

June 4, 1929.

T. J. BARRETT

1,715,634

APPARATUS FOR GENERATING INFRA-RED RAYS

Filed Sept. 23, 1926

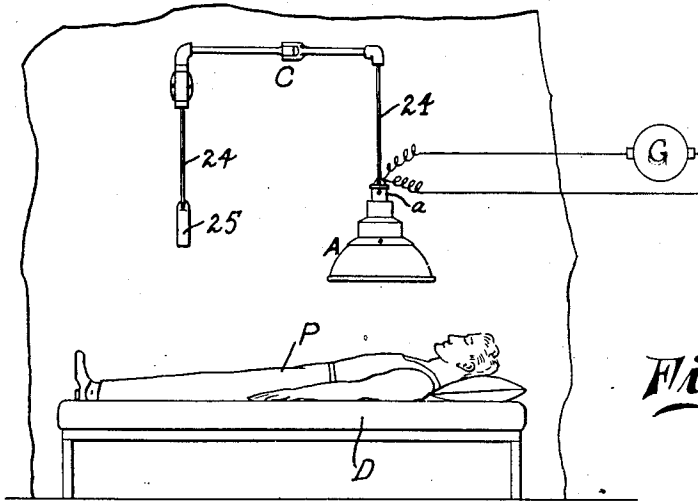


Fig. 1.

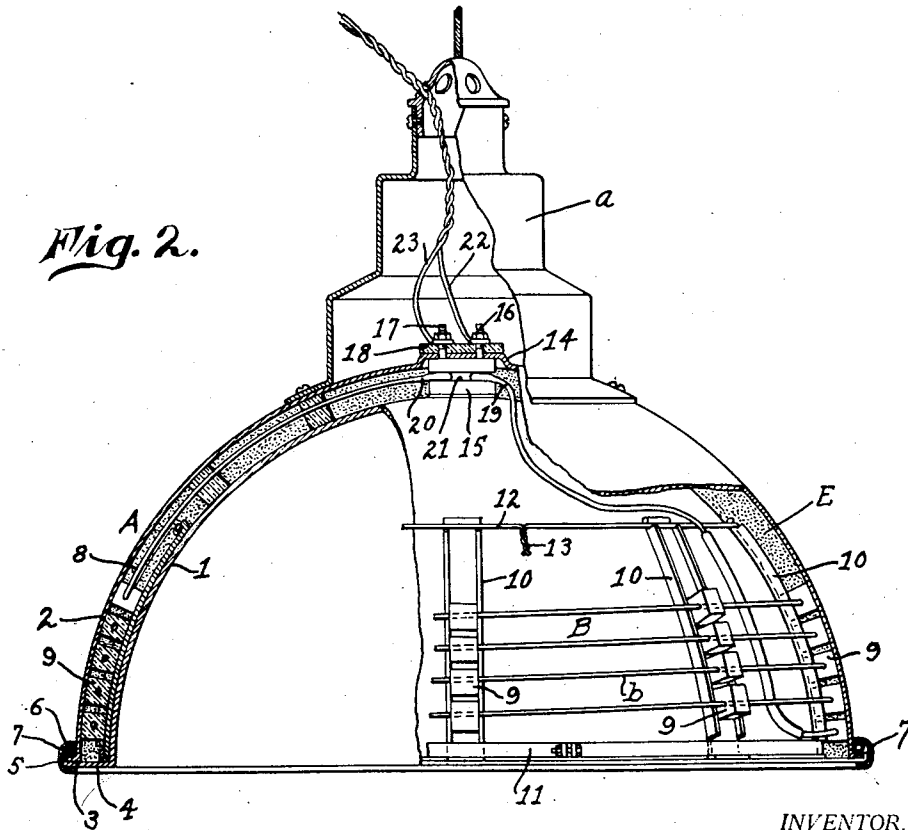


Fig. 2.

INVENTOR.
Thomas J. Barrett
BY
Blakeslee & Brown
ATTORNEYS.

Patented June 4, 1929.

1,715,634

UNITED STATES PATENT OFFICE.

