

No. 754,451.

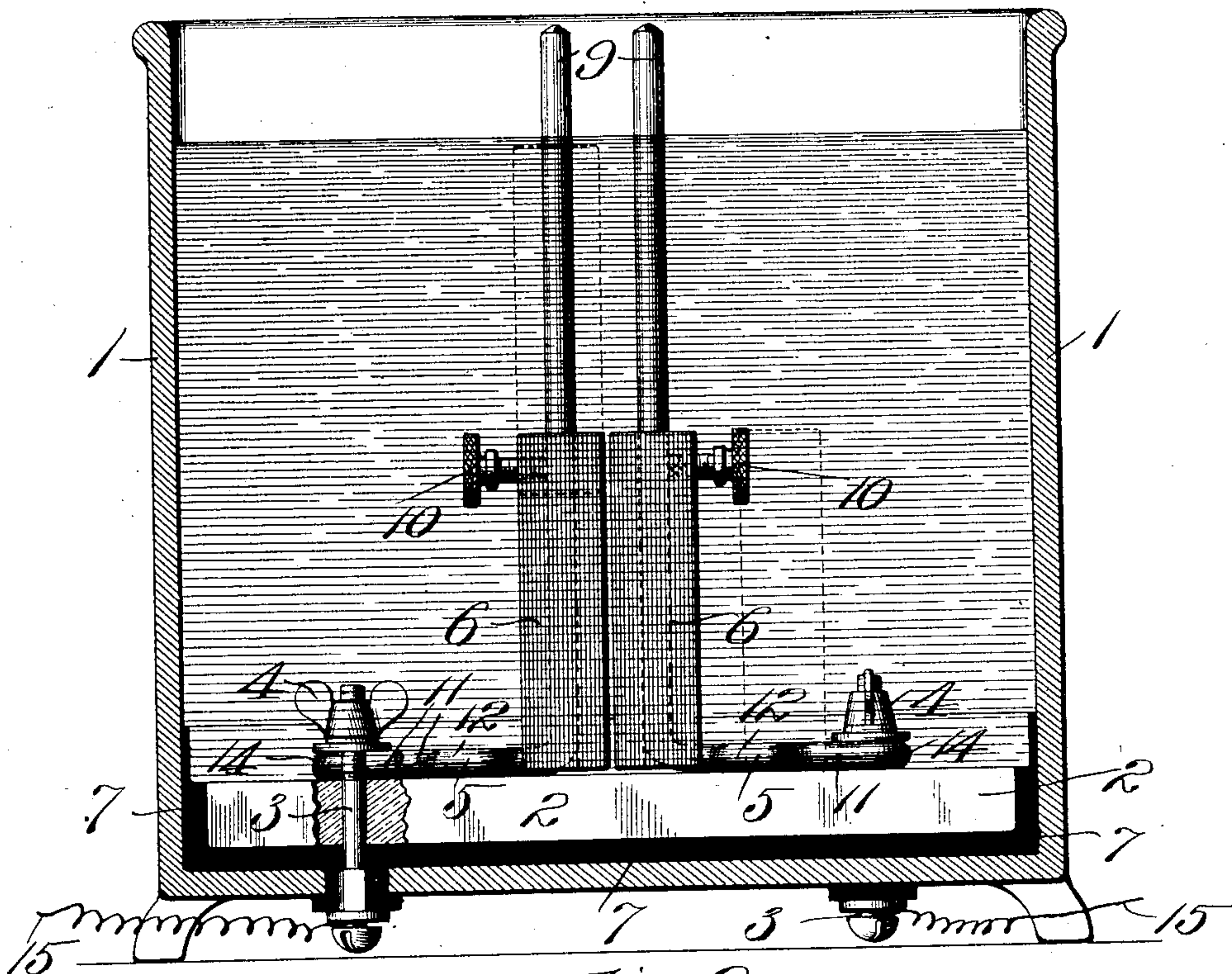
PATENTED MAR. 15, 1904.

