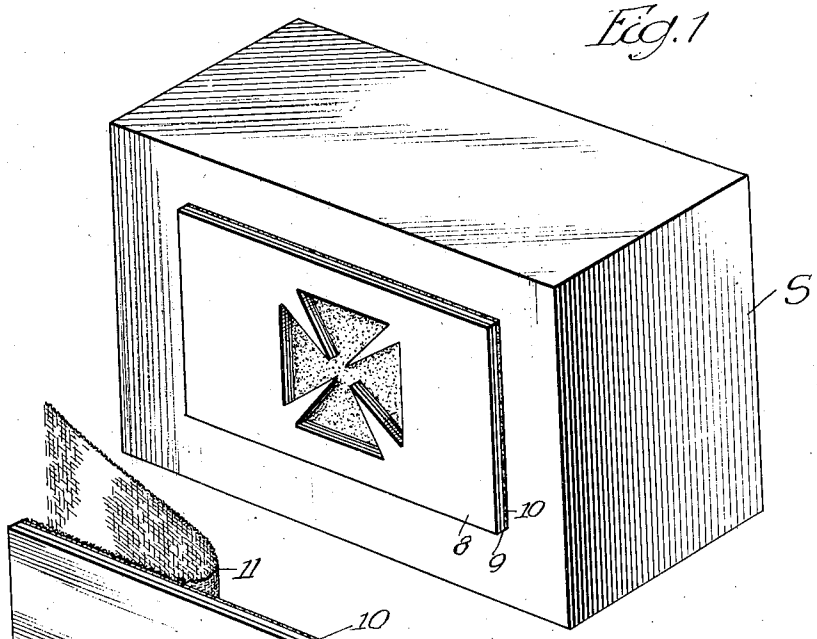
Jan. 27, 1942. C. E. FRICK 2,270,945

SANDBLASTING STENCIL AND METHOD OF MAKING SAME

Filed May 8, 1939

Fig. 1



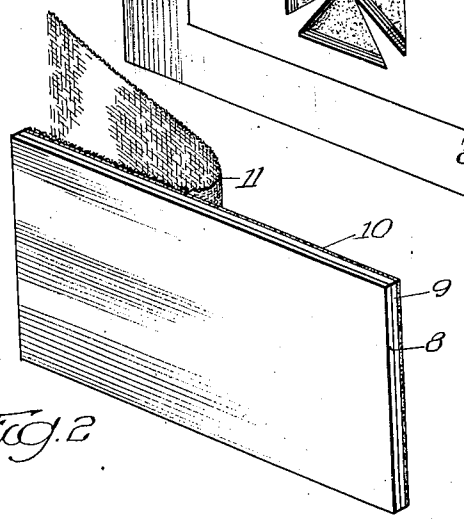




Fig. 2

Fig. 3

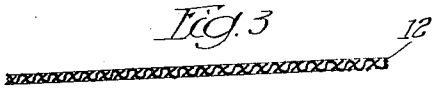



Fig. 4

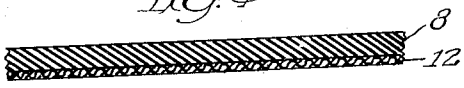



Fig. 5

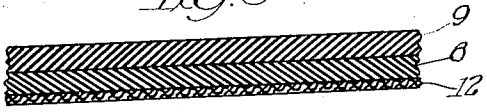



Fig. 7

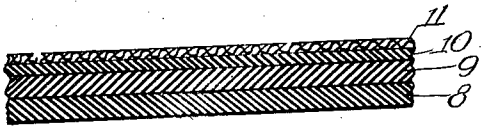
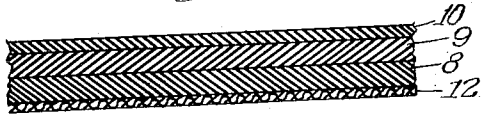



Fig. 6




Inventor:
Carl E. Frick
By Fred Gerlach his Atty.

Patented Jan. 27, 1942 2,270,945

# UNITED STATES PATENT OFFICE

2,270,945

## SANDBLASTING STENCIL AND METHOD OF MAKING SAME

Carl E. Frick, Chicago, Ill., assignor to Van Cleef Bros., a partnership consisting of Noah Van Cleef, Felix Van Cleef, and Paul Van Cleef, Chicago, Ill.

