METHOD OF MAKING SIMULATED MASONRY WALL

Filed Dec. 7, 1970

1. MIXTURE OF WATER, CEMENT, SAND AND BINDER

APPLY BASE COAT

FIG 1

DRY

FIG 2

PROVIDE MASK

FIG 3

APPLY MASK

FIG 4

MIXTURE OF WATER, CEMENT, SAND, COLORING MATERIAL AND BINDER

FIG 5

APPLY FINISH COAT

FIG 6

FINAL FINISH TREATMENT IF DESIRED

FIG 7

STRIP MASK

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4 Sheets-Sheet 2

FIG 8

FIG 9

FIG 10

FIG 11

FIG 12

FIG 13

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METHOD OF MAKING SIMULATED MASONRY WALL

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ABSTRACT OF THE DISCLOSURE

Simulated masonry wall panels are provided by first coating a base panel with a base coat to simulate mortar and then spraying a finish coat through a mask and then removing the mask. Panels to provide a simulated brick wall may abut with shiplap joints and each be three courses high and eight feet long.

FIELD

This invention relates to a method or process for providing simulated masonry walls and more particularly to a combination of process steps for providing panels to provide such walls.

PRIOR ART

The invention described and claimed herein is an improvement on and clearly distinguishes over the disclosures of the following patents: 1,123,727, Goldberg; 1,311,362, Walling; 1,341,528, Walling; 1,564,578, Kennedy; 1,591,406, Shope; 2,056,275, Holdsworth (117—8.5); 2,110,353, Kritzer (117—8.5); 2,162,861, Polak; 2,595,142, Herck; 2,628,299, Gaiser; 3,068,195, Seman (117—8.5); and 3,364,088, Seman (117—8.5).

A characteristic step in the process of the references is that a coating is applied through a mask and the mask is held tightly to the surface underlying the mask. This is accomplished for example as in Kritzer by keeping the undercoat wet and causing the mask to stick to the undercoat because of such wetness and preferably by embedding the mask in the undercoat. It is accomplished in the Seman patents by providing a tacky adhesive on the underside of the tapes used to make the mask. It is accomplished in Holdsworth and Goldberg by providing a hot plastic base coat and then embedding the mask therein. It is also accomplished in Kennedy by embedding the mask in the base coat while the base coat is plastic. And it is accomplished in Herck, for example, by stapling the mask to the undersurface.

SUMMARY

In contradistinction to the methods of the prior art, a coating is applied through a mask, as a step in the instant invention, onto an undercoat which is non-plastic, non-mastic and unimpressionable and the second coating is applied by spraying in such a manner that the force of the spray forces the mask against the undersurface. The base coat is first applied as by troweling, brushing or spraying to a base panel sheet which may be, for example, gypsum board, wood, plywood, pressed wood, synthetic resin foam or the like. The base coat is provided with a finish which simulates mortar either by reason of the method used in applying it or by a second step in the process of applying it such as by first spraying and then brushing or troweling or the like. As a critical step in the process the undercoat is then dried until it becomes non-plastic or non-mastic and nonimpressionable, that is, sufficiently hard so that no impression may be made therein by pressing hands or fingers thereagainst or laying various objects thereon or pressing objects thereagainst with any degree of force less than that which deforms the surface of the base sheet which underlies the base coat.

While the base coat is in the same state, that is, after it has been dried until it is unimpressionable and while it retains sufficient moisture, a finish coat is applied by spraying through the mask. The spraying is conducted in such manner that the force of the air and material sprayed, applied against the mask, pushes the mask against the base coat surface and holds the mask against the base coat surface while the finish coat is built up to the desired thickness. It is critical to the step that the undercoat or base coat include an appreciable degree of moisture in order to provide a suitable bond to the finish coat.

The finish coat is then treated if desired to provide it with any one of a number of suitable finishes. Such treatment may consist of brushing it with a brush having soft bristles or stiff bristles or by brushing it with a wire brush or by troweling it or by spattering it with colored materials. The mask is then removed, preferably by lifting the mask so that substantially all portions of it are removed simultaneously or almost simultaneously and so that all portions of it are removed in a direction substantially or almost normal to the surface of the panel.

The base coat was well as the finish coat may, as mentioned above, be applied by spraying from spraying devices and when spraying, either the spraying devices may be moved relative to the panels or the panels may be moved relative to the spraying devices.

