

Dec. 5, 1933.

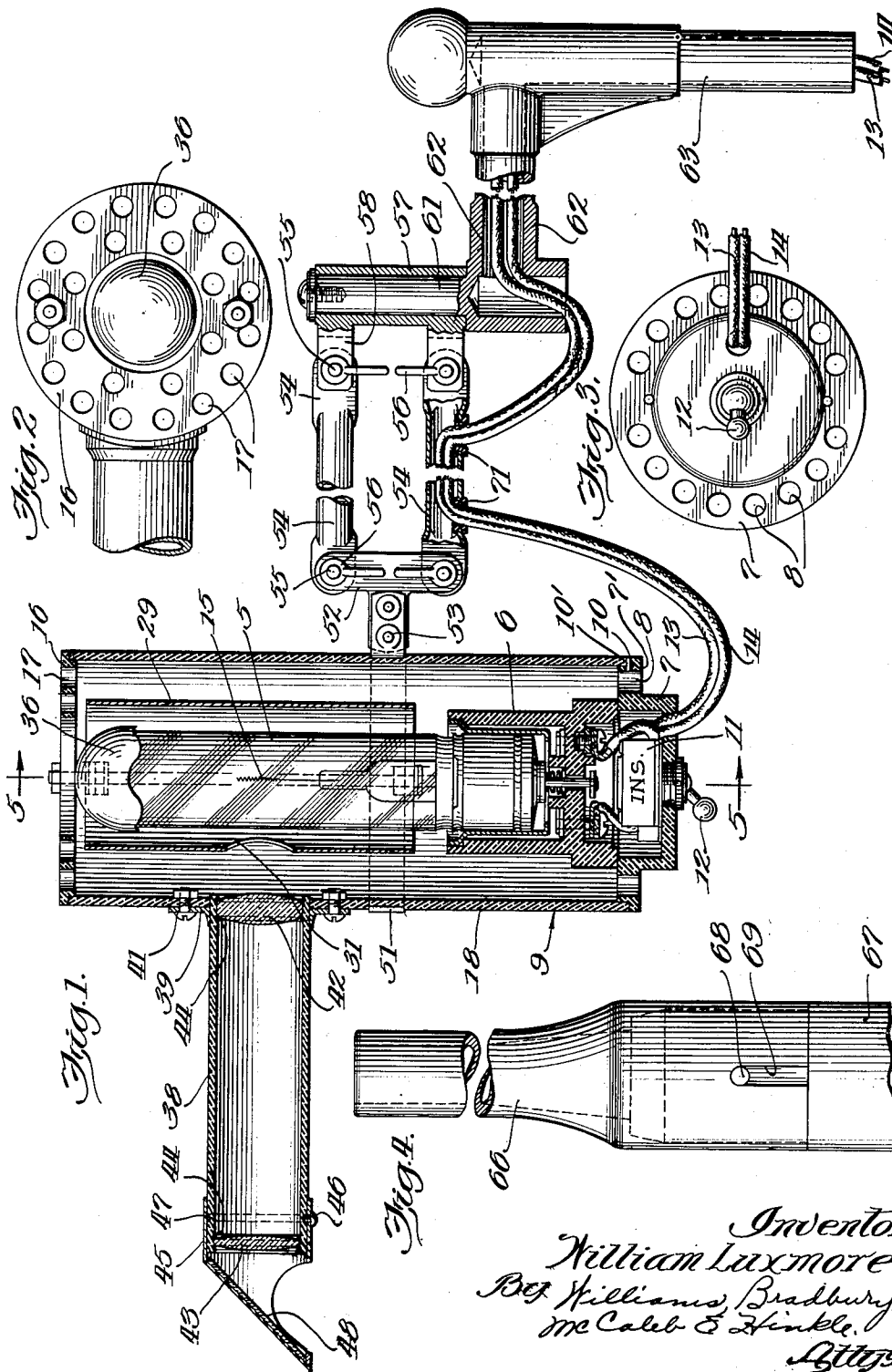
W. LUXMORE

1,937,585

OPERATING LAMP

Filed April 20, 1931

3 Sheets-Sheet 1



