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Herold

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[54] **SURGICAL OPERATING LAMP WITH INDIVIDUAL SPOT-LIGHTS**

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[51] **Int. Cl.²** **A61G 13/00;** F21V 33/00

[58] **Field of Search** ..... 240/41.15, 1.4, 41.35 A

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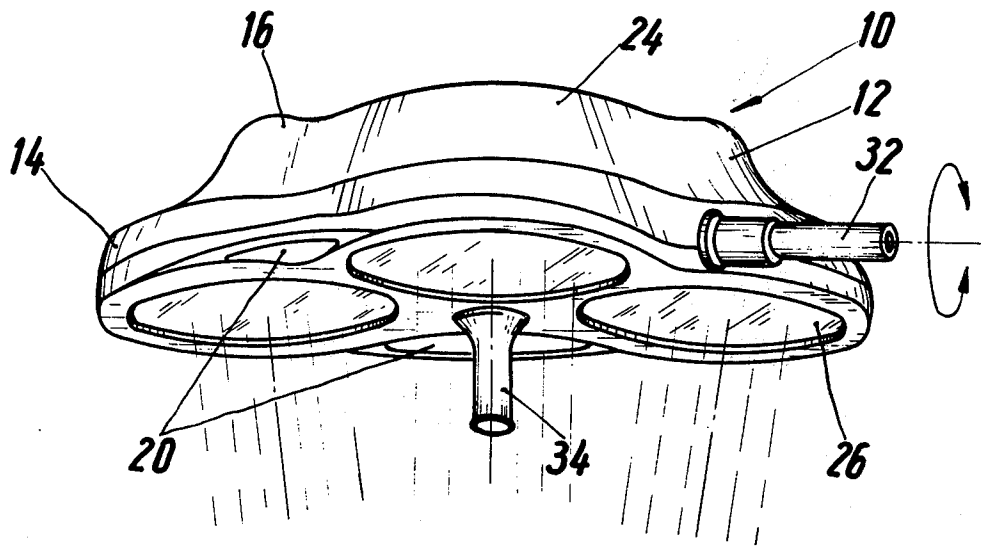
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[57] **ABSTRACT**

The present invention relates to a surgical operating lamp with adjustable individual spot-lights, disposed symmetrically about a central axis within a lighting body, the light rays of which meet approximately on the central axis of the surgical operating lamp at an adjustable distance from the lighting body.

2 Claims, 2 Drawing Figures



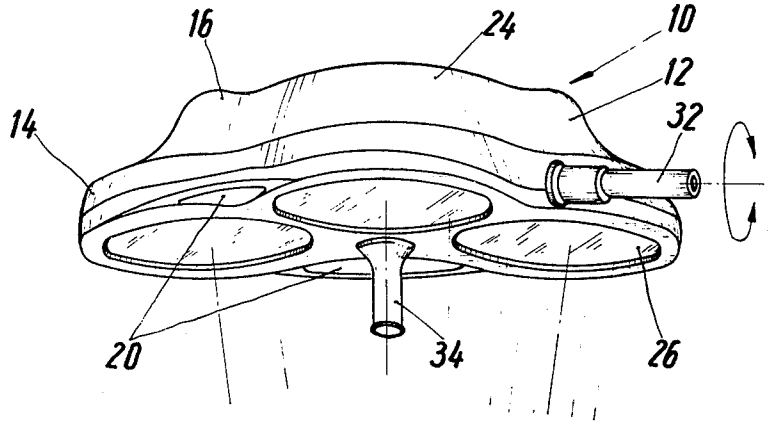
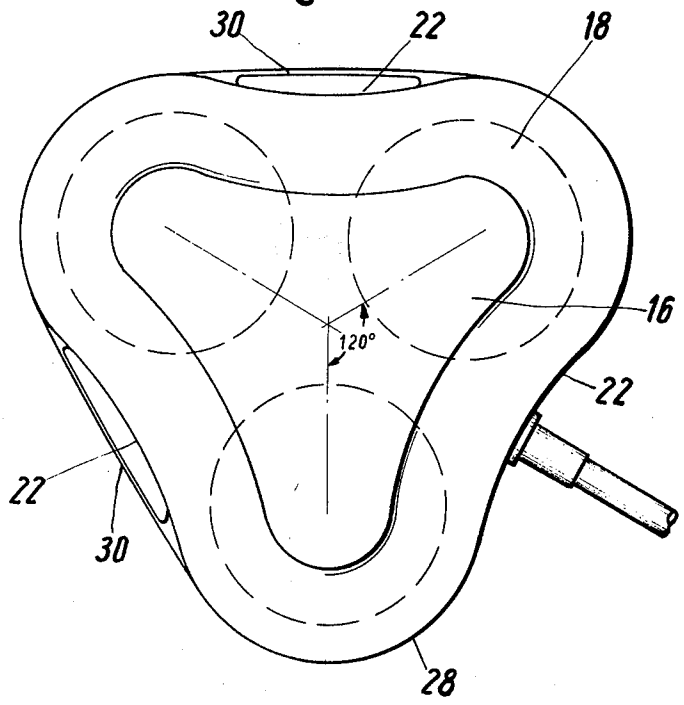


