Oct. 27, 1964 K. A. BAAKE 3,154,252

PORTABLE FLUORESCENT LIGHT

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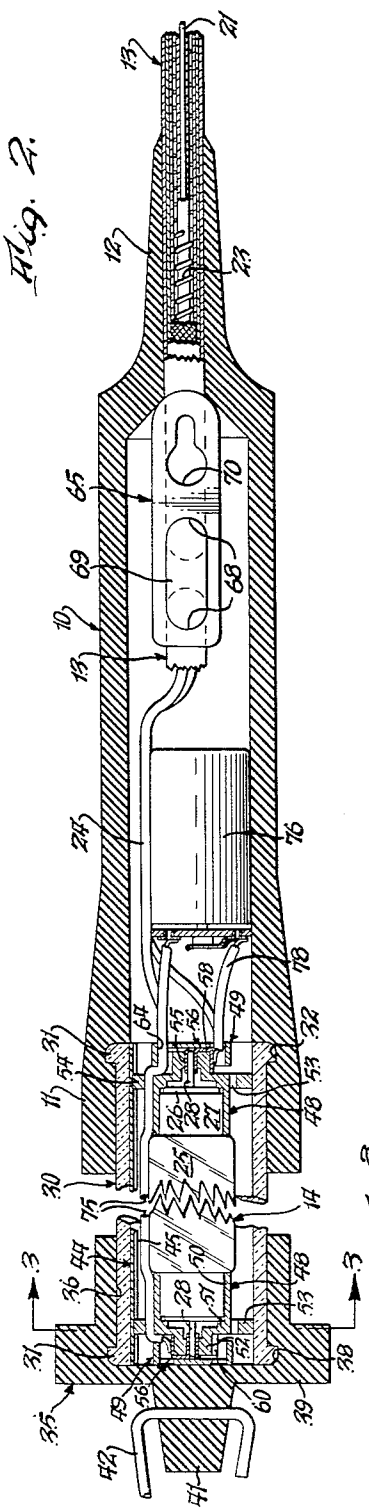


Fig. 2.