Application May 8, 1939, Serial No. 272,328

11 Claims. (Cl. 41—39)

The present invention relates to stencils for use in cutting letters, symbols or designs on monument forming stones or other stone-work by way of sand blasting.

There are now in use two types or methods of stone cutting or carving. One of these is known as ordinary cutting or carving and consists in first securing a stencil sheet by way of an adhesive to the part of the stone to be cut, then marking or penciling on the front face of the sheet the desired letters, symbols or designs, and finally, after removing from the sheet the marked letters, symbols or designs, directing a blast of sand or other abrasive material through the cut-outs in the stencil sheet in order to cut the stone in the desired manner. The other type or method is known as shape cutting or carving. This involves the cutting or carving in the stone of flowers, leaves, or other objects having irregular outer surfaces. In connection with shape cutting or carving, a stencil sheet of sand resistant material is secured against the stone to be cut by way of an adhesive. Thereafter the desired flowers, leaves, or objects are marked on the outer face of the sheet and the marked portions of the stencil sheet are cut with a knife or other instrument and then removed. At the conclusion of this operation the cut-out or exposed portions of the stone are shaped to the proper flower, leaf, or object configuration by way of an abrasive blasting tool with a small discharge orifice or by a hand tool. After this step the remainder of the stencil sheet is removed from the stone and the cut-out pieces are placed back over the shaped flowers, leaves or other objects. To conclude the cutting or carving the portions around the cut-out pieces are sand blasted to the proper or desired depth to cause the flowers, leaves, or other objects to stand in relief. It has heretofore been proposed to use as a stencil a sheet having an inner facing of permanently tacky pressure sensitive adhesive and formed of cured or vulcanized rubber and an admixture of a material such as glue or shellac for toughening the sheet and rendering it substantially inelastic. Such a stencil has been found in practice to be extremely durable and sand resistant and efficiently fulfills its purpose in connection with ordinary cutting or carving. It is, however, inefficient or difficult to use or employ in connection with shape cutting or carving because when the cut-out pieces from the stencil sheet are placed back against the irregular surfaces of the cut flowers or leaves prior to the final sand blasting operation, such cut-out pieces are subjected to such strain due to the necessary stretching to cover the surface irregularities completely that they do not adhere properly and in many cases are blown off by the final sand blast. It has also been proposed to employ as a stencil, a sheet having a permanently tacky inner adhesive facing and formed of uncured or unvulcanized rubber. Such a stencil although useable in connection with regular or shape cutting, is objectionable or defective because it does not possess the desired or necessary resistance to the abrasive action of the blast.

One object of the invention is to provide a stencil which is an improvement upon each of the aforementioned types of stencils by reason of the fact that it comprises a thin outer layer with vulcanized rubber therein and a thin inner layer having uncured or unvulcanized rubber and hence is not only useable in connection with both types of cutting but also is sufficiently wear or sand resistant efficiently and effectively to fulfill its intended purpose.

Another object of the invention is to provide a method of making the improved stencil which may be carried out expeditiously and cheaply and includes first calendering on a sheet of holland a plastic mass including milled rubber with a vulcanizing agent therefor, then calendering onto the exposed surface of the first mentioned mass a plastic mass having rubber therein but no vulcanizing agent for the rubber, then subjecting the two masses on the sheet to a vulcanizing temperature in order to vulcanize the rubber content or portion of the first mentioned mass and render the composite sheet of proper hardness, then applying by calendering or spreading on the outer face of the layer with unvulcanized rubber therein, a coating of permanently tacky pressure sensitive rubber base adhesive and then applying a sheet of holland over the adhesive coating for covering or protective purposes and at the same time removing the first mentioned sheet of holland.

Other objects of the invention and the various advantages or characteristics of the present stencil and its method of manufacture will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawing which accompanies and forms a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a perspective of a stone having applied to the front face thereof a stencil embodying the invention;

Figure 2 is a perspective of the stencil showing the protective sheet for the adhesive coating partially peeled or stripped from the coating;

Figure 3 is a section of the holland sheet over which the two plastic masses are calendered prior to the vulcanizing step;

Figure 4 is a section showing the holland sheet of Figure 3 having calendered onto one face thereof the plastic vulcanizable mass;

Figure 5 is a section showing the non-vulcanizable plastic mass calendered onto the plastic vulcanizable mass;

Figure 6 is a section showing the stencil after the vulcanizing operation and with the adhesive coating on the exposed face of the inner or unvulcanized layer; and

Figure 7 is a section showing the completed stencil after removal of the original holland sheet and application of the protective sheet of holland to the adhesive coating.

