Dec. 12, 1944. M. S. SCHNEIDER 2,364,822

PLATING RACK

Filed Nov. 6, 1941 2 Sheets-Sheet 1

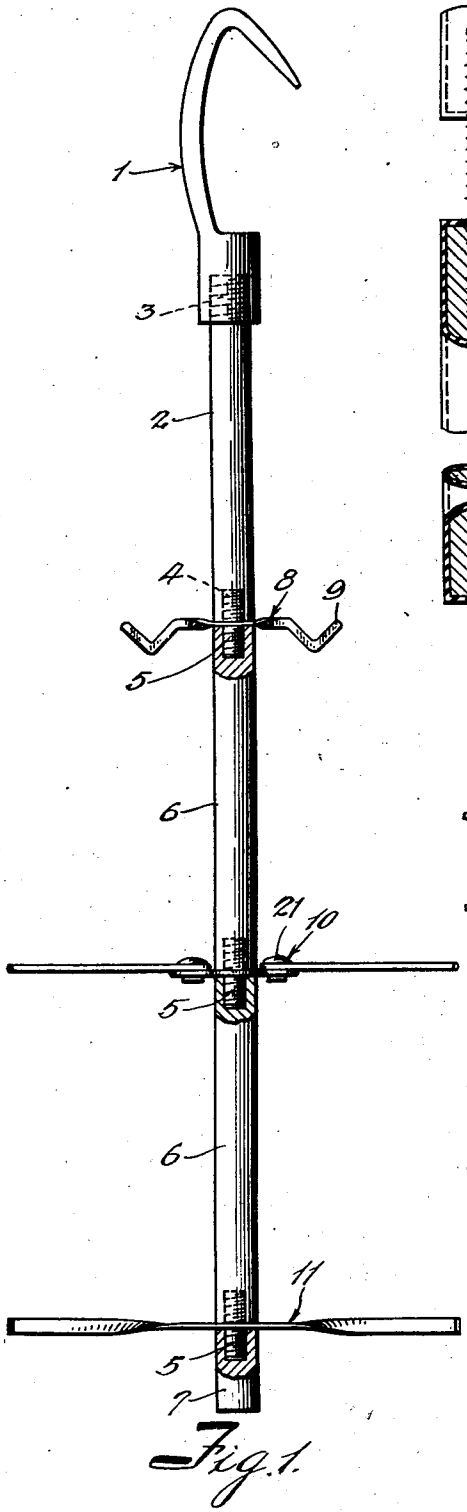


Fig. 1.

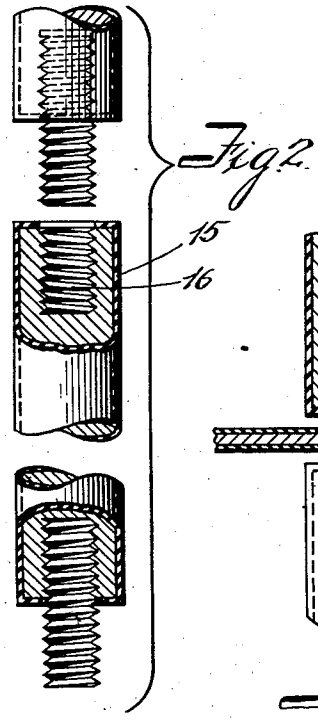


Fig. 2.

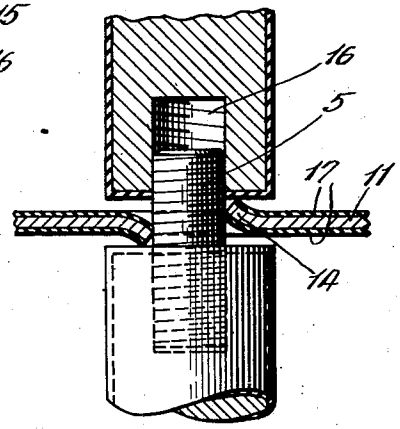


Fig. 4.

