No. 725,208. PATENTED APR. 14, 1903.

H. W. BÖTZ.

ELECTROLYTIC COATING APPARATUS.

APPLICATION FILED AUG. 6, 1902.

NO MODEL. 2 SHEETS—SHEET 1

Fig. 1.

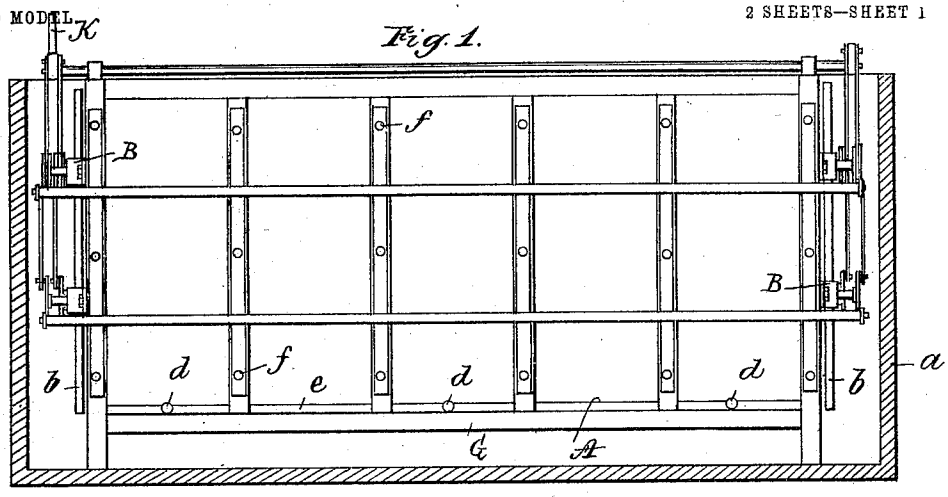


Fig. 2.

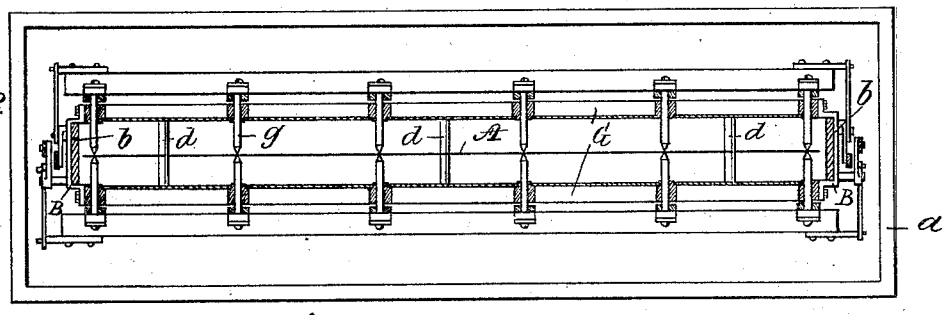
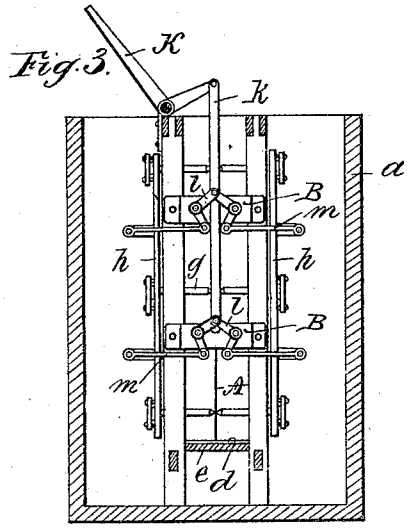


Fig. 3.



WITNESSES:

John A. Kehlenbeck.

John Lotka

INVENTOR

N. W. BÖTZ

BY Briesen & Knauth

ATTORNEYS

No. 725,208. PATENTED APR. 14, 1903.

H. W. BÖTZ.

ELECTROLYTIC COATING APPARATUS.

APPLICATION FILED AUG. 6, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

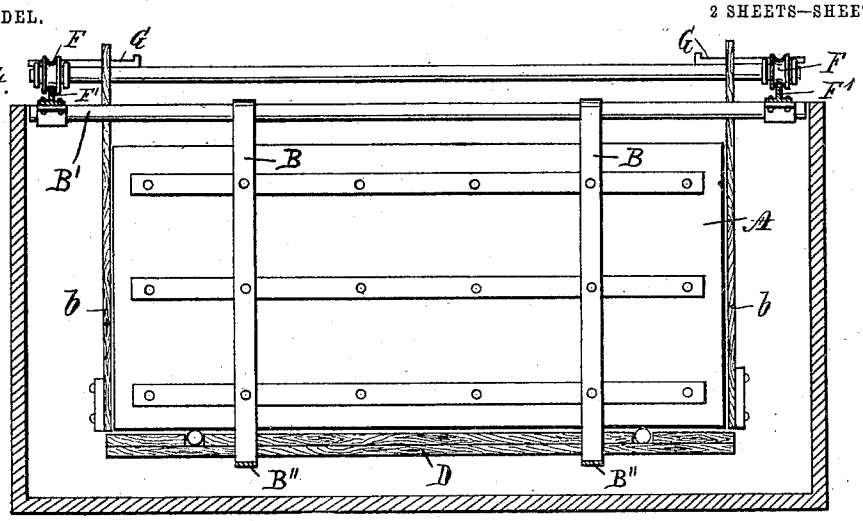


Fig. 5.