The stencil which is shown in the drawing constitutes the preferred embodiment of the invention. It is illustrated in connection with a stone S and serves, as hereinafter described, to control a blast of sand or other abrasive material in connection with the cutting or formation of letters, symbols or designs on the stone. As shown in Figure 7, the stencil comprises as its parts an outer layer 8, an inner layer 9, a coating 10 on the back or exposed face of the layer 9, and a protective sheet 11 of holland for the coating 10. The outer and inner layers constitute a composite sheet and serve as the sand or abrasive controlling medium of the stencil. The coating as hereinafter described is formed of permanently tacky pressure sensitive rubber base adhesive and is adapted after removal of the holland sheet 11 to secure in place the composite sand resistant sheet consisting of the outer and inner layers 8 and 9. Said composite sheet is adapted when the stencil is in place on the stone S to have the desired letters, symbols or designs marked thereon and then cut-out or removed from it by a knife or similar sharp instrument. When a blast of sand or other abrasive is directed against the stencil during use of the latter, the composite sand resistant sheet serves to control the sand so that it encounters only the portions of the surface of the stone behind the cut-outs and hence cuts by its abrasive action the desired letters, symbols or designs in the stone. The stencil, as hereinafter described, has the desired sand or abrasive resisting properties and is useable in connection with not only regular cutting or stone carving but also shape cutting.

The layer 8 includes as its main or principal constituents vulcanized rubber and an admixture of glue or shellac. It is preferably made of the following ingredients in substantially the proportions or amounts specified:

| Ingredients | Pounds | Ounces |
|---|---|---|
| Smoked rubber sheets (hard tough plantation type rubber) | 50 | 0 |
| Whiting | 98 | 0 |
| Pearl glue or shellac | 50 | 0 |
| Petrolatum | 0 | 4 |
| Sulphur | 0 | 10 |
| Accelerator (tetramethylthiuram disulphide) | 0 | 6 |
| Zinc oxide | 3 | 0 |

In connection with fabrication of the outer layer 8 the aforementioned ingredients are mixed together in a heated roll type mill and then while in the form of a plastic mass are calendered onto a sheet 12 of holland. Preferably the mass is spread over the holland sheet 12 until it has a thickness of approximately $^{25}/_{1000}$ of an inch. The whiting content of the material acts as a stiffener and a filler and the petrolatum serves as a dispersing or softening agent and to make the mass more workable. The sulphur constitutes the vulcanizing agent for the rubber and the tetramethylthiuram disulphide operates as an accelerator for the vulcanizing agent. The zinc oxide content of the material operates to activate the accelerator and the glue or shellac serves to toughen the mass or material as a whole and in addition to reduce the elasticity or recovery properties of the rubber. If shellac is used instead of glue slightly more sulphur is employed and petrolatum, the softening agent, is omitted. If desired, fillers other than whiting may be employed such as barytes, clay or starch, or the filler may be dispensed with. Instead of using equal parts of rubber and glue or shellac in connection with the formation of the layer 8, the rubber and glue or shellac content of the sheet may be changed by employing 40 to 60 parts of rubber and 60 to 40 parts of glue or shellac. In other words, in the aforementioned formula for the mass from which the layer 8 is made, from 40 to 60 pounds of rubber may be used and from 60 to 40 pounds of glue or shellac may be used.

