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STENCIL FOR ABRASIVE BLAST

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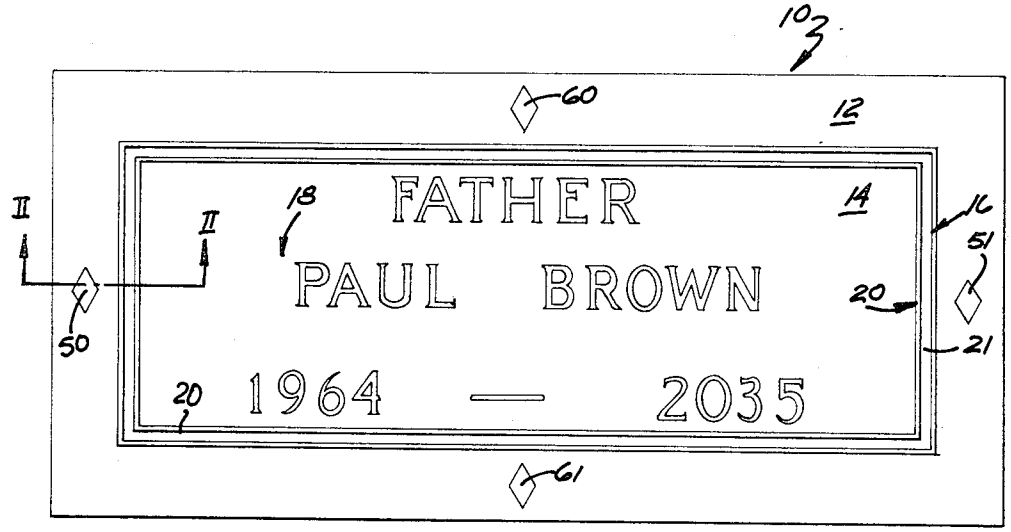


FIG. 1.

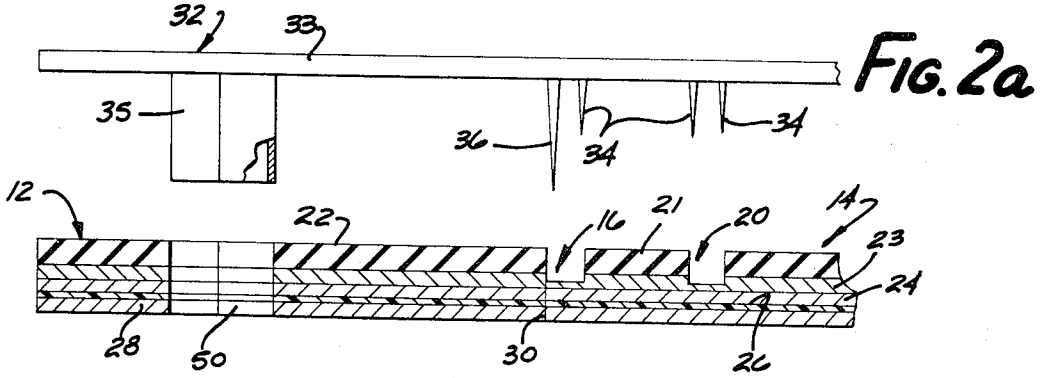


FIG. 2a

FIG. 2.

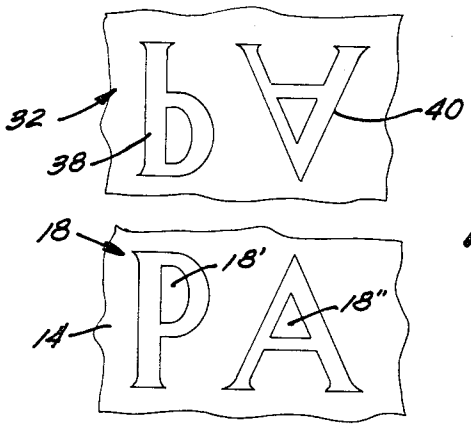


FIG. 3.

