ILLUMINATION OF PROJECTING APPARATUS

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Filed: Nov. 15, 1968

Patent No.: 3,642,361

ABSTRACT

Projecting apparatus which provides a unit which includes an airtight, rigidly constructed metallic housing that houses an illuminating source so that such unit may be interchanged within the projecting apparatus with a like unit. The illuminating source may be a high-pressure mercury vapor lamp and evacuation capabilities may be connected to the airtight housing to lower the pressure within such housing in order to minimize the extent of any explosion of the illuminating source.

3 Claims, 1 Drawing Figure
ILLUMINATION OF PROJECTING APPARATUS

FIELD OF THE INVENTION

This invention relates to projecting apparatus and more particularly to a novel means for interchanging high-pressure, illuminating source units for such projection apparatus.

DESCRIPTION OF THE PRIOR ART

Devices for projection apparatus which include high-pressure, illuminating sources are well known. Such high-pressure, illuminating sources are usually high-pressure gas discharge lamps. This type of projection apparatus has been used to display biological functions of a patient during surgical operations. A display is provided by projecting recorded signals on a screen located within the operating room. The lamps utilized in such apparatus have a relatively short lifespan; therefore, such lamps usually must be replaced after approximately 1,500 hours. Furthermore, blackening of the lamp shell increases the danger of explosion of such lamps.

In the past, such lamps have had to be changed by a skilled technician who must be very careful that the lamp was not broken because of the obvious resulting interruption to the surgical operation. The technician had to be equipped with a protective mask, special leather gloves, and other special protective clothing or attachments to protect his body. In addition, considerable time was spent in replacing the lamp, for example, in positioning the lamp to its contact position, thereby resulting in the absence of any images on the projection screen. Furthermore, there is a further danger that the vapors of narcotic gases, usually present in operating rooms, would be ignited by the explosion of such lamps.

Accordingly, it is an object of the present invention to provide a novel interchangeable high-pressure, illuminating source means to ensure expeditious replacement of such source means.

It is a further object of the present invention to provide a novel interchangeable high-pressure, illuminating source means which includes a rigidly constructed metallic housing to enclose the illuminating source.

It is a still further object of the present invention to provide a novel interchangeable high-pressure, illuminating source means wherein the person who is replacing the source means does not need to wear extensive protective devices.

It is another object of the present invention to provide a novel interchangeable high-pressure source means unit which is preadjustable for further ensuring expeditions replacement of such source means.

It is yet another object of the present invention to provide a novel interchangeable high-pressure, illuminating source means which includes an evacuation means to further ensure safety within the immediate area.

SUMMARY OF THE INVENTION

In accordance with the objects set forth above, the present invention provides an interchangeable high-pressure, illuminating source means including an illuminating source which is enclosed within a rigidly constructed metallic housing to ensure safety in case of an explosion. A ventilating means is provided as a heat-exchanger and an evacuating means is provided to further minimize the extent of an explosion of the illuminating source.

BRIEF DESCRIPTION OF THE DRAWING

Additional objects, advantages, and characteristic features of the present invention will become readily apparent from the following detailed description of the preferred embodiments of the invention when taken in conjunction with the accompanying drawing which illustrates a side elevational view of a projecting apparatus with a side housing cut away to expose an interchangeable high-pressure, illuminating source means which is partially displaced from a housing for the optics of such projecting apparatus.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawing, there is shown a projecting apparatus 10. Shown partially displaced from an optics housing 40 of the projecting apparatus 10 is an interchangeable illuminating source means 11. The interchangeable illuminating source means 11 comprises a housing 13 which encloses and illuminating source 12, which may be a conventional high-pressure gas discharge lamp, such as, a high-pressure mercury vapor lamp or a high-pressure xenon lamp. The illuminating source 12 is constructed of electrodes 14a and 14b, which are enclosed by a globe 16, and are connected to a pair of contacts 15a and 15b, respectively. As is shown an electric arc 17 may be established between the electrodes 14a and 14b. The illuminating source 12 is mounted on a socket 18. The socket 18 includes adjusting means 19a, and 19b and 19c which may be preadjusted to place the illuminating source 12 in its proper position. The housing 13 is constructed of a heavy-duty metallic material to protect the immediate area from any possible explosion of the illuminating source 12. The housing 13 is of an airtight construction, i.e., no holes exist, so as to minimize the possibility of the narcotic vapors within the operating room being ignited by an explosion of the illuminating source 12.

