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[54] **ILLUMINATED SOLES AND HEELS**

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[52] **U.S. Cl.** ..... **36/2.5 K**

[51] **Int. Cl.²** **A43B 00/00**

[58] **Field of Search** ..... 36/1, 2.5 R, 2.5 K, 2.5 AE

[56] **References Cited**

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[57] **ABSTRACT**

Shoes having illuminated portions thereof. An e.m.f. source is preferably disposed within a cavity in a platform sole of a shoe, and a light bulb and means for operatively connecting and disconnecting the light bulb from the source of e.m.f. are preferably disposed within a cavity in a transparent heel. The means for operatively connecting and disconnecting the light bulb from the e.m.f. source may include a tilt switch, a three-position manually actuated switch, and a recharging switch when the e.m.f. source is rechargeable.

6 Claims, 8 Drawing Figures

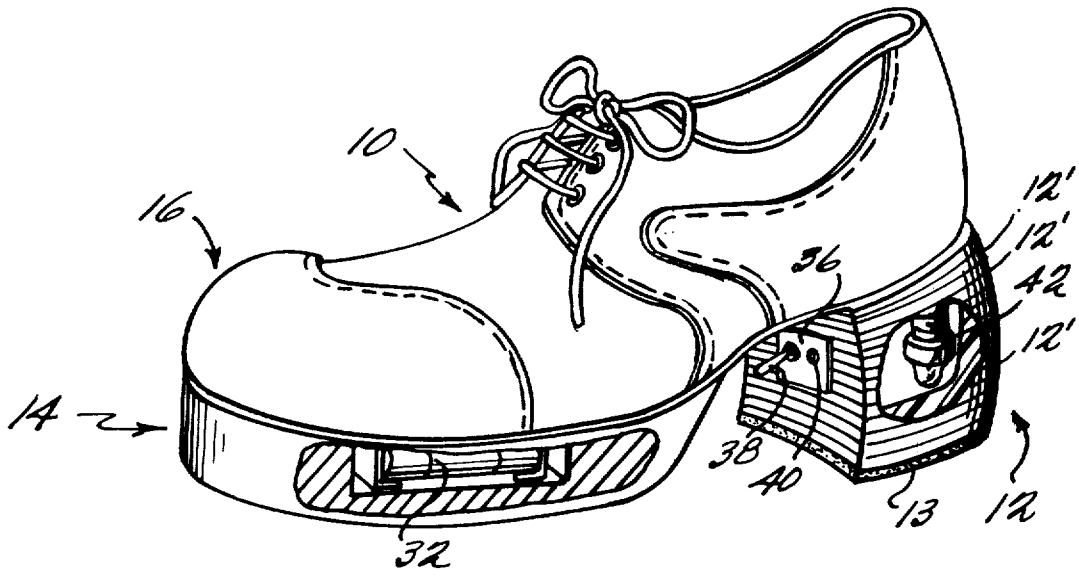
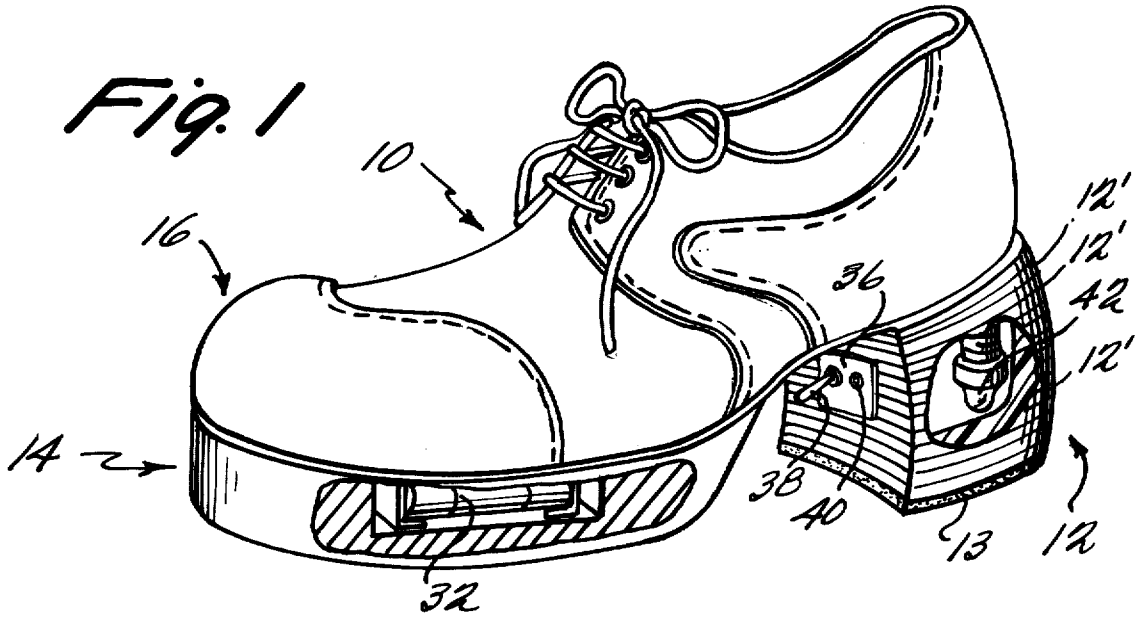


