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GRAINING INK

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This invention relates to inks and more particularly to graining inks employing a water insoluble resin.

Heretofore several different types of graining inks have been used in producing grained effects in imitating natural wood grain for finishing various articles such as metal furniture. The first of these inks developed consists of an oleoresin vehicle in which a suitable pigment is dispersed. In usual practice this ink is applied over a contrasting ground coat by means of known graining processes, a cellulose ester lacquer being applied subsequently. This type of graining ink is deficient in several respects, the most objectionable of which is the long drying period required due to the presence of a large proportion of drying oil necessary to give a good flow, and a sufficient lapse of time before setting up to permit satisfactory production of the desired designs. Another objection to this type of graining ink is that when a cellulose ester lacquer is used as a finishing top coat, the graining ink is frequently attacked and the resulting lifting and wrinkling presents an unsatisfactory appearance.

A second type of graining ink comprises a pigment dispersed in water containing a small amount of a water soluble adhesive. This ink substantially eliminates the lifting and wrinkling difficulties caused by the top coat of lacquer over the oil type graining inks, but this advantage is largely offset by a very short drying time which is not long enough to permit the production of suitable designs over normal workable areas.

A more recent type of graining ink employs special types of gums and solvents, the gums being soluble in water which comprises a substantial part of the composition. This type of graining ink, while avoiding lifting and providing satisfactory drying periods, presents a serious defect when the finished product is exposed to humid atmospheres. Moisture apparently penetrates through the top lacquer film and rapid failure of the finish occurs as evidenced by the appearance of numerous blisters over the surface of the finish.

An object of the present invention is to provide a graining ink which will not require the long drying time of the oleo-resinous type and yet will not dry too quickly to permit the production of the desired design. A further object is to provide a graining ink which can be applied over a celculose ester enamel base and coated with a cellulose ester lacquer without causing lifting or wrinkling in the finished product. A still further object is to provide a graining ink which when dry is but slightly affected by the solvents of the lacquer top coat. A still further object of the invention is to provide a graining ink which has a low surface tension, thus insuring satisfactory wetting of the grain plate. Other objects of the invention will be apparent from the description hereinafter given.

The above objects are accomplished according to the present invention by the use as a graining ink of a composition comprising coloring matter dispersed in a vehicle comprising a water insoluble resin and a relatively high boiling solvent therefor having substantially no solvent action on cellulose esters. A more specific embodiment of the invention comprises a non-bleeding pigment dispersed in a vehicle comprising a water insoluble resin, a high boiling solvent therefor substantially immiscible with water and having substantially no solvent action on cellulose esters, and a low boiling solvent therefor likewise having substantially no solvent action on cellulose esters.

More particularly the composition comprises a non-bleeding pigment dispersed in a vehicle comprising a water insoluble resin such as shellac, a high boiling solvent having a boiling point between 150–230° C., such as terpineol or one of the higher aliphatic alcohols, and a low boiling solvent having a boiling point between 90–150° C., said low boiling solvent being preferably an aliphatic alcohol.

The following examples are given to illustrate specific embodiments of the invention, parts being given by weight:

Example 1

Mahogany air drying graining ink

	Percent
Permanent non-bleeding red lake	28.6
Carbon black	1.6
Whiting	3.9
Burnt umber	9.7
Shellac (wax free)	4.4
Terpineol	38.8
Pentasol	13.0
	100.0

Example 2

Mahogany air drying graining ink omitting low boiling solvent

	Percent
Permanent non-bleeding red lake	28.6
Carbon black	1.6
Whiting	3.9
Burnt umber	9.7
Shellac (wax free)	4.4
Terpineol	51.8
	100.0

The above graining inks are prepared by charging all of the ingredients into a ball mill with steel balls in a ratio of two parts steel balls to one part of the composition. The mill is operated for a period of approximately 24 hours to secure a sat-

isfactory state of pigment dispersion. The steel ball ratio and the grinding cycle may, of course, be varied within wide limits depending on conditions, such procedure being well within the knowledge of those skilled in the art with respect to modern grinding practice. Satisfactory results may likewise be obtained by dispersing the pigment in the vehicle by means of a buhr mill, three roller mill, or similar apparatus known in the grinding art.

The graining inks thus prepared have satisfactory properties for use either in machine or hand graining, being characterized by a suitable drying period which will permit production of graining designs over workable areas without a prolonged drying period. Deleterious effects on the background coat and the final lacquer top coat are eliminated, thus giving a product having a finish of improved appearance and great durability.

It will be understood that the above examples are merely given to illustrate the invention, which may be varied widely. Any pigment or pigment dye or combination thereof which simulates the natural color of wood may be used in the graining composition, although it is preferred to use a coloring matter of the non-bleeding type.

The resins employed must have high resistance to water and relative insolubility in the usual lacquer solvents. It has been found that shellac is best suited for this purpose and preferably a wax-free shellac should be used, although other types of shellac such as the ordinary orange shellac, TN grade and the several bleached shellacs can be satisfactorily used. Besides shellac other natural and synthetic resins may also be employed, such as the following: accroides, kauri, elemi and copal. Since terpineol is preferred as the high boiling solvent, a resin soluble in terpineol would usually be selected.

