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SURGICAL LIGHT

Filed July 23, 1932

2 Sheets-Sheet 1

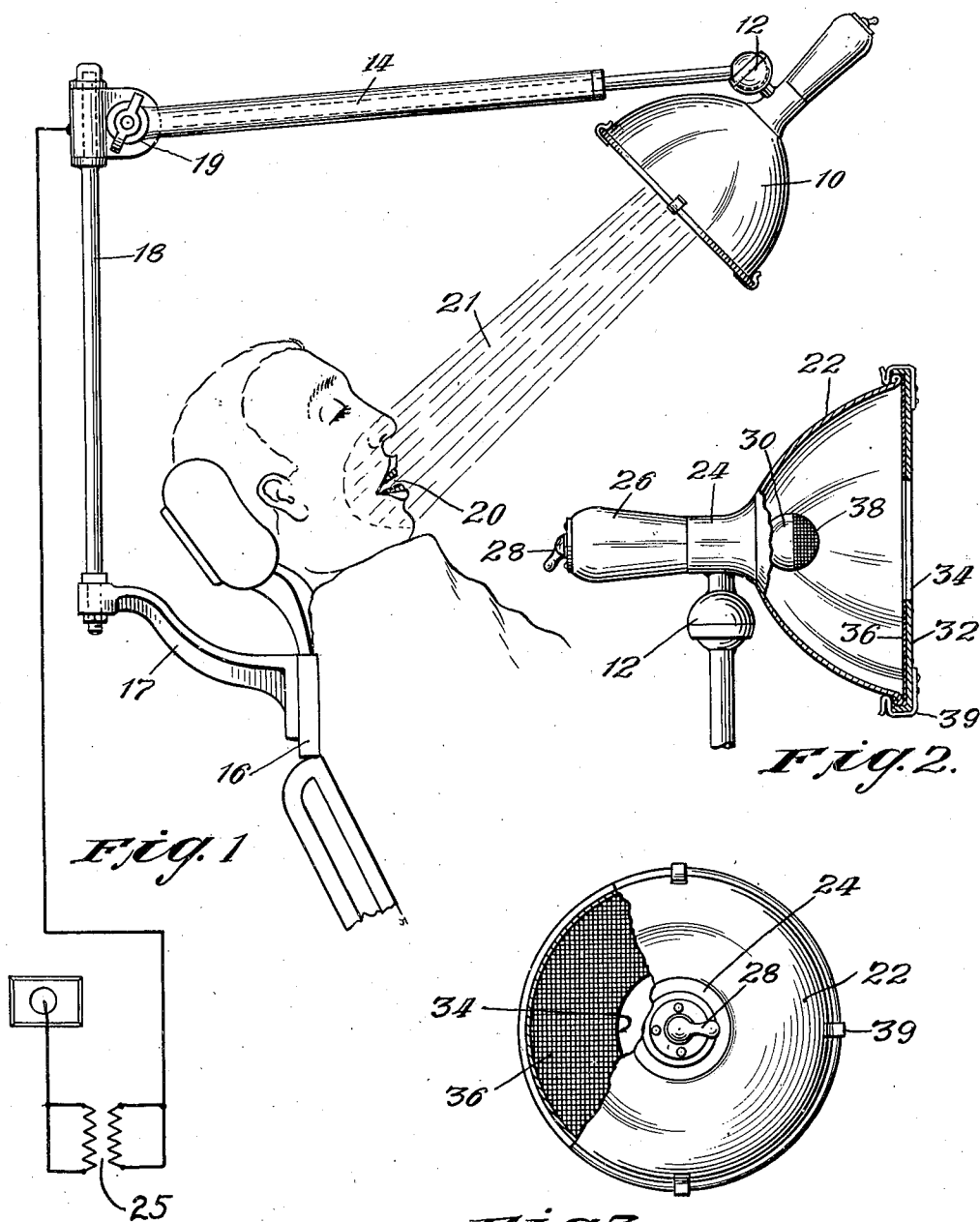


Fig. 3.

