

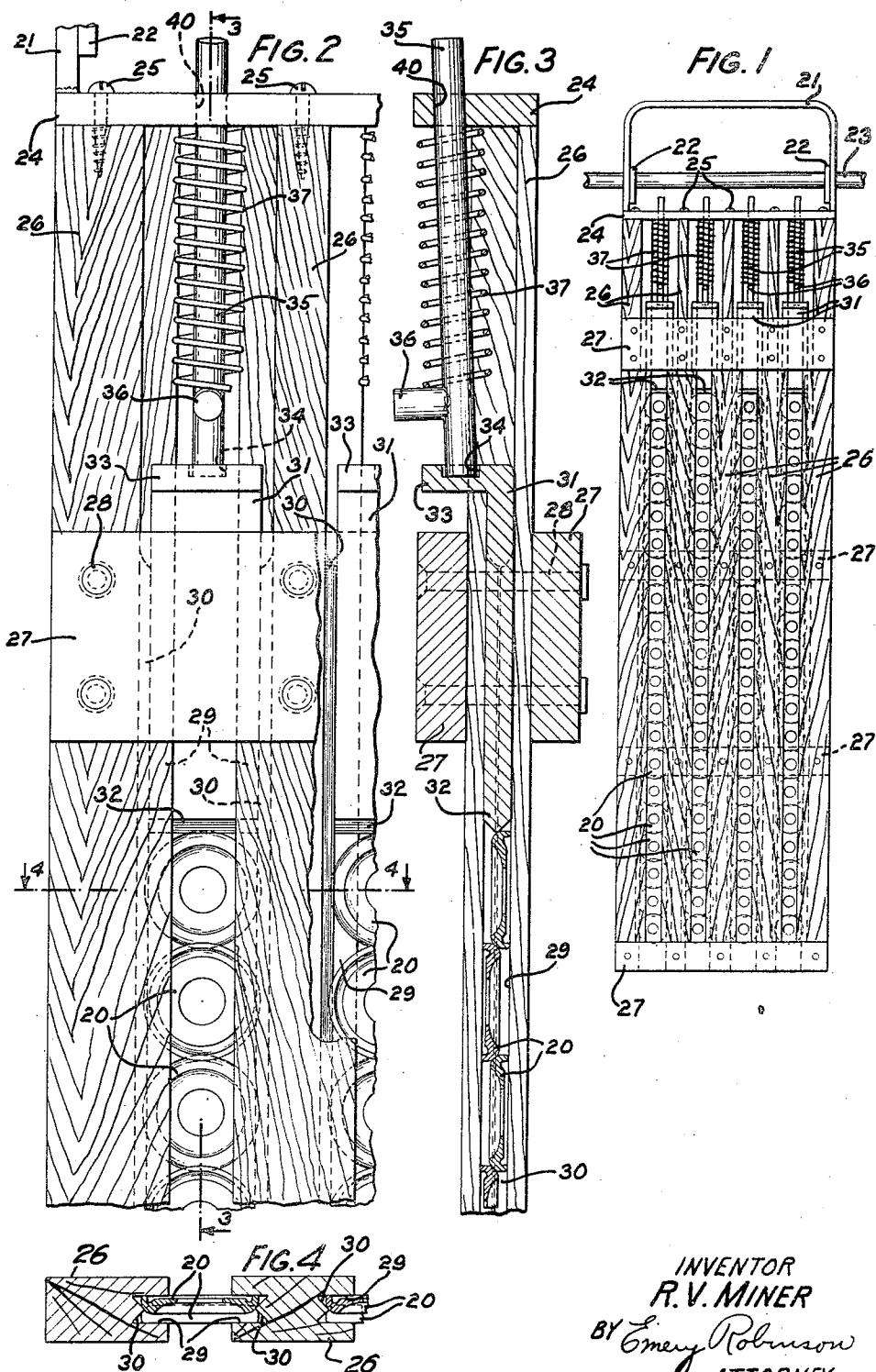
April 13, 1943.

R. V. MINER

2,316,609

ARTICLE SUPPORTING RACK

Filed March 9, 1940



INVENTOR
R. V. MINER
BY *Emery Robinson*
ATTORNEY

UNITED STATES PATENT OFFICE

2,316,609

ARTICLE SUPPORTING RACK

Robert V. Miner, Chicago, Ill., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

Application April 9, 1940, Serial No. 328,636

1 Claim. (Cl. 204—297)

This invention relates to article supporting racks, and more particularly to racks for supporting articles in an electrolytic bath.

