No. 874,374. PATENTED DEC. 17, 1907.

W. MÜLLER & C. R. MURRAY.

APPARATUS FOR ELECTRODEPOSITING METALS.

APPLICATION FILED MAY 13, 1904.

3 SHEETS—SHEET 1

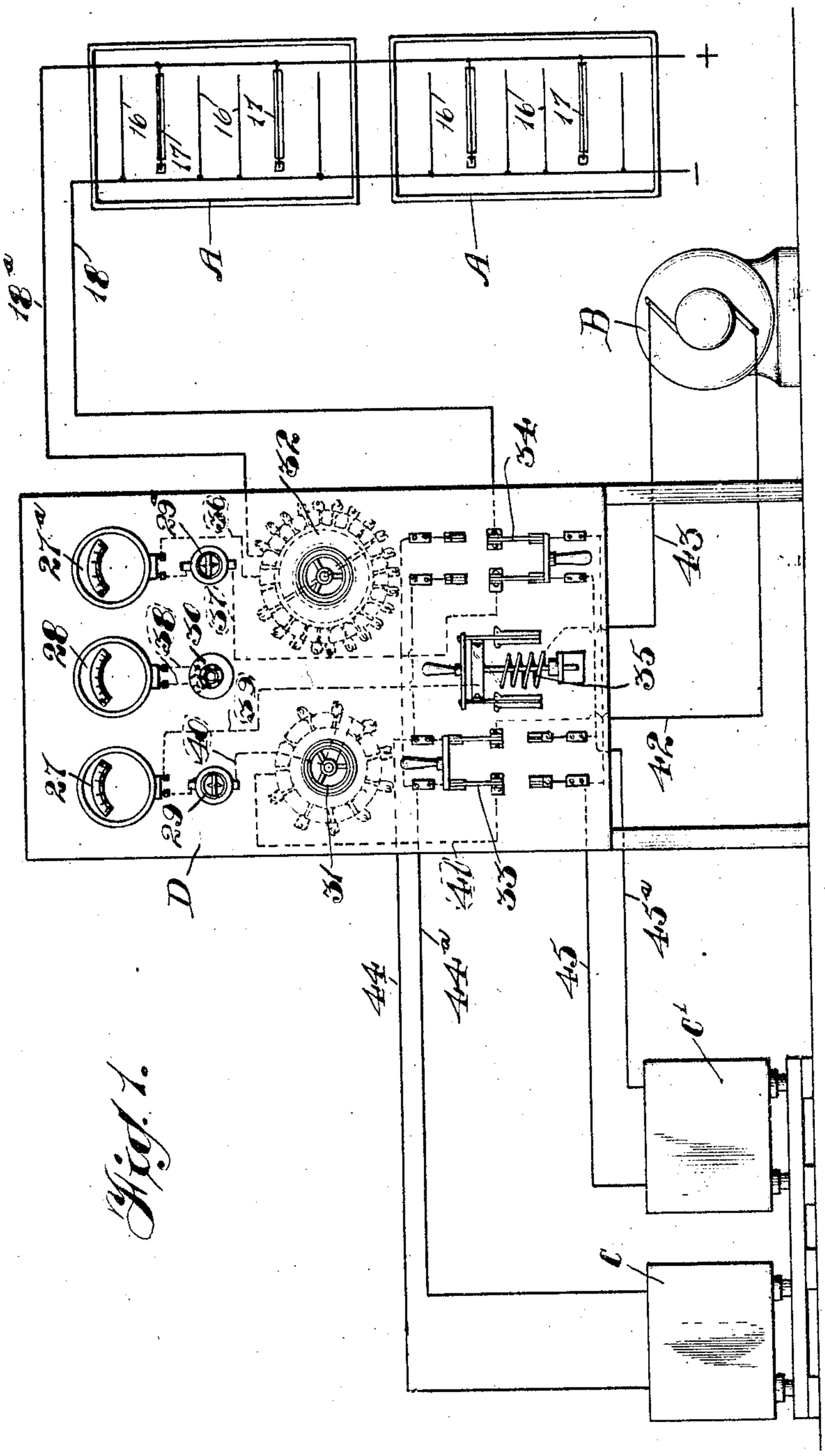

Fig. 1.

