Nov. 6, 1923. 1,472,779

F. A. ANDERSON

THERAPEUTIC APPLIANCE

Filed July 6, 1920

Fig. 2.

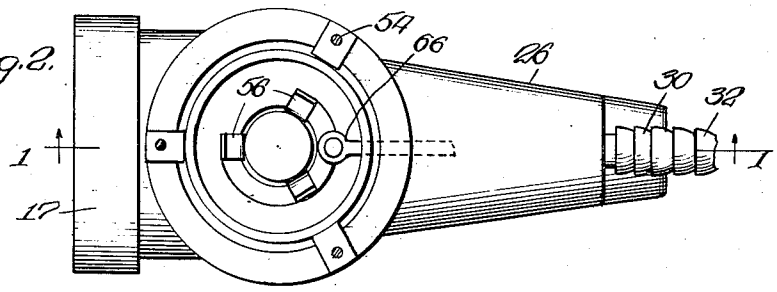


Fig. 1

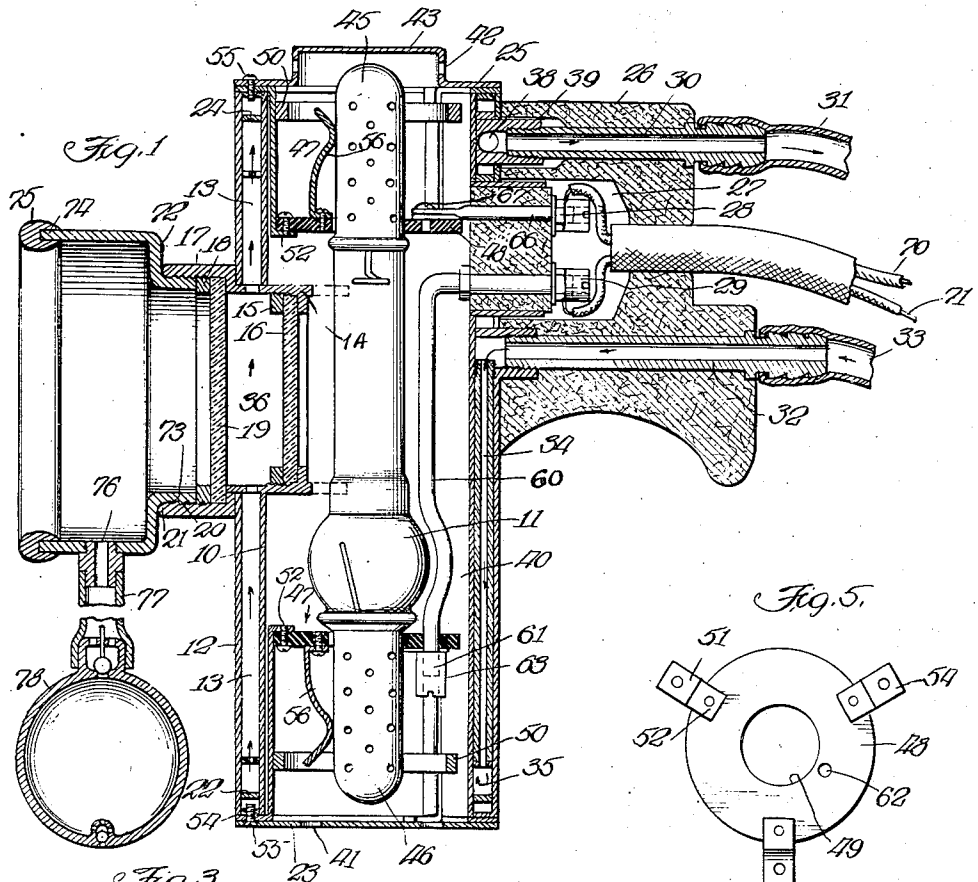


Fig. 5.

Fig. 3.

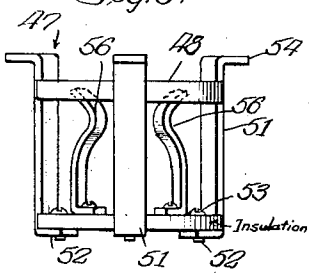
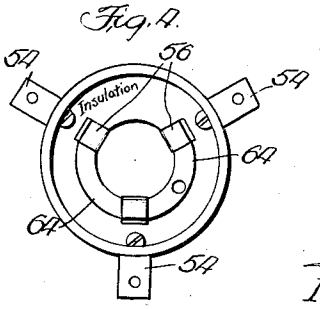


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRITZ A. ANDERSON, OF MILTON, WISCONSIN, ASSIGNOR TO BURDICK CABINET COMPANY, OF MILTON, WISCONSIN, A CORPORATION OF WISCONSIN.

