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J. B. CARR ET AL

2,154,198

DECALCOMANIA

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Fig. 1.

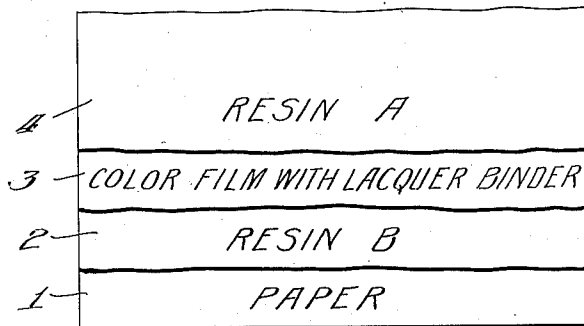


Fig. 2.

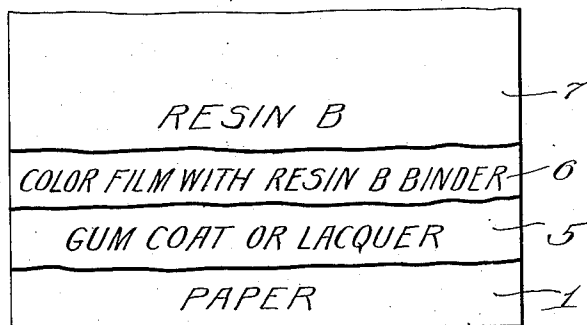
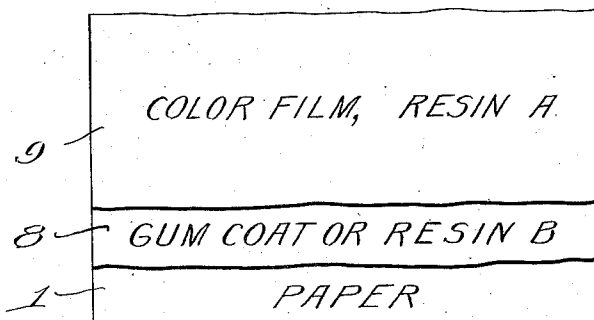


Fig. 3.



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by Wm F. Freudenreich, Atty.

UNITED STATES PATENT OFFICE

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DECALCOMANIA

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5 Claims. (Cl. 41—33)

The usual decalcomania is printed on a gum coated paper which must be made wet when transferring the ink film in order to remove the paper. A considerable part of the gum remains on the transferred film and must be washed off. Furthermore, in applying the ink film to the surface where it is to remain, it is customary to employ an adhesive material which must be allowed to dry before an ink film can be subjected to a polishing operation, for example. It has heretofore even been necessary to prime or fill some types of surfaces as, for example, the face of a wood panel, and permit its drying before the application of a transfer thereto. Thus, the applying of an ordinary transfer not only requires a considerable number of operations, but an objectionable amount of time must elapse between the beginning and the completion of a job. Thus, for example, in the finishing of panels, it may be necessary to have on hand, undergoing the process of being faced with transfer films, a supply that it will take several days to consume. This, of course, not only ties up considerable capital, but a large space is required to store the panels undergoing the initial decorative treatment.

The object of the present invention is to produce a decalcomania which may be applied, without the use of water, extraneous adhesives or sizing or priming coats, by the mere act of laying them on the surface on which they are to be mounted, subjecting them to moderate heating and pressure, and then stripping or pulling off the paper backing, whereby the process of mounting is greatly simplified and the decorated product becomes immediately ready for a finishing coat, if desired, and such working of the product as may be desired.