OBJECTS

It is an object of the invention to provide an improved method for providing panels which may be assembled to provide a simulated masonry wall.

Other objects will become apparent from the drawings and from the following detailed description in which it is intended to illustrate the applicability of the invention without thereby limiting its scope to less than that of all equivalents which will be apparent to one skilled in the art.

DRAWINGS

In the drawings, like reference numerals refer to like parts and

FIG. 1 is a schematic elevation of the step of applying the base coat;
FIG. 2 is a schematic elevation of the step of drying the base coat;
FIG. 3 is a partially cross-sectional perspective view of one embodiment of a mask in accordance with the invention;
FIG. 4 is a cross-sectional elevation of the step of applying the mask;
FIG. 5 is a schematic partially cross-sectional elevation of the step of applying the finish coat;
FIG. 6 is a schematic elevation of the step of treating to provide a desired finish;
FIG. 7 is a schematic cross-sectional elevation of the step of removing the mask;
FIG. 8 is an enlarged fragmentary cross-sectional elevation of a portion of a panel provided in accordance with the invention;

FIG. 9 is an enlarged fragmentary cross-sectional elevation of a portion of a panel provided in accordance with the invention;

FIG. 10 is an enlarged fragmentary cross-sectional elevation of a portion of a panel provided in accordance with the invention;

FIG. 11 is an enlarged fragmentary cross-sectional elevation of a portion of a panel provided in accordance with the invention;

FIG. 12 is an enlarged fragmentary cross-sectional perspective view of a portion of the mask which may be used in accordance with an embodiment of the invention;

FIG. 13 is an enlarged view of a portion of the modification of the embodiment of FIG. 12;

FIG. 14 is an enlargement of a portion of FIG. 4 in which the actual dimensional relationships of the parts are more nearly approximated;

FIG. 15 is an enlargement of a portion of FIG. 5 and corresponds to FIG. 14 in that the actual dimensional relationships of the parts are more nearly approximated;

FIG. 16 is a cross-sectional view of one embodiment of a mask which may be used in accordance with the invention;

FIG. 17 is an elevation of one panel and portions of two adjacent panels which may be provided in accordance with the invention;

FIG. 18 is a cross-sectional view taken on lines 18—18 in FIG. 17;

FIG. 19 is a cross-sectional view of a modification of a portion of FIG. 18;

FIG. 20 is a top plan view of a corner member which may be used to complement the panels of FIGS. 17 and 18;

FIG. 21 is a top plan view of a corner member which may be used to complement the member of FIG. 20;

FIG. 22 is a schematic cross-sectional elevation of the step of washing the mask; and

FIG. 23 is a schematic view of the step of drying the mask.

DESCRIPTION

Referring to FIG. 1, a base panel sheet 10 is first provided and base coat 11 is applied thereto, for example, as a spray 12 applied from spraying device 13. The panel may be moved with respect to the spraying device as indicated by arrow 14 or the spraying device may be moved with respect to the panel as indicated by arrow 15.

Base panel sheet 10 may be wood, plywood, pressed wood (such as a panel of wood cellulose fibers bonded at least in part with lignin, for example, such as is sold under the trademark Masonite by the Masonite Corporation), gypsum board, asbestos board, foamed plastics such as foamed polystyrene or the like. The thickness of the base coat is not critical. It may be as small as .005 or .010 inch. Generally a relatively thin coating is desired in accordance with the demands of economy but a somewhat thicker coating may be provided if desired to provide a desired texture. The base coating is preferably caused to have a texture which simulates mortar. This may be accomplished by spraying alone or by brushing or troweling after spraying or by simply applying the coating originally by brushing or troweling. The invention is not at all limited to the manner in which the base coat is applied. A preferred composition for the base coat may be as follows:

100 pounds portland cement 100–150 pounds sand 5 gallons of liquid

A preferred formula for the liquid is:

3 gallons of water 1 million of bonding agent

Any one of a large number of organic synthetic resinous materials may serve suitably as a bonding agent. Preferred bonding agents are acrylic latexes, rubber latexes and vinyl latexes. A preferred material for example is one in which contains vinyl acetate, copolymer latex and which is sold by the Dewey and Almy Chemical Division of W. R. Grace and Company. It is a synthetic latex emulsion which carries the registered trademark "Dura-weld-C" of that company.