Fig. 1

Fig. 2



SURGICAL OPERATING LAMP WITH INDIVIDUAL SPOT-LIGHTS

BACKGROUND OF THE INVENTION

For the illumination of an operating theatre, it is known to dispose individual spot-lights on a spherical surface as far away as possible from each other so that a shadowless lighting of the operating area is possible. Should this demand be thoroughly fulfilled, this results in a lighting body of a large surface and of a large volume. Large-sized lighting bodies have many disadvantages. Among other things they screen the illuminated operating area towards the top, whereby the freedom of motion of the operator is hindered. Furthermore, it is not possible to let the occuring heat escape to the top without interference, whereby the large-sized lighting body can become a secondary radiator as a result of the absorption of heat. It must be added to the demands required from a modern surgical operating lamp that, for the sterilization in the operating theatre or in an operating cabin, an air current is conducted from the ceiling or wall downwards to the floor, respectively from wall to wall of the operating theatre or operating cabin, parallel or obliquely to the lighting circuit.

Known surgical operating lamps have a housing which in the main corresponds to the section of a cylinder. The upper and lower terminal surfaces of the housing are spherically shaped, whereby the shielding plates are disposed in the lower terminal surface of the individual spot lights. These surgical operating lamps are large-sized and present a considerable deflectional resistance or flow resistance to the air current necessary for the sterilization and screen actually the area of the operating theatre which should be caught by the sterilization action of the air current. Thereby a dangerous whirling effect occurs above the wound.

SUMMARY OF THE INVENTION

It is therefore the object of the present invention to provide a surgical operating lamp which, by an equally illuminated surface of the individual spot-lights, has a lighting housing of small volume which opposes only a low flow resistance to the air sterilizing current. Thereby, the demand that the individual spot-lights are so disposed that they enable a shadowless lighting of the operating theatre, must be fulfilled. The object of the present invention is attained by a surgical operating lamp on which a lighting body has three individual spot-lights, disposed 120° from each other, at the vertex of a starshaped form, the reflectors of which are tightly enclosed by an upper part of the lighting body, and that a lower part of the lighting body, with the spot-light's end panes at the lower side, has the outline of a triangular-like curve with indentures in the sides enveloping the individual spot-lights. The lower part is generally triangular in shape, having the vertices of the triangle rounded off and the legs of the triangle slightly concave.

A further form of the invention consists therein that two of the concave sides of the lower part are formed as handles, whereby the outer surface of each handle is tangent to the rounded off corners enclosing the individual spot-lights. Thereby the concavities for the handles are favorably utilized without increasing the volume of the surgical operating lamp, and respectively, its flow resistance against the sterilizing current. An articulated pivot protrudes suitably out of one side of

the third concave part of the surgical operating lamp, around which the surgical operating lamp is pivotable. The configuration of this articulated pivot can be realized according to the known apparatus. The articulated pivot thereby takes over the function of a through axis, around which the lighting body is formed of several individual spot-lights which, as far as the weight is concerned, are lighter than in known surgical operating lamps. Advantageously, the upper part of the lighting body is formed so that it fits tightly around the individual spot-lights, and has the same general outline, however smaller, as the lower part. Due to this construction of the upper part, a surface results therefrom, easily blown against from the top, which deflects the air current downwards only insignificantly and mainly in streamlined form.

In order to fulfil the demand that individual spot-lights illuminate the operating theatre without shadows, a handle is disposed, in the middle of the lower part between the spot-lights' end panes, for the focussing and adjusting of the individual spot-lights of the surgical operating lamp.

