

Aug. 21, 1928.

1,681,736

A. A. KULL

THERAPEUTIC LAMP

Filed July 26, 1926

2 Sheets-Sheet 1

Fig. 1.

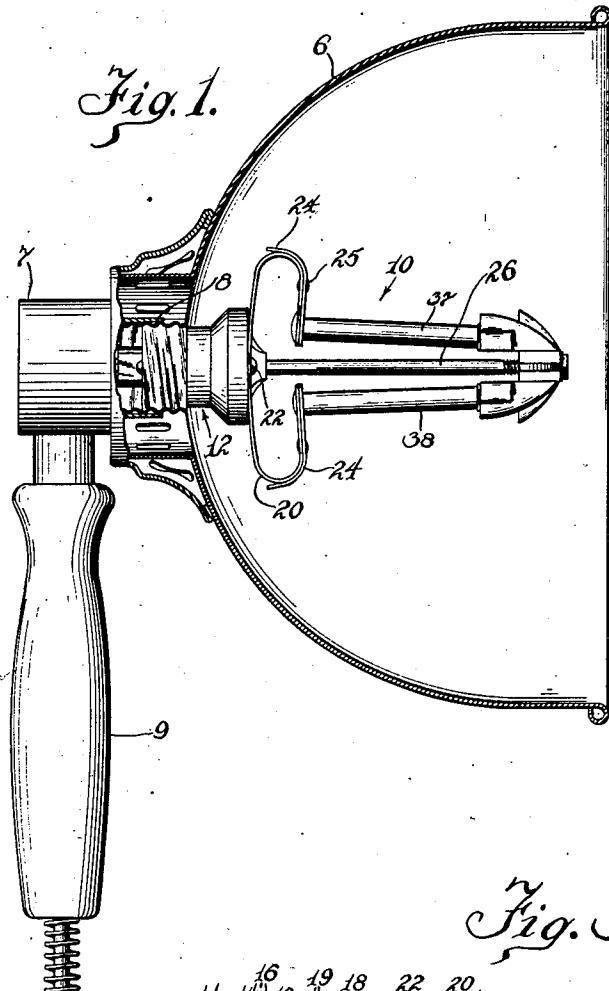


Fig. 2.

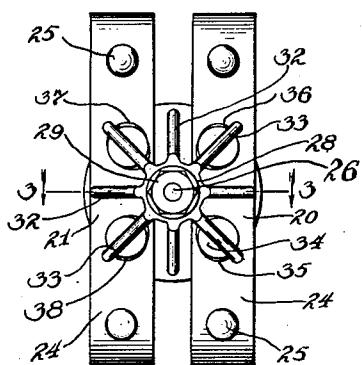
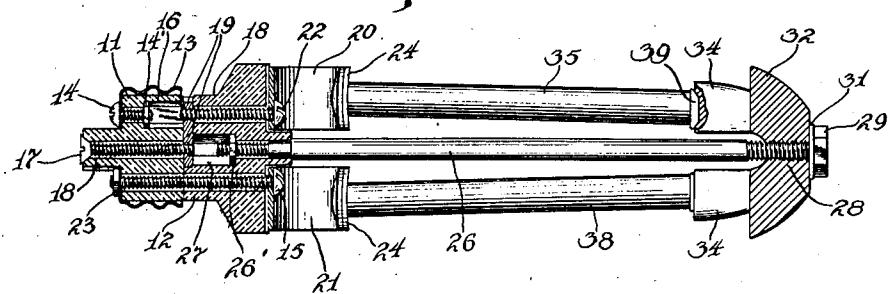


Fig. 3.



Inventor

Andrew A. Kull.

By Williams, Bradley,
McCaleb & Hinkle
Attorneys.

