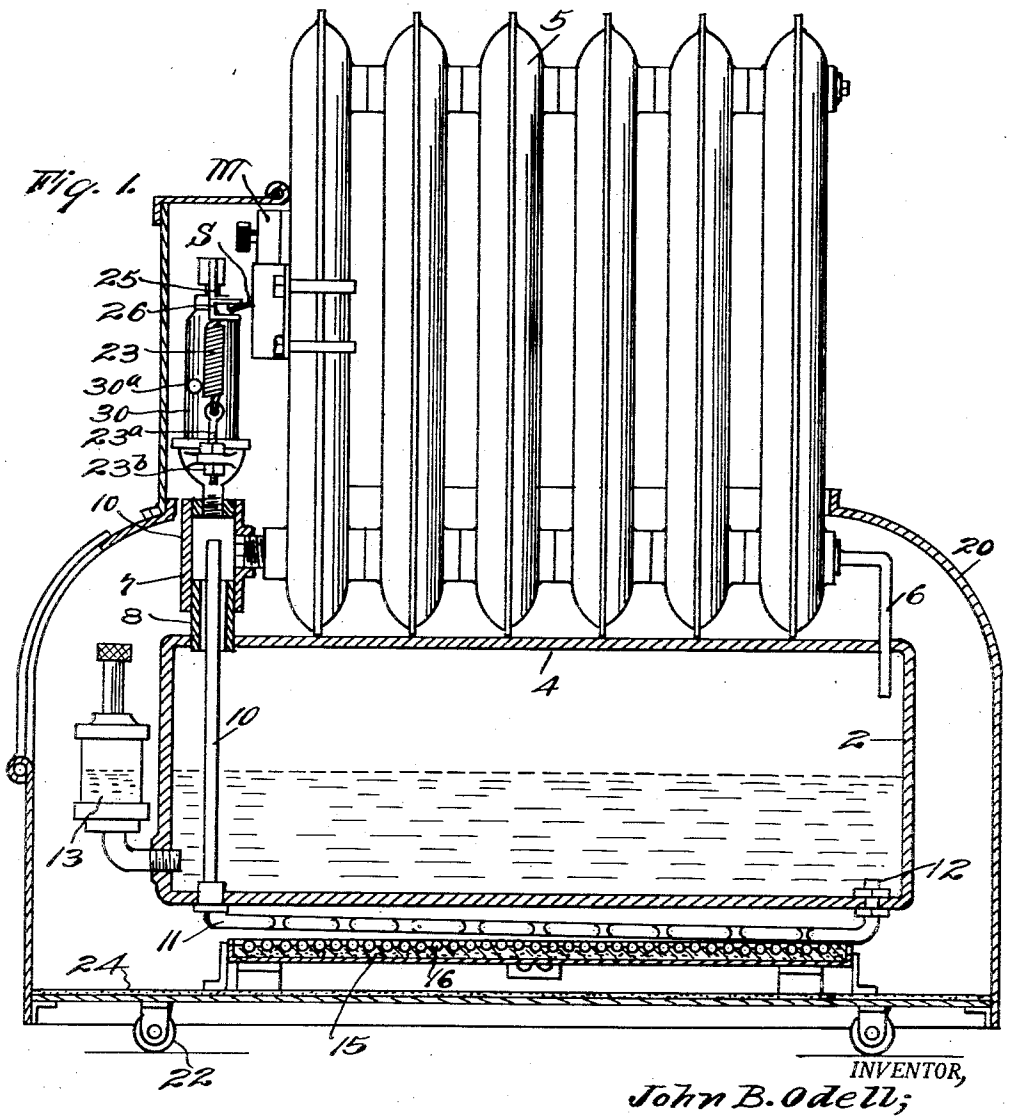
March 20, 1928. 1,662,935

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ELECTRIC STEAM RADIATOR

Filed June 6, 1927 3 Sheets-Sheet 1

Fig. 1.



