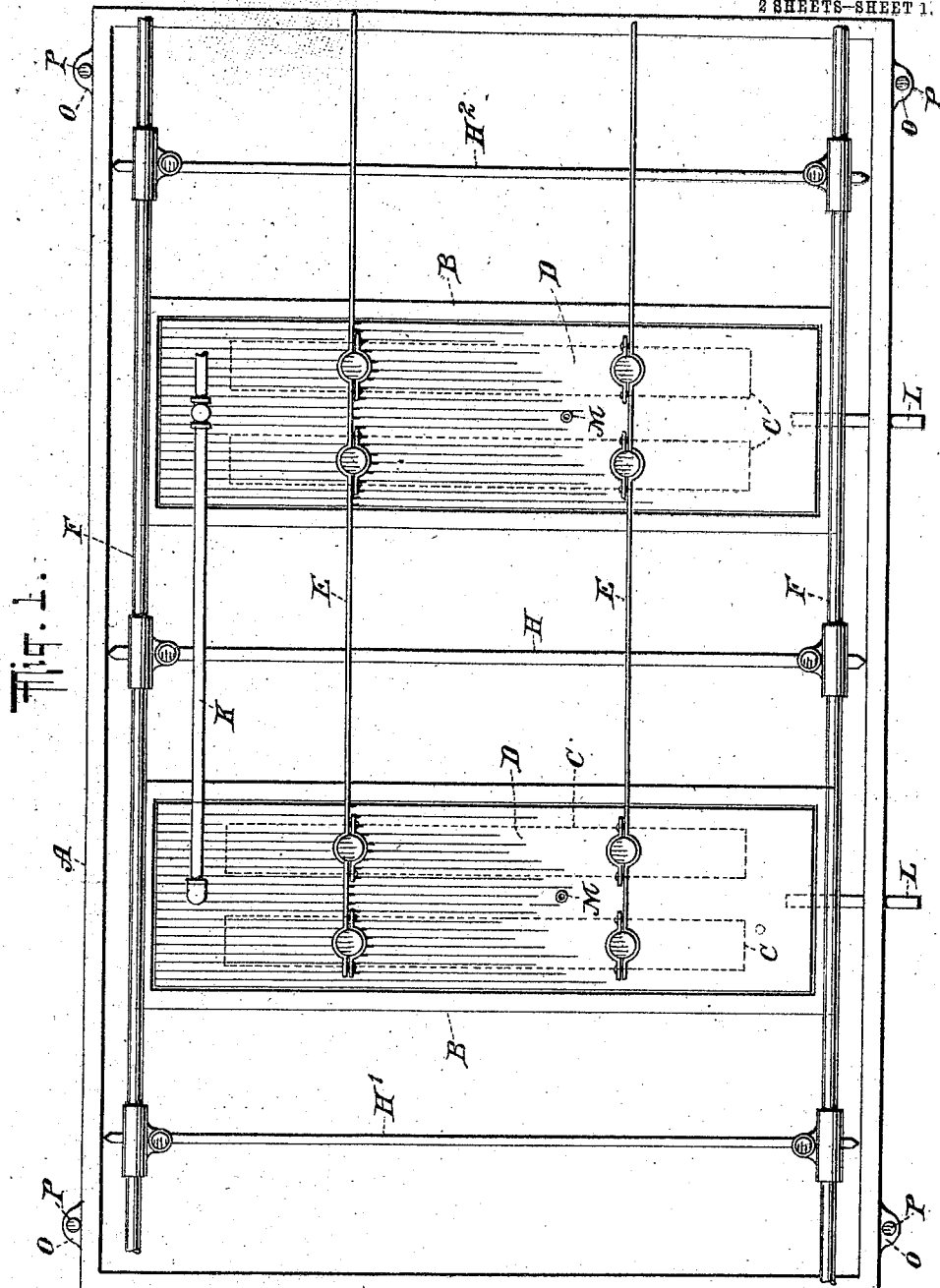


H. CROSTON.
ELECTROLYTIC APPARATUS.
APPLICATION FILED JULY 22, 1909.

1,009,133.

Patented Nov. 21, 1911.