THOMAS J. BARRETT, OF LOS ANGELES, CALIFORNIA.

APPARATUS FOR GENERATING INFRA-RED RAYS.

Application filed September 23, 1926. Serial No. 137,353.

This invention relates to therapeutics, and more particularly to a new apparatus for generating and applying infra-red rays in the treatment of diseases of the human, or other bodies.

The solar spectrum is composed of certain forms of energy, manifested by wave lengths of varying lengths. 80 per cent of the energy is known as "infra-red energy." The infra-red is below the point of visibility to the human eye. 13 per cent of the energy comes within the range of the human eye and is known as light. Seven per cent of the energy is the extremely short wave lengths, invisible to the human eye and known as "ultra-violet." The infra-red energy is composed of the very long invisible waves. The ultra-violet is composed of the very short invisible rays.

Certain substances radiate infra-red rays when heated. The particular wave length of infra-red rays given off depends upon the temperature of the radiating body. At low temperatures the energy given off is the extremely long waves. As the temperature of the radiating body is increased, the wave length of the energy decreases.

A peculiarity of the infra-red is that it is given off in greater volume by a black body. Black iron will give off a greater volume than gray iron. Black copper will give off a greater volume than burnished copper.

The volume of infra-red ray energy depends upon the extent of the surface of the radiating element. If the surface of the radiating element is small, the volume of infra-red energy will be small. If the area of radiating surface is large the volume of infra-red ray energy will be large.

In other infra-red generators, the source of the energy has been the "surface of the heating element itself." In the present apparatus, the source of the infra-red energy is "the surface of the radiating element." In other forms of generators, the energy is all taken from the field of visible light, at a constant temperature of high degree. The volume of infra-red is thus a negligible quantity and also a very narrow band of energy of extremely short wave lengths. In the present apparatus, we have a radiating element of several hundred square inches, the element being heated from a mild temperature of about 212 degrees in parts of its surface to about 800 degrees in other parts. We thus secure a wide range of energy, both the long

waves and the short waves all well within the field of infra-red.

The general object of the invention is to provide a simple and improved apparatus for generating infra-red rays of varying wave lengths and in greater volume than heretofore, and also an apparatus that is of such a design as to make it convenient and practicable to apply such rays to the human, or other bodies, for therapeutic purposes.

A more particular object is to provide an apparatus of the character stated, in which heat is applied to a plate of suitable material, such as copper or iron, externally of the radiating surface thereof, so that said plate will give off infra-red rays of varying wave lengths and in greater volume than otherwise, from its radiating surface, for application in the treatment of diseases, thus enabling the patient to receive on the surface of the body the greatest possible volume of said infra-red rays.

With the above and other objects in view, the invention consists in the novel and useful provision, formation, association, construction, and relative arrangement of parts, members and features, all as disclosed in the accompanying drawing, described generally, and more particularly pointed out in claims.

In the drawing:

Figure 1 is a side elevation of the invention illustrating how it is applied to a patient lying on a table; and,

Figure 2 is a view of the invention on a large scale, shown partly in elevation and partly in section.

Corresponding parts in both figures are designated by the same reference characters.

The invention includes a semi-spherical hood A formed with an inner radiating wall 1, an outer wall 2, spaced outwardly from said inner wall, and a cupola α upstanding centrally from the top of said outer wall, there being a heating element B interposed between said inner and outer walls extending upwardly from the lower edge of the hood A slightly over one-half the height of the hood.

The outer wall 2 is formed at its lower edge with an external flange 3 against which engages an external flange 4 on the lower edge of the inner wall 1, there being an upstanding flange 5 on the outer edge of the flange 4 which extends upwardly over the outer edge of the flange 3. A gasket 6 rests upon the flange 3 and a clamp ring 7 extends over the flanges 4 and 5 and over the gasket 6 and en-

gages the lower side of flange 4 and the upper side of said gasket, whereby the flanges 3 and 4 and said gasket are clamped together and the walls 1 and 2 firmly secured together at their lower edges.

