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METHOD OF FINISHING SURFACES

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Fig. 1.

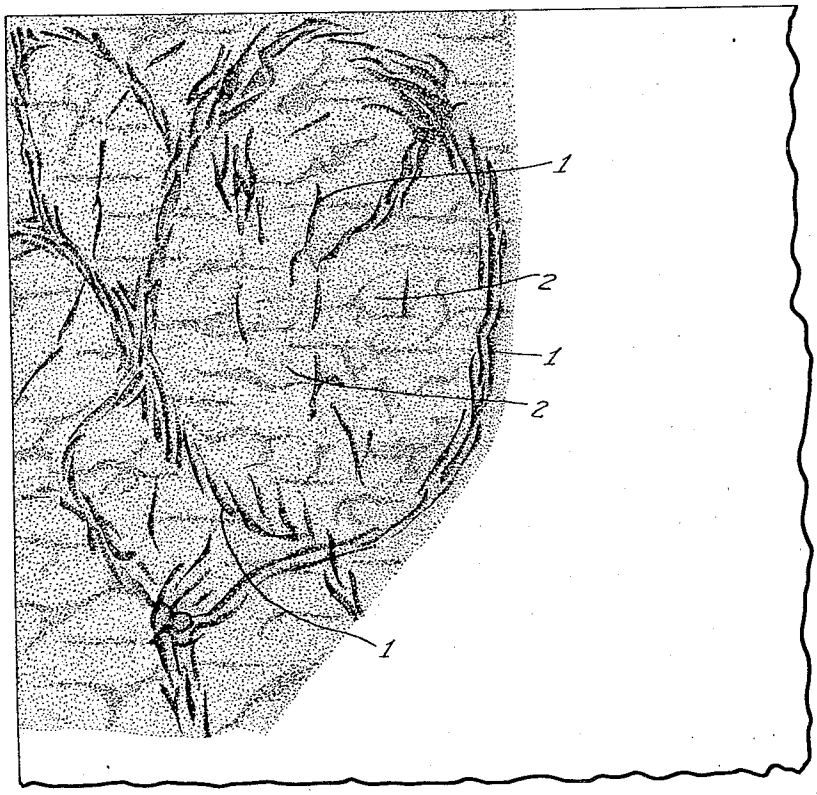
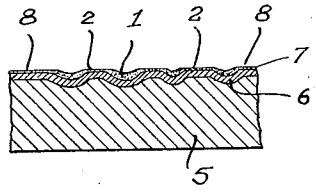



Fig. 2.




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## METHOD OF FINISHING SURFACES

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This invention relates to finishing of surfaces, especially the surfaces of structural material. More particularly the invention refers to finishing the surface of base sheets such as wall board to produce thereon the simulation of the surface of leather or other materials having indented surfaces.

It has been proposed heretofore to produce the simulation of leather or other materials having indentations or depressions in the surface thereof by embossing or otherwise indenting coatings, particularly of plastic material, applied to fabrics to produce artificial leather. Fibrous sheets also heretofore have been embossed to produce therein indentations simulative of leather or similar surfaces. In producing such simulations the indentations have been made in the sheet after the surface thereof has been colored or has been coated to produce the desired color or the characteristic sheen or dullness of the particular leather simulated. Moreover, fibrous sheets such as are used for wall board have been finished with lacquers of uniform color over the surface of the sheet and then have been embossed to produce simulations of leather such as of walrus or of morocco leather.

While such simulations have provided approximations of the conformations of the surface of leather or of similar material having depressions or indentations therein, in the forms of materials heretofore produced reliance has been placed upon the conformation of the depressions themselves with respect to the undepressed surfaces of the material in the attempt to produce the high lights and the light and shade effects which are characteristic of the convolutions of rough surfaced leathers. In the materials heretofore produced, however, there has not been obtained the high degree of light and shade effects and of uneven surface which are characteristic of such leathers as those made from walrus hide or morocco leather and the simulation of the rounded effect of the portions lying between the indentations or depressions in leathers of these types has not been successfully produced.

