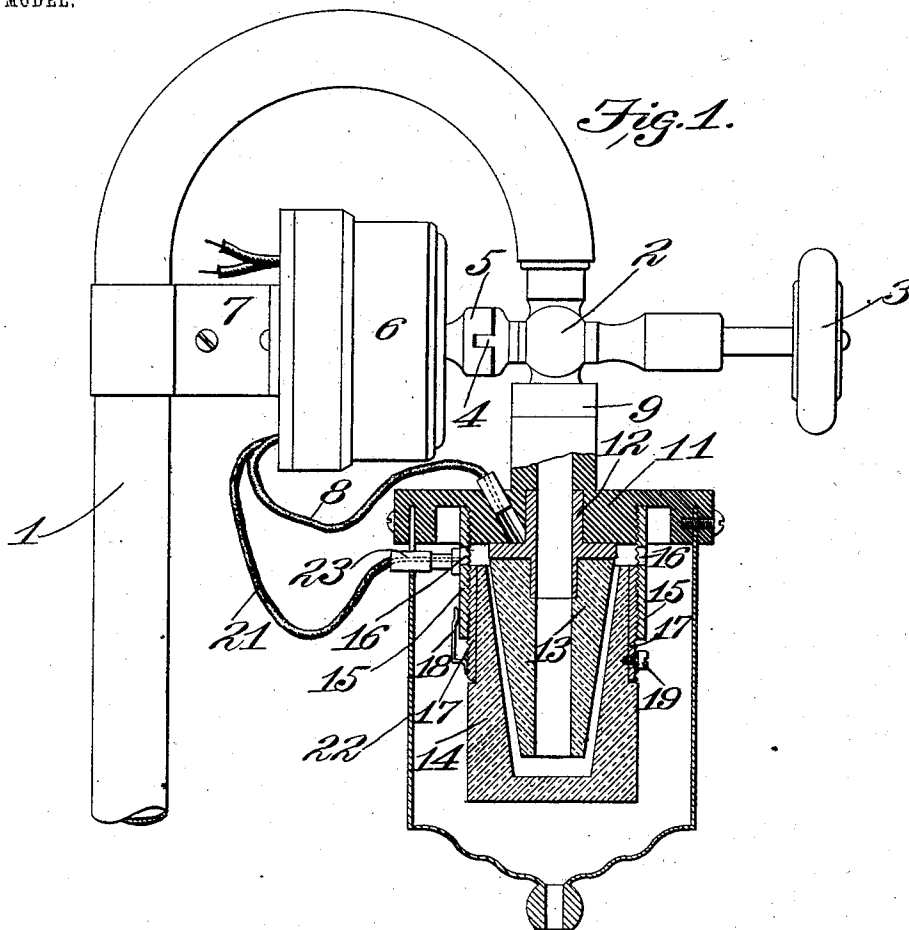
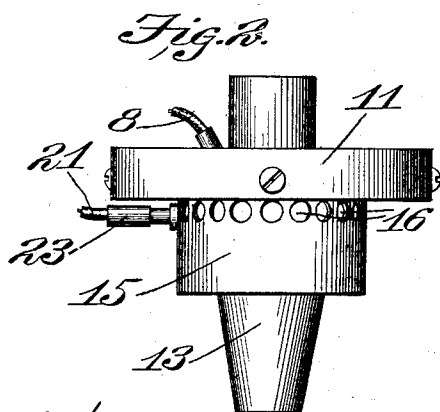
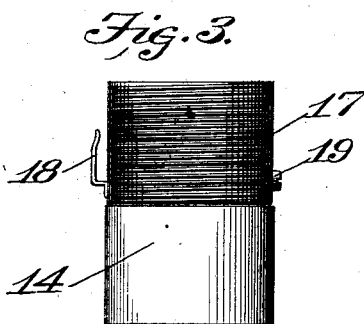


H. M. HILL.
ELECTRICAL WATER HEATER.
APPLICATION FILED MAY 10, 1902.

NO MODEL.



Witnesses:
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UNITED STATES PATENT OFFICE.

HARRY M. HILL, OF ST. LOUIS, MISSOURI, ASSIGNOR TO HILL ELECTRICAL MANUFACTURING COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

ELECTRICAL WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 727,361, dated May 5, 1903.

Application filed May 10, 1902. Serial No. 106,797. (No model.)

To all whom it may concern:

Be it known that I, HARRY M. HILL, a citizen of the United States, residing at St. Louis, State of Missouri, have invented a certain new and useful Improvement in Electrical Water-Heaters, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional view of my improved water-heater, showing the same in position. Fig. 2 is an elevational view of the insulation-head and its depending inner electrode, and Fig. 3 is a side elevational view of the adjustable outer electrode.

