

UNITED STATES PATENT OFFICE.

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SAFETY GUMMED PAPER AND PROCESS OF PREPARING SAME.

1,177,787.

Specification of Letters Patent.

Patented Apr. 4, 1916.

No Drawing.

Application filed May 11, 1915. Serial No. 27,428.

To all whom it may concern:

Be it known that we, JOHN MACLAURIN and FREDERICK W. FARRELL, citizens of the United States, and residents of Brookfield, in the county of Worcester and State of Massachusetts, have invented an Improvement in Safety Gummed Paper and Processes of Preparing Same, of which the following description is a specification.

This invention relates to safety gummed paper for use particularly as trading stamps and safety labels and to the process of producing the same.

In order that the principle of the invention may be readily understood, we will disclose the preferred embodiment of our invention and the best mode known to us for practising the same and for producing the product of our invention.

Heretofore so called "safety paper" for use as trading stamps and safety labels has been manufactured, but the paper has first been manufactured, and the marking then applied thereto, as for example by applying a dye to both surfaces thereof and then applying localized pressure at the areas where the marking is desired, after which an adhesive is applied to one surface of the sheet. So far as we are aware, however, a safety gummed sheet has never been produced by the substantially simultaneous application of a staining design or marking to one surface of the paper or sheet and a liquid to the other surface, which liquid coöperates to effect the penetration of the sheet by the said design or marking. Furthermore so far as we are aware a staining design has never been printed upon the paper in such manner as to penetrate therethrough or substantially therethrough. Safety designs heretofore printed upon the surface of safety paper have not penetrated below the surface.

In the practice of our invention, we produce a better and cheaper gummed safety paper, and preferably we effect this object by simultaneously or substantially simultaneously staining the paper with a penetrating safety design on one surface and gumming the paper upon the other surface. We thereby cause the design to penetrate clear through the paper, so that it cannot be removed without substantially destroying the paper. Satisfactory penetration can only be obtained by moistening one surface of the

sheet while staining the other, and in accordance with the preferred embodiment of the invention we employ an adhesive as a moistener inasmuch as we have found it to be particularly suitable for the purpose.

Any suitable color or character of paper may be employed. Heretofore so far as we are aware, a white paper has never been successfully employed for this purpose. By our process we are enabled satisfactorily to employ a white paper upon which the design shows with great clearness and distinctness.

In accordance with our invention we apply a stain to one surface of the sheet and simultaneously or substantially simultaneously, we apply to the opposite surface of the sheet some substance that will assist the penetration of the sheet by the stain. Preferably this substance applied to the opposite surface of the sheet is one which causes moistening of the sheet. Within the scope and purpose of the invention, such moistening may be effected by the application of water, but in the preferred embodiment of our invention, we moisten the sheet upon one surface by applying an adhesive thereto and simultaneously or substantially simultaneously therewith we apply the stain to the opposite surface of the sheet.

The stain may be applied in any suitable manner as for example by imprinting a design of characters or letters by means of an engraved brass roll or engraved roll of other suitable material. Any suitable substance may be employed as a stain. Preferably we employ a liquid that is the solvent of an aniline or other dye and also capable of penetrating a sized sheet of paper. Such solvent may or may not, as is found desirable, be diluted with a sufficient amount of a solution of gummed or other thickener to give the desired clearness or sharpness of design, and at the same time to give the maximum degree of penetration. In carrying out our invention, we have satisfactorily employed denatured wood or grain alcohol, acetic acid, acetone, ether, turpentine or other organic solvents and glue, dextrin, gum arabic, tannin or castor oil as thickeners. We have also employed many different aniline colors. Our preferred formula consists of ten parts of alcohol, 188° proof; ten parts of a 20% solution of gum arabic, and

anilin dye sufficient to give the desired intensity of color.

In order to effect the complete penetration of the stain and the clearest design, so that the matter is legible on both sides of the paper, we effect the simultaneous moistening of the paper on one surface and application of the stain to the other surface. While, as previously stated, this may be effected with water, we have achieved the best result by applying an adhesive which may be of any suitable character, as, for example, a liquid dextrin, fish glue or animal glue, or any other suitable gum solution. We have demonstrated after a great deal of experimentation that the simultaneous application of the moisture to one surface and the stain to the other surface effects the complete penetration of the paper by the stain. The reason for this result is probably due to the action of capillarity, by which the penetration of the stain is assisted. The result is a meeting of the stain and the gum by the simultaneous or substantially simultaneous application of the adhesive or moistener to one surface of the paper and of the stain to the other surface of the paper. There is a meeting of the stain and the adhesive or moistener with the further result that the stain penetrates the paper entirely and mixes with the adhesive upon the opposite face thereof. Consequently the design shows clearly on both surfaces of the paper and cannot be removed without the entire destruction of the paper itself. If white paper be employed, the design shows with even greater distinctness, and not only does the stain penetrate entirely through the paper and the design is consequently clearly apparent upon both surfaces thereof, but the adhesive has a fixing action upon the dye or other stain. Furthermore, a great saving in production and labor are effected by applying the adhesive simultaneously with the application of the stain. Heretofore it has been customary first to treat the paper to make it "safe" and afterward to apply an adhesive thereto by a separate machine. This double process causes waste and renders the resulting article more costly. By effecting both the staining of the paper and the application of the adhesive thereto simultaneously, great saving is effected.

