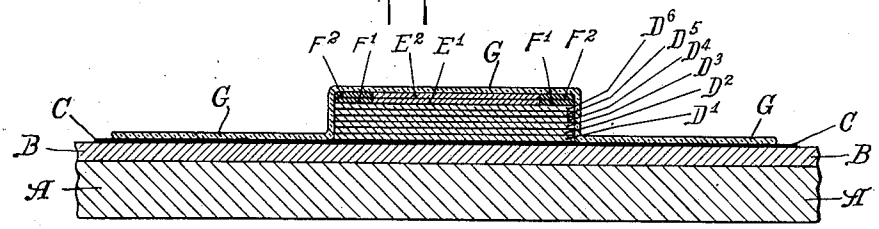
May 28, 1929. S. B. GORHAM 1,714,503

DECALCOMANIA

Filed Jan. 25, 1927

Fig. 1.

Fig. 2.



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DECALCOMANIA.

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This invention relates to decalcomanias or transfer paper and has for its object the accurate transfer of so-called open decalcomania designs, no matter how delicate, involving incidentally certain manufacturing advantages hereinafter more particularly referred to.

Heretofore, speaking generally, decalcomanias were of two general types, first the type which was intended to be transferred to a transparent material, such as glass, and second the type which was intended for transfer to the smooth surfaces of non-transparent material such as porcelain, furniture, and the like. In the first case the decalcomania material comprised a sheet of relatively stiff paper coated with gum or other suitable adhesive upon the surface of which the design to be transferred was first applied as a series of superposed layers of white lead upon which white lead foundation design there was next printed in successive layers the colors intended to be visible upon the transfer of the design to the transparent medium. The surface of the decalcomania thus prepared was covered with varnish or other adhesive medium. In the application of such designs the paper was soaked in water and the moistened transfer sheet was placed in proper position against the glass and left in place until satisfactory adhesion of that part of the face of the decalcomania which represented the design had taken place. Then the paper backing was thoroughly remoistened and drawn off, leaving the design in place. It will be apparent that in any such procedure delicacy of design was impossible. Only relatively wide letters could be used and irrespective of the amount of strength given to those letters by repeated printings of white lead as described, of which eight layers represented common practice, the drawing off of the wet paper at the end of the procedure nevertheless tended to distort the transfer design so that a perfectly effective transfer could not be made. At the same time it was quite impossible by proceeding in this way to make a transfer of any design having borders or delicate lines or designs because the distortive force necessarily resulting from the drawing off of the wet paper was greater than any capacity or strength of the design to hold its proper position on the transparent surface in resistance to said force. Furthermore the expansion of the heavy paper after being soaked would be more than the expansion of the ink film and the transfer would, as a result, crack. The letters could be strengthened by printing them in many layers of white lead foundation, but beyond this manipulation, which was not sufficiently effective, very little else could be done. Possibly the most satisfactory commercial decalcomania of this type was the one of which the edges of the layers or characters to be transferred were heavily varnished and the transfer was left in place on the glass for about twenty-four hours. In that case the stiff paper backing required substantial rewetting to permit of its removal and the effect was never very good and certainly incapable of transferring fine or delicate designs. It served well enough for wide letters or characters, but even those, after their transfer was completed, exhibited evidence of some distortion and did not give the perfect effect of a design directly applied to the glass as in the case of a hand-painted letter.

In decalcomanias intended for application to furniture or porcelain or the like, it has been customary to use a paper known as duplex paper. Duplex paper consists of a backing sheet of relatively stiff material, one surface of this sheet being lined with a sheet of tissue, the heavy backing being readily strippable from the tissue. The design to be transferred in this case was necessarily printed reversely upon the gummed surface of the tissue, i. e., that which appeared on the right-hand side of the decalcomania before its application to the article with which it was to be associated appeared on the left-hand side when said article was looked at after the transfer was completed. Then again, the colors of the design were first printed on the tissue before the white lead backing for the design was printed. The application of a decalcomania of this sort, that is a duplex paper with reversed design, did not prove practical for the purpose of making transfers to transparent surfaces for a number of reasons, so that the decalcomania art for transparent material remained unaffected by the development