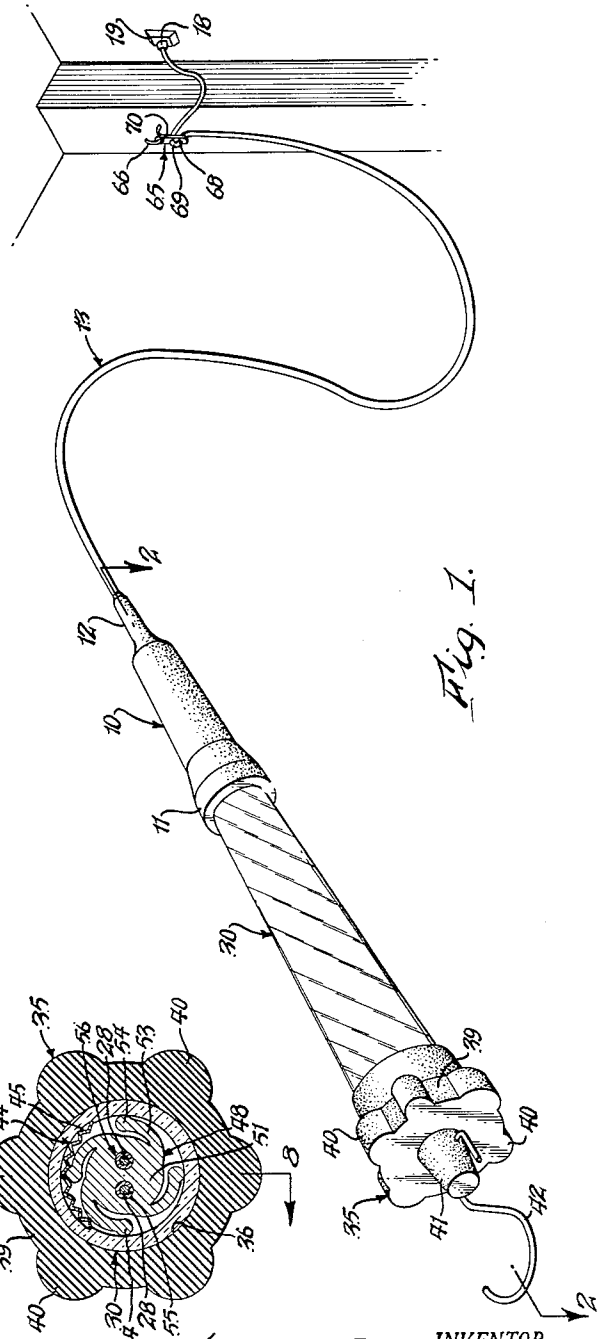


Fig. 1.

Fig. 3.

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Fig. 8.

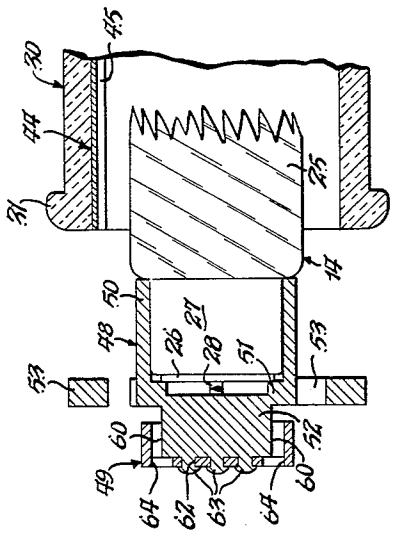


Fig. 9.

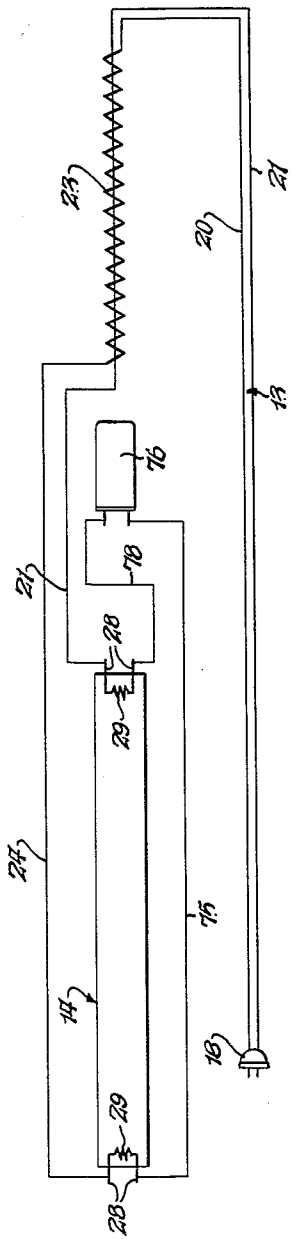


Fig. 6.

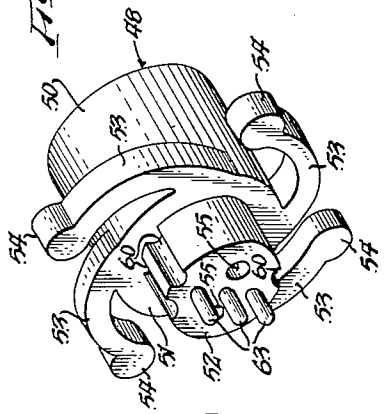


Fig. 7.

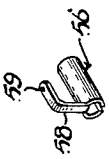


Fig. 4.

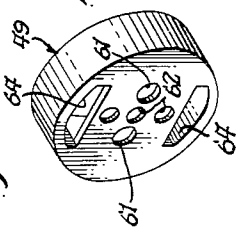
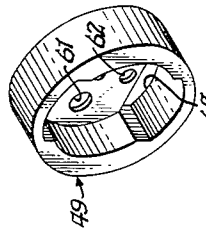


Fig. 5.



