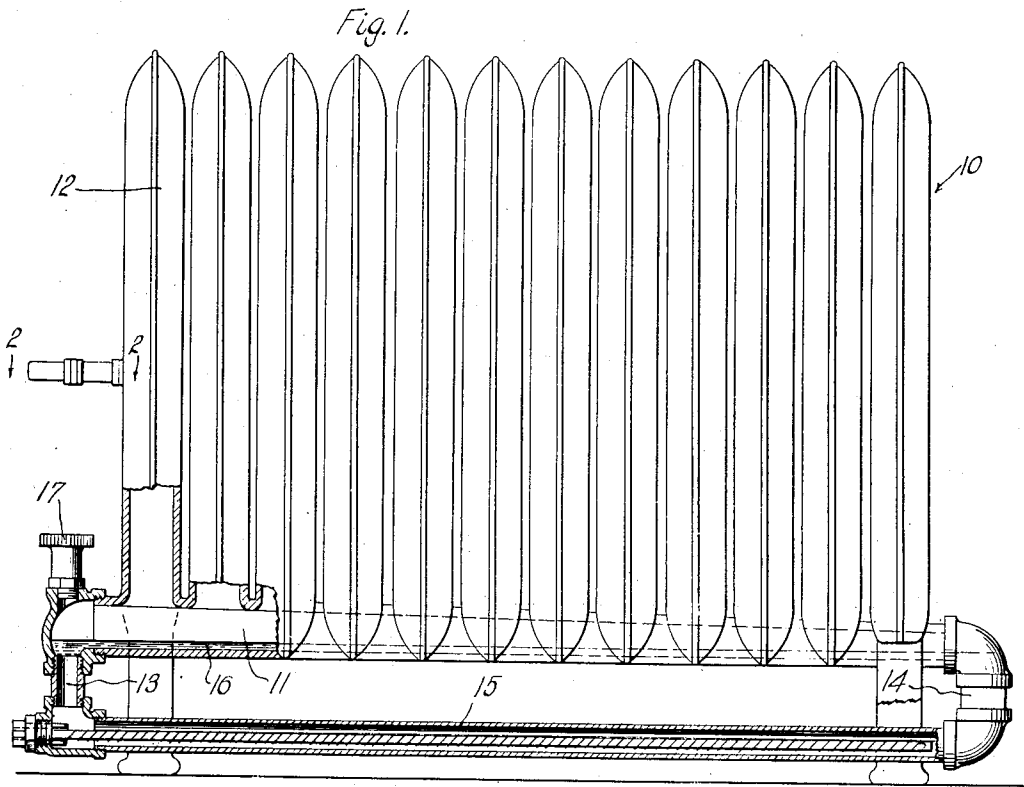
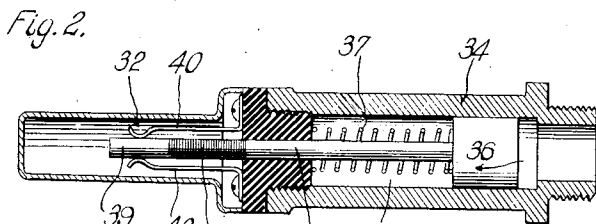
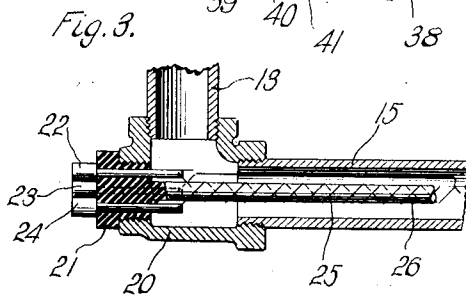
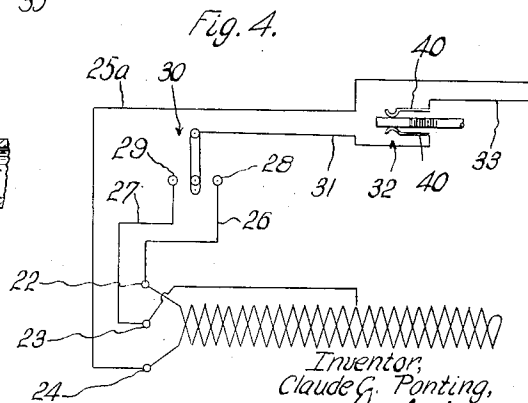


C. C. PONTING.
ELECTRIC STEAM HEATER.
APPLICATION FILED MAR. 13, 1913.

1,087,607.

Patented Feb. 17, 1914.



Witnesses.
Edward H. Barkeler
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by James T. Barkeler
his Attorney.

UNITED STATES PATENT OFFICE.

CLAUDE C. PONTING, OF MEDFORD, OREGON.

ELECTRIC STEAM-HEATER.

1,087,607.

Specification of Letters Patent.

Patented Feb. 17, 1914.

Application filed March 13, 1913. Serial No. 753,984.

