J. H. REID.

ELECTROLYTIC CELL.

APPLICATION FILED DEC. 28, 1908.

917,795. Patented Apr. 13, 1909.

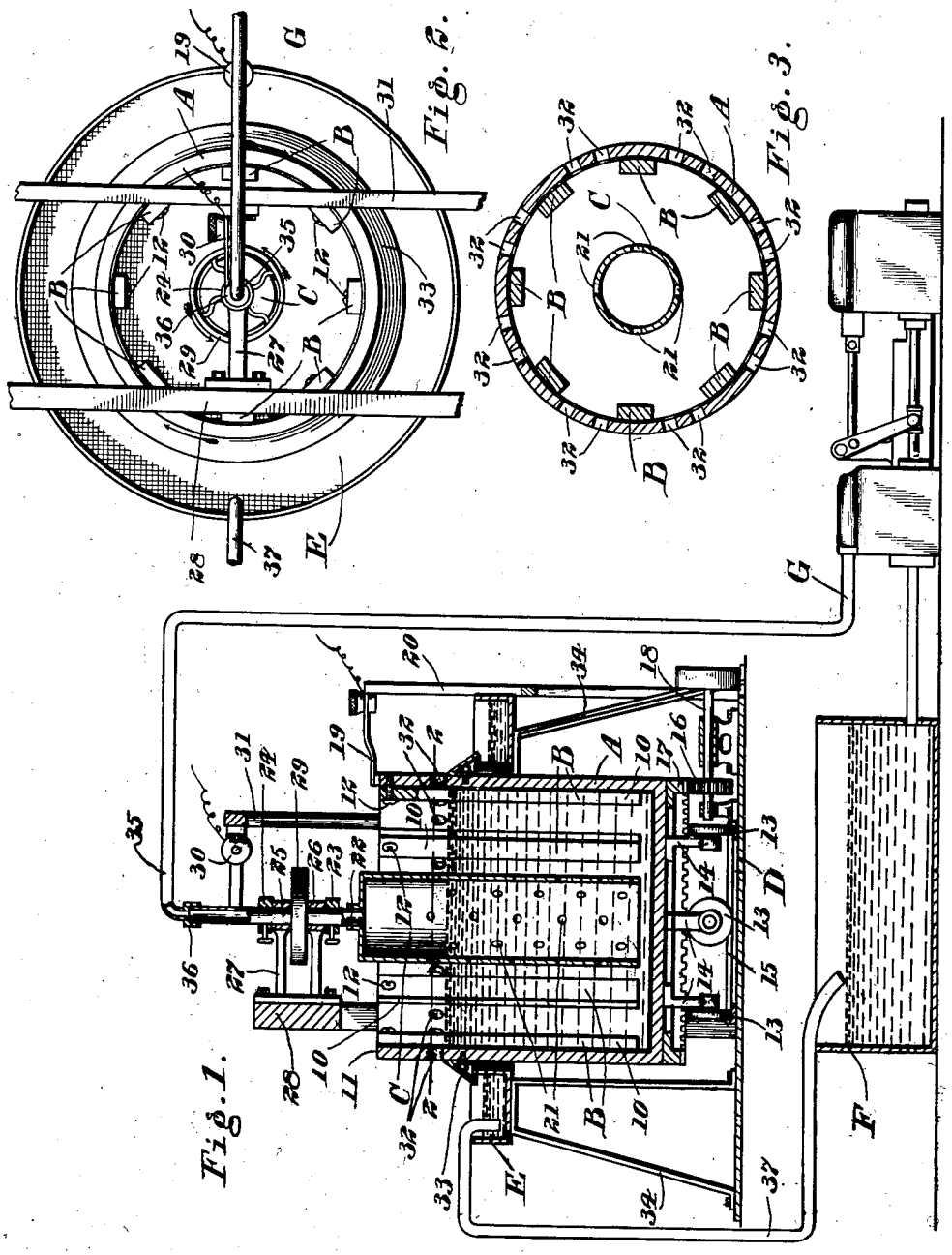


Fig. 1.

Fig. 2.

Fig. 3.

WITNESSES,

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MES HENRY REID, OF NEWARK, NEW JERSEY.

ELECTROLYTIC CELL.

No. 917,795. Specification of Letters Patent. Patented April 13, 1909.

Application filed December 28, 1908. Serial No. 469,601.

To all whom it may concern:

Be it known that I, JAMES HENRY REID, of Newark, in the State of New Jersey, United States of America, have invented certain new and useful Improvements in Electrolytic Cells, of which the following is a specification.

My invention relates to improvements in electrolytic cells, and the objects of my invention are to minimize skin friction and make a uniform and solid deposit of the metal.

In practicing the invention, the friction is very materially reduced by arranging the electrodes concentrically and rotating them in opposite directions, at the same time circulating the electrolyte between the electrodes and through one of the electrodes which is made hollow for that purpose, and provided with suitable outlet orifices, the electrolyte after circulation, being withdrawn from the cell, regenerated, and again fed into the hollow electrode, all as hereinafter more fully set forth and described in the accompanying specifications and drawings.

