Aug. 20, 1935. A. C. JEPHSON 2,011,638

ELECTROLYTIC CELL

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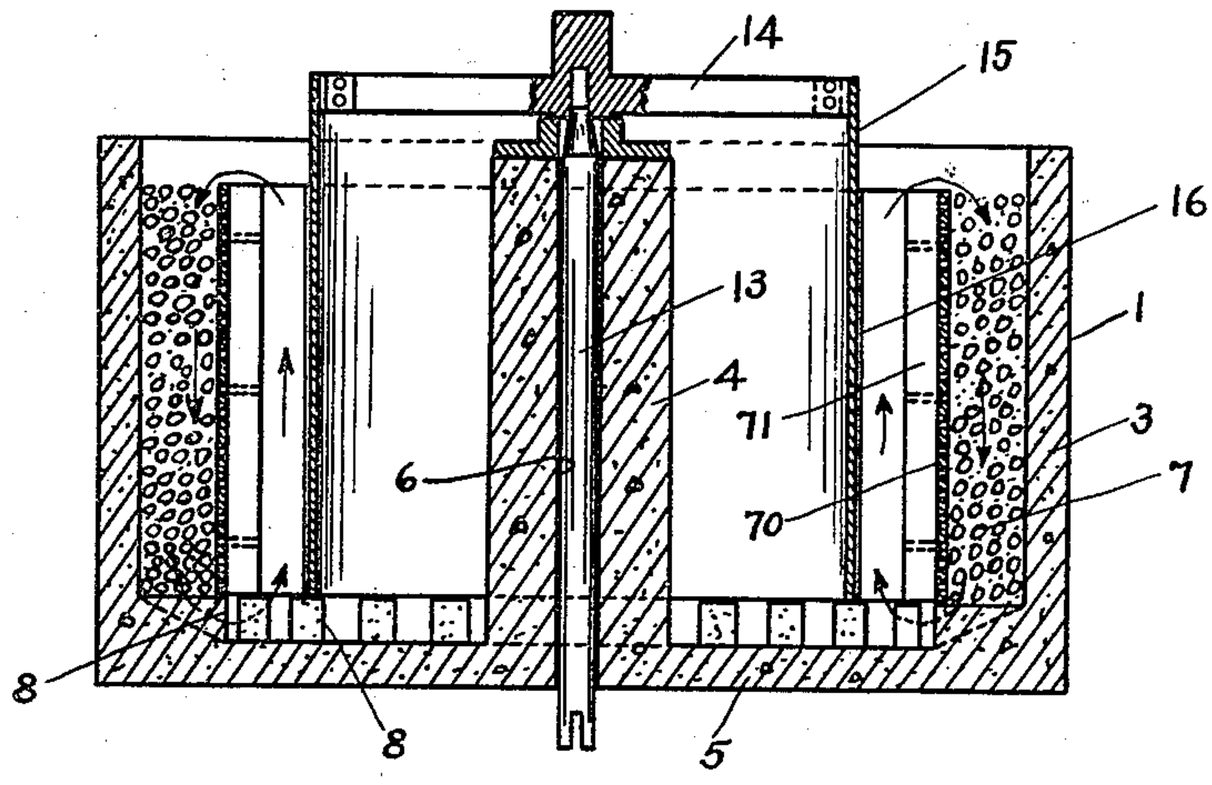

Fig. I

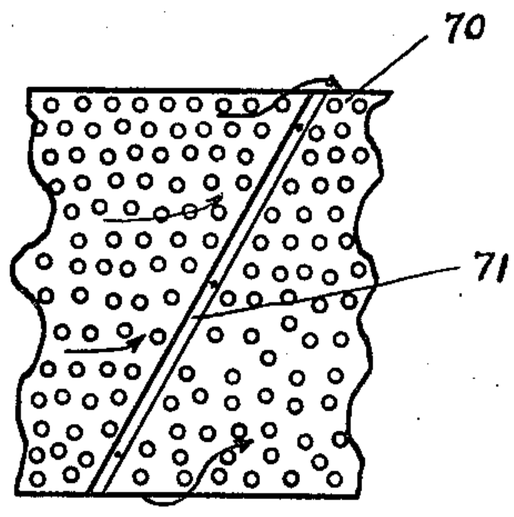

Fig. II

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ELECTROLYTIC CELL

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Application July 23, 1934, Serial No. 736,530

4 Claims. (Cl. 204—5)

This invention relates to electrolytic cells, and more particularly to cells used for the deposit of metal in sheet form upon a rotating cathode, and consists in features of structure by virtue of which the cell is rendered more effective for its intended purpose.

In the accompanying drawing Fig. I is a view in vertical and axial section of an electrolytic cell in which the features of invention are incorporated; Fig. II is a fragmentary view in elevation of that face of the anode that stands opposed to the stripping surface of the cathode.