In treating articles in electrolytic baths it is often desirable to support the articles in a rack in order to minimize the handling and processing costs. For the usual electroplating operation a rack made of electrical conducting material, in which the rack members support the articles and also conduct current thereto, is generally suitable, but racks of this type are often unsatisfactory for use in anodic oxidizing processes. Because the oxide coating is an effective insulator and its formation depends upon the flow of current to the article from the rack, no oxide is formed on the portions of the article surface that are in contact with the conducting rack members.

This coating deficiency is particularly troublesome in certain cases where the coated article is subsequently incorporated in electrical apparatus where its utility is measured by the completeness of the oxide coating. For example, a small ring-shaped insulator is used in certain telephone transmitters to form a portion of the carbon chamber. An insulator made of aluminum, or aluminum alloy, and coated with the type of oxide that is produced anodically in a sulphuric acid solution is very suitable for this purpose, but the quality of transmitter performance depends upon the completeness of the oxide coating, particularly at certain critical portions of the insulator surface. It is not possible to produce the desired coating with the usual plating racks or even by the relatively expensive method of supporting the insulators individually on wires in the anodizing bath.

An object of this invention is the provision of a rack of simple construction and improved operation for supporting a quantity of articles in an electrolytic coating bath in a manner to facilitate the formation of an adequate coating on a large and selected proportion of the article surface.

One embodiment of this invention provides a rack for supporting a quantity of thin, circular articles, such as transmitter insulators, in an electrolyte, such as a sulphuric or other acid solution, in an anodizing apparatus. The rack comprises a pair of spaced and parallel elongated members made of wood, or other absorbent material having suitable insulating properties, each having longitudinal grooves in their opposed faces in which the articles are supported and forced into edge to edge contact by a spring. Current is

applied to the top article in the stack by a conducting member connected to an electrode in the anodizing circuit. The width of each article supporting groove is greater than the thickness of the article so that only one face of each article is in contact with the supporting member and due to the absorption of electrolyte by the wooden article supporting members, oxide is formed on the article portions in contact with the members. Consequently, the articles receive an oxide coating that is complete except for the very small current transmitting areas where each article is in engagement with adjacent articles.

Following is a more detailed description of the invention taken in conjunction with the appended drawing, in which

Fig. 1 is a front view of an article supporting rack embodying certain features of the invention;

Fig. 2 is an enlarged view in section of an intermediate portion of the rack shown in Fig. 1, with a portion of the rack broken away;

Fig. 3 is a sectional view of Fig. 2 taken on the line 3—3, and

Fig. 4 is a sectional view of Fig. 2, taken on the line 4—4.

The rack shown on the drawing is especially adapted for supporting round and relatively thin articles, such as the above mentioned telephone transmitter insulator, in a standard anodizing bath, such as a solution of sulphuric, chromic or other acid. These insulators 20 are made of aluminum or an aluminum base alloy and, as shown in Figs. 2 and 3, they are ring-shaped with a rounded periphery and dished surface on one face, and a raised flat peripheral portion on the other face. When the insulator is assembled in a transmitter, it is supported on the flat peripheral portion and its dished surface carries the carbon, and consequently a complete and adequate oxide coating is required on both of these surfaces.

The rack for supporting these parts has a U-shaped handle 21 of electrical conducting material, such as brass or copper, to which a pair of hooks 22, also made of brass or copper, are brazed for suspending the rack from an electrode 23 which is part of a conventional anodic oxidizing apparatus (not shown).

A flat bar 24 of brass, or other good conducting material, extends between the two ends of the handle and is secured, as by brazing, to the end portions of the handle.

Depending from the under side of this bar and secured thereto with screws 25 or the like are

a series of uniformly spaced and parallel article supporting members 26. These members are made of wood or other material having suitable insulating and absorbent properties and have a rectangular cross section. At intervals along the length of these members are external cross braces 27 which are fastened with copper rivets 28 or bolts to each of the members to hold them rigidly in position.

In the opposed faces of each of the article supporting members is a longitudinal groove 29 for receiving the articles. These grooves have parallel side walls and their width is somewhat greater than the thickness of the articles so that the articles can be shifted to one side of the grooves and thus have only one of their faces in contact with the rack. The base 30 of the groove is shaped in the form of an inverted V with surfaces sloping from its mid-portion towards each side wall of the groove.

To facilitate loading the articles into the grooves, the portion of each article supporting member in front of the groove and above the top cross brace is cut away. The inverted V-shaped configuration of each groove base is also cut away at these locations and terminates just below the upper edge of the top cross brace, the base of the groove being flat above the top cross brace.

