Dec. 8, 1964 H. D. WOLFE 3,160,755

THERAPEUTIC RADIANT ENERGY LAMPS

Filed May 16, 1960 2 Sheets-Sheet 1

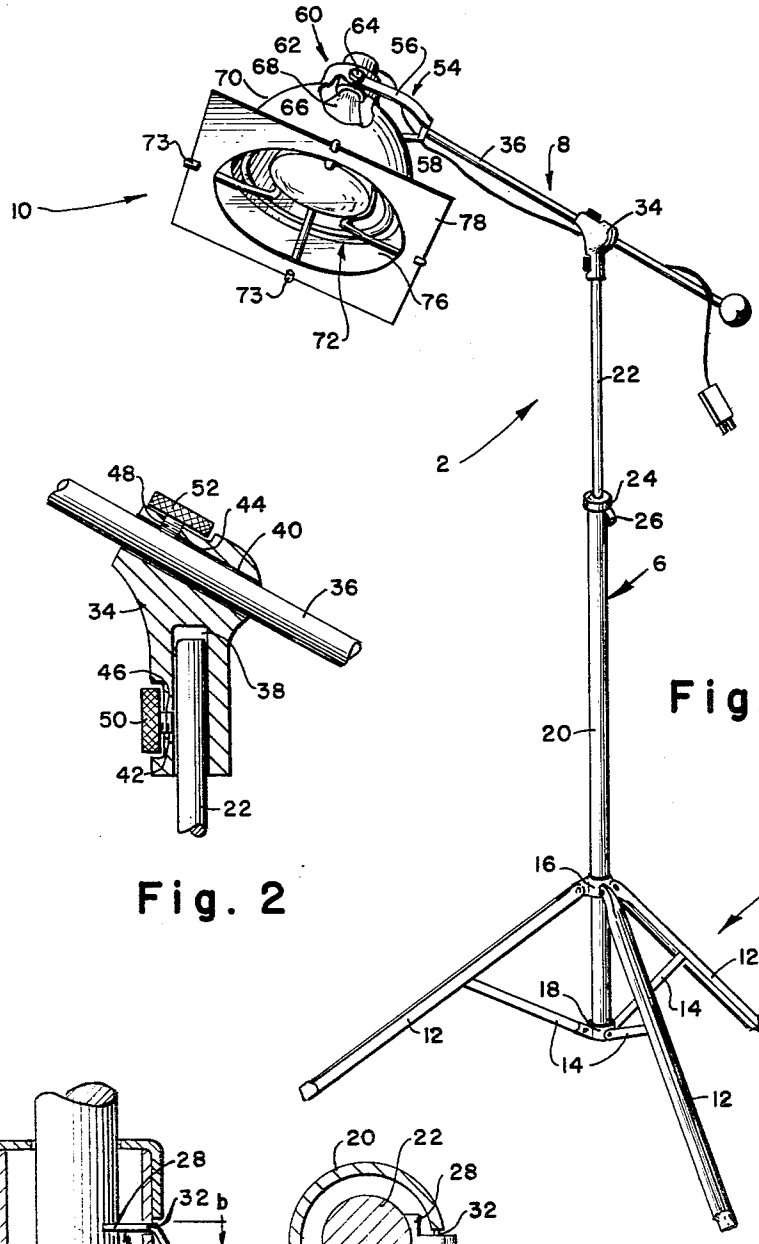


Fig. 1

Fig. 2

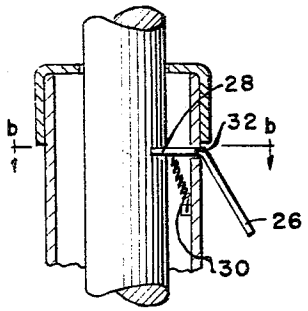


Fig. 3(a)

Fig. 3(b)

