Patented Dec. 5, 1933

1,938,543

UNITED STATES PATENT OFFICE

1,938,543

METHOD OF MAKING PAPER

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No Drawing. Application November 16, 1932 Serial No. 642,936

2 Claims. (Cl. 92—21)

This invention relates to improvements in the art of paper-making, and is directed more particularly to improvements in the method of making paper and the product thereof wherein means for detecting counterfeiting and the like is employed.

The principal objects of the invention are directed to the provision of a method of making paper wherein detecting-fibers are incorporated in the paper during its manufacture, and these fibers are treated in a certain way to bring about a certain reaction when the finished paper is subsequently subjected to the action of liquids, gases or the like which will change the color of the detecting-fibers. When it is desired to use paper having the detecting-fibers incorporated therein for certain purposes, such as documents or the like, it is possible to ascertain the genuineness of the paper by subjecting the same to a medium which will bring about the color changes in the detecting-fibers or make the fibers visible.

As one feature of the invention the detecting-fibers may be treated with a substance to have a color corresponding to that of the paper-making material and be normally indistinguishable, but will change to a color distinguishable from that of the paper when subjected to the liquid or gas referred to and which may be called a detecting agent.

As another feature of the invention the detecting-fibers may be treated in such a way that should documents made from the paper be tampered with or should printed or written matter thereon be tampered with by the use of the usual acids, eradicators, or the like, the detecting-fibers will change color. In this way the fact that the document has been tampered with will be immediately evidenced.

As a further feature of the invention it is proposed to incorporate in the paper in addition to the before mentioned normally indistinguishable fibrous material, other fibers which may be colored so as to contrast more or less with that of the finished paper. These may be treated in such a way that one may bring about changes in the color thereof when subjected to a detecting agent. In this case a detecting agent will change the color of the last-named fibers as well as that of the normally indistinguishable fibers so that they are distinguishable.

According to the novel features of the method of the invention, I incorporate with the paper-making material when in a fluid, flowable or plastic condition, a multiplicity of fibers which are adapted to be intermingled with the paper-making material and may consist of the fibers of hemp, cotton, wool, wood-pulp or various materials. These fibers are dispersed throughout the paper-making material so as to become intermingled therewith and become a part of the paper-making body. The fibers may be relatively long for the desired intermingling effect or, in some cases may, of course, be shorter.

As distinguished from such materials as small pieces of paper and the like which have no inherent tendency to interlock and intermingle with the paper-making fibers, the fibers mentioned are adapted for the desired interlocking and intermingling effect. It is desired that the fibers referred to and called detecting-fibers be intermingled and interlocked with the paper-making fibers so that the body of the paper as well as its surface is not impaired by the incorporation thereof, and by a proper intermingling or interlocking they are not readily separable from the finished paper.

The detecting fibers may be made to be indistinguishable in the paper but are treated with a substance which, when the finished paper is subjected to the action of a detecting agent such as liquids, gases, or the like, will cause the fibers to change color and become visible. By knowing the nature and characteristics of the substance or substances with which the detecting fibers have been treated, it is within the scope of the invention to subject the finished paper to the action of certain gases, liquids, and the like, to bring about the changing of the color or bringing about the visibility of the fibers. In that way a manufacturer may readily ascertain whether or not a certain paper is of his manufacture.

As an example, detecting fibers to be normally indistinguishable in a yellow paper may be treated with a yellow dye commonly known as "Brilliant paper yellow" which is sensitive to an alkali. The finished paper may be treated with or subjected to an alkaline liquid or gas such as ammonia, which will change the color of the fibers to a reddish hue whereby they become visible and contrast to some extent to that of the paper.

As another example, the fibers may be colored to contrast with that of the paper, with an alkali sensitive dye such as the yellow dye above. Then, when a portion of the paper is subsequently subjected to the action of a detecting agent such as the alkali mentioned, the fibers will be changed in color to contrast with the colored fibers of another portion of the paper.

As a further example fibers may be treated

with "Congo red" or sodium diphenyl-diazobinaphtionate and when the paper is subjected to acetic or some stronger acid the fibers are changed to a blueish hue.

Fibers may be incorporated which are colored and not intended for detecting fibers, while other fibers normally indistinguishable may be incorporated which are treated to function as detecting fibers. Still other fibers, colored so as to be visible and also treated with chemically sensitive substances, may be incorporated for use as detecting fibers. Various combinations may be used for various desired results, as will appear from the foregoing.

Having described the invention in the form at present preferred what I now desire to claim and secure by Letters Patent of the United States is:

1. The method of making paper which consists in, forming a web from paper-making material, incorporating with the paper-making material during the process of manufacture a multiplicity of detecting-fibers of a certain color and a multiplicity of other fibers of the same certain color so as to be normally indistinguishable therefrom, all of said fibers being adapted to be intermingled with the paper-making material and become a part of the paper web, said detecting-fibers being treated with a certain substance whereby when the finished paper is subjected to certain reactions, the certain color of said detecting-fibers will change and cause said detecting-fibers to become distinguishable from said other fibers.

2. Paper of a certain color having detecting-fibers dispersed therethrough and intermingled with the fibers of the paper, said detecting-fibers having previously been treated with a chemically-sensitive substance whereby said fibers are the same color as the finished paper and normally indistinguishable therefrom and whereby said fibers will, when the finished paper is subjected to certain chemical reactions, change their certain color and become distinguishable from said finished paper.

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