

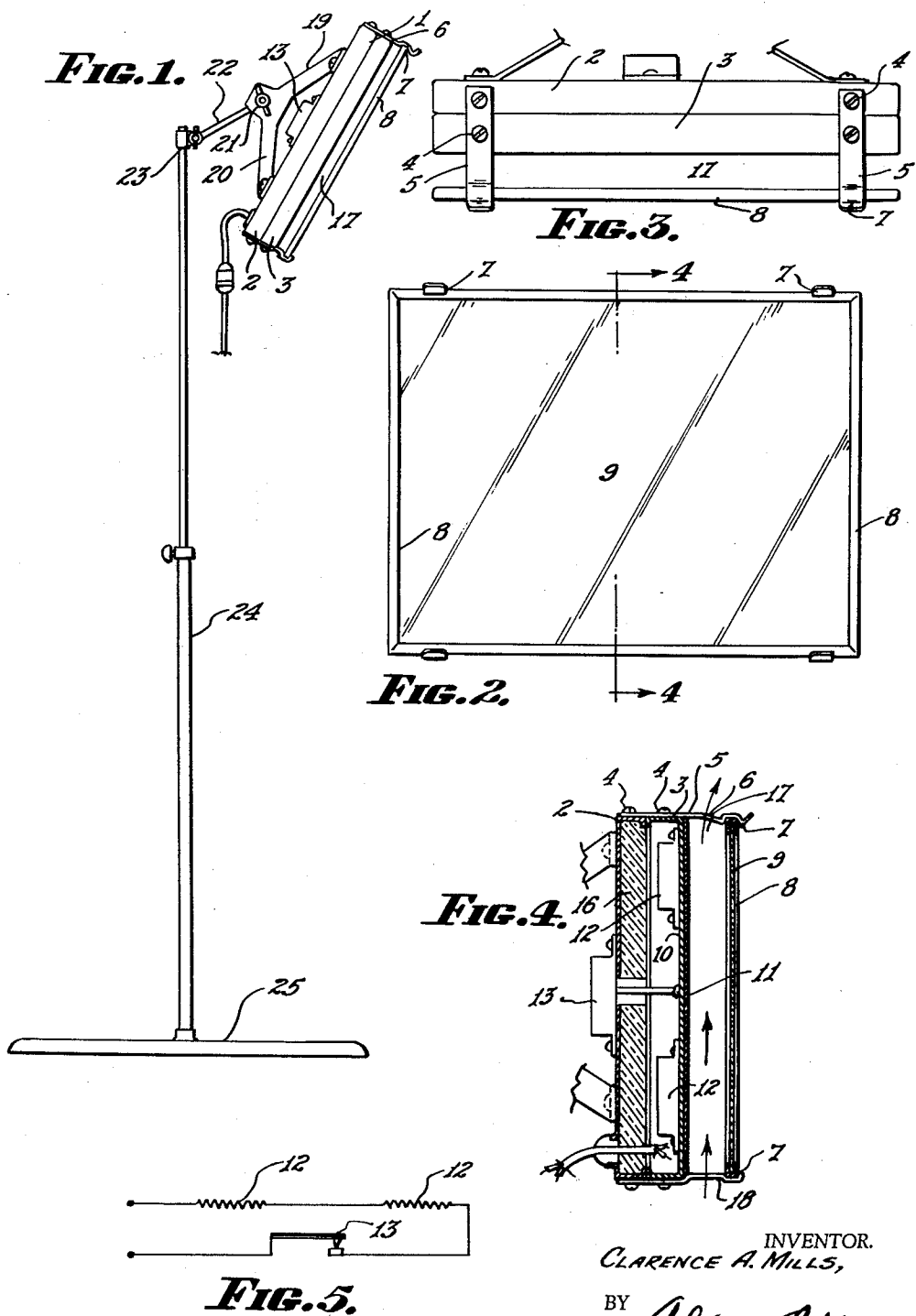
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ULTRA-LONG INFRA-RED HEAT RAY EMITTER

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1 Claim. (Cl. 219—34)

My invention relates to ultra-long infra-red heat ray emitters and to a simplified construction of baking oven or heater which controls the emission of infra-red heat rays partially limiting the heating source to the wave length range of from 100 to 400 microns.

