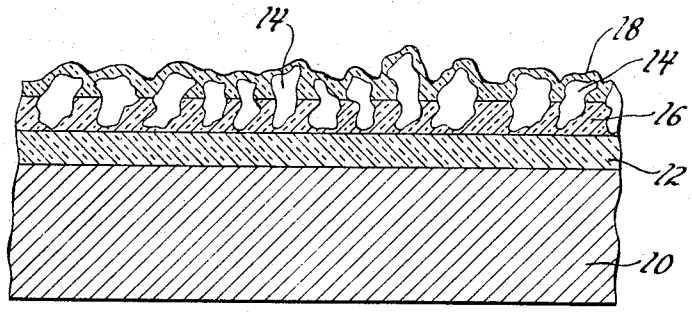
Aug. 29, 1967 J. A. HOLCOMB 3,338,732

PORCELAIN ENAMEL COATING

Filed Oct. 7, 1964



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United States Patent Office 3,338,732 Patented Aug. 29, 1967

3,338,732

PORCELAIN ENAMEL COATING

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Filed Oct. 7, 1964, Ser. No. 402,287
7 Claims. (Cl. 117—26)

This invention relates to porcelain enamel coatings and a method for applying same, and more particularly to a porcelain enamel coating for a metallic object or surface having a simulated aggregate finish.

In the manufacture and coating of many metallic objects it is not uncommon to provide a smooth and glossy finish on the object to obtain a pleasant appearance. Such finishes are normally formed by the porcelain enamel process to provide a hard and durable finish. The metallic object is first covered with a ground coat of porcelain enamel material and then fusing a colored cover coat over the ground coat. The resultant finish may range from an extremely high gloss to a low gloss as desired and, being formed of a vitreous material, is extremely hard and long lasting.

Because of the gloss on the finished coating, the surface must be kept clean to prevent blemishes, or other foreign substances from discoloring or spoiling the effect of the smooth glossy finish. Furthermore, in exterior structures, weathering often has some undesirable streaking or other adverse effect on the high gloss.

A high gloss finish is relatively common in porcelain enameled structures, particularly where such porcelain enamel is used on exterior panels or the like in building constructions. There are many instances where a less polished or mirror-like glossy surface would be desirable, either from a usage standpoint or from an appearance standpoint.

The coating in which this invention is embodied comprises, generally, a rough or textured finish porcelain enamel coating which avoids the smooth glossy finish otherwise obtained. The coating is formed by embedding finite particles in the colored cover coat when the cover coat is still wet and before fusing the cover coat, and then applying an over-spray of glaze or cover coat over the colored cover coat and the particles to secure the particles in place. The resultant structure is a simulated aggregate or rough finish which breaks up the high gloss surface and which presents a pleasant appearance to the observer. At the same time, the rough appearance of the coating helps to hide the surface blemishes and discolorations that result from weathering and the like. The coating is structurally sound and the particles are positively held in place by the fused glaze coat so that the particles do not fall or chip out of the coating structure.

These and other advantages will become more apparent from the following description and drawing in which:

The single figure is a cross-sectional view of a portion of a metallic object having the composite coating thereon.

The porcelain enameling process per se is well known in the prior art and this invention makes use of the various well known processes and materials. Generally speaking, and as set out in "The Ready Remedier—A Manual of Porcelain Enameling" by Karl Turk, Copyright 1931 by The Porcelain Enamel and Manufacturing Company, the porcelain enameling process includes the application of a ground coat of porcelain enamel materials over the metallic object, the object being in the form of a sheet metal panel, sheet metal stamping, casting, or the like. The porcelain enamel ground coat is fused at an elevated temperature to the metallic object. A porcelain enamel cover coat is then applied over the ground coat, the cover coat being provided with various oxides and other materials to produce a desired color on the structure being coated. After the application of the cover coat the object is again fused at an elevated temperature to fuse the cover coat to the ground coat. Further applications of colored cover coats may be applied if desired, each successive coat being heated to its fusing temperature in order to provide a proper porcelain enamel finish.

Referring now to the drawing, the metallic object is indicated by the numeral **10** and may be in any suitable shape or form. For purposes of illustration, object **10** is illustrated as a sheet metal panel. After the panel **10** has been thoroughly cleaned, pickled, and otherwise prepared for the porcelain enameling process, the ground coat materials are sprayed or otherwise applied to the surface of the object **10**. The ground coat is then fused at an elevated temperature to provide the proper ground or foundation coat **12** in the usual manner.

The next operation is to apply a cover coat of porcelain enamel material which may be applied by spraying or dipping. While the applied cover coat is still wet, particles **14** of finite size and of a suitable inorganic material such as fine silica, are sprinkled over the cover coat. The particles partially embed themselves in the wet cover coat, and are of such size as to project outwardly therefrom. The object is again heated to the fusing temperature to fuse the cover coat material into a porcelain enamel layer **16**, properly fused to the ground coat **12** and to the portions of the particles **14** which are embedded therein.

