UNITED STATES PATENT OFFICE

JOSEPH B. WEIS, OF HOLYOKE, MASSACHUSETTS, ASSIGNOR TO PERFECT SAFETY PAPER CO., OF HOLYOKE, MASSACHUSETTS, A CORPORATION OF WEST VIRGINIA.

PROCESS OF MAKING SAFETY-PAPER FOR CHECKS AND SIMILAR DEVICES AND THE SAFETY-PAPER ITSELF.

1,172,414. Specification of Letters Patent. Patented Feb. 22, 1916.

No Drawing. Application filed January 6, 1911. Serial No. 601,056.

To all whom it may concern:

Be it known that I, JOSEPH B. WEIS, a citizen of the United States, and a resident of Holyoke, in the county of Hampden and State of Massachusetts, have invented a new and useful Improvement in Processes of Making Safety-Paper for Checks and Similar Devices and in the Safety-Paper Itself, of which the following is a specification.

My invention relates to an improved process for the manufacture of safety paper for checks, notes, bonds, and other similar devices, and has for its object the production of a paper of such a character that any attempt to change the marks appearing thereon, or to erase or obliterate the same, by the use of chemicals, either alkaline or acid, will cause a change in the appearance or color of the paper, as a result of which the attempted fraud can be easily detected.

My invention also relates to the improved product which is produced by this new process.

A further object of the invention is to produce a paper of such a character that after the paper has been changed in appearance or discolored by the use of any alkaline or acid agent, it will be impossible to restore its original appearance or color by the use of other chemical re-agents, or by the use of coloring material applied thereto.

My improved process is carried out in the following manner: The pulp of the paper is prepared in any usual or suitable way. A mixture of a soluble ferrocyanid and an anilin or an anilin salt such as anilin chlorid is then introduced into the pulp in the proportion of about one-half per cent. of soluble ferrocyanid, and one per cent. of anilin or anilin salt, to ninety-eight and one-half per cent. of pulp. The anilin or anilin salt being white or colorless does not color the paper. Instead of introducing this mixture into the pulp it may be incorporated with or added to the sizing which is applied to the paper. It will be understood that the proportions may be considerably varied, although I prefer the proportions just stated.

The above process will produce a good and satisfactory safety paper. I prefer, however, to add additional chemicals to the mixture which is incorporated in the pulp as follows: I add to the mixture of soluble ferrocyanid and anilin or anilin salt, a persalt of iron insoluble in water but easily decomposable by weak acids in the presence of the ferrocyanid, and a salt of manganese easily decomposed by alkalis or by a solution of chlorid of lime, or of hypochlorite of sodium, or other re-agent, the active principle of which is chlorin. The mixture of these chemicals may be distributed uniformly over the paper by addition thereof directly to the pulp, or incorporating it in the sizing.

The specific formula which I have found it best to use is as follows: In one hundred parts of product I combine ninety-six per cent. of pulp, one-half per cent. of ferric phosphate, two per cent. of manganese ferrocyanid, one-half per cent. of sodium ferrocyanid, and one per cent. of anilin chlorid. It will be understood that the particular chemicals mentioned, and the proportions given above, may be considerably varied within the limits as covered by the claims without departing from the spirit or scope of the invention. If preferred the soluble ferrocyanid may be added to the sizing, and the anilin or anilin salt, with or without the other chemicals, may be incorporated directly in the pulp.

Where an attempt is made to change or obliterate a mark, or to remove it from the surface of such a paper, acid is first employed for the purpose of softening the ink, after which a bleaching compound is used such as chlorid of lime or similar chlorin compound. The soluble ferrocyanid acts to fix the ink when it is first applied to the paper. If acid is applied to the surface of the paper for the purpose of softening the ink, a re-action takes place between the soluble ferrocyanid and the persalt of iron, which causes a blue stain upon the paper. This blue stain is produced by the formation of Prussian blue. The anilin or anilin salt is introduced for the purpose of causing a brown stain in the paper when the bleaching agent, such as chlorid of lime or any other agent the active principle of

which is chlorin, is applied to the paper. This brown stain results from the compounds formed by the combination of anilin and chlorin. The presence of the salt of manganese aids in the production of the brown stain. When it is subjected to the action of the chlorin in the bleaching agent it is oxidized and also forms a brown stain. It is better to use an insoluble salt of manganese such, for example, as manganese ferrocyanid or a manganese phosphate.

