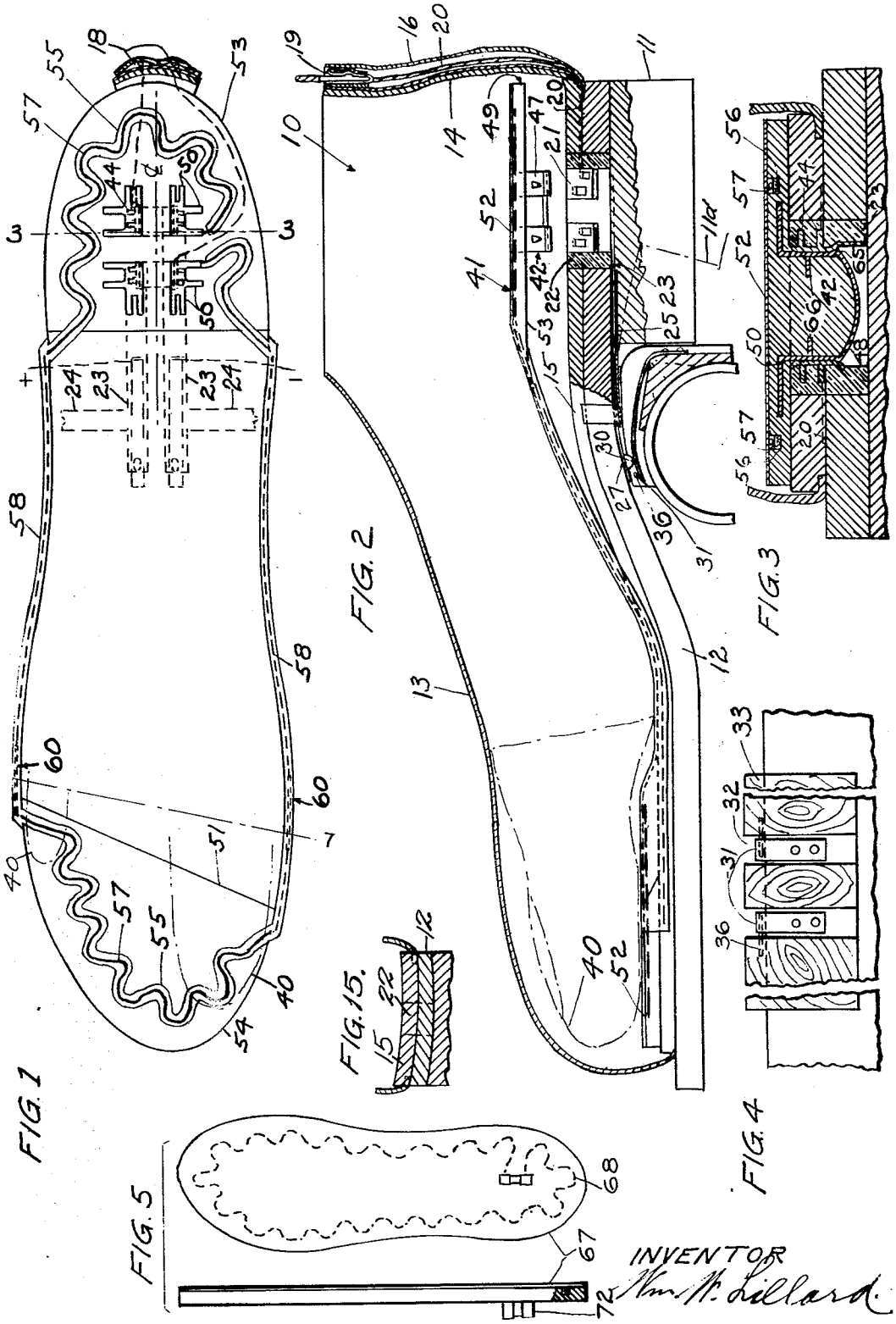
July 18, 1933. W. W. LILLARD 1,918,276

ELECTRIC BODY WARMING DEVICE

Filed Jan. 30, 1928 2 Sheets-Sheet 1



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ELECTRIC BODY WARMING DEVICE

Filed Jan. 30, 1928 2 Sheets-Sheet 2

FIG. 9

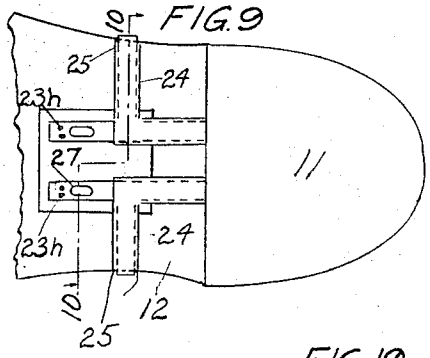


FIG. 10.

