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INSCRIPTION OF HARD SURFACES

Filed April 20, 1968

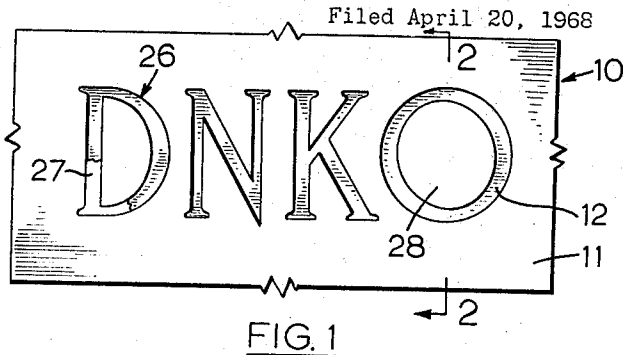


FIG. 1

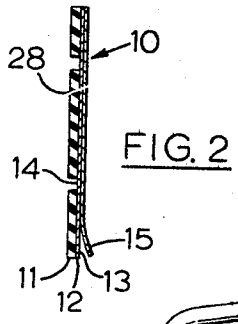


FIG. 2

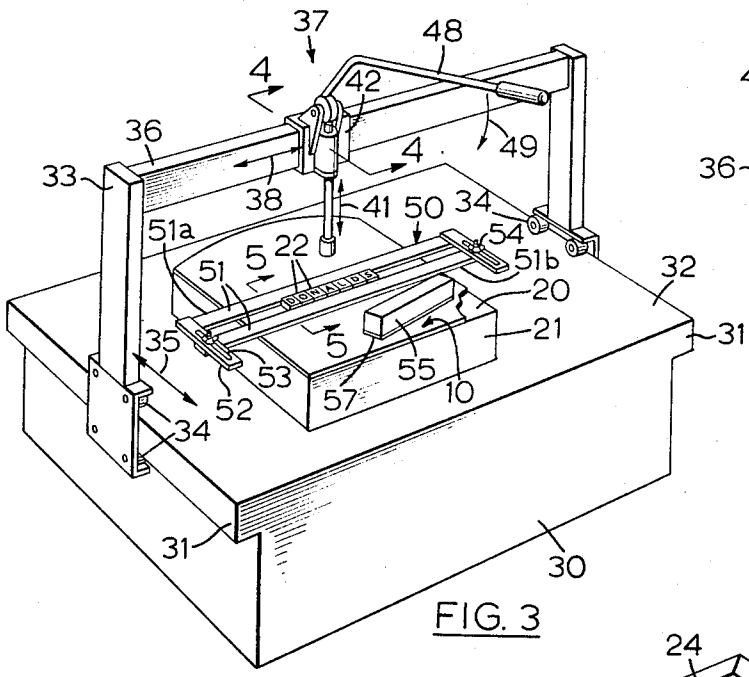


FIG. 3

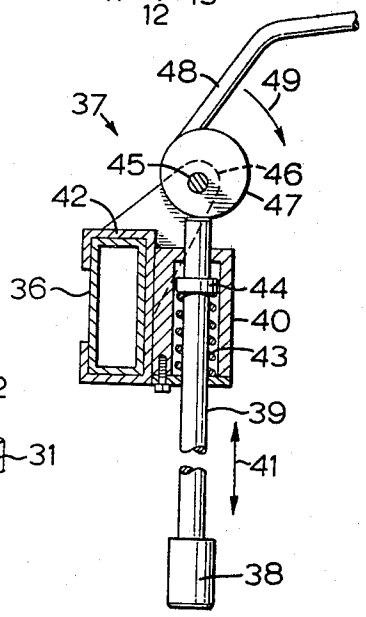


FIG. 4

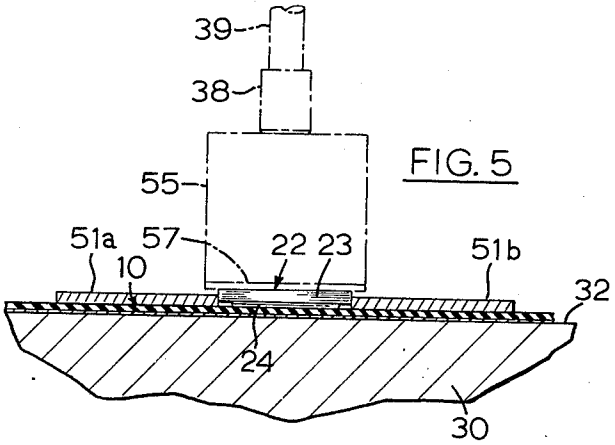


FIG. 5

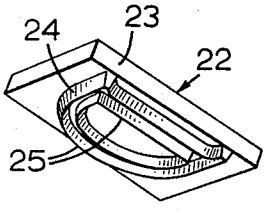


FIG. 6

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INSCRIPTION OF HARD SURFACES