2 SHEETS-SHEET 1.



WITNESSES

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John A. Schenck

INVENTOR

Henry Croston
BY
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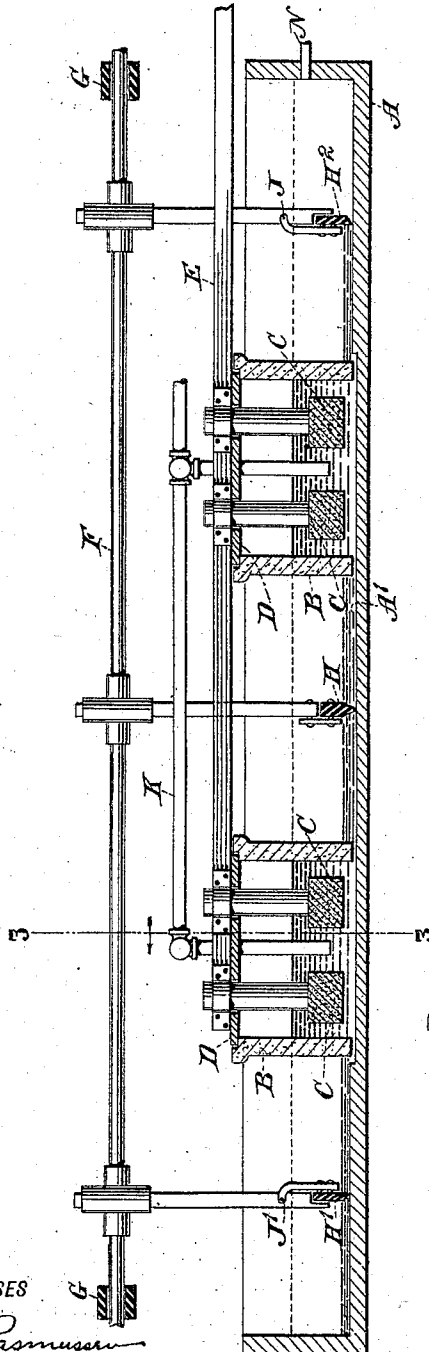
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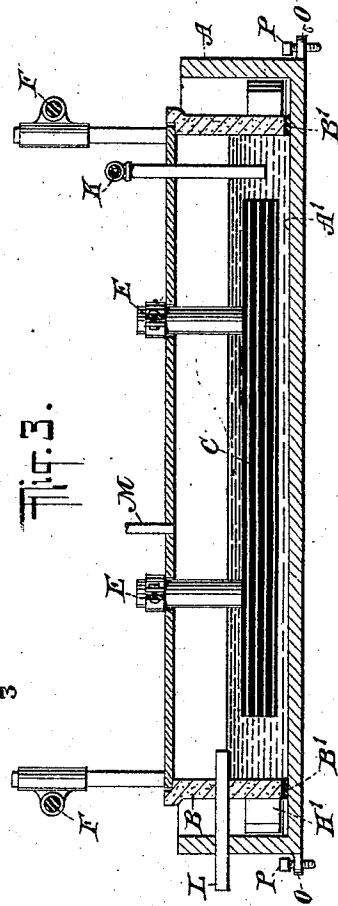
Fig. 2.



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Fig. 3.



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UNITED STATES PATENT OFFICE.

HENRY CROSTON, OF NEW YORK, N. Y., ASSIGNOR TO GENERAL CHEMICAL COMPANY,
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ELECTROLYTIC APPARATUS.

1,009,133.

Specification of Letters Patent. Patented Nov. 21, 1911.

Application filed July 22, 1909. Serial No. 509,008.

To all whom it may concern:

Be it known that I, HENRY CROSTON, a subject of the King of Great Britain, resident of the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Electrolytic Apparatus, of which the following is a specification.

My invention relates to an apparatus for use in electrolytic processes, particularly the decomposition of sodium chlorid solutions.

The chief purpose of my invention is to secure an efficient circulation of the mercury which forms a negative electrode.

A specific embodiment of my invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the apparatus; Fig. 2 a longitudinal section of the apparatus; and Fig. 3 is a cross section on line 3-3 of Fig. 2.

The apparatus comprises a tank A made of suitable material such as cast iron and preferably formed with a depressed portion A'. Within this tank and preferably at the depressed portion thereof are placed the anode chambers B, of which I have shown two, although I might employ more of them, or only one if desired. These anode chambers may be made of earthenware or concrete. The lower edges of these anode chambers are supported on end strips B' so as to be spaced from the bottom of the tank A so that the mercury (that is to say the usual mixture of mercury and sodium amalgam) which is contained at the bottom of the tank and which rises above the lower edges of the anode chamber may circulate into and out of the anode compartments when compelled, as hereinafter described. Within each chamber B are placed one or more anodes C, generally made of carbon and suitably supported as by means of covers D. The current is applied to the anodes by suitable connections such as wires or strips E and the other pole of the source of electricity is connected with the tank A.