Fig. 1



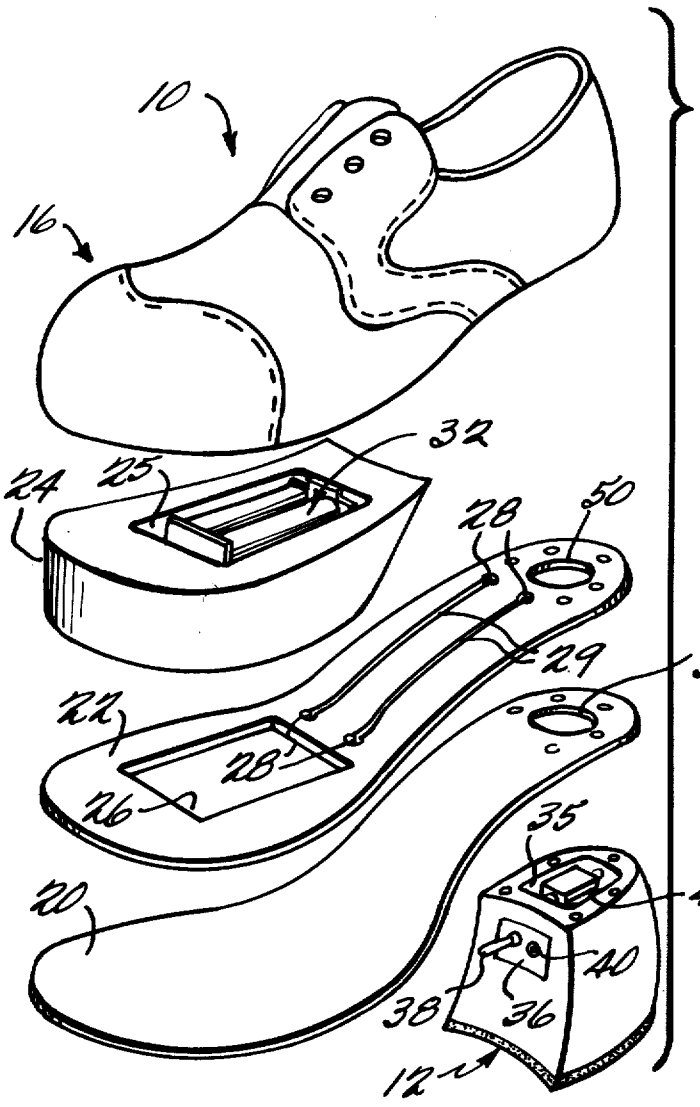


Fig. 2

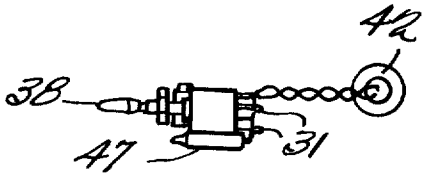


Fig. 4a

