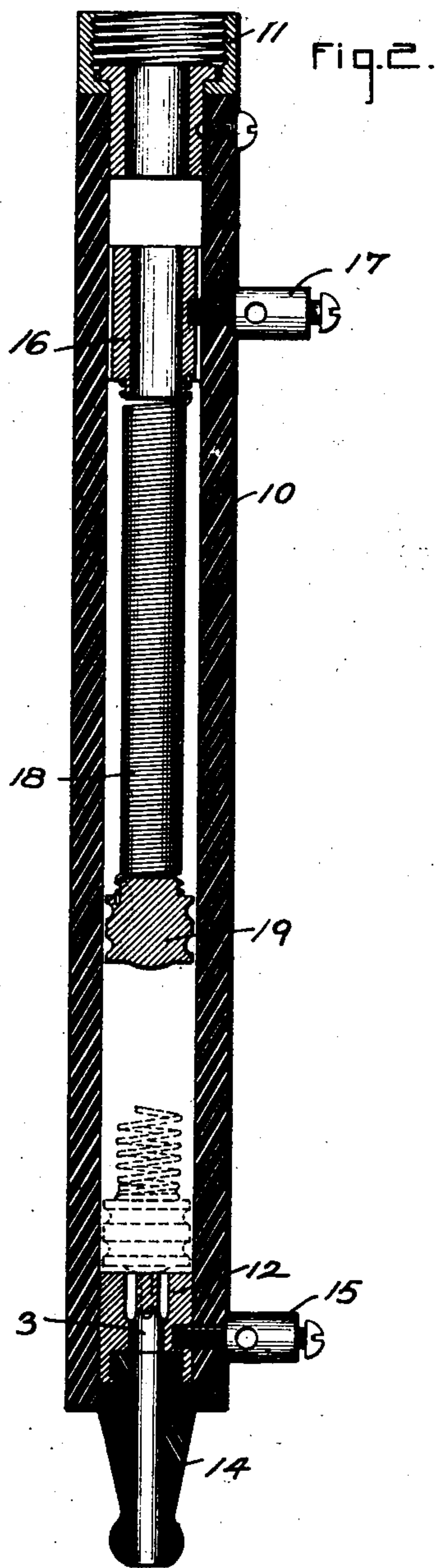
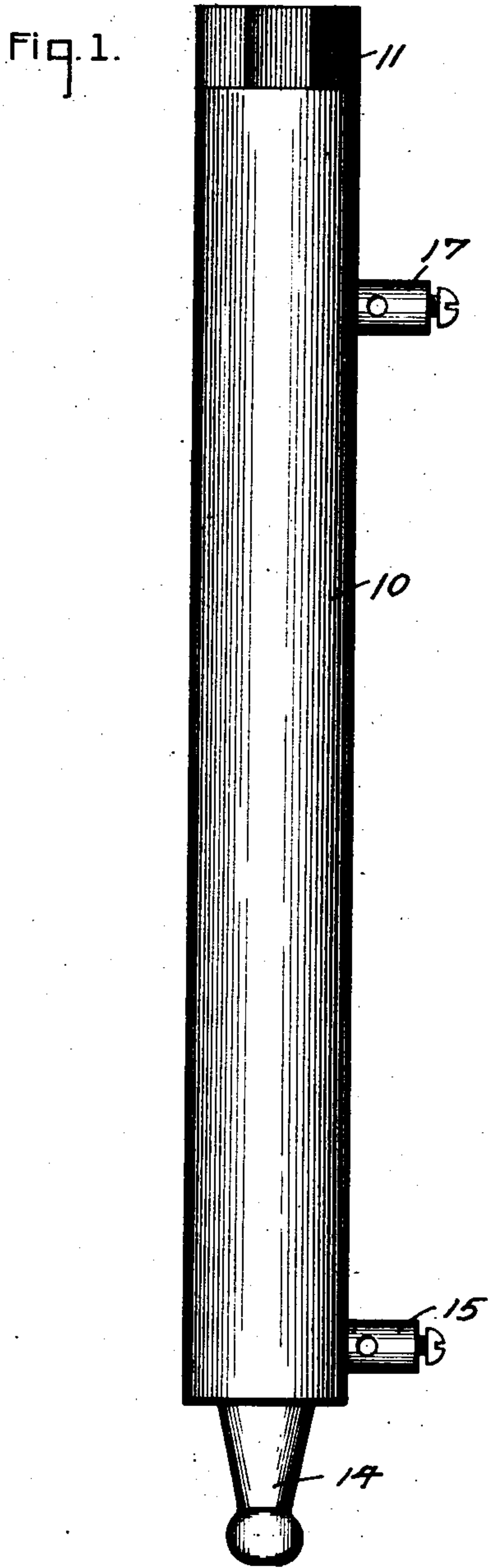


G. E. STEVENS.  
ELECTRIC HEATER.  
APPLICATION FILED SEPT. 25, 1908.

959,399.

Patented May 24, 1910.



WITNESSES:  
Mr. Ray Taylor.  
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# UNITED STATES PATENT OFFICE.

GEORGE E. STEVENS, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## ELECTRIC HEATER.