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PORTABLE FLUORESCENT LIGHT

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2 Claims. (Cl. 240—11.4)

This invention relates to a portable fluorescent light and more particularly to a work or inspection light intended primarily for industrial use as in automotive repair work where the light must be conveniently maneuverable and capable of being shoved into small difficult to reach places and supply an abundance of light without blinding the operator.

An important object of the invention is to provide such a portable fluorescent light which is capable of extremely rough usage without danger of breaking the glass tubular fluorescent light bulb or other parts of the apparatus. To this end special cushioning sockets are provided for mounting the bulb in the housing which includes a not easily breakable translucent tubular organic plastic shell.

Another object is to provide such a portable fluorescent light which is provided with a simple, inexpensive and easily installed light shield and reflector strip.

Another object is to provide such a reflector strip which diffuses the light and is rigidified, this being accomplished by corrugating the strip longitudinally.

Another object is to use identical cushion mounting sockets at both ends of the bulb and at the same time accommodate the necessarily different wiring requirements.

Another object is to provide simple, inexpensive and fully protected electrical contacts and solder strips in the light bulb end sockets for connection with the usual end prongs of the light bulb and also the lead in wires.

Another object is to provide bulb end sockets which also provide wireways for the lead in wires.

Another object is to provide such a portable fluorescent light which contains the large bulk of the electrical components on the handle of the light.

Another object is to provide a simple and effective and low cost inductive ballast for the fluorescent tube or bulb which is arranged externally of the housing and readily dissipates heat.

Another object is to provide such an inductive ballast which eliminates A.C. hum.

Another aim is to provide a simple and effective anchor for holding the electrical supply cable from being pulled out of the housing.

Another object is to provide a simple and effective hanger for hanging any unused length of the supply cable on the wall.

Other objects and advantages of the invention will be apparent from the following description and drawings in which:

FIG. 1 is a perspective view of a portable fluorescent light embodying the present invention and showing the same attached to a wall by an adjustable catch.

FIG. 2 is an enlarged fragmentary vertical section taken generally on line 2—2, FIG. 1.

FIG. 3 is a vertical transverse section taken generally on line 3—3, FIG. 2.

FIG. 4 is a perspective view of an end cap for the electrical socket at each end of the fluorescent tube.

FIG. 5 is a view similar to FIG. 4 viewed from the opposite side thereof.

FIG. 6 is a perspective view of the socket to which the end cap shown in FIGS. 4 and 5 is attached.

FIG. 7 is a perspective view of each contact and electrical lead embodied in the socket to provide a wiring connection to each prong of the fluorescent light bulb.

FIG. 8 is an enlarged exploded fragmentary view of one end of the fluorescent tube, socket and cap and also the transparent plastic tube in which the fluorescent tube is housed.

FIG. 9 is a wiring diagram of the electrical circuit of the fluorescent light.

The portable light of the present invention is particularly designed for industrial use as in auto repair shops, for example, where it is desirable to have an abundance of illumination without discomforting glare or heat and which can be projected into very small spaces. To this end the light has a housing including a tubular rubber handle 10 with an enlarged bell shape end 11 at one end and a reduced neck 12 at its other end through which the supply line 13 extends for supplying current to a tubular fluorescent bulb indicated generally at 14. The electrical supply line 13 is shown as having a conventional plug 18 at its outer end which can fit into a conventional wall socket 19 of the shop wiring system and in which 60 cycle, 120 volt alternating current is available. The two contacts of the plug 18 connect with two conductors 20 and 21 within the line and which are suitably insulated from each other and from the outside by conventional insulation. It is a feature of the invention, however, that one side 20 of the line connects with a high resistance inductor coil 23 which acts as a ballast for the bulb 14 and the turns of which wind around that end of the side 21 of the supply line entering the rubber handle 10. The end of the inductor coil 23 opposite from the side 20 of the line connects with a wire 24 for a purpose which will presently appear.

