

UNITED STATES PATENT OFFICE

1,947,451

COPPERIZED PAPER

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No Drawing. Application October 3, 1932
Serial No. 636,030

5 Claims. (Cl. 92-21)

Our invention relates to the incorporation in a paper sheet of the fungicidal and bacteriacidal chemical by the precipitation of the chemical on the fiber in the beater furnish from which the sheet is made, thus causing the deposit on, and the enmeshment of the chemical with the fiber; and in that way to produce a paper which for example may be used as a plant cover and as a fruit wrap.

- 10 The object of our present invention is to incorporate specifically in the paper, copper ortho-phenyl phenate. Since this chemical combines the toxic properties of the phenol (carbolic acid) with those of copper, it is very desirable to use the same, but the incorporation of the ortho-phenyl phenol constituent of this chemical in the paper fiber presented serious difficulties which had to be overcome. Sodium orthophenyl phenate is the most feasible form in which said chemical constituents may be used for our purpose; but it is soluble in water to such a limited degree that a solution of sufficient strength to be applied as a dampening solution to the paper is not feasible. For, in order to incorporate 1% of this chemical in the fiber it would require the adding of about 5% of water to the dry sheet in dampening the same with the chemical solution; and the latter furthermore would have to be about a 20% solution of the chemical, a degree of solution far beyond its possibilities.

Besides, the solution would not penetrate the sheet if applied by the dampening method. And, further, since this chemical is somewhat volatile, if the sheet is to be super-calendered this chemical would tend to lose much of its value from the frictional heat of the super-calendering.

Our present invention consists in effecting a solution of the necessary amount of sodium ortho-phenyl phenate in the large volume of water used in the beater, whereby the degree of solubility of the chemical is not exceeded and a solution of the necessary strength is obtained.

Our procedure is as follows:

- 45 Assuming that we use unbleached sulphite, to each ton of this pulp we add in the beater 30 pounds of sodium ortho phenyl phenate, the latter being added as a dry powder and first dissolved in the beater water; its solution being effected by circulation of the water in the beater for about 10 minutes which we found sufficient to effect complete solution.

The preliminary step of dissolving the chemical in the beater water we find necessary, since if the chemical is added either dry to the fiber

already in the beater, or added wetted in water, it resists complete solution, due to particles clinging to the fiber; and thus undissolved particles will then appear in the sheet as green specks of the copper combination, which would detract from the appearance of the sheet.

After the chemical has been dissolved in the beater water, slush and lap stock may be added to the desired consistency, and then the beating operation must be continued for about another half hour.

Then we add 25 pounds of copper sulphate in solution. The stock will turn a delicate light green. After the addition of the copper sulphate the stock is further beaten for about half an hour.

Tests of the back-water showed the same to be remarkably free from the presence of dissolved copper.

We also found that the copper retention by the fiber is remarkably high. It is our opinion that such high retention may come from some similarity of the copper ortho phenyl phenate to dye stuffs with regard to the latter's properties of adherence and adsorption to the fiber.

The paper sheet so prepared contains an excess of 1% of a copper modification of the essential copper ortho phenyl phenate, and this paper web charged with the said chemical especially lends itself in super-calendering to transparency.

The proportions above given are of course variable if a greater or lesser amount of copper ortho phenyl phenate is to be incorporated in and retained by the paper fiber, and the beating periods are given approximately, in accordance with the best results obtained by us.

We claim:

1. A paper sheet characterized by the fiber thereof carrying a predetermined amount of copper ortho phenyl phenate precipitate.

2. A paper sheet characterized by the fiber thereof carrying a precipitate of copper ortho phenyl phenate of not less than 1% by weight.

3. The process of incorporating a definite amount of copper ortho phenyl phenate in the fiber of a paper sheet comprising, dissolving an alkaline ortho phenyl phenate in the water of the beater before introducing the stock, then adding copper sulphate and beating the stock for a period, the chemicals being relatively proportioned to each other and the stock to effect the precipitation of a definite amount of copper ortho phenyl phenate in and on the fiber, substantially as described.

4. The process of incorporating a definite amount of copper ortho phenyl phenate in the fiber of a paper sheet comprising, dissolving an alkaline ortho phenyl phenate in the water of the beater before introducing the stock, then adding copper sulphate and beating the stock a period, the chemicals being relatively proportioned to each other and the stock to effect the precipitation of not less than 1% of copper ortho phenyl phenate in and on the fiber, substantially as described.
5. The process of incorporating a definite amount of copper ortho phenyl phenate in the fiber of a paper sheet comprising, dissolving for each ton of pulp to be beaten approximately 30 pounds of an alkaline ortho phenyl phenate in the water of the beater before introducing the stock and then adding approximately 25 pounds of copper sulphate and beating the stock for a period, substantially as described.

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