Heaters and diathermy and fever therapy equipment and the so-called infra-red heat lamps has heretofore not been possible except with costly diathermy equipment. They require carefully adjusted electric circuits and controls and are so expensive to purchase that the full range of possible usefulness has never been developed.

Further there is normally in such equipment such a mixture of low range infra-red rays that the possibility of a concentration of ultra-long infra-red rays of the wave length of from 100 to 400 microns has heretofore not been possible except with costly diathermy equipment.

It is the object of my invention to provide a heater or heat ray emitter of simple construction which will require only a regular electric outlet and a 110 volt electrical circuit, and which will screen most of the rays occurring in the wave length substantially below 100 microns.

The basis for my invention in theoretical physics depends on the tendency of carbon atoms in the amorphous state (lampblack carbon-black) to associate in pairs, with the four active outer electrons of each carbon atom joining into a close lattice semi-crystalline structure (the so-called electron octet), and in going from the freely active state into this octet lattice structure, the electrons emit definite quanta of energy in the 100 to 400 micron wave length of the ultra-long infra-red range. This octet lattice structure can be converted back to the individual carbon atoms with freely active outer electrons by an energy or heat input sufficient to raise the carbon-black temperature to 200° to 500° F.

It is known that the penetrability of radiant energy into and/or through non-metallic materials is dependent upon the wavelength of such radiant energy: in general the shorter the infra-red wavelength the less the penetration and the longer the wavelength the greater the penetration. The very long infra-red wavelengths as developed by high-frequency electrical oscillations, for instance, penetrate well through most non-metallic materials, with a minor portion of their radiant energy being interrupted and transformed into sensible heat in their passage through the material. Such penetrating energy has been used for the through-and-through heating of many types of materials in commerce and of living human tissues where local deep heat development is desired. The wavelengths of energy most effective for such purposes seem to be those of 100 to 400 micron wavelength, although the evidence in this area of science is far from specific.

Heretofore methods of generating these deep heating wavelengths of radial energy have been dependent upon the use of high frequency electric generating systems. Such high frequency electric generators are costly to manufacture and wasteful of operating power, as well as acting as a very troublesome source of static interference for many types of sensitive electronic equipment located anywhere nearby. For these various reasons, the presently described simplified new method of producing such ultra-long-wavelength infra-red radiations is considered to hold great potential value in industry and medicine and to be sufficiently novel to warrant the issuance of Letters Patent.

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Essentially this novel development arose from applicant's discovery that carbon-blackened surfaces heated to temperatures from about 150° F. to 500° F. emitted these valuable ultra-long wavelengths of infra-red energy in considerable intensity and that these valuable radiations could be purified to a very considerable degree of the unwanted shorter infra-red wavelengths by the interposition of suitable screening materials (such as cellophane or certain other plastic materials) which intercepted the shorter wavelength radiations but permitted free passage of the desired ultra-long infra-red radiations.

My invention consists in apparatus of which a preferred modification is shown in the drawings in which:

FIGURE 1 is a side elevation of a heater incorporating the principles of my invention.

FIGURE 2 is a front plan view.

FIGURE 3 is a top elevation of the heater.

FIGURE 4 is a side elevation of the assembly.

FIGURE 5 is a wiring diagram including a simple bi-metallic thermostat.

The metallic housing 1 is composed of rectangular frames 2, 3, secured together in the assembly with screws 4 passing through metal clips 5. The metal clips have forwardly extending extensions 6 having grooved or slotted members 7 for receiving a frame 8 which mounts a cellophane sheet or panel 9. The panel may be composed of other plastic which is opaque to the passage of infra-red heat waves substantially below 100 microns wavelength.

In the modification illustrated, the frame 8 and panel 9 may be withdrawn from the grooved members and replaced or reconditioned.

