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APPARATUS FOR ELECTROCHEMICAL ANALYSIS.

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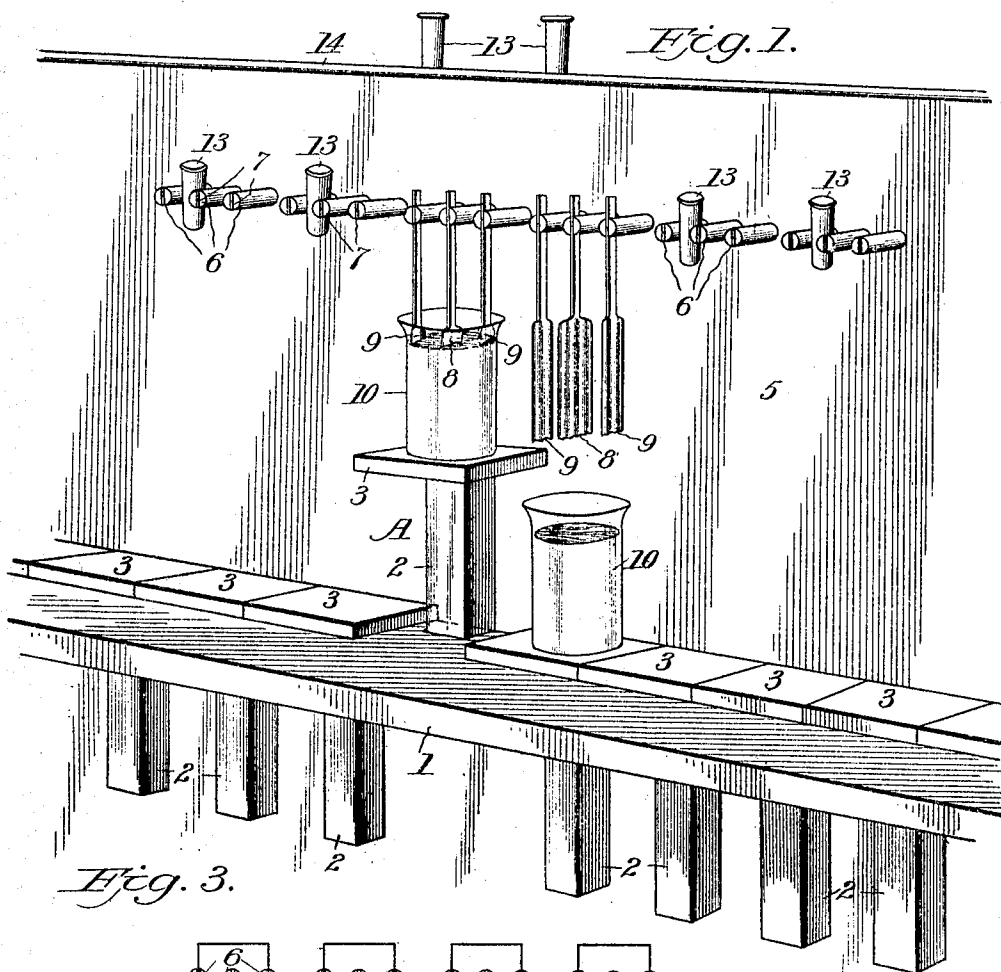
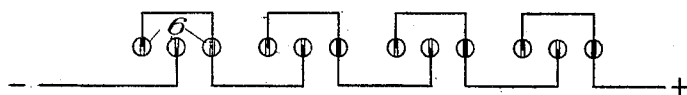
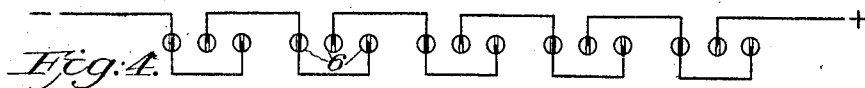
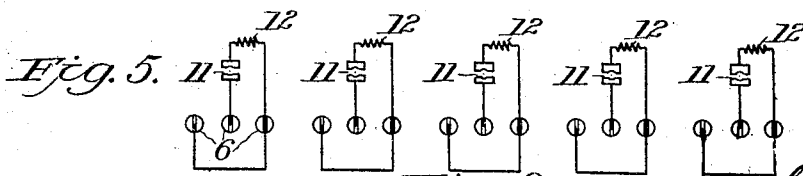
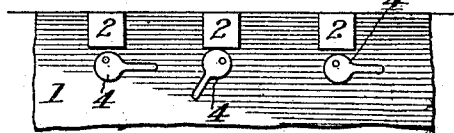


Fig. 3.



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APPARATUS FOR ELECTROCHEMICAL ANALYSIS.

No. 870,674.

Specification of Letters Patent.

Patented Nov. 12, 1907.

Application filed April 26, 1905. Serial No. 257,540.

