J. A. YUNCK.

APPARATUS FOR ELECTROPLATING.

APPLICATION FILED NOV. 8, 1906.

900,340. Patented Oct. 6, 1908.

Fig. 1.

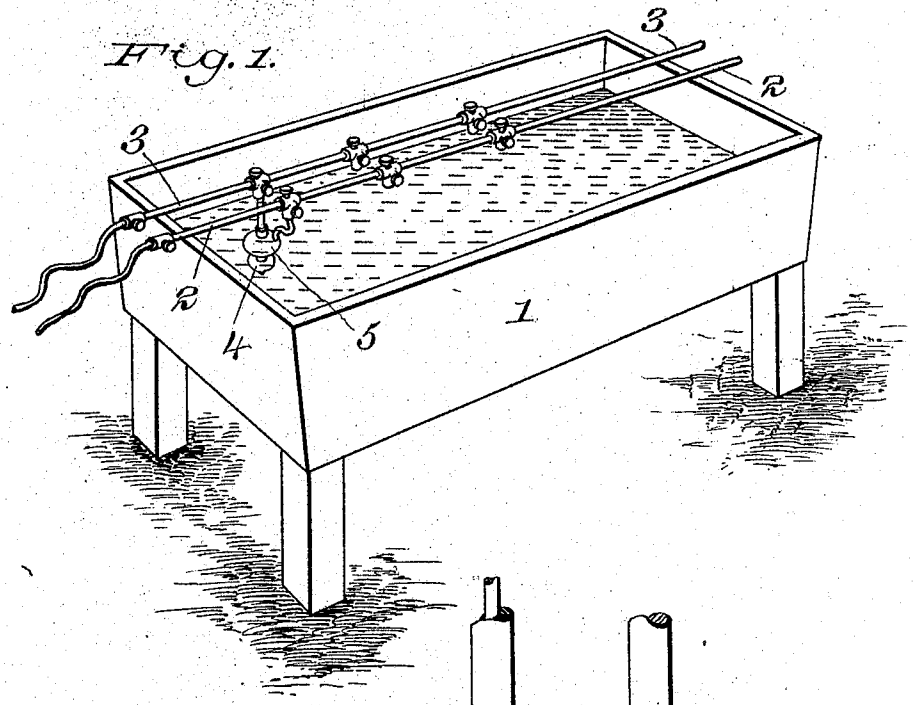
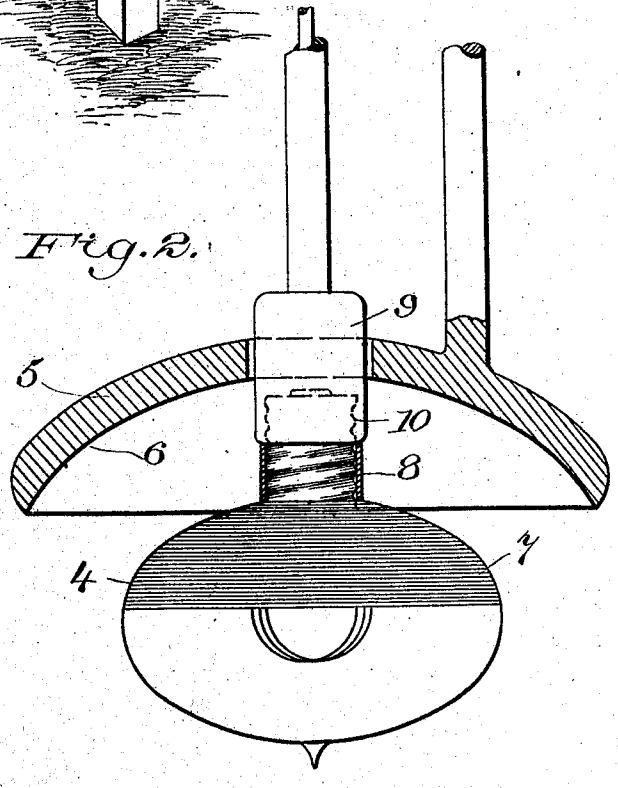


Fig. 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR ELECTROPLATING.

No. 900,340. Specification of Letters Patent. Patented Oct. 6, 1908.

Application filed November 8, 1906. Serial No. 342,493.

To all whom it may concern:

Be it known that I, JOHN A. YUNCK, a citizen of the United States of America, and a resident of South Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Electroplating, of which the following is a specification.

