

IHMA PATENT NEWSLETTER

Limited circulation patent news bulletin for the Holography Industry

DECEMBER 2023 – 73 PATENTS

Published and granted patents

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- 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).
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P37149

**SECURITY & OPTICAL EFFECTS' COLUMN
BANKNOTE – THREAD – RELIEF – MICROLENS – WINDOW**

WO2023232188

GIESECKE & DEVRIENT CURRENCY TECHNOLOGY

Inventor(s):

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Application Nber / Date:

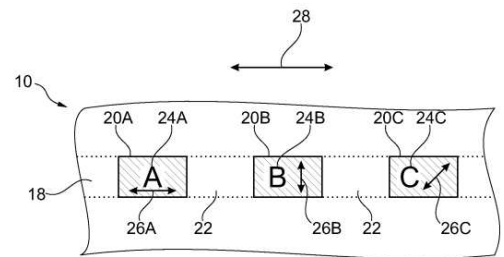
WODE2023/100378 2023-05-23

Priority Nber / Date / Country:

DE102022001950 2022-06-03

DATA CARRIER WITH WINDOW REGIONS, AND PRODUCTION METHOD

The invention relates to a data carrier (10), in particular a value or security document, comprising a plurality of spaced window regions (20A, 20B, 20C) which each have a security feature (24A, 24B, 24C) having an optically variable effect, and comprising intermediate regions (22) without an optically variable appearance, which intermediate regions separate the window regions (20A, 20B, 20C) from one another. According to the invention, different information is displayed in the plurality of window regions (20A, 20B, 20C) and the optically variable security features (24A, 24B, 24C) of the plurality of window regions each produce different dynamic effects (26A, 26B, 26C).



SUPPORT DE DONNÉES COMPRENANT DES RÉGIONS DE FENÊTRE ET PROCÉDÉ DE PRODUCTION

L'invention concerne un support de données (10), en particulier un document de valeur ou de sécurité, comprenant une pluralité de régions de fenêtre (20A, 20B, 20C) espacées qui comprennent chacune un signe de sécurité (24A, 24B, 24C) présentant un effet optiquement variable, et comprenant des régions intermédiaires (22) sans aspect optiquement variable, lesdites régions intermédiaires séparant les régions de fenêtre (20A, 20B, 20C) les unes des autres. Selon l'invention, différentes informations sont affichées dans la pluralité de régions de fenêtre (20A, 20B, 20C) et les signes de sécurité optiquement variables (24A, 24B, 24C) de la pluralité de régions de fenêtre produisent chacun différents effets dynamiques (26A, 26B, 26C).

CLAIM 1. Data carrier, in particular value or security document, having a plurality of spaced-apart window regions, which each have a security feature with an optically variable effect, and having intermediate regions without an optically variable appearance, which separate the window regions from one another, characterized in that different information is displayed in each case in the plurality of window regions and the optically variable security features of the plurality of window regions each produce different dynamic effects.

Equivalentents : DE102022001950A1

Status: Pending

Research Report:

INTERNATIONAL SEARCH REPORT

International application No.
PCT/DE2023/100378

A. CLASSIFICATION OF SUBJECT MATTER		
B42D 25/29(2014.01); B42D 25/342(2014.01); B42D 25/351(2014.01); B42D 25/355(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*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 102016007784 A1 (GIESECKE+DEVRIENT CURRENCY TECH GMBH [DE]) 28 December 2017 (2017-12-28) paragraph [0092] - paragraph [0093]; figure 8	1,2,5-8,10,12,16-18 3, 4
X	DE 102008032224 A1 (GIESECKE & DEVRIENT GMBH [DE]) 14 January 2010 (2010-01-14) figure 1	1,9,11-16,18
X	DE 102004049118 A1 (GIESECKE & DEVRIENT GMBH [DE]) 13 April 2006 (2006-04-13) figure 2	1,11-13,15,16,18

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

P37158

PRINTING – CARD – PASSPORT

US20230398799

Priority Date: 14/06/2022

ENTRUST

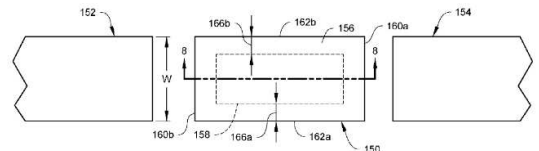
RIBBON SUPPLY ROLL HAVING ZONE-COATED SPLICE TAPE

A ribbon supply roll for use in a plastic card or passport personalization machine. The ribbon supply roll includes a zone-coated splice tape with a pressure sensitive adhesive on a backing film where the adhesive does not flow or ooze beyond the edges of the backing film. Therefore, a transferrable material on a winding layer in contact with the splice tape is not pulled away. For example, portions of the backing film of the splice tape are not coated with the adhesive which permits the adhesive to flow or ooze when pressure is applied to the splice tape. However, the adhesive does not flow enough to flow beyond the edges of the backing film.

ROULEAU D'ALIMENTATION EN RUBAN AYANT UNE BANDE D'ÉPISSURE REVÊTUE PAR ZONE

Rouleau d'alimentation en ruban destiné à être utilisé dans une machine de personnalisation de carte plastique ou de passeport. Le rouleau d'alimentation en ruban comprend une bande d'épissure revêtue par zone avec un adhésif sensible à la pression sur un film de support où l'adhésif ne s'écoule pas ou ne suinte pas au-delà des bords du film de support. Par conséquent, un matériau transférable sur une couche d'enroulement en contact avec la bande d'épissure n'est pas retiré. Par exemple, des parties du film de support de la bande d'épissure ne sont pas revêtues de l'adhésif, ce qui permet à l'adhésif de s'écouler ou de suinter lorsqu'une pression est appliquée sur la bande d'épissure. Cependant, l'adhésif ne s'écoule pas suffisamment pour s'écouler au-delà des bords du film de support.

CLAIM 1. A ribbon supply roll for use in a plastic card or passport personalization machine, the ribbon supply roll comprising: a core; a ribbon wound on the core, at least a portion of the ribbon includes a carrier film and a transferrable material disposed on the carrier film, wherein the transferrable material is suitable for being transferred from the carrier film



to a plastic card or a passport in the plastic card or passport personalization machine; a splice tape disposed along a length of the ribbon and interconnecting two initially separate sections of the ribbon, the splice tape includes a backing film and a pressure sensitive adhesive on the backing film, and the pressure sensitive adhesive does not extend beyond edges of the backing film.

P37164

LABEL – RFID – TRACK & TRACE

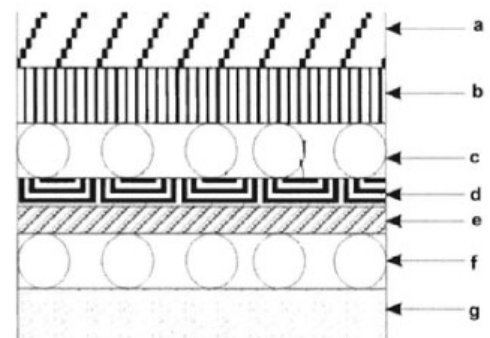
RO-137796

Priority Date: 13/05/2022

INSTITUTUL NATIONAL DE CERCETARE DEZVOLTARE PENTRU MICROTEHNOLOGIE IMT BUCURESTI | OPTOELECTRONICA 2001

PROCESS OF INTEGRATION OF LONG RANGE RFID ELEMENTS IN MULTILAYER SMART HOLOGRAPHIC LABELS FOR INCREASED SECURITY DEGREE

The invention relates to a process for making a smart holographic label with integrated RFID element meant to protect products against counterfeiting, to ensure traceability from the producer to the consumer, to ensure checking and authentication of product originality from a distance of up to 10 m and to permit the consumer to chose the product which better meets his/her demands. According to the invention, the process consists in combining a process for making labels with multilayer smart hologram (a) with high security degree by integration of different security elements in several label layers with a process of making a polymeric foil with RFID antenna and chip (d).



P37166

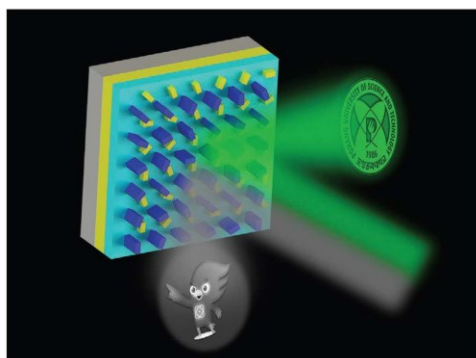
KR20230168505

Priority Date: 07/06/2022

POHANG UNIVERSITY OF SCIENCE & TECHNOLOGY POSTECH |
POSCO | RESEARCH INSTITUTE OF INDUSTRIAL SCIENCE &
TECHNOLOGY

METASURFACE REALIZING INDEPENDENT HOLOGRAM USING VARIOUS WAVELENGTHS AND METHOD OF MANUFACTURING THE SAME

The present invention relates to a metasurface which realizes an independent hologram using various wavelengths which can be used in a 3D display, an anti-counterfeiting technique, and the like, and a method for manufacturing the same.



CLAIM 1. A meta-surface comprising: a substrate; a back-surface reflective plate provided on the substrate; a spacer layer formed on the back-surface reflective plate; and a plurality of nanostructures formed on the spacer layer, wherein the nanostructures are formed of two or more different materials.

P37191

PRINTING

CN220198908U

Priority Date: 19/06/2023

WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT

HOLOGRAPHIC POSITIONING THERMOPRINT FILM

The utility model discloses a holographic positioning thermoprinting film, which belongs to the technical field of anti-counterfeiting printing and comprises a base film layer, a stripping layer, a coloring layer, a plating layer, an atomizing layer and a glue layer which are sequentially laminated in the thickness direction, wherein the atomizing layer is arranged between the plating layer and the glue layer and is used for forming a fog surface so as to realize scattering of light reflected by a cursor. The holographic positioning thermoprinting film is simple in structure and convenient to set, and the atomizing layer is arranged between the adhesive layer and the plating layer, so that the thermoprinting film can show good mist effect when observed from the adhesive surface, light reflected by a positioning cursor is scattered under the action of the atomizing layer, and further, the accurate identification of the positioning cursor by a photoelectric eye is realized, and the accurate thermoprinting of color patterns on the thermoprinting film on the appointed position of an article is ensured, so that the holographic positioning thermoprinting film has good practical value and application prospect.



CLAIM 1. A holographic positioning thermoprinting film comprises a base film layer, a stripping layer, a coloring layer, a plating layer and a glue layer which are sequentially laminated in the thickness direction, and is characterized in that, the device further comprises an atomization layer arranged between the plating layer and the adhesive layer and used for forming an atomization surface so as to realize scattering of light reflected by the cursor.

P37193

LABEL – LUMINESCENCE

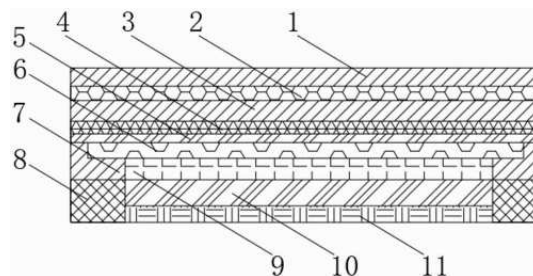
CN220171691U

Priority Date: 09/06/2023

HUBEI GEDIAN DEVELOPMENT REGION CHENGUANG INDUSTRIAL

SELF-LUMINOUS LASER HOLOGRAPHIC ANTI-COUNTERFEITING LABEL

The utility model provides a self-luminous laser holographic anti-counterfeiting label, which relates to the technical field of holographic anti-counterfeiting labels and comprises a packaging layer, wherein a holographic label layer is arranged at the bottom of the packaging layer, a shaping layer is arranged at the bottom of the holographic label layer, a reinforcing layer is arranged at the bottom of the shaping layer, a light-transmitting layer is arranged at the bottom of the reinforcing layer, a luminous base layer is arranged at the bottom of the luminous base layer, a fluorescent layer is arranged at the bottom of the fluorescent layer, an auxiliary fixing layer is arranged at the bottom of the auxiliary fixing layer, a bottom rigid layer is arranged at the bottom of the auxiliary fixing layer, a reinforcing layer and an anti-collision angle are adopted in the lateral direction, so that the whole label has better corner anti-collision performance, the label is guaranteed to have better strength, when the corner of the label is impacted, solar power supply can be adopted under the condition that illumination is good, autonomous power generation of the label is realized, and observation and recognition are more convenient.



CLAIM 1. The self-luminous laser holographic anti-counterfeiting label comprises a packaging layer (1), and is characterized in that: the bottom of packaging layer (1) is equipped with holographic label layer (2), the bottom of holographic label layer (2) is equipped with shaping layer (3), the bottom of shaping layer (3) is equipped with enhancement layer (4), the bottom of enhancement layer (4) is equipped with printing opacity layer (5), the bottom of printing opacity layer (5) is equipped with luminous basic unit (6), the bottom of luminous basic unit (6) is equipped with fluorescent layer (9), the bottom of fluorescent layer (9) is equipped with supplementary fixed layer (10), the side of luminous basic unit (6) and fluorescent layer (9) is equipped with enhancement layer (7), the bottom of supplementary fixed layer (10) is equipped with bottom rigidity layer (11).

P37198

PRINTING – HOLOGRAPHY

CN220129750U

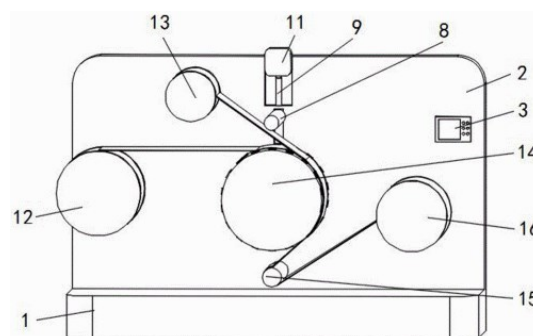
Priority Date: 16/06/2023

JIANGSU ZHENXIANG ANTI COUNTERFEITING TECHNOLOGY

LASER HOLOGRAPHIC ANTI-COUNTERFEITING PATTERN TRANSFER DEVICE

The utility model relates to the technical field of transfer printing holographic anti-counterfeiting patterns, and provides a transfer printing device capable of laser holographic anti-counterfeiting patterns. This transfer device uses through the cooperation of interior pole structure and outer pole structure, can detect the hot pressing roller at infrared inductor after, control panel control motor stop work for the slider stops rotating, presses the top of roller laminating hot pressing roller this moment, with this fixed stock and foil of effective pressing, reaches the quick adjustment hot pressing roller and presses the distance between, the effect of being convenient for stock and foil put into.

CLAIM 1. The utility model provides a but holographic anti-fake pattern transfer device of laser, a serial communication port, including bottom plate (1), the rear side fixed mounting of bottom plate (1) has curb plate (2), the upper right side fixed mounting of curb plate (2) front side has control panel (3), spout (4) have been seted up at the middle part of curb plate (2) front side, the inner chamber movable mounting of spout (4) has slider (5), the bottom fixed mounting of slider (5) has infrared inductor (6), the front side movable mounting of slider (5) has connecting rod (7), the front side movable mounting of connecting rod (7) has press roller (8), the top fixed mounting of slider (5) has interior pole (9), the top movable mounting of interior pole (9) has outer pole (10), the top fixed mounting at curb plate (2) middle part has motor (11).



P37199

LABEL

CN220129694U

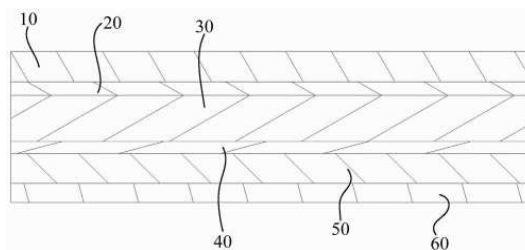
Priority Date: 15/06/2023

SHENZHEN ZHONGYI GIFTS

ALUMINUM-BASED COMPOSITE NOBLE METAL MATERIAL STRUCTURE

The utility model discloses an aluminum-based composite noble metal material structure, which comprises a noble metal foil layer, a first adhesive layer, an aluminum foil layer, a second adhesive layer, an anti-counterfeiting mark layer and a protective layer which are sequentially arranged from top to bottom, wherein the anti-counterfeiting mark layer is provided with anti-counterfeiting mark information, the protective layer covers the anti-counterfeiting mark layer, and the noble metal foil layer, the first adhesive layer, the aluminum foil layer, the second adhesive layer, the anti-counterfeiting mark layer and the protective layer are manufactured through a composite process. The technical scheme of the utility model can ensure that the anti-counterfeiting mark on the noble metal ornament is not easy to wear and consume.

CLAIM 1. The aluminum-based composite noble metal material structure is characterized by comprising a noble metal foil layer, a first adhesive layer, an aluminum foil layer, a second adhesive layer, an anti-counterfeiting mark layer and a protective layer which are sequentially arranged from top to bottom, wherein the anti-counterfeiting mark layer is provided with anti-counterfeiting mark information, the protective layer covers the anti-counterfeiting mark layer, and the noble metal foil layer, the first adhesive layer, the aluminum foil layer, the second adhesive layer, the anti-counterfeiting mark layer and the protective layer are manufactured through a composite process.



P37222

LABEL

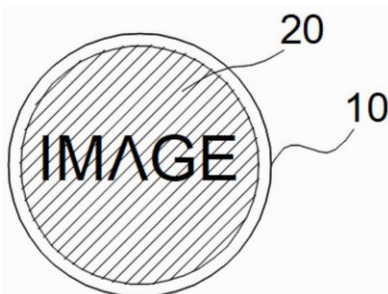
CN117162693

Priority Date: 16/10/2023

SUZHOU IMPRESSION TECHNOLOGY

HOLOGRAPHIC LASER METAL LABEL PREPARATION METHOD

The application discloses a preparation method of a holographic laser metal label, which comprises the following steps: s1, arranging a polymer on a first surface of a metal substrate; s2, arranging a holographic structure on one side of the polymer far away from the metal substrate in the S1 to form a holographic structure layer; s3, a coating layer is arranged on one side, far away from the metal substrate, of the holographic structure layer in the S2, and the coating layer at least covers the holographic structure layer. The manufacturing method provided by the application can be used for tightly applying the holographic laser optical image-text to the metal substrate, and the manufactured product has more exquisite texture than the common paper and plastic materials, because the resin layer is directly solidified on the surface of the metal substrate, and the holographic laser optical image-text has no other organic matters except the resin and the metal substrate, so that the holographic laser optical image-text has the self-tearing-proof function and has excellent weather resistance, and the manufactured product has good application space no matter being manufactured into logo label marks or anti-counterfeiting decorations.



CLAIM 1. The preparation method of the holographic laser metal label is characterized by comprising the following steps of: s1, arranging a polymer on a first surface of a metal substrate; s2, arranging a holographic structure on one side of the polymer far away from the metal substrate in the S1 to form a holographic structure layer; s3, a coating layer is arranged on one side, far away from the metal substrate, of the holographic structure layer in the S2, and the coating layer at least covers the holographic structure layer.

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

P37144

PRINTING – CARD – PASSPORT – BRAND PROTECTION – RELIEF

WO2023237476

Priority Date: 09/06/2022

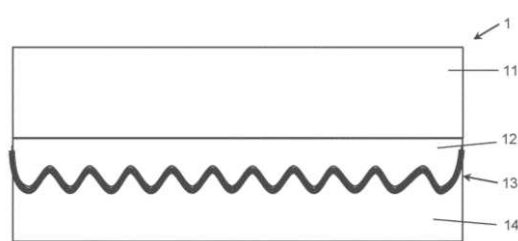
LEONHARD KURZ STIFTUNG | OVD KINEGRAM | SCRIBOS

METHOD FOR PRODUCING A MULTILAYER BODY, MULTILAYER BODY, METHOD FOR AUTHENTICATING A MULTILAYER BODY, AND AUTHENTICATION SYSTEM

The invention relates to a method for producing a multilayer body (1), in particular a laminating film or transfer film, wherein a replication layer (12) is applied to a carrier layer (11), and a first graphic code (21) is Fourier-transformed into a two-dimensional Fourier pattern (23) and the two-dimensional Fourier pattern (23) is binarised in order to obtain a binarised two-dimensional Fourier pattern (24), and the binarised two-dimensional Fourier pattern (24) is transferred to an embossing tool and, by means of the embossing tool, the binarised two-dimensional Fourier pattern (24) is moulded, as an embossed structure, into the replication layer (12) at least partially in a first region.

PROCÉDÉ DE FABRICATION D'UN CORPS MULTICOUCHE, CORPS MULTICOUCHE, PROCÉDÉ D'AUTHENTIFICATION D'UN CORPS MULTICOUCHE ET SYSTÈME D'AUTHENTIFICATION

L'invention concerne un procédé de fabrication d'un corps multicouche (1), en particulier d'un film de stratification ou d'un film de transfert, une couche de réplique (12) étant appliquée sur une couche de support (11), un premier code graphique (21) étant converti par transformation de Fourier en un motif de Fourier bidimensionnel (23), le motif de Fourier bidimensionnel (23) étant binarisé afin d'obtenir un motif de Fourier bidimensionnel binarisé (24), le motif de Fourier bidimensionnel binarisé (24) étant transféré à un outil de gaufrage et, au moyen de l'outil de gaufrage, le motif de Fourier bidimensionnel binarisé (24) étant moulé, sous la forme d'une structure gaufrée, dans la couche de réplique (12) au moins partiellement dans une première région.



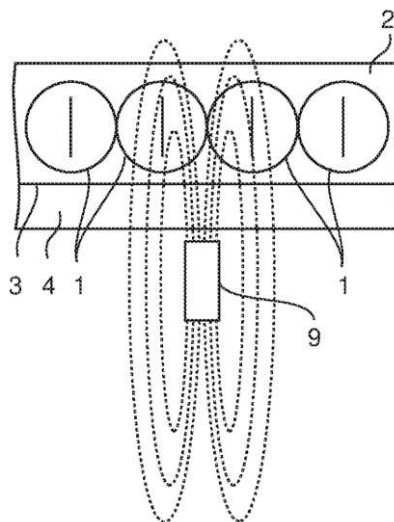
CLAIM 1. Process for producing a multilayer body (1), in particular a laminating film or transfer film, in which a replication layer (12) is applied to a carrier layer (11), and a first graphic code (21) is Fourier-transformed into a two-dimensional Fourier pattern (23) and the two-dimensional Fourier pattern (23) is binarized in order to obtain a binarized two-dimensional Fourier pattern (24), and the binarized two-dimensional Fourier pattern (24) is transferred to an embossing tool and the binarized two-dimensional Fourier pattern (24) is formed as an embossed structure at least partially in a first region into the replication layer (12) by means of the embossing tool.

METHOD FOR PRODUCING OPTICALLY VARIABLE ELEMENTS, AND OPTICALLY VARIABLE ELEMENTS FOR PRODUCING A PRINTING INK AND/OR A SECURITY FEATURE

The invention relates to a method for producing optically variable elements, comprising a pigment production step, in which a plurality of magnetic color pigments (8) are produced in such a way that they are of flat design, have an identical outer contour having a maximum lateral extent d and satisfy the following condition A: $0 < (p_j / d)^2 < 0.2$, where p_a is the standard deviation of the distribution of the maximum lateral extent d , and an encapsulation step, in which at least one magnetic color pigment (8) is in each case encapsulated in such a way that there are a plurality of capsules (5) having a solid shell (6) and a liquid core (7), in which the at least one magnetic color pigment (8) floats and is thus magnetically alignable.

PROCÉDÉ DE FABRICATION D'ÉLÉMENTS OPTIQUEMENT VARIABLES ET ÉLÉMENTS OPTIQUEMENT VARIABLES POUR LA PRODUCTION D'UNE ENCRE D'IMPRESSION ET/OU D'UNE CARACTÉRISTIQUE DE SÉCURITÉ

L'invention concerne un procédé de production d'éléments optiquement variables, comprenant une étape de production de pigment, dans laquelle une pluralité de pigments magnétiques de couleur (8) sont produits de telle sorte qu'ils sont de conception plate, présentent un contour externe identique pourvue d'une étendue latérale maximale d et satisfont à la condition suivante A : $0 < (p_j/d)^2 < 0,2$, p_a étant l'écart type de la distribution de l'étendue latérale maximale d ; et une étape d'encapsulation, dans laquelle au moins un pigment magnétique de couleur (8) est dans chaque cas encapsulé de telle sorte qu'il existe une pluralité de capsules (5) présentant une enveloppe solide (6) et un noyau liquide (7), dans lequel l'au moins un pigment magnétique de couleur (8) flotte et est ainsi alignable magnétiquement.



