Oct. 24, 1967

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3,349,236

LAMP ASSEMBLY

Filed Nov. 30, 1965

2 Sheets-Sheet 1

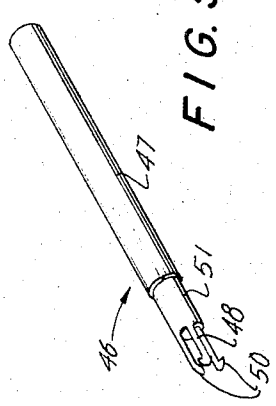


FIG. 5

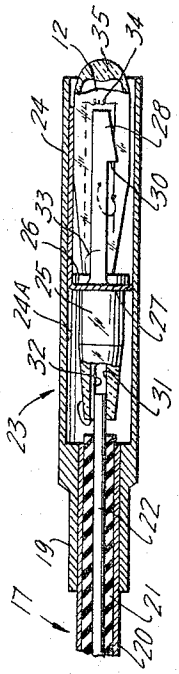


FIG. 4

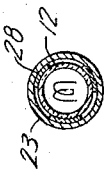


FIG. 3

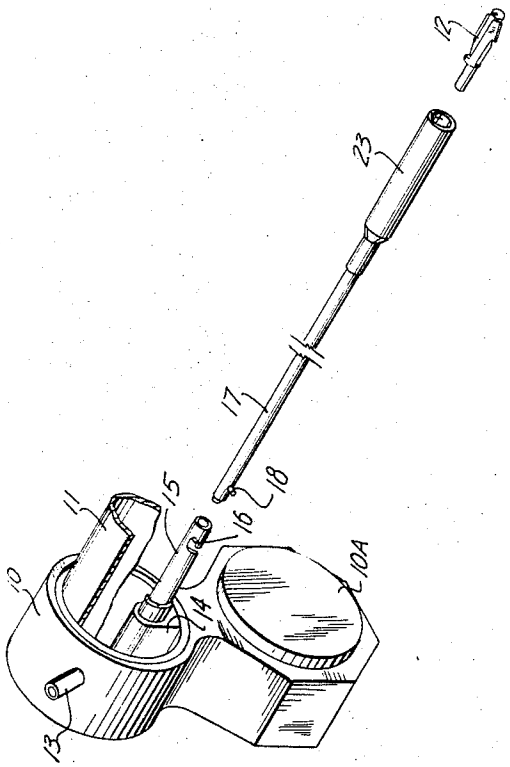


FIG. 1

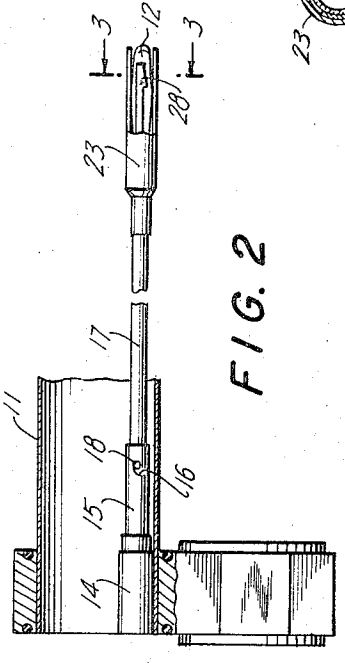


FIG. 2

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LAMP ASSEMBLY

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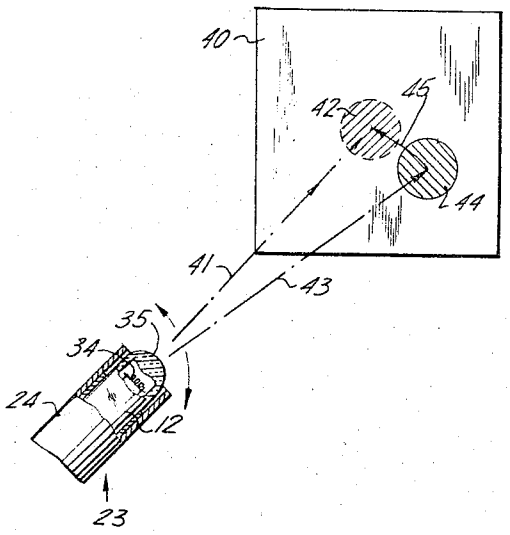


