UNITED STATES PATENT OFFICE.

GUSTAV HENRY BLOCK, OF LONDON, ENGLAND

PREPARATION OF SURFACES FOR PLANOGRAPHIC PRINTING.

SPECIFICATION forming part of Letters Patent No. 622,879, dated April 11, 1899.

Application filed March 15, 1894. Serial No. 503,783. (No specimens.)

To all whom it may concern:

Be it known that I, GUSTAV HENRY BLOCK, a subject of the Queen of Great Britain, residing at London, England, have invented new and useful Improvements in the Preparation of Surfaces for Lithographic and other Printing, (for which I have secured Letters Patent in the following countries, to wit: France, No. 236,912, dated March 10, 1894; Belgium, No. 108,967, dated March 10, 1894; Italy, XXVIII, 25,907, LXX, 298, dated March 31, 1894; Canada, No. 46,042, dated May 14, 1894; Austria, No. 44/2,187, dated June 5, 1894; Germany, No. 84,231, dated March 11, 1894, and Great Britain, No. 2,907, dated February 9, 1894;) and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to the preparation of lithographic and other printing surfaces, and has for its object to produce on lithographic stones and zinc and other metal plates stippled or lined surfaces more economically and expeditiously than heretofore.

According to my invention the surface to be prepared (whether metal or lithographic stone) is first cleaned in the usual manner and then the linework or stipple-work is transferred to the surface in the usual manner, either by lithography, photolithography, or otherwise from a previously-prepared or permanent original.

In practice I prefer to pull a transfer of the stipple-work from an existing original, using a transfer-ink of a strong consistency, so as to obtain a sharp transfer. If the transfer is pulled too full with too much ink, the stipple-work will not transfer to the surface so sharp and even as is necessary, and when such transfer is inked up in the ordinary lithographic manner with a black litho-roller the stipple-work will lose its sharpness.

The stipple transfer-sheet is placed in a damping-book and when sufficiently damp is laid face downward on the previously-cleaned surface to be treated and pulled several times through a lithographic press. The transfer-paper is then damped and soaked off of the surface under treatment, leaving the transfer-ink on the said surface. After this operation the surface is gummed up with a solution of gum-arabic which is left to dry on. This gumming up is of a great consequence to the rolling-up process. The gum solution acts as a weak acid on the unprotected parts between the stipple-work. Further, the dried gum solution deposits a film which does not dissolve readily in cold water. These are mainly the reasons that the surface does not roll up solid black, but inks up only the stipple-work when the transfer is rolled up, as described farther on. Then the stipple-transfer on said surface is rolled up with an acid-proof composition, preferably a good fatty lithographic ink, which contains a small amount of beeswax, gum-damar, and asphalt previously dissolved in turpentine. To roll up the transfer, the surface is first dampened with a water-sponge and damping-cloth to enable the moisture to penetrate between the stipple-work of the transfer. So when rolling up with the greasy acid-proof ink the roller inks up only the stipple deposited from the transfer-paper and does not ink the whole surface of the plate, providing the surface is kept moist while the rolling-up process is carried on. The surface is then etched to the desired depth with an acid, so as to leave the stipple-work in relief and of the necessary height. When the etching is completed, the surface is treated with an alkaline solution to remove the acid-proof composition and destroy the grease which remains on the plate from the original transfer and the acid-proof composition. This destruction of all the greasy matters which are on or in the surface of the plate is a very important step in my process. It is not sufficient to wash out the stipple-work pattern with turpentine, for this does not remove and destroy all the grease.

By using my alkaline solution the grease may be entirely removed, and this step must be very thoroughly and carefully performed, for if the grease is not destroyed from the raised surface the stipple-work would work up again when printing, the design would be obliterated, and the work done by the artist would be lost. After a planographic surface has been thus prepared it is sensitized, as hereinafter described.

After the surface of a zinc or other metal plate has been provided with a stipple and

cleaned from grease, as above described, it is sensitized, so as to render the surface fit for use for lithographic purposes without applying a coating in such laborious manner as used heretofore.

