

No. 817,594.

PATENTED APR. 10, 1906.

F. F. SHIPP.  
ELECTRICAL WATER HEATER.  
APPLICATION FILED SEPT. 16, 1904.

Fig. I

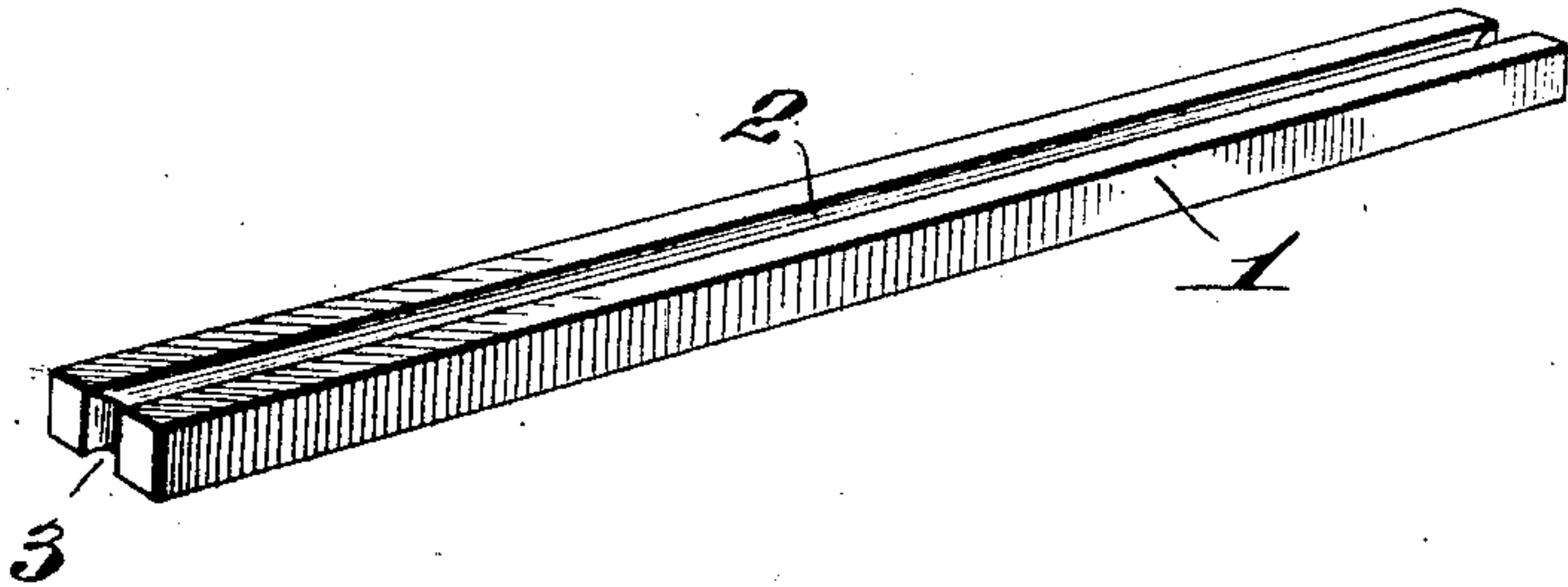


Fig. II.



Fig. III.

