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METHOD OF PREPARATION OF A CONTINUOUS FILM COATING

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Fig. 1.

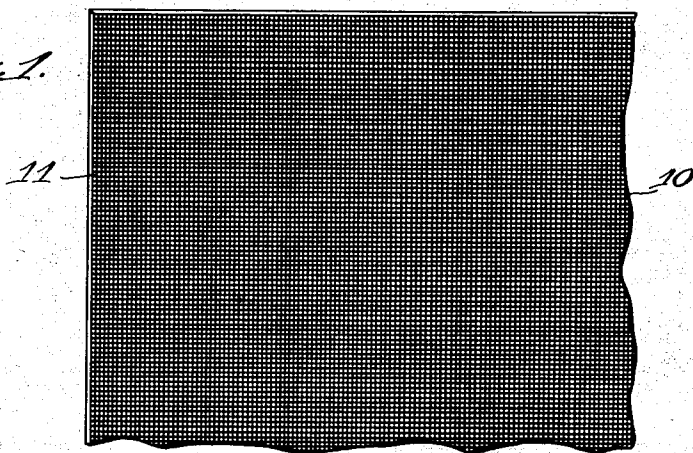


Fig. 2.

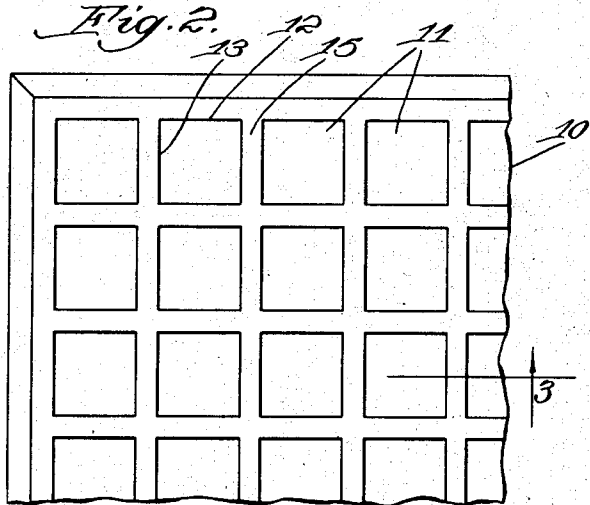


Fig. 3.

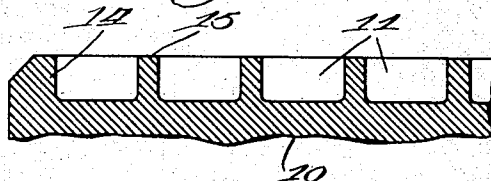


Fig. 4.



Fig. 5.



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METHOD OF PREPARATION OF A CONTINUOUS FILM COATING

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1 Claim. (Cl. 101—170)

This invention relates to coatings and the method of preparation thereof and more particularly to a continuous film coating especially adapted for use in a decalcomania transfer.

One feature of this invention is the preparation of a continuous film coating of a uniform predetermined thickness; another feature is the preparation of a water impervious coating in an integral layer; still another feature is the production of an improved decalcomania transfer which is extremely difficult to remove or counterfeit; a further feature is the production of a transfer body for decalcomania stamps by a simpler and more economical method than has heretofore been known; other features and advantages will be apparent from the following specification and drawing, in which:

Fig. 1 is a diagrammatic representation of an intaglio plate; Fig. 2 is a detail plan view of a portion of the plate; Fig. 3 is a sectional view taken along the line 3 of Fig. 2; Fig. 4 is a side elevational view of a decalcomania transfer; and Fig. 5 is a side elevational view of another transfer.

I have found that a continuous film coating may be simply and economically deposited from an intaglio plate in a predetermined thickness which, if desired, may be uniform. Such a coating may consist of any of a variety of compositions and is, of course, useful for many purposes. For instance, it may be used as the transfer body in decalcomania transfers; for the localized application of a thick coating of varnish or lacquer to obtain various results such as a gloss at desired areas, greater depth of color at desired areas, obliteration of previously printed or pictured areas, or a greater water or vapor proofness at desired areas; or for the localized application of an adhesive at desired areas. It may also be used for localized carbon paper transfers commonly called "spot carbon." The preparation of water resistant transfer bodies in decalcomania transfers serves as an excellent illustration of the method of operating the process and of the factors which must be considered in producing a satisfactory product.

Decalcomania transfers consist essentially of a water resistant transfer body joined by a water soluble adhesive to a base, usually made of paper. The transfer body when the adhesive is moistened is removed from the paper and applied to an object. In order to permit this transfer, the body must have a sufficient thickness and film strength to hold it together and prevent breaking or tearing when removed from the

paper. At the same time the transfer body may be made sufficiently thin and fragile for certain purposes to make difficult its removal without destruction once it has been applied.

Heretofore, transfer bodies have been prepared by making a letter press or lithograph type of print of the water resistant material. In order to produce a body of sufficient substance to allow transfer without injury it has been necessary to print the material in several consecutive layers. Naturally, this is a slow and tedious process.

I have found that a relatively thick transfer body may be easily and quickly deposited by means of an intaglio printing press. At the same time the thickness may be carefully controlled. By means of an intaglio plate a considerably greater quantity of ink can be easily deposited. It is preferable to use a special type of intaglio plate as illustrated in Figs. 1, 2 and 3 in order to obtain the best results.