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STENCIL FOR ABRASIVE BLAST

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ABSTRACT OF THE DISCLOSURE

A stencil for cutting letters, symbols, and the like into stone by means of an abrasive blast, wherein the stencil is comprised of two basic parts cut from a single stencil by means of a steel rule or other cutting die. The two basic parts so cut comprise a border portion and a central inscription portion. The border portion peripherally encloses the inscription portion, which may be removed from and reinserted back into the border portion, with the two such portions having closely-fitting contiguous edges. Also, cut-outs are provided through the border portion by which the entire stencil may readily be positioned and aligned upon the face of a stone, as by aligning the cut-outs over indices such as scribe lines on the stone. The inscription portion may include numerous letter and symbol inscriptions cut thereinto by a die simultaneously with the mutual separation of these two portions and forming of the aforementioned cut-outs, during a single stamping or die-cutting operation.

BACKGROUND OF THE INVENTION

This invention relates to stencils and the art of making the same, and more particularly it relates to stencils used in the cutting of letters and other symbols into stone by means of an abrasive blast.

The use of an abrasive blast for cutting symbols and letters into stone for monuments and the like has long been known, and through the years a procession of different stencils have been employed for protecting the areas on the face of the stone which are desired not to be abraded. In more recent times, stencils utilizing a mask or outer layer of a tough and moderately resilient material such as latex rubber and the like have come into use, and these are quite resistant to the abrasive blast because the resiliency of the material allows it to absorb the momentum of the abrasive particles and thus remain uncut by the same.

In practice, such masks are inscribed with the desired words and/or symbols and then secured to the stone before the blasting commences, such that the blasting process will clearly cut the message inscribed upon the stencil into the stone lying therebeneath. The overwhelmingly preponderant method currently used to inscribe the words and symbols into the stencil mask is essentially a manual one, wherein a skilled artisan painstakingly uses hand tools to cut the letters and the like through the sheet material of which the mask is made. It is frequently desired to initially mask off a face area on the stone and finish this area in a particular manner before the stencil itself is applied and the words and symbols scribed into the stencil are cut into the stone by the aforesaid abrasive blast. In such an instance, a border stencil is prepared by similar manual techniques and applied to the stone, and after the area defined by the border stencil has been treated in the desired manner, the stencil having the inscribed mask is fitted by hand into the treated area within the border and gaps which occur between the edges of the mask and the border are covered so that the abrasive will cut only the information which is scribed in the stencil mask, and not anywhere else.

It is an major object of the present invention to provide

for the first time an automated method of making stencils of the character which has been indicated, by which stencils of consistently high quality may be produced in very much less time than was previously required, and for a fraction of the previous cost. Further, the method of the invention may readily be utilized to produce a novel two-piece stencil also forming a part of the invention, which comprises an external border and an integrally formed but separate inscription portion which fits exactly into the border and greatly reduces the time required to complete a monument having a particular type of specially treated or prepared central bordered area which carries the inscription borne by the second portion of the stencil.

The foregoing major objects of the invention and the advantages provided thereby, together with other objects and advantages equally a part thereof, will become increasingly apparent following consideration of the ensuing specification and its appended claims, particularly when taken in conjunction with the accompanying illustrative drawings setting forth a preferred embodiment of the invention.

SUMMARY OF INVENTION

Briefly stated, the invention comprises the forming of a multi-layered stencil having a top or mask sheet of resilient material secured by a layer of adhesive material to a backing plate formed of a sheet of readily abradeable material. The backing plate has a contact adhesive coating on its side opposite the mask, and a removable cover sheet is attached, for shipment and the like, to the rear side of the backing plate by the aforesaid adhesive. All parts of the inscription to be formed in the mask are simultaneously cut through it, through the use of a die set up expressly for this purpose. In cutting this inscription, the cutting portions of the die are set to pass completely through the resilient material of which the mask is formed and partially into the layer of adhesive material securing the backing plate to the mask, but not to cut completely through this layer or into the backing plate therebeneath. Further, the die is purposely made to have cutting portions which do pass completely through all of the layers of the stencil, so that at the same time the inscription is cut into the mask, the stencil is cut into two separate pieces which contiguously interfit with each other, one such piece forming a border and the other forming an insert portion carrying the inscription. These latter cutting portions also form a series of apertures in the stencil which are of a particular shape and in a particular location to greatly facilitate centering of the stencil upon a monument stone.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is an overhead plan view of the stencil provided by the method of the invention, with an exemplary inscription illustrated thereon;

