

UNITED STATES PATENT OFFICE.

JULES DANSETTE, OF PARIS, FRANCE.

PROCESS OF MANUFACTURING REINFORCED CERAMIC ARTICLES.

SPECIFICATION forming part of Letters Patent No. 765,358, dated July 19, 1904.

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To all whom it may concern:

Be it known that I, JULES DANSETTE, a citizen of the Republic of France, and a resident of 18 Avenue de la Bourdonnais, Paris, in the Republic of France, have invented a certain new and useful Improved Process of Manufacturing Reinforced Ceramic Articles, of which the following is a specification.

This invention relates to a process for manufacture of reinforced ceramic articles and permits of obtaining decorative plates and the like of large dimensions without any joint and also objects in relief of any form, all these articles being perfectly durable and resistant to frost and to washing with water, acids, and alkalis.

The process essentially consists in the use of pieces of wire-gauze of suitable dimensions, which are placed in a fusible paste consisting of kaolin, silica, boric acid, and alkaline salts, the plates, slabs, or the like thus obtained being dried at a temperature of about 40° centigrade, whereupon they are placed in an enameling-furnace and subjected to a temperature of about 900° centigrade for four to five minutes. The plates subjected to that temperature undergo an incomplete fusion, which determines a molecular transformation of the mass and produces after cooling a hardening of the plates. One surface or both surfaces of the plates are then provided with a coating of ceramic paste similar to the first, but made slightly less fusible by the proportions used in the mixture, whereupon the plates are again dried at about 40° centigrade and placed in the enameling-furnace, where it is subjected to a temperature of about 1,000° centigrade for five minutes. The heat at that temperature acts first on the outer layers of paste, and when the latter begin to soften the inner layer has not been enough influenced by the heat to fuse. Besides this inner layer is very thin and serves only as a coating to protect the metallic carcass from oxidizing, so that it forms a body, with said carcass, by which it is supported and kept from flagging. The surfaces thus prepared are then treated with enamels consisting of various silicates with fusing-points below 1,000° centigrade and having a coefficient of expansion equal to that

of the paste to which they are applied. The plates are finally baked in the enameling-furnace for about five minutes and allowed to cool. The paste used in the first operation—that is to say, that into which the wire is first placed—contains a considerable proportion of boric acid, which acts as a mordant and prevents the oxidation of the iron. This paste is obtained by taking the products hereabove mentioned in a state of powder as found in the market and by adding thereto a quantity of water necessary to produce after stirring a clear mass. In this mass the grains of the different products mixed together are of variable thicknesses. The mass must therefore be rendered homogenous, and this is preferably effected by pounding the mass itself rather than by pounding the powders separately before they are diluted in water. After the pounding the paste is passed through a sieve of sixty—that is to say, a sieve which admits of sixty parallel threads in a length of one inch or three thousand six hundred meshes to the square inch. The paste has a somewhat syrupy consistency, so that if the wire is removed in a vertical position from the bath in which it is dipped the paste does not trickle down. The meshes of the wire-gauze completely retain the paste, and the plate thus obtained is of very uniform thickness, the meshes being quite covered. After the first operation the plate is allowed to dry in a vertical position at 40° centigrade, and then it can be placed flat in the enameling-furnace without becoming deformed. In the second operation one side or both sides of the plate are coated with the paste which is to constitute the principal part of the final product and by means of which the product is given the desired thickness. The operation is as follows: The plate is placed upon a wooden trellis-work arranged above a vessel with low edges adapted to receive the liquid which trickles down during the operation. The paste is then poured over the plate, the paste being slightly liquid and having previously been pounded, so as to pass through a sieve of one hundred and twenty. By a movement of the hand easy to acquire and by means of a jogging motion the surface of the plate is

made completely uniform and smooth. The plate is thereupon dried on the same wooden trellis and then taken therefrom and placed in the furnace, as has already been described.

5 If through inadvertence or accident cracks or fissures occur on the surface, they can easily be repaired, and the plate can be placed in the furnace several times without any deterioration or damage. The product obtained pre-

10 sents a completely smooth exterior surface which may be compared to biscuit porcelain or fine crockeryware. The third operation, which consists in decorating and enameling the plates thus prepared, is executed in the

15 ordinary way of decorating biscuit china. The plates can be painted in plain or mosaic style or ornamented in half-relief, or a simple transparent glaze can be applied to produce a white glazed product like ordinary tiles.

20 Multicolor effects are obtained by means of enamels made with metallic oxids like ordinary colors. The fusibility of these enamels must be regulated, so as to be below the temperature of baking at 1,000° centigrade,

25 for when the color has been applied it is baked in the enameling-furnace, as has already been mentioned. With certain colors the decorating and enameling is executed as follows: The color is first applied on the plate, whereupon

30 it is baked. It is then enameled and finally baked again. With certain other colors the baking can be dispensed with and the enameling effected at once—that is to say, the color is first applied and is then enameled and baked

35 in one single operation. The enamel is put on the surfaces to be glazed by means of a sprayer, such as ordinarily employed for this kind of ceramic work. The composition of the enamel approaches that of the paste to

40 which it is applied, so that there is a similarity in the coefficients of expansion which prevents the cracking technically known as “crazing.” Owing to this fact the plates can

45 be allowed to cool in the open air after baking without special precautions and without danger of accident; but if it does happen that a finished and glazed article shows flaws or the like due to accidents or other causes these can be easily remedied by applying more en-

amel and placing it in the furnace again in 50 order to obtain a perfect product, which was hitherto impossible in ceramic work.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A process for manufacture of reinforced ceramic articles, consisting in embedding a wire-gauze cut to the size of the articles to be manufactured in a fusible paste composed of kaolin, silica, boric acid, and alkaline salts, 60 in drying the plate thus obtained and baking it, in coating then the surfaces of the plate with a ceramic paste similar to the first but made slightly less fusible, in drying and baking the plate again, in decorating and enamel- 65 ing the surfaces thus prepared with enamels composed of silicates, in baking a third time and allowing to cool, substantially as and for the purpose set forth.

2. A process for manufacture of reinforced 70 ceramic articles, consisting in embedding a wire-gauze cut to the size of the articles to be manufactured in a fusible paste composed of kaolin, silica, boric acid, and alkaline salts, in drying the plate thus obtained at a tem- 75 perature of 40° centigrade, in subjecting it to a temperature of 900° centigrade for about four to five minutes until it just begins to fuse, in coating then the surface of the plate with a ceramic paste similar to the first but made 80 slightly less fusible, in drying the plate at a temperature of 40° centigrade and subjecting it to a temperature of 1,000° centigrade for about five minutes until the outer layers just begin to fuse, in decorating and enameling the 85 surfaces thus prepared with enamels composed of various silicates having fusing-points below 1,000° centigrade and a coefficient of expansion equal to that of the paste to which they are applied, in baking for five minutes and al- 90 lowing to cool, substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

JULES DANSETTE.

Witnesses:

ANTOINE LAVOIX,
J. ALLISON BOWEN.