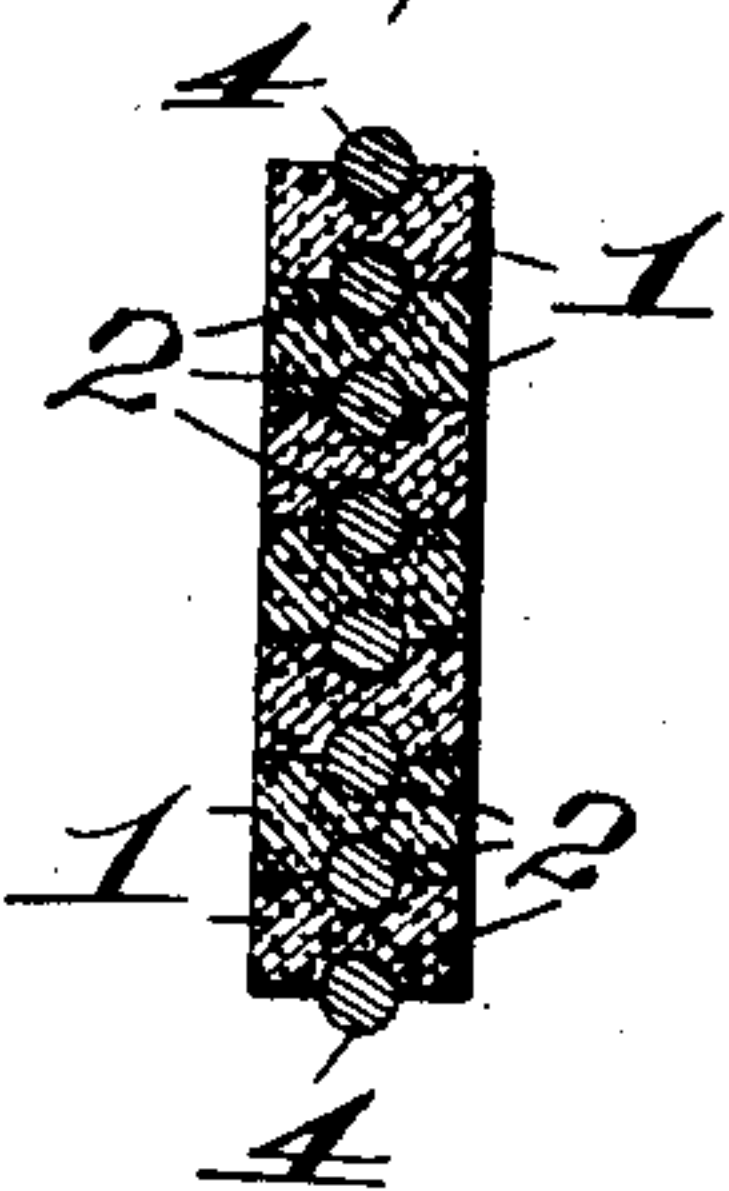


Fig. IV.

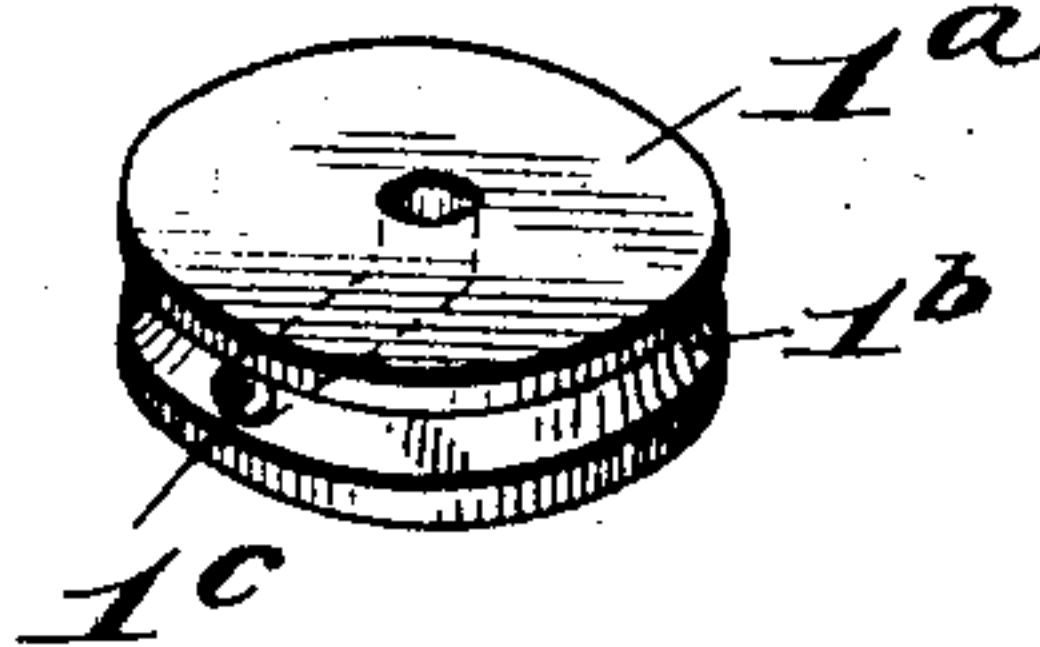


Fig. V.

