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(54) **Method of covering a wall employing an adhesive-containing, paintable composite sheet**

(57) An interior decoration method capable of hiding imperfections of the wall's surface and having an outstanding decorative capability, consists in directly gluing to the wall a composite sheet covering composed of a substrate cellulosic sheet having a screen printed or similarly defined layer of an aggregate of an inert powder material and of a binder (glue) and subsequently applying a finishing coat to the covered wall. The patterns defined in relief over the surface of the sheet may have a different tonality from the tonality of the substrate sheet thus creating ornamental designs that remain visible because of being in relief as well as retaining a distinguishable tonality after painting.

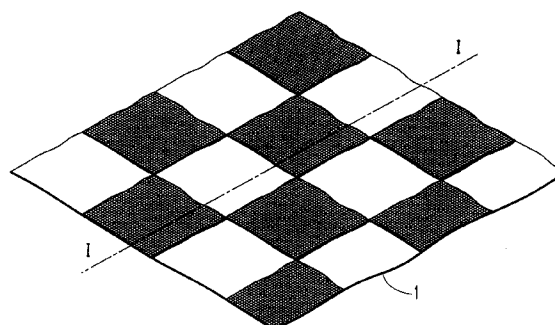


FIG. 1

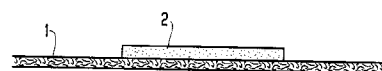


FIG. 2

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Description

The present invention relates to an improved system for covering, decorating interiors' walls by painting the surface of a substrate sheet material formerly glued to the wall.

In the field of interior decoration, there are innumerable options. Cost considerations are decisive in orienting the choice among the different options. Typically a market segregation reveals a more diffused use of wall painting in a mid segment of the market while wall-papering dominates the high (elite) segment of interior decoration market as well as the low segment of the market where the use of low-price wall papers tends to become competitive with painting.

Of course the two different approaches, painting or wall papering have intrinsic pros-and-cons, if one does take into consideration "hidden costs", tied to the relative ease with which the wall may be reconditioned in future for different decoration solutions.

Man-hour costs are more and more assuming an increasing weight in overall cost evaluations. Therefore when making a comparative cost evaluation it is important to correctly assess the cost of preparation, repair or remaking of the surface of the wall to be wall papered or otherwise decorated (painted), in order to hide small crevices and irregularities of the surface that may derive from the stripping of the accumulated paint layers and/or pre-existing wall papers, but even for hiding irregularities along "restart" lines of throwelling work in new constructions.

With the aim of reducing the cost of preparation of surfaces to be decorated, a system of precovering the wall with a fiberglass cloth has been proposed. The fiberglass cloth is glued to the wall and thereafter a first priming coat and a finishing coat may be normally applied. Gluing of the fiberglass cloth to the wall before painting it, helps in hiding small crevices, cracks and irregularities of the surface without requiring costly plastering and levelling work. On the other hand, after having applied a finishing coat, the obtained aesthetic result is primarily tied to the type of fiberglass cloth that has been used as a substrate (pre-covering of the wall). This greatly limits the decor choices and the possibility of enriching the decor of the treated walls.

On the other hand, paintable embossed wall papers are known. These special papers may be produced with ornamental features in relief (by embossing) for creating visible ornamental patterns upon the application of a finishing coat. This technique has had limited application because of the relative weakness of the embossed substrate which is too easily torn or deformed by compression.

Wall papers having an outer surface constituted by tinted grains permanently adhered onto the paper support for producing a peculiar decor are also known. These papers are not destined to be painted, do not hide more than some the irregularities of the underlying wall

surface thus "betraying" their being and typically provide a nonpatterned decor.

There is a need and/or utility for a wall covering material that may be glued to the wall as a common fiberglass cloth, that is by applying a coat of liquid glue on the wall and laying directly the covering material in sheet without the need of preventively wet it or condition it in any way, and which will permit the application of a finishing coat of paint and in so doing effectively hide small irregularities of the underlying wall surface beside having an unlimited ability to create decorative patterns that will remain highly resistant to compression and to rubbing wear.

