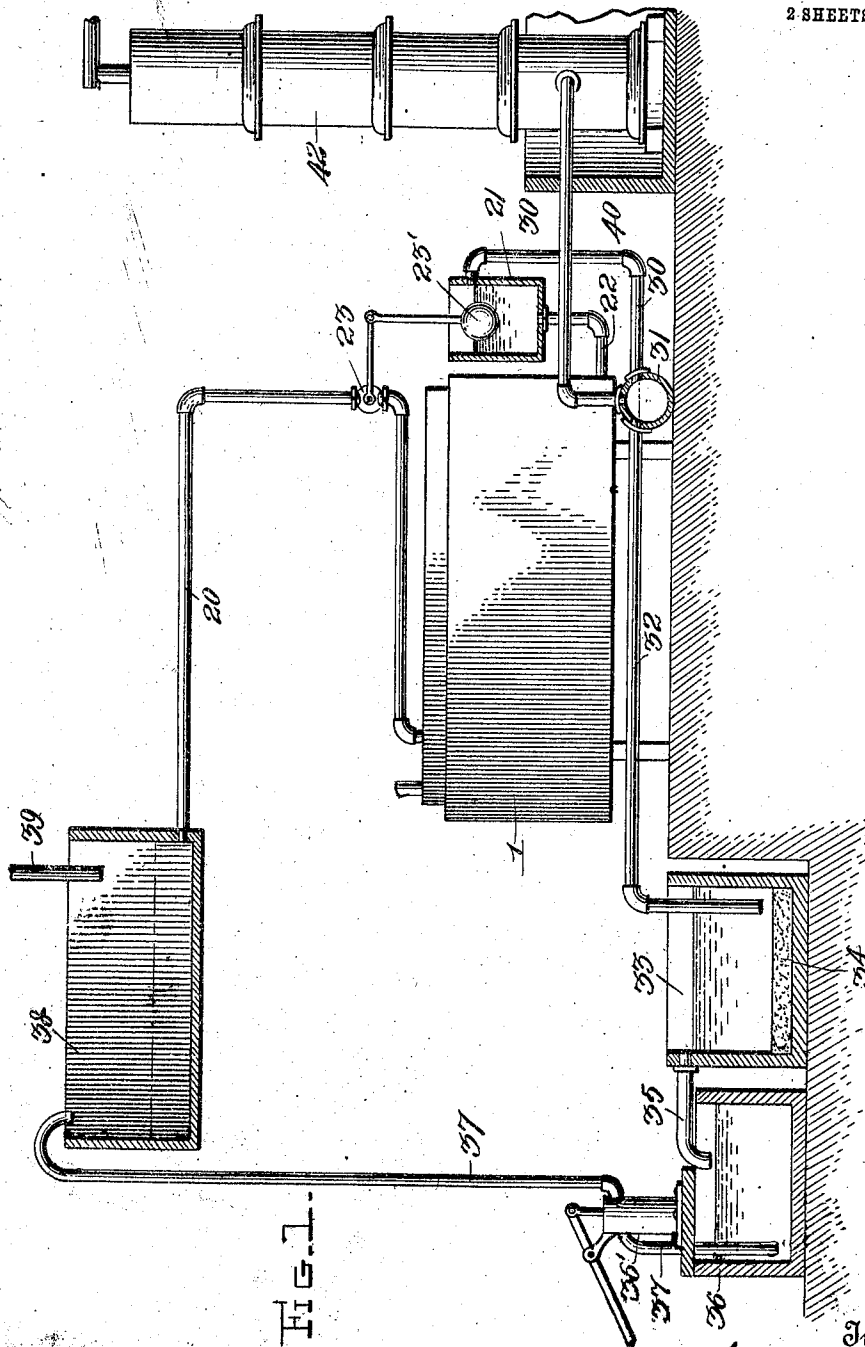


No. 814,864.

PATENTED MAR. 13, 1906.

F. McDONALD.
ELECTROLYTIC APPARATUS.
APPLICATION FILED APR. 27, 1905.

2 SHEETS—SHEET 1.



Witnesses
for A. Roell.
C. H. Giesbauer.

