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(71) Applicant: **Evermark, Birgit**
655 93 Karlstad (SE)

(72) Inventor: **Evermark, Birgit**
655 93 Karlstad (SE)

(74) Representative: **Johansson, Lars E.**
Hynell Patenttjänst AB
P.O. Box 138
683 23 Hagfors (SE)

(54) Method and system for production of a picture by means of tiles on a wall, floor or ceiling

(57) A method of production of a tile arrangement, comprising the steps of;
- choosing a picture (20') for a tile arrangement (2),
- arranging for having said picture (20') in digital form on a computer device (5),
- choosing a tile (3) to be used for the tile arrangement (2),
- using software on said computer device (5), for producing a production template (20") enabling transfer of said picture (20') onto a desired number of the said tiles (3),
- using a production unit (9) for transfer of said production template (20") onto each one of said tiles (3), wherein that said picture (20') is transferred directly onto each one of said tiles (3) by means of a production unit (9) using traditional printing technology.

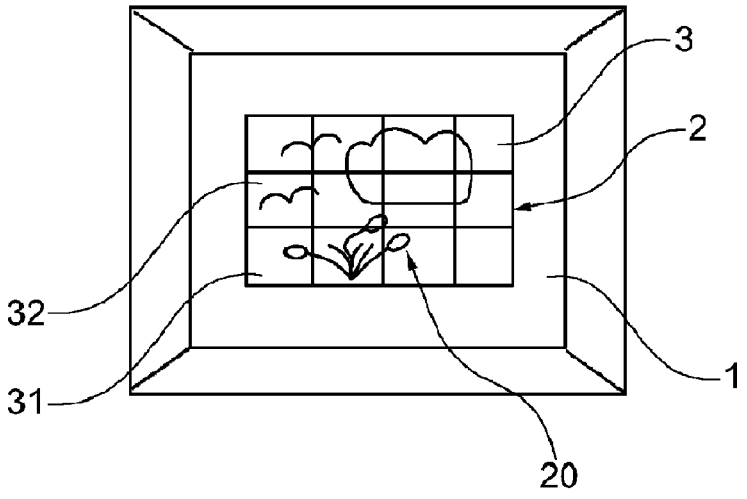

Fig. 1

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Description

TECHNICAL FIELD

[0001] This invention relates to a system and a method of production of a tile arrangement, comprising the steps of; choosing a picture for a tile arrangement, arranging for having said picture in digital form on a computer device, choosing a tile to be used for the tile arrangement, using software on said computer device for producing a production template enabling transfer of said picture onto a desired number of the said tiles, using a production unit for transfer of said production template onto each one of said tiles.

TECHNICAL BACKGROUND

[0002] The use of applying pictures to walls, floors, and/or ceilings has for long been a means for individuals and organizations to "decorate" a built in space, e.g. a room. Tiles are building elements that are preferred in many different situations thanks to their esthetic appearance and also their ability of providing strength and durability. The production of tiles includes relatively many production steps and in order to provide cost efficiency there is a need of producing a large number of each tile, having its own aesthetic appearance. This latter fact puts a limit to the ability of providing a customer an individualized picture applied by means of traditionally produced tiles. Production systems are known that may be used to produce individually designed tiles, but these systems are either very expensive or complex (e.g. US 2007/0246148 and US 2007/0085983) and therefore the cost for such tiles are very high resulting in a limited availability of such tiles.

[0003] There is a need for a production system and method that enables a more cost efficient production of individually designed tiles.

BRIEF DESCRIPTION OF THE INVENTION

[0004] It is an object of the invention to provide a more cost efficient method/system for the production of individualized tiles, which is enabled by means of a system/method as defined in the appended claims.

[0005] Thanks to the invention there is facilitated the use of standard produced tiles as a basic raw material for the production of individualized tiles, which drastically increases flexibility, and lowers the cost, for productions of such individualized tiles.

BRIEF DESCRIPTION OF THE FIGURES

[0006] In the following the invention will be described with reference to the appended figures, wherein:

Fig. 1 shows a schematic view of a room arranged with a wall portion in accordance with the invention,

Fig. 2 shows a picture used as the original for producing tiled wall portion in accordance with the invention,

Fig. 3 schematically shows the steps for transforming the original picture into a production template,

Fig. 4 schematically shows a first preparation step for tiles in accordance with the invention, and,

Fig, 5 schematically shows the production line for a tile arrangement in accordance with the invention.

