No. 799,861. PATENTED SEPT. 19, 1905.

G. L. MEAKER.

ELECTROLYTIC APPARATUS.

APPLICATION FILED FEB. 1, 1905.

4 SHEETS—SHEET 1.

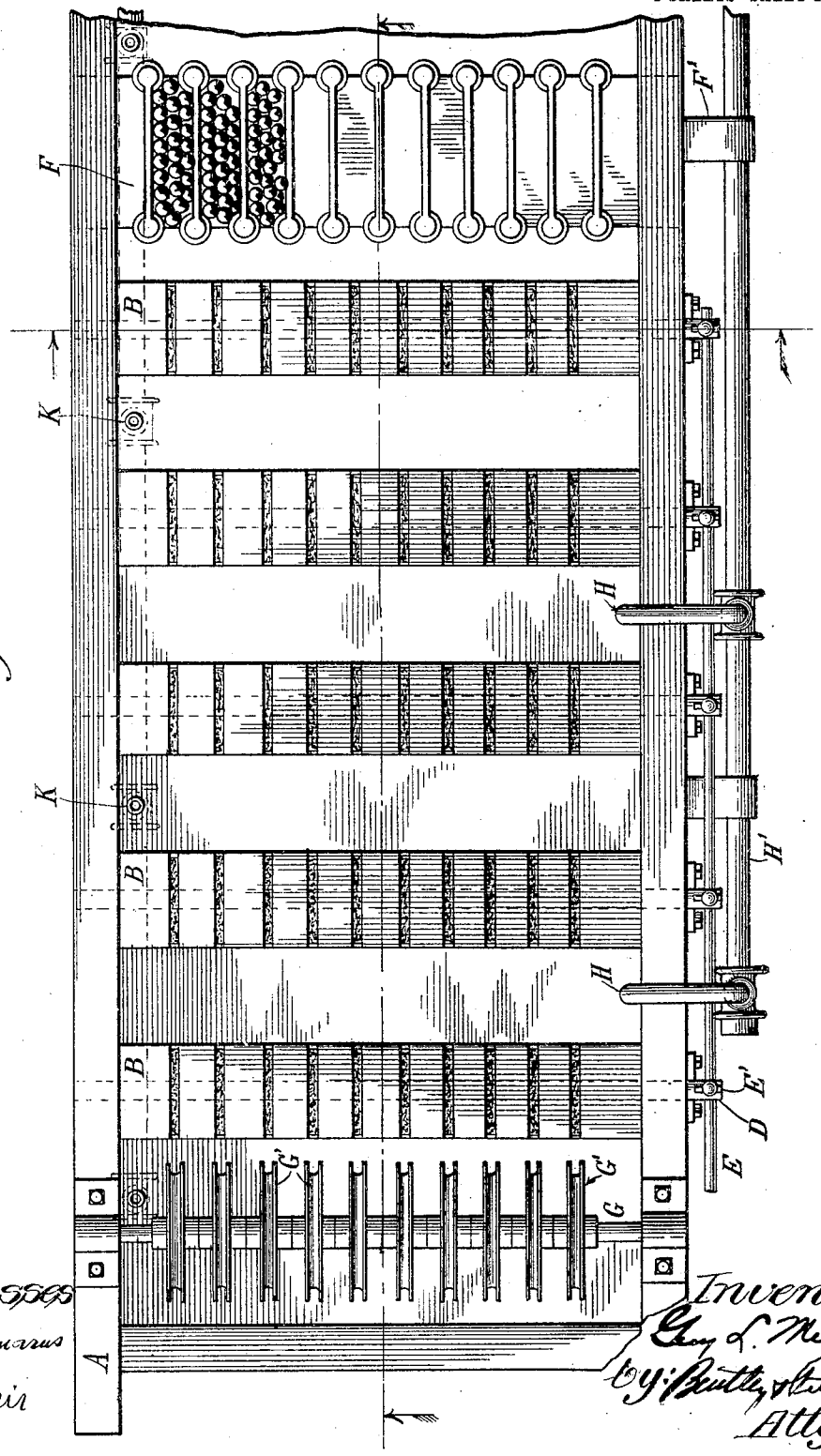


Fig. 1

Witnesses
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ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