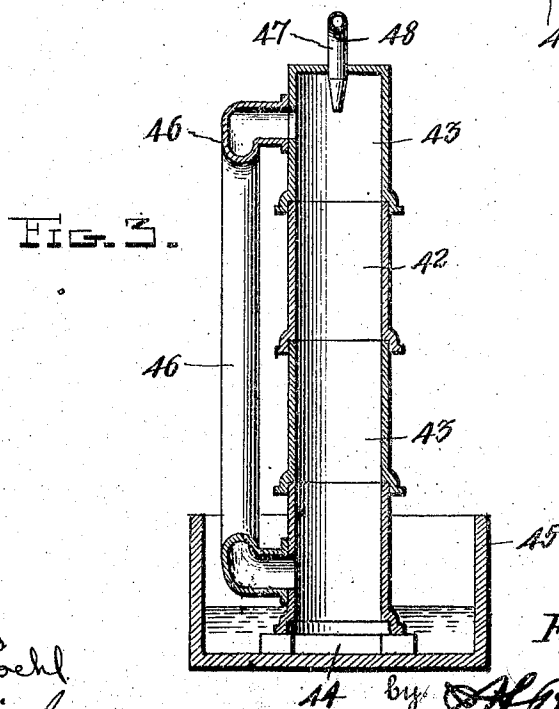
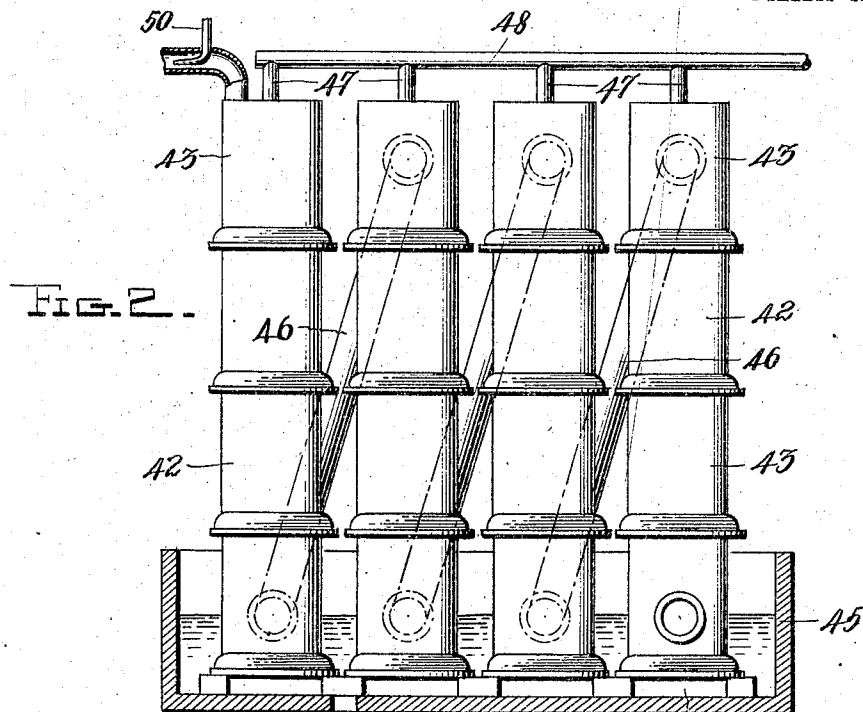
Inventor
Frank McDonald
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2 SHEETS—SHEET 2.



Witnesses
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UNITED STATES PATENT OFFICE.

FRANK McDONALD, OF ROARING SPRING, PENNSYLVANIA.

ELECTROLYTIC APPARATUS.

No. 814,864.

Specification of Letters Patent.

Patented March 13, 1906.

Application filed April 27, 1905. Serial No. 257,636.

To all whom it may concern:

Be it known that I, FRANK McDONALD, a subject of the King of Great Britain, residing at Roaring Spring in the county of Blair and State of Pennsylvania, have invented certain new and useful Improvements in Electrolytic Apparatuses; and I do 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 relates to improvements in electrolytic apparatus; and it consists in the novel construction, combination, and arrangement of devices hereinafter shown and described.

One object of the invention is to provide a continuous and automatic feed of a concentrated solution of sodium chlorid to the anode-compartment of an electrolytic cell, such as shown in Patent No. 697,157, granted to me April 8, 1902. In such devices a solution of caustic soda is produced in the cathode chambers or compartments of the cell, and chlorin gas is produced in the anode-compartment, the chlorin thus produced being used in the manufacture of bleaching liquids.

Another object of the invention is to provide a simple and efficient means whereby the chlorin gas evolved from the overflow liquid of electrolytic cells of this character may be utilized to produce chlorid of lime.

The above and other objects, which will appear as the nature of my invention is better understood, are accomplished by means of the construction illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatic view illustrating my invention. Fig. 2 is a side elevation, partly in section, of the absorbing-towers; and Fig. 3 is a vertical transverse sectional view through the same.

