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(54) **A process for realising matrices, in particular for the decoration of ceramic tiles**

Verfahren zur Herstellung einer Druckform insbesondere zur Dekoration von keramischen Fliesen

Procédé pour réaliser une plaque en particulier pour la décoration de carreaux en céramique

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Description

[0001] The invention relates to a process for realising matrices, in particular for the decoration of ceramic tiles.

[0002] The prior art teaches matrices, used in the decoration and glazing of ceramic tiles, made by engraving into elastically deformable surfaces arranged on matrix-bearing surfaces, usually cylinders, equipped on rotary machines.

[0003] The matrix recesses are cut into smooth silicone-rubber cylindrical surfaces and are constituted by a plurality of cells predisposed to retain small quantities of glaze destined, in the decoration stage, to be transferred from the cells onto the surface to be decorated, by contact between the surface to be decorated and the surface of the smooth elastically-deformable cylinder.

[0004] The prior art also teaches laser-cutting of incisions in the elastic surface of a drum in flexographic applications.

[0005] The latter process, however, requires the use of rather expensive and sophisticated apparatus, which not insignificantly limits its use potential.

[0006] FR 2 419 819 discloses a process for making a gravure type of printing plate whereby a metal or woven textile screen is coated with photosensitive material which is imagewise exposed and developed to give a screen having a predetermined design.

[0007] A layer of metal is then applied such that the holes in the engraved parts of the screen are closed off over a portion of their depth creating cavities which give a recessed design.

[0008] **For printing the cavities are filled with ink.**

[0009] The main aim of the present invention is to obviate the limitations in the prior art. An essential advantage of the invention consists in the fact that it can be actuated within the normal and usual technology of photo-engraved silk screen production. These aims and advantages and more besides are all attained by the present invention, as it is characterised in the appended claims.

[0010] Further characteristics and advantages of the present invention will better emerge from the detailed description that follows of a preferred but non-exclusive embodiment of the invention, illustrated purely by way of a nonlimiting example in the accompanying figures of the drawings, in which:

figure 1 is an enlarged-scale view of a transversal section of an engraved silk screen;
figure 2 is the same section of figure 1, showing the screen obtained by application of the process;
figure 3 is the same section of figure 2 and shows the result of a second embodiment of the invention;
figure 4 schematically shows the use of the screen as a matrix for the decoration of ceramic tiles.

[0011] With reference to the figures, 1 denotes in its entirety a normal silk screen which has been etched according to a predetermined design.

[0012] Figure 1 shows the holes 4 which are not filled with "filler" 5 which in the non-engraved zones occupies all of the space between the threads 3 and renders the screen completely impermeable in these zones.

[0013] The preparation of the above-described screen constitutes the first stage of the process of the present invention, which will be followed by a second stage in which the holes 4 in the engraved zones will be closed on one side over a portion of the breadth of the screen, so that on the opposite side, corresponding to the engraved zones, cavities 2 are identified which all together give rise to an engraved or etched design.

[0014] Before closing off, the engraved parts (i.e. the parts with the holes 4) of the screen can be treated with a waterproofing material, which has the task of waterproofing the threads 3 of the screen 1 left uncovered, i. e. not covered over by the filler material 5.

[0015] In the invention engraved parts of the screen 1 are waterproofed (to protect the threads 3) after the holes 4 are closed off.

[0016] The waterproofing treatment is performed by means of a temporary filling of the cavities in the engraved zones with a very fluid silicone-based material, the threads 3 of the screen being thoroughly drenched, followed by an aspiration (from one side of the screen 1) of the material until the previously-closed cavities are re-opened, thus returning to the original engraved configuration.

[0017] In particular the closure on one side only of the screen 1 of the holes 4 in the engraved zones concerns a portion of the depth of the screen 1 itself, and generates a surface delimiting the cavities 2 but free of undercuts. Considering that the threads 3 have a circular section, in order to eliminate undercuts it will usually be sufficient to close the holes 4 by filling them up with material (e.g. silicone rubber) over a large part of the depth of the screen, so that inside the cavities 2 the threads 3 project for less than half of their thickness, leaving no undercuts, as mentioned above.

[0018] The depth of the cavities 2 can be decided as needed, keeping constant the depth of the material used to close the holes 4 off; it is sufficient simply to apply an additional layer 6 (e.g. a layer of silicone rubber) to the side of the screen destined to afford the cavities 2. The additional layer 6 is constrained perfectly on the screen.

[0019] The screen can be used to decorate ceramic tiles 10 by a transfer operation involving dosed quantities of glaze or colour, previously loaded onto the screen and therefore contained in the cavities 2, and applied on the surface to be decorated by pressing the screen onto the surface.

[0020] The screen obtained using the above-described process constitutes a matrix, usable in particular for decorating ceramic tiles.

