

IHMA PATENT NEWSLETTER

Limited circulation patent news bulletin for the Holography Industry

JUNE 2023 – 99 PATENTS

Published and granted patents

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Please note that:

- IHMA Patent Newsletter covers the requests for worldwide patents (WO, US, EP, FR, GB, DE, JP, CN, KR, RU...).
- Some patents can be indexed in several categories.
- Some old patents are sometimes introduced in the databases if they have not been included in the previous update.
- The full patent information is in the tables at the end of this document (See TABLES WITH REFERENCES).
- IHMA Patent Newsletter is forwarded at the end of each month and corresponds to the patents appearing during the previous month. If at any time, you do not receive your newsletter in the usual time span, please contact us, as an electronic transmission problem is always possible.

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P36476

**SECURITY & OPTICAL EFFECTS' COLUMN
CARD – PASSPORT – RELIEF – MICROLENS – PERFORATIONS**

WO202311481

IDEMIA

Inventor(s):

AZUELOS PAUL | MAZZOLINI MARIE

Application Nber / Date:

WOFR2022/052396 2022-12-16

Priority Nber / Date / Country:

FR2113822 2021-12-17

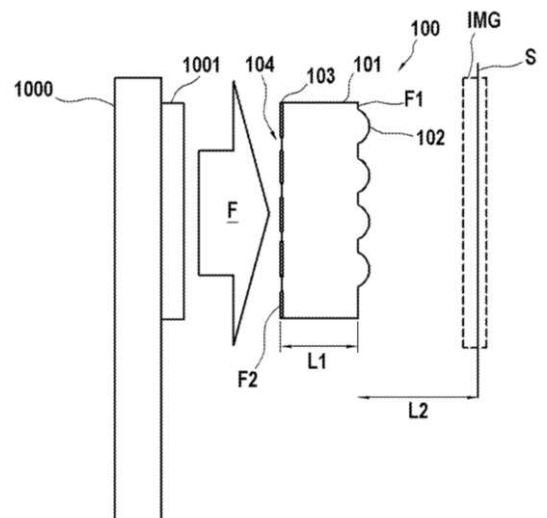
SECURITY DEVICE WHICH CAN BE USED TO GENERATE AN ENLARGED PROJECTED IMAGE USING MICROLENSES AND A PERFORATED METAL LAYER

The invention relates to a security device which can be used to generate an enlarged projected image on a surface spaced apart from the device when the device has a first face placed in front of the spaced surface and when a second face of the document opposite the first face is illuminated, the document comprising: a first layer (101) comprising an array of microlenses (102), and a second metal layer (103) arranged at a distance from the first layer that is greater than the focal length of each microlens, wherein the second metal layer includes a plurality of patterns (104), formed by one or more perforations in the metal layer (103), each pattern of the plurality of patterns being associated with a microlens so that when the second face of the document is illuminated, the enlarged projected image is formed on the spaced surface by the combination of the projections of each pattern.

DISPOSITIF DE SECURITE UTILISABLE POUR GENERER UNE IMAGE PROJETEE AGRANDIE UTILISANT DES MICROLENTILLES ET UNE COUCHE DE METAL PERFOREE

Dispositif de sécurité utilisable pour générer une image projetée agrandie sur une surface espacée du dispositif lorsque le dispositif a une première face placée en regard de la surface espacée et lorsqu'une deuxième face du document opposée à la première face est éclairée, le document comprenant : une première couche (101) comprenant un réseau de microlentilles (102), et une deuxième couche de métal (103) agencée à une distance de la première couche qui est supérieure à la distance focale de chaque microlentille, dans lequel la deuxième couche de métal comporte une pluralité de motifs (104), formés par une ou plusieurs perforations de la couche de métal (103), chaque motif de la pluralité de motif étant associé à une microlentille, pour que lorsque la deuxième face du document est éclairée, l'image projetée agrandie est formée sur la surface espacée par la combinaison des projections de chaque motif.

CLAIM 1. A security device operable to generate a projected image (IMG, IMG " ") enlarged on a surface (S) spaced by a given distance (L2) from the device when the device has a first face (F1) placed facing the spaced surface and when a second face (F2) of the device opposite the first face is illuminated, the device comprising, from the first face to the second face: - a first layer (101) comprising an array of microlenses (102), and - a second metal layer (103) arranged at a distance (L1) from the first layer that is greater than the focal length of each microlens of the microlens array, wherein the second metal layer includes a plurality of patterns (104, 1049), each pattern formed by one or more perforations of the metal layer (103), each pattern of the plurality of patterns being further associated with a microlens of the microlens array, such that when the second face of the document is illuminated, the magnified projected image is formed on the spaced surface by combining the projections of each pattern by their associated microlens, wherein the second metal layer includes a first pattern (104 A) and a second pattern (104 B) both comprising an identical pattern portion, and wherein the first pattern and the second pattern are placed relative to their respective associated microlenses (102 A, 102 B) such that: a light ray (RA) passing through a point (P1A) of the identical pattern portion of the first pattern and the center of the microlens associated with the first pattern, and a light ray (RB) passing through the same point (PIB) of the identical pattern portion of the second pattern and the center of the microlens associated with the second pattern, intersect at a same location (E) on the surface spaced at the given distance.



Equivalent: FR3130689A1

Status: Pending

Research Report:

| INTERNATIONAL SEARCH REPORT | | International application No. PCT/FR2022/052396 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| A. CLASSIFICATION OF SUBJECT MATTER <i>B42D 25/324</i> (2014.01); <i>B42D 25/346</i> (2014.01); <i>B42D 25/351</i> (2014.01); <i>B42D 25/373</i> (2014.01); <i>B42D 25/41</i> (2014.01); <i>B42D 25/425</i> (2014.01); <i>B42D 25/435</i> (2014.01) According to International Patent Classification (IPC) or to both national classification and IPC | | |
| B. FIELDS SEARCHED | | |
| Minimum documentation searched (classification system followed by classification symbols) B42D | | |
| Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched | | |
| Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal | | |
| C. DOCUMENTS CONSIDERED TO BE RELEVANT | | |
| Category ⁶ | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| X | US 2008160226 A1 (KAULE WITTICH [DE] ET AL) 03 July 2008 (2008-07-03) paragraph [0133]; figure 13 | 1-19 |

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PATENT REFERENCE – See the table at the end of this document

P36474

CARD

WO2023113043

DAI NIPPON PRINTING

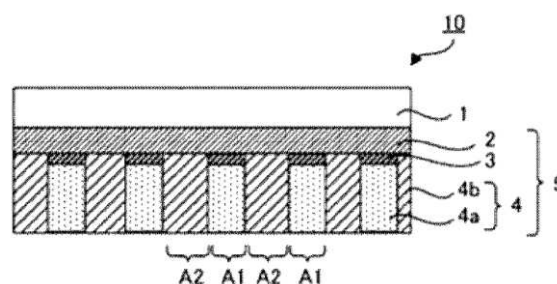
Priority Date: 17/12/2021

VOLUME HOLOGRAM LAMINATE, METHOD FOR PRODUCING VOLUME HOLOGRAM LAMINATE, VOLUME HOLOGRAM TRANSFER FOIL, VOLUME HOLOGRAM LABEL, VOLUME HOLOGRAM SHEET FOR EMBEDDING, CARD, AND HOLOGRAM STICKER-TYPE PRODUCT

The present disclosure provides a volume hologram laminate which has a substrate and a volume hologram laminate section positioned on one surface of the substrate, wherein: said volume hologram laminate section has, in this order starting from the substrate side thereof, a resin layer containing a transparent resin, an inhibiting layer positioned next to the resin layer so as to form a pattern, and a volume hologram layer which has an interference fringe recorded thereon and is positioned next to the resin layer and to the inhibiting layer; and the color of the reproduced image from the volume hologram layer differs between an inhibiting layer-forming region where the inhibiting layer is provided and an inhibiting layer non-formation region where the inhibiting layer is not provided.

STRATIFIÉ D'HOLOGRAMME EN VOLUME, PROCÉDÉ DE PRODUCTION DE STRATIFIÉ D'HOLOGRAMME EN VOLUME, FEUILLE DE TRANSFERT D'HOLOGRAMME EN VOLUME, ÉTIQUETTE D'HOLOGRAMME EN VOLUME, FEUILLE D'HOLOGRAMME EN VOLUME POUR INCORPORATION, CARTE ET PRODUIT DE TYPE AUTOCOLLANT D'HOLOGRAMME

La présente divulgation concerne un stratifié d'hologramme en volume qui comporte un substrat et une section de stratifié d'hologramme en volume positionnée sur une surface du substrat. Ladite section de stratifié d'hologramme en volume a, dans cet ordre à partir du côté substrat associé, une couche de résine contenant une résine transparente, une couche d'inhibition positionnée à côté de la couche de résine de façon à former un motif, et une couche d'hologramme en volume qui a une frange d'interférence enregistrée sur celle-ci et est positionnée à côté de la couche de résine et de la couche d'inhibition ; et la couleur de l'image reproduite à partir de la couche d'hologramme en volume diffère entre une région de formation de couche d'inhibition dans laquelle la couche d'inhibition est disposée et une région de non-formation de couche d'inhibition où la couche d'inhibition n'est pas disposée.



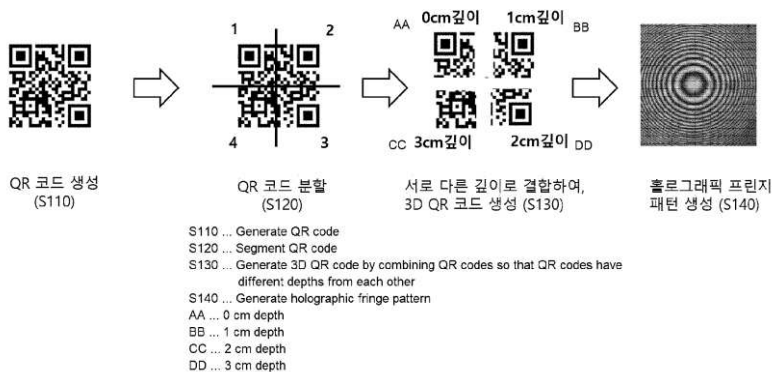
CLAIM 1. A volume hologram laminate comprising: a base material; and a volume hologram laminate portion disposed on one surface of the base material, wherein the volume hologram laminate portion includes, from the base material side, a resin layer containing a transparent resin, and an inhibition layer disposed in a pattern in contact with the resin layer; A volume hologram layer disposed in contact with the resin layer and the inhibition layer and in which interference fringes are recorded, the volume hologram layer having color of a regenerated image from the volume hologram layer different between an inhibition layer formation region in which the inhibition layer is disposed and an inhibition layer non-formation region in which the inhibition layer is not disposed.

UNCOPIABLE HOLOGRAM QR CODE

An uncopyable hologram QR code is provided. A 3D code generation method according to an embodiment of the present invention comprises: segmenting, into multiple sub 2D codes, a 2D code having specific information recorded therein; and generating a 3D code by combining one or more of the segmented sub 2D codes so that the one or more of the segmented sub 2D codes have different depths from each other. Accordingly, a QR code is recorded as a hologram in a hologram recording medium and expressed/scanned, whereby easy copying of the QR code, as is possible with the conventional 2D QR code, can be prevented.

CODE QR D'HOLOGRAMME NON COPIABLE

L'invention concerne un code QR d'hologramme non copiable. Un procédé de génération de code 3D selon un mode de réalisation de la présente invention consiste : à segmenter, en de multiples sous-codes 2D, un code 2D présentant des informations spécifiques enregistrées dans ce dernier; et à générer un code 3D en combinant un ou plusieurs des sous-codes 2D segmentés de sorte que le ou les sous-codes 2D segmentés présentent différentes profondeurs les uns des autres. En conséquence, un code QR est enregistré comme un hologramme dans un support d'enregistrement d'hologramme et exprimé/balayé, grâce à quoi une copie aisée du code QR, comme c'est le cas avec le code QR 2D classique, peut être empêchée.



CLAIM 1. Dividing the 2D code recorded with specific information into a plurality of sub-2D codes; and And combining at least one of the divided sub-2 D codes with different depths to generate a 3 D code.

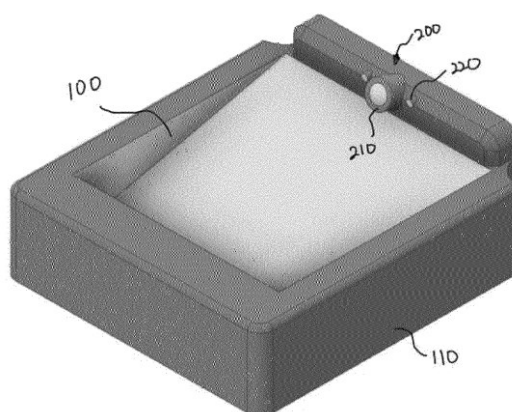
10. A hologram generation apparatus configured to divide a 2 D code containing specific information into a plurality of sub-2 D codes, to generate a 3 D code by combining at least one of the divided sub-2 D codes with different depths, and to generate the generated 3 D code in a holographic fringe pattern; and And a hologram printer that records the generated holographic fringe pattern in a hologram recording medium.

BIOMETRIC AUTHENTICATION METHOD USING HOLOGRAM AND DEVICE THEREFOR

The present invention relates to a biometric authentication method using a hologram and a device therefor, and more specifically to a biometric authentication method using a hologram and a device therefor, which belong to contactless biometrics and in which, when a hand approaches a hand-shaped guiding line outputted by a holographic method, the hand is captured by a capturing camera so as to enable acquiring biometric information and carrying out an authentication procedure, and thus hygiene and convenience may be increased. According to the biometric authentication method using a hologram and the device therefor, formed according to a preferred embodiment of the present invention, the effect is achieved of proposing a new method which, although being installed in a building or a specific location, enables a user to undergo biometric recognition in a contactless manner by the guidance of a hologram, thereby being hygienic and also not giving an unpleasant feeling to the user, enables contactless biometric authentication even in a building or a specific location, is convenient to use by enabling the user to position a hand not over air but over a holographic hand guiding line which may be visually checked, may have increased utilization by enabling biometric recognition of the user to be carried out in a contactless manner, and enables a user authentication procedure to be carried out in a contactless manner while enabling the user to undergo biometric authentication in a visually convenient manner.

PROCÉDÉ D'AUTHENTIFICATION BIOMÉTRIQUE UTILISANT UN HOLOGRAMME ET DISPOSITIF ASSOCIÉ

La présente invention concerne un procédé d'authentification biométrique utilisant un hologramme et un dispositif associé, et plus particulièrement un procédé d'authentification biométrique utilisant un hologramme et un dispositif associé, qui appartiennent à la biométrie sans contact et dans lesquels, lorsqu'une main s'approche d'une ligne de guidage en forme de main produite par un procédé holographique, la main est capturée par une caméra de capture de façon à permettre l'acquisition d'informations biométriques et la réalisation d'une procédure d'authentification, et ainsi l'hygiène et la commodité peuvent être augmentées. Selon le procédé d'authentification biométrique utilisant un hologramme et le dispositif associé, formé selon un mode de réalisation préféré de la présente invention, il est proposé un nouveau procédé qui, malgré l'installation dans un bâtiment ou un emplacement spécifique, permet à un utilisateur de se soumettre à une reconnaissance biométrique sans contact par le guidage d'un hologramme, ce qui est hygiénique et ne donne pas de sensation désagréable à l'utilisateur, permet une authentification biométrique sans contact même dans un bâtiment ou un emplacement spécifique, est pratique à utiliser en permettant à l'utilisateur de positionner une main non par radio, mais sur une ligne de guidage de main holographique qui peut être visuellement vérifiée, peut avoir une utilisation accrue en permettant une reconnaissance biométrique de l'utilisateur à effectuer sans contact, et permet de réaliser une procédure d'authentification d'utilisateur sans contact tout en permettant à l'utilisateur de subir une authentification biométrique d'une manière visuellement commode.



CLAIM 1. A display device capable of displaying an image by reproducing a hologram; An imaging apparatus comprising: a hand photographing device including a photographing camera capable of photographing in a hologram image direction and having a plurality of illuminations formed around the photographing camera; And an image processing device for providing hologram hand guide lines to the display device, Wherein the image processing apparatus is configured to acquire biometric information data from a hand of a user positioned on a hologram hand guide line in a non-contact manner.

P36485

TRACK & TRACE

WO2023101033

Priority Date: 30/11/2021

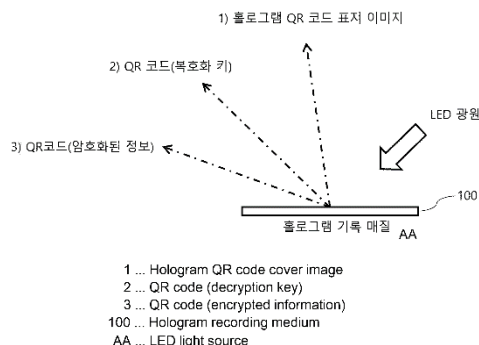
KOREA ELECTRONICS TECHNOLOGY INSTITUTE

SECURITY QR CODE USING HOLOGRAM

Provided is a security QR code using a hologram. A hologram QR code recording method according to an embodiment of the present invention involves generating a hologram QR code as a holographic fringe pattern and recording the generated holographic fringe pattern on a hologram medium, wherein the hologram QR code includes a first QR code containing encrypted information and a second QR code containing a key for decoding the encrypted information. Accordingly, the QR code is recorded as a hologram on a hologram recording medium and displayed/scanned, and thus cannot be easily copied like a conventional 2D QR code.

CODE QR DE SÉCURITÉ UTILISANT UN HOLOGRAMME

L'invention concerne un code QR de sécurité utilisant un hologramme. Un procédé d'enregistrement du code QR d'hologramme selon un mode de réalisation de la présente invention consiste à générer un code QR d'hologramme en tant que motif de frange holographique et à enregistrer le motif de frange holographique généré sur un support d'hologramme, le code QR d'hologramme comprenant un premier code QR contenant des informations chiffrées et un second code QR contenant une clé permettant de décoder les informations chiffrées. En conséquence, le code QR est enregistré sous la forme d'un hologramme sur un support d'enregistrement de l'hologramme et affiché/balayé, et ne peut donc pas être facilement copié comme un code QR 2D classique.



CLAIM 1. Generating a holographic QR code in a holographic fringe pattern; and Recording the generated holographic fringe pattern in a hologram medium, The hologram QR code comprises: A first QR code carrying encrypted information; and And a second QR code in which a key for decrypting encrypted information is recorded.

P36494

CARD – RELIEF

US20230185089

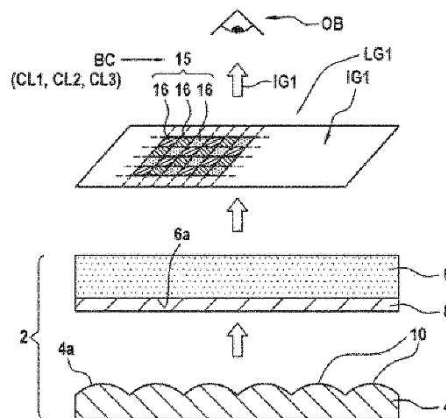
Priority Date: 13/12/2021

IDEMIA

OPTICAL DEVICE WITH HOLOGRAPHIC LAYER

An optical device and to a corresponding manufacturing process, the device including a textured layer including, on its surface, first macro-textures; and a carrier including, on its surface, a holographic layer intermediate between the textured layer and the carrier. The holographic layer includes a diffraction grating forming, via a holographic effect, an arrangement of pixels in a basis of at least two distinct colours. The textured layer is assembled by lamination with the carrier so that the holographic layer, placed between the textured layer and the carrier, is deformed by the first macro-textures so as to include second macro-textures conformal with the first macro-textures, the visual appearance of the arrangement of pixels being personalized via the second macro-textures.

CLAIM 1. An optical device comprising: a textured layer comprising a first surface having first macro-textures; and a carrier comprising on its surface a holographic layer intermediate between the textured layer and the carrier, the holographic layer comprising a diffraction grating forming, via a holographic effect, an arrangement of pixels in a basis of at least two distinct colours, the first surface of the textured layer being assembled by lamination with the carrier so that the holographic layer, placed between the textured layer and the carrier, is deformed by the first macro-textures so as to comprise second macro-textures conformal with said first macro-textures, the visual appearance of the arrangement of pixels being personalized via the second macro-textures, wherein the second macro-textures of the holographic layer are of semi-cylindrical or elliptical shape and extend along a first orientation in the plane of the holographic layer, each pixel being formed by a corresponding segment of the diffraction grating, said corresponding segment being structured into diffractive lines extending along a second orientation perpendicular to the first orientation in the plane of the holographic layer.

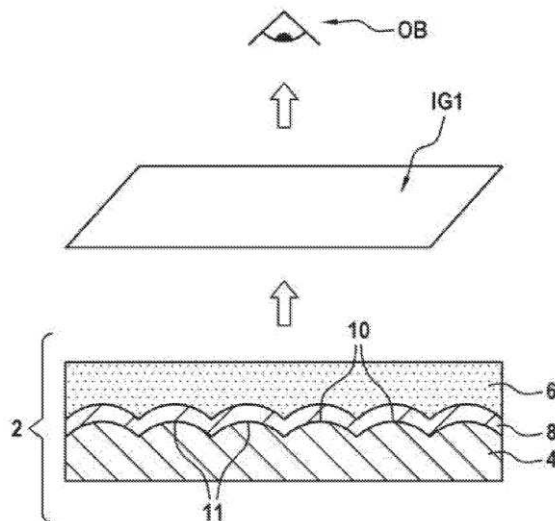


OPTICAL DEVICE WITH TEXTURED LAYER

The invention relates to an optical device (2) and to a corresponding manufacturing method, the device comprising: a textured layer (4) comprising a first surface having first macro-textures (10); and a support (6) comprising on the surface an optically active layer (8) interposed between the textured layer (4) and the support (6), the optically active layer (8) being a diffractive layer or a reflective layer. The first surface of the textured layer (4) is assembled by lamination with the support (6) so that the optically active layer (8), disposed between the textured layer (4) and the support (6), is deformed by the first macro-textures (10) to form therein second macro-textures (11) conforming to said first macro-textures (10).

DISPOSITIF OPTIQUE COMPORTANT UNE COUCHE TEXTURÉE

Dispositif optique comportant une couche texturée L'invention vise un dispositif optique (2) et un procédé de fabrication correspondant, le dispositif comprenant : une couche texturée (4) comprenant une première surface présentant des premières macro-texturations (10) ; et un support (6) comprenant en surface une couche optiquement active (8) intercalée entre la couche texturée (4) et le support (6), la couche optiquement active (8) étant une couche diffractive ou une couche réfléchissante. La première surface de la couche texturée (4) est assemblée par laminage avec le support (4) de sorte que la couche optiquement active (8), disposée entre la couche texturée (4) et le support (6), est déformée par les premières macro-texturations (10) pour y former des deuxièmes macro-texturations (11) conformes auxdites premières macro-texturations (10).



CLAIM 1. A method of manufacturing an optical device (2), said method comprising: forming (S2) a textured layer (4) comprising a first surface (4 a) having first macrotextures (10); positioning (S4) the first surface of the textured layer opposite a support (6) comprising on the surface an optically active layer (8) interposed between the textured layer and the support, wherein the optically active layer is a diffractive layer or a reflective layer; and laminating (S6) the first surface of the textured layer to the support, causing deformation by the first macrotextures (10) of the optically active layer arranged between the textured layer and the support, so that the optically active layer (8) comprises second macrotextures (11) conforming to said first macrotextures.

P36539

PRINTING – LABEL – LUMINESCENCE – TAMPER EVIDENCE – LIQUID CRYSTALS

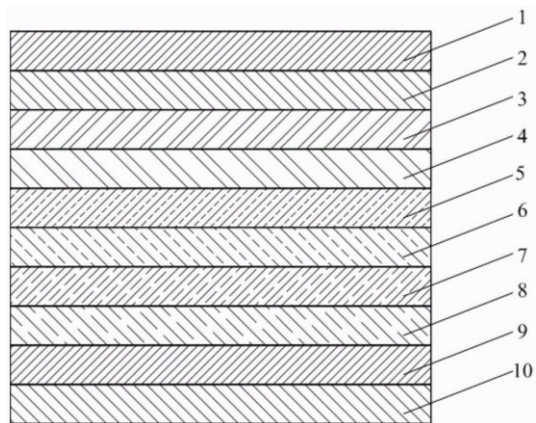
CN219202618U

Priority Date: 31/12/2022

SHANGHAI HONGDUN ANTI COUNTERFEIT MATERIAL

TEARING-PROOF ANTI-COUNTERFEITING LABEL

The utility model provides a tearing-proof anti-counterfeiting label which comprises a liquid crystal anti-counterfeiting layer, a coupling layer, a fluorescent coding anti-counterfeiting layer, a holographic micro-nano structure layer, a reflection enhancement layer and an easy-to-break paper layer which are sequentially stacked. The tearing-proof anti-counterfeiting label can not be completely peeled after being attached to an article, and has the tearing-proof and tamper-proof functions, so that the consistency of the articles and labels is ensured; the tearing-proof anti-counterfeiting label is a label with various anti-counterfeiting technical characteristics such as holographic anti-counterfeiting, machine-readable fluorescent coding, liquid crystal anti-counterfeiting and the like, and has the advantages of high anti-counterfeiting grade, rapid identification, high identification precision and wider environmental adaptability.



CLAIM 1. The tearing-proof anti-counterfeiting label is characterized by comprising a liquid crystal anti-counterfeiting layer, a coupling layer, a fluorescent coding anti-counterfeiting layer, a holographic micro-nano structure layer, a reflection enhancement layer, an adhesive layer and a fragile paper layer which are sequentially stacked.

P36540

PRINTING – LABEL – LUMINESCENCE – LIQUID CRYSTALS

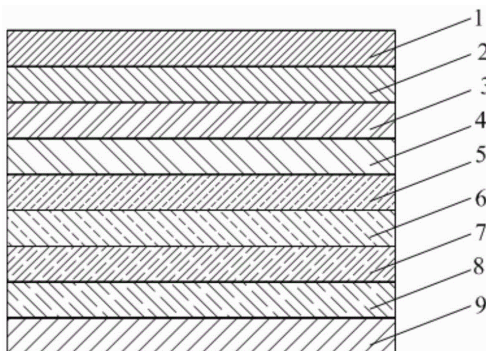
CN219202617U

Priority Date: 31/12/2022

SHANGHAI HONGDUN ANTI COUNTERFEIT MATERIAL

ANTI-COUNTERFEIT LABEL

The utility model provides an anti-counterfeiting label which comprises a wear-resistant layer, a liquid crystal anti-counterfeiting layer, a coupling layer, a fluorescent coding anti-counterfeiting layer, a reflection enhancement layer, a holographic micro-nano structure layer, a base film layer, a bonding layer and a release paper layer which are sequentially laminated. The anti-counterfeiting label provided by the utility model is a label with various anti-counterfeiting technical characteristics such as holographic anti-counterfeiting, machine-readable fluorescent coding, liquid crystal anti-counterfeiting and the like, and has the advantages of high anti-counterfeiting grade, rapid identification, high identification precision and higher environmental adaptability.



CLAIM 1. The anti-counterfeiting label is characterized by comprising a wear-resistant layer, a liquid crystal anti-counterfeiting layer, a coupling layer, a fluorescent coding anti-counterfeiting layer, a reflection enhancement layer, a holographic micro-nano structure layer, a base film layer, a bonding layer and a release paper layer which are sequentially laminated.

P36545

PRINTING – LABEL

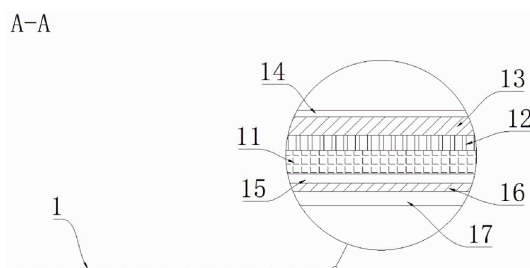
CN219180107U

ZHUHAI ZHONGNENG PRINTING

Priority Date: 20/12/2022

ANTI-FAKE LABEL STICKER

The utility model relates to the technical field of anti-counterfeit labels, and provides an anti-counterfeit label sticker which comprises an anti-counterfeit label body, wherein the anti-counterfeit label body comprises a laser printing anti-counterfeit layer, an anti-corrosion layer is arranged at the top of the laser printing anti-counterfeit layer, the anti-corrosion layer is a transparent poly-perfluoroethylene-propylene film, an anti-scratch layer is arranged at the top of the anti-corrosion layer, the anti-scratch layer is a transparent polyvinyl chloride film, and an adhesive layer is arranged at the bottom of the laser printing anti-counterfeit layer. The laser printing anti-counterfeiting layer is an anti-counterfeiting label layer finished by utilizing a laser color hologram plate making technology and a mould pressing replication technology, and can present different patterns and colors when being watched from different angles, so that shooting piracy is effectively prevented.



CLAIM 1. The utility model provides an anti-fake label sticker, includes anti-fake label body (1), its characterized in that: the anti-counterfeiting label body (1) comprises a laser printing anti-counterfeiting layer (11), an anti-corrosion layer (12) is arranged at the top of the laser printing anti-counterfeiting layer (11), the anti-corrosion layer (12) is a transparent poly-perfluoroethylene-propylene film, an anti-scratch layer (14) is arranged at the top of the anti-corrosion layer (12), the anti-scratch layer (14) is a transparent polyvinyl chloride film, and an adhesive layer (16) is arranged at the bottom of the laser printing anti-counterfeiting layer (11).

P36548

PRINTING – BRAND PROTECTION

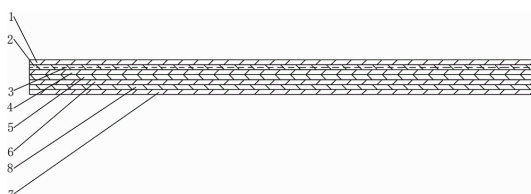
CN219153937U

SHANTOU JIAXIN PACKING MAT

Priority Date: 12/01/2022

ENVIRONMENT-FRIENDLY HIDDEN ANTI-COUNTERFEITING PACKAGING PAPER

The utility model relates to an environment-friendly hidden anti-counterfeiting packaging paper, which comprises a base film layer, a coating, an information layer, an aluminum layer and base paper, wherein the coating is coated on the lower surface of the base film layer, the information layer is molded on the lower surface of the coating, and the aluminum layer is plated on the lower surface of the information layer, and is characterized in that: the lower surface of the protective layer is attached to the upper surface of the base paper through an aqueous adhesive layer; the thickness of the aluminum layer is 300-350A. The environment-friendly hidden anti-counterfeiting packaging paper can display hidden graphics and texts under strong light, improve anti-counterfeiting effect, greatly reduce aluminum consumption and rapidly degrade aluminum.



CLAIM 1. The utility model provides an environment-friendly implicit anti-fake wrapping paper, includes base film layer, coating, information layer, aluminium layer and backing paper, and the coating is at the lower surface of base film layer, and the information layer mould pressing is on the lower surface of coating, and the aluminium layer is plated on the lower surface of information layer, its characterized in that: the lower surface of the protective layer is attached to the upper surface of the base paper through an aqueous adhesive layer; the thickness of the aluminum layer is 300-350A.

P36550

PRINTING – BRAND PROTECTION

CN219133464U

Priority Date: 28/10/2022

ZHONGSHAN YINDIAN PHOTOELECTRIC TECHNOLOGY

WEAR-RESISTANT ANTI-COUNTERFEITING MARK

The utility model discloses a wear-resistant anti-counterfeiting mark, which comprises an information layer, wherein an aluminum layer is arranged on the information layer, a plastic film layer is arranged on the aluminum layer, a wear-resistant layer is arranged below the information layer, a release layer is arranged below the wear-resistant layer, and a PET (polyethylene terephthalate) film layer is arranged below the release layer.



CLAIM 1. The utility model provides a wear-resisting anti-fake mark, includes information layer (1), its characterized in that be provided with aluminium layer (2) above information layer (1), be provided with above aluminium layer (2) and mould rete (3), be provided with wearing layer (4) below information layer (1), be provided with below wearing layer (4) from type layer (5), be provided with PET polyester rete (6) below from type layer (5).

P36555

BRAND PROTECTION

CN116265553

Priority Date: 02/12/2022

GUANGDONG BANGGU CHEMICAL TECHNOLOGY | GUANGDONG BANGGU FILM COATING INNOVATION ACADEMY

ELECTROCHEMICAL ALUMINUM HOT STAMPING GLUE FOR COSMETIC HOSE AND PREPARATION METHOD THEREOF

The invention discloses electric aluminum hot stamping glue for a cosmetic hose, which comprises the following raw materials in percentage by mass: 30-60% of matrix rubber resin, 5-30% of tackifying resin I, 3-5% of inorganic filler and the balance of organic solvent. The prepared hot stamping glue has excellent substrate applicability, can be suitable for various cosmetic hoses, has excellent thermoprinting property, trimming property, thermoprinting adhesive force, scratch resistance, chemical resistance and weather resistance, can meet the requirements of thin lines of cold holographic thermoprinting anti-counterfeiting technology and hot holographic thermoprinting anti-counterfeiting technology, can also be suitable for various storage environments encountered by the cosmetic hoses, and has excellent market prospect.

CLAIM 1. An electrochemical aluminum hot stamping glue for a cosmetic hose, which is characterized in that: the raw materials at least comprise the following components in percentage by mass: 30-60% of matrix rubber resin, 5-30% of tackifying resin I, 3-5% of inorganic filler and the balance of organic solvent.

P36558

LABEL

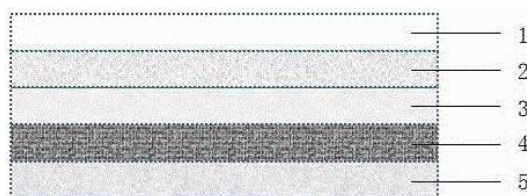
CN116239959

Priority Date: 30/12/2022

WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT

HOLOGRAPHIC ANTI-FAKE LABEL FILM OF WATERMARK

The invention discloses a watermark holographic anti-counterfeiting label film, which belongs to the field of anti-counterfeiting labels and comprises a base film layer, a holographic color layer, a plating layer and an adhesive layer which are sequentially laminated, and also comprises a watermark layer arranged between the base film layer and the holographic color layer, wherein the watermark layer is formed by coating, drying, crosslinking and curing acrylic resin and a curing agent and is used for absorbing cold color light reflected by the plating layer and passing through the holographic color layer so as to cause the holographic color layer to generate color cast. The watermark layer is formed by crosslinking and curing special acrylic resin, and the crosslinking and curing degree and thickness of the watermark layer can influence the absorption degree of cold light in the color layer. The crosslinking solidification degree and thickness of the watermark layer are adjusted by controlling the formula proportion, coating gram weight and drying process, so that the specific absorption of the cold and the light in the color layer is achieved, the copying and the color mixing are disturbed, the copying difficulty is increased, and a stronger anti-counterfeiting effect is generated.



