

H. STRECKER-AUFERMANN.

PROCESS FOR PREPARING PRINTING PLATES BY MEANS OF ELECTROLYTIC ETCHING.

APPLICATION FILED DEC. 13, 1906.

909,831.

Patented Jan. 12, 1909.

Fig.1.

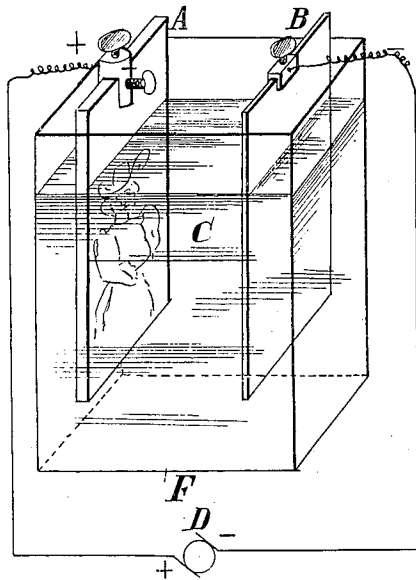


Fig.3.

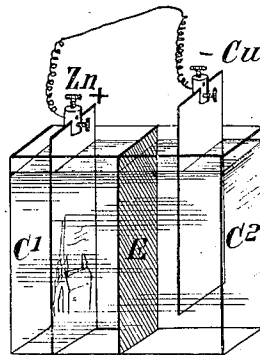
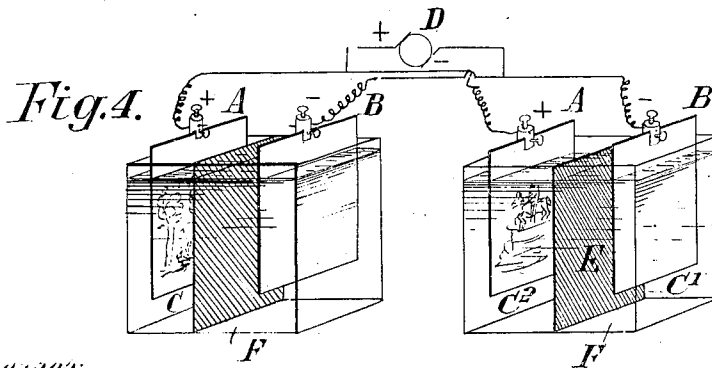
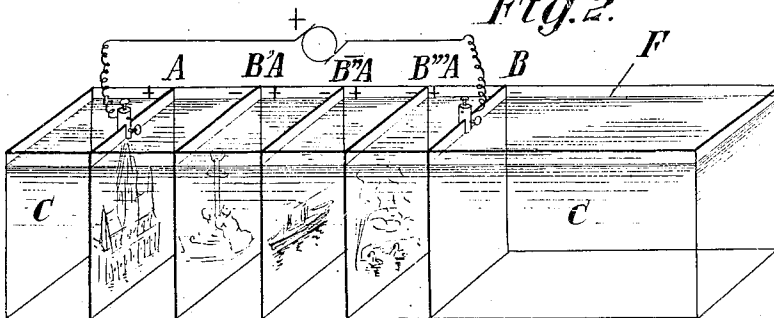


Fig.2.



Witnesses:

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PROCESS FOR PREPARING PRINTING-PLATES BY MEANS OF ELECTROLYTIC ETCHING.

No. 909,831.

Specification of Letters Patent.

Patented Jan. 12, 1909.

Application filed December 13, 1906. Serial No. 347,635.

To all whom it may concern:

Be it known that I, HANS STRECKER-AUFERMANN, a subject of the German Emperor, and resident of Munich, Germany, have invented certain new and useful Processes for Preparing Printing-Plates by Means of Electrolytic Etching, of which the following is a specification.

This invention relates to an electrolytic process of etching ready for printing, plates and printing rollers made of any metal such as iron, steel, nickel, copper, brass, zinc and the like, this etching being accomplished in the usual way.

