June 24, 1930. W. HUDSON 1,767,586

RADIANT ENERGY GENERATING UNIT AND PROCESS FOR MAKING THE SAME

Filed April 16, 1927

Fig. 1

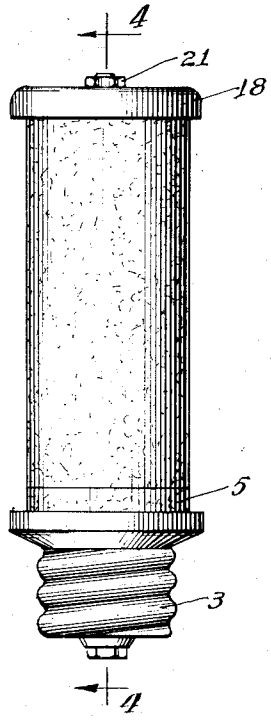


Fig. 4

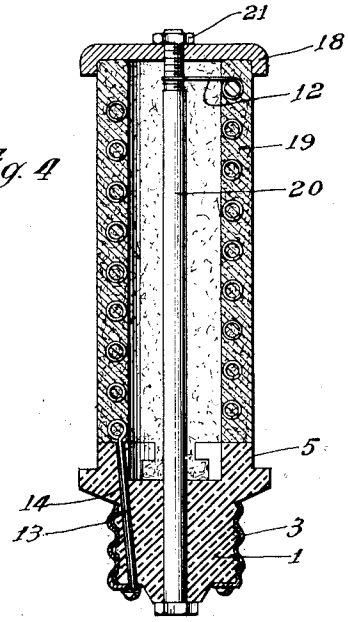


Fig. 3

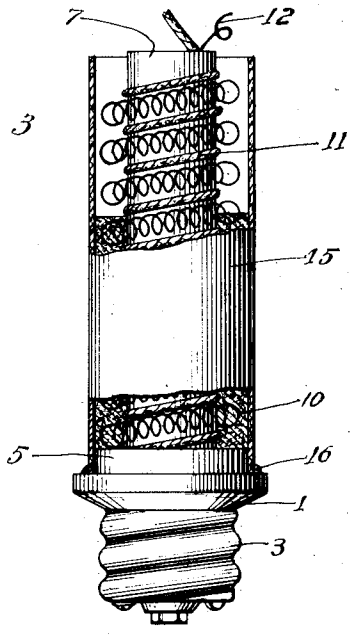
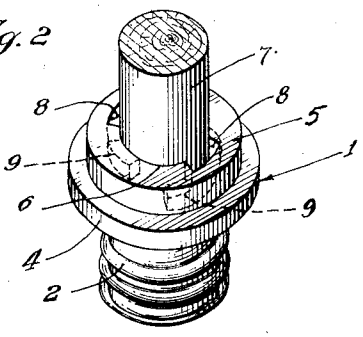


Fig. 2



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UNITED STATES PATENT OFFICE

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RADIANT ENERGY GENERATING UNIT AND PROCESS FOR MAKING THE SAME

Application filed April 16, 1927. Serial No. 184,354.

My invention relates to improvements in radiant energy generating units and process for manufacturing the same, which units are generally adaptable for all purposes requiring the emission of electrical radiant energy and which are especially adaptable for use in therapeutic apparatus.

An object of the invention is to provide a unit of this type which provides relatively intense emission of infra-red rays and the longer rays at that end of the solar spectrum.

A further object of the invention is to provide a unit of the character described in which novel means is employed for supporting the refractory element, supporting and having imbedded therein an incandescent element, upon its plug base.

A further object of the invention is in the provision of a novel process for the manufacture of the unit whereby the refractory element is rendered free from air pockets and grain and in which the distribution of the binder is uniform.

Other objects and advantages of my invention will appear more fully from the following description and the accompanying drawings in which similar characters of reference indicate similar parts throughout the several views.

In the drawings,

Fig. 1 is an elevation of a radiant energy generating unit.

Fig. 2 is a perspective view illustrating the porcelain base with a combustible core therein prior to the disposition of the resistance, and refractory material thereupon.

Fig. 3 is an elevation partly in section illustrating a step in the process of manufacture of the element.

Fig. 4 is a sectional view along the line 4—4 of Fig. 1.

In carrying out my invention, I make use of a base 1 of insulating material, such as porcelain. The base is formed at its lower portion 2 to receive the standard type of screw plug shell 3 and has an outwardly flared portion 4 which serves as a hand grip for turning the base into or out of a standard socket, as well as to provide reinforcement for the base.

Base 1 has an upstanding portion 5 at its top which has a relatively flat upper surface. A socket 6 is formed in the top wall of the base 1, having its axis common to the axis of the base, and a combustible core 7, such as wood, is disposed upon the base with its lower end in the socket 6. The opposite wall portions of the socket 6 are recessed, as shown at 8. The depth of the recesses is substantially one-third that of the diameter of the core 7.

The width of the recesses at the upper edges is slightly more than one-third of the diameter of the core 7. Other recessed portions of the inner wall of the socket 6 are provided immediately below the recessed portions 8 and are of the same depth but of greater width, as shown in dotted lines at 9 in Fig. 2. The purpose of the recessed portions 8 and 9 is to provide anchorage for a refractory material in the manner hereinafter described.

Subsequent to the introduction of the core 7 in the socket 6, the next step in the process of manufacture of the unit is the winding of a helix of coiled resistance wire 10 about the core 7. Adjacent turns of the coiled wire 10 are separated from each other by a cord 11 of combustible material.