THERAPEUTIC APPLIANCE.

Application filed July 6, 1920. Serial No. 394,302.

To all whom it may concern:

Be it known that I, FRITZ A. ANDERSON, a citizen of the United States, residing at Milton, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Therapeutic Appliances, of which the following is a specification.

This invention relates to therapeutic appliances.

It will be explained as applied to a lamp particularly adapted for therapeutic treatment by radiant energy, such as the ultra violet rays.

In the treatment of diseased conditions by radiant energy it is often desirable to isolate the affected area from the blood circulatory system in order to prevent absorption and dissipation of the rays and the effects thereof by the blood. Heretofore, isolation has been attempted by means of compressing lenses, etc., which press upon the affected area and thus interrupt or interfere with blood circulation therethrough. In order that the patient may not be burned, these compressing lenses have been cooled by streams of water which flow over the inner or unexposed surfaces thereof, the water being supplied to the lens chamber by piping or hose connections exterior of the lamp casing.

Appliances of this character are often objectionable because the pressure to effect isolation is applied to parts which may be so sore and tender that the treatment is extremely painful to the patient.

The external water connections to the lens chamber are often in the way and are sources of annoyance and danger.

One of the objects of this invention is to provide an improved therapeutic appliance.

Another object is to provide a readily portable housing for containing and manipulating a therapeutic lamp.

Another object is to provide a housing by means of which the energy effects of a lamp therein may be readily applied in a large variety of situations and wherein a lamp may be readily inserted and removed.

Another object is to provide an appliance whereby the desired isolation may be effected without contact with affected localities.

Another object is to provide a therapeutic lamp having improved cooling arrangements for the tube or ray generator and the rays.

Another object is to provide a lamp wherein a stream of cooling fluid may also assist in the application of the desired character of rays.

Another object is to provide a therapeutic lamp casing having a continuous cooling fluid circulating chamber about the tube or ray generator and the lenses.

Another object is to provide an appliance to which applicators of various characters for effecting different results and use in different situations may be readily attached and removed.

Another object is to provide an appliance wherein the isolating pressure is of a yielding nature and may be varied at will.

Another object is to provide an appliance which is simple, reliable, attractive in appearance and readily used and manipulated.

Other objects and advantages will hereinafter appear.

In general the appliance comprises a double walled lamp housing including two spaced apart lenses which form a continuous enclosed chamber for the circulation of a cooling fluid about the lamp, over the lenses and across the path of the rays projected through the lenses. The housing is arranged for the reception of applicators which are adapted to embrace the affected area to concentrate and confine the rays and to effect the desired isolation of the treated area by pressure upon surrounding relatively healthy tissues rather than over the affected parts. The appliance is arranged so that a relatively yielding pressure to any desired degree may be applied to the affected area within the confines of the applicator for the purpose of dehematizing the area to be treated. The cooling fluid may be so constituted as to assist in the filtering out of undesirable rays and thus facilitate treatments of various kinds. The lamp housing is provided with a handle for facilitating manipulation and through which the fluid and electrical connections are made.

An embodiment of the invention is illustrated in the accompanying drawing, wherein:

Fig. 1 is a vertical section of an appliance with a lamp tube therein.

Fig. 2 is, substantially, a plan view of the device.

Fig. 3 is a removable cage for holding the lamp within the casing, showing the device in side elevation.

Fig. 4 is a bottom view of the cage, and Fig. 5 is a top view, with reference to the position of the cage as shown in Fig. 3.

In all the views the same reference characters are employed to indicate similar parts.

In the treatment of disease by the agency of projected light energy and in some chemical demonstration work, it is important that the heat rays, so far as may conveniently be done, shall be carried away or eliminated from the apparatus by which it is applied, especially when the applicator, that is in touch with the skin of the patient, is a part of the lamp structure, so that the applicator may contact the surface of the patient's skin without discomfort, or that the light rays be made as cool as conditions will allow.

