

H. E. T. HAULTAIN.
ELECTROLYTIC APPARATUS.

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1,018,901.

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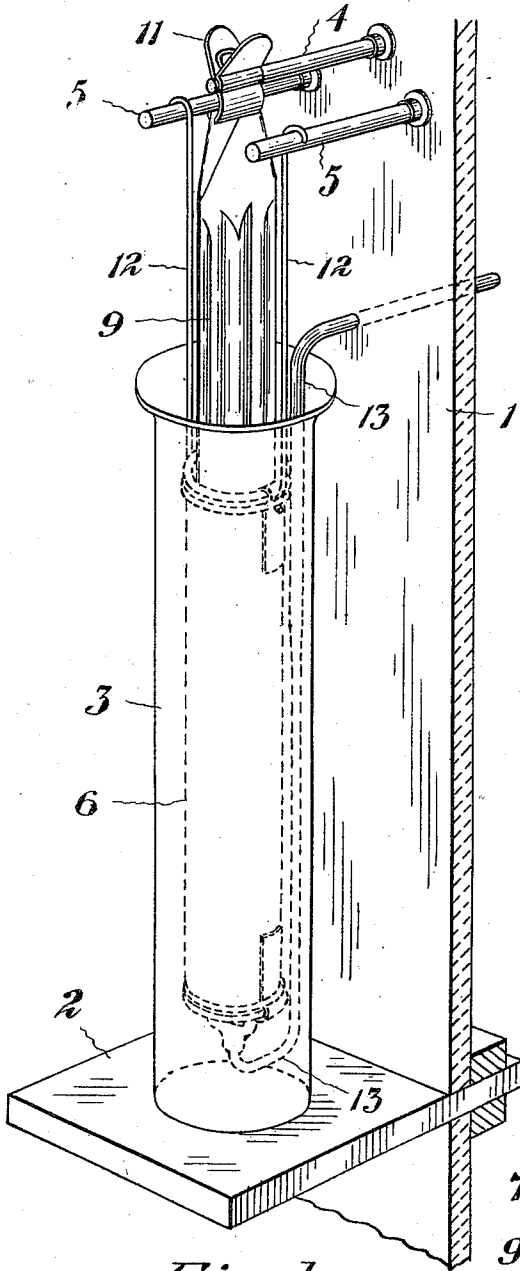


Fig. 1

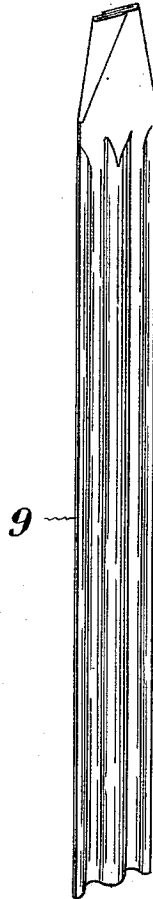


Fig. 2

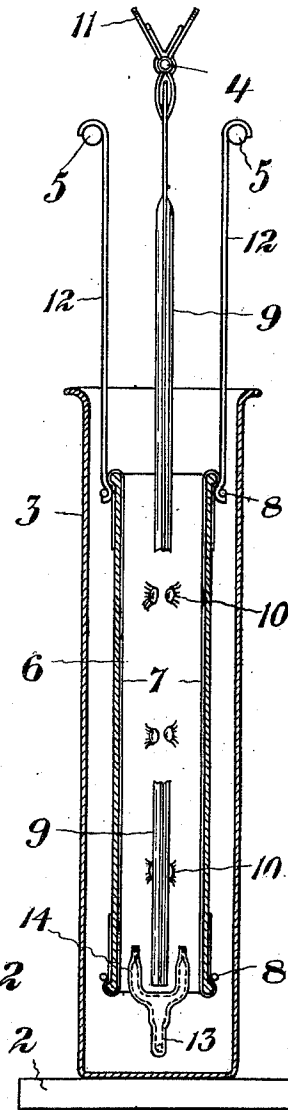


Fig. 3

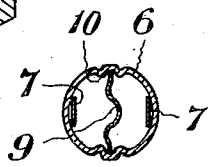


Fig. 4

WITNESSES:

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ELECTROLYTIC APPARATUS.

