held at least temporarily by means of a vacuum during production. For this purpose, vacuum channels lead from the stamp carrier and run at least in sections along a surface of the stamp carrier.

The problem is that light is scattered and reflected differently on the vacuum channels as on the smooth polished surfaces. This affects the uniformity of the irradiation in the stamp material negatively and results in process variations. In this content, this is referred to as a shadow effect.

It is therefore an object of the invention to provide stamp replication device which enables the production of stamps within a short time with a consistently high quality. In addition, it is an object of the invention to specify a method for producing a holding means for a stamp replication device as well as a method for producing a stamp.

Summary

According to an aspect, the present disclosure refers to a stamp replication device for producing stamps for the production of microstructured and/or nanostructured components comprising a platform, a cover that is positionable on the platform and a holding means for a stamp carrier, a stamp material and an irradiation source configured to expose the stamp material to light, wherein the holding means is provided on the cover or on the platform and comprises a carrier as well as a microstructured vacuum surface on the carrier for holding the stamp carrier, the microstructured vacuum surface having individual structures, wherein the stamp replication device is configured so that light emitted from the irradiation source passes through the microstructured vacuum surface and thereafter on the stamp material, and wherein light emitted from the irradiation source is at least one of broken and scattered in such a way on the microstructured vacuum surface that the individual structures of the microstructured vacuum surface are not reproduced on the stamp material.

According to an example, the present disclosure refers to a method for producing a holding means for stamp replication device, in particular stamp replication device according to the above aspect, comprising the following steps: provision of a carrier of the holding means, and generation of a microstructured vacuum surface by applying a statistical structuring, in particular by means of sand blasting, sanding, milling or etching, and/or by introducing micro-vacuum channels, in particular through the use of a lithographic method, laser method or erosion method.

According to another aspect, the present disclosure refers to a method for producing a stamp for a replication device for the production of microstructured and/or nanostructured components in a stamp replication device according to the above aspect, comprising the following steps: positioning the stamp carrier and a molding part in the stamp replication device, applying a vacuum on the microstructured vacuum surface for the purpose of holding the stamp carrier, applying the liquid stamp material on the molding part or on the stamp carrier, positioning the cover on the platform, and curing the stamp material by exposing the stamp material to UV light.

According to an example, there is provided a stamp replication device for producing stamps for the production of microstructured and/or nanostructured components comprising a platform, a cover that is placeable on the platform and a holding means for a stamp carrier, wherein the holding means is provided on the cover or on the platform and comprises a carrier as well as a microstructured vacuum surface on the carrier for holding the stamp carrier.

Within the scope of this invention, “microstructured” is understood to mean that the size of structures or unevenness is in the micrometer range or below.

The advantage of a holder comprising a microstructured vacuum surface is that the vacuum structures are so small that they are not reproduced in the production of the stamp and there are therefore no shadow effects.

The stamp replication device according to the invention thus enables the curing of stamps by exposure to light without compromising the quality of the stamp produced. The process times in the production of the stamp can be

particularly brief by the use of exposure to light which positively impacts the production costs of the stamp.

The cover of the stamp replication device is preferably at least partially transparent to light, in particular UV light, in order to allow the exposure to light of

Claims

1. Stamp replication device (10) for producing stamps for the production of microstructured and/or nanostructured components comprising a platform (14), a cover (12) that is positionable on the platform (14) and a holding means (32) for a stamp carrier (28), a stamp material and an irradiation source configured to expose the stamp material to light,

wherein the holding means (32) is provided on the cover (12) or on the platform (14) and comprises a carrier (33) as well as a microstructured vacuum surface (34) on the carrier (33) for holding the stamp carrier (28), the microstructured vacuum surface having individual structures,

wherein the stamp replication device is configured so that light emitted from the irradiation source passes through the microstructured vacuum surface and thereafter on the stamp material, and wherein light emitted from the irradiation source is at least one of broken and scattered in such a way on the microstructured vacuum surface that the individual structures of the microstructured vacuum surface are not reproduced on the stamp material.