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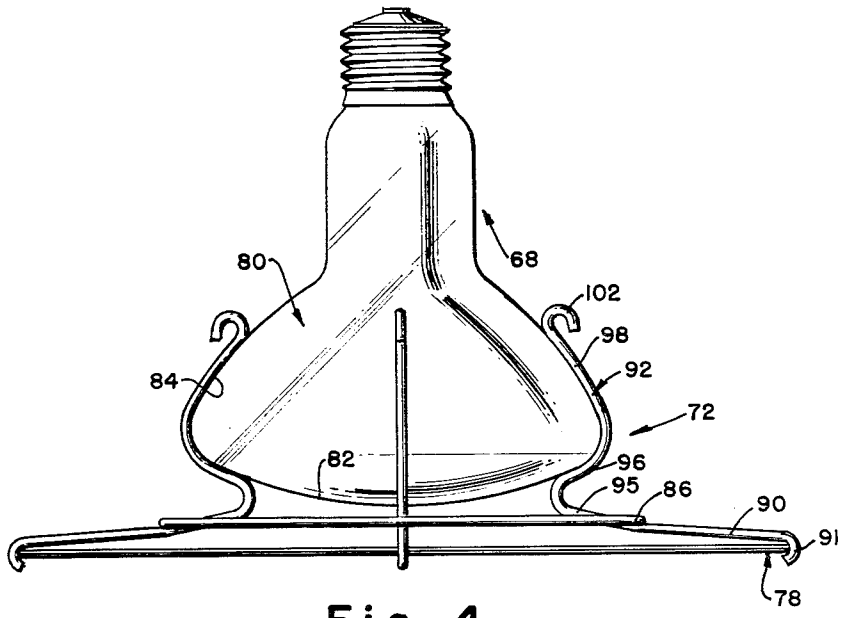


Fig. 4

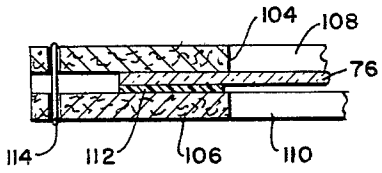


Fig. 6

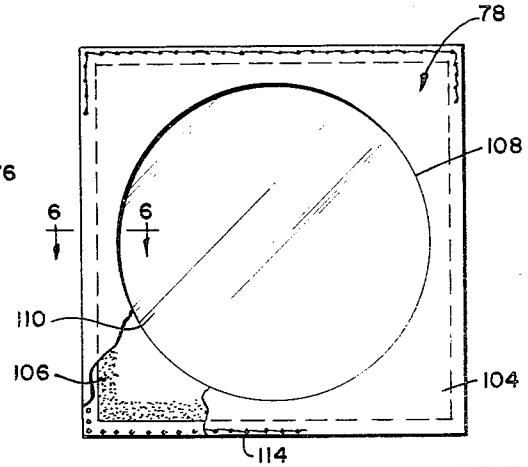


Fig. 5

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THERAPEUTIC RADIANT ENERGY LAMPS

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This invention relates to therapeutic radiant energy lamps, and more particularly to lamps from which ultra-violet radiations emanate.

Lamps which produce ultra-violet radiations, or "sun lamps," as they are commonly known, have found widespread use today outside of hospitals, doctors' offices, and clinics where trained medical personnel are available to supervise the operation of such lamps. While the lamps are known to have certain beneficial effects, they also, if used improperly, have certain detrimental effects. More particularly, ultra-violet lamps produce erythema, or sunburn, if the dosage of radiations, or time of exposure to the radiations, is excessive.

Since ultra-violet lamps are being used in the home by untrained personnel for their cosmetic, as well as their therapeutic benefits, the danger of encountering detrimental effect from the use of such lamps is greatly increased. The present invention is directed to eliminating such danger by providing a therapeutic ultra-violet lamp assembly which can be used to accomplish the beneficial effects of ultra-violet radiations without subjecting the user to the detrimental effects thereof.

The ultra-violet spectrum is generally considered to cover the range of radiations between 1000 Angstrom units and 4000 Angstrom units. (Angstrom units equals A.) Notwithstanding this broad range, it has been found that ultra-violet radiations between 2967 A. and 3150 A. are responsible for almost all erythema or sunburn which results from exposure to ultra-violet radiation. In fact, it has been found that if all ultra-violet rays between 2967 Angstrom units and 3150 Angstrom units are eliminated from an ultra-violet spectrum, then extended exposure to such spectrum has no harmful effects.