These objectives are fully met by the present invention based on the use of a special composite precovering sheet material which may be glued to the wall and thereafter painted. The composite substrate sheet of the invention has a cellulosic support (typically a paper) on which is screen-printed or similarly defined, a patterned layer of an aggregate of particles of an inert material forming ornamental designs in relief on a paintable face of the composite covering material.

The presence of a patterned layer of inert material in powder form which may be defined by a screen printing process so as to form pattern areas covered by a relief layer of aggregate on the substrate paper sheet, has an outstanding ability to hide the presence of minor crevices, asperities, irregularities of the underlying surface of the wall to be decorated, thus greatly reducing the extents of preparation work to be eventually performed. The substrate is preferably an unwoven cloth of cellulose fibers having sufficient dimensional stability so as to be able to lay the sheets onto a liquid glue pre-coated wall without any pretreatments.

Normally the wall covering composite sheet will receive a single finishing coat of paint without the need of applying a primer as is necessary by contrast in the case of a fiberglass cloth substrate of the known technique.

Of course, it is also possible to apply a primer coat on the composite covering sheet, or a primer may even be applied during the fabrication process of the composite sheet, that is after having bonded the defined layer of powdery material aggregate.

By applying a finishing coat after having laid the composite covering on the wall to be decorated, which can be commonly done by rolling, brushing or by spraying, the portions in relief of the patterned surface of the composite substrate sheet, constituted by the defined portions of the powder aggregate layer bonded thereon, define visible ornamental designs.

According to a preferred embodiment, the inert powdery material of the screen printed layer has a sufficiently different tonality from the background tonality of the substrate paper sheet that, upon the application of a finishing coat of paint, the patterning remains in evidence not only because of the relief but even of the effect of the difference of tonality deriving from the pre-existent difference of tonalities on the surface of the composite covering ma-

terial that constitutes the substrate of the finishing coat of paint. In other words the finishing coat is such as not to blank off completely the difference of tonalities of the pattern substitute.

The composite paintable covering of the invention offers a highly sophisticated decor, comparable to the one that is normally obtained with wall papers, while rendering a finish typical of a paint decoration.

This outstanding decorative result is obtained with a relatively low cost process. The composite covering may be repainted several times even moderately varying the tonality and/or the tint of the finishing coat. This aspect concurs to further reduce prospected costs of decoration and of future redecoration wall. After two or three repaintings, the covering sheet may be easily peeled off the wall.

The cellulosic substrate sheet preferably contains randomly oriented cellulosic fibers. A nonwoven (pressed) cloth of randomly oriented cellulose fibers is particularly suited because it provides a superior dimensional stability when the sheet is being glued to the wall. Imbibition by the wet glue previously applied on the wall does not induce elongations along preferential directions or swellings. The dimensional stability promoted by the presence of randomly oriented fibers permits to apply the glue directly on the wall to be treated without subjecting the composite sheet to any pre-inhibition treatment. This greatly simplifies the decoration work. The cellulosic substrate sheet may have a consistency comprised between about 70 gr/m² and about 180 gr/m². Beside the dimensional stability at the moment of being glued to the wall, the substrate sheet based on a nonwoven cloth of cellulose fibers may be easily stripped off the wall for future redecorations.

For producing the composite sheet covering of the invention, a cellulose substrate sheet in rolls may be conventionally patterned by a screen printing, lithographic, flexographic process or by a doctor blade process, or by any other suitable high definition printing process. Ornamental designs of any complexity may be defined at a relatively low cost with liquid glue or with a sufficiently fluid aggregate.

The printed sheet, while the glue or fluid aggregate is still wet and tacky, is passed through a chamber where it is "contacted" with powder of inert material which adheres onto the tacky printed portions of the surface forming an adherent aggregate layer. By contrast, the powder does not adhere to the nontacky areas of the glue patterned sheet. The sheet passes through a fixing station, for example a heated drying chamber, wherein hardening of the glue takes place thus permanently fixing the relief patterns constituted by the areas covered by the aggregate layer.

Of course the granulometry and the type of powder material may be different for realizing ornamental patterns of different aspects and consistency. Normally, the materials used in granular form would be quartz, marble, mica, silicic sands and mixtures of these materials and

may have a granulometry comprised between 20 and 2500 micrometers (μm).

