

UNITED STATES PATENT OFFICE.

PHILIPP EYER, OF HALBERSTADT, GERMANY, ASSIGNOR TO THE FIRM OF RUDOLPH KOEPP & CO., OF OESTRICH-ON-THE-RHINE, GERMANY.

PRODUCTION OF GROUND ENAMELS.

1,249,937.

Specification of Letters Patent.

Patented Dec. 11, 1917.

No Drawing.

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To all whom it may concern:

Be it known that I, PHILIPP EYER, a subject of the German Emperor, and resident of Halberstadt, Germany, have invented certain new and useful Improvements in the Production of Ground Enamels, of which the following is a specification.

My invention relates to the production of ground-enamels for coating iron and other goods. As is well known, certain metal oxids, such as the oxids of cobalt, nickel, manganese, copper and other metals are added to the ground-enamel in order to improve its capacity of adhering to the object to be enameled. Of the oxids cited the oxid of cobalt is by far the best, while nickel oxid is cheaper but less effective.

If the ground-enamel is burnt in the presence of such metal oxids, it assumes an undesirable more or less dark color. In general those ground-enamels which in melting assume the darkest color adhere best to the object to be coated. The intensity of color therefore offers to the expert an indication of and guide for determining the quality of the ground-enamel, and in this sense the expert speaks of the coloring of the ground by metal oxids. All experts however have agreed that the cobalt oxid to be added to ground-enamels should be absolutely pure or technically pure.

I have now ascertained that the very expensive pure oxid may be replaced with advantage by certain cheap ores containing the oxids of cobalt and nickel oxid compounds or at least forming such oxids during further treatment, the ground-enamel thus obtained being not only cheaper but also offering a higher resistance to all kinds of influences. Preferably such ores should be used as contain a high percentage of cobalt oxid or cobalt and nickel oxids or of the carbonates of said metals. In practice the ores sold under the name of Caledonian or New-Caledonian cobalt ores have given excellent results, such ores containing, besides a high percentage of cobalt and nickel oxids, considerable quantities of oxygen compounds of manganese.

For example to 100 parts of a ground-enamel mixture are added 1.5 to 2 parts of a Caledonian cobalt ore containing about 33 per cent. manganese oxid, 5.5 cobalt oxid and 3.3 nickel oxid.

If such ores are used, the rather black

burnt ground shows a greater adhesive power than a ground mixture prepared with corresponding quantities of pure oxids. It has not been possible to find out why this is so; possibly the physical state of the oxids contained in the ores plays a certain role.

In selecting the ores care should be taken first of all to have a high percentage of cobalt in the ore. Ores containing sulfur and arsenic are unsuited, and in those cases, where ores free of sulfur and arsenic are not to be had, care should be taken to remove these undesirable constituents. The presence of iron oxid in the ore is not generally objectionable although it is not recommended to employ ore having an especially high iron content.

It is of course not possible to use all ores containing the oxids or carbonates in question, but it is easy to ascertain the qualification of any ore by a simple test. In some cases the ores may be supplemented by pure oxids, a deficiency of the ore with regard to one or the other constituent being thus counterbalanced by an addition of corresponding quantities of pure oxids or by mixing different ores. In general however all this will prove unnecessary as there are sufficient quantities of ores available which contain all the desirable constituents in such proportions as to allow of using them alone.

In the art of enameling cobalt compounds are used also as coloring substances for cover-enamels, in order to impart to them a fine blue color. It has been proposed to use cobalt ores for this purpose, but owing to the great deterioration of the color caused by such ores they have never been used commercially. As shown in the beginning, the use of cobalt compounds for coloring cover-enamels has nothing whatever to do with the reinforcing of ground enamels by an addition of cobalt oxid, the coloring matter being in this case completely burnt.

I claim:—

1. A ground-enamel batch composition including an ore free from sulfur and arsenic and comprising a mixture of metal compounds containing cobalt oxid, for the purpose described.

2. A ground enamel batch composition including an ore free from sulfur and arsenic and comprising a mixture of metal compounds containing cobalt and nickel, for the purpose described.

3. A ground-enamel batch composition including ore free from sulfure and arsenic and containing oxids of cobalt, nickel and manganese.

4. A ground enamel batch composition including a pure oxid of metal adapted to increase the adhering capacity of the enamel and ore, free from sulfur and arsenic, containing oxids of cobalt, nickel, and manganese.

5. The herein described method of preparing a ground-enamel batch composition which comprises freeing ore containing an oxid of metal adapted to increase the adhering capacity of an enamel from sulfur and

arsenic and thereafter adding such treated ore to a suitable enamel mixture.

6. The herein described method of preparing a ground-enamel batch composition which comprises freeing ore containing cobalt oxid from sulfur and arsenic and thereafter adding such treated ore to a suitable enamel mixture.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PHILIPP EYER.

Witnesses:

JEAN GRUND,
CARL GRUND.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."