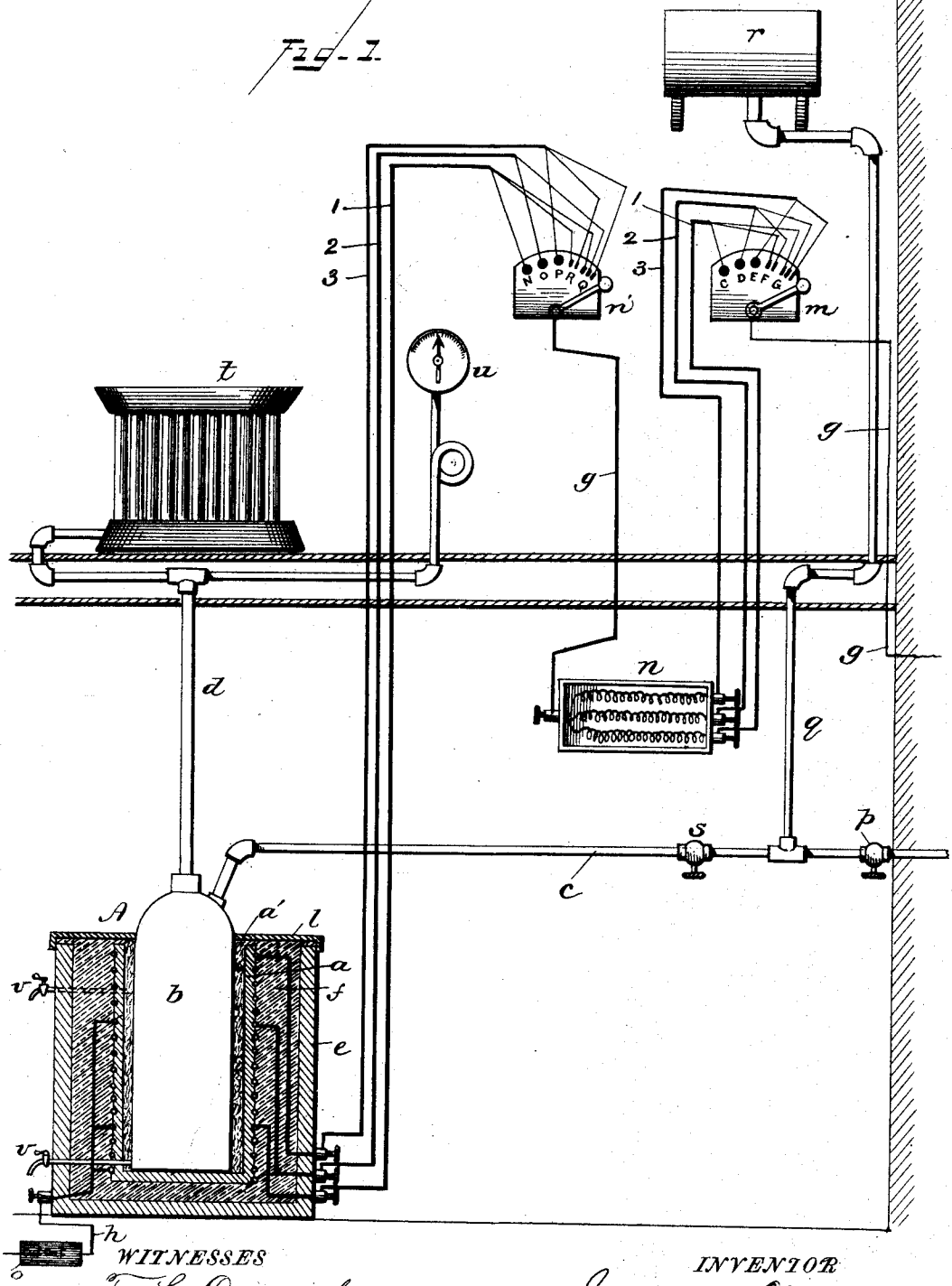
(No Model.) 2 Sheets—Sheet 1.

J. O'MEARA.

ELECTRIC STEAM GENERATOR.

No. 419,282. Patented Jan. 14, 1890.