The adhesion of the powder on the wet glue carrying areas defined by the printing process may be promoted by exposing the painted surface to a "rainfall" of powder or by passing the printed sheet (while the defined patternings are still tacky) in a fluidized bed of powder in a fluidification chamber, or with similar systems. During and/or at the end of the contacting phase with the powder of inert material, the sheet may be lightly rolled to promote the adhesion of an adequately uniform thickness of powder aggregate over the glue patterned areas.

The granulometry of the powder material may be purposely designed for producing a certain "consistency" and visual effect. Larger grains may be admixed with finer grains for realizing peculiar ornamental effects. It is even possible to pre-mix a certain amount of powder with the glue (the finest granulometry portion thereof) to form a substantially fluid aggregate which can be screen printed or otherwise defined on the substrate sheet.

As already said above, the inert material in powder form that is eventually adhered on the areas printed with glue or otherwise defined on the substrate sheet may have a certain tonality. This tonality may be imparted either by employing inert materials of such a particular tonality or by subjecting the inert material in powder form to a dyeing treatment and/or by pigmenting the binder glue.

Upon applying a finishing coat of paint on the wall precovered with the composite sheet of the invention, the difference of tonality between the background constituted by the paper substrate and the screen printed or otherwise defined patterns on which a relief layer of bonded powder is present, remains visually evident (though in a more less attenuated manner) through the finishing film of paint applied on the face of the composite covering material. This renders the ornamental designs predefined by the printing process on the face of the covering sheet visible by virtue of their relief as well as of an appreciable difference of tonality as compared with the background tonality (of the areas free of aggregate layer).

Of course, the cellulosic sheet may even be coated with a first, uniform (unpatterned) layer of an aggregate of inert powder, and thereafter be screen printed for defining relief patterns of aggregate thereon, according to the present invention.

Figure 1 is a partial view of the face of a composite covering sheet of the invention on which are visible in a purely illustrative arrangement areas provided with a screen printed or otherwise defined relief layer of an aggregate of an inert material powder bonded to the surface of the substrate sheet by a binder (glue).

Figure 2 shows a cross section of the composite sheet of Fig. 1 in the plain I-I.

With reference to the figures, an adherent layer 2 of powder of a inert material and of a binder, for example a vinilic glue, is formed in areas of the surface of a cellu-

losic sheet 1 defined by a screen printing (or flexographic or lithographic or doctor-blade) process. Through a successive contacting process with powder of inert material while the printed or otherwise defined binder is still tacky, a certain amount of powder adheres on the screen printed or otherwise defined areas.

The adhered powder may be slightly rolled before subjecting the sheet to a fixing treatment which by producing the polymerization of the binder fixes in a permanent manner the layer 2 of an aggregate of inert material powder over the areas that were precisely defined by the process used for applying the fluid binder. The thickness of the screen printed or otherwise defined layer of an aggregate of powder and binder may vary from 100 to 2500 micrometers (μm).

The peculiar nature of the wall covering material of the invention, characterized by patterns in relief, effectively hide eventual irregularities of the underlying surface of the wall onto which is glued the composite sheet and such a masking function is enhanced upon applying a finishing coat of paint.

On the other hand, the structure of the composite covering sheet of the invention and the way it may be fabricated permit to create any graphic design in relief. Outstanding aesthetic results may be obtained in a decoration or redecoration work, that could hardly be achieved by the known technique of pregluing a fiberglass cloth on the wall to be used as a painting substrate.

On the other hand, the highly decorative results may be achieved with intrinsically contained costs when compared with the costs of alternative wall decoration processes of comparable effects.

Claims

1. A method of wall decorating comprising the application of a coat of glue on the wall to be decorated, the gluing thereon of a paint substrate material and the painting of the wall so covered, characterized by comprising
 - gluing to the wall to be decorated a cellulosic sheet having on its outer surface a patterned relief layer of an aggregate of powder of an inert material and of a binder;
 - painting the irregular surface of said substrate sheet to produce visual features replica of said patterns in relief.
2. The method according to claim 1, wherein said substrate sheet has a first underlying uniform layer of an inert material powder aggregate onto which said patterns in relief are defined.
3. The method according to claim 1, wherein said patterns in relief of inert powder aggregate defined on the surface of the sheet have a tonality different from the tonality of the sheet thus producing upon paint-

ing visible features distinguishable by their being in relief and by having also a different tonality from the background tonality.

