Jan. 6, 1925. 1,521,592

W. E. BELKE

ELECTROPLATING APPARATUS

Filed Oct. 29, 1923

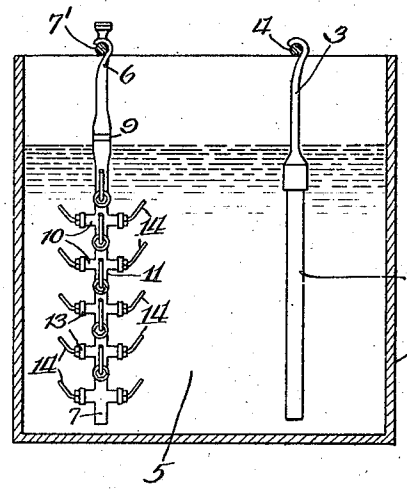


Fig. 1

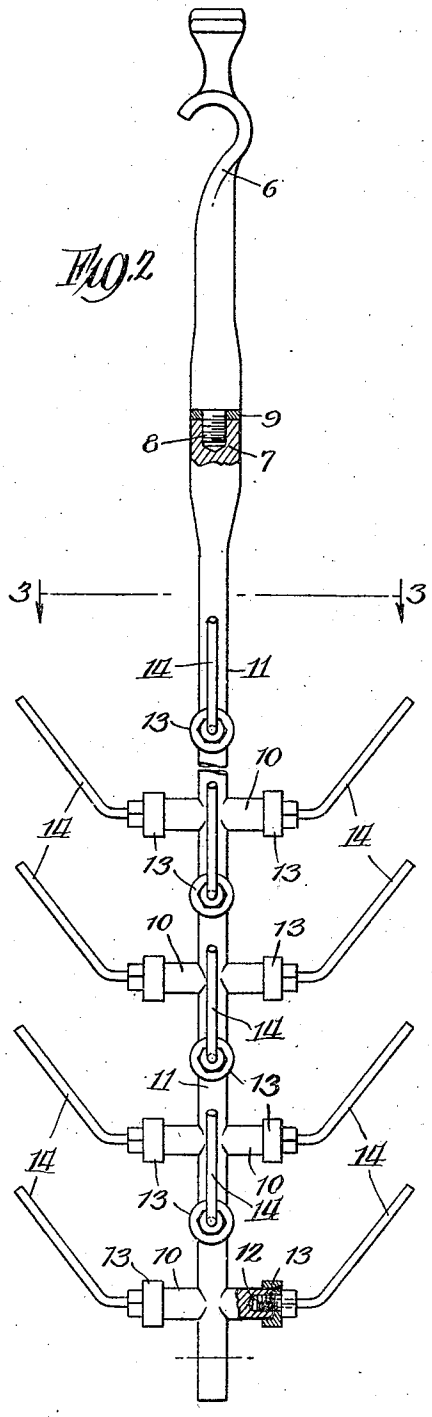


Fig. 2

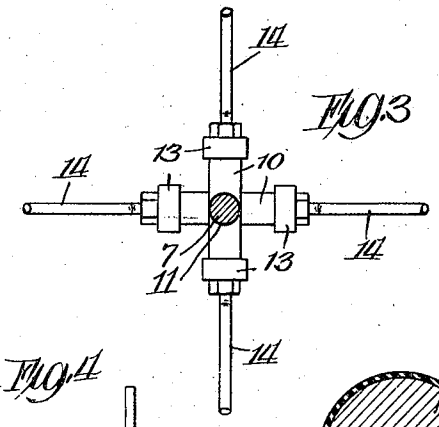


Fig. 3

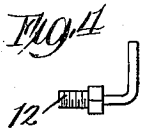


Fig. 4

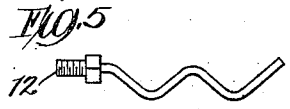


Fig. 5

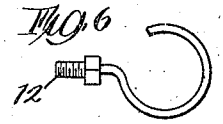


Fig. 6

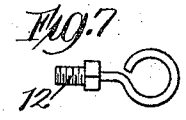


Fig. 7

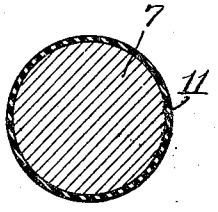


Fig. 8

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UNITED STATES PATENT OFFICE.

WILLIAM E. BELKE, OF CHICAGO, ILLINOIS.

