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PATENTED JULY 31, 1906.

R. C. TOTTEN.

APPARATUS FOR ELECTROPLATING CYLINDRICAL ARTICLES.

APPLICATION FILED JAN. 31, 1905. RENEWED JAN. 15, 1906.

2 SHEETS—SHEET 1.

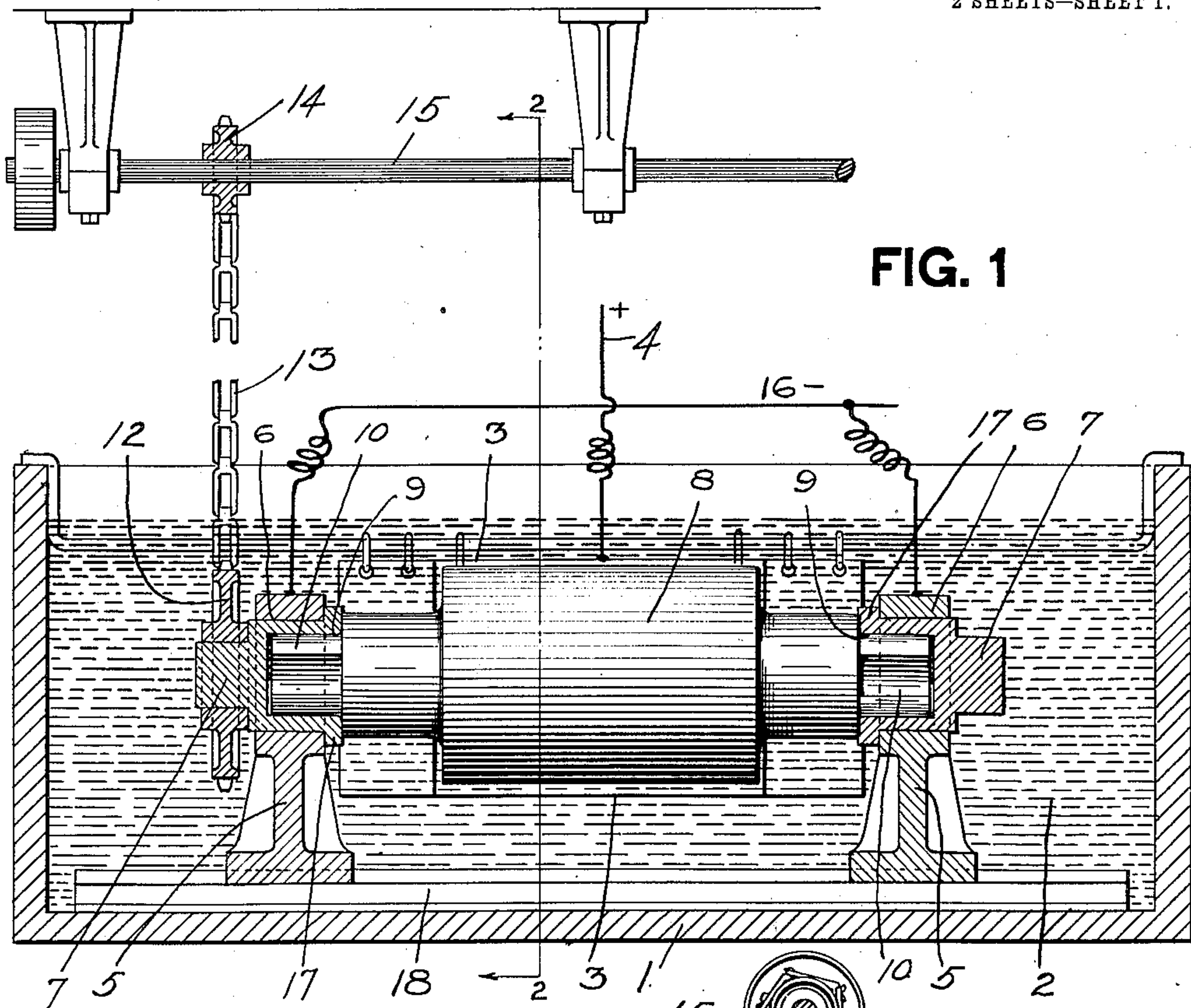


FIG. 1

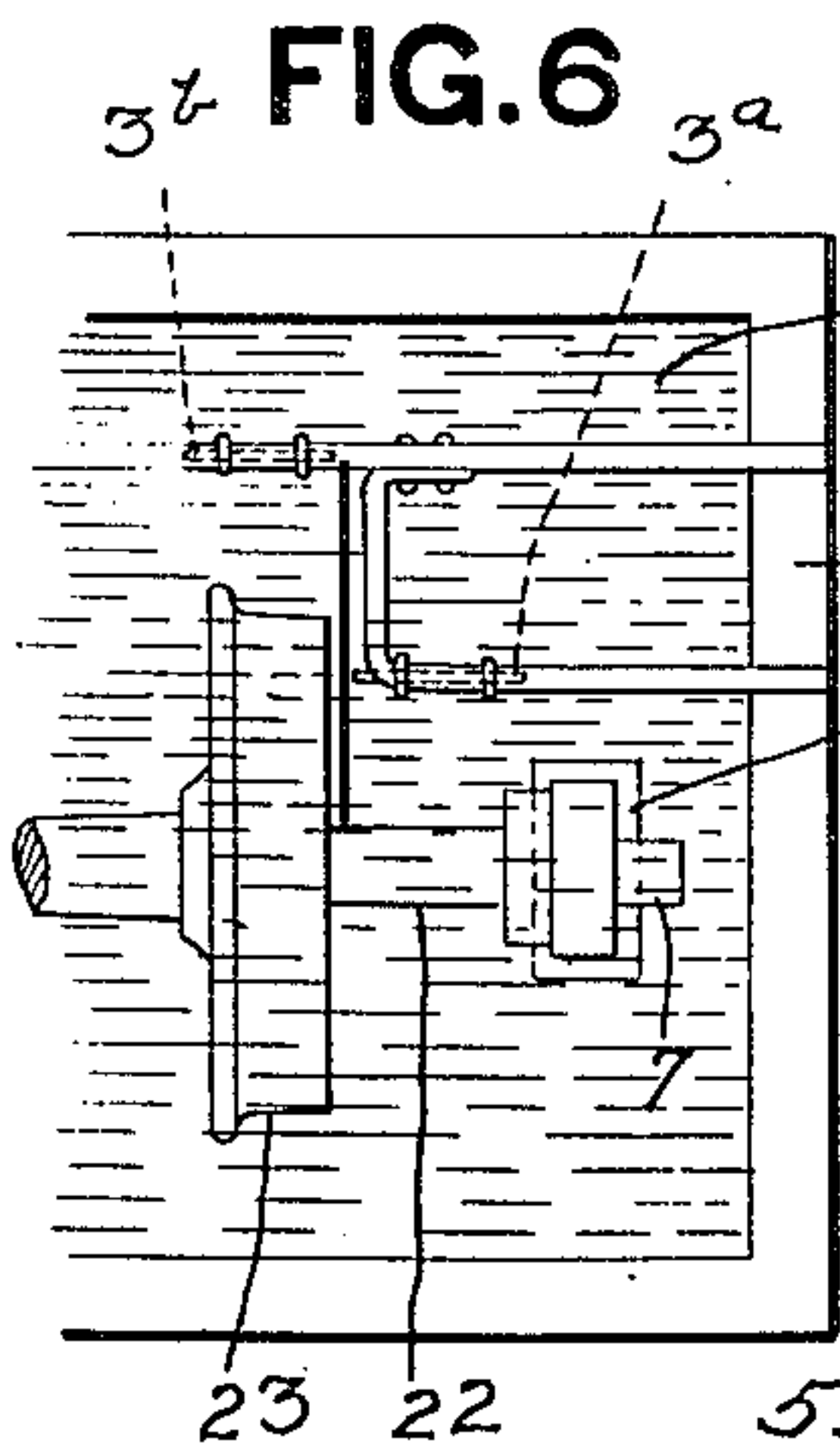
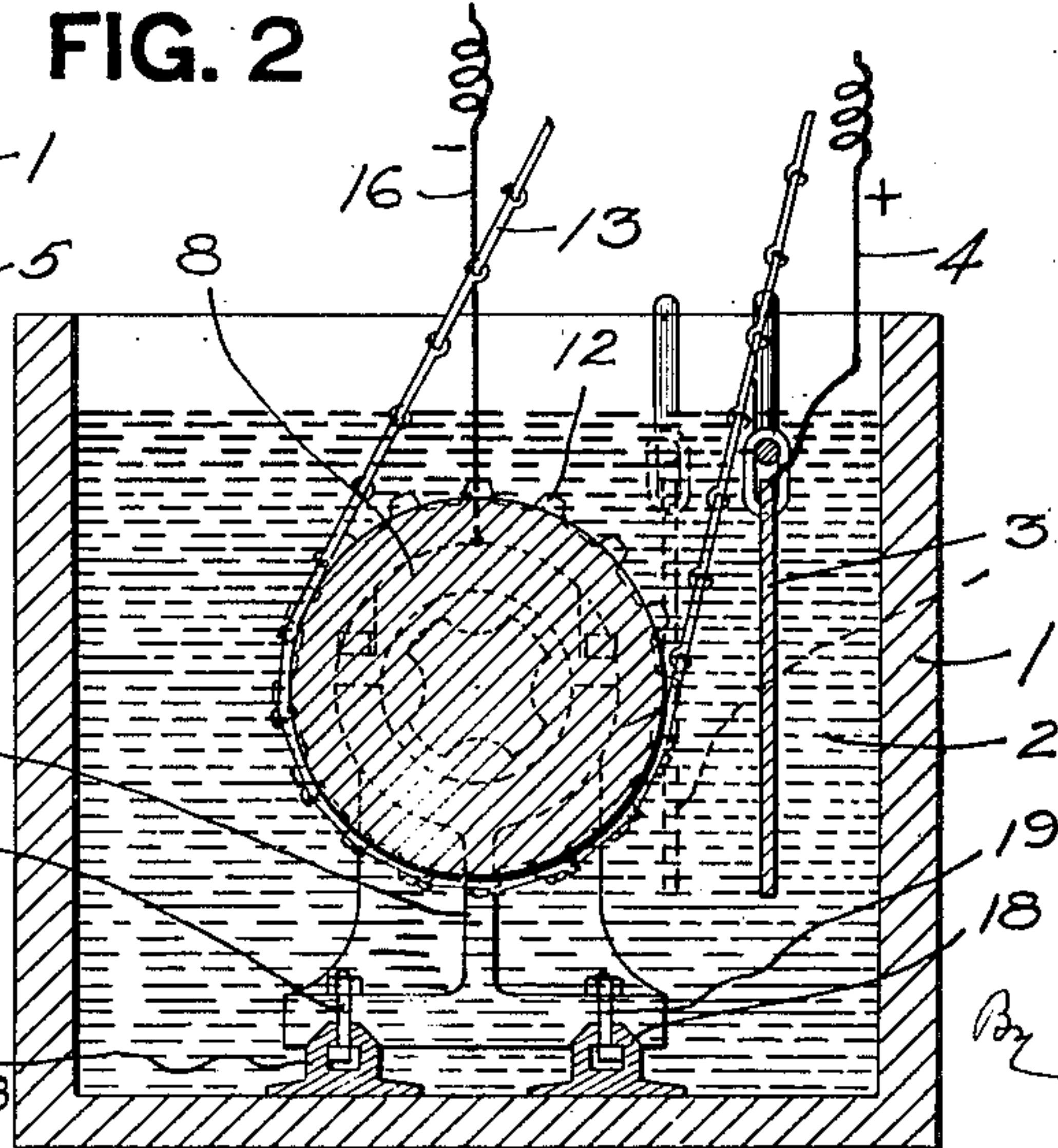


