Jan. 16, 1951 G. H. HANSEN ET AL 2,538,685

THERAPEUTIC IRRADIATOR FOR CONFINED AREAS

Filed March 8, 1948

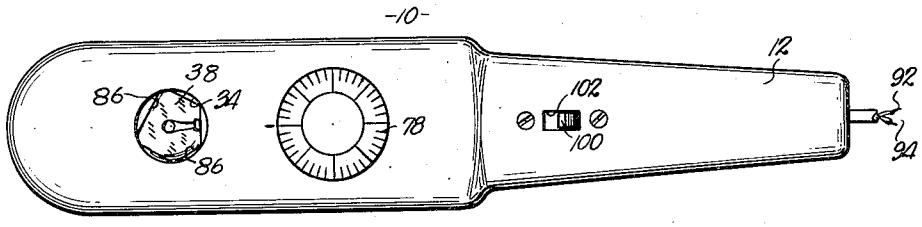


Fig. 1.

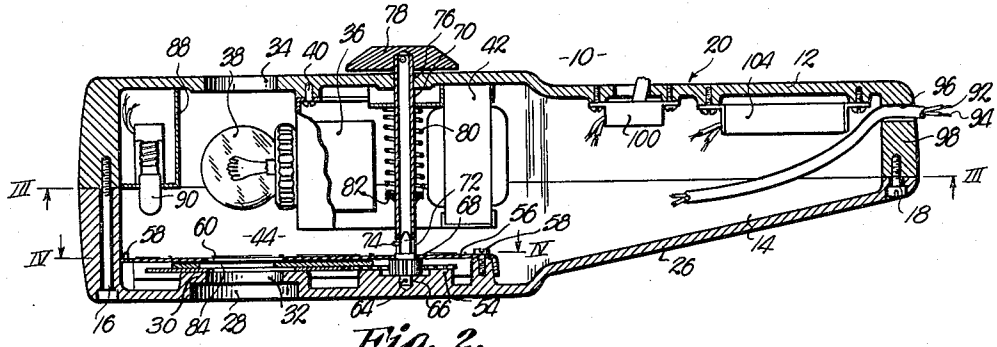


Fig. 2.

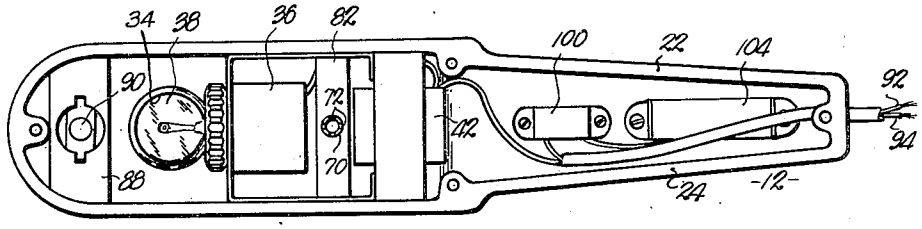


Fig. 3.

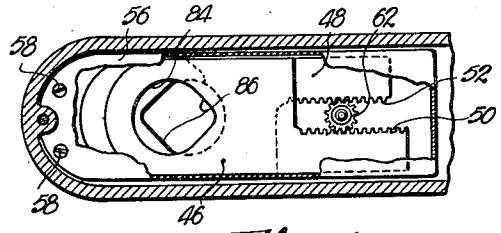


Fig. 4.

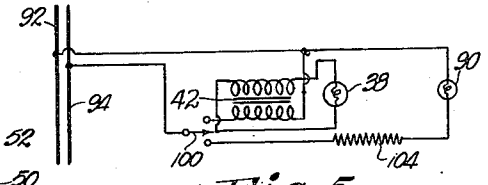


Fig. 5.

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Patented Jan. 16, 1951 2,538,685

UNITED STATES PATENT OFFICE

2,538,685

THERAPEUTIC IRRADIATOR FOR CONFINED AREAS

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Application March 8, 1948, Serial No. 13,678

3 Claims. (Cl. 240—1)

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This invention relates to the treatment of diseases, maladies and ailments generally through exposure of the affected areas to radiation, particularly ultraviolet light, radium rays and the like.

The primary aim of this invention is to provide a relatively small, compact irradiator capable of easy manipulation and use in otherwise inaccessible spots, yet inexpensive and simple to manufacture and having a neat and attractive overall appearance.

The most important object of this invention is the provision of a therapeutic irradiator having means to control the beam of heat and light thereof to any relatively small, confined area through employment of a specially formed shutter assembly.

Another important object of this invention is to provide in a therapeutic irradiator of the above mentioned character, means for rendering the small affected area visible through the body whereby the light rays may be directed precisely to the spot desired.

Other objects include the manner in which the area to be treated may be illuminated prior to treatment; the way in which the shutter means, the therapeutic lamp, and the illuminating means may all be controlled conveniently at the exterior of the instrument itself; and details of construction per se, of such character to accomplish all of the objects above enumerated as well as many other objects hereinafter more clearly set forth, reference being had to the accompanying drawing wherein:

Fig. 1 is a top plan view of a therapeutic irradiator for confined areas made in accordance with the present invention.

