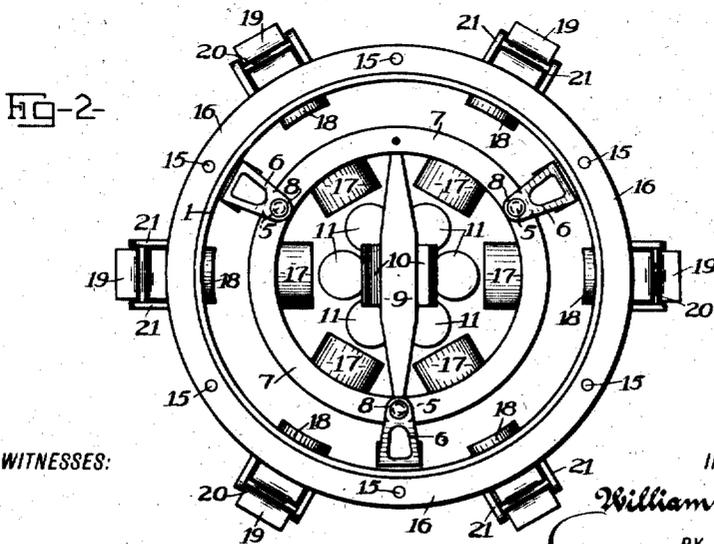
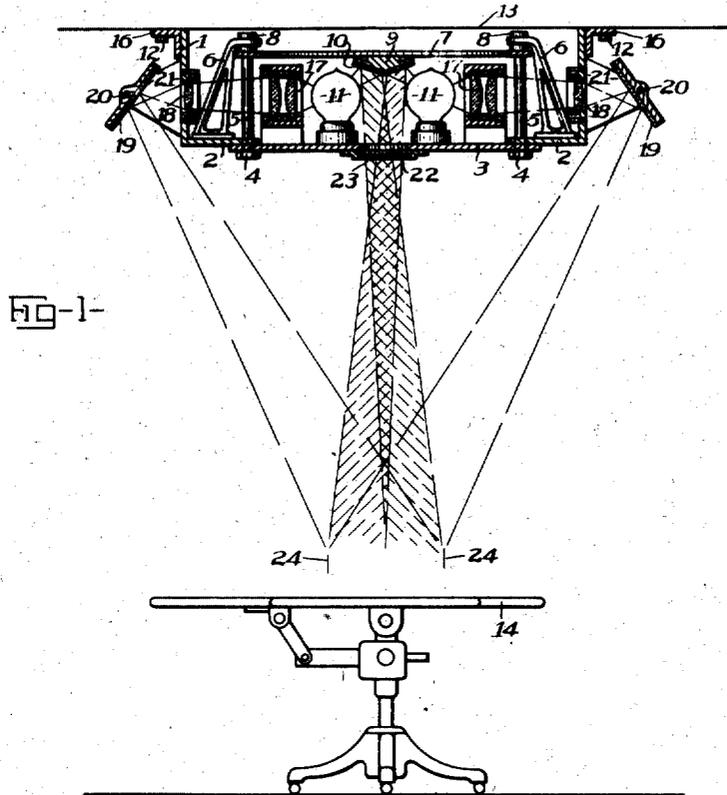


W. L. PATTERSON.
 OPERATING TABLE ILLUMINATOR.
 APPLICATION FILED APR. 16, 1917.

1,277,110.

Patented Aug. 27, 1918.



WITNESSES:

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OPERATING-TABLE ILLUMINATOR.

1,277,110.

Specification of Letters Patent. Patented Aug. 27, 1918.

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To all whom it may concern:

Be it known that I, WILLIAM L. PATTERSON, a citizen of the United States, residing at Rochester, in the county of Monroe, State of New York, have invented certain new and useful Improvements in Operating-Table Illuminators; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the characters of reference marked thereon.

This invention relates to light projectors for illuminating a restricted area, such as the field of operation of a surgeon upon a patient laid upon an operating table placed below the illuminator.

