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LAMP STRUCTURE

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Fig. 1.

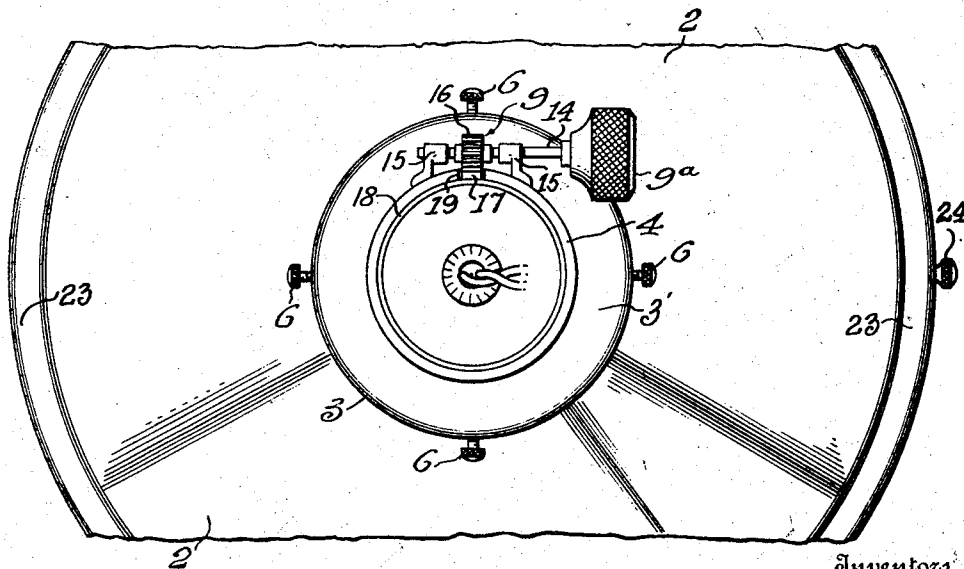
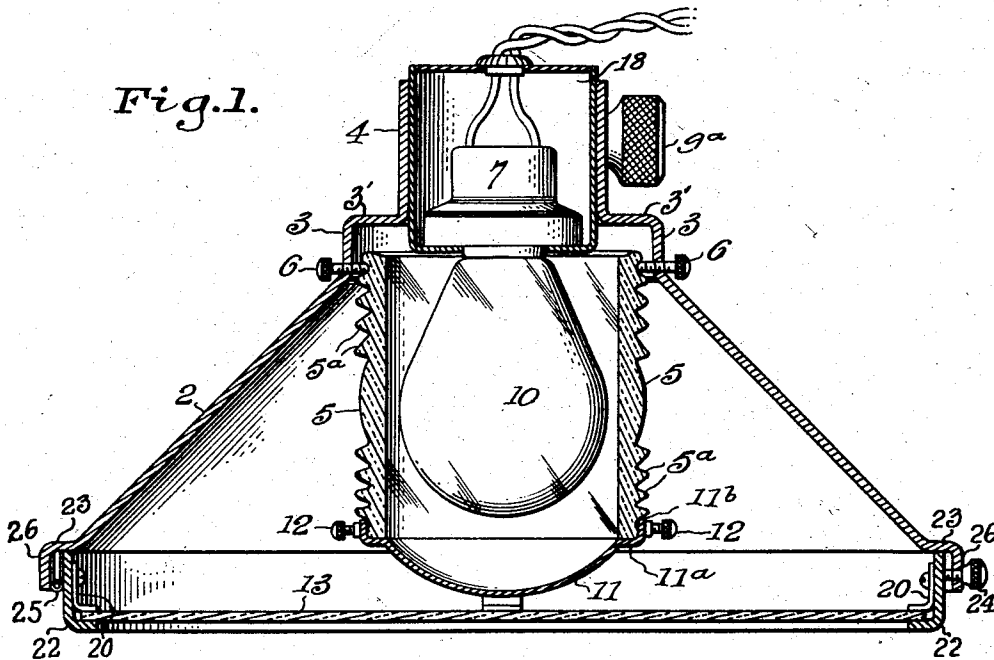


Fig. 2.

