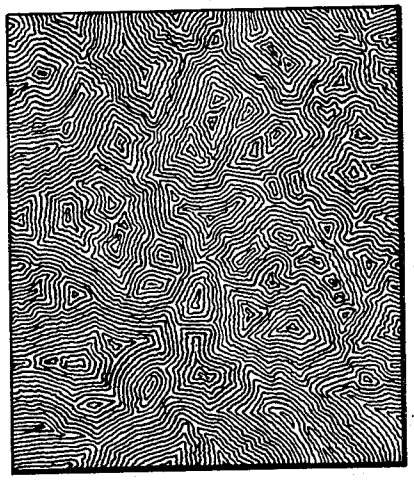
June 28, 1932. F. B. ROOT 1,864,763

ORNAMENTAL FINISH

Filed March 8, 1929

Fig. 1.



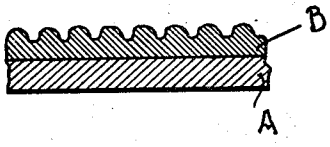


Fig. 2.

Inventor

FRANK B. ROOT.

By Frederick S. Duncan

Attorney

Patented June 28, 1932 1,864,763

UNITED STATES PATENT OFFICE

FRANK BRIAN ROOT, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO CHADELOID CHEMICAL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF WEST VIRGINIA

ORNAMENTAL FINISH

Application filed March 8, 1929. Serial No. 345,453.

This invention relates to the production of ornamental finishes on articles of manufacture and particularly to the production of novel effects with that class of finishes known as "wrinkle finishes."

The production of wrinkle finishes represents a wide departure from the prior art. In that prior art considering the production of continuous surface finishes, attempts were always made to obtain a substantially smooth surface and irregularities of surface finish were studiously avoided, every effort being directed in the prior art to a substantially smooth surface. The present invention is concerned with continuous coatings or finishes, but in accordance with present disclosure the finish instead of being smooth presents a wrinkled finish.

Among the objects of the present invention is the production of a patinized effect in coatings on articles of manufacture.

Other and further objects and advantages will appear from the more detailed description given below, it being understood however that this more detailed description is given by way of explanation and illustration 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 disclosure.

In general it may be stated that wrinkle finishes are desirably produced by applying the desired composition to the surface of an article on which the particular effect is to be produced, and then baking or drying the coated article at a temperature at which the wrinkle finish appears. Such finishes have proved very pleasing and attractive. The wrinkling appears to be due to rapid oxidation of the surface of the applied film resulting in the formation of a skin over the less oxidized material on the interior of the coating, the surface film increasing in volume and expanding laterally. The adhesion of the surface coating material for the surface of the article carrying that coating, prevents expansion beyond the confines of that article, so that the expansion of the oxidized film at the surface of the coating results in a wrinkling of the surface film, the less oxidized material on the interior of the coating flowing into folds.

The general effect in the wrinkle finish coatings is of a substantially level surface, exhibiting more or less minute ridges projecting from the surface and running more or less irregularly over that surface. In the application of the present invention to the modification of these wrinkle finishes and coatings, the wrinkling is controlled so that accentuated effects are obtained at various points of the coating, whereby improved ornamental features are procured.

The drawing is illustrative of the wrinkle effect produced in accordance with present invention, and there is shown in

Figure 1, a portion of a panel carrying a wrinkle finish coat; and in

Figure 2, a section through a portion of the panel of Figure 1 showing the wrinkle coating upon the panel.

For producing the desired effects, compositions are chosen which under drying or baking conditions give the particular effect herein denominated "wrinkle" finish. An important component of such compositions is a drying oil. The principal drying oils that need be considered in this connection are China wood or tung oil, linseed oil, and perilla oil, although other drying oils may be used.

Among the less common drying oils there may be mentioned chia, oiticica, walnut, poppy-seed, sunflower, candle nut, lumbang, hempseed, fish, etc. The oils which may thus be used in the production of wrinkle finishes are hereinafter generically referred to as "wrinkling oils." While China wood oil gives satisfactory results in wrinkling finishes, the best results are obtained with these drying oils when they have been blown or partially oxidized and preoxidized.