The press or plate is shown in the form of a flat plate 10 although a cylinder may of course be used. Covering the surface of the cylinder are etched recesses 11. The etching may be done by the conventional process used for intaglio plates.

The principles of operation are analogous in many respects to those used in gravure printing. It is desirable, however, to vary the size and shape of the recesses considerably from those normally used in a gravure plate or cylinder, in which the recesses are very small, usually 100 to 200 to the inch, and their depth varies in order to produce shades in color. I have found that larger recesses with a uniform depth are preferable for my process since a greater amount of ink can thus be deposited. With the ordinary gravure cylinder the transfer body produced is too thin and is not uniform in thickness. By my process, on the other hand, a single integral layer as thick as .002 of an inch may be produced.

Etched recesses having a length 12 and width 13 of approximately .03 of an inch, each, a depth 14 of approximately .015 of an inch and with partitions 15 between the recesses of a thickness of the order of .0075 of an inch have been found to be entirely satisfactory. The recesses must be large enough to carry the maximum quantity of the liquid coating film. The partitions must be sufficiently thin to permit the coating film after printing to flow together as it solidifies in order to cover the open space left by the partition. Such a coating is known as a continuous film coating. On the other hand, if the parti-

tions are too thin or the recesses too deep the etching process will cause the partition to be etched away at the bottom. And more important, flooding will occur, the liquid deposited flowing beyond the limits of the area covered by the plate and causing the formation of a ragged edge.

It is also necessary in obtaining a relatively sharp outline at the edge of the film while still causing coverage of the space left by the partitions that an ink or liquid having a suitable composition be chosen.

The ink used with a gravure process, in which the etching is very fine, has too low a viscosity for my purpose and will leave a ragged edge on the transfer because of its free flowing qualities. On the other hand, inks used in letter press printing will not flow freely enough to cover spaces left by the partitions and also do not flow freely into the etched plate. In addition, a fluid which, when dry, forms a body with a high film strength may be of course, highly desirable. The use of a suitable solvent which will allow the ink to dry quickly is also desirable.

I have found that a fluid with a nitrocellulose base serves to make a product with a high film strength and when mixed with other suitable ingredients gives the other desirable properties mentioned. The ink should contain in addition, a plasticizer, such as tricresyl phosphate or di-butyl phthalate, a pigment, if desired, and a solvent, such as a mixture of alcohols and esters. The following composition has been found to be particularly effective:

15-20% nitrocellulose "half-second cotton"
6-8% di-butyl phthalate
5% pigment
65-75% solvent mixture of—

	Parts
Ethyl acetate.....	30
Butyl acetate.....	35
Butanol	15
Toluol	20

with the components being mixed in such proportions as to total 100%.

Other suitable compositions are the following:

- (a) Mix 2 pounds of casein (muriatic), with 6 pounds of water. Cook the mixture at 60° C. with 90½ grams of trisodium phosphate, 22½ grams of borax and 36 cc. of phenol. When cool grind into the mixture four pounds of pigment and 3 pounds water.
- (b) A chlorinated rubber such as "Piolite" is mixed with a suitable amount of pigment and sufficient petroleum solvent added to produce the desired fluidity in the mixture.

Thus it may be seen that the area and depth of the etched recesses, the thickness of the par-

titions between the recesses, and the composition of the fluid or ink are factors which must be considered in accomplishing a satisfactory result.

In preparing a decalcomania transfer in accordance with my invention a coating of a water soluble adhesive 16 is placed on a base 17 usually made of a water-leaf paper. Upon the adhesive is printed with the cylinder 11 transfer body 18 which in turn serves as a base for a printed design 19. A single layer transfer body is usually sufficiently thick when prepared by this method, although if desired one or more additional layers may be added. Such a transfer body will normally have a thickness between .0005 and .002 of an inch, for many purposes about .001 of an inch.

If a transfer to be applied to the inside of a glass surface is to be prepared, a similar process may be followed resulting in a product as illustrated in Fig. 5. A base 20 is joined to a transfer body 21 by an adhesive 22. A printed design 23 on the transfer body is covered by a water soluble adhesive 24. The second adhesive is used in applying the transfer to the glass surface after which the base is moistened and removed.

Transfers prepared in accordance with my invention are particularly useful as revenue stamps. The thickness of the transfer body in this case must be carefully controlled, being thick enough to allow ready application without injury and thin enough to prevent removal and replacement. For such stamps it is also preferable to engrave the design on the surface of the transfer body, thus making counterfeiting much more difficult.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claim should be construed as broadly as permissible in view of the prior art.

I claim:

The improvement in the art of making by a single printing operation a flexible decalcomania transfer film having a thickness of the order of from .0005 inch to .002 inch and capable of being removed from a disposable support without serious danger of tearing or disintegration, which consists in charging a liquid having a solids content and viscosity materially greater than in the case of an ordinary photogravure printing ink, into the cells only of a gravure printing surface having a printing area corresponding in size to the area of the desired film, the cells of which surface each have a transverse dimension of approximately .03 inch, a depth of approximately .015 inch and are separated from each other by partitions of the order of .0075 inch in width, transferring said charges to a disposable support, permitting said charges to coalesce into a unitary liquid body, and drying said body.

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