

# UNITED STATES PATENT OFFICE.

PHILIP H. MANDEL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HARVEY K. FLAGLER, OF SAME PLACE.

## PROCESS OF PRODUCING PLATE-PRINTING SURFACES.

SPECIFICATION forming part of Letters Patent No. 229,435, dated June 29, 1880.

Application filed April 7, 1880. (Specimens.)

*To all whom it may concern:*

Be it known that I, PHILIP HENRY MANDEL, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Process for Producing Letters, Figures, or Designs upon Metallic Surfaces for Plate-Printing, and upon other materials, such as stone, glass, &c., for printing and various other purposes; 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.

Printing-surfaces have been produced by etching figures or designs transferred from photographs to a metallic surface in a well-known manner, the ink forming the design resisting the action of the acid employed in the etching process, which eats away the surrounding metal, leaving the design in high relief. Printing-surfaces produced in this manner answer for block-printing, but cannot be employed for plate-printing, which requires a sunken or intaglio design, to produce which by the etching process necessitated the covering of the metal surface with an "etching-ground" and the subsequent production of the design by drawing it by hand with an etching point or needle, which leaves the metal exposed to the action of the acid wherever the etching-ground has been scratched away by the point of the needle. This hand-etching process, which is employed extensively in engraving copper cylinders used for calico-printing and for other purposes, is exceedingly slow, tedious, and expensive, and it has hitherto been found impossible to employ a photographic or other transfer in the process of producing an etched intaglio design, for the reason that the ink forming the design effectually prevented the acid from acting upon the very portion of the metal which would require to be eaten away to produce a sunken figure.

To produce upon a metallic or other surface an etched design transferred thereon from a photograph, print, or impression—a desideratum heretofore unattained—is the object of my invention, which consists in producing upon a metallic or other surface the required figure or design by transferring the same from a pho-

tograph, print, or impression, and then applying an etching-ground formed of a composition which will not adhere to the ink of the transferred impression, but only to the uncovered surface, and which will resist the action of the fluid with which the ink is subsequently washed off, this removal of the ink causing the surface hitherto covered thereby to form the design, the lines or edges of which are defined by the surrounding or adjacent etching-ground, so that when the surface is subjected to the acid the design itself will be attacked by the acid, and thus produced in intaglio, as desired, whereby a perfect plate for plate-printing, or other surface having an etched intaglio design thereon, can be easily and rapidly produced from a photographic or other transfer, thus effecting a great saving in time and labor, as the etching by hand, hitherto unavoidable, is entirely dispensed with.

To carry my invention into effect I first photograph the required design, figure, or character upon paper, and then transfer the same by any well-known photo-mechanical process to the metal surface to be used for printing, or transfer the design from a print or impression by any known process. I then apply to this metallic surface and smoothly distribute thereover an etching-ground composed of three drams of shellac dissolved in five ounces of alcohol. The nature of this composition is such that it will not remain upon the surface of the ink, and will only adhere to the exposed surface of the metal not covered by the ink. Consequently the ink which forms the design is left entirely uncovered and in the same condition as when originally applied. The design is then washed off with turpentine or benzine, which does not affect or remove any portion of the etching-ground, the ingredients of which render it capable of resisting the action of the turpentine or benzine used to remove the ink from the plate. This washing off of the ink causes the surface hitherto covered thereby to form the design itself, the lines or edges of which are clearly defined by the surrounding or adjacent etching-ground. The metallic surface thus prepared is now subjected to the action of acid reduced with water to the proper strength, as in the ordinary etching process,



when that portion of the metallic surface from which the ink has been removed, and which now forms the design itself, is attacked by the acid, which is allowed to corrode or eat away the metal to the desired depth, as in the ordinary etching process, when the plate is removed, thoroughly washed with water, and dried, after which it is ready for use to print from in the ordinary process of plate-printing.

10 A perfect intaglio copy of a design or figure can thus be produced upon a plate or metallic surface from a photograph or other transfer in an exceedingly expeditious and economical manner, thus effecting an immense saving in time and labor.

15 The above-described process can be applied with great advantage to the engraving of copper cylinders for calico-printing, which can thus be produced at a greatly reduced cost; and my invention can also be advantageously employed for producing surfaces from which to print letters, designs, and figures in white upon a dark ground, and for plates to print transfers for decorating porcelain, &c.

25 I do not, however, confine or limit my invention to the production of metallic printing-surfaces, as it may be employed in producing

designs, letters, &c., upon stone surfaces for printing, or upon stone, glass, &c., for ornamental and a variety of other purposes.

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

The process of producing etched designs, letters, or figures upon metallic and other surfaces for plate-printing and other purposes, which consists in producing upon a metallic or other surface the required figure or design by transferring the same from a photograph, print, or impression in any suitable manner, then applying an etching-ground which will not adhere to the ink and will resist the action of the fluid with which the ink is subsequently washed off, and after the ink has been removed subjecting the exposed surface of the metal previously covered thereby to the action of acid, so as to produce the design in intaglio, substantially as set forth.

Witness my hand this 2d day of April, A. D. 1880.

PHILIP HENRY MANDEL.

In presence of—

P. E. TESCHEMACHER,  
W. J. CAMBRIDGE.