ELECTROPLATING APPARATUS.

Application filed October 29, 1923. Serial No. 671,320.

To all whom it may concern:

Be it known that I, WILLIAM E. BELKE, a citizen of the United States, and resident of Chicago, Cook County, Illinois, have invented a certain new and useful Improvement in Electroplating Apparatus, of which the following is a specification.

This invention relates to supports employed for the work in electroplating methods and processes, upon which the articles to be plated are supported in the solution or electrolyte, and whereby the articles are immersed in the solution and then lifted out after they are fully plated.

Generally stated, the object of the invention is to provide a novel and improved work support for the electroplating apparatus, of such character that the work is more conveniently and satisfactorily supported thereon, and of such character that the amount of metal deposited on the support, instead of on the work itself, will be reduced practically to a minimum, thereby to minimize waste of the plating metal during the operation of plating the various articles immersed in the solution.

It is also an object to provide certain details and features of construction and combinations tending to increase the general efficiency and the desirability of an electroplating apparatus work support of this particular character.

To the foregoing and other useful ends the invention consists in matters hereinafter set forth and claimed, and shown in the accompanying drawings, in which—

Figure 1 is a diagrammatic view of an electroplating apparatus having a work support embodying the principles of the invention.

Figure 2 is an enlarged side elevation of said work support, showing certain portions thereof in vertical section.

Figure 3 is a horizontal section on line 3—3 in Figure 2.

Figure 4 is a side elevation of another form of the prong for said support.

Figure 5 shows a still different form of the invention.

Figure 6 shows a different form of the invention.

Figure 7 shows a different form of the invention.

Figure 8 is an enlarged horizontal section on line 8—8 in Figure 2.

As thus illustrated, the tank 1 may be of any suitable known or approved construction, and the metal plate 2 from which the metal is to be taken through the solution to the work may be supported by a hook 3 upon the electric conductor 4, in any suitable or desired manner. The solution or electrolyte 5 is of any suitable character.

As shown in Figures 1 and 2, the support for the work to which the invention relates, comprises a metal, preferably copper, hook 6 adapted to rest on the support 7 which is the other electric conductor. The body of the support proper comprises a steel member 7 extending downwardly from the hook 6, and is securely connected thereto by a screw connection 8 of any suitable character, with a rubber or fibre gasket or washer 9 between them, as shown. The downward extending rod-like member 7 is provided with laterally extending branches or projections 10, and the rod 7 and the projections 10 are covered by a substantial coating 11 of vitreous enamel, like the enamel on bathtubs and similar plumbing fixtures. The outer ends of the projections 10 are topped to receive the screw threaded portions 12 of the different prongs shown in Figures 4 to 7 inclusive, which prongs are preferably of brass or metal suitable for this purpose, and rubber washers 13 are inserted to cover the steel ends of the projections 10, whereby no steel is exposed to the action of the solution or electrolyte. As shown in Figure 2, the prongs 14 extend upward, to support different kinds of work, but they may be of different shapes, as shown in Figures 4 to 7, without departing from the spirit of the invention. The different prongs are interchangeable, it will be seen, with each other, on one and the same body support, so that different kinds of work can be supported on the same structure.

The vitreous enamel 11 prevents the deposit of any metal from the plate 2 on the support for the work, except where the

brass prongs 14 are exposed, but this reduces the waste of the plating metal to a minimum, and confines the plating action to the work itself, practically as much as is possible in processes or methods of this kind. The enamel 11 is, of course, of such character that it cannot be attacked by acid or other chemicals, and it thus not only serves as an insulator, so that the current must pass through the prongs 14, or to any of the prongs shown in Figures 4 to 7 inclusive, but it also serves as a protective coating for the main support itself. As stated, vitreous enamel, of the kind ordinarily employed on iron bathtubs and other plumbing fixtures, can be employed for this purpose, but it is obvious that other kinds of enamel or coating can be employed without departing from the spirit of the invention.