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LAMP STRUCTURE

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1 Claim. (Cl. 240—1.4)

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This invention relates to lamp structures, and more particularly to those which are used in surgery, although not limited thereto.

Generally stated, surgical lamps are designed to produce on a restricted operating field a beam of light which is shadowless, intense yet cool, and at the same time color-corrective. In the case of a wound, it is particularly important that besides being cool the restricted beam of light be not only shadowless but possess natural color characteristics as otherwise proper diagnosis is very difficult. The proper illumination of depth is best obtained by a light beam derived from multiple sources; and it is therefore most expedient to employ multiple units each of which can be adjusted both physically and optically to train their respective projected light rays upon the focal object.

Numerous prior art lamp structures have sought to attain the foregoing objectives, but, so far as we are aware, they are all possessed of one or more shortcomings, among which are expensiveness to manufacture and maintain, difficulty of operation, and excessive bulk.

It is among the objects of the present invention to provide a comparatively simple and efficient illuminating apparatus, particularly of the type used in surgery, which projects a light beam of restricted cross-sectional area and which is intense yet cool, practically shadowless, and possessed of substantially natural color.

Another object is the provision of a compact structure of the class described which is easily portable and readily adjustable to project the desired type of light beam in almost any direction.

The invention, then, comprises the features hereinafter fully described, and as particularly pointed out in the claim, the following description and the annexed drawing setting forth in detail a certain illustrative embodiment of the invention, this being indicative of but one of a number of ways in which the principle of the invention may be employed.

In said drawing:

Figure 1 is a sectional elevation of the lamp structure of the invention.

Figure 2 is a fragmentary plan.

Referring more particularly to the drawings, the numeral 2 designates a large conical reflector of standard design, the same being made of either metal or glass in the manner well known in the art. At its inner, or reduced, end the conical reflector 2 is provided with a short annular flange 3 depending from an annular flange 3', which is

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substantially at right angles to a somewhat longer annular sleeve, and at its outer or enlarged end, the conical reflector is provided with an annular shoulder 23 and a depending side wall 26.

Disposed within the conical reflector 2 is an annular Fresnel lens 5 of standard design the same being supported in position by means of a series of screws 6 which extend radially inward through the short annular flange 3 and grip the said lens at spaced peripheral points adjacent its inner end.

As is well known to those skilled in the art of illumination, a Fresnel lens may be regarded as a plurality of lenses, the curvature of the back surface of each zone being so chosen as to eliminate spherical aberration. This construction can be modified to distribute light in almost any desired manner. In the embodiment shown, the annular lens 5 has a cylindrical bore and the exterior of the said lens is shaped to provide the Fresnel lens elements, the same being designated at 5a.

Disposed within the annular sleeve 4 is a light bulb socket 7 which is supported by an adjusting mechanism generally indicated at 9. The adjusting mechanism 9 is provided with an operating thumb-screw 9a which is disposed exteriorly of the annular sleeve 4, the same being operable to adjust the bulb socket 7 longitudinally of the said annular sleeve. The thumb-screw 9a is mounted on the outer end of a transversely extending shaft 14 rotatably mounted in bearing members 15 provided on the annular reflector sleeve 4. The shaft 14 has a pinion 16 mounted thereon adjacent to the inner end of the shaft, which pinion meshes with a rack 17 provided on the light socket housing 18, which rack 17 fits into a slot 19 formed in the reflector sleeve 4.

The bulb socket 7 carries a light bulb 10 which projects into the annular Fresnel lens 5. For the purposes of a surgical lamp the light bulb 10 may suitably be any one of a number of concentrated filament types, the same as such forming no part of the present invention.

