March 29, 1955 L. B. NEWMAN 2,705,290

ULTRAVIOLET IRRADIATORS

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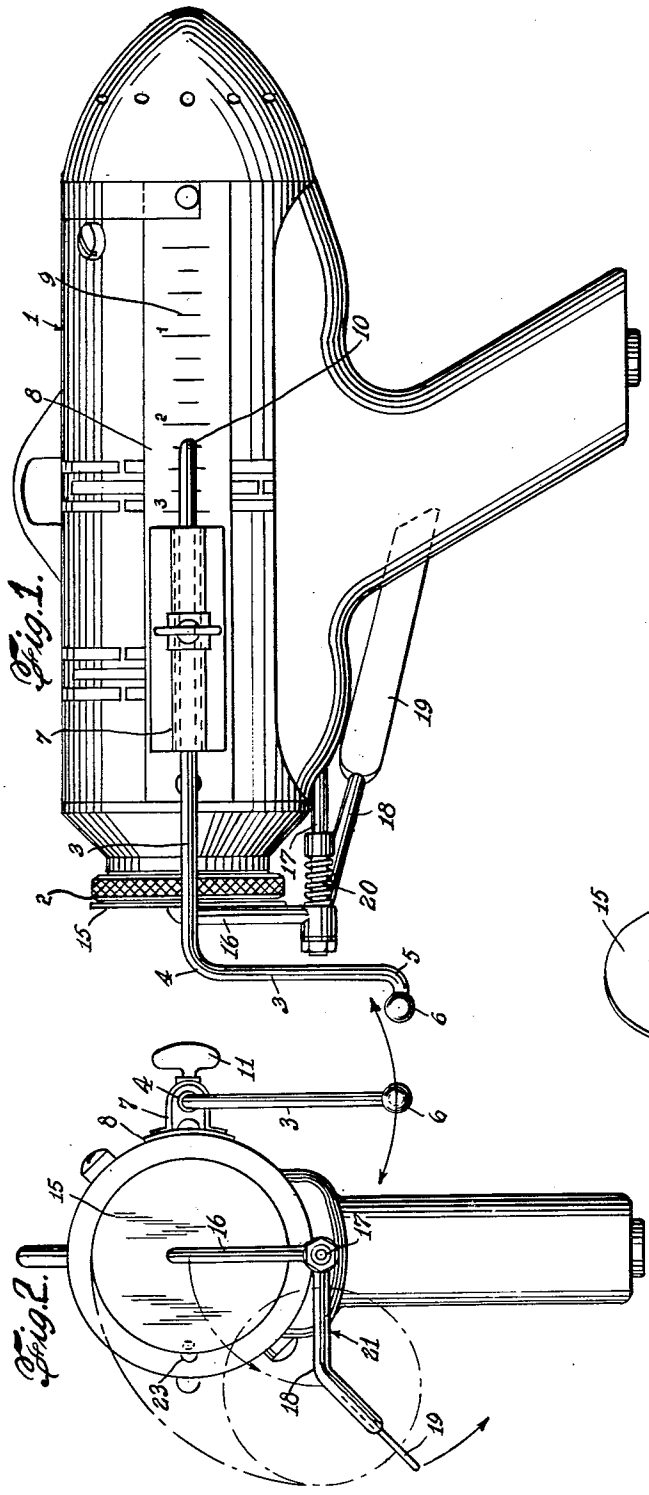


Fig. 1.

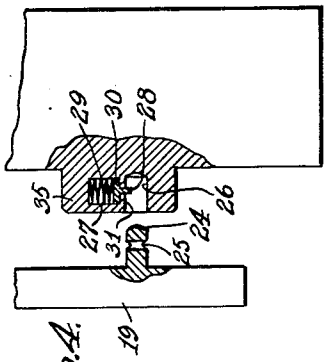


Fig. 4.

