No. 888,093. PATENTED MAY 19, 1908.

W. R. KING.

ELECTROPLATING APPARATUS.

APPLICATION FILED DEC. 15, 1906.

2 SHEETS—SHEET 1.

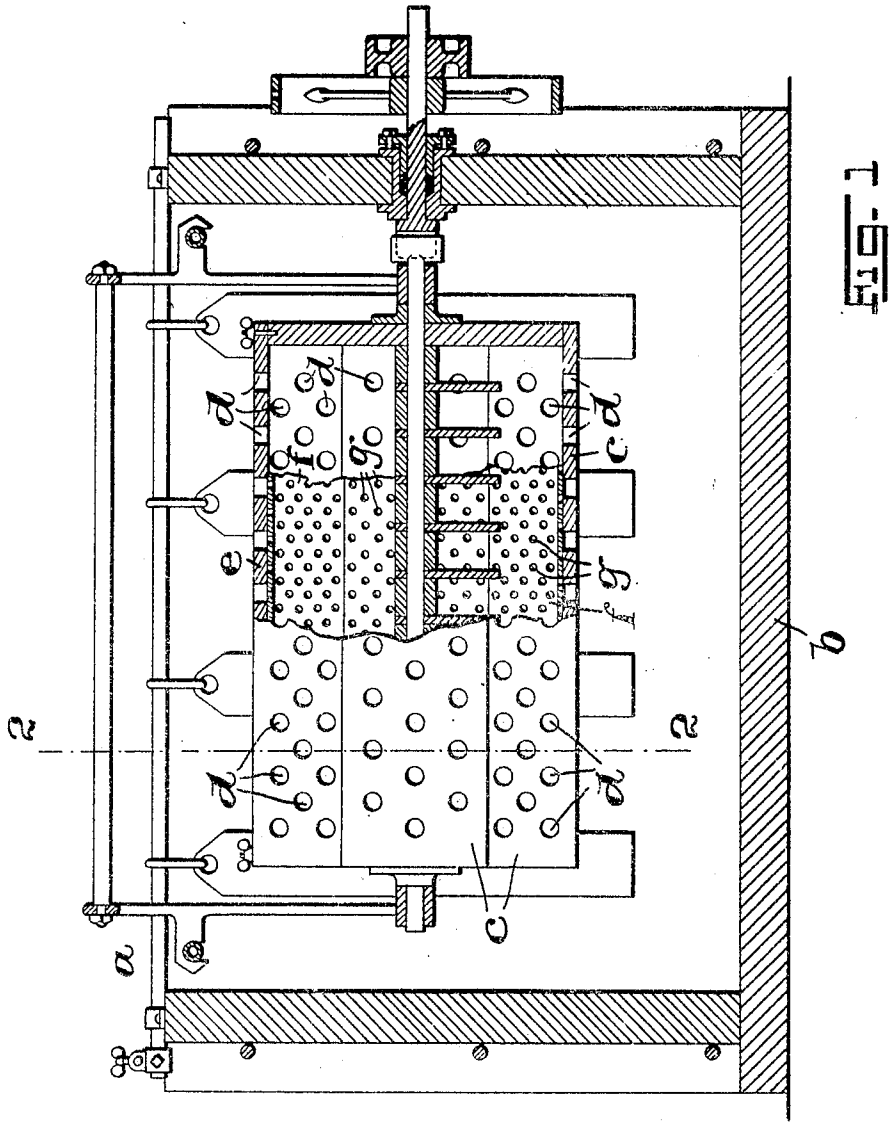


Fig. 1

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2 SHEETS—SHEET 2.

Fig. 3

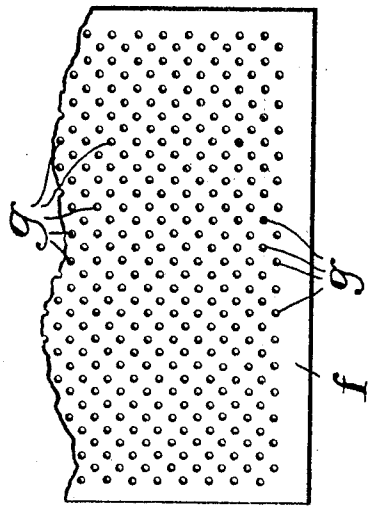
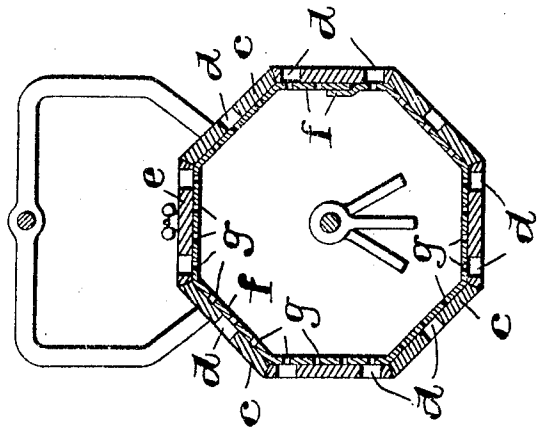