It is an object therefore of the present invention to produce upon a surface a representation of leather or similar materials with indented or convoluted surfaces.

It is a further object of the invention to produce upon the surface of a base sheet a simulation of leather and more particularly of leathers having depressions in the surface thereof but with uneven surfaces between said depressions.

It is a further object of the invention to provide a wall board of fibrous or other material having thereon a simulation of leather of uneven surface such as morocco leather or leather made from walrus hide.

Another object of the invention is to provide a method for finishing a surface to simulate the surface of leather or similar materials having indentations in the surface thereof and particularly the surfaces of convoluted form.

According to the present invention in the surface to be finished depressions are made of such form and extent over the surface as to approximate or simulate the depressions of leather or similar material having indentations or depressions in its surface which it is desired to represent. The depressions may be made by any suitable method and the most desirable method will depend upon the material in the surface of which said depressions are to be formed. For materials, especially those in sheet form, which are sufficiently soft or deformable a method of making the depression by embossing, for example with a steel embossing roll, may be used. The invention is not limited to the particular type of depression produced nor the method and means of producing the same but is particularly applicable to the simulation of leather.

Upon the surface thus provided with depressions is then applied a coating of such character that the appearance of the coated sheet, especially with respect to the light and shade upon the depressed portions as compared with those portions which are not depressed, is different. It is the purpose of the invention to produce the effect of shadow, that is, a darker appearance, in the depressions than upon the undepressed portions of the surface in order to accentuate the simulation of the shadow of the depressions as they are naturally seen and to accentuate the high lights of the portions which are not depressed the better to bring out the light and shade effects seen in the natural leathers or similar products having indented or convoluted surfaces. The invention also makes it possible to bring out the light and shade of color in the simulation of colored leathers or similar materials having convoluted and indented surfaces.

According to one embodiment of the invention a base is provided having a substantially uniform color upon its surface. In the surface of the base depressions are made as by embossing to produce the simulation of the depressions of leather or similar material having indentations or depressions in its surface. A translucent but light absorbing coating is then so applied to said

surface that the amount of light which is reflected from the surface of the base sheet through the translucent coating is greater from the portions of said surface which are not depressed than from those which are depressed. Thus the depressed portions appear darker than the portions of the coated sheet which are not depressed. The coating is not applied in such quantity as to fill the depressions and the form of the depressions and of the convolutions of the surface of the sheet produced by the embossing are maintained so that the effects of light and shadow due to the depressions and the embossing are obtained in the same manner as these effects have been obtained by the methods and in the products of the prior art. However, the difference in the amount of light reflected from the surface beneath the coating for the portions thereof which are not depressed as compared with those which are depressed accentuates the light and shadow effects produced by the convolutions and more accurately simulates these effects as they appear in leathers or similar materials with indented surfaces. Moreover, the coating may be so applied to the surface, and particularly to the portions thereof which are not indented, that an uneven amount of light is reflected from these portions through the translucent coating and a simulation of the unevenness or of the convolutions of said portions of the surface as in leathers is produced.

These effects are particularly pronounced and produce striking results when colored leathers are simulated, for example, chrome leather or tan colored leathers. In such cases the color of the tint upon the surface of the fibrous sheet is preferably that of a light tint of color which it is desired to obtain. A lacquer of such color and character and translucency may be used that the general tone of the tint is deepened to darken the general color. Particularly in the depressions, where, by using the method of applying the coating to the sheet which is embraced within our invention, a somewhat greater thickness of the coating may be laid, the color is still darker than the color of the portions of the sheet which are not depressed. Moreover, due to the uneven application of the lacquer upon the portions which are not depressed, as provided by the method of the invention, an uneven effect of light and dark shading of the color upon these portions is produced which provides a striking simulation of the uneven surface of the leather in addition to the accentuation of the depressions which is caused by the darker effect therein or resulting from the greater amount of the lacquer.