It is important that the field of a surgical operation be brilliantly illuminated without casting disturbing shadows of the surgeon's hands or implements upon the operative field, and without raising the temperature of the parts being operated upon, and without allowing fall thereon of dust or dirt from the illuminator which if permitted may infect the patient. These conditions are fully met while using this invention which assures an artificial illumination of an operative field or other restricted area substantially as adequate and effective as that afforded by bright daylight.

In the drawings:

Figure 1 is a vertical sectional elevation of this improved illuminator as arranged over an operating table, and with the deflected light beam indicated by broken lines. Fig. 2 is a top plan view of the illuminator removed from its ceiling supports.

In the illustrated embodiment of this invention the light sources and coaxing optical devices are all held to a supporting casing designed to be practically dust and fluid proof and preferably comprising a rounded marginal vertical wall 1 having an inwardly projecting horizontal flange 2, and a bottom plate 3, detachably held to the flange 2 by nuts 4 screwed upon the lower threaded ends of bolts 5. These bolts pass at their upper reduced threaded ends through the inwardly overhanging heads of brackets 6 fixed at their bases to the casing flange 2. The upper ends of the bolts 5 are first preferably passed upwardly through holes in a ring support 7, and then pass through the bracket heads above which they

receive nuts 8 which when tightened securely hold the pendent bolts 5 and the ring 7 to the fixed brackets 6. The ring 7 has fastened to it the opposite ends of a cross bar 9 which carries a central reflector 10 which may have any preferred form assuring that light rays it receives from a subjacent plurality of grouped lamps 11, shall be deflected downwardly in one or more divergent beams upon an operative field or area to be illuminated. The illustrated reflector 10 is formed with two plane reflecting surfaces meeting at their inner edges to give the reflector a general obtuse angular form with its apex facing downward.

The pendent bolts 5, and the ring 7 carrying the bar 9 and the reflector 10, are permanently fastened by the bolt nuts 8, and the brackets 6 to the marginal portion 1, 2, of the casing which is itself fastened by screws or bolts 12 to the ceiling 13 of an operating room, or to any suitable overhead support arranged above an operating table 14. The fastening bolts 12 may pass through holes 15 made in the horizontal flange of an angle-iron ring 16, fastened to the casing wall 1 of the illuminator. When the bolt nuts 4 are removed, the bottom casing plate 3 may be lowered from the fixed pendent bolts 5, to give full access to the light sources 11, and a coaxing plurality of optical condensers 17, which are secured to the detachable bottom casing plate 3 in proper focal relation with the lamps. In radial focal alignment with each coaxing lamp 11 and condenser 17 there is held to the casing wall 1 an optical objective 18 outside of which is supported an adjustable mirror reflector 19 hung by a horizontal pivot shaft 20 to brackets 21, fixed to the wall 1. The bottom casing plate 3 has a central opening 22 over which is openably or detachably held a transparent or translucent plate 23, through which the diverging light beam or beams from the overhead reflector 10 may pass downward upon the operative field or area to be illuminated, and encompassed by the line 24, shown in Fig. 1 of the drawings. After opening or removing the plate 23, free access may be had through the casing opening 22, to the lamps 11 for readjusting or renewing them without removing the casing plate 3, and when this plate is removed full access is given to all of the lamps 11, or other grouped light sources, and the co-

acting condensing lens systems 17 which are carried by the plate, and without disturbing the fixed casing parts 1, 2, and the optical elements 10, 18, 19 attached thereto.

5 The central reflector 10, may or may not be used, but its use provides the two desirable central diverging intense light beams indicated by the two differently directed series of cross-hatched dotted lines in Fig. 10 1 of the drawings, and which two central beams together cover the entire area of illumination within the line 24. This same area is covered by the diverging and convergent light beams passing downward from all of 15 the reflectors 19 and which are directed from different points around the circle of peripheral reflectors, and consequently the area within the line 24, and which may be the field of operation of a surgeon upon a patient on the table 14, is most brilliantly 20 illuminated and no disturbing shadows of the surgeon's hands or implements will be cast upon the operative field since any shadows will be dissolved immediately by remaining unobstructed light beams from 25 most of the light sources of the illuminator. The light sources being at some distance from the operative field the temperature of the parts operated upon will not be unduly 30 raised. As the entire illumination and optical systems, except the peripheral reflector 19, are placed within the casing 1, 2, 3, which is practically dust and fluid proof, there is little chance for accumulation 35 on the illuminator of dust and dirt which might fall therefrom upon the operative field and infect the patient, and the entire exterior parts or surfaces of the illuminator may quickly and easily be washed 40 or sprayed with water or any suitable anti-septic fluid.

