UNITED STATES PATENT OFFICE.

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PREPARATION OF METALLIC PLATES FOR PRINTERS.

Specification forming part of Letters Patent No. **13,587**, dated September 18, 1855.

To all whom it may concern:

Be it known that I, SAMUEL W. LOWE, of the city of Philadelphia, and State of Pennsylvania, have invented a new and improved mode of preparing or facing the surfaces of engraved or etched plates of metal or other substance, so that they may be readily printed from by a letter-press or other form of press without wiping; and I do hereby declare that the following is a full, clear, and exact description thereof.

The nature of my invention consists in coating or amalgamating with mercury the unengraved parts of the surface of any engraved or etched plate of metal or other substance capable of receiving or being made to receive or amalgamate on the surface with mercury, so that the said engraved or etched plate may be continuously printed from by a letter-press or any other suitable form of press, either alone or in the same form with the type, and without wiping the surface of the plate, as heretofore required in the process of printing from copper or steel plates.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

In preparing an engraved or etched steel-plate for the purpose, I first perfectly fill up all the engraved or etched figures on the plate with any suitable gum, resin, wax, or composition, so as to finally leave the plain or unengraved surface bare. Then by the galvanic process (which is well understood, and therefore need not be described) I coat the plain or unengraved surface with copper sufficiently thick to receive and amalgamate with mercury by rubbing it on the surface of the same, so as to fix a thin mercurialized surface upon the plate. The gum, wax, or other filling may now be removed and the plate is ready for the press.

In preparing an engraved or etched copper-plate for the purpose—there being sufficient affinity between the copper surface of the plate and the mercury—the galvanizing process is not required; but in all other respects the engraved plate is prepared precisely as the steel one, as just described, the object in both cases being to coat the unengraved surfaces of the plates with a mercurial amalgam, as I have discovered that when so coated the ink used in printing, when applied with a "sharp" inking-roller, (which is the term usually given by printers to the common elastic inking-roller when it is in the best condition for use in inking type,) will not adhere to nor even soil the mercurialized surface of the plate, while it fills and remains in the engraved lines thereof, and therefore the plates thus prepared can be continuously printed from by letter-press—wiping of course not being required. It will now be readily perceived that by this discovery common tin-plate can be used in place of copper or steel plates for the purpose of receiving engraved or etched figures, and be printed from continuously by letter-press, either alone or in the same form with the type, as just described.

In preparing the tin-plate for the purpose, I first coat it over with the usual etching-ground (which process is well understood and need not be described) and with the common engraving instruments or points produce the figures required in the usual manner. I then apply nitromuriatic acid, or any other suitable acid, which acts upon and dissolves away the exposed tin coating, after which the acid is washed off and the etching-ground removed. I then rub on the mercury, as before described, until a thin mercurialized surface is formed by amalgamation upon the plane or unetched surface of the plate, and it is ready for the press. The etched figure being bitten through the tin to the iron plate beneath, and the mercury not having an affinity for the iron, no part of the plate becomes mercurialized but the plain unetched surface, and consequently, for the reason already given, the plate may be readily used to print from continuously by a letter-press or any other suitable form of press, either alone or in the same form with the type, as before described, wiping not being necessary or required. It will also be apparent that the tin-plate may be simply engraved through to the iron with a graver instead of etching, and that the unengraved surface may be mercurialized and used precisely in the same manner, and that any cheap material whatever which may be capable of receiving or being made to receive a thin mercurial coating or amalgam surface can be thus used as a substitute for the more expensive and costly steel

or copper plates as heretofore required, and although a copper-plate press may be used in printing from the plates as prepared by my process the common letter-press, or any kind of press suitable to the form and material of the plates, can be used, so that for almost all kinds of illustrations for books, cards, &c., my discovery or invention is admirably adapted, as the engraved plate thus prepared can be rapidly printed from by a letter or other press, whether operated by hand or machine power, in the same form with the type and without wiping the surface of the plate, which is the great triumph achieved by this discovery.

The coating produced by amalgamating or mercurializing the tin-plates, as described, I have found to be more fixed and durable than the coating produced by amalgamating with mercury alone the surfaces of the copper-plates; and as this difference arises from a greater tenacity in an amalgam composed of tin and mercury it is found that by amalgamating as much tin with the mercury as it will bear without losing a semi-fluid condition produces a better material for coating the surfaces of copper-plates, because the surfaces are thereby rendered more tenacious and durable without impairing in the least the peculiar quality which the mercurial coating possesses of resisting the ink, as before described.

In preparing steel-plates for being printed from by mercurializing their surfaces, as described, another mode may be adopted which I have used with perfect success, as follows: I take a weak solution of sal-ammoniac (muriammonia) in water and rub it over the clean surface of the engraved steel-plate (after the engravings are filled with such resinous substances as before described) and then apply the mercury by continuing the rubbing with the finger or with a little raw cotton or a rag until the steel surface becomes coated with the mercury, (which will be in a few moments.) I then apply a sheet of tin-foil, pressing it down with the fingers in smooth and even contact with the mercurial surface, and let it so remain undisturbed for about an hour, at the expiration of which time it will have become perfectly fixed. I then rub the surface over with mercury in the same manner as directed for tin-plates, and the steel-plate is ready for the press. I adopt the same mode for mending the tin-plates in case a mistake is made in any part of the engraving or etching, or in case of damage being done to the surfaces thereof from any cause. The plates thus prepared, whether of steel, copper, or tin, are designed to be printed from by means of an ordinary type-printing press, or any press acting by direct pressure, whereby it is made possible to print at the same time and on the same press with the type or letters any illustrations and embellishments executed in the style of steel or copper plate engravings in place of wood-engravings, yet as these plates are adapted also for printing from or for embossing by means of a copper or steel plate roller-press the addition of tin to the mercury for the purpose of producing a more tenacious and durable alloy upon the surfaces of the plates becomes the more important and advantageous.

In printing from the engraved copper and also from the engraved steel plates prepared according to either of the processes described, it is not necessary to remove the resinous substance from the engraved lines after the surfaces of the plates are mercurialized or coated with the amalgam of tin and mercury, or, rather, it is best to leave them filled with the resinous substance, because such substance, while it readily takes the ink from the roller, also yields it as readily to the paper under the moderate pressure of a common type-printing press.

Having thus fully described the construction and operation of my invention, and pointed out several peculiar facts demonstrating not only its utility but great advantages in comparison with the use of steel and copper plates as heretofore, especially in the illustration of letter-press work, I proceed to state that I do not claim engraving or etching designs or figures of any kind upon metallic plates or surfaces of any material for the purpose of printing therefrom, as those processes have been known and practiced for a long time; but

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

1. Coating the plain or unengraved face or surface of the plate (which is intended for leaving the white or unprinted surface of the paper) with a mercurial amalgam that will have the effect of preventing the ink used in printing therefrom from adhering to or soiling the same, while the figures engraved or etched thereon readily receive the ink, and thus admit of printing from the plate by a letter or any other press, either from the plate alone or from the plate in the same "form" with the type, without the wiping heretofore required in printing from steel or copper plates, substantially as herein described.

2. The coating of the plain surfaces of etched or engraved steel-plates with an alloy of tin and mercury, substantially and for the purposes as described, and also the coating of etched or engraved copper-plates in the same manner and for the same purposes, and the coating of the plain surface of metallic embossing-plates in the same manner and for the more especial purpose of using the sunken parts, when filled up with a resinous substance, as a plate to print from, thus saving an extra color-plate where it is desired to have the parts to be embossed first printed in any color.

SAML. W. LOWE.

Witnesses:
BEN. MARTIN,
JNO. B. KENNEY.