Thus, for example, in a simulation of a leather of green color and in which the finish may resemble walrus or morocco leather the color and the indentations as well as the unevenness of the surface of the leather may be closely approximated. To produce such a simulation of a green leather, a sheet having on the surface thereof a light tint of green is used and the lacquer, though translucent, may have added thereto a pigment, which pigment may be of a color corresponding to the color of the green tint. We have found it possible, however, to use with certain compositions of lacquer a certain proportion of a neutral substance such as carbon black to serve to darken the lacquer and to absorb some of the light passing therethrough. In some cases, however, depending upon the depth of color of the simulated leather which it is desired to produce and upon the character of the lacquer, lacquers may be used which have no pigment added thereto.

Similarly, to produce a tan leather there may be provided upon the base sheet a tint of light tan, or, if a reddish cast of the leather is desired, of salmon color. There may be applied to such a tinted surface a lacquer of one of the types which have been suggested above for simulating leather with a green cast. The effects of the uneven surface and of the convolutions are obtained in either case, it usually being merely necessary in order to produce a given effect to use a tint of lighter tone of the color desired over which to apply the lacquer. However for the purpose of obtaining still further differences in the effect, pigments of a color different from that of the lacquer or from the tint of the surface may be added to the lacquer provided these pigments are of such a character as not to destroy the partial translucency of the mixture. Thus may be modified the character and color of the light which is reflected from the base surface through the lacquer to produce different shades and tones of color in the finished product.

We have also applied our invention to the simulation of black leather having depressions. The method used is the same as that described above, it being merely necessary to provide upon the surface to be embossed and coated a depth of black color which will not be jet black and may even approach a gray so that the difference in the amount of light reflected from such a surface through the different portions of the coating will be apparent.

Other features of our invention will be explained in connection with the drawing in which:

Figure 1 is a face view of the sheet with the indentations therein to simulate a leather such as walrus leather; and

Figure 2 is an enlarged section of Figure 1 showing a base sheet with the coating thereon.

In Figure 1 the indentations shown at 1 may be made in any design which will carry out the linear form and configuration and the extent and the arrangement of the indentations of the leather or other material which it is desired to simulate. The simulation intended to be illustrated by Figure 1 is that of a leather such as walrus leather in which the indentations or wrinkles in the leather surround the areas in which there are relatively few wrinkles although having therein some indentations. The indentations 1 appear darker than the other portions 2 of the surface, thus accentuating the depth and shadow of the indentations as they appear in leather itself. Moreover, it will be noted that this darker appearance does not in all cases sharply define the indentation but in some places somewhat shades off to the adjacent areas, thus accentuating the rounded effect or convolutions of the leather.

It will further be noted from Figure 1 that the areas 2 are of uneven depth of shade and give the effect mentioned above of the uneven or somewhat convoluted surface of leather such as walrus leather between its linear indentations or wrinkles. The sheet is of one general color, but, due to the difference in amount of light which is reflected from the under surface through the lacquer from the portions of the surface where the depressions 1 are made as compared with the portions 2 which are not depressed and also the non-uniform reflection from different areas of the portions 2, the appearance which has been described above and which Figure 1 is intended to represent is obtained.

While Figure 1 shows the simulation of walrus leather, similar results may be obtained with embossing to produce depressions in the sheet corresponding to those of morocco leather or similar leathers in which the method of preparation produces depressions and convolutions in the surface thereof. The light and shade effects and differences in depth of color may be obtained by so applying the lacquer to the sheet that a greater thickness of the lacquer is retained in the depressions 1 than upon the other portions 2 of the sheet but without filling the depressions to any marked degree.

Figure 2 illustrates an embodiment of the invention in which a base such as a fibre wall board is indicated at 5. Upon this base may be applied a paper liner 6. This liner may be applied to the fibrous base sheet in a board machine by methods which are well known. The color of the paper liner may be that of the desired underlying tint suitable for producing the desired color effect as described above, or there may be applied to the paper liner, if it is white or of neutral color, a coating of tint before application of the lacquer. Preferably, however, a paper liner of the desired tint but without high finish is applied to the fibre base, thus providing the board with a dry, comparatively smooth surface in which to make the depressions as by an embossing operation.

