

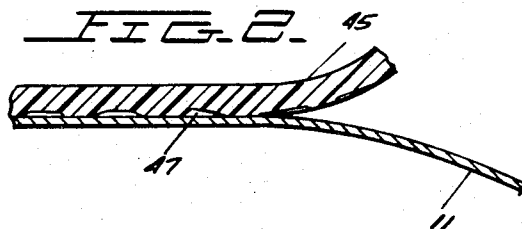
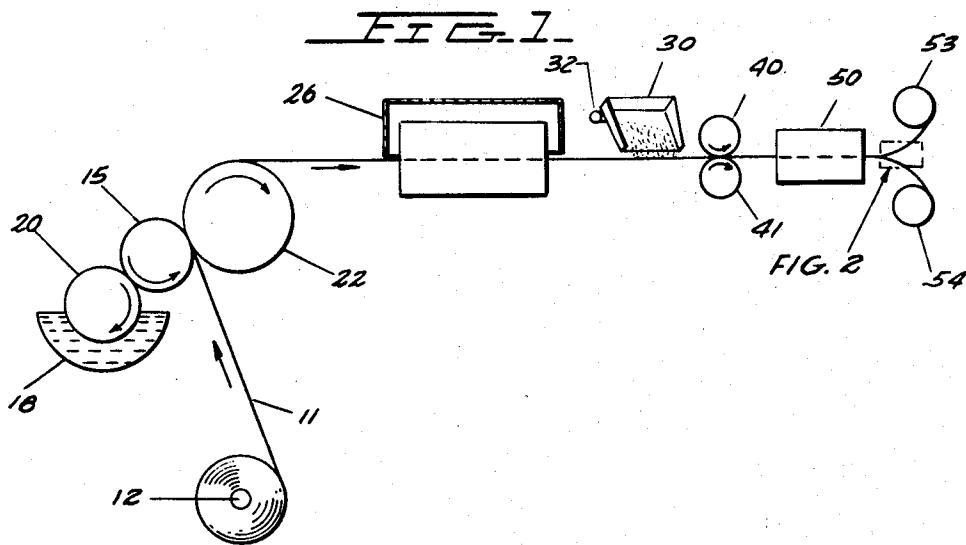
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METHOD OF APPLYING PATTERNS TO VINYL FLOOR COVERINGS

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METHOD OF APPLYING PATTERNS TO VINYL FLOOR COVERINGS

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4 Claims. (Cl. 154-26)

My invention relates to a method for applying patterns to vinyl-type coatings for floors, walls, and the like, and more particularly to a novel, economical method whereby repeatable, fanciful patterns may be applied to vinyl floor coverings.

Heretofore in vinyl-type floor coverings, the type of pattern which could be produced and reproduced thereon has been rather limited. This limitation results from the free-flowing nature of the vinyl particles which tend to form streaks and irregularities when subjected to hot calender rolls or presses. If a regular form is to be obtained as, for example, a terrazzo or parquet block effect, it has been necessary to employ printing blocks or roller printing systems.

The methods of the prior art employed such equipment and through the use of a vinyl-type ink or paste, printed patterns directly on a pre-formed sheet of the vinyl floor covering or backing material. Such printing operations provided only a very thin layer of the design which though repeatable to some extent, could readily be eroded and thereby greatly mar the appearance of the floor or wall covering.

Another disadvantage of forming regular printed patterns on vinyl sheets is that the printing remains on the surface of the sheet. This is necessarily a thin layer and penetration of the vinyl printing ink into the sheet is rather limited. Similarly, if a vinyl ink or paste is used for printing directly on a felt base, there is a tendency for plasticizer migration into the base which will eventually cause delaminating of the printed pattern.

Another method which has been attempted is to print onto a paper backing with a vinyl ink or paste, fuse this material and then calender, by a hot process, a backing onto this printed pattern. This method, however, has shown that it is not practical owing to the danger of destruction of the backing during the hot calendering process.

I propose to overcome these and other difficulties of the prior art by providing a novel method of producing an inlaid pattern into vinyl-type floor coverings. This pattern will be relatively thick as compared to those previously known and will be an integral part of the floor covering.

