350-1.1 SR
OR 1,559,770
X 3014?
JC
Draftsman

Nov. 3, 1925. 1,559,770

R. G. PADDOCK

TRANSMITTING MEANS FOR ULTRA-VIOLET RAYS

Filed Sept. 17, 1921

T4038
λ 133
X 2
λ 2

Fig. 1.

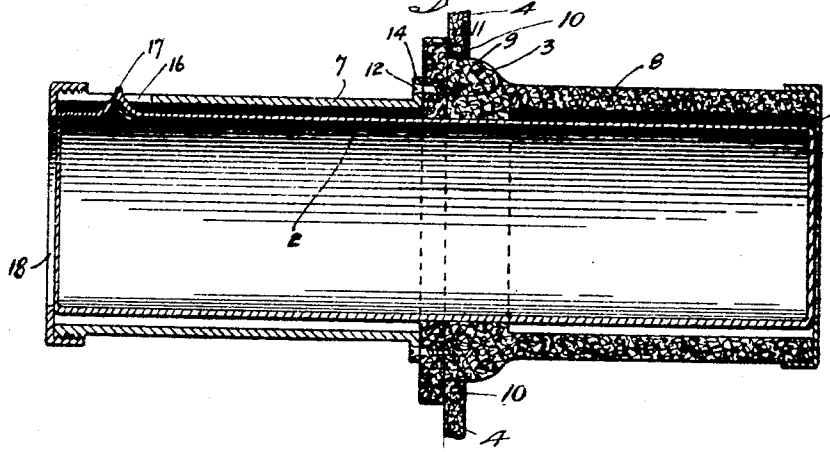


Fig. 2.

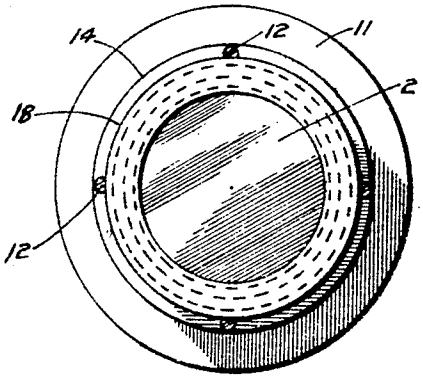


Fig. 3.

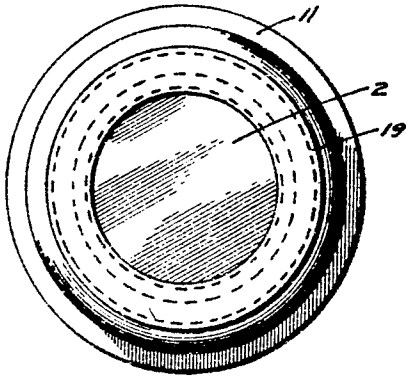
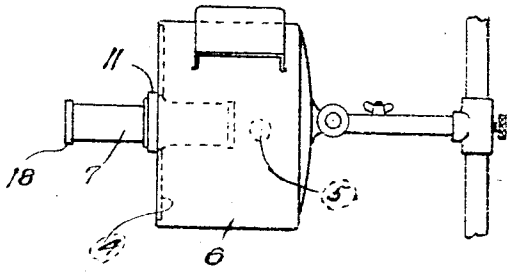


Fig. 4.



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UNITED STATES PATENT OFFICE.

ROBERT G. PADDOCK, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO H. L. MACNEILL, OF SAN FRANCISCO, CALIFORNIA.

TRANSMITTING MEANS FOR ULTRA-VIOLET RAYS.

Application filed September 17, 1921. Serial No. 501,235.

To all whom it may concern:

Be it known that I, ROBERT G. PADDOCK, a citizen of the United States, and resident of San Francisco, county of San Francisco, and State of California, have invented a new and useful Transmitting Means for Ultra-Violet Rays, of which the following is a specification.

The present invention relates to improvements in therapeutic lamps generally, and its particular object is to provide means in connection with the said lamps for facilitating the use of ultra-violet rays of extremely short wave length. It is well known among those familiar with the art that of the rays emanating from an intense light, like the mercury arc light commonly used in therapeutic lamps, only those exceeding in their wave length certain dimensions, usually 2000 Ångström units, are successfully used for therapeutic purposes, rays of shorter wave length, although considered by experts as more effective than the longer ones, going to waste due to the failure of the present lamp to properly transmit them to the object to be treated. The light sends out heat as well as light, which heat is very intense in its immediate proximity and to prevent the burning of the patient's skin, the latter either has to be held a certain distance away from the lamp or protecting means absorbing the heat units have to be interposed between the lamp and the skin to be treated. As such protecting means water is now commonly used, but it is a fact that the short wave rays mentioned will not penetrate water nor will they travel very far in air so that in either case the latter rays do not reach the patient.

