

- [54] **FLEX LIGHT**
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- [73] Assignee: **Concept, Inc.**, St. Petersburg, Fla.
- [22] Filed: **July 16, 1973**
- [21] Appl. No.: **379,218**

- [52] **U.S. Cl.**..... **128/23; 240/2.18; 240/2 S; 240/10.66**
- [51] **Int. Cl.**..... **A61b 1/06**
- [58] **Field of Search** ..... **128/23; 240/2.18, 10.66, 240/2 S**

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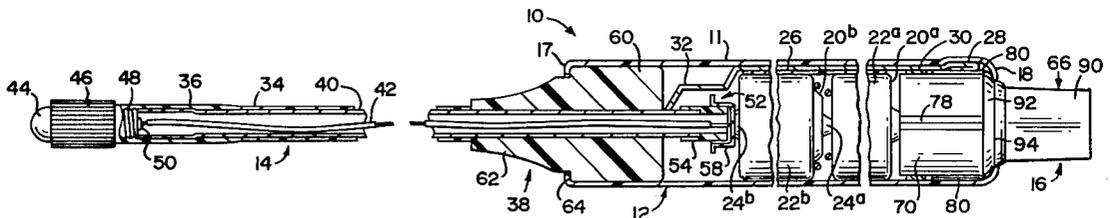
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[57] **ABSTRACT**

A flexible surgical light for use in illuminating various body cavities during surgery comprising a housing configured to house a voltage source therein and having a first conductor means formed thereon, an extended bulb assembly mounted on one end of the housing and a switch means mounted on the opposite end of the housing, the extended bulb assembly comprises an elongated hollow sleeve having mounting means attached on one end thereof to attach the extended bulb assembly to the housing and a bulb housing having a light source disposed therein attached to the opposite end thereof. A second conductor means is disposed within the hollow sleeve being coupled to a portion of the light source and a third conductor means extending substantially the length of the hollow sleeve coupled to another portion of the light source. The switch means is movable to operatively engage the first conductor means to selectively close the circuit and activate the light source.

**6 Claims, 8 Drawing Figures**



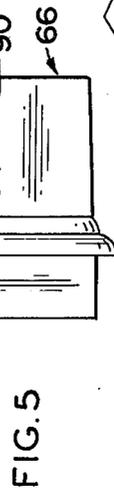
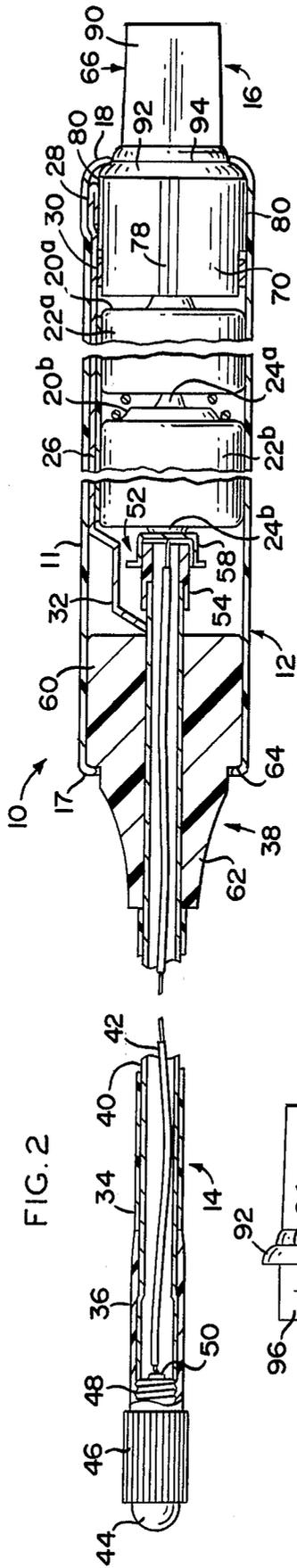
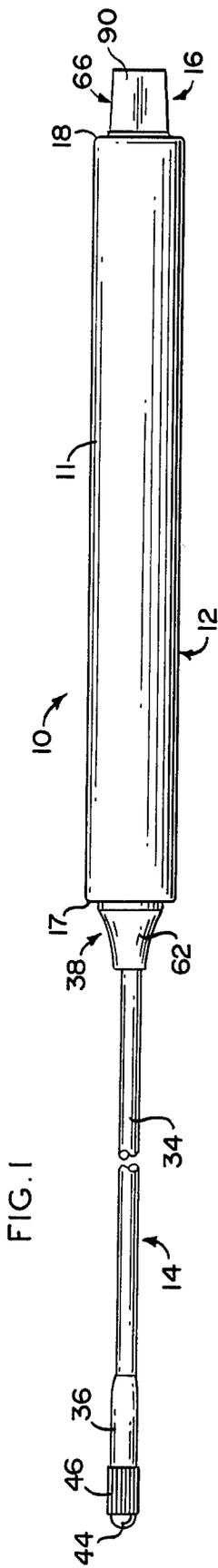