While a varnish or other composition to be used to produce a wrinkle finish must contain a substantial proportion of a wrinkling oil, admixtures of the non-wrinkling oils may be used so long as the amount of the latter is not sufficient to eliminate the wrinkle finish. In such admixtures for the best effects,

not less than half of the oil mixture should be a wrinkling oil. It is obvious that similar considerations apply to admixtures of any number of oils whether of the "wrinkling" or "non-wrinkling" types: in all such cases the best effects are obtained in the finish if the amount of wrinkling oil is at least half of the oil content thereof.

The extent of wrinkling in the finish varies in accordance with the amount of resin that is present in the varnish or composition. For each "wrinkling oil" there is a certain range of oil-to-resin ratios within the limits of which the wrinkling takes place to give the best effect. For example, for blown China wood oil the most practicable limits insofar as the appearance of the finish is concerned is from about 6 to 18 gallons of oil to 100 pounds of resin.

Similarly, for untreated China wood oil, it is about 8 to 25 gallons; for blown perilla, 10 to 30; for blown linseed oil, 14 to 35. There is also a lower limit of the oil-to-resin ratio for the production of the more satisfactorily appearing finishes. This ratio varies with the different wrinkling oils. For blown wood oil, about 5 gallons of the oil to 100 pounds resin produces a varnish giving a more or less well defined effect. With ratios of wood oil below that mentioned, the wrinkle effect falls off while with higher ratios it is more pronounced. This number which may be referred to as "the lowest wrinkling ratio" is a measure of the activity of a wrinkling oil, that is, the lower this ratio is, the more powerful is the wrinkling tendency of the oil. The following series expresses the relative activity of the named wrinkling oils: blown China wood oil 5; China wood oil 6½; blown perilla oil 8; blown linseed oil 12.

Of the resins usable in the production of wrinkle finishes and which resins may be denominated "wrinkling finish resins" the following may be noted: Congo, kauri, damar, Cumar, Pontianak, manila, Zanzibar, elemi, mastic, phenol-formaldehyde resins particularly of the oil soluble variety, glycerol-phthalic condensation products particularly of the oil soluble variety, paracoumarone, Congo ester, rosin ester, and mixtures of these resins and resin esters.

Some substances such as pyroxylin, nitrocellulose, gilsonite, and rosin apparently tend to inhibit the wrinkling effect. Such materials should therefore not be used in proportions to prevent the desired wrinkle finish.

In small amounts these substances having a wrinkling inhibiting tendency, produce very fine wrinkles while in large amounts they may completely eliminate wrinkling. Rosin if used in large amount, also tends to produce irregularities in the size and in the interval between wrinkles in the resulting finish.

Solvents or thinners are not a main factor since any moderately volatile solvent can be used. Preferably the major portion of the solvent or thinner should distil below about 325° F. The thinner used may be a mixture of several thinning components. The low boiling thinner evaporates more quickly from the varnish or enamel film, promotes the rapid formation of a surface skin, and during drying assists in maintaining a greater differential between the degree of oxidation of the surface skin and the oil within the film. When the finish is dried at elevated temperatures, the use of low boiling thinners also assists in eliminating any tendency toward sagging of the finish during the drying operation. The following are illustrative of the thinners and solvents that may be used: Light naphtha, toluol, benzol, petroleum ether or ligroin (benzine), acetone, carbon tetrachloride, alcohol, chloroform, ethyl acetate, etc., and mixtures of these. To some extent, the character of the finish may be varied by the quantity and character of the thinner used. Turpentine and other high-boiling thinners may also be used. More pronounced wrinkles are produced with compositions containing the lower boiling point thinners.

Driers and drier combinations are also an important element in the composition, since the wrinkled effect appears to be somewhat determined by the rate of oxidation of the wrinkling oil. Such driers as cobalt acetate, red lead, manganese borate, lead linoleate, etc., used alone or in admixture with each other or with other driers are illustrative.

The compositions may be made and applied as either clear varnishes or pigmented enamels. For example, such enamels may be prepared by mixing with the clear varnish compositions, a pigment paste ground in a varnish or a gum solution.

To exemplify the types of compositions that may be used in the production of varnishes, etc., that yield wrinkle finishes the following specific examples are noted:

Example 1

100 lbs. Cumar
2½ lbs. lead linoleate
½ lb. cobalt acetate
7 gals. blown wood oil
10 gals. light naphtha
12 gals. toluol.

