June 19, 1934. A. F. PIEPER 1,963,279

OPERATING LAMP

Filed March 17, 1933 2 Sheets-Sheet 1

Fig. 1

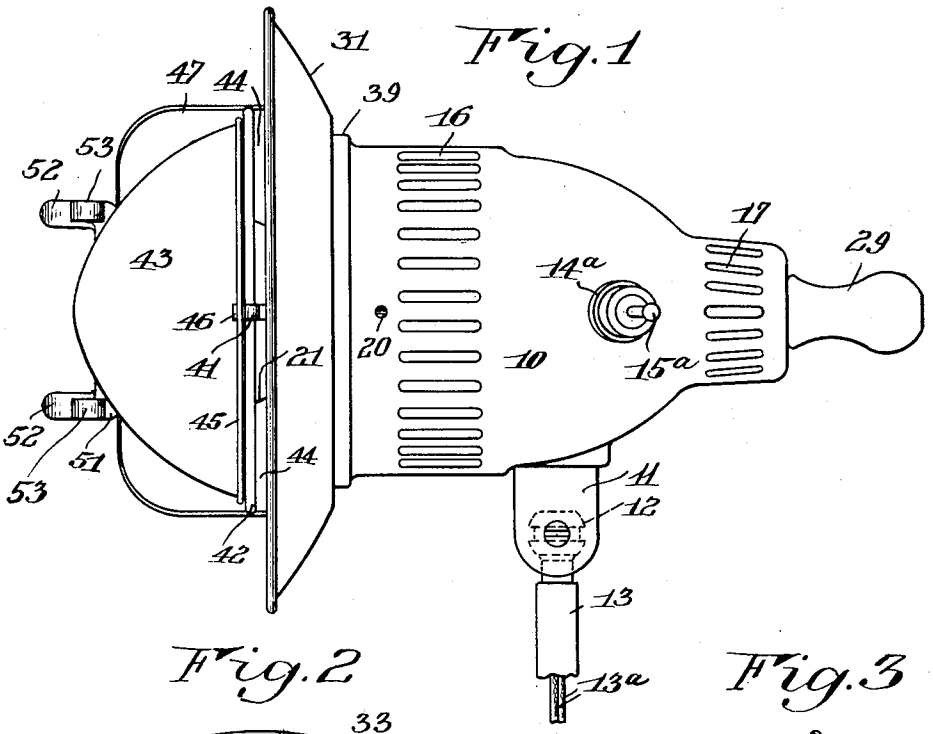


Fig. 2

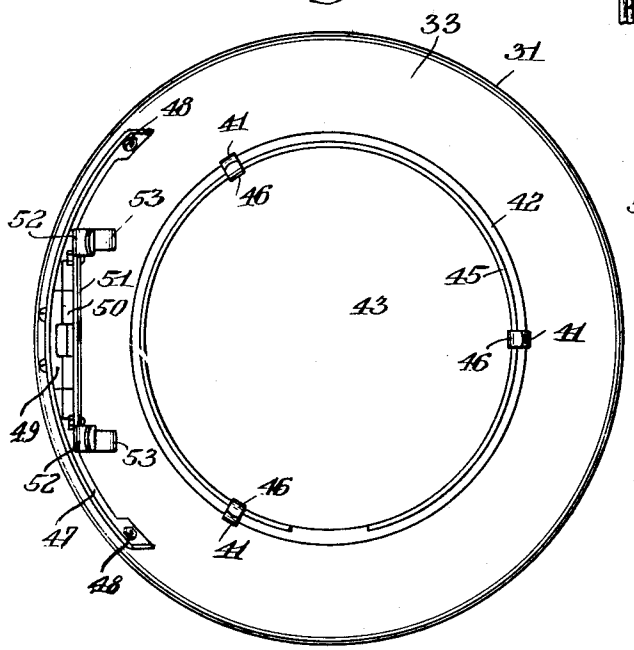
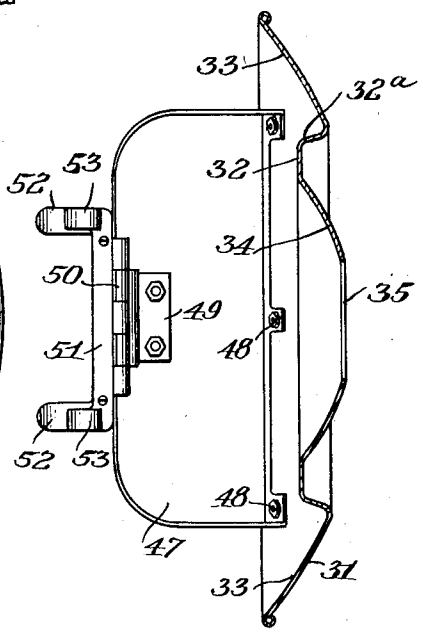