These short wave rays will, however, penetrate a vacuum and certain gases without appreciable loss in energy and it is on this fact that my improvement is based, which, briefly stated, consists in the interposition of a vacuum or gas of the character described between the lamp and the patient, thereby reducing the heat without affecting the short wave rays.

The preferred form of reducing this principle to practice is shown in the accompanying drawing, it being understood that the principle may be carried out in different ways without affecting the spirit of my invention. Figure 1 in the drawing shows a longitudinal section through my device; Figure 2 an end view of the same taken from the left hand side; Figure 3 an end view taken from the right hand side, and Figure 4 an assembly view showing a fragmentary view of a therapeutic lamp having my device attached to it.

Referring to the drawing in detail, I show in Figure 1 a tube (2), which is air tightly sealed and from which the air has been removed. I preferably use a vacuum tube since a vacuum does not perceptibly affect the short wave rays. There are, however, gases which allow the latter rays to pass freely, such as hydrogen, and it may be found more convenient to substitute one of those gases for the vacuum. The tube itself is made of quartz glass, which also allows short wave rays to pass freely.

Ordinary glass would not answer the purpose since it absorbs all ultra violet rays and would defeat the object.

This tube is interposed between the light (5), which may be of any desired construction, and the patient in any feasible manner. The device selected for the drawing comprises an exterior tube (3) set into a screen (4) forming the front wall of the lamp (6). The screen (4) is preferably made of material shutting off the heat as well as the light, such as asbestos, and has a central aperture 10 through which the outer tube (3) may be inserted. In the drawing the tube 3 is shown as consisting of two sections (7) and (8), the latter having an annular enlargement (9) near the center of the tube which fits into the aperture in the screen and a collar (11) adjacent to the same to bear against the wall. It is preferably made of asbestos or some similar material. The section (7) is designed to extend out of the lamp and is secured to the collar (11) by means of screws (12) penetrating a flange (14) and secured in the collar. A longitudinal slot (16) is provided in the section (7) for the projection (17) ordinarily left in the manufacture of a vacuum glass tube. The material of the section (7) of the tube 3 may be metal or any material adapted to properly protect the glass tube. To secure the glass tube against axial motion within the exterior tube, caps (18) and (19) are provided for the same, both caps having a central aperture slightly smaller than the glass tube so as to prevent the latter from passing through the same. One

of the caps, (18), is screwed to the end of part (7), while the other cap, (19), is preferably permanently secured on part (8). The exterior tube need not be in contact with the glass tube throughout its length, it being sufficient if the contact is limited to a central portion as shown in the drawing.

The length of the tube may be varied from a few inches to several feet to meet the requirements. In use the inner end of the tube may be brought in direct contact with the lamp or disposed any desired distance away from the same. As heat is slowly transmitted through a vacuum and along the walls of a vitreous tube, the latter will not become objectionably warm at its outer end even though only a few inches long, when used for periods of ten or fifteen minutes. I have found by actual experience that the outer end of a tube seven inches long increased but a few degrees in temperature after a period of one hour when the inner window was kept at a distance of one-half inch from a hot mercury arc lamp, where the temperature was continuously between 400 and 450° F.

I claim:

1. Means for transmitting ultra-violet rays of short wave length through a distance, comprising a vessel having quartz windows arranged in opposing relation and a short-wave transmitting gaseous medium between the windows.

2. Means for transmitting ultra-violet rays of short wave length through a distance, comprising an evacuated vessel having quartz windows arranged in opposing relation.

3. Means for transmitting ultra-violet rays of short wave length through a distance, comprising two short-wave transmitting windows, means for holding the same in spaced relation formed to air-tightly enclose a space between the same and a gaseous short-wave transmitting medium confined in the enclosure.

4. Means for transmitting ultra-violet rays of short wave length through a distance, comprising two quartz glass windows, means for holding the same in spaced relation formed to air-tightly enclose a space between the same and a gaseous short-wave transmitting medium confined in the enclosure.

5. Means for transmitting ultra-violet rays of short wave length through a distance, comprising two quartz glass windows and means for holding the same in spaced relation formed to air-tightly enclose a space between the same, the latter space being evacuated.

6. Means for transmitting ultra-violet rays of short wave length through a distance, comprising two short-wave transmitting windows and means for holding the same in spaced relation formed to air-tightly enclose a space between the same, the latter space being evacuated.

ROBERT G. PADDOCK.