CLAIM 1. Method for producing optically variable elements, comprising a pigment production step, in which a plurality of magnetic color pigments (8) are produced in such a way that they are flat, have an identical outer contour with a maximum lateral extent d and satisfy the following condition A: $0 < (p_a / d)^2 < 0.2$, where p_a is the standard deviation of the distribution of the maximum lateral extent d , and an encapsulation step, in which in each case at least one magnetic color pigment (8) is encapsulated in such a way that a plurality of capsules (5) with a solid shell (6) and a liquid core (7) are present, in which the at least one magnetic color pigment (8) floats and is thus magnetically alignable.

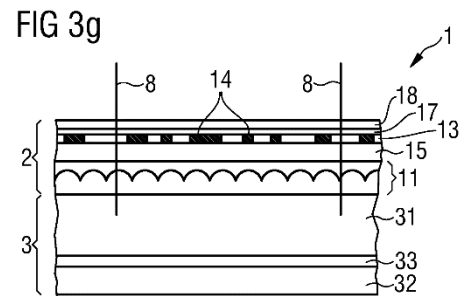
SECURITY ELEMENT TRANSFER MATERIAL FOR TRANSFERRING SECURITY ELEMENTS HAVING A MICRO-OPTICAL AUTHENTICITY FEATURE AND METHOD FOR PRODUCING SAID SECURITY ELEMENT TRANSFER MATERIAL

The invention relates to security element transfer materials (1) for transferring security elements (4) having a micro-optical authenticity feature to a valuable object (5, 30). The micro-optical authenticity features produce an optical effect by the cooperation of a first micro-optical arrangement (11), which has focusing elements (12, e.g. micro-lenses), with a second micro-optical arrangement (13), which has micro-motif elements (14). The security element transfer material (1) has a temporary carrier (3) in the form of a layered composite material. The temporary carrier is composed of a first temporary carrier substrate (31, 34) and a second temporary carrier substrate (32), which can be undetachably adhesively bonded by means of an adhesive layer (33). The outlines of the security elements to be transferred are cut in (8) or have been pre-cut (8), while the second temporary carrier substrate (32) is not cut, so that the temporary carrier can be removed as a complete carrier layered composite (figures 3i, 4g, 5h). A permanent carrier (15) is undetachably joined to the micro-lenses. A transfer adhesive (18) makes possible the adhesion to the final substrate (30) of the valuable object.

MATÉRIAU DE TRANSFERT D'ÉLÉMENT DE SÉCURITÉ POUR TRANSFÉRER DES ÉLÉMENTS DE SÉCURITÉ AYANT UNE CARACTÉRISTIQUE D'AUTHENTICITÉ MICRO-OPTIQUE ET PROCÉDÉ DE PRODUCTION DUDIT MATÉRIAU DE TRANSFERT D'ÉLÉMENT DE SÉCURITÉ

L'invention concerne des matériaux de transfert d'éléments de sécurité (1) pour transférer des éléments de sécurité (4) présentant une caractéristique d'authenticité micro-optique à un objet de valeur (5, 30). Les caractéristiques d'authenticité micro-optique produisent un effet optique par la coopération d'un premier agencement micro-optique (11), qui a des éléments de focalisation (12, par exemple des microlentilles), avec un second agencement micro-optique (13), qui a des éléments de micro-motif (14). Le matériau de transfert d'élément de sécurité (1) comporte un support temporaire (3) sous la forme d'un matériau composite stratifié. Le support temporaire est composé d'un premier substrat de support temporaire (31, 34) et d'un second substrat de support temporaire (32), qui peuvent être collés de manière adhésive et inamovible au moyen d'une couche adhésive (33). Les contours des éléments de sécurité à transférer sont coupés (8) ou ont été prédécoupés (8), tandis que le second substrat de support temporaire (32) n'est pas coupé, de sorte que le support temporaire peut être retiré en tant que composite stratifié de support complet (figures 3i, 4g, 5h). Un support permanent (15) est relié de manière inamovible aux microlentilles. Un adhésif de transfert (18) permet l'adhérence au substrat final (30) de l'objet de valeur.

CLAIM 1. Method for producing a security element transfer material (1), which has a security element layer composite (2) and a temporary carrier (3) which is detachably connected to the security element layer composite, wherein the security element layer composite (2) has a layer with a first micro-optical arrangement (11), which has a plurality of focusing elements (12), a layer with a second micro-optical arrangement (13), which has a plurality of micro-motif elements (14), and a permanent carrier substrate (15) between the layers the first and the second micro-optical arrangement, wherein the first (11) and the second (13) micro-optical arrangement cooperate to produce an optical effect, and wherein the method has the following steps: (1) producing the first micro-optical arrangement (11). (a) applying an embossing varnish (20) with a refractive index $n > 1.55$, in particular $n > 1.6$, to a surface of the temporary carrier (3), the embossing varnish layer (20) being releasably bonded to the temporary carrier (3). is, embossing a focusing structure (10) into the embossing lacquer layer (20), and laminating the permanent carrier substrate (15) onto the focusing structure (10) using a laminating lacquer (23) with a refractive index $n < 1.45$, in particular $n < 1, 3$, wherein the laminating lacquer layer (23) forms a structure complementary to the focusing structure (10) at the interface to the embossing lacquer layer (20) while producing the focusing elements (12) and connects the permanent carrier substrate (3) to the embossing lacquer layer (20), or by (b) applying an embossing varnish (21) with a refractive index $n < 1.45$, in particular $n < 1.3$, to a surface of the permanent carrier substrate (15), the embossing varnish layer (21) being inseparable from the permanent carrier substrate (15) is connected, inversely embossing a focusing structure (19) into the embossing lacquer layer (21), and laminating the temporary carrier (3) onto the inverse focusing structure (19) by means of a laminating lacquer (22) with a refractive index $n > 1.55$, in particular $n > 1.6$, whereby the laminating lacquer layer (22) forms a structure complementary to the inverse focusing structure (19) at the interface to the embossing lacquer layer (21) while producing the focusing elements (12) and is inseparable from the embossing lacquer layer (21), but is detachably connected to the temporary carrier (3), (2) producing the second micro-optical arrangement (13) by forming the micro-motif elements (14) on the surface of the permanent carrier substrate (15) facing away from the temporary carrier (3), (3) optionally coating the entire surface or part of the second micro-optical arrangement (13) with at least one further layer, (4) applying a transfer adhesive layer (18) to the second micro-optical arrangement (13) and/or the at least one further layer, and (5) cutting the Outline shapes (7) of the security elements (4) to be transferred, wherein in step (1) a carrier layer composite is used as the temporary carrier (3), which consists of a first temporary carrier substrate (31) and a second temporary carrier substrate (32), which are formed by means of a Adhesive layer (33) are permanently bonded, or in step (1) a first carrier substrate (31) is used as a temporary carrier (3), and before step (5) the first carrier substrate (31) is inextricably bonded to a second carrier substrate (32) is glued, and wherein in step (5) at least the second temporary carrier substrate (32) is not cut, so that the temporary carrier (3) can be separated as a complete carrier layer composite.

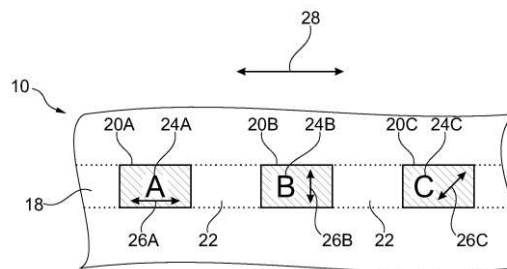


DATA CARRIER WITH WINDOW REGIONS, AND PRODUCTION METHOD

The invention relates to a data carrier (10), in particular a value or security document, comprising a plurality of spaced window regions (20A, 20B, 20C) which each have a security feature (24A, 24B, 24C) having an optically variable effect, and comprising intermediate regions (22) without an optically variable appearance, which intermediate regions separate the window regions (20A, 20B, 20C) from one another. According to the invention, different information is displayed in the plurality of window regions (20A, 20B, 20C) and the optically variable security features (24A, 24B, 24C) of the plurality of window regions each produce different dynamic effects (26A, 26B, 26C).

SUPPORT DE DONNÉES COMPRENANT DES RÉGIONS DE FENÊTRE ET PROCÉDÉ DE PRODUCTION

L'invention concerne un support de données (10), en particulier un document de valeur ou de sécurité, comprenant une pluralité de régions de fenêtre (20A, 20B, 20C) espacées qui comprennent chacune un signe de sécurité (24A, 24B, 24C) présentant un effet optiquement variable, et comprenant des régions intermédiaires (22) sans aspect optiquement variable, lesdites régions intermédiaires séparant les régions de fenêtre (20A, 20B, 20C) les unes des autres. Selon l'invention, différentes informations sont affichées dans la pluralité de régions de fenêtre (20A, 20B, 20C) et les signes de sécurité optiquement variables (24A, 24B, 24C) de la pluralité de régions de fenêtre produisent chacun différents effets dynamiques (26A, 26B, 26C).



CLAIM 1. Data carrier, in particular value or security document, having a plurality of spaced-apart window regions, which each have a security feature with an optically variable effect, and having intermediate regions without an optically variable appearance, which separate the window regions from one another, characterized in that different information is displayed in each case in the plurality of window regions and the optically variable security features of the plurality of window regions each produce different dynamic effects.

P37188

PRINTING – CARD – PASSPORT – MAGNETISM

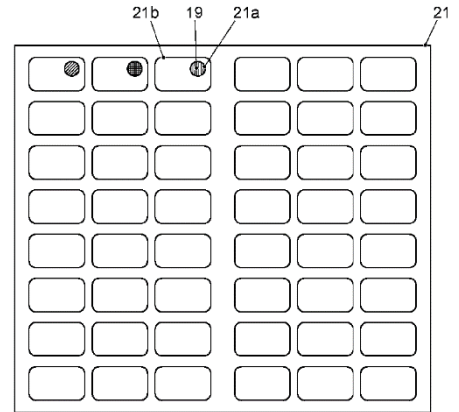
EP4282663

GIESECKE DEVRIENT EPAYMENTS

Priority Date: 24/05/2022

METHOD FOR PRODUCING A SECURITY FEATURE, SECURITY FEATURE FOR A DATA CARRIER, DATA CARRIER AND LAMINATION SHEET

The invention relates to a method for producing a security feature (11) for a data carrier (10), comprising the following steps: - providing a data carrier (10) consisting of films (15, 16); - applying an ink (18) or a magnetic pigment film (17) with magnetically orientable effect pigments to a film (15, 16); - laminating the data carrier (10) consisting of the films (15, 16) and the ink (18) or the magnetic pigment film (17) by means of a laminating sheet (21) which has at least one magnet (19), wherein the following steps are carried out: - liquefying the lacquer or the ink (18) with magnetically orientable effect pigments; and - aligning the magnetically orientable effect pigments by means of the magnets (19).



CLAIM 1. Method for producing a security feature (11) for a data carrier (10), having the steps: - providing at least two films (15, 16); - applying a lacquer or a color (18) with magnetically orientable effect pigments to a film (15, 16); - laminating the films (15, 16) by means of a laminating sheet (21) which has at least one magnet (19), the following steps being carried out during lamination: - liquefying the color (18) with magnetically orientable effect pigments; and - aligning the magnetically orientable effect pigments by means of the magnets (19).

P37189

CARD – MAGNETISM

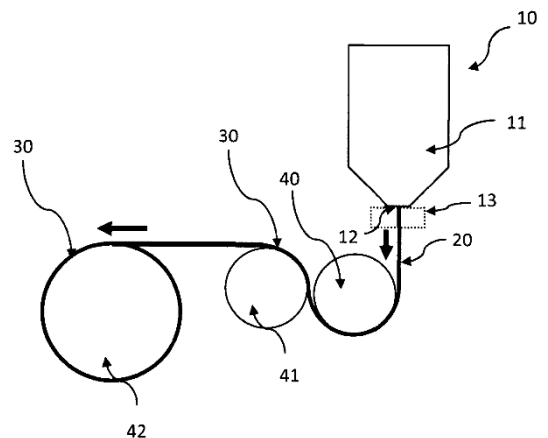
DE102022001820

GIESECKE DEVRIENT EPAYMENTS

Priority Date: 24/05/2022

METHOD FOR PRODUCING A FILM WITH A SECURITY FEATURE FOR A CARD-SHAPED DATA CARRIER, FILM, CARD-SHAPED DATA CARRIER AND EXTRUSION DEVICE

The invention relates to a method for producing a film (30) having a security feature for a card-shaped data carrier, comprising the following steps: - providing at least one film material; - providing magnetically orientable effect pigments; - introducing the film material and the magnetically orientable effect pigments as a mixture into an extruder (11) of an extrusion device (10), which has at least one magnetic alignment unit (13); - heating the mixture to form a melt (20); - extruding the melt (20) through a die outlet gap (12) of the extrusion device (10) to form a film (30); - aligning the magnetically orientable effect pigments by means of the magnetic alignment unit (13) to form a security feature in the film, wherein the aligned magnetically orientable effect pigments are integrated within the film (30); and - cooling the film (30) in order to form the aligned magnetically orientable effect pigments within the film. The invention also relates to a film (30), a card-shaped data carrier and an extrusion device (10).



CLAIM 1. Method for producing a film (30) having a security feature for a card-shaped data carrier, which comprises the following steps: - providing at least one film material; - providing magnetically orientable effect pigments; - introducing the film material and the magnetically orientable effect pigments as a mixture into an extruder (11) of an extrusion apparatus (10) which has at least one magnetic alignment unit (13); - heating the mixture to form a melt (20); - extruding the melt (20) through a die outlet gap (12) of the extrusion apparatus (10) to form a film (30); - aligning the magnetically orientable effect pigments by means of the magnetic alignment unit (13) to form a security feature in the film, the aligned magnetically orientable effect pigments being integrated within the film (30); and - cooling the film (30) in order to form the aligned magnetically orientable effect pigments within the film (30) in their positions and/or orientations.

P37202

PRINTING – CARD – RELIEF

CN220121262U

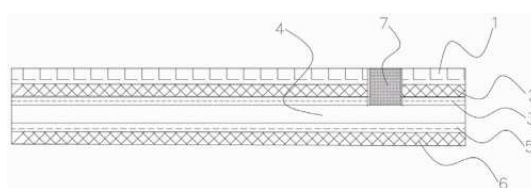
Priority Date: 05/05/2023

HIGHTEC TECHNOLOGY

ANTI-FAKE SMART CARD

The utility model discloses an anti-counterfeiting smart card, which comprises an anti-counterfeiting layer, a first protective layer, a printing layer and a second protective layer, wherein the anti-counterfeiting layer, the first protective layer, the printing layer and the second protective layer are sequentially laminated from top to bottom, the anti-counterfeiting layer comprises a grating layer and a character layer, the grating layer is arranged on the upper surface of the anti-counterfeiting layer, micrometer-sized cylindrical grooves are etched on the grating layer at intervals, the character layer is arranged above the grating layer, and micrometer-sized micro characters are etched on the character layer. The utility model makes the surface of the smart card have a certain concave-convex anti-counterfeiting effect through the micro etching process, and can accurately identify the related image-text information at the anti-counterfeiting layer under the condition of using a magnifying glass with a certain multiple, thereby providing anti-counterfeiting measures of micron-sized micro characters and grating laser carving patterns with concave-convex effect for the smart card so as to improve the anti-counterfeiting effect.

CLAIM 1. The utility model provides an anti-fake smart card, its characterized in that, includes anti-fake layer, first protective layer, printing layer and second protective layer, anti-fake layer, first protective layer, printing layer and second protective layer from top to bottom laminate forming in proper order, anti-fake layer includes grating layer and literal layer, the grating layer sets up the upper surface on anti-fake layer, just the interval etching has the cylinder groove of micron order on the grating layer, literal layer sets up the top on grating layer, the etching has the miniature characters of micron order on the literal layer.



P37203

PRINTING

CN220121018U

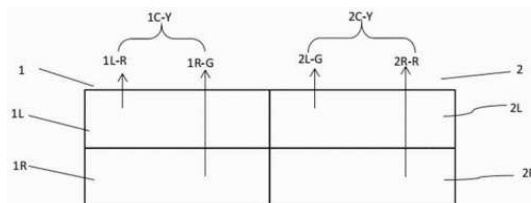
Priority Date: 24/04/2023

SHANGHAI XIANHUAN HIGH TECHNOLOGY NEW MATERIAL

IDENTIFICATION ELEMENT AND IDENTIFICATION OBJECT

The present utility model relates to the field of identification media, and more particularly to an identification element and an identification object. An identification element comprising a first area 1 and a second area 2 randomly distributed. The phase difference layer is arranged, the identification dimension is increased, and the identification element which has multiple colors under a single identification window and can be switched along with the rotation of the identification window is provided; the phase difference layer is arranged, so that the identification difficulty is reduced, and an identification element which has multiple colors only through the irradiation of a mobile phone screen and can be switched in color when the mobile phone screen rotates is provided; the patterned phase difference layer is added, so that the safety of the identification element is further improved, and the identification element which can be identified only by irradiation of a mobile phone screen and is formed by multiple color combinations and is patterned is provided, and when the mobile phone screen rotates, the colors and the patterns can be switched.

CLAIM 1. An identification element is characterized by comprising a first area (1) and a second area (2) which are randomly distributed, wherein the first area comprises n layers of left-handed cholesteric liquid crystal reflecting layers (1L) and n layers of right-handed cholesteric liquid crystal reflecting layers (1R) which are mutually overlapped, and a color difference value delta E between the lamination color 1L of the left-handed cholesteric liquid crystal reflecting layers (1L) and the lamination color 1R of the right-handed cholesteric liquid crystal reflecting layers (1R) is more than or equal to 6.5; the second region comprises n layers of left-handed cholesteric liquid crystal reflecting layers (2L) and n layers of right-handed cholesteric liquid crystal reflecting layers (2R) which are mutually overlapped, the color difference value delta E between the color 2L of the left-handed cholesteric liquid crystal reflecting layers (2L) of the second region and the color 1R of the right-handed cholesteric liquid crystal reflecting layers (1R) of the first region is less than or equal to 6.5, and the color difference value delta E between the color 2R of the right-handed cholesteric liquid crystal reflecting layers (2R) of the second region and the color 1L of the left-handed cholesteric liquid crystal reflecting layers (1L) of the first region is less than or equal to 6.5; n is more than or equal to 1.



P37208

BANKNOTE – RELIEF – MICROLENS

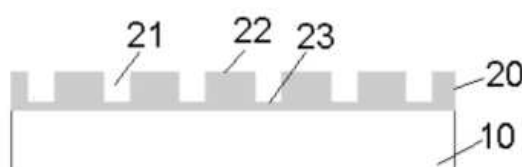
CN117227350

Priority Date: 07/06/2022

CHINA BANKNOTE PRINTING & MINT

METHOD FOR PRODUCING AN OPTICAL SECURITY ELEMENT AND OPTICAL SECURITY ELEMENT

The application provides a preparation method of an optical anti-counterfeiting element and the optical anti-counterfeiting element. A method of making an optical security element comprising: step S1: obtaining a substrate layer; step S2: a compression molding layer is arranged on one side surface of the substrate layer, the compression molding layer comprises a first surface and a second surface with a height difference, the second surface is concavely arranged towards the substrate layer relative to the first surface, and a groove is formed on the second surface; step S3: filling water-soluble materials in the grooves; step S4: depositing a plating layer on one side of the compression molding layer away from the substrate layer; step S5: removing a coating on the water-soluble material in the groove by adopting a water washing mode; step S6: and printing a coloring layer on one side of the plating layer away from the compression molding layer. The application solves the problem that the optical anti-counterfeiting element in the prior art is difficult to realize.



CLAIM 1. A method of making an optical security element comprising: step S1: obtaining a substrate layer (10); step S2: - providing a compression molded layer (20) on one side surface of the substrate layer (10), the compression molded layer (20) comprising a first surface (22) and a second surface (23) having a height difference, the second surface (23) being arranged concave to the substrate layer (10) relative to the first surface (22), the second surface (23) forming a groove (21); step S3: filling the grooves (21) with a water-soluble material (30); step S4: depositing a plating layer (40) on a side of the compression molding layer (20) remote from the substrate layer (10); step S5: removing the water-soluble material (30) in the groove (21) and a coating (40) on the water-soluble material (30) in a water washing mode; step S6: a coloring layer (60) is printed on the side of the plating layer (40) remote from the compression molding layer (20).

P37210

BANKNOTE – LABEL

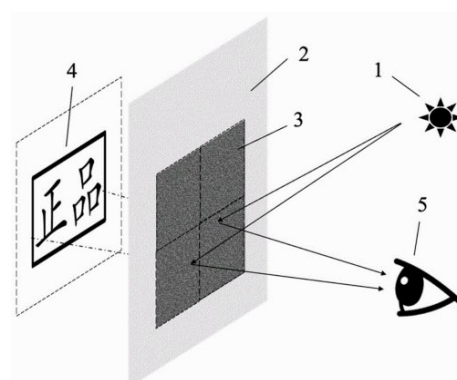
CN117218939

Priority Date: 09/05/2023

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

ANTI-COUNTERFEITING OPTICAL ELEMENT AND PREPARATION METHOD THEREOF

An anti-counterfeiting optical element and a preparation method thereof, wherein the anti-counterfeiting optical element comprises a planar substrate and is characterized by further comprising a surface optical anti-counterfeiting layer positioned on the planar substrate; the surface optical anti-counterfeiting layer is formed by periodically distributed phase areas, each phase area is formed by a plurality of step pixel blocks which are closely arranged, have different heights and have the same square bottom surface, and the surface optical anti-counterfeiting layer forms an anti-counterfeiting pattern under the irradiation of visible light. The anti-counterfeiting optical element has the advantages of low processing cost, strong anti-counterfeiting capability, wide application range, clear anti-counterfeiting image and the like, and can be applied to the fields of currency, credentials, labels and the like.



CLAIM 1. An anti-counterfeiting optical element comprising a planar substrate, and further comprising a surface optical anti-counterfeiting layer on the planar substrate; the surface optical anti-counterfeiting layer is formed by periodically distributed phase areas, each phase area is formed by a plurality of step pixel blocks which are closely arranged, have different heights and have the same square bottom surface, and the surface optical anti-counterfeiting layer forms an anti-counterfeiting pattern under the irradiation of visible light.

P37216

PRINTING – BRAND PROTECTION

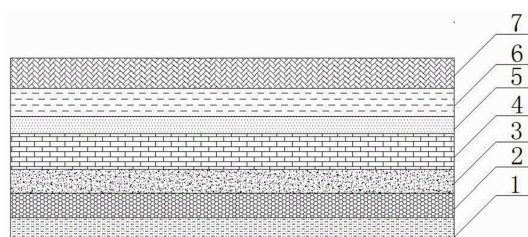
CN117188209

Priority Date: 28/09/2023

SVG YANCHENG OPTRONICS

LOW-SOLVENT-RESIDUE UV TRANSFER PAPER AND PREPARATION METHOD THEREOF

The invention relates to low-solvent-residue UV transfer paper and a preparation method thereof, belonging to the technical field of cigarette packaging materials; the UV transfer paper is a back coating, and a base paper layer, a water-based environment-friendly adhesive layer, a medium layer, a water-based bonding coating, a UV transfer coating with micro-nano structure laser patterns and a water-based paint layer containing a water-based ultraviolet absorber are sequentially combined into a whole; the aqueous paint layer adopts aqueous acrylic varnish to add 5-10% aqueous ultraviolet absorber; the water paint layer containing the water-based ultraviolet absorber effectively blocks ultraviolet rays from the UV coating, so that the light initiator cannot be cracked, the product has smaller solvent residue, and the solvent residue standard of the cigarette packet is met; on the basis of solving the solvent residue, the water-based bonding coating is added, so that the UV transfer coating and the zinc sulfide medium layer can be bonded with effective fastness, and the coating cannot be removed under the high-temperature and high-humidity conditions.