Fig. 2



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UNITED STATES PATENT OFFICE.

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ELECTROPLATING APPARATUS.

No. 888,093. Specification of Letters Patent. Patented May 19, 1908.

Application filed December 15, 1905. Serial No. 291,879.

To all whom it may concern:

Be it known that I, WILLIS R. KING, a 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 letters of reference marked thereon, which form a part of this specification.

The present invention is in the nature of an improvement in that class of apparatus employed for the purposes of electro-deposition of metals upon articles of the various kinds; and, the invention relates more especially to improvements in revoluble mechanical plating apparatus of the various kinds which are provided with a revolving container, basket or barrel, usually of wood, ratan, or other suitable material, provided with apertures or holes for the flow of the electrolyte or plating solution therethrough to the articles which are placed within the said container, and which are to be plated.

Heretofore, the holes or perforations in the containers have been of such size that very small articles to be plated would readily drop from the container through a hole or perforation, or sometimes would become stuck fast therein; while, on the other hand, owing to an arrangement of fine or small perforations in a wooden container, as now sometimes used, great resistance is offered to the passage of the current from the anode through the perforations in the container to the articles which are to be plated, and thus resulting in a very slow process of plating the said articles which are placed in the container.

The present invention has for its principal object to provide such containers with larger openings or perforations so as to offer practically no resistance to the current as compared to the resistance offered when a wooden barrel which is provided with fine perforations is employed, and within such container placing a flexible and perforated diaphragm or sheet of non-conducting material, such as celluloid, vulcanite, vulcanized fiber, or other analogous and waterproof material, the perforations in the said diaphragm or sheet being variously disposed and being made very small, that the smallest articles can be suitably disposed in the container of the electro-plating apparatus, without any possibility of dropping through the larger holes or perforations in the container, and in consequence thereof falling to the bottom of the tank, as heretofore. To obtain the best results, the said interiorly placed diaphragm or sheet within the revolving container of the plating apparatus, may be made from a thin continuous sheet of such materials hereinabove specified and provided with an arrangement of fine or small holes or perforations, and is removable therefrom, being capable of being slipped into position with the revolving container in the manner of a cylinder, as will hereinafter appear. The said inner diaphragm, if desired, may also be made in other suitable shapes or in sections, so as to be used with containers of hexagonal or other similar cross-sections, the said sections being capable of removal as a whole or separably from the said container.

With a container provided with large openings or perforations and with a thin diaphragm provided with a series of fine perforations or openings, it has been found in practice, that the resistance to the current as compared to that offered in a container of wood provided with fine holes or perforations, as heretofore, decreases from eighty to ninety per cent., thus enabling the work, with an apparatus embodying the features of my present invention, to be plated in a similar reduction of time. With a diaphragm made from celluloid, vulcanite, or the like, having a thickness of say 15/1000 of an inch, as against the usual perforated wood container of at least $\frac{1}{4}$ of an inch, and with a larger number of perforations in the diaphragm and a smaller number of large openings or perforations in the wood container or the interstices between the ratan reeds of a revolving basket, the final results are obvious, the electro-plating being more thoroughly done, and in less time, and with a great saving in the item of expense.

In order to particularly describe my present invention, and the manner in which the same is to be performed, I annex herewith the accompanying drawings, in which the invention is clearly illustrated.

Referring now to the said drawings, Figure 1 illustrates in longitudinal vertical section the tank of an electro-plating apparatus provided with a revolving container or drum, the said container or drum being shown partly in elevation and partly in longitudinal vertical section, and having placed therein a flexible diaphragm or sheet formed with fine or small holes or perforations, and made according to the principles of this invention. Fig. 2 is a transverse vertical section, taken on line 2—2 in said Fig. 1; and Fig. 3 is a face view of a portion of the said perforated diaphragm.

