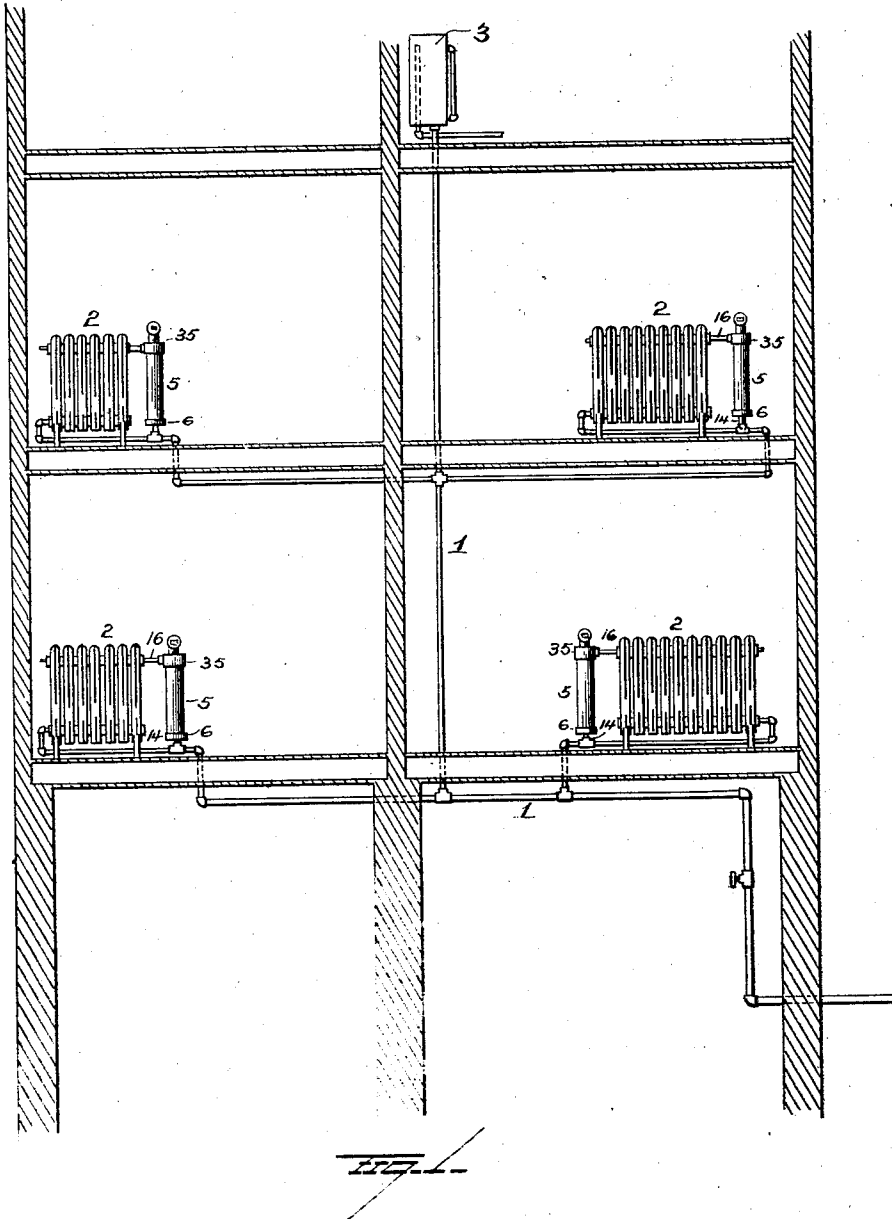


W. H. FOX.
ELECTRIC FLUID HEATER.
APPLICATION FILED AUG. 8, 1912.

1,067,647.

Patented July 15, 1913.