It will be noted that the depressions 1 in this surface are not of great depth, the depth requisite to produce the desired results being that approximating the depth of such depressions in leather itself. The depressions, however, may be of somewhat greater or less depth corresponding to the difference in depth of shade represented in Figure 1, the depth of the depressions necessary to produce the simulation in the particular kind of leather intended to be illustrated in Figure 1 usually being somewhat greater for the depressions representing the wrinkles than for the intermediate indentations in the surface of the leather.

Upon the tinted surface of the base is applied a coating of lacquer 7. This coating is comparatively thin, such as would be produced by a film of lacquer applied to a surface by a spreading or squeegee action to extend the coating over the surface. The thickness represented in Figure 2 is somewhat exaggerated to illustrate the invention. It will be noted that the thickness of the portion of the coating lying in the depressions is shown somewhat greater than that of the portions of the coating upon the adjacent areas. Light, therefore, reaches the surface of the paper liner and is reflected therefrom through the lacquer in greater amount for the undepressed surfaces than for the surfaces of the depressions because of absorption of light produced by the difference in the thickness of the lacquer.

In order to produce the different depths of shade upon the undepressed surfaces and the gradations of shade as such areas meet the indentations, we have found that conveniently we may apply the lacquer by means of a roller to effect the spreading. We prefer in most cases to use a rubber roller. The rubber on this roller is of such degree of softness and the pressure is applied to the roller in such an amount that the pressure upon different areas becomes unevenly distributed and as the sheet passes under the roller an uneven application of the lacquer results, as mentioned above. There is thus produced a kind of squeegee action in the application of the lacquer which, because of the combined effect of the uneven surface and of the uneven pressure distributed through the soft roller, spreads or squeezes the lacquer unevenly upon the different portions of the surface, the lacquer also tending to be moved or forced into the depressions to produce a somewhat greater thickness thereof in said depressions than upon the areas which are not depressed.

We have also found that a steel or other solid roller may be used to effect the spreading when the coating is so delivered to the roller and the roller is so adjusted with respect to the surface being coated as both to provide the correct amount of the coating for spreading over the surface and to apply the proper force to the surface to carry the coating into the depressions without entirely removing it from the undepressed areas. Other devices which are effective for mechanical application of the coating and its spread over the surface to leave a thin coating upon the high portions thereof and a thicker coating upon the depressed portions may be used within the scope of our invention. The depressions, however, for the most part are only partially filled so as to maintain the wrinkled or convoluted surface.

While in the above description mention has been made of the relatively smooth surface upon which to produce the embossing, upon which embossed surface thereafter the lacquer is applied, it is not intended that necessarily the surface which is desirable for producing a simulation of leather is a hard or glassy smooth surface. The character of surface produced by a paper liner which has been made without hard sizing or hard calendering of the surface of the paper is suitable for simulation of leathers such as walrus and morocco. There may be slight unevenness in the surface of such a liner and particularly when applied to a fibrous base such as a fiber wall board. While some of the unevenness may be reduced in the process of embossing, the slight unevenness which remains in the areas other than the depressions may be of assistance in producing the uneven distribution of the lacquer by the rubber roller and in the accentuation of the simulation of the convolutions of the leather as mentioned above. Moreover, if such a paper liner is somewhat unevenly porous, the lacquer may penetrate unevenly into the liner which contributes to the desired effect.