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3 SHEETS—SHEET 2.

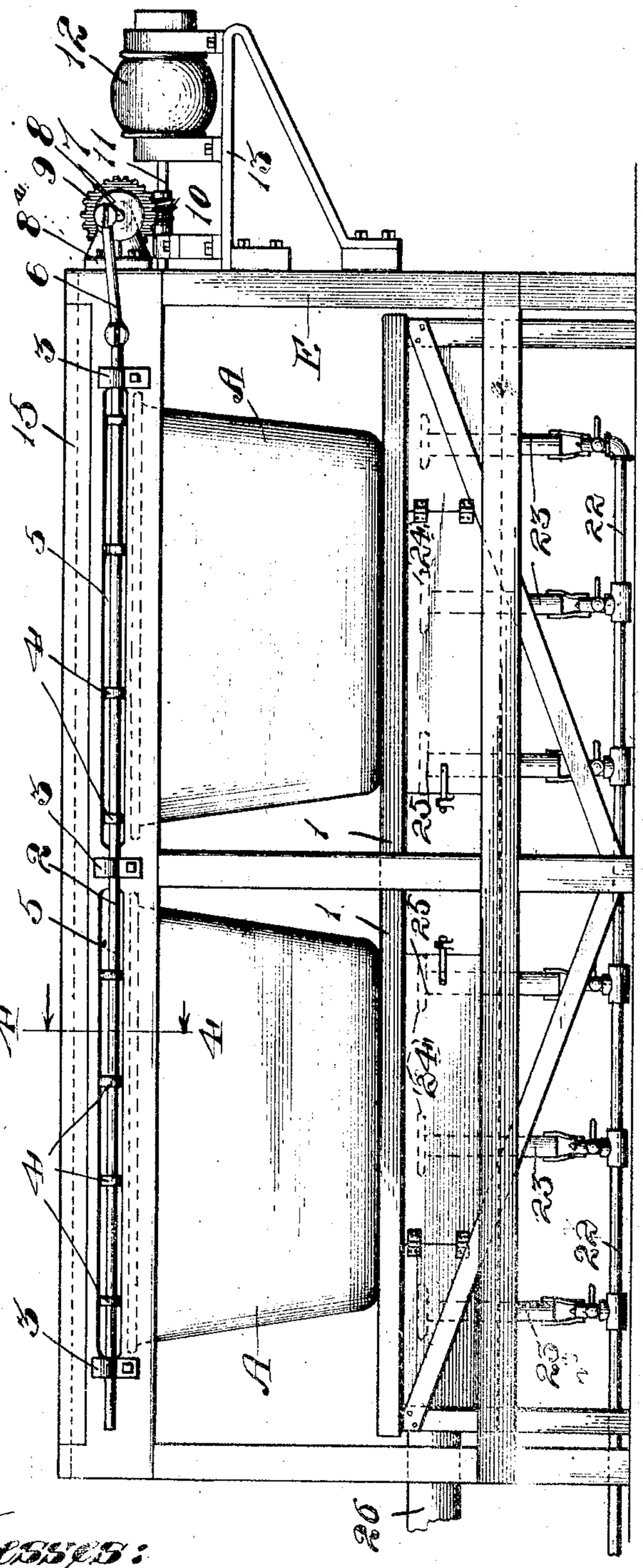

Fig. 2.

