

A printing blanket

The invention relates to a printing blanket for intaglio printing, comprising at least a first area (11) with a first roughness, with there being provided in at least one second area a predeterminable second roughness which is lower in comparison with the first roughness and/or a predeterminable depression and/or a predeterminable modulus of elasticity which is lower in comparison with the first area.

In intaglio printing, which is also known as siderography, high pressing pressures are used, thus leading to a print image which can be sensed in a tactile manner and which is not achieved with other conventional printing methods. This tactility represents a security feature, which is why intaglio printing is usually used in the printing of security documents such as banknotes, bonds, documents and the like. As a result of the high pressing pressure, the security document is rolled out and changed with respect to its size. An approximately even change in size and thus maintaining predetermined tolerances can be achieved by using printing blankets with a rough surface, with the structure of the printing blanket being embossed into the side opposite of the printed side. If a foil element is applied to said side, the foil element will also be transferred to the structure of the printing blanket, thus usually producing an intensive loss of foil quality with respect to its glossy properties. This is accompanied by a loss of the information content, which is why the security value of the foil element is reduced.

EP 1 026 004 A1 relates to a printing blanket which in its transversal extension has a different surface roughness, total surface energy or surface energy with polar character, with the blanket being constant in the circumferential direction.

EP 1 216 832 A shows a cylinder shell profile for counterpressure or sheet transfer cylinder in sheet printing machines. In order to improve the cleaning behavior, a surface coating is provided on the chromium layer, with the same being arranged as a light cleaning layer with a layer thickness of less than 5 μm .

DE 24 52 752 A1 deals with an apparatus in multicolor rotation offset printing machines with at least one printing cylinder and a rubber cylinder resting on a pressure cylinder for influencing the register stability.

EP 0 878 326 A2 concerns a tubular blanket for use on the cylinder of a printing machine. The surface of the tubular blanket is divided into two areas: In the first area, the main area, the blanket comes into contact with the paper web. The second area, the boundary area, lies outside of the paper web. The tubular blanket in the second area has a lower wall thickness than in the main area.

WO 99/01289 A concerns a transparent rubber blanket for in-line coating and methods for the use of the same. The transparent rubber blanket comprises a transparent printing layer which is arranged for applying a coating to a board, a paper, a foil and onto laminates, and a transparent supporting layer.

US 2,638,050 A shows a printing roll for intaglio printing with a ribbing. The ribbing is provided with varying depth on the surface of a printing element.

US 3,817,209 A shows a method for gravure coating on an article, especially a cylinder, an aluminum or steel can. The printing pattern or the pattern of the printing cylinder has three zones: A central band, a first and second boundary band, with the two boundary bands representing the overlapping printing area on the article.

US 6,176,522 B1 concerns the embossing of banknotes or the like with security features. For this purpose, the banknote comprises a transparent area made of plastic material which contains the security feature.

US 5,251,989 A describes an apparatus for producing multi-colored printing ribbons.

US 5,463,953 A concerns an apparatus and a method in order to print identity cards with blind hole-shaped recesses.

It is the object of the present invention to provide a printing blanket of the kind above in which the known disadvantages are avoided and with which security documents with applied foil elements can be printed in intaglio printing by protecting the foil elements.

This is achieved in accordance with the invention in such a way that second area is arranged in the printing area and as a receiver for at least a second area of an optically variable element of a security document, especially an effect foil or an effect dye, and that the second area comprises a

plurality of receivers which are arranged in a raster. This leads to the advantage that only a slight change in the surface structure of the foil element occurs, with the gloss properties of the foil element being maintained to a substantial extent. A lower partial pressure can be achieved by the second area, which ensures that damage to the portion of the security document which comes into contact with the second area can be substantially avoided. Moreover, the surface structure can be maintained substantially by means of the second area even for other elements. This has proven to be beneficial especially in optically variable elements. An effect dye can also be provided in addition to an effect foil for example. The optically variable element can be arranged on the side to be printed or on the side opposite of the same. Both sides of the security document can also be provided with an intaglio print in particular.

This ensures that the quality of the optically variable element is substantially not impaired during the printing process. The optical variable element can be applied before the printing step with the printing blanket. The printing of a portion of the optically variable element can be provided.