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

In the said drawings, the reference character *a* indicates an electro-plating apparatus of any well known construction, comprising the usual vat or tank *b*, for containing the electro-plating solution or electrolyte, and *c* is the usual container, made of wood, ratan, or similar material, and adapted to be revolved in the said tank or vat *b*, by means of any usual and suitably constructed mechanism. Ordinarily this container is made of wood, and it is provided with small openings or perforations, the holes or perforations being purposely made small, that any small articles which are placed within the container to be plated will not drop through the holes or perforations of the container, or become stuck therein. In the present apparatus, the said device is provided with a container of wood, ratan, or other suitable material, having a series of large holes or other suitably formed openings, as *d*, and the said container is provided with the usual and suitably secured cover or lid *e*. Suitably arranged within the said container *c*, so as to conform to the inner contour of the said container, is a flexible sheet or diaphragm *f* of celluloid, vulcanite, vulcanized fiber, or other suitable non-conducting and waterproof material, which is provided with many fine holes or perforations *g*, substantially as illustrated in the several figures of the drawings. The said diaphragm or sheet may be made of any suitable configuration, or in sections, as may be desirable, according to the kind and construction of revolving container with which it is to be used, and can be easily slipped in its position within the said container during the process of electro-plating. The said diaphragm or sheet can also be easily removed from the container, when desired, for making necessary repairs or for the purpose of replacing the worn out diaphragm or diaphragm-sections with new ones, or when it is desired to use the container of the electro-plating apparatus without a diaphragm, as in the case of the deposition of metals upon larger articles placed within the container which can not fall through the openings or perforations formed in the sides of the container.

The operation of the device or apparatus briefly is as follows: The diaphragm or sheet having been slipped into position within the container, the articles to receive the deposit of metal or to be bright-plated are prepared for plating in the ordinary manner and are placed within the inner container formed by the said perforated diaphragm or diaphragm sections, by way of the removable cover or lid. The said cover or lid is then again secured in place upon the container, the latter then placed in its revolving relation within the tank or vat of the apparatus, and then by means of power and any suitable driving mechanism the said container is revolved in the solution or electrolyte contained in the said tank or vat. Electric current is sent through the apparatus in any usual manner.

From the foregoing description of my present invention, it will be evident, that the improvement which embodies the principles of this invention can be easily and at slight expense applied to existing electrolytic vats provided with revolving containers or drums made of wood, ratan, or other suitable material, and of any desired size and cross-area, whether hexagonal, cylindrical, octagonal, or of any other suitable cross-section.

The invention is especially applicable to a container provided with large openings, or to the wicker basket provided with a great many openings, offering very little resistance to the current in its passage to the interior of the container or basket, and the diaphragm providing a safe means adapted to contain all kinds of small articles capable of rolling over and over within the container, to be thoroughly and properly electro-plated.

The flexible perforated diaphragm may be applied to any known form of revolving container, and the details of the apparatus are modified to suit any existing conditions.

I claim:—

1. An electro-plating apparatus comprising a hollow container having apertures or openings, means for revolving said container, a flexible diaphragm or sheet adapted to be slipped into said container, and adapted to be removed therefrom, said diaphragm or sheet being provided with fine holes of smaller diameter than the openings of the container to prevent small articles which are to be plated from dropping into the larger apertures or openings of said container, substantially as and for the purposes set forth.

2. An electro-plating apparatus comprising a hollow container having apertures or openings, means for revolving said container, a flexible diaphragm or sheet of celluloid, arranged against the inner faces of the sides of said container said sheet being provided with fine holes of smaller diameter than the openings of the container to prevent small arti-

cles which are to be plated from dropping into the larger apertures or openings in said container, substantially as set forth.

3. An electro-plating apparatus comprising a hollow container having apertures or openings, means for revolving said container, a flexible diaphragm or sheet of celluloid, adapted to be slipped into said container, and adapted to be removed therefrom, said diaphragm or sheet being provided with fine holes of smaller diameter than the openings of the container to prevent small articles which are to be plated from dropping into the larger openings or apertures of the said container, substantially as set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 9th day of December, 1905.

WILLIS R. KING.

Witnesses:

FREDK. C. FRAENTZEL,

GEO. D. RICHARDS.