

Feb. 1, 1938.

R. H. KAVANAUGH

2,106,980

METHOD FOR SANDBLAST ORNAMENTATION

Filed March 20, 1936

2 Sheets-Sheet 1

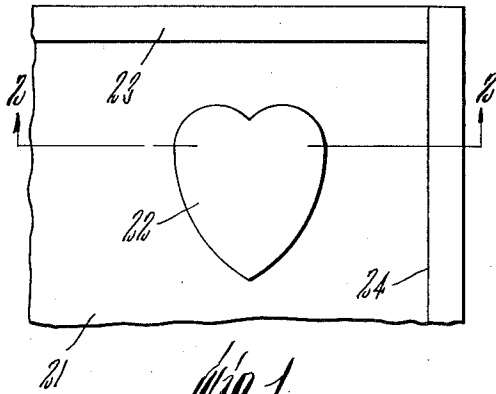


Fig. 1.

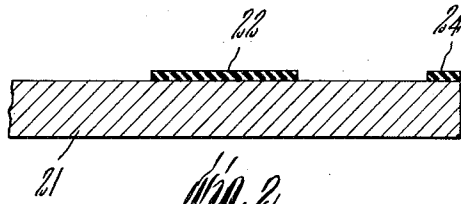


Fig. 2.

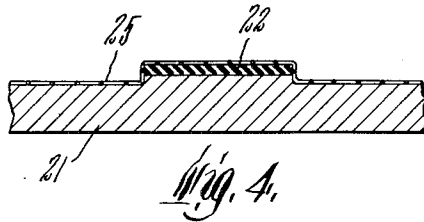


Fig. 4.

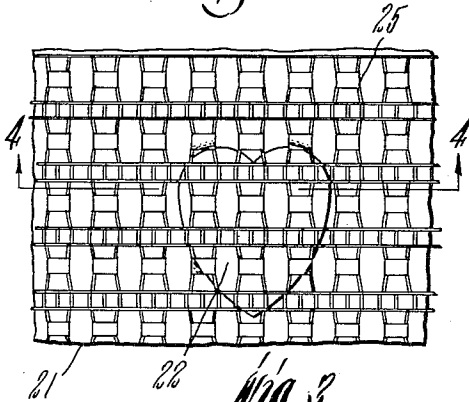


Fig. 3.

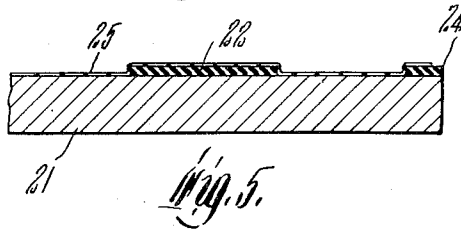


Fig. 5.

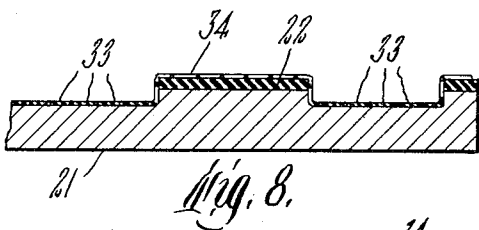


Fig. 8.

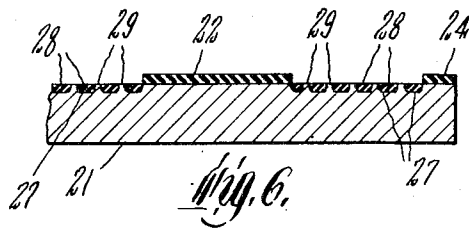


Fig. 6.

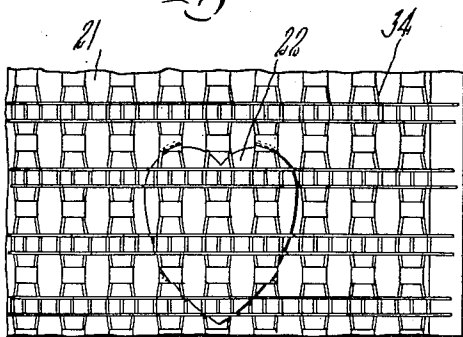


Fig. 9.

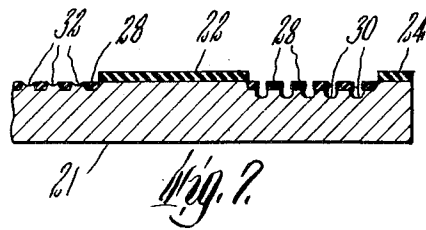


Fig. 7.

