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LIGHT SAVER COMPRISING A RECTIFIER IN A DISK INSERT

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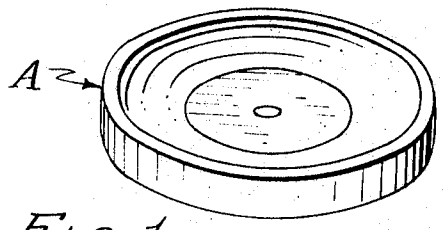

FIG. 1

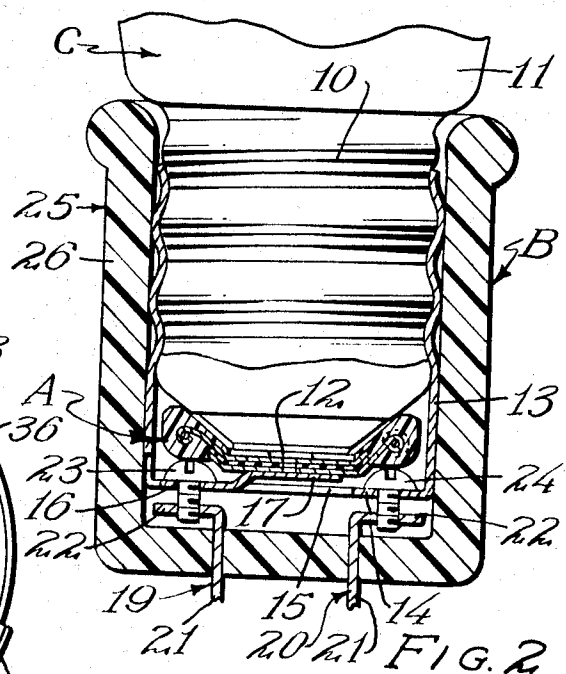

FIG. 2

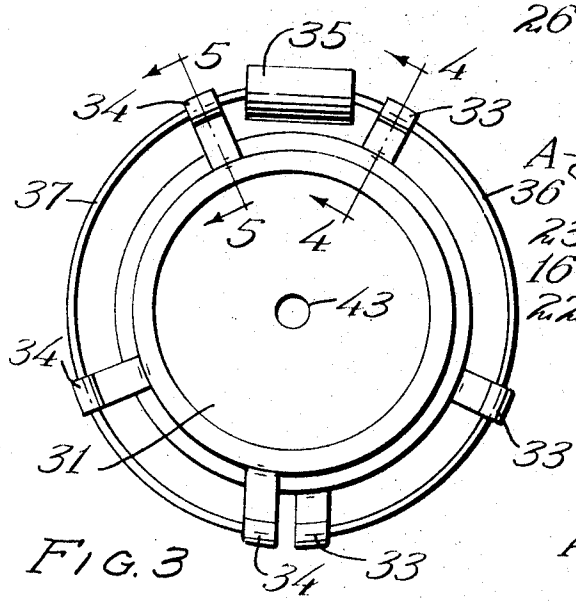

FIG. 3

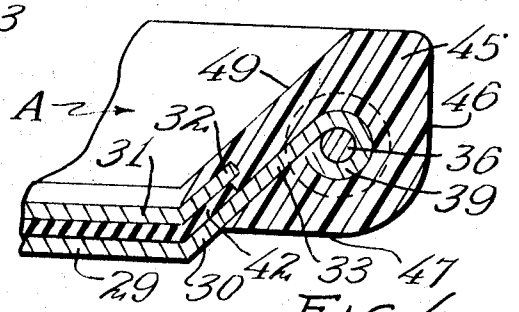

FIG. 4

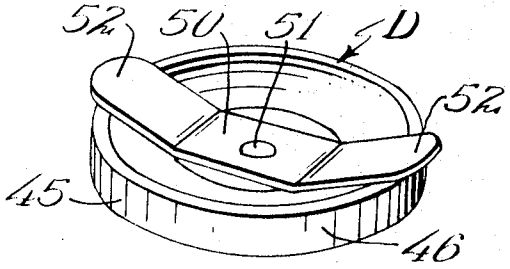

FIG. 6

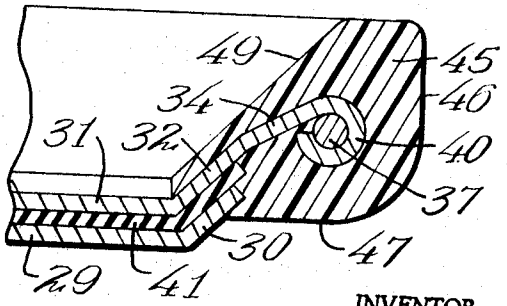

FIG. 5

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LIGHT SAVER COMPRISING A RECTIFIER IN A DISK INSERT

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6 Claims

ABSTRACT OF THE DISCLOSURE

A device for prolonging the life of an electric light bulb is adapted to fit into a light socket between the central contact of the light pocket and the central contact of a light bulb. A rectifier having arcuate leads is enclosed in a ring-shaped body of insulation. Two disk-shaped contacts are supported in axially spaced relation within the body. Each disk is connected to a corresponding arcuate lead by conductor arms.

This invention relates to an improvement in electric light saving device and deals particularly with a simple and effective means of increasing the life of electric light bulbs.

Various devices have been produced for increasing the life of incandescent light bulbs. Most such devices comprise resistance units which materially reduce the voltage of the circuit. While such devices probably increase the bulb life, they also decrease the amount of light emanating from the bulb. Recently, however, a silicon rectifier has been produced which is extremely small in physical size, and which is capable of transforming the alternating current normally supplied to the light socket to a pulsating current. As a result, through a portion of each cycle, the circuit to the bulb is turned off. As a result, a saving in current is effected, and the life of the bulb is lengthened due to the fact that it is only energized a part of the time.

An object of the present invention resides in the provision of a button which is of proper size to fit within a conventional light socket between the central contact of the socket and the light bulb. The button is provided with a central contact on one surface designed to engage the central contact of the light socket, and a central contact on its opposite surface designed to engage the central terminal of a light bulb. A silicon rectifier is embodied in the button electrically connected between the two button contacts. When current is supplied to the light bulb, the rectifier transforms the alternating current into a pulsating current, cutting down the time when the light filament is energized and causing a corresponding increase in the life of the light bulb.

A further feature of the present invention resides in the provision of a novel construction in which the electrical components are held in assembled relation by the leads emanating from opposite ends of the rectifier. The two contact plates and the intermediate insulating plates are held in assembled relation by attachment to the rectifier leads during the molding operation where the peripheral portion of the button are enclosed in plastic.

