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COLORED METALLIC FINISH

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This invention relates to high luster finishes, and especially to high luster colored metallic finishes and to the production of a durable non-tarnishing colored finish coat.

Heretofore metallic colored finishes have been produced on paper, cellulose derivative coated fabrics, and the like by adding metallic pigments to the conventional cellulose derivative coating composition, shellac, or other film forming materials and subsequently coating the same on sheet material. Such finishes are characterized by a relatively dull appearance which is objectionable for many purposes. Moreover, coatings containing copper bronze pigments are not highly satisfactory as they are easily and frequently tarnished. Another means of obtaining colored metallic finishes on cellulose derivative coated fabrics comprised laminating colored metal foil with a suitably prepared base. By metal foil is meant a continuous sheet of approximately 0.0001 to 0.05 of an inch thick. Because of their lack of flexibility and tendency to crack when subjected to repeated flexing the coated fabrics of woven or non-woven base material of the described composite character are not suitable for the many uses, such as book-binding material, material for making shoes and for other uses of leather and artificial leather. In the coatings which were made heretofore, it was difficult to obtain proper anchorage of the colored coating so as to prevent its detachment from the base material after relatively short use.

This invention has as an object the production of improved high luster colored metallic finishes.

Another object of the invention is the production of high luster colored metallic finishes on cellulose derivative coated fabrics and on non-woven bases.

A still further object is the production of a flexible article having a brilliant and highly reflective surface.

Other objects of the invention will appear in connection with the following description:

The objects of this invention are accomplished in general by coating a suitably prepared woven or nor woven, flexible or rigid base material in any known manner with a cellulose derivative composition, applying an intermediate or anchoring coat of a polyhydric alcohol-polybasic acid type resin composition, allowing the same to dry to a dust free condition, applying leaf-like particles of metal bronz flakes to the resin surface, properly orienting the metal particles, causing them to adhere thereto, burnishing to obtain a high luster mirror-like surface, baking the varnish to anchor the metal particles permanently, applying a transparent or translucent, non-tarnishing, protective coating of polyhydric alcohol-polybasic acid resin composition over the mirror-like surface, and finally applying a suitably colored transparent or translucent lacquer as an ultimate surface coat.

In Patent No. 2,087,094 there is described and claimed processes for producing highly polished mirror-like surfaces to resemble polished silver.

In accordance with said invention, the making of the mirror-like finished coatings comprises coating a base material with an anchoring coat of a polyhydric alcohol-polybasic acid type resin composition, allowing the same to dry to a degree of tackiness known in the art as a dust-free condition, applying metal flakes having reflective surfaces, properly adhering the particles on the surface and orienting the metal particles with their faces outwardly so as to give a mirror-like surface. The colors of the materials described in the above mentioned applications are limited by the colors of the metal flakes.

Dyed cellulose nitrate lacquer will not anchor firmly to the mirror-like surface produced according to the disclosure of the copending applications mentioned above. Furthermore, if a lacquer is applied directly upon the mirror-like surface which results from orientation of the metal particles, the high luster will be impaired, at least to some extent, if for no other reason than the result of the action of the lacquer solvent or the deorientation of the metal flakes. Now, it has been discovered that if the highly polished mirror-like surface is coated with a light-transmitting polyhydric alcohol-polybasic acid type resin composition, the colored light-transmitting cellulose nitrate lacquer will anchor satisfactorily to the resin coat and the orientation and other reflective properties of the metal particles will not be disturbed.

In a preferred embodiment of this invention a suitable coated fabric base with the mirror-like surface of aluminum particles is prepared in accordance with the disclosure of Patent No.

2,087,094 as above described, and is given one coat of a light-transmitting non-tarnishing protective composition consisting of a China-wood linseed oil modified polyhydric alcohol-polybasic acid resin, thinner and a quantity of cobalt and manganese drier. The following are detailed formulations of two suitable compositions for this purpose.

Composition A

Solids 43.88%—	Percent
Glycerol triphthalate	23.25
Linseed oil	13.75
China-wood oil	6.8
Thinner 53.13%—	
High flash naphtha	35.75
Mineral spirits	17.38
Drier solution 2.99%—	
Cobalt linoleate solution in mineral thinner	1.06
Manganese linoleate solution in mineral thinner	1.93

Composition B

Solids 55.24%—	Percent
Glycerol triphthalate	22.26
Linseed oil	16.49
China-wood oil	16.49
Thinner 43.40%—	
Toluol	19.73
Mineral spirits	7.89
High flash naphtha	15.78
Drier solution 1.36%—	
Cobalt linoleate solution in mineral thinner	1.36