FIG. 6

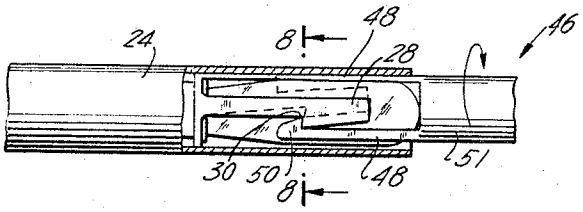


FIG. 7

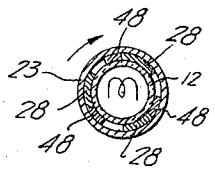


FIG. 8

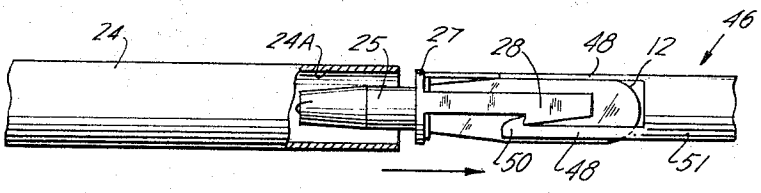


FIG. 9

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3,349,236
LAMP ASSEMBLY

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Filed Nov. 30, 1965, Ser. No. 510,574
8 Claims. (Cl. 240—2.18)

The present invention relates to a lamp assembly for adjustably holding a small lamp bulb within the end of a long tube for insertion into portions of a body cavity. The invention has particular reference to a lamp mounting which permits insertion, rotation, and withdrawal by a tool designed to engage parts of the mounting structure.

One of the more important requirements for certain exploratory investigations and some surgical operations, is the provision of adequate illumination within a body cavity. This illumination can be provided by a small electric lamp, many types of which have been designed and manufactured for such a use. One such lamp is provided with a small lens at its end for concentrating a light beam in an axial direction from the lamp and its mounting. Another and similar lamp also includes an end lens, but this lens is set off-axis a few degrees so that the light beam is directed at an angle from the housing. This type of lamp is designed to be used in larger body cavities where the lamp housing and supporting tube are positioned along one edge of a larger tube through which an operator may observe the cavity interior. In such an assembly it is important to position the lamp and its offset lens in proper relationship to the larger tube so that the light from the lamp will cover the area seen by the operator. Presently known devices achieve this orientation on a trial and error basis with many bulbs being rejected during manufacture. The present invention is designed to adjust such lamps for their maximum illuminating value and also to provide a convenient means for inserting a new lamp into a holder and for extracting the lamp from the holder when it is to be replaced. In prior art devices both holder and lamp are thrown away when the lamp fails. In order to accomplish these results, the lamp mounting is provided with a set of hooked extensions disposed around the sides of the bulb. An adjusting tool with complementary hooked extensions is provided for turning the lamp in its mounting and also for installing it and extracting it.

One of the objects of this invention is to provide an improved lamp assembly which avoids one or more of the disadvantages and limitations of prior art arrangements.

Another object of the invention is to install a light bulb within the end of a probe having electrical connections therein.

Another object of the present invention is to rotate the light bulb within the mounting in order to orient the light beam from the lamp to a desired area.

Another object of the invention is to provide a replaceable bulb and mounting assembly.

Another object of the invention is to reduce the cost of lamp mountings and to permit easier cleaning, servicing, and repair.

The invention comprises a lamp bulb mounting which includes a long thin cylindrical probe for supporting the bulb mounting at one end. The probe consists of an outer metal conductive tube, a first cylindrical insulator sleeve mounted in axial alignment within the outer tube, and an axial rod within the insulator sleeve. The outer tube and the axial rod are connected to a source of electrical power for supplying electrical current to the lamp. A lamp bulb retaining means is secured to one end of the probe and includes a second hollow insulator sleeve in which is positioned one of the lead-in conductors from the lamp. A

conductive disk is secured to the second insulator sleeve and a plurality of equally spaced hooked extensions are formed integral with the disk and extend along the sides of the bulb and in contact with the other of the lead-in conductors from the lamp. The lamp may be turned on its axis, inserted, or withdrawn from the retaining means by a tool which includes a plurality of equally spaced hooked extensions complementary to those in the mounting. The extensions are secured to a handle for inserting into the lamp mounting to make contact with the hook portions of the extensions in the mounting.