Accordingly, it is an object of my invention to provide a vinyl-type floor covering which is capable of carrying a regularly repeatable pattern of such a nature that it will not be easily eroded and will be as resistant to wear as the other vinyl material in the floor covering.

It is another object of my invention to provide a novel vinyl-type covering for floors, walls and the like which contains an inlaid pattern, the pattern forming an integral part of the vinyl material and being readily repeatable in desired, fanciful designs.

Still another object of my invention is to provide a method for producing an inlaid type vinyl covering material which is highly economical and advantageous when compared with methods of the prior art.

These and other objects of my invention will become

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apparent from the following description when taken in connection with the drawings in which:

Figure 1 is a schematic diagram illustrating specifically an embodiment of my novel process.

Figure 2 is a magnification of the area on Figure 1 showing how the backing material is stripped from the printed vinyl covering.

Figure 3 is an example of a terrazzo repeatable pattern which may be obtained by my process, although it is to be understood that other fanciful patterns are equally reproducible.

Essentially my invention involves the printing of a desired pattern effect on a thin strippable backing material such as paper, metal foil or cardboard and thereafter applying to the said backing material discrete, malleable polyvinyl granules of the type described and claimed in my co-pending application (M-439) Serial No. 499,251, filed April 4, 1955, now U. S. Patent No. 2,835,620. These granules, when subjected to pressure under calender rolls, will form a continuous sheet of vinyl material which will completely cover the printed pattern previously applied to the backing.

After a heating step, the backing may be readily stripped and in doing so, the area which was previously adjacent or contiguous to the backing comprises the printed pattern. By superimposing on this pattern a sheet of vinyl material made from my novel malleable granules, the pattern becomes inlaid in the said sheet and is not subject to wear or erosion as were the thin superimposed patterns heretofore known.

This process is particularly advantageous because it allows the production of a vinyl covering for floors, walls and the like which may consist either of layers of laminated vinyl tile or of a single layer of printed vinyl secured to any desired backing material such as, for example, impregnated felt.

Referring now to the drawings and to a specific embodiment of my invention, a sheet of paper, cardboard, metal foil or other thin strippable relatively weak backing material 11 is unwound from roll 12. A vinyl paste or ink of a composition well known in the art is retained in reservoir 18. A specific example of the vinyl paste or ink to which I refer is as follows:

Material:	Parts by weight
Opalon 410 (an emulsion type polyvinyl chloride sold by Monsanto Chemical Company)-----	100
Tricresyl phosphate-----	20
Diocetyl phosphate-----	20
Pigment-----	10
Diluent or solvent-----	20

Obviously, the amount of diluent can be varied according to the viscosity desired and of course other polyvinyl chloride resins may be substituted for the Opalon. Examples of these are resins going under the trade names Exon 654 of Firestone, Solvic 334 of Solvic Company, Belgium, and QYNV of Carbide and Carbon Company.

This vinyl ink is picked up by the rotation of roll 20 and then transferred to printing roll 15. In order to facilitate the picking up of suitable quantities of the ink from the reservoir, the roll 20 may have a rubberized surface. The roll 15 presses the ink against the backing material 11 as it passes over pressure roll 22. From here, the printed backing material goes into oven 26 which is maintained at a temperature between 70° and 180° C. so as to evaporate the diluent. The time in the furnace may vary from one to five minutes depending upon the temperature, thickness of backing and the type of oven used.

After leaving the oven, the printed vinyl layer on the paper or other strippable backing passes underneath a vibrator 30 which distributes thereon malleable, poly-

vinyl granules of the type described in my copending application (M-439) Serial No. 499,251, filed April 4, 1955, now U. S. Patent No. 2,835,620. These granules are of from 10 to 120 mesh size and contain a resin from the group consisting of polyvinyl chloride, copolymers of vinyl chloride and vinyl acetate and copolymers of vinyl chloride and vinylidene chloride, the said resin comprising a mixture of the said polymers in which 45 to 90 percent by weight, thereof, is an emulsion type polymer and from 10 to 55 percent, thereof is a dispersion type polymer.