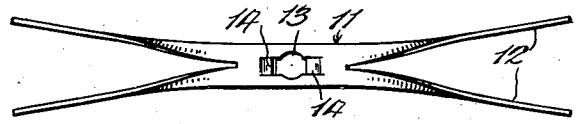


Fig. 3.

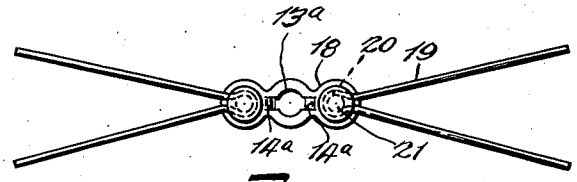


Fig. 5.

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PLATING RACK

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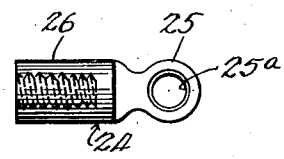


Fig. 7.

Fig. 6.

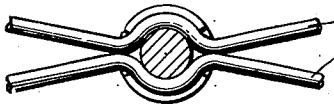


Fig. 10.

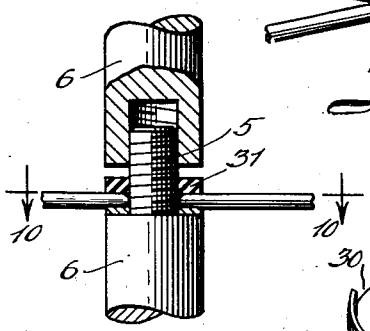


Fig. 9.

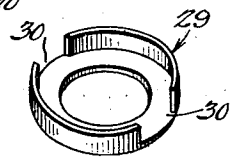


Fig. 11.

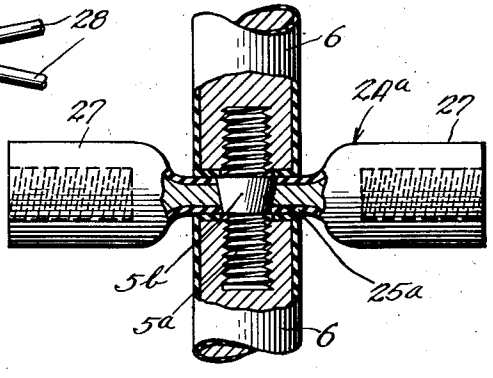


Fig. 8.

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UNITED STATES PATENT OFFICE

2,364,822

PLATING RACK

Max Stefan Schneider, Chicago, Ill.

Application November 6, 1941, Serial No. 417,997

5 Claims. (Cl. 204—297)

This invention relates to electroplating apparatus and particularly to work supports or so-called plating racks for supporting in a plating solution the various articles to be plated.

Plating racks of the general type disclosed herein usually comprise one or more integral elongated bars or rods having a hook at one end so that they may removably be suspended from a bus bar supported above the solution in the plating tank. Suitable arms are attached to the rods to support the articles to be plated, and these arms usually comprise small hooks or arms which are preferably removably attached to the racks so that hooks or arms of various shapes may be attached to conform with the requirements of different types of articles to be plated.

It has been found that, when uninsulated racks are used for supporting articles to be plated, the plating lacks uniformity over the surface of the articles and particularly the surfaces adjacent the rack may not plate as well as the rest of the article for the reason that the large exposed surfaces of the uninsulated rack absorb the electric current and it is sometimes necessary, when such racks are used, to turn the work several times in the process of plating in order to deposit a uniform coating. Also, when the rack is not insulated, a considerable amount of metal is deposited thereon instead of on the work itself, thereby causing considerable waste of the plating metal. It is also desirable to use racks of different size and shape in accordance with the requirements of the articles to be plated. It has, therefore, been necessary to keep in stock large numbers of racks of various sizes and types in order to meet all of the usual requirements.

It is an object of the present invention to provide a knockdown plating rack which is entirely made up of small interchangeable parts which parts may be assembled in various relationships, together with suitable interchangeable work supports, so that a great variety of racks of various sizes and arrangements may easily be made up by merely changing the connected relationship of the various elements.

It is also an object to provide suitable insulation on the various elements and to provide an improved means for connecting these various insulated elements to obtain the desired electrical characteristics and at the same time to enable any desired positioning or relationship of various types of interchangeable work supports.

