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WOOD STAIN

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This invention relates to stains and particularly to wood stains which are substantially free from shade changing effects.

In the production of wood stains, the water soluble aniline dyes have proved to be most suitable as coloring components principally because of their substantial fastness to light. The use of these water soluble dyes in wood stains, however, requires a suitable solvent and the solvents heretofore proposed have given rise to disadvantages in the finished wood stains. In this connection it its important to note that the dissolving ability of the solvent is only one of a number of factors which must be considered. For instance, water is a solvent for these dyes, but it is not a suitable solvent for use in wood stains due to the fact that it raises the grain of the wood. Furthermore, the use of water as a solvent gives rise to unsatisfactory penetration of the dye into the wood.

It has been proposed to use methyl alcohol as a solvent but when this is done it is necessary to convert the dye to an alcohol soluble form and the disadvantages of grain raising and lack of penetration are only partly alleviated. Moreover, where methyl alcohol is used as the dye solvent there is a pronounced tendency to bleeding of the color in the stain into lacquer or similar coatings subsequently applied to the stained surface.

It has also been proposed to employ the more complex organic compositions such as the glycols and their alkyl ethers as solvents for use in wood stains. These complex organic compounds have certain serious disadvantages when used in wood stains. Perhaps the most serious of these disadvantages is that a stain made with one of these compounds as the principal solvent ingredient tends to undergo a change in shade during the period between the time that the stain is made up and the time when it is applied. The term "shade-changing effect" as used throughout this specification and the claims is meant to refer to this effect which takes place before application and is to be distinguished from the term "fading effect" which is used to refer to fading of the color which takes place after application. This shade-changing effect is quite apparent over periods as short as a week or less. It is probably derived from a number of causes, among which are precipitation of the dye, colloidal dispersion of the dye and changes in the chemical structure of the dye. Whatever may be the causes, it will be readily understood that shade-changing is a disadvantage of serious import, since it makes it practically impossible to produce a stain to match a given shade unless the application is to take place within a relatively short period of time after the stain is prepared. Moreover, such stain as is not used in a given application will not match the shade so obtained if additional material is to be stained at a later date with the same stain. In addition, the glycols and their alkyl ethers are hygroscopic and this results in grain raising when the atmosphere is relatively humid.

An additional problem in the wood staining art has to do with the production of reducer solutions which consist of all of the essential ingredients of a wood stain except the dye. Such reducer solutions are made up into stains by adding the desired dye directly to the reducer solution. Heretofore reducer solutions have not proved practical due to the fact that in order to get the dye into solution it was necessary to use relatively large amounts of solvent in the reducer as compared with the amount of solvent which would be sufficient where the wood stain was made up in the customary fashion, and this increased the cost of the finished stain. The difficulty, therefore, resided in the characteristics of the solvents heretofore proposed for use in reducer solutions.

Therefore, the main object of the present invention is to overcome the disadvantages inherent in the wood stains of the prior art by the use of a dye solvent which makes it possible to produce wood stains substantially free from shade-changing effects prior to application and substantially free from fading effects after application and which penetrate the stained surface without causing any substantial grain raising and at the same time are free from bleeding effects.

A further object of this invention is to produce a practical wood stain reducer solution comprising all of the essential components of a wood stain except the color ingredient which may be added to the reducer solution when desired.

In the practice of this invention the preferred dye ingredient is selected from the group comprising the water soluble aniline dyes. The specific dyes set forth below are examples of dyes

which are suitable for the production of the colors ordinarily used in wood stains. Wherever possible the color index number follows the name of the dye.

The following reds are suitable:
- Azo rubine 179
- Carmoisine 179
- Croceine scarlet MOO 252
- Brilliant croceine scarlet conc. 252
- Fast red conc. 176

Suitable oranges are:
- Acid oranges such as,
  - Acid orange A 151
  - Acid orange Y 151
  - Acid orange II 151
  - Croceine orange 26

Suitable yellows are:
- Naphthol yellow 10
- Tartrazine 640
- Metanil yellow MXX 138

Suitable blacks are:
- Buffalo black NBR conc. 246
- Acid black BX 267
- Fast black B 996
- Naphthylamine black 10 BR 246

Suitable browns are:
- Resorcin brown 234
- Benzo brown B 608

Suitable greens are:
- Wool green S 737
- Acid green B 666

As a blue, acid blue R (Manual of Dyeing, by Knecht, Rawson and Loewenthal, published London, 1917, by Charles Griffin & Co., Ltd., Fourth Edition, Vol. 2, page 549) may be used.