In addition to or in place of portions of the sand there may be added relatively small amounts such as 5 or 10 or 20 pounds each of such materials as lime, clay, asbestos or sand-like materials such as fine silica sand or silica powder to suitably adjust properties, for example, to prevent settling or to affect the setting time and the like.

The bond which is obtained between the above described base coat compositions and each of the specifically above mentioned substrate base panel sheet materials is stronger than the substrate and the base coat itself is stronger than the substrate, i.e., when a panel coated with a dried base coat of the above composition, .010 to .025 inch in thickness is bent until it breaks, the base coat does not buckle, delaminate or show any other indication of failure until the base panel sheet breaks.

Latex paint containing sand may be used to provide a base coat but has the disadvantage that the paint washers out, i.e., is degraded and removed by the action of ultraviolet light, wind, hail, snow and the like whereas the composition described above is relatively highly resistant to weathering. Furthermore, a base coat of latex paint and sand may not have the desirable strengths discussed above.

Referring now to FIG. 2, base panel sheet 10 provided with base coat 11 is dried by any suitable means such as being allowed to stand unmolested for some 10 minutes to 30 minutes at temperatures of 60° to 100° F. The manner of drying is not critical. Drying may be accelerated by drying in a tunnel dryer for example and may be accomplished at higher or lower temperatures.

The panel is dried until coating 11 becomes non-plastic and un-mastic, that is, until it becomes unimpressionable. By "unimpressionable" it is meant that no impression may be made on a piece of paper by pressing against, without making a corresponding impression on base sheet 10. However, the panel is not dried until layer 11 is devoid of moisture.

After the panel has been dried until layer 11 is unimpressionable, but while layer 11 still retains an appreciable amount of moisture, a mask 16 (FIG. 3) is applied (FIG. 4) and while coating 11 is still in the same condition a finish coat 17 is applied (FIG. 5).

Finish coat 17 may be applied in the form of a spray 18 from spraying device 19 which may travel with respect to the panel as indicated by arrow 20; alternatively the panel may travel with respect to the spraying device as indicated by arrow 21. The steps of FIGS. 4 and 5 are discussed in greater detail below in connection with FIGS. 14 and 15.

Spraying device 19 may be similar or even identical to spraying device 13. Spraying devices for spraying mixtures of the general nature described herein for the base coat and the finish coat are well known and available commercially and therefore are not described herein.

Finish coat 17 may be applied to a depth of as little as .005 or .010 inch in some instances but is preferably applied to a thickness of at least 1/8 inch or 1/4 of a milimeter and it may be applied to a thickness of 3/4 or 1/2 inch. Generally more suitable thicknesses are on the order of from 1/8 to 3/4 inch, the thickness selected being that which will provide suitable relief, that is, which provides a depth of the simulated mortar joint sufficient to provide the desired effect. Surprisingly, relatively low relief such as may be provided by a thickness of 1/32 or 1/34 inch for coating 17 provides remarkable effective simulation of a brick wall but generally greater relief, such as is provided
by a thickness of \( \frac{3}{4} \) inch or greater, and in many cases, preferably \( \frac{1}{4} \) inch, is preferred.

A preferred composition for a finish coat may be as follows:

- 100 pounds portland cement
- 200 pounds sand
- 5 gallons of liquid suitable small amount of coloring material

A preferred formula for the liquid is:

- 5 gallons of water
- 1 gallon of bonding agent

The bonding agent may be any suitable bonding agent described above as being suitable for use in the formulation for the base coat but is preferably the same or similar to that used for the base coat. Materials described above which may suitably be added to or in place of portions of the sand in the base coat may likewise be added for the same purposes in the finish coat.

Whereas it may be noted that there is a marked similarity between the formulation for the base coat and the formulation for the finish coat, it may be observed that generally and preferably a larger portion of sand or other aggregate and a lower proportion of bonding agent are found preferable and suitable for the finish coat.

As noted above, the cohesive strength of the finish coat and the strength of the bond between the finish coat and the base coat after the finish coat has been dried exceed the strength of the substrate material, namely, the material of panel 10 of any one of the aforementioned materials which may be used for panel 10. That is, if the completed panel, after the finish coat is dried, is bent until it breaks, the finish coat (like the base coat) does not show any indication of failure prior to breakage of the substrate base panel sheet.

Coloring material, as indicated above, which is generally preferably a pigment or comprises a pigment, may be added in suitable quantity in a manner well known in the prior art to provide a suitable color for the finish coat. Colors generally preferred are red, white, yellow, brown and grey and by suitable selection of the amount and type of coloring material, the chrome, hue and tone of the color may be varied greatly to provide many variations of each of the foregoing.