A feature of the preferred form of construction of the invention resides in shaping the rectifier leads into substantially semi-circular form, terminating in spaced relation. The two contact plates comprise disks which are held in space relation by an intermediate insulation disk. A series of arms extend radially from each of the contact plates, the arms from one plate being secured to one of the rectifier leads, and the arms from the other contact plate being attached to the other rectifier lead. The resulting unit may be placed in a plastic mold and the plastic may be molded about the rectifier, the rectifier leads, and the radially extending arms to complete the structure.

A further feature of the present invention resides in the provision of a device of the type described which may be provided with a means of retaining the button in the light socket if desired.

A further feature of the present invention resides in the provision of a device of the type in question having a central portion which is extremely thin which is designed to extend between the central socket terminal and the central light bulb contact or terminal. Some light sockets are shorter than others and barely engage the threads of the light socket. At the sametime, there is a substantial distance between the periphery of the end of the light bulb and the peripheral portion of the socket. By producing the button with a thin center portion and a thickened rim, a button is provided which will fit virtually any type of conventional socket.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims:

In the drawings forming a part of the specification;

FIGURE 1 is a perspective view of the button in its completed form.

FIGURE 2 is a sectional view through a conventional light socket and through the button showing the manner in which the button may be interposed between the central contact of the socket and the central contact of the bulb.

FIGURE 3 is a top plan view of the assembled components for the plastic molding operation.

FIGURE 4 is an enlarged sectional view through a portion of the button, the position of the section being indicated by the line 4—4 of FIGURE 3.

FIGURE 5 is a view similar to FIGURE 4, the position of the section being indicated by the line 5—5 of FIGURE 3.

FIGURE 6 is a perspective view showing the button with a means thereupon for holding the button in place within the socket.

The rectifier button is indicated in general by the letter A and is designed to fit into the base of a conventional light socket indicated by the letter B. The socket B is designed to support an electric light bulb C having an externally threaded sleeve **10** at one end of the bulb body **11**. The bulb also includes a central contact **12**. The light bulb filaments are connected in series between the metal shell **10** and the central contact **12**.