While certain specific dyes have been mentioned herein, it is to be understood that these dyes have been set forth merely by way of example.

I have discovered that the methyl ester of alpha hydroxy propionic acid, commonly called methyl lactate, when used as a solvent ingredient in wood stains produces far reaching improvements in the finished product. These results are all the more remarkable in view of the fact that the higher esters of lactic acid, such, for instance, as butyl lactate, have proved unsatisfactory. As illustrations of the present invention, the following examples of wood stain compositions containing methyl lactate may be noted. The parts are by volume except for the dye ingredients.

Example 1

Methyl lactate	part	1
Methyl alcohol	parts	5½
Ethyl alcohol	do	4½
Toluol	do	5
Water soluble aniline dye per gallon of stain	ounces	1 to 4

A reducer solution for wood stains may be prepared according to the following example:

Example 2

	Parts
Methyl lactate	1¼
Methyl alcohol	5¼
Ethyl alcohol	4½
Toluol	5

While ethyl alcohol is preferred in the above examples, it may be replaced with methyl alcohol, isopropyl alcohol, or acetone. Toluol is preferred for a number of reasons but equivalents such as xylol, benzol, solvent naphtha, benzene, turpentine or dipentene may be used without departing from the spirit of this invention. As a practical matter ethyl alcohol in denatured form is used, but it will be understood that ethyl alcohol in any form is suitable.

In addition to the principal advantage mentioned above, namely, the prevention of shade-changing effects, the use of methyl lactate makes it possible to produce a practical wood stain reducer solution wherein the increase in the amount of the solvent ingredient necessary is extremely small as compared with substantial increases heretofore necessary. Methyl lactate has the further advantage of making it possible to produce so-called heavy color stains containing as high as 6 ounces of color per gallon of wood stain without an undue increase in the methyl lactate content. In addition to these specific advantages, wood stains made with methyl lactate give better penetration than other non-grain raising wood stains made from water soluble aniline dyes, for the methyl lactate gives stains that are non-hygroscopic.

While methyl lactate has been referred to above as the solvent ingredient for the improved wood stain composition which is the subject of this invention, it is to be understood that the term "solvent ingredient" has been used in the sense of "principal solvent ingredient" since the methyl lactate may be assisted by such well known solvent assistants as methyl and ethyl alcohol. However, in spite of the fact that the methyl lactate is used in relatively smaller amounts than the assisting ingredients, it is important to note that the methyl lactate, due to its great solvent power, is the principal solvent ingredient in the sense that it is primarily responsible for the solvent effect.

While the present invention has been described in detail with reference to specific wood stain compositions, various changes in the kinds of materials used, particularly in the kinds of dyes, are within the contemplation of the invention and such changes should not be deemed to constitute a departure from the spirit of the invention as hereinafter claimed.

Having thus described my invention, I claim:

1. A wood stain containing a water-soluble aniline dye in solution in methyl lactate, which constitutes the essential dye-solvent of the stain, whereby the stain is rendered substantially non-shade-changing prior to use, non-hygroscopic and penetrant of wood without raising its grain, and non-bleeding into lacquer or similar coatings subsequently applied to the stained surface.

2. A wood stain in accordance with claim 1 containing methyl alcohol as a solvent assistant, and also containing toluol.

3. A wood stain in accordance with claim 1 containing methyl and ethyl alcohols as solvent assistants, and also containing toluol.

4. A wood stain in accordance with claim 1 consisting essentially of 1 part methyl lactate, 8 parts methyl alcohol, and 5 parts toluol, together with 1 to 4 ounces of water-soluble aniline dye per gallon of the stain.

5. A wood stain in accordance with claim 1 consisting essentially of 1 part methyl lactate, 5½ parts methyl alcohol, 4½ parts ethyl alcohol, and 5 parts toluol, together with 1 to 4 ounces of water-soluble aniline dye per gallon of the stain.

6. A reducer for making wood stains of water-soluble aniline dyes as set forth in claim 1, said reducer comprising a minor proportion of methyl

lactate as its principal dye-solvent ingredient, together with a major proportion of solvent assistant.

7. A reducer for making wood stains of water-soluble aniline dyes as set forth in claim 1, said reducer consisting essentially of 1¼ part methyl lactate, 8 parts methyl alcohol, and 5 parts toluol.

8. A reducer for making wood stains of water-soluble aniline dyes as set forth in claim 1, said reducer consisting essentially of 1¼ part methyl lactate, 5¼ parts methyl alcohol, 4½ parts ethyl alcohol, and 5 parts toluol.

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