No. 768,827. PATENTED AUG. 30, 1904.

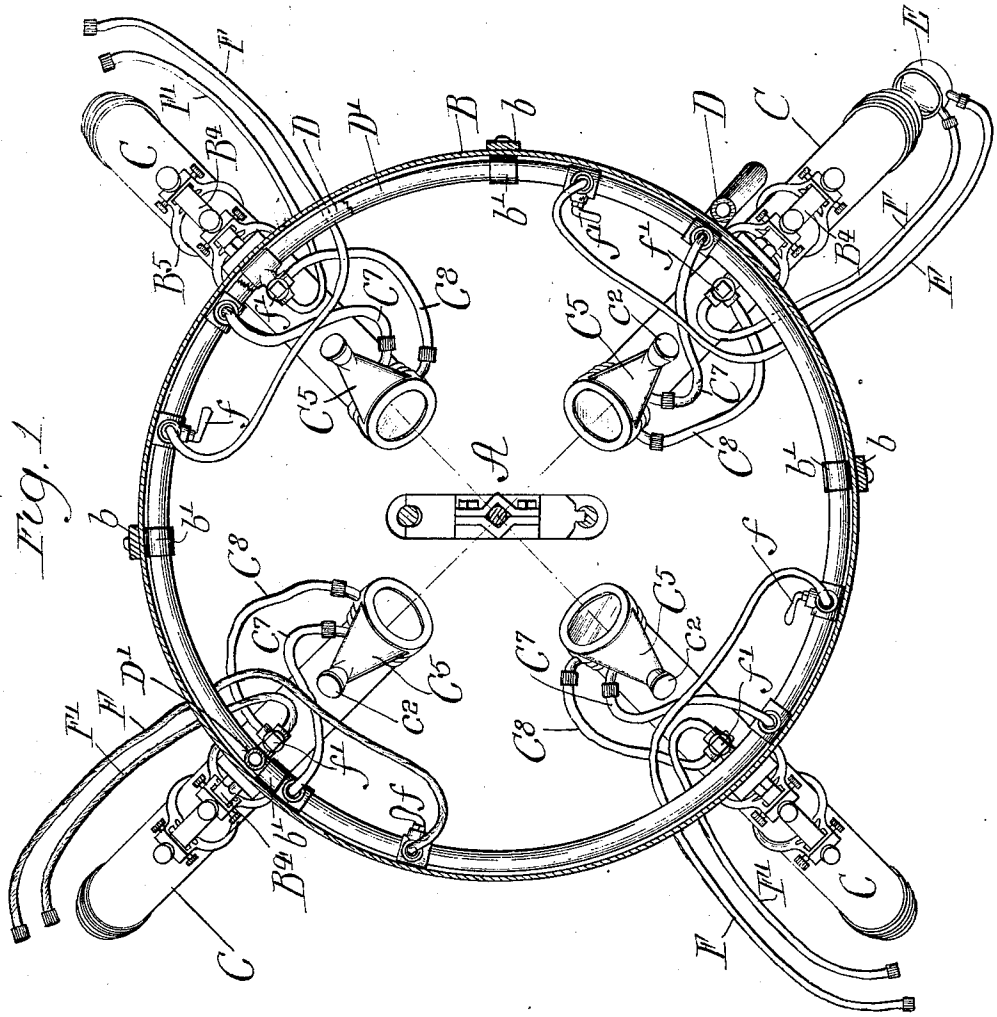
C. F. STEWART.

APPARATUS FOR TREATING DISEASES BY LIGHT RAYS.

APPLICATION FILED MAY 19, 1904.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
H. C. Barnett
W. S. Hall

