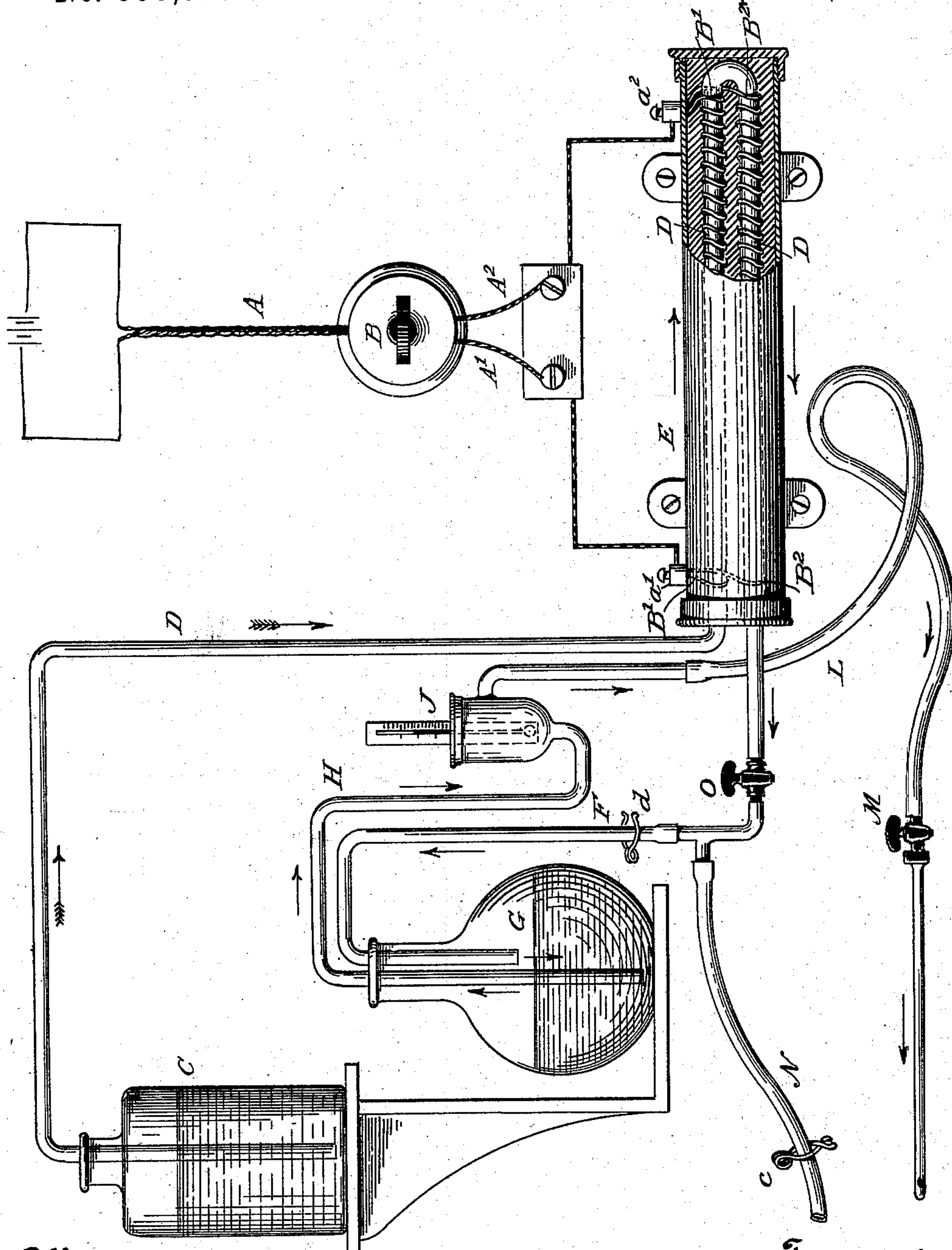


(No Model.)

J. A. NOBLE.
HOT WATER IRRIGATOR.

No. 558,979.

Patented Apr. 28, 1896.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN ALBERT NOBLE, OF SAN FRANCISCO, CALIFORNIA.

HOT-WATER IRRIGATOR.

SPECIFICATION forming part of Letters Patent No. 558,979, dated April 28, 1896.

Application filed February 23, 1895. Serial No. 539,459. (No model.)

To all whom it may concern:

Be it known that I, JOHN ALBERT NOBLE, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Apparatus for the Treatment of Certain Diseases; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to an apparatus for treating certain forms of disease, and more particularly chronic or obstinate cases affecting the genito-urinary organs. It is a common practice among physicians to treat such diseases by what is known as "irrigation"—that is, by the injection of a quantity of some medicinal solution—so as to thoroughly wash out or irrigate an affected part, such as the bladder or urethra. Such a solution is sometimes used when cold, but has also been heated by means of a spirit-lamp or a gas-flame to whatever may be the temperature considered by the physician as best for any particular case. I have discovered in practice that it is necessary in order to secure the best results from this kind of treatment that the temperature of the solution should be maintained without varying at the precise degree decided upon throughout the whole operation of irrigation, and I have also discovered that the means above referred to for heating this solution cannot be depended upon to maintain this temperature long enough for the treatment to be thoroughly effective.