CLAIM 1. The holographic watermark anti-counterfeiting label film comprises a base film layer (1), a holographic color layer (3), a plating layer (4) and an adhesive layer (5) which are sequentially laminated, the holographic color film further comprises a watermark layer (2) arranged between the base film layer (1) and the holographic color layer (3) and used for absorbing cold color light which is reflected by the plating layer (4) and passes through the holographic color layer (3).

P36559

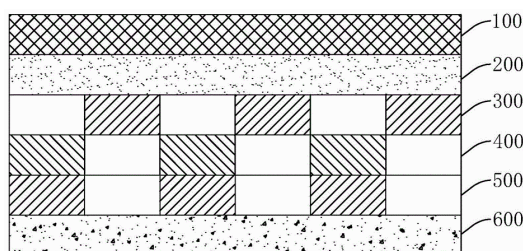
CN116238265

Priority Date: 03/03/2023

ZHONGSHAN GUOAN NEW MATERIAL

HOLOGRAPHIC THERMOPRINTING FILM WITH VARIABLE INFORMATION AND PRODUCTION PROCESS THEREOF

The invention discloses a holographic thermoprinting film with variable information and a production process thereof, wherein the holographic thermoprinting film with variable information comprises a base film layer, a release layer, a variable information layer, a mould pressing layer, a metal layer and a back adhesive layer which are sequentially distributed from top to bottom, the variable information layer is provided with holographic variable patterns and/or characters and cursor patterns for mould pressing and positioning, and the mould pressing layer is provided with mould pressing patterns corresponding to the patterns and/or characters of the variable information layer through the cursor patterns.



CLAIM 1. A holographic thermoprinting film with variable information, comprising: a base film layer (100); the release layer (200) is arranged below the base film layer (100); a variable information layer (300), wherein the variable information layer (300) is arranged below the release layer (200), and the variable information layer (300) is provided with holographic variable patterns and/or characters and cursor patterns for mould pressing positioning; the embossing layer (400) is arranged below the variable information layer (300), and the embossing layer (400) is positioned and provided with embossing patterns corresponding to patterns and/or characters of the variable information layer (300) through the cursor patterns; a metal layer (500), the metal layer (500) being provided below the molding layer (400); and the back adhesive layer (600), wherein the back adhesive layer (600) is arranged below the metal layer (500).

Click on the title to return to table of contents

PATENT REFERENCE – See the table at the end of this document

P36475

BANKNOTE – CARD

WO202311864

Priority Date: 13/12/2021

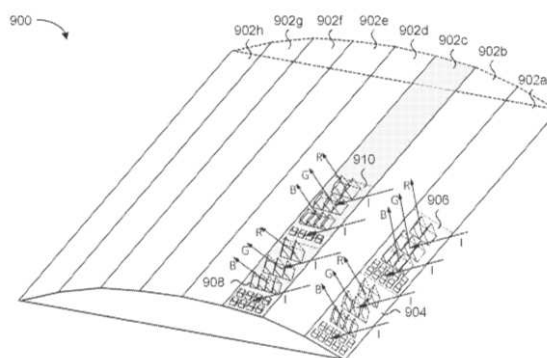
NANOTECH SECURITY

DIFFRACTIVE DISPLAYS

The present disclosure provides a diffractive display for displaying a diffracted image, an article, comprising the diffractive display, and methods of forming a display for displaying a diffracted image.

DISPOSITIFS D'AFFICHAGE À DIFFRACTION

La présente invention concerne un afficheur à diffraction pour afficher une image diffractée, un article, comprenant l'afficheur à diffraction, et des procédés de formation d'un afficheur pour afficher une image diffractée.



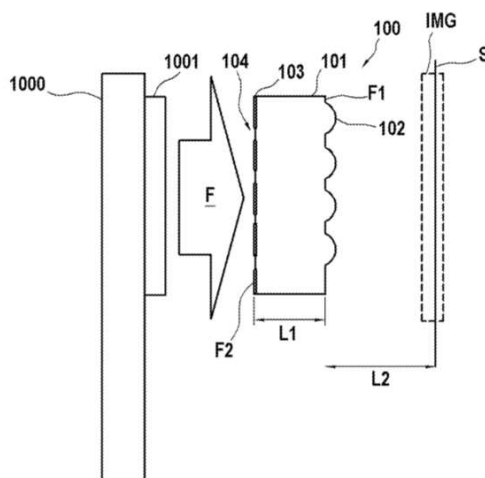
CLAIM 1. A diffractive display for displaying a diffracted image at a viewing angle, comprising: a layer having a plurality of frame-pixels corresponding to the diffracted image, each frame-pixel corresponding to the diffracted image including at least one diffractive structure disposed on the layer configured to have a fundamental diffraction order along the viewing angle of the diffracted image, the at least one diffractive structure disposed in a first region of the layer of the frame-pixel, and at least some of the frame-pixels corresponding to the image comprising absorptive metastructures disposed on the layer, the absorptive metastructures configured to have a light absorption resonance in the visible spectrum, the absorptive metastructures disposed in a second region of the layer of the pixel that is nonoverlapping with the first region.

SECURITY DEVICE WHICH CAN BE USED TO GENERATE AN ENLARGED PROJECTED IMAGE USING MICROLENSES AND A PERFORATED METAL LAYER

The invention relates to a security device which can be used to generate an enlarged projected image on a surface spaced apart from the device when the device has a first face placed in front of the spaced surface and when a second face of the document opposite the first face is illuminated, the document comprising: a first layer (101) comprising an array of microlenses (102), and a second metal layer (103) arranged at a distance from the first layer that is greater than the focal length of each microlens, wherein the second metal layer includes a plurality of patterns (104), formed by one or more perforations in the metal layer (103), each pattern of the plurality of patterns being associated with a microlens so that when the second face of the document is illuminated, the enlarged projected image is formed on the spaced surface by the combination of the projections of each pattern.

DISPOSITIF DE SECURITE UTILISABLE POUR GENERER UNE IMAGE PROJETEE AGRANDIE UTILISANT DES MICROLENTILLES ET UNE COUCHE DE METAL PERFOREE

Dispositif de sécurité utilisable pour générer une image projetée agrandie sur une surface espacée du dispositif lorsque le dispositif a une première face placée en regard de la surface espacée et lorsqu'une deuxième face du document opposée à la première face est éclairée, le document comprenant : une première couche (101) comprenant un réseau de microlentilles (102), et une deuxième couche de métal (103) agencée à une distance de la première couche qui est supérieure à la distance focale de chaque microlentille, dans lequel la deuxième couche de métal comporte une pluralité de motifs (104), formés par une ou plusieurs perforations de la couche de métal (103), chaque motif de la pluralité de motif étant associé à une microlentille, pour que lorsque la deuxième face du document est éclairée, l'image projetée agrandie est formée sur la surface espacée par la combinaison des projections de chaque motif.



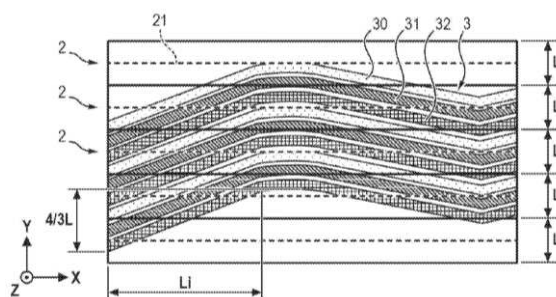
CLAIM 1. A security device operable to generate a projected image (IMG, IMG " ") enlarged on a surface (S) spaced by a given distance (L2) from the device when the device has a first face (F1) placed facing the spaced surface and when a second face (F2) of the device opposite the first face is illuminated, the device comprising, from the first face to the second face: - a first layer (101) comprising an array of microlenses (102), and - a second metal layer (103) arranged at a distance (L1) from the first layer that is greater than the focal length of each microlens of the microlens array, wherein the second metal layer includes a plurality of patterns (104, 1049, each pattern formed by one or more perforations of the metal layer (103), each pattern of the plurality of patterns being further associated with a microlens of the microlens array, such that when the second face of the document is illuminated, the magnified projected image is formed on the spaced surface by combining the projections of each pattern by their associated microlens, wherein the second metal layer includes a first pattern (104 A) and a second pattern (104 B) both comprising an identical pattern portion, and wherein the first pattern and the second pattern are placed relative to their respective associated microlenses (102 A, 102 B) such that: a light ray (RA) passing through a point (P1A) of the identical pattern portion of the first pattern and the center of the microlens associated with the first pattern, and a light ray (RB) passing through the same point (PIB) of the identical pattern portion of the second pattern and the center of the microlens associated with the second pattern, intersect at a same location (E) on the surface spaced at the given distance.

SECURITY ELEMENT FOR A SECURITY DOCUMENT AND SECURITY DOCUMENT PROVIDED THEREWITH

The present invention relates notably to a security element for a security document which consists of a support, comprising a network of parallel lines (2) in relief, notably oriented in a favoured direction X and each of width L, each line (2) in relief having a profile comprising at least one crest (21) and one trough (20), said network being coloured or at least partially coloured and made up of a repetition of contiguous or adjacent strips (3), the strips (3) being of width L' and each made up of N stripes (30-32), N being an integer greater than or equal to two, these stripes being contiguous or adjacent and having, if applicable, a between-strips space of a width smaller than the width of a stripe, these N stripes (30-32) being at least two different colours, said strips (3) running substantially parallel to the lines in relief (2) that make up said network, characterized in that, in at least one region of said coloured or partially coloured network, the stripes (30-32) of at least one strip (3) extend from one end of this region to the other as a partially-differentiable continuous function F(x) of which the derivative is non-constant and in that, within said region, there is an interval of length L_i visible to the naked eye in which the derivative of said function F(x) is comprised between $L/(2L_i)$ and $3L/L_i$, or between $-3L/L_i$ and $-L/(2L_i)$.

ELÉMENT DE SÉCURITÉ POUR UN DOCUMENT SÉCURISÉ ET DOCUMENT SÉCURISÉ QUI EN EST POURVU

La présente invention se rapporte notamment à un élément de sécurité pour un document sécurisé qui est constitué d'un support, comprenant un réseau de lignes parallèles (2) en relief, notamment orientées selon une direction privilégiée X, qui présentent chacune une largeur L, chaque ligne en relief (2) comportant un profil ayant au moins une crête (21) et un sillon (20), ledit réseau étant coloré ou au moins en partie coloré et constitué d'une répétition de bandes (3) contiguës ou adjacentes, bandes (3) de largeur L' formées chacune de N filets (30-32), N étant un entier supérieur ou égal à deux, contigus ou adjacents avec, le cas échéant, un espace entre filets ayant une largeur plus petite que la largeur d'un filet, ces N filets (30-32) étant d'au moins deux couleurs différentes, lesdites bandes (3) s'étendant sensiblement parallèlement aux lignes en relief (2) dudit réseau, caractérisé par le fait que, dans au moins une région dudit réseau coloré ou en partie coloré, les filets (30-32) d'au moins une bande (3) se propagent d'une extrémité à l'autre de cette région selon une fonction continue F(x), en partie dérivable et dont la dérivée est non constante et qu'il existe, au sein de ladite région, un intervalle de longueur L_i visible à l'œil nu dans lequel la dérivée de ladite fonction F(x) est comprise entre $L/(2L_i)$ et $3L/L_i$, ou entre $-3L/L_i$ et $-L/(2L_i)$.



CLAIM 1. Security element (12) for a secure document (1) that consists of a support, comprising a network of parallel lines (2) in relief, in particular oriented in a privileged direction X, that each have a width L, each line in relief (2) comprising a profile having at least one ridge (21) and a groove (20), said network being coloured or at least partially coloured and consisting of a repetition of contiguous or adjacent strips (3), strips (3) of width L' each formed of N threads (30-32), N being an integer greater than or equal to two, contiguous or adjacent with, if appropriate, a space (D) between threads having a width smaller than the width of a thread, these N stripes (30-32) being of at least two different colors (C1 -C3), said strips (3) extending substantially parallel to the relief lines (2) of said grating, characterized in that, in at least one colored or at least partially colored region of said grating, the threads (30-32) of at least one strip (3) propagate from one end to the other of this region according to a continuous function F(x), which can be derived in part and the derivative of which is non-constant and that there exists, within said region, a range of length L_i visible to the naked eye in which the derivative of said function F(x) is between $L/(2L_i)$ and $3L/L_i$, or between $-3L/L_i$ and $-L/(2L_i)$. Security element (12) according to claim 1, characterized in that N is equal to 3. The security element (12) according to claim 1 or claim 2, characterized by the fact that said width L of the lines (2) in relief is constant within said network in relief, preferably comprised between 10 micrometers and 2 millimeters, preferably between 30 micrometers and 1 millimeter, more preferably between 300 and 500 micrometers.

P36481

PRINTING – CARD – LABEL – RELIEF

WO2023106240

TOPPAN PRINTING

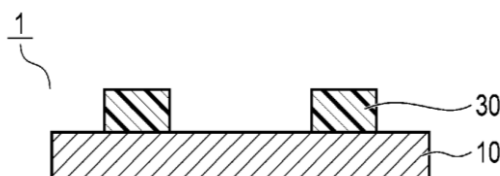
Priority Date: 07/12/2021

OPTICAL STRUCTURE, MANUFACTURING METHOD FOR SAME, AND CODE FORMATION METHOD

Provided is an optical structure capable of forming a code that is difficult to forge, and achieves both high readability and aesthetics. An optical structure of the present invention comprises: a reflective layer with specular reflectivity; and a printed layer as a diffuse reflector with diffuse reflectivity, which is stacked on at least a part of the reflective layer. In the printed layer, an image portion which is recognizable when viewed from the stacking direction is formed. The image portion has printed light-color level areas, and a non-light-color level area interposed between the light-color level areas.

STRUCTURE OPTIQUE, SON PROCÉDÉ DE FABRICATION, ET PROCÉDÉ DE FORMATION DE CODE

L'invention concerne une structure optique pouvant former un code qui est difficile à falsifier et qui permet d'obtenir à la fois une lisibilité et une esthétique élevées. Une structure optique de la présente invention comprend : une couche réfléchissante à réflectivité spéculaire ; et une couche imprimée en tant que réflecteur diffus à réflectivité diffuse qui est empilée sur au moins une partie de la couche réfléchissante. Dans la couche imprimée, une partie d'image, qui est reconnaissable lorsqu'elle est vue dans le sens d'empilement, est formée. La partie d'image présente des zones de niveaux de couleur claire imprimées et une zone de niveaux de couleur non claire interposée entre les zones de niveaux de couleur claire.



CLAIM 1. An optical structure comprising: a reflective layer having specular reflectivity; and a printed layer laminated on at least a portion of the reflective layer and serving as a scattering reflector having scattering reflectivity, wherein an image portion recognizable when viewed from a lamination direction is formed on the printed layer, and the image portion includes a printed light-color level region and a non-light-color level region interposed between the light-color level regions.

P36490

INK – BANKNOTE – CARD

WO202394028

GIESECKE & DEVRIENT MOBILE SECURITY

Priority Date: 26/11/2021

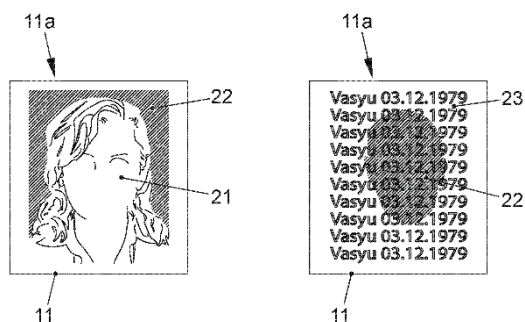
SECURITY FEATURE FOR AN IDENTIFICATION DOCUMENT, IDENTIFICATION DOCUMENT AND METHOD FOR PRODUCING A SECURITY FEATURE

The invention relates to a security feature (11) for an identification document (10), comprising a film (14), in the volume of which optically variable pigments (15) are introduced, and a marking (11a) which extends at least over a part of the optically variable pigments (15), wherein at least a part of the pigments (15) are carbonized.

ÉLÉMENT DE SÉCURITÉ POUR UN DOCUMENT D'IDENTIFICATION, DOCUMENT D'IDENTIFICATION ET PROCÉDÉ DE FABRICATION D'UN ÉLÉMENT DE SÉCURITÉ

L'invention concerne un élément de sécurité (11) pour un document d'identification (10), comprenant un film (14), dans le volume duquel des pigments optiquement variables (15) sont introduits, et un marquage (11a) qui s'étend au moins sur une partie des pigments optiquement variables (15), au moins une partie des pigments (15) étant carbonisée.

CLAIM 1. Security feature (11) for an identification document (10) having at least one marking (11 a), characterized in that it has a film (14), into the volume of which optically variable pigments (15) are introduced, and the at least one marking (11 a) extends at least over part of the optically variable pigments (15), at least part of which is carbonized.



P36492

US20230193447

Priority Date: 17/12/2021

TREXLER ADAM | JOHANSEN LAURIE | DIFFENDAFFER PAUL

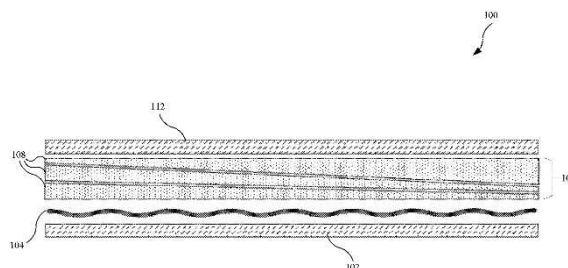
PRECIOUS METAL LAMINATE AND METHODS OF MANUFACTURE

A precious metallic laminate may include a first transparent substrate, a transparent transition layer deposited on the first transparent substrate, and a metallic layer deposited on the transparent transition layer. The metallic layer may include a precious metal. The laminate may include a second transparent substrate covering the metallic layer.

STRATIFIÉ DE MÉTAL PRÉCIEUX ET PROCÉDÉS DE FABRICATION

L'invention concerne un stratifié de métal précieux pouvant comprendre un premier substrat transparent, une couche de transition transparente déposée sur le premier substrat transparent, et une couche métallique déposée sur la couche de transition transparente. La couche métallique peut comprendre un métal précieux. Le stratifié peut comprendre un second substrat transparent recouvrant la couche métallique.

CLAIM 1. A precious metallic laminate, comprising: a first transparent substrate; a transparent transition layer deposited on the first transparent substrate; a metallic layer deposited on the transparent transition layer, wherein: the metallic layer comprises at least one precious metal selected from the group consisting of gold, silver, platinum, palladium, rhodium, osmium, iridium, ruthenium, rhenium, indium, germanium, beryllium, tellurium, and bismuth; and the transparent transition layer contacts at least a portion of the first transparent substrate and at least a portion of the metallic layer; and a second transparent substrate covering the metallic layer.



P36499

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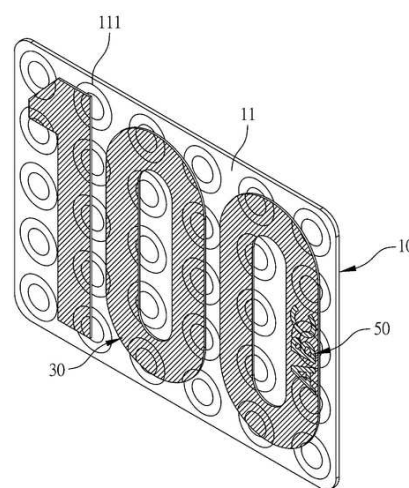
Priority Date: 22/01/2022

HOLO SOLUTION

ANTI-COUNTERFEITING STRUCTURE WITH DOUBLE ANTI-COUNTERFEITING OPTICAL REFRACTIVE EMBOSING

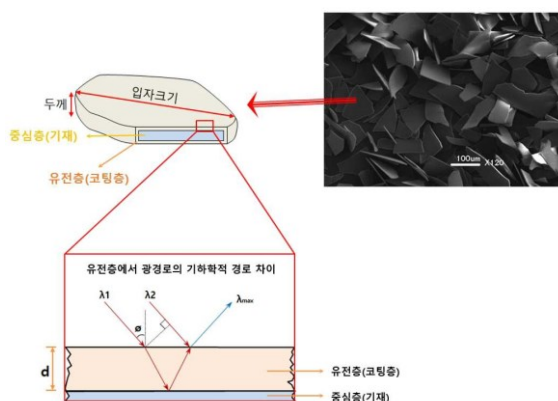
The present invention provides a dual security refractive embossed security structure, comprising: a carrier and an imprinting structure in the form of a sheet, the carrier system having a concave imprint imprinted on its upper surface to form a nanometer-level contactless height difference, the imprinting structure being disposed on the carrier upper surface and defining a plurality of square virtual blocks; Each square virtual block is divided into four spaces by a cross, the four spaces being provided with planes or slopes, respectively, and the slopes of each square virtual block being provided with the same or different sloping angles, whereby the manufacturing process is simple, meets the needs of a small number of diversity, exhibits a much more variable image, has dual visual security effects, and improves security and recognition functions.

CLAIM 1. A dual security refractive embossed security structure comprising: a carrier in the form of a sheet, the carrier having an upper surface provided with a pan-image layer, the pan-image layer being embossed with a recessed mark having a difference in height from the pan-image layer surface of the nanoscale contactless sensation, thereby providing visual sensation, whereby the pan-image layer appears as a pan-image image when viewed at a particular viewing angle; Provided on the upper surface of the carrier, the imprinting structure divides into a plurality of square virtual blocks, each of the square virtual blocks divides into four spaces in a cross, the four spaces being provided with planes or slopes, respectively, the slopes of each of the square virtual blocks being provided with the same or different sloping angles, thereby having a haptic and visual sensation, so that the imprinting structure exhibits a predetermined image at a particular viewing angle.



SECURITY PIGMENT WITH DUAL COLOR SHIFTING FUNCTION

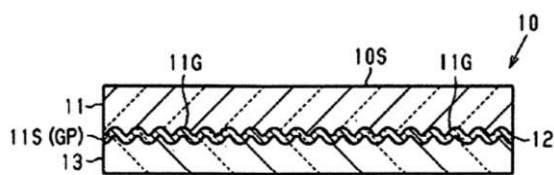
The present invention relates to a double color conversion pigment comprising a first color conversion pigment and a second color conversion pigment, wherein the first color conversion pigment and the second color conversion pigment have a composite structure in which dielectric layers are coated on both sides of a central layer, wherein the first color converting pigment and the second color converting pigment are observed in the same colors or in different colors depending on viewing angles, wherein the composite structure comprises: a central layer; and dielectric layers formed on upper and lower surfaces of the central layer, wherein the dielectric layer has a structure in which a first dielectric layer, a second dielectric layer, and a third dielectric layer are stacked. the first dielectric layer and the third dielectric layer are formed of the same metal oxide. the dielectric layer of the first color conversion pigment and the dielectric layer of the second color conversion pigment have the same optical thickness. accordingly, a security element having a color change according to an observation angle is formed using a security ink including the double color conversion security pigment.



CLAIM 1. A double color conversion pigment comprising a first color conversion pigment and a second color conversion pigment, wherein the first color conversion pigment and the second color conversion pigment have a composite structure in which dielectric layers are coated on both sides of a central layer, the first color conversion pigment and the second color conversion pigment are observed in the same colors or different colors depending on a viewing angle, A double color conversion pigment, comprising: a center layer; and dielectric layers formed on upper and lower surfaces of the center layer, respectively, wherein the dielectric layer has a structure in which a first dielectric layer, a second dielectric layer, and a third dielectric layer are laminated, the first dielectric layer and the third dielectric layer are formed of the same metal oxide, and the dielectric layer of the first color conversion pigment and the dielectric layer of the second color conversion pigment have the same optical thickness.

OPTICAL ELEMENT AND AUTHENTICATOR

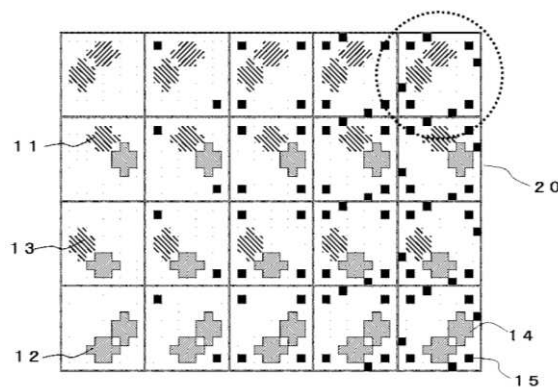
TOPIC: To provide an optical element and an authenticator capable of easily performing authenticity determination of an optical element and an identification card body installed in a polycarbonate card. **INVENTION:** An optical element including a first layer, a second layer in contact with the first layer, and a third layer in contact with the second layer, each layer having optical transparency, wherein The first layer containing a urethane resin having a molecular weight of 1000 or more and less than 10000 relative to an ultraviolet light curable resin having a molecular weight of 20000 or more and less than 100000 in a weight ratio of 5% or more and less than 45%.



CLAIM 1. An optical element comprising: a first layer; a second layer in contact with the first layer; and a third layer in contact with the second layer, each layer having light-transmissive properties, wherein the first layer is a resin layer having a first refractive index and includes a first surface in contact with the second layer, A grating structure formed by recesses and protrusions on at least a portion of the first face, the second layer being a dielectric layer having a second refractive index higher than the first refractive index and having recesses and protrusions following the grating structure, The device according to claim 1, wherein the third layer is a resin layer having a third refractive index lower than the second refractive index, the first face has a recessing and protruding face, and the grating structure includes a first grating structure and a second grating structure, and The semiconductor light emitting device according to claim 1, wherein the recessing and protruding face includes a first region in which the first grating structure is located, and a second region adjacent to the first region in a plan view facing the first face and in which the second grating structure is located, an azimuth angle of the first grating structure and an azimuth angle of the second grating structure are equal to each other, and grating periods of the first grating structure and the second grating structure are such that: A difference between a grating period of the first grating structure and a grating period of the second grating structure is 20 nm or greater, and the first layer includes a weight ratio of a urethane resin having a molecular weight of 1000 or greater and less than 10000 relative to an ultraviolet light curable resin having a molecular weight of 20000 or greater and less than 100000 of at least 5% and less than 45%.

COPYING RESTRICTION STRIKE LINE PRINT AND METHOD FOR CREATING COPY RESTRICTION STRIKE LINE PRINT

TOPIC: To provide a copy restraining streak printed material capable of distinguishing between an original and a copied material and demonstrating that the original material has been copied from the original material by a visible image having a density less than or equal to that of an invisible image and becoming invisible when copied by a copying machine. INVENTION: The present invention provides a display device including, on a base material, at least one element of a first streak element and a second streak element, at least one element of a third streak element and a fourth streak element, the first streak element and the second streak element being arranged to face each other with a center of a streak unit as a boundary; A fifth streak element having a shape unreproducible by a copying machine is arranged in an area where the first streak element, the second streak element, the third streak element, and the fourth streak element are not present.



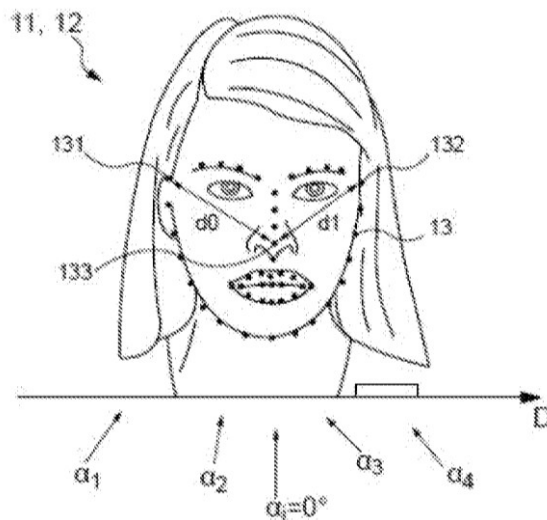
CLAIM 1. A streaking apparatus comprising: at least one element of a first streaking element and a second streaking element disposed opposite each other along a first direction with a center of a streaking unit as a boundary on a base material; and a streaking element disposed along a second direction different from the first direction; At least one element of a third streak element and a fourth streak element arranged to face each other with the center as a boundary therebetween is arranged in a matrix at a fixed pitch, and the first streak element and the second streak element in each of the streak units are in a negative-positive relationship with each other; And have the same area, and a positive image or a negative image of a first invisible image is formed by the first streak element, and a negative image or a positive image of the first invisible image is formed in a negative-positive relationship with the positive image or the negative image of the first invisible image formed by the second streak element and the first streak element; The third streak element and the fourth streak element in each of the streak units are in a negative-positive relationship with each other and have the same area, and a positive image or a negative image of a second invisible image is formed by the third streak element, A negative image or a positive image of a second invisible image having a negative-positive relationship with the positive image or the negative image of the second invisible image formed by the fourth streak element and the third streak element is formed therein, and at least one of the streak units arranged in the plurality of matrices includes: The device according to claim 1, further comprising one or more fifth streak elements having a shape that is not reproducible by a copying machine in an area where the first streak element, the second streak element, the third streak element, and the fourth streak element are not present, wherein the fifth streak element is configured so that, in the first streak element and the second streak element, A center at a position shifted from a center line of a determination tool on which the first invisible image is visualized when the determination tool is overlapped, and a center at a position shifted from a center line of the determination tool on which the second invisible image is visualized when the determination tool is overlapped, in the third streak element and the fourth streak element; A visible image is formed by the fifth streaking element, and when the visible image is copied by the copying machine, the fifth streaking element retracts and becomes invisible.

METHOD FOR AUTHENTICATING AN IDENTITY DOCUMENT, AND DEVICE FOR IMPLEMENTING THE METHOD

The present invention relates to a method for authenticating an identity document (10), in which, for various observation angles (α_i) in an observation direction, a first distance (d_0) between a first point and a midpoint of a first portrait (12) representing a face is measured according to a considered observation angle, a second distance (d_1) between a second point and the midpoint of the first portrait (12) according to the considered observation angle is measured, and a ratio (r) between the first distance (d_0) and the second distance (d_1) is calculated, then the method comprises a step (E6) of processing the ratios (r) calculated for each of the different observation angles for the first portrait (12) and a step (E7) of validating the first portrait (12) as a 3 D portrait based on a result of the processing step. It also relates to a device for implementing the method.

PROCÉDÉ D'AUTHENTIFICATION D'UN DOCUMENT D'IDENTITÉ, ET DISPOSITIF POUR METTRE EN ŒUVRE LE PROCÉDÉ

La présente invention concerne un procédé d'authentification d'un document d'identité (10), dans lequel, pour différents angles d'observation (α_i) selon une direction d'observation, une première distance (d_0) entre un premier point et un point médian d'un premier portrait (12) représentant un visage est mesurée selon un angle d'observation considéré, une deuxième distance (d_1) entre un deuxième point et le point médian du premier portrait (12) selon l'angle d'observation considéré est mesurée, et un ratio (r) entre la première distance (d_0) et la deuxième distance (d_1) est calculé, puis le procédé comporte une étape (E6) de traitement des ratios (r) calculés pour chacun des différents angles d'observation pour le premier portrait (12) et une étape (E7) de validation du premier portrait (12) comme portrait 3D en fonction d'un résultat de l'étape de traitement. Elle concerne également un dispositif pour mettre en œuvre le procédé.



CLAIM 1. Method for authenticating an identity document (10), the method comprising at least: a step (E1) of providing an identity document (10) comprising at least one first portrait (12) representing a face; a step of determining a direction of observation of the first portrait (12); A step (E2) of identifying at least three characteristic points (131, 132, 133) of the face of the first portrait (12), including a first point (131), a second point (132) and a so-called "median" point (133); and for different observation angles (α_i) according to the observation direction: * a step (E3) of measuring a first distance (d_0) between the first point and the median point of the first portrait (12) according to an observation angle considered from among the different observation angles; * a step (E4) of measuring a second distance (d_1) between the second point and the mid-point of the first portrait (12) according to the observation angle considered; and * A step (E5) of calculating a ratio (r) between the first distance (d_0) and the second distance (d_1), for the observation angle considered, for the first portrait (12); * A step (E6) of processing the ratios (r) calculated for each of the different observation angles for the first portrait (12); and * a step (E7) of validating the first portrait (12) as a 3 D portrait according to a result of the processing step.

P36526

LABEL

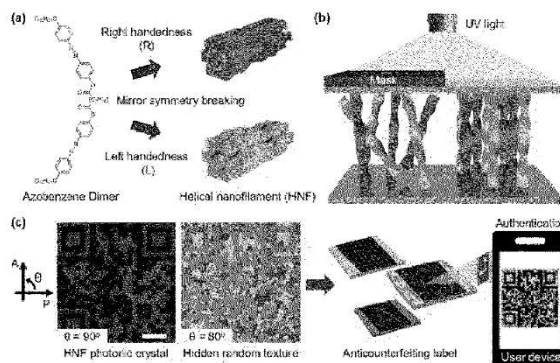
EP4198107

Priority Date: 17/12/2021

KOREA ADVANCED INSTITUTE OF SCIENCE & TECHNOLOGY

STRUCTURES FOR PHYSICAL UNCLONABLE FUNCTION USING SPONTANEOUS CHIRAL SYMMETRY BREAKING AND METHOD OF PREPARING THE SAME

The present invention relates to a structure for a physical unclonable function using spontaneous chiral symmetry breaking and a method of preparing the same, in which a chiral random pattern, which is unclonable and is observable with an optical microscope and a mobile phone camera, is formed using chiral photonic crystals in which chiral symmetry breaking occurs and is applied to a physical unclonable function (PUF), thereby attaining high encoding capacity, high recognition rate, and security while achieving high performance in reproducibility, uniqueness, unpredictability, and reconfigurability, and forming a desired pattern through a conventional photolithography method.



CLAIM 1. A helical nanofilament (HNF) photonic crystal structure obtained by randomly patterning helical nanofilaments (HNFs) in which a bent-shaped liquid crystal molecule is grown in a twisted layered structure by self-assembly.

