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DECORATED WALL COVERING

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This invention relates to wall coverings, and aims to provide an inexpensive wallpaper which can be hung like ordinary wallpaper, but which is characterized by excellent waterproofness and unusual resistance to wear.

Wallpaper provides a highly desirable cheap decoration for home interiors, but is subject to premature deterioration because the paper, when soiled, cannot be cleaned easily and economically. The use of wash-resistant prints has been widely adopted in an attempt to overcome this objection, but even the best of the so-called "washable" wallpapers are not entirely satisfactory, particularly where exposed to water (as in bathrooms and kitchens) and to children's dirty hands. The market for really washable products has been filled by oilcloth, linoleum and coated fabrics, and more recently by decorated foils laminated to fabric. These products are all very expensive, and most of them are rather difficult to hang.

Attempts to protect the decorations on ordinary wallpaper, and thus obtain washfastness, by lacquer coatings or by the lamination of transparent or decorated foils thereto, have been made, in an effort to produce a cheap and really washable wall covering. But these attempts have failed, due to the fact that the coated or laminated wallpapers do not hang readily, and stick to the walls poorly. Apparently, this failure is due to the fact that the outer surface of the coated paper is substantially impervious to moisture, whereas the ordinary wallpaper permits rapid passage of moisture therethrough; since aqueous pastes are used in hanging the paper, trouble ensues, because of the water trapped back of the paper.

We have discovered that wallpapers, impervious on one side thereof, may be manufactured and successfully applied to walls, by using a base paper comprising a sized calendered sheet, which wets through with water very rapidly, and have developed a test whereby such papers can be distinguished from other papers.

In our test, three-inch diameter circles of paper are placed on the surface of a body of water, and the curling of the paper observed. All papers will curl to a maximum, and then flatten out. We have found that, by observing the time of maximum curl, papers which can be imperviously coated on one side and still hung can be readily chosen. If the average time of maximum curl, using several samples, is below ten seconds, good results can be obtained; if the time is between about ten and fifteen seconds, just passable results are obtained; while times of sixteen seconds and over (such as are obtained with ordinary wallpaper stocks) produce unsatisfactory sheets.

Typical of the papers which can be used are light weight papers (up to perhaps 50 or 60 pounds per ream), which are lightly sized and calendered, but uncoated, for example, some kraft stocks, and light weight "Hibulk" (a printing stock sold by West Virginia Pulp and Paper Company made by the soda process from about 70% of short deciduous fibers and 30% of long coniferous fibers, sized with rosin, having a density of 5 to 10 seconds, and having a low Mullen). Thus, 30-pound kraft shows a time of maximum curl of 7 seconds, 30-pound "Hibulk" a time of maximum curl of 6 seconds.

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Coated stocks, unsized highly absorbent stocks such as newsprint, heavy-weight sized stocks (such as 70-pound kraft or "Hibulk"), heavily sized papers such as most writing papers, and all the wallpaper stock we have tested, have proven unsatisfactory. Thus, 70-pound kraft has a maximum curl time of thirty seconds; conventional wallpapers are worse, with a time of 30 to 45 seconds.

The paper may be printed in conventional fashion, and coated with a water-resistant lacquer, applied as liquid or molten coating, but we prefer to laminate a thin sheet of water-resistant foil (e. g., cellulose acetate, cellulose aceto-butyrate, ethyl cellulose, vinyl resins, Pliofilm) to the paper. Such a coating should not be too thick, or hanging properties will be disturbed; foil of up to about 3 mils may, however, be used safely. Most preferably, the top face of the foil is matte, and the decoration is printed or otherwise applied to the foil on the side to be laminated. This takes advantage of the fact that the foil is ordinarily a better printing surface than the paper, and particularly that there is no danger of obscuring the print by the use of an adheisve which would have to be interposed between the foil and the print.

As typical of our invention, we printed a design on the glossy side of a 3-mil cellulose acetate foil with a nitrocellulose lacquer ink containing about 10% of methyl ethyl ketone, leaving the matte side to be used as the top surface. This solvent attacks the acetate, causing permanent adherence of the ink, which would not be attained in the absence of a solvent for the acetate. A printed foil in which the ink was merged into the foil was thus obtained. The ink was then over-printed, from an over-all intaglio plate, with a coating which acts both as a colored background for the print, and as an adhesive, comprising:

	Parts by weight
½" RS nitrocellulose	10
Alkyd resin (35% oil-modified) in Toluol	17
	17
Plasticizer	5
Titanium dioxide	12
Solvent	39

While this coating was still wet, the foil was

laminated to a calendered, sized paper sheet having a 3-second maximum curl time, and weighing thirty pounds per ream. The resultant decorated paper hung well, was washable and resistant to dirt. As distinguished from even most wallpapers, this wall covering showed no curling of the edges when once applied to the wall, largely eliminating the touch-up work necessary in most wall covering jobs. The wall covering itself could be smeared with ink, crayon, butter, etc., and cleaned without a trace with soap and water or gasoline—a property not possessed by other wall coverings.

Examples of coatings and foil laminations, of varying adhesives, and of papers, could be multiplied indefinitely. Various water-resistant foils can be used, such as nitrocellulose, cellulose acetate, cellulose mixed esters, cellulose ethers, and various resins (polyvinyl esters, and halides), Pliofilm, etc. Cellulose hydrate (Cellophane) and the hydrophilic cellulose derivatives (e. g., methyl cellulose) and resins (e. g., polyvinyl alcohol) are unsatisfactory. The basic thought of this invention, however, is in the choice of certain papers which permit hanging even when one side is protected with a water-impervious film, and is expressed in the claims.

We claim:

1. A wall covering consisting of paper having one side thereof covered with a water-impervious film tightly adherent to the paper, the paper being characterized by having a time of maximum curl, when a three-inch circle thereof is placed on the surface of a body of water, of fifteen seconds or less.

2. A wall covering consisting of paper having one side thereof covered with a water-impervious film tightly adherent to the paper, the paper being characterized by having a time of maximum curl, when a three-inch circle thereof is placed on the surface of a body of water, of below ten seconds.

3. A wall covering consisting of paper having one side thereof covered with a water-impervious film tightly adherent to the paper, the paper being characterized by being uncoated but sized and calendered, and having a time of maximum

curl, when a three-inch circle thereof is placed on the surface of a body of water, of below ten seconds.

4. A wall covering consisting of paper having one side thereof laminated to a water-resistant foil carrying a design on the side thereof laminated to the paper, and tightly adherent to the paper, the paper being characterized by having a time of maximum curl, when a three-inch circle thereof is placed on the surface of a body of water, of fifteen seconds or less.

5. A wall covering consisting of paper having one side thereof laminated to a water-resistant foil carrying a design on the side thereof laminated to the paper, and tightly adherent to the paper, the paper being characterized by having a time of maximum curl, when a three-inch circle thereof is placed on the surface of a body of water, of below ten seconds.

6. A wall covering consisting of paper having one side thereof laminated to a water-resistant foil carrying a printed design on the side thereof laminated to the paper, and tightly adherent to the paper, the paper being characterized by being uncoated but sized and calendered, and having a time of maximum curl, when a three-inch circle thereof is placed on the surface of a body of water, of below ten seconds.

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