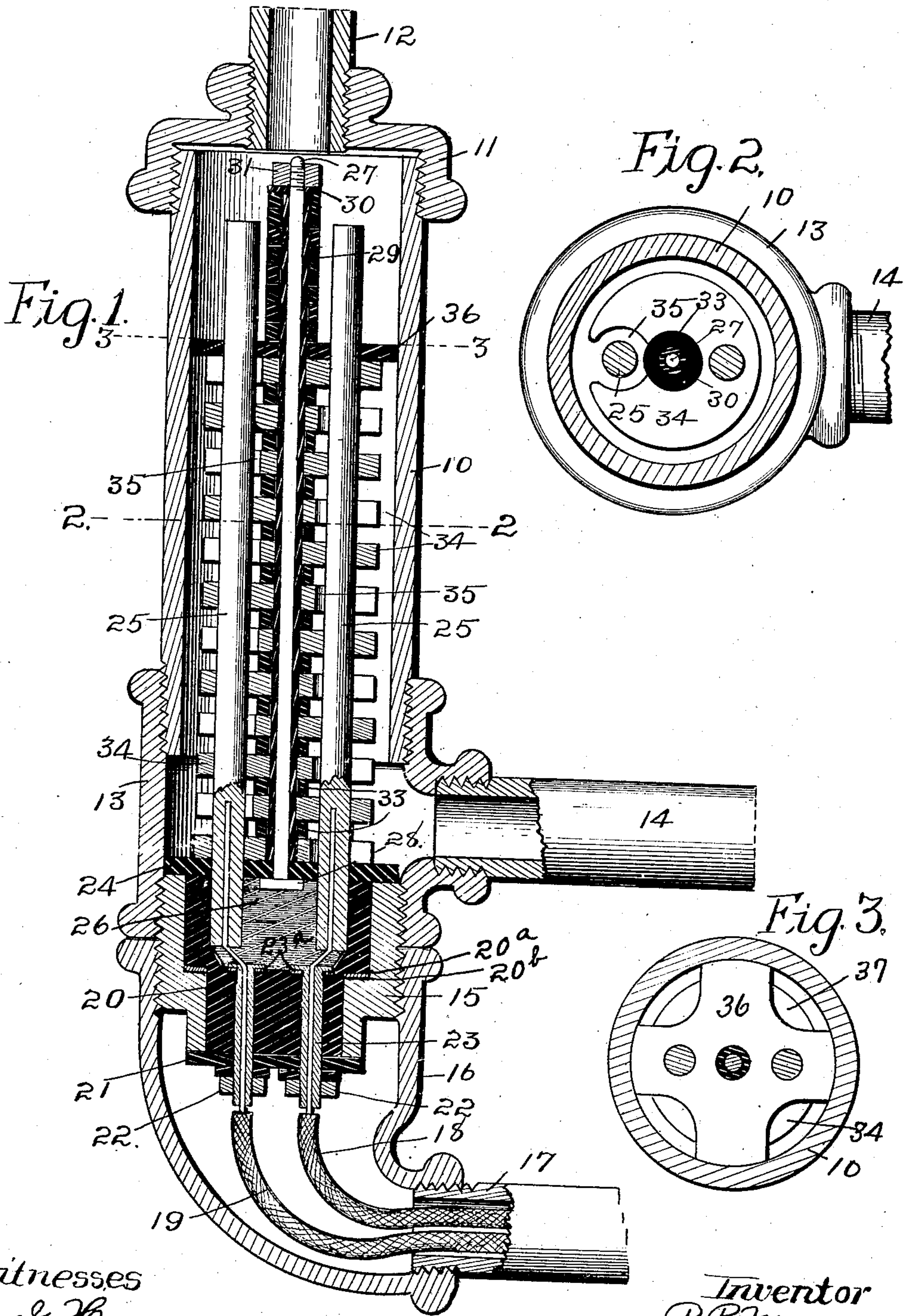


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ELECTRIC WATER HEATER.  
APPLICATION FILED JAN. 2, 1909.