The layer 9 includes as its main parts or constituents unvulcanized or uncured rubber and an admixture of glue or shellac for toughening purposes. It is preferably made of the following ingredients in substantially the proportions specified:

| Ingredients | Pounds | Ounces |
|---|---|---|
| Smoked rubber sheets (hard tough plantation type rubber) | 50 | 0 |
| Whiting | 100 | 0 |
| Glue or shellac | 50 | 0 |
| Palm oil | 1 | 8 |
| Burnt alum (potassium aluminum sulphate) | 0 | 12 |

In connection with the fabrication or formation of the layer 9, the last mentioned ingredients are milled and mixed together in any suitable manner to form a plastic mass and this mass is calendered onto the exposed face of the mass previously calendered onto the holland sheet 12. Preferably the mass which serves to form the layer 9 is spread over the first calendered mass until it has a thickness of approximately $^{15}/_{1000}$ of an inch. The whiting content of the mass which is used to form the layer 9 serves as a stiffener and a filler and the glue or shellac serves as a toughening agent and also a medium for rendering the rubber inelastic. The alum serves as a retarder, that is, as a medium for preventing vulcanization of the rubber content and the palm oil acts as a softener and to disperse the glue or shellac in the rubber. After the last mentioned calendering or spreading operation, the holland sheet 12 with the two plastic masses thereon, is placed in an oven or other heating apparatus and is subjected to a temperature of approximately 200° F. for about eighteen hours. This serves to form the composite sand resistant sheet and causes vulcanization of the rubber content of the layer 8. Because of the use of alum or a like retarder in the mass which serves to form the inner layer 9 of the sheet, the rubber of such layer remains in an uncured or

unvulcanized condition. By having vulcanized rubber in the outer layer 8 the composite sheet as a whole has the desired or necessary resistance to sand blasting and is sufficiently durable or wear resisting for its intended purpose. By employing the layer 9 with its uncured or unvulcanized rubber, the composite sheet as a whole has the necessary flexibility and setting properties to make it useable in connection with shape cutting or carving as well as regular cutting.

The adhesive coating 10 is applied to the exposed face of the inner layer 9 by way of a calendering or spreading operation after the vulcanizing step. It is essentially permanently tacky and is preferably formed of the following ingredients in substantially the proportions specified:

| Ingredients | Pounds | Ounces |
|---|---|---|
| Milled white crepe rubber | 38 | 0 |
| Zinc oxide | 12 | 0 |
| Burgundy pitch | 18 | 12 |
| Oregon balsam | 1 | 8 |

The Burgundy pitch content of the adhesive serves as the softener and makes the adhesive extremely tacky. The Oregon balsam due to the fact that it is non-volatile makes the adhesive permanently tacky. After application of the adhesive coating 10 to the exposed face of the layer 9 of the composite sheet, the sheet 11 of holland is applied to the exposed face of the coating. This sheet 11 corresponds in size to the coating and serves to prevent the latter from adhering to objects prior to use of the stencil. During or after application of the holland sheet 11 to the permanently tacky pressure sensitive adhesive coating 10 the holland sheet 12 on the layer 8 is removed. By reason of the fact that the coating 10 is in the form of a permanently tacky pressure sensitive rubber base adhesive the stencil may be readily applied to the work, that is, the surface to be cut, without a preliminary wetting or moistening operation, and may be readily removed after the sand blasting step. The coating serves as a cushion type backing for the composite sand resistant sheet and by absorbing the shock or impact of the sand as it impinges against the sheet increases materially the lasting properties of the sheet. Another feature or advantage of employing a coating of pressure sensitive adhesive resides in the fact that the composite sheet is firmly held in place against the work during the sand blasting operation and may, if desired, be removed and then reapplied.

In using the stencil in connection with regular said blasting to form letters on the stone S the holland sheet 11 is first stripped or peeled from the coating 10 of pressure sensitive rubber base adhesive. Thereafter the stencil is pressed against the surface to be cut or lettered in order to bring the coating 10 into adhesively connected relation with the latter. Thereafter the letters or designs to be cut in the stone S are penciled or otherwise marked on the front face of the layer 9 and are cut out or removed by a sharp knife or like tool. At the conclusion of this operation sand is blasted against the layer 8. During the sand blasting operation the sheet controls the sand so that it encounters only the portions of the surface of the stone S behind the cut-outs and hence cuts by its abrasive action the desired letters in the surface. By reason of the fact that the outer layer of the composite sheet is formed of a composition of vulcanized rubber and glue or shellac it resists any abrasive or wearing effect of the sand and hence the portions of the stencil which remain after the letter or design cutting operation protect the contiguous portions of the surface of the stone from abrasion by the sand. After the sand blasting operation, the stencil is stripped or peeled from the cut surface. If the stencil is used in connection with shape carving of the stone S it is applied to the stone by way of the adhesive coating 10. Thereafter the front or outer face of the outer layer 8 is marked with any desired designs such as flowers or leaves, and the flower or leaf portions are cut out. After this step the exposed portions of the stone within the confines of the stencil are suitably shaped by way of an abrasive blasting tool with a small discharge orifice or by a hand tool. After the proper shaping of the flowers or leaves the stencil is removed and the cut-outs are placed back on the flowers or leaves. At the conclusion of this step the portion of the stone around the flowers or leaves are sand blasted to the desired depth to bring the flowers or leaves into relief. By reason of the fact that the composite sand resistant sheet includes the layer 9 with uncured or unvulcanized rubber therein, the cut-outs when reapplied conform to the surface irregularities of, and adhesively grip, the previously shaped underlying portions of the stone.

