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STATIC DISCHARGING SHOE

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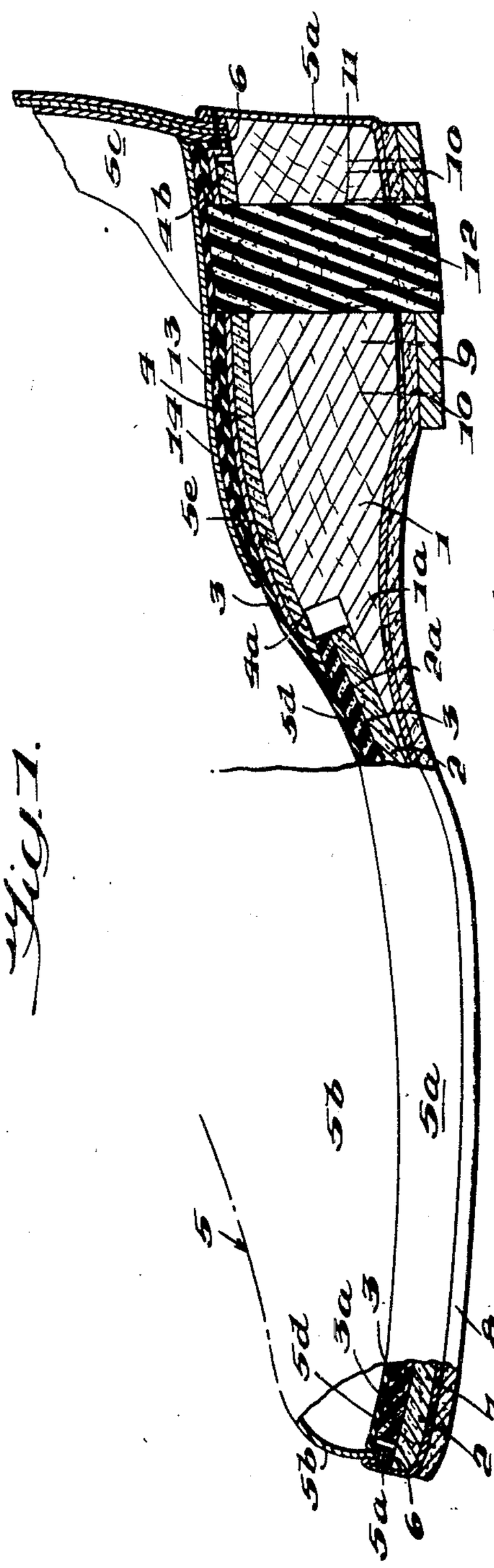

Fig. 1.

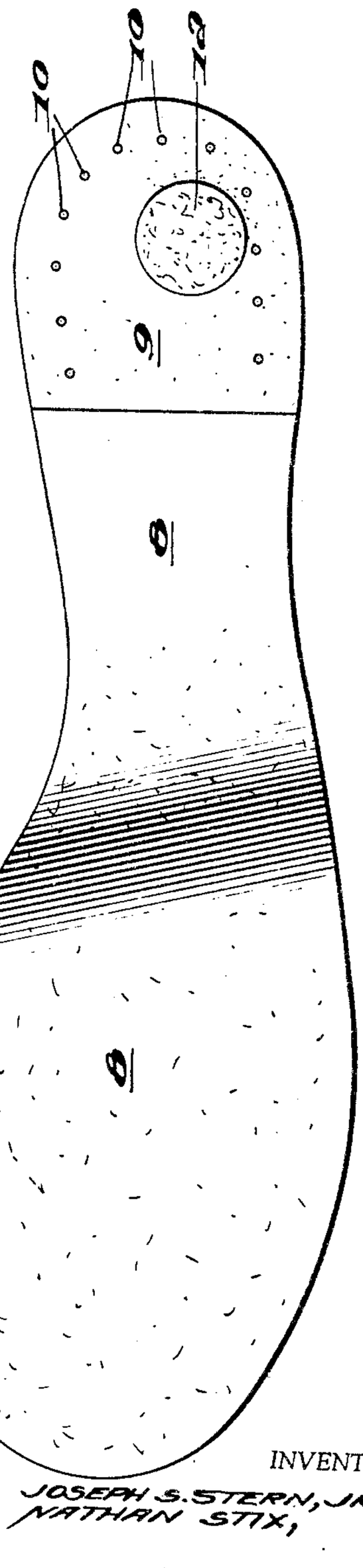

Fig. 2.