The high boiling solvent is preferably terpineol having a boiling range of 217–220° C. This high boiling solvent should possess good solvent action on the chosen resin, preferably be substantially immiscible with water, have a boiling point between 150–220° C. and have substantially no solvent action on cellulose esters, good wetting of the graining plate and some dispersive action on the pigments during grinding. Besides terpineol, the higher aliphatic alcohols have been found to meet these requirements satisfactorily. Specific high boiling solvents, other than terpineol, are as follows: lauryl alcohol, borneol, cineol, fenchyl alcohol and hexyl alcohol. Both alpha or beta terpineol, or a mixture of these, are suitable.

It is highly advantageous to use a high boiling solvent substantially immiscible with water, as the solvent may remain to some extent in the graining ink after the top coat is applied. If the solvent is immiscible with water, the graining ink will have no tendency to absorb water and form blisters, whereas such a tendency does exist when a water miscible high boiling solvent is used. However, the amount of solvent left in the graining ink is usually so small that a high boiling solvent not substantially immiscible can be used without much danger of water being absorbed.

Of the suitable low boiling solvents, amyl alcohol is preferred. Solvents having a boiling range between 90–150° C., approximately, are suitable as low boiling solvents in the vehicle of the present invention. The requisites for this solvent are identical with those specified above for the high boiling solvents, with the exception that pigment dispersing properties are not of much importance for this ingredient, and immiscibility with water is immaterial. Other suitable low boiling solvents comprise propyl alcohol and butyl alcohol.

The proportions given in the above specific examples are merely a guide to show approximately what proportions are suitable, although those skilled in the art will know that the proportions can be widely varied without departing from the spirit of this invention. The ratio of high boiling solvent to low boiling solvent is adjusted to give the drying period desired, the drying period, of course, being increased as the proportion of high boiling solvent is increased.

As shown in Example 2, the low boiling solvent may be eliminated entirely and, in fact, where a high boiling solvent having a boiling point not much above 150° C., such as hexyl alcohol boiling at 158° C., is used, ordinarily no low boiling solvent is used. However, it is preferred to use a high boiling solvent having a boiling point not much under 200° C. in combination with a low boiling solvent since, by varying the proportions of the two solvents, the evaporation rate of the solvents can be accurately adjusted to meet specific working conditions.

While the resins disclosed above are preferred because of their solubility in the solvents mentioned above which have been found most satisfactory, other resins, such as damar, cumar, rosin modified phenol-formaldehyde resins may be used, in which case Hi-flash naphtha i. e., aliphatic hydrocarbons boiling between 150–250° C., or kerosene should be employed as the high boiling solvent and toluol as the low boiling solvent. While these resins are operative in the present invention they have not been found to be as satisfactory in providing good definition and depth of design as the preferred graining ink first disclosed.

The use of the herein disclosed graining ink in conjunction with the production of imitation wood grains or other designs on metal, wood or other surfaces provides a finish which has satisfactory durability, since no harmful effects result from penetration of moisture through the lacquered or varnished top coats. All of the substantially non-volatile ingredients used in the graining ink are substantially insoluble in water. The solvent combination in the present graining ink is so designed that it causes only a slight softening of the background coat of cellulose ester, enamel, or the like, thus providing good definition of the grain design, a most important factor in the production of a satisfactory article.

An advantage of this graining ink is that it may be used successfully where lacquers are desired for the top coat, since the solvents in this ink composition are substantially unaffected by lacquer solvents and no bleeding or smearing results.

The use of the type of high boiling solvent herein disclosed apparently affords a most suitable surface tension as indicated by the proper wetting of the graining plate. This solvent also has some dispersive action on the pigments during grinding, thus assisting in obtaining an ink of superior quality from the standpoint of color and absence of grit.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the appended claims.

I claim:

1. A graining ink comprising a pigment which

simulates the color of wood dispersed in a non-aqueous vehicle which is water insoluble comprising about 4% resin selected from the class consisting of shellac, accroides, kauri, and elemi gums, and a solvent for the resin, the major component of which is material selected from the class consisting of terpineol and alcohols boiling between 150° C. and 230° C., said vehicle being a non-solvent for cellulose esters.

2. A graining ink comprising a pigment which simulates the color of wood dispersed in a non-aqueous vehicle which is water insoluble comprising about 4% resin selected from the class consisting of shellac, accroides, kauri, and elemi gums, and a solvent for the resin, the major component of which is material selected from the class consisting of terpineol and alcohols boiling between 150° and 230° C. and a minor component comprising a solvent for the said resin having a boiling point between 90° C. and 150° C., said vehicle being a non-solvent for cellulose esters.

3. A graining ink comprising a pigment which simulates the color of wood dispersed in a non-aqueous vehicle which is water insoluble comprising about 4.4% shellac and a solvent comprising terpineol in major proportion and amyl alcohol in minor amounts, said vehicle being substantially a non-solvent of cellulose esters.

4. A graining ink as claimed in claim 1, in which the pigment is permanent non-bleeding red lake.

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