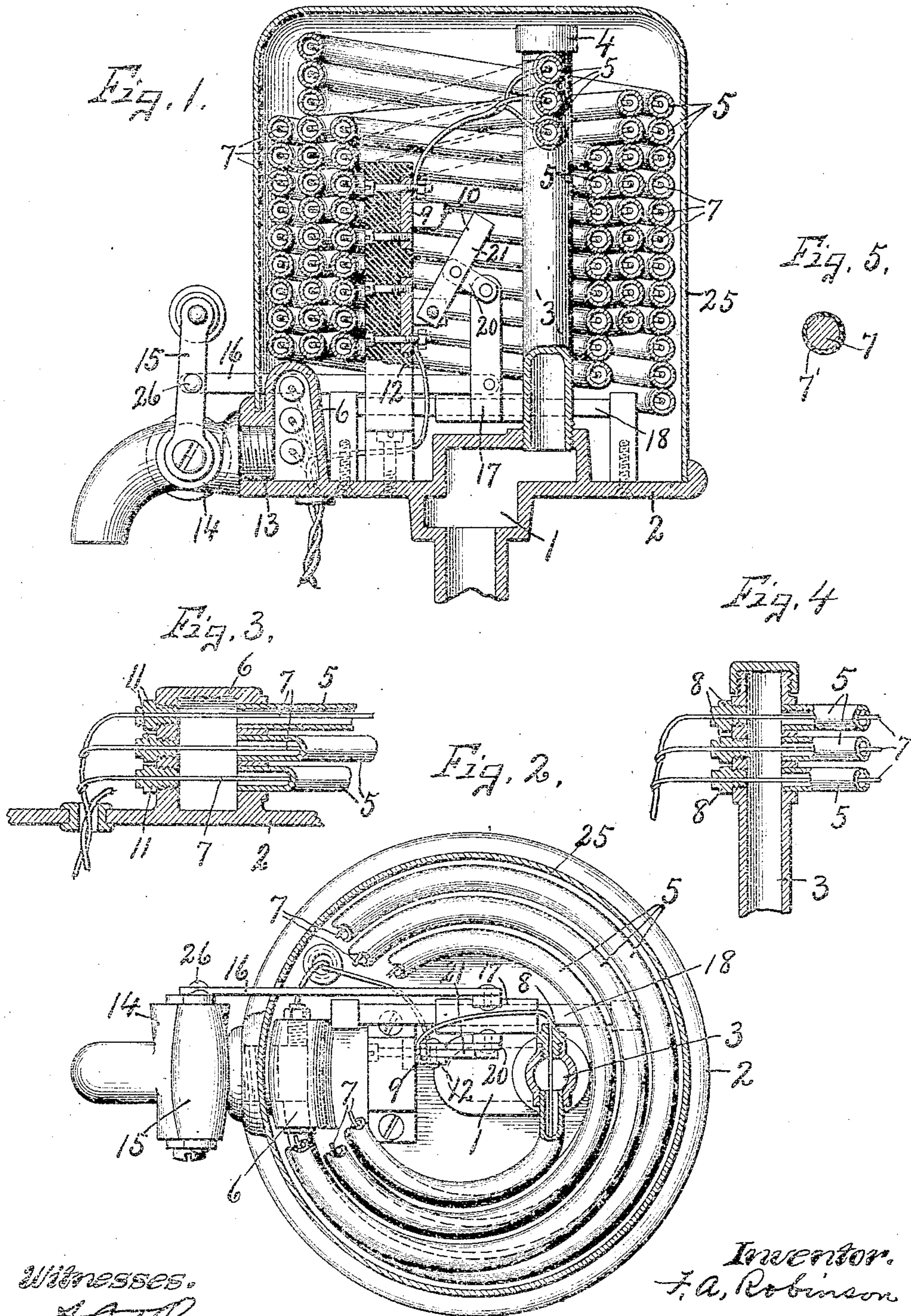


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ELECTRIC WATER HEATER.  
APPLICATION FILED OCT. 27, 1908.

965,332.

Patented July 26, 1910.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

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ELECTRIC WATER-HEATER.

965,332.

Specification of Letters Patent.

Patented July 26, 1910.

