

UNITED STATES PATENT OFFICE.

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PAPER FOR BANK-NOTES, CHECKS, BONDS, STOCKS, AND OTHER INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 531,507, dated December 25, 1894.

Application filed January 26, 1894. Serial No. 498,160. (No specimens.)

To all whom it may concern:

Be it known that I, DAVID N. CARVALHO, a citizen of the United States, residing in New York, in the county and State of New York, have invented certain new and useful Improvements in Paper for Bank-Notes, Checks, Bonds, Stocks, and other Instruments, of which the following is a full, clear and exact description.

The subject of my improvements is the production of an improved safety paper for bank-notes, checks, bonds, stocks and other instruments, of such nature that when any chemical or chemicals which will remove ink are applied thereto they will instantly and permanently discolor the paper, producing thereon a stain wherever said chemical or chemicals will have touched it.

The object of preparing such paper is to prevent the possibility of altering such documents. It is a common practice with forgers to erase, by means of chemicals, the ink from portions of such documents; thus, in the case of checks, a portion of the amount may be erased and a new amount greater than that for which the check was drawn, may be substituted, or the name of the payee erased and a new one substituted, or again the name of the indorser or indorsers changed in like manner. Such is the ordinary process of check raising. If on the application of the known ink-erasing agents, the ink is erased, but at the same time, a permanent and characteristic stain is produced on the paper, the check is, of course destroyed and the drawer or person who is to pay the check is protected. The same applies to other documents where dishonest people may desire to change them by erasing the ink and altering any of the parts or the entirety.

The paper of my invention is charged with an iodide, preferably a solution of bismuth iodide in a solution of sodium iodide. Such solution is readily made by adding to an aqueous solution of any bismuth salt, such as the chloride or nitrate, an excess of sodium iodide or equivalent salt. The bismuth iodide (BiI_3) thus formed in a precipitate and dissolves in the excess of sodium iodide present. Instead of bismuth iodide, I may dissolve mercury iodide (HgI_2) or the iodide of any

other suitable heavy metal, in sodium iodide, my object being to obtain a solution of one of the ordinarily insoluble metallic iodides in sodium iodide, in other alkaline iodide or known equivalent. These double iodides have the effect of producing a more permanent stain when treated with an eraser. The paper may be charged with this solution either by having it mixed with the paper pulp in the course of manufacture, or the surface of the paper may simply be sponged therewith, the method of applying it to the paper being merely a matter of technical detail. If such paper be treated with a hypochlorite, especially after the addition of an acid, which is the regular erasing process employed, the bismuth iodide will be decomposed and iodine will be set free, staining the paper and forming a stain which does not yield to any ordinary re-agents or solvents.

It is known that there are a number of coal tar colors, so called, which colors are also affected by oxidizing re-agents. If such colors be applied to paper they will color it, something that is desirable, and they will then naturally act also as a safe-guard, being themselves changed in color by the typical erasers. If the solution of these colors be applied to my paper with the iodide solution, a double protection is offered besides the incidental advantages of coloring the paper. In regard to the solution, moreover, of these dyes in water before application, I find that the addition to the water of sodium iodide makes them dissolve more readily so as to be ready for application to the paper and does not change their color.

As regards the salt formed by the solution of bismuth iodide in sodium iodide, it may be assumed to be the double iodide of bismuth and sodium ($2\text{NaI}, \text{BiI}_3$). The re-action which takes place by the action on this compound of an oxidizing re-agent in general terms, is the liberation of the iodine, and there may also be effected the formation of some definite compounds of iodine with the metals, the stain produced being of a high degree of permanency.

As coloring matters suitable for my process, I may cite as typical, primulin and benzidene colors in general. By the action of the

oxidizing agents such as are used for erasing ink, these dyes have their colors changed and to their color change is superadded that due to the separation of the iodine.

5 Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A safety paper consisting of paper charged with bismuth iodide and sodium
10 iodide, substantially as described.

2. As a new article of manufacture, the combination of paper and a salt of bismuth with iodide of sodium and either primulin, congo red, or other pigment for the purpose

of obtaining a variety of colors, substantially 15 as described.

3. A check protecting fluid consisting of a solution of a benzidine dye with an alkaline iodide, substantially as specified.

In testimony that I claim the foregoing as 20 my own I sign this specification, in the presence of two subscribing witnesses, this 19th day of January, 1894.

DAVID N. CARVALHO.

Witnesses:

S. C. CAMPBELL,
SUMNER B. STILES.