Further shown is a handle 20 to facilitate the insertion and the removal of the interchangeable illuminating source means 11 to and from the projecting apparatus 10. Guide means 21, which is adjusting the contact 15a and 15b, and stop means 22, which includes a conical surface 22a and a conical recess 22b, ensure the proper positioning of interchangeable source means 11. Connected between a pair of plug contacts 24a and 24b and the contacts 15a and 15b are leads 23a and 23b, respectively. Leads 23a and 23b furnish electrical energy from an electrical source, not shown, to the illuminating source 12, via a plug socket 26 which includes leads 25a and 25b, which are shown within an input cable 25.

The interchangeable illuminating source means 11 further includes a plurality of cooling fins 26 which are mounted to the housing 13 as shown. A protective window 27 is shown in the path of a beam 28, illustrated by the dotted lines, originating from the electric arc 17 of the illuminating source 12. To the left of the protective window 27 is a cylindrical member 29, for dissipating some of the heat generated by the beam 28 in the area of the protective window 27. Further provided is ventilation means 30, including a motor 30a and blades 30b, which in combination with the cooling fins 26 serves as a heat-exchanger. In the vicinity of the handle 20, there is shown a connecting stub 31 for a housing 32. The connecting stub 31 and the hose 32 are provided to lower the pressure within the housing 13. Thus, providing a sink for pressure within the illuminating source 12, which is approximately 25 atmospheres in the hot state. Such evacuation means would minimize the extent of an explosion of the illuminating source 12.

The interchangeable illuminating source means 11 may be mounted on the optics housing 40 of the projecting apparatus 10. Within the optics housing 40 is a first intermediate wall 34 and a second intermediate wall 35. Between the first intermediate wall 34 and the second intermediate wall 35, an illuminating optics means 36 is mounted in an opening defined by a first retaining channel 33. In the second intermediate wall 35, there is provided a picture gate 37 into which a film 38 may be placed. Between a projection screen 39 and the second intermediate wall 35, there is shown an opening defined by a second retaining channel 41 in which projection optics means 42 is located.

Thus, although the present invention has been shown and described with reference to particular embodiments, for example, particular guide means and stop means, nevertheless, various changes and modifications obvious to a person skilled in the art to which the invention pertains are deemed to lie within the spirit, scope, and contemplation of the invention as set forth in the appended claims.

What is claimed is:
1. Projecting apparatus for use in a potentially explosive gaseous environment of an operating room comprising:
   first means having front and rear portions, said front portion including optical means for projecting image information, said rear portion having a recessed area, said recessed area having concave alignment means on one of the walls defining said recessed area, said rear portion further having guide slots located exterior to said recessed area; and an interchangeable illuminating source means adapted to be slidably mounted within said recessed area of said first means for providing illumination of said image information, said interchangeable illuminating source means including an airtight, heavy-duty metallic housing having a transparent covered aperture, and a high-pressure gas discharge lamp located within said housing for providing illumination of said image information via said transparent covered aperture, said housing having convex alignment means and guide extensions respectively cooperating with said concave alignment means and guide slots of said first means to ensure that said interchangeable illuminating source means is properly positioned within said recessed area of said first means.

2. A projecting apparatus as recited in claim 1 wherein said housing of said interchangeable illuminating source means includes inner and outer cooling fins, said first means includes ventilation means for providing heat exchanging capabilities mounted in said rear portion thereof in proximity of said outer cooling fins of said housing when said interchangeable illuminating source means is mounted within said recessed area of said source means, and said high-pressure gas discharge device as a high-pressure mercury vapor lamp.

3. A projecting apparatus as recited in claim 2 wherein said interchangeable illuminating source includes means for mounting evacuation means to said housing of said interchangeable illuminating source means for lowering the pressure within said housing in order to minimize the extent of any explosion of said high-pressure mercury vapor lamp.

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