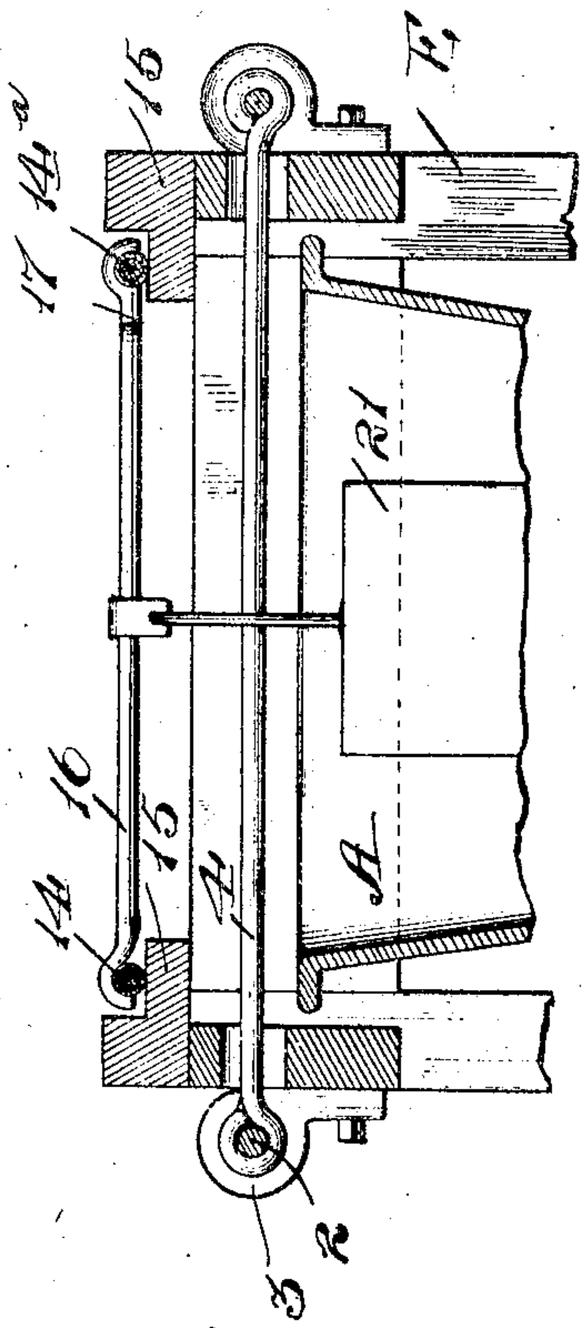

Fig. 4.

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3 SHEETS—SHEET 3

Fig. 3.

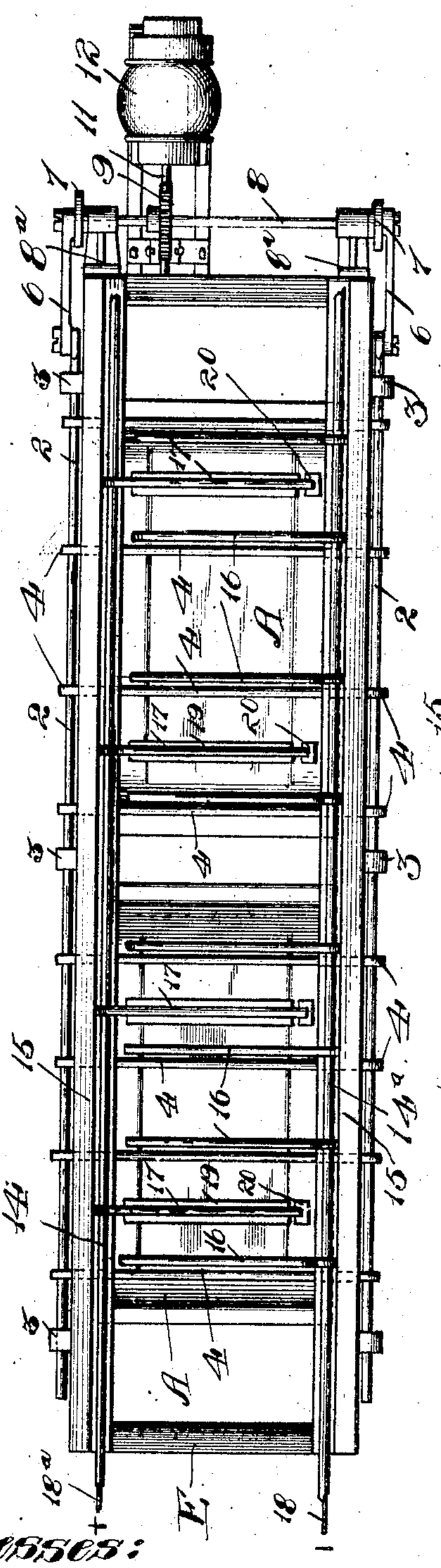

Fig. 4.