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2 Sheets-Sheet 2

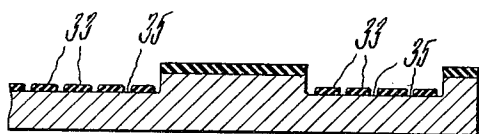


Fig. 10.

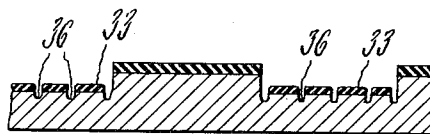


Fig. 11.

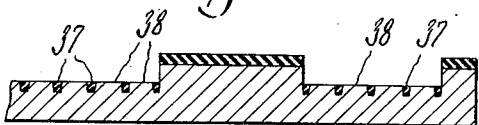


Fig. 12.

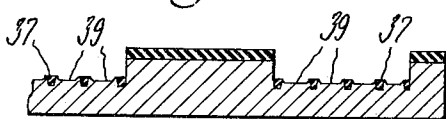


Fig. 13.

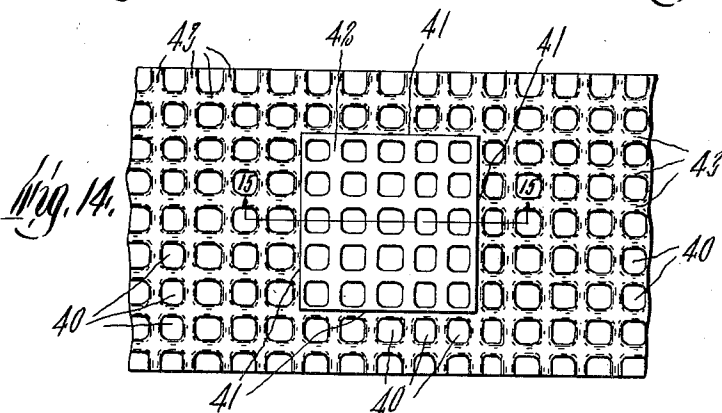


Fig. 14.

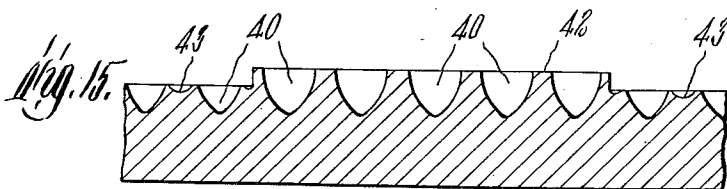


Fig. 15.

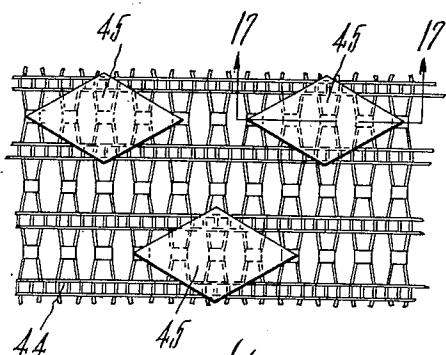


Fig. 16.

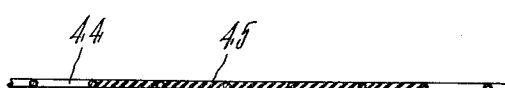


Fig. 17.

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UNITED STATES PATENT OFFICE

2,106,980

METHOD FOR SANDBLAST ORNAMENTATION

Robert H. Kavanaugh, Brewer, Maine

Application March 20, 1936, Serial No. 69,850

3 Claims. (Cl. 41—39)

The invention hereinafter described relates to ornamenting bodies such as blocks and slabs of stone, walls of buildings, sheets, panels, plates, slabs, boards, etc. of glass, metal or wood, tiles, and in general all materials which are susceptible of being cut or etched by a sand blast; with the aid of stencils and the like by which impingement of the sand blasting grains may be limited to selected parts of the surfaces to be thus ornamented. Its object is to obtain improved effects in sand blast carving and to provide improved means available for carrying out such methods. The nature of such improved means and effects, and the principles and particulars of the new procedures and means in which the invention consists are explained in the following specification, in connection with the drawings, to which attention is now directed.

