

UNITED STATES PATENT OFFICE

2,372,334

LACQUER COATINGS

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No Drawing. Application June 22, 1942.
Serial No. 448,051

6 Claims. (Cl. 106—193)

This invention relates to coating compositions and particularly to lacquers for interior use, and more specifically is concerned with the production of lacquers that yield opalescent finishes, bronze effects, etc.

The production of opalescent finishes and colored bronze effects by the use of coating compositions has met serious difficulties in the prior art. Opalescent lacquers were produced with pearl essence of other perishable materials which were expensive and inadequate because subject to a number of deficiencies. The colored bronzes either did not yield stable solutions or suspensions, or exhibited livering particularly when produced with copper base materials, while those produced with aluminum were comparatively rough and rather dull in finish also showing rather poor covering.

A distinct advance in the art was taught in prior applications Serial No. 234,489, entitled Aluminum bronze containing compositions, filed October 11, 1939, now Patent No. 2,287,053, issued June 23, 1942, as a continuation of an application entitled Opalescent lacquers, filed July 24, 1931, Serial No. 553,007. Application Serial No. 234,489 was particularly concerned with durable compositions for use on exterior exposure, as for example, as coatings on automobiles, etc. The present specification is a continuation-in-part of those prior applications, and is particularly concerned with those portions of the disclosures therein utilized in connection with coating compositions adapted for interior use.

Among the objects of the present invention is the production of cellulose ester lacquers of low solids content for interior use to produce special effects including opalescence, bronze, etc.

Other objects and advantages of the present invention will appear from the more detailed description set forth below, it being understood that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In accordance with the present invention, opalescent and colored bronze effects are obtained by the use of aluminum bronze in pigmented cellulose ester binders of low solids con-

tent. The cellulose component of such binder may be such cellulose derivatives as nitrocellulose, cellulose acetate, cellulose ether, etc., the opalescent or bronze effect being obtained by the utilization of aluminum with colored pigments, the effect being translated to the article by the low solids vehicle or binder. The binder should give quick set and resistance to metal particle movement, the properties of smoothness and brilliance being paramount as against that of durability, in these compositions for interior use, as for example, on caskets, and various articles that are used within buildings such as meat chopping machines, clocks, etc.

A quick-setting, low solids binder vehicle is particularly important in connection with such compositions for use for interior purposes and the cellulose ester lacquers are particularly important as such low solids binder vehicle. As a general rule the binder may be said to be of low solids content when it contains not more than 25 ounces per gallon of solids, in the case of cellulose ester vehicles, the solids being largely the cellulose ester ingredient such as nitrocellulose, which may run, for example, as much as 80% of the binder solids, or even more, the remainder of the solids being the usual ingredients incorporated with such cellulose vehicles such as plasticizers, softeners, non-volatile oils, etc.

Aluminum bronze is utilized in such vehicles for producing the effects sought in accordance with the present invention. The aluminum bronze may be introduced into the composition in any desired form although it has been found that improved results are obtained if the bronze is first dispersed in paste form in some vehicle, such as petroleum spirits, or other medium compatible with the other components employed in the composition. An example of an aluminum bronze paste is one containing 65% of aluminum bronze per se, and 35% of mineral spirits, but this is merely exemplary of such compositions since the aluminum bronze may be introduced in dry form if desired. The aluminum bronze preferably in dispersed form as illustrated, may be directly incorporated by any desired mixing operation with the desired composition and when used in the form of a paste as referred to above, thorough dispersion is readily obtained without elaborate mixing or grinding operations. The

aluminum paste material offers further advantages in the final coating composition since when produced in this way, they yield a very even laying on of the powder on the surface and a remarkably complete coverage even with relatively low pigment content. In securing the special finishes of the present invention, relatively small amounts of aluminum bronze may be employed in the composition, and up to a certain point increase in the amount of the aluminum bronze increases the special effect obtained. Beyond that point, increase in the amount of aluminum bronze will to some extent decrease the opalescent effect and give a substantially solid ground color, but even in those cases where a higher content of aluminum bronze is employed than is normally necessary for the particular finish such as opalescence, the introduction of the aluminum bronze in the dispersed condition in the hydrocarbon or other vehicle, still yields a substantially smooth finish, free from rough surface irregularities. By variation in the relative amount of coloring matter to aluminum bronze, variation in shade of color is secured, deeper shades being obtained with more coloring matter and less aluminum bronze, whereas more bronze and less color give lighter shades.

The non-metallic coloring agents employed in these compositions include generally dyes and pigments.