The metal plates or rollers which are provided with a layer sensitive to light and upon which an image has been copied by applying a photographic negative thereover and exposing, said layer being formed of chrome gelatin, chrome glue, chrome albumin, chrome fish glue, chrome gum arabic or similar substances or of a mixture of these materials, with or without graining, are placed as anodes in a bath with their layers directed towards a cathode. A screen may be copied into the layer or it may contain a simple line drawing. The layer acts as a diaphragm which allows of the free exchange of the ions.

Any concentrated solution which has a swelling but not dissolving action upon the layer of chrome glue or the like may be used as the electrolyte.

The concentrated solutions of the metal chlorids are well adapted for this purpose such for example, as ferric chlorid or chlorids of zinc, copper and aluminum.

The process can be advantageously carried out, by means of the apparatus shown in the accompanying drawing, in which—

Figure 1 is a perspective view showing a simple arrangement of the apparatus and Figs. 2, 3 and 4 are similar views showing slightly different arrangements.

In all the figures the image surface which is equivalent to the anode has been designated by A, the cathode by B, the electrolyte by C, the source of electrical supply by D and the receptacles, in which the anode and the cathode are suspended, by F.

According to the simple arrangement shown by Fig. 1, the plate A, which it is desired to etch and which carries the faintly visible layer is connected by a conducting

wire with the positive pole of the dynamo 55 and the cathode B is connected by a second wire with the negative pole of the dynamo.

The plate A carrying the copy of the image is protected at its borders from the etching action by a coat of lacquer, and is suspended as the anode in the bath C. The material of the cathode B may be of any kind desired. The electrolyte used is a concentrated aqueous solution of one of the above cited swelling but not dissolving agents. 60 After about 5 to 15 minutes, during which time the circuit may be open or closed, the layer composed of glue or the like swells to different thicknesses according to the image. When the circuit has previously been interrupted, it is now closed and the etching operation begins, the ions of the acid wandering to the metal through the layer as a diaphragm while dissolved metal goes to the cathode. As the current, according to the 75 thickness of the layer, which varies according to the more or less strong exposure of the parts, reaches the metal more or less easily, a true etching is obtained which produces the image exactly. 80

The process may also be very advantageously carried out by arranging any desired number of etching plates B'A, B''A, B'''A between the anode A and the cathode B, the layers of these plates which are to be etched, 85 being all directed towards the cathode and, consequently, are anodic while the back sides of the plates which remain uncovered and must not be lacquered, are directed towards the anode and therefore are cathodic. 90 All the anodic sides are etched, while the dissolved metal is precipitated upon the cathodic sides, or hydrogen is set free thereupon when certain electrolytes are used. In this arrangement only the extreme anodes A 95 are connected with the positive pole of the engine and the extreme cathodes with the negative pole. The intermediate plates have their image, which in the drawing is scarcely visible, directed towards the cathode, the 100 image side being anodic.

The strength of the current must be held in this process between low limits and varies according to the fineness of the image between 0.05 and 2 amperes per square centimeter. The electrolyte generally consists of ferric chlorid of 42 to 30° Baumé. The degree of concentration of the bath is high, 105

it is however sometimes necessary to use baths which gradually become weaker or to produce a dilution of the bath by introducing water. The dilution can also be produced by separating the anode chamber from the cathode chamber by a diaphragm and using a weak solution in the cathode chamber, the solution in the anode chamber being concentrated. This arrangement has been shown by Fig. 4. This apparatus comprises two cells or baths which are connected in parallel. The second bath contains a diaphragm E and the solution C^2 is more concentrated than the solution C^1 . During the electrolysis the solutions diffuse through the diaphragm and solution C^2 is thereby more and more diluted. The degree of concentration of C^1 and C^2 is consequently compensated by diffusion, the solution contained in the anode chamber gradually becoming more diluted. Here also, it is impossible to give determined rules; the process must be carried out according to other well known indications.

It is sometimes advantageous to cause the current to be interrupted by means of an interrupter instead of permitting it to act continuously.

The plate, after the etching has been completed is cleaned by means of hydrate of sodium or similar material, whereafter it is subjected to another etching operation carried out in the usual or in the above described manner.