DETAILED DESCRIPTION

[0007] In Fig. 1 there is shown in a schematic manner, a room having a wall 1, wherein a part thereof has been arranged with a tile arrangement 2 in accordance with the invention. The tile arrangement 2 comprises a number of tiles 3 (or clinkers, slabs or the like), in this example twelve tiles, which together present a picture 20, which may be individually chosen. Accordingly each tile, e.g. 31 and 32, present a fraction of a total picture 20' and by positioning the tiles in a predetermined manner on the wall 1 they will present a totality picture 20 in accordance with that picture 20' chosen. As is evident also the rest of the wall 1 may of course be arranged with tiles, e.g. by means of using standard tiles in a traditional manner. Furthermore it is understood that the whole of the wall 1 may be used to present a picture 20, or a plurality of pictures and further that the presentation of the picture may be achieved by the use of tiles of varying size. Furthermore it is of course evident that the picture, or indeed pictures, may be applied also to either one or all of wall, ceiling and floor.

[0008] In Fig. 2 there is shown an original picture 20' intended for the use to present the picture that shall be produced by means of tiles 3 on a wall 1. The picture 20' may be a handmade painting, of any kind, or indeed any kind of picture that is positioned on a substrate (not shown) that is possible to handle for production of a production template. A very convenient format for the original picture 20' is a digital photo, which preferably should be of high quality to enable high quality enlargement and reproduction.

[0009] In Fig. 3 there is shown a schematic view of a production facility 4,5,6,7 for production of a production template 20". In Fig. 3 there is presented an embodiment wherein the original desired picture 20' is in the form of a picture on a web shaped substrate, e.g. a sheet of paper or a sheet of cloth. The substrate 20' is then introduced into a scanner 4 which transforms the picture 20' into a digital representation and transmits the picture to a computer device 5. The computer device 5 has a software enabling production of a production template 20". As indicated the computer 5 may preferably be connected to the internet 7 and/or to database 6 (which indeed may be stored internally on the computer 5). By means of the

connection to the database 6 (or internet 7) the person at the computer device 5 may chose a desired basic tile 3 from a large variety of available tiles registered in the database 6 and/or identified on the internet 7. Furthermore the person at the computer device 5 has knowledge of (preferably stored on the computer device) all needed input from the customer who has ordered the tile arrangement 2, e.g. size of the area intended for the picture 2, preferences regarding tile quality, preferences regarding size of each tile, preferences regarding basic color of the tiles, etc, etc. Based on all input the person at the computer device 5 will make an appropriate choice of a tile 3 for production of the template 20" and the computer device 5 will by means of the specific software produce a production template 20' that includes each one 31, 32, etc of all the tiles 3 that are needed to form the picture 20 of the tile arrangement 2.

[0010] In Fig 4 it is shown a pre treatment unit 8. The tiles 3, in a traditional manner, comprises backside 34, within appropriate surface for attachment thereof, an intermediate layer 36 forming the core of the tile, and a top surface 35 that is intended for exposure. The top surface 35 often comprises a sintered/glazed layer of a material that is not appropriate for application of any printed matter. As a consequence prior to applying any desired decoration on to the tiles 3 they are treated in the pre treatment device 4 to transform the top surface 35 into a modified surface 35' that is appropriate for application of printing material. Many different kinds of treatments may be used for modification of the surface 35. The most preferred treatment in accordance with the invention is the use of pickling to chemically transform the surface 35 into a printable top surface 35'.

[0011] Regarding the pre treatment of the tiles 3 the main purpose of that is to provide a surface that is appropriate for the transfer of the printing onto it, and that is sustainable. There are many different methods that can be used in order to achieve an appropriate surface 35'. A preferred embodiment includes the use of pickling, i.e. using a pickling acid. The pickling acid is a placed onto the top surfaces 35 of the tile, which preferably is performed by means of spraying it onto the surface 35. Alternatively the tiles 3 may be dipped into a vessel (positioned within the pretreatment device 8) containing the pickling acid. Varying kinds of pickling acids are feasible, which may include supplementing contents, depending on what kind of basic material and top surface there of the tile 3 to be treated. Preferably a mixture of at least two acids is used from the group hydrogen fluoride acid, nitric acid, sulphuric acid, phosphoric acid and hydrochloric acid. Tests have shown that preferably nitric acid is the main ingredient in the mixture, and then preferably containing at least 50% nitric acid. Once applied the pickling acid is allowed to be in contact with the surfaces 35 for a sufficient time (preferably between 1 and 24, more preferred between about 2-6 hours) to modify the surfaces 35 to a printable surfaces 35'. Also the time in contact with the surfaces will of course vary depending on the properties of the surfaces 35. Once a desired roughness/surface property of the tile 3 has been achieved, the tile 3 is cleaned, e.g. by means of flushing water onto it, preferably tempered water, between 20-70 degrees C°, often more preferred between 30-50 degrees C°. Thereafter the top surfaces 35' of the tile 3 are protected, e.g. by means of wrapping it into a protective cover and moved to the facility having the printing device 9.

