

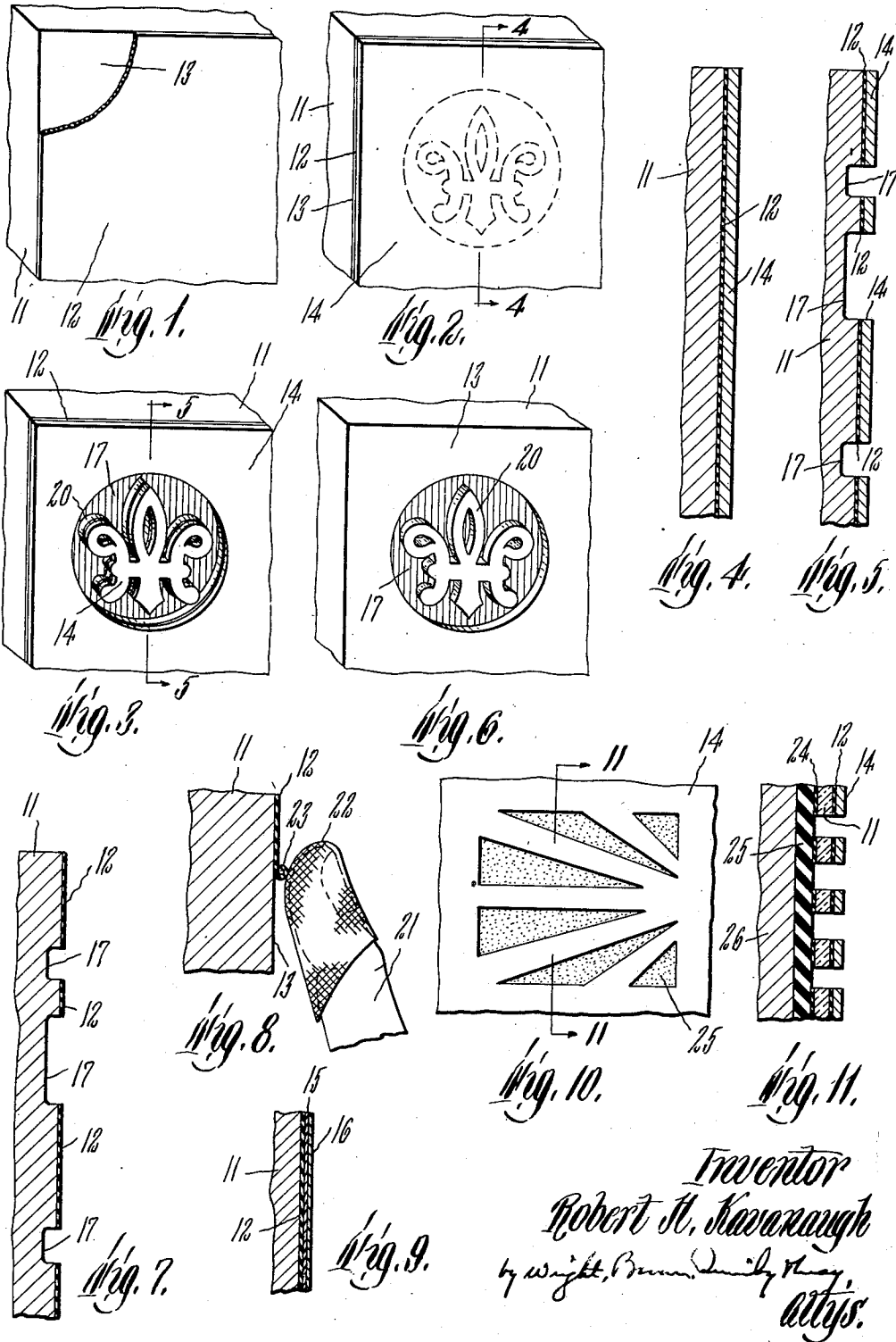
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PROTECTION OF BODIES FOR SANDBLASTING ORNAMENTATION

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PROTECTION OF BODIES FOR SANDBLAST-
ING ORNAMENTATION

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This invention relates to ornamentation by sand blasting of the surface of bodies and articles of various characteristics made of different materials, such as stone, wood, glass, etc. In thus ornamenting such articles it has been common to apply and adhesively secure a stencil of sand blast resistant material to the surfaces to be ornamented, whereby only those portions of such a surface which appear through the apertures of the stencil are attacked and cut away by the sand blast.