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*To all whom it may concern:*

Be it known that I, FRANK A. ROBINSON, of Albany, in the county of Albany, in the State of New York, have invented new and useful Improvements in Electric Water-Heaters, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in electric water heaters in which the primary object is to thread an electric conductor of high electrical resistance such as nickel steel or German silver through the water conduit preferably in the form of a coil so that a considerable length of water pipe may be brought into a compact space and the water drawn into direct contact with the heated electric conductor passing through the pipes thereby causing the water to envelop the heated conductor throughout the entire length of the water pipe and to absorb the heat from said conductor while in transit from one end to the other of the water conduit so that cold water may be introduced into one end of such conduit and discharged in a more or less heated condition at the discharge end. In other words, I have sought to heat continuously flowing cold water to any desired degree below the boiling point with a minimum consumption of electric current by confining the water in coil pipes and passing the electric heating conductor through said pipes so as to be enveloped by the water and absorb the heat which is radiated from the conductor as distinguished from winding the electric heating conductor around the outside of the pipe.

Another object is to provide means whereby a plurality of pipe coils with one or more helices or turns may be used in the same apparatus without materially increasing its size.

Other objects and uses will be brought out in the following description.

In the drawings—Figure 1 is an elevation partly in section of an electric water heater embodying the various features of my invention, portions of the pipe coils being broken away. Fig. 2 is a horizontal sectional view through the same device also showing portions of the coils broken away to more clearly show the underlying mechanism. Figs. 3 and 4 are enlarged sectional views through portions of the upright stand

pipes and terminal ends of the water conduits and electric conductors. Fig. 5 is an enlarged transverse sectional view of one of the insulator conductors.

In carrying out the objects stated, the water from any suitable source of supply is diverted into a suitable chamber —1— in the base as —2— of the apparatus and is conducted from said chamber into a stand pipe —3— rising from the chamber —1— and closed at its upper end by a suitable cap —4—.

A series of, in this instance three, coils of comparatively small pipe —5— have one end connected to and leading from the upper end of the stand pipe —3— and their opposite end connected to and terminating in a second stand pipe or chamber —6— which, in this instance, is formed in the base, the intermediate portion of said pipes —5— being coiled in one or more helices around a common axis which, in this instance, forms the axis of the base —2—, the latter being circular. An electric conductor —7— of nickel-steel, German silver or other suitable material of high electrical resistance is threaded through each pipe coil, one end of each conductor being brought out from the head —3— through a suitable bushing —8— and connected to a suitable terminal —9— of an electric switch —10— while the opposite ends of said conductors are brought out from the chamber —6— through suitable bushings —11— and connected to the other terminal —12— of the switch —10—.

The chamber —6— is provided with an outlet —13— in which is secured a suitable valve —14— for controlling the discharge of the heated water after passing through the pipe coils —5—, said valve being controlled by a suitable operating member —15— which is, in this instance, connected by a link —16— to a cross head —17—, the latter being slidably mounted upon a guide rod —18— and connected by a link —20— to the movable member as —21— of the electric switch —10— so that the electric circuit may be closed and opened simultaneously with the opening and closing of the valve —14—, that is when the valve —14— is opened by the movement of the operating member —15— in one direction to permit the escape of water from the pipe coils —5—, the switch —10— will be simulta-



neously closed to divert the electric current through the electric conductor —7— thereby heating the latter, which in turn gives up its heat to the water in transit through the pipe coils —5—. On the other hand, when the valve —14— is closed by the movement of the lever —15— in the opposite direction, the electric switch —10— will be opened to break the electric circuit thereby cutting off the current through the conductor —7—.

Although I have shown the valve operating member —15— as connected to the electric switch —10—, I do not wish to be limited to this connection as in many instances I may prefer to operate the valve —14— independently of the switch —10— as for instance when it may be desired to use cold water instead of hot water.

The electric conductor —7— is coated with a thin layer of insulating material —7'— or enamel and is usually inserted or threaded through the pipe —5— while the latter is straight or before bending it into the form of a coil, the insulator serving to prevent short circuit between the pipe and conductor and at the same time being sufficiently thin to allow the heat to readily radiate from the conductor and to be taken up by the water which envelops said conductor in its transit through the pipes —5—. The entire system of pipe coils and electric conductors therein together with the switch —10— are inclosed in a suitable housing or case —25— which is mounted upon the supporting base —2— and gives the entire device a pleasing and characteristic appearance.

In operation when it is desired to obtain heated water it is simply necessary to open the valve —14— thereby closing the switch —10— and heating the wire —7— whereupon the water readily flows from the inlet chamber —1— through the stand pipe —2— and thence through the coils —5— to the chamber —6— and out through the valve —14— being heated in transit by direct contact with the conductor —7— except for the thin insulation with which said conductor is covered. If cold water is desired, the operating member —15— may be disconnected from the link —16— by the withdrawal of a pin —26— which connects said link to the operating member —15— whereupon the valve —14— may be opened leaving the switch —10— open and thereby preventing the heating of the conductor —7—.