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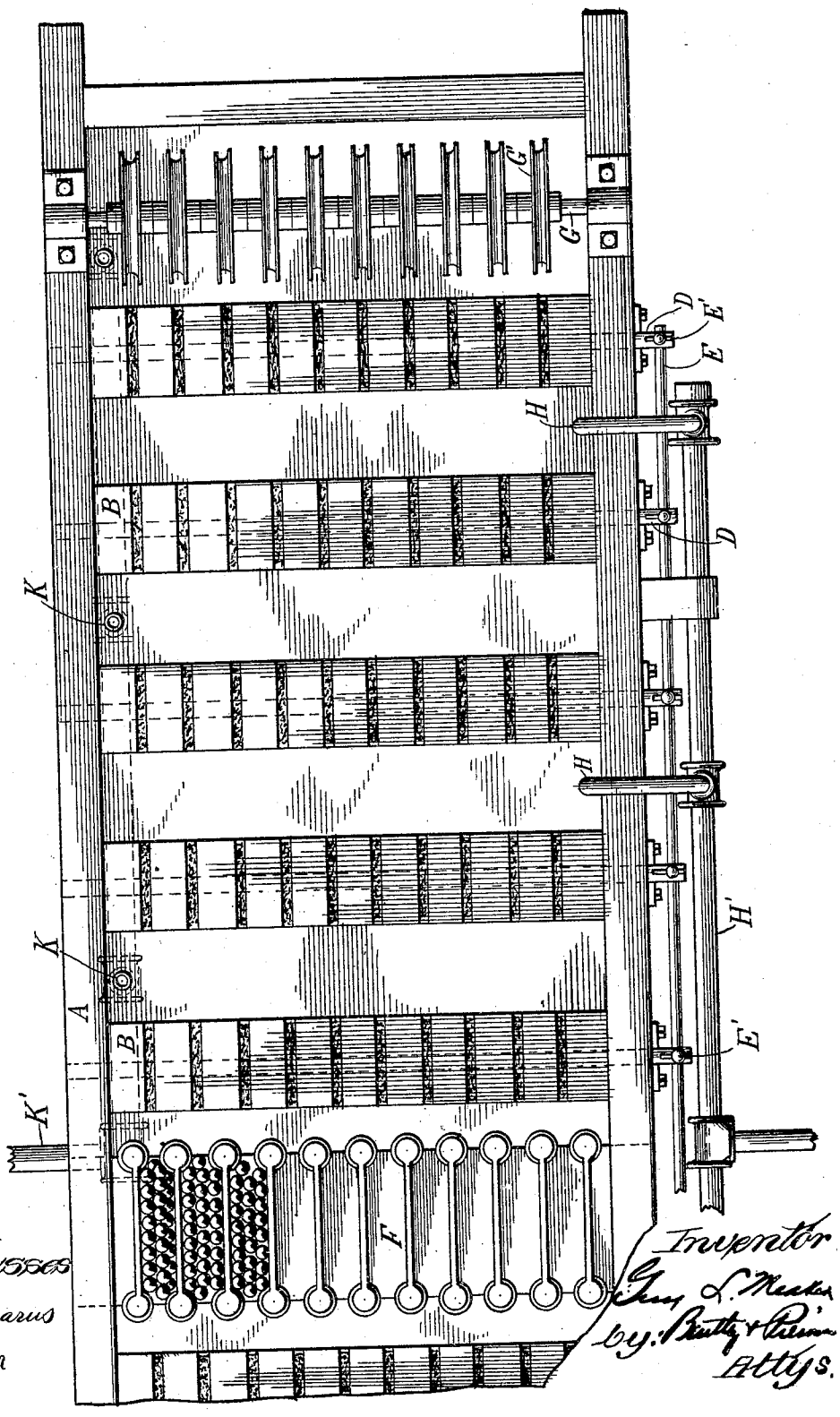


Fig. 2.