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U.S. Cl. 161—167 7 Claims

ABSTRACT OF THE DISCLOSURE

A stenciling mask of laminated construction including a sandblast-resistant sheet in which the letters, figures and symbols are cut and a pliable backing is secured to one planar side of this sheet whereby the stencil may be processed at a point remote from the surface to be cut in that said sheet provides a mounting for the disconnected portions of said letters, figures and symbols.

The present invention relates to the inscription of hard surfaces and more particularly to a method, device and apparatus for inscribing the surface of hard objects such as stone by sand blasting.

Inscribing or lettering a hard surface such as the facing of a stone monument or cornerstone demands skilled craftsmanship. The craftsman first traces an outline of each letter or figure on the face of the stone and then carefully chisels out the letters or figures by hand. Various methods and apparatuses have been devised to facilitate this laborious process. The most common method is to apply a material to the stone facing either as a coating which has been allowed to set or as an adhesive sheet. The material adhering to the stone facing is cut to form a stencil and the letters or figures are sand blasted onto the facing through the stencil. In a variation of this procedure the letters or figures are first positioned on the facing and a blast-resistant coating is formed around them after which the letters are either removed by hand or are formed of a substance destructible by the sand blast. These methods suffer from the disadvantage that the stencil must be cut on the stone since the adherence of the material of the sheet is necessary to keep free portions, such as the unattached centers of certain letters, in their proper positions.

The present invention overcomes the above disadvantages by providing a method, device and apparatus for inscribing hard surfaces by sand blasting in which a preformed mask may be stencilled either directly on the facing or separate from the facing and applied thereto.

In its broadest aspect the invention consists of a method of inscribing a hard surface comprising the steps of: adhering to the surface a laminated mask of material having (1) a sheet adapted to be cut by a stencilling die but resistant to erosion by sand blasting, and (2) a backing adhering to the sheet and adapted to be destroyed by sand blasting; cutting, by means of the die, portions of the sheet either before or after the adherence thereof to said surface and removing the cut portions to form a stencil of the mask; and impinging a stream of abrasive particulate material under pressure against the stencil. The invention further resides in a stencilling material for use in inscribing a hard surface by sand blasting, comprising: a laminated mask having a sheet adapted to be cut by a stencilling die but resistant to erosion by sand blasting, and adhered to the sheet a backing adapted to be destroyed by sand blasting, the backing being adapted to adhere to the hard surface. The backing is preferably a material resistant to being cut by the die and is pressure sensitive on its exposed face for adherence to the hard surface, the exposed face carrying a removable cover for handling. In another aspect of the invention an apparatus is provided for preparing a stencil, from a laminated mask having a sheet and a backing adhered to the sheet, for inscribing a hard surface by sand blasting, comprising: a die having raised lettering of a depth at least equal to the thickness of the sheet of the mask; a frame to hold the die; and pressing means having a face adapted to bear on the die and overlap the frame; the face when bearing on the die being spaced above the frame a distance equal to the depth of the raised lettering.

Example embodiments of the invention are illustrated in the accompanying drawings in which:

FIGURE 1 is a plan view of a stencil made according to the invention;

FIGURE 2 is a cross-section of the stencil taken along the line **2—2** of FIGURE 1;

FIGURE 3 is a view in perspective of apparatus for cutting the stencil shown in FIGURE 1 of the drawings;

FIGURE 4 is a cross-section taken along the line **4—4** of FIGURE 3;

FIGURE 5 is a cross-section taken along the line **5—5** of FIGURE 3; and

FIGURE 6 is a perspective view of a lettering die used with the invention.