One terminal 12 of the resistance coil 10 is permitted to extend beyond the upper end of the core 7 and the opposite terminal 13 is threaded through a passage 14 extending longitudinally through the base 1.

The next step in the process is that of securing a combustible shell 15, preferably of cardboard, to the base 1 by means of wax 16. The wax 16 may be composed of equal parts of beeswax and rosin. The diameter of the shell 15 is such as to engage with the outer wall of the upstanding portion 5 of the base. The shell is thus held concentric with the core and the core with its resistance coil 10.

The next step is the preparation of material for the refractory element. This material consists of 100 parts, by weight, of carborundum and 48/100 parts, by weight, of

a silicate of sodium. This mixture is placed in a mixing machine and thoroughly mixed so as to form a heavy fluid mass.

The mixing machine is kept in operation to maintain the mass against separation and small quantities are removed therefrom by dipper or the like, and poured into the shell 15, as shown in Fig. 3. The mass entirely surrounds the core with its coil 10 thereupon.

After the shell has been filled, the unit, in this condition, is placed upon a vibrating machine to thoroughly settle the mass and to eliminate any air pockets or bubbles which might have been formed therein.

At this stage in the process the elements are racked and dried at room temperature for twenty-four hours.

After drying at room temperature, the elements are placed in an oven and maintained at an oven temperature of 100° F. for another twenty-four hours. My purpose in slowly drying the refractory element is to retain the binder evenly throughout the mix, as a quick drying of the mix causes the binder and carborundum to separate somewhat.

The elements are now placed in a kiln and the temperature brought up slowly during the course of five hours to 1600° F.

When the temperature has risen to this height at the end of five hours, the kiln is operated for an additional half hour at 1600°.

During this latter step the wooden core 7, the cord 11, and the shell 15 are burned away, leaving only the base member 1, with its cylinder of refractory material in which the coil 10 is imbedded, supported thereupon.

I next place the standard plug shell 3 in place upon the portion 2 of the base 1 and secure the shell by means of a screw 17 to the terminal 13.

A metal cap 18 is disposed over the upper end of the refractory element 19 and a bolt 20 is projected longitudinally through the base 1, the bore of the element 19 and a central opening provided in the cap 18. The nut 21 at the upper end of the bolt 20 serves to draw the cap 18 toward the element 19 and further maintain the element against movement with respect to the base 1.

The terminal 12 of the coil 10 is electrically connected to the bolt 20 in any well known manner, such as by extending the terminal through the bore of the cap 18 and under the nut 21.

The unit at this stage is complete and ready for use.

In operation, my improved radiant energy generating unit is connected as by introduction of the plug base in a standard current supply socket so as to cause the coil 10 to heat up and by conduction heat the entire refractory element. The fact that the refractory composition employed is substantially black increases the ray absorption properties thereof so that the entire element will glow and radiate energy uniformly throughout the entire exposed surface thereof. The intimate bond between the coil 10 and the refractory composition also increases the efficiency of conduction as between these elements.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. The steps in a process for constructing a radiant energy generating unit, which consist in placing a combustible core upon the base member of the unit, supporting an electrical heating member upon the core, placing a combustible shell concentric with and spaced apart from the core and heating member, filling the space between the core and the shell with a refractory compound in plastic condition, and subsequently kiln drying the refractory compound at a temperature sufficient to thoroughly harden the compound and burn away the core and shell.

2. A method of constructing a radiant energy generating unit, which consists in placing a combustible core upon the base member of the unit, winding an electrical heating coil about the core, separating the turns of the heating member with combustible material, enveloping the core and heating element with a refractory compound in plastic condition, and subsequently kiln drying the refractory compound at a temperature sufficient to thoroughly harden the compound and burn away the core.

3. The process for constructing a radiant energy generating unit, which consists in supporting an electrical heating member upon a combustible core, placing a combustible shell concentric with and spaced apart from the core and heating member, filling the space between the core and shell with a refractory compound in plastic condition, vibrating the elements thus assembled to cause the compound to settle thoroughly about the heating member and to eliminate air pockets, and subsequently kiln drying the refractory compound at a temperature sufficient to thoroughly harden it and burn away the core.

4. A method of constructing a radiant energy generating unit which consists in placing an electrical heating element upon a combustible core, separating the adjacent portions of the heating element with combustible material, enveloping the heating element with a refractory compound in plastic condition, causing the compound to settle against the adjacent surfaces of the core, and subsequently kiln drying the refractory compound at a temperature sufficient to thoroughly harden the compound and burn away the combustible core.

5. A process for constructing a radiant energy generating unit which consists in placing an electrical heating element upon a

combustible form, separating the adjacent portions of the heating element with combustible material, enveloping the heating element with a refractory compound in plastic condition, consisting of carborundum and a silicate of soda, causing the compound to settle against the adjacent surfaces of the form, and subsequently kiln drying the refractory compound at a temperature sufficient to thoroughly harden the compound and burn away the combustible form.

6. The method of constructing a radiant energy generating unit, which consists in winding a helical heating element upon a combustible core forming a large helix, surrounding the heating element and core with a combustible enclosure, introducing a fluid refractory compound between the core and the enclosure and embedding the helices of the heating element therein, and heating the refractory compound to thoroughly harden the compound and burn the combustible enclosure.

In witness whereof, I hereunto subscribe my name this 13th day of April, 1927.

WALTER HUDSON.