The final operation is to provide an over-spray of glaze or cover coat **18** of porcelain enamel. The porcelain enamel materials are first sprayed or otherwise applied over the surface of the cover coat **16** and the exposed portions of the silica particles **14**. The over-spray or glaze coat is then raised to the elevated temperature to properly fuse the material to the exposed portions of the silica particles **14** and to the exposed surface of the cover coat **16**. The over-spray or glaze coat may be colored as is the cover coat, by applying the proper oxides and other materials in the well known manner. Alternatively, the over-spray coat may be clear or uncolored, being prepared in the well known manner.

The resultant composite coating is one that has all the attributes of the usual porcelain enamel finish, that is, the hardness and durability, but does not have the smooth and glossy finish normally associated with porcelain enamel. It will be apparent that the particles **14**, embedded in the cover coat **16** and covered by the over-spray coat **18**, will provide a rough aggregate-like finish that breaks up the normal high gloss of the porcelain enamel. At the same time the appearance is pleasant and different but is structurally sound in that the over-spray coat **18** securely retains the silica particles **14** in place in the coating.

Should it be desirable to provide several layers of the cover coat **16**, in order to provide the proper color or pattern to the finish, such additional coats are applied between the ground coat and the cover coat **16** having the silica particles **14** disposed therein. In other words, the top or last layer of cover coat **16** is sprinkled with the particles before it is dry, to partially embed the particles in the porcelain enamel coating.

It is also possible to eliminate entirely the ground coat **12**. Depending upon the use and location of the object **10**, the colored cover coat **16** may be fused directly to the metallic object and the over-spray coat **18** fused over such cover coat and the particles **14** embedded therein.

Thus, a porcelain enamel composite coating is provided for a metallic object which is extremely hard and durable but which does not have the high gloss or shine normally associated with porcelain enamel and further has an aggregate-like finish or texture which has not heretofore been available.

Numerous modifications and alterations in the composite coating structure will become apparent to those having skill in the art after having had reference to the foregoing description and drawing. However, it is not intended to limit the scope of the invention by the foregoing description and drawing but by the scope of the appended claims in which:

I claim:

1. An article having a rough aggregate finish comprising a metallic structure having thereon a composite coating comprising:
a porcelain enamel ground coat on said subject;
a porcelain enamel cover coat over said ground coat and having particles of inorganic material fused therein, said particles being of a size to extend outwardly from said cover coat;
and a porcelain enamel over-spray coat over said cover coat and said particles.

2. An article having a rough aggregate finish comprising a metallic structure having thereon a composite coating comprising:
a porcelain enamel ground coat applied on said structure and fused at an elevated temperature;
a porcelain enamel cover coat sprayed on said ground coat and having particles of inorganic material and of sufficient size to extend outwardly therefrom, said cover coat and said particles being fused at an elevated temperature;
and a porcelain enamel over-spray sprayed over said cover coat and said particles and fused at an elevated temperature.

3. An article having a rough aggregate finish comprising a metallic structure having thereon a composite coating comprising:
a porcelain enamel ground coat on said structure;
a porcelain enamel cover coat over said ground coat;
a sprinkling of particles of inorganic material fused in said cover coat, said particles being of sufficient size to extend outwardly from said cover coat;
and a porcelain enamel over-spray coat over said cover coat and said particles to secure said particles in said coating.

4. An article having a rough aggregate finish comprising a metallic structure having thereon a composite coating comprising:
a porcelain enamel ground coat fused to said structure;
a porcelain enamel cover coat fused to said ground coat;
a sprinkling of silica particles fused in said cover coat and being of sufficient size to extend outwardly therefrom;
and a porcelain enamel over-spray fused to said cover coat and said particles to maintain said particles in said coating.

5. An article having a rough aggregate finish comprising a metallic structure having thereon a composite coating comprising:

a porcelain enamel cover coat on said structure;
particles of inorganic material fused in said cover coat and being of sufficient size to extend outwardly therefrom;
and a porcelain enamel over-spray coat over said cover coat and said particles and fused thereto.

6. A method of forming a porcelain enamel coating having a rough aggregate finish to a surface of a metal panel comprising the steps of:
covering said surface of said panel with a ground coat and fusing said ground coat at an elevated temperature;
covering said ground coat with a cover coat of porcelain enamel material;
sprinkling particles of silica of sufficient size to extend outwardly from said cover coat on said cover coat and allowing the particles to partially embed in said cover coat;
heating said cover coat and said particles to an elevated temperature to fuse said cover coat to said ground coat and to said particles;
and covering said cover coat and the exposed portions of said particles with an over-spray coat of porcelain enamel and fusing said over-spray coat thereto at an elevated temperature.

7. A method of forming a porcelain enamel coating having a rough aggregate finish to a surface of a metal panel comprising the steps of:
covering said surface with a cover coat of porcelain enamel material;
sprinkling particles of inorganic material and of sufficient size to extend outwardly from said cover coat on said cover coat when said cover coat is in fluid condition to partially embed said particles in said cover coat;
heating said panel and said cover coat and said particles to an elevated temperature to fuse said cover coat to said panel and to said particles;
and covering said cover coat and the exposed portions of said particles with an over-spray coat of porcelain enamel and fusing said over-spray coat thereto.

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