Referring to FIGURES 1 and 2 of the drawings, these figures show a stencil cut and ready for application to a hard surface for inscription by sand blasting. The stencil comprises a laminated mask **10** having sheet **11** with a backing **12** adhering to one side thereof. Sheet **11** of laminated mask **10** may be composed of any form-retaining material, preferably flexible, capable of being cut by a die but resistant to erosion by sand blasting. A suitable material for sheet **11** is one having a composition of rubber such as that sold by Minnesota Mining and Manufacturing of Canada Limited. Backing **12** is preferably a pressure sensitive tape material with an exposed adhesive surface **13** and a non-exposed surface **14** adhered to sheet **11** by a glue such as a filler adhesive sold by Minnesota Mining and Manufacturing of Canada Limited. The glue is applied to the back of sheet **11** and is removed with the portions of the letters or figures cut by the die and withdrawn to form the stencil. Backing **12** must be destructible by sand blasting and preferably also should be difficult to cut or tear. A suitable material for this purpose is a pressure sensitive tape material of pigmented polyester film sold by Du Pont of Canada Limited under the trademark "Mylar" which is extremely resistant to cutting or tearing but is easily eroded by the impingement under pressure of abrasive particulate material such as aluminum oxide sand sold under the trademark "Carborundum Sand" by the Carborundum Company Limited (Canada). Such a backing reduces wear of the cutting edge of the die which is usually subjected to a pressure of 500 to 700 pounds per square inch. Another suitable material for the purpose is a pressure sensitive tape material of pigmented polyester film sold by Minnesota Mining & Manufacturing of Canada Limited under the trademark "Silver Simlar." To enable handling and shipping a protective covering **15** is adhered to surface **13***a* of backing **12** and is adapted to be peeled off to expose the pressure sensitive adhesive. Cover **15** is preferably of thin plastic material.

In the method of inscribing a hard surface such as a face **20** of a stone or monument **21** shown in FIGURE 3 of the drawings, a size of laminated mask **10** is chosen to cover that portion of face **20** sought to be protected against erosion by sand blasting. Cover **15** is peeled from mask **10** and the mask is adhered to face **20** by means of adhesive surface **13** of backing **12**. To cut a stencil in mask **10** individual lettering dies **22** such as that shown in FIGURE 6 of the drawings (or composites of such dies)

are used. Each dies **22** comprises a mounting plate **23** and a raised letter or figure in double outline. Raised letter **24** terminates in a cuitting edge **25** which is pressed into and completely traverses the thickness of body portion **11** of sheet **10** but leaves backing **12** intact. Die **22** is then removed leaving an outline **26** of the letter imprinted through mask **10**. Strips **27** of sheet **11** bounded by outline **26** is removed in a conventional manner by a knife or other pick means leaving portions of backing **12** exposed corresponding to outline **26** of the letter. Facing **20** of stone **21** is now ready for sand blasting which, when applied against mask **10**, will erode and destroy the exposed portions of backing **12** leaving corresponding portions of face **20** exposed for erosion or etching by the sand blast. It will be appreciated that backing **12** holds central portions **28** of certain letters or figures, which retain no link with the remainder of sheet **11** of mask **10**, firmly and in correct position against the face **20** of stone **21**. When the proper amount of erosion has been achieved by the sand blast on face **20** to inscribe the letters or figures, mask **10** may be peeled away to expose the inscribed face.

Apparatus for carrying out the above mentioned method is shown in FIGURES 3, 4 and 5 of the drawings. This apparatus consists of a base **30** having overhanging parallel flanges **31** and an upper flat bearing surface **32**. A gantry **33** is mounted on base **30** by means of journalled rollers **34** which move along flanges **31** in the directions of arrow **35**. A crossbeam **36** of gantry **33** carries a press means **37** movable along the beam in the directions of arrow **38** which is normal to the movement of the gantry itself. As shown in FIGURE 4, press means **37** comprises a head **38** carried on a vertical shaft **39** which is movable in a cylinder **40** axially in the directions of arrow **41**. Cylinder **40** is mounted on a C-shaped channel **42** which is freely slidable on crossbeam **36** of gantry **33**. A compression coil spring **43** carried within cylinder **40** concentrically about shaft **39** bears against a shoulder **44** fixed on shaft **39** within the cylinder and urges the shaft in an upward direction. A transverse shaft **45** is journally mounted above shaft **39** in a pair of brackets **46** fixed on channel **42**. Shaft **45** carries a circular cam **47** fixed to a handle **48** which extends laterally from crossbeam **36**. Thus handle **48** is movable upwardly or downwardly in the directions of arrow **49**. When handle **48** is moved downwardly the action of cam **47** against shaft **39** causes head **38** to be lowered against the action of spring **43**.