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

One advantage resulting from the use of this invention is that the re-action between the chlorin or the bleaching agent, and the anilin or anilin salt, is very rapid, and the brown stain is therefore produced very rapidly. Moreover, this brown stain caused by the reaction between the chlorin and the anilin or the anilin salt, is deep, and the stain is very permanent. The result of this is that this brown stain can not be removed thereafter by the use of acids, no matter how skilfully they are applied or manipulated.

What I claim as new and desire to secure by Letters Patent, is:

1. The process of making safety paper which consists in adding to the paper a soluble ferrocyanid, and anilin or an anilin salt, as and for the purpose described.

2. The process of making safety paper which consists in adding to the paper a soluble ferrocyanid, a per-salt of iron insoluble in water but decomposable by a weak acid in the presence of the ferrocyanid, and anilin or an anilin salt, as and for the purpose described.

3. The process of making safety paper which consists in adding to the paper a soluble ferrocyanid, a per-salt of iron insoluble in water but decomposable by a weak acid in the presence of the ferrocyanid, a salt of manganese easily decomposable by alkalis or bleaching agents, and anilin or an anilin salt, as and for the purpose described.

4. The process of making safety paper which consists in adding to the paper a soluble ferrocyanid, and anilin chlorid.

5. The process of making safety paper which consists in combining the following materials in substantially the following proportions, 96 per cent. of pulp, ½ per cent. of ferric phosphate, 2 per cent. of manganese ferrocyanid, ½ per cent. of sodium ferrocyanid, and 1 per cent. of anilin chlorid.

6. A safety paper containing a soluble ferrocyanid and anilin or an anilin salt, substantially as described.

7. A safety paper containing a soluble ferrocyanid, a per-salt of iron insoluble in water but decomposable by a weak acid in the presence of the ferrocyanid, and anilin or an anilin salt, substantially as described.

8. A safety paper containing a soluble ferrocyanid, a per-salt of iron insoluble in water but decomposable by a weak acid in the presence of a soluble ferrocyanid, a salt of manganese decomposable by alkalis or bleaching agents, and anilin or an anilin salt, substantially as described.

9. A safety paper composed of the following materials in substantially the following proportions: 96 per cent. of pulp, ½ per cent. of ferric phosphate, 2 per cent. of manganese ferrocyanid, ½ per cent. of sodium ferrocyanid, and 1 per cent. of anilin chlorid, substantially as described.

10. A safety paper containing anilin or a white or colorless anilin compound adapted to produce a brown stain on treatment with alkalis or bleaching agents.

11. A safety paper containing iron and anilin or a white or colorless anilin salt, capable of producing blue and brown stains on the paper when treated with acid and bleaching agents.

12. A safety paper containing matter adapted to produce a dark stain in the paper when treated with acid, and anilin or a white or colorless anilin compound adapted to produce a brown stain on the paper when treated with bleaching agents.

13. A safety paper containing matter distributed substantially uniformly over the paper and adapted to produce a blue stain in the paper when treated with acid, and a manganese compound and anilin or anilin salt distributed substantially uniformly over the paper and adapted to produce a brown stain in the paper when treated with bleaching agents.

14. A safety paper containing white or colorless matter distributed substantially uniformly thereover and adapted to produce a dark stain on the paper when treated with acid, and white or colorless matter also distributed substantially uniformly over the paper and adapted to produce a dark stain thereon when treated with bleaching agents.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOSEPH B. WEIS.

Witnesses:
CHAS. A. RENNER,
MOREY BORLEN.