Sept. 28, 1937. F. H. SCANTLEBURY 2,094,025

METHOD OF MANUFACTURING STENCILS FOR SAND CARVING OPERATIONS

Original Filed Jan. 2, 1934 2 Sheets-Sheet 1

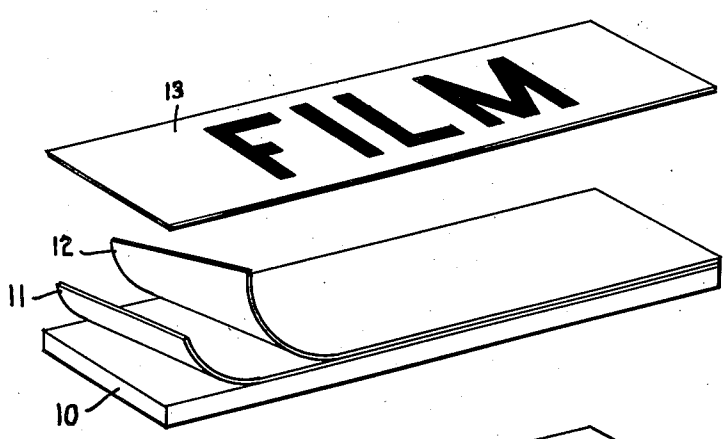


FIG. 1

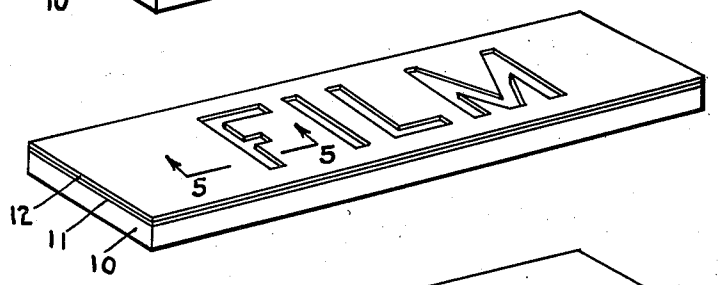


FIG. 2

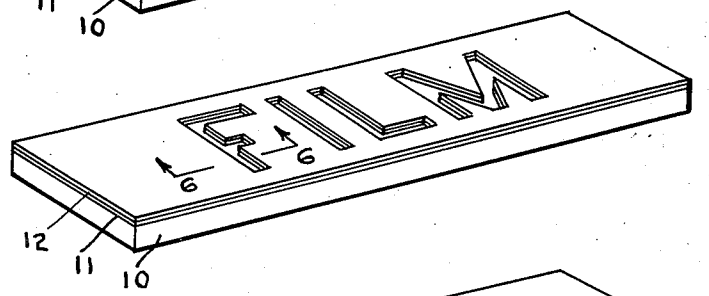


FIG. 3

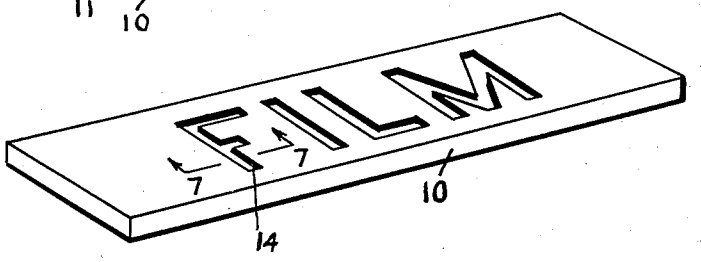


FIG. 4

FIG. 5

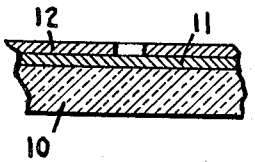


FIG. 6

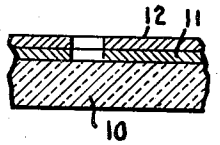
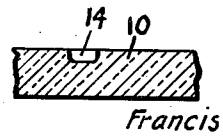