In the drawings the lamp housing has an inner cylindrical wall or casing 10 containing the removable lamp 11. The inner casing is surrounded by an outer wall or casing 12, leaving a water space 13 therebetween thru which space water is made to circulate to carry away the heat that is produced by the operation of the lamp. The inner casing 10 is provided with an inwardly projecting threaded ring 14 within which is a bezel 15 to contain a lens 16. The lens, or substantially transparent panel, is preferably duo-planar, in shape, that is to say, both sides are straight and preferably the lens, or plate 16, is made of quartz because glass is more or less opaque to ultra violet rays and in the operation of the lamp it is desirable that these rays should be made made available. The outer casing, or jacket 12, also contains a ring 17 and an inner bezel 18 to contain a similar lens, or transparent plate 19, preferably, quartz. The outer ring 17 is threaded, as at 20, within which exchangeable applicators may be inserted, while the outer rim 21 of the ring 17, may also serve as an applicator, for surrounding the diseased part, of the patient to be treated, and by which pressure may be applied to the flesh of the patient for the purpose heretofore described. A ring 22 closes the water space between the two casings at the bottom of the structure, so as to render the structure watertight when the bottom plate 23 is removed, and a similar ring 24 closes the opening between the jacket and the inner casing at the top for the same purpose, so that the two end plates 23 and 25 may be removed without causing a leak of the water or other liquid circulating between the two casings.

A handle 26 is secured to the rear part of the jacket 12 and is a means by which the apparatus may be handled. It is preferably made of some nonconducting material, such as bakelite, or the like, to facilitate and improve the construction. The handle has a cavity 27 within which electric terminals 28 and 29 are contained. A tube 30 passes thru the handle 26 and is connected to a flexible tube on its outer end 31 thru which a circulating heat conveying medium may pass. A similar tube 32 passes thru the lower part of the handle and has connected to it a flexible tube 33. The tube 32 is connected to another tube 34, within the water space 13, between the inner and outer casings, to convey the cooling liquid to the lower end of the casing, to the annular opening 35, so that the water will pass entirely around the inner casing within the outer casing or jacket. In its passage it enters the space 36 between the lenses 16 and 19 and is conveyed further in the space 13, thru the discharge opening 38, into the fitting 39 and from thence out thru the tube 30 to the tube 31, thus completing the circulation of the water and carrying away the heat that may be engendered from the operation of the lamp 11. The water forms a screen before the beam of light coming from the lamp and a suitable coloring matter may be put in solution with the water or other liquid to filter out undesirable light rays. Distilled water may be successfully used, circulated by any suitable means to which suitable coloring matter or other chemicals may be added on a definitely prescribed filtration basis, to eliminate or suppress certain rays of light, for example those which irritate the mucous membrane as when making applications of light to the gums, as in dental work, thus permitting continued application for time sufficient to produce deep penetration and without making the tissue sore or causing pain or discomfort.

The chamber 40, within the inner casing, is ventilated by the holes 41 in the bottom plate 23 and by the holes 42 in the cap portion 43 of the top plate 25, so that in addition to the circulation of water between the casings, there is a natural air draft thru the interior of the casing 10 thru the chamber 40.

The lamp 11 is a vapor tube type, having conducting ends 45 and 46. In lamp structures heretofore constructed, for containing lamps, the lamp is usually embedded in some plastic material. It becomes necessary to return the structure to the factory from whence it came in order to replace a defective mercury lamp therein. In this particular structure the lamp 11 may easily be removed and replaced.

In each end of the structure there is a lamp holding cage 47 which is easily removed and which very efficiently holds the lamp in position. The cage 47 consists of a disc of insulating material 48, perforated as at 49 to receive one of the ends 45 or 46 of the lamp. This disc may be porcelain, fiber, or the like, which is an electric insulator and more or less refractory to the effects of high

temperature. A ring 50 is secured to the disc 49 by three spaced-apart legs 51, having inturned flanges 52 for screws 53 and having outturned flanges 54 for screws 55. The flanges 54 lie upon the ends of the casing and the top plate 25 and the bottom plate 23, overlies the legs, as clearly shown in the drawings, for removing the cages. Spring tongues 56, of which there may be a suitable number, three being shown in the present instance, bear gently upon the metal parts 45 and 46 of the lamp and make electrical contact therewith.

