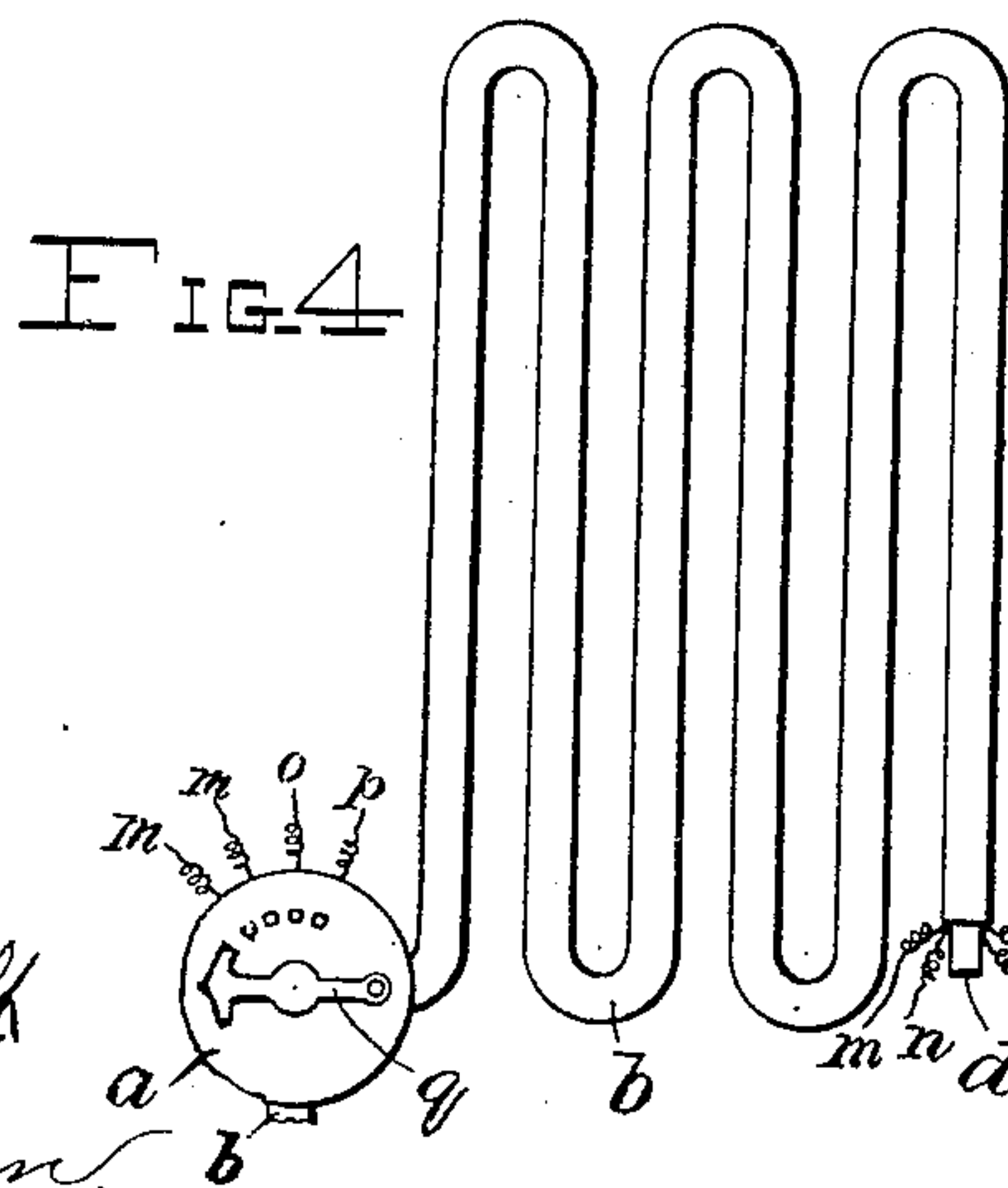