939,054.

Patented Nov. 2, 1909.



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# UNITED STATES PATENT OFFICE.

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## ELECTRIC WATER-HEATER.

939,054.

Specification of Letters Patent.

Patented Nov. 2, 1909.

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*To all whom it may concern:*

Be it known that I, PAUL P. MEYERS, a citizen of the United States, residing at Grinnell, in the county of Poweshiek and State of Iowa, have invented a certain new and useful Electric Water-Heater, of which the following is a specification.

My invention relates to that class of electric water heaters in which two electrodes are spaced apart within a suitable water chamber, and the water is heated by causing a current to flow from one electrode to the other through the water, the water itself forming the resistance which is essential in causing the water to be heated.

I have discovered that water in different localities has a very wide degree of variation in regard to its resistance to electric current and that, therefore, in some instances, electrodes may be used having a comparatively small amount of exposed surfaces, and in other instances it is necessary to have electrodes with a much greater amount of exposed surfaces.

My object is to provide a heater of this kind in which the electrodes are so arranged that the area of the exposed surfaces thereof may be readily, quickly, and easily varied to suit the requirements of the kind of water used.

A further object is to provide a heater of this kind of simple, durable, and inexpensive construction that is not likely to get out of order, or leak water.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows a vertical, central, sectional view of the electric water heater embodying my invention. Fig. 2 shows a sectional view of same on the line 2—2 of Fig. 1, and—Fig. 3 shows a sectional view on the line 3—3 of Fig. 1.

Referring to the accompanying drawings, I have used the reference numeral 10 to indicate the body portion of the heater which is preferably made of a piece of pipe or tubing. At the upper end thereof is a screw-cap 11 having a discharge pipe 12 connected

with it. Screwed to the lower portion of the body portion 10 is a T-connection 13 having a water inlet pipe 14 screwed into one of the branches thereof. At the bottom of the T-connection 13 is a screw-plug 15 having a central opening therein and connected to this plug 15 is a pipe section 16 having one end shaped to receive a pipe 17, which pipe 17 is designed to receive and protect the electric wires 18 and 19.

Arranged within the screw-plug 15 is an insulator block 20 having an annular shoulder 20<sup>a</sup> thereon to rest on a mating shoulder on the screw-plug 15. A gasket 20<sup>b</sup> is placed between these shoulders to prevent leakage of water. Mounted in the insulator block 20 are two metal tubes 23 projected through the plate 21 and having the nuts 22 screwed thereon. The electric wires 18 and 19 pass through these tubes 23 and extend upwardly through the block 20. Surrounding the upper ends of the tubes 23 are the gaskets 23<sup>a</sup>. Below the insulator block 20 is an insulator plate 21, and said plate and the tubes 23 are held in position by the nuts 22 on the tubes.

The electrodes are constructed and arranged within the heater as follows: Two electrode members 25 are provided, each consisting of a straight, round rod, preferably made of carbon. The lower ends thereof are extended through the plate 24 and into the insulator block 20, and they are provided with openings at their lower ends into which the wires 18 and 19 are inserted, as clearly shown in Fig. 1. These carbon rods are held in position in the block 20 by means of a sealing material 26 arranged surrounding the lower ends of said carbon rods, and also arranged to insulate the wires from the liquid. These carbon rods are arranged parallel with each other and extend to a point near the top of the body portion 10.

Extended through the plate 24 is a metal rod 27 having a head 28 below the plate 24. Surrounding the metal rod 27 is an insulator tube 29 and at the upper end of the rod is a washer 30 and a nut 31. Arranged on top of the plate 24 is a disk shaped insulator spacing washer 33, surrounding the tube 29 and arranged between the carbon rods 25. Above the washer 33 is an electrode mem-