959,399.

Specification of Letters Patent.

Patented May 24, 1910.

Application filed September 25, 1908. Serial No. 454,745.

*To all whom it may concern:*

Be it known that I, GEORGE E. STEVENS, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Electric Heaters, of which the following is a specification.

This invention relates to electric heaters, and has for its object the provision of a device of this character in which the energy of electric current may be converted into heat in a reliable, simple and efficient manner.

My invention relates specifically to electric heaters intended for heating fluids, such as water and the like, and is particularly well adapted for the type of heaters known as "instantaneous water heaters", in which the water is heated during its passage through a tube.

In carrying out my invention I employ a resistance conductor which is of a resilient nature. The conductor is preferably wound in the form of a spiral, and since the metal is resilient a spiral spring is formed. One end of the spiral is fixed within a container, such as a tube, while the other end is provided with a contact, which is adapted to be moved by the pressure of the water into engagement with a fixed contact, so that the circuit is thereby closed through the spiral and the water heated.

In the accompanying drawing, in which I have shown my invention embodied in concrete form, Figure 1 is an elevation of my device, and Fig. 2 is a longitudinal section of the same.

Referring to the drawing, 10 is a tube, preferably of some insulating material, such, for instance, as fiber or the like. Secured to one end of this tube is a coupling 11 adapted to be screwed on to a pipe or a faucet in a well-known manner. In the opposite end of the tube is a metallic contact plug 12 having perforation 13 therethrough, so as to permit water to escape through it. A nozzle 14, preferably of insulating material, is screwed into this contact plug, and a binding post 15 is electrically connected through the plug and holds the latter in place. Near the upper end on the inside of the tube is secured a supporting ring 16 of metal, which is likewise held in place by a binding post 17, whereby electrical connection is made between the support and the outside of the

tube. A spiral wire 18 of resistance material forms the heating element within this tube. This spiral is of a resilient metal, and its nature is such that it will retain its resiliency or elasticity at strong heat. The particular resistance wire which I use forms no part of my invention, but I have found that a chrome-nickel wire, such as is described and claimed in the Dempster Patent, No. 901,428, answers my purpose. One end of this spiral is screwed to the support 16, while a plunger contact 19 is secured to the other end. This plunger fits into the tube in such a way that there will be a clearance between the plunger and the tube as shown, to permit passage of the water. It will be seen that when connections are made to an electric circuit at binding posts 15 and 17, and the coupling 11 is screwed on to a faucet or other source of water supply the water will pass through the support 16 and press against the plunger 19, forcing it downward into engagement with the plug contact 13, as shown in dotted lines in Fig. 2. The circuit is thereby closed from binding post 17 through resistance spiral 18, contacts 19 and 13, back to binding post 15. The spiral is thereupon brought to a high temperature and the surrounding water heated. This water will then pass through the clearance between the plunger and the tube and discharge through the perforations in the plug 12 and the nozzle 14. In case of the formation of steam there will be sufficient back pressure to unseat the plunger and break the circuit. As soon as the pressure or flow of water is removed the spring will retract the plunger and open the circuit.

It will be seen that I have provided an exceedingly simple instantaneous heater, which is automatic in its action, which cannot be injured by carelessness, since the heating element cannot be in circuit unless there is water in the tube.

While I have described my invention as embodied in concrete structure in accordance with the patent statutes, it should be understood that I do not limit my invention thereto, since various modifications will suggest themselves to those skilled in the art without departing from the spirit of my invention, the scope of which is set forth in the annexed claims.



What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. An electric heater, comprising a resilient heating element, and a device for closing the circuit therethrough normally held in open position by said element.
2. An electric heater, comprising a resilient heating element, and a member for closing the circuit therethrough arranged to be moved by said element.
3. An electric heater, comprising a resilient heating element and a switch controlled thereby and arranged to be operated to close a circuit therethrough by flexing the element.
4. A water heater comprising a heating element in the path of water flow, and a normally open circuit closer responsive to water flowing over the heating element to close the circuit through the heating element.
5. An electric water heater, comprising a container, a resilient resistance element therein fixed at one end, and a contact member at the opposite end arranged to be moved by the flow of water through the container to close a circuit through the element.
6. An electric water heater, comprising a container, a fixed contact therein, a resilient

heating element within said container, a cooperating contact arranged to be moved and flex element by the flow of water through the container until it engages the fixed contact and closes a circuit through the element.

7. An electric water heater, comprising a tube, a fixed contact therein, a resilient resistance spiral fixed at one end within said tube, a contact member at the opposite end of the spiral arranged to be moved and flex the spiral by the flow of water through the tube until it engages with the fixed member and closes the circuit through the spiral.

8. An electric water heater, comprising a tube, a fixed contact therein, a resilient resistance spiral within said tube fixed at one end and a plunger contact at the free end of said spiral arranged to be moved by the flow of water through the tube into engagement with the fixed contact to close a circuit through the spiral.

In witness whereof, I have hereunto set my hand this 23rd day of September, 1908.

GEORGE E. STEVENS.

Witnesses:

JOHN A. McMANUS, Jr.,  
H. O. WESTENDARP.