CROSS REFERENCE

EXAMINE

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2 Sheets-Sheet 2

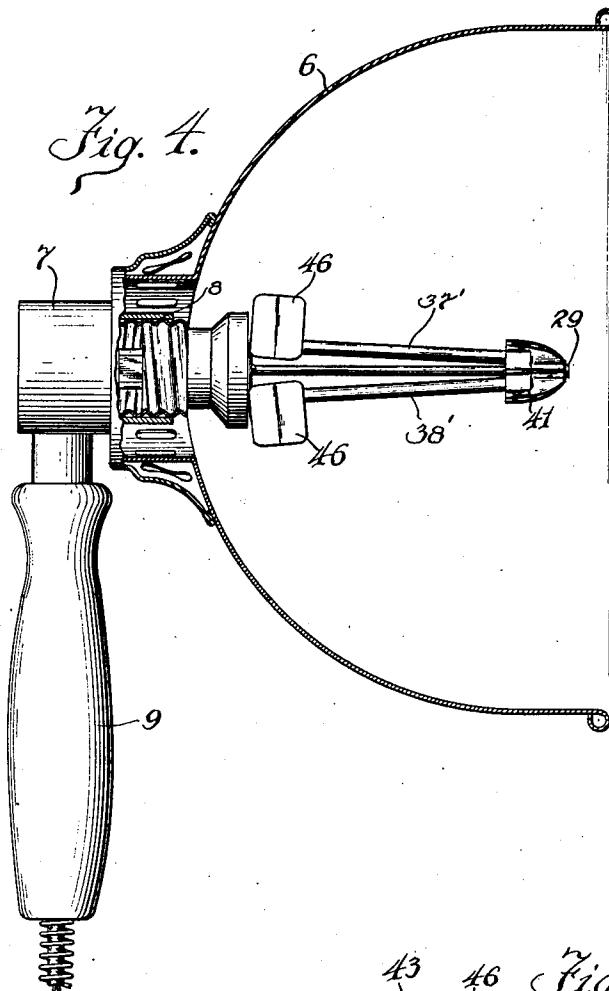
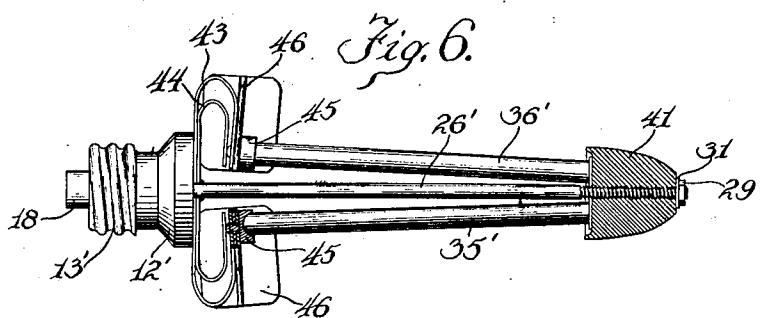
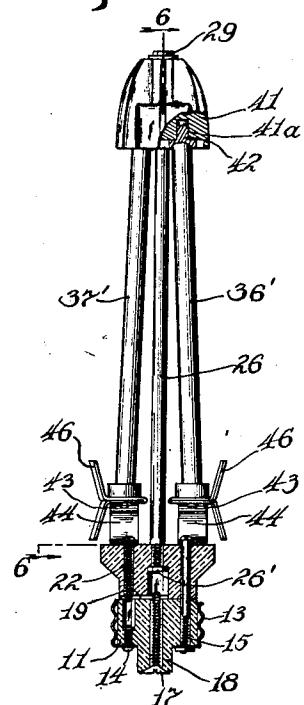


Fig. 5.



Inventor

Andrew A. Kull

By Williams, Bradley,
McCaleb & Hinckley,
Attorneys

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UNITED STATES PATENT OFFICE.

ANDREW A. KULL, OF MILTON, WISCONSIN, ASSIGNOR TO THE BURDICK CORPORATION, OF MILTON, WISCONSIN, A CORPORATION OF DELAWARE.

THERAPEUTIC LAMP.

Application filed July 26, 1926. Serial No. 124,833. 219-34

My invention relates to therapeutic lamps.

It relates more particularly to an improved light and heat generating unit or cartridge for use in therapeutic lamps wherein the 5 production of red and infra-red rays is of primary concern, although, of course, it may be applied to other lamps.