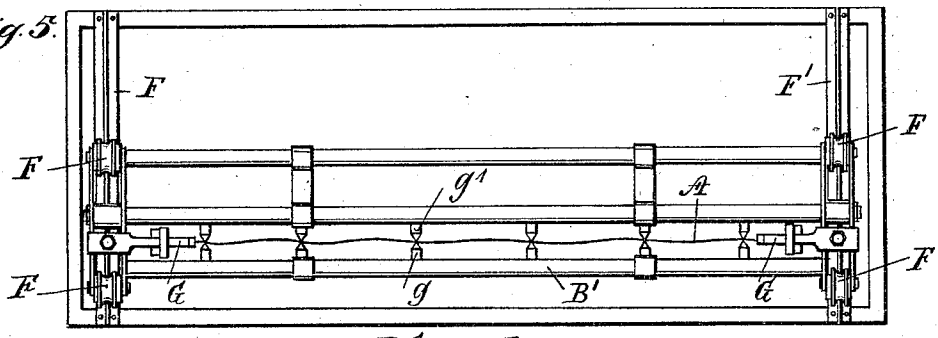
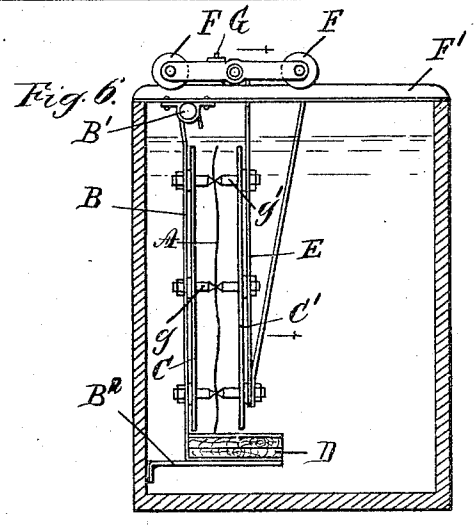


Fig. 6.



WITNESSES:

John A. Kehlenbeck.

John Lotka

INVENTOR

H. W. BÖTZ

BY Briesen & Knauth

ATTORNEYS

UNITED STATES PATENT OFFICE.

HEINRICH WILHELM BÖTZ, OF LUDWIGSHAFEN-ON-THE-RHINE, GERMANY, ASSIGNOR TO THE FIRM OF COLUMBUS ELECTRIZITÄTS-GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG, OF LUDWIGSHAFEN-ON-THE-RHINE, BAVARIA, GERMANY.

ELECTROLYTIC COATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 725,208, dated April 14, 1903.

Application filed August 6, 1902. Serial No. 118,552. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH WILHELM BÖTZ, engineer, residing at Gartenstrasse No. 3ª, Ludwigshafen-on-the-Rhine, in the Palatinate, Bavaria, Germany, have invented new and useful Improvements in Electrolytic Coating Apparatus, of which the following is a specification.

This invention relates, essentially, to an apparatus for electrolytically coating sheet metal with zinc in which the zinc anodes can be placed as closely as possible to the metal sheet, suspended or otherwise placed between them, so as to diminish the internal resistance of the bath and save current. The difficulty hitherto experienced in adopting such an arrangement is that the metal sheet to be coated is not of quite even surface, but is frequently bent and undulating, so that it must be kept in one plane by some means. Unless such means be used deviations of as much as fifteen centimeters on either side of the median vertical plane may occur. By the present invention the distance between the zinc anodes and the cathode may be reduced to five centimeters.

The use of distance-pieces for keeping the anodes and cathode in proper relative positions is open to the objection that the places where these pieces come in contact with the sheet metal do not get coated, or if the places of contact are changed the precipitated zinc thereon has a very indifferent color.

According to the present invention the distance-pieces are made of a resistant material, like glass or stone ware, and of such form that they come in contact with the sheet only at a point or along a line, so that the surface of contact may be reduced to the fraction of a millimeter.

In the case of a coating of zinc on iron the coating not only protects the surface actually covered, but the protection extends to several millimeters from the edge of the coating, so that the portion not covered, owing to the contact of the distance-pieces made according to this invention, does not tend to rust. Nevertheless, the plates may be shifted during the process, and the invention also provides for this movement.