Fig. 2 is a vertical, longitudinal, substantially central cross-sectional view through the irradiator shown in Fig. 1.

Fig. 3 is an inverted plan view thereof, the lowermost body section being entirely removed.

Fig. 4 is a fragmentary cross-sectional view taken on line IV—IV of Fig. 2; and

Fig. 5 is a wiring diagram of the electrical system thereof.

A body, broadly designated by the numeral 10, constitutes a pair of substantially symmetrical hollow sections 12 and 14 fitted together in lip-to-lip relationship and removably held together through the medium of a pair of bolts or the like 16 and 18 at opposed ends of said body 10.

The configuration and form of this body 10 is highly important and necessarily specially formed as indicated in the drawing for several

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important reasons. In the first place the irradiator forming the subject matter of this invention is designed to be definitely portable and usable for treating spots ordinarily inaccessible by the conventional type of irradiator now in common use. In order to make the entire assembly relatively small, non-bulky and attractive in appearance and at the same time capable of containing all of the necessary parts, a portion of the body 10 forms a handle designated broadly by the numeral 20.

This portion 20 of the body 10 serves not only such purpose of providing the handle but being hollow, contains many of the component parts of the entire assembly. It is to be noted that the normally uppermost wall of section 12 forming the handle portion 20 of body 10 is offset and is substantially parallel with the remainder of the uppermost wall of section 12. As clearly indicated in Figs. 1 and 3, the handle portion 20 of body 10 has a pair of side walls 22 and 24 that converge as the outermost free end of the handle portion 20 is approached. Likewise, a bottom wall 26 for the handle portion 20 is disposed angularly from the main portion of body 10 toward the outermost free end of the handle portion 20. It is clear, therefore, that the handle portion 20 is somewhat smaller in cross-sectional area than the remainder of body 10 and presents an attractive and easily gripped portion when the entire irradiator is placed in use.

The section 14 of body 10 has an opening 28 formed in the normally bottom wall thereof and an in-turned annular flange 30 defines an opening 32 of smaller diameter than that of the opening 28. Similarly, the normally uppermost wall of the section 12 has an opening 34 formed therein of substantially the same diameter as the opening 32 in the section 14 and these openings 34 and 32 are in direct alignment.

An electrical socket 36 within the body 10 receives a lamp 38, the latter of which is disposed in direct alignment and between the openings 32 and 34 formed in the body 10. This lamp socket 36 is secured directly to one of the innermost faces of the section 12 of the body 10 through the medium of screws or the like 40.

A transformer hereinafter more fully described and designated by the numeral 42 is likewise secured to the section 12 within body 10. A shutter assembly broadly designated by the numeral 44 is mounted within the body 10 and directly upon the innermost face of the bottom wall of section 14. This shutter assembly 44 includes a pair of reciprocable plates 46 and 48,

each of which is substantially L-shaped and each having ratchet teeth 50 and 52 formed on one leg thereof respectively. These plates 46 and 48 are disposed in relative superimposed relationship, the plate 48 sliding directly upon the innermost face of flange 30 and upon inturned embossment 54 formed in the section 14. The plate 46 is slidable directly upon the uppermost face of the plate 48 and these two plates 46 and 48 are held against displacement by a covering plate 56 within the body 10 and secured to the section 14 through the medium of screws or the like 58. The plate 56 is provided with an opening 60 in co-axial alignment with the openings 32 and 34 of body 10.

A small gear 62 interposed between the legs of plates 46 and 48 having ratchet cogs 50 and 52 thereon, is in mesh with such cogs 50 and 52 and is secured to a stub shaft 64 journaled at one end thereof in an opening 66 formed in the section 14 of body 10 and at its opposite end within an opening 68 formed in the plate 56.

It is clear from the foregoing that rotation of the gear 62 will cause reciprocation of the plates 46 and 48 in opposite directions. The rotation of this gear 62 is accomplished manually through the medium of a tubular shaft 70 having longitudinal slots 72 formed in the normally lowermost end thereof for receiving a transverse pin 74 in the shaft 64. This tubular shaft 70 extends transversely through the body 10 and is journaled for free rotation in an opening 76 formed in the uppermost wall of section 12.

A knob 78 secured directly to the shaft 76 and exteriorly of the body 10 permits rotation of this shaft 70 and thereby the gear 62. A spring 80 coiled about the tubular shaft 76 and having one end thereof bearing against a shoulder 82 on shaft 76 and its opposite end bearing against a portion of the socket 36 yieldably holds the shaft 76 at the innermost end of its path of travel where the slots 72 and pin 74 are in engagement.