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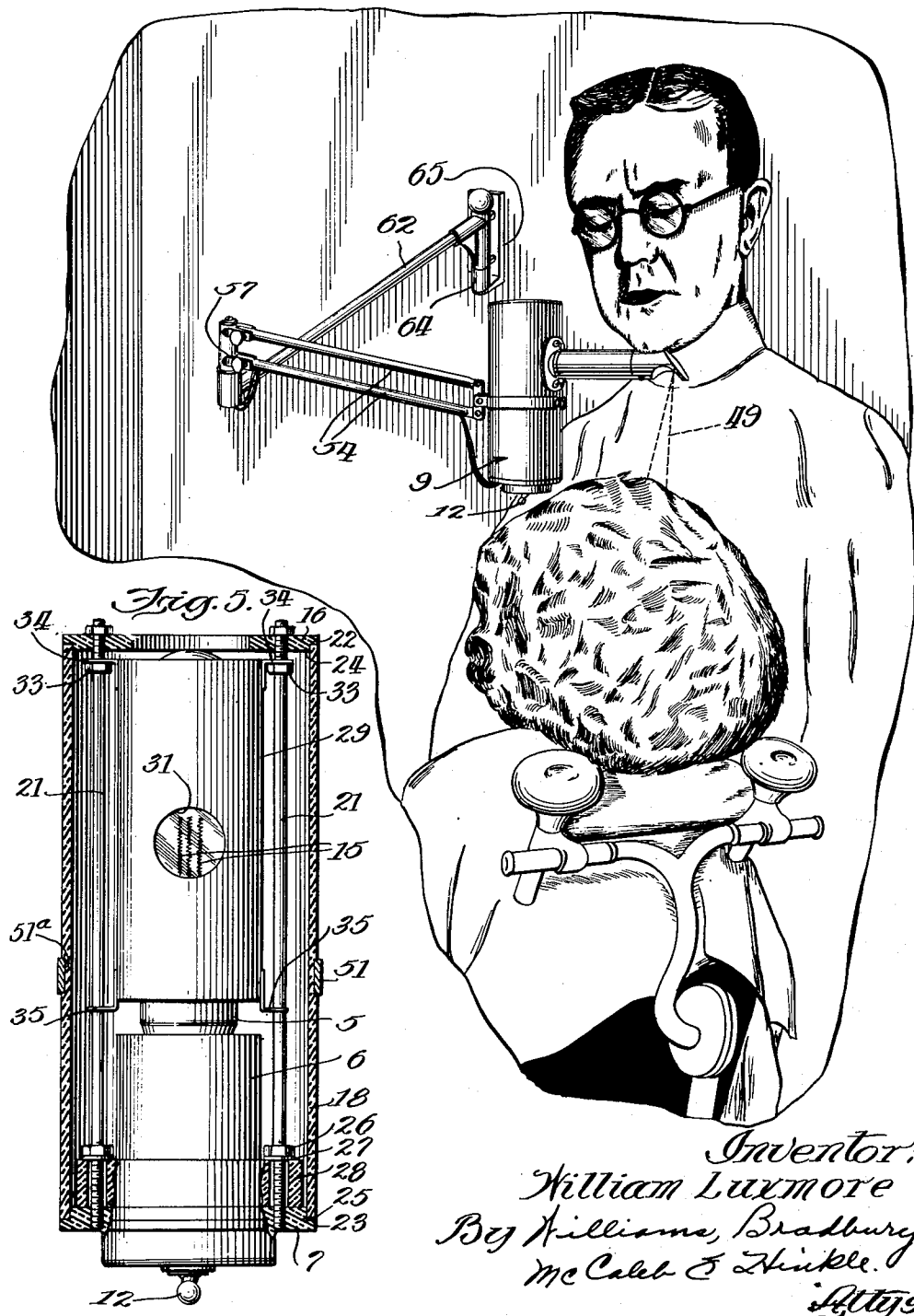
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Fig. 6.