In carrying out our invention, the film to be transferred is built up on a suitable backing, usually of paper, having thereon a coating which has very little affinity for the inks or other materials of which a film is composed. Then, when the film is transferred and is firmly adhering to the surface on which it is to remain permanently, the backing with its coating is easily stripped from the film, without wetting the backing and without the necessity of washing the transferred film after the backing has been removed. We also employ such a composition for the film, or provide it on its exposed face with a layer of the proper material, to enable us to bond the film successfully to bare wood, metal and other materials by simply pressing the decalcomania against the same while heating it sufficiently to

render the back of the film or coating on the back of the film somewhat tacky. Only moderate heat and a comparatively light pressure are required. Thus, in the case of flat panels, for example, the bonding of the film to a panel is brought about by simply laying the decalcomania upon the panel, with the exposed face of the film in contact with the latter, and passing the assembly through hot rollers; the rollers smoothing the decalcomania so as to cause it to lie flat on the panel and, at the same time, supplying the requisite amount of heat and pressure. Of course, the work may be done in a hot press. It takes but a fraction of a minute to bond the film to the panel, and not any longer to strip off the backing and thus leave the panel ready for its intended use and further finishing, if desired.

The various features of novelty whereby our invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of our invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawing, wherein:

Figures 1, 2 and 3 represent diagrammatically several different compositions of decalcomania embodying the present invention.

In order to make possible the bonding of a transfer film to a surface that is unsized and dry, without interposing any adhesive between the film and such surface, it is necessary that the film to be transferred contain in its exposed face material which will possess the proper characteristics to effect a bond. Certain resinous materials, properly formulated, are suitable for this purpose. These resinous materials may be in the binder for the pigments in the case of a pigmented film, or they may constitute a coat on the side of the film which is exposed while the film remains on its backing or carrier. Lacquers that are commonly employed in the manufacture of certain types of transfer films are not suitable for making a successful bond in accordance with the present invention; but, since it may be desirable to employ lacquer in the body of a transfer film, this may be done provided a resinous coating can be effectively bonded to or integrated with the body of the film. In accordance with one feature of our invention, we have produced a resinous compound which is compatible with or has a strong affinity for lacquer and may therefore be utilized as a coating for a lacquer film and to bond the film to the surface on which it is to be mounted. This resinous compound

has little affinity for the gum usually employed as a coating on decalcomania paper, so that if used as the binder for the pigments, the printing may be done directly upon ordinary decalcomania paper which will strip off easily without first dissolving the gum. Where the body of the film is of the lacquer type, the lacquer will adhere so strongly to the gum if printed directly thereon, that the gum must be dissolved. To avoid this, we print such a film upon a coating composed of a material with which the lacquer has little affinity, and we have produced for this purpose a second resinous composition. This composition is employed in lieu of the gum coating; and, since the backing sheet need not be absorbent when it is not required to soak up water in order to dissolve a coating thereon, any smooth paper on which printing may be done properly serves our purpose.

A typical formula for the first of the resinous compositions referred to above, to which we shall refer as Formula A, is as follows:

Six pounds of "phenac" resin is dissolved in sufficient "Dipentine" which is a substance similar to high-flash naphtha, and dibutyl phthalate to make two gallons; the quantity of dibutyl phthalate being only about one-tenth that of the "Dipentine";

Three pounds of ethyl cellulose, three gallons of toluol, and one gallon of dibutyl alcohol are brought together in a second mixture.

When the two mixtures or batches have been thoroughly digested, they are mixed together, and the resulting compound is ready for use.

"Phenac" is the trade name of a synthetic resin of the phenolic type and provides not only the resinous ingredient in the formula, but also gives to the composition body which would otherwise be lacking.

A typical formula for the second of the resinous compositions, to which we shall refer as Formula B, is as follows: one pound of vinyl; two pounds of ketone; two pounds of toluol; one-eighth pound of dibutyl phthalate. In this formula the ingredients are, in the order named, respectively the resin, the solvent, a diluent, and a plasticizer.

In Figure 1 of the drawing there is illustrated diagrammatically a decalcomania in which the body of the film contains lacquer as a binder. In this figure, 1 represents a sheet of paper which may conveniently be so called enamelled paper. The paper is coated on one side, as indicated at 2, with a layer of material corresponding to Formula B. The color film contains lacquer as a binder. On top of the color film is a layer of material corresponding to Formula A. The lacquer does not adhere to the layer 2 but has such an affinity for the material in layer 4 that the layers 3 and 4 may be said to be integral with each other. Thus, the composite film comprising the layers 3 and 4 may easily be separated from the backing and its coating, by simply pulling them apart.