The object of my invention therefore is to provide an apparatus by means of which the solution, coming in a cold state from the reservoir which contains it, shall be heated to the required degree and shall be maintained at an unvarying temperature during the time in which the patient is exposed to the treatment.

Generally speaking, my apparatus consists in an electrical heating device interposed between the reservoir which contains the solution and the instrument by which the latter is injected. The apparatus also comprises certain peculiar details of construction for rendering its operation more certain and effective, which need not be specifically referred to here, but which are fully hereinafter described.

This specification should be read in connection with the accompanying drawing, which shows in elevation the complete apparatus.

My apparatus is particularly adapted for use in places provided with the ordinary incandescent electric light, the current for which is sufficient to produce the desired degree of heat. A therefore represents the usual electrical conductor, and B the button for turning the current on and shutting it off.

C is the reservoir which contains the medicinal solution, and which is placed in a somewhat elevated position, so that the tube D leading from it will act as a siphon to draw off the contents. The character of the solution will of course be varied according to the nature of the disease under treatment, and it is unnecessary to specify any particular kind or kinds of solution, as physicians in their treatment will be guided in this matter by the condition of the patient.

E represents a hollow shell or cylinder, preferably of metal, within which the tube D enters and is bent so as to return upon itself, as shown. In any case I prefer to make the portion of the tube within this shell of glass, which is not affected by heat and is non-corrosive. All of the tubing outside the cylinder may, however, if preferred, be made of rubber. The tubing within the cylinder is closely wound with fine wire, as shown, although in the drawing the gage of the wire and the spaces between the coils are considerably exaggerated for the sake of clearness.

I have shown the main conductor A as divided to form two conductors A' A², which extend to the binding-posts a' a² on the cylinder. From these posts the wires B' B² extend to and are coiled upon the tubes within the cylinder, such tubes, or, rather, their inclosing wires, thus becoming part of the main circuit. I have found iron wire of about No. 32 gage well adapted for this purpose; but I may use German-silver wire or indeed any other kind desired.

The space in the cylinder between and around the tubes is filled with a non-conducting packing of asbestos or some equivalent material, which prevents the heating of the cylinder itself. When the current is turned on, the resistance in the fine coils surround-

ing the glass tubing in the cylinder is sufficient to create heat enough to raise the temperature of the solution passing through such tubing to or above the degree of temperature
5 required.

It would be possible to apply the heated solution as an injection directly after it leaves the heating-tubes; but as in that case there would always be a liability of back pressure
10 in the tubes, which would interfere with the regularity of the flow of the solution, I prefer to lead the latter through a tube F' to a flask G, placed at a level below that of the supply-reservoir. This flask thus becomes a second-
15 ary source of supply, and any subsequent back pressure extends only to such flask and cannot reach the heating-tubes. The heated solution is siphoned out of the flask through a tube H and into the cup of the thermometer J, where its temperature can always be
20 observed. Thence it passes through a tube L to the catheter or other instrument by which it is injected, a cock M being provided for regulating the flow at this point.

N represents a waste-pipe connected to the tube which supplies the flask O, by means of which the apparatus can be emptied when
25 desired. While the operation is going on this pipe will be pinched and stopped up by the wire clip c, as shown in the drawing. A similar clip d is placed upon the tube which
30 supplies the flask in order to cut off such tube when the waste-pipe is open.

The temperature of the liquid supplied is regulated by the cock G, which is preferably
35 placed in the tube leading from the heater. The temperature depends upon the rate at which the solution flows through the heating-tubes—that is, upon the length of time during which the solution is exposed to heat in
40 the tubes. By means of the cock O the liquid can be backed up in the tubes in order to increase the temperature, or can be suffered to flow more freely in order to lower it, until the
45 thermometer shows the degree desired by the physician.

In using my apparatus it is my custom to

irrigate the patient in the manner described for a period of time varying from half an hour to an hour, according to the circumstances,
50 using the solution at a temperature of about 110° Fahrenheit. It will readily be understood that when the resistance in the coils around the heating-tubes is properly proportioned to the intensity of the current, so as
55 to produce this temperature or any other temperature desired, and the cock O properly adjusted then the temperature will remain constant and unvarying during the whole operation. In the case of a gas-heater or spirit-
60 lamp the temperature can be regulated only by turning out and relighting the gas or lamp alternately, and while by this means the temperature of the solution might be kept in approximation to the desired point it is impos-
65 sible to preserve that constant and uniform degree of heat which I derive from my apparatus and to which I attribute its success.

Having described my invention, what I claim is—
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1. In combination, the cold-water reservoir, the hot-water reservoir, the pipe connecting the same, the heating-coil embracing said pipe intermediate of said reservoirs, the syringe-nozzle and the supplemental reservoir
75 interposed between said instrument and the hot-water reservoir, said supplemental reservoir being adapted to hold a thermometer, substantially as described.

2. In combination, the cold-water reservoir, the hot-water reservoir, the pipe connecting the same, said pipe being intermediately bent in juxtaposition, the heating-coil entwining the parallel portions of said pipe, the syringe-nozzle and the second pipe leading from
85 said hot-water reservoir and carrying said nozzle upon its outer end.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 8th day of February, 1885.

JOHN ALBERT NOBLE.

Witnesses:

L. W. SEELY,
H. J. LANG.