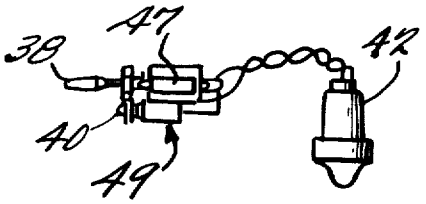


Fig. 4b

Fig. 3a

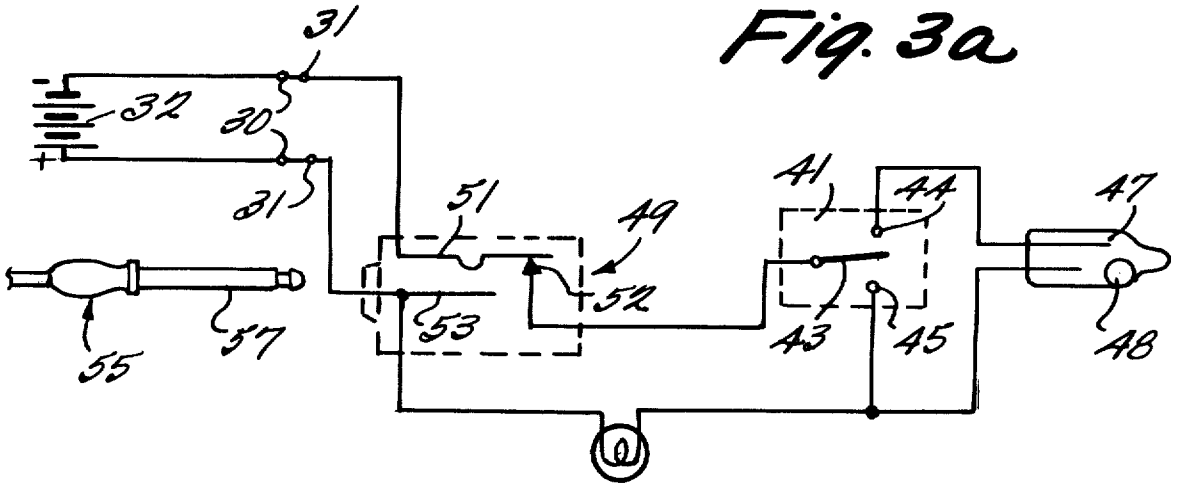
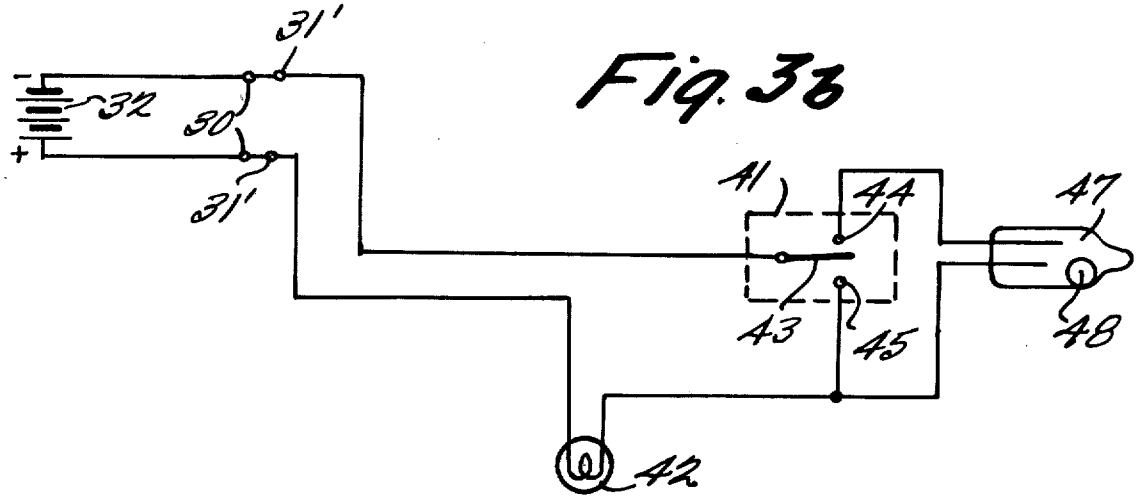