[0021] The engraved design, constituted by the totality of the cavities 2, is filled with glaze at the start of each operational cycle, while the smooth external surface 7

stays perfectly clean.

[0022] The matrix, with the cavities 2 full of glaze, is then brought into contact with the surface to be decorated 11 of the tile 10 and pressed against it undraggingly - this can be achieved, for example, by rolling the matrix, which could be mounted on a cylinder, on the surface 11 of the tile 10 - with the elastic deformability of the matrix causing the dosed amounts of glaze contained in the cavities 2 to be expelled and transferred on to the surface 11 of the tile 10. The transfer of the dosed amounts of glaze is facilitated by the fact that the surfaces delimiting the cavities 2 are waterproofed and free of undercuts. The use of the matrix obtained using the process of the invention is preferably accompanied by the use of a doctor to scrape away the extra glaze from the smooth external surface 7 of the matrix so that the glaze fills only the cavities 2 while the surface 7 is left perfectly clean.

[0023] The invention has, among others, the not inconsiderable advantage of enabling engraved matrices to be made using a traditional and economical silk screen manufacturing technique.

Claims

1. A process for realising matrices, in particular for decoration of ceramic tiles, **comprising:**

   preparation of a silk screen (1) engraved with a predetermined design; a closing-off, on one side of the screen (1), of holes (4) in engraved zones of the screen (1) over a portion of a depth of the screen (1), creating cavities (2) which altogether give rise to a recessed engraved design;
   the zones of the screen (1) affording the cavities (2) being brought into contact with a surface (11) in order to transfer thereon amounts of a substance contained in the cavities (2);

   characterised in that the threads (3) of the screen (1) are treated with the a waterproofing material after the closing-off of the holes (4).

2. The process of claim **1, characterised in that** the treatment of the engraved zones of the screen (1) with a waterproofing material is obtained by temporarily filling the cavities present in the engraved zones with a very fluid silicone-based material, up until the threads (3) of the screen (1) are thoroughly drenched, followed by an aspiration, performed on one side of the screen (1), of the waterproofing material up until the cavities are freed thereof.

3. The process of claim 1, **characterised in that** the closing-off on one side of the screen (1) of the holes present in the engraved zones refers to a portion of a depth of the screen (1) and produces a surface delimiting the cavities (2) which is free of undercuts.

Patentansprüche

1. Verfahren zur Herstellung einer Druckform, insbesondere zur Dekoration von keramischen Fliesen, enthaltend:

   - Vorbereitung einer Siebdruckschablone (1), graviert mit einem bestimmten Muster;
   - Verschliessen auf einer Seite der Schablone (1) von in den gravierten Bereichen der Schablone (1) vorhandenen Öffnungen (4) über einen Tiefenabschnitt der Schablone (1), wobei Vertiefungen (2) hergestellt werden, welche zusammen ein vertieftes graviertes Muster ergeben;

   wobei jene die Vertiefungen (2) aufweisenden Bereiche der Schablone (1) in Kontakt mit einer Oberfläche (11) gebracht werden, um auf diese Mengen einer in den Vertiefungen (2) enthaltenen Substanz zu übertragen;
   dadurch gekennzeichnet, dass die Fäden (3) der Schablone (1) nach dem Verschliessen der Öffnungen (4) mit einem wasserabweisenden Material behandelt werden.

2. Verfahren nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die Behandlung der gravierten Bereiche der Schablone (1) mit einem wasserabweisenden Material durch gleichzeitiges Füllen der in den gravierten Bereichen vorhandenen Öffnungen mit einem sehr flüssigen Material auf Silikonbasis erfolgt, bis die Fäden (3) der Schablone (1) vollkommen eingetaucht sind, gefolgt von einem auf einer Seite der Schablone (1) durchgeführten Absaugen des wasserabweisenden Materials, bis die Vertiefungen von diesem befreit sind.

3. Verfahren nach Patentanspruch 1, **dadurch gekennzeichnet, dass** das Verschliessen der in den gravierten Bereichen vorhandenen Vertiefungen auf einer Seite der Schablone (1) sich auf einen Tiefenabschnitt der Schablone (1) bezieht und somit eine die genannten Vertiefungen (2) eingrenzende Oberfläche erzeugt, welche frei von Unterschnitten ist.

Revendications

1. Un procédé pour réaliser des plaques, en particulier pour la décoration de carreaux en céramique, comprenant:

- la préparation d'un écran sérigraphique (1) gravé avec un dessin prédéterminé;
- la fermeture, sur un seul côté de l'écran (1), d'orifices (4) dans les zones gravées de l'écran (1) sur une portion de l'épaisseur de l'écran (1), en créant des cavités (2) qui ensemble donnent lieu à un dessin gravé renfoncé;
- les zones de l'écran (1) comportant les cavités (2) étant mises en contact avec une surface (11) de manière à transférer sur cette dernière des quantités d'une substance contenue dans les cavités (2);

caractérisé en ce que les fils (3) de l'écran (1) sont traités avec un matériau imperméabilisant après la fermeture des orifices (4).