Fig. 1.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

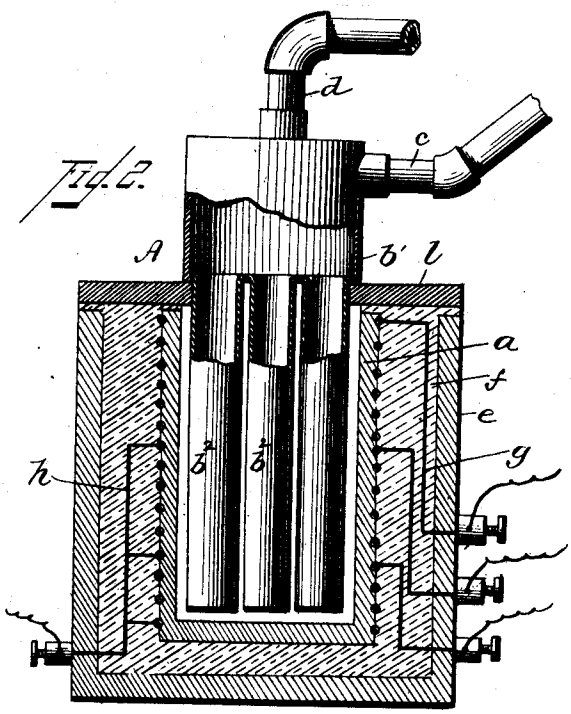


Fig. 3.

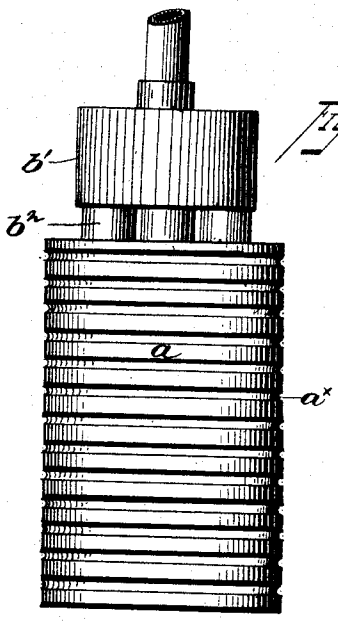


Fig. 4

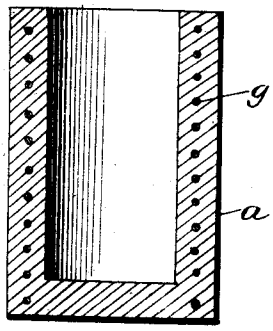
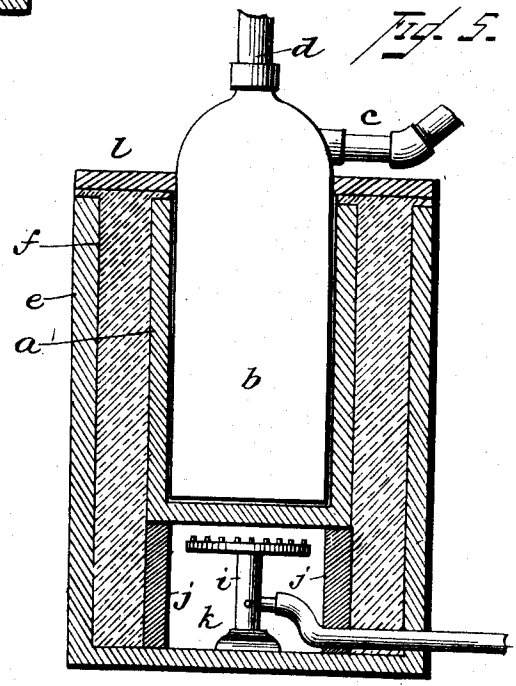


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

JEREMIAH O'MEARA, OF NEW YORK, N. Y.

ELECTRIC STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 419,282, dated January 14, 1890.

Application filed April 2, 1889. Serial No. 305,669. (No model.)

To all whom it may concern:

Be it known that I, JEREMIAH O'MEARA, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Hot-Water or Steam Generators, of which the following is a full, clear, and exact description.

This invention relates to an apparatus for heating water or producing steam for heating purposes especially; but it may be used also for power.