A further object is to provide an improved construction whereby all of the separable joints and connections of the various elements may be properly insulated and sealed so as to prevent corrosion or other interference with the electrical characteristics of the connections.

It is also an object to provide a knockdown rack construction in which the separate elements may be so insulated as to prevent corrosion at any point or, if desired, the insulation may be omitted and the entire structure may be insulated after assembly, in which latter case the insulation may be scraped or otherwise removed from the work contacting portions of the article supporting arms or hooks.

Another object is to provide an improved electrical connector means which is automatically operative merely by threading the rack members together to thereby provide an effective electrical connection of the article supporting arms with the rack bars and at the same time to obtain an effectively sealed and insulated mechanical connection of the elements.

Further objects will be apparent from the specification and the appended claims.

In the drawings:

Fig. 1 is a side elevation of a knockdown plating rack in the form of a single sectional rod and illustrates one embodiment of the invention.

Fig. 2 is a detailed side elevation of a portion of the rack shown in Fig. 1 before assembly.

Fig. 3 is a top plan view of one of the sheet metal article supporting members adapted to be interchangeably assembled in any desired relationship between the sections of knockdown racks such, for instance, as shown in Figs. 1 and 6.

Fig. 4 is a fragmentary elevation partly in section of partially assembled elements and illustrates the manner of assembling the article supporting arms to form an insulated joint and at the same time an effective electrical connection between any of the rod elements forming the rack.

Fig. 5 is a top view of another embodiment of interchangeable article supporting element.

Fig. 6 is a front elevation of a multiple-rod rack made up of various interchangeable rod sections. The article supporting members are omitted in this view.

Fig. 7 is a top view of one of the branch connectors shown in Fig. 6.

Fig. 8 illustrates still another embodiment of branch connector.

Fig. 9 illustrates still another embodiment of work support and the method of assembling this support between any pair of sectional rod elements.

Fig. 10 is a transverse sectional view taken on a line substantially corresponding to line 10—10 of Fig. 9.

Fig. 11 is a perspective view of the cup-shaped washer shown in Fig. 9 for retaining the wire article supporting elements in assembled relationship.

Referring to the drawings in detail, the embodiment illustrated in Fig. 1 comprises a terminal hook 1 for suspending the rack on a suitable bus bar. A connector section 2 is threaded into the hook as shown at 3, the opposite end of this sec-

tion being internally threaded at 4 to receive a similarly threaded brass stud 5. The section 2 is preferably of brass or other material of high conductivity. The remainder of the sectional rod is made up of sections 6 which may be of any suitable material but are preferably made of steel and are internally threaded at each end to receive threaded brass connector studs 5 similar to the stud previously described. Brass studs are preferable for connecting the various sections of the rod in order to provide effective electrical connections when the rod sections are screwed together, although any suitable material may be used. A threaded cap 7 is provided at the lower end of the rack assembly, and this threaded cap may be merely a short section of rod or an entire section may be used for that purpose if desired.

Various types of work supporting hooks or arms may be clamped between the various rod sections, as illustrated, and are constructed to provide suitable electrical connection with the studs 5 during the clamping operation. In the embodiment shown in Fig. 1, a sheet metal article supporting member 8 is clamped between the first sections and with the arm portions formed in the shape of a hook 9 and each arm twisted as illustrated to bring the hook portion into position to support an article thereon. Interchangeable article supports 10 and 11 are also shown assembled in this embodiment and are illustrated in detail in Figs. 3 and 5.

The member 11 comprises an elongated sheet metal strap having bifurcated ends forming arms 12 which arms may be used in the form shown or may be bent to any shape desired in accordance with the article supporting requirements. The strap 11 is provided with a central opening 13 to receive one of the studs 5 and is sheared on opposite sides of this opening to provide oppositely formed tongues 14, one tongue being pressed outwardly from each side of the material, substantially as illustrated in Fig. 4. The space between the ends of these tongues, before they are formed outwardly from the blank, is slightly less than the diameter of the stud 5 and is just sufficient after they are formed outwardly to permit the stud to be inserted through the opening, as shown in Fig. 4.