The terms "emulsion-type" polymer and "dispersion-type" polymer are known to the art and are described in more detail in my copending application hereinbefore referred to. As stated therein, an emulsion-type polymer is a polymer which has been made by the emulsion polymerization process and which forms a paste at room temperature. Polymers of similar or identical chemical composition which have been formed by a dispersion polymerization process are referred to as "dispersion-type" polymers and are identifiable by the fact that at room temperatures they will not readily form a colloidal suspension. Both of these materials are well known to the art and are sold under various trade names as hereinafter indicated.

The emulsion-type polymers are sold under such names as: Opalon 410, sold by Monsanto Chemical Co.; Geon 121, sold by Goodrich; Exon 654, a Firestone product; Vestolite P. H. sold by Chemische Werke Hols, Germany; Solvic 334, of Solvic, Belgium, and QYNV of Bakelite. The dispersion type polymers are sold under the names of: Opalon 300, of Monsanto Chemical Co.; Geon 101, Geon 202 and Geon Ep-103 of Goodrich; Solvic 136 of Solvic, Belgium; and VYNW of Bakelite.

The major ingredient of all these resins is polyvinyl chloride; however, the Geon 202 referred to above is a copolymer of vinylchloride and vinylidene chloride. The VYNW referred to is a mixture of polyvinyl chloride and polyvinyl acetate which contains between 93 and 95 percent vinylchloride.

Along with the resinous components, the granules contain suitable fillers, stabilizers and pigments which are well known in the art.

The vibrator is operated at a constant oscillatory rate by eccentric 32. This allows the spreading of a constant flow of granules onto the backing, providing thereon a relatively even distribution of the vinyl composition. As the granules are applied over the printed pattern, the backing granules and printed pattern are passed through calender rolls 40 and 41. These rolls may operate at room or elevated temperatures and the malleable granules form a resinous sheet 45 which is superimposed over the printed portion 47 as can be seen more readily in Figure 2. At this point, the vinyl sheet is laminated to the base and passed through another oven 50 which is maintained at temperatures between 120 and 180° C. for a period of about two to five minutes depending on furnace, film and other conditions.

After the vinyl coating 45 has fused to the backing 11, the laminated layers are separated in a manner indicated in Figure 2, so that the vinyl composition is wound up on roll 53 while the backing previously holding the printed film is wound upon roll 54. The vinyl composition may take various patterns such as a terrazzo type pattern as illustrated in Figure 3.

The pattern which is inlaid onto the vinyl tile will have a thickness varying from five to twenty mils depending upon the viscosity of the printing paste or ink. pending upon the viscosity of the printing paste or ink. laid pattern may vary from about ten mils to one-quarter of an inch, depending upon whether or not the final floor or wall covering is to comprise only a vinyl tile or a vinyl layer superimposed upon a backing material such as burlap or impregnated felt, or other heavy fabrics.

Ordinarily, the printed pattern will be embedded in

the vinyl sheet or tile to a depth varying between five and twenty percent of the total thickness of the vinyl. The pattern and the basic vinyl layer are a single, integral unit and may be readily separated from the paper, cardboard or foil backing without being separable from each other. After separation from the foil, the patterned vinyl layer 45 may then be laminated onto a heavy backing fabric such as impregnated felt, burlap or it may be laminated to additional polyvinyl chloride layers, if desired.

It is to be understood that the rolls 15, 20 and 22 may be replaced by flat bed printing devices or other printing methods well known to the art and I do not intend to limit my invention to the particular printing means herein illustrated.

Vinyl floor or wall coverings or tiles or other vinyl-coatings produced in accordance with my novel process contain an infinite variety of fanciful patterns which, being integral with the vinyl tile will not wear, erode or otherwise mar the appearance of the floor or wall covering. Moreover, such patterns can be made repeatable as often as desired by suitable adjustment of the printing rolls.