As heretofore constructed the radiant energy generating unit comprises a porcelain base, a post fixed in the base and carrying a head at its outer extremity. The resistor rods 10 were held between this head and resilient supporting clips secured to the base. In use the head and also the clips sometimes became heated to a very high temperature, causing 15 oxidation of the head and clip contacts and causing the spring supports to lose their resiliency. Since the parts were mounted on a porcelain base, there was little opportunity 20 for the escape of heat from the unit. This condition was especially aggravated in the larger size units and also where more than two resistor rods were grouped together. The head, particularly, had a tendency to become 25 overheated due to the fact that the most desirable arrangement of the rods was such that they were in close proximity to each other near the head. In addition, the head was in a position where it was subject to heating 30 by the more or less concentration of rays from the reflector.

An object of my invention is to provide an improved radiant energy generating unit for use in therapeutic lamps, the unit being 35 constructed in an improved manner to prevent undue heating of the support for the resistors by which the radiant energy is developed upon the passage of an electric current.

40 Other objects will appear from the following description, reference being had to the accompanying drawings in which,

Fig. 1 is a side elevation of the radiant energy generating unit of my invention mounted in a suitable reflector which is shown 45 partly in section;

Fig. 2 is an end elevation of the radiant energy generating unit;

Fig. 3 is a horizontal sectional view on the 50 line 3-3 of Fig. 2;

Fig. 4 is a view similar to Fig. 1, showing a modified construction of the radiant energy generating unit;

Fig. 5 is a fragmentary plan view of the

modified form of radiant energy generating unit, and

Fig. 6 is a sectional view thereof on the line 6-6 of Fig. 5.

The lamp comprises generally a parabolic reflector 6 carried on a plug receptacle housing 7, an electric screw plug receptacle 8 in the housing at the rear or closed end, a handle 9 attached to the receptacle housing, and a radiant energy generating unit or cartridge 10 carried by the screw plug receptacle. 35

The handle, housing, screw plug receptacle, and reflector may be of any suitable construction which will conveniently serve the purpose of connecting the generating unit to a source of electric current and will 70 efficiently reflect the radiant energy emitted thereby. The cartridge or generating unit 10 comprises a base made of two pieces 11 and 12 of porcelain or other suitable insulating material. A threaded brass ferrule or 75 shell 13 is secured over the piece 11 by means of bolts 14 and 15. The nut 14' of bolt 14 is lodged in a suitable recess 16 formed in the piece 11. The head of screw 17 which passes through a central axial bore in piece 80 11 protrudes slightly from the end of projection 18 of piece 11, and is threaded into a small conducting bar 19 which fits into registering recesses formed in the contacting faces of pieces 11 and 12. C-shaped resilient 85 supports or clips 20 and 21 are secured to the outer face of piece 12 by screw 22 and bolt 15, respectively. Screw 22 threads into bar 19, and bolt 15 passes through both pieces 11 and 12 and threads into nut 23, which is 90 held against rotation by the abutment of one of its faces with the side of the projection 18. Supports or clips 20 and 21 are made of any suitable metal which will retain its resiliency at high temperatures. Supports 20 and 21 95 have plates 24 of aluminum secured at their outer ends by rivets 25 for a purpose which will appear hereinafter.

A rod or post 26 extends within a central axial bore in piece 12, its end being threaded 100 in nut 26' which is held against rotation in a recess 27 formed in the rear face of piece 12. The other end of rod 26 is screw threaded to receive heat radiating head 28, which is held in the desired position by lock nut 105 29 and washer 31. The head 28 is preferably made of bronze, brass or other good electrical and heat conductor and has a plurality