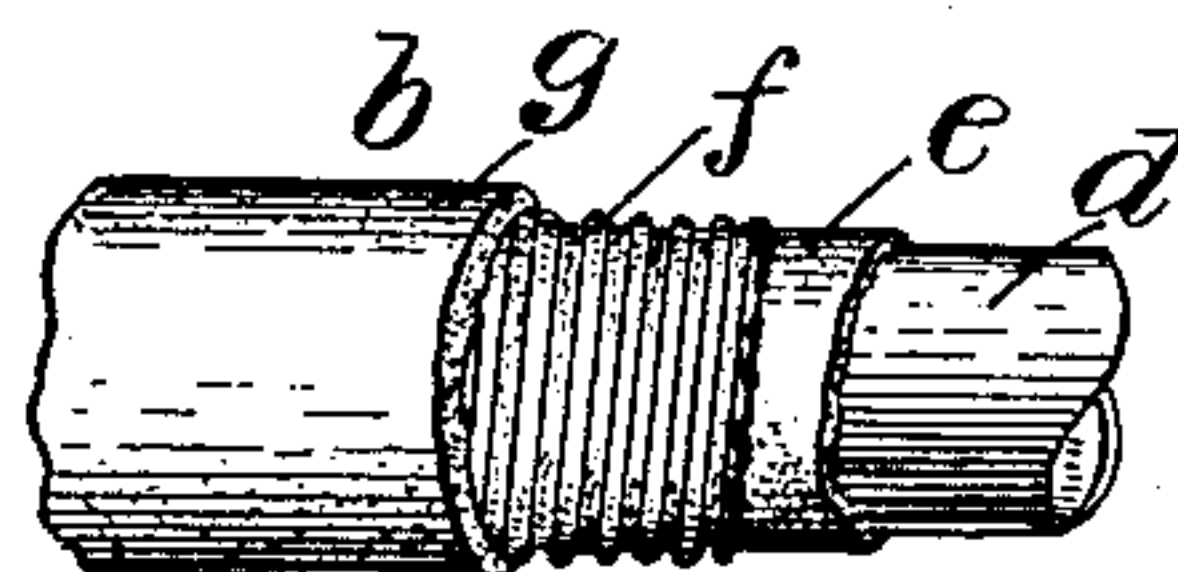
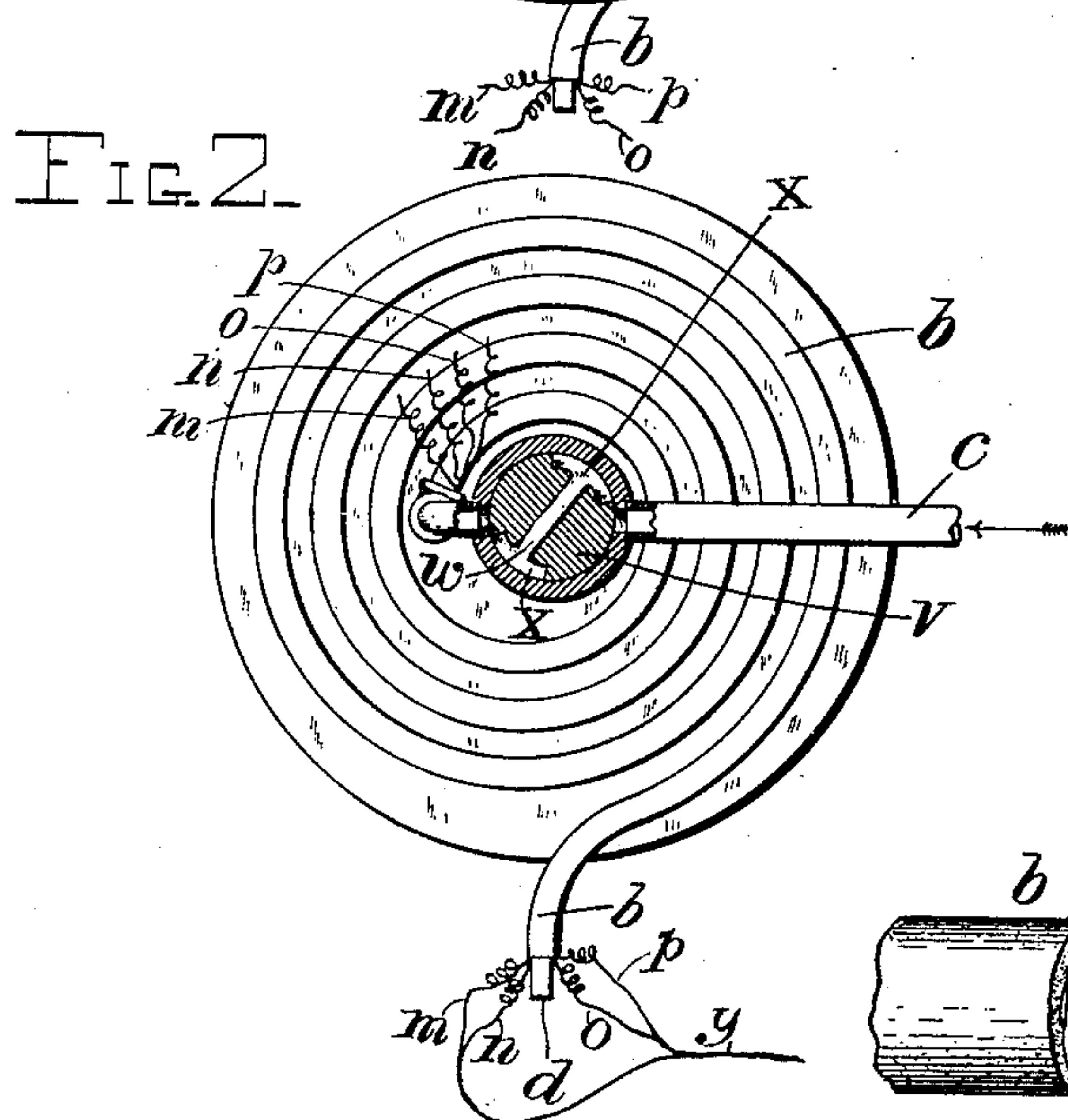