The fluorescent bulb 14 is of conventional present commercial elongated tubular form and preferably is about a foot long to provide a portable light which can be conveniently moved around and also admitted to small spaces and is composed of the conventional internally coated glass tube 25 having a dielectric end head 26 embraced by a tubular metal ferrule 27 and containing spaced contact prongs 28 extending through the dielectric head and projecting outwardly from opposite ends of the fluorescent tube. Internally, as shown in the wiring diagram, FIG. 9, these prongs connect with filament electrodes 29. The glass shell 25 of the fluorescent bulb is extremely fragile and a feature of the invention resides in the protection of this shell both from a direct blow and also by providing a cushioned mounting for the fluorescent tube.

For the protection of the fluorescent bulb from a direct blow the fluorescent bulb is encased within a transparent organic plastic tubular shell 30 which is not easily broken as compared with glass and which also forms part of the housing for the glass bulb 14. This shell is preferably substantially equal in length to the fluorescent bulb 14, including the extending prongs 28 of the latter, and is provided at its opposite ends with radially enlarged rounding beads 31. The bell shaped mouth 11 of the rubber handle 10 is of sufficient internal cylindrical size to snugly fit around one end of the shell 30 and is internally provided with an annular groove 32 which snugly receives the corresponding end bead 31 of the shell to releasably hold the shell, the rubber of this handle being sufficiently soft, however, that the shell 30 can be worked out of its bell shaped end 11 when replacement of a fluorescent tube 14 is required.

The opposite end of the organic plastic transparent tube 30 is embraced by a soft rubber end head 35 which completes the housing for the glass bulb 14. This end head is shown as being in the form of a cap having a bore 36 yieldingly embracing the corresponding end of the shell 30 and as having an internal annular groove 38 releasably catching the enlarged bead 31 at the corresponding end of the transparent shell 30. The end head is also shown as having a thick radially outwardly pro-

jecting flange 39 the periphery of which is provided with an annular series of knobs or other protuberances 40 designed to keep the light from rolling. The end head is completed by an axially projecting nose 41 to which an S hook 42 is releasably secured, the free end of this S hook being of sufficient size to be radially hooked around parts of the mechanism being inspected or repaired. The rubber of the end head 35 is sufficiently soft so that by firmly grasping the end of the transparent shell 30, it can be worked off of the end of this shell when replacement of the fluorescent tube 14 is required.

The light desirably has a light shield 44 which desirably also serves as a reflector in intensifying the light emitted from one side of the bulb. This reflector is shown as comprising a strip of reflective metal or foil-covered paper and extends substantially the full length inside the transparent protecting shell 30 and occupies about one-third of the diameter of the shell and is interposed between this shell and the fluoroescent bulb 14. In accordance with the present invention, this reflector 44 is longitudinally corrugated, as indicated at 45, to diffuse the reflected light and to impart longitudinal rigidity to the reflector. This reflected light is, of course, reflected through the fluorescent tube 14 and the reflector also acts as a light shield at one side of the light which enables the workmen to repair and study the apparatus being inspected free from any direct light shining in his eyes. This light shield and reflector 44 is preferably held in position by means which are preferably constructed as follows:

A feature of the invention resides in the cushioned support at each end of the glass fluoroescent bulb 14 in such manner that the same socket and cap constituting this cushion mounting can be used at both ends of the tube and at the same time accommodating the necessary difference in wiring requirements. These sockets also hold the combined light shield and reflector 44 in position.

This mounting comprises a socket, indicated generally at 48, having a cap, indicated generally at 49, both of these members being made of soft, resilient, readily fusable plastic such as polyethylene.

Each socket comprises a cup-shaped cylindrical body 50 open at one end to fit around the metal ferrule 27 of the fluorescent tube 14 and having an end head 51 at its opposite end which is formed to provide a reduced axially outwardly extending neck or hub 52. From the closed end of the socket 48 a plurality of integral arms 53 spiral radially outwardly in regularly spaced relation around the socket. These arms are shown as terminating in end knobs 54 and, when inserted in the transparent plastic shell 30 these arms are flexed to be in compressive relation with this shell and also with the reflector 44, as best shown in FIG. 3, so as to hold the latter in position.