FIG. 2 is an enlarged, fragmentary sectional elevation taken through the plane II—II of FIG. 1;

FIG. 2*a* is a fragmentary elevation, partly in section, of a portion of a die used to cut the border portion of the stencil, shown in alignment with corresponding portions of FIG. 2; and

FIG. 3 is a fragmentary compound perspective view showing the portion of the stencil bearing the inscription and a portion of the die used to cut the inscription into the stencil, the die being shown in alignment with corresponding portions of the stencil.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring now in more detail to the drawings, the stencil **10** seen in FIG. 1 comprises two basic parts. These are a border portion **12**, and an insert portion **14**, which closely interfits within the border portion **12**

along a boundary of mutual separation **16**. As illustrated, words **18** forming an inscription on the insert portion **14** are formed in the insert portion, as is a closed loop **20**, shown in a rectilinear form, located immediately inside the boundary **16**. As will be explained subsequently, the continuously adjacent boundary line **16** and the loop **20** form an inscription border frame **21** which extends around the words **18**, which, while shown as being merely rectilinear in form, may equally well be far more elaborate and include a variety of different sweeping and curving lines.

The nature of the construction used to form the two-part stencil **10** may be seen in FIG. 2. The stencil **10**, including both the border portion **12** and the insert portion **14**, includes an upper layer **22** of resilient material forming a mask, to which is attached a backing plate or sheet **24**, as by a layer of adhesive **23**. On the side of the backing plate **24** which is opposite the mask **22**, a layer **26** of pressure-sensitive adhesive is provided. A cover sheet **28** is applied to the outer or exposed side of this pressure-sensitive adhesive to cover it and prevent contact therewith of things other than a surface to which the stencil is to be attached, such as during shipping and storage.

It will be observed from FIG. 2 that the boundary **16** noted previously and the loop **20** each in fact comprise a notched-out or cut-out channel which extends downward through the mask **22** and slightly into the adhesive layer **23**. One edge of the boundary **16** forms a narrow slit or cut **30**, however, which not only extends through the mask **22** and adhesive layer **23**, but also extends completely through the backing plate **24**, the adhesive **26**, and the cover sheet **28**. This severs the insert portion **14** completely free of the remainder of the stencil and thereby provides the two-piece construction noted previously, wherein the border **12** and insert **14** are contiguously interfittable but are actually separable from each other.

The notched-out or cut-out channels indicated at **16** and **20** are cut into the stencil by means of a steel rule die **32** (FIG. 2*a*), which comprises a platen **33** from which extends a plurality of knife-like steel rule cutting elements, of which elements **34** and **36** are exemplary. As seen in plan view, these elements form the closed retilinear loops exemplified by the boundaries **16** and **20** seen in FIG. 1. With such a die, it will be readily perceived that by bringing the die against the stencil in a die-cutting operation the cuts forming the boundary channels **16** and **20**, including the cut **30** separating the stencil **10** into two parts, will simultaneously be made in a single stamping operation.

The words **18** forming the inscription on the insert portion **14** of the stencil are also preferably cut into the latter by knifelike cutting elements which may be attached to the platen **33** and thus form a part of the die **32**, so that the entire inscription, as well as the boundary channels **16** and **20**, including the bifurcating slit **30**, may all be cut into the stencil in a single operation. Consequently, each letter used in the inscription may comprise a separate cutting element such as **38** or **40** (FIG. 3) forming a part of the die **32** and extending outwardly therefrom, similar to the shorter cutting elements **34** seen in FIG. 2.