Accordingly, an object of the present invention is to provide a therapeutic ultra-violet lamp assembly which effectively suppresses the range of ultra-violet radiations which produce erythema, while at the same time transmitting ultra-violet radiations having beneficial effects. More particularly, an object of the present invention is to provide an ultra-violet therapeutic lamp which suppresses ultra-violet radiations between 2967 A. and 3150 A. while at the same time transmitting ultra-violet radiations of longer wave length which produce a maximal melanogenic or tanning effect.

Although one important aspect of the invention concerns eliminating the harmful band of ultra-violet radiations from an ultra-violet spectrum so that an ultra-violet lamp can be safely used in the home, the invention is also concerned with providing an ultra-violet lamp having other characteristics which particularly adapt the lamp for home use. Specifically, further objects of the present invention are:

(1) To provide an ultra-violet lamp in accordance with the preceding objects which can be inexpensively manufactured;

(2) To provide an ultra-violet lamp incorporating an ultra-violet bulb and a filter means cooperating therewith to suppress harmful rays, which filter means is easily replaceable and non-breakable;

(3) To provide an ultra-violet lamp conforming with the preceding objects, and eliminating the necessity for the user's wearing of filter eyeglasses during exposure to the rays produced by the lamp;

(4) To provide an ultra-violet lamp assembly which

can be easily disassembled and stored in a relatively small space or container;

(5) To provide an ultra-violet lamp which incorporates a non-breakable as well as a removable filter so that, upon removal of the filter, a deeper tanning can be obtained from the lamp on a short exposure if desired;

(6) To provide an ultra-violet lamp in accordance with (5) above wherein the filter is supported within an inexpensive frame and wherein a frame-holder adapted to be clipped onto the bulb portion of a lamp assembly is provided; and

(7) To provide a self-supporting therapeutic lamp assembly including a base stand, an adjustable upright support, an adjustable cross support, and a lamp bulb, reflector, and filter arrangement carried at one end of the cross support whereby rays can be directed at various angles onto surfaces disposed at differing heights.

While the term "home use" has been used herein, such term only refers to use outside of establishments where trained medical personnel are available. Of course, although the lamp assembly provided by the invention is particularly adapted for "home use" it can be advantageously used in hospitals, clinics and the like also.

Yet other, still further, and more specific objects of the present invention are:

(*a*) To provide an improved type of non-breakable filter to be used with an ultra-violet lamp to suppress the harmful range of ultra-violet radiations, which filter comprises a sheet of clear transparent plastic, preferably polyethylene terephthalate film, disposed between a pair of stiff, but flexible, plates provided with central openings covered by the sheet of plastic, and

(*b*) To provide a holder for mounting a filter of the type set forth in (*a*) above in spaced relation to, and forward of, an ultra-violet lamp bulb, which holder supports the edges of the filter without interfering with the transmission of rays thereto, and in addition, is adapted to snap on to the ultra-violet bulb.

The invention consists in the construction, arrangements, and combination of the various parts of the lamp assembly, whereby the objects contemplated are attained as hereinafter more fully set forth and specifically pointed out in the annexed claims. The invention will be better understood, and objects other than those specifically set forth above will become apparent, when consideration is given to the following detailed description of the illustrative embodiments of the invention presented in the annexed drawings, wherein:

FIGURE 1 is a perspective view of an overall lamp assembly constructed in accordance with the present invention;

FIGURE 2 is a fragmental, detailed, cross-sectional view showing the preferred manner and means of coupling between the upright support of FIGURE 1 and the cross support which carries at one end thereof the radiation-producing, directing, and filtering components;

FIGURE 3(*a*) is a fragmental, detailed, cross-sectional view showing the manner in which, and means by which, adjustment of the upright of the assembly shown in FIGURE 1 is achieved, and FIGURE 3(*b*) is a plan view taken on line *b*—*b* of FIGURE 3(*a*);

FIGURE 4 is a side view presenting an ultra-violet lamp, a filter, and a filter holder for supporting the filter removably in spaced relation to the bulb in accordance with the invention;

FIGURE 5 is a plan view, partially broken-away, of a filter and associated frame constructed in accordance with the invention; and

FIGURE 6 is a cross-sectional view taken on the line 6—6 of FIGURE 5 and showing the disposition of, and means of attachment between, the various components of the filter and frame shown in FIGURE 5.