The rod sections 2 and 6 are preferably completely insulated by means of any suitable covering or coating 15 such, for instance, as hard rubber (Fig. 2), except in the internally threaded openings 16 (Fig. 4). Therefore, when any of these sections are screwed snugly together with an article support therebetween, the joint is effectively insulated. In order to provide a suitable insulation when any of the article supporting arms are mounted between the sections, each article supporting member is preferably provided with an insulating covering 17 (Fig. 4). However, the end edges of the tongues 14 are not insulated for the reason that these edges are intended to make electrical connection with a stud 5 during assembly of a rack.

All of the article supporting members are preferably provided with the contactor tongues 14 and the insulation just described, and the connection with the rod sections is made in a similar manner to that disclosed in Fig. 4. In this view it will be apparent that, if the article supporting member 11 or any other article supporting member of a similar type is mounted in the joint in the manner shown, the tongues 14 will be in the relationship illustrated and, when the rod sections are screwed snugly together, the tongues 14 will be flattened out and the inner edges thereof will be firmly pressed against the brass threaded stud 5 to form an effective electrical connection. At the same time the insulation on the ends of the rod sections and on the article supporting member will form an effective seal against the entrance of any plating fluid into the joint.

Fig. 5 illustrates another type of article supporting member and comprises a sheet metal connector plate 18, the connector portion of which is formed substantially identical with that just described and is provided with a central opening 13*a* for a stud 5 and with oppositely disposed and oppositely bent contact tongues 14*a*. Resilient wire fingers 19 of any desired type are formed to provide a loop 20 integral therewith and this loop is secured to the plate 18 by means of a rivet 21. The resilient wire arms may be used in the form illustrated or may be formed to any desired shape to support the type of article to be plated. It will be understood, of course, that all of the article supporting members may have a suitable insulation covering, which covering may be provided by dipping or otherwise, and the insulation may be removed from the article supporting portions and tongue edges by scraping or by any other suitable expedient.

Fig. 6 illustrates an assembly of interchangeable elements forming a rack having a plurality of vertical rods 22 and a plurality of horizontal bars 23 assembled therewith. Both the horizontal bars and the vertical rods may, if desired, be made up of the sections 6, as illustrated in Fig. 1. However, it is preferable to provide horizontal sections 6*a* of somewhat shorter length than the vertical sections 6, although they may be identical with the sections 6 except for the difference in length. They may also be connected by the same studs 5. However, it is preferable to make these cross bar sections with an integral stud on one end and a threaded socket on the other end. It will, of course, be understood that the length of any of these sections may be in accordance with the type of articles to be supported and that in any case the elements are all interchangeable one with the other.

Branch connectors 24 and 24*a* are provided for connecting the horizontal sections to the vertical sections, these connectors being illustrated in detail in Figs. 7 and 8.

Fig. 7 shows a single branch connector 24 having a flattened portion 25, which portion is provided with a slightly tapered opening 25*a* therethrough to receive a tapered stud such as shown in Fig. 8. The connector 24 is also provided with an internally threaded socket portion 26 adapted to receive any one of the studs 5 or the like so that any desired rod section may be connected thereto and, if desired, any article supporting member may be clamped between this branch connector and an adjacent rod section.

A double branch connector 24*a* is shown in Fig. 8 and is substantially identical with the single connector of Fig. 7, except it is provided with two oppositely disposed internally threaded socket portions 27. The flattened portion is also provided wtih a slightly tapered hole 25*a*, which hole is identical with that previously described in connection with the connector 24.

A stud 5*a* (Fig. 8) is used for securing these branch connectors between the sections 6, and this stud is provided with a tapered portion 5*b*, which latter snugly fits in the complementary tapered opening of either of the branch con-

nectors as shown. The sections and the connectors are preferably provided with insulation coverings, as previously described, except that the edges of the tapered holes are not insulated. Therefore, when the sections are clamped snugly together, the tapered portion 5b of the stud makes an effective electrical connection in the tapered opening and the joints between the sections are simultaneously sealed. The taper is exaggerated in the drawing, but in practice is only about a two-degree taper so that all of the elements be securely clamped together to secure the desired results.