While opalescence and colored bronzes may be obtained by the use of water-soluble aniline dyes as stated above, which compositions do not fade or bleed, improved results are obtained by the use of insoluble pigments as the coloring medium. When opaque or substantially opaque pigments are employed, the amount of the opaque pigment used in the composition should be such that the coating deposited from the composition does not give a solid ground color, since in this way coatings having diaphanous or light-transmitting properties which are very desirable in carrying out the present invention, are obtained. Best results are secured from pigments that have a deep mass tone and a bright transparent undertone. Examples of these pigments are: iron blues such as Prussian, milori, Chinese, etc.; phthalocyanine blues and greens, yellow, red and orange lakes, madder lake, alizarine lakes and toners, carbon black (when used in small quantities), burnt umber, burnt sienna, etc.

On the other hand, pigments which possess a milky top tone and undertone tend to produce a duller and degraded effect, and are less desirable. Such pigments are chrome yellows and oranges, molybdate orange, iron oxide yellows and reds, cadmium yellows and reds, chromium oxide, chrome greens, and white in all forms. Any of the desired pigments may be ground in a suitable vehicle and subsequently incorporated with the film-forming compositions, such as the low solids nitrocellulose lacquer binder. Such pigment pastes will generally contain from 20 to 75% pigment, depending on the nature of the pigment and the grinding vehicle.

The effects obtained by the use of the insoluble pigments as opposed to the dye compositions set forth above, are preferred because deeper effects are obtained with the pigment-containing compositions. However, both types of compositions yield satisfactory opalescent lacquers and colored bronze effects; the color of course, depends on the nature of the dye, pigment or other color employed in the composition, so that

bronze, copper, gold, etc. effects may be readily obtained with these compositions.

The vehicle employed should be practical for the purposes in hand and requires that it give quick-set and resistance to metal particle movements which is particularly important to the opalescent and special effects obtained with the present finishes. Particularly the vehicle employed should be of such character as to avoid any substantial floating of the aluminum bronze, particularly when sprayed. Vehicle should possess good wetting properties (should have a low surface tension toward the aluminum bronze powder), as a vehicle with a high surface tension will repel the aluminum flakes and cause leafing which would destroy the opalescent effect. The composition in general should be such that there is a rapid expulsion of the solvents in order to get proper set, and under such circumstances no substantial floating effect will result.

The proportions of aluminum bronze to non-metallic pigment employed in the quick-setting low solids binder vehicle, is limited for the purposes to be secured in accordance with the present invention. With such low solids binder vehicle, the overall proportions for aluminum bronze and non-metallic pigment may be stated generally to be from 1 to 12 ounces of aluminum bronze per gallon of finished lacquer and from 1 to 16 ounces of actual non-metallic pigment per gallon of finished lacquer. The pigment proportions referred to are based on actual pigment content exclusive of any extending base for such pigment. In general the solids in such binder vehicle will be approximately 5 to 25 ounces per gallon of vehicle and such binder will be largely the cellulose ester such as nitrocellulose, ingredient, such binders frequently being made up with 80% of cellulose ester to 20% of other components such as softeners, etc. present therein. The range of 5 to 25 ounces per gallon for the solids in such lacquer binder vehicle represents the practical limits for present purposes, which may be used with the overall proportion for aluminum bronze and non-metallic pigment as set forth above. More preferred limits may be stated to be 6 to 21 ounces of nitrocellulose per gallon of binder vehicle, 1 to 8 ounces of aluminum bronze per gallon of finished lacquer, and 1 to 10 ounces of non-metallic pigment per gallon of finished lacquer.

The compositions as given above, may be diluted in accordance with acceptable spraying practice. For example, they may be diluted with an equal amount of thinner to give ratios at the point of the gun, about one-half that set forth above. Generally, dilution for spray application will run from 40:60 to 60:40 of lacquer to thinner.

While the opalescent and bronze finishes produced in accordance with the present invention may be directly applied to the article to be given the ornamental or decorative finish, more desirably such lacquers are applied over suitable primer coatings in order to secure sufficient adhesion. In addition in order to protect the opalescent and bronze lacquer finishes produced in accordance with the present invention, they may be given overcoats of clear high solids coatings to protect the opalescent or bronze finish and to heighten the effect secured thereby.

Examples are given below illustrating specific types of compositions that may be employed in producing the finishes of the present invention.

A dark statuary bronze shade of opalescent lacquer may be made as follows:

One pound of a paste made of equal parts of burnt turkey umber and grinding vehicle. The latter may be composed of 30 parts softener, 30 parts resin, and 40 parts solvent naphtha. The paste may be made from the stated components ground in a roller mill.

One ounce of aluminum bronze paste (composed of 65% aluminum bronze powder and 35% mineral spirits).

