UNITED STATES PATENT OFFICE.

JOSEPH S. IVES, OF NEW YORK, N. Y.

IMPROVEMENT IN PROCESSES OF REMOVING INK FROM ENGRAVED PRINTING-PLATES.

Specification forming part of Letters Patent No. **144,544**, dated November 11, 1873; application filed October 9, 1873.

To all whom it may concern:

Be it known that I, JOSEPH S. IVES, of New York city, of New York county, in the State of New York, have invented a new Process of Removing Ink from Engraved Printing-Plates; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Previous to my invention it has been customary in cleaning off ink from polished and engraved surfaces—as, for instance, from the steel plates used in printing bank-notes and other engraved articles—to first wipe off with a cloth or rag the bulk of the ink to be removed, and then, with the palms of the hands and whiting, to rub over very carefully and remove from the surface of the plate all remaining particles; and to do this perfectly, and so as to leave the plain polished portion of the plate perfectly clean, and at the same time leave the proper charge of ink in all the finest cuts and depressions of the engraved portion of the plate, requires the skill and experience of an expert hand.

It has heretofore been suggested by me to wash off the surface of such plates with alkaline mixtures and other liquids containing some chemical property which would enable them to mix with and remove the ink; but in any such process there is liability of so disturbing or chemically affecting the portions of ink which fill minute lines of the engraving as to destroy or impair the appearance of the printing done from the plate, or cause an imperfect impression to be taken.

The objections to all heretofore-suggested modes of, and compounds of liquids for, cleaning off the ink from such plates, and their want of utility in practice, is evidenced in the fact that at the present time, in all establishments where bank-note and other fine engraving is done, the process of wiping and then rubbing off with whiting and the hands is always practiced. In this practiced mode of cleaning it is necessary to have a stone or pad kept heated by a gas-jet or other applied heat, on which the plate may be laid each time it is inked. In order that the ink applied to the whole surface of the plate may be so softened by the slight warming of the plate that it can be readily and perfectly cleaned off from the polished or unengraved portions of the plate's surface, and by the constant rubbing off of the plate with the palms of the hands covered with whiting, not only is much and very skilled labor requisite, but this polishing process, of course, in time wears away the surface slightly, and destroys very soon the sharpness of the impression.

To provide some process or mode of perfectly cleaning off the plate each time it is inked, as a substitute for that now employed, and in the practicing of which no skilled labor would be necessary, the use of heated surfaces would be dispensed with, and the work of the operative would be made comparatively cleanly and easy and more rapid, would, of course, be a great desideratum; and to gain this desirable object is the purpose of my invention, which consists in simply subjecting the inked plate, after it has had the bulk of the surplus ink wiped off as usual, to a washing off with a cloth thoroughly wetted with clean water.

I have discovered, after a long series of experiments and the bestowal of much thought to the subject, that, contrary to the natural and general impression of those skilled in the art, simply by the application of clean water, in a rag or cloth, such as generally used for wiping, every particle of ink and other matter will be removed from the plain and polished portion of the surface, while, by reason of the incapacity of the water to chemically mix with the ink, the minutest or finest engraved parts will not have the ink deposited therein removed or affected to the slightest extent.

When it is remembered that the surface of the paper for receiving the impression is always wetted, and that the presence thus of water on the surface of the plate is not only no detriment, but really advantageous, the propriety of the moisture left on the plate by my proposed plan of washing will be appreciated, and in view of the fact stated it will also be understood how the application of water to the surface of the engraved and inked portions can effect no harm.

I have found by careful practice that it is not material as to the extent of washing to which the plate is subjected, so long as it is washed enough to remove every particle from

the polished surfaces—that is to say, so long as the polished portion is washed off clean; the continuance of the washing thereafter, for a reasonable time, does not appear to have any tendency to affect the ink-filled portions of the plate, or to affect the impression derived from the engraved and ink portion.

In the process now practiced, the experience of a skilled expert is necessary, since, if the wiping off with the whitened hands be continued beyond just the proper extent, the engraved portion will not produce a sharp and perfect impression on the paper, and the appearance of the impression varies according to the extent of wiping.

I have also found, in practicing my invention, that, in applying the saturated cloth to the plate and wiping it over the surface thereof with water, no particle of ink taken off by the wet cloth can be put back or redeposited on the plate. It will be understood that this would probably not be the case were not the surface of the plate polished; and it will also be understood that the success of my process of washing off with water is dependent upon this condition of the surface to be cleaned, which condition exists in all plates for printing.

It was the conception of the difference in effect in the treatment of polished surfaces with water from the treatment of unpolished surfaces, that led to the new results I have attained.

I need not expatiate upon the great advantages which necessarily flow from the use of my new process or mode of cleaning the plate, since they are too apparent to those skilled in the art to need comment here.

I am aware, of course, that the water may have mixed with it some simple ingredient which will not affect its operation; but in the use of any such mixture the presence of such other ingredients will be a mere superfluity, and its use will involve my invention.

The presence of any substance which will, in any manner, affect the ink, will only be detrimental, or at least not essential or auxiliary, to the cleaning operation effected by the water alone, which I therefore prefer to use in its purest and natural condition.

I have used the water cold with perfect results, and therefore propose its use in this condition.

Having so fully explained my invention that any one skilled in the art can fully understand and practice it, what I claim as new, and desire to secure by Letters Patent, is—

The process of cleaning engraved printing-plates by first removing the bulk of the ink from the plain portions of the surface, and then washing off such portions with water, substantially as hereinbefore set forth.

In testimony whereof I have hereunto set my hand and seal this 8th day of October, 1873.

JOSEPH S. IVES. [L. S.]

In presence of—
J. N. McINTIRE,
JACOB FELBEL.