2. Stamp replication device (10) according to claim 1, characterized in that the individual structures of the microstructured vacuum surface (34) have a feature size of no greater than 50 µm

3. Stamp replication device (10) according to claims 1 or 2, characterized in that the microstructured vacuum surface (34) comprise a statistical structuring.

4. Stamp replication device (10) according to any of the preceding claims, characterized in that the microstructured vacuum surface (34) comprises micro-vacuum channels (46) that extend over the surface of the holding means (32).

5. Stamp replication device (10) according to claim 4, characterized in that the depth (t) and/or the width (b) of the micro-vacuum channels (46) are in each case smaller than 50 µm, in particular smaller than 10 µm.

6. Stamp replication device (10) according to claims 4 or 5, characterized in that the micro-vacuum channels (46) run radially on the holding means (32) seen in top view.

7. Stamp replication device (10) according to claims 4 or 5, characterized in that the micro-vacuum channels (46) run in a lattice shape on the holding means (32) seen in top view.

8. Stamp replication device (10) according to claims 4 or 6, characterized in that the micro-vacuum channels (46) are provided at regular intervals, wherein a web (50) is provided between two micro-vacuum channels (46) in each case, in particular wherein the pitch (p) of the microstructured vacuum surface (34) being the width (b) of one of said micro-vacuum channels (46) and the adjacent web (50) is less than or equal to 50 µm, preferably less than or equal to 10 µm.

9. Stamp replication device (10) according to claim 7, characterized in that a width (b) of the micro-vacuum channels (46) is a maximum of 90% of the pitch (p).

10. Stamp replication device (10) according to claims 4 and 8, characterized in that a depth (t) of the micro-vacuum channels (46) is no greater than ten times the width (b) of the micro-vacuum channels (46).

11. Stamp replication device (10) according to any of the preceding claims, characterized in that the holding means (32) comprises a macroscopic vacuum channel (40), wherein the vacuum surface (34), in particular the micro-vacuum channels (46), is fluidly connected to the macroscopic vacuum channel (40), in particular wherein the macroscopic vacuum channel (40) completely surrounds the microstructured vacuum surface (43).

12. Stamp replication device (10) according to any of the preceding claims, characterized in that the stamp replication device (10) comprises a spacing adjustment device (18) for adjusting the spacing between the cover (12) and the platform (14) and a measuring device (24) for measuring the spacing between the cover (12) and the platform (14), wherein the spacing adjustment device (18) and the measuring device (24) are provided separately from each other.

13. Stamp replication device (10) according to any of the preceding claims, characterized in that three support regions (22a, 22b, 22c) are provided on the platform (14) for supporting the cover (12), wherein one of the support regions (22a) provides five degrees of freedom, another of the support regions (22b)

provides four degrees of freedom and/or a further support region (22c) provides three degrees of freedom.

14. Stamp replication device (10) according to any of the preceding claims, characterized in that the holding means (32), in particular the carrier (33), is made of glass or quartz, wherein the holding means (32) is transparent to light, in particular UV light, in particular light with a wavelength of 250 nm to 450 nm.

15. Stamp replication device (10) according to any of the preceding claims, characterized in that stamp replication device (10) comprises an irradiation source (30) for the purpose of exposing a liquid stamp material to light, in particular UV light, wherein the irradiation source (30) comprises a flood lamp and/or a collimator.

16. Method for producing a stamp for a replication device for the production of microstructured and/or nanostructured components in a stamp replication device (10) according to any of the preceding claims, comprising the following steps:

- positioning the stamp carrier (28) and a molding part (26) in the stamp replication device (10),
- applying a vacuum on the microstructured vacuum surface (34) for the purpose of holding the stamp carrier (28),
- applying the liquid stamp material on the molding part (26) or on the stamp carrier (28),
- positioning the cover (12) on the platform (14), and
- curing the stamp material by exposing the stamp material to UV light.