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W. BEEBE

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ELECTRIC ETCHING OR DEPOSITION FRAME

Filed June 12, 1937

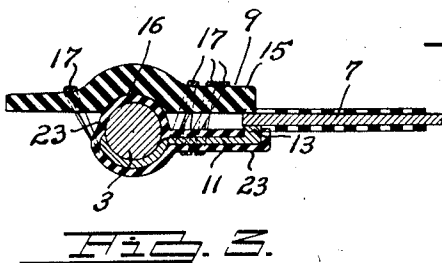
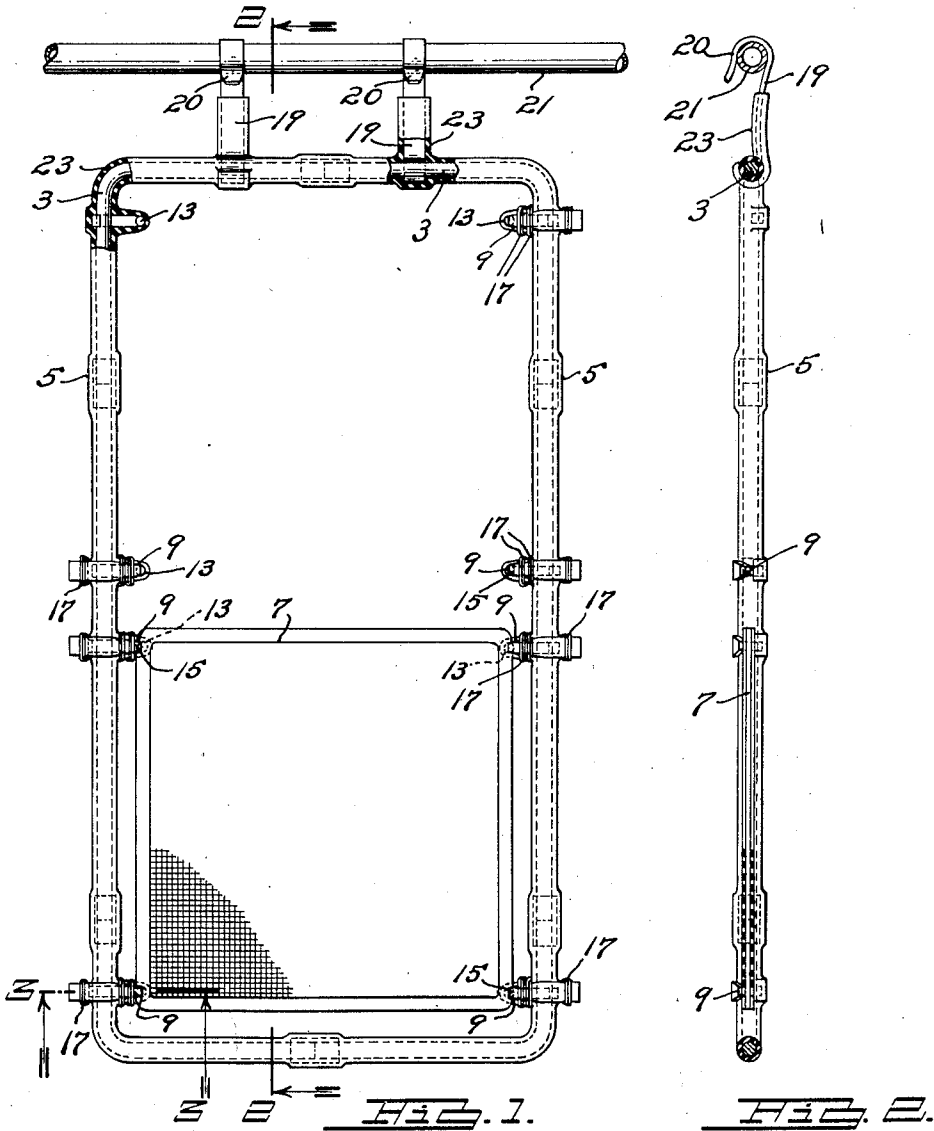
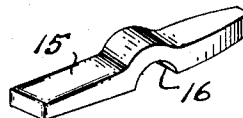


FIG. 4.



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UNITED STATES PATENT OFFICE

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ELECTRIC ETCHING OR DEPOSITION
FRAME

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mesne assignments, to The Trumbull Metal
Products Company, a corporation of Dela-
ware

Application June 12, 1937, Serial No. 147,968

3 Claims. (Cl. 204—5)

My invention relates to a frame for supporting metal plates for plating and etching.

It is an object of my invention to provide a frame for conveniently receiving and supporting metal plates in conductive connection in an electrolytic bath, in which the frame may be conveniently suspended or removed for quickly unloading and reloading.

It is also another object of my invention to provide such an electric deposition and etching frame comprising a substantially rectangular frame of electrically conductive material having intumed clamps disposed around the sides for clamping the corners of square or rectangular matrix plates to support the plates, and to provide substantially uniform current conduction therein.

It is a further object of my invention to provide such a frame having pairs of clamp jaws of which one jaw of each pair is of electrically conductive material extending rigidly from the frame, and the other is a movable jaw of non-conductive material which is movably supported on the rigid jaw by resilient rubber bands which also compress the jaws together.