One gallon of lacquer vehicle composed as follows:

	Per cent
Nitrocellulose -----	8½
Softener -----	1½
"Solvesso #1" -----	50
Butyl acetate -----	20
Ethyl acetate -----	20

A pale gold shade of opalescent lacquer may be made as follows:

Four ounces of a paste composed of 25 parts transparent orange lake, 11 parts transparent yellow toner, and 64 parts grinding vehicle as above;

Six ounces aluminum bronze paste.

One gallon lacquer vehicle as above.

A gunmetal shade may be made as follows:

Four ounces of a paste composed of 1 part carbon black and 9 parts grinding vehicle (as above) ground in a roller mill;

Four ounces fine aluminum bronze powder;

One gallon lacquer vehicle as above.

The formula as given above illustrate various compositions that may be employed in accordance with the present invention and such compositions are illustrative and not limiting since the proportions and constituents of the compositions may vary as explained above.

The novel effects obtained in accordance with the present invention may be explained on the following basis, this explanation, however, is not to be interpreted as limiting in the character of the invention as set forth herein. Since the coating compositions produced in accordance with the present invention are diaphanous, that is either transparent or at least translucent, the light passes through the colored composition and is reflected back from the aluminum with a resultant opalescent or bronze effect.

The compositions of the present invention may be employed on any types of base material, including metal, glass, wood, paper, pottery, etc. Because of the poor adhesion of low solids binder vehicles, a primer or sealing coat is desirably employed on most surfaces to which these compositions are to be applied. The compositions may be employed on base metals such as black iron, to produce perfect reproductions of first-class natural bronze and brass finishes.

The term "aluminum bronze" is utilized herein to cover the leaf type of product which has a greater brilliancy and is preferable to aluminum powders made by blowing processes and related processes that result in a more or less gray amorphous product.

The compositions may of course, contain inert ingredients, such as barytes, china clay, etc.

Having thus set forth my invention, I claim:

1. As an opalescent lacquer for interior use: a quick-setting low solids cellulose ester binder ve-

hicle containing 6 to 21 ounces of cellulose ester per gallon of vehicle, from 1 to 12 ounces of aluminum bronze per gallon of lacquer, and from 1 to 16 ounces of non-metallic pigment per gallon of lacquer, the proportions being chosen within the stated limits to give smoothness and brilliancy of coating as against the durability required in lacquers for exterior exposure.

2. As an opalescent lacquer for interior use: a quick-setting low solids binder vehicle containing 6 to 21 ounces of nitrocellulose, 1 to 8 ounces of aluminum bronze, 1 to 10 ounces of non-metallic pigment, the weights being given in ounces per gallon of lacquer, the proportions being chosen within the stated limits to give smoothness and brilliancy of coating as against the durability required in lacquers for exterior exposure.

3. An article of manufacture for interior use carrying an opalescent lacquer thereon, said lacquer being deposited from a low solids quick setting cellulose ester lacquer vehicle carrying aluminum bronze and non-metallic pigment containing from 6 to 21 ounces of cellulose ester per gallon of vehicle, carrying from 1 to 12 ounces of aluminum bronze per gallon and from 1 to 16 ounces of non-metallic pigment per gallon, the proportions being chosen within the stated limits to give smoothness and brilliancy of coating as against the durability required in lacquers for exterior exposure.

4. An article of manufacture for interior use carrying a primer and an opalescent lacquer thereover, said lacquer being a low solids cellulose ester binder carrying aluminum bronze and non-metallic pigment deposited from a vehicle quick setting containing 6 to 21 ounces of cellulose ester per gallon of vehicle, 1 to 12 ounces of aluminum bronze per gallon and 1 to 16 ounces of non-metallic pigment, the proportions being chosen within the stated limits to give smoothness and brilliancy of coating as against the durability required in lacquers for exterior exposure.

5. An article of manufacture for interior use carrying an opalescent lacquer thereon, said lacquer being deposited from a quick-setting low solids cellulose ester lacquer vehicle containing 6 to 21 ounces of cellulose ester per gallon of vehicle, from 1 to 12 ounces of aluminum bronze per gallon and from 1 to 16 ounces of non-metallic pigment per gallon, the proportions being chosen within the stated limits to give smoothness and brilliancy of coating as against the durability required in lacquers for exterior exposure, and a clear high solids topcoat over said opalescent lacquer.

6. An article of manufacture for interior use carrying a primer, an opalescent lacquer thereon deposited from a quick-setting low solids cellulose ester vehicle containing from 6 to 21 ounces of cellulose ester per gallon of vehicle, from 1 to 12 ounces of aluminum bronze per gallon and from 1 to 16 ounces of non-metallic pigment per gallon, the proportions being chosen within the stated limits to give smoothness and brilliancy of coating as against the durability required in lacquers for exterior exposure, and a clear high solids topcoat over said opalescent lacquer.

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