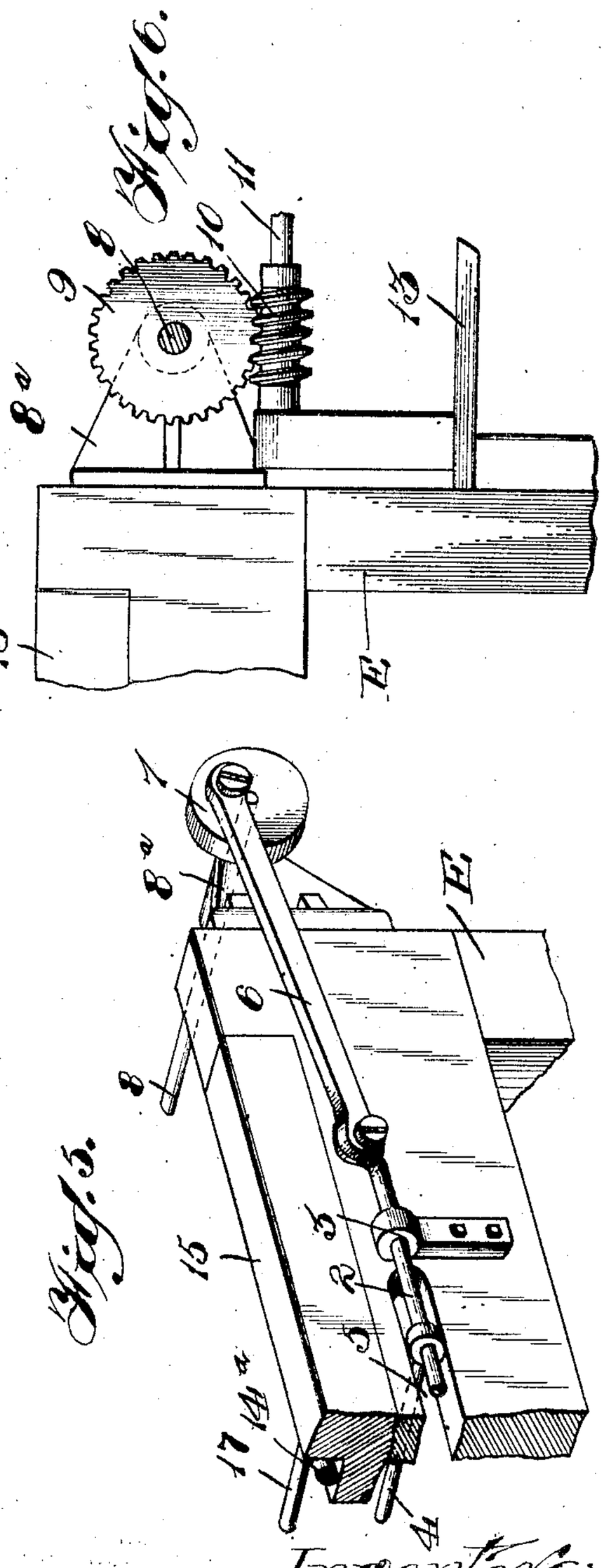

Fig. 5.

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UNITED STATES PATENT OFFICE.

WILHELM MÜLLER, OF OFFENBACH-ON-THE-MAIN, GERMANY, AND CHARLES R. MURRAY, OF CHICAGO, ILLINOIS, ASSIGNORS TO ACTIENGESELLSCHAFT FUR SCHRIFTGIESSEREI UND MACHINENBAU, OF OFFENBACH, GERMANY, A CORPORATION OF GERMANY.

APPARATUS FOR ELECTRODEPOSITING METALS.

No. 874,374. Specification of Letters Patent. Patented Dec. 17, 1907.