The cutting elements such as **38** and **40** which form letters are integral units of complex shape, and each produces a complete letter cut-out in the mask **22** which has the same depth as the boundary channel **20** seen in FIG. 2 and discussed previously. That is, the letter cut-outs extend completely through the mask **22** and slightly into the top of the adhesive layer **23**. This is done for the purpose of making certain that the letter cut-outs extend completely through the mask but do not cut the backing plate **24**, which must remain intact to support portions of the inscription and the border frame **21** which are otherwise unattached to any other portion of the stencil construction. The backing plate **24** should be relatively inelastic or unstretchable, since it is desired that this member provide dimensional support for the supple and stretchable mask **22**, to hold the same against stretching and in proper position, both when it is being cut by the die and also in subsequent handling, such as when the stencil is applied to the monument stone. As previously stated, the material of which the backing plate **24** is made should also be readily abradeable, but it should not fail laterally or undercut under the influence of the abrasive blast, since this produces ragged or irregular edges and may loosen and dislodge individual otherwise unattached central portions or "islands," of the letters in the inscription **18**. Also, the surface characteristics of the backing sheet should provide for superior adhesion of the contact adhesive **26**, so that the stencil will firmly attach itself to the monument stone. It has been found that a sheet of relatively thin polyester film such as that sold under the trademark "Mylar" is very suitable for use as the backing sheet **24**, since it appears that this material possesses all of the required qualities just described.

Another feature of the present stencil construction lies in the diamond-shaped cut-outs **50** and **51**, and **60** and **61** which are formed in the border portion **12**. Like the notched-out channels **16** and **20** and the letters forming the inscription **18**, the aforesaid cut-outs are also made by the die **32**, in the same stamping or cutting operation in which the channels and letters are made. For this purpose the die **32** is provided with cutting knives **35** (FIG. 2*a*) of the desired size and diamond shape, each located to cut one of the diamond-shaped cut-outs.

As illustrated in FIG. 1, the cut-outs **50** and **51** are located in the opposite side portions of the border **12**, midway between the top and bottom edges thereof, whereas the cut-outs **60** and **61** are located in the top and bottom portions, respectively, of the border **12**, midway between the side edges thereof. The cut-outs **50** and **51** are positioned upon the horizontal centerline of the stencil, and the cut-outs **60** and **61** are positioned upon the vertical centerline thereof.

Cut-outs **50**, **51**, **60** and **61** provide a ready means of indexing the stencil **10** in the desired location and in proper alignment upon the monument stone when the stencil is applied and secured thereto by the pressure-sensitive adhesive layer **26**. As will readily be understood, the horizontal and vertical centerlines of the stone may easily be located and scribed or otherwise marked thereupon, and the top and bottom points of cut-outs **60** and **61** are superimposed upon the vertical centerline, while the lateral points of cut-outs **50** and **51** are superimposed upon the horizontal centerline. For this reason the diamond shapes illustrated for these cut-outs are to be preferred, although other analogous shapes having oppositely-disposed end points may be used if desired.

This indexing feature of the invention provides a very valuable adjunct to the stencil itself, since a locating problem always exists with respect to any stencil and this is particularly true of stencils used on large monument stones, which often are of irregular overall shape. With the stencil of the present invention the border portion **12** is readily centered and located, and the border portion itself will readily and effortlessly serve to center and locate the inscription portion **14**.

As will already be apparent to those skilled in the pertinent arts, the present invention provides a stencil construction and a method of making the same which for the first time eliminates costly hand techniques and operations previously used and provides a much desired degree of uniformity and consistency in the inscription incorporated in the stencil. Production of the stencil is obtainable on an order basis and is exceedingly rapid and economical. Further, the stencil is made in a two-piece construction which always provides a pre-formed border portion for accurately and cleanly defining an inscription area which

is to be preliminarily treated before the actual inscription is cut into this area.