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To all whom it may concern:

Be it known that I, HERBERT E. T. HAULTAIN, of the city of Toronto, in the Province of Ontario, Canada, have invented certain
5 new and useful Improvements in Electrolytic Apparatus, of which the following is a specification.

This invention relates to apparatus for the electro-chemical assaying of metallic ores
10 such as those of copper, nickel, or zinc, in which a deposit of the metallic content of the ore is received on a platinum or other suitable electrode and my object is to devise means for accelerating the electrolytic action
15 and thus materially shortening the time required for an assay, to devise simple and effective connections between the electrodes and the terminals of the electric power circuit, and to devise simple means for accurately defining the relative positions of the
20 electrodes when the apparatus is in operation.

I attain my objects by means of the constructions hereinafter particularly described
25 and illustrated in the accompanying drawings in which—

Figure 1 is a perspective view showing a single unit of my apparatus. Fig. 2 is a detail of the central electrode. Fig. 3 is a
30 vertical section of an electrode supporting tube. Fig. 4 is a horizontal sectional view showing the means for centering the inner or central electrode relative to the outer electrodes.

In the drawings like letters of reference indicate corresponding parts in the different
35 figures.

1 is a suitable board or back for the apparatus. In this back a support 2 for the
40 containing vessel 3 is slidable, this support being pulled out to support the containing vessel and pushed in when it is desired to remove the said vessel. Supported by this board or backing 1 are electric terminals 4
45 and 5, the outer terminals 5 being preferably of the same polarity as one another and of opposite polarity to the central electrode 4.

The parts of the apparatus I have just described are old in the art, my invention
50 lying particularly in the device I will now describe.

6 is an electrode supporting and positioning tube preferably of glass or celluloid. When in use the lower end of this tube is
55 above the bottom of the containing vessel 3 and its upper end below the upper end of

such vessel so that it may be entirely submerged in the electrolyte. To this tube are connected in any suitable manner the outer
60 electrodes 7 preferably formed of thin sheet platinum. In the drawings I show a simple way of connecting these electrodes their ends being bent around the rim of the tube at each end and clamped to the tube by means
65 of retaining bands 8 of any suitable inert material. These electrodes are connected in any suitable manner with the outer terminals 5 but preferably in a manner I will hereinafter describe.

9 is a central electrode also formed of
70 sheet platinum and preferably constructed as hereinafter described. This electrode is accurately positioned relative to the outer electrode in the following manner. Teats 10
75 are blown or otherwise suitably formed in the sides of the tube intermediate the electrodes 7. These teats are preferably arranged in pairs as shown and the edges of the central electrode 9 fit between them as
80 shown (see Figs. 3 and 4). By this arrangement I positively insure that the central electrode will be and remain in a central position approximately equidistant from the outer electrodes which condition is
85 essential in securing the best results.

The central electrode being formed of
90 very thin sheet platinum is longitudinally corrugated from end to end in order to stiffen it. In order to secure an easily detachable connection between the central electrode and the terminal 4 I provide the latter
95 with a spring clip 11 of any ordinary construction which spring clip engages the upper end of the electrode as shown. In order to thicken and stiffen the upper end
100 of the electrode where it is gripped by the clip I bend over each corner of the electrode, as shown particularly in Fig. 2 and thus insure not only that a good connection shall be obtained between the clip and the electrode but also prevent the latter from being
105 damaged by the engagement and reengagement with the clip.

