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(54) A process for realising mosaics in ceramic material

(57) A process for realising mosaics in ceramic material comprises stages of realising a support made of ceramic material, which includes fashioning on the in-view surface of the tile parts of surface which are not reciprocally coplanar; glazing the support, done by reproducing on said support a mosaic design such as to obtain a final required design for each tessera of the mosaic, and also designing division lines between the various tesserae; realising non-through incisions on the glazed surface of the support, done by making incisions which exactly follow the division lines between the tesserae.

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Description

[0001] In the field of industrial ceramics, pre-composed mosaic panels constituted by tesserae are very commonly made by cutting tiles, which are then grouted in random or predetermined sequence for realising decorations on a support element. The support element retains the tesserae, constraining them to form a mosaic panel.

[0002] As is known, this process is widely applied, in particular in the sector of ceramic tiles and marble.

[0003] This mode of operating, which with the panels thus obtained enables realisation of mosaics having almost the qualities of real hand-laid mosaics, entails using expensive, complex and cumbersome production lines, and also causes difficulties for the tiler in terms of achieving the desired effect, due to the fact that it is not simple to lay the supports bearing the tesserae in reciprocally correct positions.

[0004] For some time now the prior art has taught realising tiles in which cuts are made after glazing to divide the glazed surface into many portions, all anchored to the tile body as the mentioned cuts are not total through-cuts, although they appear like mosaic tesserae; these tiles are laid one next to another and the cuts, like the lines between a tile and another, are grouted so as to create a mosaic effect. The final effect, however, is not very similar to a mosaic, and thus does not achieve the desired effect, as the joins between a "tessera" and another are very well visible due to the initial glazing and the overall configuration.

[0005] A further process involves obtaining cuts during the tile pressing, the cuts being made by the die on the unfired tile, which is then glazed and fired. With this process there is difficulty in getting the grout to adhere when laid in the glazed cut-lines, and there is also the problem that the impression of wholeness of the tile is not removed, so the final effect does not look like a mosaic.

[0006] Leaving aside the process of using single tesserae grouted onto a support, with which the most varied designs are obtained, all the above-described processes, which normally include a silk-screening glazing process, do not allow more than two or three types of different tiles to be obtained, as normal drum-type silk screens are usually provided with two or three surfaces, and flat screens can be put on the glazing line in a rather limited number in order not to create excessive constructional complications in the glazing plant. Further, with these processes the continuous effect typical of a cut tile is visible.

[0007] The aim of the invention is to obviate the drawbacks inherent in the prior art by providing a process which enables tiles to be obtained which can reproduce, once assembled with other tiles, the typical effect of a mosaic.

[0008] A further aim of the present invention is to make economies in production of tiles able to realise mosaics which are similar to "real" mosaics i.e. those made by manual laying of single tesserae.

[0009] An advantage of the present invention is to provide a process for creating tiles reproducing mosaics which can reproduce mosaics with tesserae of any shape and size.

[0010] A further advantage of the present invention is to provide a process for creating tiles reproducing mosaics in which the lie of each tessera is not perfectly coplanar with the lie of other tesserae, exactly as happens with mosaics entirely produced by manual laying of the single tesserae.

[0011] These aims and advantages and more besides are all attained with the present invention, as it is characterised in the appended claims.

[0012] Further characteristics and advantages of the present invention will better emerge from the detailed description that follows, of possible ways of realising the stages of the process of the invention.

[0013] The process of the invention aims at realising mosaics made of ceramic material, and in particular realising ceramic tiles which, after laying, faithfully reproduce a mosaic and all the salient characteristics, such as for example the irregularity of the lie of the tesserae and the discontinuity of the decoration due to the different shades and irregularity of the "chromatic veins" of the single tesserae, typical of a mosaic obtained by hand-laying of the single tesserae. As will better emerge in the following description, the process realises tiles which on the in-view surface thereof (the surface opposite the blank, which is the surface of the tile which is grouted to the surface to be decorated when the tiles are laid) there are decorated tesserae which exactly reproduce the tesserae of a mosaic, separated by division lines between the tesserae which are typical of mosaics, and which are in a single body with the tile.

