United States Patent [19]

Johnson

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[54] **LIGHT SOURCE WITH RF INTERFERENCE SHIELD**

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[52] **U.S. Cl.** **240/2.1,** 240/151, 313/313

[51] **Int. Cl.** **G01d 11/28**

[58] **Field of Search** 240/2.1, 151; 313/313

[56] **References Cited**

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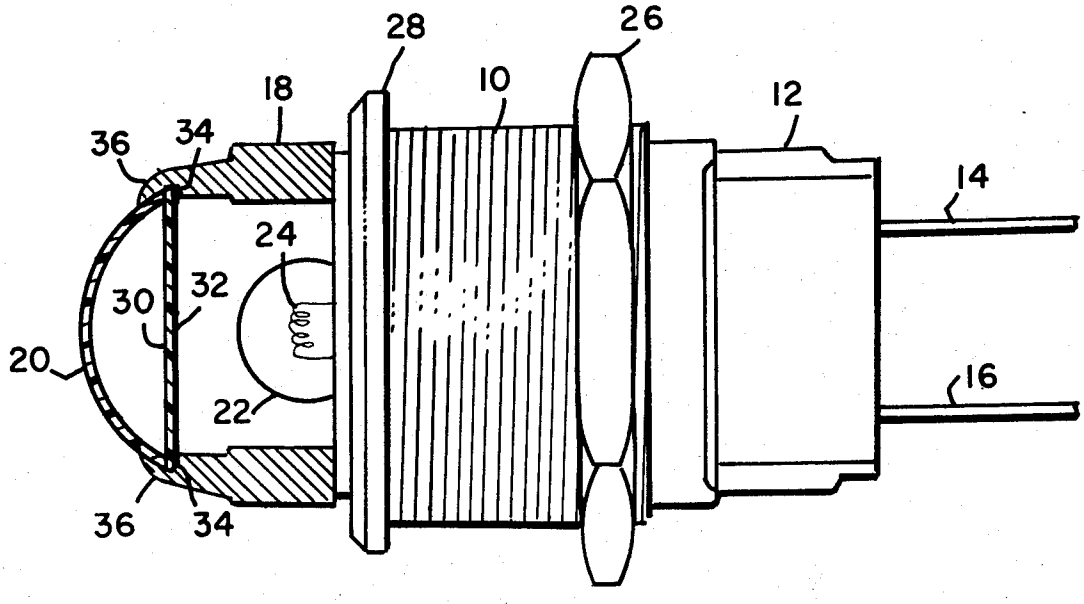
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Attorney, Agent, or Firm—Edward J. Coleman

[57] **ABSTRACT**

A pilot lamp fixture having a transparent conductive shield for substantially reducing or eliminating RF interference which may be radiated from the lamp filament. The transparent shield may comprise a coating of clear conductive material, such as stannic oxide, on a transparent mica insert disposed between the lamp and the lens therefor, with the periphery of the conductive coating being in contact with the metal housing of the fixture.