Inventor:
Charles Frederick Stewart
by Poole & Brown
his Attys

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3

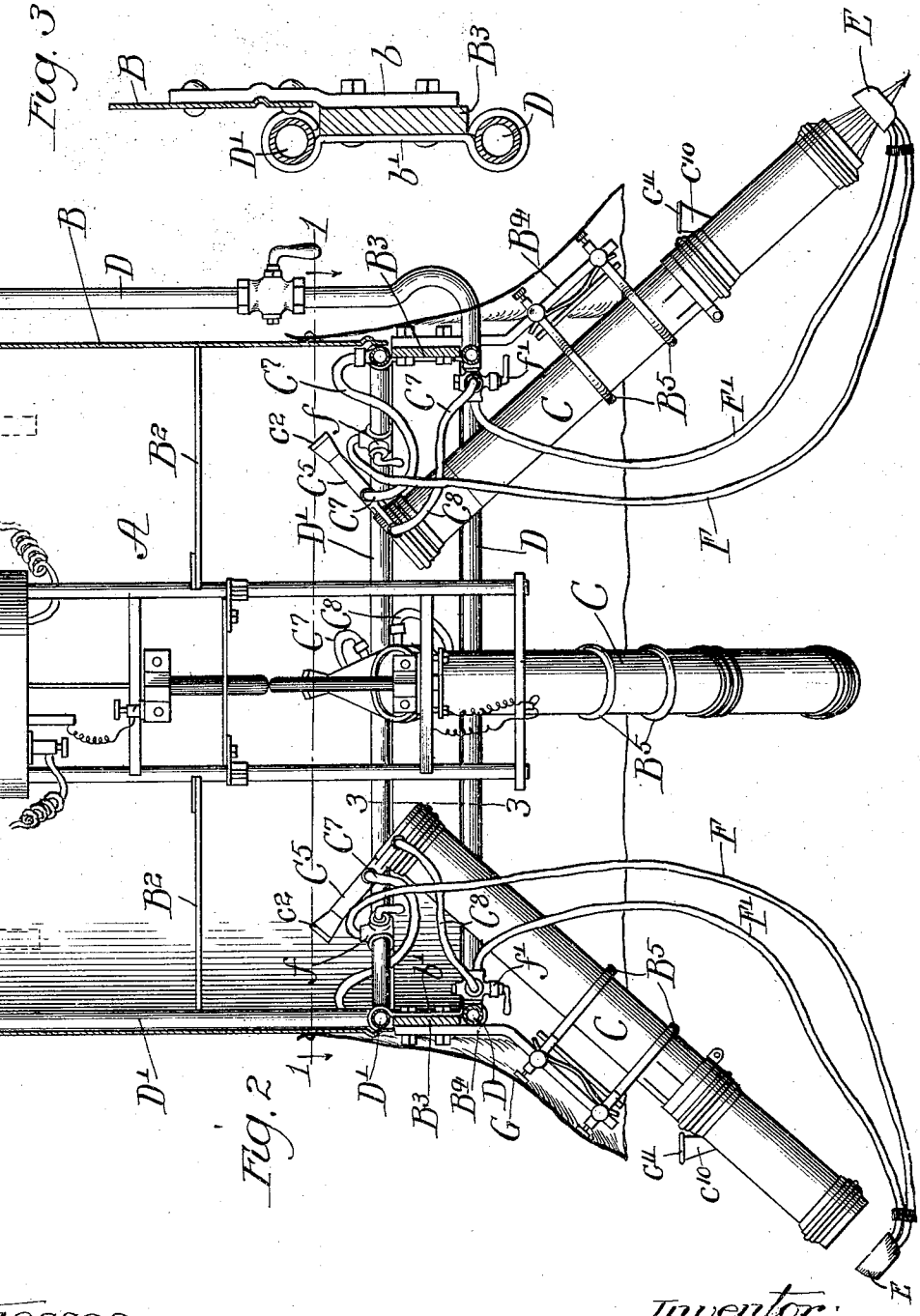


Fig. 2

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NO MODEL. 3 SHEETS—SHEET 3.