FIG. 4

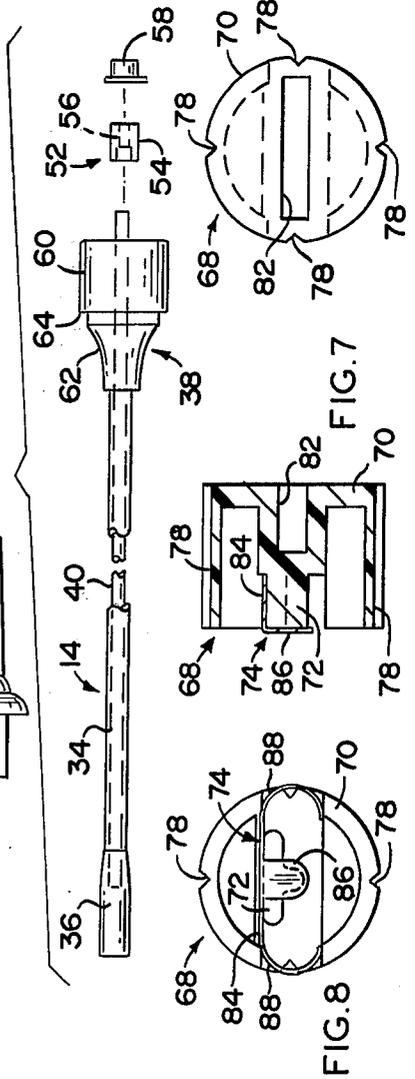


FIG. 3

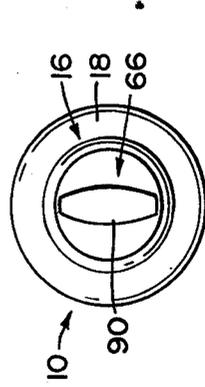


FIG. 6

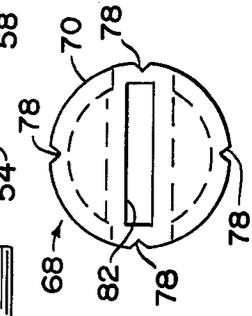


FIG. 7

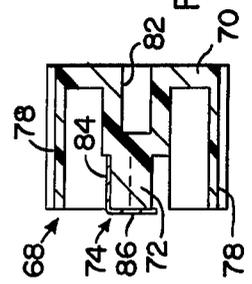
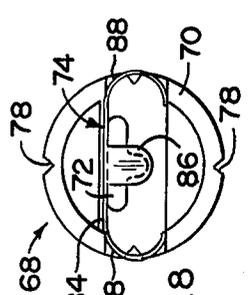


FIG. 8



## FLEX LIGHT

## BACKGROUND OF THE INVENTION

## 1. Field of the Invention

A flexible surgical light comprising a housing configured to house a voltage source therein having an extended bulb assembly mounted on one end thereof and a switch means formed on the opposite end thereof, the switch means being movable to electrically couple and decouple the voltage source to the extended bulb assembly.

## 2. Description of the Prior Art

A number of surgical lights have been developed for use in the medical profession and similar endeavors. Generally, these surgical lights comprise a current or voltage source in combination with a light source and switch means to actuate/deactuate the surgical light.

When used for surgical purposes, these lights often include extended flexible light assemblies to permit insertion of the light into various body cavities for illumination thereof. In these configurations, the light source is commonly secured within a socket which is electrically coupled to the voltage source. Since the light source is simply screwed into the socket rather than securely affixed thereto as an integral unit, the light source may become dislodged from the socket during use and possibly fall into the patient's body. This is obviously unacceptable particularly since the light source may remain undetected in the patient's body.