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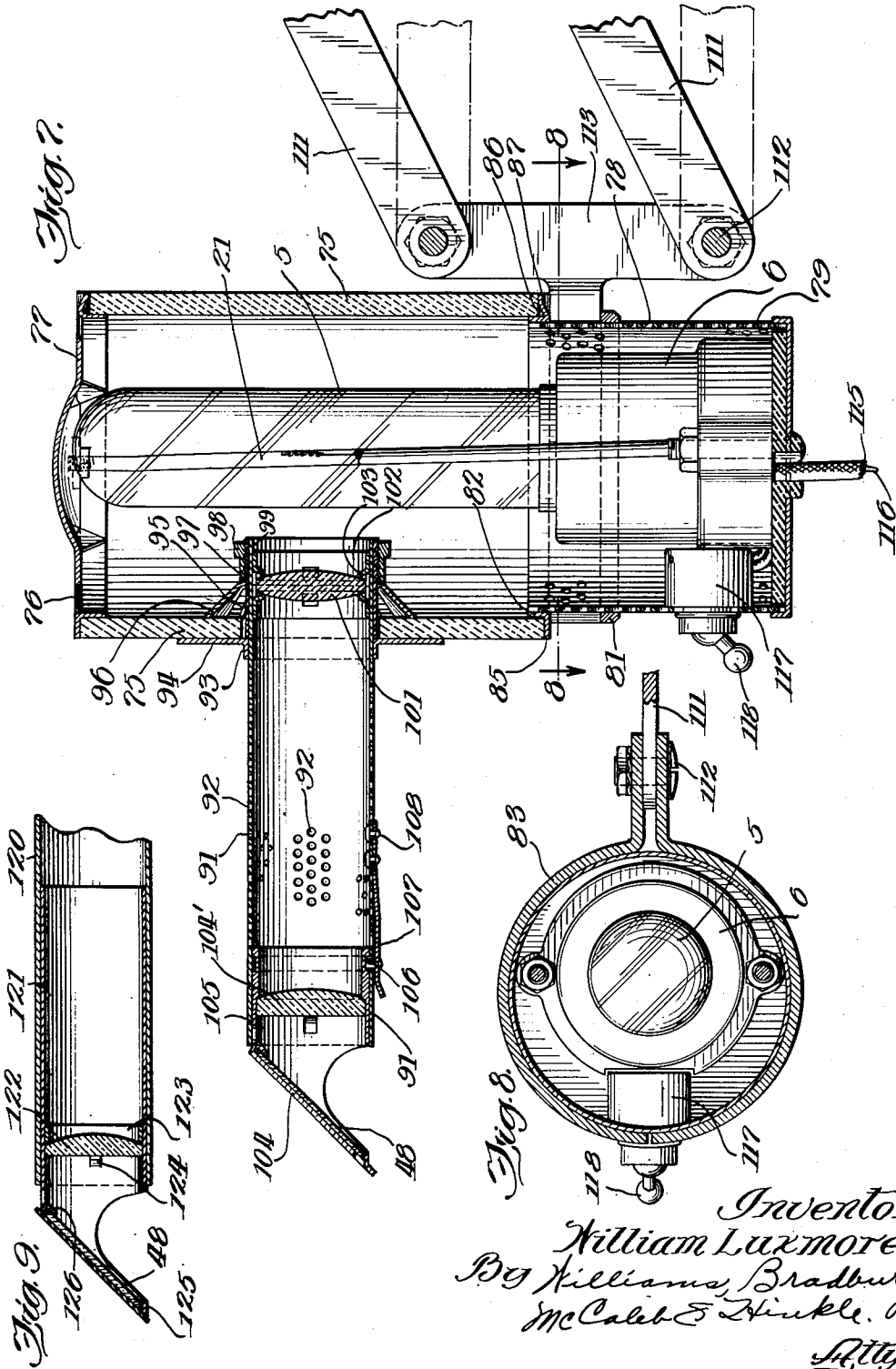
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OPERATING LAMP

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UNITED STATES PATENT OFFICE

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OPERATING LAMP

William Luxmore, Chicago, Ill.

Application April 20, 1931. Serial No. 531,299

3 Claims. (Cl. 240-1)

This invention relates to operating lamps and more particularly to light projecting lamps adapted for use by physicians, surgeons and dentists for facilitating observations of parts of the human body to be treated. It will be understood that my invention may be advantageously employed for many other analogous purposes.

An object of this invention is the provision of an improved operating lamp of the type above identified, which is adapted to direct a powerful beam of light on the part of the body being operated upon, such, for instance, as in the mouth of the patient while the teeth are being repaired.

Another object is the provision of such a device which permits substantially universal adjustment of the light beam and which device, although capable of producing a powerful light, may be employed without obstructing the line of vision of the operator.

A further object is the provision of such a lamp having means to insulate the light source in such a way that the heat of the light is shielded from the operator, and means for facilitating cooling of the instrument so that the lamp may be handled without danger of injuring the operator or the patient.

Lamps heretofore used have been equipped with small bulbs which do not produce adequate light and which, because of their manner of mounting, are in the way of the operator. By using a larger bulb in the lamps of the prior art, the lamps, because of their increased size obstruct the view of the operator, and they are also too hot to position close enough to the patient to be effective. My improved light producing device overcomes these objections and produces a very powerful, accurately directed beam of light. This device may be placed close to the patient without exposing the patient to excessive heat and it may be employed in the most advantageous positions without obstructing the view of the operator.

