UNITED STATES PATENT OFFICE.

ALBERT FRIEDRICH ECKHARDT, OF MUNICH, BAVARIA.

IMPROVEMENT IN PREPARING PLATES FOR PRINTING.

Specification forming part of Letters Patent No. **167,158**, dated August 31, 1875; application filed December 28, 1874.

To all whom it may concern:

Be it known that I, ALBERT FRIEDRICH ECKHARDT, of the city of Munich, in the Kingdom of Bavaria, have invented a new Process for Preparing Electrotype-Plates for Printing Pictures, Bank-Notes, Patterns, &c., and the means for producing on such plates the subject to be printed, of which the following is a specification:

My invention relates, first, to a new process for preparing the plates upon which the picture, bank-note, pattern, or other subject to be printed is to be formed—that is to say, the preparation of the negative plate, which is to receive the subject to be printed, and from which the electrotype or copper plates are made. Secondly, the invention relates to a new composition or compound and process for forming or making the picture, bank-note, pattern, or other subject to be printed in bas-relief upon the negative plate.

It is well known that the art of wood and steel engraving is not only very tedious to acquire, requiring years of practice to become a proficient engraver, but also that when the art is acquired it takes weeks to execute a picture or design on wood, and years to do the same on steel. By means of my invention the work is done in a comparatively short time, and any expert draftsman may in a short time acquire the art of producing plates equally as fine in execution as the finest wood or steel engravings, and with much finer lines than can be done by wood-engraving. But that my invention may be fully understood I will proceed to describe the same in detail.

The preparation of the plates for the operator is as follows: I take a piece of sheet-iron of the requisite size and heat it to a cherry or red heat, and then chill the same in a bath of boiling muriatic acid and subject the plate to a second heat, as before, after which it is dipped in a bath of molten lead. For this purpose the lead should be of the purest kind, and very soft. The plate is subjected to this bath until a deposit or coat is formed on the plate of about the thickness of ordinary writing-paper or tracing-muslin. The plate is then passed between smooth rollers and subjected to pressure until the surface thereof is very smooth and shiny, when the plate is whitened in the same manner as the block of wood is for engraving purposes. The plate thus prepared is ready for the artist to produce thereon the picture, bank-note, pattern, or other subject to be printed. The artist then traces the outlines of the subject on the plate by means of an etching-needle, or a needle the point of which has previously been ground to the form and shape of an engraver's tool or burin, the lines of the tracing being of a depth equal to the thickness of the coat of lead on the plate—that is to say, the needle, in making the tracing, pierces the coat of lead and touches the iron plate. The lead being very soft, this can be done in as short a time as it would take an ordinary draftsman to make a tracing on tracing-muslin.

When so prepared the plate is ready for the finishing of the subject, which is the reverse of wood or steel engraving, where the picture is excavated more or less deeply, according to the shades to be produced, while in this process the subject is raised on the plate—that is to say, it is formed in bas-relief. Those parts intended to form the darkest shades in the finished electrotype are raised highest, and the remaining parts are gradually lowered, according to the shading to be produced, as fully illustrated by the plate herewith presented, and in order to accomplish this I employ the following means: A composition or compound made of one part of the purest silver powder and three parts of very pure graphite, which are ground together in a mortar with a sufficient quantity of alcohol to form a semi-fluid paste or mass, and triturated until the ingredients are thoroughly incorporated. The mass is then placed on a marble slab, and while triturating and grinding it I add thereto gradually gutta-percha dissolved in the following manner: I take one part of gutta-percha, one part of rectified alcohol, and one part of spirits of turpentine, and place them in a suitable vessel over a spirit-lamp or in a hot-water bath. The dissolved gutta-percha is ground with the above-named ingredients in a manner similar to the grinding of oil-colors, and triturated, so as to incorporate the ingredients thoroughly, gutta-percha being added until the mass is of the consistency of butter.

The quantities above mentioned will answer

for general purposes; but when it is desired that the work should set more or less quickly, according to the subject to be produced, the quantities above given will vary slightly.

When in use the composition is placed in a porcelain vessel placed in a water-bath so as to keep it in a semi-fluid state, and in this state it is introduced into a hollow conical and flexible pencil, and is ready for the artist to finish the picture or other subject, which is done by allowing the composition to flow out of the aperture or pressing the same through it in ridges of varying height, according to the lights and shades to be produced, and is done in a manner similar to that used by confectioners for the icing of cakes, &c., by means of his paper cornets containing the icing. This composition will harden almost as soon as the work is accomplished, when the plate may at once be subjected to a galvanic battery to receive a deposit of copper to form the electrotype from which the picture, pattern, or other subject is printed.

In xylography, in order to obtain a copper plate, a gutta-percha negative has to be obtained first, and by this process the engraved lines lose their sharpness, in consequence of which the lines of the picture are dull and the picture not clear, while with my process this is obviated, since the plate itself is the negative. Much finer lines and finer pointing may be produced than by wood-engraving.

The most artistic subjects are produced; in fact there is nothing now done in lithography, xylography, or steel-engraving that cannot be produced by my process, and in a comparatively short time. Assuming, for example, the production of the letter A, to engrave it on wood will require from one to two hours, while it can be done by my process in almost the same time it would take to write it on paper.

Another great advantage in this process is, that mistakes may be corrected and faulty parts amended by washing out the faulty or incorrect part with spirits of turpentine and going over it again with the pencil, while it is well known that it is almost an impossibility to make corrections on a block of wood or steel plate. Scientific men, such as botanists, archeologists, and others, who are generally draftsmen, may in a short time acquire the art and produce with great exactitude the illustrations for their own works for publication. The process is not only applicable for the purposes of printing, but may also be applied to the production of plates for raised ornaments on leather, paper, &c., and for ornamenting and printing of calico, wall-paper, and other articles.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A plate for engraving purposes having a coat of soft lead deposited thereon, and prepared in the manner hereinbefore fully described.

2. A composition or compound of graphite, silver powder, and gutta-percha, in or about in the quantities specified, as and for the purposes herein fully set forth and described.

3. The process of preparing negative plates for obtaining copper electrotype-plates for printing from and other purposes, consisting of the employment of the subject-matter claimed in the first and second clauses, in the manner substantially as hereinbefore fully set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 4th day of December, 1874.

ALBERT FRIEDRICH ECKHARDT.

Witnesses:
G. HENRY HORSTMANN,
JOSEPH FISCHER.