Dec. 16, 1947. E. E. MAURER 2,432,917

SPACE HEATER

Filed May 31, 1946

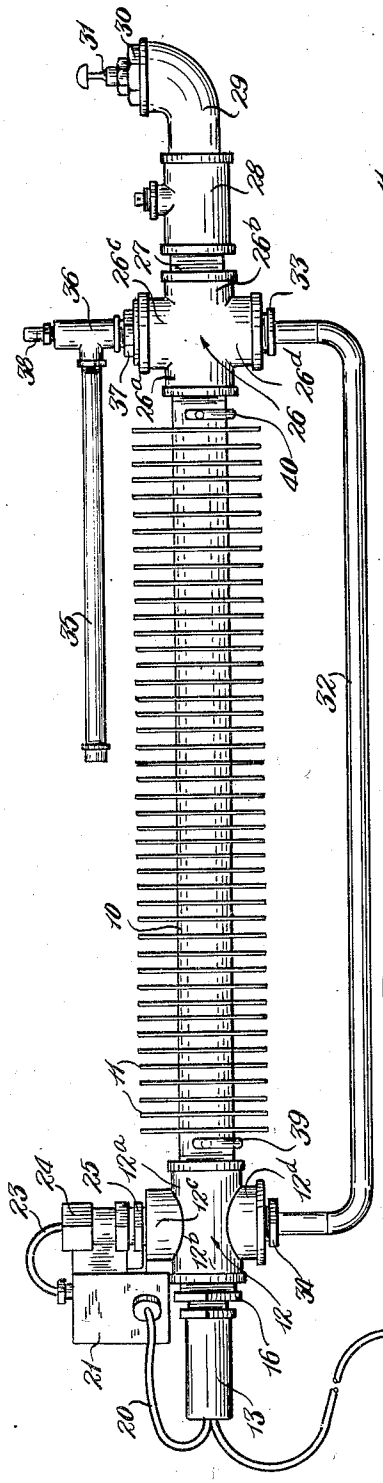


FIG. 1

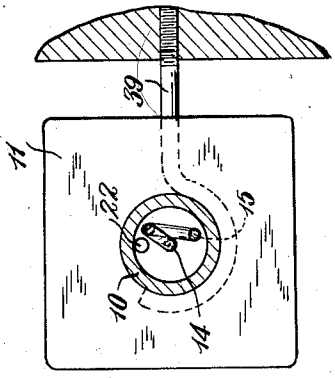


FIG. 3

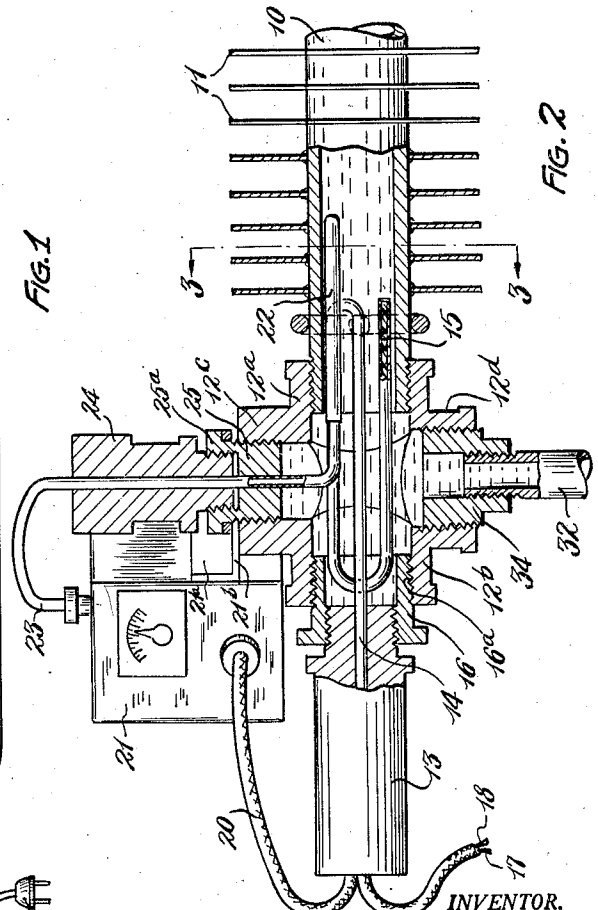


FIG. 2

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## SPACE HEATER

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4 Claims. (Cl. 219—38)

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This invention relates to what are known as "space heaters," which are self-contained, portable, and are usually employed for the heating of a single enclosed space, such as a room of a building.

It is the general object of the invention to provide a heater of this character which is particularly light in weight, cheap in construction and capable of efficiently heating a relatively large room or compartment in which it may be located. In the embodiment of my invention shown and described herein, the heat which is delivered to the space within which the heater is located is generated by raising to a suitable temperature a liquid enclosed in a tubular receptacle and which receptacle is provided with radiating plates or fins, with means for heating the liquid by a thermostatically-controlled electrical heating element, and with means for circulating the liquid from one end to the other thereof, and being also provided with an expansion tube and a safety valve.