Fig. 3



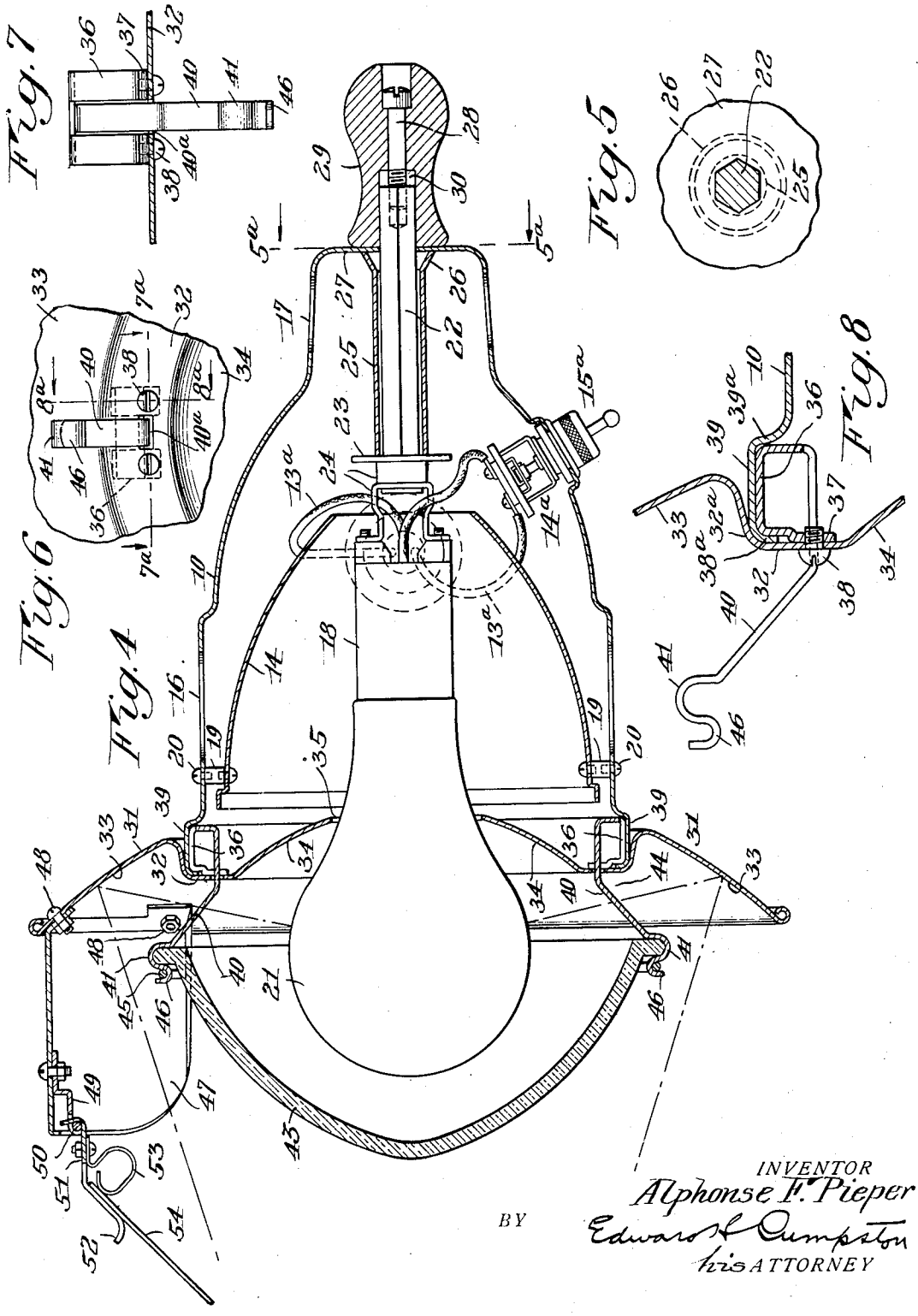
INVENTOR
Alphonse F. Pieper

BY Edward H. Crumpton
his ATTORNEY

June 19, 1934. A. F. PIEPER 1,963,279

OPERATING LAMP

Filed March 17, 1933 2 Sheets-Sheet 2



INVENTOR
Alphonse F. Pieper
BY Edward L. Cumpston
his ATTORNEY

Patented June 19, 1934

1,963,279

UNITED STATES PATENT OFFICE

1,963,279

OPERATING LAMP

Alphonse F. Pieper, Rochester, N. Y.

Application March 17, 1933, Serial No. 661,301

20 Claims. (Cl. 240—41.15)

The present invention relates to light projecting apparatus such, for example, as that employed in the performance of dental or surgical work and has for its object to provide an improved operating lamp designed to effectively illuminate the parts to be treated or operated upon and constructed in a manner whereby it can be conveniently adjusted to different operating positions with respect to the patient.

A further object of the invention is to provide improved means by which to control and effectively increase the extent or degree of illumination in lamps of this class without increasing the cost of operating the same.

A further object of the invention is to provide an improved operating lamp designed to illuminate the various parts or objects to be inspected, treated, or operated upon, and one which is particularly useful in the practice of dentistry where it is desired to illuminate the oral cavity during treatment of the teeth or in the performance of surgical operations and which is designed to focus the light on the work with a high degree of efficiency.

A further object of the invention is to provide in a dental or surgical operating lamp a combined reflector and light transmitting element, the reflector being arranged to receive certain of the rays of the light source and adapted to project them in advance of the light transmitting element outside and independently thereof or without passage therethrough.