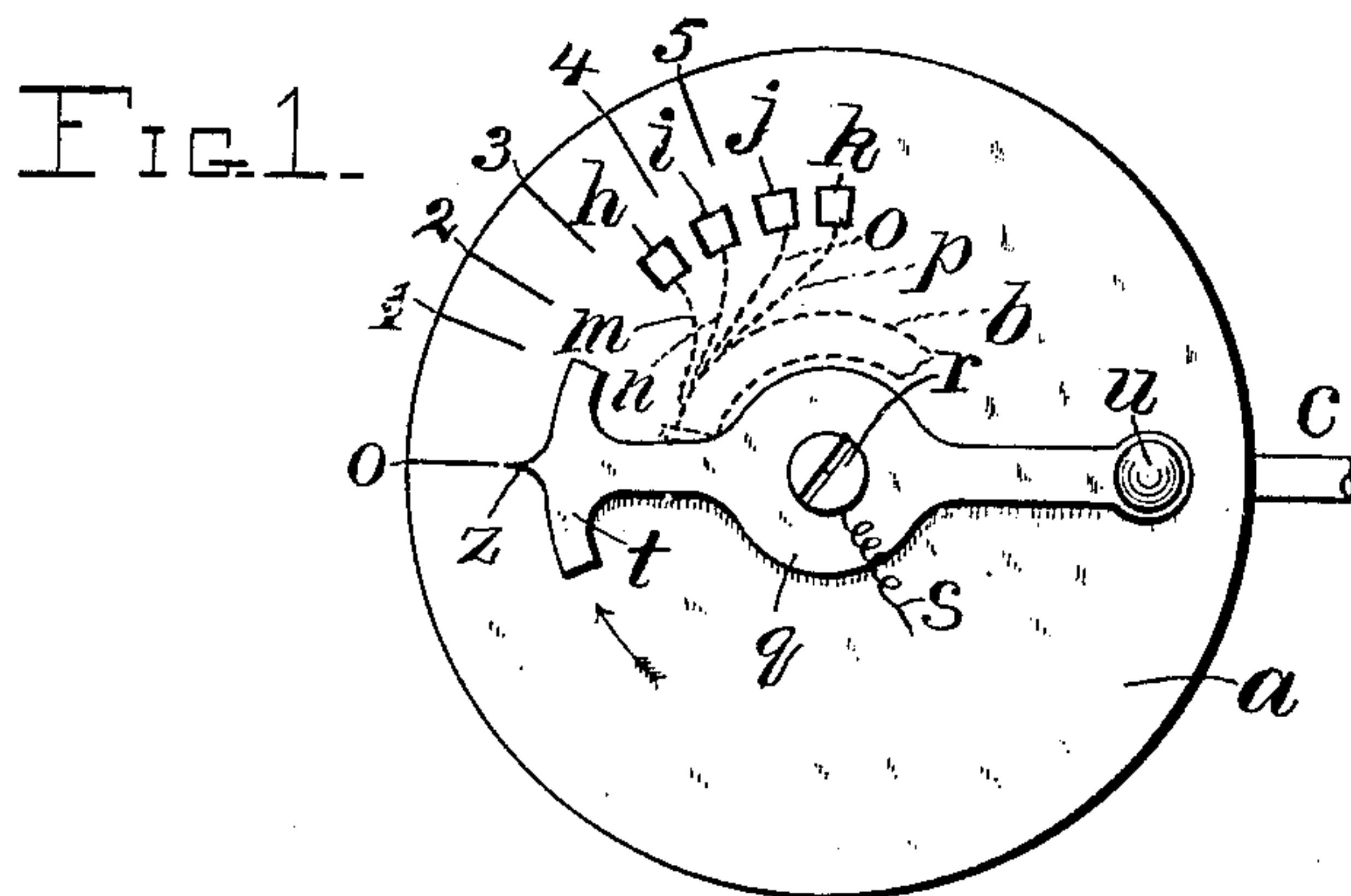