P36530

BANKNOTE – CARD – RELIEF

EP4190582

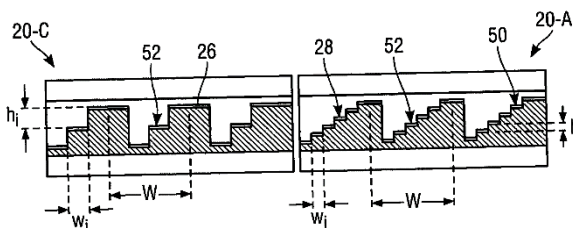
Priority Date: 30/11/2021

GIESECKE & DEVRIENT CURRENCY TECHNOLOGY

SECURITY ELEMENT HAVING A REFLECTIVE SURFACE AREA, DATA CARRIER AND PRODUCTION METHOD

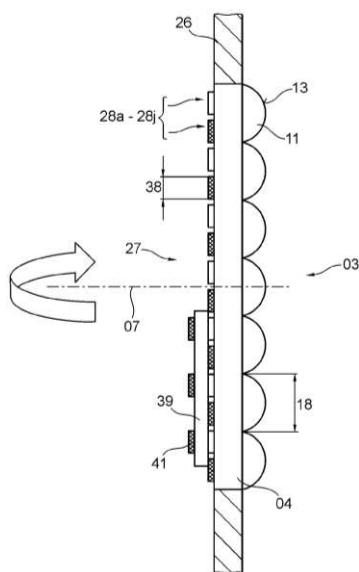
The invention relates to a security element (20) for securing valuable objects, comprising a reflective surface area (22) whose extension defines an x-y plane and which generates a multicolored three-dimensional representation (40) when viewed in reflected light. According to the invention, the reflective surface area (22) comprises a coarse structure (30) for producing the three-dimensional representation (40) and a fine structure (50) superimposed on the coarse structure for producing the multicolour appearance of the representation (40). The coarse structure (30) comprises a plurality of directionally reflecting facets (32) which are oriented in such a way that the reflective surface area (22) can be perceived by a viewer in the form of the three-dimensional representation (40) with a surface which protrudes and/or recedes in relation to the actual spatial shape thereof. The fine structure (50) is formed by a stepped Bragg interference structure with metallized steps (52) which are superimposed on the directionally reflecting facets (32) of the coarse structure (30) and which produce a colour effect on adjacent steps (52) when viewed by Bragg interference. In this case, a different height of the steps (52) in regions (20-A, 20-C) in the reflective surface region (40-a, 40-b, 40-C) produces different colors of the three-dimensional representation (40) in regions (40-A, 40-B, 40-C).

CLAIM 1. A security element for securing objects of value, having a reflective surface region whose extent defines an x-y plane and which generates a multicolored three-dimensional representation when viewed in reflected light, characterized in that - the reflective surface region comprises a coarse structure for generating the three-dimensional representation and a fine structure superimposed on the coarse structure for generating the multicolored appearance of the representation, wherein - the coarse structure comprises a plurality of directionally reflecting facets which are oriented in such a way that the reflective surface region is perceptible to a viewer in the form of the three-dimensional representation with a surface projecting and/ or receding with respect to its actual spatial shape, and - the fine structure is formed by a stepped Bragg interference structure with steps on which a reflective or reflection-increasing coating is formed, wherein the stair steps are superimposed on the directionally reflecting facets of the coarse structure and, when viewed by Bragg interference, produce a colour effect on adjacent stair steps, wherein a different height of the stair steps in regions in the reflective surface region produces different colours of the three-dimensional representation in regions.



SECURITY DOCUMENT WITH A TRANSPARENT WINDOW FORMED IN ITS SUBSTRATE

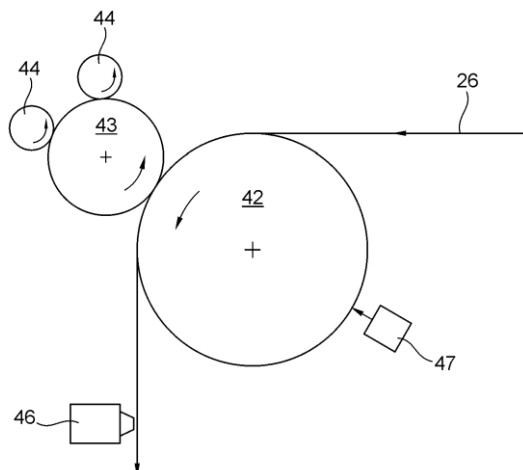
The invention relates to a security document having a transparent window formed in its substrate, wherein a microoptical structure consisting of microlenses is arranged at least in the region of the transparent window on one side of the substrate and a first printed image is arranged at least in the region of the transparent window on the other side of the substrate opposite this microoptical structure, wherein this first printed image has a plurality of image elements in a punctiform or linear grid, wherein an image point size or a line thickness of these image elements is in each case formed smaller than a lens width of the microlenses arranged in the microoptical structure, wherein on a part of the first printed image, on the side thereof facing away from the microoptical structure, there is arranged an areally extended layer covering this first printed image, wherein on the side facing away from the microoptical structure, of the layer partly covering the first printed image, there is arranged a second printed image.



CLAIM 1. A security document (02) having a transparent window (04) formed in its substrate (26), wherein a microoptical structure (03) consisting of microlenses (11) is arranged at least in the region of the transparent window (04) on one side of the substrate (26) and a first printed image (27) is arranged at least in the region of the transparent window (04) on the other side of the substrate (26) opposite this microoptical structure (03), wherein this first printed image (27) has a plurality of image elements (28 a to 28 j) in a punctiform or linear grid, wherein an image point size (38) or a line thickness (38) of these image elements (28 a to 28 j) is in each case formed smaller than a lens width (18) of the microlenses (11) arranged in the microoptical structure (03), wherein on a part of the first printed image (27) on the side thereof facing away from the micro-optical structure (03) there is arranged a layer (39) which extends over a large area and covers this first printed image (27), wherein on the side of the layer (39) facing away from the micro-optical structure (03) there is arranged a second printed image (41), characterized in that In that the second printed image (41) is arranged on the layer (39) covering a part of the first printed image (27) in such a way that this second printed image (41) can be brought into coincidence with the micro-optical structure (03) applied to the other side of the substrate (26) of this security document (02) after carrying out a folding at a fold line (07) in such a way that, characterized in that this second printed image (41) or at least one piece of information contained therein becomes visible and/or recognizable when viewed from the direction of the micro-optical structure (03).

PRINTING MACHINE FOR PRODUCING A SECURITY DOCUMENT

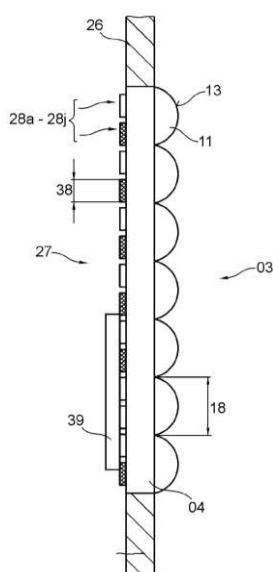
The invention relates to a printing press for producing a security document, wherein an impression cylinder guiding a substrate of the security document and a transfer cylinder cooperating with the impression cylinder at a transfer point and printing a printed image on the substrate are provided, wherein the substrate of the security document has at least one transparent window, wherein a microoptical structure consisting of microlenses is provided on one side of the substrate at least in the region of the relevant transparent window, wherein the impression cylinder and the transfer cylinder are arranged so as to interact in such a way that, characterized in that the micro-optical structure consisting of microlenses is arranged on one side of the substrate at least in the region of the relevant transparent window and the at least one printed image is arranged on the other side of the substrate opposite this micro-optical structure at least in the region of the transparent window, wherein a printing device is provided which applies an areally extended layer covering the relevant printed image on at least one section of the relevant printed image on its side facing away from the microoptical structure, wherein this printing device is arranged downstream of the transfer point, at which the transfer cylinder prints the printed image on the substrate guided by the impression cylinder, is arranged on the same side of the substrate as the printed image produced at the transfer point and is designed as at least one inkjet print head.



CLAIM 1. A printing press for producing a security document (02), wherein an impression cylinder (42) guiding a substrate (26) of the security document (02) and a transfer cylinder (43) cooperating with the impression cylinder (42) at a transfer point and printing a printed image (27) on the substrate (26) are provided, wherein the substrate (26) of the security document (02) has at least one transparent window (04), wherein a micro-optical structure (03) consisting of micro-lenses (11) is provided at least in the region of the relevant transparent window (04) on one side of the substrate (26), the impression cylinder (42) and the transfer cylinder (43) being arranged so as to interact in such a way that, characterised in that the micro-optical structure (03) consisting of micro-lenses (11) is arranged on one side of the substrate (26) at least in the region of the relevant transparent window (04) and the at least one printed image (27) is arranged on the other side of the substrate (26) opposite this micro-optical structure (03) at least in the region of the transparent window (04), wherein the relevant printed image (27) has a plurality of image elements (28 a to 28 j) in a punctiform or linear grid, wherein these image elements (28 a to 28 j) of the printed image (27) are each formed in a hue different from white, wherein a printing device is provided which applies an areally extended layer (39) covering the relevant printed image (27) at least on a section of the relevant printed image (27) on the side thereof facing away from the microoptical structure (03), this printing device being arranged downstream of the transfer point at which the transfer cylinder (43) prints the printed image (27) onto the substrate (26) guided by the impression cylinder (42), on the same side of the substrate (26) as the printed image (27) produced at the transfer point, characterized in that In that the printing device arranged downstream of the transfer point at which the transfer cylinder (43) prints the printed image (27) onto the substrate (26) guided by the impression cylinder (42) is designed as at least one inkjet print head (46), wherein the layer (39) formed by the at least one inkjet print head (46) consists of a lighter hue than the hue different from white, of which the relevant print image (27) consists.

SECURITY DOCUMENT WITH A TRANSPARENT WINDOW FORMED IN ITS SUBSTRATE

The invention relates to a security document having a transparent window formed in its substrate, wherein a microoptical structure consisting of microlenses is arranged on one side of the substrate at least in the region of the transparent window and at least one printed image is arranged on the other side of the substrate opposite this microoptical structure at least in the region of the transparent window, wherein the printed image in question has a plurality of image elements in a punctiform or linear grid, wherein these image elements are formed in a hue different from white, wherein an image point size or a line thickness of these image elements is in each case formed smaller than a lens width of the microlenses arranged in the microoptical structure, wherein at least on a section of the relevant printed image on its side facing away from the microoptical structure there is arranged an areally extended layer covering the relevant printed image, wherein this layer consists of a lighter hue than the at least one hue different from white, of which the relevant printed image consists.



CLAIM 1. A security document (02) having a transparent window (04) formed in its substrate (26), wherein a microoptical structure (03) consisting of microlenses (11) is arranged at least in the region of the transparent window (04) on one side of the substrate (26) and at least one printed image (27) is arranged at least in the region of the transparent window (04) on the other side of the substrate (26) opposite this microoptical structure (03), wherein the relevant printed image (27) has a plurality of image elements (28 a to 28 j) in a punctiform or linear grid, wherein these image elements (28 a to 28 j) are formed in a hue different from white, wherein an image point size (38) or a line thickness (38) of these image elements (28 a to 28 j) is in each case formed smaller than a lens width (18) of the microlenses (11) arranged in the microoptical structure (03), wherein at least on a section of the relevant printed image (27) on its side facing away from the microoptical structure (03) there is arranged a layer (39) extending over the area and covering the relevant printed image (27), wherein this layer (39) consists of a lighter hue than the at least one hue different from white, of which the relevant printed image (27) consists, characterized in that in that the layer (39) covering the relevant printed image (27) is produced in an inkjet printing method, wherein this layer (39) is transparent to electromagnetic radiation having a wavelength in the range from 380 nm to 780 nm, wherein a degree of transparency for this electromagnetic radiation is in the range between 10% and 90% , wherein the transparency varies gradually over the two-dimensional areal extent of the layer (39) covering the relevant printed image (27), so that at least one location of the layer (39) or some locations of the layer (39) are formed to a different degree of transparency than other locations of this layer (39).

P36538

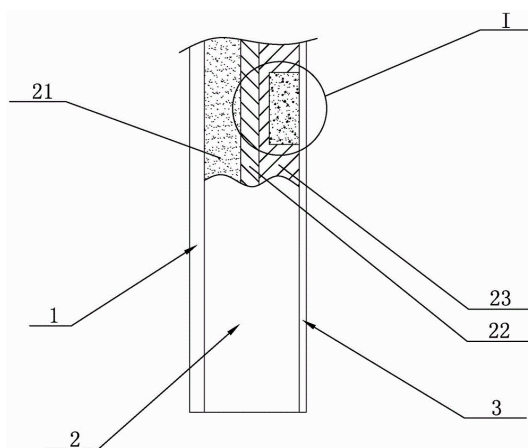
CN219214379U

Priority Date: 06/02/2023

WENZHOU GETTEL PLASTIC

WEAR-RESISTANT HEAT-INSULATING COMPOSITE ALUMINIZED FILM

The utility model discloses a wear-resistant heat-insulating composite aluminized film which comprises a corona layer, an intermediate layer and a heat-sealing layer, wherein the intermediate layer comprises a metal powder reinforcing layer, an aluminized layer and a heat-insulating silica gel layer, the inner surface of the metal powder reinforcing layer is fixedly bonded with the outer surface of the corona layer, the outer surface of the metal powder reinforcing layer is fixedly bonded with the inner surface of the aluminized layer, the outer surface of the aluminized layer is fixedly bonded with the inner surface of the heat-insulating silica gel layer, and the outer surface of the heat-insulating silica gel layer is fixedly bonded with the inner surface of the heat-sealing layer. According to the technical scheme, the metal powder reinforcing layer can strengthen the corona layer and the aluminum plating layer, so that the wear resistance is better, the corona layer, the aluminum plating layer and the heat insulation silica gel layer all have heat insulation effects, and the three-layer heat insulation structure has good heat insulation performance; the photochromic anti-counterfeiting layer can change color through the light sensing, thereby playing the role of anti-counterfeiting, being not easy to imitate, and having good anti-counterfeiting performance and good practicability.



CLAIM 1. The utility model provides a wear-resisting thermal-insulated compound aluminizer, includes corona layer (1), intermediate level (2) and heat-seal layer (3), its characterized in that: the middle layer (2) comprises a metal powder reinforcing layer (21), an aluminum plating layer (22) and a heat-insulating silica gel layer (23), wherein the inner surface of the metal powder reinforcing layer (21) is fixedly bonded with the outer surface of the corona layer (1), the outer surface of the metal powder reinforcing layer (21) is fixedly bonded with the inner surface of the aluminum plating layer (22), the outer surface of the aluminum plating layer (22) is fixedly bonded with the inner surface of the heat-insulating silica gel layer (23), and the outer surface of the heat-insulating silica gel layer (23) is fixedly bonded with the inner surface of the heat-sealing layer (3).

P36564

PRINTING – BRAND PROTECTION

CN116215105

Priority Date: 16/11/2022

GUANGDONG HAIFU INTELLIGENT ENVIRONMENTAL PROTECTION TECHNOLOGY

PRINTING PROCESS OF LOCAL IMITATION GRATING THREE-DIMENSIONAL ANTI-COUNTERFEITING PACKAGE

The invention discloses a printing process of a local imitation grating three-dimensional anti-counterfeiting package, which comprises the following steps of: step one, processing a picture layer and a picture-text region; step two, high-fidelity color separation and mixed screening; step three, modifying UV gloss oil; step four, plate making and printing; step five, post-printing processing; the invention adopts high-fidelity color separation and mixed screening printing technology, utilizes the color illusion and the dumb silver light column effect of a printing object, realizes the local imitation grating three-dimensional effect of the package, and more highlights the three-dimensional effect of the imitation grating area by carrying out white printing on the common image-text area in the field, thereby improving the anti-counterfeiting strength and the decoration of the package, and simultaneously improving the environmental protection of the package by avoiding using grating plates; according to the invention, through modification of the UV gloss oil, the highlighting effect and self-cleaning performance of local UV are enhanced; the invention can complete the printing and local polishing of all pictures and texts by one paper feeding, reduces the printing process and lowers the production cost.

CLAIM 1. A printing process of a local imitation grating three-dimensional anti-counterfeiting package comprises the following steps: step one, processing a picture layer and a picture-text region; step two, high-fidelity color separation and mixed screening; step three, modifying UV gloss oil; step four, plate making and printing; step five, post-printing processing; the method is characterized in that: in the first step, the printed sheet is manufactured by using image-text processing software, the printed sheet layer is divided into a color image layer and a white image layer, an imitation grating image-text area and a common image-text area, a white light band parallel to the imitation grating image-text area is arranged in the imitation grating image-text area, and the white light band is arranged on the white image layer; in the second step, the color separation and screening are carried out on the printed sheet processed in the first step, specifically: for a color image layer, using high-fidelity color separation software to separate the image and text into seven colors of cyan, magenta, yellow, black, red, green and blue, wherein the cyan, magenta, yellow and black adopt amplitude modulation screening, the number of screening lines is 150-250, the screening angles are 5-15 degrees, 30-45 degrees, 0 degrees and 75-90 degrees respectively, and the red, green and blue adopt frequency modulation screening; for a white image layer, the white light band is a flatscreen with the screen dot area coverage rate of 10% -30%, and the common image-text area is a solid screen with the screen dot area coverage rate of 100%; wherein in the third step, 0.1 to 2 percent of urea and 0.05 to 2 percent of nano SiO₂ are added into the UV gloss oil according to the mass ratio 2 And 0.5% -3% of defoaming agent, and uniformly stirring by using stirring equipment to obtain modified gloss oil; in the fourth step, the modified gloss oil prepared in the third step is added to a UV (ultraviolet) glazing unit of printing equipment, and the printed sheet subjected to color separation and screening in the second step is subjected to CTP (computer to plate) and is printed on a printing stock through the printing equipment; and in the fifth step, after the printed sheet in the fourth step is printed, the printed sheet is mounted with an ash plate, and then die cutting, slotting and forming processes are sequentially carried out, so that the anti-counterfeiting package with the local imitation grating three-dimensional effect can be obtained.

P36567

PRINTING – INFRARED

CN116198244

Priority Date: 23/02/2023

YANGZHOU XIANGHUA NEW MATERIAL TECHNOLOGY

ANTI-COUNTERFEITING ELECTROCHEMICAL ALUMINUM HOT STAMPING FOIL AND PREPARATION METHOD THEREOF

The invention discloses an anti-counterfeiting electrochemical aluminum hot stamping foil and a preparation method thereof. The biaxially oriented polyester film is used as a base material layer, and a release layer, a coloring layer, an anti-counterfeiting layer, an aluminized layer and an adhesive layer are sequentially coated on the biaxially oriented polyester film. The color-changing type electrochemical aluminum hot stamping foil adopts the derivative containing double-layer phthalocyanine, and has strong absorption property in the near infrared wavelength region to prevent counterfeiting; the bonding layer adopts the combination of polystyrene 2-methyl butenoate and sesbania gum, so that the adhesive force of the material is improved.

CLAIM 1. An anti-counterfeiting electrochemical aluminum hot stamping foil is characterized in that a biaxially oriented polyester film is used as a base material layer, and a release layer, a coloring layer, an anti-counterfeiting layer, an aluminum plating layer and an adhesive layer are sequentially coated on the film.

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PATENT REFERENCE – See the table at the end of this document

N9434

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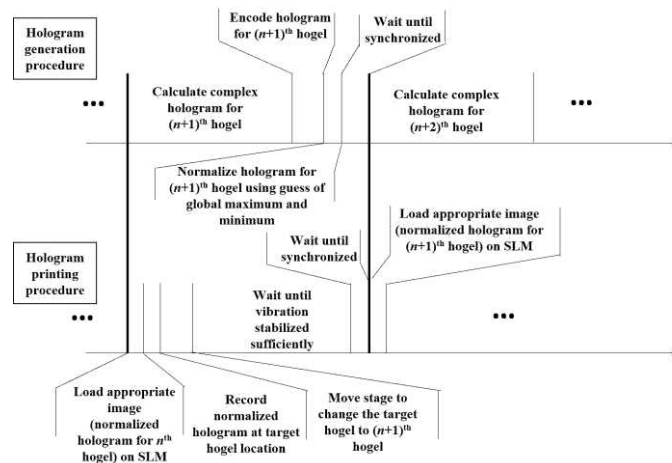
KOREA ELECTRONICS TECHNOLOGY INSTITUTE

HOLOGRAPHIC IMAGE NORMALIZATION METHOD FOR HOLOGRAPHIC PRINTER

A holographic image normalization method for a holographic printer is provided. A holographic printing method according to an embodiment of the present invention is performed in parallel to generating, encoding, and normalizing a hologram for an (n+1)th hogel, loading and recording a normalized hologram for an nth hogel, moving the position of a stage for the (n+1)th hogel, and waiting. Therefore, hologram generation and printing procedures can be parallelized by calculating the global maximum value and minimum value for normalization as close estimates, and thus total printing time can be minimized and memory use capacity can be optimized in holographic printing.

PROCÉDÉ DE NORMALISATION D'IMAGE HOLOGRAPHIQUE POUR IMPRIMANTE HOLOGRAPHIQUE

L'invention concerne un procédé de normalisation d'image holographique pour une imprimante holographique. Un procédé d'impression holographique selon un mode de réalisation de la présente invention est exécuté en parallèle à la génération, au codage et à la normalisation d'un hologramme pour un (n + 1)ième hogel, au chargement et à l'enregistrement d'un hologramme normalisé pour un nième hogel, au déplacement de la position d'une platine pour le (n + 1)ième hogel, et à l'attente. Par conséquent, la génération d'hologrammes et les procédures d'impression peuvent être parallélisées en calculant la valeur maximale et la valeur minimale globales pour la normalisation en tant qu'estimations relativement précises, et, par conséquent, le temps d'impression total peut être réduit au minimum et la capacité d'utilisation de mémoire peut être optimisée en impression holographique.



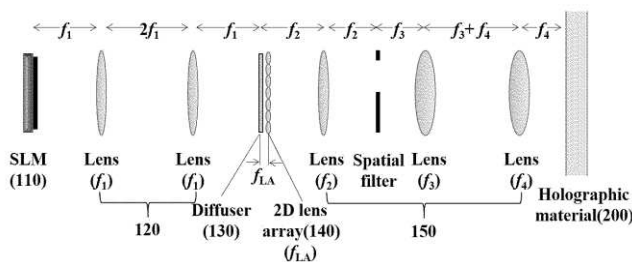
CLAIM 1. Generating a hologram for the nth hogel making up the hologram; Encoding the generated hologram; Normalizing the encoded hologram; Loading the normalized hologram into a Spatial Light Modulator (SLM); Recovering and recording the original hologram from the hologram loaded in SLM in a holographic medium; Shifting the position of the stage on which the holographic medium is placed to the position where the (n+ 1) th hogel can be recorded in the holographic medium'; Waiting until the moved stage settles, Wherein the generating, encoding and normalizing steps for the (n+ 1) th hogel comprise: And the second hogel is carried out in parallel with the loading and writing steps for the n th hogel and the shifting and waiting steps for the (n+ 1) th hogel.

SUB-HOGEL-BASED HOLOGRAPHIC STEREOGRAM PRINTING METHOD

A sub-hogel-based holographic stereogram printing method is provided. A holographic stereogram printer according to an embodiment of the present invention comprises: a modulator for generating an SLM image; a front-end optical system for imaging the generated SLM image on a diffuser; the diffuser for scattering the imaged SLM image; a 2D lens array for generating a multi-view SLM image from the scattered SLM image; and a rear-end optical system for inputting the generated multi-view SLM image into a holographic medium. Therefore, several sub-hogels can be recorded using one SLM image in holographic stereogram printing, and thus hologram printing time can be greatly reduced even without decreasing cognitive performance with respect to respective resolutions of a three-dimensional image to be shown.

PROCÉDÉ D'IMPRESSON À STÉRÉOGRAMMES HOLOGRAPHIQUES BASÉ SUR DES SOUS-HOGELS

L'invention concerne un procédé d'impression à stéréogrammes holographiques basé sur des sous-hogels. Une imprimante à stéréogrammes holographiques selon un mode de réalisation de la présente invention comprend : un modulateur servant à générer une image de modulateur spatial de lumière (SLM) ; un système optique frontal servant à imager sur un diffuseur l'image SLM générée ; le diffuseur, qui sert à diffuser l'image SLM imagée ; un réseau de lentilles 2D servant à générer une image SLM multivues à partir de l'image SLM diffusée ; et un système optique arrière servant à insérer l'image SLM multivue générée dans un support holographique. Par conséquent, plusieurs sous-hogels peuvent être enregistrés en utilisant une image SLM dans l'impression à stéréogrammes holographiques, et, par conséquent, le temps d'impression d'hologrammes peut être fortement réduit même sans diminuer les performances cognitives par rapport aux résolutions respectives d'une image tridimensionnelle devant être représentée.



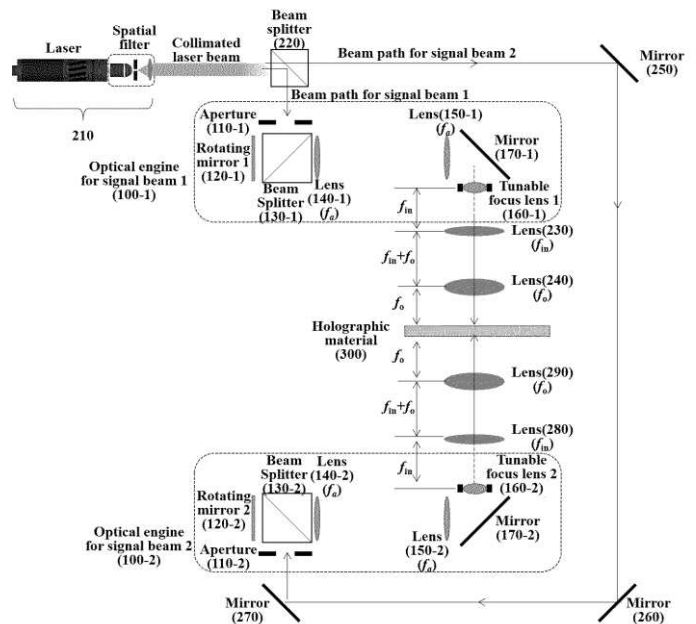
CLAIM 1. A modulator generating a Spatial Light Modulated image; Shear optics to image the generated SLM image into a diffuser; A diffuser to scatter the imaged SLM image; A 2D lens array to generate a multi-view SLM image from the scattered SLM image; And a back-end optical system for causing the generated multi-view SLM image to be incident on the holographic medium.

HOLOGRAPHIC OPTICAL ELEMENT PRINTING METHOD USING FOCUS-VARIABLE LENS AND ROTATING MIRROR

Provided is a holographic optical element printing method using a focus-variable lens and a rotating mirror. A holographic printer according to an embodiment of the present invention comprises: a first optical engine and a second optical engine which adjust a phase of incident parallel light and emit the same; and a first reduction optical system and a second reduction optical system which reduce the light emitted from the first optical engine and the second optical engine and then cause the same to enter a holographic medium, wherein the first optical engine and the second optical engine comprise: a rotating mirror which reflects the light while adjusting the phase of the incident parallel light through rotation; and a focus-variable lens which refracts the light while adjusting the phase of the parallel light reflected from the rotating mirror to be incident thereto, through focus-variation, respectively. Therefore, by replacing an SLM of the holographic printer with a combination of the focus-variable lens and the rotating mirror, the HOE quality in holographic-printing of a HOE can be improved and the printing time per hogel can be reduced, so that the entire record time can be substantially reduced.

PROCÉDÉ D'IMPRESSON D'UN ÉLÉMENT OPTIQUE HOLOGRAPHIQUE UTILISANT UNE LENTILLE À FOCALE VARIABLE ET UN MIROIR ROTATIF

L'invention concerne un procédé d'impression d'un élément optique holographique utilisant une lentille à focale variable et un miroir rotatif. Selon un mode de réalisation de la présente invention, une imprimante holographique comprend : des premier et second moteurs optiques qui ajustent une phase d'une lumière parallèle incidente et émettent la lumière ; ainsi que des premier et second systèmes optiques de réduction qui réduisent la lumière émise par les premier et second moteurs optiques puis la font entrer dans un support holographique. Les premier et second moteurs optiques comprennent : un miroir rotatif qui réfléchit la lumière tout en ajustant la phase de la lumière parallèle incidente par l'intermédiaire d'une rotation ; et une lentille à focale variable qui réfracte la lumière tout en ajustant la phase de la lumière parallèle réfléchi par le miroir par variation de focale respectivement. Par conséquent, en remplaçant un SLM de l'imprimante holographique par une combinaison de la lentille à focale variable et du miroir rotatif, la qualité d'un HOE au cours d'une impression holographique d'un HOE peut être améliorée et le temps d'impression par élément holographique peut être réduit, de sorte que l'ensemble du temps d'enregistrement peut être sensiblement réduit.



CLAIM 1. An optical engine configured to adjust a phase of incident parallel light and output the phase; A first reduction optical system that reduces light emitted from the first optical engine and enters the holographic medium; A second optical engine that adjusts a phase of incident parallel light and outputs the phase; And a second reduction optical system configured to reduce the light emitted from the second optical engine to enter the holographic medium, Wherein the first optical engine and the second optical engine comprise: A rotating mirror that reflects a phase of incident parallel light while adjusting a phase of incident parallel light through rotation; And refracting the phase of the parallel light reflected from the rotating mirror while adjusting the phase of the parallel light incident on the rotating mirror through focus variation.

N9438

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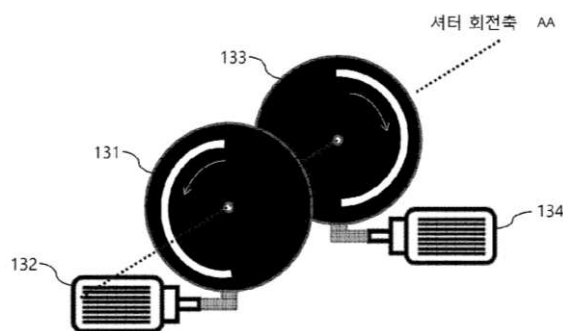
KOREA ELECTRONICS TECHNOLOGY INSTITUTE

HOLOGRAPHIC PRINTER USING MECHANICAL SHUTTER HAVING ADJUSTABLE EXPOSURE TIME AND NO VIBRATION

Provided is a holographic printer using a mechanical shutter having adjustable exposure time and no vibration. The holographic printer according to an embodiment of the present invention comprises: a light source; a modulator for generating a holographic fringe pattern in hogel units; a stage on which a hologram recording medium is placed; a driving part for moving the position of the stage in hogel units; and a shutter for periodically exposing an object light due to the holographic fringe pattern generated by the modulator to the hologram recording medium. The shutter comprises: a rotation plate having formed therein an arc-shaped opening which exposes the object light due to the holographic fringe pattern; and a motor for rotating the rotation plate. Therefore, the exposure period and exposure time of the shutter can be variously adjusted by adjusting the rotational state of the rotation plates having the arc-shaped opening formed therein.

IMPRIMANTE HOLOGRAPHIQUE UTILISANT UN OBTURATEUR MÉCANIQUE AYANT UN TEMPS D'EXPOSITION RÉGLABLE ET AUCUNE VIBRATION

L'invention concerne une imprimante holographique utilisant un obturateur mécanique ayant un temps d'exposition réglable et aucune vibration. L'imprimante holographique selon un mode de réalisation de la présente invention comprend : une source de lumière; un modulateur servant à générer un motif de franges holographiques dans des unités de hogel; une platine porte-objet sur laquelle est placé un support d'enregistrement d'hologramme; une partie d'entraînement servant à déplacer la position de la platine porte-objet dans des unités de hogel; et un obturateur servant à exposer périodiquement le support d'enregistrement d'hologramme à une lumière d'objet due au motif de franges holographiques généré par le modulateur. L'obturateur comprend : une plaque de rotation dans laquelle est formée une ouverture en forme d'arc qui expose la lumière d'objet due au motif de franges holographiques; et un moteur servant à faire tourner la plaque de rotation. Par conséquent, la période d'exposition et le temps d'exposition de l'obturateur peuvent être réglés de diverses manières en réglant l'état de rotation des plaques de rotation dans lesquelles l'ouverture en forme d'arc est formée.

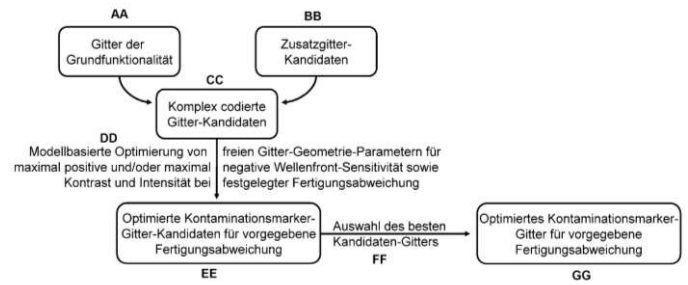


AA ... Shutter rotational axis

CLAIM 1. A light source emitting light; A modulator for modulating the light emitted from the light source to generate holographic fringe patterns in units of hogel; A hologram recording apparatus comprising: a stage in which a hologram recording medium to be recorded is placed on which a holographic fringe pattern generated in a modulator is to be recorded in units of hogel; A driving unit configured to move a position of the stage to a hogel unit; A shutter periodically exposing object light generated by the holographic fringe pattern generated by the modulator to the hologram recording medium, Wherein the shutter comprises: A first rotating plate formed with an arc-shaped opening exposing object light by a holographic fringe pattern; and A holographic printer comprising a first motor rotating the first rotating plate.

COMPUTER-GENERATED HOLOGRAM (CGH), AND METHOD FOR DESIGNING A CGH

The invention relates to a computer-generated hologram (CGH) for use in an interferometric measurement arrangement, and to a method for designing a CGH. The CGH has at least one useful structure and a contamination marker arrangement for detecting contamination in the CGH, wherein this contamination marker arrangement has: a first contamination marker structure comprising a first sub-structure and a second sub-structure which differ from one another with respect to the particular wavefront change brought about by a predetermined contamination, and at least one second contamination marker structure having a third sub-structure and a fourth sub-structure which differ from one another with respect to the particular wavefront change brought about by a predetermined contamination, wherein each of the sub-structures in complex coding has at least one first sub-grating for providing a first output wave that contributes to interferogram generation and at least one dummy grating for generating an output wave that does not contribute to interferogram generation, wherein the third and/or fourth sub-structure differ from both the first and the second sub-structure with respect to the dummy grating and/or the relative weight of the sub-gratings and dummy grating and/or the fill factor, wherein the at least two contamination marker structures of the contamination marker arrangement are each structures determined during a model-based search, and wherein the dummy structure for a predetermined first sub-grating is numerically optimised by the model-based search in order to provide a first output wave that contributes to interferogram generation.



