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DECALCOMANIA PAPER

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1 Claim. (Cl. 41—33)

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This invention relates to decalcomania paper on which designs are printed in such a manner as to be transferrable to another surface.

It is common practice to prepare paper for this purpose by applying a suitable water soluble coating to the surface of an unsized backing sheet of paper. The decalcomania design or other printed matter is then printed on the coating or otherwise applied thereto, as, for example, by a stenciling process. An unsized or so-called "water leaf" paper has always been used for the backing sheet to facilitate the penetration of the sheet by the water used for the purpose of releasing it from the decalcomania design at the desired stage in the process of applying the design to an article such as a piece of furniture to be decorated, or a plate-glass window on which the design is to serve as a sign.

A backing sheet of this character is readily affected by changes in atmospheric humidity. This causes the sheet to curl after the design has been applied to one surface; or, in the printing process, if several printings are required to complete the design, the swelling or shrinking of the paper may interfere seriously with accurate registration of the several impressions. This is especially true in the case of silk screen and multi-color work.

It is an object of the present invention to provide a decalcomania paper which shall not be subject to any substantial variation in dimensions as a result of variations of atmospheric humidity, and which will not tend to curl after application of the decalcomania design thereto.

It is also an object of the invention to provide a simple method of procedure for so preparing paper to be used for decalcomania.

More specifically, it is an object of the invention to provide a decalcomania paper composed of a water absorbent backing sheet treated on one surface with a coating adapted to take a decalcomania design but releasably bonded to the sheet by a water soluble adhesive and treated on the opposite face with a water releasable coating which operates to balance stresses in the paper and to protect it from the effect of changes in atmospheric humidity.

Other objects and advantages of the invention will appear from the following description.

For the purpose of this invention a decalcomania paper is composed, as heretofore, of a water absorbent or so-called "water leaf" backing sheet which may be treated on one surface in accordance with any usual procedure so that printed matter or other design material may be

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applied to that surface, but will be released upon the application of sufficient water to the backing sheet so as to dissolve a water soluble adhesive interposed between the surface of the sheet and the decalcomania design. To secure the advantages of this invention the opposite face of the sheet is coated with a gelatinous layer which is applied as a liquid preparation which, when dry, remains adherent to the paper. This dry gelatin film tends to exclude atmospheric moisture from the paper itself and to seal into the paper moisture already present.

The gelatinous coating material for the practice of this invention is prepared by swelling granular gelatin in from four to ten times its own volume of a solution composed of water and methyl alcohol. The gelatin is held in suspension or in colloidal solution, and to expedite this result the mixture should be warmed to approximately 115° F. The proportion of methyl alcohol to water employed in the preparation of the liquid vehicle will depend upon the rate of evaporation desired. A preparation containing forty percent methyl alcohol and sixty percent water has been found quite satisfactory.

The liquid preparation of gelatin thus produced may be applied to the surface of the paper in any convenient manner. If individual sheets are treated they may be coated by the use of a brush; but a more efficient method will be to add this coating in conjunction with the operation by which the opposite surface of the paper is coated with the usual sizing and adhesive to receive the decalcomania design. Ordinarily, this will be done as the paper is wound from a roll, with the web traveling over a coating roller which is dipped in a bath of the coating material and provided with the usual doctor bar or roll to control the thickness of the film applied. This method is suitable for application of the gelatin coating, provided the bath is maintained at a temperature of approximately 115° F.

Since, in a decalcomania sheet, the surface which is to receive the design is covered with a water releasable coating, usually containing starch and dextrose, the coating applied to the other side of the sheet must not permeate the fibers of the paper—otherwise, the decalcomania coating and design might be loosened. In actual practice it is found that the gelatinous coating herein described contracts as it dries so that even if it has partially penetrated the paper web it pulls out of the fibers and pores of the paper, and, when dry, it remains adherent to the outer surface thereof.

When a decalcomania paper is used for transferring a design it may be first moistened and then applied to the surface to be decorated, and, thereafter, additional moisture may be added by the application of a sponge to the backing sheet until the paper backing becomes releasable and can be withdrawn, leaving the design in place. It is also customary to separate the design from the paper by a flotation process and then apply the design to the surface to be decorated. The gelatinous coating herein described lends itself to either method. It can be sponged away, because, upon the addition of an excess of water, the gelatin swells and releases its hold on the paper; or, if the flotation process is employed, the immersion of the gelatin film in water produces the same result, and it is readily removed. The quantity of gelatin employed is very small in proportion to the area of the paper covered thereby so that the amount taken into a water bath used in the transfer process is not appreciable and has no undesirable effect on the ingredients of the other coating and does not interfere in any way with the usual procedure.

While there is described herein a specific material, and while the description suggests a particular method of preparing and applying this material, it is to be understood that the invention is not limited either to the materials mentioned or to the method disclosed, but is intended to embrace all equivalents and modifications thereof which may fall within the scope of the appended claims. In fact, the invention is not limited to the use of methyl alcohol, which evaporates at about 64.7° C. Ethyl alcohol has a boiling point of 78.4° C., acetone boils at 56.5° C., and tertiary butyl alcohol boils at 82.9° C. Any of these

reagents is entirely miscible with water, and in view of its low boiling point will serve satisfactorily in place of methyl alcohol in preparing the coating of gelatin as above described. Methyl alcohol, however, is preferable for large-scale production.

I claim as my invention:

The method of preparing non-curling decalcomania paper, which consists in releasably bonding, to one side of a backing sheet of water absorbent paper, by a water-soluble starch-dextrose adhesive, a coating adapted to take a decalcomania design, and covering the opposite side of the sheet with a dried layer of granular gelatine which has been swelled in a warm mixture of water and alcohol in a ratio of generally three to two.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
378,419	Baynes	Feb. 28, 1888
778,740	Chelius	Dec. 27, 1904
1,634,710	Crowell	July 5, 1927
2,007,404	MacLaurin	July 9, 1935
2,094,886	Hart	Oct. 5, 1937
2,316,120	MacLaurin	Apr. 6, 1943
1,909,719	Price	May 16, 1933

FOREIGN PATENTS

Number	Country	Date
415,256	Great Britain	Aug. 23, 1934