The stencils heretofore generally used in commercial practice are made of compositions in which glue is a principal ingredient, and in which are contained also other substances, such as glycerine and powdered soft material (whiting, starch or the like) to give greater pliability and less adhesiveness than is possessed by unmodified glue when dry. The stencil material may be applied in sheet form, after being softened by moisture and heat, or it may be applied in a mass of putty-like consistency and spread in a thick layer over the surface to be ornamented. The designs to be cut by sand blasting, or to be left in raised relief against a sunken background, are cut in the stencil material and the parts of the incised layer over the areas intended to be affected by the sand blast are removed.

These stencil materials adhere with great tenacity to surfaces of stone and wood and frequently tear away fibers from wood surfaces or pull out flakes of mica from granite, when stripped from such surfaces. They leave stains on wood and other porous surfaces, and also on stones if allowed to remain too long, which are very difficult to remove.

My object is to protect the surfaces to which such stencils are applied from deleterious effects such as those above indicated, and also to facilitate the removal of the stencils, both the parts thereof which are cut out and stripped off before sand blasting, and the remaining parts after they have served their purpose of protecting the ornamented surface from impingement of grains of sand. It is a part of this object to afford such protection by an under coat which can be easily removed after it has served its purpose and has little or no liability of staining or discoloring even the most delicate surfaces of wood and stone. The invention comprises a treatment of surfaces to be ornamented prior to the application thereto of stencils or stencil materials; it comprises the combination with such treatment of other steps in sand blast ornamentation; and

it includes new compositions especially intended and adapted for such treatment.

In the drawing furnished herewith,—

Fig. 1 shows in perspective a body of which the surface is to be ornamented, and a protective under coating applied to such surface, a portion of the under coating being broken away;

Fig. 2 is a view similar to Fig. 1 showing an outer coating or layer of sand blast resistant material over the under coating, and showing also by dotted lines markings on the resistant material indicating the lines on which the resistant material is to be cut to make a stencil;

Fig. 3 is a view similar to Figs. 1 and 2 showing the stencil produced by cutting away portions of the layer of resistant material, and showing also the effect of a sand blast on the ornamented body;

Fig. 4 is a cross section on line 4—4 of Fig. 2;

Fig. 5 is a cross section on line 5—5 of Fig. 3;

Fig. 6 is a perspective view showing the ornamented body after removal of the stencil and under coating;

Fig. 7 is a section of the ornamented body showing the same after removal of the stencil but before removal of such portions of the under coating as remain when the stencil has been stripped off;

Fig. 8 is a fragmentary sectional view showing the operation of removing the under coating;

Fig. 9 is a fragmentary section of a body having an under coating composed of a plurality of layers, applied thereon preparatory to application of the stencil layer;

Fig. 10 is a fragmentary elevation and Fig. 11 a section on line 11—11 of Fig. 10 showing an extension of the comprehensive method to the use particularly of ornamenting thin bodies.

Like reference characters designate the same parts wherever they occur in all the figures.

In the drawing, 11 represents a body of any character of which it is intended to ornament a surface by sand blasting. Such body may be of granite, marble or other stone, glass, tile, metal, wood, or any other material which is capable of being cut and abraded by the impact at high velocity of mineral particles such as grains of sand. The first and fundamental step in my present invention is to coat the surface to be ornamented with a film (which for the purposes of the present disclosure I call an under coating) which has adhesive properties sufficient to hold it in place on the surface to which it is applied during the sand blast operation, but will not in-

jure the surface to which it is applied as frequently do the glue compositions heretofore largely used for making stencils in place on the object to be ornamented, and those used for adhering stencils and stencil sheets of other compositions. Other important properties of the under coating material are that it is initially liquid, or at least sufficiently fluid to be capable of application in a thin film by brushing, spraying or dipping, and can dry into a solid state having cohesive strength approximately as great, and preferably greater than, the strength of its adhesive attachment to bodies of the nature indicated above.

