Sept. 12, 1944. B. MORRISON 2,358,244

APPARATUS FOR CLEANING THE SURFACE OF ANODES

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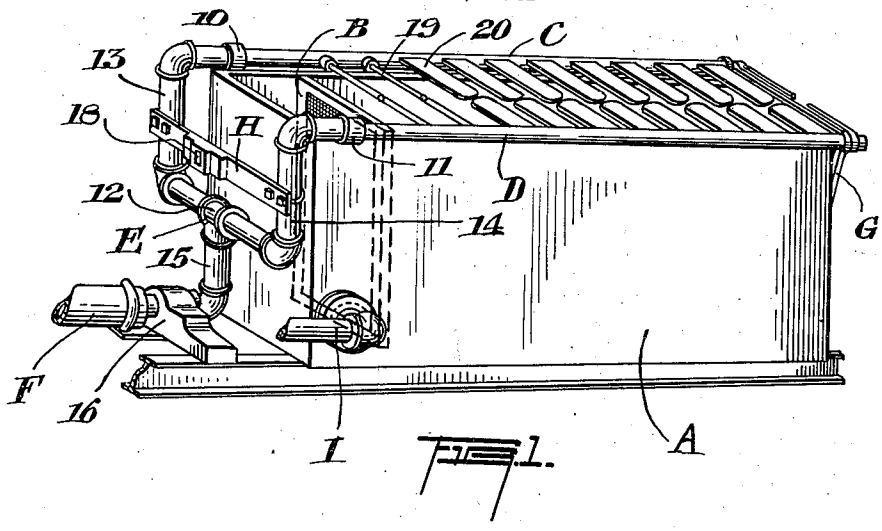


FIG. 1.

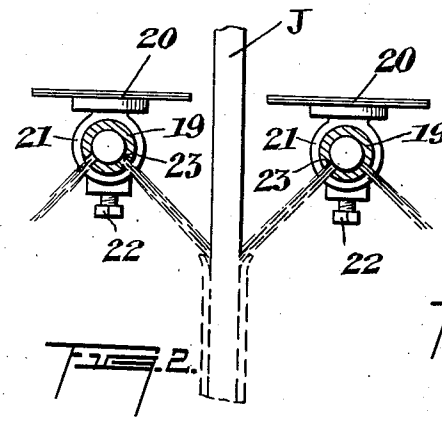


FIG. 2.

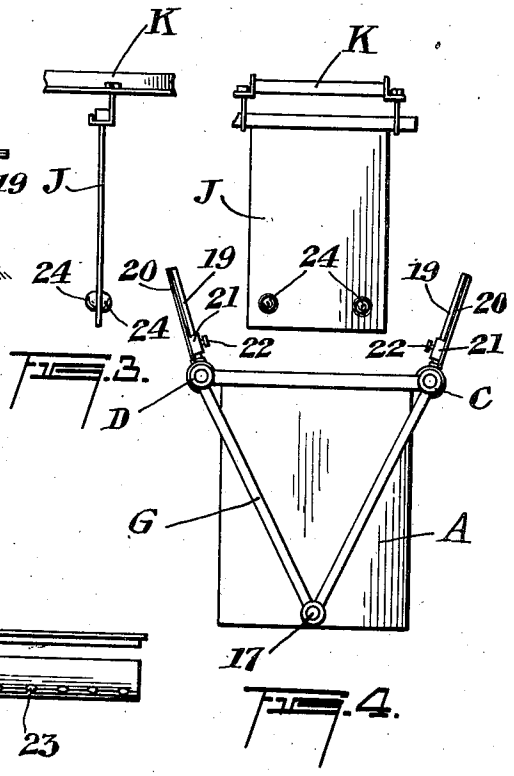


FIG. 3.

FIG. 4.

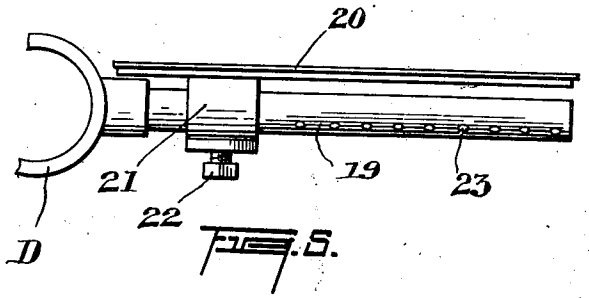


FIG. 5.

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APPARATUS FOR CLEANING THE SURFACE OF ANODES

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3 Claims. (Cl. 141—1)

This invention relates to improvements in apparatus for cleaning the surface of anodes, particularly anodes of the type used in the electrolytic recovery and refining of zinc, and the objects of the invention are to provide a simple and convenient apparatus by which foreign impurities may be removed from the surface of the anode without affecting the working surface of the anode.

It consists essentially of a tank adapted to receive the anodes and through which water is circulated and screened, and a series of pivotally mounted water jets from which jets of water may be directed on opposite sides of the surface of the anode after the anode has been soaked in the tank and during its withdrawal therefrom all as more fully set forth and described in the accompanying specification and drawing.

In the drawing—

Figure 1 is a perspective view of the apparatus.

Figure 2 is a detail in sectional elevation showing the way in which the jets are caused to play on the surface of the anodes.

Figure 3 is an end view showing the manner of supporting the anode on a suitable crane as it is being lowered into the tank.

Figure 4 is an elevation showing the end of the tank and the anode above the same.

Figure 5 is a detail elevation showing the construction of one of the jet arms.