In the preferred form of my invention I employ a vessel, hereinafter called a "crucible" of refractory material, which is rendered incandescent by means of an electric current, or by means of any other heat-producing agent, which preferably will not evolve smoke or other noxious products of combustion. This crucible contains a vessel for holding water which is to be heated or turned into steam or a heated slug.

With this general description of the invention I will proceed now to explain the principle thereof and the best mode in which I contemplate applying that principle, and will finally particularly point out and distinctly claim the invention.

In the accompanying drawings, illustrating my invention, in the several figures of which like parts are similarly designated, Figure 1 is an elevation of the plant with the heater in vertical section. Fig. 2 is a sectional elevation of another form of the heater. Fig. 3 is an elevation of the crucible and boiler detached. Fig. 4 is a vertical section of a modified form of crucible; and Fig. 5 is a sectional elevation of my heater, with a Bunsen burner applied as the heat-producing agent.

I will describe first the various forms of heater herein shown, and then explain their application as illustrated in the plant in Fig. 1.

The letter *a* indicates what is herein called a "crucible," the said crucible being formed of clay or other refractory material which may be rendered incandescent, or which possesses large heat-absorbing properties. This crucible will be of a shape to accommodate the vessel *b*, which is to contain the water to be heated or turned into steam or the heated slug. The vessel *b*, as shown in Figs. 1 and 5, may be a tube of any suitable material and construction closed at top and bottom and provided with a water-induct *c* and an outlet *d*, or it may consist of a dome *b'*, having water-legs b^2; but I do not limit my invention to any particular form of water-vessel. This water-vessel is placed within the crucible, but preferably out of contact therewith, and therefore so as to take up the heat from the crucible by radiation rather than by contact, the utility of this arrangement being that the vessel *b* will not be readily burned out.

The vessel *b* is made detachable from the crucible, or the two are easily separable for repairs and for other purposes. The crucible *a* is arranged within an outer vessel *e*, of any construction and material, but preferably of metal for strength and durability, and of much larger diameter than the said crucible, and the space between the crucible *a* and the vessel *e* is filled with asbestus or other non-conductor of heat *f*.

The preferred form of heating agent employed is the electric current, and this may be supplied from a central station of an electric-light or other plant, and the conductors are connected to the crucible by means of wires of German silver or other equivalent material, as indicated at *g* and *h*, the said wires being wound around the outside surface of the said crucible and preferably in grooves $a^{\times}$, (see Fig. 3,) made for the same therein, the said grooves being used to keep the wires in place and separated one from the other. As indicated at Figs. 1 and 2, these wires may be arranged about the crucible in separate circuits, so that one or more circuits may be applied to the crucible, and thus the degree of heat regulated.

Instead of winding the wires upon the outside of the crucible, they may be embedded within the crucible during its formation, as shown in Fig. 4.

In order to prevent the vessel *b* from being burned out by an undue heat, I line the interior of the crucible between itself and the said vessel *b* with an alloy *a'*, which will melt at a given temperature, and thus envelop the vessel in a fluid of less conductivity than the solid.

Instead of using an electric current as the

heating agent, I may employ a Bunsen burner *i*, as shown in Fig. 5, and in this case the crucible will be supported upon refractory walls *j*, which will form a fire-chamber *k* beneath the said crucible.

A cover *l* of refractory material is placed above the crucible, vessel *e*, and packing *f*, and closely surrounds the vessel *b*, and by preference this cover will be a non-conductor of heat or possess low conductivity of heat.

Instead of making the cover *l* of refractory material or material that will not conduct heat, the said cover may be of the same material as the vessel *e* and be insulated, as by an extension of the filling *f*, substantially as shown.

In applying a plant of this character to a house for the purpose of heating or warming the same the heater A (and I mean by "heater" the apparatus just described) may be erected in a basement or cellar and connected to a suitable water-supply by the pipe *c*, and also connected to electrical conductors by means of the wires *g h*. The wire *g* runs through a switch-board *m*, and thence through the resistance-coils *n* to a second switch-board *n'*, and thence to the heater. The wire *h* runs direct to the heater. The resistance-coils are simply coils of German silver or any other suitable wire offering a certain amount of resistance to the current of electricity in order to control the current to produce the required heat. The quantity of resistance may be regulated and the current entirely cut off at the switch-boards. In the negative wire *h*, I introduce a cut-out *o*, which may be a simple piece of metal fusing at a lower degree of heat than the electric wires, so that should the wires become grounded the cut-out will be melted instead of the wires, and thus the apparatus be preserved from injury.