CLAIM 1. The low-solvent-residue UV transfer paper is characterized by comprising a back coating (1), a base paper layer (2), a water-based environment-friendly adhesive layer (3), a medium layer (4), a water-based bonding coating (5), a UV transfer coating (6) and a water-based paint layer (7) containing a water-based ultraviolet absorber, the back coating (1), the base paper layer (2), the water-based environment-friendly adhesive layer (3), the medium layer (4), the water-based bonding coating (5), the UV transfer coating (6) and the water-based paint layer (7) are sequentially combined into a whole, and the surface of the UV transfer coating (6) close to the water-based bonding coating (5) is provided with a micro-nano structure; the water paint layer (7) adopts water acrylic varnish to add water ultraviolet absorber which is 5-10% of the total mass of the water acrylic varnish.

P37218

PRINTING – BRAND PROTECTION

CN117183602

Priority Date: 26/09/2023

QINGDAO JUSTO PACKAGING

PAPER DRAWING AND PRINTING PREPARATION PROCESS WITH MULTI-ANGLE GRADUAL CHANGE EFFECT

The invention relates to a paper drawing and printing preparation process with a multi-angle gradual change effect, which comprises the following steps of: s1, manufacturing colored pattern ground patterns; s2, manufacturing a silk screen printing plate; s3, preparing UV bright ink; s4, preparing silk-screen laser color printing ink; s5, enabling the printed matter to form a silk-screen laser color pattern effect; s6, drying. The invention has the advantages that: 1. the laser color pattern process has obvious visual effect, and can make the surface of the printed matter present luxurious feeling and unique effect. 2. The process is simple and feasible, no extra special equipment is needed, and the production cost is reduced. 3. Can be applied to a plurality of fields, and expands the application range of the screen printing technology. 4. By applying the laser color pattern technology, the brand image and the added value of the product are enhanced.

CLAIM 1. The paper drawing and printing preparation process with the multi-angle gradual change effect is characterized by comprising the following steps of: s1, manufacturing colored pattern ground patterns; s2, manufacturing a silk screen printing plate; s3, preparing UV bright ink; s4, preparing silk-screen laser color printing ink; s5, enabling the printed matter to form a silk-screen laser color pattern effect; s6, drying.

Click on the title to return to table of contents

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

N9843

WO2023238918

Priority Date: 08/06/2022

DAI NIPPON PRINTING

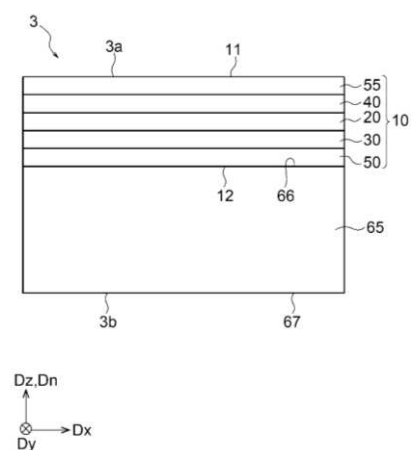
DECORATIVE LAMINATE, TRANSFER SHEET, DECORATIVE MEMBER, AND MOBILE BODY

A decorative laminate 10 has a unit optical element 13. When the total luminous reflectance and the diffused light reflectance measured in an outer region 13b of the unit optical element 13 from the side of a surface 11 of the decorative laminate 10 in accordance with JIS Z 8722: 2009 are defined as an outer total luminous reflectance (RSCI(O)) and as an outer diffused light reflectance (RSCE(O)), the outer total luminous reflectance (RSCI(O)), the outer diffused light reflectance (RSCE(O)), and the ratio (RSCI(O)/RSCE(O)) of the outer total luminous reflectance (RSCI(O)) with respect to the outer diffused light reflectance (RSCE(O)) respectively satisfy $RSCI(O) \leq 45\%$, $RSCE(O) \leq 40\%$, and $1.1 \leq RSCI(O)/RSCE(O) \leq 18$.

STRATIFIÉ DÉCORATIF, FEUILLE DE TRANSFERT, ÉLÉMENT DÉCORATIF ET CORPS MOBILE

Un stratifié décoratif 10 comprend un élément optique unitaire 13. Lorsque la réflectance lumineuse totale et la réflectance de lumière diffusée mesurées dans une région externe 13b de l'élément optique unitaire 13 à partir du côté d'une surface 11 du stratifié décoratif 10 conformément à JIS Z 8722: 2009 sont définies en tant que réflectance lumineuse totale externe (RSCI(O)) et en tant que réflectance de lumière diffusée externe (RSCE(O)), la réflectance lumineuse totale externe (RSCI(O)), la réflectance de lumière diffusée externe (RSCE(O)), et le rapport (RSCI(O)/RSCE(O)) de la réflectance lumineuse totale externe (RSCI(O)) à la réflectance de lumière diffusée externe (RSCE(O)) satisfont respectivement à $RSCI(O) \leq 45\%$, à $RSCE(O) \leq 40\%$, et à $1,1 \leq RSCI(O)/RSCE(O) \leq 18$.

CLAIM 1. A decorative laminate provided with a shaping layer having a shaping surface on which a concave-convex structure is formed, wherein the decorative laminate has at least one unit optical element that reflects, refracts, and/or diffracts incident light in accordance with the concave-convex structure, and the shaping surface in the unit optical element is adjacent to a plurality of inclined surfaces that are aligned in the direction toward an arbitrary reference line extending along the normal direction of the decorative laminate and that tilt toward the reference line. The unit optical element includes a plurality of connection surfaces that connect matching inclined surfaces, and the angle of the inclined surfaces with respect to the normal direction is greater than the angle of the connection surfaces connected to the inclined surfaces with respect to the normal direction. Each unit optical element includes a central region that is a region including the reference line, and an outer region that is positioned between the central region and the edge of the unit optical element along the direction in which the inclined surfaces and the connection surfaces are aligned, and the outer region is the outer region. When the total light reflectance and the diffuse light reflectance measured from one surface side of the decorative laminate in accordance with JIS Z 8722:2009 are each an outer total light reflectance (RSCI(O)) and an outer diffuse light reflectance (RSCE(O)), the ratio (RSCI(O)) of the outer to total light reflectance (RSCI(O)), the outer diffuse light reflectance (RSCE(O)), and the outer diffuse light reflectance (RSCE(O))) to the outer total light reflectance (RSCI(O)). A decorative laminate in which RSCE(O) satisfies the following formulas: $RSCI(O) \leq 45\%$, $RSCE(O) \leq 40\%$, and $1.1 \leq RSCI(O)/RSCE(O) \leq 18$.



N9889

CN117124762

Priority Date: 04/07/2023

GUANGXI TECHNOLOGICAL COLLEGE OF MACHINERY &
ELECTRICITY

NOVEL METHOD FOR MANUFACTURING ALDEHYDE-FREE STEREOSCOPIC ETHNIC PATTERN SOFT PORCELAIN

The application discloses a method for preparing novel formaldehyde-free stereoscopic ethnic pattern soft porcelain, which is characterized by comprising the following steps: the method comprises the following steps: step 1: selecting ethnic pattern drawing, printing a corresponding pattern model by using a 3D printer, and shooting a holographic original image; step 2: manufacturing a hologram master plate, plating a layer of very thin metal film on the surface of the master plate by using a vacuum evaporation method, and imprinting the hologram on the film after plating the master plate; step 3: manufacturing a soft porcelain substrate; step 4: firing soft porcelain; step 5: and (3) imprinting the thin film in the step (2) with the soft porcelain substrate. Compared with the prior art, the application has the advantages that: the novel preparation method of the aldehyde-free stereoscopic ethnic pattern soft porcelain can effectively and intuitively display ethnic patterns, and does not contain aldehyde compounds.

CLAIM 1. A method for preparing novel formaldehyde-free stereoscopic ethnic pattern soft porcelain is characterized by comprising the following steps: the method comprises the following steps: step 1: selecting ethnic pattern drawing, printing a corresponding pattern model by using a 3D printer, and shooting a holographic original image; step 2: manufacturing a hologram master plate, plating a layer of very thin metal film on the surface of the master plate by using a vacuum evaporation method, and impressing a hologram on the film after plating the metal master plate; step 3: manufacturing a soft porcelain substrate; step 4: firing soft porcelain; step 5: and (3) imprinting the thin film in the step (2) with the soft porcelain substrate.

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

N9856

US20230384735

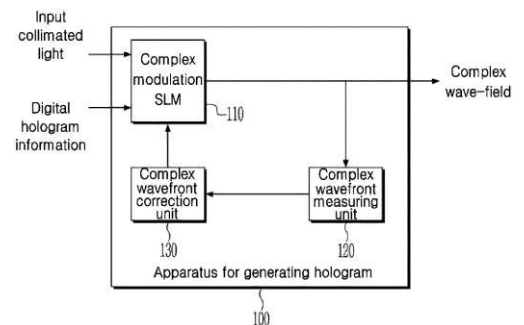
Priority Date: 31/05/2022

ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE

APPARATUS AND METHOD FOR GENERATING HOLOGRAM

There is provided an apparatus and method for generating a hologram through measuring intensity and a phase of a complex light wavefront that is output from a complex modulation spatial light modulator (SLM); determining characteristic information of the complex light wavefront by analyzing the measured intensity and phase of the complex light wavefront; creating distortion correction information for correcting distortion of the complex light wavefront from an artificial neural network by inputting the characteristic information to the artificial neural network; and feeding back the distortion correction information to the complex modulation SLM.

CLAIM 1. An apparatus for generating a hologram, the apparatus comprising: a complex wavefront measuring unit configured to measure an intensity and a phase of a complex light wavefront that is output from a complex modulation spatial light modulator (SLM), analyze the intensity and the phase of the complex light wavefront, and accordingly, determine characteristic information of the complex light wavefront; and a complex wavefront correction unit configured to create distortion correction information for correcting distortion of the complex light wavefront from an artificial neural network by inputting the characteristic information to the artificial neural network and feeding back the distortion correction information to the complex modulation SLM.



N9858

KR20230168945

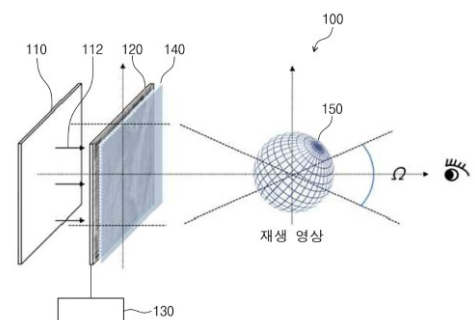
Priority Date: 08/06/2022

KOREA ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE

DIGITAL HOLOGRAPHIC DISPLAY APPARATUS

The present invention relates to a digital holographic display device. The display device includes a backlight unit which generates coherent parallel light, a spatial light modulator which is arranged to be adjacent to the backlight unit and records a digital hologram by using the coherent parallel light, a digital hologram generating/converting unit which is connected to the spatial light modulator, generates the digital hologram, and provides the digital hologram to the spatial light modulator, and a high order diffraction beam blocking filter which is arranged to be adjacent to the spatial light modulator and totally reflects and removes high order diffraction wave of the coherent parallel light.

CLAIM 1. A digital holographic display apparatus comprising: a backlight unit configured to generate a coherent parallel light; a spatial light modulator disposed adjacent to the backlight unit and configured to record a digital hologram using the coherent parallel light; a digital hologram generation/conversion unit connected to the spatial light modulator and configured to generate the digital hologram and provide the digital hologram to the spatial light modulator; and a high order diffraction beam blocking filter disposed adjacent to the spatial light modulator and configured to totally reflect and remove a high order diffraction term radio wave of the coherent parallel light.



N9860

JP2023177670
Priority Date: 02/06/2022

KDDI

COMPUTER-SYNTHESIZED HOLOGRAM GENERATOR AND PROGRAM

TOPIC: Provided is a computer-synthesized hologram generation device capable of suppressing the amount of calculation even when the range of drawing is wide, such as in the case of a global image. INVENTION: The computer synthesized hologram generation device generates a computer synthesized hologram by performing, on a hologram surface, an interference calculation of object light and reference light by a point light source on the surface of the object. The interference calculation is performed by assigning a more dense point light source to a region where it is judged that the degree of the user's gaze is larger.

CLAIM 1. The computer synthesized hologram generating device generates a computer synthesized hologram by performing interference calculation of object light and reference light by a point light source on the surface of an object on a hologram surface, wherein the interference calculation is performed by assigning a more dense point light source to a region determined to have the larger degree of gaze of a user.

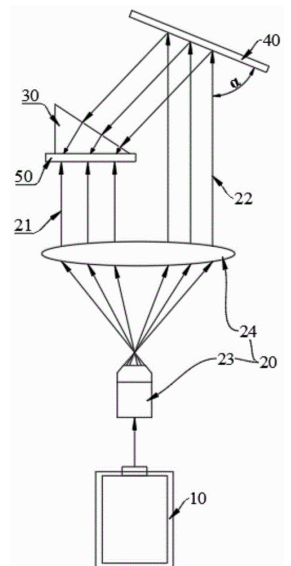
N9881

CN117214986
Priority Date: 14/09/2023

ALTIZAN OPTO CRYSTAL SHANGHAI DISPLAY TECHNOLOGY

PREPARATION SYSTEM AND METHOD OF REFLECTION TYPE HOLOGRAPHIC GRATING

The application discloses a preparation system and a preparation method of a reflection type holographic grating, wherein the preparation system comprises the following steps: the light source, the beam expanding assembly, the light guide piece and the reflecting mirror; the holographic material is arranged between the light guide piece and the beam expanding component; light rays irradiated to the first surface of the holographic material are emitted through the beam expanding assembly, and light rays irradiated to the second surface of the holographic material are emitted through the beam expanding assembly and reflected by the reflecting mirror and coupled with the light guide member, so that an interference pattern is formed on the holographic material. The application adopts the beam expanding component, after being matched with the reflector and the light guide piece, the light emitted by the light source can be transmitted to the second surface of the holographic material through the reflector and the light guide piece after being expanded by the beam expanding component, and irradiated to the first surface of the holographic material, and forms an interference pattern at the position of the holographic material, thus realizing the preparation of the holographic grating, and the preparation system of the application Omits to The spectroscope adopts a reflecting mirror, and has fewer devices and simpler structure.



CLAIM 1. A system for preparing a reflective holographic grating, comprising: a light source; the beam expanding assembly is positioned in the light emitting direction of the light source; the light guide piece and the reflecting mirror are positioned in the light emitting direction of the beam expanding assembly; the distance between the light guide piece and the beam expanding assembly is smaller than the distance between the reflecting mirror and the beam expanding assembly; the holographic material is arranged between the light guide piece and the beam expanding component; the light irradiated to the first surface of the holographic material through the beam expanding assembly and the light irradiated to the second surface of the holographic material through the beam expanding assembly and the coupling of the reflection mirror and the light guide are formed in an interference pattern at the holographic material.

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

N9894

CN117107540

Priority Date: 18/07/2023

JIANGSU JINHENG NEW PACKAGING MATERIAL

PRODUCTION PROCESS OF HOLOGRAPHIC DIRECT PLATING LASER ALUMINUM FOIL

The invention discloses a production process of holographic direct plating laser aluminum foil, which relates to the technical field of laser aluminum foil and comprises the following steps: hot-pressing the holographic laser on a film press by using an opp transfer film for standby; pressing the water-based peelable glue and the aluminum foil into an aluminum foil lining film on a compounding machine by using the pET film; coating solvent-free glue and an opp holographic laser film on the aluminum foil surface of the aluminum foil lining film on a solvent-free compounding machine for compounding; peeling off the opp transfer film after curing treatment; the aluminum foil holographic layer of the aluminum foil lining film is subjected to aluminizing treatment on an aluminizing machine, the production process is simple and convenient, an organic solvent is not needed, the environment pollution is far superior to that of the current production process, the organic solvent is not needed, no waste gas is discharged, the energy is saved, the environment is protected, the production cost is low, the method can be applied to various packaging material production processes, more choices and convenience are provided for enterprises with high environmental protection requirements and unconditionally changed production environment, the environment-friendly production concept is met, and the method is suitable for popularization and use.

CLAIM 1. A production process of holographic direct plating laser aluminum foil is characterized in that: the production process comprises the following steps: s1, hot-pressing holographic laser on a film press by using an opp transfer film for standby; s2, pressing the water-based peelable glue and the aluminum foil into an aluminum foil lining film by using the pET film on a compounding machine; s3, coating solvent-free glue and an opp holographic laser film on the aluminum foil surface of the aluminum foil lining film on a solvent-free compounding machine for compounding, and curing the transfer layer; s4, peeling off the opp transfer film after curing treatment; s5, carrying out aluminizing treatment on the holographic layer surface of the aluminum foil lining film on an aluminizing machine, stripping the pET lining film on a stripping machine after aluminizing treatment, then rolling into a laser aluminum foil product, and rolling, warehousing and finishing the product.

Click on the title to return to table of contents

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

N9859

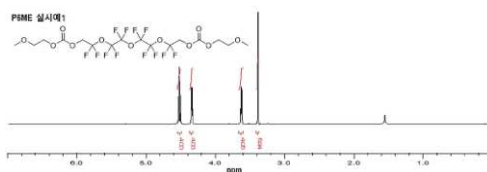
KR20230164509

Priority Date: 25/05/2022

LG CHEM

METHOD FOR PREPARING ADDITIVE FOR PHOTOPOLYMER, PHOTOPOLYMER COMPOSITION, AND HOLOGRAPHIC RECORDING METHOD

The present invention provides a method for preparing an additive for a photopolymer, which is capable of economically obtaining an additive for a photopolymer with a high yield of one-pot using a relatively inexpensive alcohol compound as a starting material, a photopolymer composition capable of more efficiently and easily providing a photopolymer layer capable of realizing a higher refractive index modulation value even in a thin thickness range, and a holographic recording method.



CLAIM 1. A method for preparing an additive for a photopolymer, the method comprising: sequentially reacting a compound represented by the following Chemical Formula 1 with an alkylene oxide including a bis(trichloromethyl)carbonate and a perfluoro alkylene group: R-OH [Chemical Formula 1] wherein, in Chemical Formula 1, R is an alkyl group having 1 to 10 carbon atoms, an alkoxy group having 1 to 10 carbon atoms, or a straight-chain or branched-chain alkyl group to which a hetero ring having 2 to 10 carbon atoms including 1 or more oxygen is bonded.

N9861

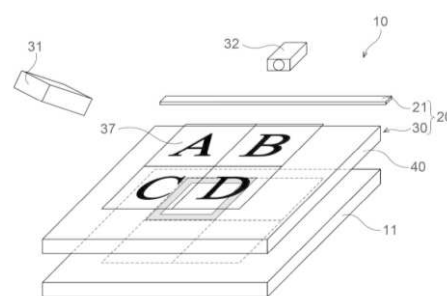
JP2023173352

Priority Date: 25/05/2022

DAI NIPPON PRINTING

TO PROVIDE A HOLOGRAM DEVICE, AN AIR INPUT DISPLAY DEVICE, A DISPLAY OBJECT WITH A HOLOGRAM, AND A METHOD FOR IRRADIATING A HOLOGRAM SHEET WITH LIGHT

TOPIC: To suppress the observation of a ghost image. **INVENTION:** The hologram device 30 includes a hologram sheet 40 and a second light source 32. An image 37 is recorded on the hologram sheet 40. The second light source 32 irradiates the hologram sheet 40 with light from a direction inclined by 30° or more from a reproduction angle of the hologram sheet 40. The difference between the illuminance on the hologram sheet 40 in a state where the second light source 32 irradiates the hologram sheet 40 with light and that on the hologram sheet 40 in a state where the second light source 32 does not irradiate the hologram sheet 40 with light is higher than that on the hologram sheet 40 in a state where the second light source 32 does not irradiate the hologram sheet 40 with light.



CLAIM 1. A hologram recording medium is provided with a hologram sheet on which an image is recorded, and a second light source which irradiates the hologram sheet with light from a direction inclined by 30° or more from a reproduction angle of the hologram sheet. The difference between the illuminance on the hologram sheet in a state where the second light source irradiates the hologram sheet with light and the illuminance on the hologram sheet in a state where the second light source does not irradiate the hologram sheet is higher than the illuminance on the hologram sheet in a state where the second light source does not irradiate the hologram sheet with light. The hologram device is higher than the illuminance on the hologram sheet.

N9867

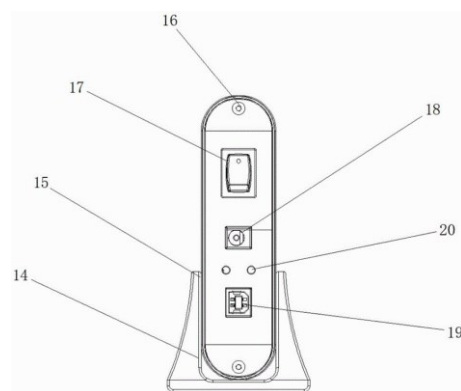
CN220171780U

Priority Date: 24/07/2023

SHENZHEN HONGMAO YUANZHI PHOTOELECTRIC

HOLOGRAPHIC STORAGE DEVICE BASED ON PHOTOELECTRIC TECHNOLOGY

The utility model provides a holographic storage device based on a photoelectric technology, which comprises a storage device shell, wherein an arc-shaped support frame is fixedly arranged below the storage device shell, a bottom plate is inlaid below the bottom plate of the arc-shaped support frame, a front panel is inlaid in a front end frame of the storage device shell, protective side plates are fixedly arranged on two side walls of the storage device shell, and the storage device shell is transmitted to a photoelectric reading port through a photoelectric flat cable interface. The electro-optical read port receives the electrical signal and transmits it to the data storage output port. The user may output data to an external device, such as a computer, display, etc., through a data storage output port. During storage, a hologram generating projection lens projects an optical signal onto a holographic storage medium, generating a hologram. Through the working principle and the working process, the holographic storage device based on the photoelectric technology can realize the storage and the reading of data, and has higher storage capacity and reading speed.



CLAIM 1. The utility model provides a holographic storage device based on photoelectricity technique, includes storage device casing (1), its characterized in that, storage device casing (1) below fixed mounting has arc support frame (2), inlay under arc support frame (2) bottom plate (3) has bottom plate (3), the embedding has front panel (4) in storage device casing (1) front end frame, and then is fixed protection curb plate (5) on both sides wall, wherein protection curb plate (5) are equipped with two, are the symmetry form between.

N9874

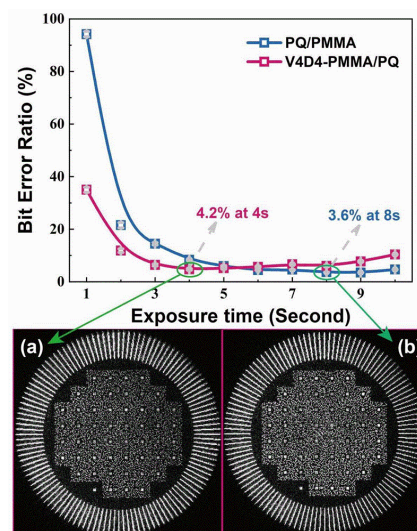
CN117247489

Priority Date: 19/09/2023

UNIVERSITY HUANGHUI

HIGH-SENSITIVITY PHOTOPOLYMER HOLOGRAPHIC STORAGE MATERIAL BASED ON CYCLOTETRASILOXANE AND PREPARATION METHOD THEREOF

The invention provides a high-sensitivity photopolymer holographic storage material based on cyclotetrasiloxane and a preparation method thereof, belongs to the technical field of holographic storage materials, and aims to solve the technical problem of poor photosensitivity of the photopolymer material. The invention comprises the following steps: (1) Uniformly mixing an acrylic ester monomer, a polyvinyl cross-linking agent, a thermal initiator and a photoinitiator to obtain a mixed solution; (2) heating the mixed solution to perform a prepolymerization reaction; (3) And carrying out thermal polymerization reaction on the prepolymer to obtain the high-sensitivity photopolymer holographic storage material. According to the invention, through adding the cyclotetrasiloxane (V4D 4) containing four vinyl groups, the high-sensitivity photopolymer holographic storage material with abundant vinyl groups and with cross-linked macromolecules as a matrix is successfully prepared, so that the photosensitivity (more than 3 times) and the diffraction efficiency (50%) of the material are greatly improved, and the rapid data storage effect (4 s storage and 4% of error rate) is realized.