Application filed May 13, 1904. Serial No. 207,853.

To all whom it may concern:

Be it known that we, WILHELM MÜLLER, a subject of the Emperor of Germany, residing at Offenbach-on-the-Main, Hesse, Germany, and CHARLES R. MURRAY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Apparatus for Electrodepositing Metals; of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to apparatus for the electrodeposition of metals, and especially to an apparatus of this kind adapted for use in electrodepositing metals for type matrices.

The object of the invention is to provide a simple, practical, inexpensive and effective apparatus of this kind.

In the accompanying drawings, Figure 1 is a view partly in elevation and partly diagrammatic, of an apparatus of the class specified, embodying my invention; Fig. 2 is a side elevation of the tanks used in such apparatus; Fig. 3 is a top plan of the same; Fig. 4 is a section taken on line 4—4 in Fig. 2; and Figs. 5 and 6 are views of details of construction.

Referring first to Fig. 1, A, A are tanks in which the electrodeposition of the metal is to be carried on. B is a dynamo which is to supply the current. C, C′ are storage batteries which are to be charged by the dynamo B; and D is a switchboard for properly connecting the tanks A, A, the dynamo B and the storage batteries C, C′.

The construction of the tanks A, A is best shown in Figs. 2 and 3. These two tanks are mounted in suitable framework E, the tanks resting on suitably supported tables or platforms 1, 1. A pair of sliding rods 2, 2 are arranged on opposite sides of the frame E near the top thereof, and supported by bearings 3, 3, 3. Cross rods 4, 4 are secured to the rods 2, 2. Slots 5, 5, are provided in the sides of the frame E to accommodate the rods 4, 4. Eccentric rods 6, 6 are pivotally secured to the ends of the rods 2, 2 and are connected with eccentrics 7, 7 on a rotary shaft 8 supported in bearings 8^a, 8^a at the end of the frame E. The shaft 8 is provided with a worm gear 9 which gears with a worm 10 on a shaft 11 of an electric motor 12 which is supported by a bracket or support 13 secured to the frame E. The rods 4, 4 are metal rods covered with rubber covering. Metallic tubes or pipes 14, 14^a are extended lengthwise of the framework E as well shown in Fig. 4 and mounted on ledges 15, 15 provided for them. Cross supporting rods 16, 16 are secured to the tube 14 and extend over the tanks A, A but not quite to the opposite tube 14^a. Other supporting rods 17, 17 are secured to and extend from the tube 14^a nearly to the opposite side of the tanks. The supporting rods 16, 16 are substantially above the cross rods 4, 4. Electrical conductors 18, 18^a are led into the tubes 14, 14^a, and through the same, and are connected with the respective rods 16, 16 and 17, 17. The conductor 18^a is understood to be positive and the conductor 18 negative. The rods 17, 17 are then for the anodes and the rods 16, 16 for the cathodes. The rods 17, 17 support blocks 19, 19 of the metal to be electrodeposited. They are also shown provided with carbon blocks 20, 20′. The articles on which the deposit is to be made are suspended from the rods 16, 16 as at 21, Fig. 4.

A heating arrangement is located below the tanks A, A. The arrangement shown comprises a gas pipe 22 arranged lengthwise and at the bottom of the frame E. This pipe is provided with branch pipes 23, 23 having burners 24, 24 located below the tanks A, A. Doors 25, 25 are arranged immediately below the tanks, and an escape pipe 26 extends from one end of the space below the tanks.

The tanks thus set forth are operated by suspending the articles to be plated, on the rods 16, 16, and blocks or plates of metal, on the rods 17, 17. The current then passes from the rods 17, 17, and the anodes, to the cathodes and rods 16, 16 so as to perform the electrolytic deposition of the metal, it being understood that the tanks A, A are provided with suitable chemical solutions in accordance with the processes to be carried on. The motor 12 is operated, and in doing so, causes a reciprocal movement of the rods 2, 2 with the result that the cross rods 4, 4 move back and forth and push against the rods or wires supporting the articles 21 so as to swing

said articles slightly back and forth in the solution and thereby prevent the accumulation of bubbles.