FIG. 2



WITNESSES.

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Gertrude Bremer

INVENTOR.

Robert C. Totten  
By Ray Totten & White  
attorneys



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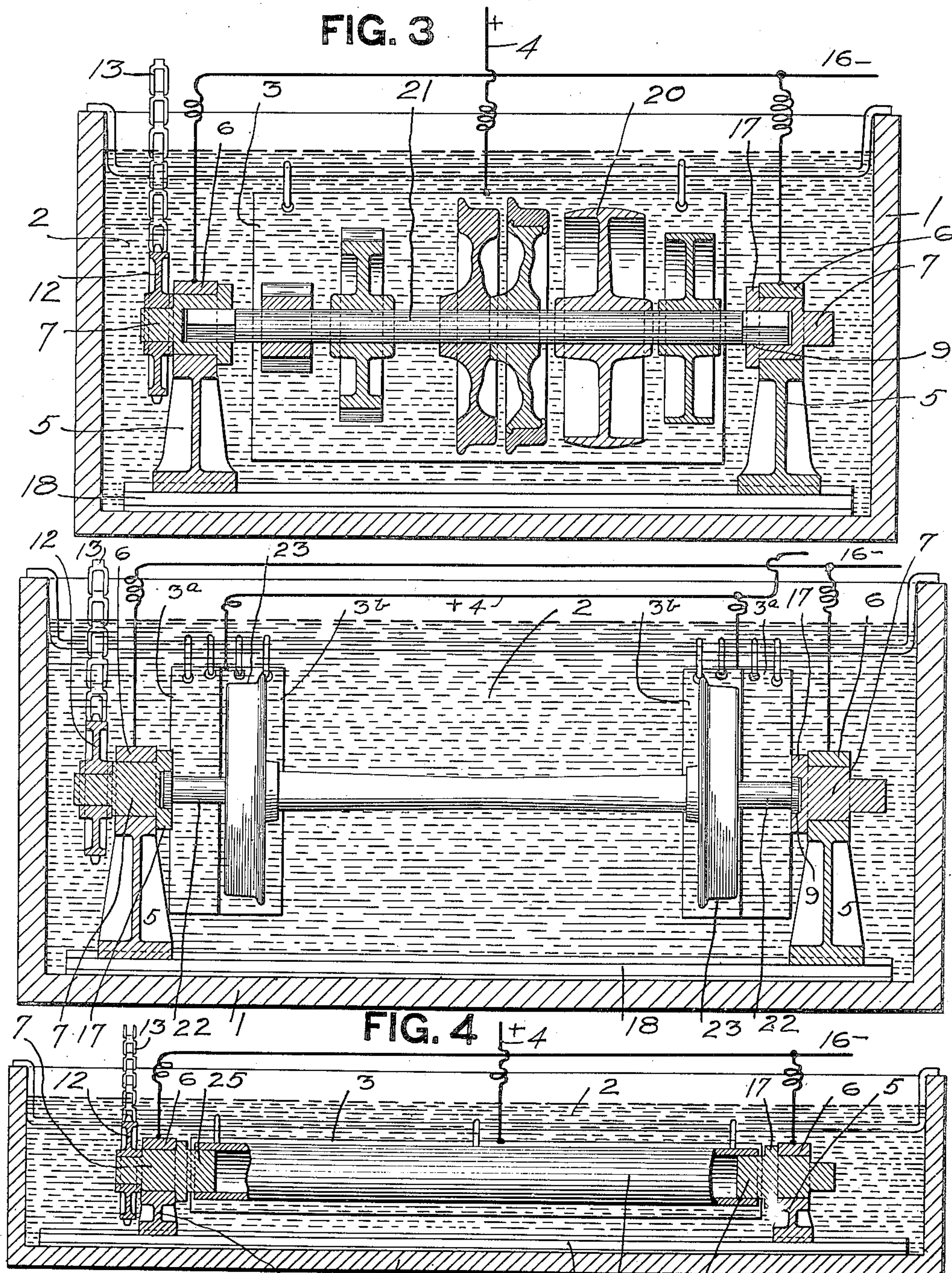
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WITNESSES.

*J. R. Keller*  
*Gertrude Kerner*

FIG. 5

INVENTOR.

*Robert C. Totten*  
*By Kay Totten & Winters*  
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# UNITED STATES PATENT OFFICE.

ROBERT C. TOTTEN, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO EVAN J. FRANCIS, OF NEW KENSINGTON, PENNSYLVANIA.

## APPARATUS FOR ELECTROPLATING CYLINDRICAL ARTICLES.

No. 827,478.

Specification of Letters Patent.

Patented July 31, 1906.

Application filed January 31, 1905. Renewed January 15, 1906. Serial No. 296,155.