What I claim is:

1. An electric water heater comprising a plurality of independent water conducting pipes, a water upflow pipe communicating with a water supply, means for coupling the inlet ends of said conducting pipes to said upflow pipe, a water receiving chamber, means for coupling the outlet ends of said

conducting pipes to said water receiving chamber, an electric switch provided with a pair of terminals, electric heating conductors connected to one terminal, extending through respectively said upflow pipe, the water conducting pipes, said chamber, and connected to the other terminal of the switch, a discharge pipe communicating with said water receiving chamber, and means for opening said discharge pipe simultaneously with the closing of the switch.

2. An electric water heater comprising a plurality of independent water conducting pipes, a water upflow pipe communicating with a water supply, means for coupling the inlet ends of said conducting pipes to said upflow pipe, a water receiving chamber, means for coupling the outer ends of said conducting pipes to said water receiving chamber, an electric switch provided with a pair of terminals, electric heating conductors connected to one terminal, extending through respectively said upflow pipe, the water conducting pipes, said chamber, and connected to the other terminal of the switch, a discharge pipe communicating with said water receiving chamber, and means for closing the switch, and means for opening the discharge pipe.

3. An electric water heater comprising a water receiving chamber communicating with a source of supply, an upflow pipe supported by one wall of said chamber and communicating therewith, a second water receiving chamber, water conducting pipes having the inlets thereof connected to and communicating with the upflow pipes and having their outlets connected to and communicating with the second water receiving chamber, an electric switch provided with a pair of terminals, electric heating conductors having one end thereof connected to one of said terminals, said conductors extending through respectively said upflow pipes, said conductor pipes and said second water receiving chambers, said conductors independent of each other, a discharge pipe communicating with said second water receiving chamber, means for controlling the discharge of water from said second water receiving chamber, and means for closing the switch.

4. An electric water heater comprising a water receiving chamber communicating with a source of supply, an upflow pipe supported by one wall of said chamber and communicating therewith, a second water receiving chamber, water conducting pipes having the inlets thereof connected to and communicating with the upflow pipes and having their outlets connected to and communicating with the second water receiving chamber, an electric switch provided with a pair of terminals, electric heating conductors having one end thereof connected to



one of said terminals, said conductors extending through respectively said upflow pipes, said conductor pipes and said second water receiving chambers, said conductors independent of each other, a discharge pipe communicating with said second water receiving chamber, a valve for opening and closing the discharge pipe, and connections between the valve and the switch for closing the switch simultaneously with the opening of the valve.

5. An electric water heater comprising a base provided with a water inlet and a water outlet chamber, an upflow pipe communicating with the inlet chamber, a discharge pipe communicating with the outlet chamber, a plurality of water conducting pipes having their inlet ends connected to and communicating with the upflow pipe and having their outlet ends connected to and communicating with the outlet chamber, an electric switch having a pair of terminals, electric heating conductors connected to one of said terminals and extending through said upflow pipe, said water conducting pipes, and through said water outlet chamber, and connected to the other terminal of the switch, a casing inclosing said conducting pipes and supported by the base, a discharge pipe communicating with the water outlet chamber, means for opening and closing the discharge pipe, and means for opening and closing the switch.

6. An electric water heater comprising a base provided with a water inlet and a water outlet chamber, an upflow pipe communicating with the inlet chamber, a discharge pipe communicating with the outlet chamber, a plurality of water conducting pipes having their inlet ends connected to and communicating with the upflow pipe and

having their outlet ends connected to and communicating with the outlet chamber, an electric switch having a pair of terminals, electric heating conductors connected to one of said terminals and extending through said upflow pipe, said water conducting pipes, and through said water outlet chamber, and connected to the other terminal of the switch, a casing inclosing said conducting pipes and supported by the base, a discharge pipe communicating with the water outlet chamber, and means for controlling the opening and closing of the discharge pipe simultaneously with the opening and closing of the switch.

7. An electric heater comprising an upflow pipe communicating with a water supply, a water outlet chamber, a plurality of water conducting pipes having their inlet ends connected to said upflow pipe and communicating with the interior of said pipe, said conducting pipes having their outlet ends connected to and communicating with said outlet chamber, a plurality of electric heating conductors extending through said conducting pipes, said conductors further extending through said upflow pipe and through said water receiving chamber, the portions of the conductors extending through said conducting pipes being insulated, means for controlling the discharge of water from said water outlet chamber, and means connected to the conductors for opening and closing the circuit.

In witness whereof I have hereunto set my hand this 9th day of October 1908.

FRANK A. ROBINSON.

Witnesses:

H. E. CHASE,  
CAROLINE McCORMACK.