2 SHEETS—SHEET 1.



WITNESSES
E. Nottingham
S. Nottingham

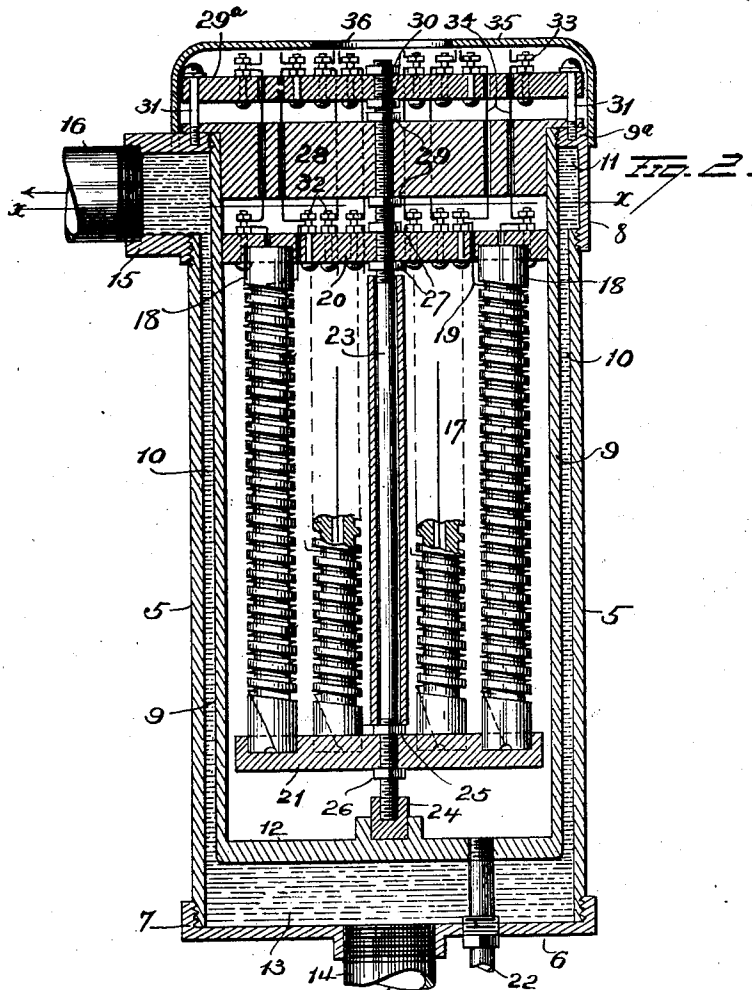
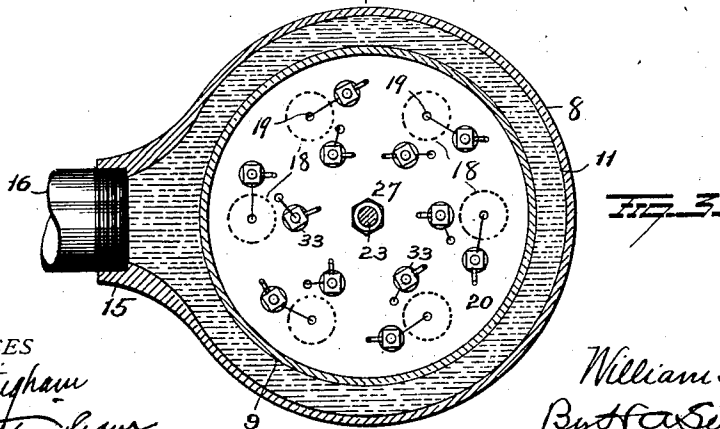
INVENTOR
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By *H. A. Seymour*
Attorney

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UNITED STATES PATENT OFFICE.

WILLIAM H. FOX, OF MINNEAPOLIS, MINNESOTA.

ELECTRIC FLUID-HEATER.

1,067,647.

Specification of Letters Patent.

Patented July 15, 1913.

Application filed August 8, 1912. Serial No. 714,091.

To all whom it may concern:

Be it known that I, WILLIAM H. FOX, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Electric Fluid-Heaters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in electrical liquid heating means and more particularly to an electrical water heater,—the object of the invention being to construct a heater which shall be simple and compact; afford a maximum amount of heating surface for the water, and which shall be readily adaptable for use in a house water system and capable of being located in proximity to and connected with a radiator of any approved construction so as to control the amount of heat radiated therefrom by regulating the temperature of the water flowing from the heater and through the radiator sections.

With this object in view, the invention consists in certain novel features of construction and combinations of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view showing a portion of a building in section and illustrating the application of my improvement to the water heating system in the building. Fig. 2 is an enlarged sectional view, partly broken away, of the heater, and Fig. 3 is a horizontal sectional view on the line $x-x$ of Fig. 2.

1 represents the piping of a hot water heating system in which a plurality of radiators 2 are connected and the usual expansion tank 3 may be employed. In the circuit of the piping system, a plurality of my improved electric water heaters 4 will be connected,—one of such heaters being located in proximity to each radiator 2.

