United States Patent Office.

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IMPROVEMENT IN MAKING PHOTOGRAPHIC TRANSFERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ARTHUR G. MOWAN, of South Bergen, in the county of Hudson, and State of New Jersey, have invented certain new and useful improvements in the Art of Making Photographic Transfers; and I do hereby declare that the following is a full, clear, and exact description thereof, and the manner in which it is to be operated.

This invention consists in a new process of making photographic transfers, and has for its principal object the reproduction of drawings, engravings, printed matter, manuscripts, and other similar things, by the action of light, so that the reproduced figures, forms, or letters, may be readily transferred to stone, zinc, or other metallic surface for printing or engraving, in the manner hereinafter described. By this process the operation is much facilitated, and results superior to those produced by any process heretofore known are effected, especially in the reproduction of line engravings, printed matter, and manuscripts.

My improved process consists of six distinct features or elements, which are here stated in the order in which they constitute my entire process of photographic transfer; and such of the methods, preparations, or sub-processes as I claim to be my own invention, both in and distinct from their offices in the whole combined process, are herein so indicated, and those which I suppose not to be in themselves new features, are in like manner so specified. First, the preparation of the paper on which the photographic picture is to be formed; second, the preparation and application of the coating for the paper, which is to constitute a material to receive the action of the light and form the picture upon the paper; third, the transfer of the picture from the negative to the paper by the action of the light; fourth, the preparation and application to the surface of the paper so bearing the picture of a second coating, to give color to the picture and to form a medium for transferring the picture from the paper to a surface of stone, wood, or metal; fifth, the removal of both coatings from the parts or spaces not covered by the picture; sixth, the imprint of the picture so made and developed upon stone, zinc, or other metallic surface, or wood.

And the following description will enable those who are skilled in the art of making photographic transfers to carry out and apply my process, and also to distinguish it and its several parts from processes heretofore known.

A negative may be taken in the ordinary way, of any print, printed matter, or writing which it is desired to engrave or multiply, or, if the design is originally taken for the purposes of this mode of transfer, it may be made or traced upon glass which has been coated with a film of asphaltum, varnish, or other opaque matter that will answer the purpose, or any other mode may be adopted for producing the picture in such a way as to give alternate opacity and transparency or translucency, so that a proof may be printed through it by the action of the light. Having a picture so made or traced upon a material through which the light can act, I proceed as follows:

First. I take any good paper which has a suitable texture for photographic printing (Saxe's being preferred,) and dip it in a bath of sour-milk whey or lactine, for the purpose of giving it greater solidity and power to resist the chemical substances afterwards to be applied to it, and then dry it at an ordinary temperature. Paper so treated will resist the subsequent stages of this process much better than the ordinary albuminized paper which is not so dipped in the whey or lactine. It is not necessary that the paper should be first albuminized before applying the whey, but if it has been, the whey improves the paper for this use. The albumen of the whey or lactine may be cleared from it by heating it before using it as a bath. It is best to apply the whey to both sides of the paper. The preparation of the paper by immersing it in a bath of lactine or whey is not new of itself, but the use of paper so treated, whether it has been albuminized or not, in combination with the other parts and features of my process, I believe to be new.

Second. For the purpose of coating the paper so prepared with a suitable material to receive the action of the light and form the picture, and also to be capable of ready solution in water where it has not been acted on by the light, I take half a pound of French gelatine, or French glue, and dissolve it in a pint of water; and while it is boiling I add to it a solution of one-third of an ounce of permanganate of potassa in a quart of water. This composition, when cool, is ready for use. I apply it to the surface of the paper so prepared, and allow it to dry in a dark room. The paper is then ready to receive the photographic impression, which may be taken in the ordinary way under a negative or other alternately opaque and transparent or translucent design. The use of permanganate of potassa, in combination with the gelatine, I claim to be new, and its advantages

are these: first, it prevents the gelatine from coagulating before it has been acted upon by the light, which is a great benefit, and one that has not been realized, so far as I am aware, by the combination with gelatine of any other ingredient capable of being used to advantage in its place; secondly, it works better and sharper in combination with gelatine in its exposure to the light, and in the subsequent washing, than bichromate of potassa, which has been heretofore combined with gelatine for the sa e purpose. In directing the use of gelatine, however, in combination with permanganate of potassa, I do not mean to confine my claim to the use of gelatine alone, because there may be other substances which, in this combination, may be used as the equivalent of gelatine, namely, to form a combination that will act as a supporter of the bituminous coating hereinafter mentioned, and at the same time be capable of being so affected by the washing hereinafter mentioned as to discharge itself and the superincumbent bituminous coating hereinafter described from those parts which have not been acted upon by the light, and to retain the bituminous coating where it ought to be retained.

Third. I produce the impression of the picture on the paper so coated, as above described, in the usual way, by allowing the light to act upon the surface of the paper through the negative or alternately opaque and transparent or translucent surface on which the picture is traced.