The herein described stencil may be produced at a comparatively low and reasonable cost and because of its composite character is readily useable for shape cutting as well as regular stone cutting. It eliminates the necessity of supplying two different forms or types of stencils for the two different types of cutting and is an improvement upon and has certain advantages over the stencil which forms the subject matter of United States Patent No. 2,162,332, granted to me on June 13, 1939, and also the stencil disclosed in United States patent application Serial No. 271,104, filed by me on May 1, 1939.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:

1. As a new article of manufacture, a stencil designed for use in cutting letters, symbols or designs on a surface by way of an abrasive blast, and comprising a composite sheet adapted to be placed against the surface and upon proper shaping thereof to control the blast so that it forms or cuts the desired letters, symbols or designs on said surface and including an abrasive resistant outer layer formed of an appreciable amount of vulcanized rubber and an admixture of a material serving to render said vulcanized rubber tough and substantially inelastic, and an inner layer embodying an appreciable amount of uncured rubber in it, and an adhesive coating on the exposed face of the inner layer for holding the sheet in adhesively connected relation with said surface.

2. As a new article of manufacture, a stencil designed for use in cutting letters, symbols or designs on a surface by way of an abrasive blast, and comprising a composite sheet adapted to be placed against the surface and upon proper shap-

ing thereof to control the blast so that it forms or cuts the desired letters, symbols or designs on said surface and consisting of an abrasive resistant outer layer including a substantial amount of vulcanized rubber and an admixture of a material serving to toughen the rubber and make it substantially inelastic, and an inner layer including a substantial amount of unvulcanized rubber in it and a medium for making said unvulcanized rubber tough and substantially inelastic, and an adhesive coating on the exposed face of the inner layer for holding the sheet in adhesively connected relation with said surface.

3. As a new article of manufacture, a stencil designed for use in cutting letters, symbols or designs on a surface by way of an abrasive blast, and comprising a composite sheet adapted to be placed against the surface and upon proper shaping thereof to control the blast so that it forms or cuts the desired letters, symbols or designs on said surface and consisting of an abrasive resistant outer layer embodying an appreciable amount of vulcanized rubber and an admixture of a material whereby said vulcanized rubber is rendered tough and substantially inelastic, and an inner layer embodying an appreciable amount of uncured rubber and serving to make the sheet as a whole appreciably flexible and capable of setting to the proper extent for shape cutting, and a coating of permanently tacky pressure sensitive rubber base adhesive applied to and completely covering the exposed face of the inner layer and adapted to hold the sheet in adhesively connected relation with said surface.

4. As a new article of manufacture, a stencil designed for use in cutting letters, symbols or designs on a surface by way of an abrasive blast, and comprising a composite sheet adapted to be placed against the surface and upon proper shaping thereof to control the blast so that it forms or cuts the desired letters, symbols or designs on said surface and consisting of a comparatively thin abrasive resistant outer layer embodying a substantial amount of vulcanized rubber and an admixture of a material serving to render the vulcanized rubber tough and substantially inelastic, and an inner layer of less thickness than the outer layer embodying a substantial amount of unvulcanized rubber in it and in addition an admixture of the same material that is in the outer layer whereby said unvulcanized rubber is also rendered tough and substantially inelastic, and an adhesive coating on the exposed face of the inner layer for holding the sheet in adhesively connected relation with said surface.