The material which I have found most suitable for formation of such an under coating is rubber latex. The unmodified latex of commerce is suitable for most purposes, but I may use vulcanized latex, or either vulcanized or unvulcanized latex modified by the addition of gelatine, glue, gum arabic, glycerine or the like to enhance its adhesive properties, and/or a material to make it more readily disintegrable under the sand blast. Examples of such materials are soft powdered materials including whiting, starch and the like, which give body to the compositions as well as making them friable; and hard mineral matter, in powdered or granular condition, such as fine sand and other substances which have similar properties of helping to break down the coating film when incorporated therein.

Illustrative formulas of modified latex compositions for these latter purposes are:

(1) 75% of commercial latex (solid content approximately 40%) with 25% by volume of a gelatine-water solution containing about 20% gelatine;

(2) 90% of latex (solid content approximately 70%) with 10% of a gum arabic solution containing one part gum arabic and two parts water;

(3) 90% of latex (solid content approximately 70%) with 10% common glue solution consisting of one part ground glue dissolved in four parts water;

(4) A mixture containing about 3% of glycerine and the balance commercial latex of any suitable concentration;

(5) Any of the foregoing mixtures, or unmodified latex, with the addition of 10% more or less of whiting, starch, sand, or other powdered or granular material suitable for the purposes set forth.

Considerable variation from the percentages here given may be made without departure from the invention.

The latex, whether modified or not, may be somewhat concentrated, but not to such an extent as to prevent being spread or deposited in a coating of substantially uniform depth which, on drying, leaves a film commensurate in thickness with tissue paper. The thickness of the under coating is material only to the extent that, as rubber is resistant to sand blast, the coating should be thin enough to offer minimum resistance and to be quickly cut away when portions of the surface over which it has been spread are exposed to a sand blast. But the under coating when dry should be continuous so as to protect the surface on which it has been applied from direct contact with the superposed adhesive stencil layer, or adhesive used to secure a stencil, at substantially all points.

The drawing shows such an under coating at 12 as applied to a surface 13 of the body 11. The freely fluid condition of the coating material

when first applied causes it to conform intimately to the surface on which it is applied, but the solid contents do not penetrate below the surface of wooden bodies or other bodies and materials having permeability equal to or less than wood.

A sheet or layer 14 of stencil material is superposed over the under coating when the latter is partly or thoroughly dry. Such layer may be a preformed sheet, or it may be applied and spread in a plastic consistency resembling that of putty. It may be of any of the compositions including a large content of glue heretofore used for making stencils resistant to sand blast, and held in place by its own adhesiveness, or may be of other suitable material secured by an applied coat of adhesive. When applied as an imperforate sheet, the design to be cut by sand blasting is first cut out of the sheet by a knife on lines such as are indicated by the dotted lines in Fig. 2, and the useless severed portions are stripped off, leaving a stencil such as shown in Fig. 3. Or a previously cut stencil sheet may be similarly applied. Such sheet or layer adheres to the under coating. Suitable strength of adhesion in various circumstances may be obtained by modifications of the latex under coating material, as previously set forth. For instance, the glue or gum arabic addition is useful when the material to be ornamented has a very smooth surface or relatively non porous structure, such as glass or highly polished stone. On the other hand, in order to prevent too great adhesion of the resistant stencil to the under coat, the latter may be covered with a thin intermediate coating of shellac, varnish, calcimine or other material suitable to form a parting layer. Or a coating of unmodified latex may be applied to an under coat of latex modified by the addition of an adhesive.

Fig. 9 shows the application of intermediate coats 15 and 16 of the nature indicated to the under coat.

The under coating, and intermediate coat when applied, permits the cut out parts of the stencil before sand blasting, and the entire stencil afterward, to be readily stripped off without pulling away any of the substance of the body 12. The commercial stencil compositions and adhesives used prior to my inventions are so exceedingly tenacious that they frequently pull out bits of the surfaces on which they are applied, such as fibers and splinters from a wood body, bits of mica from granite bodies, etc., leaving unsightly pits and depressions. Also, when applied directly to the surfaces to be ornamented, these materials often leave stains which are removable only with great difficulty and at considerable expense, and in some instances are indelible. When applied to wood they frequently have such effect as to prevent a desired finish being given to the wood by application of dyes and pigments. Such undesirable effects are prevented by the use of my under coating.