Instead of applying the stain or all the ingredients thereto to one surface only of the paper and applying the adhesive to the other, we may employ a plurality of ingredients which together form a stain or pigment. For example, we may employ as the stain or pigment, a solution of tannic acid, and we may mix with the gum or adhesive some ferrous chlorid. By applying simultaneously these two solutions or substances to the two surfaces of the paper, they combine within the paper and form a stain of tan-

nate of iron which cannot be removed without the destruction of the paper. Other substances may similarly be employed in effecting this result. For example, Prussian blue may be formed within the paper by mixing a salt of iron with the adhesive and by mixing potassium ferro-cyanid in the stain. This result may also be effected by forming anilin dyes within the paper by using one component of the dye as the stain and the other with the adhesive. When the surfaces of the paper are thus simultaneously treated, the components of the dye combine within the paper in the production of such dye.

For certain purposes, as, for example, in order to prevent fraudulent alteration, we may use a fugitive anilin dye or one sensitive to such chemicals as are used for removing ink, so that attempts to remove the stain or coloring ingredient will cause the design to disappear wherever the chemicals are applied. In carrying out our process not only does the design penetrate entirely through the paper but the gum or other adhesive upon the opposite surface penetrates the paper to an increased and a greater extent. Obviously any paper may be employed and the liquid stain may be of any suitable character to give the desired clearness, penetration and color. While our invention may under certain conditions be practiced upon and in connection with sheets of material other than paper, it is peculiarly appropriate thereto.

So far as we are aware, we are the first to ascertain that a design, stain or mark may be caused to penetrate a sheet by the act of moistening one surface of the sheet simultaneously or substantially simultaneously with the staining or marking of the other surface of the sheet and particularly that these results may be secured by the use of a gum or like solution applied to said first mentioned surface.

Having thus described our product and the best method known to us for producing the same, we desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims:

1. That method of treating a sheet which consists in substantially simultaneously applying a marking liquid to one surface and a co-acting liquid to the other surface.

2. That method of treating a sheet, which consists in substantially simultaneously applying a marking liquid to one surface and a liquid to the other surface that acts by capillarity upon said marking liquid.

3. That method of treating paper which consists in substantially simultaneously applying a marking liquid to one surface and

a liquid to the other surface that assists penetration of the sheet by said marking liquid.

4. That method of treating paper which consists in substantially simultaneously applying a marking liquid to one surface and a liquid to the other surface acting by capillarity upon said marking liquid.

5. That method of treating paper which consists in applying substantially simultaneously a marking liquid to one surface and a coating adhesive to the opposite surface that assists penetration of the sheet by the marking liquid.

6. That method of treating paper which consists in applying a marking liquid to one surface of the paper and causing the entire penetration of the paper by said marking liquid through the application of moisture to the opposite surface of the paper.

7. That method of treating paper which consists in applying a marking liquid to one surface of the paper and causing the entire penetration of the paper by said marking liquid through the application of an adhesive to the opposite surface of the paper.

8. That method of treating paper which consists in applying a penetrating stain to one surface of the paper and substantially simultaneously applying an adhesive solution to the other surface thereof.

9. That method of treating paper which consists in applying to one surface thereof a stain composed of ten parts alcohol, ten parts gum arabic, and an anilin dye, and in substantially simultaneously applying moisture to the opposite surface of the paper.

10. That method of treating paper which consists in applying to one surface thereof a stain composed of ten parts alcohol, ten parts gum arabic and an anilin dye, and in substantially simultaneously applying adhesive to the opposite surface of the paper.

11. That method of treating paper which consists in applying a marking liquid to one surface thereof and in causing said marking liquid completely to penetrate the paper by applying to the opposite surface thereof a substance acting through capillarity upon said marking liquid.

12. That method of treating paper which consists in applying a marking liquid to one surface thereof and in substantially simultaneously applying to the opposite surface thereof an adhesive containing an ingredient to combine chemically with said marking liquid in the formation of a stain.

13. That method of treating paper which consists in applying to one surface thereof, a marking liquid having an ingredient of the stain omitted therefrom and in substantially simultaneously applying to the other

surface of the paper an adhesive having mixed therewith the lacking ingredient of said stain.

14. That method of treating paper which consists in applying to one surface thereof a marking liquid having an ingredient of the stain omitted therefrom and in applying to the other surface of the paper an adhesive having mixed therewith the lacking ingredient of said stain.

15. That method of treating paper which consists in applying to one surface thereof a component of a dye and in applying to the other surface thereof an adhesive having another component of the dye therein.

16. That method of treating paper which consists in applying to one surface thereof a component of a dye and in substantially simultaneously applying to the other surface thereof an adhesive having another component of the dye therein.

17. As an article of manufacture, a sheet having one adhesive surface and having a stain extending entirely through the paper by coaction of the adhesive and clearly visible on both surfaces thereof.

18. As a new article of manufacture, a sheet of paper having one adhesive surface and having a design stain applied to the opposite surface but extending through the paper to and intermixed with the adhesive.

19. A sheet of paper having an adhesive applied to one surface thereof and a design stain applied to the other surface and fixed by the action of said adhesive.

20. As a new article of manufacture, a sheet of paper having a design stain applied to one surface thereof and a substance applied to the other surface, whereby through capillary action thereof said design stain is caused to penetrate entirely through the paper.

21. As a new article of manufacture, a sheet of paper having an incomplete design stain applied to one surface thereof and a substance applied to the other surface containing an ingredient that completes said design stain.

22. That method of treating paper which consists in applying to one surface thereof a marking liquid having an ingredient of the stain omitted therefrom and in applying to the other surface of the paper a liquid containing the lacking ingredient of said stain.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

JOHN MACLAURIN.

FREDERICK W. FARRELL.

Witnesses:

ROBERT G. LIVERMORE,

EDWARD R. BINGEN.