While our invention has been described for the most part in connection with the product, which contributes an important phase of the invention, the invention also includes the process by which such product is obtained. To carry out this process, the surface is prepared, for example, by the application of a paper liner of suitable character and color or by the application of a color or tint to a paper liner, and said surface is then embossed or indentations or depressions otherwise are made therein corresponding to the indentations of the leather to be simulated. The translucent but light absorbing coating is not applied before the embossing operation but after that operation has been finished. The application is controlled so that a different amount of the coating is applied to the raised portions as compared with the depressions. The spreading of the coating so as to form a relatively thin film or coat which, however, is thicker in the depressions is a feature of the process. Moreover, the uneven spreading of the coating upon the raised portions is also a feature of said

process. These features may be practiced by using the rubber roller or other device the position of which with respect to the surface being treated may be gauged so as to produce the proper pressure and the proper thickness of film as the device is moved over the surface. The roller may act as a kind of gauge determining different thicknesses of film or coating upon different portions of the surface.

Various effects which have been described above in connection with the product may be produced by variations in the process of applying the coating upon such prepared and embossed surfaces. By varying the character of the lacquer or the color thereof or the amount of pigment therein or by varying the character of the roller and the pressure applied thereto, variations in the resulting effect produced upon the surface may be obtained. In general, however, the process makes possible obtaining a product which constitutes a more faithful simulation of the leather than products heretofore obtained, because it is possible by our process to produce the different amounts of light and shade corresponding to the high lights and to the light and shade as seen in leather itself.

While the invention has been described more particularly in connection with fibrous base sheets and in connection with fiber wall board, by providing upon the surface of any material of such character as to receive and retain indentations or depressions, such as embossing, a tint or a shade of color or light effect which will reflect a substantial amount of the light falling thereon and, following the embossing operation, applying over such an embossed surface a translucent but somewhat light absorbing coating in such a way as to leave the coating unevenly distributed over the surface, and particularly with the greater amount thereof in the depressions than upon the other portions of the surface, the simulations of which wrinkled or convoluted surfaces it is desired to produce may be obtained upon any such materials. The fundamental physical action which is requisite for our invention is that the light shall be reflected through the coating from the base unevenly. This is accomplished in a simple and convenient way by the uneven distribution of the coating as described.

While the invention is not limited to a particular type of coating or to the use of a particular composition for the lacquer, we have found that the following composition affords a commercial material which will produce the results desired in the present invention and which does not involve the use of expensive ingredients. To prepare the lacquer, 40 pounds of No. 9 carbon black may be mixed with 20 gallons of cold pressed castor oil and 5 gallons of lacquer thinner. Such a lacquer thinner may be made of butyl alcohol, ethyl and butyl acetate and toluol. After this primary mixture is prepared, the finished lacquer may be made by combining 3½ gallons of the primary mixture with 5 gallons of cold pressed castor oil, 60 gallons of special cotton solution of a composition which will be given hereafter, 20 gallons of an ester gum dissolved in toluol, No. 10 cut, ½ gallon of butanol and 15 gallons of lacquer thinner. Number 10 cut solution of ester gum is formed by dissolving 10 pounds of ester gum in one gallon of toluol. Such a lacquer containing the carbon black although of a dark color due to the presence of the carbon black nevertheless is translucent but light absorbing and when applied in a thin film upon the surface to be treated the light will pass therethrough and be reflected from the underlying surface. The carbon black, possibly assisted by other ingredients of the lacquer, acts to absorb some of the light so that when a greater amount of the lacquer rests in the depressions or indentations less light is reflected therefrom, as described above. Moreover, the carbon black being of an extremely finely divided material is thoroughly dispersed through the lacquer and does not tend to segregate and therefore to produce spotted effects upon the undepressed areas or to cause a concentration of the carbon black in some portions of the indentations to a greater extent than in others.

Instead of the carbon black, in order to produce lacquers of different colors we may substitute other pigments which are suitable for dispersion in such a vehicle as that described in the above composition. Moreover, any vehicle which is translucent and which will carry a suitable light absorbing ingredient or which in itself is both translucent and light absorbing will serve the purpose of our invention provided it has the desired characteristics of spreading upon the surface to be covered and of drying thereon to maintain a permanent coating.

The cotton solution above referred to may be composed of nitro-cellulose 25%, alcohol 10%, the remaining 65% being one-half toluol and one-half butyl acetate. This composition is merely typical and may be varied to suit different conditions while providing a basis for the lacquer.

