

No. 682,155.

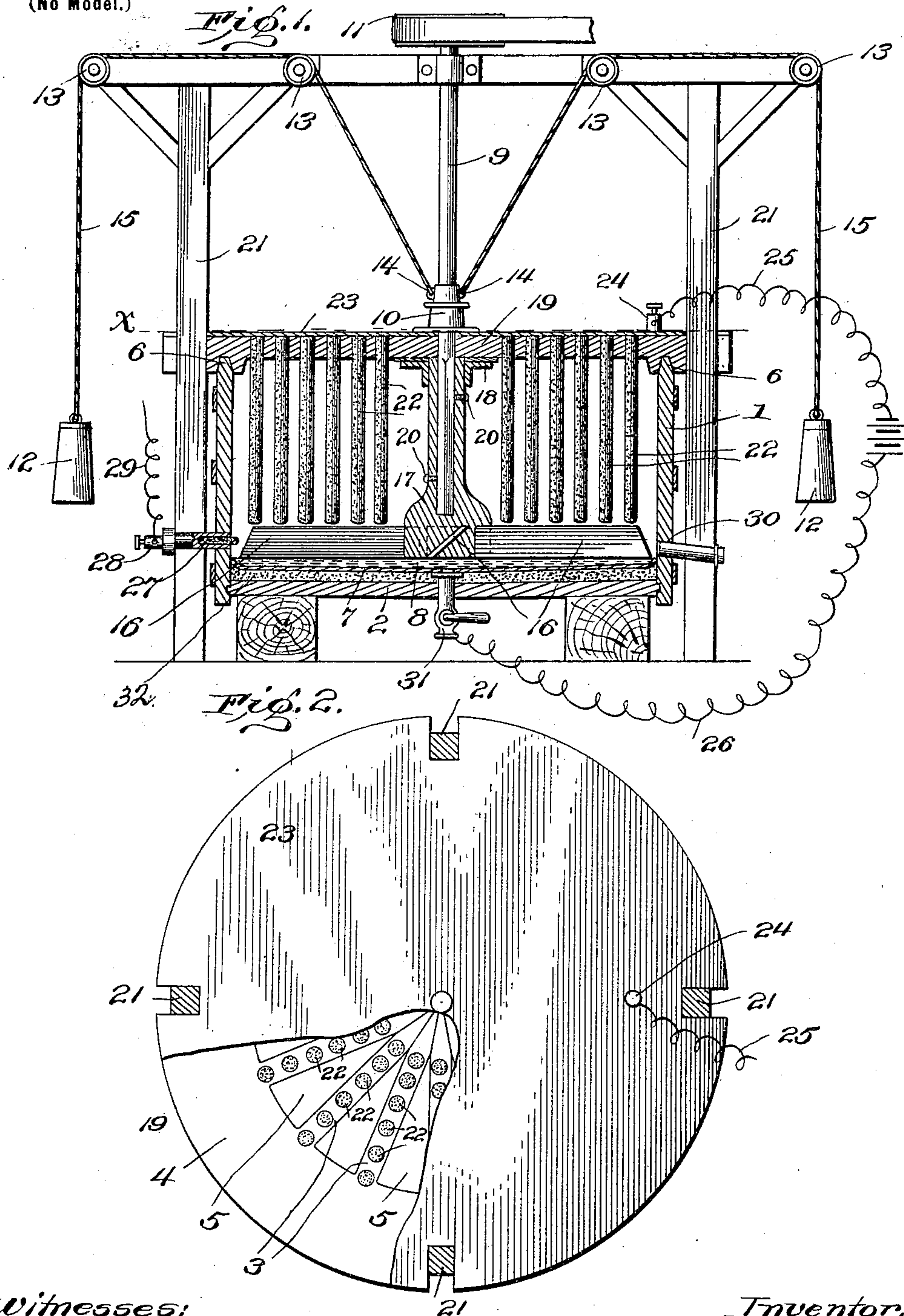
Patented Sept. 3, 1901.

C. P. TATRO & G. DELIUS.

ELECTROLYTIC APPARATUS FOR EXTRACTING PRECIOUS METALS.

(Application filed Jan. 15, 1901.)

(No Model.)



Witnesses:
Allan H. Foote.
David G. Wilson

Inventors
Charles P. Tatro
and George Delius

By H. B. Stevens. Atty.

UNITED STATES PATENT OFFICE.

CHARLES P. TATRO AND GEORGE DELIUS, OF SEATTLE, WASHINGTON.

ELECTROLYTIC APPARATUS FOR EXTRACTING PRECIOUS METALS.

SPECIFICATION forming part of Letters Patent No. 682,155, dated September 3, 1901.

Application filed January 15, 1901. Serial No. 43,334. (No model.)

To all whom it may concern:

Be it known that we, CHARLES P. TATRO, and GEORGE DELIUS, citizens of the United States, residing at Seattle, in the county of King and State of Washington, have invented a new and useful Improvement in Electrolytic Apparatus for Extracting Precious Metals; and we do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to electrolytic apparatus for extracting precious metals, and its object is to aid in the operation of the processes described in our former patents, Nos. 640,718 and 653,325, so as to simplify and minimize the labor, to render the results more positive, and to preserve the mechanism in working condition.