In accordance with another embodiment of the invention it can be provided that a substantially continuous transition is arranged between the first area and the second area, thus substantially avoiding sudden changes in loads on the security document during the printing process which can lead to damage to the security document.

The invention relates further to a method for printing a security document in intaglio printing, with the security document comprising at least one optically variable element, especially an effect foil or effect dye, with a counterpressure cylinder with a printing blanket with at least a first area with a first roughness being arranged opposite of a pressure cylinder.

It is a further object of the invention to provide a method of the kind mentioned above in which the known disadvantages are avoided and with which security documents can be printed with applied foil elements by protecting the foil elements in intaglio printing.

This is achieved in accordance with the invention in such a way that the optically variable element is brought, during the printing process, in contact at least in certain sections with a second area of the printing blanket, with the second area having a predeterminable second roughness which is lower in comparison with the first roughness and/or a predeterminable depression and/or a predeterminable modulus of elasticity which is lower in comparison with the first area.

This results in the advantage that only a slight change in the surface structure of the optically variable elements occurs, the properties of the optically variable element being largely retained. A lower partial pressure can be achieved by way of the second region, whereby damage to the part of the security document that comes into contact with the second region, in particular the optically variable element, can be largely avoided. The optically variable element can be arranged on the side to be printed or the side opposing this side. In particular it is possible for both sides of the security document to comprise intaglio printing.

In a further embodiment of the invention it may be provided that, after application of the optical variable element to the security document, the side of the security document that opposes the optically variable element is printed using the intaglio printing method, whereby the optically variable element can in particular be applied as early as during paper production and can optionally be at least partially embedded in the paper.

In a development of the invention it can be provided that in a predeterminable first section the optically variable element is brought into contact with the first region and in a predeterminable second section it is brought into contact with the second region. A surface structure of the optically variable element is produced in the first section that is different from that of the second section, whereby a further security feature can be formed.

The invention will be described in more detail with reference to the accompanying drawings, in which embodiments are illustrated and in which:

Fig. 1 shows a plan view of an embodiment of a blanket according to the invention, and

Fig. 2 shows a schematic side view of a plate cylinder, an impression cylinder and a security document.

Fig. 1 shows an embodiment of a blanket 1 according to the invention for intaglio printing. In intaglio printing, which is also known as steel engraving printing, high contact pressures are employed, whereby a tactile print image is produced which is not achieved using other conventional printing methods. This tactility represents a security feature, for which reason intaglio printing is conventionally used in the printing of security documents 4, for example bank notes, bonds, certificates or the like. Fig. 2 schematically shows a construction of a plate cylinder 3, an impression cylinder 2 with a blanket 1, and a security document 4. Owing to the high contact pressure the security document 4 is flattened during the printing process and changes in size. An approximately uniform change in size, and therewith an adherence to predeterminable tolerances, can be achieved by the use of blankets 1 with a rough surface, the structure of the blanket 1 being impressed on the side of the security document 4 that opposes the printed side. Use of a blanket 1 with a smooth surface leads to intolerable register tolerances, for which reason there are reservations among experts regarding the use of blankets 1 of this kind.

The blanket 1 comprises at least one first region 11 with a first roughness, this first roughness ensuring the adherence to the predeterminable tolerance. The first region 11 has a rough surface. The blanket 1 shown in Fig. 1 comprises a cohesive first region 11. In other embodiments the first region 11 can also comprise sections that are separate from each other.

At least one second region 12 is also provided, the second region 12 having a surface characteristic that differs from the first region 11. This different surface characteristic achieves a different impression of the blanket 1 on the security document 4 than in the first region 11. The second region 12 can in particular have a predeterminable second roughness that is lower than the first roughness and/or a predeterminable indentation 15 and/or a predeterminable module of elasticity that is lower than in the first region 11. In this case the second region 12 differs from the first region to an extent that exceeds the manufacturing tolerances, it being possible in particular to consciously produce and predetermine the differences in surface characteristic. In Fig. 2 the second region 12 has an indentation 15 compared to the first region 11. This embodiment has been selected owing to the fact that it is easy to illustrate.