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STATIC DISCHARGING SHOE

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This invention relates to static discharging shoes and aims generally to improve and simplify the construction thereof.

Shoes affording electrically conductive paths between the foot of the wearer and the earth for various purposes have been known for many years. The patents to Royer No. 497,822, issued May 23, 1893, and Cooper No. 871,479, issued November 19, 1907, employed such a construction for its alleged therapuetic effect, and patents to Olmstead No. 1,728,167, September 10, 1929, and Temple No. 2,023,346, December 3, 1935, employed similar constructions for earthing static electrical charges that might be collected by the body of the wearer.

Also for many years it has been known that by employing a conductive rubber, and more specifically a relatively high resistance conductive rubber, a leakage path for earthing static charges without danger of sparking could be provided. See McKesson Patent No. 2,047,216, July 14, 1936; Crawford Patent No. 2,084,523, June 22, 1937; Thacher Patent No. 2,318,340, May 4, 1943, and Bulgin Patent No. 2,341,360, February 8, 1944, for example.

Applying such known effects, several patents have recently been issued on particular arrangements of conductive rubber soles and insoles with conductive rubber interconections therebetween for the slow, non-sparking earthing of static charges accumulated on the body of the wearer, but such constructions in general have been difficult to assemble, complicated, relatively expensive, and, like other rubber soled shoes, have involved danger of slipping on wet floors. Examples are Monahan Patent No. 2,261,072, issue of October 28, 1941, and Taber et al. Patent No. 2,407,189, issued September 3, 1946.

The present invention is based on the same generally old principles, and aims to provide a simpler and less expensive, but highly effective combination in which the need for conductive insolves and outsoles is eliminated, and in which ordinary leather soles, less apt to slip on wet surfaces, may be employed. These and other objects and advantages of the new construction forming the subject of this invention, will be clearly apparent from the following description of a preferred embodiment thereof. The invention resides in the novel structural features and new combinations thereof hereinafter disclosed and claimed.

In the accompanying drawing of the illustrative embodiment

Fig. 1 is a partial longitudinal cross-section of a static-discharging shoe embodying the invention, and

Fig. 2 is a bottom view thereof.

As shown in the drawings, the shoe of the present invention eliminates the need for conductive insoles and conductive outsoles entirely, and instead employs a novel stitched upper assembly and a novel shoe bottom assembly so combined that an adequate leakage path is provided for the earthing of static charges without danger of sparking, with a minimum of special or difficult construction, a complete absence of elements apt to render

the shoe uncomfortable to wear, and elimination of the danger of slipping on wet floors.

As best shown in Fig. 1, is this construction the shoe includes a shoe bottom comprising a wedge heel **1**, that in the form shown consists of a wooden heel and shank member rabbeted at its shank end **1***a* to receive and support the shank end **2***a* of a cork or composition insole **2** that has secured to its upper face in spaced relation to its edges a sole filler **3** of resilient material, preferably sponge rubber, that is somewhat smaller in area than the area of the insole, to leave a rabbet **3***a* above the edge of the latter.

A suitable heel filler **4**, preferably of cork or composition, is also provided, this element being skived at its shank end **4***a* to overlie the joint between the insole and filler **2**, **3** and the heel member **1**, and being somewhat smaller in area than the top surface of the heel **1** and insole **2** and marginally spaced therefrom to form a rabbet **4***b* overlying the peripheral edges of the heel and shank member **1**.

The upper assembly **5** in the form shown comprises a welt-strip **5***a*, a shoe upper **5***b* of conventional construction that may include a heel stay **5***c*, and a sock lining **5***d* that may have its heel portion reinforced with a thin leather lamination **5***e* on its underside, the sock lining preferably being made of cotton fabric similar to a light canvas or duck, and being dip-coated or impregnated with an electrically conductive composition. Pepperell's No. 28 Black Vulcatex with U. S. Rubber Code #4506 impregnation both sides is a suitable conductive fabric, as it has firmness and body and is non-tacky, while the conductive carbon content of the coating in known manner is capable of affording a leakage path for static charges. The turned down inner edge of the welt strip **5***a*, and the down-turned edges of the upper **5***b*, **5***c*, sock lining **5***d* and sock liner heel reinforcement **5***e* are stitched together to form a depending welt-seam **6**, which welt seam lies in the rabbet **3***a*, **4***b* about the edges of the sponge rubber filler **3** and cork or composition heel filler **4** and contacts the top margins of the insole **2** and wedge heel **1**.