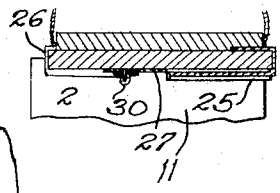


FIG. 6.

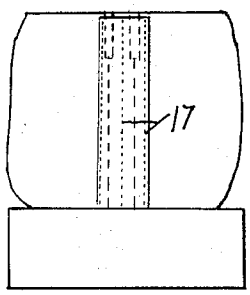


FIG. 14

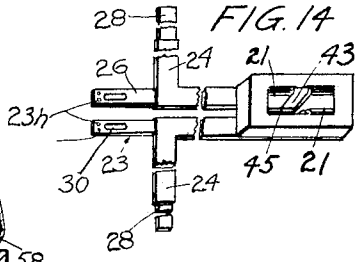


FIG. 19

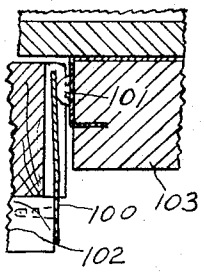


FIG. 7

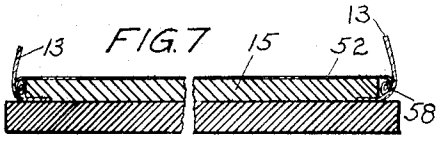
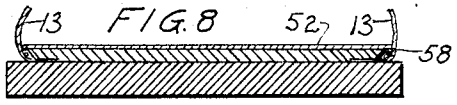


FIG. 8



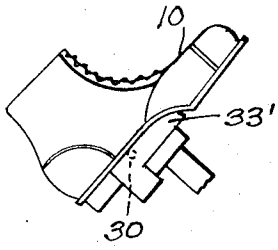


FIG. 13.

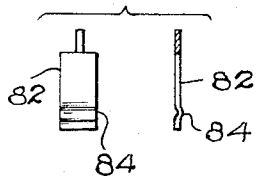


FIG. 11.

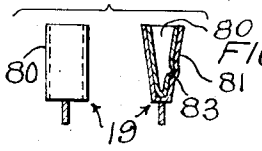


FIG. 12.

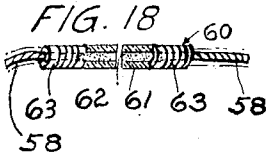


FIG. 18

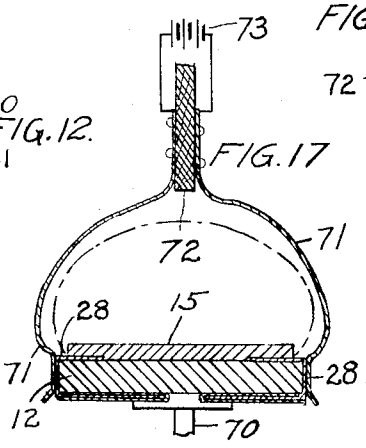
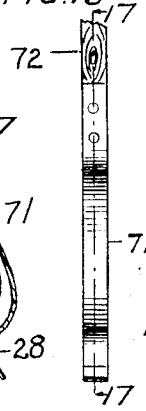


FIG. 17

FIG. 16



INVENTOR
Wm. W. Lillard

Patented July 18, 1933 1,918,276

UNITED STATES PATENT OFFICE

WILLIAM W. LILLARD, OF MAHWAH, NEW JERSEY

ELECTRIC BODY WARMING DEVICE

Application filed January 30, 1923. Serial No. 250,461.

The present invention relates generally to means for applying electrically generated heat to a person's body by conduction. It relates more particularly to means for conducting electricity to suitable electrically heated devices disposed between an outer garment or covering of a person and some desired part of the body such as a foot.

A normally clothed person standing or sitting in a cold place for a considerable period of time will usually feel his feet getting cold before any other covered part of his body is uncomfortable. Heat applied to the person's feet will not only warm them but also warms the circulating blood which returning to the heart is effective to indirectly warm, to some extent, the other parts of the person's body.

It is an object of this invention to provide convenient means for conducting electricity to an electrically heated slip insole worn inside a person's shoe.