The light-transmitting protective composition may be applied by means of a doctor knife, by roller coating, by spraying or in any other suitable method whereby a thin coating, say approximately 0.1 to 2.0 ounces per square yard is deposited. The coated material is dried in a heated chamber. Composition A requires approximately 4 minutes at 240 deg. F. for the drying time, and Composition B requires approximately 30 minutes at 240 deg. F. A light-transmitting colored lacquer composition is applied to the dried varnished surface by means of intaglio engraved 100% coverage rolls, which are well known in the art of printing. The lacquer may also be applied by means of doctor blade coating, spraying, roller coating or any other means commonly employed for coating lacquers. The detailed formulation of a dyed lacquer which when applied to the polyhydric alcohol-polybasic acid resin composition anchoring coat will simulate the appearance of gold is as follows:

	Percent		Parts
*Dye solution	0.5	Dry cellulose nitrate	7.3
40 oz. ½ sec. cellulose nitrate solution	27.9	Ethyl acetate	8.2
		Ethyl alcohol	12.4
			27.9
24 oz. 100-125 sec. cellulose nitrate solution	10.0	Dry cellulose nitrate	1.7
Ethyl acetate	39.6	Ethyl acetate	3.3
Ethyl alcohol	22.0	Ethyl alcohol	5.0
	100.0		10.0

*The dye solution contains the following components:

	Percent
Du Pont's Luxol Fast Scarlet C	4.5
Du Pont's Luxol Fast Orange E	40.5
Ethylene glycol monomethyl ether	55.00
	100.00

After application of the above composition the coating is dried, as by passing through a drying chamber to expel the volatile components, after which the material is ready for use. If so desired the material may be further decorated by embossing. Printing operations employing suitably colored lacquers may be carried out on limited areas in any combination of patterns.

The exceedingly high brilliance of the colored metallic finishes produced according to the invention is due to the reflection of light which penetrates the transparent dyed lacquer and the resin anchorage film and is reflected by the highly reflective metallic interface.

While the preferred embodiment of this invention recites a pyroxylin coated textile fabric having oriented metal particles applied over the coating as a base material for the colored metallic finishes, other base materials having the oriented metal particles superimposed thereon may be used, for example, regenerated cellulose sheet, cellulose derivative sheet material and other sheet materials, such as leather and the like. The procedure set forth in accordance with this invention is applicable to rigid as well as to flexible base materials covered with light reflecting particles, such as metal, Celluloid, glass, or wood. It is within the scope of this invention to use colored transparent pigments in the outer coating material instead of dissolving soluble dyes in the coating material, and transparent coating materials having natural resin bases can be used to lend its characteristic color.

The product of the present invention may be used for many decorative purposes now employing metal foils; it may also be used for decorative papers, book covers, artificial flowers, millinery and dress decorating, cigarette wrappers, or any type of covering material employed in packaging, dress trimmings, coverings or bindings for ladies' evening slippers where a colored metallic finish is desirable.

The product of the present invention combines the advantages of the high luster of a colored metallic foil surface with the flexibility and other desirable properties of coated fabrics or of non-woven bases. The combination of colored metal foil to paper while affording a high luster, is deficient in that the finished product cannot be repeatedly flexed without breaking the metal. The metal can be easily torn from the paper and these laminated products are so stiff that their use for many purposes is limited.

A still further advantage over the copper bronze finishes is that the colored metallic finishes described herein are non-tarnishing with respect to heat or the chemical action of sulfides, dilute acids, etc. and they are waterproof and impermeable to greases. The highly polished colored metallic finish can be printed on with commercial equipment to better advantage than metallic foils due to the property of the metal foil surface of repelling the printing materials. The finished material made in accordance with this invention is useful for wrappings in conjunction with adhesives since adhesives may be bonded to the highly polished colored metallic finish with greater strength than to metal foils.

It will be evident from the foregoing description that many variations can be made in the described invention without departing therefrom, and it will be understood that no limitations of the invention disclosed and defined in the claims are intended except those which are specifically recited or imposed by the prior art.

I claim:

1. The method of making an article having a highly polished metallic surface which comprises applying a resinous coating composition to a base, allowing the composition to harden until the dust-

free stage is reached, which is just tacky enough to retain a firmly adherent thin layer of metallic powder, applying over the coating a dusting of metal powder, the individual particles of which have light reflecting faces, removing the excess powder, orienting in overlapping relation on the surface of the coating the particles adhering thereto, applying a resinous composition to the metallic surface, and applying a subsequent colored lacquer composition which is light transmitting.

2. Process of claim 1 in which the colored lacquer composition is yellow and the finished product has the appearance of gold leaf.

3. Process of claim 1 in which the anchoring composition and intermediate protecting coat contains an alkyd resin.

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