FIG. 7



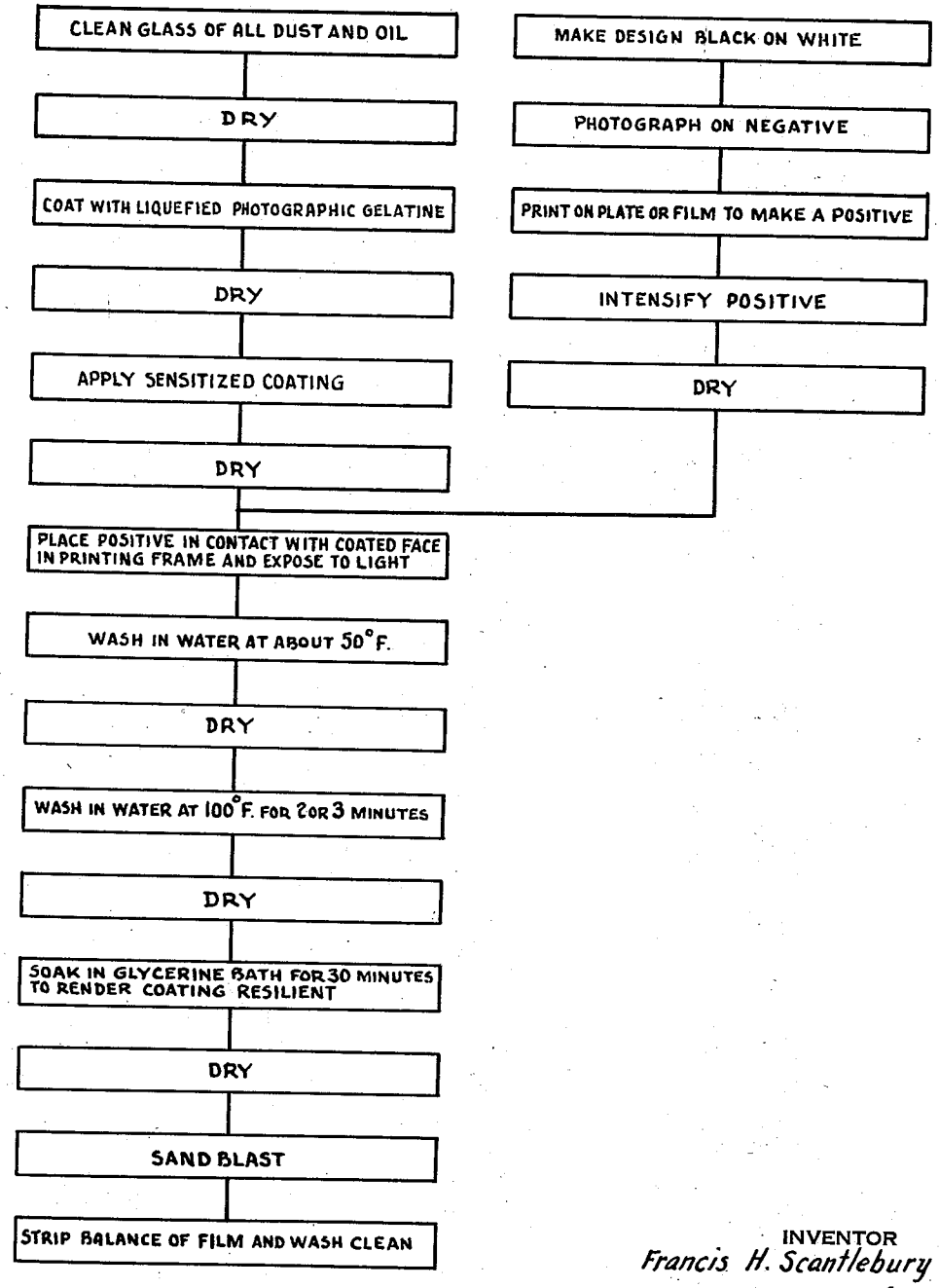
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FIG. 8



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METHOD OF MANUFACTURING STENCILS FOR SAND CARVING OPERATIONS

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Application January 2, 1934, Serial No. 705,040
Renewed December 22, 1936

6 Claims. (Cl. 41—29)

The invention relates to the manufacture of resistant stencils for use in the carving of designs on glass or other hard substances, as by sand-blasting such designs therein.

It has for an object to transfer the desired design by a photographic process to a coating provided upon the surface to be cut and effect in the coating a stencil of the said design.

The novel method is particularly applicable to the production of sand-blasted glass plates as may be used in edge-lighted signs, for example, such as are described in U. S. Letters Patent #1,707,965, granted to me on April 2, 1929.