Another object is to provide an electrically heated slip insole which can be worn in a shoe for warming the wearer's foot and which will occupy a minimum of space in the shoe.

In carrying out my invention, provision is made of a foot rest on which are mounted two contact terminals which may be connected to a convenient source of electricity. Two contact terminals are mounted on the bottom side of an outer sole of a shoe in the raised instep section of the sole a short distance in front of the heel, the latter contacts being arranged to engage with the first named contacts when the shoe is properly placed on the foot rest. From the sole contacts, electric conductors lead to a terminal block set flush with the top of the heel portion of the insole of the shoe. Two terminals are mounted in a socket opening of the block and are arranged for making contact with downwardly extending terminals of electric resistance wires embedded in a slip insole which is to be worn in the shoe. From the terminal block, two electric conductors lead to the top of the shoe and terminate in small sockets to which may be connected flexible conductors neatly and inconspicuously arranged in the clothes of the person wearing the shoe and extending upwardly to an operative connection with an electric warming pad carried against the person's body under his outer clothes.

A feature of the present invention is the provision of slots in the foot rest member and having the contact elements arranged in the slots, and the provision of downwardly extending terminal knobs on the sole of the shoe arranged for engaging in said slots and making contact with the terminals disposed therein. The arrangement of the knobs and the slots permits contact between the two sets of terminal elements to be easily and positively made and broken by simply sliding the shoe forward and backward, respectively, the engagement of the knobs in the slots serving to guide the knobs into engagement with the terminals on the foot rest without requiring any attention of the person except to move his foot forward.

Other features and advantages will appear hereinafter as the description proceeds.

With reference to the accompanying drawings which form part of the specification:

Figure 1 is a fragmentary plan view of a shoe equipped according to my invention for electrically warming the wearer's foot. In this view, the removable slip insole is shown with its top layer removed and also broken away in part, to better disclose the construction of certain terminal elements embedded in the heel portion of the insole.

Figure 2 is a longitudinal sectional view, shown partly in elevation, of the shoe disclosed in Figure 1. In this view, the heel portion of the slip insole is shown raised out of contact with the socket element in the shoe, and the shoe is shown in operative position on a foot rail equipped with terminal devices for bringing electric current to terminals on the shoe.

Figure 3 is a fragmentary, enlarged cross-section of the shoe shown in Figure 1, taken along the line 3—3 thereof.

Figure 4 is a fragmentary rear view of the foot rail shown in Figure 2.

Figure 5 is a bottom and side view of a form of slip insole which may be used in

the shoe shown in Figures 1 and 2 and which is different from the slip insole shown in these views.

Figure 6 is a rear end view of the shoe shown in Figure 1.

Figure 7 is a fragmentary cross-section through the shoe shown in Figure 1 taken along the line 7—7.

Figure 8 is a view similar to Figure 7 illustrating a different arrangement of the fixed insole of the shoe for concealing certain conducting wires.

Figure 9 is a partial bottom view, to a reduced scale of the shoe shown in Figure 1.

Figure 10 is a fragmentary cross-sectional view taken along the line 10—10 of Figure 9.

Figure 11 shows rear and side views of a plug device which may be employed in practicing the present invention.

Figure 12 shows rear and sectional views of socket terminal devices which may be employed in practicing my invention.

Figure 13 is a diagrammatic view illustrating how electric current can be brought to an electrically warmed shoe embodying certain features of my invention when worn by the driver of an automobile.

Figure 14 is an isometric view, partly broken away, of a terminal unit to be installed in a shoe for practicing my invention.

Figure 15 is a diagrammatic view illustrating how wear produces a concave upper surface of the heel element of a shoe sole. It will be understood that the degree of concavity of the sole shown in this view is more than is usually found in ordinary shoes.

Figure 16 is a side view of a terminal device arranged for use with a shoe which embodies my invention when the shoe is fastened to a skate or like device (not shown) which prevents convenient access to the bottom of the shoe sole.

Figure 17 represents a cross-section along the line 17—17 of Figure 16, a portion of the shoe mounted on a skate being illustrated in this view.

Figure 18 is a fragmentary side view, shown partly in section, of a stretch of flexible electric conductor employed in practicing my invention.

Figure 19 is a fragmentary side view, shown partly in section, illustrating another arrangement of electric conductor terminals on a foot rest and a heel of a shoe.