Thus the washers 13 cover the exposed ends of the projections 10, thereby to prevent the electrolyte from contacting with any portion of the metal of the body member composed of the upright and the lateral projections 10, which body member is insulated and protected everywhere except at the ends of the projections 10 where the prongs 14, or the prongs shown in Figures 4 to 7, are electrically joined to the body member. The coating 11, of course, is not only an insulation but is also a protective covering to resist attack by the electrolyte. As stated, this coating is preferably of a vitreous nature, such as that made by using silica, and may be the ordinary white enamel coating of the kind previously described, but of whatever material the coating is made, and regardless of just how it may be applied, it is essentially a protective coating as well as an insulation against the electric current. Moreover, as shown and described, this coating is preferably of a permanent nature, and is a part of the body member, being applied thereto in the manufacture of the body member, becoming practically a permanent part of and an outer surface for the body member, which latter may be of any suitable metal, but is preferably of steel if the hard vitreous white enamel described is to be employed for this purpose.

Furthermore, the insulation and protective covering on the body member of the support tends to insure more uniform plating on the work. For example, when large metal surfaces are left exposed on the supporting structure, the surfaces of the work adjacent the supporting structure do not plate as well, inasmuch as the large exposed surfaces of the body member absorb the electric current and the result has been, with ordinary plating apparatus, that the outer surfaces of the work plate better, and some times it has been necessary to turn the work two or three times or more in the process of plating the desired metal thereon. However, with the invention shown and described, the plating action is uniform, or more nearly so, on the outer and inner surfaces of the work, as the work itself forms the greater amount of metallic surface left exposed to receive the current and receive the metal to be plated thereon, and there is only a minimum of exposed metal surface on the supporting structure or rack on which the work is immersed in the electrolyte.

It will be understood, of course, that the supporting member can be made of steel, cast iron or any metal to which the enamel will adhere in the desired manner. Preferably a ferrous metal is employed for this purpose, inasmuch as the vitreous enamel can be made to adhere thereto, in the well known manner, and in such case the body member is preferably an iron casting, of the form shown, or of any suitable form or design, depending upon the work to be done.

What I claim as my invention is—

1. In an electroplating apparatus, the combination of a metal member to be immersed in the solution or electrolyte, a vitreous coating on said metal member, forming an insulation and protective covering therefor, uninsulated metal means carried by and mounted in electrical connection with said member, adapted to support the work to be plated in said electrolyte or solution, so that the electric current for plating purposes will pass through the electrolyte to the work supported on said uninsulated means, and through the metal of said member, and electroconductive supporting means for said member.

2. A structure as specified in claim 1, said member being made of ferrous metal, said coating being white silica enamel.

3. A structure as specified in claim 1, said insulated work supporting means comprising one or more removable prongs, whereby different prongs can be used interchangeably on one and the same member.

4. A structure as specified in claim 1, said insulated supporting means comprising one or more metal elements for directly engaging and supporting the work to be plated, with screw threaded means to connect said element or elements in place on said member, whereby different elements can be used interchangeably on said member.

5. A structure as specified in claim 1, said member comprising an upright portion with lateral projections thereon, and said uninsulated means comprising metal prongs extending from the outer ends of said projections, whereby each prong forms an extension of its allotted projection.

6. A structure as specified in claim 1, said member comprising an upright portion and lateral projecting portions extending therefrom, and said uninsulated means com-

prising metal prongs removably mounted on the outer ends of said projecting portions, whereby different prongs can be used interchangeably on one and the same member, and on the said projections thereof.

7. A structure as specified in claim 1, said supporting means comprising a metal element detachably connected to the upper end of said member.

8. A structure as specified in claim 1, said member having exposed metallic portions which are not covered by said coating, and said uninsulated means comprising metal prongs applied to said exposed metal portions, with washers of suitable insulating material to cover said exposed metal portions, so that when immersed no portion of the metal of said body is exposed to the solution.

9. In an electroplating apparatus, the combination of a body member, a permanent coating thereon, forming a permanent insulation and protective covering therefor, and uninsulated metal means projecting from said body member to engage and support the work to be plated in the solution or electrolyte, whereby the electric current passing through the electrolyte must enter said body member by way of the work and said engaging means, and is prevented from passing through said permanent coating.

10. A structure as specified in claim 9, said coating having a hard smooth surface adapted to resist attack by the solution or electrolyte.

11. A structure as specified in claim 9, said body member comprising an upright portion provided with lateral projections thereon, with the ends of said projections exposed, and said uninsulated metal engaging means being applied to said exposed ends of said projections, together with means to protect said exposed metal at the ends, thereby to prevent the electrolyte from contacting with any portion of the metal of said body member.

12. A structure as specified in claim 9, and uninsulated means comprising one or more movable metal prongs, whereby different prongs are adapted to be used interchangeably on one and the same body member.

WILLIAM E. BELKE.