In use, in an application where a particularly treated inscription area of the aforesaid type is desired, the insert portion **14** of the stencil is removed by merely pushing the insert out of the border portion **12**, in which it otherwise remains due to a light frictional engagement between the corresponding edges of the two pieces. The cover sheet **28** is then removed from the border portion **12** to expose the layer of adhesive **26** thereupon, and the border is applied to the stone by properly superimposing the cut-outs **50**, **51**, **60** and **61** upon the horizontal and vertical centerlines of the stone and then merely pressing the contact adhesive **26** against the stone. In this connection, it is to be noted that the cover sheet **28** may be formed of two separate pieces which each cover one-half of the total area of the stencil. This will facilitate mounting the stencil, since one such piece may be initially removed and the other left in place so that the smooth and non-adhesive outer surface of the latter may be first placed against the stone to properly position the cut-outs over the centerlines. The exposed part of the adhesive **26** is then pressed against the stone to hold the stencil in place while the other part of the cover sheet is removed and the adhesive therebeneath pressed against the stone.

After applying the border portion **12** of the stencil, the cut-out **50**, **51**, **60**, and **61** are covered in a desired manner, such as by placing rubber tape or the like over them. The central area of the stone exposed by the absence of the insert portion **14** of the stencil is then treated in the desired manner, such as by a light abrasive blast which slightly textures or "frosts" the exposed area. The cover sheet **28** is then removed from the insert portion **14** to expose the pressure-sensitive adhesive **26** on the rear side thereof, and the insert portion **14** is then secured to the stone inside the border portion **12**, exactly in the location from which it was originally removed. This is an exceedingly simple task, of course, since all of the edges of the border portion and insert portion correspond directly due to their contiguously interfitting relationship and, because the slit **30** separating the two stencil portions is very thin, the edges of the insert portion and border portion will in practice be in light contact with each other at substantially all or most of the points around their respective peripheral.

With the insert portion of the stencil properly in position, the abrasive blast is then directed against the stencil in the usual manner. The abrasive readily and quickly cuts through the portions of the backing plate **24** which remain intact and uncut by the die, which are located beneath the various portions of the boundary channels **16** and **20** and beneath the cut-out portions of the letters **18**. As will be appreciated, before being abraded away, these uncut parts of the backing plate serve to hold in a properly centered position the unattached interior island parts of the various letters of the inscription **18**, such as are designated **18'** and **18''** in FIG. 3. Otherwise, these unattached letter parts would, of course, immediately fall out of place if the backing plate **24** were cut completely through in the same manner as the mask **22**. After the insert portion **14** is placed in position inside the border **12** and before the abrasive blasting commences, the adhesive coating **28** on those portions of the backing plate **24** which are directly behind island portions such as **18'** and **18''** causes these island portions of the stencil to adhere directly to the stone. Consequently, when the abrasive blasting commences, the exposed portions of the backing plate are immediately abraded away, along with the adhesive directly beneath these exposed portions, thereby exposing the surface of the stone which underlies the stencil.

As soon as the stone is exposed, it begins to be cut away by the abrasive blast driected thereagainst, while the resilient characteristics of the mask resist the abrasive and protect the stone located beneath it so that it remains uncut. Thus, all of the areas of the mask cut by the die **32** and removed permit the abrasive to cut corresponding areas into the face of the stone, whereas the remaining areas of the mask prevent such cutting. After the desired duration of blasting has occurred, the entire stencil, including both the border portion **12** and the insert portion **14**, are readily removed from the stone by merely peeling them off, leaving a clean surface area bearing the desired inscription.

It is entirely conceivable that upon examining the foregoing disclosure, those skilled in the art may devise embodiments of the concept involved which differ somewhat from the embodiment shown and described herein, or may make various changes in structural details to the present embodiment. Consequently, all such changed embodiments or variations in structure as utilize the concepts of the invention and clearly incorporate the spirit thereof are to be considered as within the scope of the claims appended herebelow, unless these claims by their language specifically state otherwise.