In the accompanying drawings illustrating my invention,

Fig. 1 is a vertical section through the instrument and portions of the supporting bracket showing other portions of the bracket in elevation;

Fig. 2 is a top plan of the housing or casing in which the source of light is mounted;

Fig. 3 is a bottom plan of the casing shown in Fig. 2;

Fig. 4 is an elevation of an adapter by which the

supporting arm may be mounted on a stand or chair post;

Fig. 5 is a vertical section taken on the line 5-5 of Fig. 1 and showing portions thereof in elevation;

Fig. 6 is a perspective view of my improved light projecting instrument illustrating one mode of its application;

Fig. 7 is a vertical section through a modified form of my invention;

Fig. 8 is a horizontal section taken on the line 8-8 of Fig. 7 and showing the light bulb in plan; and

Fig. 9 is a fragmentary sectional view of a modified form of projecting tube.

In the preferred form of my invention illustrated in Fig. 1, I have shown a source of light consisting of a projection bulb 5 which is mounted in a prefocusing socket 6 of any satisfactory commercial type. The socket 6 is mounted on a bottom plate 7 which is provided with a plurality of ventilating openings 8 through which air may enter the housing or casing, designated as a whole by numeral 9, for the purpose of cooling the housing. On the base plate 7 is also mounted a suitable type of switch 11 operable by the handle 12 for opening and closing a circuit through the conductors 13 and 14 and through the filaments 15 in the bulb 5. The top plate 16 for the housing 9 is also provided with a plurality of ventilating openings 17 through which heated air may pass from the housing. The lateral wall 18 of the housing 9 is substantially cylindrical in form and preferably consists of phenol condensation products commonly known as bakelite. This cylindrical portion 18 is held in position by clamping bolts 21 which pass through the top plate 16 and have threaded engagement with the bottom plate 7 as shown in Fig. 5. The top and bottom plates have portions cut away about their periphery providing recesses 22 and 23 into which the cylindrical portion 18 is adapted to fit and corresponding shoulders 24 and 25 for holding the portion 18 against lateral movement relative to the top and bottom plates. To accurately determine the correct relative positions of the base 7 and the cylindrical portion 18, I have provided grooves 10' and 7' into which is seated a pin 10.

The prefocusing socket 6 is held in position by nuts and washers 26 and 27 which press the base portion 28 thereof into firm engagement with the base plate 7. A cylindrical light and heat shield 29 having a light opening 31 in one side thereof is preferably formed of aluminum or similar material and is mounted in spaced relation to the bulb

5 and the casing 9 by means of the clamping rods or bolts 21 which are provided with nuts 33 on which rest the laterally extending ears 34 and through which the rods 21 pass.

5 The vertical position of the shield 29 may be adjusted by adjustment of the nuts 33 on the rods 21. The lower portion of the shield 29 is also provided with laterally extending ears 35 which also engage the rods 21 for aiding in holding the shield in position. In order that an excessive amount of light may not pass through the top of the housing 9, I preferably place a cap 36 on the top of the tube 5.

For the purpose of controlling and directing the rays of light passing through the opening 31 in the shield 29 from the filaments 15, I provide a projection tube 38 having a flanged collar 39 which collar is preferably curved to conform to the cylindrical surface of the portion 18 and is secured thereto by bolts 41. The inner end of the tube 38 may extend through the portion 18 and it is provided with a lens 42 for concentrating the rays of light which pass through it and project them upon a focusing lens 43 in the forward end of the tube. The lens 43 is of such shape that the light is preferably focused on an area approximately three to five inches in diameter at a normal working distance of one and a half to two feet from the lamp, but it may be adjusted if desired. The lenses 42 and 43 are preferably held in position by spring wires 44 which are seated in grooves in the inner surface of the tube 38. On the free end of the tube 38 is mounted a hood 45 which is secured from longitudinal movement by a set screw 46 extending into an annular groove 47 in the tube 38. However, the set screw 46 is sufficiently short to permit rotary movement of the hood about the longitudinal axis of the tube 38. The hood 45 is provided with a suitable reflector 48, preferably a glass mirror and preferably positioned at an angle of substantially 45 degrees to the longitudinal axis of the tube 38 for directing rays of light from the axis of the tube 38 at an angle of substantially 90 degrees thereto, as indicated by numeral 49 in Fig. 6.