The most important advantage of the surgical operating lamp according the the invention consists therein that it has a considerably smaller volume than known surgical operating lamps, by the same luminescence, and opposes only a small flow resistance to the sterilizing air current on the operating theatre, due to the form of the lighting body, so that the air current can amply expand its sterilizing action in the operating theatre.

The invention is more precisely explained below with the help of examples of designs graphically represented.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows a perspective view of a surgical operating lamp according to the invention, and

FIG. **2** shows a top view of a surgical operating lamp according to the present invention.

DESCRIPTION OF A PREFERRED EMBODIMENT

A surgical operating lamp **10** consists of lighting body having a lower part **14** and an upper part **16.** In the lighting body, individual spot-lights **18** are disposed - in the present case three individual spot-lights - the light rays of which meet approximately in the central axis of the surgical operating lamp **10.** Of course, the amount of individual spot-lights which are disposed in a lighting housing, is not restricted to three spot-lights. The three individual spot-lights are disposed, 120° from each other, at the vertices of a star-shaped form.

The upper part **16** encloses tightly in an upward direction the spot-lights **18,** is offset inwardly, of the individual spot-lights **18,** and is closely drawn in against them.

In the lower side of the lower part **14,** and terminating the operating theatre, there are spot-lights' end panes **26.** The lower part **14** has an outline tightly enclosing the individual spot-lights **18,** consisting of a curve **28** similar to a triangle, with concavities **22** at the sides, whereby the individual spot-lights **18** enclose arched segments running convexly and which are connected between the individual spot-lights **18** by means of arched segments running concavely. Two of the concavities **22** of the sides of the lower part are formed as handles, the terminal surface **30** of which runs tangent to the arched segments concavely enclosing the individual spot-lights. The handles **30** must not be

formed sterilely, they serve, as well as a hold **34** which is disposed in the middle of the terminal surface of the lower part **14** for the purpose of correctly focussing the surgical operating lamp. Advantageously, the hold **34** disposed between the spot-lights' end panes **26,** is removable and enables, besides the focussing also the adjustment of the surgical operating lamp **10.**

In particular, the radius of the arched segments enclosing convexly the individual spot-lights and that of the concave segments connecting them can be the same. A solution in the smallest possible space is thus attained, whereby the insignificant area increases, as result of the addition of the two handles **30** at the lower part **14,** hardly carries weight.

The concavity **22** of the third side of the lower part of the lighting body **12** receives an articulated pivot **32,** around which the lighting body **12** is pivotable. The articulated pivot **32** has a self locking articulation - not represented - in order to avoid a fixing of the surgical operating lamp after each swing. The articulated pivot **32** can establish the connection of the lighting body **12** with a supporting arm or a supporting bow (not represented).

The outline of the upper part **16** is the same, on a smaller scale, as that of the lower part **14** and, as the latter, has also concavities. Due to the great similarity in the construction, as far as the outline is concerned, of the lower part and of the upper part of the surgical operating lamp, an outlone area results which can be blown against from the top and which deflects the air current only slightly and mainly in streamlined form.

A further advantage is that, due to the fitting of the surface of the lower part **14** and the upper part **16** to the individual spot-lights **18,** including their spot-lights **18,** the volume of the surgical operating lamp **10** can be maintained as small as possible. The three-eyed surgical operating lamp according to the invention has, with approximately the same projection surface, respectively, as a known surgical operating lamp, more than one and a half times more luminous surface area.

What is claimed is:

1. In a surgical operating lamp having a lighting body with individual, adjustable spotlights within the lighting body, the light rays of said spot-lights meeting approximately on the central axis at a distance from the lighting body, the improvements comprising:

a. said individual lights are three in number and are disposed 120° from each other about the central axis of the lighting body,

b. said lighting body tightly encloses said three individual lights and consists of an upper and lower portion attached together, said lower portion being attached to a lamp support means, wherein body said upper and said lower portions are generally triangular in plan view having convex vertices surrounding said three individual lamps and concave sides joining said vertices and,

c. handles attached to the lower portion of the body at two of the concave sides to enable adjustment of the position of the lamp.

2. The improved surgical lamp of claim **1** wherein the external surface of said handles are tangent to the convex vertices on each end of said handles.

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