of fins, 32, 33 extending radially from its central body portion. As shown in Figs. 2 and 3 the alternate fins 33 have enlarged integral bosses 34 extending inwardly to form seats for light generating elements 35, 36, 37 and 38 which in the drawings are shown in rod form. These rods are preferably made of powdered or granulated carborundum and carbon which has been baked in forms using silicate of soda as a binder. The ends of the rods are sintered by an electric arcing process which reduces the resistance of the end portions, so that in operation the ends will not be heated to as high a temperature as the intermediate portions. Small cup shaped discs 39 of aluminum are placed in depressions or sockets in bosses 34 to lie between the ends of the resistor rods and their seats in the ends of bosses 34. The purpose of these discs, as well as of plates 24 which are riveted to the resilient supports, is to insure good contact between the ends of the resistor rods and their supports, since it has been found that if the rods are in direct contact with the brass, bronze or ferruginous metal, of which the supports 20, 21 and 28 are made, there will be a tendency to arc which causes pitting of the supports and resistor rods and finally reduces the conductivity of their contacts to such an extent as to make a further use of the unit inefficient and sometimes practically impossible. Since the ends of the rods rest in sockets formed in the bosses 34 and in the plates 24 with their supports 20 and 21, and because of the resiliency of these supports, the rods are firmly held in position.

When in use the radiant energy emitting unit or cartridge 10 is screwed into the receptacle 8 in the reflector assembly. Upon operation of a suitable switch (not shown) the current will flow through the bolt 17, bar 19, screw 22, support 20, in parallel through resistor rods 35 and 36, head 28, in parallel through rods 37 and 38, support 21, bolt 15 and to the ferrule 13. Since the current passes through the rods 35-36 and 37-38 in parallel, respectively, the rods may be made smaller and thus for a given current consumption the total radiating surface area of the resistor elements is very large.

In ordinary use, the resistor rods are heated to a temperature which will produce a good red glow. The heat generated in the resistor rods and the heat from the post 26 is conducted to head 28 which, due to its large surface area, is able to radiate the energy sufficiently fast to prevent a dangerous rise in temperature of the head. The peculiar conformation and disposition of the fins on the head is very desirable since it not only furnishes a large radiating surface, but also offers only a very small obstruction to the radiant energy which is emitted by the rods and which is reflected from reflector 7. The desired result of maintaining the head and

post at a relatively low temperature is thus attained without in any way materially decreasing the efficiency of the lamp as a whole.

In Figs. 4, 5 and 6, I have shown a modified construction of a cartridge. For the most part, the construction is similar to that above described, and therefore, similar reference characters have been applied to the similar parts. The main difference between the two constructions are in the resistor element supports and in the means employed to dissipate the heat from the supports.

In this modification the head 41 has four sockets 41^a which receive shouldered aluminum plugs 42 having concave seats for the resistor rods. A pair of C-shaped resilient supporting members 43 are secured to the base 12 by screw 22 and bolt 15 respectively. A reinforcing C-shaped spring 44 lies within each of the supports 43 and is secured to the base by the same means. The ends of reinforcing springs 44 bear against the riveted heads of shouldered sockets 45. These sockets serve the two-fold purpose of securing radiating and reflecting plates 46 to the ends of supports 43 and also providing seats for the lower ends of the resistor rods. Plates 46 are preferably made of aluminum or a similar material which is a good conductor of heat. As best shown in Fig. 5 these plates are folded back upon themselves so as to form a double thickness where they contact with the ends of the supports 43. The edges of plates 46 are bent upwardly and downwardly at substantially right angles to the doubled portion. These plates provide a large heat radiating surface and thus maintain the supports 43 at a relatively low temperature. It is also desirable that these plates be polished, so as to reflect the infrared rays which happen to be projected upon it. By providing these heat radiating plates the supports may be made of a metal which does not retain its elasticity at as high a temperature as would be required if these plates were not provided.

The operation of the modified construction shown in Figs. 5 and 6, is, of course, similar to that above described with reference to the construction shown in Figs. 1, 2 and 3. The fluted head serves to radiate the heat and prevents undue rise in its temperature and the temperature of the stem 26, while the plates 46 maintain the supports 43 and reinforcing spring members 44 at temperatures at which their resiliency is not impaired. The aluminum discs and plates between which the resistor rods are supported have a relatively low melting point, and therefore without the provision of means for radiating the heat from the resistor rod supports the aluminum would be heated to a temperature above its melting point, causing the unit to fail and making necessary the replacement of the aluminum discs and plates.

The invention is capable of variation within equivalent limits and I contemplate such variation as may be desirable in the particular adaptation of the invention shown or in its adaptation to similar devices.