The light socket B may be of any conventional form and is shown as including an internally threaded metal shell **13** having a closed end **14** which is slotted or cut away as indicated at **15** to accommodate the center contact **16** having an offset contacting end **17** extending across the axis of the shell **13**, and normally designed to make contact with the center contact **12** of the bulb C. A pair of generally L-shaped prongs **19** and **20** are provided with parallel end portions **21** which are designed to extend into an electrical outlet. The angularly turned embedded ends **22** of the contact **19** and **20** are provided with threaded apertures designed to accommodate screws or other fastening means. One screw **23** is shown extending through the center socket terminal **16** and into the parallel end **22** of the contact **19**. A similar bolt or cap screw **24** extends through the base portion **14** of the metal shell **13** and is threaded into the end **22** of the contact **20**. Thus, the contacts **19** are electrically connected to the center contact **16** of the socket and the shell **13** thereof.

The shell **13** is located within the cup-shaped plastic body **25** which includes a peripheral wall **26** encircling the shell **13**, and a closed end **27** in which the contacts **19** and **20** are embedded.

The foregoing description of the socket and bulb is provided merely as an indication of a conventional light bulb and socket in which the rectifier button may be used.

The rectifier button A is of a proper diameter to slide through the internally threaded metal sleeve **13** of the socket. Considering the socket to be in the upright position indicated in FIGURE 2 of the drawings, the button A includes a lower contact disk **29** having an upwardly inclined peripheral edge **30** and an upper contact plate **31** having an upwardly inclined peripheral portion **32**. In actual practice, the contact disks **29** and **31** may be of identical form. The lower contact disk **29** includes a series of three radially extending arms **33** which form a continuation of the peripheral rim **30**. As indicated in FIGURE 5, the upper contact disk **31** is also provided with a series of three angularly spaced radially extending arms **34** thereupon. The arms **33** of the lower disk **29** are spaced apart a total angular distance between the outermost arms of somewhat less than 180 degrees. The arms **34** of the upper contact disk **31** are also confined within an angular distance of somewhat less than 180 degrees. The purpose of this arrangement will be apparent from an indication of FIGURE 3 of the drawings.

The rectifier **35** is confined within a substantially cylindrical enclosure and is provided with a pair of rectifier leads **36** and **37** extending therefrom. As indicated in FIGURE 3, the leads **36** and **37** are bent into substantially semi-circular form, with the radius of curvature somewhat in excess of the radius of curvature of the contact disks. As is indicated in FIGURES 4 and 5 of the drawings, the ends **39** of the arms **33** of the lower disk **29** wrapped securely about the lead **36** and are staked or soldered thereto to provide an effective electrical connection therebetween. The ends **40** of the arms **34** are wrapped securely about the lead **37** and are electrically connected thereto by suitable means. Thus, the contact disk **29** is connected to one rectifier lead **36** while the other contact **31** is electrically connected to the other lead **37**.

Contact disks **29** and **31** are held in spaced relation by an insulation disk **41** preferably provided with an upwardly angled rim **42** extending between the inclined peripheral portions **30** and **32** of disks **29** and **31**. These various disks **29**, **31**, and **42** may be provided with a small central aperture **43** extending therethrough, the purpose of the aperture being to simplify proper alignment of the disks during the assembly operation.

In operation the button A is inserted into the lamp socket D with the convex side thereof lowermost so that the contact disk **29** will engage the center contact blade **16** of the socket. The bulb C may then be screwed into the socket, and the central contact **12** of the light bulb will engage the upper contact plate **31**. Thus, the circuit extends from one socket contact **19** through the bolt **23**, the center socket contact **16**, lower button contact plate **29** and lead **36** to the rectifier **35**. The circuit then extends through the rectifier lead **37** and arms **34** to the upper contact disk **31** which is in contact with the center contact **12** of the bulb C. The other terminal of the bulb comprises the sleeve **10** which is secured to the internally threaded socket sleeve **13**. The bottom panel **14** of the sleeve **13** is electrically connected by the bolt **24** to the socket contact **20** to complete the circuit between the line wires.

The manufacturers of incandescent light bulbs have apparently put light output before bulb life, with the result that the filament runs hotter than would otherwise be the case. The present device is particularly useful where the light bulbs must remain in operation constantly or over long periods of time. Light bulbs located in public halls, stairways, entrances and the like, are often very difficult and expensive to service. In many instances, the light fixtures must be serviced every five hundred hours or approximately every twenty days.