A. W. LAWTON.  
ELECTRIC WATER HEATER.

(Application filed Apr. 6, 1899.)

(No Model.)



Witnesses  
John N. Hall  
Rory C. Bowen

Inventor  
A. W. Lawton  
by Wilkinson & Fisher  
his Attorneys



# UNITED STATES PATENT OFFICE.

ARTHUR W. LAWTON, OF NEW YORK, N. Y.

## ELECTRIC WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 641,306, dated January 16, 1900.

Application filed April 6, 1899. Serial No. 711,929. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR W. LAWTON, a citizen of the United States, residing at New York, in the borough of Brooklyn and State of New York, have invented certain new and useful Improvements in Electric Water-Heaters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention consists in an apparatus for heating water by electricity while the water is passing through a pipe.

It consists generally in surrounding the water-pipe with a wire or wires completely incased in some non-conductor of electricity capable of resisting a high heat and so adjusting the appliance that the wire or wires can be heated by an electric current to a very high heat and so heating the water passing through the pipe.

The appliance can be so constructed as to be easily attached to the ordinary water-circulating system in any house or other building.

The pipe within which the water is to be heated may be coiled, bent in parallel lines, or arranged in other forms to suit the fancy or meet the requirements of the place where it is to be used. In ordinary use it would form a part of the water-circulating system of the house or building and would be interposed between the water-supply pipe and the discharging-cock.

The appliance can be constructed by coating or covering the pipe with a thin layer of some non-conductor of electricity not destroyed by high heat.

Reference is had to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 is a side elevation of my improved water-heater. Fig. 2 is a view of the water-heater shown in Fig. 1, with the side casing removed and the valve shown in section. Fig. 3 is a detail view showing the manner of wrapping and insulating the pipes; and Fig. 4 represents a modified form of heater in which the coil or coils are arranged in parallel lines instead of spiral, as shown in Figs. 1 and 2.