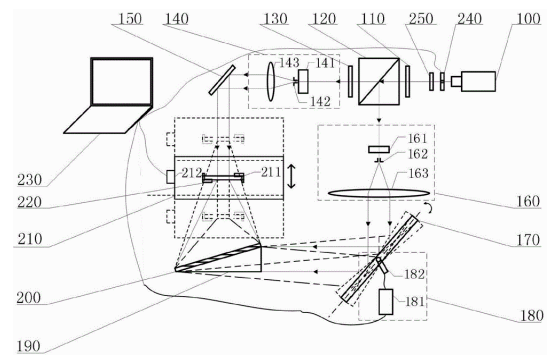


CLAIM 1. A method for preparing a high-sensitivity photopolymer holographic storage material based on cyclotetrasiloxane, which is characterized by comprising the following steps: (1) Uniformly mixing an acrylic ester monomer, a polyvinyl cross-linking agent, a thermal initiator and a photoinitiator to obtain a mixed solution; (2) Heating the mixed solution to perform a prepolymerization reaction; (3) And (3) performing thermal polymerization reaction on the prepolymer obtained in the step (2) to obtain the high-sensitivity photopolymer holographic storage material.

PREPARATION DEVICE AND PREPARATION METHOD FOR HOLOGRAPHIC OPTICAL ELEMENT FOR DIRECTIONAL BACKLIGHT THREE-DIMENSIONAL DISPLAY

The invention provides a preparation device and a preparation method of a holographic optical element for directional backlight three-dimensional display. The preparation device of the holographic optical element for the backlight three-dimensional display comprises a laser light source, a first half-wave plate, a beam splitter, a second half-wave plate, a first beam expanding and collimating system, a fixed reflecting mirror, a second beam expanding and collimating system, a rotary reflecting mirror, a prism, a holographic optical element, a moving platform, a directional diffuser, a total controller, an electronic shutter, an attenuator and a reflecting mirror rotary system. According to the requirement of preparing the holographic optical element, controlling a moving platform and a reflector rotating system through a master controller, planning a moving platform running path and each controllable rotating platform when the system judges that the preparation device is stable and opening an electronic shutter to switch on a light path and expose corresponding time after waiting time is finished; the above steps are repeated until all the design angular positions are exposed. Finally, the holographic optical element for directional backlight naked eye three-dimensional display is obtained.

CLAIM 1. The utility model provides a preparation facilities for directional holographic optical element of three-dimensional demonstration in a poor light, including monochromatic laser light source (100), first half-wave plate (110), beam splitter (120), second half-wave plate (130), first beam expanding collimating system (140), fixed mirror (150), second beam expanding collimating system (160), rotatory speculum (170), speculum rotating system (180), prism (190), holographic optical element (200), mobile platform (210), directional diffuser (220), general controller (230), electronic shutter (240), attenuator (250), its characterized in that: the monochromatic laser light source (100) is used for generating monochromatic laser with pure quality and stable spectrum; the first half-wave plate (110) is used for delaying the phase of the monochromatic



light emitted by the monochromatic laser light source (100) by an odd multiple of pi; the beam splitter (120) is a block polarization beam splitter prism or a flat polarization beam splitter, and divides an emergent beam with the polarization state changed by the first half-wave plate (110) into reference light and signal light; the second half-wave plate (130) is positioned behind the beam splitter (120) and is used for restoring the polarization state of the polarized light beam transmitted by the beam splitter (120) to the initial polarization; the first beam expansion collimation system (140) is positioned behind the output end of the second half-wave plate (130) and is used for carrying out collimation and beam expansion on the transmitted polarized light output by the beam splitter (120) to obtain parallel light of a wide beam; The fixed reflector (150) is positioned behind the first beam expanding and collimating system (140) and is used for reflecting the collimated parallel beams emitted by the first beam expanding and collimating system (140) to the fixed directional diffuser (210) on the mobile platform (200); the second beam expansion collimation system (160) is used for carrying out collimation and beam expansion on the reflected polarized light output by the beam splitter (120) to obtain parallel light of a wide beam; the rotary reflecting mirror (170) is driven by a reflecting mirror rotary system (180) and is used for reflecting the collimated parallel light beam emitted by the second beam expanding and collimating system (160) to irradiate a holographic optical element (200) to be prepared through a prism (190); the reflector rotating system (180) is connected with the master controller (230), is formed by a reflector rotating driver (181) and a rotating device (182) together and is used for controlling the rotating reflector (170) to rotate in two dimensions and changing the incidence angle of collimated parallel light irradiated to the prepared holographic optical element (200); the prism (190) is positioned behind the rotary reflecting mirror (170) and is used for deflecting light beams; the holographic optical element (200) is a holographic recording material and is a multi-angle multiplexing holographic optical element; the holographic optical element (200) records the reference light incident at different angles and the reproduction light with different focusing far and near positions; The driving motor (212) of the mobile platform (210) is connected with the master controller (230) and used for driving the mobile platform (210) to move, and the positioning clamp (211) is fixed on the mobile platform (210) and used for fixing the directional diffuser (220) placed on the mobile platform (210); the directional diffuser (220) is used for irradiating the light emitted by the fixed reflector (150) to the whole holographic optical element (200); the total controller (230) is connected with the reflector rotating system (180), the movable platform driving motor (212) and the electronic shutter (240) and is used for controlling the rotating angle of the rotating reflector (170), the displacement of the movable platform (210) and the working state of the electronic shutter (240); the electronic shutter (240) is connected with the master controller (230) by combining the working state of the mobile platform (210) to control the on-off of the light path; an attenuator (250) is used to control the power level of the laser light in the optical path.

N9884

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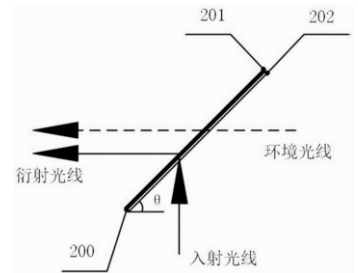
Priority Date: 21/08/2023

SHANGHAI UNIVERSITY

HOLOGRAPHIC OPTICAL ELEMENT FOR COLOR SUSPENSION TRANSPARENT DISPLAY AND PREPARATION DEVICE AND PREPARATION METHOD THEREOF

The invention discloses a holographic optical element for color suspension transparent display, a preparation device and a preparation method thereof. The human eyes can observe the colorful suspension virtual two-dimensional image and the real external environment through the holographic optical element at the same time, so that the superposition of virtual and real information is realized. The preparation device of the holographic optical element comprises a coherent light source, a beam expanding and collimating system, a beam splitter, a movable optical system and the like. The invention adopts the movable optical module to carry out two-dimensional scanning to prepare the holographic optical element for color suspension transparent display. And according to the required focus number and the position, the mobile optical system circularly exposes for a plurality of times according to a planned path. The invention also proposes the preparation of holographic optical elements for color suspended transparent display by point-to-point parallel exposure through microlens arrays.

CLAIM 1. The holographic optical element for color suspension transparent display comprises a light-transmitting substrate and a color holographic photosensitive film material arranged on the surface of the light-transmitting substrate, and is characterized in that the surface of the color holographic photosensitive film material records two-dimensional array information generated by time sequence exposure or parallel exposure, the two-dimensional array information is formed by synchronously irradiating two coherent point light sources from two sides of the color holographic photosensitive film material, namely the front surface of the color holographic photosensitive film material and the back surface of the color holographic photosensitive film material, at the same position of the color holographic photosensitive film material to generate interference, so as to realize point-to-point superposition exposure, the color holographic photosensitive film material is of a combined structure or a laminated structure, and each coherent point light source is formed by combining three light beams with different colors or formed by time sharing of the light beams with different colors.



N9893

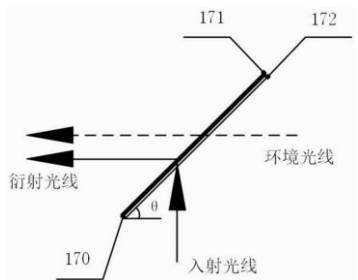
CN117111199

Priority Date: 21/08/2023

SHANGHAI UNIVERSITY

SUSPENSION TRANSPARENT HOLOGRAPHIC OPTICAL ELEMENT AND PREPARATION DEVICE AND PREPARATION METHOD THEREOF

A suspended transparent holographic optical element comprises a light-transmitting substrate and a holographic photosensitive film material arranged on the surface of the light-transmitting substrate, wherein two-dimensional array information generated by time sequence exposure or parallel exposure is recorded on the surface of the holographic photosensitive film material, and the two-dimensional array information is formed by synchronously irradiating two coherent point light sources from two sides of the holographic photosensitive film material, namely the front side of the holographic photosensitive film material and the back side of the holographic photosensitive film material, at the same position of the holographic photosensitive film material to generate interference, so that point-to-point superposition exposure is realized. The invention is used as an imaging device, so that an image is imaged in the air, and before the image is suspended in the holographic optical element, human eyes can observe the suspended image and the real environment, fusion of virtual and real scenes is realized, and the effect of augmented reality is achieved. Meanwhile, the floating display system and the gesture interaction system can be combined, a user can directly control the floating image by using gestures, the experience of the user is improved, and the actual application requirements of the user are met.



CLAIM 1. The suspended transparent holographic optical element comprises a light-transmitting substrate and a holographic photosensitive film material arranged on the surface of the light-transmitting substrate, and is characterized in that two-dimensional array information generated by time sequence exposure or parallel exposure is recorded on the surface of the holographic photosensitive film material, and the two-dimensional array information is formed by synchronously irradiating two coherent point light sources from two sides of the holographic photosensitive film material, namely the front side of the holographic photosensitive film material and the back side of the holographic photosensitive film material, to generate interference at the same position of the holographic photosensitive film material, and realizing point-to-point superposition exposure.

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

N9842

WO2023245188

Priority Date: 17/06/2022

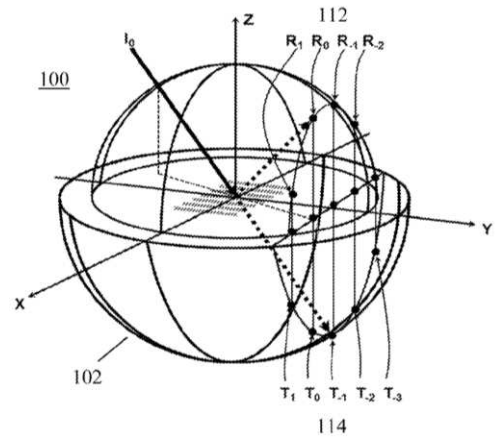
REGENTS OF THE UNIVERSITY OF CALIFORNIA

HOLOGRAPHIC METASURFACE GRATING ELEMENTS FOR AUGMENTED AND VIRTUAL REALITY

The present disclosure relates to highly efficient curved holographic aligned nonlinear grating elements (CHANGE) for high-resolution high-performance augmented and virtual reality. In embodiments, a curved shape can be designed by input angle and output angle for each position of the CHANGE. Each position has a different grating direction (x) and a different period. For AR devices, two-dimensional image sources from the displays can be used. Thus, CHANGES can be applied for both in-coupling and out-coupling diffractive metasurface optical elements (MOEs) instead of using a two-dimensional grating. In the in-coupling MOE region, collimated display input source can be diffracted and guided into waveguide glass and magnified for both of the two-dimensional directions at the out-coupling region by using in-coupling CHANGE. In an out-coupling MOE region, a magnified two-dimensional image is focused at the eyepiece by using out-coupling CHANGE. Thus, using CHANGE components according to embodiments, various sizes of input two-dimensional image sources can be converted to target sizes of two-dimensional images at the eyepiece with high efficiency.

ÉLÉMENTS DE RÉSEAU DE MÉTASURFACE HOLOGRAPHIQUE POUR RÉALITÉ AUGMENTÉE ET VIRTUELLE

La présente divulgation concerne des éléments de réseau non linéaires alignés holographiques incurvés hautement efficaces (CHANGE) pour une réalité augmentée et virtuelle à haute résolution et haute performance. Dans des modes de réalisation, une forme incurvée peut être conçue par un angle d'entrée et un angle de sortie pour chaque position des CHANGE. Chaque position a un angle de réseau différent (x) et une période différente. Pour des dispositifs AR, des sources d'image bidimensionnelles provenant des dispositifs d'affichage peuvent être utilisées. Ainsi, les CHANGE peuvent être appliqués à la fois pour le couplage d'entrée et le couplage de sortie d'éléments optiques de métasurface de diffraction (MOEs) au lieu d'utiliser un réseau bidimensionnel. Dans la région MOE de couplage d'entrée, une source d'entrée d'affichage collimatée peut être diffractée et guidée dans un verre de guide d'ondes et agrandie à la fois pour les directions bidimensionnelles au niveau de la région de couplage de sortie à l'aide des CHANGE de couplage d'entrée. Dans une région MOE de couplage de sortie, une image bidimensionnelle agrandie est focalisée au niveau de la région oculaire par utilisation des CHANGE de couplage de sortie. Ainsi, à l'aide de composants de CHANGE selon des modes de réalisation, diverses tailles de sources d'image bidimensionnelle d'entrée peuvent être converties en tailles cibles d'images bidimensionnelles au niveau de la région oculaire avec une efficacité élevée.



CLAIM 1. An apparatus for highly efficient curved holographic aligned nonlinear grating elements (CHANGE) for high-resolution high-performance augmented and virtual reality comprising: curved shape 1-dimensional grating which has high diffraction efficiency like ID grating, but, for the diffraction angle, it has 2-dimensional degree of freedom which has two orthogonal diffraction angles like a 2D grating which has low efficiency.

N9844

WO2023237558

Priority Date: 08/06/2022

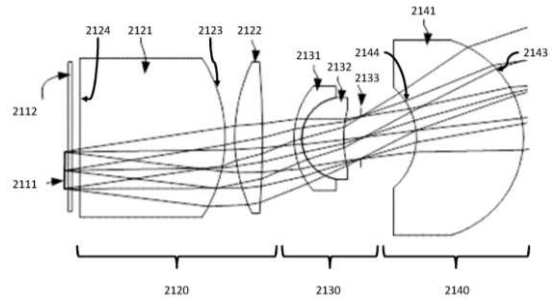
CARL ZEISS JENA

TRANSPARENT DISPLAY

The invention relates to a transparent display comprising a holographic diffuser that extends substantially in a two-dimensional diffuser plane and comprising a projector, the projector having an image generation unit, in particular a digital micromirror device (DMD), and a reflection unit, wherein the reflection unit is configured to reflect, in the direction of the holographic diffuser, images generated by the image generation unit, and the image generation unit is arranged on a side of the diffuser plane lying opposite the reflection unit. The invention also relates to a method for producing a holographic diffuser.

AFFICHAGE TRANSPARENT

L'invention concerne un affichage transparent comportant un diffuseur holographique s'étendant sensiblement dans un plan de diffuseur bidimensionnel, et un projecteur comprenant un unité de génération d'images, en particulier une matrice à micro-miroirs, et une unité de réflexion. L'unité de réflexion est conçue pour réfléchir les images générées par l'unité de génération d'images en direction du diffuseur holographique, l'unité de génération d'images étant disposée sur un côté du plan de diffuseur opposé à l'unité de réflexion. L'invention a également pour objet un procédé de fabrication d'un diffuseur holographique.



CLAIM 1. Claims for a transparent display (1000), having a holographic diffuser (1200) extending essentially in a two-dimensional diffuser plane (1201), and having a projector (1100), wherein the projector (1100) has an image generation unit (1111), in particular a digital micromirror device, DMD, and a reflection unit (1150), wherein the reflection unit (1150) is set up to reflect images generated by the image generation unit (1111) in the direction of the holographic diffuser (1200), wherein the image generation unit (1111) is arranged on a side of the diffuser plane (1201) opposite the reflection unit (1150).

N9845

WO2023237440

Priority Date: 08/06/2022

CARL ZEISS JENA

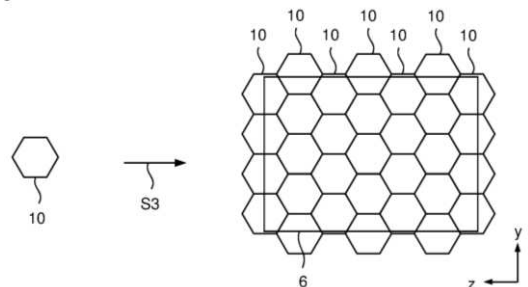
HOLOGRAPHIC OPTICAL MODULE, HOLOGRAPHIC DISPLAY DEVICE COMPRISING SUCH A HOLOGRAPHIC OPTICAL MODULE, AND METHOD FOR PRODUCING SUCH A HOLOGRAPHIC OPTICAL MODULE

The invention relates to a holographic optical module comprising a base body (4), which has a first surface (5), and a plurality of surface elements (10, 10'), each of which has a holographic structure, wherein the plurality of surface elements (10, 10') are arranged on the first surface (5) of the base body (4) such that the surface elements form a continuous surface (6) that provides a specified optical function.

MODULE OPTIQUE HOLOGRAPHIQUE, DISPOSITIF D'AFFICHAGE HOLOGRAPHIQUE COMPRENANT UN TEL MODULE OPTIQUE HOLOGRAPHIQUE, ET PROCÉDÉ DE FABRICATION D'UN TEL MODULE OPTIQUE HOLOGRAPHIQUE

L'invention concerne un module optique holographique comprenant un corps de base (4) qui présente une première surface (5) ainsi qu'une pluralité d'éléments de surface (10, 10') dont chacun comporte une structure holographique, la pluralité d'éléments de surface (10, 10') étant disposés sur la première surface (5) du corps de base (4) de telle sorte que les éléments de surface forment une surface continue (6) qui fournit une fonction optique spécifiée.

CLAIM 1. A holographic optical module comprising a base body (4) having a first surface (5) and a plurality of surface elements (10, 10') each having a holographic structure, said plurality of surface elements (10, 10') being arranged on said first surface (5) of said base body (4) so as to form a contiguous surface (6) providing a predetermined optical function.

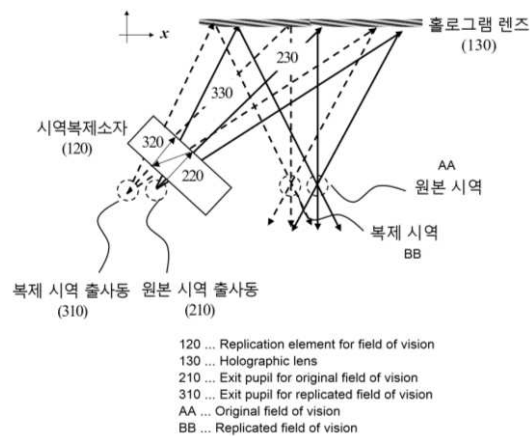


HOLOGRAM-BASED, PUPIL-DIRECTED-PROJECTION TYPE, AUGMENTED REALITY DEVICE THAT EXPANDS FIELD OF VISION BY REPLICATING FIELD OF VISION

Provided is a hologram-based, pupil-directed-projection type, augmented reality device that expands a field of vision by replicating the field of vision. The augmented reality device according to an embodiment of the present invention comprises: a projection system for generating and projecting images; a replication unit for replicating images projected by the projection system and outputting as images through different optical paths; and an image combiner for combining images outputted from the replication unit with external light incident from the real world. As a result, the size of a pupil allowance area in a compact device, which has been inconvenient for general users, is increased, enabling images to be observed without being cut off even when pupils freely move and thus alleviating the inconvenience of users, and margins are secured when designing the field of vision to enable responding to various pupillary distances, thereby reducing the unit cost of production in mass production without being limited by a user-customized design.

DISPOSITIF DE RÉALITÉ AUGMENTÉE DE TYPE À PROJECTION DIRIGÉE PAR PUPILLE BASÉ SUR UN HOLOGRAMME QUI ÉTEND LE CHAMP DE VISION PAR RÉPLICATION DU CHAMP DE VISION

L'invention concerne un dispositif de réalité augmentée de type à projection dirigée par pupille, basé sur un hologramme, qui étend un champ de vision par réplication du champ de vision. Le dispositif de réalité augmentée selon un mode de réalisation de la présente invention comprend : un système de projection pour générer et projeter des images; une unité de réplication pour répliquer des images projetées par le système de projection et délivrer en sortie en tant qu'images à travers différents trajets optiques; et un combinateur d'images pour combiner des images délivrées par l'unité de réplication avec une lumière externe incidente provenant du monde réel. Par conséquent, la taille d'une zone d'autorisation de pupille dans un dispositif compact, qui a été peu pratique pour des utilisateurs généraux, est augmentée, permettant à des images d'être observées sans être coupées même lorsque des pupilles se déplacent librement et atténuant ainsi l'inconvénient des utilisateurs, et des marges sont sécurisées lors de la conception du champ de vision pour permettre une réponse à diverses distances pupillaires, ce qui permet de réduire le coût unitaire de production en production de masse sans être limité par une conception personnalisée par l'utilisateur.



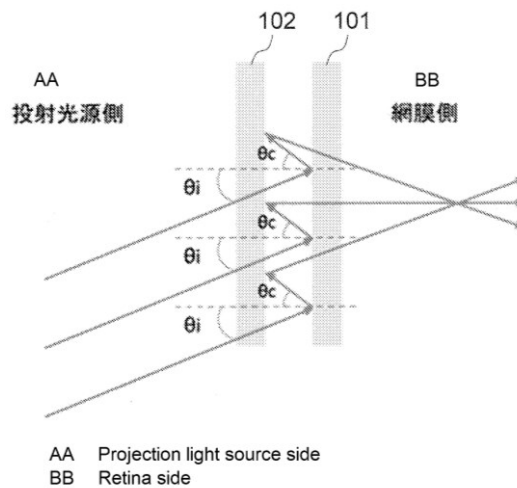
CLAIM 1. Projection system that generates and projects images; Replication unit that replicates the image projected from the projection system and emits images with different optical paths; Image that combines the images emitted from the replication unit with external light incident from the real world An augmented reality device comprising a combiner.

IMAGE DISPLAY DEVICE AND DISPLAY DEVICE

The purpose of the present technology is to provide an image display device for preventing occurrence of dark lines and discoloration in the central portion of a visual field in an image projected on retina. The present technology provides an image display device. The image display device includes a first reflective volume hologram and a second reflective volume hologram, and comprises an overall transmissive diffraction element. The first reflective volume hologram and the second reflective volume hologram satisfy the Bragg condition for red, green, and blue incident light. The first reflective volume hologram diffracts the incident light, which has entered at an incident angle θ_i , at a connection angle θ_c for deflection towards the second reflective volume hologram. The second reflective volume hologram focuses the deflected incident light. The incident angle θ_i and the connection angle θ_c satisfy specific conditions.

DISPOSITIF D’AFFICHAGE D’IMAGE ET DISPOSITIF D’AFFICHAGE

Le but de la présente technologie est de fournir un dispositif d’affichage d’image pour empêcher l’apparition de lignes sombres et la décoloration dans la partie centrale d’un champ visuel dans une image projetée sur la rétine. La présente technologie concerne un dispositif d’affichage d’image. Le dispositif d’affichage d’image comprend un premier hologramme de volume réfléchissant et un second hologramme de volume réfléchissant, et comprend un élément de diffraction transmissif global. Le premier hologramme de volume réfléchissant et le second hologramme de volume réfléchissant satisfont à la condition de Bragg pour une lumière incidente rouge, verte et bleue. Le premier hologramme de volume réfléchissant diffracte la lumière incidente, qui a pénétré à un angle incident θ_i , à un angle de connexion θ_c pour une déviation vers le second hologramme de volume réfléchissant. Le second hologramme de volume réfléchissant focalise la lumière incidente déviée. L’angle d’incidence θ_i et l’angle de connexion θ_c satisfont aux conditions spécifiques.



CLAIM 1. The first reflection type volume hologram and the second reflection type volume hologram satisfy a Bragg condition for incident light of three colors, red, green and blue, the first reflection type volume hologram diffracts the incident light incident at an incident angle θ_i at a connection angle θ_c to deflect the incident light to the second reflection type volume hologram, and the second reflection type volume hologram is provided with a transmission type diffraction element as a whole The image display device (condition 1) is $10 \text{ degrees} \leq \text{an incident angle } \theta_i \leq 90 \text{ degrees}$, $10 \text{ degrees} \leq \text{a connection angle } \theta_c \leq 90 \text{ degrees}$, $4 \times \text{an incident angle } \theta_i + \text{a connection angle } \theta_c \leq 170 \text{ degrees}$, (condition 2) $70 \text{ degrees} \leq \text{an incident angle } \theta_i \leq 90 \text{ degrees}$, and $70 \text{ degrees} \leq \text{a connection angle } \theta_c \leq 90 \text{ degrees}$ satisfies the following condition 1 or condition 2. $\leq 90 \text{ degrees}$.

