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WOOD AND SHINGLE STAINS

1. Wood Stains

The function of wood stains is to change or modify the color, and to bring out the grain and texture of the wood.[1]

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[1] See Paint Making and Color Grinding, C. L. Uebele (1913), published by The Painters Magazine, New York City; The Expert Wood Finisher, A. A. Kelly (1912), published by The Press of the Master Painter Publishing Company, Malvern, Pa.; and Painting and Decorating Methods, produced under the direction of the International Assn. of Master House Painters and Decorators of the U. S. and Canada and edited by F. N. Vanderwalker (1922).

They may be classified as oil stains, water stains, spirit stains, and stains due to chemical change.

By oil stain is meant a stain in which the vehicle contains oil, with volatile thinners, such as turpentine, mineral spirits, or solvent naphtha furnishing the penetrating agent, as a stain made only of oil and color would not penetrate properly the wood fiber. Since it is possible to make a so-called oil stain without using any linseed oil, it seems more rational to consider oil stains as those in which coloring material is mixed with solvents for oil, namely, turpentine, benzine, or solvent naphtha, while in water stains the liquid is water and in spirit stains the liquid is alcohol.

The pigments used in oil stains should be very finely ground and of the highest color strength, those colors which are somewhat transparent being, in general, more useful than the more opaque colors.

Pigment oil stains can be made easily from pigments of good quality ground in oil and a liquid composed of about 2 volumes of raw linseed oil, 1 volume of painters' liquid drier, and 2 volumes of turpentine. One pint of the pigment paste in oil to one gallon of liquid is about the correct proportion. With a supply of oil paste, yellow ocher, raw sienna, burnt sienna, raw umber, burnt umber, Van Dyke brown, indian red and Tuscan red, almost all of the stains used commonly for interior wood trim can be made. For example, with thoroughly mixed portions of 1 volume of each of the above pastes in oil to 16 volumes of the above liquid, one can make:

Light oak from equal volumes of yellow ocher and raw sienna.

Dark oak from

8 volumes raw sienna)
1 volume burnt sienna) or
1 " burnt umber)

4 volumes raw sienna)
1 volume raw umber)

Light mahogany or cherry.- Burnt sienna

The color of genuine mahogany furniture varies widely, is seldom lighter than the above mentioned burnt sienna stain, and may be a color matching any one of or any mixture of Van-Dyke brown, burnt umber, raw umber, indian red, and Tuscan red. The colors shown in genuine black walnut wood as found in furniture are the same as those in mahogany.

Another type of oil stain consists of solutions of oil-soluble dyes (generally aniline dyes) in vehicles similar to that mentioned above. Much less color is required in this type of stain, seldom more than one-fourth of a pound to the gallon.

Oil stains are applied with a brush and the wood is then rubbed clean with cotton waste. The advantages of these stains are that they are easy to prepare and to apply, and they do not raise the grain of the wood. They have the disadvantages that they are apt to give a muddy effect, they do not penetrate very deeply into the wood, and they cover the grain somewhat, so that it is impossible to stain hardwood with them and at the same time keep clear the grain and texture of the wood. By "fuming" hardwood with ammonia or adding a little ammonia to the stain just before applying it, the penetration into the wood may be increased.

Water and spirit stains are solutions of dyes in water or in alcohol. They are clear, penetrate deeply into the wood, and do not obscure the grain as oil stains are likely to do. However, they raise the grain of the wood. Water stains made from aniline dyes are likely to fade, though the addition of vinegar to certain of them is said to hinder this fading. The number of colors which may be used with these classes of stains is very large and no attempt will be made to give a list of them. Many brilliant dyewood stains, whether oil, water or spirit stains, are not only liable to fade but will be soluble enough in oil or varnish to discolor paint applied over them. There is much wood stained a garish red, and called imitation mahogany or cherry, which often has this defect of bleeding.