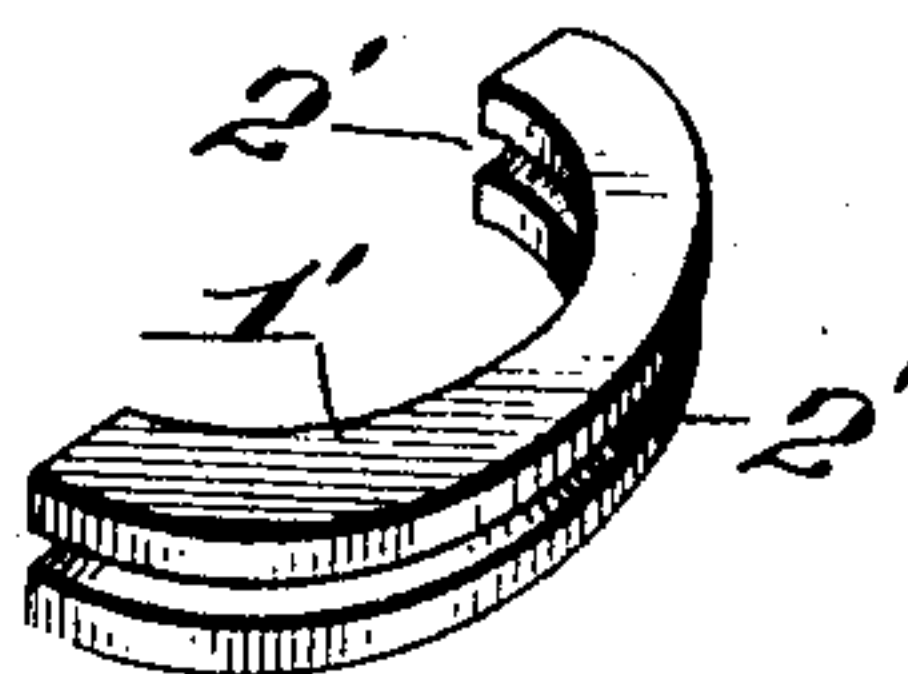
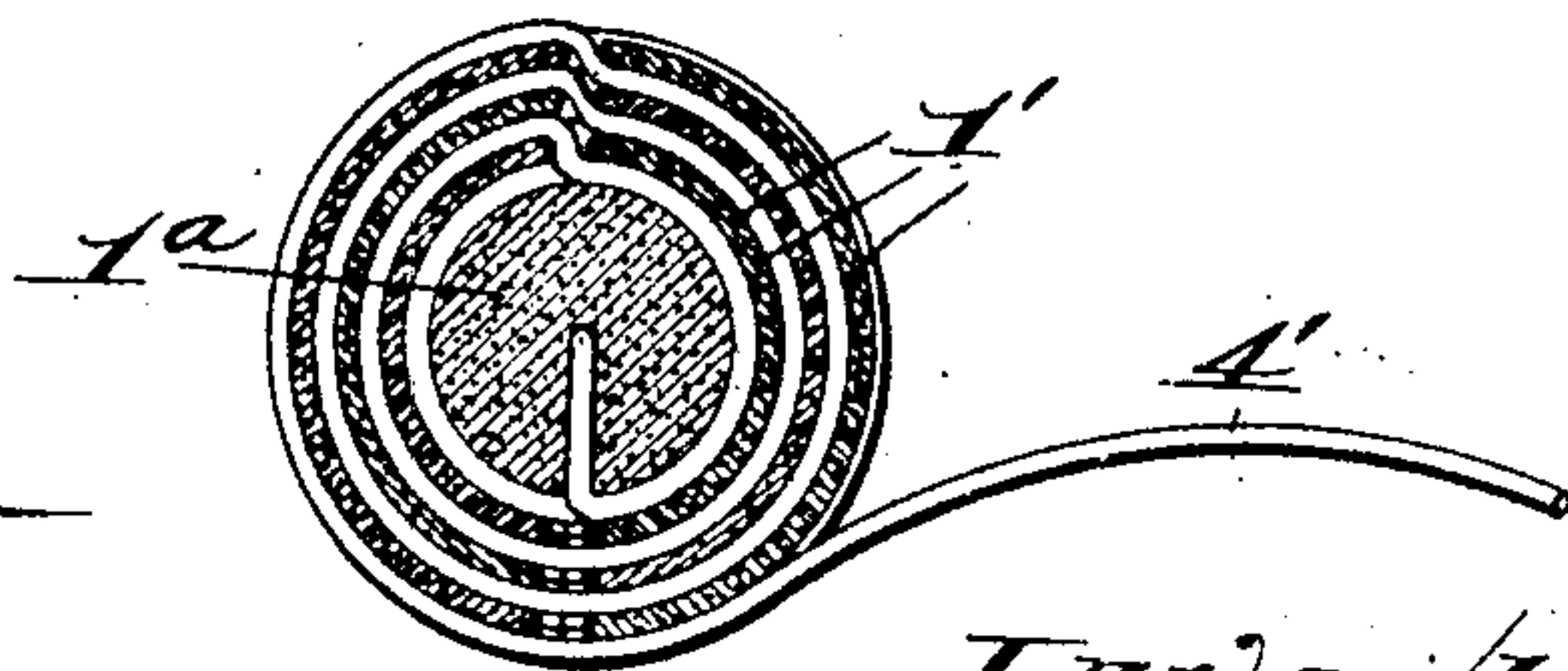


Fig. VI.



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# UNITED STATES PATENT OFFICE.