The object to be ornamented is subjected, after placement of the stencil, to the action of a sand blast which cuts away the areas exposed through the openings in the stencil, after first destroying such parts of the under coating as may be exposed through the stencil apertures. It is for the purpose of facilitating such destruction of the under coating that it is initially made as thin as possible, and is in some cases made more friable by the addition of soft powder.

Sometimes in removing the cut out parts of a stencil layer, the under coating is in part

stripped off with the waste pieces of the stencil sheet and in part left adhering to the body. When such a condition occurs, the areas from which the under coating has been stripped will be cut away during the time required to cut through the remaining parts of the under coating, and therefore cut more deeply. In order then to insure sinking the background to uniform depth, I may so far destroy the exposed under coating by action of a solvent that it offers no appreciable hindrance to complete disintegration by the sand blast. A suitable solvent for this purpose is carbon tetrachloride. It can be applied by a brush or as a spray. It flows readily into all parts of the stencil apertures and quickly disintegrates the exposed under coating. But it seems to have no effect on the glue stencil compositions in common use; and does not penetrate beneath the stencil and loosen it from the under coating. Carbon tetrachloride is here specified as an illustration of rubber solvent suitable to be used for the purpose indicated with an under coating composed principally of rubber, and is to be understood as typifying generically all suitable solvents.

At the end of the sand blasting operation, the surface of the body is formed with more or less deep depressions 17 which constitute either a depressed design or the background of a design in relief. Then the stencil is stripped off, leaving the body and its ornamental design 20 exposed. The under coating facilitates final removal of the stencil and protects the ornamented body from discoloration thereby in the same way as described before with respect to the cut out parts of the stencil.

The final step is removal of the adherent film of under coating left after the stencil has been stripped off. This is accomplished mechanically by rubbing the film with a rough cloth, such as burlap, backed up by the operator's hand or finger. Fig. 8 shows illustratively an operator's finger 21 covered by a fragment 22 of cloth in the act of rubbing the film 12 into a roll 23. The cohesive strength of the rubber film is enough to cause the rubbing action to roll it up and pull it away from the ornamented surface, with a minimum of effort and time expenditure. Ordinarily this mechanical action is sufficient to remove the film and all traces thereof; but in the cases of surfaces having crevices or cavities deep enough to confine parts of the coating film, such retained bits may be readily removed by application of carbon tetrachloride, or equivalent solvent, and brushing. It avoids the time, labor and expense of cleaning necessitated by use of the prior art cements.

The fragments of the film in being mechanically removed are rubbed over the surface of the ornamented body and have a detergent effect in removing dirt from the surface. Carbon tetrachloride, when such is used, has a further cleansing effect by its ability to dissolve and carry away matter not mechanically removed.

It is sometimes desirable to mount bodies to be ornamented on a supporting backing and to secure them adhesively to such a backing in a manner permitting them to be removed without danger of breakage and without injury or damage otherwise. The need of doing so arises particularly in the case of thin plates or slabs of wood or glass in the neighborhood of $\frac{1}{8}$ inch to $\frac{1}{4}$ inch thick, or other thin objects where the design is to be cut completely through or very deeply into the plate. For this purpose the body

is not only covered on the face with the under coating 12 and stencil layer 14, but is also coated on the back with a film 24 (Fig. 11) of the under coating material. The coated back of the object is laid against a sheet 25 of thick rubber or equivalent flexible material, which is supported by a board 26 or equivalent solid backing support during the sand blasting operation.

The thin and more or less fragile article is resiliently supported when undergoing sand blasting by a backing to which it is adherently attached. The uniting film of latex rubber or its equivalent, which may contain a modifier of the character previously described, provides a sufficiently firm bond for the purpose, but permits the backing sheet to be readily peeled from the ornamented object without defacement or breakage even though the object be a thin and fragile plate. Such parts of the coating film as then remain on the back of the object are removed in the same manner as before described with respect to the under coating film on the face.

