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UNDISTORTED NEGATIVE PATTERNS OF ANIMAL HIDES

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This invention relates to an improved process of making a negative impression of an animal hide in a matrix material. More specifically the invention contemplates the impregnation of animal hides with a heat-hardenable resin and the subsequent hardening of the impregnated hide whereby an undistorted, negative impression thereof may be obtained in the matrix.

By "animal hide," as used herein and in the appended claims, is meant any uncoated animal skin, devoid of hair or fur, whether or not the same has been processed as leather.

Ordinarily, matrices are configurated by placing a pattern material in surface contact with a matrix blank and applying pressure, and sometimes heat, thereto. Where, however, the pattern material is soft and pliable, the application of pressure acts to disfigure the relief configuration of the pattern material and results in a distorted, negative impression thereof in the matrix. An animal hide is one such soft pattern material which is particularly difficult to impress in a matrix without surface pattern distortion. Negative impressions of animal hides, in a matrix composed of a hard material, are extremely valuable as embossing matrices which may be used to simulate the surface of the pattern material on other surfaces. For example, the normally smooth surface of a tough thermoplastic resin in film or sheet form may be embossed with such a matrix to give it the appearance of various animal hides, the embossed material being useful in the fabrication of shoes, handbags, brief cases, upholstery and other articles.

The object of this invention is an improved method of creating a negative impression of an animal hide and consists in making such hide inflexible by means of impregnation with a heat-hardenable resin, while leaving unaltered the surface pattern of the material, thus enabling an undistorted, negative impression to be made in a matrix blank.

The process of the present invention will best be understood by reference to the following detailed description of its practice in obtaining undistorted, negative impressions of various animal hides such as calf, ostrich, snake, and the like.

The hide pattern material is submerged in a solution of a heat-hardenable resin. Any heat-hardenable resin may be used for which there is a solvent that does not adversely affect the surface pattern, as for example, by dissolving the hide or causing it to swell. Heat hardenable phenol-aldehyde condensation resins in alcohol solution are particularly suitable for the purpose of this invention. Other suitable heat-hardening resins include urea-formaldehyde, melamine-formaldehyde, and furfural, which resins are soluble in either water or alcohol. The amount of resin in the impregnating solution may vary considerably. Provided sufficient resin is deposited in the pores of the skin to make it hard and rigid when heat is applied, the purpose of the invention will be served. Conversely, the resin content must not be so high that the solution viscosity prevents migration into the pores of the skin. In most instances, about one part of resin to three parts of solvent makes a satisfactory impregnating solution which readily migrates into the pores and produces a hard and inflexible pattern material when the resin is hardened by the application of heat.

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The period of submersion required to fully impregnate a pattern material of animal hide varies with the pore size of the hide being treated. When the hide is simply soaked in the resin solution several days may be required. If the resin solution and hide are placed in a vacuum tank, the impregnation period may be reduced to a few hours by employing well-known vacuum impregnation techniques.

After the hide is thoroughly impregnated with the resin solution, it is removed therefrom and the skin side is carefully wiped clean of all excess resin as by wiping with a cloth preferably wetted with a solvent for the resin. It is essential that all excess resin clinging to the skin surface of the hide be removed, as any resin remaining on the surface will result in disfiguration or obliteration of the natural relief pattern of the material.

Thereafter, the hide is dried and the resin "set-up" or hardened by the application of heat. Care must be exercised not to evaporate the solvent too rapidly during the drying operation, nor to overheat the resin during the hardening operation, as this will result in the formation of bubbles which distort the natural finish of the pattern material. A preferred procedure is to air dry the hide at room temperature for about two hours or until a major amount of the solvent has evaporated, and then to oven dry it at about 80° C. for one hour. The resin may then be heat-hardened by raising the oven temperature to the normal heat-hardening temperature of the particular resin and holding at this temperature until the resin is fully cured; for instance, one hour at 150° C. is sufficient for a phenol-formaldehyde resin. While the impregnated hide is being dried and the resin hardened, it should be supported, as by a stretching frame, or mounted on a rigid surface to avoid distortion or shrinkage while hardening into a suitable shape for pressing against a matrix blank. When fully impregnated and hardened the hide will possess a uniform appearance.

An additional step is required in the above described procedure with certain animal hides that possess an artificial surface finish which has been rolled into the hide. Calfskin, for example, may be so processed as to impart a surface finish which is known in the leather industry as a "boarded grain" or "boarded calf." With such skins, the rolled finish is lost when they are impregnated with the resin solution and the resin impregnated hides must be re-rolled prior to hardening the resin. This is preferably done after the skin has air dried to some extent but while it is still pliable. Generally, air drying from one-half to one hour will place such skins in satisfactory condition for re-rolling. Thereafter, they may be placed in a stretching frame and treated in the normal manner.