*To all whom it may concern:*

Be it known that I, ROBERT C. TOTTEN, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Electroplating Cylindrical Articles; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to electroplating apparatus, and especially for apparatus for plating the surfaces of circular or cylindrical articles.

The object of my invention is to provide apparatus whereby a coating of even or uniform thickness can be formed upon the surface of the article.

Electroplating is done by immersing the article to be coated in a bath of the electroplating material, connecting said article to the negative terminal of the circuit, said article forming the cathode, and placing opposite to the article a metallic plate which forms the anode and which is connected to the positive terminal of the circuit. The current passes from the anode to the cathode, and thereby causes a deposit of the metallic ingredient of the bath on the surface of the article to be coated. This deposition takes place practically only in a straight line from the anode to the cathode, so that the portion of the surface of the article which faces the anode receives a thick coating or deposit, whereas other portions of the surface receive none or at least very little of the coating material.

Heretofore small articles have been plated by placing them in a rotating barrel, which causes them to roll or tumble, and thus present different faces toward the anode. The turning of the articles in the barrel, however, was haphazard and very irregular, so that it never was certain that all portions of the surfaces of the articles were exposed the same length of time toward the anode. The resultant coating therefore was very irregular in thickness. With larger objects the practice has been to hold them in the bath in one position for a certain length of time, then lift them out and partially turn the same, and again lower to position. In this manner the opposite sides of the article were presented toward the anode; but obviously not all portions of the periphery of the object were presented

equally in a right line toward the anode. The coating therefore was thick in some places and thinner at others, as it was uncertain where the deposit began after the article was returned to the bath.

The object of my invention is to provide electroplating apparatus whereby the foregoing difficulties are overcome.

It is designed especially for electroplating circular or cylindrical bodies—such as metal-working rolls, treads of car-wheels, tires, pulleys, wheels, journals, tubes, or other cylindrical or circular objects—and in which it is necessary or at least desirable to have a coating of uniform thickness around the entire periphery of the article.

The invention consists, generally stated, in providing a support for the article on which it rotates, together with means for rotating said articles slowly and uniformly, thus insuring the presentation on all points of the periphery of the article toward the anode for equal lengths of time.

The invention also consists in details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical longitudinal section through electroplating apparatus constructed according to my invention and showing the electroplating of a sheet-metal roll. Fig. 2 is a transverse vertical section through the same. Fig. 3 is a vertical longitudinal section showing the invention applied to the electroplating of pulleys, car-wheels, gear-wheels, and similar articles. Fig. 4 is a similar view showing the apparatus adapted for electroplating car wheels and axles. Fig. 5 is a similar view showing the invention applied to the electroplating of a tube, and Fig. 6 is a detail plan view of a portion of Fig. 4.

In the use of my apparatus I employ a suitable tank or vat 1, which may be of any desired shape, construction, or size and containing the usual electroplating-bath 2. In this vat will be suitably supported a metal plate or plates 3, forming the anode and connected to the positive terminal of the circuit 4. The article to be coated forms the cathode.

In the vat I provide suitable standards or frames 5, provided with bearings 6, in which are journaled the article-supporting members 7. The latter will be of various forms,



depending upon the article to be coated. In Fig. 1 they are shown for supporting a sheet-metal roll 8 and are provided on their facing ends with sockets 9 to receive the coupling ends 10 of the roll. Either one or both of the members 7 will be provided with means for rotating the same, the drawings showing one thereof so provided. Any suitable means or mechanism may be used for this purpose, the drawings showing a sprocket-wheel 12 connected to the supporting member and connected by a chain 13 to a similar wheel 14 on any suitable power-driven shaft, such as the counter-shaft 15. The negative terminal 16 of the circuit is connected to the bearings 6, so that the article 8 forms the cathode.

The supporting members 7 will be provided with suitable means for preventing endwise displacement thereof in the bearings 6, such as the collars 17, which bear against the inner faces of the bearings 6. To accommodate articles of various lengths, the standards 5 are adjustable toward and from each other, such as connecting them to the grooved base members 18 by means of headed bolts 19 in a manner which will be readily understood.

When the apparatus is to be used for coating pulleys, wheels, or other objects, such as shown in Fig. 3, the articles 20 will be placed upon the supporting-bar 21 and the latter will have its ends fitting in the sockets 9 of the rotating members 7, and said articles will be attached to the bar in any suitable way, so that they will rotate therewith.