I do not restrict myself in any unessential particulars, but what I claim and desire to secure by Letters Patent is:

1. In a therapeutic lamp in combination with a reflector having a screw plug receptacle associated therewith, of a radiant energy emitting unit adapted to be screwed into said receptacle to make electrical contact therewith, said unit comprising a plurality of 15 resistor rods forming a path for an electric current, and means for holding said rods in position, including a head having a plurality of heat radiating fins positioned so as to form a minimum obstruction to the emission 20 of radiant energy from said rods and reflector.

2. In a device of the class described, the combination of an insulating base, a plurality of light generating elements, and means 25 for mounting said elements on said base, comprising a post fixed in said base, supports secured to said base and a head secured on the end of said post said head having a plurality of fins extending in planes parallel to said 30 post, the alternate fins having sockets integral therewith forming seats for the ends of said elements.

3. In a device of the class described, the combination of an insulating base, a plurality 35 of resistor rods, and means for mounting said rods on said base, comprising a post fixed in said base, supports secured to said base, and a head secured on the end of said post, said head having a plurality of radially 40 extending heat radiating fins formed integral therewith.

4. In a device of the class described, the combination of an insulating base, a plurality 45 of resistor rods, and means for mounting said rods on said base, comprising a post fixed in said base, supports secured to said base, and a head secured on the end of said post, said head having heat radiating fins projecting outwardly therefrom.

5. In a therapeutic lamp, in combination 50 with a reflector having a plug receptacle associated therewith, of a radiant energy generating unit adapted to be inserted into said receptacle to make an electrical connection therewith, said unit comprising an insulating plug, a post mounted thereon, a fluted head secured at the end of said post, a plurality of 55 resilient supports carried by said plug, resistor rods held between said head and said supports and metallic heat radiating plates secured to said supports adjacent the ends of 60 said rods.

6. In a therapeutic lamp, in combination 65 with a reflector having an insulating plug receptacle associated therewith, of a radiant

energy generating unit adapted to be mounted in said receptacle to make an electrical connection therewith, said unit comprising an insulating plug, a post mounted thereon, a fluted head secured at the end of said post, a 70 plurality of resilient supports carried by said plug, resistor rods held between said head and said supports and metallic heat radiating and light reflecting plates secured to said supports.

7. In a therapeutic lamp, in combination 75 with a reflector having an insulating plug receptacle associated therewith, of a radiant energy generating unit adapted to be mounted in said receptacle to make an electrical 80 connection therewith, said unit comprising an insulating plug, a post mounted thereon, a fluted head secured at the end of said post, a plurality of resilient supports carried by said plug, resistor rods held between said 85 head and said supports and aluminum plates secured to said supports adjacent the ends of said rods, said plates being bent back upon themselves so as to be of double thickness where juxtaposed to said supports and having their end portions extending outwardly in 90 opposite directions at substantial right angles to the doubled portion.

8. In a therapeutic lamp, in combination 95 with a reflector having an insulating plug receptacle associated therewith, of a radiant energy generating unit adapted to be mounted in said receptacle to make an electrical 100 connection therewith, said unit comprising an insulating plug, a post mounted thereon, a fluted head secured at the end of said post, a plurality of resilient supports carried by said plug, resistor rods held between said 105 head and said supports and aluminum plates secured to said supports and extending therefrom in planes substantially parallel to said rods.

9. In a device of the class described, the combination of an insulating base, a plurality 110 of resistor rods, and means for mounting said rods on said base comprising a post and supports fixed to said base, a head carried by said post, aluminum members interposed between the ends of said rods and said supports and said head, and means for radiating heat conducted from said rods to prevent said aluminum members from melting.

10. In a device of the class described, an insulating base, a resistor rod adapted to be heated by an electric current, means for supporting said rod on said base, and supplying electric current thereto, an aluminum disc interposed between the end of said rod and said supporting means, and a plurality of fins on said supporting means for conducting heat 125 from said disc to prevent it from melting.

In witness whereof, I hereunto subscribe my name this 14 day of July, 1926.

ANDREW A. KULL.