In order to propel the movable mercury cathode through the anode compartments so as to secure a constant renewal of the mercury surface, I provide scrapers or agitators arranged to reciprocate in the tank a short distance above its bottom, preferably lengthwise of the tank. In the particular construction shown three scrapers are em-

ployed, all connected with suitable mechanism for reciprocating them horizontally in unison. The scrapers may all be secured to rods F arranged to slide in suitable guides G and connected with operating mechanism (not shown) to give them a reciprocating motion. The central scraper H is rigid, but the outer scrapers H' and H² are hinged at J and J' respectively and the lower ends of the corresponding support are so constructed that each of the scrapers will lie flat against its support and be practically rigid therewith when the scraper moves in one direction, but when the scraper moves in the opposite direction the scraper will swing on its hinge and exert practically no propelling action on the mercury, being simply dragged on its surface. It will be seen that the scrapers H' H² are hinged to swing in opposite directions, that is to say when the scrapers move toward the left, the scraper H' will drag and the scraper H² will be operative while with the scrapers moving toward the right, the scraper H' will be operative and the scraper H² will drag. The three scrapers have their lower edges wedge-shaped and dipping somewhat below the surface of the mercury. The length of the scrapers is practically equal to the inside width of the tank A as shown in Figs. 1 and 3.

K indicates pipes through which the electrolyte such as a solution of sodium chlorid is supplied; L indicates an overflow pipe to maintain a constant level; M pipes for the escape of the chlorine formed; and N pipes for discharging the caustic soda formed. Lugs O are provided at the sides of the tank A to receive leveling screws P.

It is well understood that in operating apparatus of this character a layer of amalgam is formed on top of the mercury and that this layer interferes with the progress of the electrolytic action. By the circulation of mercury, which I accomplish, the amalgam is removed as soon as formed and fresh, clean surfaces of mercury are brought into contact with the electrode, thus insuring a more perfect electrolytic action.

I claim as my invention:

1. In electrolytic apparatus, the combination with the anode and a tank adapted to contain the electrolyte, of means projecting into the cathode-forming body of mercury from above the surface thereof, said means

being arranged to reciprocate horizontally in the tank adjacent to its bottom, for circulating the cathode-forming body of mercury in the lower portion of the tank.

5 2. In electrolytic apparatus, the combination, with the anode and a tank adapted to contain the electrolyte, of a scraper arranged to reciprocate horizontally in the tank adjacent to its bottom, and means for
10 causing said scraper to be inoperative during its return movement.

3. In electrolytic apparatus, the combination, with the anode and a tank adapted to contain the electrolyte, of a scraper arranged
15 to reciprocate horizontally in the tank adjacent to its bottom, and means whereby said scraper will be caused to occupy a raised, inoperative position during its return movement.

20 4. In electrolytic apparatus, the combination, with the anode and a tank adapted to contain the electrolyte, of a scraper arranged to reciprocate horizontally in the tank adjacent to its bottom, and a carrier to
25 which said scraper is hinged to swing about a horizontal axis, said carrier having a stop to arrest the swinging of the scraper in one direction when it is approximately vertical.

30 5. In electrolytic apparatus, the combination, with the anode and a tank adapted to contain the electrolyte, of two scrapers arranged to reciprocate horizontally in the tank adjacent to its bottom, and means for
35 causing one of said scrapers to be inoperative during movement in one direction, and the other during movement in the opposite direction.

40 6. In electrolytic apparatus, the combination, with the anode and a tank adapted to contain the electrolyte, of two scrapers ar-

anged to reciprocate horizontally in the tank adjacent to its bottom, and carriers to which said scrapers are hinged about horizontal axes, said carriers being provided with oppositely disposed stops to render said
45 scrapers operative during movement in opposite directions.

7. In electrolytic apparatus, the combination, with the anode and a tank adapted to contain the electrolyte and provided with a
50 depressed portion, of a scraper mounted to reciprocate in the depressed portion of the tank and arranged to propel the material in both directions and another scraper arranged to reciprocate in the other portion
55 of the tank and constructed to be operative during movement in one direction only.

8. In electrolytic apparatus, the combination with the anode and a tank adapted to contain the electrolyte, of a scraper mounted
60 to reciprocate horizontally in the tank adjacent to its bottom arranged to propel the mercury in both directions.

9. In electrolytic apparatus, the combination with a tank having a depressed portion,
65 anode chambers in said depressed portion, of a scraper arranged to reciprocate between the anode chambers and operative during movement in each direction, and additional
70 scrapers arranged to reciprocate exteriorly of the anode chambers and each arranged to be operative during movement in one direction only.

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

HENRY CROSTON.

Witnesses:

JOHN A. KEHLENBECK,
G. V. RASMUSSEN.