represented in the art by the introduction of the duplex paper. According to the present invention, the underlying principle is to apply to the tissue side of duplex paper a so-called open design printed and built up in white lead or equivalent material, the edges of the white lead design coinciding with the edges of the final open design when completed by the application of open color printing, leaving spaces or hollows between the built up portions of the white lead open design; then, after thus first building up the open design in white lead, surfacing said built-up portions of the design with layers of color or colors definitive of the finished open design and finally covering the entire area of the design with an adhesive. A transfer sheet prepared in this fashion where the white lead foundation is built up in relief, the relief corresponding to the contour of an open design, will cause the design to appear as an open design on the surface to which it is transferred just as if it had been painted on that surface by an artist with all the delicacy of shape and relative position of the various parts fully preserved notwithstanding the fact that between the various parts of the open design there are tracts and areas entirely free from lateral connections in the completely finished transferred design. This method of procedure produces a transfer structure which is believed to be entirely new. An illustrative embodiment of the invention is shown in the accompanying drawings, in which Figure 1 is the front view of the sheet of duplex decalcomania of the new type, and Figure 2 is a section of a portion thereof to indicate, exaggeratedly, the manner in which the structure is built up.

In the drawings A indicates the relatively stiff backing sheet of the duplex paper; B is the tissue portion of the duplex paper; C is indicative of an adhesive or gum applied to the surface of the tissue B; D′, D^2, D^3, D^4, D^5, D^6 indicate successive printings of white lead, these printings having the contour of the open design to be transferred. E′ and E^2 represent successive applications of printings of one color conforming to the design to be transferred, and F′ and F^2 represent successive printings of a second color which likewise conforms to the design to be transferred. Obviously there may be as many or as few different colors as the design may call for. G represents a layer of varnish or other adhesive medium, which may be of uniform thickness or which may, as hereinabove described, be applied more heavily in the region of the open work design or preferably along the edges of said design. The printing of the design, both white lead and color portions, is preferably, as will be observed from Figure 1, a positive printing, to wit, the eye as it sees the decalcomania, sees the design in the form in which it is to appear after it is transferred. The transfer sheet thus prepared is then not wetted as a whole as in the prior practice, but is applied by the application of moisture only between the transparent surface and the surface G of the transfer sheet. This may be conveniently done by wetting the window and then applying the surface G to the moistened part of the window. This will cause the moisture used to establish adhesion to the transparent sheet to be absorbed in major part by the gummed tissue without noticeably softening or pulping the backing sheet A. The presence of the relatively heavy paper backing A consequently permits the decalcomania to be applied exactly as printed and without distortion or displacement such as would ensue if the tissue B were used alone and were attempted to be applied wet, or if the backing sheet A were watersoaked prior to or during the application of the design. After close surface adhesion between the surface G of the transfer sheet and the surface of a glass window, for example, is established, the heavy backing A is stripped from the tissue B, said tissue remaining in adhesion with the tranfer design. The stripping of this backing sheet A from the transfer sheet after its application to the transparent surface, does not involve any strain upon the design carried by the transfer sheet, so that no matter how delicate the design may be, it will not be disrupted, shifted or distorted by the said operation as it would be if the design were carried on the backing sheet A instead of on the tissue sheet B. About half an hour after the transfer is first applied to the transparent surface, the adhesion is complete, and all that is now necessary is to moisten the tissue, whereupon it can be easily wiped off and removed, leaving the design perfectly transferred with all its delicacy of detail unimpaired and undisrupted as an open design having edges which are free from and unsupported by adjacent edges of the open design. When the design is positively printed, as in my preferred embodiment, the face of the transfer sheet is applied to the transparent surface, so that said face may be viewed through the glass. In other words, there is always a thickness of the transparent material between the observer and the design which he observes in its transferred condition.