Example 2

100 lbs. Congo
4 lbs. rosin
3½ lbs. red lead
2 lbs. manganese oxide
10 gals. wood oil
10 gals. light naphtha
32 gals. toluol.

Example 3

100 lbs. Congo
5 lbs. red lead
2½ lbs. manganese lead
25 gals. blown linseed oil
10 gals. light naphtha
18 gals. toluol.

Example 4

100 lbs. Congo
4 lbs. rosin
1¾ lbs. red lead
¾ lb. manganese borate
2½ gals. China wood oil
6½ gals. blown wood oil
4 gals. blown soya bean oil
5 gals. light naphtha
17 gals. toluol.

Example 1 is exemplary of a varnish that contains blown wood oil as the only wrinkling oil, and this composition gives a very uniform effect.

Example 2 illustrates the use of unblown or unoxidized China wood oil. A very good wrinkling effect is obtained with this composition. Blown wood oil and other blown drying oils generally give very desirable and pronounced wrinkling effects, but wood oil untreated is the best of the untreated or unoxidized drying oils that can be used.

Example 3 illustrates the use of blown linseed oil in the composition. This composition gives a well-defined and a uniform wrinkling effect.

Example 4 illustrates the use of a non-wrinkling type of oil specifically given in the example as blown soya bean oil. Raw soya bean oil may be substituted for the blown oil and instead of soya bean oil there may also be used any semi- or non-drying oil such as cotton seed, corn, castor, rape-seed, rubber-seed, olein, etc.

In producing the improved wrinkled finish of this invention, it is advantageous to dry or bake the applied finish of varnish or enamel, preferably at an elevated temperature depending on the type of article being treated. For metal and related surfaces a temperature of 150° F. up to approximately 450° F. may be advantageously used. For wood and similar materials somewhat lower temperatures such as 120° F. up to 140° F. may be utilized. At elevated temperatures rapid oxidation of the surface of the applied film is promoted and any tendency toward diffusion of oxidation products from the surface into the interior of the film is lessened. In general, drying at elevated temperatures accentuates the wrinkling and assists in providing a harder finish.

As an illustration of drying times and temperatures satisfactory wrinkled finishes are obtained with the compositions herein set forth as follows: In five hours at 180° F., in three hours at 200° F., in two hours at 250° F., in one and one-half hours at 300° F., and in three-quarters of an hour at 400° F. Drying at elevated temperatures also assists in making the finish resistant to the action of the usual solvents employed in pyroxylin lacquers and enamels. Increase in the amount of oil in the composition results in wrinkling at lower temperatures and hence when the lower temperatures are to be used in connection with wood and related articles, the compositions may desirably contain more oil. Further, the higher oil content gives added flexibility so that the long oil compositions are desirable for use in metal stamping, or on leather, paper, cloth, rubber, etc. Example 4 above gives a baked film that is quite elastic due to the high oil content.

There have been set forth above a number of considerations directed to the types of compositions and the baking temperatures which affect the character of the wrinkles produced in the finish. Other factors however are also found which affect the character of the wrinkles produced. For example, the thickness of the applied film will result in differences in the finish. Thinner films give finer wrinkles and thicker films coarser wrinkles. When spraying is used, spray nozzles giving coarse atomization give greater deposition of composition and consequently coarser wrinkles, while on the other hand spray nozzles of finer atomization give thinner films with finer wrinkles.

It has been found that the compositions and finishes of the present invention are characterized by an exceedingly important property, namely, the quality which they possess to mask or hide a surface to which they have been applied, and this property may be referred to as their "hiding quality." This term "hiding quality" is used with more or less the same meaning that the expression "covering quality" is used in the paint art. It is a remarkable thing, for example, that a single coat of unpigmented wrinkle finish may be applied to a bright metal surface and yet the resulting finish will completely mask the metal surface. Prior art paint compositions on the other hand require at least several coats in order to secure a comparable hiding effect.