To this end our invention consists in apparatus for extracting precious metals hereinafter more fully described, and particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure I shows a central vertical section, partly in side elevation, of electrolytic apparatus according to our invention. Fig. II shows a horizontal section at the line x of Fig. I, partly in plan.

Numeral 1 represents a tub, and 2 its bottom, both of wood.

The lid 19 comprises the radial arms 3, rim 4, and segmental fillers 5, all of wood. The cover is grooved to fit closely the edge 6 of the tub, and yet it may be readily raised therefrom.

7 represents a shallow copper pan for containing mercury 8.

9 is the main shaft, usually of metal, hung vertically in the center of the tub to revolve freely in a bearing 10 in the cover and arranged to revolve in one direction by any usual means, such as a belt applied to the pulley 11.

12 represents weights connected by cords or chains 15, passing over pulleys 13, with the bearing 10 at 14 or with any convenient portion of the lid.

16 represents a series of wooden agitator-blades fixed spirally, like a screw-propeller, upon the wooden hub 17. This hub is vertically elongated to the full internal height of the tub and is provided with a broad col-

lar 18 beneath the lid 19. The lower portion of the main shaft 9 is square and is driven firmly into the hub 17 and is secured thereto by means of pins or screws 20 to revolve the hub and agitator-blades.

21 represents posts serving as guideways upon which the lid is fitted to slide freely up and down.

22 represents a series of carbons secured through and depending from the lid nearly to the annular path of the agitator-blades.

23 is a sheet of metal, preferably lead, fixed on top of the lid in contact with the carbons 22 and provided with a binding-post 24 to receive a wire 25 from one pole of a battery, thus forming the principal anode. The copper pan 7 is connected by a wire 26 with the other pole of the battery, forming, with the mercury 8, the cathode.

27 is an auxiliary or minor carbon anode having a binding-post 28 and a wire 29, which may be connected with the battery at will, but are kept permanently connected whenever there is solvent in the tub.

30 is an outlet for waste products, and 31 is an outlet for the amalgam resulting from the gathering of precious metals by the mercury.

The tub, even if it be of wood, should be covered outside and inside with a paint that is not affected by the acid and other solvents used, and it is well to further protect the bottom by a layer of cement 32, forming an inner bottom for the copper pan 7 to rest upon and to protect the wood of the bottom from wear in service.

The operation is as follows: A little force being applied to pull down on either of the weights 12 will raise the shaft 9, the lid 19, and the carbons 22 until the latter are out of the way above the level of the tub. Now the pulverized ore is to be immersed in the tub in a bath forming a suitable solvent—such, for example, as either of the baths described in our former patents, above referred to. Then the agitator is to be started to revolving while being slowly lowered into the tub. The agitator thus acts as a screw-propeller to work its way down into the heavy pulp, gradually loosening it, so that it may be set in motion. After the agitator reaches its normal level it is suspended there upon its bearing in the

lid and continues to revolve just above the mercury, thus freeing the precious metals from the lighter substance of the pulp, so that the said metals fall upon the mercury and become amalgamated with it. During this operation the electric current is to be turned on to the main anode and the cathode in order that the electrolytic action may assist in gathering the precious metals in the mercury. From time to time a little mercury may be drawn off at the outlet 31, and if it should be getting too stiff to run readily the amalgam may all be drawn off and more mercury be added by raising the lid a little. If the ore being worked is of a low grade, a number of tubfuls of pulp may be worked with a single supply of mercury. For this purpose the small anode 27 is permanently electrically connected in order that a light current may be always present to complete the circuit through the solution whenever the solvents are in the tub, and the lid and principal anodes attached to it are raised out of the solution, because that, in the absence of the electrical current, the solvents used would attack and corrode the copper pan and mercury, rendering them useless for further service. Removing the carbons of the principal anode and the agitator from the tub renders these parts as well as the interior of the tub accessible for the thorough cleaning required to keep the machine in good working order.

Having thus fully described our invention, what we believe to be new, and desire to secure by Letters Patent, is the following:

1. In apparatus for extracting precious metals, a tub; a metallic pan in the bottom

thereof; mercury in the pan; a lid for the tub; a series of carbons attached to and depending from the lid inside of the tub and connected together to form an anode; an agitator vertically journaled in the lid and having screw-propeller-shaped blades located to revolve below the said carbons; one or more balance-weights connected with the said lid; vertical guideways for the lid; and electric connections between the said carbons and one side of a battery and between the said pan and mercury and the other side of the battery, substantially as described.

2. In apparatus for extracting precious metals, a tub; mercury therein and electric connection between the mercury and a source of electricity whereby the mercury serves as a cathode; a lid for the tub and an anode depending from the lid into the tub; an agitator vertically journaled in the lid; means for raising the lid and its dependencies from the tub, and means for revolving the agitator while descending into and ascending out of the tub, substantially as described.

3. In apparatus for extracting precious metals, a tub; a mercurial cathode in the bottom thereof; a principal anode, means for lowering it into and raising it out of the tub, and a minor anode permanently in the tub, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES P. TATRO.
GEORGE DELIUS.

Witnesses:

L. B. STEDMAN,
I. B. MINOR.