[0012] Prior to introducing the tiles 3 into the printing device 9 the cover is first removed and there after the top surface 35' is cleaned, in order to remove possible stains and/or particles. A preferred cleaning means is based on some kind of alcohol, as active cleaning substance.

[0013] According to an alternative method the surfaces may be roughened by means of an abrasive blasting. Also other kind of an abrasive method may be used to obtain the desire surfaces 35'.

[0014] Once the tiles 3 have been prepared for printing they will be introduced into a production unit 9 wherein printing is performed onto the top layer 35' of each tile, by means of using the production template 20" and traditional printing technology, e.g. using a flatbed printer. As a consequence each one of the needed tiles, 31, 32, etc. will be produced to representing a specific fraction of said picture 20, by means of the production unit 9, i.e. to reproduce each and every fraction of the total picture 20 that is intended to be applied to the wall 1. Prior to the delivery of the tiles, a protective layer (not shown) is supplied on top of the printed picture of each tile 3, e.g. by means of applying vanish or any appropriate kind of seal, which may vary depending on the environment where the tile arrangement 2 is going to be applied.

[0015] In Fig.5 it is shown that one single tile at the time passes the production unit 9 so as to receive a fraction of the total picture 20. It may of course be possible to feed the production unit 9 with a matrix containing more than one tile, e.g. containing one row tiles (e.g. 3 tiles) or a multiple rows, e.g. twelve tiles as shown in Fig.1, and to either print a sub-fraction of the total picture 20 on the matrix, or the whole picture 20 at once, meaning that each tile 31, 32 receives a fraction of the total picture 20.

[0016] The printable width w' of the production unit will then have to be at least corresponding to the width w of the picture 20.

[0017] A major advantage with the production method/system in accordance with the invention is that the cost for an individualized tile picture 2 may be drastically reduced, compared to known methods. A further very important advantage is that it is easily feasible to reproduce one or more tiles 3, a later stage (e.g. due to damage) since the production template 20" may be easily stored for a very long time, implying that reproduction will be possible at relatively low cost.

[0018] Regarding the printing onto the surfaces 35 of the tile this may be achieved by the use of a flatbed UV (ultra violets) inkjet printer, e.g. a Durst, RBS Rigid Board Set, or Durst RBS30DM Rigid Premium Board Set. This

technology is based on a digital inkjet concept, wherein the printing ink reacts/hardens in when exposed to ultra violet light. Preferably the ink should be free from VOC (volatile organic compounds).

[0019] Regarding the after treatment, i.e. treatment after removing the tiles 31, 32 from the printing device 9, they 3 are firstly properly cleaned, preferably by means of spraying an appropriate cleaner onto the printed surface 35', e.g. a silicon remover. There after the tiles 31, 32 are applied with a protective surface on top of the printed top surfaces 35'. The preferred method of applying a protective layer is by means of spray painting a transparent durable layer, e.g. an appropriate transparent varnish. Preferably the protective layer is applied in multiple layers. There after the protective layer is hardened, e.g. by resting in room temperature for a period of time, or at elevated temperature if a shorter time period is desired. Alternatively, powder varnish may be used, wherein the protective layer is obtained by means of melting the powder at elevated temperature (e.g. in an oven) A further alternative embodiment to achieve the protective layer is the use of a transparent film, which either is self-adhesive or is made adhesive by a applying high temperature (hot melting).

[0020] The invention is not limited by what has been described above, but may be varied within the scope of the appended claims. For instance it is well known by the skilled person that many different kind of seals may be used, e.g. also by the use of sintering a seal on to the tiles 3. Furthermore it is evident that the flexibility of the production method enables a large variety regarding many of the parameters, e.g. enabling use of differently sized and/or colored, basic tiles 3 for production of the picture 2. Moreover it is evident that the method/system according to the invention is not limited to the use of tiles but may also be used together with any similar kind of basic building material, e.g. clinker, stone plates, etc.