In the drawings,—

Fig. 1 is a plan view of a portion of a stone slab (representative and typical of any body upon which the invention may be used) illustrating the preliminary step in the performance of my complete process;

Fig. 2 is a cross section on line 2—2 of Fig. 1;

Fig. 3 is a plan view of the slab shown in Fig. 1 after a first cutting operation and after application to the protected and unprotected areas of the slab of a lace stencil adapted to cause delineation by further sand blasting of a design in the background of the ornamented surface;

Fig. 4 is a cross section on line 4—4 of Fig. 3;

Fig. 5 is a section similar to Fig. 4 showing a variation in the process;

Figs. 6 and 7 are similar views showing two further steps constituting extensions of the foregoing processes;

Fig. 8 is a similar cross section and Fig. 9 a plan view of a slab illustrating the first steps of an alternative process;

Figs. 10, 11, 12 and 13 are sectional views similar to Fig. 8 showing further steps of the last named process;

Figs. 14 and 15 are respectively a plan view and a section (on line 15—15 of Fig. 14) enlarged, of a fragment of a slab ornamented by a further variation of the fundamental process;

Fig. 16 is a plan view and Fig. 17 a section on line 17—17 of Fig. 16 (enlarged) showing a novel stencil suitable for use in carrying out the foregoing processes.

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

In the following description it will be assumed that the body represented in these drawings as

being treated according to this invention, is a stone slab. This is not to be construed, however, as implying any limitation in the utility of the invention, but the stone slab thus shown and described shall be understood as typifying and representing any and all bodies of whatever material and dimensions capable of being cut or etched by forcible impingement of mineral grains.

In the procedure of cutting stone to present a definite design and an ornamented background, the slab 21 is first covered on the surface to be ornamented by a sheet or layer of composition which is resistant to disintegration by sand blast, to the extent at least that it protects the areas on which it is applied long enough to enable adjacent surfaces to be cut to the desired depth by the sand blast. Such layer is adhered to the surface and is cut away on the lines of any desired design, and the waste portions of the layer are stripped off, leaving protective patches or portions. In these drawings I have shown a protective patch 22 in the form of a heart, and connected elongated patches 23 and 24 which together form a border or frame. Any suitable sand blast resistant material may be used for these purposes, such as the plastic compositions described in my Patent No. 2,016,092, dated October 1, 1935, or those described in my copending application Serial No. 69,851, filed of even date herewith, or other compositions and stencil sheets in commercial use. Of course the retained patches may be of any desired outlines, such as those of letters or numbers, ornamental figures, or what not.

In the form of the invention illustrated in Figs. 1, 2, 3 and 4, the next step is to direct a sand blast against the slab and thereby cut away the exposed areas to produce a depressed background, the depth of which is determined by the length of time during which the sand blast continues. Such background at this time has no distinctive characteristics. It may be substantially level if the sand blast has been directed evenly against all parts, or it may be of unequal depths in different parts; but its surface has the same appearance at all points.

In carrying out the further step of ornamenting the background, I apply and adhesively attach to such background a flexible stencil, preferably, though not necessarily, one of the character disclosed in my Patent No. 1,954,672, dated April 10, 1934. Such stencil is constructed of flexible threads or strands interconnected to form a lace-like fabric of any desired design, and its strands are protected from destruction by the

sand blast, by being covered with rubber resulting from treating the lace with rubber latex, and drying the latex, or by the use of other suitable resistant material. Lace of this character can be made in a great variety of ornamental and intricate designs, with large or small meshes. It is extremely flexible and can be bent sharply and rebent without injury. Thus it can be entered intimately into the angles between the edges of the protective coverings 22, etc., or the plateaus of stone beneath them, and the surface of the depressed background. It is possible of course to cut the lace stencil to fit the areas of the background; but this is not necessary inasmuch as the flexibility of the stencil enables it to conform intimately with the boundaries of the background even though spread without interruption over the background and protected areas, while it is much simpler and more economical thus to apply it. A lace stencil thus applied and conformed to the contours of the sand blasted stone is shown at 25 in Figs. 3 and 4. For convenience in making the drawings, the stencil has been shown as of most simple design; but it will be understood that this showing is not a limitation and that designs of the greatest intricacy may be used provided only the meshes are wide enough to permit free passage of the grains of sand.

The strands of the lace stencil are laid closely against the background surface and secured thereto by a bonding agent which may be rubber latex or any other suitable adhesive capable of being applied to the slab or to the stencil in fluid condition, and of drying or setting into a cohesive state sufficiently strong to hold the strands of the stencil against dislodgement under subsequent sand blasting action.

The slab with the attached lace stencil is again subjected to sand blast, which further cuts away the background areas exposed in the meshes of the lace, but does not further affect the lines on which the strands of the stencil are bonded to the slab. In this operation the connecting bond has a most important function. The bonding agent holds the strands of the stencil close to the background surface, filling any crevices which may occur due to unevenness of such strands or their protective coating, or to the crossing of one strand over another. Thus the lines of the stencil are most sharply defined on the stone and particles of sand are prevented from being driven under these strands and cutting away the stone beneath them. Thus when the sand blast has been completed and the stencil stripped off, the depressed background is found to be ornamented with the lines of the stencil as sharply defined as are those of the designs protected by the resistant patches and areas 22, 23, 24 and the like.