Referring to Fig. 1 the switchboard D is understoood to be of suitable insulating material, and is provided with two ammeters 27, 27ª, and a voltmeter 28. Two indicators 29, 29ª for indicating the direction of current are located below the ammeters 27, 27ª. A voltmeter switch 30 is located below the voltmeter 28, a dynamo rheostat 31 is located below one of the indicators 29, and a tank rheostat 32 is located below the other indicator 29ª. Double pole switches 33, 34 are located below the rheostats 31 and 32, and the circuit breaker 35 is arranged between the switches 33 and 34. The conductor 18ª leading from the tanks A, A is connected with the rheostat 32, and the conductor 18 with one side of the switch 34. A conductor 36 connects the rheostat 32 with the ammeter 27ª, and another conductor 37 connects said ammeter with the other side of the switch 34 including also the indicator 29ª. The voltmeter 28 and voltmeter switch 30 are connected by conductors 38, 38. The ammeter 27 is connected with the circuit breaker 35 by a conductor 39, and with the indicator 29 and rheostat 31 by a conductor 40. The rheostat 31 is also connected with one side of the switch 33 by a conductor 41, and the other side of said switch is connected by a conductor 42 with the dynamo B, the other terminal or pole of which is connected with the circuit breaker 35 by a conductor 43. The storage battery C is connected with one pair of terminals of the switches 33, and 34, by conductors 44 and 44ª, and the other storage battery C′ is connected with another set of terminals for said switches, by conductors 45, 45ª. By such arrangement the two batteries C and C′ can either one be charged by the dynamo B, and either of the same can be used to carry on the electrodeposition of metal, and the proper indications will be made during such operations. The apparatus shown is set so that the battery C is being charged by the dynamo B, it being seen that the dynamo circuit runs by way of the conductor 42 to the switch 33, thence to the battery by conductor 44, and back by conductor 44ª to switch 33, conductor 41, rheostat 31, conductor 40, indicator 29, ammeter 27, conductor 39, circuit breaker 35, and conductor 43 to dynamo. Thus the amount of charging current is indicated by the ammeter 27, and the direction of the current by the indicator 29. The dynamo current is adjusted or varied as required by the rheostat 31. At the same time the electrodeposition is being carried on by the battery C′. The circuit is by way of conductor 45 to switch 34, thence to conductor 18, and back by way of conductor 18ª to rheostat 32, conductor 36, ammeter 27ª, indicator 29ª, conductor 37, switch 34, and conductor 45ª, to battery C′. The amount of current used in the electrodeposition is indicated by the ammeter 27ª, and its direction by the indicator 29ª. To discontinue charging the battery C the switch 33 is opened. To cause this battery to carry on the electrodeposition, said switch is closed with the other set of contacts. To discontinue the deposition by the battery C′, the switch 34 is opened; and to charge this battery by the dynamo B, said switch is thrown to close it with the upper set of contacts.

It will be seen that the apparatus is practical and efficient and can be easily operated and controlled. It will be understood that changes and modifications can be made without departing from the spirit of the invention.

What we claim is:—

The combination of a tank, a pair of slide rods running lengthwise of the tank, bearings on the side of the tank for said slide rods, a set of cross rods 4, 4 carried by said slide rods, the tank being provided with longitudinal slots 5, 5 for said cross rods, the latter being to support the articles to be plated, eccentric rods 6, 6 pivotally connected with the ends of the slide rods, a cross shaft 8 at the end of the tank provided with crank disks 7, 7 to which the eccentrics 6, 6, are connected, and means for rotating the shaft 8.

In witness whereof, I, said WILHELM MÜLLER hereunto subscribe my name, this 25th day of April, A. D. 1904.

WILHELM MÜLLER.

Witnesses:
JEAN GRUND,
CARL GRUND.

In witness whereof, I, said CHARLES R. MURRAY, hereunto subscribe my name this 29th day of February, A. D. 1904.

CHARLES R. MURRAY.

Witnesses:
EDWIN N. MCADAM,
HORACE W. TARBELL.