[0014] The process comprises a stage of realising a support in ceramic material, which is preferably obtained in a powder pressing operation, using powders normally used for realising ceramic tiles. This is done by fashioning, on the surface of the tile destined to reproduce the mosaic, not a coplanar surface, as happens with normal tiles, but at least parts of the surfaces which are destined to reproduce the single tesserae with a non-coplanar reciprocal arrangement. In particular the various parts which are not coplanar are fashioned such as to be inclined, with respect to an ideal decorated plane of the tile, with inclinations of the order of fractions of degrees, and are differently oriented, i.e. with inclinations oriented in different directions and with positive and negative angles. This type of "non-coplanarity" of the parts destined to reproduce the mosaic tesserae is what best renders the effect of a hand-laid mosaic, although it is obviously possible to create parts which are arranged on parallel planes to the ideal plane decorated by the tile, or to leave parts of the ideal plane decorated by the tile; the latter style, however, would leave a less perceptible effect of hand-laid mosaic.

[0015] The non-coplanarity of the parts destined to re-

produce the single tesserae is realised quite simply by using ceramic tile dies in which the punch destined to reproduce the decorated part of the tile has, in negative, the type of non-regular surfaces (with reciprocally non-coplanar parts), which it is desired to obtain on the decorated surface of the tile. The support is then preferably fired.

[0016] Once the ceramic support with the above-described characteristics has been obtained, the support is subjected to a stage of glazing. This stage is performed by reproducing, on the support itself, the design of the mosaic to be realised, such as to obtain the design which each tessera is to have and the design of the division line between the various tesserae. In other words, in this particular stage of glazing, many "smaller glazes" are obtained on a single tile, which smaller glazes are in a number which is equal to the number of tesserae destined to constitute the mosaic, which are, or can be, different from each other in colour, shade and veining, and which are separated from one another by the dividing lines of the various tesserae. These division lines can, though this is not necessary, be glazed for example with a colour reproducing those of the grouts used for grouting mosaics; or, especially in the case of mosaics having regular shapes, for example square, rectangular, rhomboid and the like, they can simply be defined by the separation line between the decoration of a tessera and the decoration of the tesserae in the proximity thereof.

[0017] The stage of glazing is preferably performed using programmable ink-jet decorating devices. These devices, which are of known type even though they are not frequently used in the ceramic field, have the considerable advantage of being able to realise, differently to usual silk-screening decoration systems which only enable a very limited number of different decoration sequences to be performed, very numerous decoration sequences, all different and the number of which depends only on the complexity of the program set. This way of operating is particularly useful in the case of realising mosaics provided with regular tesserae; with these devices, numerous (even hundreds) different series of tiles can be assembled with one another, continuously and on a same production line, which can then be assembled together, during laying, to produce mosaics which are very large and which do not exhibit repetitive series of tesserae, as occurs with tiles having tesserae having the same decoration sequences, which would give an "unnatural" effect to the mosaic.

[0018] Once the supports have been glazed they are fired, or double-fired if glazing has been performed on a fired support, with the usual technologies.

[0019] Then the stage of making the non-through incisions on the glazed surface of the tiles is performed.

[0020] This stage is performed by making incisions which exactly follow the division lines between the tesserae. In the case of tiles destined to reproduce mosaics having regular tesserae, the division lines are straight lines and the cuts of the lines can easily be obtained by cutting blades cutting the decorated surface of the tile in straight division lines between the tesserae. In the case of tiles destined to reproduce mosaics having irregularly-shaped tesserae, the stage of realising the incisions along the irregular lines can be performed by mechanical incision processes, such as, for example, pantograph incisions or laser incisions, using sand or water, which are of known type, which cut the decorated surface of the tile in irregular division lines between the tesserae.