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4 SHEETS—SHEET 3.

Fig. 3

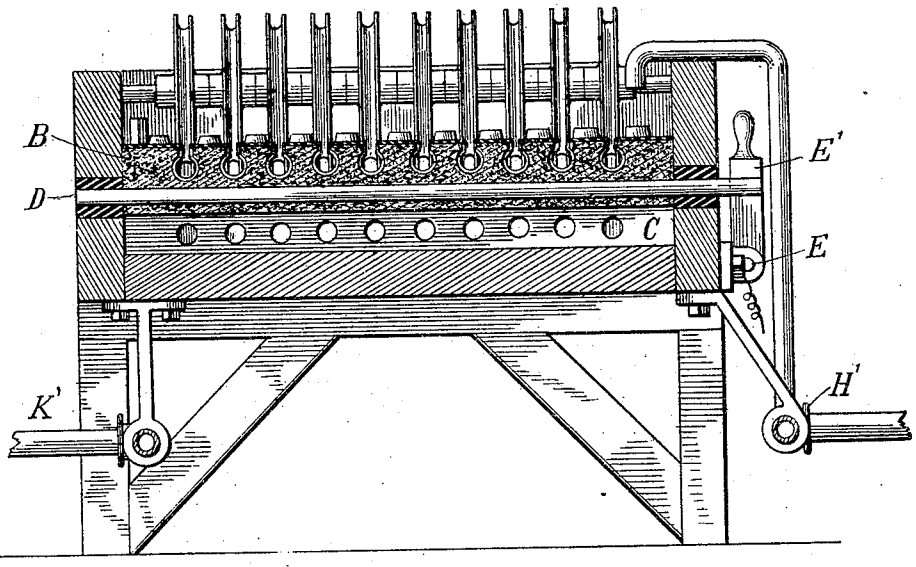


Fig. 4

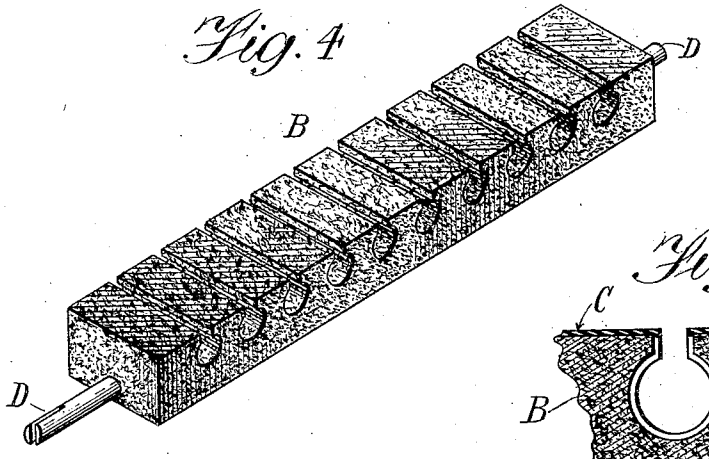


Fig. 5

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No. 799,861. PATENTED SEPT. 19, 1905.

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ELECTROLYTIC APPARATUS.

APPLICATION FILED FEB. 1, 1905.