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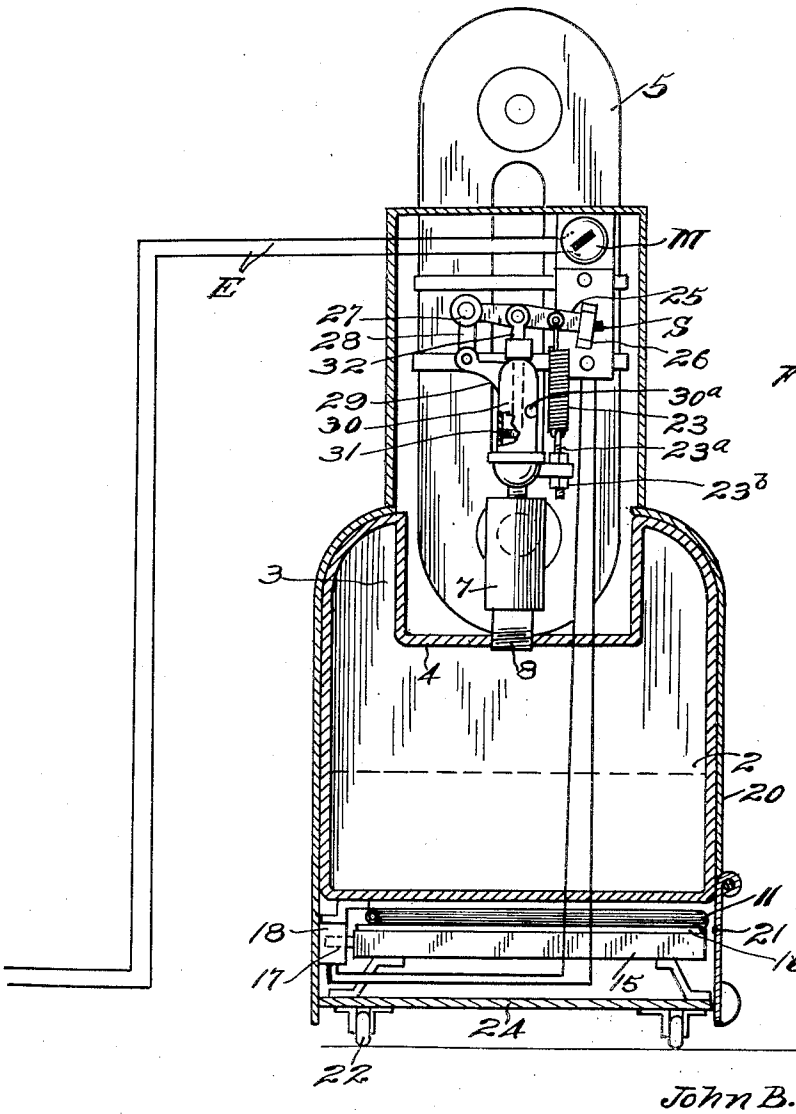


Fig. 2.