In FIGURE 1, the numeral 2 has been used to generally designate the overall lamp assembly which comprises a base 4, an upright 6, a cross support 8 adjustably coupled with the upright 6, and a radiation source, directing, and filtering arrangement 10 carried at one end of the cross support 8. While various supporting structures other than that shown may be used for supporting the radiation source, directing and filtering unit 10 provided by the invention, the arrangement shown in FIGURE 1 represents the preferred embodiment of the invention because it provides for virtually universal adjustability, easy disassembly, and inexpensive fabrication.

The base 4 of the support assembly shown in FIGURE 1 is a tripod consisting of three legs 12 which are pivotally coupled at their upper ends with a collar 16, and pivotally coupled intermediate their ends with cross bars 14. The cross bars 14 are pivotally coupled between the legs 12 and a collar 18. The collar 18 is fixedly secured to a hollow upright or base shaft 20, while the collar 16 is reciprocal thereon. By virtue of this construction, when an inward pressure is applied to the legs 12, the collar 16 rides up on the base shaft 20, the cross bars 14 are carried upwardly and inwardly toward the base shaft 20, and the legs 12 move in alongside the shaft 20. Thus, the base 4 is collapsible for purposes of storage and shipping, and yet openable to the position shown in FIGURE 1 for supporting the upright or base shaft 20.

The base shaft 20, as stated, is preferably hollow, and a support shaft 22 is reciprocal within the base shaft and adapted to extend thereabove. The base shaft 20 carries a cap 24 to maintain the support shaft centrally thereof, and an operating lever 26 is incorporated to allow for adjustably positioning the support shaft 22 with respect to the upright or base shaft 20. If reference is made to FIGURES 3(*a*) and (*b*), it will be noted that the operating lever 26, when depressed, frees a flange 28 from engagement with the support shaft 22 so that such shaft may be moved within, or out from, the base shaft 20. Any form of adjustable coupling between the upright shaft 22 and base shaft 20 may be used without departing from the scope and spirit of the invention, and it should be understood that the arrangement shown in FIGURE 3 is merely an illustrative well-known adjustment arrangement. Of course, the spring 30 shown in FIGURE 3 serves to pull the flange 28 into engagement with the shaft 22 to maintain it in a given location, but the flange 28 may be moved out of engagement with the shaft 22 by depressing the lever 26 which causes the flange to pivot about the point 32.

A coupling member 34 is carried at the top of the support shaft 22, and this coupling member allows for adjustment of the cross shaft 36. Specific reference should be had to FIGURE 2, wherein it will be noted that the coupling member 34 is provided with a first bore 38 into which the support shaft 22 extends, and a second bore 40 through which the cross shaft 36 extends. Threaded apertures 42 and 44 communicate with each of the bores, and a threaded bolt 46 having a knurled cap 50 cooperates with the threaded aperture 42, while a threaded bolt 48 having a knurled head 52 cooperates with the threaded aperture 44. It should be apparent that upon adjustment of the knurled heads 50 or 52, the shafts 22 and 36 respectively can be locked in position within the bores 38 and 40 with which they cooperate.

Carried at the left end of the cross shaft 36 as shown in FIGURE 1 is a fork member 54 which is suitably attached to the cross shaft by means of a weld, or a bolt, or the like. The fork member 54 has a pair of arms 56 and 58 between which is pivotally secured a lamp hood 60. The hood 60 is suitably apertured in the neck portion 62 thereof so as to receive lugs 64 projecting inwardly of the arms 56 and 58 of the fork member 54 for the pivotal coupling.