It is not always necessary in my process to introduce the current from an external source. It is on the other hand, possible, as in the well known Daniell cell, to have a zinc plate provided with a layer of chrome glue or the like and with a copy of the image and to dip it into a solution of sulfate or chlorid of zinc, or ferrous chlorid and to arrange opposite it a copper or lead plate contained in a porous cell containing a suitable depolarizing fluid so that a cell is obtained which has zinc and copper as poles and a diaphragm.

An apparatus suitable for this purpose has been shown by Fig. 3. This apparatus forms a primary element in the cell of which a diaphragm is introduced. Each of the two compartments or cells thus formed is filled with an electrolyte C^1 C^2 having a different composition. Suspended in the anode chamber C^1 is a zinc plate to be etched and which carries the image layer, while in the cathode chamber C^2 hangs the other metallic plate as for instance copper plate.

The liquid consists of a depolarizing fluid. Both plates are connected by means of wire. With a view of preventing precipitation of ferric hydroxid which, when zinc is etched, would be formed behind the image layer, ferric chlorid is used with ferricyanid of potassium, oxalic acid, sugar, glycerin, cit-

ric acid, tartaric acid, or acetate of sodium. This precaution may be generally employed, that is to say not only for the Daniell cell arrangement, but also when the current is conveyed from an external source.

Having now fully described my said invention what I claim and desire to secure by Letters Patent is:

1. Process of preparing printing plates or rollers by means of electrolytic etching, consisting in coating a metal plate or roller on one side with a layer of chrome colloidal material, copying an image into the said layer by exposing it to the action of the light behind a suitable phototype, and using the thus prepared plate or roller as an anode in an electrolytic bath the electrolyte whereof comprises a solution of a swelling but not dissolving agent for the said chrome colloid layer, substantially as and for the purpose described.

2. A process of preparing printing plates or rollers by electrolytic etching, consisting in coating a metal plate or roller on one side with a layer of chrome colloidal material, copying an image into the said layer by exposing it to the action of light behind a suitable negative and using the thus prepared plate or roller as an anode in an electrolytic bath, the electrolyte whereof comprises a concentrated solution of a chlorid which is a swelling but non-dissolving agent for the said chrome colloid layer, the cathode being of any suitable metal, substantially as and for the purpose set forth.

3. A process of preparing printing plates or rollers by electrolytic etching, consisting in coating a metal plate or roller on one side with a layer of chrome colloidal material, copying an image into the said layer by exposing it to action of the light behind a suitable negative and using the thus prepared plate or roller as an anode in an electrolytic bath, the electrolyte whereof comprises a concentrated solution of ferric chlorid, the cathode being of any suitable metal, substantially as and for the purpose set forth.

4. A process of preparing printing plates or rollers by electrolytic etching, consisting in coating a metal plate or roller on one side with a layer of chrome colloidal material, copying an image into the said layer by exposing it to the action of light behind a suitable negative, covering the borders of the said plate or roller with a coating of lacquer and using the plate or roller thus obtained as an anode in an electrolytic bath the electrolyte whereof comprises a concentrated solution of a chlorid which is a swelling but not a dissolving agent for the said chrome colloidal layer of the anode, the cathode being formed of any suitable metal, substantially as and for the purpose set forth.

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5. A process of preparing printing plates or rollers by electrolytic etching, consisting in coating metal plates or rollers on one side with a layer of chrome colloidal material, copying an image into the said layer by exposing it to the action of the light behind a suitable negative using the said plate as an anode in an electrolytic bath, the electrolyte whereof comprises a solution of a chlorid which is a swelling but not a dissolving agent for the said chrome colloidal material, and which is supplied with direct current from an outside source, substantially as and for the purpose set forth.

6. A process of preparing printing plates or rollers by electrolytic etching, consisting in coating a metal plate or roller on one side with a layer of chrome colloidal material,

copying an image into the said layer by exposing it to the action of the light behind a suitable negative, using the said plate or roller as an anode in an electrolyzing device, the electrolyte whereof comprises a solution of a swelling but not a dissolving agent for the said chrome colloidal material, and which is supplied with direct current from an outside source and provided with means for abruptly interrupting the current, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two witnesses.

HANS STRECKER-AUFERMANN.

Witnesses:

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MATHILDE K. HELD.