

Device and Methods for Holographic Anti-Counterfeit Applications

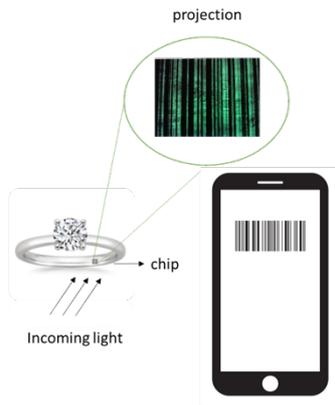


Figure 1: Example of holographic projection recorded by a smartphone
 scheme of the holographic technology

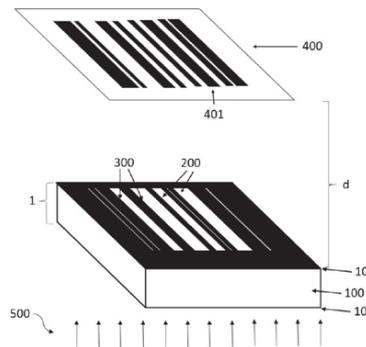


Figure 2: 3D

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Description

Two-dimensional codes can be found everywhere in everyday life. This technology conveniently and quickly allows to recognize products information. The diffusion of devices such as smartphones permits to easily access and read relevant information about goods, so that consumers no longer need specialized equipment and mass diffusion can be achieved. A (visual) data matrix code is a two-dimensional barcode consisting of black and white "cells" or modules arranged in either a square or rectangular pattern, also known as a matrix, encoding information readable by a broad range of users. The information to be encoded can be text or numeric data, and the length of the encoded data depends on the number of cells in the matrix. They are typically implemented as grids designed to be scanned by an optical scanner and subsequently decoded to determine the information contained in them. Such information can be used to track goods providing basic anti-counterfeit protocols. In resume, the verification of data matrices is objective using smartphone but these codes have limitations as an anticounterfeit technology since they can be copied or mimicked.

This invention overcome the challenges and limitations of traditional data matrices, by providing a superior protection through projected (non-printed) data matrix, such as a barcode, which is unalterable and is destroyed in case of fraud attempt. The developed solution features are conceived to produce, upon illumination with a light source, a unique space hologram stemming from the spacing and dimension features of light-blocking elements, such as slits, designed to interact with an incident light so to

obtain, via both interference and diffraction of the light waves, space holograms formed in transmission and/or reflection.

Advantages

One key advantage of this technology is that it is impossible to be mimicked/copied by standard protocols, thanks to the fact that the image to be recognized is projected outside of the feature. The sub-millimeter size of the tags (150 x 150 μm^2) makes them easy to be integrated in a larger identification system with multiple security layers. Remarkably, the solution is easily miniaturizable so to minimally impact the product aspect and, whenever needed, to be unnoticeable. Moreover, the tags can be batch produced in very large quantities at a reasonable cost. Those unique characteristics make this invention particularly well suited for protecting high-value products, for example luxury goods (e.g. perfumes, high-end alcohol), or spare parts in automotive or aeronautic industry.

Applications

- Luxury goods (jewellery, cosmetics, wines)
- Parts for automotive and airplane industry
- Electronic accessories
- Confidential documents
- Medicine blister packs