In a companion application of Allen C. Jephson and Ernest B. Custer, filed July 25, 1934, Serial No. 736,897, an electrolytic cell is shown and described, and it is in and as a feature of the Jephson and Custer cell that this invention has been conceived and applied, and in such application it will be described.

The cell 1, conveniently formed of concrete, is of annular shape, and is arranged with its axis in vertical alignment, its outer wall 3 and its inner wall 4 rising from the bottom wall 5. The inner wall becomes indeed a post of concrete with an axial bore 6, rising from the botton wall 5 of the cell.

The anode consists of a body 7 of loose fragments of proper metallic material, ordinarily scrap iron or steel, retained by and between a metallic shield 70 (ordinarily a steel plate and preferably perforate) of cylindrical shape, and the outer wall 3 of the cell. The anode is so arranged that the electrolyte may circulate vertically downward through the permeable body of fragmentary material. To such end, the space between the shield 70 and the cell wall is open above (that the electrolyte overflowing the upper rim of the shield may gain access to the space), while below, the compound anode structure rests upon a castellated step 8, between the castellations of which the circulating electrolyte may have escape.

The cathode and anode, coaxially arranged, are rotatable one relatively to the other; and to such end the structure is conveniently specifically that shown. The cathode structure includes a shaft 13, adapted in the assembly to extend vertically within the bore 6 of the central post 4 of the cell, arms 14 extending radially from the shaft, a cylindrical shell 15 carried by the arms, and a reception band 16 carried by the shell. The reception band 16, of smaller diameter, is arranged concentrically within the shield 70 of the anode, and at an interval from it. In vertical extent these two parts stand immediately opposed, and in the operation of the cell the bath of electrolyte submerges them both. The shaft 13 in its rotation carries with it the integrally mounted reception band 16.

The shield 70 carries, projecting from its inner surface and into the space between it and the reception band 16 of the cathode, baffles, conveniently in the form of strips 71. These strips are formed of insulating material (conveniently of that phenolic resin known as bakelite), and they extend obliquely, inclined upwardly in the direction of rotation of the cathode. There are a plurality of them, advantageously a large number of them, sixteen or more, equally spaced around the cylindrical extent of the shield 70. So positioned, these strips have the effect of wing-dams, so that (the cell being filled with electrolyte to or slightly above the common level of the upper edges of the shield 70 and the reception band 16) as the cathode rotates and by rotation sets the electrolyte to circulating, the circulating stream is deflected upwardly, with the consequence and effect that while operation continues electrolyte in relatively spent and exhausted condition is constantly overflowing the upper rim of shield 70, streaming downward through the body of loose and fragmentary anode material, and passing from beneath the shield to flow in refreshed and renewed condition upwardly over the cathode surface. The arrows placed upon the drawing indicate the circulating currents described, set up within the body of electrolyte by the rotation of the cathode and in consequence of the baffles borne by the anode.

I claim as my invention:

1. In an electrolytic cell an anode and cathode provided severally with internal and external cylindrical faces arranged coaxially and with their cylindrical faces in vertically extending and opposed positions and spaced apart one from the other, one of the said members being rotatable relatively to the other, the anode including a permeable body of fragmentary material accessible to the electrolyte from above, the relatively stationary member being provided with baffles extending into the space between the said members and inclined vertically upward in the direction of such relative rotation.

2. In an electrolytic cell an anode and a cathode provided severally with internal and external cylindrical faces arranged coaxially and with their cylindrical faces in vertically extending and opposed positions and spaced apart one

from the other, the cathode being rotatable relatively to the anode, and the anode including a permeable body of fragmentary material accessible to the electrolyte from above, and the anode being provided with baffles extending from its cylindrical face into the space between the said members and inclined vertically upward in the direction of such relative rotation.

3. In an electrolytic installation, a cell, a vertically standing cylindrical shield arranged within the cell and spaced from the wall of the cell and adapted to form with the cell wall a receptacle for fragmentary anode material, the arrangement being permissive of the circulation of electrolyte over the upper edge and beneath the lower edge of the shield, and a rotating cathode arranged within the cell coaxially of and at an interval from said shield, the said shield being provided with baffles inclined upwardly in the direction of cathode rotation and extending into the interval at which the cathode is spaced from the shield.

4. In an electrolytic installation, a cell, a vertically standing cylindrical metallic shield arranged within the cell and spaced from the wall of the cell and adapted to form with the cell wall a receptacle for fragmentary anode material, the arrangement being permissive of electrolyte circulation over the upper edge and beneath the lower edge of the shield, and a rotating cathode arranged within the cell coaxially with respect to and at an interval from the inner face of said shield, the said shield being equipped upon its inner face with outstanding obliquely extending strips of insulating material, whereby, in response to cathode rotation, circulation will be set up in a body of electrolyte filling the cell, outwardly over the upper edge of the said shield and inwardly beneath the lower edge thereof.

ALLEN C. JEPHSON.