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## ELECTRICAL WATER-HEATER.

No. 317,594.

Specification of Letters Patent.

Patented April 10, 1906.

Application filed September 16, 1904. Serial No. 224,714.

*To all whom it may concern:*

Be it known that I, FREDERIC F. SHIPP, a citizen of the United States, residing in the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Electrical Water-Heaters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to an electrical water-heater designed to be placed in a receptacle in water to be heated and, briefly stated, it comprises a plurality of insulator heat-radiating sections and a heating-coil wound throughout the series of said sections in a continuous circuit, so that said heat-radiating insulator-sections will serve as diffusion members for the heat imparted thereto from the coil, while maintaining the coil throughout its extent in a separated condition.

Figure I is a perspective view of one of the heat-radiating insulator-sections of my heater. Fig. II is a longitudinal section of my heater. Fig. III is a cross-section of my heater. Fig. IV is a perspective view of the core of a modification of the heater. Fig. V is a perspective view of one of the heat-radiating insulator-sections of the modification. Fig. VI is a cross-section of the modified form of my heater.

Referring first to Figs. I to III, inclusive, 1 designates a series of heat-radiating insulator-sections, which in my heater are placed side by side or in tier. Each of these sections is provided at each side with a longitudinal groove 2 and at each end with a notch 3, the notches conforming to said grooves. The sections 1 may be of any material, such as porcelain or fire-clay, that is a good conductor of heat and a non-conductor of electricity. 4 is an electrical conductor-coil that is laid throughout the series of sections 1 to occupy the longitudinal grooves and notches of said sections. In building up my heater I first lay the wire of which the coil is produced in a section 1 to occupy a longitudinal groove thereof. I next place another section 1 against said first section, so that the wire will be received by its longitudinal groove at the side facing the first section, thereby inclosing a portion of the wire between said sections. The wire is then folded over in the

notch at one end of the second section, and laid in the longitudinal groove at the top side of said second section. The next section 1 is then laid upon the second section and the wire is laid into its groove at the upper side in the same manner as just described in connection with the second section. This procedure is continued until the coil is laid throughout the series of sections made use of to produce a heater of the desired size. It will be seen that by folding the coil at each end of its series of folds in the notches 3 of the sections 1 all the coil folds are positioned inwardly from the ends of the sections, thereby providing for the jutting ends of the sections, the sides of their notches serving as insulators to prevent contact of metal or any other conductor of electricity with said coil, thereby avoiding loss of electrical current that would occur in the event of contact of the coil folds with such conductor. When the heater has been completed, the terminals of the coil are connected to any suitable source of supply of electricity. During the use of the heater the sections 1, being of insulating material and good conductors of heat, readily receive heat communicated thereto from the coil 4 and radiate such heat therefrom into the receptacle in which the heater is located in the water, with a result that the water is rapidly heated.

In the modification illustrated in Figs. IV to VI, inclusive, 1<sup>a</sup> designates a core which is provided with a circumferential groove 1<sup>b</sup> and contains a bore 1<sup>c</sup>. 1' represents a series of heat-radiating insulator-segments each of which is provided interiorly and exteriorly with grooves 2'. 4' is the electrical conductor-coil. In building up this modified form of heater I first introduce one terminal of the wire of which the conductor-coil is made through the bore 1<sup>c</sup> in the core 1<sup>a</sup> and permit said end of the wire to project from said bore through the center of said core to serve as one of the terminals of the coil. I then wind the coil-wire into the groove of said core and place against said wound portion of the wire and against the core one of the segments 1' and another segment against said core to oppose said first-placed segment. A portion of the wire is thus inclosed between the core and the first-laid segment, and the wire is then bent outwardly and its course continued

in the groove exterior of the second segment and into the outer groove of the first segment to have its course continued onto the third and fourth laid segments in the same manner as described with respect to the first and second segments. The conductor is thereby completely inclosed within the segments and wound into a coil insulated throughout, and when the winding is completed the exterior end of the coil-wire serves as a second terminal of the coil.

I claim as my invention—

1. In an electrical water-heater, the combination of a plurality of heat-radiating sections that are a non-conductor of electricity, and an electrical conductor-coil wound

throughout said sections; said sections being provided with notches at their ends in which the folds of said coil are located, substantially as set forth.

2. In an electrical water-heater, the combination of a plurality of heat-radiating sections that are non-conductors of electricity and each of which is provided with longitudinal grooves at its sides and notches at its ends, and an electrical conductor-coil laid in said grooves and notches throughout the series of said sections, substantially as set forth.

FREDERIC F. SHIPP.

In presence of—

BLANCHE HOGAN,  
G. H. KNIGHT.