While in the foregoing description I have named rubber latex as the preferred principal material of my under coating, I wish to make it plainly understood that I do not limit the protection which I claim to the use of this material exclusively in carrying out the purposes of the invention. Natural rubber latex is an aqueous dispersion of rubber, and I may also use artificial dispersions of rubber and all substances analogous to rubber in their properties of coalescing in a continuous film and of clinging to surfaces on which they have been applied in the dispersed condition. But I may also use rubber and rubber-like substances in other forms of liquid extension than the emulsified form, such as so called solutions of rubber. Still further, I may use in equivalent embodiments of the process invention, other substances than rubber which have similar mechanical properties of cohesion and adhesion. An important useful feature of the invention is the facility with which the under coat can be removed after it has served its purpose, by rubbing or pulling it off from the surface on which it had been applied. The reason for this facility of removal is, I believe, that the under coating film has substantial cohesive strength, which generally is greater than the strength of its adhesion to extended surfaces of wood, stone, metal, etc., and its adhesive attachment to such surfaces is less than that of the substances commonly classed as adhesives. Thus the film is readily loosened from the surface by rubbing, and when loosened at one point is readily peeled and stripped from adjacent points by rubbing and pulling. Rubber and substances and compositions which have properties similar to rubber in those particulars, although they may not be chemically classifiable as rubber, are included within the scope of the protection which I claim and within the meaning of the term "rubber-like" as used in this specification and in the appended claims.

What I claim and desire to secure by Letters Patent is:

1. The method of uniting a stencil to a body to be ornamented by sand blasting which consists in applying to a surface of the body a coating of rubber in liquid extension and, after drying of such coating, adhesively securing the stencil to the residual film of the coating.

2. The method of protecting a body for sand blast ornamentation which consists in applying

to the surface of the body a coating of rubber in liquid suspension or solution, allowing such coating to dry to a thin and substantially continuous film, and applying in adherent connection with such film a stencil layer.

3. The method of preparing a body for sand blast ornamentation which consists in spreading over the surface to be ornamented of such body a coating of material in liquid suspension or solution, which material has the capacity of coalescing into a substantially continuous coherent film upon drying of the liquid vehicle, and of then remaining in adherent connection with the surface to which it has been applied, with an adhesive bond of less strength than its coherent strength, and applying and adhesively connecting to such film a stencil sheet or layer of sand blast resistant material.

4. The method of ornamenting a body by sand blasting which consists in applying to the surface of such body an under coating and a stencil layer as set forth in claim 3, applying a solvent of the under coating material to such portion of the under coat as is exposed through an aperture of the stencil layer, and directing a sand blast against the body through such aperture.

5. In the method of sand blasting ornamentation, the steps of preparing a body to be ornamented by placing thereon a lightly adherent film of material which has greater strength of cohesion than of adhesion to the body, adherently connecting a stencil to said film, sand blasting the body through apertures of the stencil, stripping the stencil from the body, and removing such portion of the under film as thereafter adheres to the body, by rubbing or pulling it away.

6. In the method of sand blast ornamentation with the aid of an adhesive stencil applied to the surface to be ornamented, the step of protecting such surface from the stencil, which consists in placing on the surface beneath the stencil an under coat of material which is adherent to both the body and the stencil and has a cohesive strength greater than the strength of its adhesion to the body.

7. In the method of ornamenting stone, wood, etc. by sand blasting with the aid of a stencil of sand blast resistant material having strongly adhesive properties with respect to stone, wood, etc; the step of protecting the surface to be carved from staining by such stencil and mechanical injury when the stencil substance is stripped off, which consists in applying a fluid composed essentially of rubber latex so as to form an undercoat between such surface and the stencil.

8. In the method of ornamenting as set forth in claim 7, the step of forming a protective undercoat by applying rubber latex containing a minor proportion of an adhesive substance in liquid phase.

9. In the method of ornamenting as set forth in claim 7, the step of forming a protective undercoat by applying rubber latex containing an admixture of glycerine.

10. In the method of ornamenting as set forth in claim 7, the step of forming a protective undercoat by applying rubber latex containing in an intimately mixed state, a content in the order of 10% of dry powdered material.

11. In the method of ornamenting as set forth in claim 7, the step of forming a protective undercoat by applying rubber latex containing a minor content of glue dissolved in water.

12. In the method of ornamenting as set forth in claim 7, the step of forming a protective undercoat by applying rubber latex containing a minor content of gum arabic dissolved in water.

13. The method of protecting stone, wood, etc. from discoloration and mechanical injury due to the use of a stencil of sand blast resistant material having strongly adhesive properties, which consists in applying a fluid composed essentially of rubber latex so as to form an undercoat between the surface of the stone, wood, etc. to be sand blasted, and the adhesive stencil.

ROBERT H. KAVANAUGH 45