The hub 52 of the socket is provided with a pair of diametrically spaced, axially extending holes 55 which are positioned to receive the pair of metal prongs 28 at the corresponding end of the fluorescent bulb 14. In these holes are positioned a pair of small metal contact sleeves 56 which embrace and provide electrical contact with the prongs 28. Each of these metal contact sleeves 56 is provided with an integral outwardly extending wire attaching tab or solder strip 58 provided at its end with a hole 59, these serving to permit of attaching and soldering the wires for the fluorescent bulb as hereinafter described. The ends of these solder strips 58, after being soldered, are pushed into one of several axially extending peripheral grooves 60 provided in the hub 52 for this purpose, this permitting of the application of a cylindrical polyethylene cap 49 over these electrical connections. This cap has openings 61 in its end wall in line with the prong receiving openings 55 of the socket to permit the metal prongs of the fluorescent tube 14 to project therethrough. This cap has another group of

dimetrically arranged holes 62 which are adapted to receive a corresponding number of integral stems or fingers 63 projecting from the socket 48. After such insertion the ends of these stems are touched with a hot tool to melt them and fuse them to the cap 49 so as to hold the cap in position. Each cap is also provided with an opposite pair of openings 64 near its rim through which electrical wires can pass as hereinafter described.

With each end of the fluorescent tube so mounted in the transparent plastic shell 30 as above described, it will be seen that not only is the reflector 44 held in position, but also that the glass fluorescent bulb is yieldingly supported by the spiral arms 53 which absorb or cushion shock from the housing structure to the fluorescent tube in all directions, these arms yielding both radially and axially in supporting the fluorescent bulb. It will further be seen that the sockets 48 together with the caps 49 fused thereto provide a very efficient simple and low-cost electrical socket for both ends of the fluorescent bulb, which at the same time will stand up under conditions of severe and constant use without getting out of order.

A feature of the invention also resides in a sliding member 65 which can be moved along the line 13 to any position and which can be used to anchor the electrical supply cable against being pulled out of the rubber handle 10 and also hang any unused length of this cable on the wall, as through a hook 66 screwed into the wall. In order to anchor the end of the electrical lead-in cable 13 in the rubber handle 10, a simple wire holder, indicated generally at 65, is provided, this holder also being capable of being used in hanging any unused portion of the cable 13 from a wall hook 66. This holder 65 is preferably made of a soft resilient plastic, such as polyethylene, and is in the form of an elongated resilient strip having two holes 68 arranged in side-by-side relation lengthwise of the strip and through which the lead-in cable 13 is successively threaded. Upon being drawn taut, the bight or bend 69 of the cable 13 is caught between two holes 68 so as to be incapable of being pulled out and hence one end of the holder 65 is brought into abutting relation with the inside of the rubber handle 10 to prevent the lead-in cable 13 from being pulled out and to protect all of the electrical connections against undue stress. Desirably the holder 65 is also provided at one end with an additional opening 70 which is preferably of keyhole form so that when hung upon a wall hook 66 it will be reliably held in position until intentionally lifted from the hook. When so used as a means for hanging an unused length of the lead-in cable 13 from the wall, the holder 65 can readily be moved to any position along the cable by merely pulling out or enlarging the bight or bend 69 and feeding the lead-in cable 13 through the two openings 68 until the desired position along the cable is reached.

The electric line 24 extends from the inductor 23 to the opposite end of the transparent shell 30 between the shell and the fluoroescent bulb 14 and connects with the solder or wire attaching strip 58 of one of the tubular contacts 56. The solder strip of the companion tubular contact 56 is connected by a line 75 which returns within the transparent shell 30 alongside the fluorescent tube 14 to the opposite end thereof. At this opposite end, and within the rubber handle 10, this line 75 connects with the terminal of a conventional starter 76. The other terminal of the starter is connected by a line 78 with the solder strip 58 of one of the adjacent tubular contacts 56. The solder strip 58 of the companion tubular contact 58 connects with the side 21 of the main power line. It will be noted that the wires 75 and 78 at the right hand end of the bulb or tube 14 extend through the pair of openings 64 in the adjacent cap 49.