A further object of the invention is to provide in combination with a light projecting lamp for use in the performance of dental, surgical, or other kinds of work, a combined reflector and light control element, such for example as an eye shield for protecting the patient and the operator from the glare of the light.

A further object of the invention is to provide a lamp having an adjustable element thereon provided with means adapted to support different objects or articles for illumination by the lamp such, for example, as a data sheet, or a film or translucent element containing an image of the part to be treated in order that it may be readily inspected and viewed by the operator.

A further object of the invention is to provide in a lamp of the class described, a casing or other suitable supporting means for the light source having a reflector adjustable thereon, as for example by rotation, and adapted to support light control means or other serviceable parts or devices which it may be desired to use with the lamp.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a view in elevation of a lamp embodying one form of the invention;

Fig. 2 is a front elevation of the same;

Fig. 3 is a sectional view illustrating the reflector, the eye shield thereon and the means for supporting the data sheets to be illuminated by the lamp;

Fig. 4 is a sectional elevation taken longitudinally of the lamp and drawn to an enlarged scale;

Fig. 5 is a fragmentary section taken on line 5^a—5^a of Fig. 4;

Fig. 6 is a fragmentary view looking at the front of the reflector and showing one of the parts projecting therethrough for supporting the light control or transmitting element;

Fig. 7 is a sectional view taken on line 7^a—7^a of Fig. 6, and

Fig. 8 is a sectional elevation taken on line 8^a—8^a of Fig. 6.

