switch the conductor 32*b* is connected to the conductors 27B and 27C in parallel, and thence through the resistance element wires 14*a* and 14*b* to the terminal end of the thermostat wire 15*a*.

The heating element 14 preferably is approximately a 60 to 100 watt unit and a suitable size for the pad 12 is approximately 10" x 12". A suitable size for the base plate 10 is approximately 18" x 27". This provides a heater which is readily insertable under most desks and tables, and also is a convenient size for use to stand upon, for example, behind a counter in stores, or in factories, filling stations or other places where the device may be of use.

A modified form of the invention is shown in Fig. 4. It is similar to that shown in Figs. 1, 2 and 3, with the exception that a sheet 34 of corrugated cardboard of suitable strength and approximately ⅜" in thickness is provided beneath the heating pad 2. With this construction of Fig. 4, the pad receiving recess 11 is deepened as required to accommodate the additional thickness of the corrugated member 34. This underlying layer of corrugated cardboard provides additional air cell insulation between the element 14 and the floor upon which the device may be placed which still further protects the floor from possible heat damage. The resilient heating pad 12 overlying the corrugated sheet 34 cushions the load of a person standing on the device, so that corrugated cardboard of the type commonly used for the making of shipping cartons has been found suitable for making the member 34. A layer 21 of carpet may be provided over the entire top area of the assembled parts, the same as in Figs. 1 to 3, inclusive.

A further modification of the invention is shown in Fig. 5 wherein a base member 10*a*, of suitable rigid insulative material such as plywood, has no recess therein to receive the pad 12, and the pad 12 is laid on top of the base 10*a* and is secured thereto as by staples 38 driven marginally through the pad beyond the heating element 14 therein, and into the base. Suitable material such as corrugated cardboard 39 of apportionately the same thickness as the pad 12 is mounted to cover the entire surface area of the base 10*a* beyond the pad 12 and is secured to the base as by staples 40. This arrangement provides a flush, substantially continuous top surface for supporting a top wear resistant member 35.

For use in factories, filling stations and stores, where the device is to be used by persons standing upon it, and where appearance is not a major factor, the wear resistant top member may consist of a sheet 35, of hard pressed wooden composition board of the type known to the trade as "Masonite," or a sheet of suitable wear resistant plastic sheet material. Such materials may be easily cleaned when soiled by mud or grease, and, being electrically nonconductive are more satisfactory than carpet in locations where they are apt to be used by persons having wet or soiled shoes.

A marginal frame 23 of channel edging material may be applied around the device shown in Fig. 5 in the same manner as that described previously herein for the construction shown in Figs. 1 to 3, inclusive.

The transfer of heat from the pad 12 to one's feet resting on the device is principally by direct conduction through the carpet 21, although there is some heat transfer by radiation and a minute amount by convection. Therefore, even when one's shoes are wet, in a very short time the feet become warm, and this results in a general feeling of warmth and comfort all over one's body.

No noticeable amount of heat is transferred by the present device to the ambient air, so that the air one breathes is not heated by the device as it is with some types of spot heaters. Since the amount of moisture a unit quantity of air will carry increases with the air temperature, a certain coolness in the air one breathes reduces its tendency to dry out the mucous membranes of the nose and throat, which adds to the sense of comfort experienced, providing the body itself is sufficiently warm.

After one has used the device a few times, it has been noted that one's feet will shift, as soon as they are comfortably warmed, from the heated central area toward the marginal zones of lesser heat. This has been observed to be without intention or even knowledge on the part of the person using the device. The marginal area of the device surrounding the pad 12 provides a zone which, even though not substantially heated, provides insulation in the event the floor beneath is cold. Thus, the device may be left turned on at all times during cold or inclement weather, and the feet will tend to find their own comfort zone thereon, while the temperature of the ambient air is not noticeably affected.

The device comprises a simple, compact, easily fabricated foot warmer with a wide variety of applications and one which requires no more electrical current to operate than a medium size incandescent lamp bulb.

While I have illustrated and described a preferred embodiment of the present invention, it will be understood however, that various changes and modifications may be made in the details thereof without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. A foot warmer for under-foot use comprising a rigid base plate of poor thermal conductivity having a recess in the upper side thereof, a heater pad flush-mounted in said recess, said heater pad comprising a flexible body, a heating element arranged in said pad body, thermostat control means connected to said heating element to limit the maximum temperature thereof, a conductor cord connected to said heating element for connecting said element to a source of electrical energy, a thin sheet of heat conductive waterproof material overlying said pad and extending onto said base marginally around the recess therein, a layer of wear resistant material mounted over the entire top area of said base to enclose said pad in said recess, and fastening means securing said wear resistant material marginally to said base.

2. A foot warmer for under-foot use comprising a rigid base plate, cushioning material mounted on the top surface of said base plate and substantially co-extensive therewith, an electrical resistance heating element arranged in serpentine fashion throughout a central area of said cushioning means, thermostat control means connected to said heating element to limit the maximum temperature thereof, a conductor cord connected to said heating element for connecting said element to a source of electrical energy, switch means mounted to control the flow of electrical current through said element, a layer of wear resistant material overlying the top area of said base and substantially co-extensive therewith, and a frame of metal channel binding material fitted to receive and enclose the marginal portions of said base plate and said wear resistant material therein, thereby to grip the wear resistant material to the base and to strengthen and protect said base and said wear resistant material.

3. A foot warmer for under-foot use comprising a rigid base plate of poor thermal conductivity and of substantial thickness having a recess in the upper side thereof, a heater pad flush-mounted in said recess, said heater pad comprising a flexible body, a heating element arranged in said pad body, thermostat control means connected to said heating element to limit the maximum temperature thereof, a conductor cord connected to said heating element and flush mounted in a groove provided

therefor in the base plate, for connecting said element to a source of electrical energy, a thin sheet of heat conductive waterproof material overlying said paid and extending onto said base marginally around the recess therein, a layer of wear resistant material mounted over the entire top area of said base plate to enclose said pad in said recess, whereby heat is conducted from the heating element through the pad, the sheet of waterproof material and the wear resistant material for heating by conduction shoes and feet placed thereon, the element being insulated by the base plate from a floor therebeneath, and fastening means securing said wear resistant material marginally to said base.

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