Referring to the drawings by numeral, 1 denotes an electrolytic cell, the construction and operation of which is described in detail in my Patent No. 697,157, previously referred to. The solution of sodium chlorid is fed through a supply-pipe 20 to the anode-compartment of this cell, and said supply is controlled by a valve 23. The latter is in turn controlled by a float 23', which is mounted in a tank 21, having communication with the bottom of the anode-compartment of the cell 1 through an acid-resisting tube or pipe 20. Owing to the tube 22, the level of the brine solution will be the same in both the anode-

compartment of the cell and in the tank 21, and at a suitable point in said tank is connected an overflow-pipe 30, which leads to an acid-resisting gas-collecting pipe 31, which may be of any form and construction. I preferably, however, arrange the pipe or receptacle 31 beneath a series or row of the cells 1, so that the overflow of the anode-compartment of each of said cells discharges into said pipe. The pipe 31 is of such size and its outlet connections are such that the weak brine discharged into it from the pipes 30 is maintained at a constant level, so that there is a sufficient space in the upper portion of said pipe 31 to permit the chlorin gas evolved from such brine to collect. The solution enters the tank 21 at the bottom in a comparatively slow stream, and the chlorin gas does not generate to any great extent in said tank, owing to the fact that the solution is not agitated. As the solution passes in a small stream to the pipe 31 whatever quantity of gas it evolved will pass to the towers 42. The weak brine is discharged from the pipe 31 through a suitable conductor or connection 32 into the lower portion of a resaturating-tank 33, the bottom of which is covered with salt, as shown at 34. The brine is thus strengthened in the tank 33 and overflows from the latter through a pipe or connection 35 into a tank 36, from which it is drawn off, by means of a suitable pump or elevating device 36', through a pipe or conductor 37 to an elevated tank 38. The solution thus discharged into the tank 38 is adapted to be fed by gravity through the pipe 20 to the anode-compartment of the cell 1, and if such solution is not strong enough fresh brine may be admitted into the tank 38 through a pipe or connection 39. It will be understood that in the operation of cells of the character described the condition of the solution in the anode-chamber is of great importance, a concentrated solution of brine as free as possible from impurities being indispensable if a high efficiency is to be maintained. It will be seen that by means of the apparatus just described a constant level of a concentrated solution will be maintained in the anode-compartment of the cell.

In order to utilize the chlorin gas given off from the solution in the pipe or receptacle 31, said gas is conducted from the upper portion of said pipe through a suitable acid-resisting gas-pipe 40 through the lower end or bottom of one of a series of absorbing-towers 42. These towers, as clearly shown in Figs. 1 and

2 of the drawings, consist of tile-sections 43, secured upon each other, the lowermost section of each tower or tier being spaced, as shown at 44, from the bottom of a cement-tank 45, in which said towers are mounted. 5 The bottom section of each of the towers, excepting the two end ones, is connected by a suitable pipe 46 to the top section of the next adjacent tower, so that the chlorin gas which is discharged into the lower end of each of 10 said towers may pass in a circuitous course through the device, the gas passing upwardly through each tower and downwardly through the pipes 46, as indicated by the arrows in 15 Fig. 2 of the drawings. In order to absorb the chlorin, lime-water or milk-of-lime is sprayed into the top of each of the towers through pipes 47, which connect with a suitable supply-pipe 48. This lime-water falls 20 into the tank 45 and is maintained at a constant level, so as to form a seal for the lower ends of the towers 43. The last tower of the series is provided with an outlet-pipe 49, and a suitable steam ejector or jet 50 is provided 25 to facilitate the discharge and to create a suction through the device.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without 30 requiring a more extended explanation.

Various changes in the form, proportion,

and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention. 35

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

In an apparatus of the character described, 40 the combination of an electrolytic cell, a tank in communication with the anode-compartment of said cell, a supply-pipe for supplying a solution of brine to said anode-compartment, a valve in said supply-pipe, a ball-float 45 in said tank connected by levers to said controlling-valve, a resaturating-tank, an overflow connection between the first-mentioned tank and said resaturating-tank, an overflow-tank, an elevated tank, a pump for elevating 50 the liquid from said overflow-tank to said elevated tank, means for conducting the brine in said elevated tank to said valve, a gas-collecting pipe and a series of vertical towers connected to said gas-collecting pipe, substantially 55 as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANK McDONALD.

Witnesses:

W. S. HAIR,

A. J. CHURCHILL.