Fig. 3b



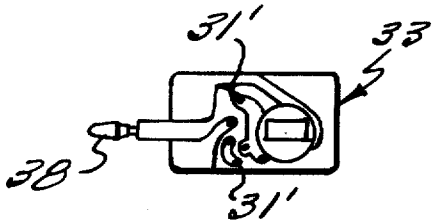


Fig. 5a

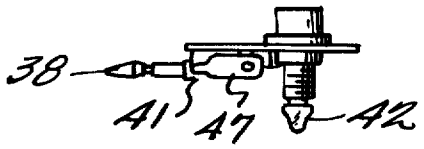


Fig. 5b

ILLUMINATED SOLES AND HEELS

BACKGROUND AND SUMMARY OF THE INVENTION

The invention relates to shoes with lighted portions thereof, and means for providing selective use of the lighted portions of the shoes. There have been many prior art proposals for providing various lighted portions of shoes — such as those shown in U.S. Pat. Nos. **2,976,622, 2,941,315, 1,597,823,** and **1,933,243** — however, none of such prior proposals have been commercially successful. Numerous problems associated with such prior art devices which undoubtedly hindered their commercialability are the problems of (a) not having a large enough cavity for incorporating a battery without significantly structurally weakening support portions of the shoe, (b) having particular shoe position responsive lighting means that were actually responsive only to the weight of the wearer, (c) having a means for turning on and off the light that was not selective in providing for particular shoe position lighting, and (d) the necessity of disassembling the shoe, with possible destruction thereof or damage thereto, when battery replacement was necessitated.

According to the present invention, all of the above-mentioned problems inherent in prior art devices have been remedied. According to the present invention, means are provided in the sole of the shoe for retaining a source of e.m.f. for energizing lights associated with the shoes, which means provides a large enough area for incorporating almost any type of battery or current source without impairment of the support function of the sole. Also, a mercury or other tilt switch is provided for selectively cutting out or on the shoe lights in response to shoe position, doing away with the necessity of cumbersome, often ineffective weight responsive means, and increasing the variety of shoe positions to which the cutoff or cutout means may be responsive.

Additionally, according to the present invention, a three-position switch is provided for either turning the shoe lights on continuously, or bringing the tilt switch into the circuit, making the shoe lights shoe position responsive. Additionally, a battery recharging means may be provided for allowing power source recharging without the need for disassembling and possibly damaging the shoes. In most prior art devices, such a means would not even be contemplated since the batteries and power sources that, of necessity (i.e. because of space limitations), had to be used were not rechargeable (i.e. dry cells).

Thus, according to the teachings of the present invention, shoes having lighted portions thereof are provided that are improved over the prior art devices for almost any purpose — whether decorative or functional — to which the shoes would be put while, at the same time, the possibilities of light response to various shoe positions are greatly increased.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of an exemplary shoe embodying the teachings of the present invention;

FIG. **2** is an exploded view of the shoe illustrated in FIG. **1**;

FIGS. **3***a* and **3***b* are exemplary circuit diagrams for shoes embodying the teachings of the present invention;

FIG. **4***a* is a top plan view of an exemplary switch and bulb and mounting means associated therewith for use in the circuit shown in FIG. **3***a*, and FIG. **4***b* is a side view of the apparatus shown in FIG. **4***a*; and

FIGS. **5***a* and **5***b* are top and side views respectively of a switch, printed circuit, and associated means for use in the circuit shown in FIG. **3***b*.

DETAILED DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of an exemplary lighted shoe according to the teachings of the present invention, which shoe may be worn either for decorative or aesthetic appeal, or for providing a means for illuminating a path on which the wearer is walking, for providing visibility of the wearer when bicycling or walking at night, or for a myriad of other purposes. The shoe **10** may comprise generally a transparent heel portion **12**, a platform sole **14**, and an upper **16** of any suitable style or construction.