To all whom it may concern:

Be it known that I, CLAUDE C. PONTING, a citizen of the United States, residing at Medford, in the county of Jackson, State of Oregon, have invented new and useful Improvements in Electric Steam-Heaters, of which the following is a specification.

This invention relates to a steam heater or radiator supplied with thermal energy by the means of electrical energy; and the invention consists in various improvements to supply a simple and efficient combination which will operate to radiate into surrounding atmosphere a quantity of heat representing a very large proportion of the electrical energy initially supplied to the apparatus.

One of the prime features of my invention is the provision of means whereby heat is readily and easily utilized from an electrical heating element to convert water into steam; and whereby free and easy circulation of the water and steam is assured.

Another feature, which I may mention, is an apparatus for controlling the electric action dependent upon the steam pressure in the radiator.

These features will be more fully explained in the following specification, reference being had to the accompanying drawings, in which:

Figure 1 is a side elevation, with parts in section, of my improved radiator. Fig. 2 is a section taken as indicated by line 2-2 of Fig. 1, and illustrating the conduction of the automatic control. Fig. 3 is an enlarged sectional detail of parts shown in Fig. 1. Fig. 4 is a diagram showing the electrical connections of my heater.

In the drawings 10 may designate a radiator of any common construction, having a lower horizontal passage 11 and radiating elements or units 12 rising vertically therefrom. The lower horizontal passage 11 has a clear opening from end to end so as to allow longitudinal circulation of the water and steam within the radiator. At each end of the passage 11 there is a vertical passage 13 and 14 which connect with the ends of a horizontal water tube 15. The water tube 15 and the passages 11, 13 and 14 form a closed circulation circuit for the water 16 and the steam formed therefrom. A filling cap 17 affords means of inserting the water 16.

At one end of the water tube 16 there is

a fitting 20 which may contain a plug 21 of suitable insulating materials and through which plug the leads 22, 23 and 24 may project. The heating element 25 is wound upon a suitable core 26, the two ends of the element being connected to leads 22 and 24 and an intermediate point on the element being connected to lead 23. A wire 25^a may lead directly from the source of electrical energy to the lead 24; and wires 26 and 27 may connect the leads 22 and 23 with contacts 28 and 29 of a suitable switch 30. A wire 31 may lead from the arm of switch 30 to the automatic control switch 32, from whence wire 33 leads to the other side of the source of electrical energy. By means of switch 30 the current may be sent through all or part of the heating element 25; and the switch 32 serves to normally pass the electrical current to the heating element, and to cut off the current when pressure in the radiator rises to a predetermined point. The construction of the automatic switch may be somewhat as indicated in Fig. 2. The essentials of this construction are comprised in switch 32 and a pressure operated apparatus 34. Apparatus 34 preferably takes the form of a cylinder 35 and piston 36, the piston being held in normal position by a small spring 37. The piston rod 38 carries a suitable contact member 39 on its end which completes the electrical circuit between contacts 40. When the piston 36 is moved in the direction indicated by the steam pressure in the radiator, the insulated portion 41 of the piston rod is pushed between contacts 40, and breaks the electrical connection between them. This form of automatic electrical control is typical of many other forms which I may utilize; the object being to break the circuit to the heating element when the steam pressure in the radiator has reached a certain predetermined point.

When electrical current is supplied to the heating element, the water, which may stand about the level shown at 51, immediately becomes heated and begins to vaporize. The vapor rises through the passages 13 and 14; and a circulation will be established around through the passages 13 and 14, and passage 11 and tube 15 in one direction or the other, carrying the steam out into the passage 11 where it may rise in radiator elements 12. Immediately a sufficient pressure,

and a corresponding temperature, of the steam is reached, the electrical current is cut off until the pressure and temperature subside. Upon subsidence of pressure the switch 32 closes and the operation is repeated. The frequency with which the water is heated and the steam generated will depend entirely upon the size and design of the heater and upon the rapidity of which the radiator elements 12 radiate steam heat to the surrounding atmosphere.

It will be noted that I require only a small amount of water to cover the electrical heating element. On account of the horizontal position of the heating element, and its arrangement in the pipe 15 closely surrounding it, most of the water in the heater is close to the heating element. This arrangement makes for good efficiency, as the electrically developed heat is transferred directly to the whole of a small body of water, requiring little current to initially heat the water to a suitable temperature.

Having described my invention, I claim:

An electric steam heater, comprising a radiator having a lower horizontal passage and radiating elements extending upwardly therefrom, a water tube parallel to and below the horizontal passage and connected therewith by a vertical passage at each end, the said horizontal passage, the water tube and the vertical passages constituting a complete endless circulating system for water and steam, and a horizontal electric heating element in the water tube, the tube closely surrounding the heating element so as to contain a minimum quantity of water, substantially as described.

In witness that I claim the foregoing I have hereunto subscribed my name this 4th day of March 1913.

CLAUDE C. PONTING.

Witnesses:

WM. P. MEALEY,
S. H. LEWIS.