According to one use of the present invention, a person sitting in an unheated automobile or elsewhere in cold weather may apply heat to any desired upper part of the body by means of an electric warming pad of any well known suitable kind, and also warm his feet by means of an electrically heated shoe 10. In practicing the present invention, attachments are provided for conveniently warming the shoe, certain of which attachments also cooperate in conveying electric current to the warming pad.

The shoe-warming attachments of the present invention are illustrated in the accompanying drawings as applied to a so-called low quarter shoe. It will be understood as this description proceeds that the invention may be applied to a usual high shoe by merely extending the conductor pockets at the back of the shoe to the top of the high shoe in a way disclosed in Patent No. 1,275,451, granted to me August 13, 1918.

With reference particularly to Figures 1 to 6 of the drawings, a shoe generally designated as 10 has a heel 11, a sole 12, an upper 13, a stiff counter 14, and an insole 15, which parts may be of usual construction except as hereinafter described. A leather back-stay 16 may be fastened to the upper 13 by three lines of sewing 17 which are positioned, to provide two pockets 18 which have their mouths positioned preferably a short distance below the top of the shoe and which extend down to the top of the heel 11. A terminal socket 19, hereinafter described more in detail, is positioned in each pocket adjacent the top thereof and a small, flexible metallic conductor 20 leads from a connection with each socket 19 down through the associated pocket 18 in under the insole 15 to a connection with a metallic terminal plate 21 fastened in a rubber terminal block or plug, generally designated as 22 which is set in a hole or recess for it cut in the portions of the insole 15 and the sole 12 which overlie the heel 11. The top surface of the plug 22 is arranged to come flush with the top surface of the insole.

A thin metal strip 23 is integrally connected to each terminal 21 and extends forwardly along the bottom of the sole 12 to a point a short distance from the forward side of the heel. An arm 24 of each strip extends from a point a short distance to the rear of its outer end at substantially right angles to the direction of the strip outwardly to the edge of the sole 12. The two strips 23 will be positioned parallel to each other with their inner edges spaced apart approximately one-half inch. A thin tough coating 25 of rubber or other suitable insulating material will cover all portions of each strip 23 and its arm 24 except as follows. A bare stretch 26 of each strip 23 extends from its forward end back to its arm 24. Before the strips 23 are attached to the shoe, for a purpose to presently appear, a small thin piece 27 of rubber sheeting is fastened between the bare portions of the terminal strips 23 and the sole 12 (see Figure 9). A bare stretch 28 of each arm 24 extends from its outer end inwardly so that the outer end of the coating 25 will stop at the adjacent edge of the sole 12. In each stretch 26, is formed an integral termi-

nal contact button or knob 30 which projects downwardly as illustrated in Figures 2 and 10. To contact with each terminal knob 30 ther is provided a terminal spring 31 which is fastened in a slot 32 cut in a contact block 33 of wood or other suitable electric nonconducting material which may be shaped to be conveniently mounted on such things as foot-controlled pedals in automobiles, foot rails in automobiles, and foot rests of various kinds in homes, offices, shops, etc. The slots 32 will be slightly wider than the springs 31 which are spaced apart the same distance as the contact knobs. A pin or nail 36 may be driven in the side of each slot 33 to hold down the forward end of the associated spring 31 which may have initial tension to swing it upwardly against the pin with enough pressure to make a good contact with the button 30. The springs may be connected by conductors 34 with a battery 35 or other suitable source of electricity (Figure 20). It will be noted that the springs 31 do not extend out beyond the surface of the block 33 at any point. This construction is desirable since if the springs should extend out from the block and a wet sole 12 be brought in contact with them a short circuit might result.

To produce a warming effect on a person's foot 40 in the shoe 10, an electrically warmed slip insole generally designated as 41 is arranged in the shoe and is provided with a downwardly extending plug member 42 which is arranged to fit snugly in a socket opening 43 provided in the terminal block 22.

Each terminal 21 consists of a strip of sheet metal securely held against a wall of the socket opening adjacent one end thereof by having integral lugs 44 embedded in the side walls of the block 22 (see Figure 3). The length of the socket opening 43 is considerably more than the widths of the two terminals 21, and each of the latter is positioned against one end of the socket opening to leave a sufficient distance between them to safeguard against short circuits. A companion plate member 45 for each terminal plate 21 may be similar to the latter and positioned opposite it across the socket opening 43 and be fastened to the side wall of the block 22 by like means as described for fastening the terminal plate. Each terminal plate 21 and its companion member 45 will have its upper end bent away from each other a small amount, (Figure 3) to form a kind of throat for a purpose to presently appear. It can be readily seen that if desired a conductor 20 can be divided into two branches and one branch be connected to a terminal strip 21 and the other branch to its companion member 45.