The heating element B comprises an electrical coil of wire *b* which extends externally of the radiating wall 1 in the space 8 between said wall and the outer wall 2, the strands of said coil being spaced apart and extending through blocks 9 of insulation fitted in arcuate channel irons 10 secured on the outer side of the reflecting wall 1 at suitable distances apart. A clamp band 11 extends around the lower ends of the channel irons 10 and clamps said ends against the wall 1 while a wire 12 with its ends twisted together at 13 extends around the upper ends of said channel irons and holds said ends against said wall.

The outer wall 2 of the hood A is impressed outwardly at the top at 14 to receive a block 15 of insulation which is secured in said impression by binding posts 16 and 17 extending through the outer wall 2 and through a plate 18 of insulation on top of said wall within the cupola *a*. The ends 19 and 20 of the heating coil *b* are connected to the lower ends of the binding posts 16 and 17 respectively in the block 15 which is grooved at 21 to receive said ends of the coil. Leads 22 and 23 are respectively connected to the binding posts 16 and 17 and extend upwardly through the cupola *a* to the poles respectively of a generator G. The space 8 between the walls 1 and 2 is packed with a heat insulating material E external to heating element B, which conserves the heat within the space between the walls 1 and 2, thus bringing the copper dome up to the effective temperature for the radiating of the greatest possible volume of infra-red rays, said temperature being desirably from 250 degrees Fah. to approximately 800 degrees Fah., the heat insulating material placed externally to the heating element thus enabling the use of a smaller amount of electrical energy in generating an effective heat in the radiating element and making it more economical in operation. The outer wall consists of aluminum, or other suitable metal or material. The purpose of this wall is to lend an elegant appearance to the apparatus, protect the internal parts and specifically to furnish a backing for the heat insulating material and a convenient part for the suspension of the apparatus in any desired way.

The top of the cupola *a* is connected to one end of a rope 24 which extends through an adjustable bracket C and is connected at its other end to a weight 25. The bracket C is mounted on a wall to be adjusted so that the hood A may be let down over different parts of the body of a patient P lying on a table D. The weight 25 balances the hood in any position in which it may be lowered.

The lower portion of the wall 1 which is

heated directly by the coil B gives off infra-red rays of shorter wave length than the upper portion of said wall which is heated only indirectly by the coil by conduction and convection, thus enabling the wall 1 to radiate infra-red rays of varying lengths corresponding substantially to the radiation of such rays by the sun which have great therapeutic value.

The concavity of the wall 1 gives the wall a much greater radiating area than a flat plate corresponding in area to the area of the internal base of the hood A. Infra-red rays are given off entirely according to the surface area of the radiating element; therefore the dome-shaped element affords the greatest area practicable in a treating apparatus for generating the infra-red rays.

The inner wall 1 is made of a suitable metal, or material, such as copper or iron. Copper has a special advantage in this respect: Infra-red rays are given off in greater volume from a black substance. By heating the copper to an annealing temperature, it turns black. In this manner we have not only a substance which gives off infra-red rays efficiently, but we also have the desirable black body, which in other equipments may be secured by use of black paint or enamel.

It is obvious that various changes, modifications and variations may be made in practicing the invention, in departure from the particular showing of the drawing, without departing from the true spirit of the invention.

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. In an apparatus as described, a concavo-convex metal plate for radiating infra-red rays, and a heating element on the convex side of said plate for directly heating said plate only a portion of its area for enabling the plate to radiate infra-red rays of varying wave lengths from its concaved surface.

2. In an apparatus as described, a metal plate for radiating infra-red rays, and a heating element for heating only a portion of said plate directly for enabling said plate to radiate infra-red rays of varying wave lengths.

3. In an apparatus as described, an inner wall for radiating infra-red rays, an outer wall spaced from said inner wall, and an electric heating coil between said walls for causing said inner wall to radiate infra-red rays, and a packing of heat insulating material between said walls.

4. In an apparatus as described, a dome-shaped wall, and an electric heating coil surrounding the lower portion of said wall for causing said wall to generate infra-red rays of different wave lengths.

In testimony whereof, I have signed my name.

THOMAS J. BARRETT.