The plate is placed in a bath composed of nitric acid, alum, and water, in the proportion of, say, nitric acid one quart, alum three pounds, and water fifty quarts, for the purpose of oxidizing the surface of the plate, the bath being shaken all the time the plate remains therein. When the plate has been in this bath for about one-half a minute, it is taken out and rinsed with water and all the loose oxid which has formed is removed by rubbing with a sponge or flannel. The plate is then again placed in the bath and left therein until oxid ceases to form thereon, (the bath is kept in motion also during the second insertion,) whereupon the plate is removed and cleaned from the loose oxid, as described before, these operations causing, through the action of the acid and alum on the previous flat relief stipple-tops, a slightly roughened and crystalline condition and produce a good grip for the lithographic crayon. The surface of the plate is finally rubbed over with carbonate of magnesia and water (in the shape of a paste) to neutralize any acid and remove any loose oxid which may adhere in the lower parts in between the stipple-relief surface. After, the surface of the plate being rinsed well with water and dried, the surface is ready for the artist or draftsman, who by using a lithographic crayon can produce designs the lines of which are interrupted or broken according to the nature of the ground, thereby producing a combined chalk and stipple effect.

I may in some instances prepare smooth zinc or other metal plates for lithographic or other printing without an etched stipple relief on the surface. The surface of the metal plate is first cleaned in the usual manner. The plate thus cleaned is placed in a bath of solution of nitric acid, alum, and water in the same proportion as described for sensitizing the relief-surface. The object of the treatment is to oxidize the surface of the plate. When the plate has been immersed in this bath of one-half a minute, (during which time the bath is shaken or kept in motion,) the plate is taken out and rinsed with clean water and rubbed over with a sponge or flannel to remove the loose oxid which is formed. The plate is now again placed in the bath and treated in the same manner as described before. Through this treatment in the bath the nitric acid and alum have a double effect—first, that of unevenly eating away the surface of the metal so as to leave it in a slightly roughened and crystalline condition, which gives the surface a slight grain, which is essential for lithographic purposes, and, secondly, sensitizing the plate-surface. The plate-surface is finally rubbed over with carbonate of magnesia to neutralize any acid which may remain thereon and to remove any particles of loose oxid which may cling in the minute pores of the roughened surface.

The plate when rinsed with water and dried is ready for any transfer work or pen-and-ink drawings, &c., and can be used to a great advantage as a substitute for a polished litho-stone.

Litho-stones with stipple relief can also be sensitized with the same material as used for zinc or metal plates; but as a cumbersome heavy litho-stone could not be placed easily in a bath the sensitizing would be performed by brushing the solution of alum, acetic acid, and water over the surface of the litho-stone and thereafter rinsing with water. Nitric acid may, however, be employed as an equivalent for the acetic acid. This operation may be repeated several times, so as to remove any alkaline solution which the porous litho-stone may have absorbed. Finally the stone surface is rubbed over with carbonate of magnesia to neutralize any acid which may be left between the stipple relief. Further, the carbonate of magnesia abstracts any acid which may have entered the porous litho-stone.

What I claim, and desire to secure by Letters Patent, is—

1. The herein-described process of preparing planographic surfaces, which consists in transferring the stipple-work thereto, rolling up the stipple-work with an acid-proof composition, etching the surface with an acid to leave the stipple-work in relief, treating the surface with an alkaline solution to remove the grease and then sensitizing the surface, substantially as described.

2. The herein-described process of preparing planographic surfaces which consists in transferring the stipple-work thereto, rolling up the stipple-work with an acid-proof composition, etching the plate with an acid to leave the stipple-work in relief, treating the surface with an alkaline solution to remove the grease, sensitizing the surface by treating it with a bath of an acid and alum, and then treating the surface with carbonate of magnesium, substantially as described.

3. The herein-described process of preparing a planographic plate which consists in treating it with a bath of an acid and alum, and then treating it with carbonate of magnesium, substantially as described.

4. The herein-described process of preparing a planographic plate which consists in treating it with a bath of nitric acid and alum, and then treating it with carbonate of magnesium, substantially as described.

GUSTAV HENRY BLOCK.

Witnesses;
G. F. REDFERN,
JOHN E. BOUSFIELD.