Title: INFRARED ROOM HEATER SYSTEM

Abstract: An infrared, room heater system for installation in a wall or on a floor. An electric fan assembly draws room air into a housing, through three parallel, air transit channels where the air is heated by infrared radiation within and about a heat exchanger assembly, and thence back out into the room. One or more ceramic heating elements attached to a copper plate incorporate a resistive conductor that causes the elements to emit infrared radiation when electrically energized. The first copper plate lies adjacent to, but spaced away from, a first heat insulated housing sidewall, thereby defining a first air transit channel. The second air transit channel is defined by the space between the second copper plate and the second housing sidewall, and the third air transit channel is defined by the space between the two copper plates.
with amended claims

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a high temperature limit sensor switch attached to the heat exchanger assembly, said switch being closed when the sensed temperature of the heat exchanger assembly is below a predetermined high temperature limit and open when said temperature exceeds said limit;

a low temperature limit sensor switch attached to the heat exchanger assembly, said switch being open when the sensed temperature of the heat exchanger assembly is below a predetermined low temperature limit and closed when said temperature exceeds said limit;

a first direct current circuit for receiving, and converting to a first rectified, direct current, the alternating current inputted to said means, feeding said first rectified, direct current through said thermostat to the direct current input terminals of the relay, and feeding said first rectified direct current through the low temperature limit sensor switch and through at least one fan of the fan assembly wired in series with the low temperature limit sensor switch;

a second direct current circuit for receiving, and converting to a second rectified, direct current, the alternating current inputted to said means, and for feeding said second rectified, direct current through at least one fan within the fan assembly, said second direct current circuit being wired in parallel to the alternating current output terminals of said relay and thereby electrically energized only when the relay is energized; and

an alternating current circuit wired in series with the alternating current output terminals of the relay and in series with the high temperature limit sensor switch, and further in series with the resistive conductors of the upstream and downstream ceramic heater elements.

20. The system of claim 19, further comprising an air inlet grate mountable over the air inlet cutout of the housing.

21. The system of claim 20, further comprising an air outlet grate mountable over the air outlet cutout of the housing.

22. The system of claim 21, further comprising an electrostatic mesh filter interposed between the air inlet grate and the fan assembly.
23. The system of claim 22, wherein the resistive conductor of each heating element is sinuously encased within ceramic, and the ceramic encasement has a front-to-rear thickness less than or equal to 0.5 inch (1.27 cm).

24. The system of claim 23, further comprising caster wheels attached to the housing to facilitate movement of the system across a room floor surface.

25. The system of any of claims 17-24, wherein the infrared radiation emitted within the heat exchanger assembly has a wavelength in the range 5-14 micron.

26. A method for heating the air of a room, comprising the steps of:
   (a) drawing room air into a substantially closed interior space of a heater system that includes a housing, wherein said housing has first and second, spaced-apart sidewalls and contains means for electrically powering the system and a heat exchanger assembly that emits infrared radiation whenever sufficient electric current from the means for electrically powering the system passes through a resistive conductor encased within one or more ceramic heating elements attached to a first copper plate;
   (b) thence forcing the air within said interior space through parallel first, second, and third air transit channels, wherein
      (1) the first copper plate, mounted to the heat exchanger assembly, is disposed adjacent to, but spaced apart from, a first heat insulating means attached to a horizontal, upper panel of said assembly, and the first air transit channel is disposed between the first copper plate and said first insulating means;
      (2) a second copper plate, mounted to the heat exchanger assembly, is disposed opposite said ceramic heating elements and adjacent to, but spaced apart from, a first heat insulating means attached to a horizontal, lower panel of the heat exchanger, and the second air transit channel is disposed between the second copper plate and said first insulating means; and
      (3) the third air transit channel is defined by the space between the first and second copper plates; and
   (c) thence forcing the air that has passed through the first, second and third air transit channels back out into the room;
whereby the air that flows through the first and second air transit channels cools the housing, the air that flows through all three air transit channels is heated by infrared radiation, and the air that is forced back out into the room heats the room.

27. The method of claim 26, wherein the system has at least one fan powered by the means for electrically powering the system that draws room air into the interior of the housing, and forces the air to flow through the first, second and third air transit channels and back out into the room.

28. The method of claim 27, wherein the one or more ceramic heating elements comprise an upstream ceramic heating element and a downstream ceramic heating element.

29. The method of claim 28, wherein the housing has an air inlet cutout and an air inlet grate mounted over the air inlet cutout, and further comprising, prior to step (a), the step of drawing the room air through said grate.

30. The method of claim 29, wherein the housing has an air outlet cutout and air outlet grate mounted over the air outlet cutout, and in step (c) the air passes through the air outlet grate on its way back out into the room.

31. The method of claim 30, wherein an electrostatic replacement mesh filter is interposed between the air inlet grate and the fan assembly.

32. The method of claim 31, wherein the resistive conductor of each heating element is sinuously encased within ceramic, and the ceramic encasement has a front-to-rear thickness less than or equal to 0.5 inch (1.27 cm).

33. The system of any of claims 26-32, wherein the infrared radiation emitted within the heat exchanger assembly has a wavelength in the range 5-14 micron.