4 SHEETS—SHEET 4.

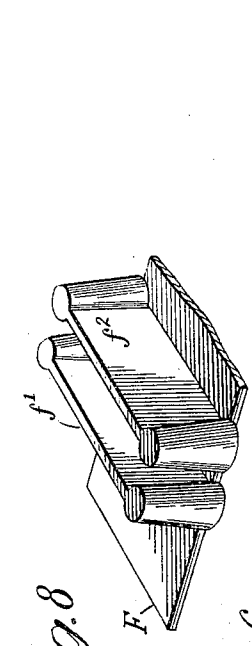


Fig. 8

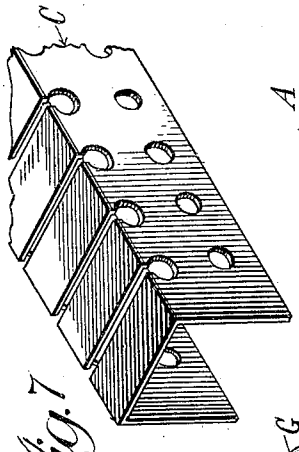


Fig. 7

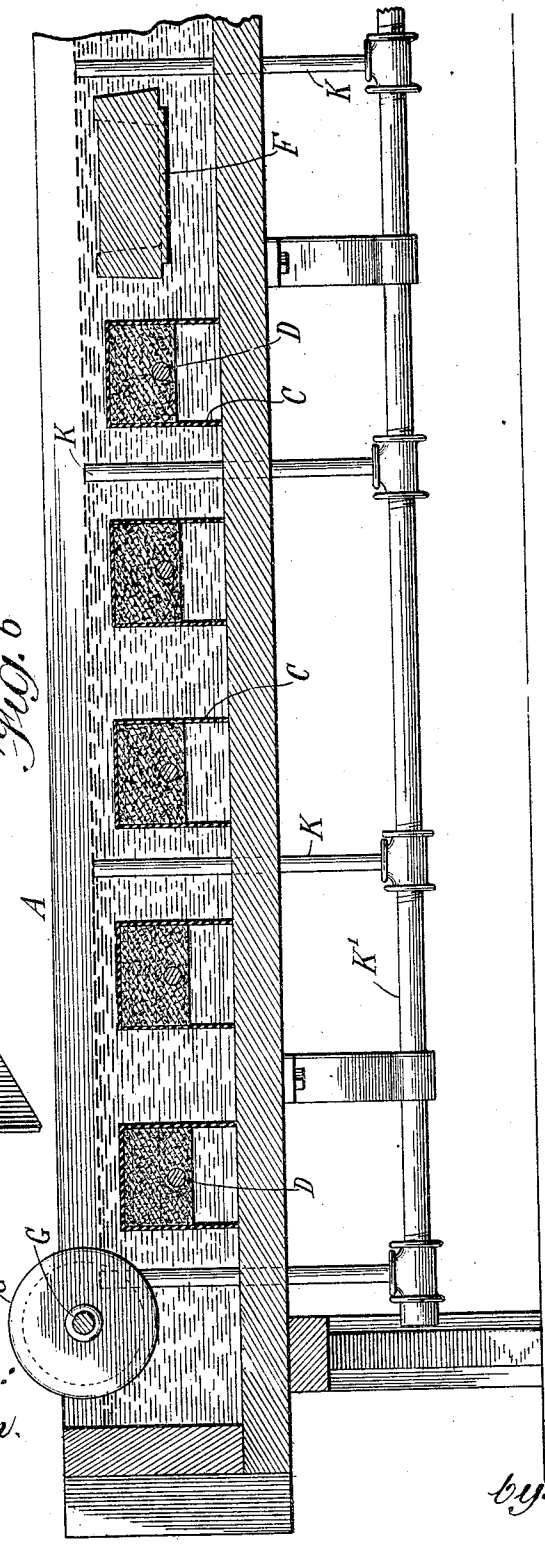


Fig. 6

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Inventor:
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by: Bartley & Pierce
Atty's.

UNITED STATES PATENT OFFICE.

GUY L. MEAKER, OF EVANSTON, ILLINOIS, ASSIGNOR TO THE AMERICAN STEEL & WIRE COMPANY OF NEW JERSEY, A CORPORATION OF NEW JERSEY.

ELECTROLYTIC APPARATUS.

No. 799,861. Specification of Letters Patent. Patented Sept. 19, 1905.

Application filed February 1, 1905. Serial No. 243,600.

To all whom it may concern:

Be it known that I, GUY L. MEAKER, a citizen of the United States, residing at Evanston, county of Cook, State of Illinois, have invented certain new and useful Improvements in Electrolytic Apparatus, which is described in the following specification, while the accompanying drawings disclose as an illustration one form of apparatus suitable for putting into practice the principles of my invention.