Referring to the drawing, which shows the present preferred embodiment of my invention, 10 denotes the body of the receptacle, which is shown in the form of a tube provided throughout the major extent of its length with radiating fins or plates 11 secured thereto (as by welding) and shown as projecting at right angles with respect to the axis thereof. What will be referred to as the "front" end of the tube is threaded into the rear horizontal branch $12^a$ of a four-way coupling, indicated generally at 12. A plug 13, which supports one end of a tube 14 enclosing an electrical resistance 15, is connected to the opposite horizontal branch $12^b$ of the coupling by means of an adapter sleeve 16, threaded at its outer end upon the threaded end of the plug 13 and having an external thread $16^a$ by means of which it is threaded into the branch $12^b$. The heating element comprising the plug 13, tube 14 and resistance 15, is of the type known to the trade as "Calrod," wherein the resistance wire is embedded within a non-conductor, such as magnesium oxide, whereby the wires will not be short-circuited by contact with the tube 14.

17 and 18 denote wires connected to a plug 19 which wires are connected to opposite ends of the resistance. The wire from the remote end of the resistance is led through a cord 20 to a well known type of thermostatically controlled switch in the casing 21, which casing is supported by the vertical branch $12^c$ of the connector 12, as by means of a bracket $21^a$ having a flange $21^b$ adapted to be received between the top of the branch $12^c$ and the bottom of a hexagonal flange

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$25^a$ on a plug 25. The switch is actuated in this case by a fluid-expansion thermostat comprising a container 22 for the fluid, which is located within the heater tube 10 and from which a tube 23 extends into operative relation to a diaphragm (not shown) by which the switch is operated. The tube 23 is located within a plug 24 the lower end of which is threaded into the upper end of an adapter plug 25, the lower end of which is threaded into the vertical branch $12^c$ of the coupling 12. The plug 24 and the adapter plug are provided with bores for the reception of the tube 23. The thermostatic switch, being of a well known construction, needs no illustration.

26 denotes a four-way coupling, similar to the coupling 12 into the rear horizontal branch $26^a$ whereof the rear end of the tube 10 is threaded. The opposite horizontal branch $26^b$ has threaded thereinto an elbow-like extension of the said tube comprising a short tubular connection 27 threaded into the branch $26^b$ and into a coupling sleeve 28, there being a short elbow 29 threaded into the opposite end of the sleeve, the upper end of the elbow being provided wtih a plug 30 by the removal of which the heater may be filled with liquid and the plug being in turn provided with a venting valve 31.

32 denotes a circulating tube one end of which is connected with the lower vertical branch $26^d$ of the connector 26 by means of an adapter 33 and the opposite end of which is connected with the lower vertical branch $12^d$ of the connector 12 by means of an adapter sleeve 34. 35 denotes an expansion tube extending above the tube 10 and carried by a T 36 the lower end of which is connected with the upper vertical branch $26^c$ of the connector 26 by means of an adapter 37. The upper end of the T is provided with a safety valve 38.

It will be noted that the heater as thus described is extremely compact, is inexpensive of production, efficient in operation, and is capable of being carried without effort to the room or compartment in which it is to be installed. It may be conveniently supported on the wall of such room by means of hooks 39 and 40, the shanks whereof can be threaded into the wall or other support.

Having thus described my invention, what I claim is:

1. A heater of the character described comprising an elongated tubular receptacle for liquid provided with radiating members connected thereto substantially throughout its length, a four-way connector having front and rear horizontal

branches and vertical branches and with the rear of which horizontal branches the front end of the tubular receptacle is connected, a plug connected with the front horizontal branch of the said connector, an electrical heating element carried by said plug and projecting through the said connector and into the portion of the tubular receptacle connected with the rear horizontal branch of said connector, a plug detachably connected to the upper of the vertical branches of said connector, a switch box mounted upon a portion of the heater adjacent to the front end of the tubular receptacle, a thermostatic element located within the portion of the tubular receptacle adjacent to the connector, a switch-operating member connected with said element and mounted in the last mentioned plug and communicating with switch mechanism in the said switch box, means for supporting the rear end of the said tubular receptacle, and a circulating tube connected to and communicating with opposite ends of the said tubular receptacle.

2. In the heater recited in claim 1, the means for supporting the rear end of the tubular receptacle comprising a connector having a horizontal branch with which the rear end of the tubular receptacle is connected and having a downwardly extending branch with which the rear end of the circulating tube is connected, and the first mentioned connector having a lower vertical branch with which the front end of the circulating tube is connected.



3. In the heater recited in claim 1, the means for supporting the rear end of the tubular receptacle comprising a connector having a horizontal branch with which the rear end of the tubular receptacle is connected and having a downwardly extending branch with which the rear end of the circulating tube is connected and the first mentioned connector having a lower vertical branch with which the front end of the circulating tube is connected, the connector for the rear end of the tubular receptacle also having an upper vertical branch, and an expansion tube connected to and communicating with the said last mentioned branch.

4. In the heater recited in claim 1, the means for supporting the rear end of the tubular receptacle comprising a connector having a horizontal branch with which the rear end of the tubular receptacle is connected and having a downwardly extending branch with which the rear end of the circulating tube is connected and the first mentioned connector having a lower vertical branch with which the front end of the circulating tube is connected, and the connector to which the rear end of the tubular receptacle is connected being provided with a rear horizontal branch, and an elbow comprising a horizontal portion detachably connected with said rear horizontal branch, said elbow having also a portion extending vertically from its horizontal portion and provided with a removable filling plug and a vent.

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