To all whom it may concern:

Be it known that we, GEORGE A. GUESS, a subject of the King of Great Britain, residing at Silverton, in the county of San Juan and State of Colorado, and HERBERT E. T. HAULTAIN, a subject of the King of Great Britain, residing at Nelson, in the county of Kootenay, British Columbia, Canada, have invented a certain new and useful Improvement in Apparatus for Electrochemical Analysis, of which the following is a full, clear, and exact description.

The object of this invention is to provide a compact and conveniently arranged apparatus, especially designed for electrolytic assaying.

The invention comprises a bench of adjustable beaker stands, in connection with which is arranged a series of terminals in sets of three supplied with electrodes and connected up in circuit in various ways, and adapted to be short-circuited so as to cut out any particular assay, or vary the current flowing through it, without affecting the others, all as we will proceed now more particularly to set forth and finally claim.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a perspective view of the apparatus. Fig. 2 is a bottom plan view of a portion of the bench and showing one means for clamping the beaker stands in position. Figs. 3, 4 and 5 are diagrams of various arrangements of circuits.

1 is a horizontal bench, having any number of holes in which are placed the shanks 2 of a series of beaker stands 3. These stands may be supported in any given position above the bench, as indicated by the stand A Fig. 1, by means of a suitable clamp or other holding device, such as an eccentric or cam 4, Fig. 2.

Above the bench and in a suitable support 5 are arranged the terminals 6. These terminals are, preferably, cylinders of aluminium of suitable length, and have their ends 7 slitted longitudinally. The terminals are connected up in any suitable way with the opposite poles of a source of electricity, such as a battery or dynamo. These terminals support by frictional engagement the electrodes 8 and 9; and we prefer to use the thin corrugated platinum electrodes forming the subject of our concurrent application Serial No. 257,541.

The beaker 10 having been supplied with the electrolyte or fluid to be analyzed or treated, it is placed upon one of the stands 3 and raised so as to submerge the blades of the electrodes, and the current is then turned on. As many beakers may be arranged upon the bench as there are sets of terminals, and independent operations carried on in all of them.

As shown in Fig. 3, the terminals are wired up for running assays in series, and in this case the central

terminal supports the cathode, for receiving metallic deposit, as in copper, nickel, or zinc assays.

As shown in Fig. 4, the wiring is arranged for assays in series, but the central terminal supports an anode for receiving peroxid deposit, as in lead or manganese assays.

As shown in Fig. 5, the wiring is arranged for the introduction of a shunt resistance across the terminals before removing the electrolyte. A pair of plates 11 is interposed in the circuit to receive a metal plug, not shown, and in the circuit also is arranged the resistance coil or device 12.

Any one of the assays or beakers may be short-circuited in order to remove the electrolyte and without cutting off the current from the other sets, by introducing between the terminals a hollow thimble 13 of aluminium or other conductor; and as already indicated by reference to Fig. 5, the shunt resistance may be introduced for the same purpose.

The short-circuiting with a thimble or other hollow or solid resistance, fixed or variable, is an important feature in the apparatus. The fixed resistance keeps the current and the remaining assays approximately constant while some assays are being removed; and the variable resistance permits a variation of the current flowing through any assay without seriously affecting the rest of the assays. The fixed shunt resistance preferably is approximately of a resistance to absorb the same number of volts as the assay.

14 is a rail conveniently located above the bench to receive the thimbles when not in use.

The terminals are placed equidistant, and hence the electrodes are similarly arranged, and the result is that a uniform deposit is obtained on the middle electrode. This with heavy deposits tends to lessen the tendency of such to peel off, and consequently permits the use of a smaller area to hold the same quantity of deposit.

The combination of slit terminals in lieu of ordinary screw binding posts, with frictionally engaged electrodes of very thin material, permits the ready and rapid connection and disconnection of the parts, without appreciable abrasion, and gives better contact, particularly after being in use for some time; and the terminals being of aluminium are not tarnished or otherwise attacked injuriously by acid fumes, and hence the surface and electrical contact is always preserved in good working order.

What we claim is:—

1. An electro-chemical apparatus, comprising the combination of three terminals in a set, slit longitudinally, and an independent electrode arranged in the slit of each terminal and frictionally held thereby, the electrode in the middle terminal adapted to receive the deposit, and the several terminals connected up in circuit.

2. An electro-chemical apparatus, comprising a bench,

a series of beaker supports adjustable therein, and a series of terminals over each beaker support, and electrical connections for the terminals.

5 3. An electro-chemical apparatus, comprising slit terminals arranged in sets of three, an independent electrode applied frictionally in the slit of each of said terminals, means for connecting the several terminals in series, and means for short-circuiting any one or more of the sets of terminals.

10 4. An electro-chemical apparatus, comprising aluminium terminals, slit longitudinally and each adapted to receive

and hold an independent electrode by frictional engagement in its slit, means for connecting the terminals in circuit, and a thimble adapted to be interposed between the terminals for short-circuiting purposes.

In testimony whereof we have hereunto set our hands this 20th day of April A. D. 1905.

GEO. A. GUESS.

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Witnesses:

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