

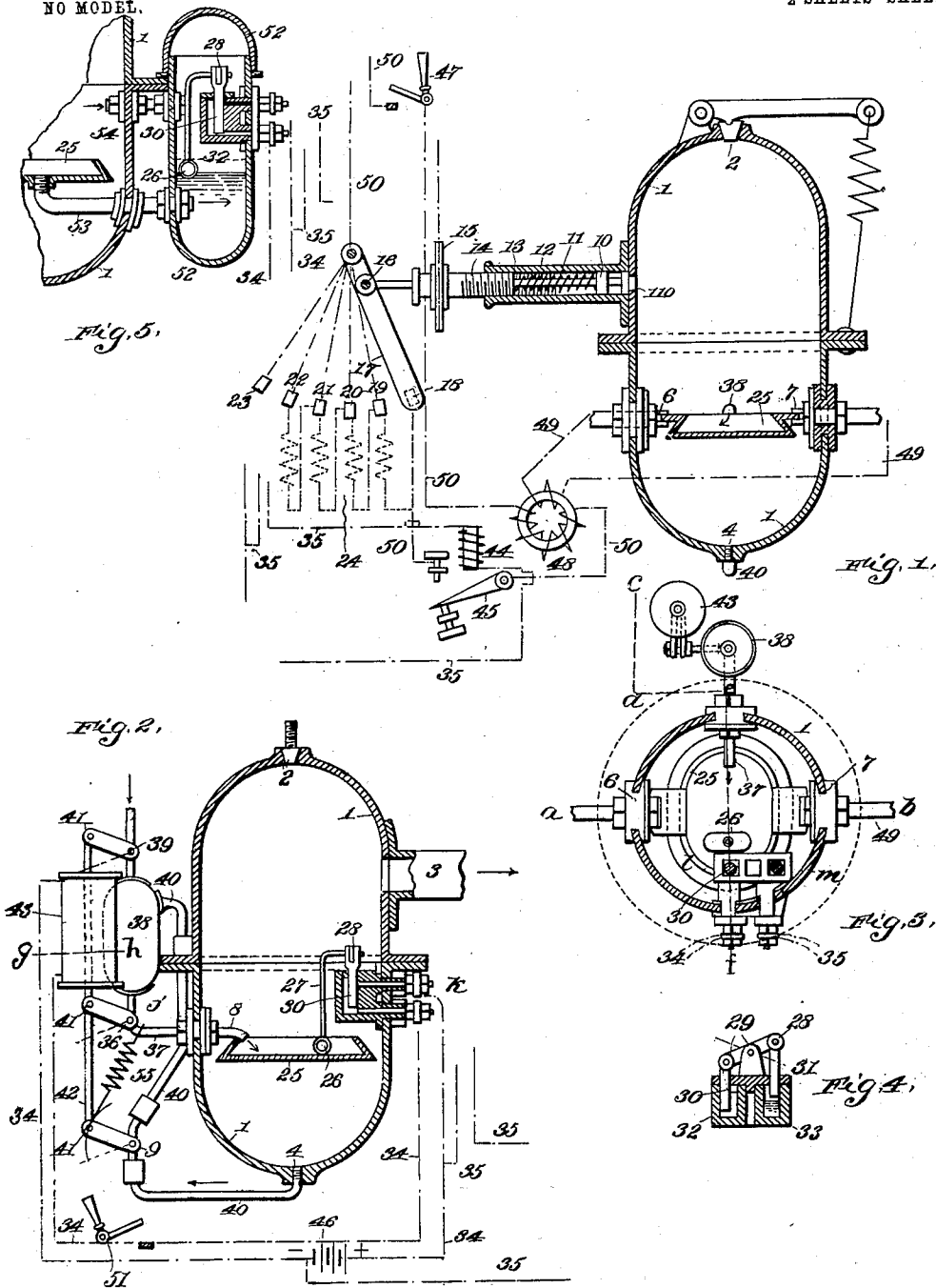
R. C. SAYER.

APPARATUS FOR BOILING BY ELECTRICITY.

APPLICATION FILED JUNE 25, 1900.

2 SHEETS—SHEET 1.

NO MODEL.



Witnesses:

Samuel Percival
Albert Jones

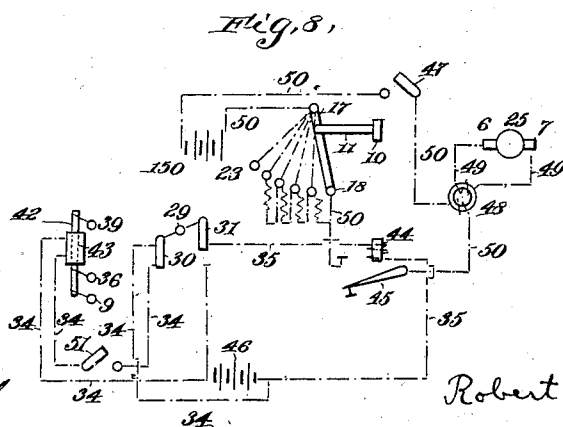
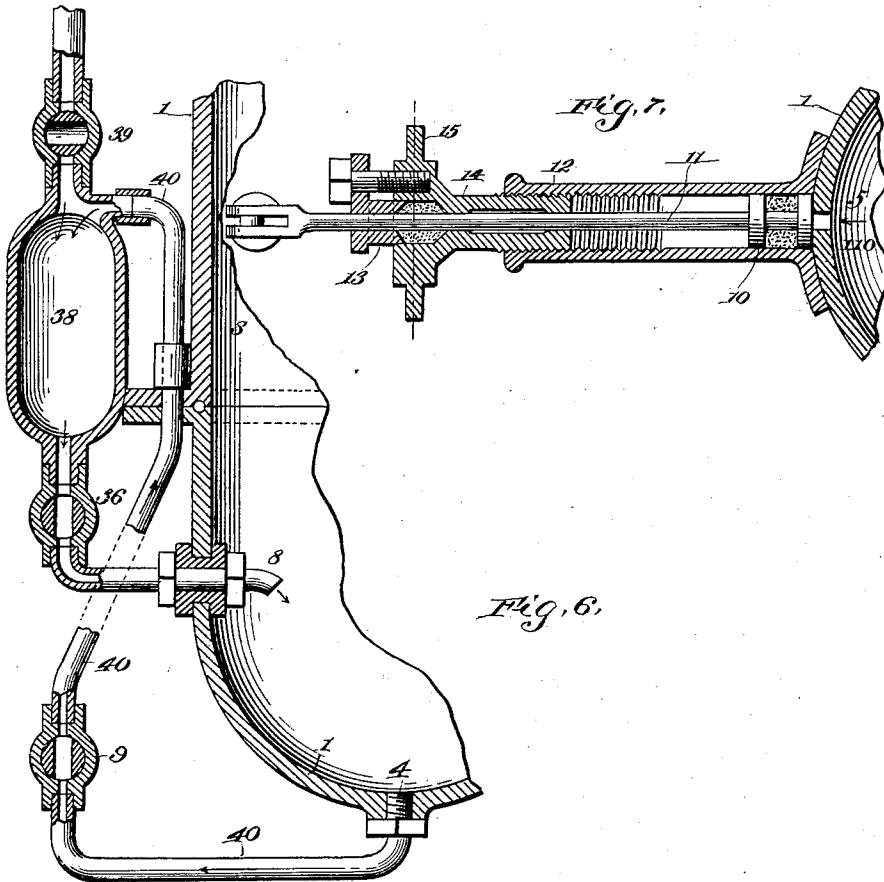
Inventor:

Robert Cooke Sayer
By his Attorneys.
Wheatley & McKenzie

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UNITED STATES PATENT OFFICE.

ROBERT COOKE SAYER, OF BRISTOL, ENGLAND.

APPARATUS FOR BOILING BY ELECTRICITY.

SPECIFICATION forming part of Letters Patent No. 727,848, dated May 12, 1903.

Application filed June 25, 1900. Serial No. 21,509. (No model.)

To all whom it may concern:

Be it known that I, ROBERT COOKE SAYER, a subject of the Queen of Great Britain and Ireland, and a resident of 11 Clyde road, Red-
5 land, Bristol, in the county of Bristol, Eng-
land, have invented certain new and useful
Improvements in Electric Boilers, (for which
I have made application for patent in Great
Britain, No. 7,314, dated April 20, 1900;) and
10 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.

The object of this invention is to boil and
15 vaporize fluids by electricity by automatic-
ally supplying the fluid to an open vessel situ-
ated within a closed vessel and where it is
heated by electrodes supplied with current
automatically regulated by the pressure in
20 the vessel.

In the accompanying sheet of illustrative
drawings, Figures 1 and 2 are vertical sec-
tions at right angles to one another of an ap-
paratus constructed according to this inven-
25 tion, Fig. 1 being at *a b* and Fig. 2 at *c d e f*
on Fig. 3; and Fig. 3 is a horizontal section
at *g h j k* on Fig. 2. Figs. 4 and 5 are sec-
tional details at *l m* and *e f*, respectively, on
Fig. 3. Fig. 6 is a part section showing the
30 water-feeding device to a larger scale. Fig.
7 is a section showing the governor. Fig. 8
is a diagrammatic view showing the elec-
trical connections.

The closed vessel 1 is provided with a safety-
35 valve 2, with a steam-delivery pipe 3, and
with an opening 4 for drawing off through a
tap 9 any liquid at the bottom of the boiler
1. The open or evaporating vessel 25 is di-
rectly supported by the positive and negative
40 electric terminals, that pass through open-
ings 6 and 7 in the closed vessel 1. The ter-
minals are in the secondary current-circuit
49 of the transformer 48. The primary cir-
cuit 50 of the transformer includes a switch
47, a rheostat 24, that is operated by a switch
17, actuated by the governor 12, and a switch
45, operated by a magnet 44 in a circuit 35,
having a make-and-break device situated in
a vessel 33 and which is closed by means of
50 the plunger 31, operated by the float 26 when
there is sufficient water in the evaporating
vessel 25. The float works in the vessel 25,

as shown in Fig. 2, (or in an auxiliary vessel
52, connected to the open vessel 25 and closed
vessel 1 by the pipes 53 and 54, respectively, 55
as shown in Fig. 5.)