8 Claims, 4 Drawing Figures



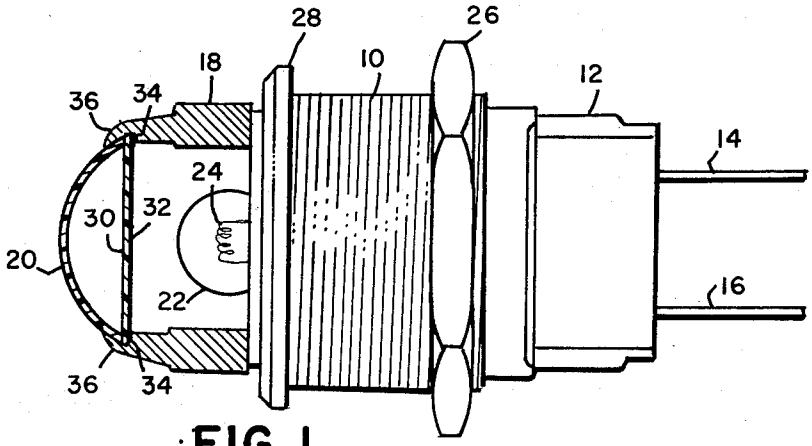


FIG. 1

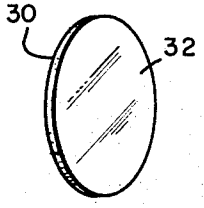


FIG. 2

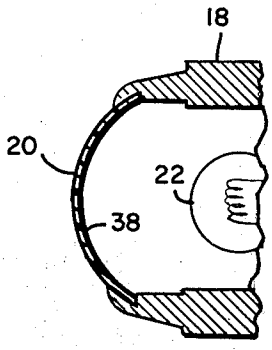


FIG. 3

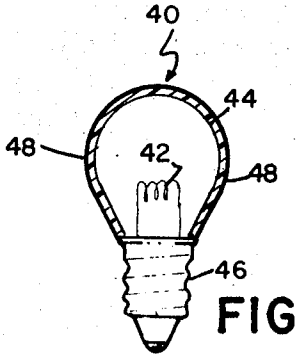


FIG. 4

LIGHT SOURCE WITH RF INTERFERENCE SHIELD

BACKGROUND OF THE INVENTION

This invention relates to light fixtures and, more particularly, to means for reducing radio frequency interference from a light source.

The present invention is particularly useful in reducing the radio frequency (150 KHz to 25 MHz) interference that may be radiated from the pilot lamp on a piece of electronic equipment. The generation of such RF interference from a lamp can result from the operation of switches in the associated equipment, or voltage surges or changes in fields of energy. For example, upon operation of any circuit breaker in the equipment, the resulting arc across the switch contacts may send an impulse through the filament coil of the lamp, which thereupon acts like a choke coil to transmit RF radiation. Such interference is extremely undesirable in a number of applications, such as situations employing different pieces of communication equipment in relatively close proximity.

In the past, this potential source of interfering RF radiation has been shielded by use of a wire screen imbedded within the plastic lens of the pilot light fixture and/or by connecting RF suppression filters in the pilot lamp circuit. As the purpose of a pilot light is to provide a clearly visible signal, however, the use of wire screening is considered less than satisfactory as the opaque portions thereof reduce the light output through the lens to an undesirably low level. The RF suppression filters employ large, relatively expensive filter chokes, and, thus, are quite disadvantages from the standpoint of relatively high cost and excessive space requirements.

SUMMARY OF THE INVENTION

In view of the foregoing, it is an object of this invention to provide improved means for reducing radio frequency interference from a light source.

A principal object of the invention is to economically provide an RF shielded light fixture with improved light output and minimized spaced requirements.

These and other objects, advantages and features are attained, in accordance with the principles of the invention by covering the light source with a transparent conductive shield which is electrically connected to conductive means supporting the light source. According to one embodiment, the RF shield comprises a clear conductive coating on a substantially rigid piece of transparent material covering the light source.

BRIEF DESCRIPTION OF THE DRAWINGS

This invention will be more fully described hereinafter in conjunction with the accompanying drawings, in which:

FIG. 1 is an elevational view, partly in section, of a pilot light fixture shielded in accordance with the invention;

FIG. 2 is a perspective view of the transparent mica disk, with clear conductive coating, employed in the fixture of FIG. 1;

FIG. 3 is a fragmentary view of a pilot light fixture employing an alternative shielding method according to the invention; and,

FIG. 4 is an elevational view, partly in section, of a lamp employing an alternative shielding method according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The pilot light fixture of FIG. 1 comprises a threaded cylindrical body **10**, an insulated base portion **12**, a pair of leads **14** and **16** projecting from the base, a conductive metal housing **18**, and a dome-shaped lens **20** of a glass or plastic material. An incandescent lamp **22** having a filament **24** is supported within the housing **18** and electrically connected to the leads **14** and **16**. For example, the lamp **22** may be mounted in a socket (not shown) attached to base **12** within the fixture body **10**. In a typical application, the pilot light fixture is mounted on the conductive metal panel of a piece of electronic equipment by passing the threaded body **10** through a close fitting hole in the panel and tightening a mounting nut **26** on the rearside of the panel, whereupon a flared portion **28** of the metal housing **18** is securely drawn against the front face of the mounting panel.

Lens **20** is attached to cover the open front end of the metal housing **18**, and, in accordance with the invention, a transparent mica insert **30** having a transparent conductive coating **32** on one surface is disposed between the lamp **22** and lens **20**. Insert **30** may be in the form of a substantially rigid disk, as shown in FIG. 2, with coating **32** comprising a clear conductive material such as stannic oxide. In lieu of mica, the disk **30** may alternatively comprise a piece of clear glass or a sheet of clear high temperature plastic.

