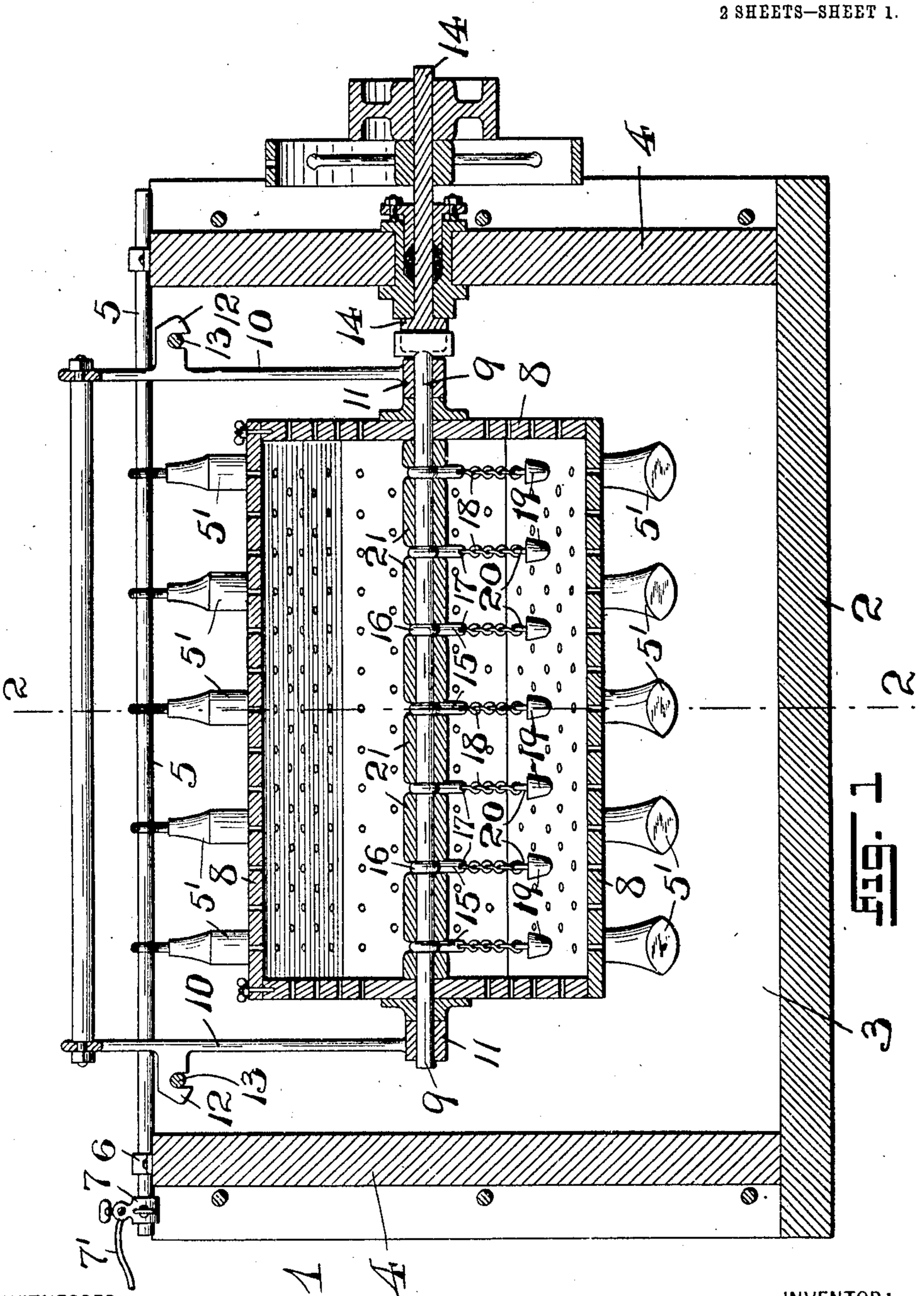
No. 888,068. PATENTED MAY 19, 1908.

J. T. DANIELS.

ELECTROPLATING APPARATUS.

APPLICATION FILED JULY 29, 1907.