In the drawings, Figure 1 is a plan of one end of my apparatus. Fig. 2 is a plan of the opposite end. Fig. 3 is a transverse section. Figs. 4 and 5 are detail views of the anode. Fig. 6 is a longitudinal vertical section. Fig. 7 shows the insulating-case for the anode. Fig. 8 shows the holder for the contact-balls.

My invention relates to apparatus for electrically coating wire with a metallic deposit, being particularly designed for coating a wire with zinc according to the process described in a copending application of mine. In the practical use of apparatus of this kind it is highly important that the wires be capable of application to the bath from its upper side without the need of threading the wire through perforations or under cross-braces or other obstructions, and one feature of my invention is to provide an apparatus in which the wires can be merely laid in place from above, both the anodes and the cathode-contacts being slotted or opened upwardly to receive the wire. I also have devised a contact for the wire comprising a receptacle containing a series of loose balls, among which the wire may be readily placed, and, while making a good contact with the wire, the balls will yield to allow a joint in the wire to freely pass through without breaking the electrical connection. I have provided, moreover, a cap or casing of insulating material for each anode and cause it also to guide the wire so as to prevent short-circuiting by its coming into contact with the anode.

Other features will appear as this description is continued.

Referring to Fig. 1, A represents one end of a tank which may be about one hundred feet in length, the fraction thereof shown in the figure serving to illustrate the entire construction. It is shown as arranged for ten wires, running parallel to one another through the entire length of the tank. This will require a tank width of about thirty-four inches, while it is about twelve inches in depth. These dimensions and others which follow may be varied as required; but they serve to indicate the general character of the apparatus as regards size. At short intervals along the tank are placed the anode-sections B, which are about six inches wide, four inches deep, and equal in length to the width of the tank. The anode is of hard graphitic carbon and is formed, as shown in Fig. 4, with a series of circular perforations or channels extending transversely through the anode, and each perforation is provided with a slot extending to the upper surface of the device. It being remembered that a cathode-wire is to travel through each perforation, it will be manifest that the wire will not have to be threaded through the perforation, but may be dropped into it through the slot from the upper side, and when a wire is to be placed in the tank it may be introduced into each one of the series of anode-sections by merely dropping it down through the slots into the perforation or cathode-receiving channel which it is to occupy. This carbon-block anode-section is traversed longitudinally by a copper rod D, which serves to establish the electrical connection therewith at each of the several channels therein and also to give strength and support to the anode itself. One end of the rod D is split to receive the blade of a connection-switch, by which it is put into communication with a bus-bar E, extending along one side of the tank, but external thereto, as will be more fully explained hereinafter. Each anode-section is embraced by a porcelain cover or casing C of the form shown in Fig. 7. This casing is provided with slots on its upper side which register with the corresponding slots in the anode and also with openings in its opposite sides which register with the ends of the transverse openings in the anode. These openings are, however, slightly smaller in diameter than the anodes, as appears in Fig. 5. The purpose of this is to insure that any possible sagging of the wire will not permit it to come into contact with the anode, so as to cause a short circuit. The sides of the casing are of sufficient length to extend down to the floor of the tank and are provided with a series of openings below the under side of the anode, which serve to facilitate the circulation of the electrolyte. At frequent intervals along the series of anode-sections I insert

the cathode-contacts F. As is shown in Fig. 8, each of these cathode-contacts comprises a brass plate F, extending from side to side of the tank, and on its upper side, opposite each wire channel through the anode, are cast two ribs f' f^2, having a cylindrical enlargement at each end. The space between two adjacent ribs is filled with metallic balls of such a size that they will not pass through the opening between the cylindrical enlargements of two adjacent ribs. These balls will thus be contained in a sort of pocket or receiver formed between the ribs, and a wire may be readily pressed down into the mass of balls from the upper side of the contact, entering and leaving the pocket through the slots or openings between the cylindrical enlargements. By this arrangement the multiplicity of balls will maintain a good electrical connection between the wire and the metal of the contact D. At the same time the wire can travel through the balls readily, and the balls will yield to permit the passage of a joint in the wire.