Disposed within the neck portion 62 of the hood 60 is a socket 66 adapted to receive an ultra-violet lamp bulb 68. Projecting forwardly of the neck 62 and in surrounding engagement to the bulb 68 is a generally cylindrical hood skirt 70, and the interior surface of the skirt 70 serves as a reflector to direct rays emitted by the lamp bulb 68 forward of the bulb.

In accordance with the invention, a holder 72 is snapped onto the bulb 68, and serves to support a filter 76 forward of the bulb 68. The filter 76 is carried in a parallelogram frame 78 with which the end portions 91 of fingers provided on the holder cooperate in a manner explained in more detail hereinafter.

The ultra-violet lamp bulb 68 may be of any well-known type now commercially available. Such bulbs produce substantially the entire ultra-violet ray spectrum, and as set forth at the outset of the present specification, the invention provides for eliminating the range of ultra-violet rays which cause erythema. To this end, the filter 76 according to the invention, comprises a sheet of clear, transparent plastic film adapted to suppress the harmful range of ultra-violet radiations, but transmit the beneficial range of such radiations. Preferably, all radiations between 2967 A. and 3150 A. are suppressed. A suitable media for suppressing this range of ultra-violet radiations is polyethylene terephthalate, and the preferred embodiment of the invention provides for utilizing such material for the filter 76.

It is important to pass all rays produced by the bulb 68 through the filter 76 so that all danger of harm from the rays will be eliminated. While the skirt 70 serves as a reflector and thus directs the rays forward of the lamp, the beam produced by the lamp is an expanding beam. Thus, according to the invention, the filter 76 covers an area at least as large as the beam spread at the position where the filter is disposed whereby all rays emitted from the lamp must pass through the filter.

Notwithstanding the fact that I have hereinabove described an overall lamp assembly which is self-supporting, it should be understood that a basic embodiment of the invention is merely concerned with the radiation source, reflector, and filter arrangement. That is to say, according to a basic emobdiment of the invention, there is provided a therapeutic radiant energy lamp assembly for emitting ultra-violet rays having a beneficial effect, while suppressing ultra-violet causing erythema, which assembly need only include a source, such as the bulb 68, producing an expanding beam of at least ultra-violet rays, a reflector such as the skirt 70 of FIGURE 1, disposed about the source for directing all of the rays produced by the source forward of the source, and a clear, transparent filter, such as that designated by numeral 76 in FIGURE 1, which is impervious to at least substantially the entire range of ultra-violet radiations which cause erythema. The filter is disposed in a position forward of the source, and as explained, covers an area at least as large as the beam spread of the source at that position.

The filter 76, as suggested above, is preferably carried in a frame 78, and the frame is maintained, by means of a frame support 72, forward of the ultra-violet lamp bulb 68. Preferably the bulb 68 has a globe portion 80 with a slightly convexly-curved front face 82 and a curved inwardly-tapering skirt 84 extending rearwardly of the front face.

The filter frame 78 preferably has a square configuration, as shown in FIGURE 5, and as explained in more detail herebelow. The frame support 72 is constructed, according to the invention, whereby it engages the edges of the filter frame 78, and snaps onto the lamp bulb 68.

As shown in FIGURE 4, the frame support comprises a ring 86, a plurality of support fingers 90, and a plurality of spring clips 92. The support fingers 90 extend laterally outward from one side of the ring 86, the underside as shown, at points spaced at least substantially equally about the ring. When a parallelogram filter is used, at least four of such support fingers are provided. The fingers have inturned ends 91 remote from the ring

86, and these ends pass around an edge of the frame 78 whereby such edge is supported between the inturned end 91 of a finger, and the finger proper. Since the frame is a parallelogram, and since four fingers are provided equally spaced about the ring 86, each edge of the frame is supported by one finger and its inturned end 91.

The fingers 90 preferably are formed of one portion of an elongated rod or wire which is attached intermediate its ends by a weld or the like with a frame 86. The other portion of the rod or wire is bent to form a clip. The clips 92, as shown in FIGURE 4, are arcuately bent to snap over and engage the peripheral area of the front face 82 of the lamp bulb and the inwardly-tapering skirt portion 84 thereof. More particularly, each clip comprises a base portion 95 which extends inwardly of the ring 86, an integral reversely-bent portion 96 which cooperates with the peripheral area of the front face 82 of the bulb 68, and an inwardly-bent elongated portion 98 cooperating with the tapering skirt 84 of the bulb 68. The ends of the clips 92 remote from the ring 86 are preferably folded over to provide a curved end which easily slides over the bulb without damaging it.