By this arrangement, as will be readily understood, the end of the tube 38 may extend laterally to a position beneath the chin of the operator or to the cheek or forehead, if desired, in such a position, however, that it directs light to the point desired while the light source remains out of the line of vision of the operator and a sufficient distance away to permit ready manipulation of surgical or dental instruments. Also by employing the shielding and ventilating arrangement disclosed in Figs. 1 and 5, the casing or housing 9 remains at such a temperature that it may be readily handled for adjustment without injuring the operator and may be positioned sufficiently close to the patient to most effectively direct light to the point required without causing discomfort to the patient.

In order to hold the light projecting instrument in any desired position, I preferably provide a split clamping ring 51, slidably mounted in a groove 51a formed in wall 18. The two halves of ring 51 are secured to T-shaped members 52 by bolts or rivets 53. The members 52 are frictionally secured to the outer end of tubular extension members 54 by bolts 55 having wing nuts 56 thereon by which the friction of the members 52 on the ends of the members 54 may be readily adjusted. Similarly the opposite ends of the tube 54 are secured to laterally projecting ears 58 on a vertically extending cylindrical supporting ele-

ment 57 by bolts 55 having wing nuts 56 thereon. The cylindrical portion 57 is mounted on a vertically extending post 61 on the outer end of a swinging bracket 62, the inner end of which is provided with a downwardly extending post 63 adapted to fit in a socket member 64 in a wall bracket 65 or it may be positioned in the upper end of the tubular adapter 66, the lower end of which is mounted on a post or the like 67 of a stand or a dental chair. The adapter is prevented from rotating on the post 67 by a laterally projecting pin 68 passing through a recess 69 in the lower end of the adapter.

In order to transmit electric current to the filament 15, I have provided conductors 13 and 14 which may pass through insulators 71 in the lower tube 54 and through the swinging arm or bracket 62, downwardly through the post 63 and to any suitable source of power.

In the modification of my invention shown in Figs. 7 and 8, the tube 5 is similarly mounted in the socket 6 which is fixed in position by the clamping rods 21. In this form of my invention the housing for the bulb 5 comprises a cylindrical member 75 preferably formed of translucent quartz which is capable of withstanding great heat and which, nevertheless, effectively insulates and shields the source of light and heat so that the instrument may be employed relatively close to the patient. For the purpose of permitting ventilation through the housing I have provided openings 76 in the top plate 77 and a multiplicity of perforations 78 in the lower cylindrical portion 79 of the housing. The portion 79 is provided with ring members 81 and 82 soldered or welded thereto, between which is positioned the complementary portions of the split friction clamp 83 which may be of resilient material and by which the casing or housing is adjustably secured. The ring 82 is provided with a radially extending flange 85 on which is seated the cylindrical quartz member 75 and on which it is held by the clamping bolts 21. At the rear side of the member 75 is provided a recess 86 into which is pressed a portion 87 of the flange 85 to prevent rotation of the portion 75 relative to the lower cylindrical portion 79.

The projection tube 91, shown in this modification, is provided with a plurality of perforations 92 which serve for ventilation. The tube 91 is provided with a collar 93 soldered or welded to the tube and having a flange 94 engaging the cylindrical portion 75. The inner end of the tube is provided with a reinforcing sleeve 95 about which is fitted a spring washer 96 which is held against the inner side of portion 75 by the forward edge 97 of a nut 98 having threaded engagement at 99 with the reinforcing sleeve 95. A lens 101 is mounted adjacent the inner end of the tube 91 by suitable mounting elements 102 which have portions 103 engaging the lens at a plurality of points around its margin.

The free end of the tube 91 is provided with a hood element 104 which has a cylindrical portion 105 extending into the end of the tube 91 and retained therein by a yieldingly held button 106 fixed to a leaf spring 107 which is secured by rivets 108 to the tube 91. The hood 104 is provided with a focusing lens 104' and suitable reflector 48 as and for the purpose hereinbefore described with reference to Fig. 1. This modification of my invention may be mounted in a similar way to that shown in Fig. 1 by adjustable extension arms 111 secured by bolts 112 to the T-shaped end 113 of the split clamping member

83. Electric current for the bulb 5 may be introduced into the socket 6 through conductors 115 and 116, the circuit of which may be closed by a suitable switch within the switch housing 117 and operable by the switch lever 118. The specific forms of switch and socket herein illustrated are no part of my invention and are not, therefore, described in detail.