Claims

1. A method of production of a tile arrangement, comprising the steps of;

    - choosing a picture (20') for a tile arrangement (2),
    - arranging for having said picture (20') in digital form on a computer device (5),
    - choosing a tile (3) to be used for the tile arrangement (2),
    - using software on said computer device (5), for producing a production template (20") enabling transfer of said picture (20') onto a desired number of the said tiles (3),
    - using a production unit (9) for transfer of said production template (20") onto each one of said tiles (3),

    characterized in that said picture (20') is transferred directly onto each one of said tiles (3) by means of a production unit (9) using traditional printing technology.

2. A method according to claim 1 **characterized in that** the said tiles (3) prior to the printing have been treated to modify its top surface (35) into a modified surface (35') appropriate for printing.

3. A method according to claim 2 **characterized in that** said tiles (3) are chosen from a ready to use, standard kind of tiles.

4. A method according to claim 3 **characterized in that** said modification of the surface (35) includes treatment by means of chemicals.

5. A method according to claim 4 **characterized in that** said chemical treatment includes steeping and/or treatment by means of acid.

6. A method according to any preceding claim **characterized in that** said production template (20") is stored on a database (6) arranged to enable reproduction of one or more of said tiles (31, 32) forming said tile arrangement (2).

7. A method according to any preceding claim **characterized by** the use of a UV hardening ink for the printing, preferably in a flat bed printer (9).

8. A system for production of a tile arrangement comprising;

    - a computer device (5) having software enabling storage of a picture (20') and production of a production template (20") for a tile arrangement (2),
    - means (4) for preparing said picture (20') to be in digital form,
    - a data base (6) and/or web connection (7) enabling access on said computer device (5) of needed parameters concerning a desired tile (3) to be used for the tile arrangement (2),
    - software and processor means on said computer device (5), arranged to produce a production template (20') wherein said picture (20') is transferred onto a desired number of said tiles (3),
    - a production unit (9) arranged to use said production template for transfer of said production template (20") onto each one of said tiles (3), **characterized in that** said production unit (9) includes means using traditional printing technology, arranged to directly transfer said picture (20') to said tiles (3).

9. A system according to claim 8 **characterized by** in-

cluding a pretreatment unit (8) arranged to modify the top surface (35) of said tiles (3) into a modified surface (35') appropriate for printing.

10. A system according to claim 8 or 9, **characterized by** using tiles (3) chosen from a ready to use, standard kind of tiles.

11. A system according to claim 9 **characterized in that** said pretreatment unit (8) includes treatment by means of chemicals.

12. A system according to claim 11 **characterized in that** said chemical treatment includes steeping and/or treatment by means of acid.

13. A system according to any of claims 8-12 claims, **characterized by** including a database (6) for storage of said production template (20") arranged to enable reproduction of one or more of said tiles (31, 32) forming said tile arrangement (2).

14. A system according to any of claims 8-12, **characterized in that** said production unit (9) includes a flat bed printer, preferably an UV ink jet flat bed printer.