Each of the plates 46 and 48 is provided with an opening 84 intermediate the ends thereof and specifically in that leg thereof which overlies the opening 32 in body 10. These openings 84 are each substantially circular and provided with a triangular shaped portion 86. These portions 86 of the openings 84 are disposed in opposed relationship and as the plates 46 and 48 are reciprocated, the hole provided by the two openings 84 will vary from a substantially circular shape to one that is polygonal as indicated in Fig. 4 of the drawing. Thus, the amount of light that may pass from the lamp 38 through the openings 32 and 28 may be varied to the minutest size as desired. A bracket 88 formed in the section 12 of body 10 carries a small illuminating lamp 90 that is disposed in offset relationship with respect to the openings 32 and 34 and the lamp 38.

Referring now to Fig. 5 of the drawing, a pair of lead lines 92 and 94 symbolizing a conventional outlet cord extending into the body 10 through an opening 96 formed in the end wall 98 of section 12, connect with a suitable source of electrical energy not shown.

A manually manipulable switch 100 secured to the innermost face of handle portion 20 of body 10 has its actuating arm extending upwardly through elongated slot 102 formed in the body 10. As shown in Fig. 5, this switch 100 is movable to close a circuit either through the lamp 38 or 90 as desired. When the switch 100 is moved to one of its contacts, a circuit is closed through the lamp 38 by way of the transformer 42 and when

this switch 100 is moved to its other pole, a circuit is closed through the small illuminating lamp 90, this last mentioned circuit having a resistor 104 interposed therein. This resistor 104 is mounted within the body 10 adjacent end wall 98 thereof and near the switch 100.

Assuming the component parts of the therapeutic irradiator to be formed and assembled as above described, the operation is as follows:

The lead lines 92 and 94 are connected to a source of energy as by means of an outlet plug and the body 10 moved to the point where treatment is to be given by the operator grasping the handle portion 20 thereof. The knob is rotated to open entirely the shutters 46 and 48 to the end that the operator may easily see the spot to be treated by looking directly through body 10 from opening 34. By actuating the switch 100, the lamp 90 is energized to illuminate such spot, the rays of light from lamp 90 passing directly through the opening 32 when the shutter assembly 44 is entirely open. While viewing the spot to be treated through the opening 34, the operator may then gradually close the shutter assembly 44 by manipulating knob 78 until only the specific confined area is illuminated by the lamp 90. When this area has definitely been determined and the operator has the irradiator positioned precisely as desired with the shutter assembly 44 adjusted properly, the switch 100 is actuated to de-energize the circuit through lamp 90 and to energize the circuit shown in Fig. 5 through lamp 38. Lamp 38 has a transparent glass bulb, rendering the above viewing operation possible. The small deenergized filament thereof will have negligible interference.

This lamp 38 may have any of the many types of therapeutic characteristics such as ultraviolet or radium rays and when energized, the light and heat rays emanating therefrom will pass through the opening provided by the shutter mechanism 44 and thus outwardly through openings 32 and 28 of body 10.

It is clear from the foregoing that the instrument forming the subject matter of this invention, may be used to therapeutically treat any small confined area and in spots otherwise difficult to reach. When so used, only that portion of the body which needs treatment will receive the benefit of the rays from lamp 38 and other parts of the body will not become effected or injured thereby.

It is now also apparent that the precise shape and configuration of the body 10 is highly important to the entire assembly, all of the mechanism of the irradiator being effectively housed within body 10 and the entire assembly being attractive and easily used.

While only one embodiment of the present invention has been illustrated and described, it is manifest that many changes and modifications may be made particularly with respect to details of construction without departing from the broad spirit thereof as defined by the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A portable therapeutic irradiator of the kind described comprising an elongated, hollow body having a pair of opposed walls; an opening formed in each of said walls respectively, said openings being in alignment; an adjustable shutter on the innermost face of one of said walls only, movable to and from a position closing the opening of said

wall; manually operable shutter-actuating means coupled with the shutter and extending across the body through the other of said walls; and an electric, radiant energy creating tube having a transparent bulb mounted in said body between said walls in coaxial alignment with said openings.

2. A portable therapeutic irradiator of the kind described comprising an elongated, hollow body having a pair of opposed walls; an opening formed in each of said walls respectively, said openings being in alignment; an adjustable shutter on the innermost face of one of said walls only, movable to and from a position closing the opening of said one wall; manually operable shutter-actuating means, said means being rotatably mounted in said other wall; an electric, radiant energy creating tube having a transparent bulb mounted in said body between said walls in coaxial alignment with said openings; and coupling structure in said body having parts on the shutter and parts on said means for actuating said shutter upon rotation of said means.

3. A portable therapeutic irradiator of the kind described comprising an elongated, hollow body having a pair of opposed walls; an opening formed in each of said walls respectively, said openings being in alignment; an adjustable shutter on the innermost face of one of said walls only, movable to and from a position closing the opening of said

wall; manually operable shutter-actuating means coupled with the shutter and extending across the body through the other of said walls; an electric, radiant energy creating tube having a transparent bulb mounted in said body between said walls in coaxial alignment with said openings; an electric lamp in said body at one side of said openings, disposed to direct rays of light when illuminated toward the opening of said one wall; and manually operable means carried by said other wall for controlling alternate energization of said tube and said lamp.

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