The rods from which the fingers and clips of the frame support 72 are formed are somewhat springy so that the support can be easily clipped on to the bulb 68, or more particularly the globe portion 80 thereof. The filter frame and filter can be carried in the frame support 72 at the time it is clipped onto the bulb, or it may be inserted between the fingers 90 and the inturned ends thereof after the support has been clipped on the bulb. The frame 78 is formed, as shown in FIGURE 5, from two stiff, but flexible plates 104 and 106. The plates preferably have a square configuration and are provided with central openings 108 and 110 which cover a major portion of the area of each of the plates. As shown in FIGURE 6, the filter 76, which takes the form of a sheet of plastic film, is disposed between the plates 104 and 106, and cemented to at least one of the plates as by an adhesive 112. The sheet of filter material 76 extends entirely across the openings 108 and 110, and the plates are stitched together at their outer edges with thread 114.

Although any suitable stiff, but flexible material may be used for the plates 104 and 106, preferably the plates are formed from cardboard, and although the openings 108 and 110 may have any configuration, preferably such openings are circular and aligned.

Since the filter frame is made from a stiff, but flexible material, it can be snapped between the inturned ends 91 of the fingers after the frame support 72 has been snapped on the lamp bulb 68. Moreover, the filter can be easily removed from a position in front of the lamp bulb if desired, by either snapping it out of engagement with the fingers 90, or by removing the frame support 72.

It should be understood that the terms and expressions which have been employed herein are used as terms of description and not of limitation, and that there is no intention in the use of such terms and expressions of excluding various modifications within the scope of the invention which will become apparent after reading the foregoing description.

What is claimed is:

1. An assembly for mounting a sheet of filter material impervious to the range of ultra-violet rays which cause erythema in front of an ultra-violet lamp whereby the lamp can be safely used for extended periods of time, comprising a filter material frame and a clip-on holder for supporting said frame, wherein said frame comprises a pair of sheets of stiff but flexible material provided with aligned enlarged openings extending through the major portions thereof, said sheets being joined together with said filter material therebetween and extending across said central openings, and wherein said clip-type holder comprises a ring, at least four support fingers extending laterally outward from one side of said ring at points equally spaced about said ring, each of said fingers having an inturned end remote from said ring adapted to pass around the edge of said frame whereby said frame is supported between the inturned ends of said fingers and said fingers, said holder also including a plurality of spring clip members projecting away from the other side of said ring and said filter, said clip members having arcuate configurations conforming, when sprung, with a portion of the outline of said lamp, whereby said clip members can be snapped about said lamp to manitain said ring and said fingers and thereby said frame forward of said lamp.

2. A therapeutic lamp assembly comprising the combination of a collapsible tripod base; a hollow base shaft supported by and extending vertically upward from said base; a support shaft adjustably reciprocal within said base shaft and adapted to extend thereabove; a coupling member having a first bore therein receiving the top end of said support shaft, and having a second bore extending therethrough above said first bore and angularly disposed with respect to said first bore; a lamp shaft slidably extending through said second bore; means carried by said coupling member for locking said lamp shaft and said support shaft in given positions within said bores; a fork member carried at one end of said lamp shaft; a lamp hood pivotally secured between the arms of said fork member, said hood having a lamp socket disposed therein; an ultra-violet lamp disposed in said socket; a clear transparent plastic filter impervious to ultra-violet radiation causing erythema; a frame for said filter, and a filter frame holder comprising a circular support ring and a plurality of bent rods disposed in spaced relation around said ring and having portions extending on either side of said ring, the portions extending on one side of said ring having configurations to engage said lamp whereby said holder can be clipped thereon, and the portions extending on the other side of said ring projecting laterally outward from said ring and having ends adapted to receive and support said frame.

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