The articles positioned in the grooves are electrically connected with the conducting bar 24 on the handle by means of removable members, which are positioned after the rack is loaded. A formed pressure member 31 of substantially rectangular section, preferably made of aluminum, is positioned in the grooves and has a beveled portion 32 at its lower end which engages the top article in the grooves, and a portion 33 at its upper end which is bent at right angles and has a circular indentation 34 in its top surface. A connector 35, positioned above the pressure member and preferably made of brass, has a cylindrical body and a handle 36 extending therefrom. The lower end of the connector rests in the indentation in the pressure member surface and the upper end portion of the connector extends through a suitable opening 40 in the conducting bar. A helical spring 37 around the connector is compressed between the conducting bar and the connector handle. The spring is sufficiently strong to insure good electrical contact between the conductor bar and the top article in the grooves and to force the stacked articles into firm end to end engagement.

The insulators are conveniently loaded at the portion of the rack above the top cross brace with the connector, spring and pressure member removed therefrom. In inserting the insulators, their positions with reference to their configuration are alternately reversed. Thus, each alternate insulator is inserted with its flat peripheral portion to the back of the rack and its rounded periphery is engaged against the rear slope of the inverted V-shaped base of the groove which directs the insulator against the rear groove surfaces as it slides down the grooves. The intermediate insulators are each inserted with their flat peripheral portions to the front of the rack and their rounded peripheries are engaged by the front groove base slope. Thus, the flat peripheral portion of each insulator is supported against the rack and its other face is spaced from the rack members. Each insulator is offset from the adjacent insulators and has a small portion

of its rounded surface in contact with the adjacent insulators.

After the grooves are filled with insulators, the pressure member is inserted in the grooves on top of the insulators with its bevelled end against the top insulator. The connector is then positioned as above described with its encircling spring forcing it into contact with the conducting bar and against the pressure member.

The loaded rack is then hung on the anode bar in the anodic oxidizing apparatus, by means of the hooks, with the surface of the electrolyte above the juncture between the top insulator and the pressure member and the oxidizing operation is then conducted in the usual manner.

In the anodizing process the entire surface of each insulator becomes coated with oxide with the exception of the two areas on its rounded peripheral portion where it engages the adjacent insulators, or the pressure member, and through which current is transmitted from article to article. These bare areas are very small because they are formed by contact between two circular and rounded surfaces, or between one such surface and the beveled end portion of the pressure member. The article supporting members absorb electrolyte from the bath and then supply electrolyte to the portions of the insulator surface which are in contact with these members. As a result, these portions of the insulator surface also become coated during the process despite the necessity for tightly compressing the insulators to provide an adequate flow of current between them.

The article supporting members are required not only to absorb the electrolyte, but also to maintain suitable conditions for the formation of an adequate oxide coating on the article surfaces in contact with the rack. Supporting members made of straight grained hard maple meet these requirements fully. Other materials having suitable absorbent and normal insulating properties can also be used but maple gives particularly good results, is relatively cheap, and in addition can be machined readily into the required shapes.

The specific rack structure described herein is adapted to a particular type of article and some changes will be necessary to accommodate different article configurations. In the transmitter insulators a particularly complete and effective oxide coating is required over the dished face, which contacts with the carbon, and over the flat peripheral portion, on which the insulator is positioned in the transmitter. Adaption of the usual plating racks or the conventional wires or hooks for supporting these articles in the electrolyte results in the formation of bare spots on one or both of these critical surfaces. By means of the rack structure described herein the inevitable bare spots are localized and accurately positioned in a non-critical area.

It will be apparent that modifications of the above described specific embodiment of the invention are feasible and it is to be understood that the invention is limited only by the scope of the appended claim.

What is claimed is:

In a rack for supporting round and substantially flat articles in an electrolyte in an anodic oxidation process, a bar of conducting material, means for supplying current to said bar, a pair of spaced and parallel article supporting members of rigid insulating material capable of absorbing said electrolyte depending from the

bar and having longitudinal grooves in their opposed faces for receiving a plurality of said articles and positioning the articles with peripheral portions of each article in contact with peripheral portions of adjacent articles, the width of said grooves being greater than the thickness of said articles and the base of each groove being configured in the form of an inverted V to engage the articles as they are inserted in the groove and direct the inserted articles selectively toward either side of the grooves, a formed pressure member of conducting material positioned in the grooves having a beveled portion at one

5 end for engaging the periphery of an end article in the groove and a bent portion at the other end with a surface recess therein, a connector of conducting material having one end portion engaging the pressure member recess and the other end portion engaging the conductor bar, and a helical spring encircling the connector for urging the connector into electrical contact with the conductor bar and the pressure member and forcing the pressure member against the end article to cause the current to travel throughout the series of articles in the grooves.

ROBERT V. MINER.