

UNITED STATES PATENT OFFICE.

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COATING METALLIC SURFACES.

SPECIFICATION forming part of Letters Patent No. 495,629, dated April 18, 1893.

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To all whom it may concern:

Be it known that I, HERMANN GIESSLER, professor of chemistry, a citizen of the German Empire, residing at Stuttgart, in the Kingdom of Württemberg, Germany, have invented certain Improvements in the Art of Coating Metallic Surfaces, of which the following is a specification.

My invention relates to the art of coating metallic surfaces with a thin metallic plating or film, which does not cover the surfaces like an enamel, but leaves the contours clearly and sharply defined, and which can be ornamented directly with metallic oxides or enamel-colors.

The object of the invention is more especially to provide the surfaces of metallic articles with a fire and rust-proof coating, which can be applied at a comparatively small expense, and which is not liable to crack and peel off by the changes of temperature to which said articles are exposed, and by which a surface is provided that forms in itself a decorative effect, which is still more enhanced when ornamented with metallic oxides or enamel-colors.

The invention consists first, in the compound employed for producing the thin metallic plating or coating on the metallic surfaces; secondly, in the method of coating on the metallic of applying said coating to metallic surfaces; and thirdly, in the method of ornamenting or decorating the so-coated metallic surfaces by means of metallic oxides or enamel-colors.

In carrying out my invention, a compound is employed for coating the metallic surfaces, which consists essentially of pulverized hammer-slag, that is, magnetic oxide of iron (Fe_3O_4) or the magnetic oxide of iron produced by precipitation, a metallic soap, such as an oleate or resinate of tin or lead, an easily fusible glass-flux, and a finely pulverized refractory body-substance, such as emery-powder. These substances are mixed in various proportions, according to the result that is desired to be obtained. The following proportions have given very satisfactory results, to wit: magnetic iron one part, a sirup-like solution of metallic soap three parts, glass flux two and one-half parts and emery powder one-half a part. The compound is mixed with a suitable liquid medium, such as spirits of

turpentine or benzine, so as to be readily applied as a coating or paint by means of a brush to the metallic surfaces to be coated. The coated articles are then heated in a suitable furnace or oven to red heat until the glass-flux fuses. By the heat the oxide of iron unites with the metallic surface to be coated, while the refractory body-substance retains the coating uniformly over the entire surface, as it prevents the flux from flowing off from the thinner parts which are sooner heated to red heat than the thicker parts and from settling in the depressions of the surface. The result is a uniform film or layer on the thick as well as the thinner parts of the metallic articles. The metallic soap tends to unite the magnetic iron with the metallic surface, and to impart a metallic luster to the coating, which adheres with great tenacity to the surface and is not liable to crack or peel off. After the coating is burned in, the articles are allowed to cool off slowly. By increasing the proportions of magnetic oxide of iron and emery and diminishing the quantity of glass-flux, a coating of dull appearance is obtained, while by diminishing the proportion of iron and body-powder and increasing the flux, a coating of bright and glossy appearance is obtained. By coating the surface of a metallic body in part with one solution and in part with the other solution, the surface is covered partly with a dull and partly with a glossy coating in one burning. The coating thus obtained has a brownish-purple color similar to patinized bronze. It differs essentially from enamel in its application and appearance, as it is applied in a thin layer or film, so as to leave the contours of the surface perfectly sharp and clearly defined, while a layer of enamel covers and smoothens the contours.

My coating does not impair or change the metallic character of the surface, while a layer of enamel effaces the metallic character and imparts to the surface a ceramic character. Another point is that the compound employed fuses at a lower temperature than enamel, for which latter articles of uniform thickness are required, as they are subjected to high temperatures, at which ornamented iron articles would warp and get injured.

The plating or coating described, especially when applied so as to produce in part a dull

and in part a glossy effect, is of special advantage in ornamenting cast-iron articles, such as heating and cooking stoves, ranges and ornamental castings, as the appearance
5 of the same is greatly improved thereby and the dead color and unattractive appearance of cast-iron overcome thereby.

The coating forms a ground that can be effectively decorated with metallic oxides or
10 enamel-colors, which are applied to the ornaments in relief and then burned in by subjecting the articles to a second burning in the furnace or oven. The metallic oxides and enamel-colors may also be so prepared that dull
15 and glossy effects are produced and burned in by the second burning. By adding metallic powders obtained by precipitation, such as spongy copper, tin or lead, or reduced oxide of iron to the metallic oxides, and mixing
20 them with the metallic soap and flux, dull or dead colors will be obtained, especially when used with a dull primary coating or ground. When enamel-colors are employed for decoration, the same are mixed with a solution of
25 a lead or tin-soap. The metallic soap used can also be mixed with a non-volatile, somewhat fatty petroleum or with volatile oils, turpentine, &c., or the metallic oxides or enamel colors may be mixed with powdered metallic
30 soap and worked up with gummy, watery or mucilaginous substances.

The surface-coating or ground and the colors used for decorating the surface are burned into the articles in furnaces of the usual kind,

the temperature employed being made to vary 35 according to the thickness and composition of the articles to be coated and decorated, the proper degree of heat in each particular case being readily ascertained by any one skilled in the art.

Having thus described my invention, I claim as new and desire to secure by Letters Patent— 40

1. A compound for coating metallic surfaces and preserving the metallic character of the 45 same, consisting of pulverized magnetic oxide of iron (Fe_3O_4) a metallic soap, a glass flux, a refractory body-substance, such as emery powder or metallic powder and a liquid medium substantially as and for the purpose set 50 forth in the foregoing specification.

2. A metallic article having a vitreous coating film composed of the following ingredients united by fusion, namely, magnetic oxide of iron, a metallic soap, a glass flux, and a re- 55 fractory body substance, as emery or metallic powder, said coating film having a vitreous luster and a dark violet blue color, substantially as set forth.

In witness whereof I have hereunto signed 60 my name in the presence of subscribing witnesses.

HERMANN GIESSLER.

Witnesses:

EDWIN A. BRYDGES,
ALBERT ROGGOW,
WILHELM VOGT.