The water-pipe *c* is provided with a cock *p*, to cut off the supply from the street. The branch pipe *q* leads to a tank or pressure-apparatus *r*, erected in any suitable part of the building. A second cock *s* is interposed between the pipe *q* and the heater to regulate the supply of water to the heater. The outlet *d* may be connected with any suitable radiators, as *t*, throughout the house in a circulating system.

A gage *u* may be arranged in convenient place to indicate the pressure of steam or degree of heat in the water in the heater.

The heater may be supplied with a gage-cock *v*, or several of them, for ascertaining the quantity of water in the heater.

The vessel *b* may be filled with water by means of a pump, or the said vessel, the pipes, and the radiator may be hermetically sealed to prevent any escape or waste of water.

Instead of the boiler or water-vessel, a piece of solid metal may be used to absorb and transmit the heat, the same being hereinbefore referred to as a "slug."

If the wires of a number of circuits be wound about the crucible, these several circuits may be connected with the switch-board so as to provide for the introduction of one or more of them, and also for the cutting out of any one or more of them which may have become defective. A suitable arrangement to this end is shown in Fig. 1. The wire *g* passes to the switch-board *m*, which is provided with the usual key and five contacts where three circuits are used, as here shown. As many wires as there are circuits lead from this switch-board to the resistance, and a single wire leads from the resistance to the switch-board *n'*, which latter is a duplicate of the other switch-board, and from the switch-board *n'* the circuit-wires extend to the heater. Numbering the circuits, as 1, 2, and 3, and correspondingly designating their wires, the wire 1 connects with contacts or buttons N, R, and Q, and C, F, and G; wire 2 connects with O and Q and D, F, and G and wire 3 connects with P, R, and Q and E and G. To those skilled in the art it will be evident from the foregoing that any number of circuits or combinations of circuits and quantity of resistance can be used, as desired.

What I claim is—

1. A heating apparatus consisting of a crucible of refractory material and adapted to be highly heated, an agent to be heated and capable of transmitting heat arranged within the said crucible, a non-conductor of heat surrounding the said crucible, and a casing, substantially as described.

2. A heat-producing apparatus consisting of a crucible of refractory material and adapted to be highly heated, combined with one or more electric circuits in contact with and surrounding the crucible as the heating agent thereof and a heat-transmitting body arranged within the crucible, substantially as described.

3. In a heating apparatus, a refractory crucible adapted to be highly heated and electrical conductors in contact with and surrounding the said crucible and adapted to supply heat thereto, combined with a heat-transmitting device arranged within the said crucible and a non-conducting sheath encircling the crucible, substantially as described.

4. In a heating apparatus, a refractory crucible adapted to be highly heated, combined with a heating agent applied to the said crucible and adapted to heat the same and a vessel within the crucible to contain water to be heated or converted into steam and separated from the crucible by means of an alloy fusible at a predetermined high temperature, substantially as described.

5. In a heating apparatus, a crucible of refractory material adapted to be highly heated, combined with a series of electric circuits, an object to be heated arranged within the crucible, and a switch-board and suitable appliances for cutting in or out any number of the said electric circuits conformably to the de-

gree of heat desired, substantially as described.

6. In a heating apparatus, the combination of a crucible of refractory material adapted to be highly heated, a suitable number of electric circuits in contact with and surrounding the said crucible for heating it, a heat absorbing and transmitting agent arranged within the crucible, a resistance-coil or rheostat, and suitable switching mechanism interposed between the source of electrical supply and the heater in one of the wires, and a cut-out similarly interposed in the other wire, substantially as described.

In testimony whereof I have hereunto set my hand this 30th day of March, A. D. 1889.

JEREMIAH O'MEARA.

Witnesses:

GEO. H. PETIT,

FRANCIS P. BASSET.