- AA Basic functionality gratings
- BB Additional grating candidates
- CC Complexly coded grating candidates
- DD Model-based optimisation of free grating geometry parameters for maximally positive and/or maximally negative wavefront sensitivity as well as contrast and intensity when a manufacturing deviation is established
- EE Optimised contamination marker grating candidates for a predetermined manufacturing deviation
- FF Selection of the best grating candidate
- GG Optimised contamination marker grating for a predetermined manufacturing deviation

HOLOGRAMME GÉNÉRÉ PAR ORDINATEUR (CGH), ET PROCÉDÉ DE CONCEPTION D'UN CGH

L'invention concerne un hologramme généré par ordinateur (CGH) destiné à être utilisé dans un système de mesure interférométrique, et un procédé de conception d'un CGH. Le CGH présente au moins une structure utile et un agencement de marqueur de contamination pour détecter une contamination dans le CGH, ledit agencement de marqueur de contamination comprenant : une première structure de marqueur de contamination constituée d'une première sous-structure et d'une deuxième sous-structure qui diffèrent l'une de l'autre par rapport à la modification de front d'onde particulière provoquée par une contamination prédéterminée, et au moins une seconde structure de marqueur de contamination constituée d'une troisième sous-structure et d'une quatrième sous-structure qui diffèrent l'une de l'autre par rapport à la modification de front d'onde particulière provoquée par une contamination prédéterminée, chacune des sous-structures dans un codage complexe comportant au moins un premier sous-réseau pour générer une première onde de sortie qui contribue à la génération d'interférogramme et au moins un réseau factice pour générer une onde de sortie qui ne contribue pas à la génération d'interférogramme, la troisième et/ou la quatrième sous-structure différant à la fois de la première et de la deuxième sous-structure par rapport au réseau factice et/ou au poids relatif des sous-réseaux et du réseau factice et/ou du facteur de remplissage, lesdites au moins deux structures de marqueur de contamination de l'agencement de marqueur de contamination étant chacune des structures déterminées au cours d'une recherche basée sur un modèle, et la structure factice pour un premier sous-réseau prédéterminé étant optimisée numériquement par la recherche basée sur un modèle afin de générer une première onde de sortie qui contribue à la génération d'interférogramme.

CLAIM 1. Computer-generated hologram (CGH) for use in an interferometric measuring arrangement, having at least one useful structure and a contamination marker arrangement for detecting a contamination present on the CGH, wherein this contamination marker arrangement has: * a first contamination marker structure having a first substructure and a second substructure which differ from each other with respect to the wavefront change caused by a predetermined contamination; and * at least one second contamination marker structure having a third substructure and a fourth substructure which differ from one another with regard to the wavefront change brought about in each case by a predetermined contamination; * wherein each of the substructures has, in complex coding, at least one first partial grating for providing a first output wave contributing to the generation of interferograms and at least one dummy grating for generating an output wave not contributing to the generation of interferograms; * wherein the third substructure and/or the fourth substructure of both the first substructure and the second substructure differ from each other with respect to the dummy grid and/or the relative weight of sub-grids and dummy grid and/or the filling factor; * wherein the at least two contamination marker structures of the contamination marker arrangement are in each case structures determined by means of a model-based search, wherein the dummy structure is numerically optimized by the model-based search for a predetermined first sub-grid for providing a first output wave contributing to interferogram generation.

N9441

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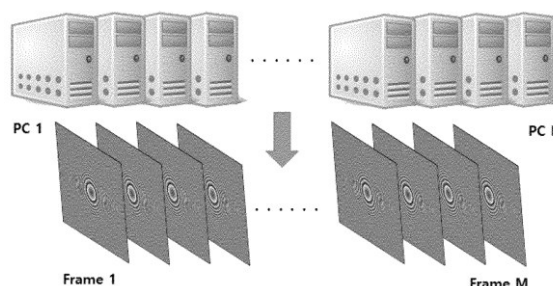
KOREA ELECTRONICS TECHNOLOGY INSTITUTE

HOLOGRAM GENERATION AND STREAMING METHOD AND SYSTEM USING MULTI-COMPUTERS

A hologram generation and streaming method and system using multi-PCs are provided. A hologram streaming service system according to an embodiment of the present invention comprises: a hologram generation server for generating a hologram streaming image by using multiple computers; and a hologram player for playing the hologram streaming image generated in the hologram generating server. Therefore, distributed processing of the multi-PCs is used to generate a hologram at high speed so that a service can be streamed without delay in real time even for a high-resolution hologram.

PROCÉDÉ ET SYSTÈME DE GÉNÉRATION ET DE DIFFUSION EN CONTINU D'HOLOGRAMME UTILISANT DES ORDINATEURS MULTIPLES

L'invention fournit un procédé et un système de génération d'hologramme et de diffusion en continu utilisant des PC multiples. Un système de service de diffusion en continu d'hologramme selon un mode de réalisation de la présente invention comprend : un serveur de génération d'hologrammes pour générer une image de diffusion en continu d'hologramme au moyen de multiples ordinateurs; et un lecteur d'hologramme pour lire l'image de diffusion en continu d'hologramme générée dans le serveur de génération d'hologramme. Par conséquent, un traitement distribué des multiples PC est utilisé pour générer un hologramme à grande vitesse de sorte qu'un service peut être diffusé en continu sans retard en temps réel même pour un hologramme à haute résolution.



CLAIM 1. A hologram generation server that generates a hologram streaming image using multiple computers; and And a hologram reproduction apparatus for reproducing a hologram streaming image generated by the hologram generation server.

N9483

CN116256958

Priority Date: 23/02/2023

SHANDONG UNIVERSITY

WEIGHT AND PHASE MULTIPLEXING WGS ALGORITHM-BASED RAPID PHASE HOLOGRAM GENERATION METHOD

The invention discloses a rapid phase hologram generating method based on a weight and phase multiplexing WGS algorithm, which is characterized in that parameters related to hologram calculation, a normalized weight term w and a normalized phase random term θ are brought into phase value calculation, the values of the weight term w and the phase random term θ are updated through the obtained amplitude distribution, the iteration process is repeated so that the generated hologram can be converged to an optimal value, and after the WGS algorithm process is completed, the weight term w and the phase term θ obtained after the phase hologram is iterated are multiplexed. The method can effectively reduce the iteration times and improve the calculation speed when the phase hologram is calculated in real time, avoids the problems of increased iteration times and prolonged response time caused by complex calculation, and is a method for realizing high-quality and real-time complex light field reconstruction with fewer iteration times and lower time cost.

CLAIM 1. The method for generating the fast phase hologram based on the weight and phase multiplexing WGS algorithm is characterized by comprising the following steps of: step 1, converting the pixel size and arrangement on a spatial light modulator into a grid with two-dimensional distribution; step 2, calculating an exponential term of the phase value loaded at each pixel coordinate of the spatial light modulator using the distribution grid and diffraction spot parameters of the spatial light modulator of step 1 And calculating ϕ_j is a collection of (3); step 3, according to the index terms of the center coordinates of different light spots Obtaining phase values ϕ_j at different pixel coordinates of a spatial light modulator j WGS ; Step 4, through ϕ_j WGS Calculating the amplitude distribution V at different diffraction spots of the Fourier surface m Updating the values of the normalized weight term w and the phase term θ through the obtained amplitude distribution; step 5, repeating the iterative process of step 3-4 so as to calculate the phase value ϕ_j WGS The generated hologram can be converged to an optimal value, and the phase hologram is drawn and the phase term θ is output m And normalized weight term w m ; Step 6, for the output phase term θ m And normalized weight term w m And multiplexing after data processing.

N9490

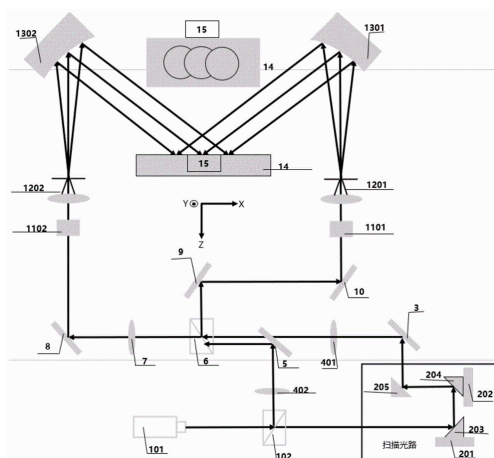
CN116224722

Priority Date: 15/02/2023

SHANGHAI INSTITUTE OF OPTICS & FINE MECHANICS – CHINESE
ACADEMY OF SCIENCES

HOLOGRAPHIC GRATING DOUBLE-BEAM INTERFERENCE EXPOSURE SYSTEM BASED ON BEAM SCANNING DODGING AND EXPOSURE METHOD THEREOF

A holographic grating double-beam interference exposure system based on beam scanning dodging and an exposure method thereof are provided, wherein the system comprises a laser, a scanning light path, a fourth reflector, a half-wave plate module, a fifth reflector, a second beam splitter, a third half-wave plate, an eighth reflector, a sixth reflector, a seventh reflector, a first acousto-optic modulator, a second acousto-optic modulator, a first spatial filter, a second spatial filter, a first off-axis reflector, a second off-axis reflector, a grating substrate and an interference fringe variation measurement assembly. The invention can greatly improve the light energy utilization efficiency of the system while realizing the light field uniformity index, thereby shortening the exposure time and improving the efficiency of the exposure system.



CLAIM 1. A holographic grating double-beam interference exposure system based on beam scanning dodging is characterized in that the system comprises: the laser device comprises a laser device (1), a scanning light path (2), a fourth reflecting mirror (3), a half-wave plate module (4), a fifth reflecting mirror (5), a second beam splitter (6), a third half-wave plate (7), an eighth reflecting mirror (8), a sixth reflecting mirror (9), a seventh reflecting mirror (10), a first acousto-optic modulator (1101), a second acousto-optic modulator (1102), a first spatial filter (1201), a second spatial filter (1202), a first off-axis reflecting mirror (1301), a second off-axis reflecting mirror (1302), a grating substrate (14) and an interference fringe variation measuring component (15), wherein the laser device (1) consists of the laser device (101) and a first beam splitter (102), the scanning light path (2) consists of a first reflecting mirror (203) arranged on a first linear displacement table (201) and a second reflecting mirror (204) and a third reflecting mirror (205) arranged on a second linear displacement table (202), and the half-wave plate module (4) consists of a first half-wave plate (401) and a second half-wave plate (402); the interference fringe variation measuring component (15) consists of a transmission type measuring grating (1501), ground glass (1502), a relay lens (1503) and a CCD (1504) from top to bottom; the beam emitted by the laser (101) is split into a scanning beam and a reference beam by a first beam splitter (102): the scanning light beam is incident to the fourth reflector (3) through the first reflector (203), the second reflector (204) and the third reflector (205), is reflected by the fourth reflector (3) and is incident to the first half wave plate (401), and is divided into two beams through the second light splitter (6): the first beam light is reflected into a first parallel beam through a sixth reflecting mirror (9), a seventh reflecting mirror (10), a first acousto-optic modulator (1101), a first spatial filter (1201) and a first off-axis reflecting mirror (1301) in sequence; the second light beam sequentially passes through a third half-wave plate (7), an eighth reflecting mirror (8), a second acoustic optical modulator (1102) and a second spatial filter (1202), and is reflected by a second off-axis reflecting mirror (1302) to become a second parallel light beam after filtering; the first parallel beam and the second parallel beam form interference on the substrate (14) coated with the photoresist; the reference beam is divided into two beams by the second half wave plate (402) and the fifth reflecting mirror (5) and by the second beam splitter (6): the first beam light sequentially passes through a sixth reflecting mirror (9), a seventh reflecting mirror (10), a first acousto-optic modulator (1101) and a first spatial filter (1201), and is reflected by a first off-axis reflecting mirror (1301) to become a first parallel beam after being filtered; the second light beam sequentially passes through a third half-wave plate (7), an eighth reflecting mirror (8), a second acoustic optical modulator (1102) and a second spatial filter (1202), and is reflected by a second off-axis reflecting mirror (1302) to become a second parallel light beam after filtering; the first and second parallel beams form interference over a component (15) of the grating substrate (14) that measures the fringe variation of the exposure beam.

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N9457

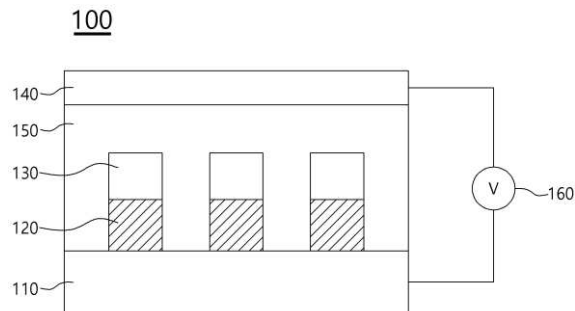
KR20230083865

Priority Date: 03/12/2021

GIST - GWANGJU INSTITUTE OF SCIENCE & TECHNOLOGY

HOLOGRAM IMPLEMENTING APPARATUS USING META-MATERIAL

The present invention relates to an apparatus for implementing a hologram using a meta-material made of a conductive polymer. A hologram implementation apparatus includes a first electrode layer, a conductive polymer layer forming a meta surface on the first electrode layer, a metal layer formed on each meta atom constituting the conductive polymer layer, A second electrode layer formed on the metal layer, and a voltage applying unit forming a potential difference between the first and second electrode layers.



CLAIM 1. A hologram implementing device, comprising: a first electrode layer; a conductive polymer layer forming a meta-surface on the first electrode layer; a metal layer formed on each meta-atom constituting the conductive polymer layer; a second electrode layer formed on the metal layer; and a voltage applying unit forming a potential difference in the first and second electrode layers.

Click on the title to return to table of contents

PATENT REFERENCE – See the table at the end of this document

N9439

WO2023106431

Priority Date: 06/12/2021

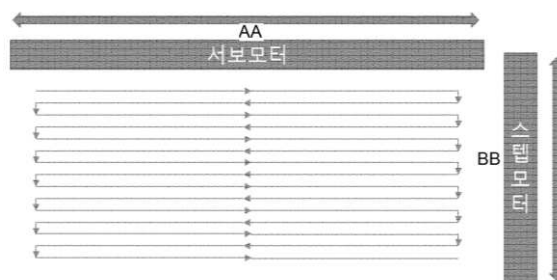
KOREA ELECTRONICS TECHNOLOGY INSTITUTE

CONTINUOUS HOLOGRAM RECORDING METHOD

A continuous hologram recording method is provided. A holographic printer according to an embodiment of the present invention comprises: a light source that emits light; a modulator that modulates the light emitted from the light source, to generate a holographic fringe pattern in units of hogels; a stage having placed thereon a hologram recording medium on which a holographic fringe pattern generated by the modulator is to be recorded in units of hogels; a first driving unit that moves the position of the stage in a first axial direction by using a first-type motor; and a second driving unit that moves the position of the stage in a second axial direction by using a second-type motor different from the first type. Accordingly, continuous hologram recording is enabled by appropriately implementing a motor that moves the stage on which the hologram recording medium is placed, according to vibration characteristics, thereby remarkably reducing the printing time for large holograms, which used to take several days to tens of days, and thus accelerating the commercialization of hologram printing.

PROCÉDÉ D'ENREGISTREMENT D'HOLOGRAMME CONTINU

L'invention concerne un procédé d'enregistrement d'hologramme continu. Une imprimante holographique selon un mode de réalisation de la présente invention comprend : une source de lumière qui émet de la lumière ; un modulateur qui module la lumière émise par la source de lumière, pour générer un motif de frange holographique dans des unités d'hogels ; un étage sur lequel est placé un support d'enregistrement d'hologramme sur lequel un motif de frange holographique généré par le modulateur doit être enregistré dans des unités d'hogels ; une première unité d'entraînement qui déplace la position de l'étage selon un premier sens axial à l'aide d'un moteur de premier type ; et une deuxième unité d'entraînement qui déplace la position de l'étage selon un deuxième sens axial en utilisant un moteur de second type différent du premier type. Par conséquent, un enregistrement d'hologramme continu est permis par la mise en œuvre appropriée d'un moteur qui déplace l'étage sur lequel le support d'enregistrement d'hologramme est placé, en fonction des caractéristiques de vibration, ce qui permet de réduire remarquablement le temps d'impression pour de grands hologrammes, lesquels nécessitaient auparavant quelques jours à plusieurs dizaines de jours, et donc d'accélérer la commercialisation de l'impression d'hologramme.



AA ... Sub-motor
BB ... Step motor

CLAIM 1. A light source emitting light; A modulator for modulating the light emitted from the light source to generate holographic fringe patterns in units of hogel; A hologram recording apparatus comprising: a stage in which a hologram recording medium to be recorded is placed on which a holographic fringe pattern generated in a modulator is to be recorded in units of hogel; A first driving unit configured to move a position of the stage in a first axial direction using a first type of motor; And a second driving unit configured to move the position of the stage in a second axial direction using a motor of a second type different from the first type.

N9440

WO2023106430

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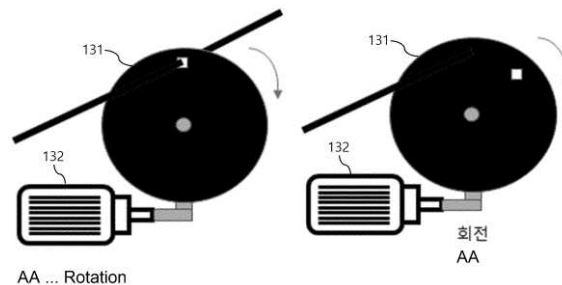
KOREA ELECTRONICS TECHNOLOGY INSTITUTE

HOLOGRAPHIC PRINTER USING VIBRATION-FREE MECHANICAL SHUTTER

A holographic printer using a vibration-free mechanical shutter is provided. A holographic printer, according to an embodiment of the present invention, comprises: a light source which emits light; a modulator which modulates the light emitted from the light source to generate a holographic fringe pattern in a hogel unit; a stage on which a holographic recording medium, on which a holographic fringe pattern generated by the modulator is to be recorded in a hogel unit, is placed; a driving part which moves a position of the stage in a hogel unit; and a shutter which periodically exposes, to the holographic recording medium, object light generated by the holographic fringe pattern generated by the modulator, wherein the shutter includes a rotating plate having a slit that exposes the object light by means of the holographic fringe pattern, and a motor rotating the rotating plate. Accordingly, by applying a mechanical shutter having a structure in which vibration does not occur to the holographic printer, it is possible to prevent degradation of hologram recording quality caused by vibration generated during opening/closing of the shutter.

IMPRIMANTE HOLOGRAPHIQUE UTILISANT UN OBTURATEUR MÉCANIQUE SANS VIBRATIONS

L'invention concerne une imprimante holographique utilisant un obturateur mécanique sans vibrations. Selon un mode de réalisation de la présente invention, une imprimante holographique comprend : une source de lumière qui émet de la lumière ; un modulateur qui module la lumière émise par la source de lumière pour générer un motif de franges holographiques dans une unité de hogel ; une platine porte-objet sur laquelle est placé un support d'enregistrement holographique sur lequel un motif de franges holographiques généré par le modulateur doit être enregistré dans une unité de hogel ; une partie d'entraînement qui déplace une position de la platine porte-objet dans une unité de hogel ; et un obturateur qui expose périodiquement le support d'enregistrement holographique à une lumière d'objet générée par le motif de franges holographiques généré par le modulateur, l'obturateur comprenant une plaque rotative comportant une fente qui laisse passer la lumière d'objet au moyen du motif de franges holographiques, et un moteur faisant tourner la plaque rotative. Ainsi, en utilisant dans l'imprimante holographique un obturateur mécanique ayant une structure dans laquelle aucunes vibrations ne se produisent, il est possible d'empêcher la dégradation de la qualité d'enregistrement d'hologramme provoquée par des vibrations générées pendant l'ouverture/la fermeture de l'obturateur.



CLAIM 1. A light source emitting light; A modulator for modulating the light emitted from the light source to generate holographic fringe patterns in units of hogel; A hologram recording apparatus comprising: a stage in which a hologram recording medium to be recorded is placed on which a holographic fringe pattern generated in a modulator is to be recorded in units of hogel; A driving unit configured to move a position of the stage to a hogel unit; A shutter periodically exposing object light generated by the holographic fringe pattern generated by the modulator to the hologram recording medium, Wherein the shutter comprises: A rotating plate formed with slits that expose object light by holographic fringe patterns; and A motor configured to rotate the rotating plate.

N9443

WO2023101274

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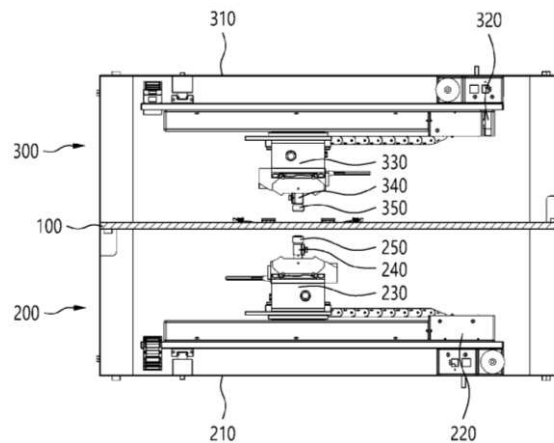
KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KYUNGPOOK NATIONAL UNIVERSITY INDUSTRY ACADEMIC COOPERATION FOUNDATION

HOLOGRAPHIC PRINTER FOR RECORDING FREE-FORM HOLOGRAPHIC OPTICAL ELEMENT

The present invention relates to a holographic printer for recording a free-form holographic optical element, the holographic printer comprising: an intermediate plate for fixing a holographic medium; an object light unit which adjusts a wave number vector of object light emitted from a light source and records a holographic optical element in units of hogels on the hologram medium; and a reference light unit which records the holographic optical element on the hologram medium in units of hogels by adjusting a wave number vector of reference light emitted from the light source. Accordingly, by changing the curvature of wavefronts of the reference light and the object light in each hogel, a wavefront having a smooth curved surface can be recorded.

IMPRIMANTE HOLOGRAPHIQUE POUR ENREGISTRER UN ÉLÉMENT OPTIQUE HOLOGRAPHIQUE DE FORME LIBRE

La présente invention concerne une imprimante holographique servant à enregistrer un élément optique holographique de forme libre, l'imprimante holographique comprenant : une plaque intermédiaire servant à fixer un support holographique ; une unité de lumière d'objet qui ajuste un vecteur de nombre d'ondes d'une lumière d'objet émise par une source de lumière et qui enregistre un élément optique holographique dans des unités de hogel sur le support d'hologramme ; et une unité de lumière de référence qui enregistre l'élément optique holographique sur le support d'hologramme dans des unités de hogel en ajustant un vecteur de nombre d'ondes d'une lumière de référence émise par la source de lumière. Par conséquent, en modifiant la courbure des fronts d'onde de la lumière de référence et de la lumière d'objet dans chaque hogel, il est possible d'enregistrer un front d'onde ayant une surface incurvée lisse.



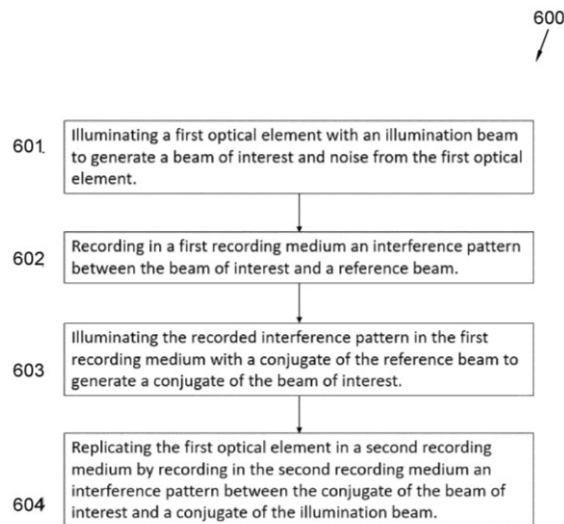
CLAIM 1. An intermediate plate to which the holographic medium is fixed; An object light unit configured to record the holographic optical element in units of hogel in the hologram medium by adjusting a wavevector of the object light irradiated from the light source; and And a reference light unit configured to record the holographic optical element in units of hogel in the hologram medium by adjusting a wavevector of the reference light emitted from the light source.

OPTICAL ELEMENT REPLICATING METHOD

A method (600) of replicating an optical element, the method comprising: illuminating (601) a first optical element (201, 301, 401, 501) with an illumination beam to generate a beam of interest and noise from the first optical element, the first optical element being a master copy to be replicated; recording (602) in a first recording medium (202, 302, 402, 502) an interference pattern between the beam of interest and a reference beam; illuminating (603) the recorded interference pattern in the first recording medium with a conjugate of the reference beam to generate a conjugate of the beam of interest; and replicating (604) the first optical element in a second recording medium (203, 303, 403, 503) by recording in the second recording medium an interference pattern between the conjugate of the beam of interest and a conjugate of the illumination beam.

PROCÉDÉ DE RÉPLICATION D'ÉLÉMENT OPTIQUE

Procédé (600) de réplique d'un élément optique, le procédé consistant : à éclairer (601) un premier élément optique (201, 301, 401, 501) avec un faisceau d'éclairage pour générer un faisceau d'intérêt et du bruit provenant du premier élément optique, le premier élément optique étant une copie maîtresse à répliquer ; à enregistrer (602), dans un premier support d'enregistrement (202, 302, 402, 502), un motif d'interférence entre le faisceau d'intérêt et un faisceau de référence ; à éclairer (603) le motif d'interférence enregistré dans le premier support d'enregistrement avec un conjugué du faisceau de référence pour générer un conjugué du faisceau d'intérêt ; et à répliquer (604) le premier élément optique dans un second support d'enregistrement (203, 303, 403, 503) par enregistrement dans le second support d'enregistrement d'un motif d'interférence entre le conjugué du faisceau d'intérêt et un conjugué du faisceau d'éclairage.



CLAIM 1. A method (600) of replicating an optical element, the method comprising: illuminating (601) a first optical element (201 , 301 , 401 , 501) with an illumination beam to generate a beam of interest and noise from the first optical element, the first optical element being a master copy to be replicated; recording (602) in a first recording medium (202, 302, 402, 502) an interference pattern between the beam of interest and a reference beam; illuminating (603) the recorded interference pattern in the first recording medium with a conjugate of the reference beam to generate a conjugate of the beam of interest; and replicating (604) the first optical element in a second recording medium (203, 303, 403, 503) by recording in the second recording medium an interference pattern between the conjugate of the beam of interest and a conjugate of the illumination beam.

N9449

US20230185236

Priority Date: 14/12/2021

META PLATFORMS TECHNOLOGIES

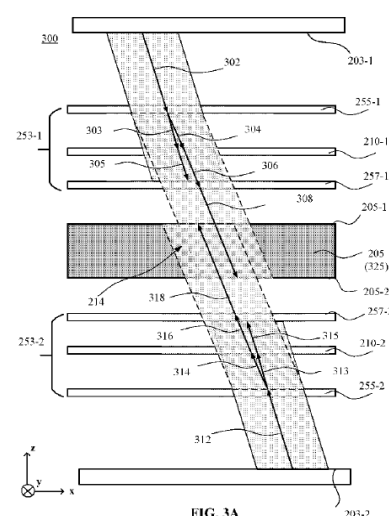
SYSTEM AND METHOD FOR FABRICATING HOLOGRAPHIC OPTICAL ELEMENTS USING POLARIZATION HOLOGRAM MASTER

A system includes a light outputting element configured to output a first beam propagating toward a beam interference zone from a first side of the beam interference zone. The system also includes a wavefront shaping assembly disposed at a second side of the beam interference zone and including a polarization hologram, the wavefront shaping assembly being configured to reflect the first beam as a second beam propagating toward the beam interference zone from the second side. The first beam and the second beam are linearly polarized beams, and are configured to interfere with one another within the beam interference zone to generate an interference pattern that is recordable in a recording medium layer disposed in the beam interference zone.

SYSTEME ET PROCEDE DE FABRICATION D'ELEMENTS OPTIQUES HOLOGRAPHIQUES A L'AIDE D'UN HOLOGRAMME DE POLARISATION MAITRE

Système comprenant un élément de sortie de lumière configuré pour délivrer en sortie un premier faisceau se propageant vers une zone d'interférence de faisceaux à partir d'un premier côté de la zone d'interférence de faisceaux. Le système comprend également un ensemble de mise en forme de front d'onde disposé sur un second côté de la zone d'interférence de faisceaux et comprenant un hologramme de polarisation, l'ensemble de mise en forme de front d'onde étant configuré pour réfléchir le premier faisceau lorsqu'un second faisceau se propage vers la zone d'interférence de faisceaux à partir du second côté. Le premier faisceau et le second faisceau sont des faisceaux à polarisation linéaire, et sont configurés pour interférer l'un avec l'autre à l'intérieur de la zone d'interférence de faisceaux et générer un motif d'interférence qui est enregistrable dans une couche de support d'enregistrement disposée dans la zone d'interférence de faisceaux.

CLAIM 1. A system, comprising: a light outputting element configured to output a first beam propagating toward a beam interference zone from a first side of the beam interference zone; and a wavefront shaping assembly including a polarization hologram, the wavefront shaping assembly being disposed at a second side of the beam interference zone, and configured to reflect the first beam transmitted through the beam interference zone as a second beam propagating toward the beam interference zone from the second side, wherein the first beam and the second beam are linearly polarized beams, and are configured to interfere with one another within the beam interference zone to generate an interference pattern that is recordable in a recording medium layer disposed in the beam interference zone.



N9458

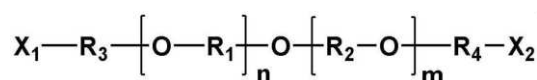
KR20230083786

Priority Date: 03/12/2021

LG CHEM

PHOTOPOLYMER COMPOSITION, HOLOGRAM RECORDING MEDIUM, OPTICAL ELEMENT, AND HOLOGRAPHIC RECORDING METHOD

Provided are a photopolymer composition for hologram formation, including: a polymer matrix or a precursor thereof; a photoreactive monomer; a photoinitiator; and a compound having a predetermined structure; a hologram recording medium, an optical device, and a holographic recording method using the same.



CLAIM 1. A photopolymer composition for hologram formation, comprising: a polymer matrix or a precursor thereof; a photoreactive monomer; a photoinitiator; and a fluorine-based compound containing oxygen and an aliphatic group having 1 to 30 carbon atoms in which one or more fluorines are substituted, wherein the fluorine-based compound contains 1.0 to 3 moles of fluorine per 1 mole of oxygen.

N9478

CN219143795U

Priority Date: 27/09/2022

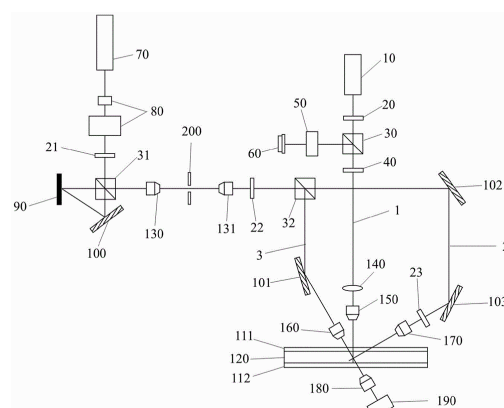
GUANGDONG ZIJING INFORMATION STORAGE TECHNOLOGY

HOLOGRAPHIC STORAGE OPTICAL PATH SYSTEM WITH CALIBRATION FUNCTION

The utility model relates to the field of holographic storage, and discloses a holographic storage optical path system with calibration. The system comprises a signal light path, a reference light path, a reproduction light path, a servo light path and a storage medium; the storage medium comprises a recording layer and an address layer, and a plurality of calibration holographic bit marks and data holographic bit marks are arranged on the address layer; the signal light path and the reference light path both comprise a relay lens group, and the relay lens group is used for adjusting the irradiation angles and positions of the signal light and the reference light; the servo optical path is independent of the signal optical path and the reference optical path and is used for identifying the calibration holographic bit mark and the data holographic bit mark; the servo light path includes a collimating lens for adjusting an irradiation position of the servo light on the storage medium, and a photodetector for receiving and analyzing the servo light reflected back from an address layer of the storage medium. The method and the device are used for solving the problem of how to calibrate and optimize the relative positions of the reference light and the servo light when the holographic storage light path system is reproduced.

CLAIM 1. A holographic storage optical system with calibration includes a signal optical path, a reference optical path, a reconstruction optical path, a servo optical path, and a storage medium; the signal light path and the reference light path respectively generate signal light and reference light, the signal light and the reference light respectively irradiate a storage medium at a certain angle, and a hologram is generated by interference exposure; the reproduction light path is used for converting the reproduction signal light diffracted by the reference light into a data page image and collecting the data page image; the storage medium includes a recording layer for storing holograms and an address layer; it is characterized in that the method comprises the steps of, the address layer is provided with a plurality of calibration holographic bit marks and data holographic bit marks; the calibration hologram bit marks are used for positioning and recording the calibrated hologram; the data hologram bit mark

is used for positioning a hologram for recording data; the signal light path and the reference light path both comprise a relay lens group, and the relay lens group is used for adjusting the irradiation angles and positions of the signal light and the reference light; the servo optical path is independent of the signal optical path and the reference optical path and is used for identifying the calibration holographic bit mark and the data holographic bit mark; the servo light path includes a servo laser for generating servo light, a calibration lens for adjusting an irradiation position of the servo light on the storage medium, and a photodetector for receiving and analyzing the servo light reflected back from an address layer of the storage medium.



N9484

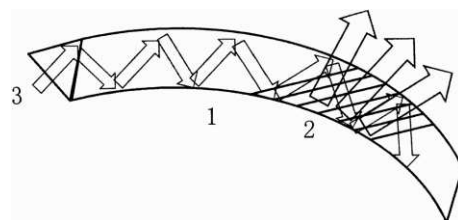
CN116255923

Priority Date: 10/12/2021

CIVIL AVIATION UNIVERSITY OF CHINA

PATCH TYPE BENDING DEFORMATION HOLOGRAPHIC SENSOR BASED ON FLEXIBLE PHOTSENSITIVE POLYMER

A flexible photopolymer based patch bending deformation holographic sensor comprising: flexible photopolymer grating recording medium, bending deformation sensing response grating and broadband light source for reading the grating. The patch type bending deformation holographic sensor based on the flexible photosensitive polymer provided by the invention adopts a double-beam interference principle to write a holographic body grating in the photosensitive polymer material, and reads the grating through total reflection transmission in the material by a broadband light source. The holographic sensor can be applied to the surface of other objects. When the object is kept motionless, the diffraction spectrum spatial distribution and the peak wavelength of the bending deformation sensor are fixed. With the increase of the bending angle of the object, the diffraction light angle of the bending deformation sensor is changed, and the spectral space distribution and the peak wavelength are obviously deviated. The patch type bending deformation holographic sensor calibration can be realized by calibrating the relation between the bending angle and the diffraction spectrum peak wavelength of the sensor. The sensor is simple and practical, has obvious diffraction phenomenon, adopts a waveguide mode to read the grating by a broadband light source, is compact in device, and has good application prospect in the field of representing the bending deformation of an object.