Although I have described preferred embodiments of my invention, it will now be apparent that variations and modifications may be made by those skilled in the art. I prefer to be limited, therefore, not by the specific disclosure herein, but only by the appended claims.

I claim:

1. The method of making a vinyl type covering for floors, walls and the like which comprises the steps of printing a vinyl resin ink on a strippable backing material, heating the printed backing material so as to remove solvent therefrom, applying to said printed backing, malleable resinous granules comprising a mixture of polymers from the group consisting of polyvinyl chloride, copolymers of vinyl chloride and vinyl acetate and copolymers of vinyl chloride and vinylidene chloride, the said granules further comprising a polymer mixture in which 45 to 90 percent, by weight, thereof is a polymer obtained by emulsion polymerization and 10 to 55 percent thereof is a dispersion type polymer, pressing the said granules into a continuous sheet and onto the printed backing, passing the resulting composite vinyl sheet and backing through a heating zone maintained between 120° C. and 180° C., and stripping the vinyl layer from the backing material thereby providing a covering of at least 10 mils thickness having inlaid therein, for at least 5 percent of its thickness, a regularly repeatable pattern.

2. The method of making a vinyl type covering for floors, walls and the like which comprises the steps of printing a vinyl resin ink on a strippable backing material, heating the printed backing material so as to remove solvent therefrom, applying to said printed backing, malleable resinous granules comprising a mixture of polymers from the group consisting of polyvinyl chloride, copolymers of vinyl chloride and vinyl acetate and copolymers of vinyl chloride and vinylidene chloride, the said granules further comprising a polymer mixture in which 45 to 90 percent, by weight, thereof is a polymer obtained by emulsion polymerization and 10 to 55 percent thereof is a dispersion type polymer, pressing the said granules into a continuous sheet and onto the printed backing, passing the resulting composite vinyl sheet and backing through a heating zone maintained between 120° C. and 180° C. for at least 2 minutes, and stripping the vinyl layer from the metallic backing material thereby providing a covering of at least 10 mils thickness having inlaid therein, for at least 5 percent of its thickness, a regularly repeatable pattern.

3. The method of making a vinyl type covering for floors, walls and the like which comprises the steps of printing a vinyl resin ink on a strippable metallic backing material, heating the printed backing material so as to remove solvent therefrom, applying to said printed me-

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tallic backing, malleable resinous granules comprising a mixture of polymers from the group consisting of polyvinyl chloride, copolymers of vinyl chloride and vinyl acetate and copolymers of vinyl chloride and vinylidene chloride, the said granules further comprising a polymer mixture in which 45 to 90 percent, by weight, thereof is a polymer obtained by emulsion polymerization and 10 to 55 percent thereof is a dispersion type polymer, calendering the said granules into a continuous sheet and onto the printed backing, passing the resulting composite vinyl sheet and backing through a heating zone maintained between 120° C. and 180° C. for 2 to 5 minutes, and stripping the vinyl layer from the metallic backing material thereby providing a covering of at least 10 mils thickness having inlaid therein, for at least 5 percent of its thickness, a regularly repeatable pattern.

4. The method of making a vinyl type covering for floors, walls and the like which comprises the steps of printing a vinyl resin ink on a strippable metallic backing material, heating the printed backing material between 70° C. and 180° C. for 1 to 5 minutes so as to remove solvent therefrom, applying to said printed metallic backing, malleable resinous granules comprising a mixture of polymers from the group consisting of polyvinyl chloride, copolymers of vinyl chloride and vinyl acetate and copolymers of vinyl chloride and vinylidene chloride, the

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said granules further comprising a copolymer mixture in which 45 to 90 percent, by weight, thereof is a polymer obtained by emulsion polymerization and 10 to 55 percent thereof is a dispersion type polymer, calendering the said granules into a continuous sheet and onto the printed backing, passing the resulting composite vinyl sheet and backing through a heating zone maintained between 120° C. and 180° C. for 2 to 5 minutes, and stripping the vinyl layer from the metallic backing material thereby providing a covering of at least 10 mils thickness having inlaid therein, for at least 5 percent of its thickness, a regularly repeatable pattern.

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