A further object of the invention resides in the provision of a photographic method whereby such designs may be produced in a manner that will insure any desired quantity of the stencils so manufactured being absolutely alike; also, to eliminate the uncertain and often crude results obtained by the use of hand-cut stencils; and to make possible stencil openings that might be too small or too intricate to be properly cut with a knife.

A still further purpose of the invention is to effect a substantial reduction in the cost of preparing stencils.

In carrying out the invention, a stencil of the desired design is provided on and temporarily adheres firmly to each individual object that is to be cut as, for example, a glass plate. Thus, the desired surface is first to be covered with a bilaminate coating, the proximate layer being of a gelatinous nature and the superposed layer of a glue previously rendered sensitive to actinic rays.

Upon the latter is placed for exposure a properly prepared positive of the design and the exposure made thereof, whereupon, by suitable washings, the design will be cut through the unexposed portions of the coating to afford the desired stencil.

The coating is then to be rendered resilient to withstand the action of the blast which cuts the design into the underlying glass surface, whereupon the remaining portion of the coating is stripped from said surface.

The nature of the invention, however, will best be understood when described in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a glass plate illustrating various coatings that comprise the stencil and the means for imparting the design to the stencil, with the various layers comprising said stencil peeled upwardly at one end.

Fig. 2 shows in perspective a plate with the stencil after exposure and partly completed.

Fig. 3 is a similar view showing the completed stencil.

Fig. 4 shows the complete plate with the stencil removed and the design carved therein.

Figs. 5, 6 and 7 are fragmentary longitudinal sections taken on the lines 5—5, 6—6 and 7—7, Figs. 2, 3 and 4, respectively.

Fig. 8 is a flow sheet showing the various steps of the process comprising the novel method of preparing a stencil from a design and carving the latter into the plate.

Referring to the drawings, more particularly Fig. 1 thereof, 10 designates a suitable substance upon which a design is to be etched, or to be cut as by the action of a blast of sand, through a stencil applied to the surface. For example, the substance may be constituted by a plate of glass which is to be first cleaned of all dust and any oily film that may be on it. When dried, the face to be carved is coated with a good grade of photographic gelatin, that has been dissolved in water until it has become liquid, forming a layer 11 thereon.

Care should be taken in the coating of the plate with this liquid that the same be uniformly applied so that the layer 11 will be of an even thickness all over the desired face. This can be accomplished by whirling the plate in a horizontal plane while the mixture is still liquid.

The applied gelatin layer 11 is then allowed to dry, after which a second layer 12 is provided thereover and which is of a nature to be sensitive to actinic rays. To this end, layer 12 may consist, for example, of the following mixture:

250 grams of photographic fish glue dissolved in
1000 grams of cold water in which
20 grams of ammonium dichromate have been dissolved.

The plate 10 is again allowed to dry, this time in a dark room; and, when fully dried, is then ready for exposure of the prepared design thereon.

The design to be applied to the stencil-forming coating, comprising the two layers 11 and 12, may be made up in any manner that will result in the combination of an opaque design on a transparent field. For the present purposes, the positive or design-bearing element 13 is generally constructed in the following manner: The design is drawn out, say in black ink on white paper, and to any size that may suit the convenience of the artist. It is then photographed; and in photographing it is reduced, if necessary, to the size desired in the finished product.

This photography of the design results in a negative in which such design is transparent and the field is dark. It is then printed onto a sensitized film which becomes the positive 13 having the design portion opaque or dark and the field transparent, or nearly so. The positive is then generally subjected to an intensifying bath, which causes the black or dark portions of the

design to become opaque and the transparent portions to be cleared of any cloudiness that may have been present. When the positive is dry, it is ready for use.

The next step is the transfer of the design onto the stencil as by printing and developing the same on the prepared surface of the glass plate 10. I prefer to use for this purpose a printing frame of the vacuum type (not shown) and in which the positive is first positioned and the glass plate with its coated surface to the positive laid thereon. The frame is then closed and the vacuum applied, which causes an even pressure to be applied to the positive and coating, whereupon the exposure may be effected—all of which is well understood in the art. The time of exposure will, of course, vary with the intensity of the light to which the work is exposed, but in using a single arc of the nature used for photographic purposes, I find that an exposure of from 2 to 2½ minutes produces the desired results.