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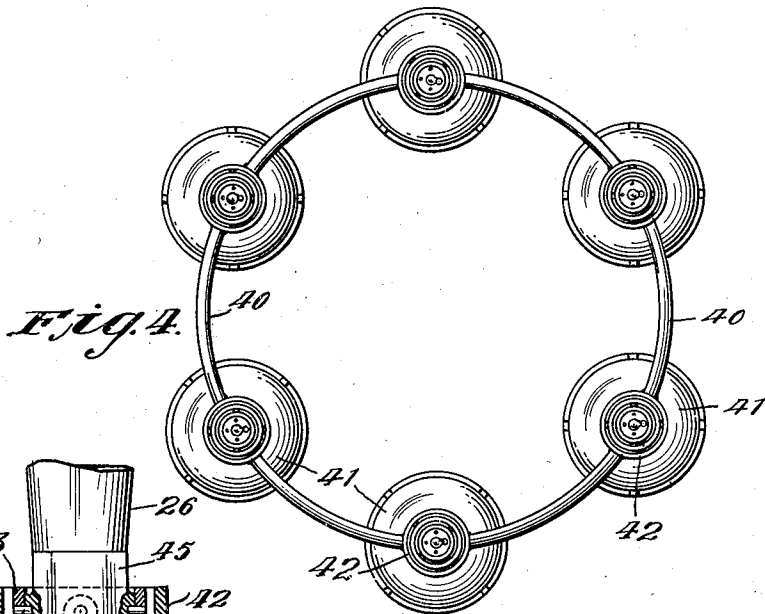
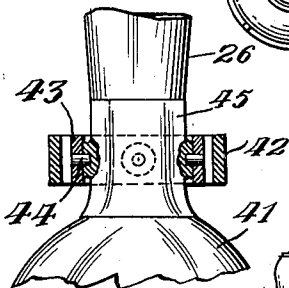
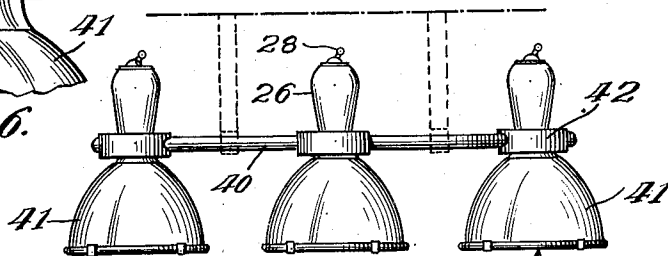
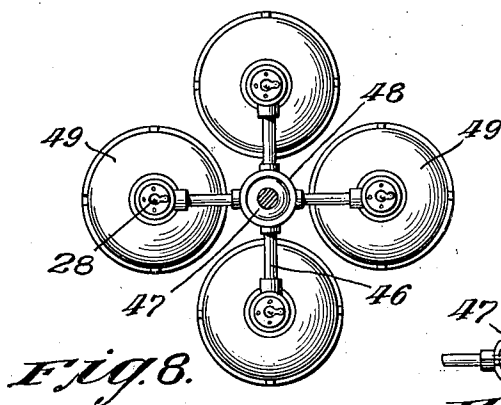
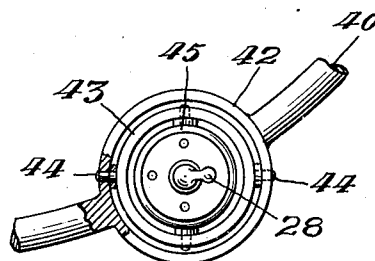
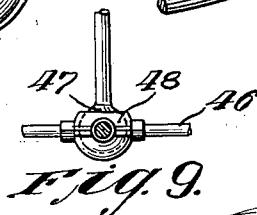
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2 Sheets-Sheet 2



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SURGICAL LIGHT

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Application July 23, 1932. Serial No. 624,240

4 Claims. (Cl. 240—41.15)

This invention relates to improvements in dental or surgical operating lights and more particularly relates to an improved form of light which is more satisfactory for operating conditions which require a concentrated light to be directed toward a particular portion of the patient's anatomy, or for example into the patient's mouth, without causing a glare in the patient's eyes, or without undue reflection into the eyes of the surgeon.

It is one of the principal objects of this invention to provide a high power concentrated beam light with the concentrated light type of bulb for use in connection with a dentist's chair or surgeon's operating table, which light is particularly adapted to direct high candle power rays into the patient's mouth without glare from other parts of the light reaching the patient's eyes.

It is another object of this invention to provide a light for dental and similar operating conditions which is particularly provided with a small sized illuminating source and suitable reflector for concentrating the direct rays over a very small area.

Another object of this invention is to provide an improved supporting bracket for supporting in universally adjustable relation, a high power reflecting light for operating purposes in which the light is adapted to project a concentrated beam of light to a desired point, and which is provided with a suitable reflector to absorb and control all light exclusive of the high power beam whereby extremely accurate focus of the light can be provided without glare or illumination of parts undesirably illuminated.

A further object of the invention is to provide a universal bracket support for mounting a multiple bank of concentrated beam spot lights, each of which is substantially universally and independently mounted to facilitate either highly concentrated or slightly more general illumination without setting up either cross shadows or glare as is more particularly required for surgical and dental operating conditions.