In the practical operation of my device a wire may be occasionally broken or come to an end, and by the arrangement just described it is possible to quickly attach together the ends of the broken wire or to attach a second section of the wire to the first one without stopping the apparatus. This is a matter of considerable importance in view of the fact that a large number of wires should be treated at the same time and that it is undesirable to stop the travel of the wires, which would cause the deposit of the zinc in a spongy or mossy condition unless the current was shut off and the entire process interrupted.

Each contact F is provided with a projection F', Fig. 1, external to the tank, by which connection with the negative bus-bar may be established.

At each end of the tank is a transverse shaft G, on which are mounted a series of sheaves G', under which the wires may run in entering and leaving the apparatus.

The electrolyte is introduced into the tank in a constant stream by the spouts H, which deliver into the tank at intervals between the anode-sections. These spouts H are all supplied from a pipe H', leading from the circulating-pump. (Not shown.) The electrolyte is withdrawn from the tank by a series of overflow-pipes K, also placed at intervals along the tank, alternating in position with the spouts H. These overflow-pipes maintain the liquid at a definite level and all communicate with the outflow-pipe K', which leads to the regenerating-tank, (not shown,) from which it is constantly pumped back into the tank A through the pipe H' aforesaid.

The positive bus-bar is shown at E, Fig. 3, and opposite each anode-section is a switch-blade E', hinged at its lower end to the bus-bar E and at its upper end adapted to enter the split above mentioned in the rod D, extending through the anode-section. By this means each anode-section may be connected electrically to the bus-bar and with equal readiness disconnected therefrom. By this arrangement it is possible to regulate to some extent the thickness of the coating without changing the speed of the wires.

In operation a series of entering wires, ten in number, will be passed under the sheaves G' at the entering end of the tank. They will then be laid in the slots on the upper sides of the anode-sections and in the ball-pockets of the anode-contacts. Then they will be passed under the sheaves G' at the leaving end of the tank. The wires will be drawn direct from the annealing-furnace through a pickling-bath and into the depositing-tank and thence will be drawn out on reels in a manner well known to the art. The sheaves are each journaled independently on the shaft G.

What I claim as new, and desire to secure by Letters Patent, is—

1. An electrolytic apparatus, comprising in combination a series of anode-sections of insoluble material with a series of interposed cathode-contacts, both the anode-sections and the contacts being open on their upper sides to receive a cathode-wire dropped into them from above, and electrical connections for both the anode-sections and the cathode-contacts.

2. An electrolytic apparatus, comprising in combination a series of anode-sections of insoluble material with a series of interposed cathode-contacts, both the sections and the contacts being open on their upper sides to receive a cathode-wire dropped into them from above, the cathode-contact being also provided with yielding surfaces to permit the passage of a joint in the wire, and electrical connections for both the sections and the contacts.

3. An electrolytic apparatus, comprising in combination a series of anode-sections of insoluble material, each provided with a multiplicity of channels for the cathode-wires, and a series of cathode-contacts interposed between the anode-sections and provided with upwardly-open receivers for the cathode-wires.

4. An electrolytic apparatus, comprising in combination a series of anode-sections, each provided with a multiplicity of upwardly-open channels to receive the cathode-wires, and a series of cathode-contacts interposed between the anode-sections.

5. An electrolytic apparatus, comprising in combination a series of anode-sections, each having a multiplicity of channels with openings on the upper side to receive the wires dropped into them from above, and a series of cathode-contacts interposed between the anode-sections.

6. An electrolytic apparatus, comprising in combination a series of anode-sections interposed between a series of cathode-contacts,

each section having a multiplicity of channels for receiving the cathode-wires, and insulating-guides for preventing contact of the wires with the adjacent surface of the anode-section.