The operations of applying decalcomania in the described manner and of removing from the transferred design all parts of the transfer sheet which are not to be a permanent portion of the transferred design, (leaving voids or open spaces between the edges of the transferred design) impose no strain upon the details of the design and in consequence the letters or other units of the design

do not require to be as greatly strengthened by white lead foundation as in the case where simplex transfer sheets were attempted to be used. Thus, where it has been customary to use eight successive printings of white lead for a solid design (no amount of white lead sufficing, according to this prior practice, to permit open designs to be properly or satisfactorily transferred) it is now possible to produce far better results, almost perfect results with open designs and to use but six or even less successive printings of white lead. The white lead mounds or built-up portions which define and de-limit the open designs rearwardly of the front or colored face thereof are not visible to the observer who looks at the design through a pane of glass to which it has been applied and, being relatively translucent so as to permit the color of the face portion of the open design to appear through the white lead, are relatively invisible to the observer who looks at that side of the glass to which the design has been applied. If the tissue sheet B is removed from the backing A the white lead built-up portions appear to be without any decorative value, but this effect disappears when the design is transferred and the tissue sheet is removed. According to the new procedure, it is possible to reproduce the finest, most delicate lettering, borders, and edges, all of which would be pulled off by suction or distortion if such designs were attempted to be transferred according to the standard method. Then again, the standard method wherein simplex paper is used, necessitates that the whole transfer sheet be soaked in water in order to be applied and that the transfer sheet must also be either still wet, or rewetted in order to permit of the removal of the paper backing. These various elements introduce factors which have thus far made is impossible to transfer delicate designs in a satisfactory manner.

So far as the backing sheet of the new duplex transfer sheet is concerned, it will be observed that the new process is to be regarded as a dry process, said backing sheet never being exposed to moisture. In fact it is of importance that the backing sheet be not wetted for otherwise a factor of disruption is very likely to make itself manifest.

The present invention, simple as it may seem to be, represents the first possibility of perfectly reproducing fine or open designs on the insides of windows, so as to present to the view of the beholder outside a design as perfectly shaped, arranged, and contoured, and as delicately drawn as if the design had been applied by the hand of the artist himself.

I claim:

1. A transfer sheet for applying decalcomania to a transparent body, comprising a relatively heavy backing sheet and a gummed layer constituted of tissue, a design of open character on the tissue layer and adapted, upon application to a transparent body to be visible from each side of the said body as the same open design, said design being a compound structure consisting of a built-up portion of protective material having edges which coincide approximately with the edges of the open design, a color face associated with the face of the said built-up portions, and an adhesive layer, the color face lying between the adhesive layer and the built-up portion of the protective material while the latter occupies the space between the color face and tissue layer, and a separable connection between the backing sheet and the tissue layer, the composite structure being such that the design of the transfer sheet may be accurately applied to a wetted transparent surface as the result of the support furnished by stiffness of the backing sheet, and that the moisture used to establish adhesion to the transparent sheet is absorbable in major part in association with the tissue layer, permitting the heavier backing sheet to be readily stripped from the rear face of the tissue without imposing strain on the open design after the design on the tissue has developed its initial adhesive grip while leaving the tissue layer to be easily wiped off without disturbing the design, as soon as the adhesive uniting said design to the transparent sheet has assumed a definite set.

2. A transfer sheet for applying decalcomaina to a transparent body, comprising a relatively heavy backing sheet and a gummed layer constituted of tissue, a design of open character printed in positive on the tissue layer and adapted, upon application to a transparent body to be visible from each side of the said body as the same open design with the positive side of the printed design visible only through the transparent body, said design being a compound structure consisting of a built-up portion of protective material having edges which coincide approximately with the edges of the open design, a color face associated with the face of the said built-up portions, and an adhesive layer, the color face lying between the adhesive layer and the built-up portion of the protective material while the latter occupies the space between the color face and tissue layer, and a separable connection between the backing sheet and the tissue layer, the composite structure being such that the design of the transfer sheet may be accurately applied to a wetted transparent surface as the result of the support furnished by stiffness of the backing sheet, and that the moisture used to establish adhesion to the transparent sheet is absorbable in major

part in association with the tissue layer, permitting the heavier backing sheet to be readily stripped from the rear face of the tissue without imposing strain on the open design after the design on the tissue has developed its initial adhesive grip while leaving the tissue layer to be easily wiped off without disturbing the design, as soon as the adhesive uniting said design to the transparent sheet has assumed a definite set.

In testimony whereof I have hereunto set my hand.

STANDISH B. GORHAM.