The long axis of the socket opening 43 will preferably lie approximately in the same plane as the center line of the heel 11 from rear to front. This arrangement is advantageous since a cross-section through the heel portion of a shoe that has been worn for some time will show the upper surface of the insole slightly concaved somewhat as illustrated in Figure 15.

A contact blade element 47 is fastened on the plug member 42 at each end and is arranged for engaging between each terminal plate 21 and its companion member 45 so that the side walls of the rubber block 22 are compressed enough to provide a good electrical contact between the blade 47 and the associated terminal plate 21.

Each blade element 47 is preferably constructed of a piece of thin pliable sheet metal and has an exposed downwardly extending U-shaped portion 48 which engages against each side of the plug member 42 and comes against the terminal plate 21. Each arm of each U-shaped portion 48 extends up into a heel element 49 of the insole 41 and terminates in a plurality of fingers 50 which are embedded in the heel element 49 between the upper and lower faces thereof.

According to one form my invention may take, each insole 41 includes the heel element 49 (Figures 1 and 2) and a toe element 51 connected by a thin top layer 52 of leather, rubber or like soft, pliable material. The heel element 49 and toe element 51 have rubber base portions 53 and 54, respectively, which are much thicker than the layer 52, and in which are molded shallow, zigzag grooves 55, the bottoms of which are covered with heat insulating strips 56 of fibrous resilient material of asbestos or the like. On the top of the strips 56 in a groove 55 will be placed a flexible, electric resistance wire 57 which will be pressed up against the top layer 52 by the resiliency of the fibrous strip 56. The extra thickness of the heel portion 53 makes for a stronger fastening thereto of the plug member 42.

Electric current enters the resistance wire 57 through one terminal blade 47 and passes out through the other blade. The current passes from the resistance wire in the heel element of the insole to the resistance wire in the toe element of the insole and back again through insulated stretches 58 of a flexible electric conductor of relatively low resistance which are positioned so that when the slip insole 41 is down in operative position over the insole 15 the stretches 58 of conducting wires will lie alongside the insole in the valley-like spaces between the side edges of the insole 15 and the upper 13. The layer 52 may extend over the tops and partly down along the sides of the conducting stretches 58 and be cemented thereto. Where very small shoes are to be electrically warmed according to my invention, an advantage may be gained by constructing the

usual insole of the shoes with beveled overhanging side edges for receiving the conducting stretches 58 thereunder as illustrated in Figure 8.

When a person walks normally, the slip insole 41, insole 15 and sole 12 will be flexed or bent a considerable amount at each step approximately along a line extending somewhat diagonally through the ball of the foot. Such a line, hereinafter called a line of flexure, is indicated at 7—7 of Figure 1.

It can be readily seen that a metallic electric conductor crossing the zone adjacent the line of flexure 7—7 is subjected in the course of a day's ordinary walking to a great many strains. It has been found that in most cases, metallic electric conductors embedded in a slip insole are more likely to break at or adjacent the places where they cross the line of flexure than at other points. To enable the stretches 58 of electric conductors to better withstand the extra strain to which they are subjected in the line of flexure zone, sections 60 of the stretches 58 extending a short distance each side of the line of flexure 7—7 may be made as follows. A small elastic rubber tube 61 is compactly filled with fine copper or aluminum filings 62 so as to be slightly swelled and in each end of the tube is inserted an end of the conductor 58 which will usually be flexible, stranded or braided copper wires. After the wires are inserted in the filings the ends of the rubber tubes may be wrapped and tied with fine thread or wire 63 (Figure 18).

It can be readily seen that an insole 67 (Figure 5) of uniform thickness having an embedded resistance wire 68 and terminal plug 69 and extra flexible conductors of any suitable kind across the zone of flexure of the insole may be used in the shoe 10.

Referring to Figure 3, it will be noted that the U-shaped contact blades 47 are each formed with projecting bead or ridge-like elements 65 one on each side of a blade adjacent the lower end thereof disposed a little farther apart than the distance between two paired or associated terminal plates 21 and 45. The elasticity of the rubber around the socket 43 permits the enlarged beaded end of the blade 47 to force apart the plates 21 and 45 and passing down be gripped or fastened securely in operative position by having the lower ends of the plates 21 and 45 bent or flared outwardly to engage behind, i. e. above the ridge-like elements 65. To fasten the metal side wall elements of the blade 47 to the rubber disposed between the walls, the latter may have integral inwardly extending fingers 66 embedded in the rubber plug member 42 which may be integral with the base portion 53 of the heel 49.