5. As a new article of manufacture, a stencil designed for use in cutting letters, symbols or designs on a surface by way of an abrasive blast, and comprising a composite sheet adapted to be placed against the surface and upon proper shaping thereof to control the blast so that it forms or cuts the desired letters, symbols or designs on said surface and consisting of a comparatively thin abrasive resistant outer layer including vulcanized rubber and an admixture of an agent adapted to toughen the vulcanized rubber and render it substantially inelastic and selected from the group composed of glue and shellac, and an inner layer including a substantial amount of unvulcanized rubber and serving to make the sheet as a whole appreciably flexible and capable of setting to the proper extent for shape cutting, and an adhesive coating on the exposed face of the inner layer for holding the sheet in adhesively connected relation with said surface.

6. As a new article of manufacture, a stencil designed for use in cutting letters, symbols or designs on a surface by way of an abrasive blast, and comprising a composite sheet adapted to be placed against the surface and upon proper shaping thereof to control the blast so that it forms or cuts the desired letters, symbols or designs on said surface and consisting of an abrasive resistant, tough, substantially inelastic, outer layer and an inner layer including a substantial amount of unvulcanized rubber and an admixture of a toughening agent selected from the group composed of glue and shellac, and an adhesive coating on the exposed face of the inner layer for holding the sheet in adhesively connected relation with said surface.

7. As a new article of manufacture, a stencil designed for use in cutting letters, symbols or designs on a surface by way of an abrasive blast, and comprising a composite sheet adapted to be placed against the surface and upon proper shaping thereof to control the blast so that it forms or cuts the desired letters, symbols or designs on said surface and consisting of an abrasive resistant outer layer including a substantial amount of vulcanized rubber and an admixture of a toughening agent selected from the group composed of glue and shellac and an inner layer including a substantial amount of unvulcanized rubber and an admixture of a toughening agent selected from the aforementioned group, and an adhesive coating on the exposed face of the inner layer for holding the sheet in adhesively connected relation with said surface.

8. As a new article of manufacture, a stencil designed for use in cutting letters, symbols or designs on a surface by way of an abrasive blast, and comprising a composite sheet adapted to be placed against the surface and upon proper shaping thereof to control the blast so that it forms or cuts the desired letters, symbols or designs on said surface and consisting of an abrasive resistant outer layer including a substantial amount of vulcanized rubber and an admixture of substantially an equal amount of a toughening agent selected from the group composed of glue and shellac and an inner layer including a substantial amount of unvulcanized rubber and an admixture of substantially the same amount of a toughening agent selected from the aforesaid group, and a coating of permanently tacky pressure sensitive rubber base adhesive applied to and covering the inner face of the sheet and adapted to hold the sheet in adhesively connected relation with said surface.

9. That improvement in the manufacture of a stencil which comprises first forming into layer form and uniting together in side by side relation two plastic masses, one of which includes a substantial amount of milled rubber and toughening agent, and a vulcanizing agent for the rubber, and the other of which includes a substantial amount of milled rubber and toughening agent, and a vulcanizing retarder for the last mentioned rubber, then heating the two layers in order to vulcanize the rubber of the one mass and form a tough sand resistant composite sheet, and then applying an adhesive coating to the exposed face of the layer formed by the other mass.

10. That improvement in the manufacture of a stencil which comprises first forming into a thin layer a plastic mass including a substantial amount of milled rubber and toughening agent,

and a vulcanizing agent for the rubber, then calendering onto one face of the first mentioned layer a thin second layer including a substantial amount of milled rubber and toughening agent, and a vulcanizing retarding agent for the last mentioned rubber, then heating the two layers in order to vulcanize the rubber of the first mentioned layer and form a tough sand resistant composite sheet, and then applying an adhesive coating to the exposed face of the second layer.

11. That improvement in the manufacture of a stencil which comprises first spreading into a layer form on a sheet of holland type material a plastic mass including milled rubber and a toughening agent, and a vulcanizing agent for the rubber, then calendering into layer form onto the exposed face of the layer formed by said mass a second plastic mass including a substantial amount of milled rubber and toughening agent, and a vulcanizing retarder for the last mentioned rubber, then heating the two layers in order to vulcanize the rubber of the first layer and form a sand resistant composite sheet, then applying a coating of permanently tacky pressure sensitive adhesive to the exposed face of the layer formed by the second mentioned mass, and then applying a sheet of holland type material over the adhesive coating and removing the first mentioned sheet of holland type material.

CARL E. FRICK.