Further objects and advantages are within the scope of my invention such as relate to the arrangement and function of the related elements of the structure, to various details of construction and combinations of parts, elements per se, economies of manufacture and numerous other features which will be apparent from a consideration of the specification in conjunction with the drawing disclosing a specific form of my invention, in which:

Fig. 1 is a front elevational view of my electric deposition and etching frame supported from an electrical conductive bus bar;

Figs. 2 and 3 are sectional views taken on lines 2—2 and 3—3 thereof; and

Fig. 4 is a perspective view showing the removable jaw of one of the plate supporting clamps.

Referring more specifically to the drawing, my electrical deposition and etching frame comprises a support member 3 which is of electrically conductive material. As shown, the electrically conductive support 3 is preferably of any suitable metal of a circular cross section to provide a frame which is rigid and light. The frame may be composed of a plurality of rod like members 3 comprising straight and corner pieces joined together in suitable coupling sleeves 5 in any suitable manner, as by sweat soldering or threading.

For supporting square or rectangular sheets or plates 7, the frame is of rectangular conformation of a proper size for accommodating a suit-

able number of the plates 7 to be immersed in edge-to-edge relation in the electrolytic bath (not shown), and it is for this purpose provided with a number of holders or clamps 9. The clamps 9 project inwardly from the frame and they are spaced around the sides at suitable positions for clamping the corners of the plates 7 to be supported therein.

Each of the clamps 9 comprises a stationary jaw 11 of electrically conductive material extending inwardly from the frame to which it is secured at one end as by welding or soldering, as shown more clearly in Fig. 3. At its inwardly projected end the stationary jaw 11 carries a laterally projecting contact 13 for providing electrically conductive connection with the plate 7 supported therein. The clamp also comprises a movable jaw 15 which is made of a non-conductive non-corrosive material, preferably hard rubber, although various other materials such as wood or porcelain could be utilized. An intermediate bearing 16 is provided in the jaw 15 for seating on the round frame.

Elastic means 17 is provided for clamping the movable jaw 15 toward the stationary jaw 11. For this purpose elastic rubber bands are disposed around the jaws for supporting the movable jaw and for compressing the jaws together.

A pair of supports 19 of strap metal are secured around the upper side of the frame and extend therefrom to provide hooks 20 for suspending the frame in an electrolytic bath from a bar 21. The hooks 20 also make electrical contact for transmitting the electrical plating or etching current between the frame and the bar 21.

For preventing the passage of the electric current directly between the frame and the electrolytic bath, a layer or film 23 of any suitable insulating material is provided thereon. This insulating covering 23 is also extended over the rigid jaw member 11 of the clamp exposing only the laterally projecting contact 13 on the end. For this purpose the frame is covered with a layer of rubber approximately $\frac{1}{8}$ inch thick, which may be applied by dipping, wrapping, spraying and vulcanizing thereon by various processes which are well known. The insulating cover 23 is preferably applied over a portion of the upwardly projecting supports 19 leaving the hooks 20 bare for making electrical contact.

In operation the frame is loaded with sheets of metal to be etched, or plates to be plated, or having electrodeposited layers to be etched, and this is conveniently accomplished by de-

pressing the outer ends of the movable jaws 15 of the clamps on the frame for inserting the corners of the plates between the inner ends of the jaws. The rubber bands 17 compress the jaws together to secure the plates and to establish electrical connection between the plates and the frame. By disposing the hooks 20 over an electrical bus bar 21 the frame is quickly and conveniently suspended in a suitable electrolytic bath to accomplish the desired process. After the process is completed, the frame is conveniently removed, unloaded, reloaded and reimmersed.

It is apparent that within the scope of the invention, modifications and different arrangements may be made other than herein disclosed, and the present disclosure is merely illustrative, the invention comprehending all variations thereof.

I claim:

1. An electric deposition or etching frame comprising, a rigid light-weight frame of electrically conductive rods, a plurality of stationary jaws of electrically conductive material joined to said rods in spaced, permanent, electrical conductive relation and projecting therefrom inwardly into the frame, a covering of insulating material on said frame, a corresponding number of movable jaws of non-corrodible material journaled directly on the frame rod adjacent the stationary jaws respectively, and having a concave bearing depression receiving the rod, and elastic

means of non-corrodible material for holding each movable jaw and compressing it toward the associated stationary jaw.

2. A support for holding articles to be electroplated or etched comprising, an electrically conductive rod, a stationary clamp jaw of electrically conductive material joined to said rod in permanent, electrically conductive relation therewith and projecting therefrom, a movable clamp jaw journaled on said frame in cooperation with said stationary jaw, and rubber elastic means disposed around said jaws and rod for securing the movable jaw on the rod adjacent the stationary jaw and compressing the movable jaw on the stationary jaw in clamping relation.

3. A support for holding articles to be electroplated or etched comprising, an electrically conductive rod, a stationary clamp jaw of electrically conductive material joined to said rod in permanent electrically conductive relation therewith and projecting therefrom, a movable clamp jaw of non-conductive material journaled directly on said rod opposite said stationary jaw, and having a concave bearing depression receiving said rod, and rubber elastic means disposed around said jaws and rod for securing the movable jaw on the rod adjacent the stationary jaw and for compressing the movable jaw on the stationary jaw in clamping relation.

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