UNITED STATES PATENT OFFICE.

PAUL SCHULZE, OF BROOKLYN, NEW YORK, ASSIGNOR TO HIMSELF AND FREDERICK W. BILLING, OF SAME PLACE.

PROCESS OF OBTAINING PRINTING-SURFACES.

Specification forming part of Letters Patent No. **37,078**, dated December 2, 1862.

To all whom it may concern:

Be it known that I, PAUL SCHULZE, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new Process of Obtaining Printing-Surfaces, also applicable to the production of substitutes for photographic negatives, and which I term "Schulze's Process;" and I do hereby declare that the following is a full, clear, and exact description of the same.

The objects of this invention are, first, to procure a cheap substitute for wood-engraving from which to obtain by the electrotype process surfaces which can be printed from in the same manner as electrotypes obtained from wood-engravings; second, to enable the process of etching metal surfaces to be performed more easily than by the mode heretofore practiced; third, to obtain an easy mode of making dies for seals or for stamps of a similar character; fourth, to obtain by drawing, without the aid of a camera or the agency of light, substitutes for photographic negatives which may be printed from in the same manner as those negatives by the action of light acting through them upon sensitive paper.

The principal feature of the invention consists in first making a drawing in ink which is soluble in water upon the surface of a plate of glass or any other hard substance which has been previously coated with an alcoholic solution of shellac, then covering the whole surface with a coating of beeswax or of a composition of beeswax, asphaltum, and linseed-oil or other menstruum, next immersing the plate in water for some time, and afterward exposing its face to the action of a stream of water, by which the latter coating is washed off only from the lines of the drawing, and the whole of the drawing itself is washed away, leaving the latter coating between and among the lines of the drawing. The plate in this condition can be used in the same manner as a wood-engraving to obtain an electrotype for printing, and with very little subsequent preparation for the other purpose hereinabove specified, as will be presently described.

I will first describe particularly the manner in which the process is performed to obtain the substitute for wood-engraving.

When the plate is of glass or other hard substance the surface to be drawn upon should be made even and have a fine grain given to it by grinding with fine sand, rotten-stone, or other suitable material. The first coating or ground of shellac solution may be applied either by pouring it over the surface or by rubbing it on with a piece of cloth, and when it is dry it is ready for the drawing. The ink with which the drawing is made may be composed of a solution of gum-arabic in water, with a enough sugar to prevent it from cracking off or separating from the plate when dry, and a suitable quantity of ivory-black, lamp-black, or other coloring-matter to make the drawing appear; or it may be composed of a weak glue-water, with any coloring-matter, or of any colored pasty substance soluble in water. The drawing may be made with a pen, brush, or pencil dipped in such ink. When the drawing has been completed the second coating can be applied. I prefer to use for this coating a composition of four (4) parts, by weight, of beeswax to one (1) part of asphaltum and one (1) part rosin, with as much thin varnish—such as is used by printers for thinning their ink—or linseed-oil as will render the composition applicable with a lithographic inking-roller or engraver's daub. The same end can be obtained with a coating of beeswax softened with spirits of turpentine, but with less sharp and clear lines. The necessary thickness of the coating will depend upon the character of the drawing, a thinner coating being sufficient for close, fine work. After the application of this coating the plate is to be immersed in water. If the coating is thin, fifteen minutes immersion will be sufficient; but a proportionately longer time will be necessary for a thicker coating. When the plate is removed from the water bath a stream of water is directed upon its face, and by that means the last coating is removed from the lines of the drawing and the ink of the drawing all washed out, leaving the said coating perfect between the lines of and around the drawing.

In most cases the coating will remain sufficiently high to enable a good electrotype for printing to be taken from it; but where a higher ground is needed it can be produced by dusting lycopodium on the surface with a soft

brush. Where the composition remains on the plate the lycopodium will unite with it, and by applying more of the composition over the surface with an inking-roller the lycopodium will be removed from the lines of the drawing and the surface of the coating of composition will be further raised. Broad spaces between the lines where a higher ground is necessary can be raised by applying beeswax in the same manner as electrotypers now apply it to the surfaces of wood-engravings or by applying asphaltum with a brush. Before the plate is put into the hands of the electrotyper a thin coat of alcoholic varnish is poured onto it, that the varnish or linseed-oil in the ground may not prevent the deposit of the copper, and this coat of varnish will insure the plumbago applied by the electrotyper being received and retained on every portion of the surface of the plate. In this way a substitute for wood-engravings is obtained in a very short time at a small cost.

Instead of the drawing being made upon a plate, it may be made upon paper which has been first thoroughly saturated with alcoholic varnish or any other substance—such as wax—that will make it perfectly water-proof, and after the drawing has been made the back of the paper should be cemented to the surface of a perfectly flat plate with beeswax or some other water-proof cement, and afterward treated in the same manner as before described with reference to the drawing on the glass or other hard plate.

For metal etching the drawing is made with the soluble ink in the manner hereinabove described on the surface of the metal, and after it has been completed the whole surface of the plate is coated either with the etching ground commonly used by engravers or with a ground of beeswax applied while the plate is warm, instead of with the second coating which is applied to obtain the substitute for wood-engraving, as hereinbefore described. The plate is then immersed in water and afterward exposed to the action of a stream of water directed upon its face to wash out the drawing, as hereinbefore explained, and the plate is ready to receive the acid for etching.

For making dies for seals or stamps of similar character, a drawing is made as at first described, and subjected to the same treatment up to the filling in of the broad spaces between the lines with beeswax or asphaltum, when it can be used as the mold from which to obtain a seal by the electrotype process, or from which to obtain a die in which to produce a seal by casting.

To obtain a substitute for photographic negatives, a drawing is made in the manner hereinbefore described on a plate of finely-ground glass, and after it has been made, instead of being coated with the beeswax or composition of beeswax, asphaltum, and rosin hereinbefore specified, it has applied a thin coating of that composition with which some fine lamp-black has been mixed, and then subjected to the soaking and washing operations to remove the ink, and when it has dried it is dusted over with lamp-black by means of a fine brush to make the ground still less transparent, after which the whole surface has applied to it a coat of alcoholic varnish. When this varnish is dry the plate is used for printing upon properly-prepared paper in the same manner as a photographic negative obtained by the camera.

The drawings for etchings, seals, and photographic purposes have to be reversed; but for the first-described purpose they should not be reversed.

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

The within-described process of drawing in soluble ink and treating such drawing for the several purposes herein specified.

PAUL SCHULZE.

Witnesses:

TIMOTHY SHINE,

M. S. PARTRIDGE.