2 SHEETS—SHEET 1.



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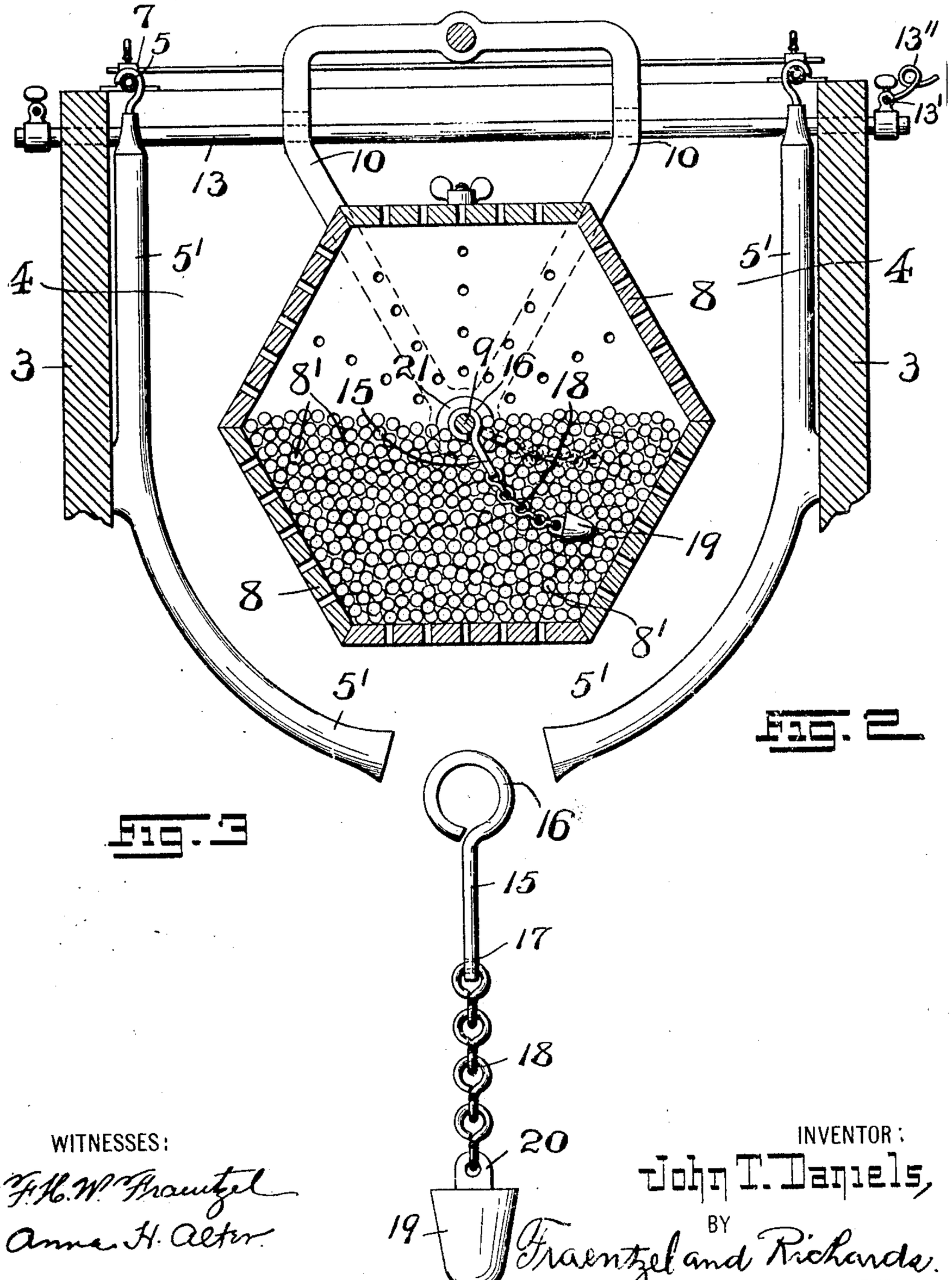


FIG. 2




FIG. 3

WITNESSES:

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BY

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# UNITED STATES PATENT OFFICE.