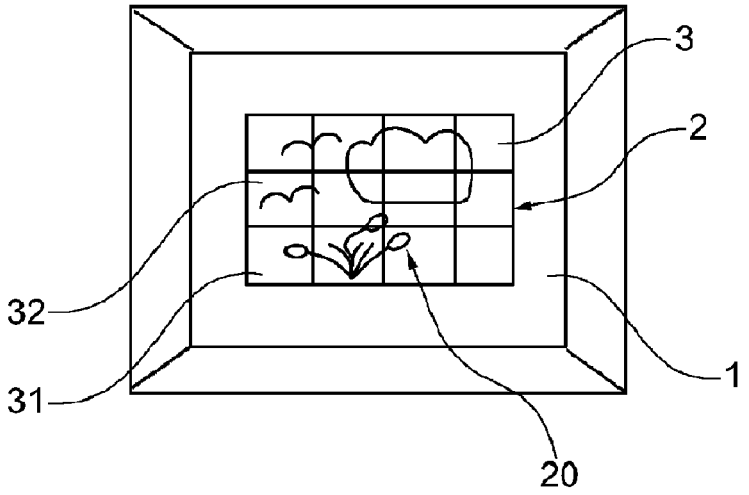

Fig. 1

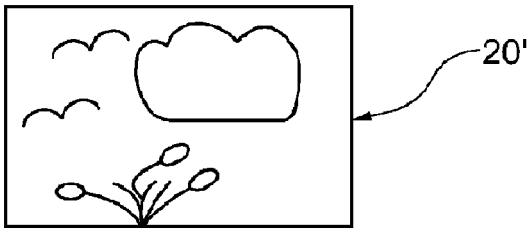

Fig. 2

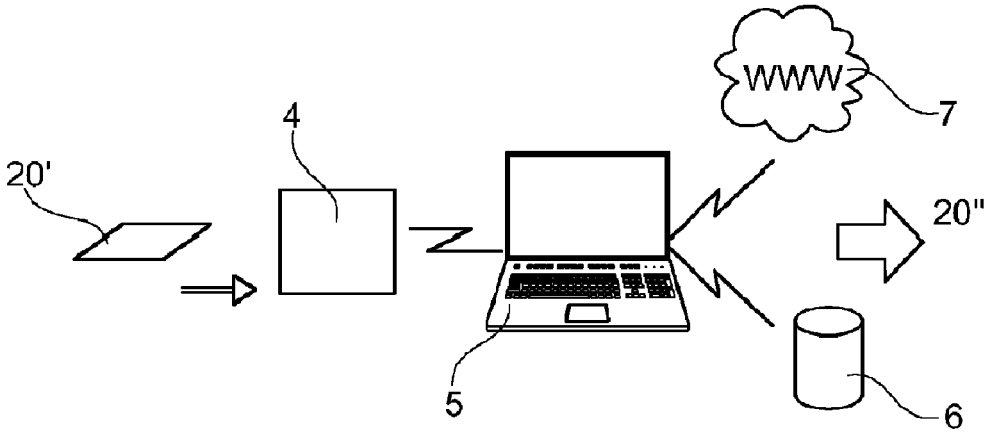

Fig. 3

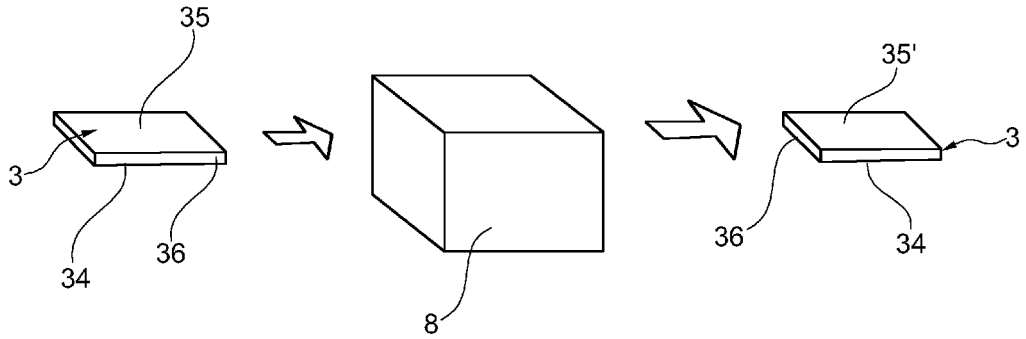

Fig. 4

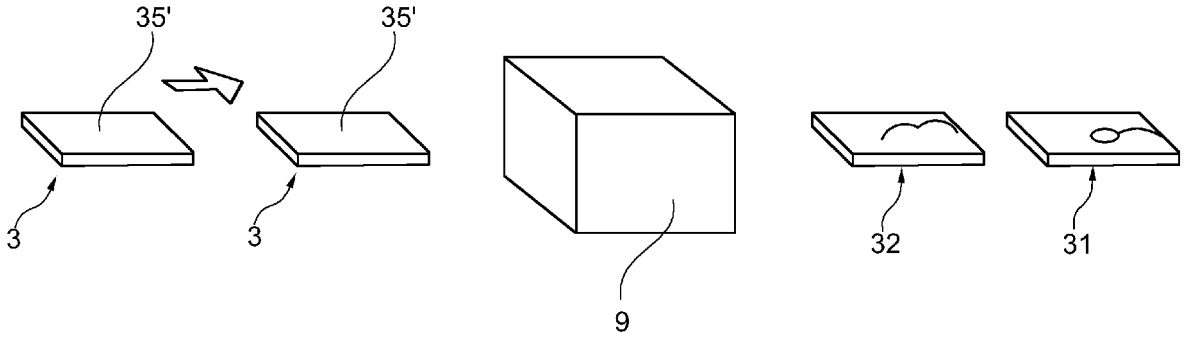

Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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