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METHOD OF FINISHING

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1 Claim. (Cl. 117-45)

The present invention relates to a method of finishing surfaces and finds a primary utility in the finishing or painting of metal surfaces.

It is well known to finish a metal surface by spraying it with a baking enamel and then heating or curing the surface in an oven. Such a procedure produces a smooth finish of constant coloring and texture. However, when such a surface is scratched or marred, the resultant marks are clearly visible and detract from the appearance of the finish. Consequently, one object of the present invention is to provide a method of finishing which produces a surface upon which scars and marks are relatively invisible as compared with standard enameled surfaces.

Still another object of the present invention is to provide a method of finishing surfaces which produces a finish giving the optical illusion of changing colors when light is played on the surface at different angles or when the surface is viewed at different angles.

Still another object of the present invention is to provide a method of finishing surfaces which produces a smooth multi-colored effect.

Still another object of the present invention is to provide an improved method of finishing surfaces, particularly metal surfaces.

Still another object of the present invention is to provide a surface coating having a sense of homogeneity and an appearance similar to marble.

In fulfillment of the above and other objects, this invention provides a method of finishing surfaces whereby a metal or the like surface is coated with a conventional primary coating or layer of preferably standard baking enamel. The surface preparation prior to the coating is conventional and may consist of phosphatizing, a primer coat or the like. Also, the surface may be ground or sanded or prepared in any other conventional manner to give a desired degree of smoothness. The above mentioned coating of enamel is conveniently placed upon the surface by means of a spray gun of conventional nature. Alternatively, the surface can be coated with the enamel by means of a paint brush or by any conventional or other coating method.

Promptly and while the primary coat is still completely wet and uncured, the surface is spattered with a texturing coating. This texturing coating includes a solvent capable of dissolving the baking enamel and also includes a certain amount of pigmentation of different color than that of the primary coat. The texturing coating includes constituents generally of the same type as the first or primary coat; however, the pigment preferably is present in greatly reduced proportions. For example, in one preferred embodiment, the texture coating pigment is present at approximately $\frac{1}{750}$ the concentration of the pigment in the conventional primary enamel coating. Thus, when a drop or globule of the texturing coating strikes the surface with the primary coat thereon, the drop does not produce a solid opaque spot but instead produces a spot or design having uneven coloring and through which the primary coating is visible to various degrees.

The spattering operation may be produced by means of a conventional spray gun such as, for example, the De Vilbiss #765 air spray gun with an FX tip manufactured by the The De Vilbiss Co. of Toledo, Ohio.

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In producing a spatter, the spray gun is operated so that the atomizing operation is very inefficient and produces globules or relatively large size. The spray gun is also operated so that the globules are very low in number whereby a spattering or sprinkling of the texturing coating upon the surface is produced.

As mentioned above, the spattering is produced upon a wet enamel surface so that the spatter coating partly dissolves the primary coating therebeneath. It should be understood that the spatter drops do not travel or merge substantially at their edges with the primary coating already in place but instead have well defined borders or boundaries. If desired, one or more further texturing spatter coatings may be used of a different color or different type of pigment than the first texturing coating.

The surface is then placed within an oven and heated to sufficient temperature to cause thermal setting of both the basic enamel and the texture coatings. It should be emphasized that a single baking operation is used and that there is no baking done between the basic enamel coating and the texture coatings but only after the primary and all succeeding texturing coatings have been made. Such a procedure produces a smooth surface because of the fusing together of the primary enamel and the texturing coats so that any subsequent scars and marks are optically invisible and also produces a surface having differing colors depending on the angle of view.

The invention is further illustrated by the following specific examples.

Example 1

Prepare an alkyd baking enamel by mixing the following substances in a container:

24 lbs. drying type alkyd resin (#2480 Aroplaz XB)
4 lbs. butyl Carbitol
4 lbs. n-butanol
9 lbs. xylol
29 lbs. naphtha
142 lbs. titanium dioxide
39 lbs. coconut oil non-drying alkyd resin (Beckasol P-222-60)

Disperse the pigment in above material by means of a conventional sand mill, ball mill or roller mill and add the following:

128 lbs. coconut oil non-drying alkyd resin (Beckasol P-222-60)
 $5\frac{1}{2}$ lbs. of xylol
40 lbs. butylated urea formaldehyde resin (F-240-N Uformite)
36 lbs. melamine-formaldehyde resin (MM-57 Uformite)
44 lbs. mineral spirits

Mixing of the above materials in the conventional manner provides 50 gallons of a conventional alkyd white baking enamel.

A green texturing coating is prepared by placing the following in a roller mill:

$\frac{2}{3}$ gal. plasticizer alkyd resin (C-57 Duraplex)
1 lb. of phthalocyanine green pigment
 $\frac{1}{2}$ gal. xylol

The roller mill is operated to disperse the pigment. To these materials, there is added: 100 gal. xylol and mixing is completed to provide a green texturing coating.

The above described alkyd white baking enamel is sprayed upon a steel, aluminum or other surface in the conventional manner by a conventional spray gun. Promptly after spraying, the surface is spattered with the above mentioned texturing coating using the above men-

tioned De Vilbiss #765 air spray gun with FX tip and needle. The De Vilbiss gun is operated with a very low (5 pounds) atomizing pressure and a very low (5 pounds) fluid pressure so that the spray produced by the spray gun is greatly reduced and includes large globules thus effecting a spattering of the surface. The surface is then baked for fifteen minutes at 300° F. producing a relatively smooth multi-colored surface. If desired, the gloss and fullness of the finish may be increased by an appropriate transparent coating.