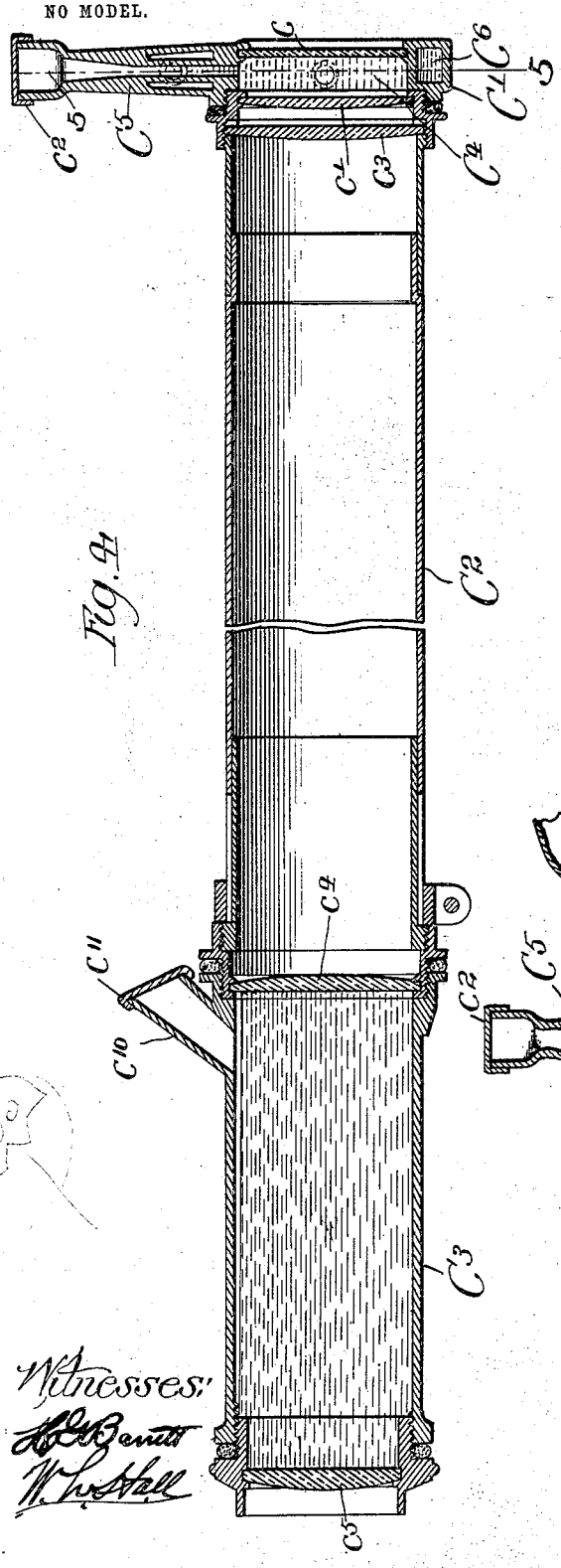


Fig. 4

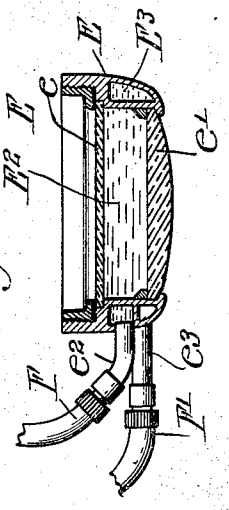


Fig. 6

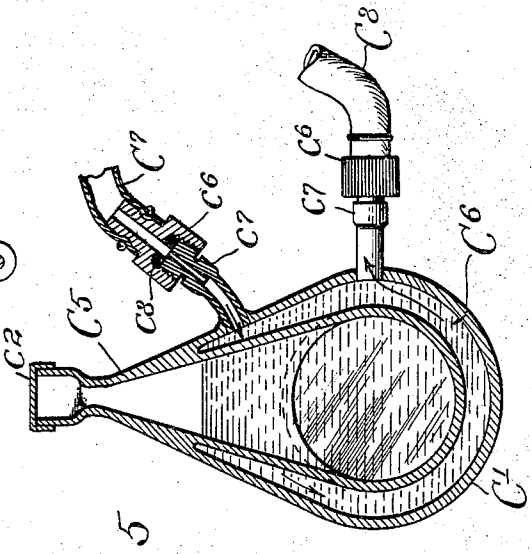


Fig. 5

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No. 768,827. Patented August 30, 1904

UNITED STATES PATENT OFFICE.

CHARLES FREDERICK STEWART, OF CHICAGO, ILLINOIS.

APPARATUS FOR TREATING DISEASES BY LIGHT-RAYS.

SPECIFICATION forming part of Letters Patent No. 768,827, dated August 30, 1904.

Application filed May 19, 1904. Serial No. 208,774. (No model.)

To all whom it may concern:

Be it known that I, CHARLES FREDERICK STEWART, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Treating Diseases by Light-Rays; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a novel apparatus for the utilization of light-rays for the treatment of diseases, more especially affections of the skin; and the invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

Among the objects of my invention is to produce an apparatus by which the curative rays of high-power light are employed as a remedial agent for the curing of skin and blood affections, such as lupus, eczema, and epithelioma.

As shown in the drawings, Figure 1 is a horizontal section of an apparatus embodying my invention, taken on line 1 1 of Fig. 2, with parts omitted. Fig. 2 is a vertical section thereof, with parts shown in elevation. Fig. 3 is a detail vertical section taken through the lower ring of the supporting-casing, showing the means for attaching said ring to the main part of the casing and the means for fixing the annular parts of the cooling-water supply and return-pipes to said ring. Fig. 4 is a detail view of one of the tubes. Fig. 5 is a transverse section of the head of one of the tubes, taken on line 5 5 of Fig. 4, showing one of the hose and its connection with the head for the circulating cooling liquid in section and the other hose and its connection in elevation. Fig. 6 illustrates one of the movable focusing devices for directing the light passing from the tube upon the affected parts.