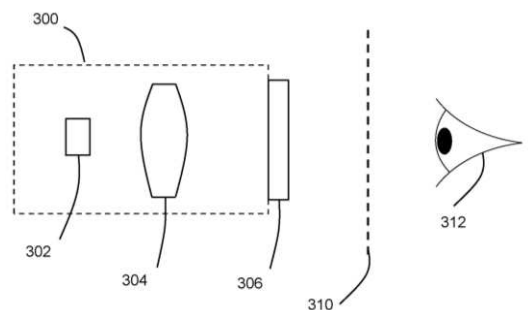
COMPUTER-GENERATED HOLOGRAPHIC DISPLAY SYSTEM

Computer-generated holographic display systems are described with improved image quality when used with illumination sources other than single mode lasers, such as broader emission light sources including LEDs and multi-mode lasers. In one example, a computer-generated holographic display system has an angular resolution and an angular field of view at a viewing position. The computer-generated holographic display system comprises: an illumination system comprising an LED or multimode laser; an SLM illuminated by the illumination system; and an optical system configured to reimage the SLM at a predetermined distance from the viewing position. The illumination system has an etendue at the SLM which is less than or equal to a product of the angular resolution at the viewing position and the angular field of view at the viewing position divided by a maximum focal power of a virtual image point with respect to the reimaged SLM; and the angular resolution is less than about 1 mrad. In another example, a computer-generated holographic display system has an angular resolution at a viewing position and a limiting aperture width. The computer-generated holographic display system comprises: an illumination system comprising an LED or multi-mode laser and having a spectral bandwidth and a nominal wavelength; an SLM illuminated by the illumination system; and an optical system configured to reimage the SLM at a predetermined distance from the viewing position. The spectral bandwidth divided by the nominal wavelength is less than or equal to the angular resolution divided by the product of the limiting aperture width and a maximum focal power of a virtual image point with respect to the reimaged SLM; and the angular resolution is less than about 1 mrad.

SYSTÈME D’AFFICHAGE HOLOGRAPHIQUE GÉNÉRÉ PAR ORDINATEUR

La présente invention concerne des systèmes d’affichage holographique généré par ordinateur dotés d’une qualité d’image améliorée lorsqu’ils sont utilisés avec des sources d’éclairage autres que des lasers monomodes, telles que des sources de lumière à plus large émission comprenant des DEL et des lasers multimodes. Dans un exemple, un système d’affichage holographique généré par ordinateur présente une résolution angulaire et un champ de vision angulaire au niveau d’une position de visionnement. Le système d’affichage holographique généré par ordinateur comprend : un système d’éclairage comprenant un laser à DEL ou multimode ; un SLM éclairé par le système d’éclairage ; et un système optique configuré pour réimager le SLM à une distance prédéterminée de la position de visionnement. Le système d’éclairage a une étendue au niveau du SLM qui est inférieure ou égale à un produit de la résolution angulaire au niveau de la position de visionnement et du champ de vision angulaire au niveau de la position de visionnement divisé par une puissance focale maximale d’un point d’image virtuelle par rapport au SLM reproduit ; et la résolution angulaire est inférieure à environ 1 mrad. Dans un autre exemple, un système d’affichage holographique généré par ordinateur présente une résolution angulaire au niveau d’une position de visionnement et une largeur d’ouverture de limitation. Le système d’affichage holographique généré par ordinateur comprend : un système d’éclairage comprenant un laser à DEL ou multimode et ayant une largeur de bande spectrale et une longueur d’onde nominale ; un SLM éclairé par le système d’éclairage ; et un système optique configuré pour réimager le SLM à une distance prédéterminée de la position de visionnement. La largeur de bande spectrale divisée par la longueur d’onde nominale est inférieure ou égale à la résolution angulaire divisée par le produit de la largeur d’ouverture de limitation et d’une puissance focale maximale d’un point d’image virtuelle par rapport au SLM reproduit ; et la résolution angulaire est inférieure à environ 1 mrad.

CLAIM 1. A computer-generated holographic display system having an angular resolution and an angular field of view at a viewing position, the computer-generated holographic display system comprising: an illumination system comprising an LED or multimode laser; an SLM illuminated by the illumination system; and an optical system configured to reimage the SLM at a predetermined distance from the viewing position; wherein: the illumination system has an etendue at the SLM which is less than or equal to a product of the angular resolution at the viewing position and the angular field of view at the viewing position divided by a maximum focal power of a virtual image point with respect to the reimaged SLM; and the angular resolution is less than about 1 mrad.



N9851

WO2023227262

Priority Date: 25/05/2022

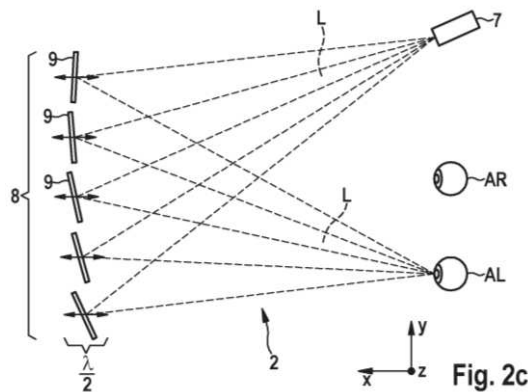
BMW - BAYERISCHE MOTOREN WERKE

HOLOGRAPHIC DIRECT VIEW DISPLAY FOR A VEHICLE

The invention relates to a holographic direct view display, in particular for a vehicle, comprising a display light source for generating at least partly coherent display light and a two-dimensional micromirror array arranged opposite thereto in the field of view of a user. According to the invention, each micromirror is designed as an electrically controllable display pixel by virtue of being translationally displaceable in a direction transverse to the mirror surface, in order to impress a phase shift on the display light reflected thereon, for the purpose of the holographic reconstruction of a desired display image, and is additionally rotatable about at least its first axis of rotation, in order to alternately reflect the display light generated by the display light source to a respective eye of the user. According to the invention, the display light source is arranged outside of a user display viewing angle, which occupies a spatial region between an eye box, predetermined for the user's eyes, and the micromirror array.

AFFICHAGE HOLOGRAPHIQUE À VISION DIRECTE POUR UN VÉHICULE

L'invention concerne un affichage holographique à vision directe, en particulier pour un véhicule, comprenant une source de lumière d'affichage pour générer une lumière d'affichage au moins partiellement cohérente et un réseau de micromiroirs bidimensionnel disposé à l'opposé de celle-ci dans le champ de vision d'un utilisateur. Selon l'invention, chaque micromiroir est réalisé sous la forme d'un pixel d'affichage pouvant être commandé électriquement en étant déplaçable en translation dans une direction transversale à la surface de miroir, afin d'imprimer un déphasage sur la lumière d'affichage réfléchi sur celle-ci, dans le but de la reconstruction holographique d'une image d'affichage souhaitée, et est en outre rotatif autour d'au moins son premier axe de rotation, afin de réfléchir en alternance la lumière d'affichage générée par la source de lumière d'affichage vers un œil respectif de l'utilisateur. Selon l'invention, la source de lumière d'affichage est disposée à l'extérieur d'un angle de visualisation d'affichage d'utilisateur, qui occupe une région spatiale entre un boîtier oculaire, prédéterminé pour les yeux de l'utilisateur, et le réseau de micromiroirs.



CLAIM 1. Holographic direct-view display (2), in particular for use in a vehicle (1), comprising: - a display light source (7) which is designed to generate at least partially coherent display light (L); - a two-dimensional micromirror array (8) which is arranged opposite the display light source (7) in the field of view of a user; - each micromirror (9) being designed as an electrically drivable display pixel which can be displaced translationally in a direction transverse to its mirror surface in order to impress a phase shift on the display light (L) reflected thereon for the holographic reconstruction of a desired display image, and additionally being rotatable at least about its first axis of rotation (D) in order to reflect the display light (L) generated by the display light source (7) alternately to in each case one eye (AL, AR) of the user; and - the display light source (7) being arranged outside a user display viewing angle which forms a spatial region between an eyebox predetermined for the user eyes (AL, AR) and the micromirror array (8).

N9852

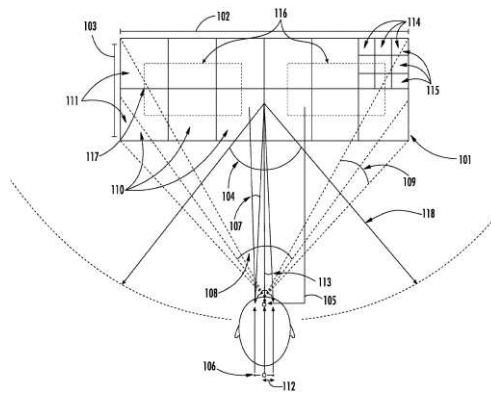
US20230408757

Priority Date: 15/07/2016

LIGHT FIELD LAB

HIGH-DENSITY ENERGY DIRECTING DEVICES FOR TWO-DIMENSIONAL, STEREOSCOPIC, LIGHT FIELD AND HOLOGRAPHIC HEAD-MOUNTED DISPLAYS

Disclosed are high-density energy directing devices and systems thereof for two-dimensional, stereoscopic, light field and holographic head-mounted displays. In general, the head-mounted display system includes one or more energy devices and one or more energy relay elements, each energy relay element having a first surface and a second surface. The first surface is disposed in energy propagation paths of the one or more energy devices and the second surface of each of the one or more energy relay elements is arranged to form a singular seamless energy surface. A separation between edges of any two adjacent second surfaces is less than a minimum perceptible contour as defined by the visual acuity of a human eye having better than 20/40 vision at a distance from the singular seamless energy surface, the distance being greater than the lesser of: half of a height of the singular seamless energy surface, or half of a width of the singular seamless energy surface.



CLAIM 1. A system comprising: an energy assembly having at least one energy device; and a relay assembly having: at least one energy relay element, the energy relay element formed of one or more of a first component engineered structure and one of a second component engineered structure, the first component engineered structure having a first wave propagation property and the second component engineered structure having a second wave propagation property; wherein, along a transverse orientation the first component engineered structure and the second component engineered structure are arranged in an interleaving configuration; wherein, along a longitudinal orientation the first component engineered structure and the second component engineered structure each have a similar configuration; wherein the relay element relays energy along the longitudinal orientation through both the first component engineered structure and second component engineered structure, the energy being relayed is spatially localized in the transverse orientation; wherein the first component engineered structure is aligned such that energy is propagated through the first component engineered structure with a higher transport efficiency in the longitudinal orientation versus the transverse orientation; and wherein the second component engineered structure is aligned such that energy is propagated through the second component engineered structure with a higher transport efficiency in the longitudinal orientation versus the transverse orientation; and wherein the energy relay element is configured to direct energy along energy propagation paths between a surface of the energy relay element and the energy device.

N9853

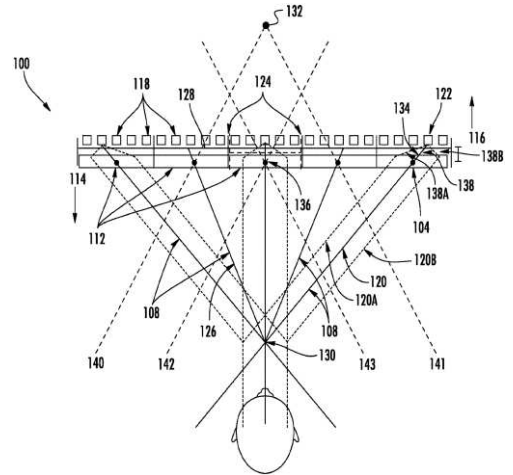
US20230408737
Priority Date: 14/01/2018

LIGHT FIELD LAB

ORDERED GEOMETRIES FOR OPTOMIZED HOLOGRAPHIC PROJECTION

Disclosed are systems for directing energy according to holographic projection. Configurations of waveguide arrays are disclosed for improved efficiency and resolution of propagated energy through, tessellation of shaped energy waveguides.

CLAIM 1. An energy waveguide system for defining a plurality of energy propagation paths comprising: an array of energy waveguides, the array comprising a first side and a second side, and being configured to direct energy therethrough along a plurality of energy propagation paths extending through a plurality of energy locations on the first side; wherein a first subset of the plurality of energy propagation paths extend through a first energy location; wherein a first energy waveguide is configured to direct energy along a first energy propagation path of the first subset of the plurality of energy propagation paths, the first energy propagation path defined by a first chief ray formed between the first energy location and the first energy waveguide, and further wherein the first energy propagation path extends from the first energy waveguide towards the second side of the array in a unique direction which is determined at least by the first energy location; and wherein each waveguide of the array of waveguides comprises a shape of a set of one or more shapes configured to tessellate across a transverse plane of the energy waveguide system, the array of energy waveguides being arranged in a tiling of the one or more shapes across the transverse plane of the energy waveguide system.



N9854

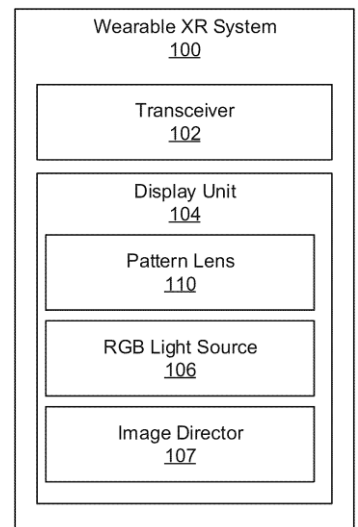
US20230401296
Priority Date: 08/06/2022

HEWLETT PACKARD DEVELOPMENT

HOLOGRAM PATTERN CONTENT DECONSTRUCTION

In an example in accordance with the present disclosure, a wearable extended reality (XR) system is described. The wearable XR system includes a transceiver to receive, from a host computing device, a hologram pattern of original content to be displayed. The wearable XR system also includes a display unit. The display unit includes 1) a pattern lens to display the hologram pattern in front of a red, green, blue (RGB) light source and 2) the RGB light source to emit red, green, and blue light towards the hologram pattern to deconstruct the hologram pattern to present the original content. The wearable XR system also includes an image director to reflect the decoded original content towards a user of the wearable XR system.

CLAIM 1. A wearable extended reality (XR) system, comprising: a transceiver to receive, from a host computing device, a hologram pattern of original content to be displayed; a display unit comprising: a pattern lens to display the hologram pattern in front of a red, green, blue (RGB) light source; the RGB light source to emit red, green, and blue light towards the hologram pattern to deconstruct the hologram pattern to present the original content; and an image director to direct decoded original content towards a user of the wearable XR system.



N9855

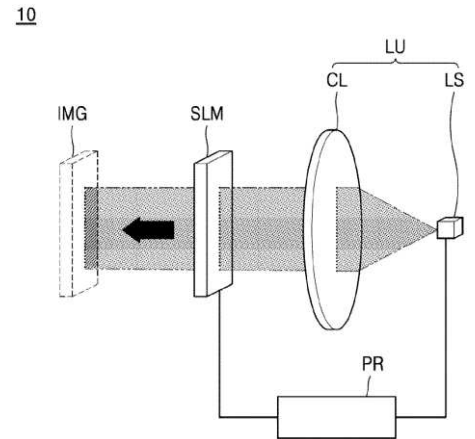
US20230400811
Priority Date: 14/06/2022

SAMSUNG ELECTRONICS | SEOUL NATIONAL UNIVERSITY R&DB
FOUNDATION

HOLOGRAM PROFILE OPTIMIZATION METHOD, HOLOGRAM PROFILE GENERATION DEVICE, AND HOLOGRAPHIC DISPLAY DEVICE TO WHICH HOLOGRAM PROFILE OPTIMIZATION METHOD IS APPLIED

A hologram profile optimization method includes: setting a first hologram profile as a variable; and performing an optimization cycle a predetermined number of times, wherein the optimization cycle includes encoding the first hologram profile into a binary hologram profile by using an ApproxSign function; calculating a field value of a holographic image on a display surface for the binary hologram profile, considering high-order diffraction term noise of the holographic image by using a tiling function; calculating an intensity of the holographic image on the display surface; calculating a loss function value based on a difference between the intensity of the holographic image and an intensity of a target image; and updating the first hologram profile to a second hologram profile based on the loss function value.

CLAIM 1. A hologram profile optimization method comprising: setting a first hologram profile as a variable; and performing an optimization cycle a predetermined number of times, wherein the optimization cycle comprises: encoding the first hologram profile into a binary hologram profile by using an ApproxSign function; calculating a field value of a holographic image on a display surface for the binary hologram profile, considering high-order diffraction term noise of the holographic image by using a tiling function; calculating an intensity of the holographic image on the display surface; calculating a loss function value based on a difference between the intensity of the holographic image and an intensity of a target image; and updating the first hologram profile to a second hologram profile based on the loss function value.



N9857

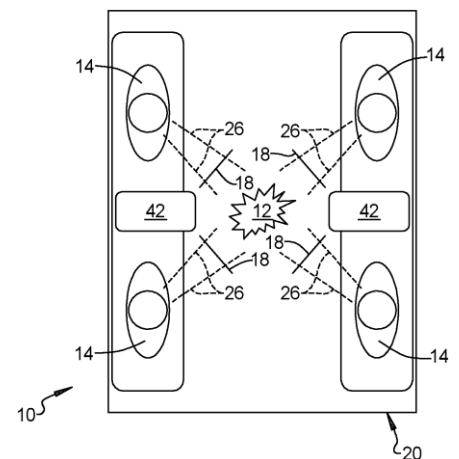
US20230384614
Priority Date: 25/05/2022

GM GLOBAL TECHNOLOGY OPERATIONS

MULTI-PERSPECTIVE THREE-DIMENSIONAL FLOATING IMAGE DISPLAY

A system for generating a centrally located floating three-dimensional image display for a plurality of passengers positioned within a vehicle includes a display adapted to project a multiplexed hologram comprising a plurality of three-dimensional holographic images, and a plurality of beam splitters, one beam splitter individually associated with each one of the plurality of passengers, each beam splitter adapted to receive one of the plurality of holographic images from the display and to reflect the one of the plurality of holographic images to the associated one of the plurality of passengers, wherein, each of the plurality of passengers perceives one of the plurality of three-dimensional holographic images floating at a central location within the vehicle.

CLAIM 1. A system for generating a centrally located floating three-dimensional image display for a plurality of passengers positioned within a vehicle, comprising: a display adapted to project a multiplexed hologram comprising a plurality of three-dimensional holographic images; and a plurality of beam splitters, one beam splitter individually associated with each one of the plurality of passengers; each beam splitter adapted to receive one of the plurality of holographic images from the display and to reflect the one of the plurality of holographic images to the associated one of the plurality of passengers, wherein, each of the plurality of passengers perceives one of the plurality of three-dimensional holographic images floating at a central location within the vehicle.



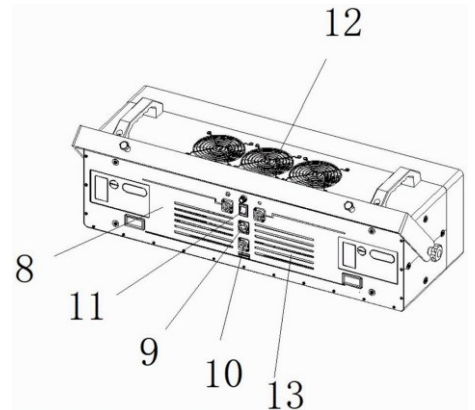
N9865

CN220208080U
Priority Date: 25/07/2023

SHENZHEN HONGMAO YUANZHI PHOTOELECTRIC

HOLOGRAPHIC PROJECTION DISPLAY DEVICE BASED ON PHOTOELECTRIC TECHNOLOGY

The utility model provides holographic projection display equipment based on photoelectric technology, which is convenient for a user to carry and move by a handle. The U-shaped mounting bracket is used for fixing equipment at a specific position so as to carry out projection. The tightening knob is used to adjust the projection angle and position of the device. The mounting pin is used for fixing and stabilizing equipment, avoiding shaking and loosening in the use process, protecting internal components of the equipment through the rear side plate and providing an interface for connecting other equipment or power supply. The holographic projection data connector is for connecting to a holographic projection data source for receiving and displaying a projected image. The power supply connector is used for connecting a power supply and providing power for equipment. The projection switch is used for controlling the on-off of the device so as to start and shut down the projection function. The heat dissipation fan is used for dissipating heat and keeping the normal working temperature of the internal components of the equipment. The heat dissipation grid holes are used for enhancing the heat dissipation effect, improving the stability of equipment and prolonging the service life of the equipment.



CLAIM 1. Holographic projection display equipment based on photoelectric technology, including light emitting source (1), shell body (3), its characterized in that, light emitting source (1) is with light projection to optical projection module (2), optical projection module (2) are including lens (21), speculum (22) and transparent screen (23), lens (21) are connected with speculum (22) through the light, speculum (22) are with light reflection to transparent screen (23) in, the rear side of shell body (3) is provided with posterior lateral plate (8), be provided with holographic projection data joint (9) on posterior lateral plate (8).

N9866

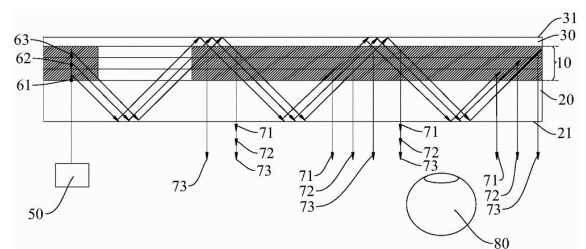
CN220188751U
Priority Date: 29/06/2023

HU DEJIAO

HOLOGRAPHIC DIFFRACTION OPTICAL WAVEGUIDE STRUCTURE AND AUGMENTED REALITY DEVICE

The utility model relates to the technical field related to augmented reality, in particular to a holographic diffraction optical waveguide structure and augmented reality equipment. The holographic diffractive optical waveguide structure includes: the grating layer comprises at least one sub-grating layer group; the substrate layer is arranged on one side of the grating layer; the protective layer is arranged on the other side of the grating layer; wherein, the stratum basale is provided with first total reflection interface in one side of deviating from the grating layer, and the protective layer is provided with the second total reflection interface in one side of deviating from the grating layer. The grating layer is clamped between the substrate layer and the protective layer, so that more degrees of freedom are provided for grating design, a wavelength-view field synthesized diffraction optical waveguide structure without an air interlayer is prepared, the holographic diffraction optical waveguide lens design with a larger view field is realized more easily through grating combination, meanwhile, the preparation difficulty is reduced, the weight is reduced, and meanwhile, the practicability and the mass acceptance are improved.

CLAIM 1. A holographic diffractive optical waveguide structure, comprising: a grating layer (10), the grating layer (10) comprising at least one sub-grating layer group (11); a base layer (20), wherein the base layer (20) is arranged on one side of the grating layer (10); a protective layer (30), wherein the protective layer (30) is arranged on the other side of the grating layer (10); the side of the substrate layer (20) facing away from the grating layer (10) is provided with a first total reflection interface (21), and the side of the protective layer (30) facing away from the grating layer (10) is provided with a second total reflection interface (31).



N9870

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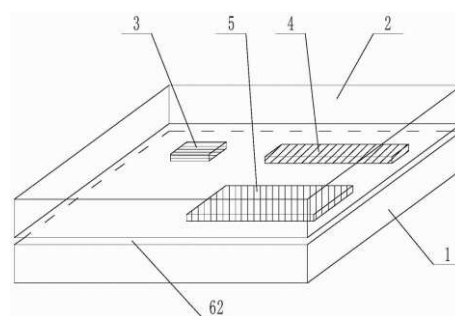
Priority Date: 29/06/2023

JIANGXI LIANHAO PHOTOELECTRIC

HOLOGRAPHIC OPTICAL WAVEGUIDE STRUCTURE OF TWO-DIMENSIONAL EXPANDED PUPIL

The utility model relates to the technical field of projection equipment, in particular to a two-dimensional pupil-expanding holographic optical waveguide structure which comprises a first waveguide sheet, a second waveguide sheet, a coupling-in grating, a turning grating and a coupling-out grating, wherein the first waveguide sheet and the second waveguide sheet are two layers of glass substrates which are arranged together to form a liquid crystal empty box, a polymer dispersed liquid crystal material is injected into the liquid crystal empty box, and the coupling-in grating, the turning grating and the coupling-out grating are prepared in the liquid crystal empty box through double-beam interference. According to the two-dimensional pupil-expanding holographic optical waveguide structure, the two layers of glass substrates are directly used as the first waveguide sheet and the second waveguide sheet, so that the process of additionally attaching gratings is omitted, and the preparation process is simplified. According to the utility model, the preparation of the coupling-in grating, the turning grating and the coupling-out grating is realized by injecting the liquid crystal material into the liquid crystal empty box formed by the first waveguide sheet and the second waveguide sheet, the overall thickness of the optical waveguide structure is smaller, and the current industry product trend is satisfied.