The same reference numerals throughout the several views indicate the same parts.

Referring to the drawings, suitable supporting means for the light source is provided which is preferably in the form of a housing or casing 10 having a tubular supporting element 11 at the outer end of which is a ball and socket joint, the socket being formed in the tubular element and receiving the ball portion 12 of the joint which is formed on the end of the tubular support 13 thus permitting the lamp to have universal movement to facilitate proper adjustment of the same to different service positions. The support is adapted to be carried by suitable means, not shown, such, for example, as the counterbalance mechanism shown in my pending application, Serial No. 645,079, filed November 30, 1933, in which the lamp is mounted for movement vertically and horizontally to any desired position with respect to the patient.

Mounted within the housing 10 is an open ended lamp socket receiving member 14 which is spaced from the wall of the housing to afford an annular air circulating passage 15. Circulation of the air through the passage 15 is insured by providing the openings 16 and 17 in the front and rear ends of the housing wall. By circulating air through said passage, the housing 10, the member 14 therein, and the lamp

socket 18 are prevented from becoming heated to any great extent. The member 14 also serves to prevent the escape of light from the housing through the openings 16 in the latter, said member being held within the housing by the parts 19 which are connected with the housing by means of the screws 20.

The lamp 21 is screwed into the socket 18 which is carried by a bolt or rod 22 having a head 23 between which and the socket is a suitable connection 24. The bolt extends through a sleeve 25, the outer end of which is flared at 26 and seated upon the inner face of the end wall 27 of the housing 10. The bolt or that part thereof which extends through the wall 27 is preferably made polygonal in cross section and the opening in said wall through which the bolt extends is correspondingly shaped whereby the bolt is held against turning when the clamping screw 28 is screwed into position to secure the lamp operating handle 29 upon the rear wall of the housing, the handle being recessed at 30 to receive the outer end of the bolt as shown in Fig. 4. It will be understood that in tightening up the screw 28 that the head 23 of the bolt will be urged into engagement with the sleeve 25 which is thus clamped upon the housing wall 27 whereby the lamp and lamp socket are rigidly held in position within the housing.

By means of the handle 29, the operator can readily swing the lamp to various angular positions upon the support 13 whereby to adjust it to the different desired positions with respect to the patient.

The circuit wires 13*a* for supplying current to the lamp are preferably carried through the tubular support 13 and through the supporting element 11 thereon from which they are extended for connection with the lamp socket and with a switch indicated generally at 14*a* for controlling the lamp circuit and having an operating portion 15*a* for opening and closing the switch.

The light projecting or reflecting means which also carries the light control means for protecting the patient's eyes from the glare of the light and the holding means for the data sheet as well, is mounted on the housing 10 for rotation about the longitudinal axis thereof as a unit, as best illustrated in Fig. 4. This means comprises a rotary supporting and light reflecting element 31 which is generally of dish-shaped construction and which has an annular and inwardly extending wall portion 32 intermediate its outer and inner light reflecting surfaces 33 and 34. The central portion of the reflector is provided with an opening 35 through which the lamp 21 extends as shown in Fig. 4.

The annular wall portion 32 of the light reflecting element is provided at its rear side with a plurality of supporting devices 36 having parts 37 thereon which are connected with the reflector by means of the screws 38. The supporting devices are disposed within a channel-shaped guideway 39 formed on the front end of the housing 10 and are prevented from moving longitudinally of the housing by the side portions 38*a* and 39*a* of the channel between which the supporting devices are free to rotate around the axis of the housing to permit the reflector element to be rotated for a purpose described hereinafter.

The portion 38*a* of the lamp casing forms a seat for the curved portion 32*a* of the reflector element 31 whereby a closed joint is afforded between the reflector and the lamp casing, the portion 38*a* of the latter forming a bearing for the reflector which serves to support and steady the reflector in its different positions of adjustment.