In assembling the shoe, the upper assembly **5—6** is first fabricated and welt seamed as above described. The heel filler **4** is then cemented to the sock lining **5***d* or sock liner reinforcer **5***e* inside the heel embracing part of the welt seam **6**. The insole **2** and sole filler **3** is then assembled with the latter lying within the sole embracing part of the welt seam **6** and preferably marginally cemented thereto. The wooden wedge heel **1** is then placed to align with the edges of the heel embracing portion of the welt seam **6** and its rabbeted shank edge **1***a* is cemented to the shank edge **2***a* of the cork insole **2** whereever it falls. Thus any variations in length necessary to align the toe portion of the insole **2** and the rear face of the heel **1** with the faces of the welt seam **6**, is accommodated by the overlap of these elements at the supporting rabbet **1***a*, as shown.

The upper assembly, sole- and heel-fillers, insole and heel having thus been assembled, the welt strip **5***a* is turned downwardly and stretched smoothly about the outer faces of the insole and heel member **2** and **1**, and its inturned edges are cemented to the marginal portions of the undersides of these members. A suitable filler **7**, say of cotton or the like, is placed to support the center of the cork insole **2** that is not covered by the inturned portions of the welt strip **5***a*, and the outsole **8** of leather or any other suitable material is cemented in place. The top lift **9**, preferably of leather, though composition or like top lifts may be used, is then cemented and secured in place against the outsole, as by brass nails **10** penetrating the wooden heel **1**.

By the procedure just described there is created a wedge heel shoe especially well adapted for nurses when made

with a white leather upper and a white leather welt strip.

The next step in the production of the new shoe is to bore a hole 11, say ¾ of an inch in diameter, vertically through the top lift 9, wooden heel 1, cork heel filler 4 and sock lining 3. This hole is preferably outwardly and rearwardly offset from the center of the top lift or overlying heel receiving space, say by an amount of about ¼ inch for the purpose hereinafter described.

When the hole 11 has been bored through the assembly a plug 12 of conductive rubber of known composition is cement coated and inserted in the hole flush with the inside of the shoe, and subsequently buffed off at its outer end as the heel lift is buffed. Rubber containing conductive carbon as disclosed in the patents to McKesson, Crawford, Bulgin or Thatcher, may be employed for this plug, or the commercially available ¾" extruded cord conductive rubber, U. S. Rubber Company Compound S8752, may be used.

Following the insertion of plug 12 a conductive patch or heel pad layer 13 of material similar to that of the sock lining 5*a*, is cemented in overlying relation to the plug and the adjacent portions of the sock lining, using a commercially available conductive cement, and a somewhat larger decorative patch or heel pad layer 14 of thin leather or fabric is cemented in overlying relation to the conductive heel pad 13.

The edges and bottoms of the leather or like outsole and top lift being suitably finished there is produced a static discharging shoe hardly different in appearance from a standard shoe, fully as comfortable to wear, but very slightly greater in cost, and which provides an adequate leakage path from the forepart of the foot of the wearer through the thin conductive sock lining 5*a*, the conductive heel pad 13 and the conductive rubber plug 12 to the floor or ground. As will be clear to those skilled in the art the materials above designated to constitute and connect the plug 12, impregnated sock lining 3 and impregnated heel patch 13 are selected to impart to the shoe a conductivity conforming to the current standards of the National Fire Protection Association. Further when the sole becomes worn the new construction permits "half-soling" of the shoe with leather or any other standard material without loss of its static discharging efficiency. The offset location of the plug 12 places it where the weight of the heel rests directly on top of the plug the bottom of which is in direct contact with the ground or floor. With the long bearing surface afforded between the wooden heel and plug the latter is securely positioned without need for flanges or other anchors, contributing to the simplicity of the assembly. The use of a single plug 12 is preferred, though a plurality thereof may be employed if desired, and the resiliency of the rubber causes it to abrade less quickly than the leather or composition top lift and thus to protrude very slightly when the top lift has been buffed initially, or in subsequent replacements of the top lift rendered possible by the fact that the rubber is better resistant to abrasive than the top lift, and also largely protected from all but rolling contact with the ground thereby.