A method of producing a permanent black, which is a very satisfactory finish for wooden tops of laboratory tables, is as follows: Solution A, 125 g of copper sulphate, 125 g of potassium chlorate, and water to make 1000 ml. Solution B, 60 g of aniline, 90 ml of concentrated hydrochloric acid (specific gravity 1.18) and water to

make 500 ml. If English units are used instead of metric grams and milliliters, the formula becomes:

Solution A, 4-1/5 oz. avoir. (3.8 oz. apoth.) of copper sulphate, 4.2 oz. avoir. (3.8 oz. apoth.) of potassium chlorate, and water to make 1 quart (946 ml). Solution B, 2 oz. avoir. (1.8 oz. apoth.) of aniline, 2.9 fl. oz. of concentrated hydrochloric acid (specific gravity 1.2), and water to make 1 pint (473 ml). First paint with solution A and when dry with solution B and allow to dry several hours. Wash with hot water and repeat the whole operation until the wood is dark green. Finish by rubbing with raw linseed oil until a black surface is secured. By going over the work at intervals of one to two weeks with a cloth moistened with raw linseed oil it may be kept in perfect condition. The wood to be treated must be free from oil. Imperfections requiring putty should not be filled until the woodwork is stained. Putty colored with lampblack may then be employed.

This aniline-black table-top finish is, in a sense, a stain due to chemical action, since the two solutions react upon one another to produce the aniline black in the pores of the wood. There are, however, other stains produced by the action of certain chemicals on constituents of the wood. Ammonia has much the same effect on oak as aging or weathering. It also seems to open the grain of oak and thereby makes it possible for other stains to penetrate better. It is best applied by moistening the wood with water and exposing it in a covered box to fumes of ammonia.

For directions for staining and numerous formulas for stains see "The Expert Wood Finisher" by A. A. Kelly.

2. Shingle Stains

Shingle stains are used to color uniformly shingles and rough siding. Like pigment-oil wood stains they are very fluid paints, but whereas a wood stain is brushed on and then wiped off to bring out the grain of the wood, shingle stains are applied by dipping or brushing and are not wiped off. Shingle stains should not cake or change color in the containers and when stirred up should settle very slowly. With the exception of some dark brown stains which are simply refined coal tar creosote with volatile thinners, all shingle stains are made from very finely ground pigments, drying oils and volatile thinners. Most commercial shingle stains contain some creosote oil from coal tar or water-gas tar which is supposed to act as a wood preservative. While pressure treatment with creosote is one of the most efficient methods of preventing wood from rotting, the small amount that penetrates into the wood from a simple dip or brush treatment probably has no marked effect.

Uebele (Paint Making and Color Grinding - 1913) gives the following formulas for creosote shingle stains:

(1) Deep Green Stain (Chrome-Green Type)

15 lbs. C.P. chrome green in oil
1 gal. benzine japan drier
4 gal. creosote oil
4 gal. heavy benzine

(2) Mineral Red Stain (Venetian Red Type)

17 lbs. red oxide (95 percent) ground in oil
1 gal. benzine japan drier
4 gal. creosote oil
4 gal. heavy benzine

(3) Walnut Brown Stain

13 lbs. burnt Turkey umber in oil
1/2 gal. benzine japan drier
1/2 gal. 160° benzol
5 gal. creosote oil
3 gal. heavy benzine

(4) Silvery Gray Stain

20 lbs. zinc white in bleached linseed oil
1/8 lb. lampblack
1/2 gal. pale liquid drier
1/2 gal. straw-colored cresylic acid
8 gal. heavy benzine

Paint applied over creosote stain is likely to be ruined by the creosote bleeding through. Pigment-oil shingle stains without creosote do not have this disadvantage. They can be made by thinning a good outside oil paint with turpentine and some boiled linseed oil, or by mixing suitable pure high grade pigments ground in linseed oil with a vehicle made from about 4 volumes of boiled linseed oil, 1 volume of liquid drier, and 1 volume of turpentine, in the proportion of about 1 gallon of vehicle to 1 pint of the pigment in oil. A great variety of pigments may be used, and the following are merely examples of commonly used shingle stains:

For deep red brown, use indian red

" red, use bright red oxide

" brown, use raw umber or burnt umber

" green, use chromium oxide green or pure chrome green

" gray, use zinc oxide, white lead, or a mixture tinted with lampblack.