As the next step in the process, a finish treatment may be carried out if desired, as shown in FIG. 6, to provide a suitable texture on the outer surface of the finish coat 17. Thus, a brush may be applied to provide a brushed finish as indicated by brush 22 which may be moved with respect to the panel as indicated by arrow 23. The panel may also be moved with respect to the brush as indicated by arrow 24. The brush may for example have soft bristles, stiff bristles or may even have wire bristles and may be moved laterally or transversely or with a circular or elliptical motion to provide any one of a large number of finishes, any one of which may be desired. In place of or in addition to such brushing, the surface may be troweled lightly or heavily and additionally or alternatively the surface may be spattered with materials of slight or great contrast in color to provide any one of a large number of finishes.

Before layer 17 has dried mask 16 is removed as shown in FIG. 7. Mask 16 is preferably removed in such manner that all portions thereof are simultaneously or almost simultaneously removed and also so that all portions of mask 16 are preferably removed in a direction normal or substantially normal or almost normal to the surface of the panel. If the mask is relatively flexible, as it may be and is removed by peeling as described, for example, in connection with the Seman patents, bits and pieces are removed in an objectionable manner from edges of portions of layer 17 which remain attached to layer 11.

In order to effectuate the removal of the mask in the desired manner, namely without a peeling action and specificaly with all of its portions being simultaneously or almost simultaneously removed and so that they are removed in a direction normal to the panel surface, the mask may be made relatively rigid; for example, mask 16 (FIG. 12) may be utilized. Mask 16' may be made by cutting rectangular portions from a solid sheet of acrylic resin, i.e., cast polymethylmethacrylate, which may be as thick as \( \frac{3}{4} \) inch or \( \frac{1}{4} \) inch. It is also suitable to provide a thinner mask and to retain it within a frame as described in conjunction with FIG. 16.

Such a mask may be made by cutting portions from a thin sheet of steel, for example, a sheet of steel having a thickness of 0.030 inch or 0.040 inch, or may be provided by fastening together in a frame a plurality of pieces of tape such as tape 16'' (FIG. 13) which as shown may consist of two facing layers 45 of polymeric synthetic resin having glass fiber strands 46 embedded in synthetic resinous polymeric adhesive material 47 disposed thereinbetween. Solid polymeric synthetic resin tape may, if desired, be used in place of tape 16'' if it is of sufficient strength; for example, extruding nylon tape may be used.

Referring now to FIG. 16, a mask 16'' may be cut from a sheet of steel or plastic or may be made by fastening together pieces of tape. One end of mask 16'' may be clamped between rigid members 35 and 36 with bolts 27. The other end of mask 16'' may be clamped between rigid members 35 and 36 with bolts 37. A plurality of holes 28, of which one is shown, may be provided in member 25 to receive hooked ends of longitudinally extending tension members 29, of which one is shown. Likewise a plurality of holes 38 may be provided in rigid member 35 to receive hooked ends of longitudinally extending tension members 39. A relatively rigid frame of steel pipe 40 may be provided extending entirely around mask 16'' and may be provided with holes to receive longitudinally extending portions of members 29 or 39 provided with threaded portions 42. Adjusting nuts 41 may be provided on portions 42 to draw members 29 and 39 toward frame members 40 to exert tension on mask 16''. Mask 16'' may be tensioned laterally, although to a lesser extent, in similar manner.

By thus tensioning mask 16'', it may be removed, to accomplish the step of FIG. 7, in the desired manner. That is, by withdrawing frame members 40 in a direction normal to the surface of the panel, mask 16 is removed in such manner that all portions are almost simultaneously freed from the panel and are withdrawn from the panel in a direction normal or almost normal to the surface.

In some instances, a relatively thick and rigid mask such as mask 16'' may be mounted in a frame such as frame 40 or otherwise mounted to tension the mask as described for mask 16''.

After completing the step of FIG. 7, finish coat 17 is dried.

There may thus be provided a panel indicated as 51 if layers 11 and 17 are applied to a base sheet panel 52 of plywood as shown in FIG. 8.