The thickness of the blades 47 and the associated opening 43 in the socket of the terminal block 22 will be made as small as practicable from the standpoint of stiffness of the blades 47 and will ordinarily not exceed one-quarter inch in thickness. Then when a person desires to use a pair of shoes constructed in accordance to the present invention for a considerable period of time without employing the electric warming feature, he can remove the slip insoles 41, stop up the socket opening 43 easily with a piece of cork or a folded piece of cloth and wear an ordinary slip insole in each shoe.

To provide means for bringing electric current to the slip insole 41 in such cases as when the wearer of the shoe 10 may have on ice skates 70 (indicated fragmentarily in Figure 17), the bare outer ends 28 of the arm 24 may be bent up against the edges of the sole 12 and inserted inwardly between the latter and the insole 15. To connect the terminal ends 28 with a source of electric current, two spring metal strips 71 shaped substantially like the side pieces of a stirrup may be fastened to a stick of wood 72 and connected to a battery 73 or other suitable source of electricity. The lower ends of the strip 71 may be spread apart and permitted to press against the ends 28.

The terminal sockets 19 of the conductors 20 (Figure 13) may be made by bending a thin strip 80 of resilient metal, such as brass, into a V-shape and pulling a section of a small thin walled plastic rubber tube 81 over the V-shaped strip.

A terminal plug 82 to engage in the socket 19 may be made from a short narrow strip of metal like brass or bronze. To provide for holding the plug 82 positively in the socket 19 one arm of the V-shaped terminal strip 80 may have formed therein a shallow, transverse, concave groove 83 and the plug 82 may have formed therein a corresponding transverse, convex bead 84 to fit, i. e. latch in the groove 83, the engagement of the bead in the groove permitting the plug and socket to be removed by a light pull on the plug.

Many persons having used pairs of shoes may wish to have them equipped with electric conductor terminals for use with a terminal-bearing footrest for warming their feet, but will not wish to use with the shoe a warming pad P. For such cases, it is obviously desirable to supply the contact and conducting elements for each shoe as a single, easily installed unit. To this end (Figure 14) the terminal block 22 and the contact strips are constructed to form a single unit which can be readily attached by any shoe repair man to a used shoe by removing the heel, cutting a hole through the sole and insole to receive the block 22, and nailing or sewing the strips 23 to the bottom of the sole, holes 23*h* in the strips being provided for facilitating the attachment of the strips to the sole.

Some persons when wearing a usual high shoe, flex the upper of the shoe adjacent the usual back-stay, just above the counter, a considerable amount at each step. In equipping the shoes of such persons for use with a warming pad it will be desirable to use stretches of electric conductors, constructed like the stretch 60 (Figure 18), in the electric conductor leading from the heel to the top of the shoe.

In Figure 19 is illustrated an arrangement of an electric terminal contact spring 100 and knob 101 on a foot rest 102 and a shoe heel 103, respectively, which disclose an embodiment of my invention different from the construction shown in Figure 2. The contact knobs 101 are fastened against the forward side of the heel 103 and correspond to the terminal knobs 30. Contacts between the knobs 101 and springs 100 is broken by simply sliding the heel 103 back in the same way as indicated for the heel 11 (see disconnected portion of heel Figure 1, designated by reference character 11*d*). It will not be necessary to move the heel 103 as far backward in breaking contact with the terminal spring 100 as the contacts 30 are required to be moved to break contact with the springs 31.

Referring to Figure 5, it can be readily seen that by omitting the resistance wire 68 from the slip insole 67, the latter may be used as an ordinary slip insole, the plug 69 advantageously serving to hold the slip insole from "creeping" forwardly. Also, by severing the part of the slip insole 67 which lies forward from the heel portion of the insole, the heel portion may be used as a heel cushion, the engagement of the plug 69 in the socket 43 being effective to hold the cushion securely in operative position in the shoe.

With reference to Figures 1 and 2, it will be noted that the toe element 51 of the insole 41 extends only a short distance toward the heel element 53 and terminates under the toes short of the forward end of the ball of the foot. By this arrangement, the toe element 54 occupies space in the shoe without causing uncomfortable crowding of any part of the foot since the inside depth of the toe portion of the shoe is usually more than the thickness, top to bottom, of any toe.