CLAIM 1. A two-dimensional pupil-expanding holographic optical waveguide structure is used for expanding light beams, and is characterized in that: the optical fiber coupler comprises a first waveguide sheet (1), a second waveguide sheet (2), a coupling-in grating (3), a turning grating (4) and a coupling-out grating (5), wherein two layers of glass substrates serving as the first waveguide sheet (1) and the second waveguide sheet (2) are arranged together to form a liquid crystal empty box (6), a containing cavity (61) is arranged in the liquid crystal empty box (6), the coupling-in grating (3), the turning grating (4) and the coupling-out grating (5) are arranged in the containing cavity (61), a light beam passes through the outer side surface of the first waveguide sheet (1) along the z-axis direction to be diffracted on the coupling-in grating (3), and continuously propagates along the x-axis direction in a mode of total reflection between the first waveguide sheet (1) and the second waveguide sheet (2), and completes the light beam expansion along the x-axis direction through the turning grating (4), and simultaneously when the light beam reaches a plurality of positions of the turning grating (4), the light beam propagates along the y-axis direction to the coupling-out grating (5) along the y-axis direction, and completes the coupling-out grating (5) along the y-axis direction.



N9871

CN220105521U

Priority Date: 14/06/2023

SHENZHEN IWIN VISUAL TECHNOLOGY

HOLOGRAPHIC DISPLAY DEVICE

The utility model belongs to the technical field of holographic equipment, and particularly relates to a holographic display device. The holographic display device comprises a display assembly for forming a holographic image, wherein the display assembly comprises a display terminal and a projection plate; the upper box body and the lower box body are detachably connected, and the upper box body and/or the lower box body is/are provided with an accommodating space for accommodating the display assembly; the supporting piece is detachably arranged between the upper box body and the lower box body, so that a spacing space for installing the display assembly is formed between the upper box body and the lower box body; the projection plate is obliquely arranged in the interval space, and the display terminal is arranged on the upper box body or the lower box body; and the projection angle of the projection plate and the display terminal is set, and information displayed by the display terminal is output outwards. The utility model can solve the technical problem that the holographic display equipment in the prior art is inconvenient to store, carry and transport.

CLAIM 1. A holographic display, comprising: the display assembly is used for forming a holographic image and comprises a display terminal and a projection plate; the upper box body and the lower box body are detachably connected, and the upper box body and/or the lower box body is/are provided with an accommodating space for accommodating the display assembly; the supporting piece is detachably arranged between the upper box body and the lower box body, so that a spacing space for installing the display assembly is formed between the upper box body and the lower box body; the projection plate is obliquely arranged in the interval space, and the display terminal is arranged on the upper box body or the lower box body; and the projection angle of the projection plate and the display terminal is set, and information displayed by the display terminal is output outwards.

N9872

CN220085248U

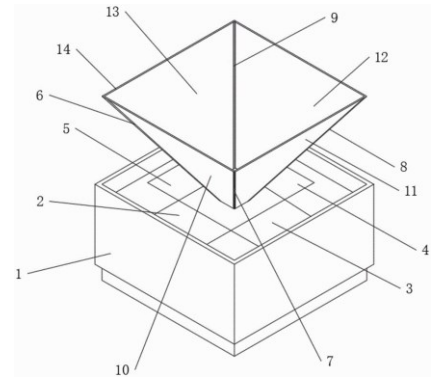
Priority Date: 25/03/2023

SHANGHAI HEYI FUTURE CULTURE & TECHNOLOGY

HOLOGRAPHIC IMAGING CABINET

The utility model provides a holographic imaging cabinet, comprising: the computer is arranged in the bottom cabinet and is electrically connected with the power supply, the imaging system comprises a placing frame and imaging glass, the placing frame is detachably arranged on the upper surface of the bottom cabinet, and the imaging glass is arranged on the placing frame; the display system comprises a first display, a second display, a third display and a fourth display which are arranged on the upper surface of the bottom cabinet and are electrically connected with a power supply, and the first display, the second display, the third display and the fourth display are respectively arranged around the placement frame and respectively correspond to imaging glass. According to the holographic imaging cabinet method, the placement frame is convenient for rapid and accurate installation of imaging glass, the actual look and feel of a visitor is guaranteed, meanwhile, the holographic imaging cabinet can be kept stable, the placement frame is of a detachable structural design, the occupation of space can be reduced by disassembling the placement frame, and the holographic imaging cabinet is convenient to store and transport.

CLAIM 1. A holographic imaging cabinet, comprising: the system comprises a base cabinet, a computer, a display system and an imaging system; the computer is arranged in the bottom cabinet, is electrically connected with a power supply and is electrically connected with the display system; the imaging system comprises a placing frame and imaging glass, wherein the placing frame is detachably arranged on the upper surface of the bottom cabinet, and the imaging glass is arranged on the placing frame; the display system comprises a first display, a second display, a third display and a fourth display, wherein the first display, the second display, the third display and the fourth display are arranged on the upper surface of the bottom cabinet and are electrically connected with a power supply, and the first display, the second display, the third display and the fourth display are respectively arranged on the periphery of the placement frame and respectively correspond to imaging glass.



N9873

CN220085182U

Priority Date: 12/04/2022

GANSU ZHITONG TECHNOLOGY ENGINEERING DETECTION CONSULTING | GANSU ZHITONG YUNXIANG TRAFFIC TECHNOLOGY

NAKED EYE 4D HOLOGRAPHIC IMAGE DEVICE

The utility model discloses a naked eye 4D holographic imaging device, which comprises a device base; the rotating body is arranged at the upper part of the base and comprises at least four turntables concentrically arranged from outside to inside; the driving mechanism is arranged in the base and is respectively connected with the at least four turntables and used for driving the turntables to rotate; the LED lamp strips are uniformly distributed on the crankshaft lamp posts, the crankshaft lamp posts are respectively arranged on the at least four turntables, and the crankshaft lamp posts are distributed in a cross shape on the at least four turntables. The utility model can solve the problems that in the prior holographic image technology, the displayed content only exists in a two-dimensional plane, the depth display capability is not provided, the corresponding content can be displayed in the fixed 4 directions which are perpendicular to each other, and the ideal display effect can not be realized at any angle.

CLAIM 1. A naked eye 4D holographic imaging device, comprising: a base (1); the rotating body is arranged at the upper part of the base (1) and comprises at least four turntables concentrically arranged from outside to inside; the driving mechanism is arranged in the base (1) and is respectively connected with the at least four turntables and used for driving the turntables to rotate; the LED lamp comprises at least four rotating discs, a plurality of crankshaft type lamp posts (16), wherein LED lamp strips (20) are uniformly distributed on the crankshaft type lamp posts (16), the crankshaft type lamp posts (16) are respectively arranged on the at least four rotating discs, the crankshaft type lamp posts (16) are distributed in a cross shape on the at least four rotating discs, the radius of the crankshaft type lamp posts (16) on each rotating disc from the center of the rotating disc is gradually reduced to form a spiral track, conductive assemblies are arranged on the at least four rotating discs, a power transmission end of each conductive assembly is connected with the crankshaft type lamp posts (16), and a power supply end of each conductive assembly is connected with a power supply assembly; the sub wireless communication control components are respectively arranged on the at least four turntables and are respectively connected with the crankshaft type lamp post (16); the total wireless communication control assembly is arranged in the base (1) and is respectively connected with the driving mechanism and the sub wireless communication control assembly; and the sound assembly is arranged inside the base (1) and is connected with the total wireless communication control assembly.

N9877

CN117221503

Priority Date: 08/11/2023

BEIJING FENGHUO WANJIA TECHNOLOGY

HOLOGRAPHIC PROJECTION SYSTEM OF DIGITAL PERSONAL MOBILE TERMINAL

The embodiment of the application relates to the technical field of artificial intelligence, in particular to a holographic projection system of a digital personal mobile terminal. The digital personal mobile terminal holographic projection system at least comprises: a mobile terminal and a digital person service platform; the mobile terminal at least comprises a holographic projection module and an auxiliary information module, wherein the holographic projection module is used for receiving a user operation instruction and controlling projection of a digital person in space according to the operation instruction; the auxiliary information module is used for providing an information interaction channel between the digital person and the user; the digital person service platform is used for receiving the interaction information of the digital person and the user, converting the interaction information into interaction content in a preset format and sending the interaction content to the digital person application program of the mobile terminal so that the digital person application program can control the digital person interaction based on the interaction content.

CLAIM 1. A digital personal mobile terminal holographic projection system, comprising at least: a mobile terminal and a digital person service platform; wherein, the mobile terminal at least comprises a holographic projection module and an auxiliary information module, wherein the holographic projection module is used for receiving a user operation instruction and controlling projection of a digital person in space according to the operation instruction; the auxiliary information module is used for providing an information interaction channel between the digital person and the user; The digital person service platform is used for receiving the interaction information of the digital person and the user, converting the interaction information into interaction content in a preset format and sending the interaction content to the digital person application program of the mobile terminal so that the digital person application program can control the digital person interaction based on the interaction content.

N9879

CN117215416

Priority Date: 08/11/2023

BEIJING FENGHUO WANJIA TECHNOLOGY

HOLOGRAPHIC COMMUNICATION METHOD AND DEVICE FOR MOBILE TERMINAL, COMPUTER EQUIPMENT AND STORAGE MEDIUM

The embodiment of the application relates to the technical field of artificial intelligence, in particular to a mobile terminal holographic communication method, a device, computer equipment and a storage medium. The holographic communication method of the mobile terminal comprises the following steps: responding to a holographic communication control instruction of the holographic communication application program, and sending the holographic communication control instruction to a holographic video communication service platform; receiving holographic communication response information sent by a holographic video communication service platform, and calling a holographic projection module to carry out holographic projection on content corresponding to the holographic communication response information; the holographic communication response information refers to holographic communication information which is responded by other mobile terminals aiming at communication control instructions and is sent to the holographic video communication service platform. Holographic communication among users at different mobile terminal sides is realized in a holographic projection mode, convenience is better, real holographic projection communication interaction can be realized, and the problem that face-to-face communication cannot be realized due to long distance of people is solved.

CLAIM 1. The holographic communication method of the mobile terminal is characterized by being applied to any mobile terminal in a holographic communication system, and the holographic communication system at least comprises: a plurality of mobile terminals and a holographic video communication service platform; each mobile terminal is at least provided with a holographic projection module and a holographic communication application program; the method comprises the following steps: responding to a holographic communication control instruction of the holographic communication application program, and sending the holographic communication control instruction to the holographic video communication service platform; receiving holographic communication response information sent by the holographic video communication service platform, and calling the holographic projection module to carry out holographic projection on content corresponding to the holographic communication response information; the holographic communication response information refers to holographic communication information which is responded by other mobile terminals aiming at the communication control instruction and is sent to the holographic video communication service platform.

N9883

CN117193533

Priority Date: 12/09/2023

SIWEI OPTOELECTRONIC TECHNOLOGY SHANGHAI

WEARING SYSTEM AND METHOD FOR HOLOGRAPHIC AIR PROJECTION IMAGING

The invention relates to the technical field of holographic projection, and discloses an air holographic projection imaging wearing system which comprises a quantum computer processing module, an information storage module, an information processing module, a monitoring and positioning module, a data acquisition module, a sound control motion capture sensing module, an imaging position adjusting module, a man-machine interaction module and a parallax compensation unit. When the wearing method of the air holographic projection imaging is used, firstly, a quantum computing processor is used for collecting objects detected and exchanged in a preset range through a monitoring and positioning module, and through data stored by a data collecting module, an angle parameter and a position parameter are calculated by a quantum computer processing module, the collected angle parameter and position are used as target values, then, a parallax compensation unit is used for calculating a difference value which appears in collection and display, compensation is carried out, and optimal parallax data are fixed through an information storage module, so that virtual screen response is accelerated.

CLAIM 1. An air holographic projection imaging's wearing system, its characterized in that: the wearable system comprises a quantum computer processing module, an information storage module, an information processing module, a monitoring and positioning module, a data acquisition module, a sound control motion capture sensing module, an imaging position adjusting module, a man-machine interaction module and a parallax compensation unit; the quantum computer processing module can collect data of a detection object in a range, calculates visual difference values of left and right eyes of a user, and adjusts imaging positions in air through the visual difference values, so that man-machine interaction is more convenient to realize; the information storage module is used for recording and detecting original data of a user and storing the data subjected to parallax compensation of the left eye and the right eye, so that the response speed of the virtual screen is higher; the monitoring and positioning module can collect related information of an alternating object in a preset range, track a user through hole, feed visual information back to the quantum computer processing module, drive the information processing module through the quantum computer processing module and calculate a visual difference value of left eyes and right eyes of the user; the voice control motion capture sensing module is used for further determining the voice and the motion of a user through the voice control motion capture sensing module so as to realize man-machine interaction; and the imaging position adjusting module is used for adjusting the imaging position according to the data calculated by the information processing module by the quantum computer processing module.

N9886

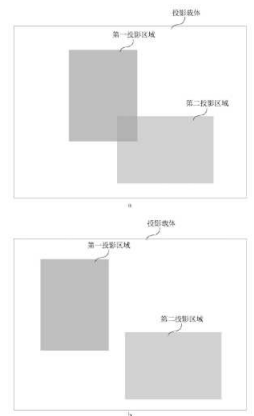
CN117170206

Priority Date: 31/08/2023

GOOLTON TECHNOLOGY

HOLOGRAPHIC IMAGING METHOD AND DEVICE AND ELECTRONIC EQUIPMENT

The application provides a holographic imaging method, a holographic imaging device and electronic equipment, which relate to the technical field of virtual reality, wherein the method is applied to holographic projection equipment and comprises the following steps: acquiring the light intensity of ambient light penetrating through the holographic grating film; judging whether the light intensity is greater than or equal to the preset intensity, and if the light intensity is greater than or equal to the preset intensity, acquiring a first number of the projection layers; determining a second number of the plurality of projection carriers; and carrying out layered projection on projection images corresponding to the projection layers on the plurality of projection carriers based on the first quantity and the second quantity, so that at least one projection image exists on each projection carrier, or each projection image is positioned on different projection carriers, the plurality of projection images are a plurality of images obtained by separating the content to be projected, and the projection images are in one-to-one correspondence with the projection layers. The application can solve the problem of poor holographic imaging effect under the condition of strong ambient light brightness.



CLAIM 1. A holographic imaging method, the method being applied to a holographic projection device, comprising: acquiring the light intensity of ambient light penetrating through the holographic grating film; judging whether the light intensity is larger than or equal to preset intensity, and if the light intensity is larger than or equal to the preset intensity, acquiring a first number of a plurality of projection layers; determining a second number of the plurality of projection carriers; and carrying out layered projection on projection images corresponding to a plurality of projection layers on a plurality of projection carriers based on the first quantity and the second quantity, so that at least one projection image exists on each projection carrier, or each projection image is positioned on different projection carriers, the plurality of projection images are a plurality of images obtained by separating contents to be projected, and the projection images are in one-to-one correspondence with the projection layers.

N9887

CN117153067

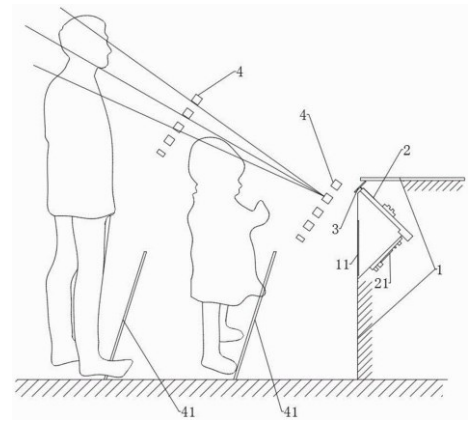
Priority Date: 09/03/2023

MAXELL DIGITAL PRODUCTS

HOLOGRAPHIC PROJECTION STRUCTURE AND INTERACTIVE PROJECTION METHOD THEREOF

The invention discloses a holographic projection structure and an interactive projection method thereof in the technical field of holographic projection, comprising a box body, a semi-reflective polarizing plate, a luminous imaging device, a retro-reflective plate and a sensor; the semi-reflective polarizing plate, the luminous imaging device, the retro-reflective polarizing plate and the sensor are all arranged in the box body, one side wall of the box body is provided with the semi-reflective polarizing plate, the retro-reflective polarizing plate and the luminous imaging device form a reflective included angle, the semi-reflective polarizing plate is vertically arranged, and the semi-reflective polarizing plate faces one side of the projection holographic image; the sensor is positioned outside the box body, the sensor is just opposite to the projection range of the holographic image outside the box body, the holographic projection direction of the equipment can be changed into vertical forward projection, the projection image accords with human eyes to watch, and meanwhile, the sensor can be suitable for people with different heights to watch, and can also be suitable for operation interaction of people with different heights, so that people can use the holographic projection equipment more conveniently.

CLAIM 1. A holographic projection structure, comprising: the device comprises a box body (1), a semi-reflective polarizing plate (11), a luminous imaging device (2), a retro-reflective plate (21) and a sensor (3); the light-emitting imaging device comprises a box body (1), a semi-reflection polarizing plate (11), a light-emitting imaging device (2), a retro-reflection plate (21) and a sensor (3), wherein one side wall of the box body (1) is provided with the semi-reflection polarizing plate (11), the retro-reflection plate (21) and the light-emitting imaging device (2) form a reflection included angle, the light-emitting direction of the light-emitting imaging device (2) is opposite to the semi-reflection polarizing plate (11), and the retro-reflection plate (21) is opposite to the semi-reflection polarizing plate (11); the semi-reflective polarizing plate (11) is vertically arranged, and the semi-reflective polarizing plate (11) faces one side of the projection holographic image (4); the monitoring range of the sensor (3) is positioned outside the box body (1), and the detection direction of the sensor (3) is over against the projection range of the holographic image (4) outside the box body (1).



N9890

CN117111430

Priority Date: 13/07/2023

LIMITED COMPANY OF FORCE PARTY DIGITAL SCIENCE & TECHNOLOGY GROUP

HOLOGRAPHIC DINING TABLE SYSTEM AND DISPLAY METHOD

The invention provides a holographic dining table system and a display method, wherein the system comprises a holographic interface generating unit, a holographic projection area generating unit and a holographic scene adjusting unit; the holographic interface generating unit is used for acquiring environmental information of the environment where the dining table is positioned and generating a plurality of holograms; the holographic projection area generating unit is used for determining a projection area of the dining table; the holographic scene adjusting unit is used for carrying out holographic display in the projection area of the dining table according to a plurality of holograms. The holographic dining table system determines the projection area through a plurality of holograms, and accurately displays the holograms in the projection area, so that the situation that the projection area is not overlapped with the dining table area is avoided, and the user experience is influenced.

CLAIM 1. The holographic dining table system is characterized by comprising a holographic interface generating unit, a holographic projection area generating unit and a holographic scene adjusting unit; the holographic interface generating unit is used for acquiring environmental information of the environment where the dining table is positioned and generating a plurality of holograms; the holographic projection area generating unit is used for determining a projection area of the dining table; the holographic scene adjusting unit is used for carrying out holographic display in a projection area of the dining table according to a plurality of holograms.

N9891

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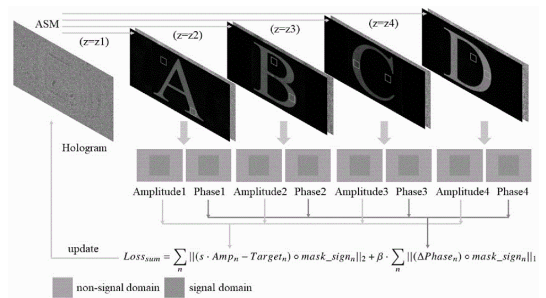
Priority Date: 25/08/2023

SICHUAN UNIVERSITY

CROSSTALK SUPPRESSION METHOD FOR MULTI-PLANE HOLOGRAPHIC DISPLAY

The invention relates to a crosstalk suppression method of multi-plane holographic display, and provides a double-constraint random gradient descent (DC-SGD) method for suppressing inter-plane crosstalk. In the hologram optimization process, the present invention uses a mask to make the optimization process more focused on the optimization of the signal region and to improve the reconstruction quality. Meanwhile, the invention adopts a phase regularization strategy to reduce the randomness of the reconstructed phase signal area and inhibit the inter-plane crosstalk. Compared with a time division multiplexing random gradient descent (TM-SGD) method, the method can inhibit inter-plane crosstalk at smaller inter-plane intervals, and greatly shorten the optimization time of holograms. The method can be widely applied to the three-dimensional visualization of the tomographic images in the biomedical field.

CLAIM 1. A crosstalk suppression method for a multi-plane holographic display, characterized by: step 1, setting a phase hologram as an initial optimization variable, and diffracting the phase hologram to planes at different depths by using a diffraction algorithm to obtain reconstruction; step 2, extracting the reconstruction amplitude and the reconstruction phase of each reconstruction plane, and multiplying the reconstruction amplitude and the reconstruction phase by a signal area mask to obtain the reconstruction amplitude and the reconstruction phase of the signal area; step 3, calculating L2 norms between the reconstructed amplitude of each plane and the target amplitude respectively, and summing the L2 norms of all planes to obtain total amplitude loss; step 4, carrying out phase regularization operation on the reconstructed phases, respectively calculating L1 norms of second derivatives of the reconstructed phases of all planes, and summing the L1 norms of all planes to obtain total phase loss; step 5, adding the total amplitude loss and the total phase loss to obtain a total loss Adjusting the optimization force of the amplitude and the phase through the weight coefficient; step 6, continuously updating the phase hologram by calculating the gradient of the total loss function, wherein the loss function designed by the optimization method is expressed as: where in And-> Amplitude and phase total losses, respectively, < >> And-> In order to reconstruct the amplitude and the target amplitude, mask for reconstructing a planar signal region> To reconstruct the phase +.> For the Laplacian used for calculating the second derivative, < +.> Is a scale factor for adjusting energy difference, < -> Is a weight coefficient for adjusting the specific gravity of the amplitude loss and the phase loss.



N9892

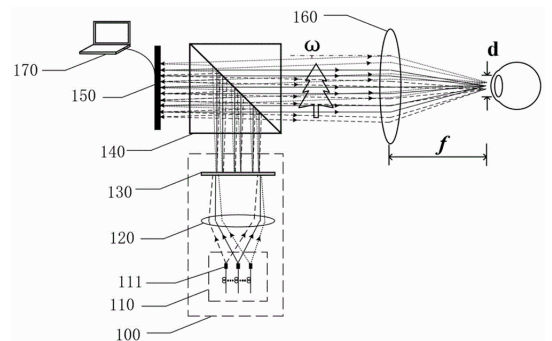
CN117111305

Priority Date: 29/08/2023

SHANGHAI UNIVERSITY

LARGE-FIELD-ANGLE HOLOGRAPHIC NEAR-TO-EYE DISPLAY DEVICE AND DISPLAY METHOD

The holographic near-to-eye display device with large field angle comprises a structured light multi-angle lighting module, a spatial light modulator and an ocular lens, wherein the structured light multi-angle lighting module is used for generating and modulating parallel light with different angles and commonly irradiating different areas on the spatial light modulator; and the spatial light modulator is loaded with holograms and is used for modulating and diffracting parallel light with different angles, and diffracted image light with different angles is converged by the ocular and then enters human eyes. The invention utilizes parallel light with different angles generated by the structural light modulator to jointly irradiate different areas of the spatial light modulator, and diffraction image light generated by the spatial light modulator is rearranged on an image plane in resolution, so that the size of the image plane is enlarged, and the aim of enlarging the angle of view is achieved. And the diffraction image light of different angles is partially overlapped on the image plane, the resolution of the overlapped area is higher than that of the non-overlapped area, and the visual characteristics of the human eye fovea are met.