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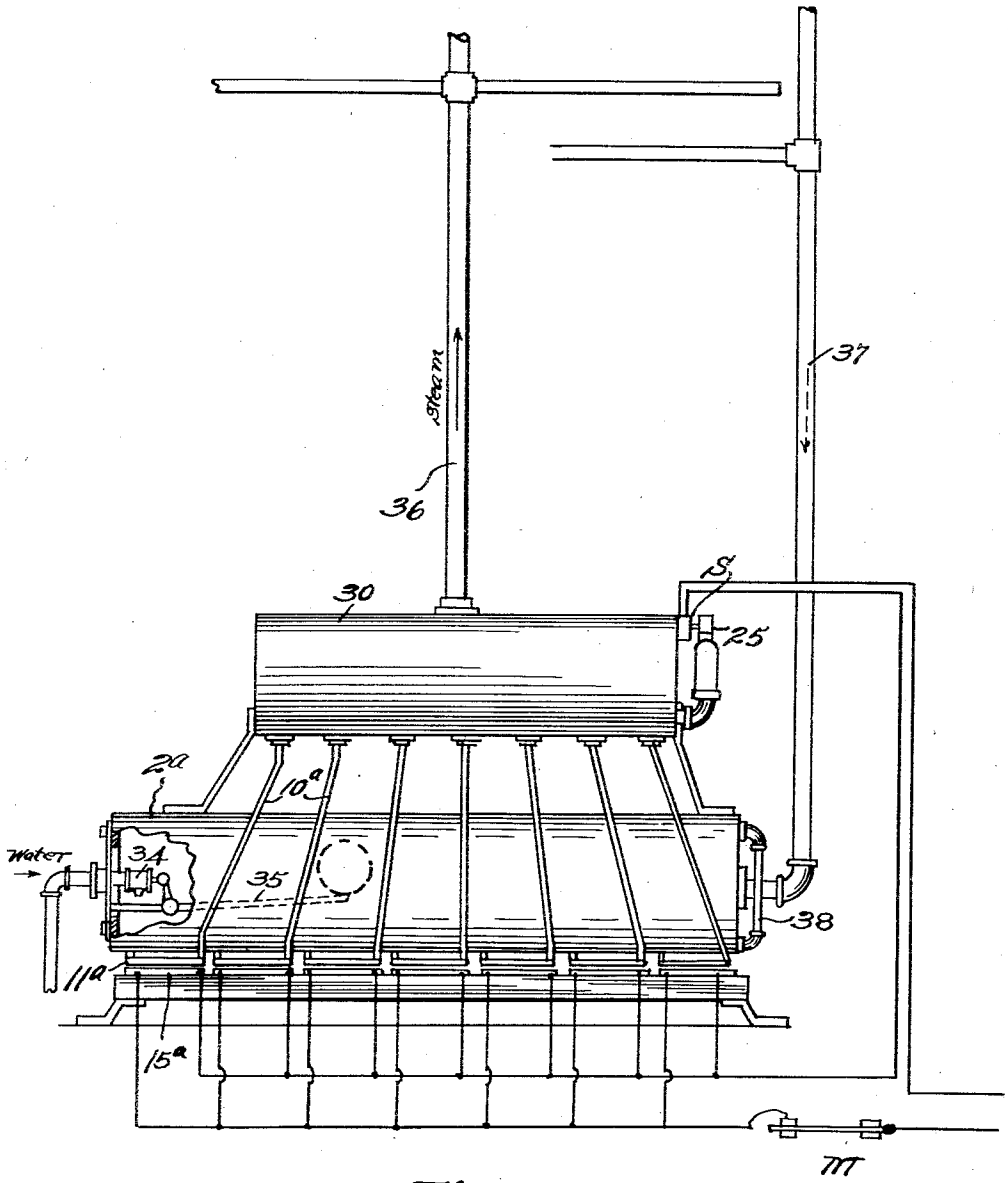


Fig. 3.

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Patented Mar. 20, 1928. 1,662,935

UNITED STATES PATENT OFFICE.

JOHN B. ODELL, OF RIVERSIDE, CALIFORNIA.

ELECTRIC STEAM RADIATOR.

Application filed June 6, 1927. Serial No. 196,840.

This invention relates to heat radiators and more especially to steam generators.

There is at present an extensive use of heat radiating devices of more or less simple character for the heating of individual rooms in homes, offices and stores and which utilize gas as fuel. The several kinds of gas burning heaters have as many objectionable drawbacks, the principal ones being the throwing off of the fumes of combustion directly into the room and the common danger of leaky and broken hose.

My present invention aims to do away with these serious objections and to provide a fool-proof means consisting of an electrically heated steam generating radiator.