The governor comprises a cylinder 12, com-
municating at one end with the boiler 1
through the opening 5 and provided with a
piston 10, forced inward against the boiler- 60
pressure by a spring whose strength is ad-
justed by hand by screw-gear 15, screwing up
the plunger 14 and gland 13, through which
the piston-rod 11 passes. The piston-rod 11
is directly and suitably connected at 16 to 65
the switch-lever 17, that passes over the con-
tacts 18, 19, 20, 21, 22, and 23 of the rheo-
stat 24.

The fluid to be evaporated is first admitted
through the tap 39 into the vessel 38, that is 70
connected at its bottom through the tap 36
with the water-inlet pipe 8 to the evaporat-
ing vessel 25 and is connected at its top
through the pipe 40 and tap 9 with the open-
ing 4 at the bottom of the closed vessel 1. 75
The three taps 39, 36, and 9 are coupled to-
gether and are operated simultaneously, so
that when 39 is open 36 and 9 are closed by
means of a solenoid 43, situated in the cir-
cuit 34, controlled by a switch 51, and that 80
is opened and closed by the plunger 30 in a
vessel 32, Fig. 4, when the float 26 and its
arm 27 and lever 28, centering at 29, rise to
the required level. The cocks are returned
to their initial positions by the spring 55. 85

The working is as follows, the parts be-
ing, as shown, all empty except the vessel 38:
The switch 51 is closed to send current from
a source 46 through the circuit 34. The plun-
ger 30, switch 51, solenoid 43 so actuate the 90
rod 42 to close the tap 39 and open taps 36
and 9. The fluid passes from the vessel 38
through 36 and entrance 37 to charge the ves-
sel 25. As the float 26 rises the plunger 30
breaks contact, and the solenoid 43 ceasing 95
to act the spring 55 reverses the taps, open-
ing 39 and closing 36 and 9, and allows the
vessel 38 to be again charged from its fluid-
supply. As the float rises the plunger 31
closes the circuit 35 to send current through 100
the magnet 44, which closes switch 45 in the
main circuit. When the switch 47 is closed
by hand, a main current passes through the
circuit 50, rheostat 24, switches 17 and 45,

converter 48. Currents are thus generated in the circuit 49 and pass through and heat the fluid in the vessel 25. As the fluid evaporates the float 26 falls, the plunger 31 in the circuit 35 breaks contact, the switch 45 breaks the circuit 50, and the plunger 30 makes contact in the circuit 34 to again reverse the taps 9, 36, and 39 to send another charge to the evaporating vessel 25. When pressure in the vessel 1 increases above the normal, (regulated by the screw-plunger 14,) the piston 10 is thrust outward against the pressure of the spring in the cylinder 12 and thrusts over the switch 17 to reduce the evaporation of the fluid in the vessel 25 by reducing current in the circuit 50 as the switch 17 passes successively to the contacts 19 20 21 22 and cutting it off at the position 23. Should the pressure abnormally increase in the vessels 1 and 25 and 52, it blows off at the valve 2.

To vary the normal pressure in the vessels 1 38 52, the plunger 14 is screwed in or out of the pipe 12 to vary the pressure of its spring against the piston 10.

In a modification the float 26 or pressure in the vessel 1 actuates the taps 39, 36, and 9 and closes the break in the main circuit, the circuits 34 and 35 being dispensed with and also the switch 45, and the vessel 25 is carried by any means, but supplied with fluid, as above, which is vaporized by the heat of a suitable resistance wire or band connecting the anode and cathode passing through the fluid. All three of the taps 39, 36, and 9 or only two of them are united as one with passages to effect the same purpose.

What I claim, and desire to secure by Letters Patent, is—

1. An evaporating apparatus or boiler, consisting of a closed vessel, an open vessel in the closed vessel, a means for heating the open vessel, a water-supply, a receiver or trap connected on top to a water-tank open at its top to the atmosphere and to the closed vessel, and at its bottom to the open vessel, three cocks for simultaneously closing the receiver to the water-supply and opening it to the open and closed vessels or vice versa, and a float in the open vessel operating the cocks so that water is supplied when the float falls below a certain level and is cut off when the float rises above that level.

2. An electric evaporating apparatus or boiler consisting of a closed vessel, an open shallow vessel in the closed vessel, electrodes passing through the walls of the closed vessel to the open vessel, a water-supply, a receiver or trap connected to the water-tank and at its top and to the closed vessel and at the bottom to the open vessel, three cocks for simultaneously closing the receiver to the water-supply and opening it to the open and closed vessels or vice versa, a make-and-break switch in the circuit to the electrodes, a float in the open vessel operating the cocks and the switch so that water is supplied when the float falls below a certain level and is cut off when the float rises above that level and when it descends lower still breaks the current to the electrodes.

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

ROBERT COOKE SAYER.

Witnesses:

LIONEL A. WILSON,
GILBERT J. RICKETTS.