Fourth. I then prepare and apply a second coating of the paper, to give color to the picture and to form a medium for transferring the picture, as follows: Immediately after taking the impression upon the paper, and before developing the impression, I coat the paper evenly upon the side which has been coated with the solution of gelatine and permanganate of potassa, with a composition made of equal parts of Judea bitumen, white wax, and Burgundy pitch, dissolved in a sufficient quantity of essence of lavender to make it capable of being properly spread with a brush in a thin and uniform coating, and after spreading it allow it to dry in the dark. Asphaltum or Judea bitumen has been before used for the same or similar purpose as that for which it is here employed, combined with one or the other or both of the other ingredients above mentioned, but in such further combinations as to form compositions entirely different in their working, for the purposes of a process of photographic transfer, from the composition invented by me; for in such previous compositions the further ingredient of grease or oil has been introduced, and this I deem essential to avoid, because when present it gives the composition a greater tendency to penetrate the paper and spoil the picture by producing a semi-transparency in spots, than the one I have described, and it would also have a tendency to prevent the proper action of the final bath upon the permanganate of potassa and gelatine. It is indispensable, however, that the coating used for this purpose should contain some ingredient or ingredients which will cause it to transfer and adhere to a surface on which it may be impressed. The combination of Judea bitumen, wax, and Burgundy pitch, which is above described, accomplishes this result, and gives a tenacity and a sharpness of outline which are highly satisfactory.

Fifth. For the purpose of developing the picture upon the paper by the removal of the coatings from the parts or spaces not acted on by the light, I place the proof so coated, with its black side upward, in a bath of cold water, which dissolves the permanganate in those parts or spaces which have not been acted on by the light, carrying with it the superincumbent coating of bitumen, wax, and Burgundy pitch, and I finish cleaning the proof by a few strokes of the sponge, after which it is dried, when it is ready to be transferred.

Sixth. I transfer the picture, made and developed in the manner above described, by contact and pressure, to a lithographic stone, or to zinc or other metal, or wood, in the ordinary manner, to be printed from if upon stone, or etched or engraved if upon metal or wood.

The above-described process enables me to transfer to a lithographic stone to be printed, or to metal plates, or to wood to be etched or engraved, almost or quite any design or imprint, in such a manner as to give sharpness of outline and a clearness not hitherto attained, and, if conducted with reasonable care, insures great certainty in the result. When the design is transferred upon stone in the manner I have described, it may be printed from the same as any ordinary lithographic transfer. When it is transferred upon zinc or other metal plate, it may be etched in any of the well-known modes known to engravers, the composition of bitumen, wax, and Burgundy pitch protecting the parts covered by them from the action of the etching fluid. When the design is transferred upon wood it forms a clear, well-defined, and bold outline, to guide the engraver in his execution of the work of cutting; but these last uses of these improvements will probably be of less importance, owing to the fact that the design can be much more cheaply and readily transferred to a metal plate, and at once etched, when it will be ready for the press. When it is desirable to engrave in sunk lines, as is very commonly done upon the harder metals, such as copper and steel, a positive print can be taken upon glass in the usual manner, and the remainder of the process conducted the same as already described.

I claim as my invention—

1. The combined process, hereinbefore described, for making photographic transfers by means of the several methods, preparations, applications, and compositions above described, or their equivalents.

2. I also claim the several elements of my invention, as—

First. The preparation of the paper by a bath of whey or lactine, as above described, when used in combination with the other elements of the process above described, or their equivalents.

Second. The preparation and application of the coating of gelatine, or its equivalent, and permanganate of potassa, for the purposes above described, whether the same is used in combination with the other elements of my entire process, or is used separately therefrom, as a material to be acted on by the light, and subsequently to be dissolved and removed where it has not been so acted upon.

Third. The use of a paper so prepared and coated, as above described, in the formation of the impression thereon by the action of the light according to the usual modes.

Fourth. The preparation and the application of the second coating, above described, composed of Judea bitu-

men, white wax, and Burgundy pitch, or their equivalents, without grease or oil, for the purposes above described, whether the same is used in combination with the other elements of my entire process, or is used separately therefrom, as a material to give color to the picture on the paper, and to act as a medium for transferring it.

Fifth. The removal of both the coatings above described from the parts or spaces not acted on by the light, by placing the paper so prepared and coated with the materials above described, or their equivalents, in a bath of cold water, in the manner above described, and cleaning it in the manner above described, or by any equivalent method of solution and removal.

Sixth. The impressing of a photographic picture or design, or printed or written matter, upon stone, wood, or metal, from a paper proof made and prepared as above described, and by the several means above described, for the purpose of engraving, lithographing, etching, or preparing plates for printing such picture, design, or printed or written matter.

A. G. MOWAN.

Witnesses:

THOS. P. HOW,

H. JAMES WESTON.