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

N9849

WO2023233016

Priority Date: 03/06/2022

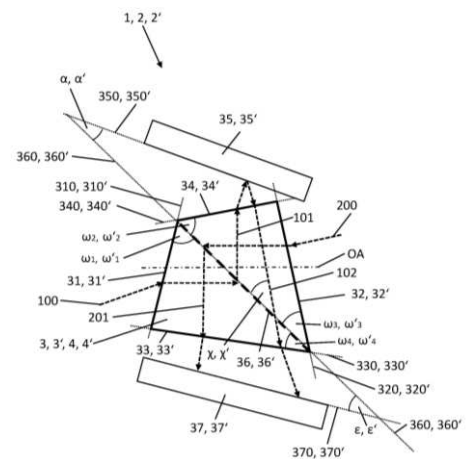
AKMIRA OPTRONICS

OPTICAL SYSTEM FOR DIGITAL HOLOGRAPHY

The invention relates to an optical system (1) comprising at least the following components: a first holography assembly (2) comprising a first diffraction element (3) which is made of a first prism assembly (4) with an at least rectangular base surface, wherein a lateral surface of the first prism assembly (4) has the following lateral surface regions: a first inlet surface (31) for reference light (100), said first inlet surface extending along a first inlet plane (310), a second inlet surface (32) for object light (200), said second inlet surface extending along a second inlet plane (320), the first and second inlet surfaces (31, 32) forming opposing lateral surface regions of the first prism assembly (4), an outlet surface (33) which extends along an outlet plane (330) and through which the diffracted reference light (102) and diffracted object light (201) can exit the first diffraction element (3), a prism surface (34) which lies opposite the outlet surface (33) and which extends along a prism plane (340), and an optical transmission diffraction grating assembly (36) that is arranged in the first diffraction element (3) and extends between the first inlet surface (31) and the outlet surface (33) along a diffraction plane (360), which intersects the first inlet plane (310), wherein the transmission diffraction grating assembly (36) of the first diffraction element (3) comprises at least one first volume phase hologram grating, the first holography assembly (2) has a first mirror (35) with a first mirror plane (350) on the prism surface (34) side, the first mirror plane (350) forms an angle α together with the diffraction plane (360), the prism plane (340) forms an angle ω_2 together with the diffraction plane (360), and at least one of the angles α , ω_2 differs from 45° .

SYSTÈME OPTIQUE POUR HOLOGRAPHIE NUMÉRIQUE

L'invention concerne un système optique (1) comprenant au moins les composants suivants : un premier ensemble holographique (2) comprenant un premier élément de diffraction (3) qui est constitué d'un premier ensemble prisme (4) avec une surface de base au moins rectangulaire, une surface latérale du premier ensemble prisme (4) ayant les régions de surface latérale suivantes : une première surface d'entrée (31) pour une lumière de référence (100), ladite première surface d'entrée s'étendant le long d'un premier plan d'entrée (310), une seconde surface d'entrée (32) pour une lumière d'objet (200), ladite seconde surface d'entrée s'étendant le long d'un second plan d'entrée (320), les première et seconde surfaces d'entrée (31, 32) formant des régions de surface latérale opposées du premier ensemble prisme (4), une surface de sortie (33) qui s'étend le long d'un plan de sortie (330) et à travers laquelle la lumière de référence diffractée (102) et la lumière d'objet diffractée (201) peuvent sortir du premier élément de diffraction (3), une surface de prisme (34) qui se trouve à l'opposé de la surface de sortie (33) et qui s'étend le long d'un plan de prisme (340), et un ensemble réseau de diffraction de transmission optique (36) qui est agencé dans le premier élément de diffraction (3) et s'étend entre la première surface d'entrée (31) et la surface de sortie (33) le long d'un plan de diffraction (360), qui coupe le premier plan d'entrée (310), l'ensemble réseau de diffraction de transmission (36) du premier élément de diffraction (3) comprenant au moins un premier réseau d'hologrammes de phase volumique, le premier ensemble holographique (2) ayant un premier miroir (35) avec un premier plan de miroir (350) sur le côté de surface de prisme (34), le premier plan de miroir (350) formant un angle α avec le plan de diffraction (360), le plan de prisme (340) formant un angle ω_2 avec le plan de diffraction (360), et au moins l'un des angles α , ω_2 étant différent de 45° .



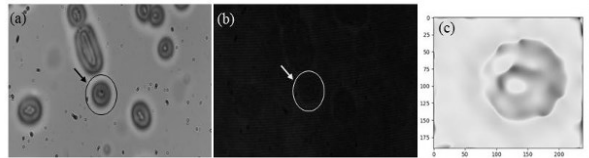
N9862

IN202231057141
Priority Date: 06/10/2022

SAHU ASHOK KUMAR | PANDA BANDITA | TRIPATHY ADIK AMIYAN |
DASH SANDIP KUMAR | BAL ATANU KUMAR | SAHOO NABA KISHOR |
TRIPATHY SUKANTA KUMAR

METHOD AND SYSTEM FOR MONITORING BLOOD HBA1C LEVEL USING DIGITAL HOLOGRAPHIC MICROSCOPE

The present invention discloses a method and system for monitoring glucose level in blood by detection of haemoglobin A1c (HbA1c) using digital holographic microscope with introduction of a new function Φ_{cp} . The present includes the steps of preparation of a RBC sample, recording hologram image of the RBCs in the sample, digitally reconstructing the RBCs using a reconstruction algorithm and calculating Φ_{cp} of HbA1c in the reconstructed RBCs, then a catalogue is created of normal Φ_{cp} values and abnormal Φ_{cp} values from multiple samples which is used further for correlation to monitor of blood glucose level.



CLAIM 1. A method for monitoring glucose level in blood by detection of HbA1c using digital holographic microscope, wherein the method comprises the step of: preparation of a RBC sample; recording hologram image of the RBCs in the sample; digitally reconstructing the RBCs; calculating Φ_{cp} of the reconstructed RBCs; creating a catalogue of normal Φ_{cp} values and abnormal Φ_{cp} values from multiple samples; and correlating of catalogue with Φ_{cp} of HbA1c of sample for monitoring glucose level in blood, wherein the phase Φ_{cp} value of >3.5 points out hyperglycemia condition.

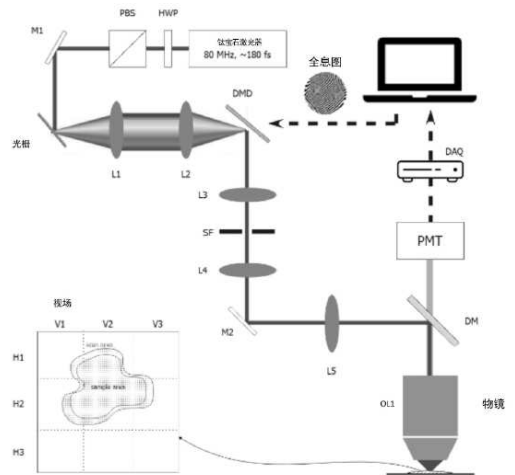
N9878

CN117218332
Priority Date: 22/08/2023

HONG KONG CENTRE FOR CEREBRO CARDIOVASCULAR HEALTH
ENGINEERING

CYCLIC NEURAL NETWORK AUXILIARY WAVEFRONT SENSING METHOD AND EQUIPMENT BASED ON HOLOGRAPHIC PROJECTION

The embodiment of the application provides a cyclic neural network auxiliary wavefront sensing method, a device, electronic equipment, a computer readable storage medium and a computer program product based on holographic projection, and relates to the fields of microscopic imaging and artificial intelligence. The method comprises the following steps: acquiring a first fluorescence image; then determining a region of interest of the first fluoroscopic image; and further, performing wavefront detection processing on the region of interest of the first fluorescent image based on the cyclic neural network to obtain target wavefront information corresponding to the region of interest of the first fluorescent image, wherein the target wavefront information comprises target wavefront aberration. The embodiment of the application realizes the improvement of the wavefront detection efficiency.



CLAIM 1. A cyclic neural network auxiliary wavefront sensing method based on holographic projection is characterized by comprising the following steps: acquiring a first fluorescence image; determining a region of interest of the first fluoroscopic image; and performing wavefront detection processing on the region of interest of the first fluorescent image based on a cyclic neural network to obtain target wavefront information corresponding to the region of interest of the first fluorescent image, wherein the target wavefront information comprises target wavefront aberration.

N9885

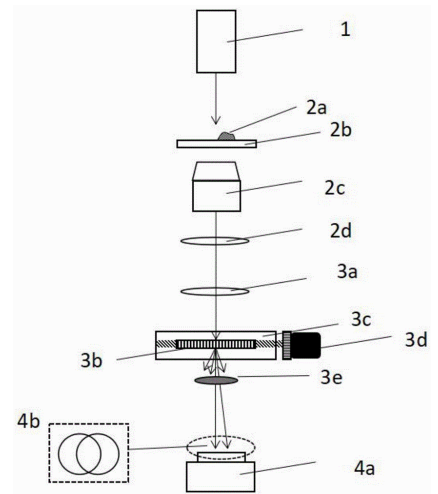
CN117190849

Priority Date: 08/09/2023

SICHUAN UNIVERSITY

HETERODYNE DIGITAL HOLOGRAPHIC MICROSCOPIC PHASE IMAGING SCHEME BASED ON MOVABLE GRATING

The invention discloses a heterodyne digital holographic microscopic phase imaging scheme based on a movable grating. The described solution comprises an optical imaging device and a measuring method. The optical imaging device comprises a light source system, an amplifying system, a heterodyne interference system and an image acquisition system. The light beam emitted by the light source penetrates through the measured object and carries the optical phase information of the measured object, the light beam is amplified by the amplifying system, then the incident light is divided into a plurality of light beams with different frequencies and sizes by the movable grating in the heterodyne microscopic system, and the light beams with 0 and +1 orders are selected by the diaphragm to interfere on the detection surface of the camera to generate continuous movable interference fringes. The measuring method mainly comprises the following steps: optical path debugging, image data acquisition, image processing and phase-height calibration. Compared with the traditional reconstruction scheme based on a single image, the method can obtain higher reconstruction accuracy, has the characteristics of low cost and good stability, and provides a new measurement scheme and thought for digital holographic microscopic imaging.



CLAIM 1. The heterodyne digital holographic microscopic phase imaging scheme based on the moving grating comprises an optical imaging device and a measuring method, and is characterized in that: the optical imaging device comprises a light source system (1), an amplifying system (2), a heterodyne interference system (3) and an image acquisition system (4), wherein the light source system (1) is composed of a helium-neon laser, the amplifying system is composed of a tested sample (2 a), a sample table (2 b), a microscope objective (2 c) and a convex lens (2 d), the heterodyne interference system is composed of a convex lens (3 a), a grating (3 b), a linear translation table (3 c), a stepping motor (3 d), a diaphragm (3 e) and a convex lens (3 f), and the image acquisition system (4) is composed of a COMS (4 a) camera.

N9888

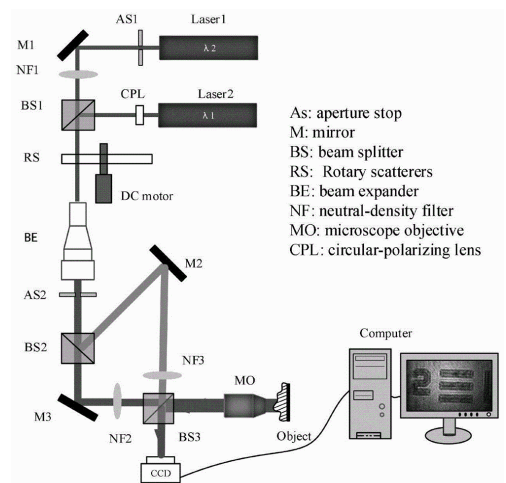
CN117147547

Priority Date: 31/08/2023

CHINA JILIANG UNIVERSITY

COHERENT NOISE PROCESSING METHOD OF HOLOGRAPHIC MICRO-CHANNEL MEASUREMENT SYSTEM

The invention discloses a coherent noise processing method of a holographic micro-channel measurement system, which comprises a computer and a dual-wavelength digital holographic micro-system light path based on a rotary scattering sheet. According to the coherent noise processing method of the holographic micro-channel measurement system, a rotary scattering sheet is added on the basis of dual-wavelength digital holographic microscopy, the coherent noise caused by interference of micro-channel surface materials in reflective measurement is restrained by utilizing a speckle field of the scattering sheet, and effective restraint of the coherent noise is proved by adopting hologram recording and reproduction comparison under the condition that the same micro-fluidic chip is provided with or not by the scattering sheet system, so that measurement of a micro-channel can be successfully realized by utilizing the method.



Click on the title to return to table of contents

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

N9847

WO2023233827

Priority Date: 03/06/2022

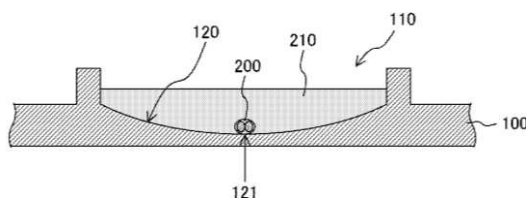
FUJIFILM

PHASE IMAGE ACQUISITION METHOD AND QUANTITATIVE DATA ACQUISITION METHOD

The present invention acquires a hologram image of an object in a state in which the object is accommodated in a recess in a container, a bottom surface of the recess being curved. A phase image is generated from the hologram image. Processing for subtracting, from the phase image, a phase component that is derived from a polynomial indicating the shape of the bottom surface of the recess is performed to acquire a processed phase image.

PROCÉDÉ D'ACQUISITION D'IMAGE DE PHASE ET PROCÉDÉ D'ACQUISITION DE DONNÉES QUANTITATIVES

La présente invention permet d'acquérir une image d'hologramme d'un objet dans un état dans lequel l'objet est logé dans un évidement dans un récipient, une surface inférieure de l'évidement étant incurvée. Une image de phase est générée à partir de l'image d'hologramme. Un traitement pour soustraire, à partir de l'image de phase, une composante de phase qui est dérivée d'un polynôme indiquant la forme de la surface inférieure de l'évidement est effectué pour acquérir une image de phase traitée.



CLAIM 1. Provided is a phase image acquisition method for acquiring a processed phase image by acquiring a hologram image of an object while the object is housed in a recessed section of a container having a recessed section having a curved bottom surface, generating a phase image from the hologram image, and performing processing for subtracting a phase component derived from a polynomial indicating the shape of the bottom surface of the recessed section from the phase image.

N9863

FR3135969

Priority Date: 30/05/2022

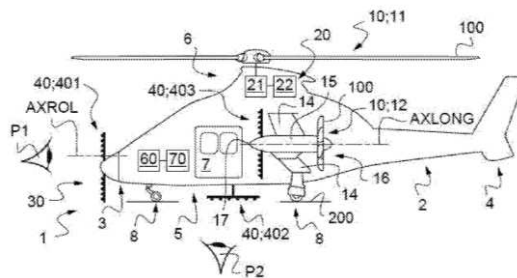
AIRBUS HELICOPTERS

AIRCRAFT EQUIPPED WITH A HOLOGRAPHIC WARNING SYSTEM

The present invention relates to an aircraft (1) provided with a rotating member (10), outside a supporting structure (2), said rotating member (10) comprising at least one blade (100), said aircraft (1) being provided with a warning system (30) configured to signal a danger to a person in the vicinity of said rotating member (10). The warning system (30) comprises at least one holographic warning system (40), said warning system (30) having a controller (60) in communication with said holographic warning system (40) and at least one state sensor (70) of said aircraft (1), said controller (60) being configured to control during a ground person protection mode a display on the holographic warning system (40) of at least one warning message containing at least one predetermined symbol in at least one predetermined state of the aircraft (1) according to at least one measurement of said at least one status sensor (70).

AÉRONEF MUNI D'UN SYSTÈME D'AVERTISSEMENT HOLOGRAPHIQUE

La présente invention concerne un aéronef (1) muni d'un organe tournant (10), à l'extérieur d'une structure porteuse (2), ledit organe tournant (10) comprenant au moins une pale (100), ledit aéronef (1) étant muni d'un système d'alerte (30) configuré pour signaler un danger pour une personne à proximité dudit organe tournant (10). Le système d'alerte (30) comporte au moins un système d'avertissement holographique (40), ledit système d'alerte (30) ayant un contrôleur (60) en communication avec ledit système d'avertissement holographique (40) et au moins un capteur d'état (70) dudit aéronef (1), ledit contrôleur (60) étant configuré pour commander durant un mode de protection de personne au sol un affichage sur le système d'avertissement holographique (40) d'au moins un message d'avertissement contenant au moins un symbole prédéterminé dans au moins un état prédéterminé de l'aéronef (1) en fonction d'au moins une mesure dudit au moins un capteur d'état (70).



CLAIM 1. An aircraft (1) provided with a rotating member (10), said rotating member being arranged outside a supporting structure (2), said rotating member (10) comprising at least one blade (100), said aircraft (1) being provided with a warning system (30) configured to signal a danger for a person in the vicinity of said rotating member (10), characterized in that said warning system (30) comprises at least one holographic warning system (40), said holographic warning system (40) comprising a plurality of transmitters light (50) rotatable about an axis of rotation, said warning system (30) having a controller (60) in communication with said holographic warning system (40) and at least one state sensor (70) of said aircraft (1), said controller (60) being configured to control, during a ground person protection mode, a display on the holographic warning system (40) of at least one warning message (90) containing at least one predetermined symbol in at least one predetermined state of the aircraft (1) that is identified according to at least one at least one measurement of said at least one state sensor (70).

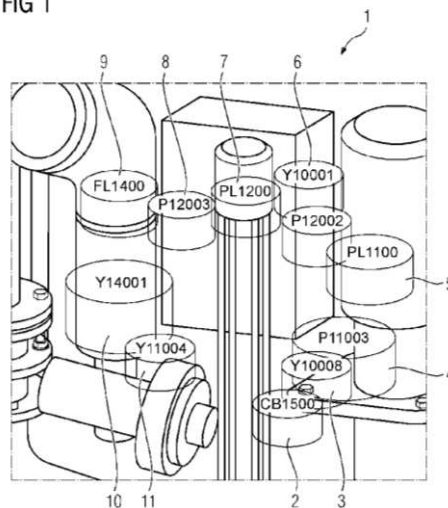
GENERATION OF HOLOGRAMS FOR REPRESENTATION IN AN AUGMENTED REALITY ENVIRONMENT

The invention relates to a method comprising the following steps: - capturing an environment by an image capturing means comprised by a system, - adding image information to the image captured environment by means of calculating means comprised by the system, - pictorial reproduction (1) of the image captured environment by the image capturing means together with the image information added by the calculating means by means of image means comprised by the system, wherein the calculating means are designed to identify objects located in the environment taking into account a position and/or a capturing direction of the image capturing means. The method is characterized in that the calculating means identify one or more objects in the pictorial reproduction (1) when a point is selected by a user of the system, which objects could represent the target of the selection, and then generate a hologram (2, 3, 4, 5, 6, 7, 8, 9, 10, 11) or a plurality of holograms (2, 3, 4, 5, 6, 7, 8, 9, 10, 11) which are reproduced by the image means in the pictorial reproduction (1), wherein the hologram (2, 3) is The invention also relates to a method for identifying a specific object. According to the invention, the holograms (2, 3, 4, 5, 6, 7, 8, 9, 10, 11) or the holograms (2, 3, 4, 5, 6, 7, 8, 9, 10, 11) preferably respectively comprise information which is necessary for an unambiguous identification of the respective identified object.

GÉNÉRATION DES HOLOGRAMMES DESTINÉS À ÊTRE AFFICHÉS DANS UN ENVIRONNEMENT DE RÉALITÉ AUGMENTÉE

L'invention concerne un procédé qui consiste à : - capturer un environnement par un moyen de capture d'image compris par un système ; - ajouter des informations d'image à l'environnement visuellement capturé à l'aide de moyens informatiques compris par le système ; - reproduire visuellement (1) l'environnement capturé par le moyen de capture d'image, conjointement avec les informations d'image ajoutées par le moyen informatique, à l'aide du moyen d'imagerie compris par le système, les moyens informatiques étant conçus de façon à identifier des objets situés dans l'environnement, en tenant compte d'une position et/ou d'une direction de capture du moyen de capture d'image. Le procédé est caractérisé en ce que le moyen de calcul génère un hologramme (2, 3, 4, 5, 6, 7, 8, 9, 10, 11) pour chaque objet identifié, ledit hologramme étant reproduit par le moyen d'imagerie dans la reproduction visuelle (1), et qui comprend de préférence des informations qui sont requises pour une identification univoque de l'objet identifié. Le système, lorsque l'un des objets identifiés est sélectionné par un utilisateur du système, affiche un élément d'informations dans la reproduction visuelle (1), qui indique à l'utilisateur quelle quantité d'autres informations (12, 13) relatives à l'objet respectif est disponible, ou le système, lorsqu'un des objets identifiés est sélectionné par un utilisateur du système, génère un affichage de type liste des autres informations disponibles.

FIG 1



N9868

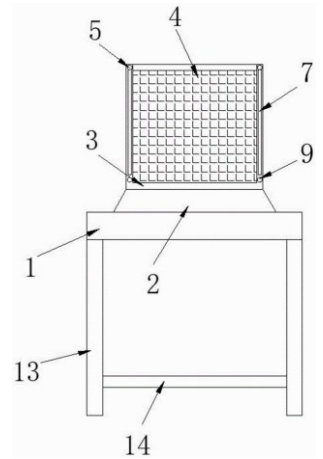
CN220154673U

Priority Date: 30/03/2023

SUZHOU WENSHENG OPTICS

HOLOGRAPHIC DIFFRACTION GRATING

The utility model discloses a holographic diffraction grating, which comprises a base, wherein an installation seat is fixed on the upper surface of the base, a protection frame is fixedly arranged on the upper end of the installation seat, diffraction sheets are arranged in the protection frame, and two first limiting components penetrate through two sides of the installation seat. The utility model provides a protection frame, a diffraction sheet, a sponge layer, a sliding rail, a positioning part, a second limiting component and a first limiting component, wherein the first limiting component comprises a connecting rod, a limiting plate, a first handle and a spring, the diffraction sheet is inserted into the protection frame, the second limiting component is used for limiting and fixing the diffraction sheet at the bottom of the protection frame, the first handle is pushed, the first limiting component slides up and down along the sliding rail, the sponge layer is used for cleaning dust on the surface of the diffraction sheet, when the sponge layer slides to the positioning part, the two limiting plates clamp the diffraction sheet, and the spring is compressed and generates larger friction force with the inner wall of the protection frame to enable the first limiting component to be fixed at the upper part of the protection frame to limit and fix the diffraction sheet, and the diffraction sheet is replaced in the same way.



CLAIM 1. A holographic diffraction grating comprising a base (1), characterized in that: the utility model discloses a protection device for the automobile, including base (1), base (1) upper surface fixation has mount pad (2), mount pad (2) upper end has set firmly protection frame (3), inside diffraction piece (4) that are provided with of protection frame (3), and mount pad (2) both sides pass there are two first spacing subassemblies (5), first spacing subassembly (5) are including connecting rod (51) that pass protection frame (3) both sides, connecting rod (51) both ends are fixed with limiting plate (52) and first handle (53) respectively, and the position cover that connecting rod (51) surface is located between limiting plate (52) and protection frame (3) is equipped with spring (54), limiting plate (52) one side is fixed with sponge layer (6), slide rail (7) corresponding with limiting plate (52) position are seted up to protection frame (3) both sides, and protection frame (3) upper end is equipped with location portion (8), and protection frame (3) lower part is provided with second spacing subassembly (9).

N9869

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Priority Date: 23/03/2023

SUZHOU WENSHENG OPTICS

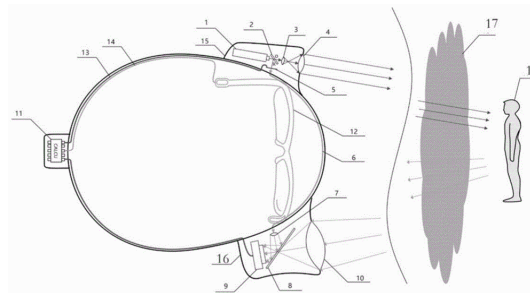
HOLOGRAPHIC GRATING WITH MULTILAYER STRUCTURE

The utility model discloses a holographic grating with a multilayer structure, which comprises a holographic grating with a multilayer structure, wherein an upper holographic grating fixing frame and a lower holographic grating fixing frame are respectively arranged at the top and the bottom of the holographic grating with the multilayer structure, and two telescopic positioning structures are respectively arranged at two sides of the holographic grating with the multilayer structure; the utility model adopts the holographic grating upper fixing frame and the holographic grating lower fixing frame to clamp and fix the multi-layer structure holographic grating, the holographic grating upper fixing frame and the holographic grating lower fixing frame are connected and fixed through the spring and the telescopic positioning structure, the spring is used for driving the holographic grating upper fixing frame and the holographic grating lower fixing frame to be mutually close, the purpose of clamping the multi-layer structure holographic grating is realized, and the telescopic positioning structure is used for stabilizing the holographic grating upper fixing frame and the holographic grating lower fixing frame, so that the problem that the clamping effect is influenced due to the fact that the holographic grating upper fixing frame and the holographic grating lower fixing frame cannot be aligned is avoided.