In FIG. 9 there is shown a panel provided in accordance with the process of the invention by application of layers 11 and 17 to a panel of gypsum board 53 which may consist of a layer of paper 55 covering a gypsum core 54. A panel in accordance with the invention may be provided by application of layers 11 and 17 to a pressed wood-fiber base panel sheet as shown in FIG. 10 and likewise a panel may be provided in accordance with the method of the invention by application of layers 11 and 17 to a foamed polystyrene base panel sheet 57 as shown in FIG. 11.

As indicated in FIG. 14, it is inevitable that mask 16, due to manufacturing and mounting variations and irregularities is not perfectly and absolutely flat. Likewise it is inevitable that the outer surface of layer 11 is not absolutely flat, due to minor variations in manufacturing proc-
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It is necessary that the mask, when provided as indicated in the step of FIG. 3 and applied as indicated in the step of FIG. 4, be clean and dry. If the mask is not dry when applied in the step of FIG. 4, the material of layer 17 will leak out and create an objectionable or undesired pattern. Therefore, it is necessary to clean and dry a mask, such as mask 16, relatively often. It is necessary to clean it to some extent before each use and preferably the steps of washing mask 16 by any suitable process such as by agitating it in water 90 contained in container 91 as shown in FIG. 22 and then drying it by blowing air thereagainst as indicated by arrows 92 in FIG. 23 are carried out as additional steps in the process described above which comprises the steps of FIGS. 1 to 7. Thus, although the process of the invention may be considered to comprise the steps of FIGS. 1 to 7, it may also be considered to comprise the steps of FIGS. 1 to 7, 22 and 23. The steps of FIGS. 22 and 23 preferably follow the step of FIG. 7 and precede the step of FIG. 5.

By provision of different masks having suitable patterns panels may be provided to simulate not only the half bond brick wall indicated for panel 70 but to simulate other known brick patterns such as quarter bond, third bond, stack bond and the like. Not only may walls made with common brick be simulated but walls made of other brick such as Roman brick may be simulated and likewise walls made of stone such as fieldstone or quarry stone may also be simulated.

It may thus be seen that the invention is broad in scope and includes such modifications as will be apparent to those skilled in the art and is to be limited only by the claims.

Having thus described my invention, I claim:

1. In the process of providing a simulated masonry wall, the combination of the steps of:
   providing a base panel sheet,
   coating said base panel sheet with a base layer of cementitious material comprising water, portland cement, sand and an organic synthetic resinos binder,
   providing said layer with a finish to simulate mortar, drying said layer until said layer is non-plastic and non-mastic and unimpressable, and then before said base layer is entirely dry and while it retains some moisture, laying against said partially dry base layer a mask of relatively rigid non-fibrous non-tacky relatively water-impervious material, and then before said base layer is entirely dry and while it retains some moisture, spraying against said mask and onto unmasked portions of said base layer an air-entrained mixture of cementitious material comprising water, portland cement, sand, coloring material and an organic synthetic resinous binder, thereby forcing said mask against said base layer and coating unmasked portions of said base layer with said cementitious material to provide a finish-layer, and then removing said mask.

2. The process of claim 1 further characterized by providing said base layer as a relatively thin layer so that sand particles therein are visible and providing said finish layer as a relatively thick layer having a thickness of at least 3/4 inch or ¾ of a millimeter.

3. The process of claim 1 further characterized by treating the surface of said finish layer, before removing said mask, to provide a surface thereon which resembles any one of various brick finish surfaces.

4. The process of claim 1 further characterized by removing all parts of said mask substantially simultaneously and in a direction substantially normal to said base layer.

5. The process of claim 4 further characterized by treating the surface of said finish layer, before removing said mask, to provide a surface thereon which resembles any one of various brick surface finishes.

Corner members may be provided to facilitate application of panels of the invention, such as for example, panel 70, to walls having exterior corners. Thus as shown in FIG. 20, a corner member 80 may be provided which may be simulated by a joint of a half brick on the long side and a half of the latter simulated brick to be presented along the short side.
6. The process of claim 5 further characterized by providing said base layer as a relatively thin layer so that sand particles therein are visible and providing said finish layer as a relatively thick layer having a thickness of at least \( \frac{1}{8} \) inch or \( \frac{3}{4} \) of a millimeter.

7. The process of claim 1 wherein said layers are applied by spraying from spraying devices by moving said base panel sheet past said devices and maintaining said devices substantially stationary.

8. The process of claim 1 further characterized by washing said mask and then drying said mask after removing said mask from the finish layer and before applying it again against a base layer.

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