In the above description of certain devices provided for practicing the present invention, reference has usually been made to the application of such devices to only one shoe. It can be readily seen that such devices can be applied in substantially the same way to each shoe or similar article of footwear of a usual person. Certain parts, such as the slip insoles, will, of course, be constructed to fit the shoe with which they are to be used.

It will be understood that while the electrically warmed shoe described hereinbefore will warm a person's foot more efficiently when only a usual stocking or hose is worn on the foot, the shoe can also serve advantageously as an electrically warmed overshoe in some cases. For example, a person wearing a pair of usual skating shoes with thin soles and heels could use a pair of shoes constructed like the shoe 10 with electrically heated insoles like the insole 67 for warming his feet without removing his skating shoes.

Variations may be resorted to within the scope of the invention, and portions of the improvement may be used without others.

Having thus described my invention, I claim:

1. In an electrically warmed shoe of the class described, a terminal unit including a rubber terminal-carrying block for embedment in the heel portion of the shoe, said block having a socket opening, a pair of terminal plates fastened to said terminal block in said socket opening, a metallic contact strip connected to each of said plates and extending forwardly therefrom, and terminating in the instep portion of the shoe, and a downwardly extending contact knob or bead on each strip positioned in the instep portion of the shoe, said knobs being arranged to clear a surface upon which said shoe rests.

2. In combination, a shoe, having a recess in its heel portion and a terminal-carrying block disposed in said recess so as to come flush with the upper face of the insole of said shoe, said block having a socket opening, a pair of terminal plates fastened to said terminal block in said socket opening, a terminal strip connected to each of said terminal plates and extending forwardly therefrom along the bottom side of the sole portion of said shoe a short distance from the front side of said heel, said strips being fastened to the bottom of said sole portion, and a contact element on the bottom of each strip.

3. In an electrically warmed shoe, a slip insole including a relatively thick heel portion, and a relatively thick toe portion, and a thin layer member extending between said heel portion and said toe portion, electric resistance wires embedded in said heel and toe portions, a separate wire being embedded in each of said portions, insulated electric conductors providing a path of low resistance for electric current passing from one of said thick insole portions to the other, said insulated wires being disposed at the side edges of said insole so as to be out from under the foot of the person wearing the electric warmed shoe.

4. An insole for an electrically warmed shoe including a heel portion, a toe portion, a plurality of lengths of resistance wire, one length embedded in said toe portion and other lengths embedded in said heel portion, means connecting the resistance wires in said heel portion to the terminals of an electric

circuit in said shoe, two flexible electric conductors connecting the resistance wire in said toe portion with the resistance wires in said heel portion, said conductors being positioned to lie across a narrow zone on each side of the line of flexure of the sole of said shoe.

5. In a device of the class described, in combination, a slip insole having electric resistance wires embedded therein for warming said insole, and spaced terminal members for said wires extending downwardly from the heel portion of said insole, said terminal members being positioned substantially on the front-to-rear medial line of the heel portion of said insole.

6. In an article of footwear having an insole with a heel portion whose upper surface has a shallow valley-like depression, the medial line of said depression extending from rear to front of said heel portion, said article of footwear having a recess in its heel portion extending along said medial line on each side thereof, in combination, a terminal-carrying block of electrical non-conducting material disposed in said recess to have its upper face approximately flush with the upper surface of said insole, said block having a socket recess extending along the medial line of said valley-like depression on each side thereof, two spaced apart terminal members fastened against the sides of said socket recess, one terminal member disposed adjacent the forward end of said block and the other terminal member disposed adjacent the rear end of said block, and electric conducting devices connecting said terminals with a source of electricity.

7. In combination, a shoe having a sole and a heel below said sole at the rear of said shoe, a foot-rest for said shoe including a member having a side adjacent said heel transversely disposed to the direction said shoe is pointed, terminals of an electric circuit on said foot-rest insulated therefrom and including two electric contact members spaced apart in a direction transverse to the direction of said shoe, electric means for warming said shoe, two electric contact members on said shoe adjacent said foot-rest, and a connection between said last-named contact members and said warming means, said last-named contact members arranged on said shoe whereby they are brought into engagement with said foot-rest contact members upon abutting the forward side of said heel against said transverse side of said foot-rest at a point opposite the contact members thereon, said foot-rest having recess elements, and the contact members on said foot-rest being positioned in the recess elements of said foot-rest, and their outer extremities terminating inwardly a short distance from the work surface of said foot-rest, whereby the electric circuit is safeguarded against being short circuited by the shoe sole when wet.