By the use of the rectifier buttons A, the bulb life is materially increased. A half-way device such as the silicon rectifier cuts half of the AC sine wave allowing only one-half of the wave to pass. The pulsing direct current is about sixty percent of the full alternating current sine wave power (watts) allowing less power (watts) to reach the filament of the light. Each pulse of the direct current has the full voltage, but is only on one-half or sixty percent as much time, allowing the filaments of the light bulb to cool down before another pulse heats it up. This effects less power (watts) getting to the filaments and thus allows the filaments to run cooler, thereby increasing their life.

By forming the rectifier buttons in the manner described, several advantages are obtained. By making the undersurfaces of the buttons somewhat convex as illustrated, the lower contact protrudes below the level of the plastic ring to provide clearance beneath the plastic ring for screws and bosses which would otherwise prevent the lower contact from engaging the central contact of the light socket. The structure also provides a minimum of thickness at the center of the buttons, this portion being equal only to the thickness of the two contact disks plus the intermediate disk of insulation. At the same time, the thicker peripheral rim of plastic is located in the area of the socket between the light bulb and the socket base which is usually empty because of the generally frusto-conical shape of the end of the light bulb.

The particular shape of the button is of importance as it simplifies the placement of the buttons in ceiling fixtures and the like where the base of the light socket is uppermost. In inserting the button, it is only necessary to place the concave side of the button upon the frusto-conical end of the light bulb before screwing the bulb into position. The button will remain in place and not fall off due to its concave shape.

The particular structure of the components forming the button is of importance as the structure is very practical from an assembly standpoint. The rectifier is formed with arcuate leads having a common center of arcuation. The lower contact disk **29** is positioned with its arm **33** hooked over one of the arcuate leads **36**. The insulation disk is positioned to overlie the bottom disk **29**, and the upper contact plate **31** is placed upon the insulation disk with its arms **34** hooked over the second rectifier lead **37**. The ends **39** and **40** of the arms **33** and **34** are crimped about the rectifier leads **36** and **37**, forming an integral unit which may be placed in a mold cavity with the center portions of the contact disks **29** and **31** in engagement with surfaces of the mold. Plastic is then forced into the mold cavity to enclose the marginal portions of the contact disks, the arms **33** and **34** extending therefrom, the silicon rectifier **35**, and the leads **36** and **37**.

FIGURE 6 discloses a modified form of construction which may be identical to the previously described construction but actually comprises an addition thereto. The button D has a plastic body **45** of ring-shaped form similar to that illustrated in FIGURES 1 through 5 including a cylindrical outer-surface **46**, a substantially flat undersurface **47**, and a frusto-conical uppersurface **49** which forms the concave uppersurface of the button. However, the button D includes a thin resilient strip **50** of electrically non-conductive material secured at **51** to the upper contact plate **31** and having ends **52** which project beyond the cylindrical periphery **46** of the button body **45** to engage the threads of the socket shell **13**. This structure may be found preferable where it is necessary that the button remain engaged in the socket after the bulb has been removed.

In accordance with the patent statutes, I have described the principles of construction and operation of my improvement in light saving device, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that changes may be made

within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A device for prolonging the life of an electric light bulb and adapted to fit in the bulb socket between the central contact of the socket and the central contact of the bulb, the device comprising:

a generally cylindrical body of insulating material having a periphery adapted to fit into said socket and having a pair of axially spaced opposed contacts,

a rectifier incorporated in said body and having a pair of terminal leads,

conductor means connecting each terminal lead of said pair to a corresponding contact of said pair,

said leads being arcuate and having a common center of arcuation,

said opposed contacts comprising spaced disks of a smaller radius than said leads, and

arms on said disks secured to, and supported by, said leads.

2. The structure of claim 1 and in which said body is of ring-shaped form and encloses said rectifier, said leads, and said arms.

3. A device for prolonging the life of an electric light bulb and adapted to fit in the bulb socket between the central contact of the socket and the central contact of the bulb, the device comprising:

a generally cylindrical ring-shaped body of insulating material having a periphery adapted to fit into said socket and having a pair of axially spaced opposed contacts,

a rectifier incorporated in said body and having a pair of terminal leads,

said leads being substantially arcuate and having a substantially common center,

said opposed contacts comprising disks of smaller radius than said leads, and

conductor means connecting each said disk with a corresponding one of said leads, and supported thereby.

4. The structure of claim 3 and including a disc of insulation between said disks.

5. The structure of claim 3 and in which said body enclosures said rectifier, said leads, and said conductor means.

6. The structure of claim 4 and in which said body encloses said rectifier, said leads, said conductor means, and the marginal edges of said disk of insulation.

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