Example 2

Prepare a blue vinyl-alkyd baking enamel including the following constituents:

20 lbs. of thermosetting alkyd resin (C-55X Duraplex)
28 lbs. toluol
10 lbs. rutile titanium dioxide
1 lb. of organic pigment (R-592-D Copper Maroon)
5½ lbs. lampblack

The pigment is dispersed by mixing the above materials in a sand mill, ball mill or roller mill and the following materials are added to the materials in the mill:

84 lbs. of thermosetting alkyd resin (C-55X Duraplex)
15 lbs. xylol
36 lbs. vinyl resin (VAGH Vinylite)
84 lbs. methyl isobutyl ketone
88 lbs. toluol
8 lbs. of cyclohexanone
½ lb. 6% solution of cobalt dissolved in naphthenic acid also known as cobalt naphthenate drier

Mixing of the above materials in the conventional manner provides 50 gallons of blue vinyl-alkyd baking enamel.

A silver texturing coating is then prepared by the mixing of the following substances:

⅛ oz. by weight of powdered aluminum pigment paste including:
Al powder non-leafing, 66 parts by weight
V.M. & P. naphtha, 33 parts by weight
Stearic acid, 1 part by weight
4 oz. by volume of isopropyl acetate
4 oz. by volume toluol

A copper texturing coating is then prepared by mixing the following substances:

⅛ oz. by weight powdered copper metal pigment (#903 XX Copper Lining)
4 oz. by volume isopropyl acetate
4 oz. by volume toluol

The above described blue vinyl-alkyd baking enamel is sprayed or otherwise applied to the metal surface being coated. Promptly after coating by the vinyl-alkyd enamel, the surface is spattered in the manner above described with the silver texturing coating and in rapid succession or simultaneously is spattered with the copper texturing coating. The spattering operation may be performed in the manner described in Example 1. The surface is then baked for 25 minutes at 225° F.

Example 3

A white thermosetting acrylic enamel is prepared by mixing:

119 lbs. titanium dioxide
60 lbs. thermosetting acrylic resin (Interpol 17-1575)

The above material has its pigment dispersed by means of a roller mill or other suitable paint mill and then the following substances are added thereto:

165 lbs. of thermosetting acrylic resin (Interpol 17-1575)
30 lbs. of butyl Cellosolve
88 lbs. xylol

Conventional mixing produces 50 gallons of white thermosetting acrylic enamel.

A yellow texturing coating is then prepared by mixing the following substances:

1 lb. medium chrome yellow pigment (X-2541 C.P. Medium Yellow)
⅓ lb. acrylic resin (Interpol 17-1575)
⅓ lb. xylol

The pigment of the texturing coating is dispersed by means of a roller mill or other suitable device to which is added: 100 gal. of xylol.

Conventional mixing produces the texturing coating.

The above white thermosetting acrylic enamel is applied by spray or other means to a metal surface. As soon as possible thereafter, and before setting of the enamel, the above yellow texturing coating is spattered on the surface. In place of the yellow texturing coating or in addition to the yellow texturing coating, either or both of the silver and copper texturing coatings set forth in Example 2 may be used as spatter coats. The spattering is accomplished in the manner described above in Example 1. The surface is then baked for five minutes at 450° F.

Example 4

Although this invention is most effective when a baking enamel is used and when the baking process insures a fusion between the baking enamel and the texturing coating, the invention may also be used with enamels which dry or cure at normal room temperatures of approximately 70° F. to 80° F. In practicing the invention without baking, care should be taken to insure that the primary enamel coating remains wet and fluid sufficiently long to permit application of the texturing coating and fusion of the texturing coating into the primary enamel coating before drying of the primary coating takes place.

Coral air-dry enamel is prepared by placing the following materials in a sand mill, roller mill or the like and operating the mill to disperse the pigment:

10 lbs. air-dry alkyd resin (Chempol 13-1802)
13 lbs. toluol
40 lbs. titanium dioxide
1½ lbs. pigment (Molybdate Orange)

After the pigment has been dispersed, the following substances are added to the materials in the mill for further mixing:

24 gal. air-dry alkyd resin (Chempol 13-1802)
17 gal. toluol
3 oz. by volume 6% solution of cobalt dissolved in naphthenic acid

The above procedure yields 50 gallons of coral air-dry enamel.

A black texturing agent is prepared by mixing the following substances.

⅓ oz.:
25 gal. air-dry alkyd resin
20 gal. toluol
72 lbs. lampblack

The above material is dispersed on a roller mill and the following materials added to the mixture:

4 oz. by volume isopropyl alcohol
4 oz. by volume toluol

The above Coral air-dry enamel is applied as a coating to a wood surface. Promptly and while the enamel is still wet, the surface is spattered with the above black texturing agent. Such spattering may be accomplished with a De Vilbiss pressure cup air spray gun using an EX tip and needle, said gun also being manufactured by The De Vilbiss Co. The gun is operated with #30 air cap with approximately 5 lbs. atomization pressure and approximately 5 lbs. pressure on the pressure cup.

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It should be understood that the above examples are certainly not the only possible ways in which the invention can be practiced and that various modifications can be made within the scope of the invention. For example, various solvents can be used alternatively to those above mentioned (benzene, isobutanol, acetone, high-flash naphtha butyl lactate) depending, inter alia, upon the desired evaporation rate as determined by the temperature, humidity and other conditions.

The invention claimed is:

A method of finishing surfaces to produce a smooth multi-colored effect consisting of:

(a) coating said surface with a pigmented baking enamel

(b) applying a texture coating to said surface while the enamel coating is still wet, said texture coating comprising a plasticizer, a solvent for said enamel coating and a different colored pigment than said enamel coating, said pigment being present in ap-

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proximately $\frac{1}{750}$ the concentration of pigment in said enamel coating, and
(c) heating said surface to a temperature sufficient to cause thermal setting of both the basic enamel and texture coatings.

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