This invention relates to a new and useful improvement in electrical water-heaters, the object being to construct a device of the character described which is capable of adjustment whereby the temperature of the water heated can be regulated. This regulation is effected through the adjustment of one or the other of the electrodes between which the water to be heated passes. These electrodes are preferably made of carbon and so constructed that they have contiguous faces arranged at an angle to the line of adjustment, whereby when one of said electrodes is moved relatively to the other of said electrodes the proximate faces are caused to approach toward or recede from each other. By this adjustment of the electrodes the space in which the water is being heated is enlarged or diminished, also the overflow or escape ports of the heated water are adjusted, so far as their available area is concerned.

My present invention consists in the construction, arrangement, and combination of the several parts of my device, all as will hereinafter be described and afterward pointed out in the claims.

In the drawings I have shown an apparatus operating upon the principle described in an application filed by me March 31, 1902, serially numbered 100,740.

In the drawings, 1 indicates a stand-pipe for water, the same being arranged in an ordinary pipe system. The upper end of this

stand-pipe is shown as being curved to form a gooseneck, the end thereof carrying a spigot 2, manipulated by a handle 3. The spigot-stem is provided with a key 4, fitting in a slot in a switch-stem 5, said switch being inclosed in a casing 6, supported by a bracket 7 upon the stand-pipe.

Referring to Fig. 1, 9 indicates a coupling which is screwed in the lower end of the spigot, into which coupling is fitted a head 11, made of insulation material. 12 indicates a flanged boss secured to the under side of the head 11, said coupling 9, head 11, and flanged boss 12 being provided with alining openings for the passage of water. A wire 8 leads to the flanged boss 12. The purpose of thus separating the coupling 9 and the flanged boss 12 is to insulate the apparatus from the water-pipe.

13 indicates an electrode which for the sake of distinction will be termed the "inner" electrode, the same being provided with a bore for the passage of water, whereby the water is caused to pass downwardly through this inner electrode and thence upwardly through the space between the same and the outer electrode, (indicated at 14.) The inner electrode, as shown in Figs. 1 and 2, is substantially conical in shape—that is, its outer periphery is formed tapering.

15 indicates a threaded flange secured to and depending from the insulation-head, said flange being provided with a series of openings 16, arranged under the insulation-head.

The outer electrode 14 is formed with a tapering recess or pocket designed to receive the inner electrode. The lower end of the outer electrode is formed solid or imperforate, so as to force the water issuing from the bore in the inner electrode to pass upwardly between the inner and outer electrodes and overflow the upper edge of the outer electrode. The upper portion of the outer electrode is encircled by a metallic band 17, which is designed to be threaded into the flange 15. In order to make good electric contact between the flange 15 and the band 17, I provide a yielding tongue 18 on said band, which is designed to contact with the outer periphery of the flange 15. Thus I do not rely en-

tiely upon the contact made by the threads, which contact is liable to be affected by the corrosion of the metal. This tongue also serves to frictionlessly lock the outer electrode against unintentional displacement.

19 indicates a screw whose function is to secure the band to the outer electrode and whose head provides a stop to limit the upward movement of the outer electrode.

8 indicates a wire leading from the switch to the inner electrode, and 21 indicates a wire also leading from said switch to the flange 15 and its electrically-connected outer electrode.

22 indicates a housing which is received in a concentric groove in the insulation-head, said housing being of larger diameter than the outer electrode, so as to provide a passage for the heated water. This housing is slotted for the reception of a thimble 23, through which the wire 21 passes. The opening thus provided affords a suitable vent to accommodate the displacement of the air when the water is turned on and also enables steam to escape should steam be generated, and this relieves the water between the electrodes from back pressure due to the generation of such steam and prevents the water from becoming turbulent and "spitting."

In operation the admission of water to the heater by turning the spigot throws the switch and completes the circuit. The water passes downwardly through the bore of the inner electrode and thence upwardly in the space between the inner and outer electrodes, by which it is heated. The water overflows through the opening 16 and is received in the housing, the same discharging through the opening in the bottom of said housing. If it is desired to heat the water extremely hot, the outer electrode is screwed up, so as to cause the proximate faces of the inner and outer electrodes to closely approach each other, which adjustment of the outer electrode also reduces the space occupied by the water during the time it is being heated and reduces the available area of the openings 16, so that the overflow is retarded and the water being heated is held a longer time between the two electrodes. In this manner it is possible with my present construction to heat water up to the boiling-point; but of course when the device is thus adjusted the output of heated water is much smaller than is the case where water at a lower temperature is desired, and the outer electrode is adjusted outwardly or downwardly, so as to increase the available area of openings 16, increase the space between the electrodes occupied by the water being heated, and also increase the distance between the proximate faces of the electrodes. The value of this adjustment can be readily appreciated when it is understood that the same renders my improved device capable of various uses where it is desired to get hot water at varying degrees of temperature from a current of electricity of given voltage. Furthermore, it has been found that different

waters require different electrical treatment to be heated, and by this adjustment my device is adapted for heating all kinds of water, it being only necessary to determine the temperature required, when the outer electrode can be adjusted inwardly to meet the demands of the particular kind of water being treated, the electrode being left in its final position when the temperature of the water being treated reaches the desired point.