*a* represents the casing, preferably slate or other suitable material. Inside of this casing

is arranged a coil of pipes *b*, which coil consists of the central pipe *d* for the water and the layer *e*, either of asbestos paper or like material, or preferably of Lawton's vitreous compound, now on the market, which compound is a refractory glass enamel. Outside of this enamel is a wire winding *f*, outside of which again is another layer of non-conducting material, preferably vitreous enamel similar to that already described; but any other suitable form of non-conducting material may be adopted, if desired. This wire is preferably wound on without any insulation of its own, but spaced far enough apart so that the vitreous enamel will penetrate and completely fill the space between the wires and will thus keep the same separate, while at the same time the spaces between the wire will afford a hold for the enamel. The purpose of this construction is to have the wires embedded in a mass of refractory insulating material, so that should the heat be sufficient to melt the wires, as occasionally happens in practice, they still may act as conductors, and thus the efficiency of the heater will not be destroyed by the melting of the wires. There are several of these wires each insulated from the other, as has been described, and in practice I provide four separate wires. Each is wound spirally around the pipe, and at the same time each is insulated from the other, as indicated by the letters *m*, *n*, *o*, and *p*. These wires or contact-strips are connected to the contacts *h*, *i*, *j*, and *k*, projecting from the face of the casing *a*.

*q* represents a contact-arm which also serves as a hand-lever for turning the valve *v*, having the port *w* with enlarged passages *x*. This contact-arm and valve-lever are secured to the valve *v*, as by means of the screw *r*, and are connected, as by means of the conductor *s*, to the source of electricity. (Not shown.) The contact-arm *q* is provided with a broadened head *t* and with a pointer *z* and also with a handle *u*. The wires *m*, *n*, *o*, and *p* are connected to the return-main *y*. When the pointer *z* is in the position indicated in Fig. 1 or pointing to the zero-mark, the valve is closed and the electric circuit is broken. Now if the pointer be turned slightly upward in the direction indicated by the arrow until it points to the numeral "1" the valve will be open. The contact-head *t* will not yet have



touched the contact-strip *h*, and consequently cold water will flow through the system, but there will be no current on. Now if the pointer be turned still farther until it points to the numeral "2" the head *t* will make contact with the strip *h* and the current will flow through the main *s*, through the arm *q*, the strip *h*, and the wire *m* to the return-main *y*, thus slightly heating the water. If the pointer *z* be returned to the position indicated by the numeral "3," the water will be still further heated by having the current flow through the wires *m* and *n*. Again, if the pointer be moved to the position indicated by the numeral "4" the current will flow through the three wires *m*, *n*, and *o* and the water will be still further heated, and finally the maximum heating effect of the system occasioned by the current flowing through all four wires *m*, *n*, *o*, and *p* will occur when the pointer is at the position indicated by the numeral "5."

Thus it will be seen that I provide a simple and efficient heater by means of which the water may be merely tempered or heated to a higher degree of temperature by simply turning a switch.

It will be obvious that various modifications might be made in the herein-described apparatus which could be used without departing from the spirit of my invention.

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

1. An electric water-heater comprising a coiled pipe, a layer of insulating material surrounding said pipe, a plurality of conducting-wires separated from each other wound spirally around said insulating material, and

a second layer of insulating material surrounding said wires, said insulating material being fused so as to completely inclose said conducting-wires separated from each other, a valve controlling the flow of water through said pipe, a plurality of contact-strips, one connected to each of said conducting-wires, and a combined contact-maker and valve-lever for simultaneously making an electric connection with one or more of said conducting-wires and for moving said valve, substantially as described.

2. An electric water-heater comprising a casing, a coiled water-pipe within said casing, a layer of refractory insulating material covering said water-pipe, a plurality of conducting-wires coiled around said material but separated from each other, a second layer of insulating material surrounding said wires, said layers of insulating material being fused together so as to tightly inclose said wires and insulate them from each other, a valve controlling the flow of water through said pipe, contact-strips projecting through said casing, one of said strips being connected to each of said conducting-wires, and a combined contact-lever and valve-lever for simultaneously making electric connection through one or more of said conductors of said wires and for moving said valve, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR W. LAWTON.

Witnesses:

F. D. BLACKISTONE,  
JOHN CHALMERS WILCOX.