Further objects and advantages of the invention will appear from the following description thereof taken in connection with the attached drawings which illustrate preferred forms of embodiment of the device and in which:

Figure 1 is a side view showing the operation of a light secured to a dentist's or similar chair;

Figure 2 is a side elevation of the light shown in Figure 1 with parts broken away to show the internal construction;

Figure 3 is a rear plan view of the light shown

in Figure 2 with a part of the reflector broken away to show the interior of the glare shield;

Figure 4 is a top plan view of a modified form of securing bracket for multiple lights;

Figure 5 is a side elevation of the securing bracket and light shown in Figure 4 with the supporting members in dotted outline;

Figure 6 is a detail elevational view partly broken away showing the construction of the universal bracket;

Figure 7 is a top plan view partly broken away further illustrating the universal form of bracket used in Figures 4 to 6 inclusive;

Figure 8 is a modified form of bracket for securing a cluster of lights, and

Figure 9 is a detail of the ball and socket joint used in mounting the cluster shown in Figure 8.

As more clearly shown in Figure 1, the preferred form of light 10 is provided with a ball and socket joint 12 by which it may be secured to the telescoping rod 14. This rod 14 may in turn be adjustably secured to the dentist's chair 16 by means of any suitable bracket 17, standard 18 and adjustable bracket 19. The light 10 may equally as well be supported from any other bracket, from the wall, or from the floor for example, or as desired. The arrangement of support however, is such that the front of the light 10 may be directly focused toward the patient's mouth 20, so that the light beam 21 from the light 10 may be directed more particularly into the patient's mouth or to some limited area on which the operation is to be performed.

The light 10 in general may suitably be provided with the reflector 22 which is secured to the neck or body 24 which has the ball and socket joint 12 or other fixture by which the light is mounted to its support. A handle 26 is preferably provided to facilitate adjustment of, as well as give balance to the light and a hand operated toggle switch 28 may be located in the handle to control the source of current.

The reflector 22 is preferably of parabolic form and may be demountably secured to the neck or body 24 and an adjustable focus of the light source with reference to the reflector may be provided or the light source may be fixed in its focus position.

Projecting into the reflector, is a suitable socket (not shown) for receiving a small sized high candle power low voltage light bulb 30, of the type ordinarily having a small filament for search light use. The use of the low voltage type of bulb is quite important inasmuch as the small filament provides a nearly point source of illumina-

tion, although giving a powerful light. It is not usually possible with the 110 volt or higher voltage bulbs to provide a small light source approaching a point as is true of the six or twelve volt automobile or searchlight type bulbs and the higher voltage bulbs have not been perfected for search light use. This bulb may be energized by the use of a suitable transformer or resistance element 25 from the commercial source of 110 volt or higher electricity, the transformer or resistance element stepping the voltage down to the capacity of the filament of the bulb 30.

The light 10 is therefore in the nature of a high powered spotlight and will throw a very concentrated beam 21 from the reflector. It has been found however, that there is sufficient stray light from the reflector to cause glare in the patient's eyes unless provision is made for its elimination. I therefore provide a glare shield 32 having a central opening or transparent part 34, through which the light rays may pass, and a substantial surrounding opaque border 36, the interior of which is painted a dull black for the purpose of absorbing and preventing the emanation of light rays. For most purposes, the central part 34 may be left open, although a continuous cover over the entire light could be fitted with a clear or translucent glass center portion equally as well.

The bulb 30 is also covered on substantially its outer hemisphere 38, as for example with black paint or otherwise so that direct rays from the bulb will not escape and cause glare as these rays would otherwise be normally uncontrolled in the sense that they are not reflected. The glare shield 32 will therefore direct a concentrated pencil beam only and this may be controlled to a radius of a few inches. The light can therefore be controlled to prevent any possible glare in the patient's eyes and yet very strongly illuminate the interior of the patient's mouth. The central part 34 of the shield 32 and the amount of light absorbing covering 38, on the bulb 30 have a direct relation to the size of the beam as will be clearly understood.

The glare shield 32 may be secured to the reflector 22 by any suitable means such as the clips 39 and may be made of any suitable material such as glass, metal or other material and may blend in with the color of the reflector. It should preferably not have a reflecting surface as this would permit the patient to view the operation as in a mirror which would often be disagreeable to the patient. If, the glass type of shield is used, it would preferably be of plain glass and flat rather than of a lens type and the larger part would be covered internally with the light absorbing material.

In operation, the light 10 may be placed in any suitable location, such as on the patient's chair and by the swivel supports, ball and socket joint brought into position to direct a beam of light where desired eliminating all other light. The switch in the handle may be used, as it is easily located, while the light is being adjusted. Due to the length of the handle, the light is normally balanced and special attachments on the ball and socket joint to hold the adjustment are not needed.