As shown in the drawings, A designates a special electric-arc lamp, which is surrounded by a sheet-metal casing or inclosure B, herein shown as made cylindric. Said casing is adapted to be suspended from an overhead support by means of rods B′, and the electric-lamp structure is supported from the casing by means of radially-arranged bars B^2.

C C designate a plurality of light-tubes, which are supported from said casing in an inclined position with their inner ends directed toward the point of radiance of the arc and with their lower ends directed downwardly and outwardly in general symmetrical order. Said tubes are supported from a ring B^3, attached to the lower margin of the casing B by means of brackets B^4, suspending therefrom, and hangers B^5, attached to the brackets and surrounding the tubes. The said ring B^3 is supported from the casing B through the medium of a plurality of straps *b*, as shown in Fig. 3.

The detailed construction of the several tubes is identical, and reference is made to Figs. 4 and 5 for specific illustration thereof. By reference to said figures it will be noted that said tube comprises in general terms a head-section C′, an intermediate section C^2, and a lower end section C^3, the parts being secured together by suitable screw-threaded connections, as shown. Said head-section is provided with a chamber C^4, which is formed between a circular glass plate *c* and a plano-convex lens *c′*, which is suitably secured in said head, and said chamber is adapted to be filled with a body of sterilized water or like liquid, the purpose of which is to absorb some of the heat from the light-rays passing therethrough. Said head also carries just inside the plano-convex lens *c′* a second plano-convex lens c^3, parallel with the first-mentioned lens. The said head is provided with a filling-nozzle C^5, by which the water in the chamber is replenished, and said nozzle is closed by a cap c^2. Located at the lower end of the intermediate section C^2 is a plano-convex lens c^4, and a fourth plano-convex lens c^5 is located at the lower end of the end section C^3. The intermediate section C^2 is free or unobstructed throughout its length. Said tube is made up of suitably-shaped screw-threaded sections constructed to permit the ready removal and insertion of the lens and provided with suitable packing-joints to retain the cooling liquid.

The end section C^3 of the tube between the lenses c^4 c^5 is filled with water, the purpose of which is to cool the light-rays passing therethrough and also to refract the rays, so as to properly focus the same at the lower or directing end of the tube. The water or other liquid is supplied to the chamber in the lower end section of the tube through a nipple c^{10}, closed by a cap c^{11}. The body of the sterilized water in the chamber C^4 of the head of the tube is kept suitably cooled by the circulation of water therearound, the water being circulated through a surrounding passage or chamber C^6. (Shown more clearly in Fig. 5.) The water is supplied to and drawn from the cooling-chamber C^6 through the medium of supply and discharge pipes C^7 C^8, leading from a suitable source supplying water, as will hereinafter more fully appear. The pipes or hose C^7 C^8, which are preferably made of flexible rubber or the like, are provided at their ends with short tubes c^6, made of vulcanized rubber or the like, and which are enlarged at their outer ends and interiorly screw-threaded to fit over exteriorly-screw-threaded nipples c^7 on the head. Packing-gaskets c^8 are fitted between the said nipples and interior annular shoulders in said tubular connecting-fittings c^6. The hose or pipes C^7 C^8 of the several light-tubes are connected with supply and return pipes D D′, respectively, which are herein shown as supported within the casing B upon the lower ring B^3 thereof, as more clearly seen in Fig. 3, said pipes being fastened to said ring by tie-bars b', which are secured to the ring and folded at their upper and lower ends about said pipes.

The tubes are provided with focusing and cooling devices E (shown in detail in Fig. 6) and which are adapted to receive the rays focused from the lenses of the tube C and to effect the final focusing and cooling of the rays upon the part being treated. Such separate focusing device is desirable inasmuch as by its use it is unnecessary to accurately place the patient under the light-tube. The focusing device E consists of a casing E′, provided with a chamber E^2, located between a circular plate of glass e and a plano-convex lense e', and said chamber is adapted to contain a body of sterilized water. Said chamber is surrounded by a circulating passage or chamber E^3, through which is adapted to be circulated a cooling liquid to keep properly cooled the sterilized water in the chamber E^2. Cooling-water is supplied to the passage E^3 through the medium of two hoses or pipes F F′, which are connected, respectively, with the supply and return pipes D D′. The connection of said hose with the supply and return pipes embraces faucets f f', by means of which the water may be cut off from said pipes when the fucusing devices are detached from said hose. The manner of connecting the pipes or hose F F′ with the receiving and discharging nipples e^2 e^3 of the circulating passage or chamber is the same as that illustrated in connection with the head in Fig. 5. The pipes C^7 C^8, which supply and discharge water from the heads C′, are connected with said supply and return pipes D D′.

