

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN SAFETY-PAPERS FOR BANK-NOTES, &c.

Specification forming part of Letters Patent No. 137,775, dated April 15, 1873; application filed August 19, 1870.

To all whom it may concern:

Be it known that I, JOHN JAMESON, of Gateshead, in the county of Durham, England, engineer, have invented new and useful Improvements in the Preparation of Safety-Paper; and that the following is a full and exact description of my said improvements, and of the manner in which the same are to be made and performed.

The nature of my invention and improvements not admitting of illustration by drawings, I have accompanied the same with specimens of paper prepared according to my said invention.

I print on the paper a design or designs of such character as that by the use of chemical inks the design shall either be changed in color or obliterated, or, being invisible, or nearly so, shall be rendered visible at the parts written upon; or I prepare a paper answering to more than one of these tests, selecting the chemicals, and so applying the designs as to make alterations of the writing or imitation of the chemical action very difficult if not impossible.

As an instance of the change of color, the design may be printed with a colored persalt of iron and the writing effected with a ferrocyanide.

As an instance of obliteration, the design may be printed with Prussian blue and the writing made with an alkali.

As an instance of development of invisible or nearly invisible design, the printing may be done with ferrocyanide and the writing with a persalt of iron.

Having thus stated the nature of the invention, I will proceed more particularly to describe the manner of carrying the same into effect.

A great variety of chemical substances are available for the purpose of carrying out my invention, and the chemicals or combination of chemicals may require to be varied so as to suit the particular circumstances in which the paper is intended to be used. The preparation which I prefer to employ for ordinary purposes is the following: If the paper contain traces of iron or other injurious matter, I film it with a thin film of such material as

gutta-percha dissolved in chloroform or other suitable solvent, so as to some extent to insulate the chemical design from impurities in the paper. I then print from an engraved block a design of minute wavy lines, having very small intervals between each, (about sixty to the inch is a fair proportion,) in an ink composed of gum arabic in water or gelatine, albumen, or other medium suitable for giving tenacity to the ink with ferrocyanide of potassium. After this design has become dry I print over it a second much more open design, (which I call for distinction the super-design,) crossing the first, in an ink composed of gum arabic or other suitable medium in water to which a very small quantity of perchloride of iron has been added, so as to produce this last design in a just perceptible blue color at its points of intersection with the first design, or otherwise. I give to the primary design a slight blue color, by mixture of a very minute portion of the permuriate of iron with the ink of which it is composed. I use with the paper so prepared an ink composed of a weak solution of perchloride of iron and gum, and the writing is produced in Prussian blue by the intersection of the lines formed by the pen and the lines formed by the first printed design. If it be desirable to render the writing still more secure than by the process I have described, I employ for the design an engraved block of wavy lines, (as before described,) with spaces between the lines, of such a size as to enable me to print another line between each line of the design—say, for instance, thirty lines to the inch; and in the spaces thus left I print a similar design in infusion of galls with a little gum, and, having impressed the super-design as before, I use the same chemical ink, which developes, at the points of intersection with the designs first mentioned, alternate spots of black and blue.

The object of my invention is to indicate the genuine character of the ink employed, and I accomplish it in the manner I have stated by the furnishing in the paper itself the necessary chemical tests. There exist already many processes for detecting the extraction of genuine writing-ink from paper by chem-

ical agents, which may be used in combination with my process or not. If it be desired to avoid the necessity for using a special ink, the design in a persalt of iron may be printed on the paper, and a thin film of gutta-percha thereafter applied; and after the whole has become thoroughly dry, ferrocyanide of potassium in the form of an impalpable powder suspended in alcohol with a little Canada balsam or gum dammar may be applied spread over the surface. If a writing be made on this paper by means of water only, or water and gum, it will develop the design at the points of intersection; or the same effect may be produced by printing a design in ordinary ink, and soaking the paper with oxalic acid in absolute alcohol; and when the oxalic acid is brought into contact with the design by means of water, discharge of color will take place; but the disadvantage of these processes is that long exposure to damp or wetting will destroy the properties of the paper.

Another manner in which my process may be employed is with ordinary ink, in which case I prefer to employ at least two designs of a more bold character than those I have before described—say fifteen lines to the inch—one being in such chemicals as oxalic acid, and one in such as carbonate of soda or bicarbonate of potash. The design in oxalic acid is developed under the covering of

most inks by discharge of the black color from the same, and the design on the soda is developed by the deposit of a black precipitate, passing gradually into a brown by exposure to air, or over the bichromate of potash into an instantaneous and tolerably permanent black; but I prefer to employ special inks not requiring this change of color in all cases in which they can be conveniently used.

Another method in which paper may be prepared for ordinary inks is by printing as before directed with ferrocyanide of potassium and soaking the paper when quite dry with solution of oxalic acid in alcohol.

What I claim as my invention and improvement, and for which I desire Letters Patent, is—

A safety-paper provided with a design or designs produced by the process and in the manner substantially as described, whereby the character of the ink employed is indicated by the discharge, change, or development of color of the same, substantially as and for the purposes set forth.

J. JAMESON.

Witnesses:

DANIEL GREEN,

JOHN WOOD CHERRY,

*Clerks to William Daggett, Notary
Public, Newcastle-on-Tyne.*