Furthermore, the additional socket structure requires additional manufacturing and assembly costs.

Thus, there is a need for a relatively simple, efficient device comprising an integral light source/voltage source package that is both inexpensive to manufacture and assemble.

## SUMMARY OF THE INVENTION

This invention relates to a flexible surgical light. More specifically, the surgical light includes a tubular housing configured to house a voltage source in operative engagement with a light source mounted within an extended bulb assembly and a switch means operatively attached to the tubular housing to selectively actuate the surgical light.

The tubular housing comprises a hollow cylindrical barrel including retaining means formed at each end thereof to retain the extended bulb assembly and switch means therein. Disposed within the cylindrical barrel is a first conductor means extending substantially the length thereof. The first conductor means is arranged to operatively engage the extended bulb assembly and switch means as more fully described hereinafter while insulated from the voltage source.

The switch means comprises a switch base connected to the voltage source by a switch contact means formed thereon and a switch actuator means.

The extended bulb assembly comprises an elongated hollow sleeve having a mounting means attached to one end thereof and a bulb housing attached to the opposite end thereof, a light source mounted within the bulb housing, a second conductor means extending substantially the length of the hollow sleeve and a third conductor means within the second conductor means. The third conductor means comprises an insulated wire which extends through a semi-rigid metal tube which comprises the second conductor means. The second conductor means contacts the periphery of the bulb

while the insulated wire is connected to the inner contact point of the bulb. At the base of the metal tube is a coupling means comprising a plastic collar surrounded by a metal ring which acts as a retainer for the bare end of the insulated wire which is bent backwardly over the plastic collar. The ring thus acts as a contact for the central core of the uppermost battery.

To operate, the operator rotates the switch actuator means from the first to the second position causing switch contact means to engage first conductor means to complete the circuit between the light source and the voltage source such that the current flows from the voltage source to the light source and returns through the first conductor means, switch contact means back to the voltage source.

By this unique combination of elements, a highly reliable relatively inexpensive surgical light is provided.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth and the scope of the invention will be indicated in the claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a side view of a flexible surgical light.

FIG. 2 is a cross-sectional side view of the flexible surgical light.

FIG. 3 is an end view of the switch actuator means.

FIG. 4 is an expanded side view of the extended bulb assembly.

FIG. 5 is a top view of the switch actuator means.

FIG. 6 is an end view of the switch base means.

FIG. 7 is a cross-sectional side view of the switch base means.

FIG. 8 is a rear view of the switch base means.

Similar reference characters refer to similar parts throughout the several views of the drawings.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in FIG. 1, the flexible surgical light generally indicated as 10 comprises tubular housing 12, extended bulb assembly 14 and switch means 16.

As shown in FIG. 2, tubular housing 12 comprises a hollow cylindrical barrel 11 including retaining means comprising a pair of retainer lips 17 and 18 formed on the upper and lower ends thereof respectively. Retainer lips 17 and 18 are configured to operatively couple extended bulb assembly 14 and switch means 16 respectively to barrel 11 as more fully described hereinafter. Barrel 11 is dimensioned to house one or more batteries. As shown in FIG. 2, base 20a of lower battery 22a engages switch means 16 while terminal post 24b of upper battery 22b engages extended bulb assembly 14. As depicted, a plurality of batteries may be placed in series, end to end, such that terminal post 24a of lower battery 22a engages base 20b of upper battery 22b. First conductor means 26 comprising an elongated strip of conductive material extends substantially the length of barrel 11. One portion 28 of strip 26 includes contact point 30 positioned to operatively engage switch means 16 while a second portion 32 of strip 26

is shaped to operatively engage extended bulb assembly 14 as more fully described hereinafter.

As shown in FIG. 2, extended bulb assembly 14 comprises an elongated hollow sleeve 34 having bulb housing 36 attached to the outer end thereof and mounting means 38 attached to the inner end thereof. Extending substantially the length of the hollow sleeve 34 are second conductor means 40 and third conductor means 42. Third conductor means 42 comprises an insulated wire mounted on the interior of second conductor means 40. Light source 44 is retained in bulb housing 36 by attachment means 46 such that second conductor means 40 engages the sides 48 of light source 44 while wire 42 is affixed to base 50 thereof (FIG. 2).