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PATENT REFERENCE – See the table at the end of this document

N9437

WO2023113059

Priority Date: 13/12/2021

KOREA ELECTRONICS TECHNOLOGY INSTITUTE

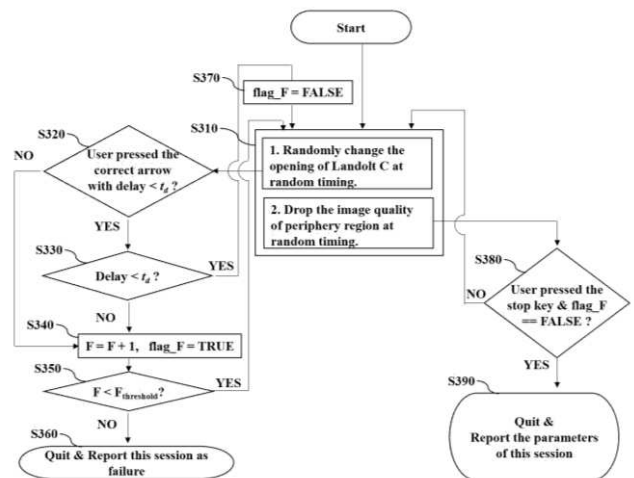
PERCEPTION EXPERIMENT METHOD FOR PERIPHERAL VISION IMAGE QUALITY CHANGES FOR DETERMINING PARAMETERS OF FOVEATED HOLOGRAM

Provided is a perception experiment method for peripheral vision image quality changes for determining parameters of a foveated hologram. A perception experiment method for determining parameters of a foveated image, according to an embodiment of the present invention, generates a foveated image composed of a central vision region and a peripheral vision region, displays the foveated image while degrading the image quality in the peripheral vision region, receives a response to the image quality of the peripheral vision region from a subject, and collects information about an appropriate image quality of the peripheral vision region on the basis of the response inputted by the subject. Accordingly, when applying a foveated hologram generation algorithm for real-time reproduction, it is possible to appropriately determine various parameters, such as the boundary between a central vision image and a peripheral vision image, the degree of degradation of the peripheral vision image in the foveated hologram, etc., through a perception experiment.

PROCÉDÉ D'EXPÉRIENCE DE PERCEPTION POUR DES CHANGEMENTS DE QUALITÉ D'IMAGE DE VISION PÉRIPHÉRIQUE POUR DÉTERMINER DES PARAMÈTRES D'HOLOGRAMME FOVÉAL

L'invention concerne un procédé d'expérience de perception pour des changements de qualité d'image de vision périphérique pour déterminer des paramètres d'un hologramme fovéal. Un procédé d'expérience de perception pour déterminer des paramètres d'une image fovéale, selon un mode de réalisation de la présente invention, génère une image fovéale composée d'une région de vision centrale et d'une région de vision périphérique, affiche l'image fovéale tout en dégradant la qualité d'image dans la région de vision périphérique, reçoit une réponse à la qualité d'image de la région de vision périphérique à partir d'un sujet et collecte des informations concernant une qualité d'image appropriée de la région de vision périphérique sur la base de la réponse entrée par le sujet. En conséquence, lors de l'application d'un algorithme de génération d'hologramme fovéal pour une reproduction en temps réel, il est possible de déterminer de manière appropriée divers paramètres, tels que la limite entre une image de vision centrale et une image de vision périphérique, le degré de dégradation de l'image de vision périphérique dans l'hologramme fovéal, etc., par l'intermédiaire d'une expérience de perception.

CLAIM 1. A foveated image generation method comprising: generating, by a foveated image generation system, a foveated image including a central vision region and a peripheral vision region, while reducing image quality for the peripheral vision region; Displaying, by the display system, the generated foveated image; Receiving, by an input device, a response to an image quality of a peripheral visual region from a subject; and A cognitive test method for determining foveated image parameters, comprising: collecting, by a foveated image generation system, information on proper image quality of a peripheral vision area based on a response input by a subject through an input device.



N9442

WO2023106428

Priority Date: 06/12/2021

KOREA ELECTRONICS TECHNOLOGY INSTITUTE

METHOD AND SYSTEM FOR FOVEATED HOLOGRAM RENDERING

A method and a system for foveated hologram rendering are provided. A method for foveated hologram rendering according to an embodiment of the present invention comprises: tracking a user's line of sight, rendering a hologram having a first resolution in the user's central line of sight, and rendering a hologram having a resolution lower than the first resolution in the user's peripheral line of sight. Accordingly, a hologram content with high quality and high resolution can be generated and reproduced at high speed through foveated hologram rendering in which holograms having different resolutions are rendered in the user's central line of sight and peripheral line of sight.

PROCÉDÉ ET SYSTÈME DE RENDU FOVÉAL D'HOLOGRAMME

L'invention concerne un procédé et un système de rendu fovéal d'hologramme. Un procédé de rendu fovéal d'hologramme selon un mode de réalisation de la présente invention consiste à : suivre la ligne de vision d'un utilisateur, effectuer le rendu d'un hologramme présentant une première résolution dans la ligne de vision centrale de l'utilisateur, et effectuer le rendu d'un hologramme présentant une résolution inférieure à la première résolution dans la ligne de vision périphérique de l'utilisateur. Un contenu d'hologramme de haute qualité et haute résolution peut ainsi être généré et reproduit à grande vitesse par un rendu fovéal d'hologramme dans lequel le rendu d'hologrammes présentant des résolutions différentes est effectué dans la ligne de vision centrale et la ligne de vision périphérique de l'utilisateur.

- S210 ... Track user's line of sight
- S220 ... Render high-resolution hologram in user's central line of sight
- S230 ... Render low-resolution hologram in user's peripheral line of sight
- S240 ... Combine rendered holograms and generate one hologram content
- S250 ... Reproduce hologram content
- AA ... Start
- BB ... End

CLAIM 1. Tracking a gaze of a user; A first rendering step of rendering a hologram at a first resolution in a center-vision portion of a user; and And a second rendering step of rendering a hologram lower than the first resolution in the peripheral visual portion of the user.

N9446

US20230194889

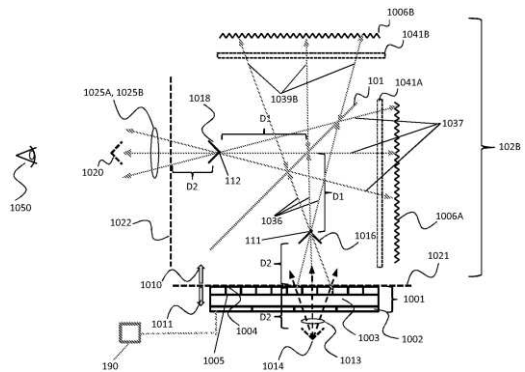
Priority Date: 28/09/2018

LIGHT FIELD LAB

HOLOGRAPHIC OBJECT RELAY FOR LIGHT FIELD DISPLAY

Relay systems and methods are operable to redirect light corresponding to a light field or holographic object such that imagery generated by a light field or other display is perceived by a viewer without having to address the display itself.

CLAIM 1. A holographic display system, comprising: a first display, comprising a light field display configured to project light along a set of projected light paths to form at least a first holographic surface having a first projected depth profile relative to a display screen plane; and a relay system positioned to receive light along the set of projected light paths from the light field display and relay the received light along a set of relayed light paths such that points on the first holographic surface are relayed to relayed locations thereby forming a first relayed holographic surface having a first relayed depth profile relative to a virtual screen plane, the first relayed depth profile being different from the first projected depth profile; wherein the light field display comprises a controller configured to receive instructions for accounting for the difference between the first projected depth profile and the first relayed depth profile by operating the light field display to output projected light such that the first relayed depth profile of the first relayed holographic object is the depth profile intended for a viewer.



N9447

US20230194882
Priority Date: 16/12/2021

META PLATFORMS TECHNOLOGIES

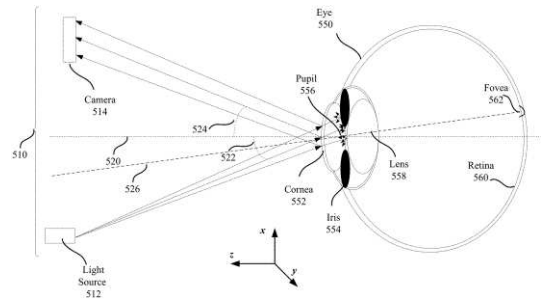
LIQUID CRYSTAL POLARIZATION HOLOGRAM (LCPH) BASED EYE TRACKING FOR AR/VR

An eye-tracking system includes a substrate transparent to visible light and configured to be placed in a field of view of an eye of a user, a plurality of waveguides on the substrate, a light source optically coupled to the plurality of waveguides, and a plurality of polarization volume holograms (PVHs) in the field of view of the eye of the user. Each PVH of the plurality of PVHs is optically coupled to a respective waveguide of the plurality of waveguides and is configured to couple a respective light beam out of the respective waveguide towards the eye of the user.

SUIVI DU REGARD BASÉ SUR UN HOLOGRAMME DE POLARISATION À CRISTAUX LIQUIDES POUR RA/RV

Système de suivi du regard comprenant un substrat transparent à la lumière visible et conçu pour être placé dans un champ de vue d'un œil d'un utilisateur, une pluralité de guides d'ondes sur le substrat, une source de lumière couplée optiquement à la pluralité de guides d'ondes et une pluralité d'hologrammes de volume de polarisation dans le champ de vue de l'œil de l'utilisateur. Chaque hologramme de volume de polarisation de la pluralité d'hologrammes de volume de polarisation est optiquement couplé à un guide d'ondes respectif de la pluralité de guides d'ondes et est conçu pour coupler un faisceau lumineux respectif hors du guide d'ondes respectif vers l'œil de l'utilisateur.

CLAIM 1. An eye-tracking system comprising: a substrate transparent to visible light and configured to be placed in a field of view of an eye of a user; a plurality of waveguides on the substrate; a light source optically coupled to the plurality of waveguides; and a plurality of polarization volume holograms (PVHs) in the field of view of the eye of the user, wherein each PVH of the plurality of PVHs is optically coupled to a respective waveguide of the plurality of waveguides and is configured to couple a respective light beam out of the respective waveguide towards the eye of the user.



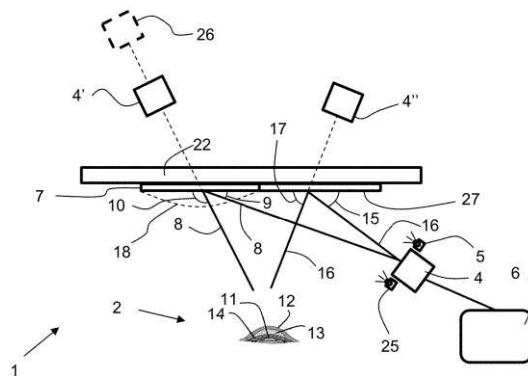
N9448

US20230186682
Priority Date: 29/03/2019

TOBII

HOLOGRAPHIC EYE IMAGING DEVICE

An eye tracking device for tracking an eye is described. The eye tracking device comprises: a first diffractive optical element, DOE, arranged in front of the eye, an image module, wherein the image module is configured to capture an image of the eye via the first DOE. The first DOE is adapted to direct a first portion of incident light reflected from the eye, towards the image module. The eye tracking device is characterized in that the first DOE is configured to provide a lens effect.



CLAIM 1. An eye tracking device for tracking an eye, comprising: a first lens; a first diffractive optical element (DOE), arranged adjacent to the first lens and in front of the eye; an image module, wherein the image module is configured to capture an image of the eye via the first DOE, wherein the first DOE is adapted to direct a first portion of incident light reflected from the eye towards the image module, wherein the first DOE is configured to provide a lens effect.

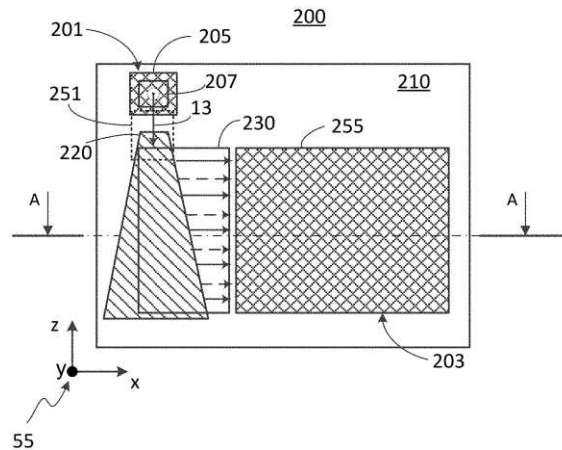
N9450

US20230185091
Priority Date: 13/12/2021

FACEBOOK TECHNOLOGIES

WAVEGUIDE WITH POLARIZATION VOLUME HOLOGRAM GRATING

A waveguide is provided. The waveguide includes a substrate having two outer surfaces for propagating a beam of light in the substrate by reflecting the beam from the two outer surfaces. The waveguide includes at least one polarization volume hologram (PVH) grating to couple light in and/or out of the waveguide. The PVH grating may be a multi-layer PVH grating with graded birefringence.



CLAIM 1. An optical waveguide comprising: a substrate of optically transparent material comprising two opposing outer surfaces for guiding a beam of light in the substrate by reflections therefrom; and a polarization volume hologram (PVH) disposed in or upon the substrate, the PVH configured to transmit therethrough light of a first polarization while diffracting light of a second, orthogonal polarization, wherein the PVH is further configured to diffract out of the substrate a portion of the beam having the second polarization.

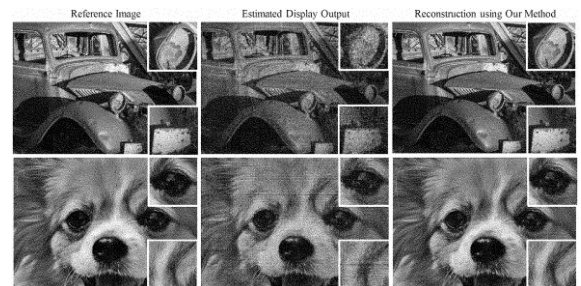
N9451

US20230171385
Priority Date: 29/11/2021

PRINCETON UNIVERSITY | UNIVERSITY OF NORTH CAROLINA

METHODS, SYSTEMS, AND COMPUTER READABLE MEDIA FOR HARDWARE-IN-THE-LOOP PHASE RETRIEVAL FOR HOLOGRAPHIC NEAR EYE DISPLAYS

A method for learned hardware-in-the-loop phase retrieval for holographic near-eye displays includes generating simulated ideal output images of a holographic display. The method further includes capturing real output images of the holographic display. The method further includes learning a mapping between the simulated ideal output images and the real output images. The method further includes using the learned mapping to solve for an aberration compensating hologram phase and using the aberration compensating hologram phase to adjust a phase pattern of a spatial light modulator of the holographic display.



CLAIM 1. A method for learned hardware-in-the-loop phase retrieval for holographic near-eye displays, the method comprising: generating simulated ideal output images of a holographic display; capturing real output images of the holographic display; learning a mapping between the simulated ideal output images and the real output images; using the learned mapping to solve for an aberration compensating hologram phase; and using the aberration compensating hologram phase to adjust a phase pattern of a spatial light modulator of the holographic display.

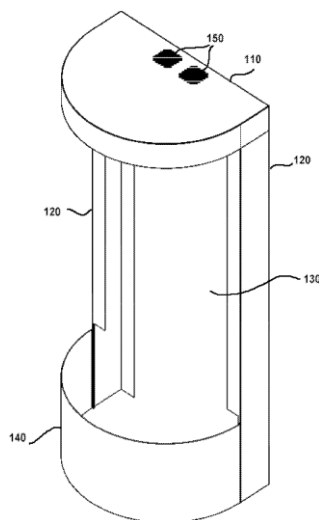
N9453

US20230168520
Priority Date: 01/12/2021

SAFARI ROBERT

HOLOGRAPHIC DISPLAY

The present invention discloses a display for projecting images with the appearance of three dimensions. The display comprises a display housing, which includes a semi-circular window, and a display projection system which includes a media input device and a display monitor. The display monitor can be covered in a two-way film, and the window can be tinted, such that when images are transmitted to the display monitor through the media input device, that media images are reflected against the tinted window and appear to be floating in the semicylindrical space circumscribed by the window and display housing, which appears as a cylindrical space to an observer.



CLAIM 1. A display for projecting images with the appearance of three dimensions, said display comprising: a display housing, wherein said display housing includes a window; a display projection system, wherein said display projection system includes a display monitor capable of projecting an image on said window.

N9454

TWM642245
Priority Date: 10/11/2022

WEI SHENG INTERNATIONAL TECHNOLOGY

HOLOGRAPHIC PROJECTION MAN-MACHINE INTERFACE DEVICE

The present invention discloses a floating projection human-machine interface device comprising a planar display unit, an optical mediation unit formed as a plate of a light-transmissive media material, light rays of a display screen output from the planar display unit entering from the entrance side of the optical mediation unit, and changing the path of the light rays by the optical mediation unit, and a light source coupled to the optical mediation unit. And imaging the display screen output from the planar display unit on a virtual plane located on the exit side of the optical mediation unit, a transparent panel disposed on the exit side of the optical mediation unit, and a spatial detection module for detecting movement of the user's gesture or identifying the user's biological information to enable the user to enter operational instructions through the gesture or biological information.

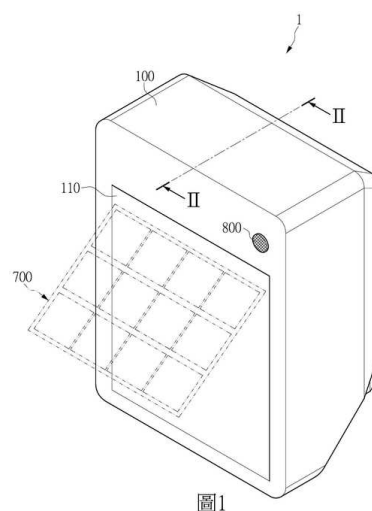


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N9456

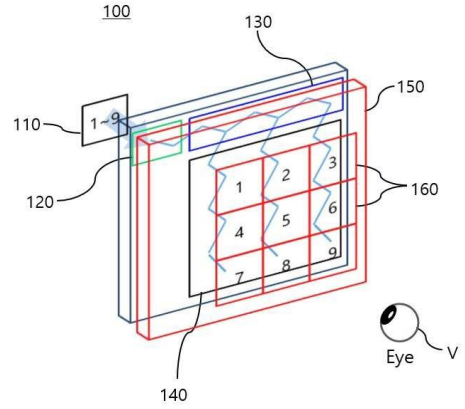
KR20230085044

Priority Date: 06/12/2021

KOREA UNIVERSITY INDUSTRIAL & ACADEMIC COLLABORATION FOUNDATION

LARGE-AREA HOLOGRAPHIC WAVEGUIDE DISPLAY WITH WIDE FIELD OF VIEW AND METHOD OF OPERATION THEREOF

Various embodiments of the present disclosure provide a large-area hologram waveguide display and an operating method thereof. According to various embodiments, large area holographic waveguide displays implement holographic images representing multiple depths with wide field of view and high resolution using projectors and fast shutters. Specifically, the large-area hologram waveguide display implements holographic images for large-area holograms by operating a projector and a fast shutter time-sequentially in synchronization with each other. The large-area holographic waveguide display implements a noise-free holographic image as the phase delay is corrected based on the optical paths in the waveguide.



CLAIM 1. A large-area hologram waveguide display, comprising: a waveguide configured to replicate input hologram information while reflecting; and a fast shutter disposed on one surface of the waveguide and configured to transmit the replicated hologram information.

N9460

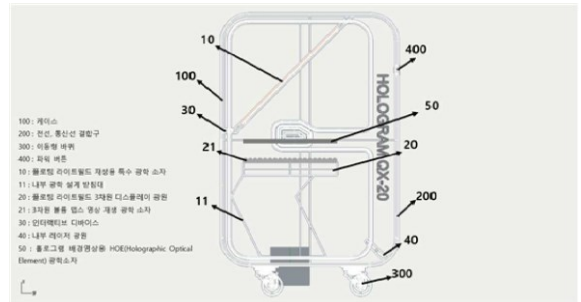
KR20230081263

Priority Date: 30/11/2021

DONGSEO UNIVERSITY TECHNOLOGY HEADQUARTERS

5 G NETWORK-AWARE MULTI-LAYER HOLOGRAM IMAGE REPRODUCING SYSTEM BASED ON FLOATING LIGHT FIELD

The present invention relates to a system for reproducing a 5 g network interworking multi-layer hologram image based on a floating light field. the system for reproducing a 5 g network interworking multi-layer hologram image based on a floating light field A three-dimensional display light source (20) and a hoe (Holographic Optical Element) optical element (50) for holographic background images are projected onto the three-dimensional volume-depth image reproduction optical element (21), Centers of a floating lightfield three-dimensional display light source (20) and a holographic optical element (hoe) optical element (50) for holographic background images are provided so that a straight line connecting a center of a special optical element (10) for floating lightfield reproduction is 90 ° vertically upward in a horizontal plane, Floating lightfield hologram image content having a three-dimensional depth sensation based on a multi-depth multi-layer appears on a front surface of a system, The present invention relates to a three-dimensional display device comprising a multi-depth multilayer by means of a floating lightfield three-dimensional display light source (20) and a holographic optical element (hoe) optical element (50) for holographic background images. A playback image of a three-dimensional floating lightfield hologram having a hologram background image by Calibration of floating lightfield hologram content having a three-dimensional depth and a structure of kiosk or tabletop type, It is possible to obtain a floating lightfield three-dimensional hologram image having a sharper hologram background image by optimizing a content viewing angle (viewing range). In addition, it is possible to provide a user with an image such as floating lightfield 3 D hologram content and an image having a more realistic hologram background image, to have a kiosk or tabletop shape, and to have a quality greater than or equal to an existing 3 D image because a new concept of multi-depth multi-layer and a representation viewing angle are wide. There is an excellent effect that presentation of content is free and intuitive in controlling interactive content directly by a user as one system and product, such as existing pseudo-holographic equipment.



CLAIM 1. An optical element (10) for floating lightfield reproduction is provided in a case (100) in which a floating lightfield 3 D hologram system is embedded such that a floating lightfield 3 D display light source (20) and a hoe (Holographic Optical Element) optical element (50) for hologram background image correspond to 90 ° at right angles, Wherein a flotyl light field three-dimensional hologram image having a hologram background image appears in the special optical element (10) for floating light field reproduction.

N9464

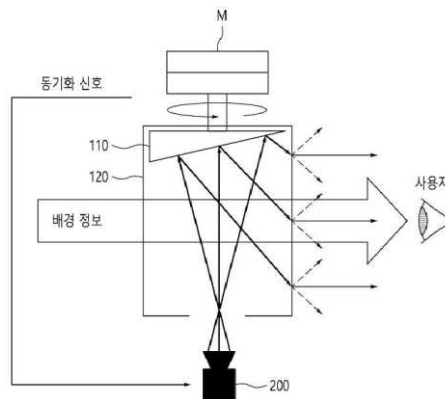
KR20230073603

Priority Date: 19/11/2021

KYUNGPOOK NATIONAL UNIVERSITY INDUSTRY ACADEMIC COOPERATION FOUNDATION

TRANSPARENT CYLINDRICAL THREE-DIMENSIONAL DISPLAY SYSTEM USING HOLOGRAPHIC OPTICAL ELEMENTS

The present invention relates to a three-dimensional display system, comprising a display module and a projector module, wherein the display module comprises: a scanning mirror rotated by a motor and reflecting light based on a three-dimensional image incident from the projector module; And a holographic diffuser surrounding the scanning mirror and providing a three-dimensional image to a viewer by changing a path of light reflected from the scanning mirror. Accordingly, the scanning mirror allows the 3 D virtual image to be placed in the cylinder without obscuring the outer background, so that the outer background and the virtual image can be simultaneously provided to the viewer.



CLAIM 1. A three-dimensional display system, comprising: a display module; and a projector module, wherein the display module comprises: a scanning mirror rotated by a motor and reflecting light based on a three-dimensional image incident from the projector module; and a control unit surrounding the scanning mirror, And a holographic diffuser provided so that the scanning mirror positioned therein is rotatable and configured to change a path of light reflected from the scanning mirror to provide a 3 D image to a viewer.

N9465

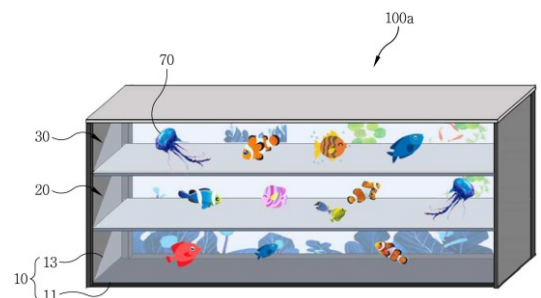
KR20230073121

Priority Date: 17/11/2021

KOREA ELECTRONICS TECHNOLOGY INSTITUTE

HOLOGRAM VIEWER DEVICE

The present invention relates to a hologram demonstration apparatus for demonstration of holograms in multiple layers of which space utilization can be increased by reducing or adjusting a thickness thereof. The hologram demonstration apparatus has a structure in which a plurality of hologram demonstration modules are stacked. each of the plurality of hologram demonstration modules includes: a display panel unit configured to reproduce an image including hologram content; and a demonstration unit disposed at an acute angle to the display panel unit to reflect the image and thereby demonstration the image into a hologram.



CLAIM 1. A hologram demonstration device having a structure in which a plurality of hologram demonstration modules are stacked, wherein each of the plurality of hologram demonstration modules comprises: a display panel unit configured to reproduce an image including hologram content; and a demonstration unit disposed at an acute angle to the display panel unit, and configured to reflect the image and thereby demonstration into a hologram.

N9467

KR102539025

Priority Date: 04/08/2022

BETREE

REFRIGERATED AND FROZEN SHOWCASE WITH HOLOGRAM DEVICE AND HOLOGRAM IMPLEMENTATION METHOD USING THE SAME

The present invention provides a refrigerated and refrigerated showcase having a hologram device and a method for implementing a hologram using the same, the refrigerated and refrigerated showcase having the hologram device and displaying information corresponding to the user as a hologram by recognizing voice, gesture, and screen touch of the user. A refrigerated and refrigerated showcase having a hologram device includes: a hologram device in which an image of a product and a description of the product are displayed as a hologram; a touch panel positioned below the hologram device and capable of selecting a desired product; A freezer compartment disposed under the touch panel and storing a product needing frozen storage; and a refrigerator compartment disposed under the freezer compartment and storing a product needing refrigerated storage.



CLAIM 1. A display device comprising: a hologram device in which an image of a product and a description of the product are displayed as a hologram; a touch panel disposed below the hologram device and capable of selecting a desired product; a freezer disposed below the touch panel and storing a product requiring freezer storage; and a display device disposed below the freezer, wherein the hologram apparatus includes a model product storage unit in which a model product is stored, and a product display unit which is located above the model product storage unit and is a space in which the model product stored in the model product storage unit can be displayed together with a hologram, wherein the product display unit includes an openable and closable door unit at a lower portion, the door unit is opened only when a model product stored in the model product storage unit moves to the product display unit, a first conveyor belt is provided at a lower portion of the model product storage unit to move left and right along the first conveyor belt so that the model product can move left and right along the first conveyor belt, the model product corresponding to the product selected by the user is moved by the first conveyor belt to be loaded into a first lifting unit, and a first lifting portion that moves up and down along a first lifting bar that connects the model product storage portion and the door portion so that the model product is movable from the model product storage portion to the product display portion, a voice recognition unit configured to recognize a voice of a user, a gesture recognition unit configured to recognize a gesture of the user, a screen touch recognition unit configured to recognize a touch of the user by a touch screen, a product selection unit configured to select a desired product by the user, a payment unit configured to make payment of a product to purchase, a hologram implementation method using a refrigerated and refrigerated showcase including a hologram device including a screen touch recognition unit and a control unit analyzing data recognized by a product selection unit by artificial intelligence to select hologram information suitable for a user and display the selected hologram information to the hologram device, the method comprising: a first step of selecting a product of interest by a user through the product selection unit; a second step of analyzing the product selected by the control unit and displaying the hologram of the selected product to the user through the hologram device; a third step of moving the model product of the selected product to the product display unit and displaying the model product together with the hologram of the selected product; a fourth step of selecting and paying the product to purchase through the product selection unit; a fifth step in which a model product being displayed is moved to the model product storage unit; and a sixth step in which a purchased product is received by a user after the purchased product is moved to the product display unit.

N9466

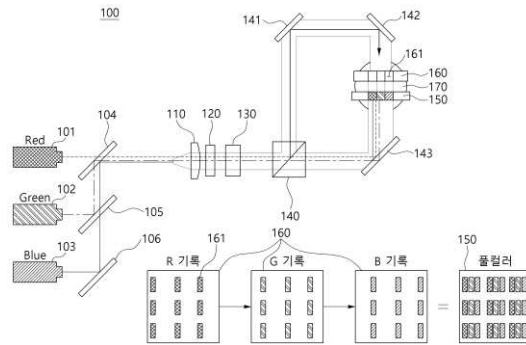
KR20230071885

Priority Date: 16/11/2021

HEESUNG ELECTRONICS

APPARATUS AND METHOD FOR MANUFACTURING FULL-COLOR HOLOGRAM OPTICAL ELEMENT, AND AUGMENTED REALITY DISPLAY DEVICE PROVIDED WITH THE OPTICAL ELEMENT

An apparatus for manufacturing a full-color holographic optical device according to an embodiment of the present invention includes a red (R) laser generating a red (R) laser beam, a green (g) laser generating a green (g) laser beam, a blue (b) laser generating a blue (b) laser beam, A mask for generating respective unit pixel type laser beams for respective wavelengths of red (R), green (g), and blue (b) laser beams provided from green (g) laser and blue (b) laser; and a recording medium for simultaneously recording or sequentially recording the respective unit pixel type laser beams passing through the mask.



CLAIM 1. A laser system comprising: a red (R) laser generating a red (R) laser beam; a green (g) laser generating a green (g) laser beam; a blue (b) laser generating a blue (b) laser beam; a red (R) laser provided from the red (R) laser, the green (g) laser and the blue (b) laser, A mask for producing each unit pixel type laser beam for each wavelength of each of g (Green) and b (Blue) laser beams; and a recording medium for simultaneously recording or sequentially recording each of the unit pixel type laser beams passing through the mask.

N9469

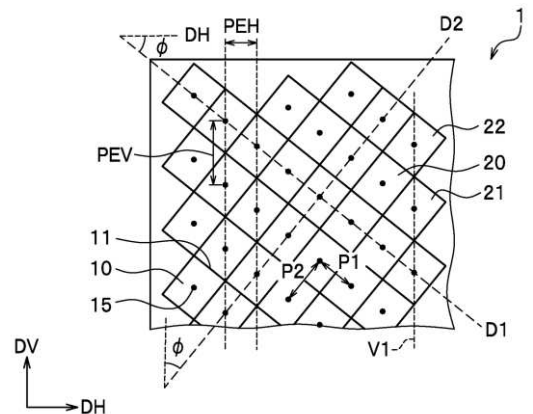
JP2023080909

Priority Date: 30/11/2021

NIPPON HOSO KYOKAI

SPATIAL LIGHT MODULATOR, HOLOGRAM DATA GENERATING DEVICE, AND HOLOGRAM DISPLAY SYSTEM

TOPIC: To provide a spatial light modulator, a hologram data generating device, and a hologram display system capable of enlarging a viewing angle. INVENTION: a spatial light modulator in which centers 15 of pixels of a pixel row are arranged in a rectangular grating pattern, the rectangular grating pattern being a first direction D1 and a second direction D2 orthogonal to the first direction D1. the first direction D1 forms a rotation angle ϕ greater than 0 degrees and less than 90 degrees with respect to a horizontal direction DH in display of a hologram. The hologram data generating device samples the complex amplitude distribution by rotating the complex amplitude distribution in a direction opposite to the rotation angle by a magnitude of the rotation angle. The hologram display system causes the spatial light modulator to display hologram data generated by the hologram data generating device.



CLAIM 1. A spatial light modulator used for display of a hologram, the spatial light modulator including pixel columns arranged in centers of pixels in a rectangular grating pattern corresponding to a first direction and a second direction orthogonal to the first direction, wherein the first direction forms a rotation angle larger than 0 degrees and smaller than 90 degrees with respect to a horizontal direction in the display of the hologram.

N9470

ES2940858

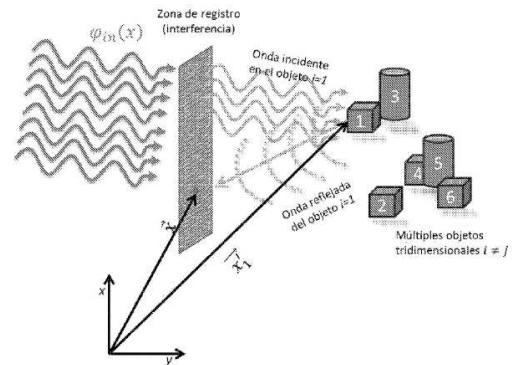
Priority Date: 14/11/2022

UNIVERSIDAD COMPLUTENSE DE MADRID

SYSTEM FOR GENERATION OF DIGITAL HOLOGRAMS VIA SIMULATION

System for generating digital holograms via simulation. The hologram is an innovative and attractive format of interest in environments as diverse as product display at fairs, computer-aided design, architecture, up to medicine or education. However, generation of 3 D holograms has heretofore required a large computer power, difficult to achieve. The invention brings a solution to this problem by considerably reducing the necessary computing resources. For this purpose, it uses a new numerical method of simulating the interference pattern, calculating the transmittance function based on the extent of an algorithm applicable to neutron waveguide simulation. The simulation system and method is proposed for both the production of holograms and zonal plates associated with electromagnetic radiation (IR, visible light, UV, x-ray, gamma...) and for the production of holograms and zonal neutron plates.

CLAIM 1. Method of generating a digital hologram of an object via simulation implanted in a computational system where the interference pattern characterizing the hologram is the transmittance function and comprising: Numerically define an incident wave function in (x) at a point x initially calculate the auxiliary function or functions μ i (x 1) defining the object at the integrating contours an i n) by equation [2] 1,11(x 1) = in(x 1) J. aQicm. 2 t ac(x considering μ i (x 1) = O and recalculating as μ 1 (x 1) = in(x j) Resolve equation [2] by iteratively calculating each of the auxiliary functions defining object μ i (x 1) according to equation [3], where the terms FFT[μ i (x1)](x j) are the representation of the FFT application to each of the auxiliary functions μ i (x 1), and propagate the result to the point x 1. μ 1(x1) = — in(x j) — F FT [u i (4)](x j) [3] - Propay the total wave function 9(x) using Equation [1] with the FFT algorithm, per the equation [4] 9(x) = in(x) + r i 2 =1 F FT [pt i (4)](x) [4] - Calculate transmittance function as numerical equivalent to the log that would be obtained on a holographic plate using the equation [5] T (x 0) = (x o) + (x o)) (9 in(x0) + 9(x0)) * = = i n(x 0) + 1 (x0) + in(x0)9(4) *) + in(x o) * (x o)) [5] where x0 is the point where the numerical holographic plate is located; (Xo) is the reference beam wave intensity at x 0; 1 (x 0) is the total intensity of the overlapping of the incoming reference wave at the object and the diffracted object wave at the x0 point where the registration is made; and * denotes the conjugated complex.