The outer end of the annular Fresnel lens 5 is provided with a light-impregnable closure 11 which may suitably take the form of a concavo-convex cap provided with a continuous radially extending peripheral flange 11a which abuts the end of the said lens. The peripheral radially extending flange 11a terminates in a continuous annular lip 11b which embraces the periphery

of the adjacent end of the annular lens 5, and held in position therein by a series of screws 12.

According to the foregoing construction and arrangement each of the light rays emitted by the light bulb 10 must, in order to be projected from the outer end of the conical reflector 2, travel through the annular Fresnel lens 5. In this manner, then, the light rays transmitted to the conical reflector 2 are directed by the latter to a point of concentration which is coincident with the axis thereof. In addition, the point of concentration may be varied by the simple expedient of adjusting the longitudinal position of the light bulb 8 with respect to the annular Fresnel lens 5.

When the light bulb is raised by means of the adjusting mechanism 9 the light rays passing through the lens 7 are bent down and are concentrated at a lower point than was the case prior to said adjustment, but on the same axis. When the light bulb 10 is lowered, the converse is true (i. e. the light beams concentrate at a higher point out on the same axis as aforesaid). Whatever the degree of adjustment, the reflected light beam is in effect the same as derived from multiple sources because of the optical effect of the combined annular Fresnel lens 5 and the conical reflector 2. Thus, the projected light beam is inherently shadowless.

The outer end of the conical reflector 2 is provided with a conventional heat-absorbing and color-corrective glass 13 which is suitably removably maintained in position by spring clips 20 mounted in an annular closure member 22 for the outer or enlarged end of the conical reflector, the closure member 22 being connected hingedly on the side wall 26 of the reflector by the hinge 25. The closure member 22, when in closing position, abuts against the annular shoulder 23 on the reflector 2 and is held removably in position by screw 24 threadedly mounted in the side wall 26 and contacting the closure member 22 at its inner end in diametrically opposite relation to the hinge 25. Upon loosening the screw 24, the closure member 22 may be swung open about its hinge 25 for replacing or cleaning the parts of the lamp structure. The effect of the glass 13 is to intercept the light rays projected by the conical reflector and remove therefrom the heat-giving infra-red rays and also any color characteristics, whereby the projected beam of light is rendered cool and colorless.

Other modes of applying the principles of the invention may be employed, changes being made

as regards the details described, providing the features stated in the following claim, or the equivalent of such, be employed.

Having thus described our invention, what we claim as new and wish to secure by Letters Patent is:

A lamp structure comprising a reflector housing having a cylindrical sleeve portion and a conical reflector portion, a cylindrical housing adj-
10 justably mounted in the sleeve; an annular flange extending from the sleeve portion at substantially right angles thereto, and a second flange depending substantially perpendicularly therefrom, the conical reflector portion extend-
15 ing divergingly from the second flange, means for slidably adjusting the housing in the sleeve, a light socket mounted in the housing, a lamp mounted in the socket, a tubular Fresnel lens en-
20 closing the lamp, a series of screws threadedly mounted in the second flange and extending therethrough in engagement with the Fresnel lens for holding the lens in position, an opaque cap closing the lens, means for securing the cap
25 to the lens, the said conical reflector portion terminating in an annular shoulder having a flange depending therefrom to form an annular wall, an annular closure member for the conical reflector positioned in the wall, a heat-absorbing and color-corrective glass removably mounted in the an-
30 nular closure member for closing the annulus thereof, a connection between the annular closure member and the wall, and a securing screw threadedly mounted in the wall and extending
35 therethrough in engagement with the annular closure member in diametrically opposite relation to the said connection for holding the closure member in closing position against the
40 shoulder for closing the conical reflector portion.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,806,384	Benard	May 19, 1931
1,985,922	Gelb	Jan. 1, 1935
2,173,325	Alexander	Sept. 19, 1939

FOREIGN PATENTS

Number	Country	Date
542,417	Great Britain	Jan. 8, 1942