In order that the tube be accurately
110 positioned within the containing vessel, as hereinbefore described, it is necessary to provide some means of supporting it. I prefer that the support shall be independent of the retaining vessel and therefore hang the tube, preferably from the terminals 5, and preferably arrange it that the
115 supporting means shall form an electrical

connection between the terminals and electrodes 7. For this purpose I employ the wires 12 one or both of which at its lower end is in electrical connection with one of the electrodes 7. If only one is in such electrical connection the upper retaining band 8 must be of conducting material and in electrical connection with both electrodes 7. These wires may be connected in any suitable manner with the terminals 5 but are preferably hooked over the same as shown. The tube 6 is thus given a flexible support and consequently neither the tube nor its connections will be broken off if in placing the containing vessel 3 in position the tube is knocked or pressed to one side.

From the construction described it will be seen that not only are the electrodes always properly positioned when the apparatus is in use but the tube 6 and the containing vessel 3 are also suitably positioned relative to one another. At the same time the central electrode or the tube with the outer electrodes in position thereon may be quickly engaged and disengaged from the terminals 4 and 5. The tube 6 has however another function and that is to materially decrease the length of time required in making a determination. A quick circulation of the electrolyte is necessary for this purpose. As a considerable amount of heat is generated at the surfaces of the electrodes and also bubbles of gas, the electrolyte within the tube has a tendency to rise returning to the bottom through the annular space between the tube and containing vessel. The tube 6 thus serves the purpose of a circulating tube, defining the course the circulating medium will take, thus securing a maximum circulation for the amount of heat and gas developed. In order to still further increase the circulation I preferably employ a tube 13 provided at its lower end with one or more nozzles 14. Through this tube air or other suitable gas may be forced, the rapidity of the circulation being materially increased by the bubbles of gas rising from the nozzles 14.

From the above description it will be seen that I have devised an electrolytic apparatus which is not only very convenient in use, requiring the minimum of attention, but also is exceedingly rapid in its operation. It will be understood, of course, that in practice a large number of the devices will be employed, the construction as above described forming only a single unit.

What I claim as my invention is:—

1. In electrolytic apparatus the combination of a containing vessel; a tube open at both ends supported within the containing

vessel with its lower end above the bottom of the vessel and its upper end below the top of the vessel; electrodes supported by said tube; an electrode of opposite polarity between the aforesaid electrodes; and a support for said electrode independent of the tube.

2. In electrolytic apparatus the combination of a containing vessel; a tube open at both ends supported within the containing vessel with its lower end above the bottom of the vessel and its upper end below the top of the vessel; a pair of electrodes of similar polarity carried by said tube at opposite sides thereof; a central electrode of opposite polarity; and guiding means within the tube defining the position of said central electrode relative to the other.

3. In an electrolytic apparatus the combination of an electrode supporting and positioning tube open at both ends; a pair of electrodes of similar polarity carried by said tube at opposite sides thereof; a central electrode of opposite polarity; and guiding means within the tube defining the position of said central electrode relative to the others.

4. In electrolytic apparatus the combination of a containing vessel; a tube open at both ends supported within the containing vessel with its lower end above the bottom of the vessel and its upper end below the top of the vessel; electrodes supported by said tube; means for introducing a gas into the lower end of the tube; an electrode of opposite polarity between the aforesaid electrodes; and a support for said electrode independent of the tube.

5. In electrolytic apparatus the combination of a pair of suitably supported terminals; an electrode supporting and positioning tube open at both ends; a pair of electrodes of similar polarity carried by said tube; electrical conductors connected with the electrodes and terminals and adapted to form a flexible support for the tube; a third terminal; and a central electrode of opposite polarity connected with said third terminal.

6. In electrolytic apparatus the combination of a tube open at both ends flexibly supported from above; an electrode carried by said tube; an electrode of opposite polarity within said tube; electrical connections between said electrodes and a source of current; and a containing vessel removably supported about said tube.

Toronto, this 14th day of July 1910.

HERBERT E. T. HAULTAIN.

Signed in the presence of—

J. EDW. MAYBEE,

E. P. HALL.