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## ELECTROPLATING APPARATUS.

No. 888,068. Specification of Letters Patent. Patented May 19, 1908.

Application filed July 29, 1907. Serial No. 385,988.

*To all whom it may concern:*

Be it known that I, JOHN T. DANIELS, citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Electroplating Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention relates, generally, to improvements in electroplating apparatus; and, the invention has reference, more particularly, to a novel contact or cathode-element for use with the revolving drum, cylinder or basket, known as the container, in which various small articles which are to be electroplated are placed.

In electroplating apparatus which are provided with revolving containers for the reception of such small articles, that a more perfect electrical contact may be made with the surfaces of such small articles, and at the same time to also stir up such small articles and cause them to change their positions with relation to one another, contact or cathode-elements, in the form of bars or rods, were loosely mounted upon the centrally disposed shaft or spindle of the container. The objection to these cathode-bars is that in view of the greater body-portion of each bar being rigid, and being loosely pivoted upon the shaft of the container, the rigid body-portions of said cathode-bars will lie directly upon the upper surface of the bulk of articles within the container, instead of readily entering between the said articles, thereby in many instances producing a very poor electrical contact.

It is the primary object of this invention to overcome this objection, and the principal object of my invention is to provide cathode elements, having such novel proportions, qualities and capacities, as to improve and increase their contact with said articles, thereby facilitating, economizing and improving their electroplating.

A further object of the present invention is to provide an electroplating apparatus of the general character hereinafter set forth which shall be of a simple and effective construction, and in which a positive and perfect electrical contact is made with the small articles which are to be plated. I attain this object by imparting to said cathode a flexible medial portion, and, preferably, also, at their free ends, a relatively rigid portion of such sufficiently greater relative weight as to insure its remaining, during rotation of the drum or container, within, and covered by the mass of said articles, such terminals therefore functioning analogously to sinkers.

By means of my novel construction is insured constant embedding of the cathodes within the mass of said articles, without undue friction therewith or resistance to revolution of the container and with superiority of contact as compared to previously employed rigid cathodes which, when rigidly secured near the axis of rotation develop undesirable friction and resistance, or, when loosely secured, tend to remain superimposed on the surface of said mass with comparative loss of desired contact.

The invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a longitudinal vertical section of one form of electroplating apparatus, and one form of revoluble container, drum or cylinder, mounted upon a shaft or spindle, said view illustrating in elevation, a number of flexible contacts or cathode-elements embodying the principles of this invention; Fig. 2 is a transverse section of details taken on line 2—2 in said Fig. 11, said view being made on an enlarged scale; and Fig. 3 is a side-elevation, on an enlarged scale, of one of the said cathode-elements.

Similar characters of reference are employed in all of the above described views, to indicate corresponding parts.

Referring now to the drawings, which illustrate one well known type of electroplating apparatus, such for instance as is described in U. S. Letters Patent No. 772,102 granted October 11, 1904 to Willis R. King, 1 is the tank, comprising base 2, sides 3 and ends 4. 5 is one of the two usual and similar anode bars from which the anodes 5′ are suspended on either side of the drum or container 8. These bars 5 are secured to the tank by fasteners, as 6, and are connected by means of the connector 7 with the wire 7′ which connects with the positive terminal of an electric generator.

The mass of articles 8′ is placed within

drum 8 which is rigidly mounted on shaft 9 rotatable in bearings 11 of removable suspension frame 10 having members 12 removably engaging with and supported by rods 13 secured to and extending across tank 1, and through connector 13′ and wire 13″ connected with the negative terminal of an electric generator. Shaft 9 is driven from a shaft member 14 by any convenient power, a separate connection between said shaft and member being made, in this instance, as per said Letters Patent to King.

My novel cathode members, or elements, are loosely and movably combined with and supported by shaft 9 from which they depend. They comprise, in this instance, a weight or sinker-portion 19, a coupling portion comprising ring, or eye, 16 loosely encircling shaft 9, and an intermediate flexible portion, in this instance a section of chain 18, the upper link of which is connected with an eye or hook-shaped part 17 of a stem or rod 15, thereby loosely connecting 15 with 19 as shown.