I am aware that many minor changes in the construction, arrangement, and combination of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an electrical water-heater adapted for heating flowing water and provided with inlet and outlet passages for the flow of water therethrough, the combination with two electrodes so located as to leave a liquid-channel therebetween, one of said electrodes being adjustable, with its face at an angle to its line of adjustment, and means for so adjusting one of said electrodes as to increase or diminish the area of said passage and regulate the flow of liquid through the same; substantially as described.

2. In an electrical water-heater adapted for heating flowing water and provided with inlet and outlet passages for the flow of water therethrough, the combination with an electrode having an inclined face, of an adjustable electrode having an inclined face at an angle to its line of adjustment and so disposed as to leave a passage between said electrodes, and means for adjusting the last-mentioned electrode so as to regulate the area of said channel, thereby controlling the quantity of water passing through the same; substantially as described.

3. In an electrical water-heater adapted for heating flowing water and provided with inlet and outlet passages for the flow of water therethrough, the combination with a conically-shaped electrode with a passage therethrough, of an outer electrode having a tapered recess cooperating with said conically-shaped electrode, and means for adjusting one of said electrodes with relation to the other so as to increase or diminish the resistance of the liquid flowing between said electrodes; substantially as described.

4. In an electrical water-heater adapted for heating flowing water and provided with inlet and outlet passages for the flow of water therethrough, the combination with a supporting-head, a stationary, conically-shaped electrode provided with an opening for the passage of liquid therethrough, of an adjustable electrode having a tapered recess for cooperating with the conically-shaped electrode, means for adjusting the last-mentioned electrode longitudinally, and a shell, with a discharge-

opening therein, surrounding said electrodes and connected with said head; substantially as described.

5 5. In an electrical water-heater, the combination with an insulation-head, of a conically-shaped electrode depending therefrom, a threaded flange secured to said insulation-head, and an inclosing electrode adjustably mounted in said threaded flange; substantially as described.

15 6. In an electrical water-heater, the combination with an insulation-support, of an electrode mounted thereon and provided with an opening for the passage of water, a threaded metallic flange arranged on said support, and an inclosing electrode threaded in said flange and adjustable with respect to said first-mentioned electrode; substantially as described.

20 7. In an electrical water-heater, the combination with a support, of a conically-shaped electrode mounted thereon and provided with an opening for the passage of water, a threaded flange on said support, and an inclosing electrode provided with an encircling threaded band cooperating with said flange; substantially as described.

30 8. In an electrical water-heater, the combination with an inner electrode, of a threaded flange, an outer electrode threaded into said flange, and a spring-pressed tongue carried by said outer electrode for engaging said flange; substantially as described.

35 9. In an electrical water-heater, the combination with an inner electrode, of a flange encircling the same and provided with escape-openings near its top, and means for regulating the area of said openings; substantially as described.

40 10. In an electrical water-heater adapted for heating flowing water and provided with inlet and outlet passages for the flow of water therethrough, the combination with electrodes forming between them a conduit through which water is designed to pass, and means for regulating the size of the space between said electrodes, which space is occupied by said flowing water; substantially as described.

50 11. In an electrical water-heater, the combination with electrodes between which passes water to be heated, said water escaping through openings, and means for adjusting said electrodes toward and from each other, said means also regulating the size of said escape-openings; substantially as described.

55 12. In an electrical water-heater, the combination with electrodes between which passes

water to be heated, of openings for conducting off the heated water, and means for coincidentally adjusting the proximity of said electrodes with respect to each other, regulating the space between said electrodes occupied by water being heated, and regulating the available area of the openings through which the heated water passes; substantially as described.

13. In an electrical water-heater, the combination with a conically-shaped electrode provided with an opening for the passage of water, of a perforated flange surrounding said electrode, an inclosing electrode provided with a tapered recess for cooperating with said conically-shaped electrode, and means for adjusting the inclosing electrode so as to regulate the size of the escape-openings; substantially as described.

14. In an electrical water-heater, the combination with a conically-shaped electrode provided with a passage for water, of a flange encircling the upper portion of said electrode and provided with an escape-opening at or near the upper end of said electrode, an inclosing electrode provided with a tapered recess designed to receive the conically-shaped electrode, and means for adjusting the inclosing electrode, the upper edge of said inclosing electrode controlling the size of the escape-opening; substantially as described.

15. In an electrical water-heater adapted for heating flowing water and provided with inlet and outlet passages for the flow of water therethrough, the combination of electrodes one of which has a passage entirely through the same and has an inclined face, said electrodes being so located with relation to each other as to leave a liquid-channel therebetween, and means for increasing the area of said channel; substantially as described.

16. In an electrical water-heater adapted for heating flowing water and provided with inlet and outlet passages for the flow of water therethrough, the combination of electrodes, one of which has an inclined face, said electrodes being so located with relation to each other as to leave a liquid-channel therebetween, and means for decreasing the area of said channel; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 7th day of May, 1902.

HARRY M. HILL.

Witnesses:

GEORGE BAKEWELL,
G. A. PENNINGTON.