In Fig. 2, 5 is a coating of gum or lacquer on the paper sheet 1, and 6 is the color film in which the binder is in accordance with Formula B. There may or may not be an additional layer 7 upon the layer 6; but, if so, the material of this additional layer should correspond to Formula B. Since the material of Formula B has very little affinity for either lacquer or the gum coating on ordinary decalcomania paper, the film may be printed directly on ordinary gum coated decal-

comania paper or upon paper of any kind that has been coated with lacquer.

In Fig. 3 the binder in the transferable film 9 corresponds to Formula A, and therefore, the coating on the paper 1 may be either the gum found on the ordinary decalcomania paper or a material corresponding to Formula B. In this instance the coating on the paper must not be lacquer, because the material of Formula A will unite with the lacquer if printed thereon, although it will not unite with a coat or layer of Formula B material.

It will thus be seen that we have made it possible to apply any one of a number of different types of decalcomanias directly to a dry, hard surface, without the use of cements or the like, or requiring any filling, sizing or priming; and, what is just as important, making it unnecessary to wet the decalcomania or to have resort to cleaning processes for the color film at the end of the transferring operation. Of course, the transfer may be effected by securing the ink film to a surface by means of cement or other adhesive material, if that be desired; in which case the removal of the backing may still be accomplished by simply stripping the dry backing from the ink film.

While we have described specifically only a few preferred types of decalcomanias, and given preferred formulae for certain of the compositions employed in the manufacture thereof, we do not desire to be limited thereto; but, in addition to the specific things disclosed in detail, we intend to cover all decalcomanias and methods embodying the principle of our invention as set forth in the definitions of the latter constituting the appended claims.

We claim:

1. A decalcomania comprising a backing having thereon a coating composed mainly of vinyl resin and a plasticizer, together with a film to be transferred overlying the said coating; that part of the film in contact with said coating being composed of lacquer having little affinity for the latter, whereby the backing and its coating may be stripped from the film, in a dry state, in transferring; and the exposed face of the film being largely composed of "phenac" resin and ethyl cellulose and having a strong affinity for said lacquer and giving to the film the capacity to be adhered firmly to a surface when engaged directly with the latter, in a dry state, and pressed against the same by means of a heated pressure device.

2. A decalcomania comprising a backing having thereon a coating composed mainly of vinyl resin and a plasticizer, together with a film to be transferred overlying the said coating; said film being composed mainly of "phenac" resin and ethyl cellulose and having little affinity for the material in the coating, whereby the backing and its coating may be stripped from the film, in a dry state, in transferring; and the exposed face of the film being composed of materials that give to the film the capacity to be adhered firmly to a surface when engaged directly with the latter, in a dry state, and pressed against the same by means of a heated pressure device.

3. A decalcomania comprising a backing having thereon a coating composed mainly of vinyl resin and a plasticizer, together with a film to be transferred overlying the said coating; that part of the film in contact with said coating being composed of lacquer having little affinity for the latter, whereby the backing and its coating

may be stripped from the film, in a dry state, in transferring.

5 4. A decalcomania comprising a backing having thereon a coating composed mainly of vinyl resin and a plasticizer, together with a film to be transferred overlying the said coating; said film being composed mainly of "phenac" resin and ethyl cellulose and having little affinity for the material in the coating, whereby the backing and
10 its coating may be stripped from the film, in a dry state, in transferring.

5. A decalcomania comprising a backing hav-

ing thereon a coating layer and a layer in the form of a film to be transferred overlying the coating layer; one of said layers being composed mainly of vinyl resin and a plasticizer, and that
5 part of the other layer in engagement therewith being composed of lacquer having little affinity for the vinyl resin; whereby the backing and its coating layer may be stripped from the film in a dry state, in transferring.

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