In the drawings, Figure 1 is a vertical section through an embodiment of the invention. Fig. 2 is a plan view of the same. Fig. 3 is a section on the line 2—2, Fig. 1.

In the drawings, like characters of reference, indicate corresponding parts in each figure.

In the drawings, A represents the outer receptacle of suitable material, such as iron, lined with porcelain or lead, B the anodes and C the cathodes.

The form of anodes illustrated are bars of metal 10 secured to an annular ring 11, on the top of the receptacle, and being removably connected thereto, as by screws 12. In accordance with the present invention, it would be necessary to rotate the anodes, and preferably the receptacle also, and this is accomplished by rotatably mounting the receptacle, through the medium of rollers 13 supported on the underside from brackets 14, and rolling on a track 15, provided in a suitable base D, the motive power for the rotation being obtained through a pinion 16 engaging an annular rack 17 in the underside of the receptacle, the pinion being driven from a shaft 18 actuated by any suitable source of power. The electrical connection for the anodes may be furnished through a brush 19 engaging the top of the ring 11 and the said brush being held on a suitable fixed support 20.

To increase the effectiveness of the cell, it is desirable to circulate the electrolyte continuously between the electrodes, and this is accomplished by forming the cathodes C hollow, they being constructed in practice, of hollow steel coated with plumbago and having a plurality of outlet orifices 21.

To permit of rotation, the cathode is rotatably supported by means of a hollow tube 22 at the top thereof, which has rollers 23 and 24 which fit on the opposite sides of bearings 25 and 26, formed on a standard 27 which is secured to a suitable fixed support 28, the said tube 23 having belt 29 thereon, which is driven from a suitable source of power.

To give electrical connection to the cathode, a brush 30 is provided, supported from a fixed support and adapted to bear on the metallic exposed side of the tube. To permit of the outlet of the electrolyte after it has reached the anode, apertures 32 are provided through the side of the receptacle near the top, and immediately below these apertures, an inclined elbow 33 is provided, the said elbow extending outwardly and downwardly into an annular trough E which is supported from suitable braces 34.

In carrying out the electrolytic action, the current is supplied to the anodes and cathodes as usual, and they are then rotated in opposite directions. Fresh electrolyte is fed into the top of the tube 27, as through the supply pipe 35 having a coupling 36 engaging the top of the tube. This electrolyte passes down the cathode, out through the apertures of the same, across to the anodes, and then out the apertures 32 into the annular trough E. From here, it is withdrawn to a suitable tank F connected to the trough by means of a pipe 37, and it is here regenerated. Thus, for example, if the electrolyte is used for a solution of copper sulfate, additional copper sulfate would be added. It is then pumped by a suitable pipe G back to the supply pipe 35 and again circulated through the cell.

It will be observed that the electrolyte flowing out of the apertures in the rotating cathode will tend to move with the cathode, while the electrolyte at the outer side of the cell will tend to move with the anode, which

is rotating in the opposite direction, but will, in each case, lag a little behind the electrode, and this may be so adjusted as to be just sufficient to overcome the skin friction. In this way, the resistance in the cell, due to skin friction, may be practically eliminated, permitting the use of a higher voltage and amperage, and giving a much more solid deposit owing to the elimination of the small bubbles incident upon the presence of skin friction.

What I claim as my invention is:

1. An electrolytic cell, including a receptacle having suitable outlet ports, a hollow central electrode, outer electrodes, means for supplying electrolyte to the central electrode, and means for rotating the outer electrodes with respect to the central one.

2. An electrolytic cell including electrodes, one of which is hollow, means for rotating one of the electrodes and means for circulating an electrolyte through the hollow electrode.

3. An electrolytic cell including electrodes, one of which is hollow and provided with perforations, means for rotating one of the electrodes, and means for circulating an electrolyte through the hollow electrode to the other electrode.

4. An electrolytic cell including a rotatably mounted vessel having suitable outlet ports, a fixed tank adapted to receive the liquid from the outlet ports, means for rotating the vessel, electrodes within the vessel, and means for supplying the vessel with electrolyte.

5. An electrolytic cell, including a rotatably mounted vessel, electrodes connected to the same and adapted to rotate therewith, a central electrode, and means for rotating the same in the opposite direction to that in which the vessel rotates.

6. An electrolytic cell comprising a rotatably-mounted vessel having outlet orifices therein, a fixed tank adapted to receive the liquid from the outlet orifices, electrodes secured to the vessel and adapted to rotate therewith, a hollow, central electrode, means for rotating the said central electrode in opposite direction to that in which the vessel rotates, and means for supplying the central electrode with electrolyte.

7. The herein described process of electrodeposition, which consists in passing a current between two electrodes rotating in opposite directions and maintaining a continuous circulation of electrolyte between the two electrodes.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JAMES HENRY REID.

Witnesses:
RUSSEL S. SMART,
WM. A. WYMAN.