7. An electrolytic apparatus, comprising in combination a series of anode-sections alternating with cathode-contacts, each anode-section having a channel for receiving the cathode-wire, electrical connections for the cathode-contacts, a bus-bar for the anode-sections and a regulating means consisting of switches between the several anode-sections and the bus-bar.

8. In an electrolytic apparatus, the combination with a series of carbon-anodes, of metallic rods connected thereto respectively, a bus-bar extending along the apparatus, and regulating means consisting of an electric switch between each of the said rods and the bus-bar.

9. In an electrolytic apparatus, the combination with a carbon-anode having a multiplicity of channels for receiving the cathode-wires, of a metallic rod extending along the anode opposite each of the said channels, and means for connecting said rod to one terminal of the electric circuit.

10. In an electrolytic apparatus, the combination with a carbon-anode having a multiplicity of cathode-receiving channels on its upper side, of a metallic rod extending along said anode transversely to the said channels, and means for connecting said rod to one terminal of the electric circuit.

11. In an electrolytic apparatus, the combination with a carbon-anode having a series of cathode-receiving channels on its upper side, of a metallic rod below the said channel and extending transversely thereto, and means for connecting the said rod to one terminal of the electric circuit.

12. A carbon-anode, for an electrolytic apparatus, traversed in one direction by a series of cathode-receiving channels and in the other direction by an electric conductor for equalizing the potential at each of the said channels.

13. An anode for an electrolytic apparatus, having on its upper side an upwardly-opening channel for receiving a cathode-wire and in its under side an electric conductor for maintaining electrical connection therewith.

14. An anode for an electrolytic apparatus, having on its upper side a multiplicity of cathode-receiving channels opening upwardly, and provided on its under side with an electric conductor for equalizing the potential at each of the said channels.

15. An anode for an electrolytic apparatus, having a cathode-receiving channel and provided with a covering of insulating material having openings in line with the said channel.

16. An anode for an electrolytic apparatus, having an upwardly-opening cathode-receiving channel, and a casing or cover therefor of insulating material having an opening on its upper side in line with the opening of the said channel.

17. An anode for electrolytic apparatus, having a cathode-receiving channel and a guide of insulating material for centering the cathode in said channel.

18. An anode for an electrolytic apparatus, having a cathode-receiving channel and a cover of insulating material with an opening in line with the said channel and serving as a guide or guard for the cathode therein.

19. An anode for an electrolytic apparatus, comprising a block of carbon having a series of upwardly-opening channels for receiving a multiplicity of cathode-wires, and a covering of insulating material for the anode having openings in line with the said channel.

20. A contact device for progressive contact with a wire, comprising a pocket or receiver of conducting material with wire-openings on its opposite ends, and a plurality of loose balls contained therein of a size larger than the said wire-openings.

21. A contact device for progressive contact with a wire, comprising a pocket or receiver of conducting material with wire-openings on its opposite ends reaching to the upper edge of the pocket, and a plurality of loose balls contained therein of a size larger than the said wire-openings.

22. A contact device for progressive contact with a wire, comprising a pocket or receiver of conducting material open on one side to receive the wire, with slots on its opposite ends through which the wire may enter and leave the pocket, and a plurality of loose balls contained in said pocket and of a size larger than the said slots.

23. A cathode-contact for an electrolytic apparatus employing a moving wire for the cathode, consisting of a base provided with a series of pockets or receivers having wire-openings at their opposite ends, and each provided with a plurality of loose balls of a size larger than the said wire-openings.

24. An electrolytic apparatus, comprising in combination a series of anode-sections, each provided with a multiplicity of cathode-receiving channels, a series of cathode-contacts interposed between the anode-sections, and a series of independently-journaled sheaves at each end of the apparatus corresponding in number to the anode-channels and in line therewith respectively.

In witness whereof I have hereunto set my hand, before two subscribing witnesses, this 14th day of January, 1905.

GUY L. MEAKER.

Witnesses:

J. W. MEAKER, Jr.,

G. A. MASON.