

UNITED STATES PATENT OFFICE

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PROCESS OF TRANSFERRING SUBJECTS TO METAL SURFACES

No Drawing.

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My invention or discovery has for its object to transfer a photographic image, or a photographic copy of a picture, design, drawing or other subject to a metal surface in the form of a reversed positive for the purpose of making an etching or an engraving, or to form a foundation on which to build with acid proof ink or pencil.

I have discovered that a subject may be transferred directly from any photographic silver paper, such as a silver chloride, a silver bromide, or a silver chloride bromide paper to a zinc or copper surface of a plate, roller or other body by first bleaching the photographic print and then laying the print, face down, on the metal surface and moistening the print with a reagent that will cause such a reaction between the metal surface and the silver of the print as to form a definite-clear image on such surface.

Various different bleaching compounds may be employed. Good results have been obtained with solutions as follows: (a) a solution containing ten percent of potassium-ferri cyanide and five percent of oxalate of potassium. This solution may be made either stronger or more dilute. (b) a solution of twenty percent ferri cyanide. (c) a solution containing twenty percent of ferri cyanide and ten percent of potassium bromide. (d) a solution containing twenty percent of ferri cyanide, five percent of potassium bromide, and five percent of potassium oxalate. (e) a solution containing ten percent of ferri cyanide and five percent of potassium oxalate.

A bleaching solution that may be used successfully when the transfer is to be made to copper comprises 1.5 gram of nitrate of lead, 1 gram of ferri cyanide, $\frac{1}{2}$ cubic centimeter of nitric acid and 100 cubic centimeters of water.

Still another bleaching solution may consist of 1 gram of potassium permanganate, 1 gram of potassium bromide, 1 cubic centimeter of a one to twenty solution of sulphuric acid, and 200 cubic centimeters of water.

After the silver print has been dipped into the bleaching solution and allowed to remain there for a minute or two, it is removed from the solution and washed. The bleaching

process transforms a portion of the silver, at least, into silver compounds whose composition depends upon the character of the bleach employed. The print is laid, face down, upon a polished zinc or copper surface on a plate or cylinder and is pressed into intimate contact with such surface, conveniently by means of a rubber roller. The back of the print is then moistened with a reagent to bring about a reaction between the silver compounds on the print and the metal of the plate or roller and create an image on the latter. The reagents with which I have moistened the print lying in contact with the metal surface are diluted aqua ammonia or strong ammonium carbonate solutions.

After about a minute from the time of moistening the print, the latter is peeled from the metal surface which will be found to have thereon a brown image corresponding exactly with that in the original print. The metal surface is then rinsed in water and is ready for etching or engraving, or the image may be used as a foundation on which to lay acid proof inks or the like.

I am not quite certain what the chemical reactions are, but apparently some of the silver is precipitated in the form of oxides, while the copper or zinc of the plate or roller is also caused to oxidize. At any rate, very clear images are formed on the zinc or copper.

The process is a simple one, requiring only a few minutes for its completion, so that I am enabled very quickly to place an accurate positive image on a metal plate or roller, directly from the original subject if the latter be a silver print, and directly from a photograph of the subject if the latter be not a silver print.

In some cases my improved product may be put to no further use than would any fine photograph. On the other hand, the metal plate or roller or other body may afterwards be employed for printing. It may be prepared for printing in any one of several ways. If the subject be one containing much fine detail, the artist may trace over the lines of the photograph with an acid-proof ink, and the subject may then be etched into the sur-

face of the metal in any usual way. In other cases the artist simply traces over the lines of the subject with a grease pencil, preparatory to etching or, a light coat of acid-proof
5 varnish may be placed over the image. After the varnish has hardened, the artist may scratch the desired lines through the varnish, preparatory to etching.

It will be seen that where a metal plate
10 or other body is to be used for printing, the artist is not required to draw the subject free hand on a metal surface or to copy it laboriously if accuracy in detail be required; my improved process providing an image in re-
15 verse that is accurate in every detail; and the working face being left in such a condition that the subsequent operations to prepare the surface for etching will not result in the peeling off or chipping away of parts or frag-
20 ments of the image.

I claim:—

1. The method of forming an image on a zinc or copper surface, which consists in bleaching a silver print, laying the print on
25 said surface, and applying a reagent to effect a chemical reaction between the print and the zinc or copper.

2. The method of forming an image on a zinc or copper surface, which consists in
30 bleaching a silver print, laying the print on said surface, and wetting the print with a solution of ammonia or ammonium carbonate.

3. The method of forming an image on a zinc or copper surface which consists in
35 bleaching a silver print with a solution containing a ferri cyanide, laying the print on said surface, and wetting the print with a solution or ammonia or ammonium carbonate.

In testimony whereof, I sign this specifica-
40 tion.

HENRY L. KREBS.

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