The supporting devices are provided with spring-like arms 40 which extend forwardly of the reflector through suitable openings 40*a* in the wall thereof, preferably formed in the annular wall portion 32 of the reflector. The ends of the arms are curved at 41 to receive the bead-like portion 42 of a light transmitting or control element 43 of any suitable or preferred type. Thus an opening 44 is provided between the reflector element and the light control element for the direct passage of certain of the rays of the lamp to the surface 33 of the reflector element for projection thereby outside and independently of the light control element without passage therethrough whereby to more effectively illuminate the parts to be treated or operated upon. In other words, the non-intercepted light rays are those projected forwardly of the lamp by the reflecting surface 33 independently of the light transmitting or control element 43. The reflecting surface 33 is preferably so arranged as to cause the rays projected thereby to converge on the longitudinal axis of the lamp at a point well in advance of the light source so that the lamp when being used may be supported at a suitable distance from the patient out of the way of the operator in order that he may conveniently perform the required treatments or operations.

In order to prevent accidental displacement of the spring-like arms 40 for supporting the light control element said arms are held in position upon the light transmitting element by means of a split ring 45 which engages the several arms within the U-shaped ends 46 thereof, as shown in Fig. 4. The ring is, of course, detachable and the light transmitting or control element may also be detached by swinging the arms outwardly to disengage the same.

The light control means for protecting the eyes of the patient from the glare of the light when under treatment, comprises a shield or visor 47 extending in advance of and suitably secured upon the reflector element 31 as by means of the bolts 48. The shield may be readily moved to protecting position merely by rotating the reflector element about the longitudinal axis of the lamp, which can be done by employing the fingers to grip the peripheral portion of the reflector to rotate the same when desired which, of course, will effect rotation of the light transmitting or control element 43 carried in advance of the reflector by the arms 40 of the supporting devices 36.

Means is provided upon the light controlling shield for supporting the data sheet or other image bearing objects at a suitable point in front of the light source for illumination thereby. This means preferably comprises a support 49 suitably connected with the shield and having hinged thereon at 50 a holder 51 provided with extended finger-like portions 52 with which are associated the spring clips 53 between which and the finger-like portions are inserted the data sheets 54 as shown in Fig. 4. The data sheets when thus supported by the clips are illuminated by the lamp and serve as a guide to the dentist or surgeon in determining the condition and the particular location of the part to be treated or operated upon. It will be understood that the

data sheets can be adjusted to different angular positions with respect to the lamp by adjusting the holder 51 upon the light controlling shield and that they may be supported in position to be illuminated by the lamp rays at the same time that the lamp is being used to project the light into the oral cavity or to illuminate other parts requiring examination or treatment.

It will be understood that the control element 43, which is preferably of the light transmitting type, may be shaped or constructed in any desired manner to operate either as a light focusing and projecting means or as means for diffusing the light or for varying the intensity of the same, depending on the nature of the work.

It will be further understood that by providing the opening 44 between the reflector element 31 and the light control element 43 to permit of the passage of the light rays to the reflecting surface 33, that a flood-like effect is produced whereby the degree of illumination is increased.

The reflector is preferably designed to cause the rays reflected thereby to converge on the longitudinal axis of the lamp in order that the light may be better concentrated within the oral cavity or on the part to be treated or operated upon.

While it is preferred to mount the data sheet holder directly on the light controlling shield 47 it will be understood that it may, if preferred, be connected with the reflector element 31 independently of the shield.

I claim:

1. An operating lamp, comprising a casing, a light transmitting element connected with and supported in advance of the casing, means connected with the casing for supporting a light source in rear of the light transmitting element, a reflector element spaced from the light transmitting element and having a reflecting surface adapted to receive light rays from said light source and to project them forwardly of the casing in advance of the light reflecting element and independently thereof, and light control means secured upon the reflector element, and extending in advance of the reflector and in spaced relation to the light transmitting element.