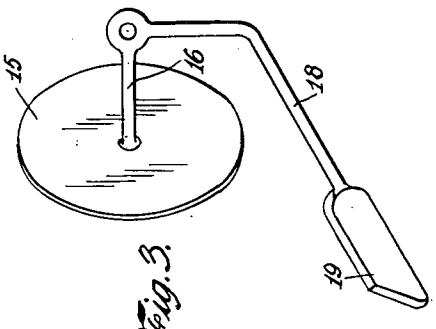


Fig. 3.

Fig. 2.

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ULTRAVIOLET IRRADIATORS

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6 Claims. (Cl. 250—88)

This invention relates, generally, to therapeutic lamps and is concerned in particular with improvements for such lamps whereby they are more suited for the treatment of human skin with ultra-violet radiations.

In the therapeutic treatment of diseased skin by ultra-violet rays it is customary to use an irradiator that will provide high intensity ultra-violet irradiation over a relatively small area. Conventional irradiators for this purpose consist mainly of an ultra-violet ray discharge lamp housed within a chamber having a window through which the energy from the lamp is transmitted. Examples of such irradiators are shown and described in Letters Patent Nos. 1,472,779 and 2,261,215.

While irradiators of this type are efficient and effective insofar as is concerned the actual performance of their function to emit ultra-violet rays, it is not uncommon during its use in certain cases, that injury results to the patient as a result of overexposure to the rays. In many cases, such as, for example, in the treatment of decubitis, a specific exposure time period for the treatment and a specific distance between the source and the surface being treated is indicated. These interrelated variables may involve a time period of a few seconds' duration depending on the intensity of ultra-violet energy and therefore must be carefully controlled. Exposures beyond the required short time period may result in further injury to the diseased area as well as to the healthy skin that surrounds it. Exposure at too close a distance from the skin will increase the intensity of the irradiation above that desired. Yet it is most difficult or practically impossible for the technician or doctor who administers the treatment to simultaneously observe the second hand on his watch, focus his attention on the small area undergoing treatment, hold or move the burner to direct the rays from the lamp onto this small area only, and maintain a predetermined distance of the lamp from the treated surface as required.

A further inconvenience in the use of such irradiators is the necessity to shut off the burner after each treatment. It has been thus found that when a series of treatments are to be given to different patients or to different portions of the body on a single patient the lamp must be repeatedly shut off and on. Much time is thus lost in waiting for the arc to form again, since as is well known, when the temperature of any part of the envelope of the electrical discharge device falls, condensation of the metal vapor is produced with a consequent decrease in vapor pressure and cessation of arcing.

It is, therefore, a general object of this invention to provide improvements on irradiators of the type hereinabove referred to for enabling proper control of the variables affecting treatment. A further object is the provision of such improvements that are simple in construction, easy to operate, and inexpensive to manufacture.

With the above and other objects in view, which will appear as the description proceeds, the invention consists in the novel details of construction, and arrangement of parts, described in the following specification and illustrated in the accompanying drawing.

In said drawing,

Figure 1 is a right side view of a hand operated ultra-violet ray irradiator provided with the attachments comprising my invention,

Figure 2 is a front view of the device shown in Figure 1,

Figure 3 is a perspective view of the shutter attachment,

Figure 4 is a partial front view of a modification of the shutter attachment.

According to my invention the reference character **1** designates a hand operated ultra-violet ray irradiator which may be of any suitable construction. In the present instance the irradiation device has been shown of the same construction as that described and claimed in said Letters Patent No. 2,261,215 the window of the device being indicated by the numeral **2**.

One feature of the invention is the provision of an adjustable distance rod that is mounted on the housing of the irradiator and is adapted for accurately setting the distance at which the irradiator should be operated from the surface to be treated. This rod is shown at **3** and it is preferably bent as at **4** and **5** so that it will contact the patient at a point that is spaced from the area to be irradiated whereby no pressure will be exerted on or near said area during treatment. A ball tip **6** on the end of the rod makes its point of contact more comfortable.