As shown most clearly in FIG. **2**, the sole **14** comprises a bottom portion **20** that is adapted to be fastened to the heel **12** and to engage the ground when the shoe **10** is worn, and an insole **22** that is adapted to be sandwiched between the sole **20** and a platform sole **24**. The insole **22** has an opening **26** therein and contacts **28** adjacent thereto, with wires **29** leading from contacts **28** to contacts **30** located above heel **12** when the shoe components are assembled. The platform sole **24** has an opening **25** therein adapted to receive a battery **32** — such as nickel-cadmium battery — or other suitable source of e.m.f. The hole **25** cooperates with the hole **26** in the insole **22**, the battery **32** also being received by the hole **26** and having contacts thereon adapted to operatively cooperate with contacts **28** on insole **22**. Preferably, the shoe has a covering (not shown) therein to be disposed over the platform **24** and insole **22** to contact the wearer's foot. The covering may be removed and easy access thereby gained to the battery or batteries **32** with the platform **24**, and also — through apertures **50** — to the electrical components within the heel **12** so that both the battery **32** and other electrical components may be quickly replaced without requiring shoe disassembly.

The heel **12** is preferably formed of a hard transparent material such as acrylic or lucite (sturdy enough to serve as a shoe heel). As shown in FIG. **1**, the heel may be formed of layers **12'** each of a different color and of various sizes to provide an unusual visual effect. The heel may have a ground-engaging portion **13** at the bottom thereof which portion **13** may be formed of rubber or leather or the like and be adapted to be replaced when worn down. Located within heel **12** may be a cavity **35** adapted to receive various electrical components to be further described, and on the outside front face of the heel **12** preferably is located a plate **36** having a toggle switch actuator **38** and recharger orifice **40** received therein.

As shown most clearly in FIGS. **3***a* and **4***a* and **4***b*, the electrical components received by the cavity **35** and plate **36** preferably are a three-Way switch **41** for actuation by toggle actuator **38**, a light bulb **42**, a tilt switch **47**, and a charging switch **49**, contacts **31** providing connection between contacts **30** (and e.m.f. source **32**) and the rest of the electrical components. Preferably, the three-way switch **41** comprises a movable contact **43** and stationary contacts **44** and **45**, the movable contact **43** adapted to be moved either into contact

with contacts **44** or **45**, or into a center "off" position. When the contact **43** is in engagement with contact **44**, the tilt or mercury switch **47** is inserted into the circuit whereby energization of the bulk **42** occurs when the shoe **10** is so positioned that the tilt switch **47** is closed. When the contact **43** engages contact **45**, the mercury switch **47** is bypassed and the bulb **42** is constantly energized, the circuit from battery **32** always being complete.

Preferably the tilt switch **47** is a mercury switch that — once it is tilted — will provide for oscillation of the mercury **48** therein back and forth to intermittently make and break the contacts of the switch **47** thereby causing flashing of the light **42** on and off. The mercury will stop oscillating once the shoe remains in a certain orientation for a predetermined amount of time (depending upon the design of the switch **47**).

A charging switch **49** is preferably employed in all situations where the e.m.f. source is rechargeable — such as nickel-cadmium battery — thereby eliminating the necessity of taking the shoe apart when the battery wears out, as it necessary with prior art devices which utilize dry cell batteries, or removing the covering of the platform **24** as is possible with the present invention. The charging switch **49** may be of the type having a movable cammable contact **51** normally biased into contact with stationary contact **52** to complete the circuit from battery **32** to the electrical components within heel **12**, and another stationary contact **53** for cooperation with a recharger plug **55** for providing a recharging circuit for the battery **32**. When the tip portion **57** of the recharger plug **55** is inserted into opening **40** of switch **49**, it cams contact **51** out of engagement with contact **52** and, at the same time, completes a contact between contact **43** and contact **51** through any suitable recharging means with which the plug **55** is associated. Upon withdrawal of tip **57** of plug **55** after recharging, the contact **51** will again return to engagement with contact **52**.

A modification of the electrical components shown in FIGS. **3a**, **4a** and **4b** is shown in FIGS. *3b*, *5a* and *5b*. In this modification, the charging switch **49** is eliminated, and the contacts **31'** for making contact with contacts **30** leading to battery **32** are formed on a printed circuit board **33** which mounts the switch **41**, tilt switch **47**, and bulb **42**. As with the modification of FIGS. *4a* and *4b*, with this modification the cavity **35** for mounting the electrical components within the heel **12** need not be formed so large that the structural integrity of the heel is impaired, diminishing its ability to perform its support function since the largest component — the e.m.f. source **32** — need not be incorporated therein.