N9471

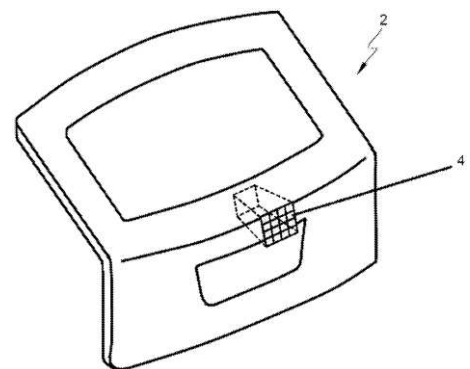
EP4197840

Priority Date: 17/12/2021

PLASTIC OMNIUM

VEHICLE PART WITH USER INTERFACE

This vehicle part (2) comprises: - a light source (8) capable of emitting a light image, - a micromirror plate (12) capable of projecting the light image outside the vehicle part (2) in the form of a hologram (4), - a confidentiality filter (15) situated between the light source (8) and the hologram (4), and - a sensor (16) able to detect the presence of any object in a projection plane (17) coinciding at least partially with the hologram (4).



PIÈCE DE VÉHICULE AVEC INTERFACE UTILISATEUR

Cette pièce de véhicule (2) comprend :- une source de lumière (8) apte à émettre une image lumineuse,- une plaque à micro-miroirs (12) apte à projeter l'image lumineuse en dehors de la pièce de véhicule (2) sous la forme d'un hologramme (4),- un filtre de confidentialité (15) situé entre la source de lumière (8) et l'hologramme (4), et- un capteur (16) apte à détecter la présence de tout objet dans un plan de projection (17) coïncidant au moins partiellement avec l'hologramme (4).

CLAIM 1. Vehicle part (2; 2'), characterized in that it comprises:- a light source (8) capable of emitting a light image, - a micromirror plate (12) capable of projecting the light image out of the vehicle part (2; 2') in the form of a hologram (4), - at least one privacy filter (15) located between the light source (8) and the hologram (4), and - a sensor (16) able to detect the presence of any object in a projection plane (17) coinciding at least partially with the hologram (4).

N9474

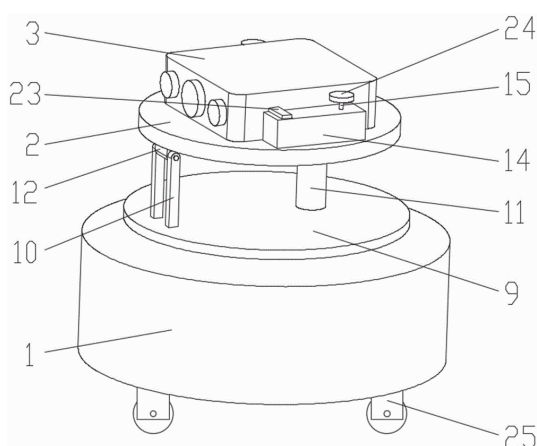
CN219198727U

Priority Date: 18/10/2022

HENAN TONGMAN EDUCATION TECHNOLOGY

HOLOGRAPHIC PROJECTION EQUIPMENT

The utility model discloses holographic projection equipment, which relates to the technical field of book design game models, and specifically relates to holographic projection equipment. This holographic projection equipment, through round bar, connecting rod, first electronic hydraulic push rod, cooperation piece, location slider, disc, montant, second electronic hydraulic push rod, auxiliary block and protruding slider's setting, make this holographic projection equipment possess the effect of conveniently adjusting projection angle, through the extension or the withdrawal of first electronic hydraulic push rod expansion end, conveniently adjust the angle on the horizontal direction, through the extension or the withdrawal of second electronic hydraulic push rod expansion end, conveniently adjust the angle on the vertical direction, reached the purpose that improves the practicality.



CLAIM 1. Holographic projection equipment, including base section of thick bamboo (1), backup pad (2) and holographic projection equipment body (3), its characterized in that: the inside of base section of thick bamboo (1) is connected with round bar (4) through the bearing rotation, the surface mounting of round bar (4) has connecting rod (5), the interior surface mounting of base section of thick bamboo (1) has first electric hydraulic push rod (6), cooperation piece (7) are installed to the expansion end of first electric hydraulic push rod (6), location slider (8) are installed at the top of cooperation piece (7), disc (9) are installed at the top of round bar (4), montant (10) and second electric hydraulic push rod (11) are installed respectively at the top of disc (9), montant (10) are connected with auxiliary block (12) through the axostylus axostyle rotation, the expansion end of second electric hydraulic push rod (11) is connected with protruding slider (13) through the axostylus axostyle rotation, cavity case (14) are installed at the top of backup pad (2), cavity case (14) are connected with branch (15) and threaded rod (16) through the bearing rotation respectively, first bevel gear (17) are installed at the surface of branch (15), the surface mounting of branch (16) has threaded rod (19) the external surface of threaded rod (19), threaded ring (19) are installed at the bottom of threaded ring (19), a limiting block (21) is arranged on one side face of the threaded ring (19), a strip-shaped plate (22) is arranged on the inner bottom wall of the cavity box (14), and clamping blocks (23) are arranged in front of and behind the holographic projection equipment body (3).

N9475

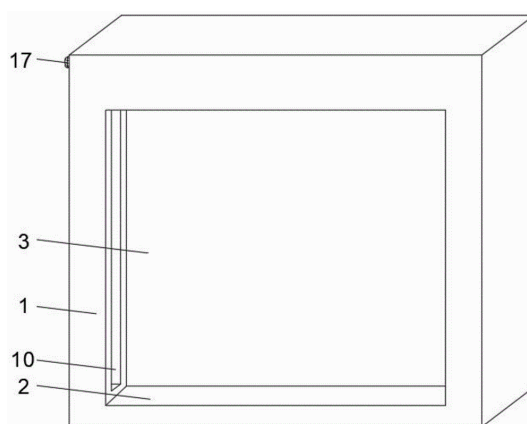
CN219179768U

Priority Date: 12/11/2022

HE YICHEN

HOLOGRAPHIC PROJECTION SCREEN

The utility model discloses a holographic projection screen, which comprises a fixed frame, wherein a notch is arranged in the fixed frame, a screen body is fixedly arranged in the notch, holographic curtains are arranged in the screen body, outer surface layers are arranged on two sides of the outer surface of each holographic curtain, outer protective layers are arranged on the outer sides of the two outer surface layers, a containing groove is formed in the top of the inner wall of the notch, a movable frame is arranged in the containing groove, a cleaning layer is fixedly connected onto the movable frame, a groove is formed in the side edge of the inner wall of the notch, a screw is rotationally connected onto the groove, and a screw block is connected onto the screw in a threaded manner. According to the utility model, through the cooperation of the fixing frame, the holographic curtain, the outer surface layer and the outer protective layer structure, the screen is ensured to be transparent and stable, stable projection display work can be performed, meanwhile, the screen has good protective performance, is wear-resistant and scratch-resistant, and can effectively improve the structural stability and the use safety of the whole curtain.



CLAIM 1. A holographic projection screen comprising a mount (1), characterized in that: the utility model discloses a bevel gear, including fixed frame (1), recess (2) are provided with notch (2), fixed mounting has screen body (3) in notch (2), be provided with holographic curtain (4) in screen body (3), the surface both sides of holographic curtain (4) all are provided with extexine (5), two the outside of extexine (5) all is provided with outer inoxidizing coating (6), notch (2) inner wall top is provided with accomodates groove (7), accomodate and be provided with in groove (7) and remove frame (8), be connected with cleaning layer (9) on removing frame (8), notch (2) inner wall side is provided with recess (10), recess (10) rotation is connected with screw rod (11), threaded connection has screw rod (12) on screw rod (11), screw rod (12) and remove frame (8) fixed connection, be close to top position in fixed frame (1) and be provided with inside groove (13), and be located inside groove (13) fixedly connected with bevel gear (14), rotation bar (13) are connected with bevel gear (16) for two bevel gears (16) are connected with one in a nested bevel gear (16), the outer side of the fixing frame (1) is provided with a motor (17), and the output end of the motor (17) is fixedly connected with one end of the rotating rod (15).

N9476

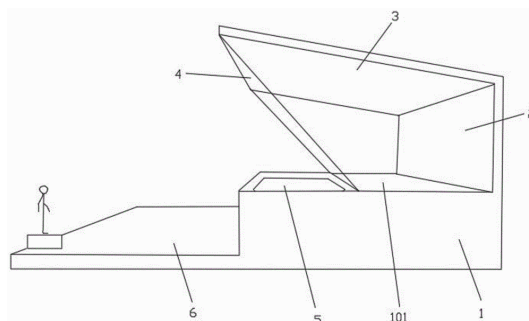
CN219162544U

Priority Date: 28/11/2022

SHANGHAI TENGRONG INTELLIGENT TECHNOLOGY

HOLOGRAPHIC IMMERSION SPACE STRUCTURE FOR GROUND INSTALLATION OF HOLOGRAPHIC SCREEN

The utility model discloses a holographic immersion space structure for ground installation of a holographic screen, and relates to the field of multimedia space application display. The utility model comprises the following steps: the holographic imaging structure comprises a holographic projection display screen arranged on the ground at the front side of the table surface, and a holographic imaging film obliquely connected between the front end of the top display screen and the rear end of the holographic projection display screen on the table surface; the immersion type projection structure comprises a top display screen arranged at the top of the space and a rear display screen which is arranged at the rear part of the top display screen and connected with the top display screen; the height of the table top is larger than that of the standing surface of the viewer, so that the view angle range of the viewer can be positioned between the head-up table top and the topmost end of the holographic imaging film. According to the utility model, under the condition that the standing surface of the viewer is lower than the table top, a better viewing angle and experience are obtained, and the structure adopting the technical scheme with better experience can have better installation environment advantages and effects.



CLAIM 1. Holographic screen ground-mounted holographic immersion space structure, its characterized in that includes: holographic imaging structure: the device comprises a holographic projection display screen (5) arranged on the ground at the front side of a table top (1), and a holographic imaging film (4) obliquely connected between the front end of the top display screen (3) and the rear end of the holographic projection display screen (5) on the table top (1); immersion projection structure: the display device comprises a top display screen (3) arranged at the top of a space and a rear display screen (2) which is arranged at the rear part of the top display screen (3) and is connected with the top display screen; the height of the table top (1) is larger than that of the standing surface (6) of the viewer, so that the view angle range of the viewer can be positioned between the top of the head-up table top (1) and the topmost end of the holographic imaging film (4).

N9479

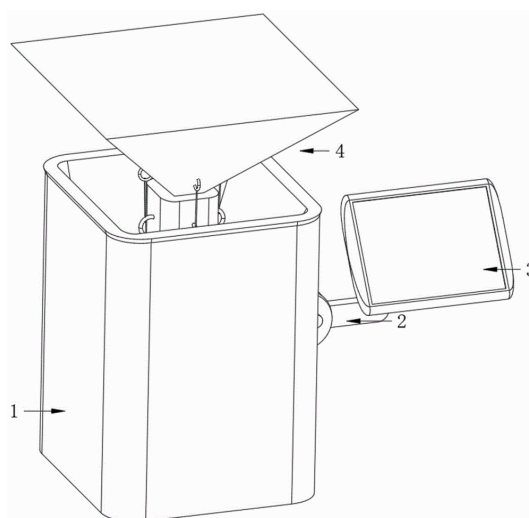
CN219143289U

Priority Date: 31/12/2022

JIANGSU WIN ZAM DESIGN CONSTRUCTION

HOLOGRAPHIC THREE-DIMENSIONAL DISPLAY DEVICE

The utility model discloses a holographic three-dimensional display device in the technical field of holographic display, which comprises a display base, wherein a holographic mechanism is arranged in the display base, the holographic mechanism comprises a driving rod, a stabilizing mechanism is arranged on the outer side of the driving rod, a bearing outer ring is arranged on the outer side of a bearing inner ring, a first annular clamping plate is arranged above the bearing outer ring, a second annular clamping plate is arranged below the bearing outer ring, a first nut is arranged above the first annular clamping plate, a second nut is arranged below the second annular clamping plate, the holographic three-dimensional display device is provided with the stabilizing mechanism, when the driving rod is stressed to rotate, three groups of bearing inner rings are synchronously driven to rotate, under the buffering effect of the three groups of annular clamping plates, the bearing outer ring and the bearing inner rings in the stabilizing mechanism, the driving rod is stably rotated at a constant speed, the projector and the projection plate at the upper end of the driving rod are ensured to rotate at a constant speed, the stability of the projection effect is ensured, and a viewer can be ensured to observe and know objects in all directions.



CLAIM 1. Holographic three-dimensional display device, including show base (1), the inside of show base (1) is provided with holographic mechanism (4), holographic mechanism (4) include actuating lever (406), its characterized in that: the outside of actuating lever (406) is provided with stabilizing mean (5), stabilizing mean (5) are including screw rod (501), first annular splint (502), second annular splint (503), bearing inner race (504), first nut (506), second nut (507) and rubber buffer (508), the outside of bearing inner race (505) is provided with bearing outer race (504), the top of bearing outer race (504) is provided with first annular splint (502), the below of bearing outer race (504) is provided with second annular splint (503), the top of first annular splint (502) is provided with first nut (506), the below of second annular splint (503) is provided with second nut (507).

N9480

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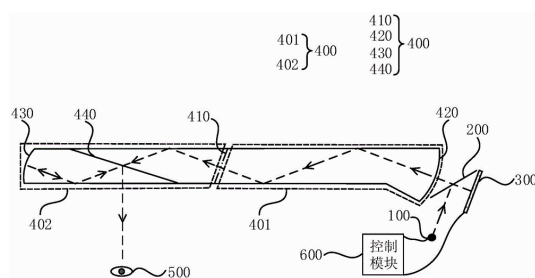
Priority Date: 14/12/2021

JITONG TECHNOLOGY BEIJING

HOLOGRAPHIC NEAR-TO-EYE THREE-DIMENSIONAL DISPLAY SYSTEM

The embodiment of the utility model discloses a holographic near-eye three-dimensional display system, which comprises: the light source, the semi-transparent semi-reflecting mirror, the spatial light modulator and the light guide prism, wherein the light guide prism comprises a filtering structure; the light source is used for emitting a first light beam, and the first light beam comprises a coherent light beam; the half-mirror and the spatial light modulator are positioned on the propagation path of the first light beam, the first light beam is sequentially reflected by the half-mirror and modulated by the spatial light modulator to form a second light beam, and the second light beam comprises a target three-dimensional imaging light beam; the half-mirror and the light guide prism are sequentially positioned on the propagation path of the second light beam, and the second light beam is converged to the human eye position after being transmitted by the half-mirror, filtered by the filtering structure and totally internally reflected and conducted by the light guide prism. The light guide prism directly projects the target three-dimensional imaging light beam projected by the spatial light modulator to human eyes, so that the structure can be simplified, the system volume can be reduced, meanwhile, the three-dimensional image chromatic aberration can be eliminated, the imaging quality can be improved, and the holographic near-eye three-dimensional display system suitable for head wearing can be realized.

CLAIM 1. A holographic near-eye three-dimensional display system, comprising: the light source, half mirror, spatial light modulator and light guide prism, the light guide prism includes: a filtering structure; the light source is used for emitting a first light beam, and the first light beam comprises a coherent light beam; the half-mirror and the spatial light modulator are positioned on the propagation path of the first light beam, the first light beam is reflected by the half-mirror and modulated by the spatial light modulator in sequence to form a second light beam, and the second light beam comprises a target three-dimensional imaging light beam; the half-mirror and the light guide prism are positioned on the propagation path of the second light beam, and the second light beam is converged to the human eye position after being transmitted by the half-mirror, filtered by the filtering structure and conducted by the total internal reflection of the light guide prism.



N9482

CN116263542

Priority Date: 14/12/2021

JITONG TECHNOLOGY BEIJING

HOLOGRAPHIC NEAR-TO-EYE THREE-DIMENSIONAL DISPLAY SYSTEM

The embodiment of the invention discloses a holographic near-eye three-dimensional display system, which comprises: the light source, the semi-transparent semi-reflecting mirror, the spatial light modulator and the light guide prism, wherein the light guide prism comprises a filtering structure; the light source is used for emitting a first light beam, and the first light beam comprises a coherent light beam; the half-mirror and the spatial light modulator are positioned on the propagation path of the first light beam, the first light beam is sequentially reflected by the half-mirror and modulated by the spatial light modulator to form a second light beam, and the second light beam comprises a target three-dimensional imaging light beam; the half-mirror and the light guide prism are sequentially positioned on the propagation path of the second light beam, and the second light beam is converged to the human eye position after being transmitted by the half-mirror, filtered by the filtering structure and totally internally reflected and conducted by the light guide prism. The light guide prism directly projects the target three-dimensional imaging light beam projected by the spatial light modulator to human eyes, so that the structure can be simplified, the system volume can be reduced, meanwhile, the three-dimensional image chromatic aberration can be eliminated, the imaging quality can be improved, and the holographic near-eye three-dimensional display system suitable for head wearing can be realized.

CLAIM 1. A holographic near-eye three-dimensional display system, comprising: the light source, half mirror, spatial light modulator and light guide prism, the light guide prism includes: a filtering structure; the light source is used for emitting a first light beam, and the first light beam comprises a coherent light beam; the half-mirror and the spatial light modulator are positioned on the propagation path of the first light beam, the first light beam is reflected by the half-mirror and modulated by the spatial light modulator in sequence to form a second light beam, and the second light beam comprises a target three-dimensional imaging light beam; the half-mirror and the light guide prism are positioned on the propagation path of the second light beam, and the second light beam is converged to the human eye position after being transmitted by the half-mirror, filtered by the filtering structure and conducted by the total internal reflection of the light guide prism.

N9489

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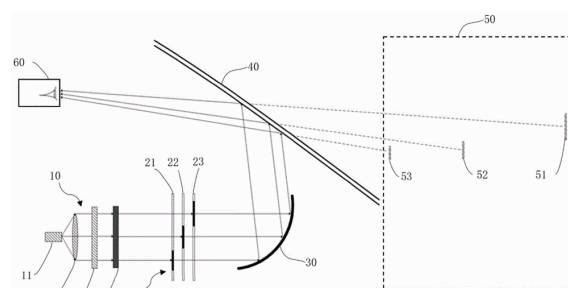
Priority Date: 30/03/2023

HEFEI UNIVERSITY OF TECHNOLOGY

VEHICLE-MOUNTED HOLOGRAPHIC IMAGING DEVICE AND DISPLAY SYSTEM

The invention provides a vehicle-mounted holographic imaging device and a display system, wherein the imaging device comprises: the projection imaging assembly is used for generating real image light rays; the scattering array component is arranged at the transmitting end of the projection imaging component and comprises a plurality of imaging plane units, and the imaging plane units are sequentially arranged along the propagation path of the real image light rays and are used for scattering imaging the real image light rays so as to generate a plurality of real image projections; the first reflection element is arranged on the extension line of the projection imaging assembly and the scattering array assembly and is used for reflecting a plurality of real image projections; the second reflecting element is arranged on one side of the concave opening of the first reflecting element and is used for projecting and reflecting a plurality of real images to the eye box area so as to generate a plurality of virtual images; wherein the virtual image generated by each imaging plane unit is located at a different depth of field. The invention can display the identification images with different depth of field in the whole field of view, thereby improving the display effect of the vehicle-mounted head-up display.

CLAIM 1. An in-vehicle holographic imaging apparatus, comprising: the projection imaging assembly is used for generating real image light rays; the scattering array component is arranged at the transmitting end of the projection imaging component and comprises a plurality of imaging plane units, and the imaging plane units are sequentially arranged along the propagation paths of the real image light rays and are used for scattering imaging the real image light rays so as to generate a plurality of real image projections; the first reflection element is arranged on the extension line of the projection imaging assembly and the scattering array assembly and is used for reflecting a plurality of real image projections; and the second reflecting element is arranged on one side of the concave opening of the first reflecting element and is used for projecting and reflecting a plurality of real images to the eye box area so as to generate a plurality of virtual images; wherein the virtual image generated by each imaging plane unit is located at a different depth of field.



N9492

CN116206541

Priority Date: 07/03/2023

SHANGHAI RUANJIE SOFTWARE

HOLOGRAPHIC PROJECTION CONSTRUCTION SYSTEM BASED ON BIM

The application relates to a holographic projection construction system based on BIM, which comprises an image acquisition module, a control module and a control module, wherein the image acquisition module is used for acquiring multi-view image information of a construction site; the three-dimensional modeling module is used for receiving and processing the image information and providing a user with a BIM three-dimensional model of a structure and a construction site based on a BIM software tool; the holographic projection module is in signal communication with the three-dimensional modeling module and is used for receiving BIM three-dimensional model data created by the three-dimensional modeling module, processing the received BIM three-dimensional model data and carrying out actual equal-proportion holographic projection display on a construction site. The method and the device have the advantages that the method and the device can bring field final construction effect display to owners and constructors, enable the owners and the constructors to know the whole construction scheme more intuitively, and provide more efficient and accurate effect display for the owners and the constructors.

CLAIM 1. The utility model provides a holographic projection construction system based on BIM which characterized in that includes: the image acquisition module (1) is used for acquiring multi-view image information of a construction site; the three-dimensional modeling module (2) is used for receiving and processing the image information and providing a user with a BIM three-dimensional model of a structure and a construction site based on a BIM software tool; the holographic projection module (3) is in signal communication with the three-dimensional modeling module (2) and is used for receiving BIM three-dimensional model data created by the three-dimensional modeling module (2), processing the received BIM three-dimensional model data and carrying out actual equal-proportion holographic projection display on a construction site.

N9491

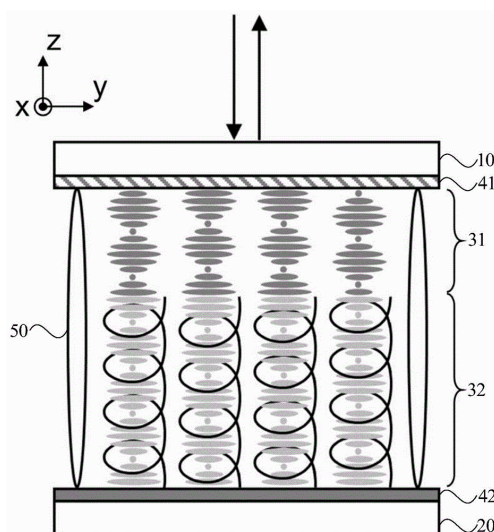
CN116224667

Priority Date: 22/02/2023

NANJING UNIVERSITY

ADJUSTABLE LIQUID CRYSTAL HOLOGRAPHIC DEVICE, PREPARATION METHOD THEREOF AND HOLOGRAPHIC LIGHT FIELD MODULATION DEVICE

The embodiment of the invention discloses an adjustable liquid crystal holographic device, a preparation method thereof and a holographic light field modulation device. The adjustable liquid crystal holographic device comprises a first substrate, a second substrate and a first and a second spin-direction cholesteric liquid crystal layers, wherein the first substrate, the second substrate and the first and the second substrates are oppositely arranged; the first substrate is provided with a first orientation layer, the second substrate is provided with a second orientation layer, and the first orientation layer and the second orientation layer are provided with rewritable orientation directions; the second spin-direction cholesteric liquid crystal layer is oriented according to the first control pattern, and the first spin-direction cholesteric liquid crystal layer is oriented according to the second control pattern; a spacer is arranged between the first substrate and the second substrate. The adjustable liquid crystal holographic device provided by the embodiment of the invention can carry out independent geometric phase modulation on two chiral circularly polarized lights, and realize dynamic adjustable double-channel holographic display so as to improve the multiplexing dimension and flexibility of the holographic device.



CLAIM 1. The tunable liquid crystal holographic device is characterized by comprising a first substrate, a second substrate, a first spin-direction cholesteric liquid crystal layer and a second spin-direction cholesteric liquid crystal layer, wherein the first substrate and the second substrate are oppositely arranged, and the first spin-direction cholesteric liquid crystal layer and the second spin-direction cholesteric liquid crystal layer are stacked between the first substrate and the second substrate; a first orientation layer is arranged on one side of the first substrate facing the second substrate, a second orientation layer is arranged on one side of the second substrate facing the first substrate, no photoinitiator is arranged in the first orientation layer, the second orientation layer contains a photoinitiator, and the first orientation layer and the second orientation layer both have rewritable orientation directions; the first rotating direction cholesteric liquid crystal layer is adjacent to the first orientation layer, the second rotating direction cholesteric liquid crystal layer is adjacent to the second orientation layer, and the rotating directions of the first rotating direction cholesteric liquid crystal layer and the second rotating direction cholesteric liquid crystal layer are opposite; the second spin-direction cholesteric liquid crystal layer is oriented according to a first control pattern, and the first spin-direction cholesteric liquid crystal layer is oriented according to a second control pattern; and a spacer is arranged between the first substrate and the second substrate to control the total thickness of the first spiral direction cholesteric liquid crystal layer and the second spiral direction cholesteric liquid crystal layer.

N9497

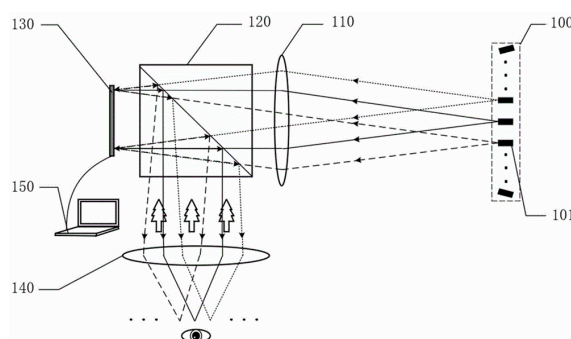
CN116184669

Priority Date: 23/02/2023

SHANGHAI UNIVERSITY | UNIVERSITY OF HONG KONG

HOLOGRAPHIC NEAR-EYE DISPLAY DEVICE CAPABLE OF SIMULTANEOUSLY ILLUMINATING AT MULTIPLE ANGLES AND EYE PUPIL BOX EXPANSION METHOD

A holographic near-eye display device capable of simultaneously illuminating at multiple angles comprises a light source module, a spatial light modulator, a beam splitter, an ocular and a master controller; the light source module is used for emitting parallel light with different angles, and simultaneously illuminating and covering the effective working area of the spatial light modulator; and the spatial light modulator is loaded with holograms and is used for modulating incident parallel light with different angles to form diffraction parallel light with different angles, namely virtual images with different visual angles. The invention illuminates the spatial light modulator through parallel light with different angles, is modulated and diffracted by the calculation hologram on the spatial light modulator, and the diffracted image light is converged by the second lens to form different viewpoints for viewing by human eyes. The multi-angle simultaneous illumination condition does not need to carry out additional time-sharing control on the illumination unit, and when the size and the position of the pupil of the human eye change, clear virtual images can be always seen, so that the purpose of expanding the pupil box is achieved.



CLAIM 1. The utility model provides a holographic near-to-eye display device of multi-angle simultaneous illumination, includes light source module, spatial light modulator, beam splitter, eyepiece and total controller, its characterized in that: the light source module is used for emitting parallel light with different angles, and simultaneously illuminating and covering an effective working area of the spatial light modulator; the spatial light modulator is arranged on the light emitting side of the light source module, is connected with the master controller, is loaded with holograms and is used for modulating incident parallel light with different angles to form diffraction parallel light with different angles, namely virtual images with different angles; The beam splitter is used for reflecting the diffraction parallel light of the virtual images with different visual angles to the ocular; the ocular lens is used for converging diffraction parallel light of virtual images with different visual angles into human eyes to form different visual points; the master controller is used for loading the holograms required on the spatial light modulator.

N9499

CA3141962

Priority Date: 13/12/2021

ARHT MEDIA

PORTABLE APPARATUS FOR GENERATING AND USING SIMULATED 3D IMAGES

A simulated three-dimensional display apparatus for displaying a hologram, including a cabinet including an interior projection space defined by side panels, a rear panel, a top panel and a floor panel, where the projection space is open on the front side, a first polarizing film on the interior surfaces of the panels, except for the rear panel, defining the interior projection space, and a second polarizing film on the first polarizing film, where the first polarizing film is has a linear polarization in a first direction and the second polarizing film has a linear polarization in a direction perpendicular to the first direction, a projection screen covering the open front side, where the projection screen includes a gauze, a projector in front of the projection screen configured to project an image on the projection screen, at least one uplighter located behind the projection screen on the floor panel in the back corners of the interior space, and a curtain covering the rear panel in the interior projection space.

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N9468

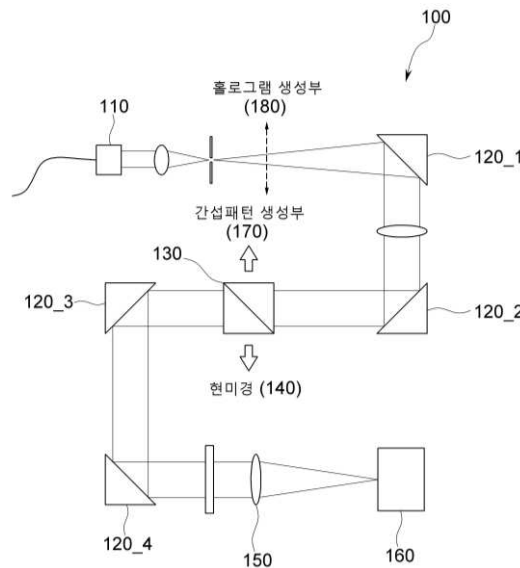
KR102534468

HICS

Priority Date: 07/06/2022

3D DIGITAL HOLOGRAPHIC MODULE DEVICE ATTACHABLE TO A MICROSCOPE AND 3D CONVERSION METHOD OF A MICROSCOPE

The present invention relates to a digital holographic module device for microscopic detachment. A digital holographic module apparatus for microscope attachment and detachment includes a light source configured to emit light, a light splitter configured to split the light emitted from the light source into object light and reference light, and provide the object light reflected after irradiating a target object through a microscope and the reference light reflected through a plurality of reflectors to an interference pattern generator, an interference pattern generation unit configured to receive the object light and the reference light from the light splitter to generate an interference pattern and provide the generated interference pattern to the hologram shape generation unit, and a hologram generation unit configured to receive the interference pattern from the interference pattern generation unit to generate a hologram shape for a target object.



CLAIM 1. A digital holographic module device for microscope attachment and detachment, comprising: a light source for irradiating light; a light splitter for splitting the light irradiated from the light source into object light and reference light, and providing the object light reflected after irradiating a target object through a microscope and the reference light reflected through a plurality of reflectors to an interference pattern generator; An interference pattern generator configured to receive the object light and the reference light from the light splitter to generate an interference pattern and provide the generated interference pattern to a hologram shape generator; a hologram generator configured to receive the interference pattern from the interference pattern generator to generate a hologram shape for the target object; And a variable lens for matching curvatures of the objective light and the reference light, wherein the light source is reflected by a first reflector and a second reflector and provided to the light splitter, the plurality of reflectors include a third reflector and a fourth reflector, And the reference light is reflected by the third reflector and the fourth reflector to reach an interference mirror through the variable lens, and is reflected by the interference mirror to be provided to the interference pattern generator.

N9472

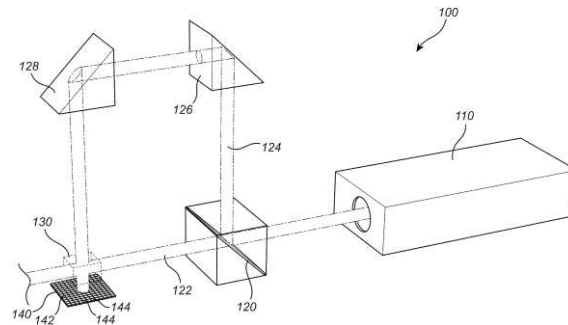
EP4191344

Priority Date: 06/12/2021

IMEC - INTERUNIVERSITAIR MICRO ELECTRONICA CENTRUM VZW

IMAGING DEVICE AND METHOD FOR HOLOGRAPHIC IMAGING OF SAMPLES

According to an aspect of the present inventive concept there is provided an imaging device for holographic imaging of a sample, the imaging device comprising a light source generating a light beam, a beam splitter splitting the light beam into an object beam along an object beam path and a reference beam along a reference beam path, and a detector. The imaging device defines a sample position. The object beam is propagated through the sample position, and the detector is arranged to prevent non-scattered object light, passing through the sample position without being scattered by the sample, from being incident onto the detector. The reference beam is propagated through the sample position, and the detector is arranged so that non-scattered reference light, passing through the sample position without being scattered by the sample, is incident onto the detector. The detector detects an interference pattern formed by scattered object light, scattered by the sample, and the non-scattered reference light.



CLAIM 1. An imaging device for holographic imaging of a sample, the imaging device comprising: a light source configured to generate a light beam; a beam splitter configured to receive the light beam and to split the light beam into an object beam along an object beam path in the imaging device and a reference beam along a reference beam path in the imaging device; a detector comprising an array of light sensitive areas; wherein the imaging device defines a sample position, the sample position being configured for receiving the sample; wherein the object beam path is arranged in the imaging device such that the object beam is propagated through the sample position, and wherein the detector is arranged in relation to the object beam path so as to prevent non-scattered object light, passing through the sample position without being scattered by the sample, from being incident onto the array of light sensitive areas; wherein the reference beam path is arranged in the imaging device such that the reference beam is propagated through the sample position, and wherein the detector is arranged in relation to the reference beam path so that non-scattered reference light, passing through the sample position without being scattered by the sample, is incident onto the array of light sensitive areas; and wherein the detector is configured to detect an interference pattern formed by interference between scattered object light, being scattered by the sample, and the non-scattered reference light.

N9477

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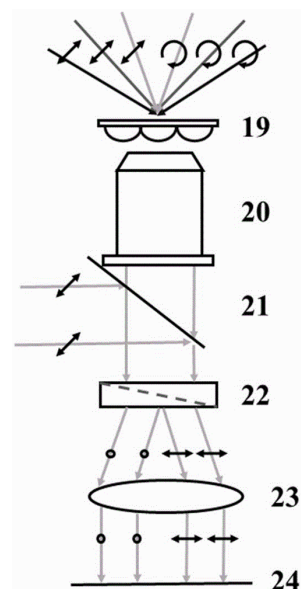
Priority Date: 27/04/2023

SICHUAN KEAODA TECHNOLOGY

TRANSIENT STRUCTURED LIGHT DIGITAL HOLOGRAPHIC SUPER-RESOLUTION IMAGING DEVICE

The utility model discloses a transient structure light digital holographic super-resolution imaging device, which belongs to the technical field of imaging equipment and solves the problem of poor demodulation instantaneity of the existing equipment. The method is used for simplifying the phase shift and the rotation process of the structured light in the structured light digital holographic measurement by combining the polarization modulation technology, and further improving the time resolution of the structured light digital holographic.

CLAIM 1. The utility model provides a transient structure light digital holographic super resolution image device, its characterized in that includes light source group, sample (19) that awaits measuring, second microobjective (20), beam splitting element (21), polarization beam splitting element (22), coupling lens (23) and photodetector (24) that set gradually along the light path, light source group includes three illumination light sources that are used for producing different wavelength light beams, photodetector (24) include area array color camera, light source group includes one or more in laser light source, LED lamp light source or the mercury lamp light source, beam splitting element (21) are beam splitting prism, beam splitting film or beam splitting plain film, polarization beam splitting element (22) are polarization beam splitting prism or Wollaston prism.



