

UNITED STATES PATENT OFFICE.

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LITHOGRAPHY.

1,007,846.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, OSCAR BUSSE, a citizen of the United States, and a resident of the city and county of San Francisco, State of California, have invented new and useful Improvements in Lithography, of which the following is a specification.

This invention relates to improvements made in producing the design, picture or subject on the surface of a lithographic stone by printing thereon with a photographic negative, as a preliminary step to the work of the draftsman by whom the design or picture is brought to the finished state for transferring to paper.

The invention has as its object the exact reproduction of the design upon as many stones as the character of the work may call for; being especially useful in all color work, and where separate stones must be prepared, as well, for the outlines and for special tints or other effects, requiring accurate register in printing; and being further of value in doing away with the tedious and more or less uncertain and ineffective work involved in transferring the design from stone to stone by the use of chalked tracings, according to the methods heretofore commonly used by the draftsman in work of this character.

Heretofore, so far as I am aware, in the production of a design or picture on a lithographic stone for the guidance of the draftsman, by use of a photographic negative, the process has been confined to one-color work requiring the use of a single stone, and no attempt has been made to repeat the design by sensitizing the surface of the number of stones required to produce a given piece of color work, and printing on each stone by means of the same negative. But on the contrary, in the reproduction of the design on each stone the practice of transferring by chalked tracings has been followed. The reason for this, I find by investigation and experiment, arises from the objectionable qualities and effects both of the sensitizing solutions and the fixing solution or medium employed in preparing the surface of the stone for the solar printing, and in fixing the prints after exposure; as both the sensitizing agents and the fixing agents heretofore employed for the purpose mentioned in lithographic work have left the surface of the stone in a more or less greasy condi-

tion, or have produced a condition of surface that prevented it from taking the ink or crayons used by the draftsman, and which involved also both labor and loss of time in restoring the surface to a condition sufficiently clean for the work—to such an extent that what might have been gained in sharpness and correctness of outline and accuracy of registration by reproducing the design on each separate stone with the same photographic negative, would be offset by the expense and loss of time involved in cleaning the surfaces of the stones.

In the course of my experiments I have discovered that it is possible and practicable to sensitize the surface of a lithographic stone for solar printing thereon, and afterward to fix the picture in such manner that the surface will be in condition to take the ink and crayons of the draftsman without further treatment or manipulation, and with the most effective results in sharpness, clearness and other desirable artistic effects. The result of the improvements constituting my present invention is that its use renders possible the multiplication or reproduction of the outline, design or picture for the draftsman upon any required number of stones with the same negative, instead of transferring the same to one stone after another of the set or number by the usual method of tracing; thereby securing accuracy of register between the series of stones in the finished work, and simplifying as well as greatly reducing the cost of the steps or operations involved in preparing the picture for printing.

This invention is based on the discovery I have made that by excluding from the sensitizing agent all oily or greasy elements, and confining the agent to a simple solution or mixture of iron and ammonium citrate, nitrate of silver and citric acid in water, and likewise confining the fixing agent to a solution or mixture of desiccated sulfite of soda, powdered alum, acetic acid and hyposulfite of soda in water, the process of producing the design on the stone by solar printing with a negative becomes practicable in the art, and can be substituted to advantage for the method of transferring from one stone to another by the use of chalked tracings.

In carrying out and practicing the said invention I prepare a sensitizing solution

or mixture of the following substances preferably taken in the proportions named:—

Solution No. 1.—Iron and ammonium citrate 40 grams, nitrate of silver 8 grams, citric acid 9.5 grams, water 500 cu. centimeters.

After being thoroughly dissolved and mixed, this solution is to be applied to the surface of the stone with a brush, care being taken to coat the surface evenly and avoid streaks. After being allowed to stand several seconds, the stone is placed on a revolving table, or "whirler", and dried. It is better, usually, to coat and prepare the surface of a stone one day, to be used the next day.

Upon the sensitized surface the design or subject for the picture is printed by exposure to sun-light under the negative; the length of exposure being regulated and determined by the color of the surface, which should be a deep brown, and the stone should be removed from the light and subjected to the fixing process when that condition is reached. Under longer exposure the color of the surface will change to a yellow hue, which is destructive of subsequent good work at the hands of the draftsman. The same condition is liable to be produced, also, if the coating of sensitizing solution be applied to the surface too thin. After the proper length of exposure, the stone is to be removed from the sun-light and placed in a fixing pan of any well known kind, and the surface washed by flowing water over it, care being taken to cover the surface thoroughly by allowing the stream to run over it. The surface thus treated being ready for fixing the sun print, the water is run off, and the stone is subjected to the second step of the process in which the solution composed of the following mixtures or solutions is employed:—

Solution A.—Desiccated sulfite of soda 7.25 grams, powdered alum 15.5 grams, acetic acid No. 8, 25 per cent. pure, 46 cu. centimeters, water 78 cu. centimeters.

Solution B.—Hypo-sulfite of soda 250 grams, water 1000 cu. centimeters.

Each of the above solutions is preferably formed of the substances named in about the proportions given. They are mixed separately until the substances have become thoroughly dissolved, after which solution B is added to solution A, producing solu-

tion 2. To produce the fixing solution a quantity of solution 2 is diluted with water, preferably in the proportion of 40 cubic centimeters of the solution to 960 cubic centimeters of water. The surface of the stone being covered with the fixing solution above mentioned for the period of two minutes, more or less, it is washed in clear running water and finally dried with blotting paper and a fan. The stone is then ready for the work of the draftsman either with ink or crayons.

With the solutions properly compounded and ready, the entire process of solar printing, fixing and drying should not consume more than thirty minutes. Ordinarily, the exposure to the sun-light should be about three minutes' duration.

The whole number of stones employed in a given piece of color work prepared and treated according to this invention will have the design or picture produced on their surfaces in exact correspondence to insure accurate registration, and with all the characteristics and details reproduced in a more complete manner than it is possible to transfer and produce on the stone by the use of chalked tracings.

I claim:—

That improvement in preparing the design or picture in multiple on lithographic stones for the production of the same in colors which consists in sensitizing the surfaces of the stones by coating the same with a preparation of iron and ammonium citrate, nitrate of silver, and citric acid in water in about the proportions hereinbefore given, then drying the surface, then exposing said sensitizing surface to sunlight under a negative of a design or picture, then washing the surface and fixing the print by immersing the surface in a solution of desiccated sulfite of soda, powdered alum, acetic acid, and hypo-sulfite of soda in water, in about the proportions hereinbefore given, and then drying the surface, thereby leaving the surface in condition to take the ink and crayons of the draftsman without further treatment or manipulation, substantially as set forth.

OSCAR BUSSE.

Witnesses:

E. E. OSBORN,
M. REGNER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."