Within the housing there is a metal plate 10 coated on its front surface 11 with a suitable carbon black base paint or preparation. The carbon black may be brushed or sprayed on or the plate may be dipped in a carbon black composition and the back surface scraped off.

Electric resistance heating units 12 are mounted on the back surface of plate 10 with a thermostat 13 in the circuit mounted on the rear exposed surface of the frame 2. In the wiring diagram (FIGURE 5) an 110 volt electric circuit is indicated which is suitably supplied with current. The heating resistance elements indicated at 12 are in circuit with the thermostat at 13. Insulation material 16 is received within the frame 2, the heat transfer pin to the thermostat extending through an opening 17 in the insulation. The thermostat can be set to maintain any desired plate temperature between 200° F. and 500° F. and any desired intensity of heat ray output within these limits.

For ventilating the carbon blacked plate to prevent overheating openings 17, 18 are arranged in the top and bottom of the housing to permit ventilation or cooling of the air passing through the heater in the direction indicated by the arrows.

The housing has bracket arms 19, 20 with a butterfly nut 21 mounting it on the arm 22 also secured to the upright support 23. The upright support has a telescoping attachment to the upright support 24 which is held in position by a base member 25. It will be obvious that with such a mounting the 100 to 400 micron wavelength rays must be directed in any direction in which it is desired to heat an object with such rays.

Within the temperature range of 200° to 500° F. as heated by the resistance elements, the carbon black surfacing material is thus capable of receiving energy or heat from one surface and emitting it in radiant form on the outer exposed surface, with a very considerable portion of this radiation falling in the 100 to 400 micron wavelength of the ultra-long infra-red (or short Hertzian) range known to be effective for deep heating. Most organic materials or masses are largely transparent to these 100 to 400 micron wave length radiations, but partial

absorption as the rays pass through the mass provides an even through-and-through rise in temperature which has proved useful in many ways. Certain organic plastics such as polyethylene are transparent to all infra-red wave lengths of radiation, while others such as cellophane are opaque to the shorter infra-red wave lengths and quite freely transparent to the ultra-long wave lengths in the 100 to 400 micron range. Carbon-black is not the only material capable of such ultra-long infra-red emission—boron in the amorphous state behaves similarly but is far less available and far more expensive than carbon-black.

The range of usefulness will cover all heaters and the established uses of diathermy and fever equipment and, in addition, those of the so-called infra-red heater. The operation with the cellophane (or plastic of similar behavior) diaphragm provides even through-and-through heating, while its operation without the diaphragm would provide additional but less penetrating surface heating. Both its plastic diaphragm and its carbon-black heating element are made freely removable and replaceable.

I have illustrated the simplest form of the device. Changing the size and shape of the parts diagrammatically shown will occur to those skilled in the art.

As an indication of the effectiveness of an emitter such as I have described, enclosing in my closed fist the bulb of a thermometer for five minutes exposure, the temperature was raised at least 3° F. above the temperature recorded in a thermometer held in the unradiated control fist. It took an hour before the temperature dropped back to normal.

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

An infrared ray heater having a metal housing having a backwall and an open front, a thin metal plate having a carbon black coating on one side thereof, means mounting the metal plate in the open front of the housing in spaced relation to the back wall and with the carbon black coated surface exposed, a plurality of electrical resistance heating elements disposed in spaced relation to

each other on the uncoated side of the plate, said heating elements arranged to heat the plate to a temperature of from 200° to 500° F. whereby the carbon black coating emits infrared radiation in the wave length range of 100 to 400 microns, a wiring system for the heating elements, a thermostat arranged in the wiring system and responsive to the temperature of the metal plate for controlling the heating elements, a cellophane filter panel opaque to infrared rays having a wavelength below 100 microns but transparent to infrared rays above 100 microns in wavelength mounted forwardly of and in spaced relation to the exposed carbon black coated surface of the plate so as to intercept and filter infrared rays emitted therefrom, apertures in the housing in communication with the space between the plate and the panel for permitting the ventilating flow of cooling air between the plate and the panel and an insulating partition in the housing disposed between the backwall of the housing and the heating elements mounted on the uncoated side of the metal plate.

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