During the rotation of the drum, the articles to be electroplated are tumbled about within said drum, constantly exposing new surfaces, and making efficient contact with the weight or sinker-portion 19 of the cathode-member.

It will be understood that I do not confine myself to the particular form of construction of cathode element thus shown nor to its loose connection, my invention extending broadly to any flexible cathode used in combination with a drum or container, and also to any such flexible cathode comprising, near its free end, a portion of such weight and size, as to insure its remaining embedded within the body of the mass of articles within the drum during rotation. It will also be understood that my said cathodes may, with equal effectiveness, be supported by and upon a sleeve surrounding said shaft in cases in which the drum is separately rotated while the shaft is stationary.

From the foregoing description of my present invention it will be clearly evident, that while the rings or eyes 16 of the short members 15 are freely disposed upon the shaft or spindle 9, it will be noticed that each body or weight 19, owing to its flexible connection with the end of the member 15, will readily embed itself between the small articles within the container, thereby pulling the member 15 and the chain into and through the pile of articles, and thus insuring a positive and perfect contact at various points with the small articles, while the container is being revolved, and resulting in more effectively depositing the metal from the anodes upon the said small articles of manufacture.

I claim:

1. In an electroplating apparatus a tank adapted to contain an electroplating solution, a rotatable container, means to support said container in said tank, means to rotate said container, an anode, means to support said anode within said tank, a cathode element comprising a flexible portion and, at its free end, a part heavier than said portion, and means to support said cathode within said container.

2. In an electroplating apparatus a tank adapted to contain an electroplating solution, a rotatable container, means to support said container in said tank, means to rotate said container, an anode, means to support said anode within said tank, a cathode element comprising a flexible portion and, at its free end, a part heavier than said portion, and means to loosely support said cathode within said container.

3. In an electroplating apparatus, a tank or vat adapted to contain an electroplating solution, a container in said tank, a shaft upon which said container is mounted, and cathode-elements, each element comprising a short member provided with an eye loosely arranged upon said shaft, a heavy body-member, and a flexible connection between said body-member and said short member, substantially as and for the purposes set forth.

4. In an electroplating apparatus, a tank or vat adapted to contain an electro-plating solution, a container in said tank, a shaft upon which said container is mounted, and cathode-elements, each element comprising a rigid short member provided at one end with an eye loosely arranged upon said shaft, said short member being provided at its opposite end with a flexible chain, and a weight secured to said chain, substantially as and for the purposes set forth.

5. In an electroplating apparatus, a cathode element comprising at its free end a sinker connected therewith by a chain.

6. In an electroplating apparatus, a cathode-element comprising a heavy body-member, an eye-shaped member adapted to be arranged upon a shaft, and a flexible chain arranged between and connected at its respective ends with said two members.

7. In an electroplating apparatus, a cathode-element comprising a short rigid member provided at one end with an eye for the arrangement thereof upon a shaft, a heavy body-member, and a flexible connection between said two members, substantially as and for the purposes set forth.

8. In an electroplating apparatus, a cathode-element comprising a short rigid member provided at one end with an eye for the arrangement thereof upon a shaft, a heavy body-member, and a flexible chain arranged between and connected at its respective ends with said two members.

9. In an electroplating apparatus, a cathode-element comprising a short rigid mem-

ber provided at one end with an eye for the arrangement thereof upon a shaft, said rigid member being provided at its opposite end with a hole, a flexible connection having one end extending through said hole and secured to the end of said rigid member, and a heavy body-member provided with a perforated lug with which the other end of said flexible connection is connected, substantially as and for the purposes set forth.

10. In an electroplating apparatus, a cathode-element comprising a short rigid member provided at one end with an eye for the arrangement thereof upon a shaft, said rigid member being provided at its opposite end with a hole, a chain having its one free end-link loosely arranged in the hole in said end of the rigid member, and a heavy body-member provided with a perforated lug with which the other free end-link of the chain is loosely connected, substantially as and for the purposes set forth.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 27th day of July, 1907.

JOHN T. DANIELS.

Witnesses:
G. L. FELDMAN,
B. F. PIERSON.