

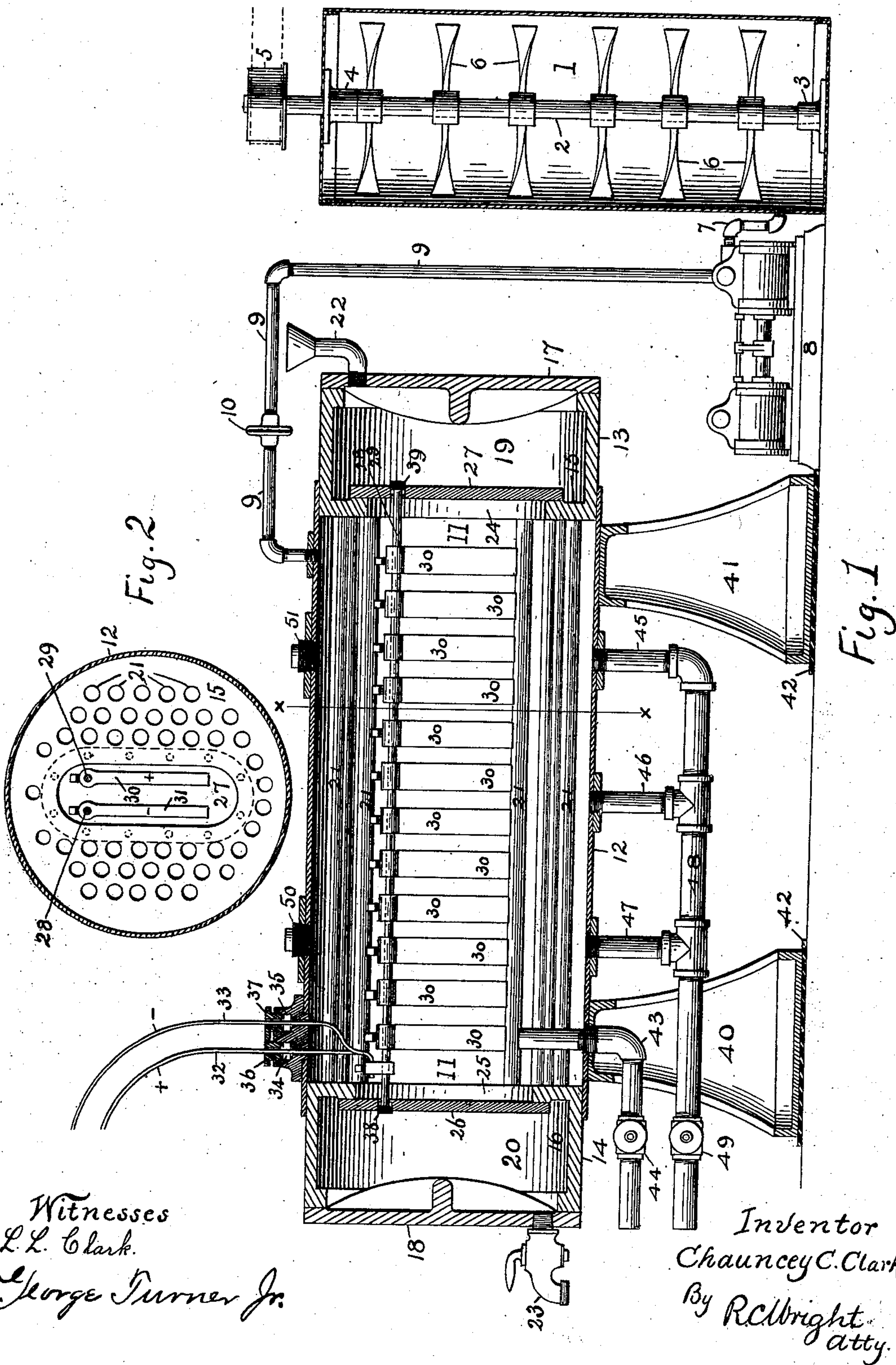
No. 708,796.

Patented Sept. 9, 1902.

C. C. CLARK.
BLEACHING APPARATUS.

(Application filed Jan. 22, 1901.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

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BLEACHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 708,796, dated September 9, 1902.

Application filed January 22, 1901. Serial No. 44,273. (No model.)

To all whom it may concern:

Be it known that I, CHAUNCEY COOK CLARK, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for the Production of Bleaching Material; 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.

The object of my invention is to construct an apparatus for the manufacture of bleaching material in an inclosed receptacle by electrolysis, to thereby prevent the escape of the valuable chlorin gas separated from the chlorid of sodium (common salt) and assure its absorption by the inclosed liquid, the separation being produced by a series of electrodes suspended in the salt solution, the residuum, comprising the impurities of the solution, as the earthy, saline, vegetable, animal, metallic matter, &c., falling to the bottom of the receptacle, where means are provided for its removal. As the electrical decomposition for the purpose of freeing the chlorin is productive of heat, it is necessary to provide means whereby the heat may be regulated to a proper temperature, and this is done by a series of tubes adapted to circulate cold water through the solution, as it is very essential to prevent any increase of temperature to obtain the best practical results.

Further particulars of construction and use are set forth in the specification and illustrated in the drawings, in which—

Figure 1 is a central vertical section as to most parts. Fig. 2 is a cross-section on line *x x*, Fig. 1.

Similar figures of reference indicate similar parts throughout the views.