A rod 60 is connected to the electric terminal 29 and its lower end, 61, is passed thru a perforation 62 in the disc 48 and held in place by nut 63. The nut 63 is electrically connected to the spring tongues 56 by means of a metal strip 64.

The other terminal, 28, of the device is connected by rod 66 to a similar strip by means of the screw 67, so that the respective electric terminals, 28 and 29, are thus connected to the spring tongues 56 for the purpose of imparting electric current to the terminal ends 45 and 46 of the lamp. When the screws 55, 65, at either end, are taken out, the cap plates 23 or 25 may be removed whereupon the cage 47 may be removed and the lamp taken therefrom. Generally, it is only necessary to remove the cage at the bottom of the structure in order that the lamp may conveniently be taken therefrom and a new one inserted.

It will be noticed that the lamp 11 is surrounded by an ever-changing self-induced current of air which passes thru the inner casing as a result of the temperature therein.

The wires 70 and 71 may be attached to any source of electric current suitable for the operation of the lamp.

The applicator 72 is attachable to the ring 17. It is one of many that may be used in this way with or without compressed air. It has a threaded part 73 shown screwed into the ring. Its free end 74 may be covered with a relatively soft yielding ring 75 such as soft rubber. There is a nipple 76 in the side wall of the applicator 72 to which is attached a hose 77 and to the outer end of the hose is a suitable air pump 78.

When the ring 75 is placed in contact with the body of the patient air is then pumped into the applicator 72. This produces a yielding pressure on the surface enclosed by the applicator and serves as a very efficient and gentle means for dehematizing this area and facilitates the penetration of the radiant energy applied to the affected part.

While I have herein shown a single embodiment of my invention for the purpose of clear disclosure, it will be manifest to persons skilled in the art, that considerable change may be made in the general arrangement and disposition of the parts, within the scope of the appended claims.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A therapeutic appliance having a casing; a lamp in the casing; means for passing a fluid thru the light field of said lamp and coloring matter in the fluid to filter out or eliminate objectionable rays that emanate from said lamp.

2. A therapeutic appliance having a casing perforated to permit light to pass therefrom and means for passing a fluid thru the light field to carry away the heat of the lamp and light-filtering matter in the fluid to eliminate objectionable rays that emanate from the lamp.

3. A therapeutic appliance having a casing with an opening thru which to project light; a lamp in the casing; two spaced apart quartz lenses in the path of the light thru said opening between which to pass a fluid to carry away the heat from the lamp; and a light filter carried by said fluid to eliminate objectionable rays of light that otherwise would pass thru the opening.

4. A therapeutic appliance having a casing with a perforation thru which to pass light; a lamp in the casing; a reflector in the casing to project light thru said opening; a pair of spaced apart lenses in the path of the light between which to pass water to carry away heat from the lamp; and a light filter moving with the water to eliminate objectionable rays of light.

5. A therapeutic lamp housing providing two spaced apart casings and two spaced apart lenses for circulation of a liquid between the casings and between the lenses and a lamp in the inner casing.

6. A therapeutic appliance having two spaced-apart casings; a lens in each casing, leaving a liquid circulating space between the lenses and between the casings; a lamp in the inner casing and a removable and insertable holding cage for supporting the lamp.

7. A therapeutic appliance having two spaced-apart casings; a lense in each casing, leaving a liquid circulating space between the lenses and between the casings; a lamp in the inner casing, and a perforate closure for each end of the inner casing for inducing a draft of air through the inner casing.

8. A therapeutic appliance having two spaced-apart casings; a lens in each casing, leaving a liquid circulating space between the lenses and between the casings; a lamp, having metal terminal caps at each end, in the inner casing, and an insertable and removable cage, in each end of the inner casing, engaging the respective lamp terminal.

9. A therapeutic appliance having two spaced-apart casings; a lens in each casing

leaving a liquid circulating space between the lenses and between the casings; a lamp, having metal terminal caps at each end thereof, in the inner casing; a removable cage in each end of the inner casing, engaging a lamp terminal; a closure for each end of the inner casing and screws holding the closure and respective cage in place.

10. A therapeutic appliance having a projecting ring for compressing contact with the body of a patient to produce constriction surrounding a diseased part defined by the ring and a source of radiant energy for projecting lines of radiant force into the area surrounded by the ring.