The aforesaid description makes it apparent that this invention comprehends the use of a plurality of light sources grouped 45 together, light collecting and projecting means for each light source arranged outside of the latter, and a corresponding plurality of deflectors arranged outside the light projecting means and in the path of 50 the light beam from each light projecting means and bending all the light beams convergently and merging them together upon a common area to be illuminated. In the preferred arrangement of parts, the grouped 55 light sources or lamps are spaced equidistantly and are located directly above the area to be illuminated, and the light beams between the lamps and the coating condensing lenses converge laterally and the 60 light beams between the lens systems and the coating reflectors diverge laterally, and the reflectors are located laterally beyond the area to be illuminated and throw laterally directed converging inwardly and downwardly 65 directed divergent light beams upon the

common illuminated area, and the central reflector if used is located directly above this illuminated area and deflects a light beam or beams directly downward thereupon.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is:

1. In an illuminator, the combination 70 with a plurality of light sources grouped around a central area, light collecting and projecting means for each light source arranged outside of the latter, a corresponding plurality of light deflecting elements 75 arranged outside of the light projecting means and in the path of the light beam, from each light projecting means and bending said light beams convergently and merging them together upon a common area to 80 be illuminated, and means arranged at said central area bending the light beams directed inward and upward from all the light sources and deflecting them upon the common illuminated area.

2. In an illuminator, the combination 90 with a plurality of light sources spaced around a central area, of a plurality of condensing lens systems arranged outside of the light sources, there being one lens system for each light source, an objective alined 95 with each of the condensing lens systems and projecting the light received from it outwardly, a reflector placed in the path of each of the projected light beams and deflecting its respective beam inwardly and 100 downwardly, the several beams converging from the different reflectors upon a single area to be illuminated, and a reflector arranged at said central area bending the light beams directed from all the light sources 105 upon the same single illuminated area.

3. In an illuminator, the combination 110 with a plurality of light sources grouped around a central area, of a projecting lens system arranged outside of each light source, said lenses projecting their collected light rays radially in divergent beams, reflectors placed in the several paths of light and deflecting said divergent beams upon a common field, and a reflector arranged in said 115 central area and deflecting light rays therein from the several light sources divergently over the illuminated area.

4. In an illuminator, the combination 120 with a casing comprising a marginal portion and a detachable bottom portion, of a plurality of light sources and coacting condensing lens systems secured to said bottom within the casing, means securing the marginal and bottom portions of the casing 125 together, a plurality of objectives held by the marginal part of the casing and coacting with the respective condensing lenses, and a plurality of reflectors supported on the outside of the marginal wall of the cas- 130

ing, one reflector coating with each condensing lens system and the corresponding objective, said reflectors deflecting the light beams from all the coating lens systems upon a single area to be illuminated.

5 In an illuminator, the combination with a casing comprising a marginal portion and a detachable bottom portion, of a plurality of light sources and coating condensing lens systems secured to said casing bottom within the casing, said bottom having an opening closed by a removable transparent plate, means securing the marginal and bottom portions of the casing together, a plurality of objectives held to the marginal part of the casing and coating with

the respective condensing lenses, a plurality of reflectors supported by the marginal wall of the casing outside of the latter, one reflector coating with each condensing lens system and the corresponding objective, said reflectors deflecting the divergent beams of light from all the coating lens systems upon a single area to be illuminated, and a reflector supported by the marginal portion of the casing and located above the area encompassed by the light sources and deflecting the light converging from the several light sources divergently downward through the transparent plate on the casing bottom.

WM. L. PATTERSON.