The apparatus is provided with any suitable brine-mixer, and for illustration I have shown a mixer 1, having a cylindrical shell placed upright, a shaft 2 within the mixer, having a step 3 at its lower end, a bearing 4 near its upper end and carrying a pulley 5, whereby the shaft is rotated, and a series of blades or paddles 6, secured to rotate with shaft 2 to thoroughly mix the salt with the water to the proper degree of saturation. A pipe 7 leads

from the mixer to a pump 8, and a pipe 9 leads from the pump to the apparatus, it being provided with an insulating-joint 10. The decomposing-receptacle 11 is formed by a cylindrical sheet 12, having cylindrical heads 13 14 secured thereto and each formed with tube-sheets 15 16, which close the ends of cylinder 11, and covers 17 18 are secured to the outer ends of the heads 13 14, making inclosed chambers 19 20, connected through cylinder 11 by multiple tubes 21, expansively secured in sheets 15 16. On cover 17 near its top is a funnel-shaped inlet-pipe 22, affording means to introduce cooling liquid to chamber 19, tubes 21, and chamber 20 for regulating the temperature of the contents of cylinder 11. A cock 23 draws the water from chamber 20, tubes 21, and chamber 19, which, if allowed to remain open, keeps up a continuous circulation. Tube-sheets 15 16 have openings 24 25 there-through, closed by covers 26 27, which support bus-bars 28 29, which reach from cover 26 to cover 27 and support a series of platinum anodes 30 and zinc cathodes 31, having electrical connection to a dynamo (not shown) by conductors 32 33, passing through insulated stuffing-boxes 34 35, which are provided with packing to prevent the escape of gas or liquid from the interior of cylinder 11, the packing being compressed by glands 36 37. Bus-bars 28 29 are protected from deterioration by a coating of platinum and secured to covers 26 27 at 38 39 by any suitable liquid-retaining and expansible means, such as the well-known expansion stuffing-box. Cylinder 11 rests upon supports 40 41, having insulating material 42 thereunder. A pipe 43 enters underneath the cylinder 11 and extends for some distance upward therein and is the means for withdrawing the contents, it being controlled by a valve 44, while pipes 45 46 47, connected to pipe 48, controlled by valve 49, serve to withdraw the residuum of the decomposed salt and the impurities of the water, which by its own weight has settled to the bottom of cylinder 11. When a thorough cleansing of cylinder 11 is necessary, plugs 50 51 may be removed for the introduction of hose.

The operation of my device is as follows: The brine is first mixed in the tank 1. It is then pumped into the receptacle 11, which is

completely filled, after which the electric current is supplied to the anodes 29, and the brine being an electrolyte the current passes through to the cathodes 30. This action decomposes the brine and frees the chlorine, which is then absorbed by the liquid, and the residuum, comprising the matter heretofore referred to, descends to the bottom of the cylinder to be withdrawn after the chlorine solution is removed and previous to another charge of brine, the condition of the electrolytic decomposition being carefully noted by instruments adapted to correctly exhibit the conditions of electrical energy, temperature, and saturation, the process requiring about three hours. By confining the electrolytic action within a closed receptacle the valuable gas is all secured, and as the apparatus is thoroughly insulated no electrical energy is lost. The passing of cold water through the apparatus regulates the heat produced electrically. The means employed to suspend the series of electrodes makes their insertion and removal an easy matter, while ample facilities are provided for the removal of all residuum.

I claim—

1. In an apparatus for brine electrolysis, an inclosed cylindrical decomposing-receptacle, a series of electrodes in double rows therein, having electrical connections thereto, and within the receptacle means for the circulation of cooling material therethrough, from end to end of the cylinder.

2. In an electrolytic apparatus, a mixing-tank, an inclosed receptacle for the electrolyte, a series of electrodes in the receptacle and means for their electric energizing; chambers at the ends of the receptacle, a liquid-inlet to one of the chambers, a liquid-outlet for the other chamber, tubes connecting the chambers and passing through the receptacle, and means to withdraw the electrolyte after its electrolysis.

3. In a chlorine-manufacturing apparatus,

an inclosed receptacle having chambers at the ends with inlet and outlet passages and tubes from chamber to chamber through the receptacle, tube-sheets in the chambers to which the tubes are expansively secured, openings in the tube-sheets, removable covers for the openings, and bus-bars secured to the tube-sheets for expansion and insulation and having anodes and cathodes secured thereto.

4. In an electrolytic apparatus, an inclosed cylindrical horizontal electrolyte-receptacle, electrodes removably suspended in the receptacle and having conductors therefor and electrical contact therewith, tube-sheets and chambers at the ends of the receptacle, means to cool the electrolyte by a series of independent tubes having expansion connections to the tube-sheets and adapted for the receipt and discharge of cooling liquid and its passing through the electrolyte and its receptacle, means for the discharge of the product of electrolysis, and its settled impurities and means to afford access to the receptacle for its cleansing.

5. In apparatus for the purpose described, a tightly-closed receptacle, heads forming the ends of the receptacle and removable covers thereon, tube-sheets formed on the heads, and chambers inclosed by the head formations, tubes secured to the tube-sheets, extending from sheet to sheet, connecting the chambers through the receptacle; openings in the tube-sheets, covers for the openings, bus-rods carried by the covers, a series of electrodes secured to and in contact with the bus-rods, and electrical conductors secured to the bus-rods, and passing outward from the receptacle through insulated and liquid-retaining stuffing-boxes to a source of electrical energy.

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

CHAUNCEY COOK CLARK.

Witnesses:

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