While there has been described herein what is at present considered a preferred embodiment of the invention, it will be obvious to those skilled in the art that minor modifications and changes may be made therein without departing from the essence of the invention. It is therefore to be understood that the exemplary embodiment is illustrative and not restrictive of the invention, the scope of which is defined in the appended claims, and that all modifications that come within the meaning and range of equivalency of the claims are intended to be included therein.

We claim:

1. A static discharging shoe comprising an upper having a conductive sock lining stitched thereto along a welt seam, a non-conductive insole and sole filler underlying the forepart of said sock lining and welt seam, a wooden heel and shank member underlying the heel part of said sock lining and welt seam, and supporting the shank end of said insole and filler, a non-conductive heel filler interposed between said heel and sock lining and extending across the junction of said heel and insole, a welt strip extending from said welt seam into underlying relation to said insole and said heel and shank portion and secured thereunder to form an assembly, an outsole and top lift secured to said assembly, a plug of conductive rubber extending through said top lift, wooden heel, heel filler and sock lining, and a conductive patch overlying the upper end of said plug and in electrical contact therewith and with said sock lining.

2. A static discharging shoe comprising an upper having a conductive sock lining stitched thereto along a welt seam, a non-conductive insole and sole filler underlying the forepart of said sock lining and welt seam, a wooden heel and shank member underlying the heel part of said sock lining and welt seam, and supporting the shank end of said insole and filler, a nonconductive heel filler interposed between said heel and sock lining and extending across the junction of said heel and insole, a welt strip extending from said welt seam into underlying relation to said insole and said heel and shank portion and secured thereunder to form an assembly, an outsole and top lift secured to said assembly, a plug of conductive rubber extending through said top lift, wooden heel, heel filler and sock lining, a conductive patch overlying the upper end of said plug and in electrical contact therewith and with said sock lining, and a decorative patch overlying said conductive patch.

3. A static discharging shoe comprising an upper having a conductive sock lining stitched thereto along a welt seam, said sock lining comprising an underlying non-conductive heel area reinforcement, a non-conductive insole and sole filler underlying the forepart of said sock lining and welt seam, a wooden heel and shank member underlying the heel part of said sock lining and welt seam, and supporting the shank end of said insole and filler, a non-conductive heel filler interposed between said heel and sock lining and extending across the junction of said heel and insole, a welt strip extending from said welt seam into underlying relation to said insole and said heel and shank portion and secured thereunder to form an assembly, an outsole and top lift secured to said assembly, a plug of conductive rubber extending through said top lift, wooden heel, heel filler reinforcement and sock lining, and a conductive patch overlying the upper end of said plug and in electrical contact therewith and with said sock lining.

4. A method of constructing a static discharging shoe that comprises: assembling a shoe upper with an external welt strip and a sock-lining of fabric impregnated with electrically conductive material by edge sewing the same together to form a downwardly extending welt seam, cementing a heel filler to the assembly inside the heel embracing part of the welt seam, assembling an insole and sole filler within the sole embracing part of the welt seam, aligning a wooden heel wedge with the edges of the heel embracing portion of the welt seam and cementing its shank portion to the shank portion of said insole, turning down the welt strip and stretching it smoothly about the outer faces of the insole and heel member and turning its edges in under said insole and heel member and cementing them thereto, positioning a filler within the sole framing portions of said inturned edges, cementing a non-conductive outsole and top lift to the resulting assembly, drilling a vertical hole of substantial diameter completely through said top lift, wooden heel, heel filler and sock lining, forcing into said hole flush with the inside of said sock lining and slightly projecting from said top lift a plug of conductive rubber, and cementing a conductive patch to the upper side of said conductive sock lining and said plug with conductive cement, thereby establishing a conductive path from the forepart of the sock lining through said heel plug.

5. A method according to claim 4, in which the top

lift and conductive rubber plug are buffed off simultaneously, the resiliency of the plug causing it to abrade less quickly than the top lift and thus to protrude slightly below the plane thus produced on the top lift.

6. A method according to claim 4, in which said hole is drilled in a position outwardly and rearwardly offset from the center of the heel of the shoe to a position in which the weight of the heel of a wearer will rest directly on top of the plug that in use falls into direct contact with the ground or floor during standing or walking.

7. A method according to claim 4, further comprising the step of cementing a decorative non-conductive heel pad in overlying relation to said conductive patch.

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