N9488

CN116243577

Priority Date: 27/02/2023

HUAZHONG UNIVERSITY OF SCIENCE & TECHNOLOGY

HOLOGRAPHIC IMAGING AND DEVICE APPLIED TO ULTRAFAST LIGHT SOURCE

The invention discloses a holographic imaging device applied to an ultrafast light source, and belongs to the technical field of microscopic imaging. The method comprises the following steps: under the condition of using a broadband light source, respectively collecting background light spot diffraction data and sample diffraction data, and dividing the sample diffraction data points by the background light spot diffraction data to obtain a normalized hologram; amplitude and phase limitations are applied to the sample function in the near field plane to obtain a reconstructed image that is completely free of twin images. The invention applies the holographic imaging technology to ultrafast imaging, and can realize the large-field super-resolution holographic imaging of the broadband light source only by inputting a pair of diffraction patterns, compared with a lamination algorithm, the time spent on reconstruction is greatly reduced, and the time spent on collecting data is far less than that of the lamination algorithm; the sampling density of the spectrum can be improved, and the loss of the resolution of the reconstructed image is reduced.

CLAIM 1. A holographic imaging method applied to an ultrafast light source, comprising: s1, irradiating a pinhole by using an ultrafast light source, enabling an illumination light spot formed after diffraction of the ultrafast light source to be incident on a sample plane, and respectively collecting a background light spot hologram and a sample diffraction hologram to obtain a normalized hologram; s2, reversely transmitting the normalized hologram back to a sample plane to obtain a result serving as an initial sample function; s3, applying amplitude limitation to the current sample function on the sample plane, so that the amplitude of the sample function is not greater than a set constant; simultaneously, phase limitation is applied, so that the phase of the transmitted light part of the sample function is constant; s4, transferring the sample function to a detector plane, and calculating the light field intensity value of the detector plane; s5, judging whether the error between the detector plane light field intensity value and the normalized hologram is smaller than a set value; if yes, outputting a sample function; if not, amplitude replacement is carried out on the diffraction light field corresponding to the center wavelength in the detector plane, the diffraction light field is reversely transferred back to the sample plane, and S3 is executed.

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PATENT REFERENCE – See the table at the end of this document

N9452

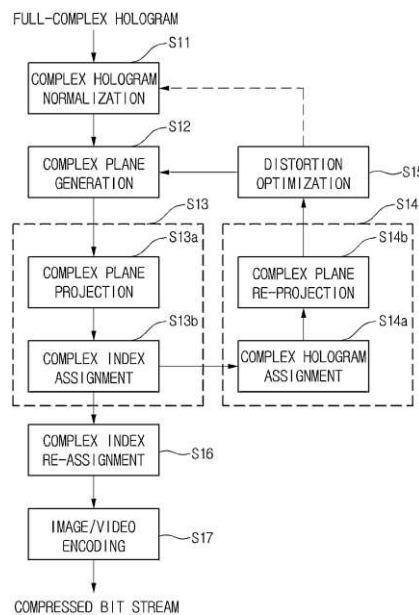
US20230168627

Priority Date: 26/11/2021

**KWANGWOON UNIVERSITY INDUSTRY ACADEMIC
COLLABORATION FOUNDATION**

CODING METHOD FOR COMPRESSING COMPLEX HOLOGRAM

Provided is a coding method for compressing a complex hologram, in which the coding method includes: (b) creating a complex vector plane divided into unit regions, and giving an index to each unit region of the complex vector plane; (c) projecting the complex hologram to the complex vector plane by regarding the complex hologram as a complex vector, and assigning the index given to the unit region of the projected complex vector plane as a complex index of the complex hologram; and (f) encoding the complex hologram assigned with the complex index. According to the method described above, the full-complex hologram is reconstructed into one piece of index information using the complex vector plane to code the full-complex hologram, such that the hologram can be efficiently compressed while preserving a relationship between a real hologram and an imaginary hologram.



CLAIM 1. A coding method for compressing a complex hologram, the coding method comprising: (b) creating a complex vector plane divided into unit regions, and giving an index to each unit region of the complex vector plane; (c) projecting the complex hologram to the complex vector plane by regarding the complex hologram as a complex vector, and assigning the index given to the unit region of the projected complex vector plane as a complex index of the complex hologram; and (f) encoding the complex hologram assigned with the complex index.

N9455

KR20230085963

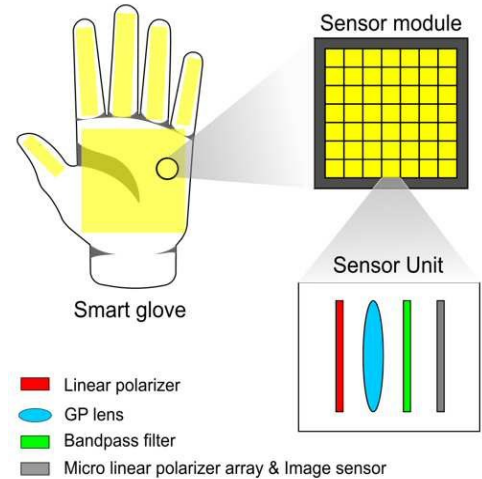
KOREA INSTITUTE OF SCIENCE & TECHNOLOGY | KOREA UNIVERSITY INDUSTRIAL & ACADEMIC COLLABORATION FOUNDATION

Priority Date: 07/12/2021

DEVICE FOR GENERATING HOLOGRAPHIC IMAGES IN GLOVE FORM

The present specification discloses a holographic pickup system with improved mobility compared to the prior art. The holographic pickup system according to the present disclosure can be implemented by attaching a sensor to a smart glove. In addition, the deep learning technology combines the deep learning technology to compensate for problems caused by the sensor arrangement of the smart glove, thereby increasing the hologram acquisition level, and applying the hologram pickup system to the wearable device.

CLAIM 1. An apparatus for generating a holographic image, comprising: a glove worn on a hand of a user; and a sensor module having a plurality of sensor units attached to an inner surface of the glove, wherein each of the sensor units comprises: a linearly polarizing film for converting light reflected from an object into 45 degrees linearly polarized light; A lens unit dividing the light passing through the linearly polarizing film into two object light beams; a filter unit passing the light passing through the lens unit through only a predetermined wavelength; and an image sensor unit converting the light passing through the filter unit into an electrical signal.



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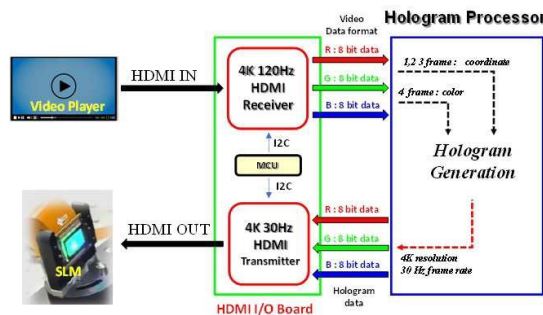
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KOREA ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE

Priority Date: 01/12/2021

INPUT INTERFACE METHOD FOR DIGITAL HOLOGRAM GENERATION APPARATUS

An input interface method of a digital hologram generation apparatus is provided. An input interface method of a digital hologram generating apparatus includes (a) transmitting coordinates of a polygon to a color channel data position of a frame according to a predetermined order using an interface for a two-dimensional image, and (b) transmitting color data to the color channel data position of the frame according to the predetermined order.



CLAIM 1. (a) An input interface method for a digital hologram generation apparatus, comprising: (a) transmitting coordinates of a polygon to a color channel data position of a frame according to a predetermined order by utilizing an interface for a two-dimensional image; and (b) transmitting color data to the color channel data position of the frame according to the predetermined order.

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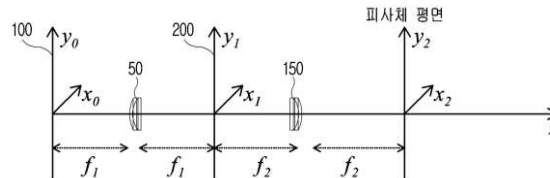
KR20230078528

Priority Date: 26/11/2021

KOREA ELECTRONICS & TELECOMMUNICATIONS RESEARCH
INSTITUTE

DIGITAL HOLOGRAPHIC MEASUREMENT DEVICE

A digital holographic measurement apparatus includes a first spatial light modulator configured to output a digital holographic signal, and a second spatial light modulator configured to receive a spectral signal for the digital holographic signal and diffract the spectral signal to generate an output signal.



CLAIM 1. A digital holographic measurement apparatus comprising: a first spatial light modulator configured to output a digital holographic signal; and a second spatial light modulator configured to receive a spectral signal for the digital holographic signal and diffract the spectral signal to generate an output signal.

N9462

KR20230077232

Priority Date: 25/11/2021

LSWARE

SYSTEM AND METHOD FOR PROTECTING HOLOGRAM CONTENT

A hologram content copyright protection system using high-speed encryption of a hogel image of a digital hologram is provided. the hologram content protection system includes a content registration device that encodes a plurality of hogel images of hologram content to generate an image and encrypts the image, A distribution platform device displaying content information about the stored hologram content of the image on a user interface; and a printing device acquiring and decrypting the encrypted image from the distribution platform device and printing the hologram content using the decrypted image.

CLAIM 1. A hologram content copyright protection system using high-speed encryption of a hogel image of a digital hologram, the system comprising: a content registration device that generates an image by encoding a plurality of hogel images of hologram content, and encrypts the image; a storage device that acquires and stores an encrypted image from the content registration device, A distribution platform device displaying content information about the stored hologram content of the image on a user interface; and a printing device acquiring and decrypting the encrypted image from the distribution platform device and printing the hologram content using the decrypted image.

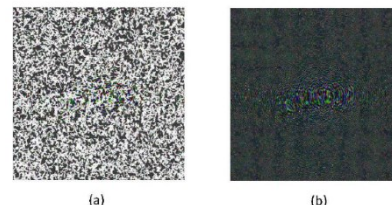
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Priority Date: 19/11/2021

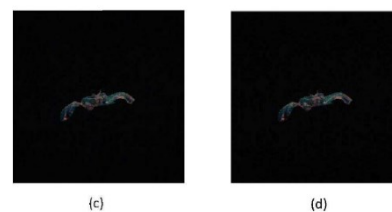
KOREA INSTITUTE OF SCIENCE & TECHNOLOGY

ARTIFICIAL INTELLIGENCE LEARNING METHOD FOR RESTORING HOLOGRAPHY

The present specification discloses a learning method of artificial intelligence for holographic reconstruction. The holographic image has information about interference fringes and can be subsequently reconstructed into a three-dimensional image by reference light. Accordingly, the artificial intelligence learning method for holographic reconstruction according to the present specification can learn artificial intelligence using holographic image data having information on interference fringes and three-dimensional reconstructed holographic image data.



CLAIM 1. (a) A holographic recording method comprising the steps of: (a) storing, by a processor, original holographic image data in a memory; (b) generating, by the processor, holographic image data having a partial area of the original holographic image (hereinafter, mask holographic image data); (d) Recovering, by the processor, a region occluded from the mask holographic image data through a neural network algorithm; (e) generating, by the processor, reconstructed holographic image data using the holographic image data recovered in step (d); (f) Comparing, by the processor, the holographic image data recovered in step (d) with the original holographic image data to calculate a first difference value; (g) comparing, by the processor, the holographic image data recovered in step (e) with the original holographic image data to calculate a second difference value; And (h) the processor modifying the numerical value of the parameter included in the neural network algorithm and repeatedly executing the steps (d) to (g) until the first difference value or the second difference value decreases.



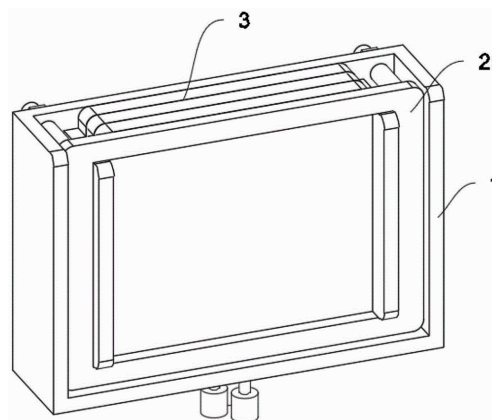
N9473

CN219201972U
Priority Date: 27/12/2022

SANYI PHOTOELECTRIC TECHNOLOGY SUZHOU

HOLOGRAPHIC GRATING WITH MULTILAYER STRUCTURE

The utility model discloses a multilayer-structure holographic grating, which comprises a multilayer grating fixing frame, a multilayer grating pressing mechanism and a multilayer holographic grating main body, wherein one side of the multilayer grating fixing frame is provided with a grating matching window, the other side of the multilayer grating fixing frame is provided with an open structure, the bottom of the multilayer grating fixing frame is provided with a plurality of ejector rod mounting holes, each ejector rod mounting hole is internally provided with one ejector rod, the multilayer holographic grating main body is arranged in the multilayer grating fixing frame and is fixed through the multilayer grating pressing mechanism, the multilayer holographic grating main body is formed by superposing a plurality of gratings, and each ejector rod corresponds to one grating; when the grating is required to be replaced, the locking nut is required to be loosened, and then the ejector rod is controlled to eject the corresponding grating out of the multi-layer grating fixing frame according to the requirement, so that the grating fixing frame is more convenient to use.



CLAIM 1. The utility model provides a holographic grating of multilayer structure, includes multilayer grating mount (1), multilayer grating hold-down mechanism (2) and multilayer holographic grating main part (3), its characterized in that: the multilayer grating structure comprises a multi-layer grating fixing frame (1), wherein one side of the multi-layer grating fixing frame (1) is provided with a grating matching window (6), the other side of the multi-layer grating fixing frame (1) is provided with an open structure, the bottom of the multi-layer grating fixing frame (1) is provided with a plurality of ejector rod mounting holes (7), each ejector rod mounting hole (7) is internally provided with an ejector rod (8), a multi-layer holographic grating main body (3) is arranged in the multi-layer grating fixing frame (1) and is fixed through a multi-layer grating pressing mechanism (2), the multi-layer holographic grating main body (3) is formed by overlapping a plurality of gratings, and each ejector rod (8) corresponds to one grating.

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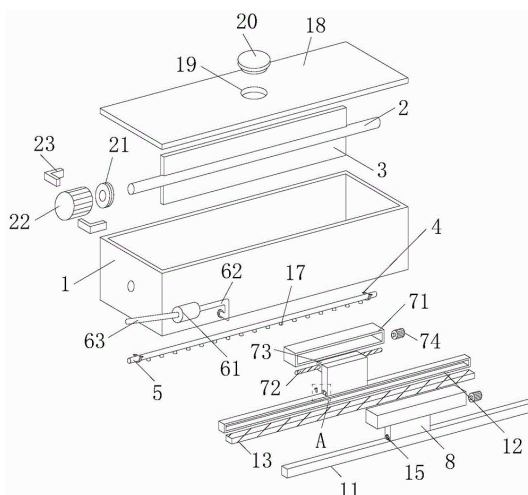
CN219076840U

Priority Date: 21/12/2022

SHANGHAI CEREMONY GRAPHIC TECHNOLOGY

INK SUPPLY MECHANISM OF HOLOGRAPHIC CODING IMAGE PRINTER

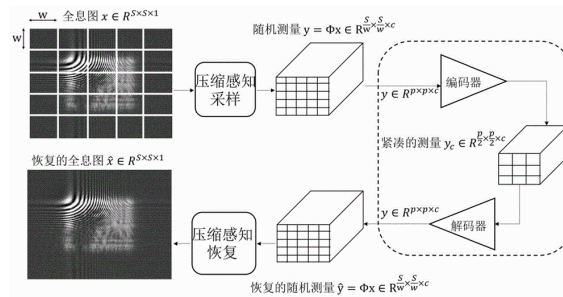
The utility model discloses an ink supply mechanism of a holographic coding image printer, which relates to the technical field of the ink supply mechanism of the holographic coding image printer, and aims to solve the technical problems that in the prior art, ink in an ink box cannot be stirred, the ink is easy to precipitate, the thickness of the ink sprayed on an ink roller is uneven, and the printing effect is affected; wherein, supply the ink horn front end to install the confession liquid subassembly that links to each other with the play black pipe, the equal fixedly connected with reciprocating motion subassembly of both sides around the ink horn lower extreme, reciprocating motion subassembly lower extreme fixedly connected with can follow transverse movement's connecting plate, this ink feed mechanism utilizes the axis of rotation to drive stirring vane rotation to prevent the printing ink deposit, thereby ensure that printing ink spouts thickness on the ink roller is even.



CLAIM 1. The ink supply mechanism comprises an ink supply box, a rotating shaft rotationally connected in the ink supply box, stirring blades fixedly connected to the outer side of the rotating shaft, pipe clamps symmetrically distributed left and right and arranged at the lower end of the ink supply box, and ink outlet pipes clamped inside the pipe clamps and the other pipe clamps; the ink supply box is characterized in that the front end of the ink supply box is provided with a liquid supply assembly connected with the ink outlet pipe, the front side and the rear side of the lower end of the ink supply box are fixedly connected with reciprocating movement assemblies, the lower end of each reciprocating movement assembly is fixedly connected with a connecting plate capable of moving transversely, the left end of each connecting plate is provided with a sliding groove, a sliding block is connected in each sliding groove in a sliding manner, the lower end of each sliding block is fixedly connected with an ink homogenizing plate, the inner side of each ink homogenizing plate is provided with a clamping groove, and sponge is connected in each clamping groove in a clamping manner.

COMPUTER HOLOGRAM COMPRESSION TRANSMISSION METHOD

The invention provides a computer hologram compression transmission method, and belongs to the field of holographic information compression and transmission. The method adopts a secondary compression method to compress the computer hologram, namely, the computer hologram is sampled by a compressed sensing algorithm and simultaneously compressed, then the sampled information is secondarily compressed from multiple space dimensions by using a quantum heuristic neural network again, and finally, the hologram is reconstructed by using the quantum heuristic neural network to carry out primary recovery and the compressed sensing recovery algorithm respectively, so that the rapid transmission, the efficient compression and the high-quality recovery of the holographic information are realized.



CLAIM 1. a computer hologram compression transmission method is characterized by comprising the following specific steps: step 1) dividing computer holograms CGH into blocks, wherein one hologram $x \in \mathbb{R}^{S \times S \times 1}$ Divided into blocks of size $w \times w$, and shared A plurality of blocks; step 2) compressing the computer hologram CGH by adopting compressed sensing, replacing a measurement matrix in the compressed sensing by using a convolutional neural network CNN, and performing convolutional operation on the CGH to correspond to measurement in the compressed sensing, wherein the measured result is that Wherein $c = w \times MR$ is the dimension of the random linear measurement, MR is the measurement rate; step 3) after the compressed sensing measurement is completed, the encoder using the quantum heuristic neural network receives an input dimension of I_s compressed again by utilizing a quantum heuristic convolution layer, and has an output dimension of I_s a compact representation of (1); step 4) is transmitted, and the decoder of the quantum heuristic neural network receives U_p -sampling by interpolation, reconversion to $+$.> I.e. recovering the random linear measurements; the results of residual learning and interpolation recovery are then used to add to generate the final random linear measurement as shown in the following equation: in the method, in the process of the invention, for the up-sampled result, the function $f(\cdot)$ represents the pair $+$.> Performing an improved nonlinear function; step 5) compressed sensing and recovering part receives Thereafter, up-sampling is completed to generate a block vector x vector The block vector is then transformed into blocks by transformation, and all the blocks are stitched together to generate a preliminary recovery x initial ; Step 6) carrying out nonlinear signal recovery on the primary recovery result by using a deep neural network, wherein the nonlinear signal recovery is shown in the following formula: where $g(-)$ represents the depth nonlinear recovery, representing the recovered hologram, thereby enabling computer generated hologram CGH compression transmission.

N9486

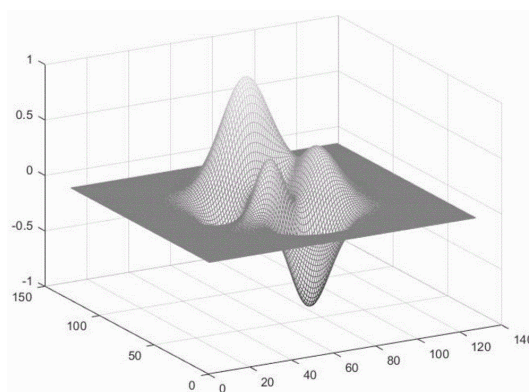
CN116245012

Priority Date: 29/12/2022

QILU UNIVERSITY OF TECHNOLOGY

DIGITAL HOLOGRAPHIC OBJECT LIGHT WAVE EXTRACTION METHOD BASED ON MACHINE LEARNING

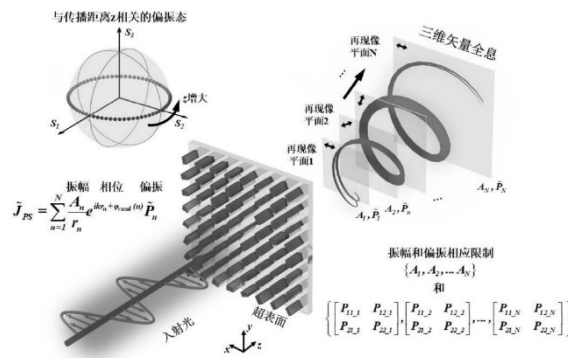
The invention discloses a machine learning-based digital holographic object light wave extraction method, which is characterized by comprising the following steps of: step one: building a training set; the method comprises the following steps: constructing a curved surface as the object plane input of the holographic system, wherein the reference light is plane light; step two: obtaining the phase distribution and the complex amplitude distribution of the object plane light waves; step two: building a neural network; step three: and (5) reconstructing the phase. The invention relates to the field of object light wave extraction, in particular to a digital holographic object light wave extraction method based on machine learning. The invention aims to solve the technical problem of providing a digital holographic object light wave extraction method based on machine learning, which is used for completing holographic recording and reproduction simulation on MATLAB and producing a training set, a checking set and a testing set required by training a neural network; the model after training is verified by using the test set; and extracting a phase shift value by using the verified neural network, reconstructing an original object light wave according to a phase shift algorithm based on the phase shift value and the interferogram, and finally analyzing the reconstruction quality.



CLAIM 1. The machine learning-based digital holographic object light wave extraction method is characterized by comprising the following steps of: step one: building a training set; the method comprises the following steps: constructing a curved surface as the object plane input of the holographic system, wherein the reference light is plane light; step two: obtaining the phase distribution and the complex amplitude distribution of the object plane light waves; step one, three: by formula (1): $R(x,y,\theta)=A O e^{i\theta}$ (1) establishing a rectangular coordinate system by taking the center of a curved surface as an origin, wherein the Z axis is vertically upwards, the X axis is horizontally rightwards, and the directions of X, Y, Z axes are in right-hand spiral relation; wherein: $r(x, y, \theta)$ represents the complex amplitude of the reference light, x, y represents X, Y axis coordinates, θ represents the phase of the reference light, $A O$ The real amplitude of the reference light is represented, and i represents an imaginary unit. Continuously changing the phase θ of the reference light wave, wherein the $\theta=0.005 xk$ and k are the recording times, so that k interferograms with phase shift value θ with the original interference image can be obtained; step two: building a neural network; constructing a neural network by using Resunet, wherein the neural network returns the loss of the model on a training set and a checking set after training so as to evaluate the accuracy of the model; step three: reconstructing the phase; step three: phase shift hologram generation and reconstruction; step three, two: analyzing data; and step three: and (5) error analysis.

THREE-DIMENSIONAL VECTOR HOLOGRAPHIC IMAGING METHOD BASED ON METASURFACE

The invention discloses a three-dimensional vector holographic imaging method based on a metasurface, belonging to the technical fields of micro-nano optics, diffraction optics and holographic imaging application. The implementation method of the invention comprises the following steps: the control of the polarization state of the holographic reconstruction image is introduced into the calculation process of the hologram, the required polarization response limitation is applied to different reconstruction image planes, and the three-dimensional holographic reconstruction image polarization state is randomly controlled. And generating a hologram in the form of unitary matrix according to the electric field distribution obtained by back propagation by using a matrix polar decomposition method. And customizing a Jones matrix of each unit by combining the polarization rotation matrix with the birefringence characteristics of the metasurface, and generating a processing file of a corresponding medium metasurface structure according to the size and azimuth angle of each unit nano column of the metasurface in the hologram code Yu Chaoying surface in unitary matrix form. When incident light with any polarization state irradiates the metasurface, holographic reconstruction images at different planes can present different polarization information, and the reconstruction of the three-dimensional vector holographic image is realized.



CLAIM 1. The three-dimensional vector holographic imaging method based on the metasurface is characterized by comprising the following steps of: comprises the following steps of the method, step one: selecting the contrast to meet a predetermined criterionThe quasi-required three-dimensional image is used as an original image for realizing three-dimensional vector holographic imaging; by combining a hologram calculation method of a three-dimensional image with a Jones matrix method, namely introducing the control of the polarization state of a holographic reconstruction image into the hologram calculation process, applying required polarization response limits on different reconstruction image planes along the z direction, and carrying out arbitrary control on the polarization state of the three-dimensional holographic reconstruction image; generating holograms in unitary matrix form from counter-propagating resulting electric field distribution in hologram plane using matrix polar decomposition method Step two: the metasurface for realizing three-dimensional vector holographic imaging consists of medium nano-pillar arrays with rectangular cross sections, different geometric dimensions and different azimuth angles; customizing a Jones matrix of each unit by combining a polarization rotation matrix with the birefringence characteristic of the metasurface of the medium, and generating a processing file of a metasurface structure of the corresponding medium according to the size and azimuth angle of each unit nano column of the metasurface in the hologram code Yu Chaoying surface in the unitary matrix form generated in the step one; the geometric dimensions comprise the long axis length L, the short axis length W and the height H of the nano-pillar and the period length P of the metasurface unit; step three: preparing a transmission type medium metasurface by using the processing file of the medium metasurface structure obtained in the step two; by controlling polarization responses of the holographic reconstruction images of different planes, the holographic reconstruction images of different planes along the z direction can show different polarization information under the irradiation of incident light of any polarization state, thereby realizing three-dimensional vector holographic imaging.

N9493

CN116205111

Priority Date: 09/03/2023

BEIJING UNIVERSITY OF TECHNOLOGY

MULTI-DIMENSIONAL MULTI-CHANNEL MULTIPLEXING SUPER-SURFACE HOLOGRAPHIC OPTIMIZATION METHOD BASED ON REVERSE DESIGN

The invention discloses an optimization method of multi-dimensional multi-channel multiplexing super-surface hologram based on reverse design, and belongs to the field of optical hologram. The implementation method of the invention comprises the following steps: enriching and refining a response database of the super atom by using a data interpolation method or a deep learning method; transmitting the intensity of the target image back to the holographic surface to obtain complex amplitude distribution, constructing a loss function by using the reconstructed image and the target image, and calculating gradient distribution by using an accompanying algorithm; optimizing the maximum or minimum value of the loss function by using a nonlinear optimization algorithm, and updating the super-surface parameters; based on optimizing out the geometrical parameters of the super surface, the super surface hologram of the multi-wavelength and multi-polarization channels is realized. According to the invention, the material can be replaced by replacing the super-atomic response database, the near-field or far-field image reconstruction can be realized by replacing the diffraction transmission algorithm, and the reconstruction effect is optimized in the reverse design process. The invention can be applied to the fields of display, imaging, information storage, microscopy and anti-counterfeiting encryption.

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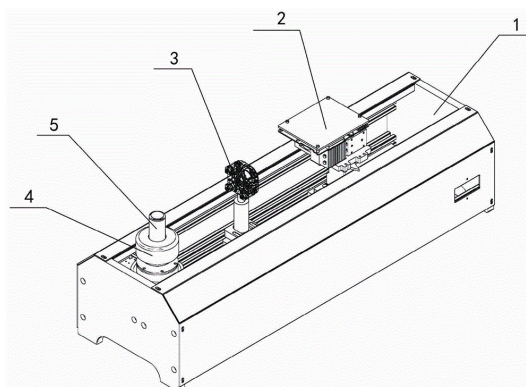
CN116198128

Priority Date: 01/03/2023

NOTTINGHAM INSTITUTE OF EXCELLENCE LIGHTHOUSE NINGBO INNOVATION RESEARCH INSTITUTE

HOLOGRAPHIC 3D PRINTER AND 3D PRINTING METHOD

The invention provides a holographic 3D printer and a 3D printing method, wherein the holographic 3D printer comprises: the rack is internally provided with an installation space; the guide rail is fixedly connected with the frame and is arranged in the installation space; the projection system is fixedly connected with the guide rail; the rotating platform is fixedly connected with the guide rail and can rotate relative to the guide rail; the focusing lens is fixedly connected with the guide rail and is clamped between the projection system and the rotating platform; imaging bottle, imaging bottle is fixed to the rotary platform; the projection system, the focusing mirror and the rotating platform are positioned in the same direction, and the projection system, the focusing mirror and the rotating platform are positioned in the same straight line.



CLAIM 1. A holographic 3D printer, comprising: the rack is internally provided with an installation space; the guide rail is fixedly connected with the rack and is arranged in the installation space; the projection system is fixedly connected with the guide rail; the rotating platform is fixedly connected with the guide rail and can rotate relative to the guide rail; the focusing lens is fixedly connected with the guide rail and is clamped between the projection system and the rotating platform; the imaging bottle is fixedly arranged on the rotary platform; the projection system, the focusing mirror and the rotating platform are positioned in the same direction, and the projection system, the focusing mirror and the rotating platform are positioned in the same straight line.

N9495

CN116184798

Priority Date: 27/02/2023

CHINESE PEOPLE S LIBERATION GROUND FORCE ARMORED TROOP
ACADEMY

ENCODING METHOD AND SYSTEM FOR GENERATING THREE-PHASE HOLOGRAM

The invention discloses a coding method and a system for generating a three-phase hologram, which relate to the field of coding, and the method comprises the following steps: obtaining an initial complex amplitude of a diffraction field in the back propagation process of an original image based on the Fourier transform and an optical transfer function in the back propagation process; sequentially carrying out normalization, complex exponential form representation and square opening on the initial complex amplitude of the diffraction field to obtain the complex amplitude of the diffraction field; decomposing the complex amplitude of the diffraction field according to a vector addition principle to obtain a first unit complex amplitude and a second unit complex amplitude; constructing cross-coded first, second and third phases based on the complex amplitude of the diffraction field, the first unit complex amplitude and the second unit complex amplitude; and performing cross coding based on the first phase, the second phase and the third phase to obtain a three-phase hologram. The invention improves the display quality of the reconstructed image on the premise of not reducing the double-phase encoding speed basically.

CLAIM 1. A coding method for generating a three-phase hologram, comprising: obtaining an initial complex amplitude of a diffraction field in the back propagation process of an original image based on the Fourier transform and an optical transfer function in the back propagation process; sequentially carrying out normalization, complex exponential form representation and square opening on the initial complex amplitude of the diffraction field to obtain the complex amplitude of the diffraction field; decomposing the complex amplitude of the diffraction field according to a vector addition principle to obtain a first unit complex amplitude and a second unit complex amplitude; constructing cross-coded first, second and third phases based on the complex amplitude of the diffraction field, the first unit complex amplitude and the second unit complex amplitude; and performing cross coding based on the first phase, the second phase and the third phase to obtain a three-phase hologram.

N9496

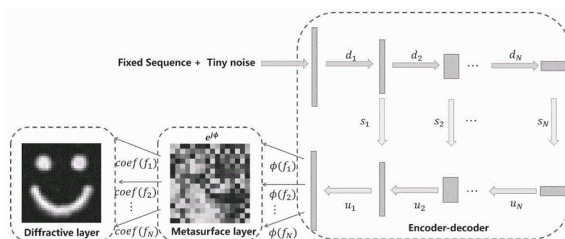
CN116184796

Priority Date: 13/02/2023

ZHEJIANG UNIVERSITY

ACHROMATIC BROADBAND SUPER-SURFACE HOLOGRAPHIC IMAGING METHOD BASED ON NEURAL NETWORK

The invention discloses an achromatic broadband super-surface holographic imaging method based on a neural network, which belongs to the field of super-surface holographic imaging, and comprises the steps of designing a double-ring type polarization conversion unit structure; constructing a deep learning network model capable of adaptively optimizing structural dispersion and spatial dispersion to generate an achromatic broadband phase hologram; and filling and forming a corresponding holographic super surface by using a double-ring type polarization conversion unit according to the achromatic broadband phase hologram generated by the neural network. The invention aims to consider the dispersion relation and combine with the neural network calculation method to realize broadband holographic imaging, can rapidly generate broadband effective holographic super-surface according to the target imaging and the determined dispersion relation, has simple manufacturing process and strong practicability, and is suitable for future broadband application requirements.



CLAIM 1. The achromatic broadband super-surface holographic imaging method based on the neural network is characterized by comprising the following steps of: designing a double-loop type polarization conversion unit, and determining the relationship between a phase response curve and structural dispersion of the double-loop type polarization conversion unit; constructing a neural network model, inputting an imaging target picture and generating an achromatic broadband phase hologram; the achromatic broadband phase hologram is output according to the phase response of a certain frequency point; and filling the corresponding super-surface hologram by combining the achromatic broadband phase hologram generated by the neural network model and the double-ring type polarization conversion unit.

N9498

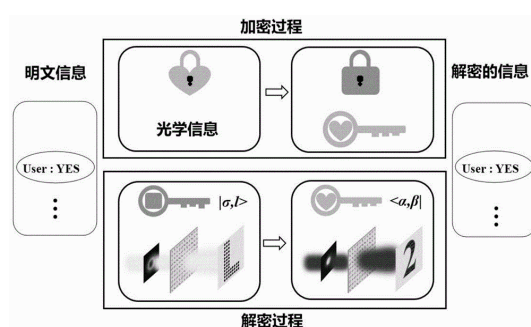
CN116165863

Priority Date: 30/12/2022

HUDA GUANGDONG HONG KONG MACAO GREATER BAY AREA
INNOVATION RESEARCH INSTITUTE ZENGCHENG GUANGZHOU |
HUNAN UNIVERSITY

NESTED ENCRYPTION METHOD BASED ON MULTI-DIMENSIONAL MULTIPLEXING HOLOGRAM OF SUPER-SURFACE LIGHT FIELD

The invention discloses a nested encryption method based on multi-dimensional multiplexing holograms of a super-surface light field, which comprises the following steps: the holographic super surface for realizing multiplexing of spin, orbital angular momentum and polarization vector consists of titanium dioxide elliptic cylinder arrays with different elliptic cross sections. The nested encryption method based on the multi-dimensional multiplexing hologram of the super-surface light field utilizes the cooperative nested encryption of a plurality of dimensions of the light field, can not acquire useful information by single or non-sequential decryption, and has extremely high encryption security. Compared with the traditional single-dimensional or multi-dimensional superposition multiplexing encryption technology, the method has the advantages of higher design freedom and higher safety, can be widely applied to the fields of information encryption and the like, and has wide application prospect.