For a better understanding of the present invention, together with other and further objects thereof, reference is made to the following description taken in connection with the accompanying drawings.

FIGURE 1 is a somewhat exploded isometric view of the probe, the lamp housing, the lamp, and a base holder which includes a socket for the probe and a mounting for a larger viewing tube.

FIGURE 2 is a cross sectional view, with some parts shown in elevation of the lamp assembly shown in FIGURE 1.

FIGURE 3 is a cross sectional view of a small portion of the lamp assembly shown in FIGURE 2 and is taken along line 3—3 of that figure.

FIGURE 4 is a cross sectional view, to an enlarged scale, showing the lamp, its housing, the offset lens, a portion of the probe, and the hooked extensions.

FIGURE 5 is an isometric view of the tool employed to insert the lamp, adjust it, and to withdraw it.

FIGURE 6 is an isometric view of the end of the lamp together with its offset lens illustrating how the light beam from the lamp is directed to one side of the probe axis.

FIGURE 7 is a cross sectional view with some parts in elevation showing the lamp tool inserted into the lamp housing and in position for rotatably adjusting the lamp.

FIGURE 8 is a cross sectional view of the lamp and tool shown in FIGURE 7 and is taken along line 8—8 of that figure.

FIGURE 9 is a cross sectional view of the end of the lamp housing showing the lamp partially withdrawn from the housing.

Referring now to the figures, the lamp assembly plus the base fixture is shown in FIGURE 1. The base fixture includes a cylindrical housing 10 in which is secured a hollow viewing tube 11 for observing the interior portions of a body cavity which are to be illuminated by a lamp 12. A portion 10A of housing 10 contains a compartment (not shown) for holding an electrical battery. On the exterior surface of base 10 is a small socket 13 for connection to an electrical fitting which supplies current to charge the battery. On the inside of viewing tube 11 a bracket 14 is mounted for securing a tubular socket 15 having bayonet slot 16. This socket and slot are for supporting a thin probe 17 which includes a bayonet extension 18 for latching into slot 16. The probe 17 includes an outer cylinder 20 which is conductive and which forms one conductor to convey current from the battery to the lamp 12. Inside the tube 20 is a nonconductive sleeve 21 which may be made of plastic or any other suitable non-conductive material. On the inside of sleeve 21 an axial rod 22 is positioned, this rod being a conductor and comprising the electrical supply line for lamp 12.

The end of the probe 17 is connected to a lamp housing 23 which includes a larger outer conductive tube 24 and a constricted portion 19 which fits over the end portion of sleeve 20. This assembly is shown in detail in FIGURE 4. The lamp end of the housing 23 is provided with a cavity 24A for supporting the lamp. Rod 22 extends into this cavity for a short distance to make electrical

contact with one of the lamp lead-in conductors **32**. The lamp itself is first placed in a lamp mounting which includes a hollow cylindrical insulator **25** having a flared portion **26**. A conductive disk **27** is secured to the disk end of insulator **25** and fastened thereto by plastic cement. The disk **27** is formed integral with a plurality of conductive leaf-like members **28** which extend around the outer surface of the lamp and fit snugly between the outer lamp surface and the inner surface **24A** of housing **24**. Each of the leaves **28** are formed with a hooked portion **30** as shown in the drawings.

When the lamp is inserted into this mounting one of the lead-in wires **32** is directed through a hole **31** in the center of insulator **25**. This lead-in wire **32** is then bent around the edge of the insulator end, thereby holding the lamp in place. The other lead-in wire **33** is bent toward the lens of the lamp and is turned around one of the leaves **28** so that it will make contact with the inner surface **24A** of housing **24**. When the lamp is inserted into cavity **24A**, the extension portion of rod **22** moves into hole **31** and the lead-in wire **32** then makes contact with the end of the rod. At the same time, the other lead-in wire **33** is coupled to the outer conductor **20**. When tube **17** is inserted into the socket **15**, the outer and inner conductive members make contact with portions of the socket and the lamp can then be lighted by the current supplied by the battery.