What is claimed is:

1. As an article of manufacture, a base having depressions in the surface thereof and having portions of said surface which are not depressed, said base having upon said surface a coating covering said depressions and said undepressed portions of the surface, the distribution of the coating upon said surface being such that a greater amount of the coating is applied in the depressions than upon the portions of the surface which are not depressed to provide a darker appearance in the depressions than upon said portions.

2. A construction material comprising a base having applied thereto a paper liner of a light tint in color when uncovered by superposed material, said paper liner conforming to depressions formed in the surface of said base in simulation of the depressions in the surface of leather, said construction material having upon the surface of said tinted liner a coating of lacquer covering both said depressions and the undepressed portions of the surface and of such translucency that the general color of the tinted liner may be seen through said coating, said depressions in said lined surface of the base having therein a greater amount of the lacquer than the portions of said lined surface which are not depressed, whereby said depressed portions appear of darker color than said portions which are not depressed, the lacquer being unevenly distributed upon said portions of the tinted liner which are not depressed whereby some parts of said portions appear of darker color than other parts thereof and simulate the light and shade of the irregular surface of leather.

3. The method of finishing the surface of a base which comprises producing depressions in said surface and so applying to said surface with a squeegee action a translucent but light absorbing coating as to retain the coating upon the portions which are not depressed but to cause more of said coating to be applied in said de-

pressions than upon said portions of the surface which are not depressed.

4. The method of finishing the surface of a base to simulate the surface of leather, which comprises producing in said surface depressions simulating the depressions in the surface of leather, and so applying to said surface with a resilient squeegee roll a translucent but light absorbing coating as to retain the coating upon the portions which are not depressed but to cause more of said coating to be applied in said depressions than upon said portions of the surface which are not depressed and unevenly to apply said coating upon said portions which are not depressed.

5. The process of finishing a surface which comprises embossing said surface to produce depressions therein, and so applying to said embossed surface a translucent but light absorbing coating and so retaining said coating upon said surface as to cover both said depressions and the undepressed portions of the surface but so as to leave in said depressions a greater thickness of said coating than is retained upon the surfaces between or adjacent to said depressions.

6. As an article of manufacture, a base having portions of the surface thereof depressed and having portions of said surface which are not depressed, said base having upon said surface thereof a translucent but light absorbing coating covering both said depressed and said undepressed portions of the surface, the coating upon the portions of the surface which are not depressed being capable of absorbing less light than the coating upon said depressed portions of the surface.

7. As an article of manufacture, a base having a surface of a given depth of shade when uncovered by superposed material, said surface being embossed to provide portions thereof depressed relative to the portions thereof between said depressed portions, said surface having thereon a translucent but light absorbing coating covering both said depressed and said relatively undepressed portions of the surface and capable of deepening the shade of said surface when applied thereto, said coating being so distributed over said surface that the depth of shade in said depressed portions is greater than in said undepressed portions of said surface.

8. As an article of manufacture, a base having portions of the surface thereof depressed relative to portions of said surface which are not depressed, said base having upon said surface a coating of such translucency that light passing therethrough is partially absorbed, said coating covering both said depressions and said underpressed portion of the surface, the coating upon the portions of the surface which relatively are not depressed being capable of absorbing a less amount of light than the coating upon said depressed portions of the surface, whereby is provided a darker appearance in said depressions than upon said portions which are not depressed, said portions of the surface which relatively are not depressed having the coating so distributed thereon that the light is unevenly absorbed and a simulation of light and shade on said undepressed portions is produced.

9. As an article of manufacture, a base having portions of the surface thereof depressed and having portions of said surface which are not depressed, said base having upon said surface a translucent but light absorbing coating covering said depressed and said undepressed portions of the surface, said surface being of a light tint in color before said coating is applied thereto, said coating being of such translucency and color as to deepen the color of the tint while maintaining the general color thereof, the portions of the coating in said depressions being capable of deepening the color of said tint to a greater degree than the portions of said coating on said undepressed portions of the surface.