Figs. 9, 10, and 11 illustrate another embodiment of article supporting member and retaining means therefor. This embodiment is particularly adapted for use on uninsulated racks, although it may be used equally well with insulated rod sections. As shown in Fig. 10, the elongated article supporting arms 28 are preferably made of wire with their intermediate portions arcuately formed as illustrated so that these portions may be seated in a sheet metal cup-like washer 29. The walls of this washer are interrupted to provide openings 30 through which the oppositely disposed wire arms extend. The washer and wires therein are adapted to be mounted on any one of the studs 5 between any of the vertical sections 6 or between similar horizontal sections 23.

In assembling these arms between the sections, a washer 31 is also mounted on the stud 5 and over the open end of the cup 29. The washer is preferably of lead, but may be of any suitable soft material so that, when the sections 6 are screwed snugly together, the material of the washer is pressed into all of the interstices of the joint and completely seals the joint to prevent the entrance of plating fluid therein and at the same time provides intimate electrical contact between the parts. This type of joint is, of course, not insulated during the process of assembly. However, it is especially adapted for racks which are first assembled of uninsulated parts and then dipped in a suitable insulating material and the insulation then scraped or otherwise removed from the article supporting portions of the members.

It is intended, of course, that the invention should not be limited to the specific embodiment or embodiments disclosed herein, since modifications may be made, and it is contemplated, therefore, by the appended claims to cover any such modifications as fall within the true spirit and scope of this invention.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. A knockdown plating rack comprising at least two rod-like sections arranged substantially end to end, a tension element extending between and connecting said sections and having a screw-threaded engagement with at least one of said sections, the adjacent ends of said sections having clamping shoulders adjacent said tension element, and a work supporting element extending laterally from said sections and having an opening through which said tension element passes, a portion of said work supporting element adjacent said tension element being clamped between said shoulders, and said work supporting element being angularly adjustable about the axis of said tension element.

2. A knockdown plating rack comprising at least two rod-like sections arranged substantially end to end, a tension element extending between and connecting said sections and having a screw-threaded engagement with at least one of said sections, the adjacent ends of said sections having clamping shoulders adjacent said tension element, and a work supporting element extending laterally from said sections and having an opening through which said tension element passes, a portion of said work supporting element adjacent said tension element being clamped between said shoulders, said rod-like sections having an insulating covering overlapping said clamping shoulders and said work supporting element being angularly adjustable about the axis of said tension element.

3. A knockdown plating rack comprising at least two rod-like sections arranged substantially end to end, a tension element extending between and connecting said sections and having a screw-threaded engagement with at least one of said sections, the adjacent ends of said sections having clamping shoulders adjacent said tension element, and a work supporting element extending laterally from said sections and having an opening through which said tension element passes, a portion of said work supporting element adjacent said tension element being clamped between said shoulders and having a spring element said spring element being pressed by said clamping action into engagement with said tension element, said work supporting element being angularly adjustable about the axis of said tension element.

4. A knockdown plating rack comprising at least two rod-like sections arranged substantially end to end, a tension element extending between and connecting said sections and having a screw-threaded engagement with at least one of said sections, the adjacent ends of said sections having clamping shoulders surrounding said tension element, and a work supporting element extending laterally from said sections and having an opening through which said tension element passes, said work supporting element having a flat portion surrounding said tension element being clamped between said shoulders, said flat portion being sheared to provide tongues to be forced into engagement with said tension element by said clamping action, and said work supporting element being angularly adjustable about the axis of said tension element.

5. A knockdown plating rack comprising at least two rod-like sections arranged substantially end to end, a tension element having a tapered portion extending between and connecting said sections and having a screw-threaded engagement with at least one of said sections, the adjacent ends of said sections having clamping shoulders surrounding said tension element, and a work supporting element extending laterally from said sections and having a tapering opening in which said tapered portion fits, a portion of said work supporting element surrounding said tension element being clamped between said shoulders, said work supporting element being angularly adjustable about the axis of said tension element.

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