

UNITED STATES PATENT OFFICE.

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SAFETY-PAPER FOR CHECKS, &c.

SPECIFICATION forming part of Letters Patent No. 511,271, dated December 19, 1893.

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To all whom it may concern:

Be it known that we, WILLIAM HOSKINS, residing at La Grange, and JOSEPH B. WEIS, residing at Chicago, in the county of Cook, State of Illinois, citizens of the United States, have invented a new and useful Improvement in Safety-Paper for Checks, &c., of which the following is a specification.

Our invention relates to an improvement in the manufacture of safety paper for checks, &c., of the kind which is intended to make evident any attempt by the use of chemicals, whether alkaline or acid, to obliterate or change marks made thereon with ink or otherwise.

Safety paper is generally of three classes. One class involves a peculiarity in the structure of the paper, such as the incorporating in it of threads, or the like, which will disclose at once, by the destruction of the fiber, any attempt to alter superficial writing by erasure or any action tantamount to erasure. A second class involves the preparation of the surface of the paper either by the employment of a color, glaze or enamel or similar material, so that any attempt to remove the superficial marks thereon will result in the removal of a part of the superficial safety application. A third class involves such a composition of the paper itself that an attempt to act upon superficial marks thereon with a chemical factor, such as chloride of lime, oxalic acid, tartaric acid, &c., will produce a marked change in the color of the paper at the point where the chemical re-agent is applied, thus giving evidence at once of the attempt to remove the mark from the surface. It is to the third of the above classes that the present invention more particularly relates.

Several compositions and processes of treating paper, either in the pulp or other stages of its manufacture, or by mixture with the sizing or otherwise, the purpose of which is to offer immediate evidence of the use of a chemical re-agent for the obliteration of ink or other marks, have heretofore been suggested, and some of these have in a measure been successful. It is found, however, that the ingenuity of those evil-minded persons, to the detection of whose efforts to change the writing upon

paper this class of invention has more particularly been directed, finds a ready way of removing, in many cases, the evidence which the chemical re-agent furnishes. For instance, the production of a blue tinted safety paper, which under chemical reaction becomes white at the point of treatment, is met by the ingenious application of water colors, by which the treated portion is caused to reassume its former appearance. For this reason, also, any method which depends upon the giving of a normal tint to the paper is found ineffective. Compositions which are perfect in their operation when the eradicating agent is alkaline are found to be ineffective if an acid be employed, and others which are effective with an alkaline or certain acid re-agents are found to be insufficiently operative if a weak organic acid such as tartaric acid be employed for obliteration.

The object of our invention is to produce a safety paper which shall cause any attempt to obliterate marks thereon by the use of a chemical factor, whether alkaline or acid, to be at once made apparent by such a discoloration of the surface as can not be disguised by the use of colors or further chemical re-agents.

In carrying out our invention we prefer to combine with the pulp, but may introduce otherwise into the paper or incorporate in the sizing, a mixture of a ferrocyanide soluble in water, a per-salt of iron insoluble in water but easily decomposed by weak acids in the presence of a ferrocyanide soluble in water, and a salt of manganese easily decomposed by alkali or solution of chloride of lime, chloride of soda, or other re-agent, the active principle of which is chlorine. A more specific formula may be given as follows, but it should be understood that the exact chemicals mentioned and the proportions here given may be varied: In one hundred parts of product combine 97.0 per cent. pulp, .5 per cent. ferric phosphate, 2.0 per cent. manganese phosphate, and .5 per cent. potassium ferrocyanide.

The attempt to obliterate marks from the surface of paper which is impregnated with this chemical composition, by the use of an alkali causes a brownish discoloration due to the formation of oxide of manganese and ox-

ide of iron, and a similar attempt with an acid re-agent, such as oxalic acid or tartaric acid, causes a pronounced blue discoloration due to the formation of a prussiate of iron. Instead of the manganese phosphate we may employ the ferrocyanide of manganese, and instead of the ferrocyanide of potassium any ferrocyanide soluble in water may be employed. We prefer the chemicals above mentioned and in such proportions as will produce a paper nearly white, as we find that this may be done and still have sufficient chemicals present to re-act distinctly upon the addition of the re-agents employed.

15 In place of the phosphate of iron any salt of iron which is insoluble in water but is decomposed by weak acids in the presence of a ferrocyanide soluble in water may be employed.

What we claim as new, and desire to secure by Letters Patent, is—

1. A safety paper having added thereto a soluble ferrocyanide and a per-salt of iron insoluble in water but decomposable by a weak acid in the presence of a soluble ferrocyanide, as and for the purpose described.

2. A safety paper having added thereto a ferrocyanide soluble in water, a per-salt of iron insoluble in water but easily decomposed by weak acids in the presence of a ferrocyanide soluble in water, and a salt of manganese easily decomposed by alkalies or bleaching agents, substantially as described.

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In presence of—

M. J. FROST,

W. N. WILLIAMS.