Individual stencil cutting dies **22** are held together as a group by a frame **50** consisting of a pair of elongated straight-edged slats **51** and a pair of cross-arms **52** each having a slot **53**. One slat **51*a*** is fixed to each of cross-arms **52** while the other slat **51*b*** is mounted on the cross-arms with wing nuts **54** movable in slots **53** whereby slats **51** are adjustable laterally with respect to one another.

A rectangular pressblock **55** is supplied to transfer pressure from head **38** of press means **37** to dies **22**. Block **55** consists of an elongated metal bar having a strip **57** of resilient padding fixed to its undersurface.

To save wear on cutting edges **23** of dies **22**, block **55** is of a width greater than the length of mounting plate **23** of the dies. The thickness of plate **23** of each die **22** is made equal to the thickness of slats **50** and the depth of letter **24** of the die is made equal to the thickness of sheet **11** of mask **10**. Thus when head **38** applies pressure to block **55** and the pressure is transferred to die **22**, cutting edge **25** of the die will penetrate through sheet **11** whereupon the portions of block **55** overlapping die **22** will meet slats **51** of frame **50** and prevent any penetration of backing **12** by the die. Of course, where backing **12** is composed of material such as that identified above by the trademark "Silver Simlar" penetration of the backing by cutting edge **25** of die **22** will be prevented in any event.

An important advantage of the present invention is that the stencil may be prepared separately from surface **20** of stone **21** to be inscribed and then applied to the surface for the final step of sand blasting. In carrying out this operation mask **10** is laid on a suitable platen (not shown) which rests on surface **32** of base **30**, with cover **15** remaining affixed to backing **12** of the mask or with the cover temporarily removed in order to adhere the sheet to the platen. The same steps as outlined above are then carried out to obtain the stencil. The completed stencil is lifted from the platen and if necessary cover **15** is replaced for handling. The stencil is then applied to surface **20** of stone **21** after peeling off cover **15** to expose adhesive surface **13** of backing **12**. It will be appreciated that this method would be applicable where a monument or other work to be inscribed is not of a size and shape suitable for placement on base **30** of the apparatus. On the other hand, the apparatus may be made portable by mounting base **30** on a suitable carriage.

It will be seen that a distinct advance in the art of inscribing hard surfaces has been achieved since hitherto all known methods have involved laborious steps whereas the present invention is simple, requiring a minimum amount of skill while accelerating production.

I claim:

1. On a laminated stencilling mask for use in inscribing a hard surface by sandblasting of the type comprising a flexible sheet of material resistant to erosion by sandblasting but adapted to be cut by a sharp instrument for purposes of removing letter and symbol portions therefrom, a pressure-sensitive adhesive on the face of said sheet whereby said mask can be removably secured to said hard surface, the improvement comprising a synthetic film backing adhered to and disposed between said face of said sheet and said pressure sensitive adhesive, said synthetic film backing being resistant to cutting or tearing but being easily eroded by sandblasting, whereby said stencilling mask may be prepared separately from the surface to be treated and subsequently applied thereto.

2. A stencilling mask as defined in claim **1**, wherein a removable protective covering is disposed over said adhesive prior to securement to said hard surface.

3. A stencilling mask as defined in claim **2** wherein said backing is composed of a material resistant to cutting.

4. A stenciling mask as defined in claim **2** wherein said backing is composed of a film of polyester material.

5. A stencilling mask as defined in claim **1**, wherein said backing is composed of a material resistant to cutting.

6. A stencilling mask as defined in claim **1**, wherein said sheet is of a rubber composition.

7. A stencilling mask as defined in claim **1**, wherein said sheet is of rubber composition and the backing is a film of polyester material, the backing carrying a pressure sensitive adhesive on the face thereof, and a removable protective covering of sheet plastic material adhered to the backing by said adhesive and wherein said sheet, film and adhesive are pliable to facilitate securement to said hard surface.

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51—262, 311; 161—231, 406