A flexible shield G surrounds the lower end of the casing and extends below the margin thereof to shield the operatives and patients from the intense light of the lamp A.

In the use of the light produced by the apparatus the patient is placed with the affected part closely adjacent to the lower end of one of the light-tubes, which latter are properly furnished with water to cool the light-rays in their passage through the tube. The focusing device E, being filled with water and the cooling-passage thereof connected with the water supply and return pipes D D′, is held between the lower lens c^5 of the tube and the part to be treated in such manner as to properly focus the light on the affected part, and the duration of the exposure to the light depends upon the ailment and the intensity of the lamp A. The measurements of the lenses depend upon the length of the light-tube, it being the purpose thereof to properly focus the light, in connection with the focusing device E, upon the affected parts, and the intense heat of the light-rays is tempered by its passage through the body of water in the head of the tube and the lower section thereof, as well as through the focusing device, to properly cool the same.

I claim as my invention—

1. An apparatus for the purpose set forth comprising a high-power lamp, a plurality of tubes the upper ends of which are directed toward the lamp and receive light-rays therefrom, and the lower ends of which diverge downwardly and outwardly, each of said tubes being provided with a series of lenses which focus the light at the other end thereof, said tube being provided with a chamber or chambers containing a body of liquid through which the light-rays pass and by which they are cooled.

2. An apparatus for the purpose set forth comprising a high-power lamp, a tube which receives at its inner end light therefrom and provided with a plurality of lenses which focus the light from said lamp at the opposite end thereof, said tube being provided with a chamber or chambers containing a body of liquid through which the light-rays pass and by which they are cooled, and a focusing device movable relatively to said tube and provided with a lens and with a chamber adapted to contain a body of cooling liquid.

3. In an apparatus for the purpose set forth, the combination with a high-power lamp, of a tube which receives at its inner end light-rays from said lamp, said tube having at its receiving end a plurality of lenses and provived with a chamber adapted to receive a

body of sterilized water and provided also with a passage through which is adapted to be circulated a body of cooling-water, the tube embracing an unobstructed intermediate section having at its lower end a lens, and a lower section provided at its lower end with a lens, said lower section being filled between said last-mentioned lenses with a body of liquid.

4. An apparatus for the purpose set forth comprising a central high-power lamp and a plurality of tubes, the upper ends of which are directed toward said lamp and receives light therefrom, and the lower ends of which are directed downwardly and outwardly, a casing surrounding said lamp and the upper ends of said tubes and supporting said tubes, said tubes being provided with a plurality of lenses which focus the light at the lower ends thereof and being provided with one or more chambers adapted to receive a cooling liquid through which the light-rays pass to cool the same, and liquid supply and return pipes supported in said casing and provided with branches which are connected with passages in said light-tube for maintaining the bodies of liquid therein properly cooled.

5. An apparatus for the purpose set forth comprising a central high-power lamp and a plurality of tubes, the upper ends of which are directed toward said lamp and receives light-rays therefrom, and the lower ends of which are directed downwardly and outwardly, a casing surrounding said lamp and supporting said tubes, said tubes being provided with a plurality of lenses which focus the light at the lower end thereof and being provided with one or more chambers adapted to receive a cooling liquid through which the light-rays pass to cool the same, supply and return pipes supported on said casing and provided with branches, which branch pipes are connected with passages in said light-tube for maintaining the bodies of liquid cooled therein, each of said tubes being provided with a movable focusing device having suitable lenses and provided with a chamber for receiving a body of liquid, and with passages surrounding the chamber through which is adapted to circulate a cooling liquid, supply and return hose connecting said surrounding passage with liquid supply and return pipes, respectively.

6. In an apparatus for the purpose set forth, the combination with a high-power light, of a tube which receives at one end light-rays therefrom and provided with suitable lenses for focusing the light at the other end of the tube, a chamber at the receiving end of the tube adapted to contain a body of water and provided with a passage surrounding the chamber, supply and return pipes or hose for delivering water to said circulating-passage, said pipes or hose being provided with tubes which are internally screw-threaded and having screw-threaded connection with nipples connected with said surrounding passage, and a gasket interposed between said screw-threaded tube and nipple.

7. In an apparatus for the purpose set forth, the combination with the focusing device having suitable lenses and a chamber to receive a body of liquid, and provided with a passage surrounding said chamber, of supply and return pipes provided with screw-threaded tubes which have screw-threaded engagement with nipples connected with said passage, and gaskets interposed between said nipples and tubes.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 14th day of May, A. D. 1904.

CHARLES FREDERICK STEWART.

Witnesses:
C. R. SMITH,
GEO. W. MASON.