A feature of the invention resides in the high resistance inductive ballast 23 wound around one side 21 of the main power line and in series with the other side 20 of the main power line. Conventional fluorescent lights now

have a ballast in the form of an inductor coil in one side of the power supply which serves to reduce the voltage across the bulb or fluorescent tube and also to provide the proper conditions when the starter breaks the circuit through the filaments. In lieu of such a ballast, the relatively high resistance wire **23** is wound around one side **21** of the power supply line and placed in series with the other side **20** of the main power line. The fundamental purpose of this winding is to avoid the expense of a conventional ballast although other advantages are present such as the complete elimination of A.C. hum and the ready dissipation of the heat incident to the resistance and impedance of this coil. The winding must be long enough to provide the requisite number of turns for the required impedance as well as to provide the required heat dissipation and the resistance of the wire used is dependent upon the voltage or wattage requirement for the particular bulb **14** employed.

A feature of the readily contractible legs **53** of the sockets is that these sockets, after being wired, can be applied to the ends of the fluorescent tubular bulb **14** and the bulb and sockets then inserted in the plastic shell **30** following which the rubber handle **10** and rubber end head **35** can be attached to the end of the plastic shell **30**. This greatly facilitates assembly of the light. From the foregoing it will be seen that the present invention achieves the objectives and has the advantages enumerated.

I claim:

1. A portable fluorescent light comprising an elongated tubular fluorescent light bulb having a pair of axially projecting contact prongs at each end, a housing for said bulb including a transparent organic plastic tubular shell, a socket made of a resilient plastic material fitting around each end of said bulb and having radial outward pressure contact with the interior of said housing, a pair of parallel bores through each socket positioned to receive said prongs, a metal contact sleeve in each bore, an integral wire attaching strip projecting from the end of each contact sleeve, electrical wires severally secured to each wire attaching strip, and a cap fitted over said wire attaching strips and wires and the corresponding side of each socket, each of said sockets being provided with fingers parallel with its bores projecting through

openings in said cap, the ends of said fingers being fused to the caps.

2. In a portable fluorescent light having an elongated tubular fluorescent bulb with a pair of electrical terminals at each end connected by a filament electrode, a housing for said bulb including a translucent organic plastic tubular shell and a tubular handle fixed to one end of said shell, and a socket fitted around each end of said bulb and fitting in said housing to support said bulb in said housing; the combination therewith of a circuit for starting and maintaining the illumination of said fluorescent bulb, comprising a starter in said housing, a pair of wires connecting opposite terminals of said starter severally with terminals at the opposite ends of said fluorescent bulb, a first insulated supply wire connecting with one of said terminals at one end of said fluorescent bulb and extending out through and beyond said handle, a companion insulated supply wire extending along said first insulated supply wire and terminating short of said handle, an inductance coil in the form of a helix of high resistance insulated wire having one end connected to the end of said companion insulated supply wire adjacent said handle and coiled concentrically around said first insulated supply wire between said handle said adjacent end of said companion supply wire, the convolutions of said inductance coil being closely spaced to be inductively coupled and provide the impedance and resistance required to act as a ballast for said fluorescent bulb, and the greater part of said inductance coil being disposed externally of said handle to dissipate heat to the atmosphere, and a wire connecting the other terminal at the other end of said fluorescent bulb with the adjacent end of said inductance coil.

References Cited in the file of this patent

UNITED STATES PATENTS

1,761,528	Fyrberg	June 3, 1930
2,309,971	McLarn	Feb. 2, 1943
2,336,750	Roney et al.	Dec. 14, 1943
2,363,109	Keiffer	Nov. 21, 1944
2,423,884	Glass	July 15, 1947
2,619,351	Kennedy	Nov. 25, 1952
2,824,214	Bertsche	Feb. 18, 1958
2,849,598	Lipscomb	Aug. 26, 1958
2,874,270	Douglass et al.	Feb. 17, 1959