As shown in FIGS. 2 and 4, conductive coupling means 52 comprises coupling collar 54 having aperture 56 formed thereon and conductive retainer ring 58 attached thereto. When assembled, one end portion of wire 42 is passed through aperture 56 and press fitted between retainer ring 58 and coupling collar 54.

As best shown in FIG. 4, mounting means 38 comprises an enlarged base 60 and reduced upper portion 62 which cooperatively form ledge 64 therebetween such that ledge 64 and retaining lip 17 engage each other to secure extended bulb assembly 14 to barrel 11. As configured, extended bulb assembly 14 comprises an integral unit which prevents any accidental separation of parts during use.

As shown in FIGS. 3 and 5 through 8, switch means 16 comprises switch actuator means 66 and switch base means 68. As shown in FIGS. 6 through 8, switch base means 68 comprises a hollow substantially cylindrical member 70 including retaining means 72 formed thereon to retain contact means 74 comprising a bar-like member which extends outward from member 70. Formed about the outer periphery of member 70 are detent locking means 78 spaced at 90 degree intervals. These detents or locking means 78 cooperate with blades 80 (FIG. 2) formed on the inner periphery of barrel 11 to lock switch means 16 in position as described more fully hereinafter. A substantially rectangular recess 82 is formed in the top of member 70. Contact means 74 comprises clip member 84 having voltage source contact in the form of tongue means 86 and first conductor contacts 88.

As shown in FIGS. 3 and 5, switch actuator means 66 comprises handle 90, annular base 92 and ledge 94 and interconnecting member 96 is configured to fit into recess 82. When assembled, switch means 16 is held in barrel 11 by the cooperative engagement of retainer lip 18 and ledge 94.

When not in use, switch member 16 is held in the first or open position out of contact with first conductor means 26 to prevent illumination of the light source 44. To activate surgical light 10, switch actuator means 66 is rotated relative to cylindrical barrel 11 to the second or closed position causing one of contacts 88 to engage contact point 30 such that current will flow from batteries 22a and 22b through conductive retainer ring 58, third conductor means 42 into base 50 of light source 44. From thence, the current flows through the filament to second conductor means 40, first conductor means 26, contact point 30, contact means 74 and to the base 20 causing bulb 44 to illuminate.

It will thus be seen that the objects set forth above, 65

among those made apparent from the preceding description, are efficiently attained, and since certain changes may be made in carrying out the above method and article without departing from the scope of the invention, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention, which, as a matter of language might be said to fall therebetween.

Now that the invention has been described, what is claimed is:

1. A surgical light comprising a housing configured to retain a voltage source therein, said housing having a first conductor means disposed therein, an extended bulb assembly and a switch means attached to said housing, said extended bulb assembly comprising an elongated sleeve having a second and third conductor means disposed therein, a bulb housing attached to one end of said elongated sleeve, a light source secured within said bulb housing by attachment means, mounting means attached to the opposite end of said sleeve to mount said extended bulb assembly to said first conductor to hold said third conductor means in operative engagement with said voltage source, said second and third conductor means being electrically insulated from each other, said first conductor means coupled to said second conductor means, said switch means rotatably mounted within said housing and electrically coupled to said voltage source, said switch means being out of contact with said first conductor means when in a first position to deactivate said surgical light; said switch means comprising a switch base means having a recess formed therein, contact means mounted within said recess and including a clip member configured to expose a plurality of first conductor contacts to movably engage said first conductor means and tongue means integrally attached to said clip member so as to complete the circuit between the voltage source, contact means and first conductor means.

2. The surgical light of claim 1 wherein said housing comprises a substantially cylindrical barrel having retainer means formed thereon.

3. The surgical light of claim 2 wherein said cylindrical barrel and said retainer means are integrally formed.

4. The surgical light of claim 1 wherein said second conductor means comprises a hollow semi-rigid tube engaging said light source and said third conductor means comprises a flexible insulated conductive wire disposed within said second conductive means.

5. The surgical light of claim 4 further comprising coupling means including a hollow cylindrical body mounted on said hollow semi-rigid tube and a conductor retainer ring mounted on said body, a portion of said third conductor means engaging said conductor retainer ring, a conductive retainer ring engaging said voltage source to interconnect said voltage source with said light source.

6. The surgical light of claim 3 wherein said retainer means comprises a pair of retainer lips formed at opposite ends of said cylindrical barrel.

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