The invention comprises further similar methods of ornamentation without much, or any, depression of the background as a whole. For example, beautiful effects may be obtained on polished, glazed or glossy surfaces by preserving the surface finish on certain areas and merely dulling the background areas by the sand blast. In such cases the first sand blasting action, before application of the lace stencil, is continued only long enough to break up the gloss or polish on the exposed areas.

A variation of the invention consists in sinking the design of the lace stencil into the background and/or defining such design by narrow edges running in parallel. The stencil 25 is applied, as shown in Fig. 5, directly over the slab after application and formation of the protective

coverings, but before any sand blasting has been performed. Then a sand blast is applied to the stencil covered areas and the slab is cut to the desired depth through the meshes of the stencil, forming depressions 27. The stencil is removed and the depressions filled with masses 28 of a plastic composition which is resistant to destruction by sand impingement, such as those disclosed in my Patent 2,016,092 and my pending application Serial No. 69,851. Such composition is applied in a plastic consistency resembling that of putty, to a depth greater than sufficient to fill the depressions, and the excess is scraped off, leaving exposed areas and lines which were previously covered by the stencil.

The compositions above described are convertible by drying into a state in which the material is cohesive, flexible and resilient. When the masses 28 have dried to this condition, the slab is again subjected to a sand blast, which cuts down the ridges 29 between the original depressions and, if continued long enough, causes deeper depressions 30 as shown in the right hand part of Fig. 7. When the protective bodies 28 are removed, as they may readily be by rubbing them with the fingers or a cloth, or brushing, the design of the stencil appears in the form of depressed troughs 30, while the areas corresponding to the meshes of the stencil are relatively elevated, and may be higher at their edges than in interior parts of their areas. Or if the sand blasting is stopped at an early stage, an effect like that shown at the left hand part of Fig. 7 results, in which shallow grooves 32 appear bounded by narrow raised edges, extending in lines corresponding to the strands of the stencil.

Although I have described this last procedure as carried out without any sand blasting preliminary to application of the stencil 25, it will be understood that it may equally well be performed on a previously sunken background, such as that described in connection with Figs. 3 and 4. Those steps of this last described process which comprise reversing the design by filling the depressions cut through the meshes of the stencil, and sand blasting again, may be carried out also with the use of other types of stencil than my patented lace stencil; as, for instance, continuous sheets of resistant material in which apertures have been cut, or patches of such material around which background areas have been exposed.

A further embodiment of the invention, shown in Figs. 8-13, consists in applying masses 33 of plastic protective material (such as any of the compositions suitable to form the bodies 28) through the meshes of a stencil 34 applied to the surface to be ornamented. Such stencil may be a lace stencil which may or may not be protectively covered by a sand blast resistant coating, as desired, and may be impregnated or covered with shellac, varnish or other material suitable to give permanence to the shape of the stencil and its constituent elements. Other types of stencil also may be used. Before applying the plastic material the stencil is preferably attached adherently to the surface of the slab. It is removed after application of the plastic material, but before the masses or bodies of this material in its openings and meshes have dried or hardened enough to prevent its satisfactory removal, leaving these bodies as discontinuous patches separated by grooves or recesses 35 previously occupied by the parts of the stencil. The surface so protected is then subjected to the sand blast, which cuts grooves 36 in the slab, thus producing an orna-

mentation of which the depressed lines have the same pattern as the stencil. In other words, the stencil pattern is sunk into the stone instead of being raised.

5 A further extension of this process consists in removing the protective bodies 33, filling the grooves 36 with the bodies 37 of equivalent plastic material, and after this material has solidified, cutting away the intermediate areas 38 by the sand blast to make depressions 39 of any desired depth. According to the depth to which the latter depressions are cut, the final result is either to reproduce the stencil pattern in raised double lines with thin edges, or to depress the background below the stencil pattern and leave the latter in a raised condition but concave on the top of its lines, similar to the results produced by the methods of Figs. 5, 6 and 7.

Here also the stencil may be either a lace stencil, or a stencil sheet with broad surfaces and openings in the form of letters, figures or other designs, or the counterpart of such a stencil. Again, the equivalent of a stencil may be made in place on the surface of the slab by spreading a layer of plastic composition which hardens on exposure to the air, and forming the desired pattern by cutting out and removing parts of the material before or after hardening.