An object is to provide a steam radiator which will automatically function to make and break an energizing circuit to a heating-coil plate so that when a predetermined high pressure is attained in the radiator the heat will be cut off until a desired low pressure is reached whereupon the automatic mechanism will again close the energizing circuit to again build up a steam head.

Again, an object is to provide a heater having variable means to automatically control the temperature of a room by automatically regulating the heater of the radiator by controlling the range of pressures in the steam chamber.

A further object is to provide a large water reservoir and means for readily replenishing it from time to time as may be needed.

Another object is to provide a portable electrically energized steam radiator of simple, compact, substantial structure.

An object is to provide an automatic pressure controlled electric switch for making and breaking the energizing circuit.

Additional objects, advantages and features will be made manifest in the ensuing specification of the herewith illustrated embodiment; it being understood that modifications, variations and adaptations may be resorted to within the spirit, scope and principle of the invention as it is hereinafter more particularly claimed.

Figure 1 is an elevation and partial section, longitudinally.

Figure 2 is an end view and transverse section.

Figure 3 is an elevation of a plural unit heater.

In its preferred form the radiator includes a water tank or reservoir 2 of elongated form and having its top depressed to form side buttresses 3 and a bench 4 on which are supported interconnected conventional steam shells or columns 5. These shells communicate with each other at the tops and bottoms in the usual manner for steam passage. One end shell has a drain pipe 6 for condensed steam water back to the tank 2.

The opposite end shell connects with a T 7 having a nipple 8 to the top of the tank 2.

A steam nozzle 10 leads down from the T 7 and out of the bottom of the tank and joins a generating manifold 11 of any approved type which has a water inlet 12 from the bottom of the tank.

Attached to one end of the tank is a simple water level gage 13 to readily show the level of water in the tank.

For the purpose of heating the water in the manifold and discharging steam at the nozzle 10 I provide an electric heating unit or plate 15 having heating coils 16 arranged thereon.

Terminals 17 of the coils are adapted to plug into a socket 18 attached to the bottom of the tank, which is elevated and covered in a suitable decorative and protecting casing 20 having a front door 21 to provide for access to the heating unit.

Current is supplied to the unit by an extension line E to a main switch M from which wires pass to a second switch of the snap type whose arm S is automatically actuated by a pressure controlled means to break the circuit at a given high pressure of steam in the heater and is automatically thrown to close the circuit at a prefixed low.

The switch actuating means includes a lever 25 interconnected to the arm S so as to move it two ways, as by a yoke 26. The lever has a floating pivot 27 on a link 28 which is pivoted on a lug 29 projecting from a cylinder 30 whose lower end is attached to and communicates with the T 7. Pressure of steam entering the cylinder 30 acts on a piston 31 whose rod 32 is connected to the lever 25 to push it against the action of a spring 23 whose effort is to so move the lever as to close the circuit of switch S.

Hence when the switches M and S are closed the unit coils 16 are energized and their heat is transmitted to the closely adjacent water manifold conduit 11. Steam being produced raises the air pressure in the

closed radiator spaces and as the pressure increases it lifts the piston and lever 25 until the switch arm S snaps over and breaks the circuit. As pressure falls the spring 23 plays its function of gradually pulling down the lever 25 until the switch S snaps to the closing position.

This dual automatic pressure and spring action continues until the main switch M is opened.

The higher the mean range of the pressure in the radiator the higher the mean range of temperature in the room being heated, and the converse. The automatic action of the heater automatically controls room temperature.

The portable form of the radiator is mounted on rollers 22 to facilitate its change of position as desired.

To conserve heat and prevent injury to a subjacent floor or floor covering the casing has a heat insulated bottom 24 and the heating coil unit or plate is removably supported on the bottom.