The lamp **12** contains the usual concentrated filament **34** and an offset lens portion **35** which focusses the light from the lamp and directs it generally in a beam which makes a small angle with the tube axis. The reason for this angle is to illuminate a portion of the cavity which is situated to one side of the tube so that the tube will not obstruct the viewers vision of the best lighted area.

Referring now to FIGURE 6, an area **40** is to be illuminated by the lamp. The lamp **12** is shown in the end portion **24** of its housing **23**, this housing having an axis which extends in the direction indicated by dashed line **41**. If the lamp did not have an offset lens **35**, the central area **42** would be illuminated. Since the lens is offset, the concentrated beam of light from the lamp travels in a direction indicated by line **43** to illuminate an off-axis area **44**. It is obvious that there must be an adjustment of the lamp and its lens in order to place the illuminated spot at a position which is unobstructed by the housing **23**. The leaf-like members **28** within the lamp housing are designed to facilitate the lamp adjustment. When the lamp is turned, the central portion of the illuminated area **44** can be moved through a circle which is indicated by the arrows **45** on area **40**. This adjustment can be done after the lamp is installed in its mounting and has been lighted. The means for this adjustment is a special tool **46** shown in FIGURES 5, 7, and 9.

The adjusting tool includes a handle **47** and a plurality of tines **48**, each having a hook portion **50**. The tines are formed integral with a base section **51** which has the same outside diameter as the inside surface **24** of the lamp housing. The tines and the base **51** are thin enough so that the tool may be inserted into the housing over the lamp bulb as shown in FIGURES 7, 8, and 9. If it is desired to turn the lamp so as to rotate the off-axis beam, the tool is rotated one way or the other until the lamp lens is in the desired position. If it is desired to remove the lamp **12** the tines **48** are pushed around the lamp and given a short rotary movement until the hook portions **50** engage the hook portions **30**. Then the lamp **12** and its socket may then be removed from the housing. The lamp may be inserted without the tool by pushing it in with the fingers but it is much better to place the lamp within the tine space of the tool **47** and then push the entire assembly into tube **24**. If this is done, the hole **31** at the base of the lamp socket will be sure to pass over rod **22** (see FIGURE 4).

It is obvious from the above description that the housing and lamp assembly can be employed to install, replace, and adjust the lamp and the lamp beam moved to meet any requirements of instruments of this class.

Having thus fully described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A lamp assembly comprising, a tungsten filament lamp including two lead-in conductors, a long thin cylindrical probe for supporting the lamp at one end thereof, said probe including an outer metal conductive tube, a first cylindrical insulator sleeve mounted in axial alignment within the outer tube, and an axial conductive rod within the insulator sleeve, said outer tube and axial rod adapted to supply electrical current to the lamp, a lamp bulb retaining means secured to one end of the probe and including a second hollow insulator sleeve in which is positioned one of the lead-in conductors from the lamp, a conductive disk secured to said second insulator sleeve, and a plurality of equally spaced hooked leaf-like extensions integral with said disk and extending along the sides of said bulb for adjusting the lamp position, the other of said lead-in conductors from the lamp arranged for contact with one of said extensions.

2. A lamp assembly as claimed in claim **1** wherein said lamp is formed with an offset transparent lens portion adjacent to the filament for focusing a beam of light at an angle to the axis of the lamp and the leaf-like extensions are of conductive material.

3. A lamp assembly as claimed in claim **1** wherein said rod and tube are provided with a bayonet extension for attaching to a bayonet socket.

4. A lamp assembly as claimed in claim **1** wherein a viewing tube is mounted external to the lamp assembly with the axis of the lamp assembly offset from the axis of the viewing tube.

5. A lamp assembly as claimed in claim **4** wherein said viewing tube and said lamp assembly are both secured to a base structure which contains an electrical battery for lighting the lamp.

6. A lamp assembly as claimed in claim **4** wherein an adjusting means is provided for rotating the lamp within its housing to produce a desired light pattern.

7. A lamp assembly as claimed in claim **6** wherein said adjusting means includes a plurality of equally spaced hooked tines adapted to fit over the lamp bulb within the bulb retaining means and make mechanical contact with said hooked extensions.

8. A lamp assembly as claimed in claim **4** wherein a base member is secured to said viewing tube and to a bayonet socket, said base member including a compartment for a battery which is adapted to supply electrical current to the lamp.

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