The methods previously described are shown as applied in connection with protective coverings adapted to leave a portion or portions of the stone intact. But such protective coverings may be removed after a preliminary sand blasting of the unprotected surfaces and a stencil applied over the intact part as well as the background so that the final patterns will be cut in the raised as well as the depressed parts of the surface. Again, the entire surface or a prescribed area of a slab may be first cut with a pattern in any of the ways previously described, and afterwards a part of the decorated surface may be sunk below another part by placement of protective material over such latter part and a further application of the sand blast.

45 Figs. 14 and 15 show the results of such treatment. So much of the slab as is shown in these figures was first overlaid by a lace stencil and carved by a sand blast whereby the depressions 40 were formed. Thereafter a portion of the area, bounded by the lines 41 shown in Fig. 14, was covered with a sheet or coating of sand blast resistant material, the depressions in the uncovered portion were filled with plastic composition, and after hardening of the composition the surface was sand blasted again. This resulted in depressing the surface all around the protected area, leaving a raised plateau 42, reducing the depth of the depressions 40 in the surrounding area, and cutting shallow grooves 43 between these latter depressions.

The descriptions and illustrations thus given explain the principles of the invention and show some of the particulars in which they can be applied. A great variety of ornamental effects additional to those illustrated may be produced by combining details of these principles in different permutations and combinations, sinking the background and the excavations under the openings of the stencils to greater or less depths, etc., and by employing lace stencils of different designs. The surfaces protected by the covers 22, 23, 24 and the like may also be ornamented in detail by removing the covering in whole or in part and cutting the uncovered areas by sand blast,

with or without the production of figured surfaces by application of stencils.

The patterns cut with the aid of lace stencils may be modified in part by covering or filling certain meshes of the stencil in such a way as to provide blank areas having desired outlines. Figs. 16 and 17 show a stencil 44 thus modified by patches 45 of sand blast resistant material in which the strands of the stencil are embedded. The patches here shown are diamond shaped, but may be of any other desired outline, dimensions and location. They protect the surface over which the stencil is laid, just as the strands of the stencil do, and when used in the performance of the methods hereinbefore described accomplish all the effects obtained by the stencil strands except for the differences of design due to their extended area and their outlines. An effective procedure for combining such patches with an open meshed stencil is the following. A patch of plastic material of the character hereinbefore described or referred to is deposited on a smooth supporting surface, and molded as to its outline by being passed through an opening in a stencil or matrix. Then while the material is still plastic, the reticulated stencil is laid upon it and pressed into it until the strands are embedded in and interlocked with it. After drying and hardening of the plastic, the patch so applied becomes a permanent part of the stencil. To prevent adhesion of the patch to the surface on which it was laid before embedment of the stencil strands, such surface may be overlaid with a loose sheet of paper, which can be peeled or washed from the patch after the latter has hardened.

As noted in the introductory part of this specification, some of the phases of this invention are applicable to bodies of any material which is hard and brittle enough to be abraded by a sand blast or analogous treatment by impact of hard mineral particles. Those phases which include the filling of depressions cut in the body, and subsequent cutting by sand blast of the areas exposed between the filled depressions, may be used with any bodies and substances of a nature which permits cutting of depressions deep enough to receive a plastic composition and to retain disconnected masses of such composition after removal of the excess and hardening of the residual masses.

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

1. The method of ornamenting a body capable of being abraded by a sand blast or the like which consists in covering part of the surface of such body with a layer of sand blast resistant material, placing over the uncovered area of the body and into the angles between the edges of such layer and said area a flexible stencil and bonding the stencil to such surface so as to prevent undercutting by sand blast, and directing a sand blast against such stencil and through the meshes thereof.

2. The method of ornamenting bodies capable of being abraded by a sand blast which consists in applying to a portion of the surface of such a body a cover layer of sand blast resistant material, directing a sand blast against the body and cutting down the surface thereof adjacent to such cover layer, spreading a flexible stencil over the cover layer and adjacent depressed surface, bonding the strands of such stencil to the surface of the body and in the angles between such depressed surface and the covered area so as to prevent un-

der-cutting, and again directing a sand blast against the body through the meshes of the stencil.

5 3. The method of sand blast ornamentation of a body capable of being abraded by sand blast which consists in placing a protective cover of sand blast resistant material over a portion of the surface of such body, laying a flexible stencil over the protective cover and adjacent surface of
10 the body and bonding it to the latter surface, cut-

ting away the body by a sand blast through the meshes of the stencil, removing the stencil, filling the depressions thus cut by the sand blast with a plastic substance which has the capacity of hardening into a cohesive sand blast resistant mass, and further cutting the body by sand blast
5 between the masses of such composition after hardening thereof.

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