8. In an article of footwear having an insole with a heel portion whose upper surface has a valley-like depression the medial line of which extends from the rear to the front of said heel portion, in combination, a sole, a built-up heel thicker than said sole whereby to raise the instep portion of said sole above the surface on which said heel rests, said article of footwear having a recess in its heel portion extending downward through said insole and said sole, the center line of said recess disposed approximately on said medial line, a terminal carrying block of electrical non-conducting material disposed in said recess to have its upper face approximately flush with the upper face of said insole, said block having a socket recess, the center line of said socket recess disposed approximately on said medial line, two spaced apart electric terminal members fastened to said terminal block in said socket recess, one terminal member disposed adjacent the front end of said block and the other terminal member disposed adjacent the rear end of said block, two spaced apart metallic contact strips, one connected to each of said members and passing forwardly therefrom between said heel and said sole and fastened against the lower face of said sole and terminating at a point thereon in the raised instep portion of said sole, the forward end portion of each of said contact strips having means for making contact with a source of electricity below said sole.

9. A shoe for use with an electrically warmed insole, including an upper portion, a sole with a raised instep portion, a member set flush in the heel portion of said shoe and having two spaced terminals arranged for engagement with said insole, two spaced apart electric conductors, each extending forwardly from a connection with one of said terminals and being fastened against the lower side of said sole, said conductors having contact elements for making connection with a stationary source of electricity below said shoe when the wearer of it is at rest, two spaced apart electric conductors, each extending rearwardly from a connection with one of said socket terminals to said upper portion of said shoe, and an insulated socket terminal for each of said last-named conductors carried by said upper portion in position for engaging conductors from a portable source of electricity carried above said shoe by the wearer of the same, whereby electric current may be fed to said shoe to warm the wearer's foot while he is walking.

10. A shoe for use with an electrically warmed insole including a sole, a heel thicker than said sole whereby to raise the instep portion thereof above the surface on which said heel rests, a member set flush in the portion of said shoe over said heel, and having two spaced apart terminals for engagement

with said electrically warmed insole, two spaced apart metallic strips each passing from a connection with one of said terminals outwardly from between said heel and said sole to the adjacent side edge of said sole and having a portion turned up and fastened against said adjacent side edge, said turned-up portions serving as contact terminals for engaging terminals of an electric circuit, one at each side of said shoe, said strips also having elements for engaging electric terminals below said sole.

11. An electrically heated insole including a body of electrical non-conducting material having a groove in its upper surface, a layer of resilient electrical non-conducting material in said groove, a resistance wire in said groove resting on said layer, a thin layer of electrical non-conducting material affixed to said upper surface of said body for retaining said wire in said groove, and terminals for said wire on said insole.

12. The structure described in claim 11 characterized by said layer being a better insulator of heat than said body.

13. In an electrically warmed insole for an article of footwear, said insole having resistance wire embedded therein, in combination a body portion of said insole of flexible electrical non-conducting material, two terminals for said wire, and a plug member of non-conducting material extending downwardly from said body portion, said plug being stiffer than body portion, said plug member being secured to said body portion in a substantially rigid manner, said terminals being mounted on said plug in spaced relation to each other, the fastening of said plug to said body portion being effective to maintain said plug and said terminals in a plane which is substantially at right angles to the normal plane of said body portion.

14. A slip insole for an electrically warmed shoe including a middle body portion, a heel portion of electric non-conducting material thicker than said body portion, electric resistance wires carried by said insole, a downwardly extending plug-like member of electrical non-conducting material securely fastened to said heel portion and two spaced terminals each including a metallic plate member connected to said wires, and fastened against said pluglike member by cooperating integral elements embedded in said thickened heel portion and in said pluglike member.

15. The structure described in claim 14 characterized by said plug-like member having a substantially rectangular cross-section when cut by a plane parallel to the heel-portion of said insole, the long axis of said plug-like member lying substantially in a vertical plane through the front-to-rear medial line of the heel portion of said insole.

16. In an electrically warmed shoe having a zone of flexure in the sole portion of the shoe, a slip insole including electric resistance wires disposed in said insole on each side of said zone of flexure without crossing said zone, external terminals for said resistance wires carried by said insole, and conductor members disposed in said insole across the zone of flexure of the same, for connecting said wires, said conductor members being better suited to withstand repeated flexing than said resistance wires.

WILLIAM W. LILLARD.