I claim:

1. A stencil construction for use in cutting inscription symbols and the like into stone by an abrasive blast, said stencil construction comprising in combination: a mask, comprising a sheet of abrasive-resistant material; a backing plate secured to said mask in laminate form, said backing plate comprising a sheet of relatively unstretchable material; a layer of pressure-sensitive adhesive on the side of said backing plate opposite said mask; a cover of sheet material removably attached to said side of said backing plate by said adhesive; said adhesive having sufficient adhesion power to secure both said cut mask and the backing plate secured thereto to a desired stone after said cover has been removed and prior to abrasive blasting of said stone; and said laminated mask, backing plate, adhesive and cover comprising two separate component parts including a first part comprising a peripheral border portion and a second part comprising a central insert portion contiguously interfitted within said border portion; whereby said border portion may first be attached to a stone by said adhesive to expose an area on such stone defined by the size of said central portion, said area may be preliminarily treated in a desired manner, and said central portion may then be attached by said adhesive to said stone to cover said area.

2. The stencil construction of claim **1** in which one of said component parts has a strip cut out of the mask contiguous to the other component so as to provide a sand blasted border frame around said treated area of the stone.

3. The stencil construction recited in claim **2**, wherein said backing plate is of polyester material.

4. The stencil construction recited in claim **1**, wherein at least one of said component parts includes means for locating and centering said stencil construction upon a monument stone.

5. The stencil construction recited in claim **4**, wherein said means for locating and centering said stencil comprises at least two cut-out apertures for superimposition over indicia on said stone.

6. The stencil construction recited in claim **5**, wherein said cut-out apertures are located in said peripheral border portion.

7. In a stencil construction for use in cutting inscription symbols and the like into stone by an abrasive blast, of the type wherein said stencil construction includes a mask comprising a sheet of abrasive-resistant material and a backing plate of readily abradeable material secured to said mask in lamnate form, the improvement comprising: said laminated mask and backing plate consisting of two separate component parts including a first part comprising a closed peripheral border portion and a second part comprising a central insert portion; said central portion being contiguously interfitted within said

border portion whereby said border portion may first be attached to a stone to expose an area thereon defined by the size of said central portion, said area may be preliminarily treated in a desired manner, and said central portion may then be attached intact to said stone to cover said area so that inscription symbols cut out of said central portion may be cut into the stone by an abrasive blast while leaving other portions of said treated area undisturbed.

8. The improvement in stencil constructions recited in claim **7**, wherein said central portion is of a size with respect to said border portion such that when placed within the border it is in contiguous contact with the border at substantially all points around the inner periphery thereof; whereby said border may first be attached to a stone to expose an area thereon defined by the size of said central portion, said area may be preliminarily treated in a desired manner, and said central portion may then be attached intact to staid stone to cover said area so that said cut-out inscription symbols may be cut into the stone while leaving other portions of said treated area unlisturbed.

9. The improvement in stencil constructions recited in claim **7** in which one of said component parts has a strip cut out of the mask contiguous to the other component so as to provide an abrasive-blasted border around said treated area of the stone.

10. The improvement in stencil constructions recited in claim **7**, wherein at least one of said component parts includes means for locating and centering said stencil construction upon a monument stone.

11. The improvement in stencil constructions recited in claim **10**, wherein said means for locating and centering said stencil comprises at least two cut-out apertures for super-imposition over indicia on said stone.

12. The improvement in stencil constructions recited in claim **11**, wherein said cut-out apertures are located in said peripheral border portion.

13. The stencil construction of claim **1**, wherein said central portion is in contiguous contact with said border portion at substantially all points around the inner periphery thereof, whereby the reinsertion of said central portion after the preliminary treatment of the stone area defined by the size of said central portion will always result in the proper centering of said central portion.

14. The stencil construction of claim **13**, wherein one of said component parts has a strip cut out of the mask contiguous to the other component so as to provide a sandblasted border frame around said treated area of the stone.

15. The stencil construction of claim **14**, wherein said strip does not penetrate into said backing plate.

16. The stencil construction of claim **2**, wherein said strip does not penetrate into said backing plate.

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