The concentrated beam light which is produced is of particular advantage in dental operations inasmuch as operations of this type are usually carried on with the aid of a small reflector placed in the mouth. Such a light does not have the disadvantage of causing glare in the patient's eyes and is not limited therefore by the general illumina-

tion which must be controlled within that which the eye can withstand. The remainder of the room in which the light is used may be relatively dark and the operator with positive control may use a very powerful light in a concentrated spot. The light is of relatively light weight and with a single bulb will be less expensive to operate although more effective in use than the heretofore known groups of lights.

This form of light is also very useful in connection with other operating conditions where the patient is placed on an operating table for example, and the lights may be suspended from a chain or other bracket, from the ceiling. If more than one light is desired a support 40, such as shown in Figure 4 may be used and each of the lights 41 may then be mounted in a universal joint 42 which is more clearly shown in Figure 7. In this construction an intermediate ring 43 is provided with suitable trunnions 44, one pair of diametrically opposite trunnions extending into the outer ring 42, and the other pair, also being diametrically opposed and extending into the neck or body 45 of the light.

With such a construction each light is universally adjustable with respect to each and every other light and with strong pencil light beams the light may be concentrated on a suitable point or over a suitable range as desired. As the light beams come from different points spaced around the bracket 40, it is possible to avoid any cross shadows or other interferences with the proper illumination of the object. Such lights will also preferably have the suitable glare shields 32 thereby permitting the proper control of the emanating light rays.

A still further modified form of construction is shown in Figures 8 and 9 in which a plurality of lights such as four are held in a close cluster in substantially fixed relation one to the other, but so arranged that each of the lights will focus at a single point at a fixed distance. The bracket 46 may be supported from the central ring 48 forming part of a ball and socket joint 47 and at the end of each of the cross arms 46, a separate light 49 is properly suspended. It is to be understood that the lights are focused for the illumination desired and by means of the ball and socket joint 47 the cluster of lights may be supported from any wall or ceiling bracket and as the elevation of the light can be controlled the correct focus of the lights can be maintained. Such lights are particularly suited for more general illumination than can be obtained from a single light.

Although it is to be understood that a preferred use for such a light is in connection with a dentist's chair in which high powered light is particularly desired, it is to be understood that the light may be used for other purposes requiring similar sources of illumination.

While I have shown preferred forms of embodiment of my invention I am aware that other modifications may be made thereto and I therefore desire an interpretation of my invention within the scope and spirit of the description herein and of the claims attached hereinafter.

I claim:

1. In a surgical operating light for dentists, doctors and the like and having a universally adjustable support for said light, a body portion co-operating with said support, a substantially parabolic reflector secured to said body portion and having a substantially point filament bulb, and a shield extending inwardly from the edges of the reflector leaving a central opening through which

the light rays emerge, a light absorbent material on the inside of said shield, and a light absorbent material on the outer half of said bulb, whereby the escape of direct rays of light is prevented and only reflected rays emerge through said central opening.

2. In a surgical operating light for dentists, doctors and the like having a universally adjustable support for said light, which comprises a body portion cooperating with said support, a substantially parabolic reflector demountably mounted on said body portion, and a shield extending inwardly from the edges of the reflector leaving a central opening through which the light rays emerge, a light absorbent material on the inside of said shield, a bulb having a concentrated light source mounted in said reflector, and a light absorbent material on the outer tip of said bulb, whereby the escape of direct rays of light is prevented and only reflected rays emerge through said central opening, a handle projecting rearwardly from and demountably secured to said reflector to balance said light on said support and a switch in the end of said handle.

3. A device of the character described comprising in combination a substantially parabolic reflector, a low voltage high candle power bulb having a substantially point source filament located within the reflector, a glare shield secured to the

open end of the reflector, the glare shield having an opaque marginal portion and a central transparent portion, the bulb having an opaque tip, the transparent portion of the glare shield being of relatively small diameter and defining the light beam emanating from said reflector, and a body portion secured to said reflector having integral means for holding said light in a fixed adjustable position with respect to a support whereby a concentrated beam of light may be provided as and for the purpose described.

4. An operating light of the class described comprising in combination with a support for said light, a universal adjustment for said light whereby said light may be adjusted with respect to the common support, said light having a substantially parabolic reflector, a searchlight type of low voltage high candle power bulb, and a glare shield, said glare shield having an opaque portion and a transparent portion, the opaque portion of said glare shield having a light absorbent material thereon, said transparent portion limiting and defining the size of the light beam, said bulb having a light absorbing covering corresponding to and adjacent the transparent portion of said glare shield, whereby direct rays from said light source are absorbed.

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