11. A therapeutic appliance having two concentric spaced-apart casings, leaving a liquid circulating space therebetween; two spaced-apart lenses, one in each casing, the space therebetween communicating with said circulating space; a handle projecting laterally from the outer casing; liquid circulating pipes passing through the handle into the circulating space; a lamp in the inner casing and electric conductors passing through the handle into the inner casing to contact with the terminal ends of said lamp.

12. A lamp structure of the character described, comprising an inner lamp casing; a lamp in said casing; an outer casing or jacket, spaced away from the inner casing to provide a path for the circulation of a cooling liquid medium, coaxially arranged lenses in the respective casings and perforated closures for the ends of the inner lamp casing to provide an air circulating path through the lamp casing.

13. A therapeutic appliance, having a cylindrical lamp casing; a lens in the side wall thereof; a lamp in the casing, having terminal caps and a removable cage insertable in each end of the cylinder having contacting means to engage the caps of the lamp; closures for each end of the cylinder and means to hold the closure and respective cage on and in the cylinder.

14. A therapeutic appliance, having a cylindrical lamp casing; a lens in the casing; an outer casing or jacket, spaced away from the inner casing; a threaded ring attached to the outer casing; a lens in said ring, near the inner end thereof leaving the outer end as an applicator and means to attach another applicator.

15. A therapeutic appliance for application of radiant energy comprising a casing; two spaced apart lenses supported thereby; a lamp in the casing and means to circulate water about the lamp and between the lenses.

16. A therapeutic appliance for application of radiant energy comprising a casing structure; two spaced apart lenses supported thereby; a lamp in the casing; a path thru which to circulate water about the lamp and between the lenses; a handle on one side of the casing; and water conduits passing thru the handle and communicating with said path.

17. A therapeutic appliance for application of radiant energy comprising a casing structure; having a pair of spaced apart lenses; a lamp in said structure; a cup-shape applicator in front of said lenses; means for attaching an air pump to said applicator; means to circulate water about said lamp and between said lenses and a handle on said casing.

18. A therapeutic appliance having an inner and an outer casing to form a lamp chamber and spaced apart to form a fluid circulating chamber therebetween, a lens in each casing for completing the circulating chamber and allowing passage of rays from a lamp, means for holding a lamp in the lamp chamber, and perforated closures for the ends of the lamp chamber.

19. A therapeutic appliance having a double walled lamp housing and a lens in each wall forming a continuous fluid circulating chamber, a lamp support within the housing, and a handle for the housing and through which fluid and electrical connections may be made to the circulating chamber and the lamp respectively.

20. A therapeutic appliance comprising a housing having double walls which form a fluid circulating chamber about a lamp, a pair of lenses fitted to the housing walls to complete the circulating chamber and permit the passage of rays from a lamp, means for supporting a lamp tube within the inner wall of the housing, and connections for connecting a source of fluid supply to the circulating chamber.

21. A therapeutic appliance comprising a lamp housing having double walls and a lens for each wall to form a fluid circulating chamber about a lamp, a lamp holder within the housing, a handle for the housing, fluid and electrical connections for the circulating chamber and the lamp, and an applicator for directing the application of rays passing through the lenses.

22. A portable housing for a therapeutic lamp tube comprising inner and outer tubular casings which include axially aligned lenses, the casings being separated to form a continuous fluid chamber about the inner casing and between the lenses and the inner casing being open at both ends; end walls for completely closing the fluid chamber; fluid connections communicating with the fluid chamber; and a support for holding a lamp tube within the inner casing.

23. A portable therapeutic appliance comprising two parallel tubular side walls which include axially aligned lenses, the walls

being separated to provide a continuous fluid chamber between the walls and the lenses therein and to form a tubular lamp housing; end walls, between the side walls, for closing the fluid chamber; fluid connections to the fluid chamber; and a support for holding a lamp within the tubular housing.

24. A portable therapeutic appliance comprising inner and outer parallel tubular side walls each of which includes a lens, the walls being separated and the lenses being in axial alignment to provide an uninterrupted fluid chamber around the inner wall and between the lenses and to constitute a fluid jacketed housing for a lamp tube; end walls which interconnect the side walls to close the fluid chamber; a lamp support within the housing and for holding a lamp tube; and fluid connections communicating with the fluid chamber.

In testimony whereof I hereunto subscribed my name.

FRITZ A. ANDERSON.