My invention relates to processes of electro deposition of metals, or electroplating in general, and more specifically consists of an improved apparatus for depositing a protecting shell of copper over a film of silver previously deposited upon glass, and my invention finds its most useful application in copper plating a portion of the surface of an incandescent electric lamp globe which has been previously covered with a film of silver for the purpose of producing a reflector for the light.

Heretofore, it has been customary to silver a portion of the surface of the globe of an incandescent electric lamp in order to produce a reflector of the light and to protect said film of silver with a coating of varnish, but when the lamp is lighted, the heat of the lamp causes the varnish to curl up and it pulls the silver from the glass, destroying the reflecting powers thereof and so on, permitting the entire coating to drop off. It has also been attempted to copper-plate a protecting shell over the film of silver, but the ordinary electroplating methods produce an uneven deposit on account of the varying distances between the anode or positive pole and the different portions of surface to be plated. Also the curved surface of the lamp globe being inclined to the line of travel of the metallic particles from the anode or positive pole to the cathode or negative pole, the bombardment by these particles striking the inclined surface of the glass tends to tear off the previously deposited film of silver. I have invented a form of anode and arrangement thereof which avoids all these difficulties.

The best form of apparatus embodying my invention at present known to me is illustrated in the accompanying sheet of drawings in which:

Figure 1 is a perspective view of the ordinary electroplating bath, with my invention applied thereto. Fig. 2 is an enlarged side elevation of an electric lamp with my invention in operative relation thereto, shown in partial section.

Throughout the drawings, like reference figures indicate like parts.

1 is the ordinary trough containing the electroplating solution.

2 is a support for and conductor of current to, a series of anodes. 3 is a similar support for, and conductor of current to, a series of cathodes to each of which an electric lamp 4 may be connected. The anode consists of a cast plate or block 5 of chemically pure copper, free from blow holes, such as is produced by process covered by Letters Patent of the United States No. 825,100, granted to me July 3, 1906. This anode has its operative face 6 so shaped as to conform to the surface of the object to be plated, in this case a portion of the surface of the bulb of the lamp 4. The lamp 4 has a previously deposited film of silver 7, covering a portion of its surface, and this film of silver is connected to the negative pole or cathode in any convenient manner, preferably by means of the sleeve 8, of copper or other conducting metal, which surrounds the stem of the lamp and reaches from the film 7 up to the metallic cup 9, which forms the termination of the cathode, or negative pole, and which has a threaded socket adapted to receive the threaded base 10 of the lamp.

The operation of my invention is as follows: The rods 2 and 3 being connected to the proper terminals of an electric circuit, including a source of current, not shown, and the trough 1 being filled with any copper plating solution, preferably a simple solution of sulfate of copper, lamps are screwed into the cup-shaped cavities 9, and together with the series of anodes 5 are immersed in the solution. The current being turned on, the usual electrolytic action takes place, consisting of the transference of a series of molecules of copper from the solution and from the anode 5 to the surface of the silver film 7, which has become the cathode by virtue of its connection through the sleeve 8 to the metallic cup 9. The anode 5 being pure copper, free from blow holes, the molecules of pure copper are transferred to the surface of the silver film, striking the same in a line perpendicular to the surface of each point, and adhere thereto. As the distance along the line of transference from any point of the silver film to the nearest point of the anode is substantially the same for every portion of the silver surface, the electrical resistance is the same at all

points and there is no tendency to produce a heavier deposition of copper at any one point than at any other. The result is an even deposition of copper producing a shell of even thickness throughout covering and protecting the silver film. As the particles of copper strike the surface always squarely at right angles, there is no tendency for the same to dislodge or displace the particles of silver and the integrity of the film of silver is therefore preserved. The result is a durable, strong protecting shell of copper formed over an undisturbed film of silver, which produces a powerful reflector that will last as long as the lamp itself lasts.

It is evident, of course, that the principle of my invention could be applied to the electroplating of other objects having curved or irregular surfaces, and that it can be applied to the electroplating of other articles of glass coated with films of silver, so long as the anodes are made to have their operative faces conform to the surfaces to be plated, and are so located that the shortest distance between the anode and cathode will be approximately equal for all points.

Having, therefore, described my invention, I claim:

The combination with an electroplating bath and circuit connections, of a cathode or negative pole adapted to hold an incandescent electric lamp, and an anode having its operative face shaped to conform to the adjacent surface of the lamp bulb, a coating of silver on the said surface, and a metal sleeve extending from the negative pole to said silver coating centrally located with reference to said silver coating.

Signed at New York, N. Y. this 4th day of October 1906.

JOHN A. YUNCK.

Witnesses:
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