The rod **3** is slidably carried in a sleeve member **7** that is fastened, as by soldering, to the forward portion of the face of the plate **8**, said plate being secured along one side of the housing of the irradiator by screws or other suitable means. A distance scale is marked off on the plate as shown at **9**. The rod **3** extends through the sleeve member **7** and its end **10** indicates on the scale **9** the distance between the tip **6** and the window **2** measured along the line of the axis of the housing. When the rod is positioned to provide the desired distance for spacing the lamp from the patient, it is tightened in the sleeve member by means of the wing screw **11**.

In addition to the above described adjustable distance rod, the invention provides a shutter that is adapted for easy operation in cutting off the rays from the window of the irradiator for controlling the time period of the treatment. This shutter consists of a disc **15** constructed of any suitable material such as nickel, copper, steel or other refractory metal or refractory non-metallic materials that covers the window **2** and is carried by the bell crank **21** which is pivotally mounted on a pin **17** secured to the forward and lower portion of the irradiator housing. The arm **16** of the bell crank lever carries the disc **15** and is rotated on its pivot by means of the operating lever **19** that is fastened to or integral with the arm of the bell crank **18** and extends toward the handle of the irradiating device where it is in easy reach of the operator's finger. The disc **15** may also be made of any ultra-violet ray impermeable material.

Opening of the shutter by operation of the lever **19** is done against the tension of a spring, such as is shown at **20** coiled around the pin **17** and having one end thereof secured to the pin and its other end connected to the lever **21**. The normal tension of the spring urges the disc **15** into a position covering the window **2**. Thus, when the lever **19** is released the spring **20** will cause the disc to swing back to its "closed" position covering the window **2**. Movement of the disc beyond the window **2** is prevented by any suitable stop element such as by the ear or stop member **23** on the disc **15** that strikes against the rim of the window **2**. (See Figure 2.)

According to the embodiment of Figure 4 means are provided to hold the lever **19** in open position, thus relieving the operator from applying continuous finger pressure to the lever to keep the disc **15** in its "open" position. To accomplish this a cylindrical projection **24** is mounted on lever **19**. The projection **24** is provided with a groove **25** located adjacent its outer point. Mounted on the handle of the device in opposed relationship to the projection **24** is a flange **35** having a cylindrical opening **26** into which the projection is to be inserted. Arranged perpendicular to opening **26** is a passage **27** having a snub-nosed detent **28** mounted therein and biased towards opening **26** by means of compression spring **29**. Detent **28** has a flange **30** against which spring **29** abuts, which flange also serves to limit the travel of the detent by engaging flange **31** in passage **21**.

It is thus apparent that when the disc **15** is swung into "open" position by lever **19**; the lever can be held in "open" position by pushing the lever towards the handle of the device until the projection **24** enters opening **26** and the detent **28** engages groove **25**. In order to release

the lever **19** it is only necessary to push the lever in the opposite direction to release projection **24** from detent **28** and then the torsion spring **20** will operate to return disc **15** to its "closed" position.

What I claim is:

1. In a high intensity ultraviolet irradiation device including a housing with a forward window, the combination of an ultraviolet impermeable disc pivotally mounted on said housing and externally positionable to cover said window completely, lever means connected to said disc for moving said disc away from said window, spring means connected to said disc for moving said disc over said window upon release of said lever means, and a pistol-grip handle projecting from said housing for positioning said device, said lever means extending opposite said handle so that the lever may be actuated by the fingers of the hand which engages with said handle.

2. In an ultraviolet irradiation device having a housing and a window through which radiations are emitted, the improvement of a shutter device comprising an ultraviolet impermeable disc pivotally mounted externally on said housing and adapted to cover said window completely when in its closed position, means connected to said disc for rotating said disc on its pivot to an open position, spring means biasing said disc toward its closed position, stop means for preventing the movement of said disc beyond said window, and a pistol-grip handle projecting from said housing for positioning said device, said disk rotating means extending adjacent to said handle to permit the fingers of the hand which grasps said handle to operate said means.