In Fig. 4 the invention is shown applied to coating car-wheels on the axle. When so used, the ends of the axle will be seated in the sockets 9 of the rotating members 7 and will be held therein in any suitable way, so as to rotate therewith. A tight frictional fit is sufficient. When so applied, a coating will be formed on the journals 22 and 23 of the wheels and also upon the main body of the axle unless prevented by covering such portions of the latter as are not necessary to be coated.

In Fig. 5 the invention is shown applied for coating a tube 24. In this case the rotating members 7 are not provided with sockets, but with gudgeons 25, which project into the ends of the tube.

By various modifications the invention can be adapted for coating articles of any kind or description. The anode-plate 3 will be made of various sizes and shapes, depending upon the articles to be coated, or it may be made in the form of two or more plates, as shown in Fig. 4, so as to confine the deposit to those portions of the article opposite the plates.

The resistance of the bath is quite high, and the flow of current and corresponding deposit of the coating material is greatest at the points of the article which is nearest to the

anode. Hence for irregular articles the anode plate or plates should be shaped or arranged so as to be substantially equal distances from all parts of the article to be coated. This principle is illustrated in Fig. 6, in which the anode-plate is formed in two parts, the part 3<sup>a</sup> opposite the journal 22 of the car-axle and the part 3<sup>b</sup> opposite the tread 23 of the wheel. As a consequence the journals and wheel-treads will receive substantially equal deposits. A variation in the amounts of these deposits may be effected by varying the distances of the anodes 3<sup>a</sup> and 3<sup>b</sup> from their respective portions of the article to be coated. Instead of making the anode-plate in separate parts, as shown in Fig. 6, the same result can be accomplished by using a single plate shaped to conform substantially to the surface to be coated.

In the use of the apparatus the articles to be coated will be attached to the rotating supports 7 in such a manner as to turn with the latter. With rolls such as shown in Fig. 1 the socket in the member 7 will be made to correspond somewhat to the coupling member 10 of the roll. When coating articles such as shown in Figs. 3, 4, and 5, a tight frictional fit of the articles with the support will be sufficient, or, if desired, a wooden wedge or plug may be driven between the support and the article, this providing a sufficient connection to insure the article being rotated with the support. If it is desired to leave the necks of the roll shown in Fig. 1 uncoated, said necks may be journaled directly in the bearings 6 and the rotating mechanism 12 connected directly to the roll coupling member, thus dispensing with the rotating supporting members 7. The supporting-bar 21 (shown in Fig. 3) may likewise be mounted directly in the bearings 6 and have the sprocket-wheel 12 connected directly thereto.

In the use of my apparatus the bath and current will be applied in the usual way. During the application of the current the article or articles will be rotated slowly and uniformly or intermittently when desired, thus insuring the exposure of all portions of the periphery of the articles for equal lengths of time toward the anode and insuring the formation of a coating of uniform thickness on the articles.

What I claim is—

1. In electroplating apparatus, the combination with a tank, of oppositely-disposed bearings mounted in said tank and adjustable toward and from each other, members journaled in said bearings in such a manner as to be incapable of endwise movement and adapted to support the article therebetween, and means for rotating said members.

2. In electroplating apparatus, the combination with a tank, of bearings mounted therein, unconnected supports journaled in said bearings in such a manner as to be inca-



pable of endwise movement and provided on their facing ends with sockets for the attachment and support of the article, and means for rotating said supports.

5 3. In electroplating apparatus, the combination with a tank, of bearings mounted in said tank and being adjustable toward and from each other, unconnected supports journaled in said bearings in axial alinement and  
10 provided on their facing ends with sockets for the attachment and support of the article, and means for rotating said supports.

4. In electroplating apparatus, the combi-

nation of bearings, supports journaled in said bearings in axial alinement with each other 15 and provided with means on their facing ends for supporting the article, collars formed on said supports for preventing endwise displacement thereof, and rotating means connected to one of said supports. 20

In testimony whereof I, the said ROBERT C. TOTTEN, have hereunto set my hand.  
ROBERT C. TOTTEN.

Witnesses:

F. W. WINTER,  
J. R. KELLER.