After this exposure, the coated plate is removed from the printing frame and placed in a bath of running water at a temperature of about 50° F., and maintained therein for some 15 minutes. This washing removes from the coating 12 such portions of the coating as have been shielded from the rays of the arc lamp as the opaque design portions in the positive, and as indicated in Figs. 2 and 5.

The plate is allowed to dry, and it is then placed in a bath of running water at a temperature of about 100° F. for 2 or 3 minutes. The elevated temperature of this bath causes the gelatin of the coating 11 to be washed out at the shielded portions, as indicated in Figs. 3 and 6; and the plate is then again allowed to dry.

It should be noted that the coating 12, which included ammonium dichromate, has been rendered insoluble in water due to exposure to the light passing through the transparent portions of the positive; and that when the plate is first washed, the portions of coating 12 exposed to light will remain and protect certain parts of the gelatin-coating 11 from the effects of the subsequent washing in warm water.

There will, therefore, be produced on the glass a combination stencil comprising a layer of gelatin against the glass and a layer of fish glue composition over and adhering to the gelatin layer, and a portion out of both of which layers there has been washed the elements forming the design embodied in the positive or original to be reproduced.

The stencil formed thus far is generally not resilient enough to withstand the bombardment of a sand blast, and further treatment may be necessary to render it sufficiently resilient and elastic. This may be accomplished by immersing or soaking the stencil for one-half hour in a bath at room temperature and composed of equal parts of water and glycerine. After removal from this bath, the plate is allowed to dry, and the stencil is then in condition to withstand the action of the sand blast to permit cutting the design therethrough into the glass as indicated at 14.

The sand-blasting may be conducted in the usual manner until the design has been cut into the plate to the desired depth, whereupon the remainder of the stencil material is removed from the plate. This may be done by scraping or peeling the same therefrom, or by the immersion of the entire plate in a photographic stripping solution.

I claim:

1. The method of manufacturing from a positive of a design stencils for sand carving operations, which comprises preparing a surface to be carved by applying thereover a bilaminate coating, the proximate layer being a gelatinous material of a glycerine-absorbing nature and the superposed layer of a glue rendered sensitive to actinic rays, printing the positive upon the coating, and removing from the unexposed portions the two layers of the coating by washing both in water.

2. The method of manufacturing from a positive of a design stencils for sand carving operations, which comprises preparing a surface to be carved by applying thereover a bilaminate coating, the proximate layer being a gelatinous material of a glycerine-absorbing nature and the superposed layer of a glue rendered sensitive to actinic rays, printing the positive upon the coating, and removing from the unexposed portions the two layers of the coating by successively washing in water at a relatively low temperature and at an elevated temperature.

3. The method of manufacturing from a positive of a design stencils for sand carving operations, which comprises preparing a surface to be carved by applying thereover a bilaminate coating, the proximate layer being of a gelatinous nature and the superposed layer of a glue rendered sensitive to actinic rays, printing the positive upon the coating, removing from the unexposed portions the two layers of the coating, and then immersing the plate in a solution of an agent for rendering the coating resilient.

4. The method of manufacturing from a positive of a design stencils for sand carving operations, which comprises preparing a surface to be carved by applying thereover a bilaminate coating, the proximate layer being a gelatinous material of a glycerine-absorbing nature and soluble in water and the superposed layer of a glue rendered sensitive to actinic rays and also soluble in water, printing the positive upon the coating, and successively washing the exposed surface in water, first at a temperature of approximately 50° F. and then at a temperature of approximately 100° F.

5. The method of manufacturing from a positive of a design stencils for sand carving operations, which comprises preparing a surface to be carved by applying thereover a bilaminate coating, the proximate layer being of a gelatinous nature and soluble in water and the superposed layer of a glue rendered sensitive to actinic rays and also soluble in water, printing the positive upon the coating, successively washing the exposed surface in water, first at a temperature of approximately 50° F. and then at a temperature of approximately 100° F., and then immersing in an aqueous glycerine solution.

6. The method of manufacturing from a positive of a design stencils for sand carving operations, which comprises preparing a surface to be carved by applying thereover a bilaminate coating, the proximate layer being of a gelatinous nature and the superposed layer of a glue rendered sensitive to actinic rays, printing the positive upon the coating, removing from the unexposed portions the two layers of the coating, and then treating the underlying coating to render it resilient.

FRANCIS H. SCANTLEBURY.