4. A composite material for covering and decorating walls, glueable to a wall and paintable, characterized by comprising
 - a cellulosic substrate sheet;
 - at least a patterned top layer of an aggregate of a powder of an inert material and of a binder defined on the paintable surface thereof.
5. The composite material as defined in claim 4, wherein said cellulosic substrate sheet is a nonwoven cloth containing randomly oriented cellulose fibers.
6. The composite material as defined in claim 4, wherein said powder of inert material is bonded to the substrate sheet by a binder which is screen printed on the surface of the sheet.
7. The composite material as defined in claim 4, wherein said powder has a granulometry comprised between 20 and 2500 micrometers (μm).
8. The composite material as defined in claim 7, wherein said inert material belongs to the group composed of quartz, mica, marble, silicic sand and mixtures thereof.
9. The composite material as defined in claim 4, characterized in that is provided with a priming coat on said paintable face.

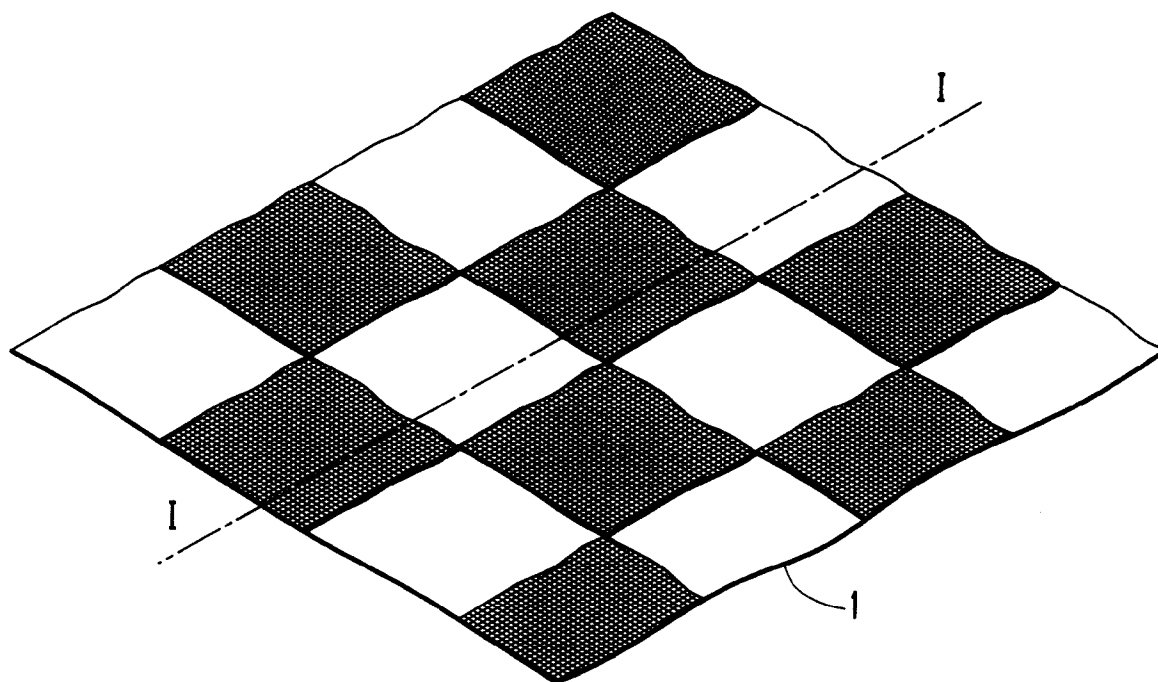


FIG. 1

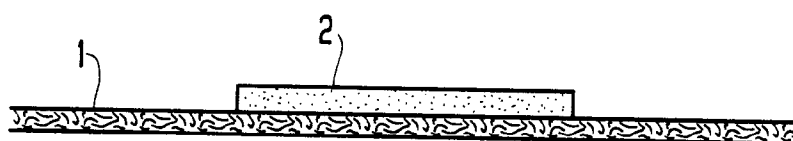


FIG. 2