2. Le procédé de la revendication 1, **caractérisé en ce que** le traitement des zones gravées de l'écran (1) avec un matériau imperméabilisant est obtenu par un remplissage temporaire des cavités présentes dans les zones gravées avec un matériau très fluide à base de silicone, jusqu'à ce que les fils (3) de l'écran (1) soient complètement imprégnés, et l'aspiration successive, réalisée sur un côté de l'écran (1), du matériau imperméabilisant jusqu'à ce que les cavités en soient libérées.

3. Le procédé de la revendication 1, **caractérisé en ce que** la fermeture sur un côté de l'écran (1) des orifices présents dans les zones gravées concerne une portion de l'épaisseur de l'écran (1) et produit une surface délimitant les cavités (2) dépourvue de contre-dépouilles.

Fig. 1

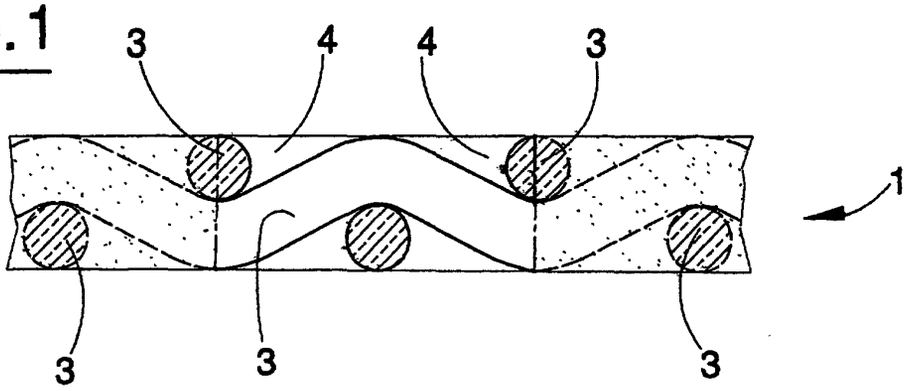

Fig. 2

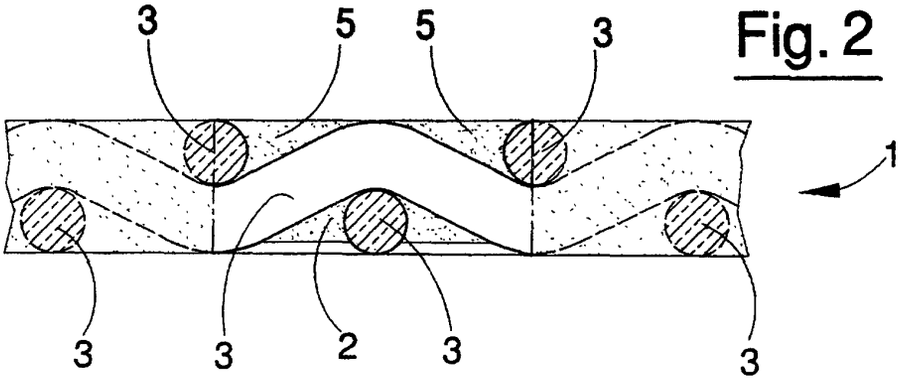

Fig. 3

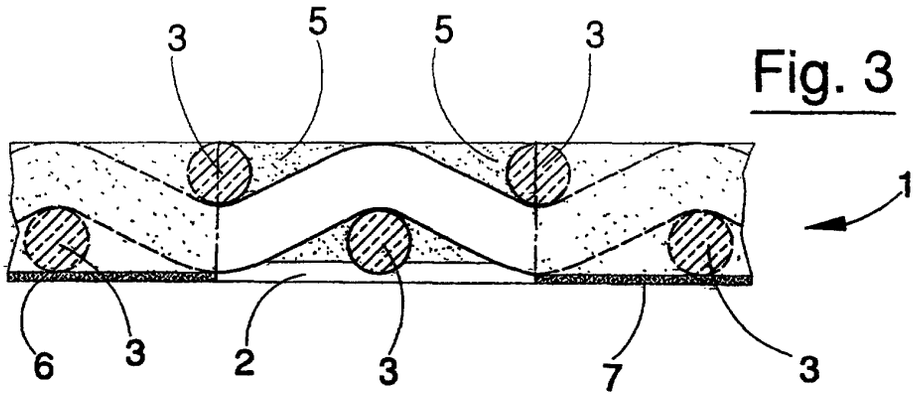

Fig. 4