The new distance-pieces are generally of the form of pointed bolts and are fixed in a series on a frame. By moving two such frames, standing or suspended vertically in the bath, against each other or the one against the other all the points are moved to the same extent and bear opposite each other on the two surfaces of the metal sheet, which they keep upright and firm between them. This arrangement and movement of the points may be effected in one of two ways with respect to the arrangement of the anodes. The latter may be stationary in the bath, while the distance-pieces projecting through holes in the anodes move to and fro, or the anodes may be moved with the distance-pieces. As a variation on the latter method only one anode with the corresponding distance-pieces may be moved, so that the metal sheet is kept against the other distance-pieces as a support, and in this case it is advantageous to suspend the one anode with the distance-pieces from a carriage which runs on rails on the upper edge of the electrolytic cell. The stationary anode has at its lower part a horizontal projection in the direction of the movable anode. On this projection rests the lower edge of the immersed metal sheet whenever the cathode-carriage is moved away and when the latter is made to approach presses on the stationary cathode.

Another part of this invention consists in suspending plates at the lower edge of the sheet metal as well as at its side edges. In this manner the high current density at the edges is avoided and the thickening of the deposit thereon is prevented.

When both anodes are fixed in the bath, the frames carrying the distance-pieces are attached to a system of levers, so that by turning a handle the frames may be made to approach or recede from the anodes, and in order that my invention may be better understood I have affixed drawings, whereof—

Figures 1, 2, and 3 are a front view, a plan, and a side view, respectively, of one modifi-

cation of my invention, whereas Figs. 4, 5, 6 are a front view, a plan, and a side view of a preferred modification.

Referring to Figs. 1 to 3, *a* is the vat containing the electrolytical bath, wherein a frame G is placed, consisting of a number of vertical standards and transverse rods. This frame comprises two equal halves, which are united by cross-bars B and which support the anodes and receive between themselves the cathode. The two halves of the frame are connected at their bottom by a plate *e*, which may be of metal, wherein glass rods *d* are embedded, which support the lower edge of the cathode. The vertical standards are provided with holes *f*, and the anode-plates are fixed to the frames in any convenient way. *h* represents light movable frames carrying the distance-bolts *g* in series. These bolts are supported and guided in the holes *f* and allow horizontal motion of the frames, preserving the vertical position and avancing all the bolts, the points thereof being kept in the same vertical plane. Fig. 2 shows the bolts in their most advanced position, holding between them the cathode sheet metal A. Fig. 3 shows a mechanism to move the two frames *h* symmetrically. The lever K is connected with the rod *k*, which swings the crank-levers *l*, and thereby moves the rods *m* and the frames *h*.

Referring to Figs. 4, 5, and 6, B is a frame fixed to a rod B′ at its upper end and supported by a support B^2 at its foot. This frame consists of the flat iron rails and is provided with one set of distance-bolts *g* and an anode-plate C. This frame is provided with a projection D, which supports the cathode-plate A. E is a frame corresponding to and parallel to the frame B and is provided with distance-bolts *g′* and an anode *c′* and suspended from a carriage. This carriage comprises a frame supported by four rollers F and travels on rails F′ on the upper edge of the vat. If it is desired to introduce the sheet metal to be coated into the apparatus, the carriage is moved to the right, Fig. 6, the sheet is immersed, and the carriage moved back until the points of the bolts *g′* touch the bolts *g*. The carriage comprises two arms G, on which plates *b* are suspended, which shield the side edges of the sheet metal against an excess of current.

Now what I claim, and desire to secure by Letters Patent, is the following:

1. In an electrolytical apparatus for coating sheet metal, pointed distance-pieces substantially as described.

2. In an electrolytical apparatus for coating sheet metal, a frame adapted to be moved in vertical position and provided with distance-pieces, substantially as described.

3. In an electrolytical apparatus for coating sheet metal, the combination of a fixed frame provided with distance-pieces, with a movable frame each provided with distance-pieces, and means to remove and carry back the movable frame, substantially as described.

4. In an electrolytical apparatus for coating sheet metal, the combination with a frame carrying distance-pieces, with a horizontal projection at the foot thereof, substantially as described.

5. In an electrolytical apparatus for coating sheet metal, the combination with two frames carrying the anodes, of shielding-plates provided at the sides of the anodes, substantially as described.

6. In an electrolytical apparatus for coating sheet metal, the combination with a fixed anode, of a horizontal support at the foot thereof, a movable anode guided in vertical position, and a carriage supporting the said movable anode, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HEINRICH WILHELM BÖTZ.

Witnesses:

NICOLAUS ERNST ROSA,

EMIL RAUCH.