In the drawing like characters of reference indicate corresponding parts in all the figures.

Referring to the drawing, A indicates the wash solution vat conveniently divided into two compartments, one much smaller than the other, by a screen B conveniently of twenty mesh. C and D indicate supply mains extending along the top of the sides of the vat A connected to suitable packing glands 10 and 11, which by a suitable pipe fitting assembly E are connected with a flexible supply hose F, the fitting including a T-coupling 12 uniting the branches 13 and 14 and having a pipe connection 15 leading to the hose through a bearing 16.

The extremity of the mains C and D remote from their connection with the hose F may be conveniently supported by a triangular framework G, the mains being mounted in the framework with freedom to turn and the framework itself being supported on a pivot pin 17 whereby the mains may be reciprocated slightly laterally if desired. In order to provide conveniently for causing reciprocation of the manifold system constituted by the mains C and D and the connections thereto a coupling bar H is provided suitably connected to the branches 13 and 14 and having a slot 18 adapted to receive a roller which is given a suitable movement to cause reciprocation in the manner well known in apparatus of this type.

Each of the mains C and D is fitted with a plurality of securely attached jet arms 19 provided with suitable spray covers 20. Each spray cover may be conveniently formed of flexible rubber and is secured in position on the jet arm 19 by a ring 21 connected to the spray covering 20 and held thereon by a set screw 22. Each jet arm is provided with jet orifices 23 at a suitable angle to produce the jets on the anode as indicated in Figure 2, each of the mains C and D being supported at one end by the packing glands 10 and 11 and at the other end, being mounted freely to turn in the framework G, may be turned on its axis so that the jet arms may be swung upwardly out of the way, as indicated in Figure 4, to permit the anode to be lowered into the tank.

The hose F is supplied with water from a suitable pump and the wash solution is returned from the tank to the pump through the return line I suitably connected to one side of the vat at the lower side thereof.

By the use of the apparatus described it is possible to remove impurities from the working surface of anodes without disturbing the working surface itself. The anodes used, for example in the recovery of zinc by electrolysis, are frequently formed of lead or alloyed lead which become coated with a film peculiar to their composition and which constitutes the working surface of the anode. Foreign material, such as gypsum and other material, tends to accumulate on this surface and it is desired to remove this without injury to the surface and film.

In operating the apparatus described the vat A is charged with hot water by injecting steam into a vat of cool water or otherwise, and the jet arms assembled on the mains C and D are turned up into the position shown in Figure 4. It has already been observed that the mains are free to turn by reason of the packing glands 10 and 11. If desired, operating levers for turning the mains may be attached to them at a convenient point.

The vat A having been filled with hot water, the anodes J whose surface is to be cleaned are carried by suitable crane assembly K and are lowered into the larger compartment of the vat A until the insulators 24, usually formed on the sides of the anode, are below the top of the vat A. A set of anodes from an electrolytic cell may be carried on the crane assembly and spaced

apart a distance to correspond with the distance between the jet arms 19. The jet arm assemblies are then brought back into working position, as shown in Figure 1. The anodes are then lowered into the vat of hot water and their surfaces are allowed to soak about five minutes in the vat. The anodes are then raised slowly while the pump is operated, causing the wash water to be drawn through the screen B and discharged from the jets against the surface of the anodes, as shown in Figure 2, the angle of incidence being an acute angle of substantially 45°. This action continues until the anodes have been lifted to a point where the insulators are up to the jet arms. During this action the foreign material is removed from the anode surface and swept into the vat, where it is prevented from circulating through the pump by the screen B and settles in the vat, whereby it is discharged on draining the vat at the end of the day. If necessary the anodes may be lowered and raised for more thorough cleaning. When the anodes are satisfactorily cleaned the jet arm assembly is turned up again and the anodes completely removed from the vat and returned to their respective places in the electrolytic cell. The apparatus is then ready to receive the next set of anodes to be cleaned.

By imparting a limited reciprocating motion to the supply mains C and D through the member H more complete scanning of the moving anode face may be achieved.

What I claim as my invention is:

1. Apparatus for washing anodes comprising a tank adapted to receive a number of anode plates and through which water may be circulated, a crane assembly having a plurality of supporting means adapted to suspend a plurality of anode plates in spaced relation and parallel to each other, a plurality of parallel spaced jet arms extending transversely across the upper portion of the tank between which the anodes are adapted to be lowered, each of the said jet arms having angular nozzles on each side whereby jets of water may be angularly directed on to both surfaces of each anode plate if it becomes exposed on being lifted vertically from the tank and supply mains extending along the top of the tank and connected to the jet arms.

2. An apparatus for washing anodes comprising a tank adapted to receive a number of anode plates, supply mains extending along the top of the sides of the tank, packing glands connected to the supply mains at one end, a pipe fitting assembly connected to the packing glands, a framework supporting the supply mains at the end remote from the packing glands, said framework being pivotally mounted whereby the mains may be reciprocated slightly and means for reciprocating the aforesaid pipe fitting assembly.

3. Apparatus of the character described comprising a tank adapted to receive a number of anode plates arranged vertically therein, a crane assembly adapted to be connected to each anode plate by which they may be raised and lowered into the tank, supply means extending along the top of the tank having packing glands thereon, a pipe fitting assembly connected to the packing glands, a flexible supply hose connected to the assembly, a framework supporting the pipe assembly with freedom to be reciprocated slightly laterally, a coupling bar connected through a suitable fitting with the mains by which they may be reciprocated, jet arms provided on the mains and a spray cover on the jet arms.

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