[0021] For reasons which will better be described herein below, the edges of the tiles are made at the division lines between the various tesserae, and are rectified. In the case of tiles destined to reproduce mosaics with regular tesserae, the edges will be straight and the tile will be shaped as a normal ceramic tile. In the case of tiles destined to reproduce mosaics with irregularly-shaped tesserae, especially for the realisation of large-size tiles where complete realisation requires two or more ceramic tiles, there are two possibilities: either the design of the mosaic can include straight parts which will coincide with the edges of the tile, or irregularly-edged tiles are made, then to be assembled according to a pre-constituted sequence so that joining them together gives a complete mosaic design. The irregular edges can be obtained either during the stage of pressing the support, using dies of the desired shape, or by cutting the tiles along the edges, for example using the same machines which perform the non-through cuts, which in this case will obviously perform through-cuts such as to cut through the whole ceramic support.

[0022] With the above-described process ceramic tiles are obtained on which upper surface thereof mosaic tesserae are reproduced, each having a particular decoration and a particular lie, together on the very support they have been created on. Effectively, ceramic tiles have been obtained which have the same characteristics as ceramic mosaics made from single tesserae and uniting them on a support, for example by grouting them on a cloth or net or in any case on a non-rigid support, destined to keep them connected in order to facilitate laying thereof. The described process is, however, as can easily be understood, much more economic during the stage of realising the tiles and provides elements (the tiles) which are much easier to lay than the elements (tesserae grouted onto non-rigid supports) at present used for obtaining ceramic mosaics which are similar to mosaics laid tessera by tessera by hand.

[0023] Laying the tiles is extremely simple. The tiles are laid on the surface to be covered, side by side, and then grouted so as to fill the cuts between the various tesserae of the tile as well as the join lines between one tile and another. The rectification of the tile edges means that the various tiles can be placed side-by-side such as to exactly reproduce a division line between the tesserae of a mosaic.

[0024] The final effect obtained after laying the tiles is that of a large mosaic, the tesserae of which are singly laid by hand. Each tessera of the whole mosaic is geo-

metrically arranged, typical in artisan mosaics, and has its own decoration, which gives the whole mosaic a configuration which is similar to that obtained with a mosaic laid tessera by tessera.

Claims

1. A process for realising mosaics in ceramic material, comprising stages of realising a support made of ceramic material, glazing the support, firing the glazed support, realising non-through incisions on a glazed surface of the support, **characterised in that**: the stage of glazing the support is performed by reproducing on the support a design of a mosaic to be realised, such as to obtain a desired design of each tessera of the mosaic, and a design of division lines between the tesserae; the stage of realising non-through incisions on the glazed surface of the support being performed by realising incisions exactly following the division lines between the tesserae.

2. The process of claim 1, **characterised in that** the stage of realising the support made of ceramic material is performed by fashioning, on the surface of the tile which will reproduce the mosaic design, parts of surface which are destined to receive the design of a single tessera, which parts are not reciprocally coplanar.

3. The process of claim 2, **characterised in that** the parts of surface which are not reciprocally coplanar are inclined with respect to an ideal decorated plane of the tile, with inclinations of fractions of a degree, and are also reciprocally differently oriented.

4. The process of claim 1, destined to obtain mosaics having tesserae exhibiting regular prismatic shape, **characterised in that** the stage of realising incisions is performed using cutting blades which cut into the decorated surface of the tile in straight dividing lines between the tesserae.

5. The process of claim 1, destined to obtain mosaics with irregular shape, **characterised in that** the stage of realising the incisions is performed using known-type mechanical cutting processes along irregular lines, which cut the decorated surface of the tile in irregular dividing lines between the tesserae.

6. The process of claim 1, **characterised in that** the stage of glazing is performed using programmable ink-jet decorating devices of known type.

7. The process of claim 1, **characterised in that** edges of the tiles are fashioned at division lines between various tesserae and are rectified.

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EUROPEAN SEARCH REPORT

Application Number
EP 07 42 5607

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 February 2008	Sartor, Michele

CATEGORY OF CITED DOCUMENTS

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