3. In an ultraviolet irradiation device of high intensity including a housing, a pistol-grip handle portion projecting from said housing and a window through which radiations are emitted, the combination therewith of a shutter device to cover said window completely and to uncover said window alternately thus allowing said device to be in continuous operation, said shutter device comprising a pin mounted externally of said housing, a bell crank lever pivotally mounted on said pin, an ultraviolet impermeable disc affixed to one arm of said bell crank, said bell crank lever having a portion which extends in the vicinity of said handle portion so that it may be actuated by the fingers of the hand which grasps said handle portion, spring means operatively associated with said crank for biasing said disc to a closed position covering said window, and a stop member affixed to said disc and engageable with the side of said window for preventing the movement of said disc beyond said window.

4. In an ultraviolet irradiation device of high intensity including a housing, a handle portion and a window through which radiations are emitted, the combination therewith of a shutter device to alternately cover and uncover said window thus allowing said device to be in continuous operation, said shutter device comprising shutter actuating means movably mounted on said housing, an ultraviolet impermeable window cover affixed to said actuating means, spring means operatively associated with said actuating means for biasing said cover to a closed position covering said window, a stop member for preventing the movement of said cover beyond said window, and latching means mounted on said handle and on said actuating means, said handle and said actuating means serving as cooperating members, to hold said cover in an open position uncovering said window.

5. In an ultraviolet irradiation device of high intensity including a housing, a handle portion and a window through which radiations are emitted, the combination therewith of a shutter device to alternately cover and uncover said window thus allowing said device to be in continuous operation, said shutter device comprising shutter actuating means movably mounted on said housing, an ultraviolet impermeable window cover affixed to said actuating means, spring means operatively associated with said crank for biasing said cover to a closed position covering said window, a stop member for preventing the movement of said cover beyond said window, and latching means mounted on said handle and on said lever, said handle and said lever serving as cooperating members, to hold said cover in an open position uncovering said window, the latching means comprising a cylindrically grooved projection member mounted on one of said cooperating members, a part of the other cooperating member having an opening therein for the reception of said projection member, elastically biased detent means mounted within said opening and engageable in the groove of said projection member to retain said latter member in said opening.

6. In an ultraviolet irradiation device of high intensity including a housing, a handle portion and a window through which radiations are emitted, the combination therewith of a shutter device to alternately cover and uncover said window thus allowing said device to be in continuous operation, said shutter device comprising shutter actuating means movably mounted on said housing, an ultraviolet impermeable window cover affixed to said actuating means, spring means operatively associated with said actuating means for biasing said cover to a closed position covering said window, and a stop member for preventing the movement of said cover beyond said window, said handle and said actuating means serving as cooperating members, and including a latching means comprising a grooved projection member mounted on one of said cooperating members, a part of the other cooperating member having an opening therein for the reception of said projection member, elastically biased detent means mounted within said opening and engageable in the groove of said projection member to retain said member in said opening, said device being provided with an adjustable distance means comprising a sleeve member fastened on said housing and extending in the direction of said radiations, a rod passing through and extending beyond the ends of said sleeve member, a scale on said housing associated with one end of said rod for indicating the distance of the other end of said rod from said window measured in the direction of said radiations, and means for securing said rod in fixed position in said sleeve member.

References Cited in the file of this patent

UNITED STATES PATENTS

339,910	Marvin	Apr. 13, 1886
481,343	Bristol	Aug. 23, 1892
1,013,895	Penney et al.	Jan. 9, 1912
1,338,954	Oldfield	May 4, 1920
1,753,151	Israel	Apr. 1, 1930
2,093,835	Prouty	Sept. 21, 1937
2,261,215	Bird	Nov. 4, 1941
2,265,357	Demarest	Dec. 9, 1941
2,525,464	Springer	Oct. 10, 1950
2,551,703	Puls	May 8, 1951
2,593,526	Bell	Apr. 22, 1952