ber comprising a disk shaped body portion 34 having a central opening to receive the tube 29 and a small opening on one side to receive and fit tightly on one of the carbon rods 25, and a large opening at its other side to receive the other carbon rod 25 and to stand in position out of contact with it, as clearly shown in Fig. 2, this latter opening being indicated in said figure by the numeral 35. Above the carbon member 34 is a second spacing washer 33, and above it is a second electrode member 34 similar to the one before described in all respects except that it is reversed in position, that is to say, the large opening 35 therein is arranged adjacent to the opposite one of the carbon rods 25. A number of these disk shaped electrode members are employed and all are arranged in the same manner as the two just described, the alternate ones being in contact with the opposite carbon rods 25. Above the upper one of the electrode plates is a supporting and bracing washer 36, made of insulating material and having openings through it to receive the rod 27 and the carbon rods 25. Its edges engage the interior of the pipe 10 and openings 37 are formed in it to permit the passage of water.

In practical use and assuming that the wires 18 and 19 are connected with a source of electrical supply, then the current would flow through one of said wires to the carbon rods 25 connected with it and would then be distributed to all of the electrode members 34 that were connected to said carbon rod 25, and when the body portion 10 is filled with water, the current will flow from all of said electrode members 34 to the adjacent surfaces of the electrode members 34 that are connected with the opposite carbon rod 25.

Assuming that the kind of water being used has comparatively great resisting qualities, then a comparatively great number of electrode members 34 must be used, or if it is found that the kind of water being used does not offer great resistance to the current, then a less number of electrode members are employed. The operator may very readily and easily ascertain, by experiment, just what number of electrode members 34 are most desirable to be used in connection with water having a certain amount of resisting qualities, by first testing the device under the conditions of practical use. If it is found that a comparatively large volume of water heated to the boiling point will constantly flow from the heater, then the number of electrode members 34 may be somewhat reduced in order to obtain a less volume of heated water and a reduced consumption of electric current, or, if it is found, upon experiment, that only a com-

paratively small volume of water heated to the boiling point will continuously flow from the heater, then additional electrodes 34 may be added until the desired quantity of continuously flowing water heated to the proper degree will flow from the heater.

The structure of the device is so arranged that an operator may readily and easily remove or attach the electrode members 34 by first unscrewing the plug 15, and then removing the heating member from the body portion 10, and then unscrewing the nut 31 to thereby obtain access to the electrode members 34.

I claim as my invention.

1. In a device of the class described, the combination of a body portion having an inlet and a discharge opening therein, two electrodes contained within said body portion, and a number of electrode members detachably connected with each electrode, the electrode members on one electrode being interposed between those on the other electrode and spaced apart therefrom.

2. In a device of the class described, the combination of a body portion having inlet and discharge openings therein, two electrodes arranged within the body portion, a rod arranged between the electrodes and a series of electrode members detachably connected with each electrode and with said rod, the electrode members on one electrode being arranged between those on the other, and spaced apart therefrom, and insulators on the rod for holding the electrode members properly spaced apart, said electrode members and said insulators being detachably connected with said rod.

3. In a device of the class described, the combination of a body portion having inlet and discharge openings therein, a series of electrode plates arranged within the body portion and spaced apart from each other, two electric wires, means for detachably connecting the alternate ones of said electrode plates with one wire, and means for detachably connecting the remaining plates with the other wire, for the purposes stated.

4. In a device of the class described, the combination of a body portion having inlet and discharge openings, a plug inserted in the lower portion of said body, two electrode rods fixed in and insulated from the plug, and spaced apart from each other, a conductor wire connected with each electrode rod, a supporting rod secured to the plug between the electrode rods, an insulator tube thereon, a number of electrode plates, each having a central opening to receive the rod, and an opening on one side to receive and fit against one of the electrode rods, and a larger opening on the other side to surround the other electrode rod and to stand in position out of contact



with it, each of the alternate ones of said  
electrode plates being connected to one of  
the electrode rods, and the remaining elec-  
trode plates to the other, insulating washers  
5 on the supporting rod between the electrode  
plates to space the plates apart, and a nut  
on said supporting rod to connect all of the

electrode plates and insulating washers to-  
gether.

Des Moines, Iowa, Sept. 8, 1908.

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