In assembly, the mica insert **30** is placed with its conductive coated surface **32** facing lamp **22**, the periphery of the coated surface **32** abutting a step portion **34** about the circular opening of metal housing **18**. In this manner, the transparent conductive shield covers the light source. The lens **20** is then placed over disk **30** with the periphery of the lens bearing against the periphery of the uncoated surface of the mica disk. This sandwich assembly is then tightly secured by swaging a peripheral portion **36** of the metal housing over onto the outer rim of the lens. As a result, the periphery of conductive coating **32** is in good electrical contact with the metal housing portion **34**, whereby the transparent conductive shield may be electrically grounded to the equipment chassis via housing **18** and its flared portion **28** and/or the threaded body **10**, which is arranged in good electrical contact with the equipment mounting panel. In this manner the lamp filament **24** is surrounded with RF shielding comprising the metal housing **18** and the clear conductive coating **32**.

To evaluate the effectiveness of this shielding, RF radiation measurements were made employing a Stoddart NM20A Field Intensity Meter. Lamp fixtures of the type shown in FIG. 1 were purposely excited with a 160 KHz RF signal, modulated 30 percent with 400 Hz, to cause radiation. For comparison purposes, a group of standard pilot lamp fixtures, similar to FIG. 1 but with the mica insert **30** removed, were also RF excited in the same manner. The resulting measurement data showed that use of the transparent conductive shield **30, 32** provides approximately a 25 to 1 reduction in RF radiation over that observed with the standard fixture. Accordingly, use of the coated mica shield obviates the need for large, costly filter chokes. Further, the trans-

parent shield has essentially no adverse effect on light output.

FIG. 3 illustrates an alternative construction wherein the mica insert is not used, but the transparent RF shield is provided by applying a clear conductive coating **38** on the inside surface of the lens **20**, being certain that the coating extends about the rim of the lens so as to be in electrical contact with the housing **18**.

FIG. 4 illustrates another alternative construction as applied to a lamp **40** having a filament **42**, a glass envelope **44** and a threaded metal base **46**. The RF shielding is provided by coating the entire exterior surface of the lamp envelope **44** with a clear conductive material **48**, with the conductive coating extending to the base **46** so as to be in electrical contact therewith.

Accordingly, although the invention has been described with respect to a specific embodiment, it will be appreciated that modifications and changes may be made by those skilled in the art without departing from the true spirit and scope of the invention.

What I claim is:

1. A shielded light source comprising, a conductive metal housing, an incandescent lamp supported within said housing, a substantially rigid transparent means covering said lamp in said housing, and transparent conductive means disposed between said lamp and said rigid transparent means and electrically connected to said housing.

2. The light source of claim **1** wherein said rigid transparent means comprises a lens of glass or plastic covering said lamp in said housing, and said transparent conductive means comprises a sheet of substantially rigid transparent material inserted between said lens and said lamp and having a transparent conductive coating on one surface thereof, the periphery of said coated surface being in contact with said housing.

3. The light source of claim **2** wherein said sheet of rigid transparent material is mica.

4. The light source of claim **2** wherein said transparent conductive coating comprises stannic oxide.

5. The light source of claim **1** wherein said transparent conductive means comprises a coating on one surface of said rigid transparent means, the periphery of said coating means being in contact with said housing.

6. The light source of claim **1** wherein said housing comprises a fixture within which said lamp is mounted, said rigid transparent means comprises a lens attached to said fixture, and said transparent conductive means comprises a sheet of rigid transparent material inserted in said fixture between said lamp and said lens and having a transparent conductive coating on one surface thereof, the periphery of said coated surface being in electrical contact with said conductive fixture whereby radio frequency radiation from said lamp is shorted out to said fixture.

7. Means for reducing radio frequency interference from a light source comprising, in combination, a conductive metal housing disposed about and supporting said light source, a substantially rigid transparent means covering said light source in said housing, and transparent conductive means covering said light source and electrically connected to said conductive metal housing, said transparent conductive means comprising a conductive coating on one surface of said rigid transparent means, said coated surface being in contact with said housing.

8. The means of claim **7** wherein said rigid transparent means is a sheet of mica, and said transparent conductive means comprises a coating of clear stannic oxide on a surface of said sheet of mica.

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