From the foregoing description it will be readily appreciated that the housing in which the source of light is positioned may be rotated through an angle of 360 degrees and in like manner the hood on the end of the projection tube, together with its reflector therein contained, may be rotated through an angle of 360 degrees. By the mounting arrangement of the instrument as a whole it may be moved through horizontal and vertical planes which when combined with the possible movements of the casing and hood makes it possible to direct the rays of light passing from the projection tube into substantially any direction.

Referring to Fig. 9, this is a fragmentary sectional view of a modified form of projection tube which may be used in either of the devices described. In actual practice where the operating lamp is used in dental work, I find that the focusing of the lens is not always desirable because the present lamp can be arranged to give such a strong light that the average focus is sufficient for all practical purposes. Where the lamp is not arranged with an adjustable focus, there is no possibility of the lamp getting out of focus and furthermore no necessity for wasting time endeavoring to focus the beam.

However, in close work it may be desirable to focus the beam more closely to secure a stronger light and in such cases the projection tube may consist of a pair of tubes 120 and 121 of metal or phenolic condensation compound, the tubes 120 and 121 being adapted to engage each other with sufficient friction to retain them in any adjusted position but sufficiently loose to permit a manual adjustment of the tube 121 in the tube 120. The other details of construction of the hood and mirror may be substantially as described with respect to the other projection tubes, the lens 122 being retained in tube 121 by means of collar 123 having tongues 124 pressed out to engage the lens. The glass mirror 48 is likewise retained by the shoulder 125 on tube 120 and by a metal tongue 126.

It will thus be observed that I have invented an operating lamp in which a large projection bulb may be employed but the structure of the lamp is such that the lamp bulb may be disposed at one side of the operator and patient and the light projected against the work by the projection mirror. The projection tube is of such length and extends laterally from the casing in such manner that my invention makes it practical to employ a very high power projecting bulb for the source of light without making the instrument cumbersome or objectionable on account of its size because the instrument when employed in the intended manner as illustrated in Fig. 6, for example, will at all times remain outside of the line of vision of the operator and will be sufficiently out of the way that the instruments may be used on the patient with facility.

It is conceivable that various modifications may be made in my invention without departing from the principle thereof or the scope of the appended claims.

1. In an operating lamp, the combination of an insulating base with an insulating cover plate, said base and cover plate being formed with annular shoulders, an insulating tube adapted to fit against the annular shoulders on said base and cover plate, a prefocusing socket carried by said base, a standard projection bulb carried by said socket, a heat shield surrounding said bulb and having an aperture for emission of light from said bulb, a pair of rods securing said base and cover plate in clamping relation upon said tube, said rods supporting said shield, an elongated laterally projecting tube carried by said first mentioned tube, a condensing and a focusing lens carried by said latter tube, and a reflector carried by the end of said latter tube and adapted to reflect light from said bulb in a lateral direction whereby the bulb casing may be disposed at one side of the line of vision.

2. An operating lamp comprising a substantially cylindrical casing for enclosing a source of illumination, a laterally projecting tube carried by said casing and adapted to be disposed in the line of vision of the operator, said tube being located in substantial alignment with the filament of a source of illumination in said casing, a lens carried by said tube and adapted to project the illumination from said source longitudinally of said tube out of the end of said tube, and a mirror angularly arranged across the end of said tube and adapted to reflect the projected beam transversely to the direction of the tube to produce a spot light on the work, said mirror being carried by a hood, and said hood being rotatably mounted with respect to said tube whereby said mirror is adapted to direct the spot light in any of a multiplicity of angular directions radially of the axis of said tube, said casing being provided with an annular supporting shoulder and a pair of clamping members slidably engaging said casing below said shoulder for rotatably supporting said casing for rotation about the axis of said casing whereby said spot light may be worked in any direction.

3. An operating lamp comprising a substantially cylindrical casing for enclosing a source of illumination, a laterally projecting tube carried by said casing and adapted to be disposed in the line of vision of the operator, said tube being located in substantial alignment with the filament of a source of illumination in said casing, a lens carried by said tube and adapted to project the illumination from said source longitudinally of said tube out of the end of said tube, and a mirror angularly arranged across the end of said tube and adapted to reflect the projected beam transversely to the direction of the tube to produce a spotlight on the work, said mirror being carried by a hood, and said hood being rotatably mounted with respect to said tube whereby said mirror is adapted to direct the spotlight in any of a multiplicity of angular directions radially of the axis of said tube, and devices for supporting said casing for rotation about its axis whereby said spotlight may be worked in any direction.

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