CLAIM 1. The nested encryption method based on the multi-dimensional multiplexing hologram of the super-surface light field is characterized by comprising the following steps of: s1: the holographic super-surface for realizing multiplexing of spin, orbital angular momentum and polarization vectors consists of titanium dioxide elliptic cylinder arrays with different elliptic cross sections, a phase distribution map of 16 independent channels is generated by utilizing a corrected calculated holographic image phase recovery algorithm, wherein the angular momentum hologram and the vector hologram are respectively provided with 8 channels and are decomposed into superposition of holograms under orthogonal circular polarization, the arrangement of the super-surface is realized by combining the transmission phase and geometric phase of a medium elliptic cylinder and the calculated hologram phase, and the corresponding holographic reconstruction image is obtained on an imaging surface at a specific position away from the super-surface by utilizing CCD or other photoelectric devices by controlling the number of spin and orbital angular momentum carried by incident light and the polarization state of emergent light; s2: generating a processing file according to the super-surface structure determined in the step S1; s3: preparing a required transmission type medium super surface by utilizing the processing file of the super surface obtained in the step S2 through a titanium dioxide film plating process, electron beam exposure and micro-nano processing by an etching means; s4: placing the processed medium super-surface object in an experimental light path, and obtaining a corresponding holographic reconstruction image on an imaging surface at a specific position away from the super-surface by controlling the number of spin and orbital angular momentum carried by incident light and the polarization state of emergent light; obtaining different reconstructed images by changing the angular momentum of the incident light; different reconstructed vector holographic images are obtained by setting incident light to Gaussian light and extracting specific polarization vectors on an imaging surface, when the incident light carries specific spin and orbital angular momentum, different letter images appear on the imaging surface, and when the incident light is Gaussian light with the topological charge number of 0, specific vector holographic digital images appear on the imaging surface, and the corresponding polarization states are x-ray polarization, 45-degree linear polarization, left-handed circular polarization and ellipsometry respectively; s5: providing a specific nested encryption implementation, coding plaintext information to be transmitted into a vector holographic image, recording the polarization state corresponding to the image as a key $\langle a, \beta \rangle$, then encrypting the key again and coding the key into an angular momentum holographic image, recording the spin and orbit angular momentums corresponding to the image as a key $|\sigma, l \rangle$, finally coding different information into the same super-surface, namely ciphertext, transmitting the ciphertext and the key I to a specific user, and carrying out the reverse operation in a decryption process by using the key I: the angle momentum holographic image is obtained by the $|\sigma, l \rangle$ and the key II needed by the second decryption is obtained by comparing with the key coding table: $\langle a, \beta \rangle$, decrypting again, user 1 and user 2 obtain the original encoded information according to the corresponding information encoding table.

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HOLOGRAMS - 14 PATENTS

| REFERENCE | COUNTRY | PATENT NUMBER | PUBLICATION DATE Day-Month-Year | APPLICANT | PRIORITY | PRIORITY DATE Day-Month-Year | PRIORITY NUMBER | EQUIVALENTS | TITLE | KEY WORDS |
|------------------------|---------|---------------|------------------------------------|-----------------------------------------------------------------------------------------|----------|---------------------------------|-----------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| P36474 | WO | 2023113043 | 22/06/2023 | DAI NIPPON PRINTING | JP | 17/12/2021 | JP2021000204859 | WO2023113043 | VOLUME HOLOGRAM LAMINATE, METHOD FOR PRODUCING VOLUME HOLOGRAM LAMINATE, VOLUME HOLOGRAM TRANSFER FOIL, VOLUME HOLOGRAM LABEL, VOLUME HOLOGRAM SHEET FOR EMBEDDING, CARD, AND HOLOGRAM STICKER-TYPE PRODUCT | |
| P36480 | WO | 2023106437 | 15/06/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KR | 06/12/2021 | KR2021000172554 | WO2023106437 KR20230084651 | UNCOPIABLE HOLOGRAM QR CODE | |
| P36484 | WO | 2023101199 | 08/06/2023 | WINNINGI | KR | 30/11/2021 | KR2021000168609 | WO2023101199 KR20230080980 | BIOMETRIC AUTHENTICATION METHOD USING HOLOGRAM AND DEVICE THEREFOR | |
| P36485 | WO | 2023101033 | 08/06/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KR | 30/11/2021 | KR2021000167813 | WO2023101033 KR20230080525 | SECURITY QR CODE USING HOLOGRAM | |
| P36494 | US | 20230185089 | 15/06/2023 | IDEMIA | FR | 13/12/2021 | FR2021000013404 | US20230185089 FR3130195 | OPTICAL DEVICE WITH HOLOGRAPHIC LAYER | |
| P36524 | FR | 3130428 | 16/06/2023 | IDEMIA | FR | 13/12/2021 | FR2021000013402 | FR3130428 | OPTICAL DEVICE WITH TEXTURED LAYER | |
| P36539 | CN | 219202618 | 16/06/2023 | SHANGHAI HONGDUN ANTI COUNTERFEIT MATERIAL | CN | 31/12/2022 | CN2022003582215 | CN219202618U | TEARING-PROOF ANTI-COUNTERFEITING LABEL | |
| P36540 | CN | 219202617 | 16/06/2023 | SHANGHAI HONGDUN ANTI COUNTERFEIT MATERIAL | CN | 31/12/2022 | CN2022003580362 | CN219202617U | ANTI-COUNTERFEIT LABEL | |
| P36545 | CN | 219180107 | 13/06/2023 | ZHUHAI ZHONGNENG PRINTING | CN | 20/12/2022 | CN2022003406366 | CN219180107U | ANTI-FAKE LABEL STICKER | |
| P36548 | CN | 219153937 | 09/06/2023 | SHANTOU JIAXIN PACKING MAT | CN | 12/01/2022 | CN2022000067786 | CN219153937U | ENVIRONMENT-FRIENDLY HIDDEN ANTI-COUNTERFEITING PACKAGING PAPER | |
| P36550 | CN | 219133464 | 06/06/2023 | ZHONGSHAN YINDIAN PHOTOELECTRIC TECHNOLOGY | CN | 28/10/2022 | CN2022002851322 | CN219133464U | WEAR-RESISTANT ANTI-COUNTERFEITING MARK | |
| P36555 | CN | 116265553 | 20/06/2023 | GUANGDONG BANGGU CHEMICAL TECHNOLOGY GUANGDONG BANGGU FILM COATING INNOVATION ACADEMY | CN | 02/12/2022 | CN2022001543102 | CN116265553 | ELECTROCHEMICAL ALUMINUM HOT STAMPING GLUE FOR COSMETIC HOSE AND PREPARATION METHOD THEREOF | |
| P36558 | CN | 116239959 | 09/06/2023 | WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT | CN | 30/12/2022 | CN2022001718580 | CN116239959 | HOLOGRAPHIC ANTI-FAKE LABEL FILM OF WATERMARK | |
| P36559 | CN | 116238265 | 09/06/2023 | ZHONGSHAN GUOAN NEW MATERIAL | CN | 03/03/2023 | CN2023000203813 | CN116238265 | HOLOGRAPHIC THERMOPRINTING FILM WITH VARIABLE INFORMATION AND PRODUCTION PROCESS THEREOF | |

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| REFERENCE | COUNTRY | PATENT NUMBER | PUBLICATION DATE Day-Month-Year | APPLICANT | PRIORITY | PRIORITY DATE Day-Month-Year | PRIORITY NUMBER | EQUIVALENTS | TITLE | KEY WORDS |
|------------------------|---------|---------------|------------------------------------|----------------------------------------------------|----------|---------------------------------|-----------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------|
| P36475 | WO | 2023111864 | 22/06/2023 | NANOTECH SECURITY | US | 13/12/2021 | US2021063289125 | WO2023111864 | DIFFRACTIVE DISPLAYS | |
| P36476 | WO | 2023111481 | 22/06/2023 | IDEMIA | FR | 17/12/2021 | FR2021000013822 | WO2023111481 | SECURITY DEVICE WHICH CAN BE USED TO GENERATE AN ENLARGED PROJECTED IMAGE USING MICROLENSES AND A PERFORATED METAL LAYER | MicroLens |
| P36478 | WO | 2023110227 | 22/06/2023 | OBERTHUR FIDUCIAIRE | FR | 13/12/2021 | FR2021000013369 | WO2023110227 FR3130194 | SECURITY ELEMENT FOR A SECURITY DOCUMENT AND SECURITY DOCUMENT PROVIDED THEREWITH | |
| P36481 | WO | 2023106240 | 15/06/2023 | TOPPAN PRINTING | JP | 07/12/2021 | JP2021000198412 | WO2023106240 | OPTICAL STRUCTURE, MANUFACTURING METHOD FOR SAME, AND CODE FORMATION METHOD | |
| P36490 | WO | 202394028 | 01/06/2023 | GIESECKE & DEVRIENT MOBILE SECURITY | DE | 26/11/2021 | DE202110005870 | WO202394028 DE102021005870 | SECURITY FEATURE FOR AN IDENTIFICATION DOCUMENT, IDENTIFICATION DOCUMENT AND METHOD FOR PRODUCING A SECURITY FEATURE | |
| P36492 | US | 20230193447 | 22/06/2023 | TREXLER ADAM JOHANSEN LAURIE DIFFENDAFFER PAUL | US | 17/12/2021 | US2021017555170 | US20230193447 WO2023114434 | PRECIOUS METAL LAMINATE AND METHODS OF MANUFACTURE | |

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|------------------------|---------|---------------|------------------------------------|-----------------------------------------------------------------|----------|---------------------------------|-----------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------|
| P36499 | TW | 628186 | 11/06/2022 | HOLO SOLUTION | TW | 22/01/2022 | TW2022000200910 | TWM628186 | ANTI-COUNTERFEITING STRUCTURE WITH DOUBLE ANTI-COUNTERFEITING OPTICAL REFRACTIVE EMBOSGING | |
| P36502 | KR | 20230080134 | 07/06/2023 | COLOR MOVING KOREA SECURITY PRINTING & MINTING | KR | 29/11/2021 | KR2021000167587 | KR20230080134 | SECURITY PIGMENT WITH DUAL COLOR SHIFTING FUNCTION | |
| P36516 | JP | 2023074287 | 29/05/2023 | TOPPAN PRINTING | JP | 17/11/2021 | JP2021000187160 | JP2023074287 | OPTICAL ELEMENT AND AUTHENTICATOR | |
| P36518 | JP | 2023071182 | 22/05/2023 | NATIONAL PRINTING BUREAU | JP | 21/12/2022 | JP2022000203847 | JP2023071182 | COPYING RESTRICTION STRIKE LINE PRINT AND METHOD FOR CREATING COPY RESTRICTION STRIKE LINE PRINT | Microlens |
| P36525 | FR | 3130059 | 09/06/2023 | IDEMIA | FR | 07/12/2021 | FR2021000013085 | FR3130059 | METHOD FOR AUTHENTICATING AN IDENTITY DOCUMENT, AND DEVICE FOR IMPLEMENTING THE METHOD | Microlens |
| P36526 | EP | 4198107 | 21/06/2023 | KOREA ADVANCED INSTITUTE OF SCIENCE & TECHNOLOGY | KR | 17/12/2021 | KR2021000181789 | EP4198107 US20230193134 | STRUCTURES FOR PHYSICAL UNCLONABLE FUNCTION USING SPONTANEOUS CHIRAL SYMMETRY BREAKING AND METHOD OF PREPARING THE SAME | |
| P36530 | EP | 4190582 | 07/06/2023 | GIESECKE & DEVRIENT CURRENCY TECHNOLOGY | DE | 30/11/2021 | DE202110005911 | EP4190582 DE102021005911 CN116198246 | SECURITY ELEMENT HAVING A REFLECTIVE SURFACE AREA, DATA CARRIER AND PRODUCTION METHOD | |
| P36531 | DE | 102022111099 | 01/06/2023 | KOENIG & BAUER | DE | 05/05/2022 | DE202210111099 | DE102022111099 | SECURITY DOCUMENT WITH A TRANSPARENT WINDOW FORMED IN ITS SUBSTRATE | Microlens |
| P36532 | DE | 102022111098 | 01/06/2023 | KOENIG & BAUER | DE | 05/05/2022 | DE202210111098 | DE102022111098 | PRINTING MACHINE FOR PRODUCING A SECURITY DOCUMENT | |
| P36533 | DE | 102022111097 | 01/06/2023 | KOENIG & BAUER | DE | 05/05/2022 | DE202210111097 | DE102022111097 | SECURITY DOCUMENT WITH A TRANSPARENT WINDOW FORMED IN ITS SUBSTRATE | |
| P36538 | CN | 219214379 | 20/06/2023 | WENZHOU GETTEL PLASTIC | CN | 06/02/2023 | CN2023000181303 | CN219214379U | WEAR-RESISTANT HEAT-INSULATING COMPOSITE ALUMINIZED FILM | |
| P36564 | CN | 116215105 | 06/06/2023 | GUANGDONG HAIFU INTELLIGENT ENVIRONMENTAL PROTECTION TECHNOLOGY | CN | 16/11/2022 | CN2022001433646 | CN116215105 | PRINTING PROCESS OF LOCAL IMITATION GRATING THREE-DIMENSIONAL ANTI-COUNTERFEITING PACKAGE | |
| P36567 | CN | 116198244 | 02/06/2023 | YANGZHOU XIANGHUA NEW MATERIAL TECHNOLOGY | CN | 23/02/2023 | CN2023000153708 | CN116198244 | ANTI-COUNTERFEITING ELECTROCHEMICAL ALUMINUM HOT STAMPING FOIL AND PREPARATION METHOD THEREOF | |

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|-----------------------|---------|---------------|------------------------------------|----------------------------------------|----------|---------------------------------|-----------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------|
| N9434 | WO | 2023113062 | 22/06/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KR | 13/12/2021 | KR2021000177361 | WO2023113062 | HOLOGRAPHIC IMAGE NORMALIZATION METHOD FOR HOLOGRAPHIC PRINTER | |
| N9435 | WO | 2023113061 | 22/06/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KR | 13/12/2021 | KR2021000177360 | WO2023113061 | SUB-HOGEL-BASED HOLOGRAPHIC STEREOGRAM PRINTING METHOD | |
| N9436 | WO | 2023113060 | 22/06/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KR | 13/12/2021 | KR2021000177358 | WO2023113060 | HOLOGRAPHIC OPTICAL ELEMENT PRINTING METHOD USING FOCUS-VARIABLE LENS AND ROTATING MIRROR | |
| N9437 | WO | 2023113059 | 22/06/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KR | 13/12/2021 | KR2021000177357 | WO2023113059 | PERCEPTION EXPERIMENT METHOD FOR PERIPHERAL VISION IMAGE QUALITY CHANGES FOR DETERMINING PARAMETERS OF FOVEATED HOLOGRAM | |
| N9438 | WO | 2023106438 | 15/06/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KR | 07/12/2021 | KR2021000173360 | WO2023106438 KR20230085313 | HOLOGRAPHIC PRINTER USING MECHANICAL SHUTTER HAVING ADJUSTABLE EXPOSURE TIME AND NO VIBRATION | |
| N9439 | WO | 2023106431 | 15/06/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KR | 06/12/2021 | KR2021000172559 | WO2023106431 KR20230084655 | CONTINUOUS HOLOGRAM RECORDING METHOD | |
| N9440 | WO | 2023106430 | 15/06/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KR | 06/12/2021 | KR2021000172558 | WO2023106430 KR20230084654 | HOLOGRAPHIC PRINTER USING VIBRATION-FREE MECHANICAL SHUTTER | |
| N9441 | WO | 2023106429 | 15/06/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KR | 06/12/2021 | KR2021000172556 | WO2023106429 KR20230084653 | HOLOGRAM GENERATION AND STREAMING METHOD AND SYSTEM USING MULTI-COMPUTERS | |

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|-----------------------|---------|---------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------|---------------------------------|-----------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------|
| N9442 | WO | 2023106428 | 15/06/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KR | 06/12/2021 | KR2021000172555 | WO2023106428 KR20230084652 | METHOD AND SYSTEM FOR FOVEATED HOLOGRAM RENDERING | |
| N9443 | WO | 2023101274 | 08/06/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE KYUNGPOOK NATIONAL UNIVERSITY INDUSTRY ACADEMIC COOPERATION FOUNDATION | KR | 01/12/2021 | KR2021000170001 | WO2023101274 KR20230082252 | HOLOGRAPHIC PRINTER FOR RECORDING FREE-FORM HOLOGRAPHIC OPTICAL ELEMENT | |
| N9444 | WO | 202399127 | 08/06/2023 | AMS INTERNATIONAL | GB | 30/11/2021 | GB2021000017270 | WO202399127 GB202117270 | OPTICAL ELEMENT REPLICATING METHOD | |
| N9445 | WO | 202394045 | 01/06/2023 | CARL ZEISS SMT | DE | 29/11/2021 | DE202110213383 | WO202394045 DE102021213383 | COMPUTER-GENERATED HOLOGRAM (CGH), AND METHOD FOR DESIGNING A CGH | |
| N9446 | US | 20230194889 | 22/06/2023 | LIGHT FIELD LAB | US | 28/09/2018 | US2018062739000 | US20230194889 | HOLOGRAPHIC OBJECT RELAY FOR LIGHT FIELD DISPLAY | |
| N9447 | US | 20230194882 | 22/06/2023 | META PLATFORMS TECHNOLOGIES | US | 16/12/2021 | US2021017553739 | US20230194882 WO2023114116 | LIQUID CRYSTAL POLARIZATION HOLOGRAM (LCPH) BASED EYE TRACKING FOR AR/VR | |
| N9448 | US | 20230186682 | 15/06/2023 | TOBII | SE | 29/03/2019 | SE2019000050397 | US20230186682 US20200394400 US11594075 CN11751987 CN11751987B | HOLOGRAPHIC EYE IMAGING DEVICE | |
| N9449 | US | 20230185236 | 15/06/2023 | META PLATFORMS TECHNOLOGIES | US | 14/12/2021 | US2021063289535 | US20230185236 WO2023114115 | SYSTEM AND METHOD FOR FABRICATING HOLOGRAPHIC OPTICAL ELEMENTS USING POLARIZATION HOLOGRAM MASTER | |
| N9450 | US | 20230185091 | 15/06/2023 | FACEBOOK TECHNOLOGIES | US | 13/12/2021 | US2021017549394 | US20230185091 WO2023114113 | WAVEGUIDE WITH POLARIZATION VOLUME HOLOGRAM GRATING | |
| N9451 | US | 20230171385 | 01/06/2023 | PRINCETON UNIVERSITY UNIVERSITY OF NORTH CAROLINA | US | 29/11/2021 | US2021063283744 | US20230171385 | METHODS, SYSTEMS, AND COMPUTER READABLE MEDIA FOR HARDWARE-IN-THE-LOOP PHASE RETRIEVAL FOR HOLOGRAPHIC NEAR EYE DISPLAYS | |
| N9452 | US | 20230168627 | 01/06/2023 | KWANGWOON UNIVERSITY INDUSTRY ACADEMIC COLLABORATION FOUNDATION | KR | 26/11/2021 | KR2021000166202 | US20230168627 | CODING METHOD FOR COMPRESSING COMPLEX HOLOGRAM | |
| N9453 | US | 20230168520 | 01/06/2023 | SAFARI ROBERT | US | 01/12/2021 | US2021063264710 | US20230168520 | HOLOGRAPHIC DISPLAY | |
| N9454 | TW | 642245 | 11/06/2023 | WEI SHENG INTERNATIONAL TECHNOLOGY | TW | 10/11/2022 | TW2022000212323 | TWM642245 | HOLOGRAPHIC PROJECTION MAN-MACHINE INTERFACE DEVICE | |
| N9455 | KR | 20230085963 | 15/06/2023 | KOREA INSTITUTE OF SCIENCE & TECHNOLOGY KOREA UNIVERSITY INDUSTRIAL & ACADEMIC COLLABORATION FOUNDATION | KR | 07/12/2021 | KR2021000173382 | KR20230085963 | DEVICE FOR GENERATING HOLOGRAPHIC IMAGES IN GLOVE FORM | |
| N9456 | KR | 20230085044 | 13/06/2023 | KOREA UNIVERSITY INDUSTRIAL & ACADEMIC COLLABORATION FOUNDATION | KR | 06/12/2021 | KR2021000172967 | KR20230085044 | LARGE-AREA HOLOGRAPHIC WAVEGUIDE DISPLAY WITH WIDE FIELD OF VIEW AND METHOD OF OPERATION THEREOF | |
| N9457 | KR | 20230083865 | 12/06/2023 | GIST - GWANGJU INSTITUTE OF SCIENCE & TECHNOLOGY | KR | 03/12/2021 | KR2021000172256 | KR20230083865 | HOLOGRAM IMPLEMENTING APPARATUS USING META-MATERIAL | |
| N9458 | KR | 20230083786 | 12/06/2023 | LG CHEM | KR | 03/12/2021 | KR2021000172111 | KR20230083786 | PHOTOPOLYMER COMPOSITION, HOLOGRAM RECORDING MEDIUM, OPTICAL ELEMENT, AND HOLOGRAPHIC RECORDING METHOD | |
| N9459 | KR | 20230082526 | 08/06/2023 | KOREA ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE | KR | 01/12/2021 | KR2021000170393 | KR20230082526 | INPUT INTERFACE METHOD FOR DIGITAL HOLOGRAM GENERATION APPARATUS | |
| N9460 | KR | 20230081263 | 07/06/2023 | DONGSEO UNIVERSITY TECHNOLOGY HEADQUARTERS | KR | 30/11/2021 | KR2021000169162 | KR20230081263 | 5 G NETWORK-AWARE MULTI-LAYER HOLOGRAM IMAGE REPRODUCING SYSTEM BASED ON FLOATING LIGHT FIELD | |
| N9461 | KR | 20230078528 | 02/06/2023 | KOREA ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE | KR | 26/11/2021 | KR2021000165987 | KR20230078528 | DIGITAL HOLOGRAPHIC MEASUREMENT DEVICE | |
| N9462 | KR | 20230077232 | 01/06/2023 | LSWARE | KR | 25/11/2021 | KR2021000164272 | KR20230077232 | SYSTEM AND METHOD FOR PROTECTING HOLOGRAM CONTENT | |
| N9463 | KR | 20230073644 | 26/05/2023 | KOREA INSTITUTE OF SCIENCE & TECHNOLOGY | KR | 19/11/2021 | KR2021000160236 | KR20230073644 | ARTIFICIAL INTELLIGENCE LEARNING METHOD FOR RESTORING HOLOGRAPHY | |

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|-----------------------|---------|---------------|------------------------------------|------------------------------------------------------------------------------|----------|---------------------------------|------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| N9464 | KR | 20230073603 | 26/05/2023 | KYUNGPOOK NATIONAL UNIVERSITY INDUSTRY ACADEMIC COOPERATION FOUNDATION | KR | 19/11/2021 | KR2021000160167 | KR20230073603 | TRANSPARENT CYLINDRICAL THREE-DIMENSIONAL DISPLAY SYSTEM USING HOLOGRAPHIC OPTICAL ELEMENTS | |
| N9465 | KR | 20230073121 | 25/05/2023 | KOREA ELECTRONICS TECHNOLOGY INSTITUTE | KR | 17/11/2021 | KR2021000158375 | KR20230073121 | HOLOGRAM VIEWER DEVICE | |
| N9466 | KR | 20230071885 | 24/05/2023 | HEESUNG ELECTRONICS | KR | 16/11/2021 | KR2021000157328 | KR20230071885 | APPARATUS AND METHOD FOR MANUFACTURING FULL-COLOR HOLOGRAM OPTICAL ELEMENT, AND AUGMENTED REALITY DISPLAY DEVICE PROVIDED WITH THE OPTICAL ELEMENT | |
| N9467 | KR | 102539025 | 01/06/2023 | BETREE | KR | 04/08/2022 | KR2022000097562 | KR102539025 | REFRIGERATED AND FROZEN SHOWCASE WITH HOLOGRAM DEVICE AND HOLOGRAM IMPLEMENTATION METHOD USING THE SAME | |
| N9468 | KR | 102534468 | 30/05/2023 | HICS | KR | 07/06/2022 | KR2022000068752 | KR102534468 | 3D DIGITAL HOLOGRAPHIC MODULE DEVICE ATTACHABLE TO A MICROSCOPE AND 3D CONVERSION METHOD OF A MICROSCOPE | |
| N9469 | JP | 2023080909 | 09/06/2023 | NIPPON HOSO KYOKAI | JP | 30/11/2021 | JP2021000194473 | JP2023080909 | SPATIAL LIGHT MODULATOR, HOLOGRAM DATA GENERATING DEVICE, AND HOLOGRAM DISPLAY SYSTEM | |
| N9470 | ES | 2940858 | 11/05/2023 | UNIVERSIDAD COMPLUTENSE DE MADRID | ES | 14/11/2022 | ES2022000030979 | ES2940858 | SYSTEM FOR GENERATION OF DIGITAL HOLOGRAMS VIA SIMULATION | |
| N9471 | EP | 4197840 | 21/06/2023 | PLASTIC OMNIUM | FR | 17/12/2021 | FR2021000013813 | EP4197840 US20230194890 CN116266441 | VEHICLE PART WITH USER INTERFACE | |
| N9472 | EP | 4191344 | 07/06/2023 | IMEC - INTERUNIVERSITAIR MICRO ELECTRONICA CENTRUM VZW | EP | 06/12/2021 | EP2021000212526 | EP4191344 US20230176390 | IMAGING DEVICE AND METHOD FOR HOLOGRAPHIC IMAGING OF SAMPLES | |
| N9473 | CN | 219201972 | 16/06/2023 | SANYI PHOTOELECTRIC TECHNOLOGY SUZHOU | CN | 27/12/2022 | CN2022003505816 | CN219201972U | HOLOGRAPHIC GRATING WITH MULTILAYER STRUCTURE | |
| N9474 | CN | 219198727 | 16/06/2023 | HENAN TONGMAN EDUCATION TECHNOLOGY | CN | 18/10/2022 | CN2022002742921 | CN219198727U | HOLOGRAPHIC PROJECTION EQUIPMENT | |
| N9475 | CN | 219179768 | 13/06/2023 | HE YICHEN | CN | 12/11/2022 | CN2022003010095 | CN219179768U | HOLOGRAPHIC PROJECTION SCREEN | |
| N9476 | CN | 219162544 | 09/06/2023 | SHANGHAI TENGRONG INTELLIGENT TECHNOLOGY | CN | 28/11/2022 | CN2022003166552 | CN219162544U | HOLOGRAPHIC IMMERSION SPACE STRUCTURE FOR GROUND INSTALLATION OF HOLOGRAPHIC SCREEN | |
| N9477 | CN | 219161245 | 09/06/2023 | SICHUAN KEAODA TECHNOLOGY | CN | 27/04/2023 | CN20230000990488 | CN219161245U | TRANSIENT STRUCTURED LIGHT DIGITAL HOLOGRAPHIC SUPER-RESOLUTION IMAGING DEVICE | |
| N9478 | CN | 219143795 | 06/06/2023 | GUANGDONG ZIJING INFORMATION STORAGE TECHNOLOGY | CN | 27/09/2022 | CN2022002571655 | CN219143795U | HOLOGRAPHIC STORAGE OPTICAL PATH SYSTEM WITH CALIBRATION FUNCTION | |
| N9479 | CN | 219143289 | 06/06/2023 | JIANGSU WIN ZAM DESIGN CONSTRUCTION | CN | 31/12/2022 | CN2022003609287 | CN219143289U | HOLOGRAPHIC THREE-DIMENSIONAL DISPLAY DEVICE | |
| N9480 | CN | 219143195 | 06/06/2023 | JITONG TECHNOLOGY BEIJING | CN | 14/12/2021 | CN2021003137620 | CN219143195U | HOLOGRAPHIC NEAR-TO-EYE THREE-DIMENSIONAL DISPLAY SYSTEM | |
| N9481 | CN | 219076840 | 26/05/2023 | SHANGHAI CEREMONY GRAPHIC TECHNOLOGY | CN | 21/12/2022 | CN2022003436992 | CN219076840U | INK SUPPLY MECHANISM OF HOLOGRAPHIC CODING IMAGE PRINTER | |
| N9482 | CN | 116263542 | 16/06/2023 | JITONG TECHNOLOGY BEIJING | CN | 14/12/2021 | CN2021001526790 | CN116263542 | HOLOGRAPHIC NEAR-TO-EYE THREE-DIMENSIONAL DISPLAY SYSTEM | |
| N9483 | CN | 116256958 | 13/06/2023 | SHANDONG UNIVERSITY | CN | 23/02/2023 | CN2023000157720 | CN116256958 | WEIGHT AND PHASE MULTIPLEXING WGS ALGORITHM-BASED RAPID PHASE HOLOGRAM GENERATION METHOD | |
| N9484 | CN | 116255923 | 13/06/2023 | CIVIL AVIATION UNIVERSITY OF CHINA | CN | 10/12/2021 | CN2021001513562 | CN116255923 | PATCH TYPE BENDING DEFORMATION HOLOGRAPHIC SENSOR BASED ON FLEXIBLE PHOTSENSITIVE POLYMER | |
| N9485 | CN | 116248848 | 09/06/2023 | UNIVERSITY BEIJING | CN | 29/12/2022 | CN2022001708138 | CN116248848 | COMPUTER HOLOGRAM COMPRESSION TRANSMISSION METHOD | |
| N9486 | CN | 116245012 | 09/06/2023 | QILU UNIVERSITY OF TECHNOLOGY | CN | 29/12/2022 | CN2022001705338 | CN116245012 | DIGITAL HOLOGRAPHIC OBJECT LIGHT WAVE EXTRACTION METHOD BASED ON MACHINE LEARNING | |
| N9487 | CN | 116243578 | 09/06/2023 | BEIJING UNIVERSITY OF TECHNOLOGY | CN | 29/01/2023 | CN2023000043772 | CN116243578 | THREE-DIMENSIONAL VECTOR HOLOGRAPHIC IMAGING METHOD BASED ON METASURFACE | |

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| REFERENCE | COUNTRY | PATENT NUMBER | PUBLICATION DATE Day-Month-Year | APPLICANT | PRIORITY | PRIORITY DATE Day-Month-Year | PRIORITY NUMBER | EQUIVALENTS | TITLE | KEY WORDS |
|-----------------------|---------|---------------|------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------|---------------------------------|-----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------|-----------|
| N9488 | CN | 116243577 | 09/06/2023 | HUAZHONG UNIVERSITY OF SCIENCE & TECHNOLOGY | CN | 27/02/2023 | CN2023000170617 | CN116243577 | HOLOGRAPHIC IMAGING AND DEVICE APPLIED TO ULTRAFAST LIGHT SOURCE | |
| N9489 | CN | 116243491 | 09/06/2023 | HEFEI UNIVERSITY OF TECHNOLOGY | CN | 30/03/2023 | CN2023000331067 | CN116243491 | VEHICLE-MOUNTED HOLOGRAPHIC IMAGING DEVICE AND DISPLAY SYSTEM | |
| N9490 | CN | 116224722 | 06/06/2023 | SHANGHAI INSTITUTE OF OPTICS & FINE MECHANICS - CHINESE ACADEMY OF SCIENCES | CN | 15/02/2023 | CN2023000116929 | CN116224722 | HOLOGRAPHIC GRATING DOUBLE-BEAM INTERFERENCE EXPOSURE SYSTEM BASED ON BEAM SCANNING DODGING AND EXPOSURE METHOD THEREOF | |
| N9491 | CN | 116224667 | 06/06/2023 | NANJING UNIVERSITY | CN | 22/02/2023 | CN2023000158646 | CN116224667 | ADJUSTABLE LIQUID CRYSTAL HOLOGRAPHIC DEVICE, PREPARATION METHOD THEREOF AND HOLOGRAPHIC LIGHT FIELD MODULATION DEVICE | |
| N9492 | CN | 116206541 | 02/06/2023 | SHANGHAI RUANJIE SOFTWARE | CN | 07/03/2023 | CN2023000216860 | CN116206541 | HOLOGRAPHIC PROJECTION CONSTRUCTION SYSTEM BASED ON BIM | |
| N9493 | CN | 116205111 | 02/06/2023 | BEIJING UNIVERSITY OF TECHNOLOGY | CN | 09/03/2023 | CN2023000222586 | CN116205111 | MULTI-DIMENSIONAL MULTI-CHANNEL MULTIPLEXING SUPER-SURFACE HOLOGRAPHIC OPTIMIZATION METHOD BASED ON REVERSE DESIGN | |
| N9494 | CN | 116198128 | 02/06/2023 | NOTTINGHAM INSTITUTE OF EXCELLENCE LIGHTHOUSE NINGBO INNOVATION RESEARCH INSTITUTE | CN | 01/03/2023 | CN2023000184657 | CN116198128 | HOLOGRAPHIC 3D PRINTER AND 3D PRINTING METHOD | |
| N9495 | CN | 116184798 | 30/05/2023 | CHINESE PEOPLE S LIBERATION GROUND FORCE ARMORED TROOP ACADEMY | CN | 27/02/2023 | CN2023000206050 | CN116184798 | ENCODING METHOD AND SYSTEM FOR GENERATING THREE-PHASE HOLOGRAM | |
| N9496 | CN | 116184796 | 30/05/2023 | ZHEJIANG UNIVERSITY | CN | 13/02/2023 | CN2023000106057 | CN116184796 | ACHROMATIC BROADBAND SUPER-SURFACE HOLOGRAPHIC IMAGING METHOD BASED ON NEURAL NETWORK | |
| N9497 | CN | 116184669 | 30/05/2023 | SHANGHAI UNIVERSITY UNIVERSITY OF HONG KONG | CN | 23/02/2023 | CN2023000156967 | CN116184669 | HOLOGRAPHIC NEAR-EYE DISPLAY DEVICE CAPABLE OF SIMULTANEOUSLY ILLUMINATING AT MULTIPLE ANGLES AND EYE PUPIL BOX EXPANSION METHOD | |
| N9498 | CN | 116165863 | 26/05/2023 | HUDA GUANGDONG HONG KONG MACAO GREATER BAY AREA INNOVATION RESEARCH INSTITUTE ZENGCHENG GUANGZHOU HUNAN UNIVERSITY | CN | 30/12/2022 | CN2022001739310 | CN116165863 | NESTED ENCRYPTION METHOD BASED ON MULTI-DIMENSIONAL MULTIPLEXING HOLOGRAM OF SUPER-SURFACE LIGHT FIELD | |
| N9499 | CA | 3141962 | 13/06/2023 | ARHT MEDIA | CA | 13/12/2021 | CA2021003141962 | CA3141962 | PORTABLE APPARATUS FOR GENERATING AND USING SIMULATED 3D IMAGES | |