10. As an article of manufacture, a base having applied thereto a paper liner, said paper liner providing upon said base a surface of substantially uniform depth of color when uncovered by superposed material, said paper lined surface of said base having portions thereof depressed relative to undepressed portions of said surface, said paper lined surface having thereon a translucent but light absorbing coating covering both said depressed and said undepressed portions of the surface and so distributed thereover that the depth of the coating in the depressions is greater than on the portions of the surface which are not depressed.

11. As an article of manufacture, a base having applied thereto a paper liner, said paper liner providing upon said base a surface of a substantially uniform depth of color when uncovered by superposed material, said paper lined surface of said base having portions thereof depressed relative to undepressed portions of said surface, said paper lined surface having thereon a translucent but light absorbing coating of lacquer covering both said depressions and said undepressed portions of the surface, said lacquer containing a pigment capable of deepening the color of the liner when said coating covers said surface, said lacquer coating being so distributed thereover that the pigment therein deepens the color of said liner to a greater degree in said depressions than in said undepressed portions of the surface.

12. As an article of manufacture, a base having a surface capable of reflecting a substantial amount of light when uncovered by superposed material, said base having portions of the surface thereof depressed relative to portions of said surface which are not depressed, said base having upon said surface a coating of such translucency that light passing therethrough is partially absorbed to make said coating of darker appearance than said surface of the base, said coating covering both said depressions and said undepressed portions of the surface, the coating upon said undepressed portions being of such translucency relative to that upon said depressed portions that a greater amount of light is reflected therethrough from said portions which are not depressed than from said depressed portions.

13. Process of finishing a surface which comprises producing in said surface depressions relative to portions of the surface which are not depressed, and so applying a translucent but light absorbing coating to said surface and so retaining said coating thereon as to cover both said depressions and said undepressed portions of the surface and to leave in said depressions a different amount of said coating than is retained upon the portions of the surface which are not depressed to cause the amount of light absorbed by said coating to be different for the depressed portions than for the portions which are not depressed.

14. Process of finishing a surface which comprises producing in said surface depressions relative to portions of the surface which are not de-

pressed, and so applying a translucent but light absorbing coating to said surface and so retaining said coating thereon as to cover both said depressions and said undepressed portions of the surface but so as to cause a greater amount of light to be reflected through the coating from the portions of the surface which are not depressed than from the depressed portions thereof.

15. Process of finishing a surface which comprises producing in said surface depressions relative to portions of the surface which are not depressed, and so applying a translucent but light absorbing coating to said surface and so retaining said coating thereon as to cover both said depressions and said undepressed portions of the surface but so as to cause a greater amount of light to be reflected through the coating from the portions of the surface which are not depressed than from the depressed portions thereof, said coating being so applied to the portions of the surface which are not depressed as to cause the light to be non-uniformly reflected therefrom through said coating.

16. The process of finishing a surface which comprises producing upon the surface substantially a light tint of a given color, embossing said surface of light tint to form therein depressions relative to portions of said surface which are not depressed, and applying to said embossed surface a coating of such translucency and color that it is capable of producing a deeper tone of said tint when visible through the coating, said coating being so applied and being so retained upon said surface as to cover said depressions and said undepressed portions of the surface and to leave portions of said coating producing a deeper tone in said depressions than upon the remaining portions of the surface.

17. The process of finishing the surface of a base which comprises applying thereto a paper liner of relatively light tint in color and of relatively even surface, embossing said lined surface of said base to produce in said surface depressions relative to undepressed portions of said surface, and so applying a coating to said lined and embossed surface and so retaining said coating thereon as to cover both said depressions and said undepressed portions of the surface, said coating being of such translucency as to deepen the color of said tint appearing therethrough, said coating being so spread upon and distributed upon said embossed surface as to leave in said depressions an amount of said coating with respect to that left upon the undepressed portions thereof such that a greater depth of color is produced in said depressions than upon said undepressed portions of the surface.

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