The second region 12 can be formed as early as during production of the blanket 1 or in a subsequent operation by partially changing the surface. If the second region 12 has a lesser roughness, in particular if it is constructed with a substantially smooth surface, the second region 12 can be produced with a rough surface by partial cold-vulcanisation of blankets 1. The surface of a blanket 1 can also be

changed by an imprint, it being possible to provide conventional printing methods, in particular screen printing. In other embodiments the use of adhesive films or laminates can be provided for forming the second region 12. Combinations of the above-described treatments of a blanket 1 with a rough surface may also be provided to form the second regions 12. For a high service life of the blanket 1 the second surface 12 should have thermal stability up to about 80°C, high print stability and high extension stability.

The second region 12 can be provided for interaction with an optically variable element 5, in particular an effect film or an effect colour, of the security document 4 during the printing process. In the process impressing of the surface structure of the first region 11 into the optically variable element 5 can be effectively prevented, it being possible to largely avoid a change in the optically variable element 5 by the different surface characteristic of the second region 12.

A substantially constant passage can be formed between the first region 11 and the second region 12. This can ensure that erratic changes in the stressing of the security element during the printing process, which could lead to damage to the security document, are largely avoided.

During the printing process the optically variable element 5 is, at least in certain sections, brought into contact with a second region 12 of the blanket 1. In the process the optically variable element 5 is passed through the nip between the plate cylinder 3 and the impression cylinder 2. The optically variable element 5 can be arranged on the side

adjoining the impression cylinder or on the side of the security document 4 adjoining the plate cylinder 3.

Using this method in which an unintentional change in the optically variable element can be avoided, it is possible to print both sides of the security document 4, after application of the optically variable element 5 to the security document 4, by means of intaglio printing. In the process the intaglio printing can in particular overlap the optically variable element 5, at least in certain sections, whereby a high level of security is achieved in the security document.

It may also be provided that in a predeterminable first section 51 the optically variable element 5 is brought into contact with the first region 11 and in a predeterminable second section 52 it is brought into contact with the second region 12. The optically variable element 5 is changed thereby in the first section 51 during the printing process, but is left substantially unchanged in the second section. This difference in the optically variable element 5 constitutes a further security feature. The first section and the second section can, for example, be formed figuratively or to form a code.

The second region 12 is arranged in the printing zone, the printing zone being the zone in which the security document 4 is printed during the printing process. The second region 12 can be constructed as a receiver for at least the second section 52 of an optically variable element 5, in particular an effect film or an effect colour, of a security document 4. The second region 12 can comprise a plurality of receivers, which are arranged in a grid, in particular if a

plurality of security documents 4 is printed simultaneously during the printing process.

CLAIMS:

1. A printing blanket (1) for intaglio printing, comprising at least a first area (11) with a first roughness, with a predeterminable second roughness which is lower than the first roughness and/or a predeterminable depression (15) and/or a predeterminable modulus of elasticity which is lower in comparison with the first area being provided at least in a second area (12), characterized in that the second area (12) is arranged in the printing area and as a receiver for at least a second area (52) of an optically variable element (5) of a security document (4), especially an effect foil or an effect dye, and that the second area (12) comprises a plurality of receivers which are arranged in a raster.
2. A printing blanket according to claim 1, characterized in that a substantially continuous transition occurs between the first area (11) and the second area (12).
3. A method for printing a security document (4) by means of an intaglio printing method, with the security document (4) comprising at least one optically variable element (5), especially an effect foil or effect dye, with a counterpressure cylinder (2) with a printing blanket (1) with at least a first area (11) with a first roughness being arranged opposite of a pressure cylinder (3), characterized in that the optically variable element (5) is brought into contact at least in certain sections with a second area (12) of the printing blanket (1) during the printing process, with the second area (12) having a predeterminable second roughness which is lower in comparison with the first roughness and/or a predeterminable depression (15) and/or a predeterminable modulus of elasticity which is lower in comparison with the first area (11).
4. A method according to claim 3, characterized in that after the application of the optically variable element (5) on the security document (4) the side of the security document (4) which is opposite of the optically variable element (5) is printed by means of intaglio printing.

5. A method according to claim 3 or 4, characterized in that the optically variable element (5) is brought into contact in a predetermined first section (51) with the first area (11) and in a predeterminable second section (52) with the second area (12).