2. An operating lamp, comprising a casing, a light transmitting element connected with and supported in advance of the casing, means connected with the casing for supporting a light source in rear of the light transmitting element, a reflector element spaced from the light transmitting element and having a reflecting surface adapted to receive light rays from said light source and to project them forwardly of the casing in advance of the light reflecting element outside and independently thereof, and means connected with and extending in advance of the reflector element adapted to support a data sheet in position to be illuminated by the light rays emanating from said light source.

3. An operating lamp, comprising a casing, a light transmitting element connected with and supported in advance of the casing, means connected with the casing for supporting a light source in rear of the light transmitting element, a reflector element spaced from the light transmitting element and having a reflecting surface adapted to receive light rays from said light source and to project them forwardly of the casing in advance of the light reflecting element and independently thereof, a visor connected with the reflector element and extending in advance thereof in spaced relation to the light transmitting element, and supporting means for a data sheet secured upon the visor adapted to hold the sheet in position to be illuminated by the light rays emanating from said light source.

4. An operating lamp, comprising means for supporting a light source having an annular bearing thereon, a light transmitting element in advance of said bearing, a reflector rotatably seated on said bearing in rear of said light transmitting element, the reflector being adapted to receive the rays from said light source and to project them forwardly of the light transmitting element and independently thereof, and light control means secured upon the reflector extending in advance thereof and rotatable therewith.

5. An operating lamp, comprising means for supporting a light source having thereon an annular bearing, a light transmitting element in advance of said bearing, a reflector rotatably seated on said bearing in rear of said light transmitting element, the reflector being adapted to receive the rays from said light source and to project them forwardly of the light transmitting element and independently thereof, light control means secured upon the reflector and rotatable therewith, and supporting means for the light transmitting element rotatable with the reflector.

6. An operating lamp, comprising a casing adapted to support a light source, a reflector movable upon the casing adapted for projecting the light rays in advance thereof, an eye shield extending forwardly of the reflector movable therewith and relative to the light source, and a holder on the eye shield movable relative thereto adapted to support a data sheet for illumination by the light source.

7. An operating lamp, comprising a casing adapted to support a light source, a reflector element for reflecting the light rays in advance of the casing rotatable upon the casing around the axis of the projected beam, light control means on the reflector element rotatable therewith, and a data sheet holder adjustable upon the light control means toward and from the light source whereby illumination of the sheet is afforded.

8. An operating lamp, comprising a casing adapted to support a light source, a reflector element for reflecting the light rays in advance of the casing rotatable upon the casing around the axis of the projected beam, and a holder for a data sheet connected with the reflector element for rotation therewith and movement relative thereto adapted to support the sheet in spaced relation to the reflector and in position to be illuminated by the light source.

9. An operating lamp, comprising a casing adapted to support a light source, said casing having an annular guideway formed thereon, a reflector adjacent one end of the casing for projecting the light rays in advance thereof, means within the casing arranged to travel upon said annular guideway adapted to support the reflector for rotation to different positions, and a data sheet holder connected with and movable relative to the reflector for supporting the sheet at different angular positions relative to the light source.

10. An operating lamp, comprising means for supporting a light source having a channel shaped guideway formed thereon and provided with an annular bearing adjacent the guideway, a reflector rotatably seated upon said bearing adapted to receive and project the light rays of said light source in advance of said means, means mounted for rotation within said channel shaped guideway adapted to hold the reflector upon said bear-

ing, and light control means carried by and adapted to rotate with the reflector.

11. An operating lamp, comprising a casing having an annular guideway formed thereon, a light transmitting element spaced from said casing in advance thereof, devices rotatably seated upon said annular guideway and having forwardly extending members detachably receiving and supporting said light transmitting element, and a reflector connected with the devices in rear of the light transmitting element for rotation therewith and adapted to receive certain of the rays of the light source and to project them in advance of the light transmitting element outside and independently thereof.