H. M. HILL.  
ELECTRICAL WATER HEATER.

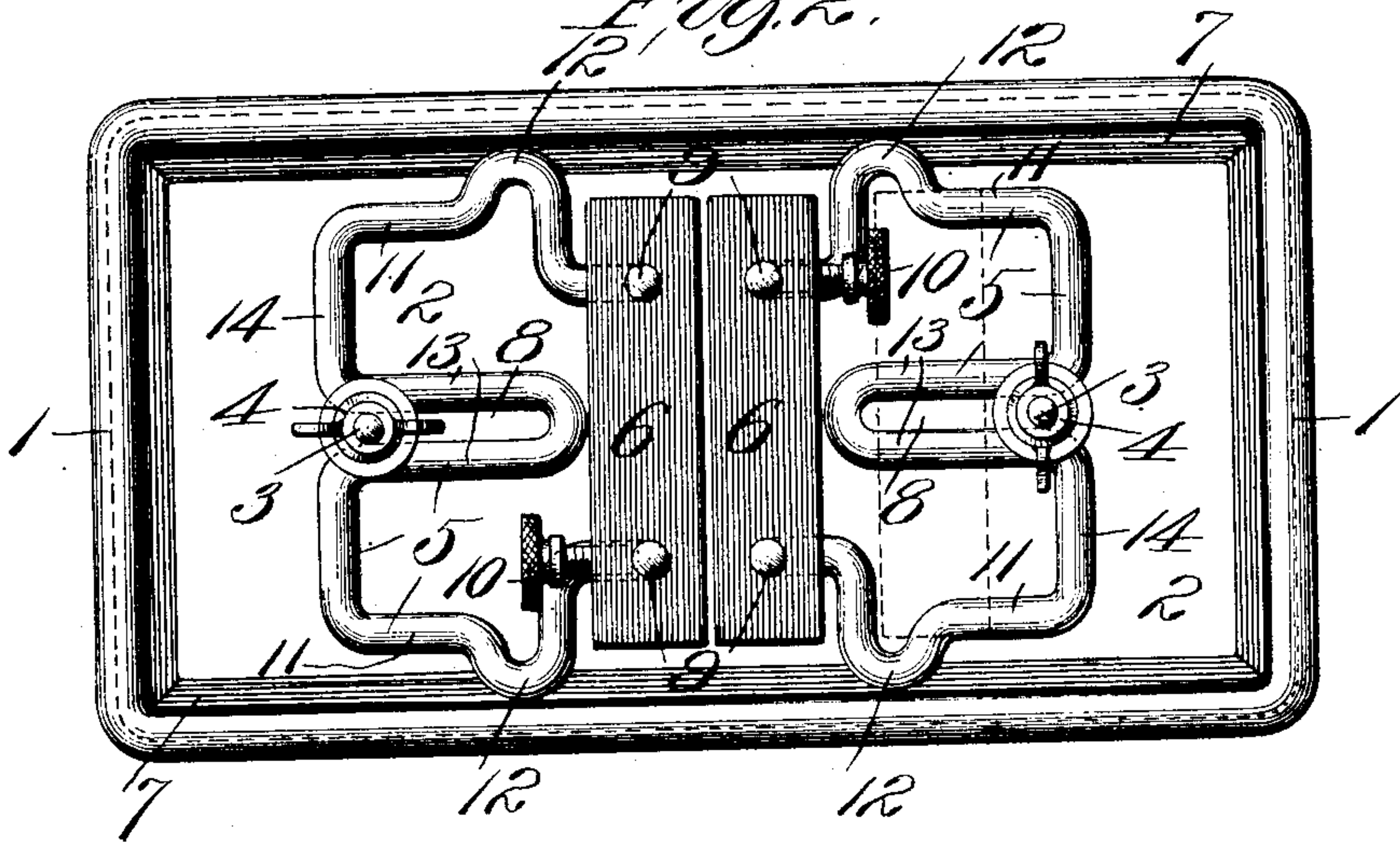
APPLICATION FILED JUNE 1, 1903.

NO MODEL.

*Fig. 1.*



*Fig. 2.*



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. 754,451, dated March 15, 1904.

Application filed June 1, 1903. Serial No. 159,629. (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, 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 view showing the receptacle in sectional elevation, the remaining parts being shown in side elevation; and Fig. 2 is a top plan view.

This invention relates to electrical water-heaters, the primary object being to provide means whereby the temperature of the water can be controlled in a very simple and efficient manner.

To this end and also to improve generally upon devices of the character indicated the invention consists in the various matters hereinafter described and claimed. Generally stated, the present device comprises electrodes between which flows the water or other substance whose temperature is to be raised, said electrodes being adjustable with respect to each other in such manner that the degree of heat imparted to the water can be controlled.

Referring now more particularly to the drawings, 1 represents a suitable receptacle, which is here shown as provided with a porcelain base 2. Suitable bolts 3 extend through the bottom wall of the casing and through the said porcelain base, said bolts cooperating with the nuts 4 to produce binding-posts and also clamps for the electrode-supports 5, which carry the electrodes 6. The said porcelain base and the bolts 3 are insulated from the casing 1 by suitable insulation 7.