In constructing the heater I employ an outer shell 5 provided at its lower end with a base head or plate 6 having at its peripheral edge an upturned flange 7 which is threaded interiorly to screw on the threaded lower end of said outer shell 5. The shell 5 is also threaded exteriorly at its upper end to receive the internally threaded lower end of an upper head 8 having an inwardly pro-

jecting portion 9^a at its upper end which is threaded to receive the upper end of an inner shell 9. The shell 9 is spaced inwardly from the shell 5 to form a water space 10 and said shell 9 also forms the inner wall of a larger chamber 11, the outer and upper walls of which latter are formed by the head 8 and its inwardly projecting portion 9^a. The bottom 12 of the inner shell 9 terminates an appreciable distance above the base 6 and forms with the latter and with the lower portion of the shell 5, a chamber 13 with which a water inlet pipe 14 communicates. The head 8 is provided with a hollow boss or enlargement 15 with which an outlet pipe 16 communicates. This outlet pipe is connected, as shown in Fig. 1 with the inlet of the radiator and the outlet of the latter is connected with the inlet pipe 14 of the heater, with which latter the supply pipe of the pipe system is also connected.

The space within the inner shell 9 constitutes a heating chamber 17 in which a plurality of electric heaters are located. Each electric heater comprises a tube 18 of porcelain or other electrical non-conducting material and is provided exteriorly with a spiral groove which receives the resistance conductor constituting the heating medium, these conductors being indicated at 19. The several tubes 18 of the heaters are disposed between insulating blocks or disks 20 and 21,—the latter having a diameter appreciably less than the internal diameter of the shell 9 so as to permit any moisture which may be condensed within the heating chamber 17, to find its way to the bottom of said chamber and finally pass out through a drain pipe 22, as clearly shown in Fig. 2. The supporting blocks or disks for the heaters are themselves supported by a centrally located rod 23, the lower end of which is stepped in an insulating block 24 mounted in a socket at the center of the bottom 12 of the shell 9.

The rod 23 is threaded at its lower portion for the accommodation of nuts 25—26 disposed respectively above and below the lower supporting block 21 to hold the latter in position. The upper portion of the rod 23 is also screw threaded to receive nuts 27 between which the block or disk 20 is secured. The rod 23 projects upwardly an appreciable distance above the disk or block 20 and passes through an insulating block or head 28 to which it is secured by the nuts 29^a and above the block 28 an insulating

disk 29 is located and secured to the rod 23 by means of nuts 30 and also by means of screws 31 located near the peripheral portions of said blocks,—the lower ends of said screws being caused to enter threaded sockets in the inwardly projecting portion of the head 8. A suitable number of binding posts 32 are secured to the block or disk 20 and the latter may be provided with passages for wires leading from the heating coils to these binding posts. The upper disk 29 has also secured thereto a plurality of binding posts 33 and this disk is provided with passages for the accommodation of wires 34 which connect the binding posts 32 with the binding posts 33 and the large intermediate block or disk 28 is also provided with suitable passages for the accommodation of these wires.

A cap or cover 35 incloses the disk 29 and the depending flange of this cap or cover is removably secured to the head 8 of the heater. This cap is provided centrally with a suitable opening 36 through which wires, connected with the binding post 33, may be passed and connected at their upper ends with any suitable switch (which may be located upon said cap) constructed to successively cut in or out of circuit the several electrical heating elements so as to thereby control the temperature and consequently the degree of heat which it may be desired the water shall furnish. This switch may be of the type commonly employed with rheostats.

It will be observed that with my improvements, the parts are not only compactly arranged, but a large extent of heating surface for the water is afforded and a large heating chamber surrounded by the water to be heated is provided.

Provision is also made for the ready removal of the heating means without disturbing the general water connections.

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

1. In an electrical water heater, the com-

bination with two concentric shells spaced one from the other and forming between them a water chamber provided with an inlet and an outlet, of a head disposed in the upper end of the inner shell, a central rod secured to said head, disks adjustably mounted on and supported by said rod, and electric heaters disposed between said disks and supported thereby.

2. In an electrical water heater, the combination with two concentric shells forming a water space between them provided with an inlet and an outlet, of two disks located within the heating chamber formed by the inner shell, electric heaters disposed between said disks, a rod removably disposed in the inner shell, means for clamping said disks adjustably to said rod, electrical connecting devices for said heaters supported by said rod, a head mounted in the upper end of the inner shell and supporting said rod, and a cap removably secured over said electrical connecting devices.

3. In an electrical water heater, the combination with two concentric shells forming a water space between them, an inlet pipe communicating with said water space, a head secured to said shells and forming a water space communicating with the first mentioned water space, and an outlet port communicating with the space within said head, of a rod disposed in the inner shell, disks secured to said rod, electric heaters supported between said disks, a disk supported on said head and disposed within the inner shell, another disk supported by the rod above said last mentioned disk, electrical connections associated with said disks, and a cap secured to the head and covering the upper disk and the electrical connections associated therewith.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

WILLIAM H. FOX.

Witnesses:

MICHAEL V. HECKINGER,
FRED. D. MERRILL.