In Fig. 3 there is shown an adaptation wherein a steam drum 30 is arranged above the water holding tank 2^a and has a series of steam tubes 10^a coming up from independent manifolds 11^a which tap into the tank bottom and are disposed on independent electric heating units 15^a. These units are connected in parallel to the feed wires from the automatically controlled switch S and the main switch M, as above described. If any of the independent heating units fail the others will continue in action. Water is supplied to the tank 2^a by an automatic valve 34 under control of a float lever 35. Steam produced is delivered from the drum by pipe 36 to remote radiators (not here shown) and condensed water is returned to the tank by a pipe 37. A gage glass 38 shows the level of water in the tank.

To provide for the ready adjustment of control of the piston action the lower end of the spring 23 has a screw stem 23^a carrying lock nuts 23^b on opposite sides of a stationary bracket or lug, on the cylinder 30, through which the stem passes freely when the nuts are loosened to adjust the spring stem.

The cylinder 30 is provided with vent ports 30^a to permit a safety blow off when steam pressure is so high as to push the piston past the vents.

What is claimed is:

1. An electric, steam radiator having an electric heat generator, a water coil disposed thereover to be heated thereby, an automatic pressure opened switch for the generator, means for automatically closing the switch, a steam shell receiving steam from the coil and a water trap serving the coil.

2. An electric, steam radiator having a water tank and a set of heat radiating steam shells communicating therewith, an electrically heated water coil leading to and from the tank and extraneous thereto, an electric circuit switch and means operative automatically to open the switch at a predetermined high steam pressure and to close it at a given low pressure in the shells.

3. An electric, steam radiator having a water tank and a set of heat radiating steam shells communicating therewith, an extraneous electrically heated water coil leading to and from the tank, an electric circuit switch and variable means operative automatically to open the switch at a predetermined high steam pressure and to close it at a given low pressure in the shells.

4. An electric, steam radiator including a water tank having a top shelf with spaced side buttresses, a set of steam shells resting on the shelf and flanked by the buttresses, a circulating water manifold connected to the tank, and an intermittently energized electric heater contiguous to the manifold.

5. An electric, steam radiator including a water tank having a top shelf with spaced side buttresses, a set of steam shells resting on the shelf and flanked by the buttresses, an extraneous circulating water coil connected to the tank, an intermittently energized electric heater contiguous to the coil, and an automatic pressure operated means to control the heater.

6. In a steam radiator, and an attached steam shell, a water tank, a water coil in circulating connection therewith, a cylinder having a piston subject to fluid pressure in the tank, and an electric switch actuated by the piston to control steam generation in the coil.

7. In a steam radiator, a cylinder having a piston subject to fluid pressure, and an electric switch actuated by the piston to control steam generation in the radiator; said piston operating to open the switch and means for automatically closing the switch, a lever connected to the switch and said piston and said means both connecting to the lever.

8. An electric steam generator including a water tank and a connected steam receiving means, a plurality of independent, electric heater units wired in parallel, a set of extraneous steam coils for the respective units, and an electric circuit for the units including pressure controlled means for breaking the electric circuit of the units, said units being extraneous to the shell and tank.

9. An electric steam generator including a water tank and a connected steam receiving means, a plurality of independent, electric heater units, a set of steam coils for the respective units exterior of the tank, an automatically closed switch for the circuits of the units, and a pressure controlled means

to break the circuits by opening the switch.

10. In a steam radiator, a flat electrically energized heating unit, a flat water coil of tubing superjacent to the unit, a water vessel feeding the coil and a steam shell connected to the coil; which latter and the unit is exterior of the tank.

11. In a steam radiator, a flat electrically energized heating unit, a flat water coil of tubing superjacent to the unit, a water vessel feeding the coil and a steam shell connected to the coil; which latter and the unit is exterior of the tank, and a casing in which said coil and unit are arranged.

12. In a steam radiator, a flat electrically energized heating unit, a flat water coil of tubing superjacent to the unit a water vessel feeding the coil and a steam shell connected to the coil; which latter and the unit is exterior of the tank, and a casing in which said coil and unit are arranged; the heating unit being removable independently of the coil.

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