The electrodes are so supported that they are adjustable toward and away from each other and are also adjustable across the opposing faces of each other, so that it is possible not only to vary the distance between the electrodes, but also to vary the effective surface of each electrode. Manifestly for the

purpose of this invention the electrodes can be supported in many ways.

As here shown, each electrode-support comprises a base which rests upon the porcelain base 2 of the receptacle and has a longitudinal slot 8, in which the bolt 3 is received, so that each support can be adjusted toward and away from the coacting support, while vertical standards 9, rising from said base pass through suitable openings in the electrode, set-screws 10, seated in the electrode, engaging said standards, and thus serving to hold the electrodes in vertically-adjusted positions upon said standards. Each electrode-support is here shown as formed of a single piece of wire whose free ends form the standards 9 and whose portion intermediate said standards extends at an angle thereto to produce the before-mentioned base. This base is here shown as comprising side bars 11, each of which has one end connected to one of the standards 9 by a portion which is first bent outwardly to produce a guide projection 12. Between said side bars are intermediate bars 13, which are spaced from each other to produce the slot 8 and are connected together at their inner ends—*i. e.*, the ends toward the standards 9—the outer end of each intermediate bar being connected to the adjacent side bar by a transverse connector 14.

The conducting-wires 15 from a suitable source of electrical energy are connected to the binding-posts in a manner which will be readily apparent, and the electrode-supports have their bases placed between the base 2 and the set-nuts 4 in a manner which will also be readily apparent, the electrodes being placed upon the standards with said standards passing through the openings provided for them in the electrodes.

Water enters the space between the electrodes and being heated by the current passing from one to the other thereof in a manner which is well understood rises, the colder water flowing into the lower portion of the space between the electrodes to take the place of the rising heated water and the circulation being thus maintained. Manifestly the extent to



which the water is heated during a single passage between the electrodes is dependent upon the effective conducting-surfaces of the electrodes. If the electrodes have the whole of  
 5 their surfaces in opposition to each other, as shown by full lines in Figs. 1 and 2, current passes from one electrode to the other from the whole surface of each electrode and a relatively great amount of heat is imparted to a  
 10 column of water flowing between the electrodes. If, however, one of the electrodes be moved across the opposing face of the other thereof to occupy the position in which the left-hand electrode is illustrated by dotted  
 15 lines in Fig. 1, the opposing or effective surfaces of the electrodes are reduced, so that a smaller amount of heat is transmitted to the column of water flowing between the electrodes. Should one of the electrodes be moved  
 20 entirely out of line with the other, the whole current is of course cut off. The degree of heat imparted to the column of water passing between the electrodes can therefore be adjustably regulated at will, the electrodes being  
 25 held in their adjusted positions just described by means of the set-screws 10. The adjustment of the electrodes toward and away from each other in order to vary the distance between them and to consequently vary the  
 30 size of the column of water being acted upon will be readily understood.

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

Having thus described the invention, what is claimed as new, and desired to be secured by  
 40 Letters Patent, is—

1. In an electrical water-heater, opposing

electrodes which have adjustment with relation to each other to vary the distance between them and have also adjustment to carry one of them across the opposing surface of the  
 45 other thereof; substantially as described.

2. In an electrical water-heater, opposing electrodes, each of which is adjustable toward and away from the other thereof and is also adjustable across the opposing surface of the  
 50 other thereof; substantially as described.

3. In an electrical water-heater, an electrode, a support extending in a line across the face of said electrode, and a second opposing electrode adjustably mounted upon said sup-  
 55 port; substantially as described.

4. In an electrical water-heater, an electrode, an electrode-support adjustable toward and away from said electrode, a standard upon said support and in a line extending across the  
 60 face of said electrode, and a second and opposing electrode adjustably supported upon said standard; substantially as described.

5. In an electrical water-heater, a casing, an electrode therein, a bolt extending through a  
 65 wall of said casing and adapted to have a conducting-wire applied thereto, an electrode-support comprising a standard which extends in a line across the face of said electrode and a base which is provided with a slot receiving  
 70 said bolt, a nut upon said bolt for clamping said base, an electrode adjustable upon said standard, and a set-screw seated in said electrode and engaging said standard; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 30th day of May, 1903.

HARRY M. HILL.

Witnesses:

GALES R. MOORE,  
 GEORGE BAKEWELL.