Thus the application of a coating of clear wrinkle finish composition, which is generally more or less golden or golden bronze in color, to a bright reflecting surface, say of sheet metal, produces the so-called patinized effect. Sheet tin or tinned sheet iron may be treated in this way and the cheap supporting surface is given a rich patina at an extremely low cost. If the surface to which such composition is applied is a tin surface or other surface of similar character, a very rich bronze effect is produced. The development of such patina without use of any pig-

ment in the finish is a striking illustration of the unique properties of these wrinkle finish compositions. The actual depth of color developed may be somewhat modified by the temperature and length of the heat treatment or baking operation, higher temperatures and more protracted heating tending to give darker bronze colors.

While the production of the patinized effect is particularly emphasized with the utilization of compositions free from pigment, pigmented compositions may be used and the tone of the patina may be modified as desired by the addition of transparent dyes or stains and even with opaque pigments.

Among the articles which may be specifically mentioned that may be patinized desirably is the whole class of containers including such articles as candy boxes, waste paper baskets, cans for cosmetics and other materials, etc.

These compositions for producing the patinized effect may also be utilized in connection with metal stampings. In such instances the coating composition should exhibit sufficient flexibility to withstand the stamping operation. Example 4 set forth above is exemplary of a long oil varnish that yields sufficient flexibility for such operations. In this manner a wrinkle finish enameled tin can can be readily produced.

The uniform character of the wrinkle finish obtained with the compositions and methods set forth above may be modified by the conditions under which the baking operation is carried out. For example, for the production of wrinkle finishes having a textured effect resulting from accentuation of certain of the rugosities or wrinkles at certain points or areas in the finish, the article to be treated may desirably be coated with a relatively heavy coating of the wrinkle composition and then dried and baked in an inclined position. The angle of the piece during the baking operation will more or less determine the effect to be obtained in this way, the maximum effect of course being obtained with the piece in substantially vertical position.

In the case of articles having a number of faces that are coated in this manner, during the baking operation some of these faces or surfaces may be angularly placed while others are substantially horizontal, with the result that a duplex effect is obtained the angularly placed surfaces developing a textured effect while the horizontal surfaces are produced with a substantially uniformly wrinkled surface. The textured effect which results in this case appears to be due to a flowing or movement of the film after it is applied and at or about the time when the baking commences, but before the baking has caused the setting of the finish to take place to an extent where such movement or flowing by gravity would be precluded. However, the flowing or movement of the wrinkled coating may be effected in other ways, as by the use of air currents.

Figure 1 of the drawing illustrates a panel showing the more or less uniform distribution of wrinkles over the surface of that panel, the sectional view of Figure 2 showing the wrinkled coating B carried by the metal plate A.

The baked or dried finishes of the present invention are particularly resistant to softening by lacquer compositions or the solvents used in such compositions. So that although the rugose surface of the wrinkle finish affords a very extensive area for the action of such solvents or lacquers such as nitrocellulose lacquers, the baking creates a resistance to such softening action. Consequently the wrinkle finishes and compositions used for producing such coatings are particularly desirable as under-coats where a wrinkle finish is desired, and such under-coats may be given one or more coats of pyroxylin enamels, oil enamels or baking Japans. When pigments are used in the wrinkle finish which have a tendency to change or to darken under the action of elevated temperatures, these finishes may be coated with pyroxylin compositions.

While certain theoretical considerations have been set forth above in an attempt to explain some of the effects obtained, it should be understood that this invention is not limited by such theoretical considerations, because the compositions and methods discussed above do result in the particular effects set forth, and it is immaterial what may be the actual cause of such effects. Pronounced effects of the character herein set forth are readily obtained with the compositions and methods outlined above.

Having thus set forth my invention, I claim:

1. An ornamented article of manufacture comprising an article having a bright reflecting surface carrying a single, unpigmented, wrinkle finish coating whereby a patinized finish is obtained.

2. An ornamented article of manufacture comprising a metal article having a bright reflecting surface carrying a single wrinkle finish coating that is at least translucent whereby a patinized finish is obtained.

3. An ornamented article of manufacture comprising a metal article having a bright reflecting surface carrying a baked, single, unpigmented wrinkle finish coating whereby a patinized finish is obtained.

4. An ornamented article of manufacture comprising a metal article having a light reflecting tinned surface, carrying a single, unpigmented, wrinkle finish coating whereby a patinized finish is obtained.

FRANK BRIAN ROOT.