12. An operating lamp, comprising a casing having an annular guideway formed thereon, a reflector element adjacent said casing having inner and outer concentrically arranged reflecting surfaces separated by an annular wall portion, devices rotatably seated upon said annular guideway and connected with said wall portion whereby the reflector is supported for rotation about the longitudinal axis of the casing, light control means secured upon and rotatable with the reflector, a light transmitting element spaced from the reflector element in front of the inner reflecting surface thereof, parts extending from said devices and supporting said light transmitting element, a lamp socket within the casing, and a lamp carried by said socket and extending between the light transmitting and reflector elements, certain of the lamp rays being received by the outer reflecting surface of the reflector element and projected thereby in advance of the light transmitting element outside and independently thereof.

13. An operating lamp, comprising a casing, a lamp socket within the casing, a rod for supporting the socket extending through the wall of the casing and provided adjacent its inner end with a shoulder, a sleeve on the rod within the casing having one end engaging the inner face of said wall and the other engaging said shoulder, an operating handle for the lamp recessed to receive the outer end of the rod and seated upon the outer face of said wall, and a screw extending within the handle and threaded within the outer end of the rod whereby the sleeve and handle are clamped upon said casing wall to rigidly support the lamp socket and lamp within the casing.

14. An operating lamp, comprising a support having an annular portion thereon, a lamp carried by the support and projecting in advance of said annular portion, a light reflector rotatably mounted upon said annular portion and having a light reflecting surface extending outwardly and laterally from said annular portion for projecting the light rays in advance of the annular portion of the support, and light control means extending from the reflector in advance thereof and rotatable therewith.

15. An operating lamp, comprising a support having an annular portion thereon, a light source carried by the support a light reflector rotatably mounted upon said annular portion and having a light reflecting surface extending outwardly and laterally from said annular portion for projecting the light rays in advance of the annular portion of the support, an eye shield on the reflector extending in advance thereof, and a light transmitting element supported in front of said light source and having its rear portion spaced from the reflector to afford an opening for the passage of the light rays to the reflector.

16. An operating lamp, comprising a support, a reflector mounted upon the support, means for supporting a light source in advance of the reflector, a light transmitting element supported in front of the light source and having its rear portion spaced from the reflector to afford an opening for the passage of the light rays to the reflector, and means extending in advance of the reflector and forming a holder for a data sheet and adapted to support the sheet in position to be illuminated by the light rays emanating from the light source.

17. An operating lamp, comprising a casing having an annular bearing formed on its wall, a reflector rotatably supported on said bearing and extending in advance of the casing, supporting means within the casing, a lamp carried by the supporting means and extending in advance of the casing, the reflector being adapted to receive the lamp rays and to project them forwardly of the casing, an eye shield connected with and extending in advance of the reflector and rotatable therewith about the axis of the lamp, and a data sheet holder secured on the eye shield adapted to support the sheet in position to be illuminated by the light rays emanating from the lamp.

18. An operating lamp, comprising a casing having an annular bearing formed on its wall, a reflector rotatably supported on said bearing and extending in advance of the casing, supporting means within the casing, a lamp carried by the supporting means and extending in advance of the casing, and means extending in advance of the reflector and forming a holder for a data sheet movable to support the sheet in relatively different positions upon the reflector.

19. An operating lamp comprising a casing adapted to support a light source, a reflector element connected with the casing and having a reflecting portion disposed exteriorly thereof and adapted for the projection of light rays emanating from the light source from the casing, and a data sheet holder connected with the reflector and movable to different positions in advance thereof in one or more of which it is adapted to support the sheet in spaced relation to the reflector and in position to be illuminated by the projected rays.

20. An operating lamp comprising a casing adapted to support a light source, a reflector element connected with the casing and having a reflecting portion adapted for the projection of light rays emanating from the light source, an eye shield secured upon and extending from the reflector, and a data sheet holder movable to different positions upon the eye shield in one of which it is adapted to support the sheet in advance of the reflector and in position to be illuminated by the light source.

ALPHONSE F. PIEPER.