Animal hides, impregnated and hardened according to the hereinabove described process, have a very hard finish and yet have lost none of their original pattern or shape. They may be used, without appreciable damage to their finish, as a pattern material for conventional matrix compositions having sufficient strength to emboss thermoplastic material, as for example, clay, plaster of Paris or metallic alloys melting at a temperature less than 300° C.

A particularly suitable matrix blank for use with the improved process of this invention is that described in U. S. Patent No. 2,278,291 issued to H. Swan et al. However, this matrix blank is composed of a phenolic type resin and therefore has a tendency to adhere to the pattern material when the latter is impregnated with the same type resin and pressed thereagainst at the elevated temperature required to harden the phenolic matric material. This sticking may be avoided without any appreciable effect on the pattern transferred to the matrix by applying to the surface of the pattern material a thin coat of a colloidal suspension of graphite in water. This coating should be re-applied prior to pressing each second or third matrix. As many as 50 phenolic matrices have been made in this manner from a single hide treated as herein described with no appreciable loss in detail of pattern material.

In pressing matrices in the manner outlined above, it is preferable to support the pattern material on a metal or other hard surface to which it may be secured by a phenolic binder or other suitable adhesive capable of withstanding the pressing temperature used in forming the matrix (about 180° C. with the phenolic type matrix blank).

What is claimed is:

1. In the process of making a negative impression in a matrix blank by means of a pattern material composed of an animal hide, the improvement which comprises impregnating said hide with a heat-hardenable resin capable of imparting rigidity and hardness to said hide, cleaning the surface of said hide of any excess impregnant, hardening said resin by the application of heat thereto to cause said hide to become hard and inflexible, and thereafter impressing said matrix with the resin-hardened hide.

2. The process of making a negative impression of an animal hide which comprises impregnating said hide with a heat-hardenable resin capable of imparting rigidity and hardness to said hide, removing any excess of impregnant from the surface of said hide, hardening said resin by the application of heat to cause said hide to become hard and inflexible, and pressing said resin-impregnated hide against a matrix blank with sufficient pressure to form said impression therein.

3. In the process of embossing on thermoplastic material the relief patten of an animal hide, by pressing said hide against a matrix blank to form a negative impression of said hide in said matrix blank, and thereafter embossing said thermoplastic material by means of the matrix so formed, the improvement which comprises impregnating said animal hide with a solution of a heat-hardenable resin capable of imparting rigidity and hardness to said hide, removing any excess impregnant from the surface of the hide, extracting the solvent from the impregnating resin at a rate insufficient to cause bubble formation in the resin, and thereafter hardening said resin with heat to produce a hard and inflexible pattern material of said animal hide.

4. In the process of making a matrix, composed of a heat-hardenable phenolic resin, by embossing therein the negative impression of an animal hide, the improvement which comprises impregnating said pattern material with a heat-hardenable phenolic resin capable of imparting rigidity and hardness to said hide, removing any excess impregnant from the surface of said hide, hardening the resin in said hide by the application of heat thereto to thereby convert said animal hide into a hard and inflexible material, coating said resin-hardened hide with a thin layer of a colloidal suspension of graphite in water, and thereafter configurating the matrix blank with a negative impression of said hide by pressing the two together.

5. The process of making a negative impression of the surface configuration of an animal hide with a rolled finish, which process comprises impregnating said hide with a solution of a heat-hardenable resin capable of imparting rigidity and hardness to said hide, cleaning any excess impregnant from the surface of said hide, extracting the solvent from the impregnated hide until its pliability approximates that of its pre-impregnated condition, re-rolling the impregnated hide until the rolled finish is reproduced, removing the remainder of the solvent, hardening the impregnating resin by the application of heat to cause said hide to become hard and inflexible, and pressing said resin-impregnated hide against a matrix blank with sufficient pressure to form said negative impression in said matrix blank.

6. A process of treating an animal hide which comprises impregnating a hide with a solution of a heat-hardenable resin capable of rendering said hide hard and inflexible, thereafter removing resin remaining on the skin surface of said hide from the impregnation step to thereby retain the natural relief pattern of the hide, and then drying and hardening the resin in the impregnated hide while the hide is supported to prevent distortion and shrinkage thereof during the hardening of the resin.

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