The shoe **10** shown in FIG. **1** is used as follows: After the component parts of the shoe are assembled so that battery **32** operatively engages contacts **28** of insole **22** and contacts **30** of insole **22** engage contacts **31** in heel **12**, the wearer may wear the shoe **10** just like any other shoe. The switch **41** will normally be in the middle off position with the bulb **42** inoperative. If it is desired that the bulb **42** constantly be energized, the toggle actuator **38** is moved so that contact **43** comes into engagement with contact **45**. If it is desired that the bulb **42** should be energized only when the shoe **10** is in a vertical position or in a horizontal position (depending upon the wiring and orientation of tilt switch **47**) or that light **42** flash on and off when the shoe is moved from one orientation and then back in place, toggle **38** is moved so that contact **43** engages contact **44**, thereby inserting the tilt switch **47** into the circuit between battery **32** and the bulb **42**. After extended use when the battery **32** is worn down, the tip **57** of recharging plug **55** is inserted into opening **40** in heel **12**, and the battery **32** is recharged, or the covering for platform **24** and apertures **50** may be removed and the various components readily replaced.

Thus, it can be seen that according to the teachings of the present invention, lighted shoes are provided not requiring that any of the supporting parts thereof be weakened by the formation of a large cavity therein for containing a large number of electrical components, shoes that have selective means for energizing and de-energizing the lights, the means allowing a great deal of versatility in condition responsiveness of the lights, and shoes that need not be disassembled when the e.m.f. source incorporated therewith has been depleted.

While the invention has been shown in what is presently conceived to be the most practical and preferred embodiments, it will be apparent to one of ordinary skill in the art that many modifications may be made thereof within the scope of the invention. For instance, a plurality of bulbs **42** may be provided, located in or on various parts of the shoe such as exteriorly mounted on the toe or sides, or a number of different ones within the heel itself. Also, the switch **41** need not have a toggle actuator therefor, but may be of any suitable type, as may the recharging switch **49**. Although a mercury switch has been disclosed for the switch **47**, other suitable tilt responsive switches may be utilized; the tilt switch can be arranged with respect to the shoe so that it is adapted to be closed upon any predetermined orientation or orientations of the shoe. Also, the controls for the bulb need not necessarily be mounted on the front of the heel, but may also be mounted at other suitable locations on the shoe **10**. Other modifications are also possible, thus the invention is not to be limited to what has been herein illustrated, but is to be accorded the full scope of the appended claims to encompass all equivalent structures and devices.

What is claimed is:

1. A shoe comprising:

a. a sole,

b. an upper,

c. a heel,

d. a source of e.m.f.,

e. a light bulb adapted to be operatively connected to said e.m.f. source,

f. a circuit operatively connecting said source of e.m.f. and said light bulb,

g. means for selectively connecting and disconnecting said e.m.f. source from said light bulb dependent upon the relative orientation of said shoe, said means including a tilt switch disposed within said circuit operatively connecting said source of e.m.f. and said light bulb, and

h. means for selectively connecting and disconnecting said tilt switch from said circuit operatively connecting said source of e.m.f. and said light bulb, said means including a manually actuated switch having a first position thereof wherein said tilt switch is inserted in said circuit and a second position thereof wherein said tilt switch is not inserted in said circuit and said source of e.m.f. and said light bulb are disconnected.

2. A shoe as recited in claim 1 further comprising means for allowing continuous operative connection of said e.m.f. source and said light bulb, said means comprising said manually actuated switch, said switch having a third position thereof wherein said tilt switch is not inserted in said circuit but where continuous connection between said e.m.f. source and said light bulb by said circuit is provided.

3. A shoe as recited in claim 1 wherein said heel has a cavity formed therein, and further comprising means for mounting said tilt switch and said manually actuated switch within said heel cavity.

4. A shoe as recited in claim 1 wherein said heel is formed of layers of transparent material, consecutive ones of said layers being of differently colored material.

5. A shoe as recited in claim 1 further comprising means for providing ready removal of said light bulb from said heel through the interior of said shoe upper.

6. A shoe as recited in claim 1 wherein said tilt switch comprises an undamped mercury switch for providing intermittent on and off flashing of said light bulb after initial tilting of said mercury switch.

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