CLAIM 1. Holographic grating of multilayer structure, comprising a holographic grating (9) of multilayer structure, characterized in that: the top and the bottom of multilayer structure holographic grating (9) are provided with holographic grating upper mount (1) and holographic grating lower mount (2) respectively, the both sides of multilayer structure holographic grating (9) respectively are provided with a flexible location structure (3), flexible location structure (3) are installed between holographic grating upper mount (1) and holographic grating lower mount (2), a spring (6) is respectively installed to both sides between holographic grating upper mount (1) and holographic grating lower mount (2), two mounting feet (8) are respectively installed on holographic grating upper mount (1) and holographic grating lower mount (2).

HEAD-MOUNTED REAL-TIME THREE-DIMENSIONAL DETECTION DEVICE AND DETECTION METHOD BASED ON INFRARED DIGITAL HOLOGRAPHY

The invention provides a head-mounted real-time three-dimensional detection device and a detection method based on infrared digital holography, wherein a narrow-linewidth infrared pulse laser emits infrared pulse laser, reference light reflected by a beam splitter I enters an infrared optical fiber after passing through an adjustable infrared attenuation sheet, and is led into an optical fiber beam expander to expand into spherical infrared light waves, and the spherical infrared light waves enter an infrared CCD after being reflected by a beam splitter II; the object light transmitted by the beam splitter I forms infrared parallel light after passing through the beam expander and the Fourier lens, and irradiates the object to be detected through smoke to generate infrared diffuse reflection, the surface diffuse reflection infrared light is converged by the adjustable lens to return infrared light, and the infrared light is transmitted and injected into the infrared CCD when passing through the beam splitter II; the reference light interferes with the object light, and the reconstructed three-dimensional image after diffraction calculation is transmitted into an individual combat helmet AR display module for infrared digital holographic real-time detection display. The invention can penetrate battlefield smog and has the advantages of holographic three-dimensional imaging and military plane false target identification.



CLAIM 1. The head-mounted real-time three-dimensional detection device based on infrared digital holography is characterized in that two sides of an individual combat helmet are respectively provided with an emission area and an interference area, the emission area is provided with an outer layer protection device I (15), and the interference area is provided with an outer layer protection device II (16); a narrow-linewidth infrared pulse laser (1) is arranged in the outer-layer protection device I (15) of the emitting area, a beam splitter I (2) is arranged on the light path of the narrow-linewidth infrared pulse laser (1), and transmitted object light and reflected reference light are formed after the beam splitter I (2); a beam expander (3) and a Fourier lens (4) are sequentially arranged on the optical path of the object light, and the Fourier lens (4) faces the front side of the individual combat helmet; an adjustable infrared attenuation sheet (5) and an infrared optical fiber (6) are arranged on the optical path of the reference light; the other end of the infrared optical fiber (6) extends into an outer layer protection device II (16) of the interference area; the object light transmitted by the beam splitter I (2) forms infrared parallel light after passing through the beam expander (3) and the Fourier lens (4), and is emitted to the outside in the outer layer protection device I (15), and is transmitted in the air for a certain distance and then irradiates to a detection target (18) through smoke (17) to generate infrared diffuse reflection; an optical fiber beam expander (7) and a beam splitter II (8) are sequentially arranged on an incident light path of the infrared optical fiber (6) in the outer layer protection device II (16) of the interference area; an infrared CCD (9) is arranged on the reflecting light path of the beam splitter II (8); an infrared CCD (9); an adjustable focusing lens (10) is arranged in the advancing direction of the outer layer protection device II (16) of the interference zone; the diffuse reflection infrared light on the surface of the detection target (18) propagates along the return direction and penetrates through the smoke (17), and enters the outer layer protection device II (16) through the adjustable lens (10) after propagating in the air, the return infrared light is converged by the adjustable lens (10), and is transmitted through the beam splitter II (8) and is injected into the infrared CCD (9); the individual combat helmet is also provided with an integrated calculation module (11) and an individual combat helmet AR display module (12); the infrared CCD (9) is connected with the integrated calculation module (11); the adjustable infrared attenuation sheet (5) is connected with the integrated calculation module (11) through a signal transmission line I (13); the integrated calculation module (11) is connected with the individual combat helmet AR display module (12) through a signal transmission line II (14).

N9876

CN117229787

Priority Date: 10/11/2023

JOURNEY TECHNOLOGY

HOLOGRAPHIC POLYMER DISPERSED LIQUID CRYSTAL MATERIAL, VOLUME HOLOGRAPHIC GRATING AND PREPARATION METHOD THEREOF

The invention discloses a holographic polymer dispersed liquid crystal material, a volume holographic grating and a preparation method thereof, wherein the holographic polymer dispersed liquid crystal material comprises a liquid crystal composition, acrylic ester polymerizable monomers and a photoinitiator; the liquid crystal composition comprises compounds shown in the following formulas I-III, and the acrylic polymerizable monomer comprises a trifunctional polymerizable monomer and a compound shown in the following formula IV. According to the holographic polymer dispersed liquid crystal material, the liquid crystal composition with a specific structural formula and the polymerizable monomer are selected, so that the prepared holographic polymer dispersed liquid crystal material has excellent performance, and can be polymerized under the light of a blue light wave band to obtain the volume holographic grating, so that the prepared volume holographic grating has high diffraction efficiency and low haze, can be switched between a holographic state and a transparent state, and can meet the application requirements of the volume holographic optical waveguide.

CLAIM 1. A holographic polymer dispersed liquid crystal material, characterized in that the holographic polymer dispersed liquid crystal material comprises a liquid crystal composition, an acrylic polymerizable monomer and a photoinitiator; the liquid crystal composition comprises compounds shown in the following formulas I-III, and the acrylic polymerizable monomer comprises a trifunctional polymerizable monomer and a compound shown in the following formula IV: a compound of formula i: ; a compound of formula ii: ; a compound of formula iii: ; a compound of formula iv: ; wherein R is 1 ,R 2 ,R 3 And R is 4 Independent representations ,/> ,/> ,/> An alkyl group having 1 to 7 carbon atoms, an alkoxy group having 1 to 7 carbon atoms, wherein at least one hydrogen atom may be substituted with a fluorine atom; and-> Independent representation-> Or-> ; X represents F, CF 3 Or OCF (optical clear) 3 ; L 1 ~L 6 Each independently represents a fluorine atom or a hydrogen atom; m and n each independently represent 0 or 1; Sp 1 ,Sp 2 each independently represents a single bond or a linear alkyl group having 1 to 6 carbon atoms, at least one or more-CH(s) in the linear alkyl group having 1 to 6 carbon atoms 2 -may be substituted by-O-, -COO-, or-c=c-; Y 1 represents a fluorine atom, a chlorine atom, an alkyl group having 1 to 7 carbon atoms, an alkoxy group having 1 to 7 carbon atoms, an alkenyl group having 2 to 6 carbon atoms, an alkenyloxy group having 2 to 6 carbon atoms or a cycloalkyl group having 3 to 6 carbon atoms; p represents 1, 2, 3, 4 or 5; q represents 0, 1, 2, 3 or 4, and when p is 2, 3, 4 or 5, Y 1 And q may be the same or different.

N9882

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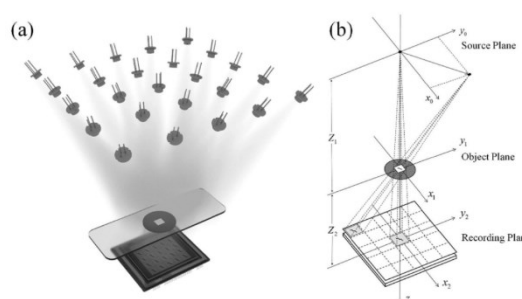
Priority Date: 06/09/2023

SHANDONG NORMAL UNIVERSITY

SINGLE CLICK LENS-FREE OPTICAL DIFFRACTION TOMOGRAPHY METHOD AND SYSTEM

The invention provides a single-click lens-free optical diffraction tomography method and a system based on a space division multiplexing technology, wherein light from different light sources irradiates a sample positioned at a diaphragm at different angles, and object light transmitted through the sample is respectively projected to different positions of an image sensor, so that a plurality of Gabor holograms are formed; and carrying out numerical reconstruction on all Gabor holograms to recover the amplitude and phase distribution of the object to be measured under different illumination angles, then reconstructing the three-dimensional information of the object by using a three-dimensional diffraction chromatography algorithm, and realizing the three-dimensional refractive index distribution imaging of the dynamic biological sample through one-time measurement.

CLAIM 1. A single click lensless optical diffraction tomography method comprising: each sub-light source in the array illumination light source emits illumination light with different angles; the imaging object is arranged below the rectangular diaphragm, the array illumination light is modulated by the rectangular diaphragm and then irradiates the imaging object, and object light is formed after passing through the imaging object; the object light is respectively projected to different positions of the image sensor to form a plurality of holograms; and carrying out numerical reconstruction on the hologram to obtain amplitude and phase distribution of the imaging object, and reconstructing three-dimensional information of the imaging object by using a three-dimensional diffraction chromatography algorithm.



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HOLOGRAMS - 8 PATENTS

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
P37158	US	20230398799	14/12/2023	ENTRUST	US	14/06/2022	US2022063366376	US20230398799 WO2023242693	RIBBON SUPPLY ROLL HAVING ZONE-COATED SPLICE TAPE	Passport
P37164	RO	137796	29/11/2023	INSTITUTUL NATIONAL DE CERCETARE DEZVOLTARE PENTRU MICROTEHNOLOGIE IMT BUCURESTI OPTOELECTRONICA 2001	RO	13/05/2022	RO202200000264	RO-137796	PROCESS OF INTEGRATION OF LONG RANGE RFID ELEMENTS IN MULTILAYER SMART HOLOGRAPHIC LABELS FOR INCREASED SECURITY DEGREE	
P37166	KR	20230168505	14/12/2023	POHANG UNIVERSITY OF SCIENCE & TECHNOLOGY POSTECH POSCO RESEARCH INSTITUTE OF INDUSTRIAL SCIENCE & TECHNOLOGY	KR	07/06/2022	KR2022000069050	KR20230168505	METASURFACE REALIZING INDEPENDENT HOLOGRAM USING VARIOUS WAVELENGTHS AND METHOD OF MANUFACTURING THE SAME	
P37191	CN	220198908	19/12/2023	WUHAN HUAGONG IMAGE TECHNOLOGY & DEVELOPMENT	CN	19/06/2023	CN2023001567412	CN220198908U	HOLOGRAPHIC POSITIONING THERMOPRINT FILM	
P37193	CN	220171691	12/12/2023	HUBEI GEDIAN DEVELOPMENT REGION CHENGUANG INDUSTRIAL	CN	09/06/2023	CN2023001478011	CN220171691U	SELF-LUMINOUS LASER HOLOGRAPHIC ANTI-COUNTERFEITING LABEL	
P37198	CN	220129750	05/12/2023	JIANGSU ZHENXIANG ANTI COUNTERFEITING TECHNOLOGY	CN	16/06/2023	CN2023001537116	CN220129750U	LASER HOLOGRAPHIC ANTI-COUNTERFEITING PATTERN TRANSFER DEVICE	
P37199	CN	220129694	05/12/2023	SHENZHEN ZHONGYI GIFTS	CN	15/06/2023	CN2023001542276	CN220129694U	ALUMINUM-BASED COMPOSITE NOBLE METAL MATERIAL STRUCTURE	
P37222	CN	117162693	05/12/2023	SUZHOU IMPRESSION TECHNOLOGY	CN	16/10/2023	CN2023001336120	CN117162693	HOLOGRAPHIC LASER METAL LABEL PREPARATION METHOD	

VARIOUS OPTICAL EFFECTS - 12 PATENTS

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
P37144	WO	2023237476	14/12/2023	LEONHARD KURZ STIFTUNG OVD KINEGRAM SCRIBOS	DE	09/06/2022	DE202210114564	WO2023237476 DE102022114564	METHOD FOR PRODUCING A MULTILAYER BODY, MULTILAYER BODY, METHOD FOR AUTHENTICATING A MULTILAYER BODY, AND AUTHENTICATION SYSTEM	Passport
P37145	WO	2023237155	14/12/2023	GIESECKE & DEVRIENT CURRENCY TECHNOLOGY	DE	10/06/2022	DE202210002099	WO2023237155 DE102022002099	METHOD FOR PRODUCING OPTICALLY VARIABLE ELEMENTS, AND OPTICALLY VARIABLE ELEMENTS FOR PRODUCING A PRINTING INK AND/OR A SECURITY FEATURE	
P37148	WO	2023232196	07/12/2023	GIESECKE & DEVRIENT CURRENCY TECHNOLOGY	DE	01/06/2022	DE202210001915	WO2023232196 DE102022001915	SECURITY ELEMENT TRANSFER MATERIAL FOR TRANSFERRING SECURITY ELEMENTS HAVING A MICRO-OPTICAL AUTHENTICITY FEATURE AND METHOD FOR PRODUCING SAID SECURITY ELEMENT TRANSFER MATERIAL	Microlens
P37149	WO	2023232188	07/12/2023	GIESECKE & DEVRIENT CURRENCY TECHNOLOGY	DE	03/06/2022	DE202210001950	WO2023232188 DE102022001950	DATA CARRIER WITH WINDOW REGIONS, AND PRODUCTION METHOD	Microlens
P37188	EP	4282663	29/11/2023	GIESECKE DEVRIENT EPAYMENTS	DE	24/05/2022	DE202210001819	EP4282663 DE102022001819	METHOD FOR PRODUCING A SECURITY FEATURE, SECURITY FEATURE FOR A DATA CARRIER, DATA CARRIER AND LAMINATION SHEET	
P37189	DE	102022001820	30/11/2023	GIESECKE DEVRIENT EPAYMENTS	DE	24/05/2022	DE202210001820	DE102022001820	METHOD FOR PRODUCING A FILM WITH A SECURITY FEATURE FOR A CARD-SHAPED DATA CARRIER, FILM, CARD-SHAPED DATA CARRIER AND EXTRUSION DEVICE	
P37202	CN	220121262	01/12/2023	HIGHTEC TECHNOLOGY	CN	05/05/2023	CN2023001074867	CN220121262U	ANTI-FAKE SMART CARD	
P37203	CN	220121018	01/12/2023	SHANGHAI XIANHUAN HIGH TECHNOLOGY NEW MATERIAL	CN	24/04/2023	CN2023000949886	CN220121018U	IDENTIFICATION ELEMENT AND IDENTIFICATION OBJECT	
P37208	CN	117227350	15/12/2023	CHINA BANKNOTE PRINTING & MINT	CN	07/06/2022	CN2022000637011	CN117227350	METHOD FOR PRODUCING AN OPTICAL SECURITY ELEMENT AND OPTICAL SECURITY ELEMENT	Microlens
P37210	CN	117218939	12/12/2023	SHANGHAI INSTITUTE OF OPTICS & FINE MECHANICS - CHINESE ACADEMY OF SCIENCES	CN	09/05/2023	CN2023000513337	CN117218939	ANTI-COUNTERFEITING OPTICAL ELEMENT AND PREPARATION METHOD THEREOF	
P37216	CN	117188209	08/12/2023	SVG YANCHENG OPTRONICS	CN	28/09/2023	CN2023001273023	CN117188209	LOW-SOLVENT-RESIDUE UV TRANSFER PAPER AND PREPARATION METHOD THEREOF	
P37218	CN	117183602	08/12/2023	QINGDAO JUSTO PACKAGING	CN	26/09/2023	CN2023001246959	CN117183602	PAPER DRAWING AND PRINTING PREPARATION PROCESS WITH MULTI-ANGLE GRADUAL CHANGE EFFECT	

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NON SECURITY HOLOGRAMS - 53 PATENTS

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
N9842	WO	2023245188	21/12/2023	REGENTS OF THE UNIVERSITY OF CALIFORNIA	US	17/06/2022	US2022063353493	WO2023245188	HOLOGRAPHIC METASURFACE GRATING ELEMENTS FOR AUGMENTED AND VIRTUAL REALITY	
N9843	WO	2023238918	14/12/2023	DAI NIPPON PRINTING	JP	08/06/2022	JP2022000093267	WO2023238918	DECORATIVE LAMINATE, TRANSFER SHEET, DECORATIVE MEMBER, AND MOBILE BODY	
N9844	WO	2023237558	14/12/2023	CARL ZEISS JENA	DE	08/06/2022	DE202210114423	WO2023237558 DE102022114423	TRANSPARENT DISPLAY	
N9845	WO	2023237440	14/12/2023	CARL ZEISS JENA	DE	08/06/2022	DE202210114381	WO2023237440 DE102022114381	HOLOGRAPHIC OPTICAL MODULE, HOLOGRAPHIC DISPLAY DEVICE COMPRISING SUCH A HOLOGRAPHIC OPTICAL MODULE, AND METHOD FOR PRODUCING SUCH A HOLOGRAPHIC OPTICAL MODULE	
N9846	WO	2023234458	07/12/2023	KOREA ELECTRONICS TECHNOLOGY INSTITUTE	KR	02/06/2022	KR2022000067595	WO2023234458 KR20230167579	HOLOGRAM-BASED, PUPIL-DIRECTED-PROJECTION TYPE, AUGMENTED REALITY DEVICE THAT EXPANDS FIELD OF VISION BY REPLICATING FIELD OF VISION	
N9847	WO	2023233827	07/12/2023	FUJIFILM	JP	03/06/2022	JP2022000091056	WO2023233827	PHASE IMAGE ACQUISITION METHOD AND QUANTITATIVE DATA ACQUISITION METHOD	
N9848	WO	2023233823	07/12/2023	SONY GROUP	JP	30/05/2022	JP2022000087375	WO2023233823	IMAGE DISPLAY DEVICE AND DISPLAY DEVICE	
N9849	WO	2023233016	07/12/2023	AKMIRA OPTRONICS	DE	03/06/2022	DE202210114150	WO2023233016 DE102022114150	OPTICAL SYSTEM FOR DIGITAL HOLOGRAPHY	
N9850	WO	2023227902	30/11/2023	VIVIDQ	GB	27/05/2022	GB2022000007882	WO2023227902 GB202207882	COMPUTER-GENERATED HOLOGRAPHIC DISPLAY SYSTEM	
N9851	WO	2023227262	30/11/2023	BMW - BAYERISCHE MOTORENWERKE	DE	25/05/2022	DE202210113344	WO2023227262 DE102022113344	HOLOGRAPHIC DIRECT VIEW DISPLAY FOR A VEHICLE	
N9852	US	20230408757	21/12/2023	LIGHT FIELD LAB	US	15/07/2016	US2016062362602	US20230408757	HIGH-DENSITY ENERGY DIRECTING DEVICES FOR TWO-DIMENSIONAL, STEREOSCOPIC, LIGHT FIELD AND HOLOGRAPHIC HEAD-MOUNTED DISPLAYS	
N9853	US	20230408737	21/12/2023	LIGHT FIELD LAB	US	14/01/2018	US2018062617288	US20230408737	ORDERED GEOMETRIES FOR OPTOMIZED HOLOGRAPHIC PROJECTION	
N9854	US	20230401296	14/12/2023	HEWLETT PACKARD DEVELOPMENT	US	08/06/2022	US2022017835287	US20230401296	HOLOGRAM PATTERN CONTENT DECONSTRUCTION	
N9855	US	20230400811	14/12/2023	SAMSUNG ELECTRONICS SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION	KR	14/06/2022	KR2022000072432	US20230400811	HOLOGRAM PROFILE OPTIMIZATION METHOD, HOLOGRAM PROFILE GENERATION DEVICE, AND HOLOGRAPHIC DISPLAY DEVICE TO WHICH HOLOGRAM PROFILE OPTIMIZATION METHOD IS APPLIED	
N9856	US	20230384735	30/11/2023	ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE	KR	31/05/2022	KR2022000067056	US20230384735 KR20230166719	APPARATUS AND METHOD FOR GENERATING HOLOGRAM	
N9857	US	20230384614	30/11/2023	GM GLOBAL TECHNOLOGY OPERATIONS	US	25/05/2022	US2022017824210	US20230384614 DE102022128426 CN117130251	MULTI-PERSPECTIVE THREE-DIMENSIONAL FLOATING IMAGE DISPLAY	
N9858	KR	20230168945	15/12/2023	KOREA ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE	KR	08/06/2022	KR2022000069330	KR20230168945	DIGITAL HOLOGRAPHIC DISPLAY APPARATUS	
N9859	KR	20230164509	04/12/2023	LG CHEM	KR	25/05/2022	KR2022000064335	KR20230164509	METHOD FOR PREPARING ADDITIVE FOR PHOTOPOLYMER, PHOTOPOLYMER COMPOSITION, AND HOLOGRAPHIC RECORDING METHOD	
N9860	JP	2023177670	14/12/2023	KDDI	JP	02/06/2022	JP2022000090462	JP2023177670	COMPUTER-SYNTHESIZED HOLOGRAM GENERATOR AND PROGRAM	
N9861	JP	2023173352	07/12/2023	DAI NIPPON PRINTING	JP	25/05/2022	JP2022000085542	JP2023173352	TO PROVIDE A HOLOGRAM DEVICE, AN AIR INPUT DISPLAY DEVICE, A DISPLAY OBJECT WITH A HOLOGRAM, AND A METHOD FOR IRRADIATING A HOLOGRAM SHEET WITH LIGHT	
N9862	IN	202231057141	17/11/2023	SAHU ASHOK KUMAR PANDA BANDITA TRIPATHY ADIK AMIYAN DASH SANDIP KUMAR BAL ATANU KUMAR SAHOON NABA KISHOR TRIPATHY SUKANTA KUMAR	IN	06/10/2022	IN2022031057141	IN202231057141	METHOD AND SYSTEM FOR MONITORING BLOOD HBA1C LEVEL USING DIGITAL HOLOGRAPHIC MICROSCOPE	
N9863	FR	3135969	01/12/2023	AIRBUS HELICOPTERS	FR	30/05/2022	FR2022000005155	FR3135969	AIRCRAFT EQUIPPED WITH A HOLOGRAPHIC WARNING SYSTEM	

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NON SECURITY HOLOGRAMS - 53 PATENTS (continuation)

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N9864	EP	4287043	06/12/2023	SIEMENS	EP	03/06/2022	EP2022000177294	EP4287043 WO2023232819	GENERATION OF HOLOGRAMS FOR REPRESENTATION IN AN AUGMENTED REALITY ENVIRONMENT	
N9865	CN	220208080	19/12/2023	SHENZHEN HONGMAO YUANZHI PHOTOELECTRIC	CN	25/07/2023	CN2023001957189	CN220208080U	HOLOGRAPHIC PROJECTION DISPLAY DEVICE BASED ON PHOTOELECTRIC TECHNOLOGY	
N9866	CN	220188751	15/12/2023	HU DEJIAO	CN	29/06/2023	CN2023001691404	CN220188751U	HOLOGRAPHIC DIFFRACTION OPTICAL WAVEGUIDE STRUCTURE AND AUGMENTED REALITY DEVICE	
N9867	CN	220171780	12/12/2023	SHENZHEN HONGMAO YUANZHI PHOTOELECTRIC	CN	24/07/2023	CN2023001942780	CN220171780U	HOLOGRAPHIC STORAGE DEVICE BASED ON PHOTOELECTRIC TECHNOLOGY	
N9868	CN	220154673	08/12/2023	SUZHOU WENSHENG OPTICS	CN	30/03/2023	CN2023000667543	CN220154673U	HOLOGRAPHIC DIFFRACTION GRATING	
N9869	CN	220154672	08/12/2023	SUZHOU WENSHENG OPTICS	CN	23/03/2023	CN2023000588553	CN220154672U	HOLOGRAPHIC GRATING WITH MULTILAYER STRUCTURE	
N9870	CN	220121023	01/12/2023	JIANGXI LIANHAO PHOTOELECTRIC	CN	29/06/2023	CN2023001672085	CN220121023U	HOLOGRAPHIC OPTICAL WAVEGUIDE STRUCTURE OF TWO-DIMENSIONAL EXPANDED PUPIL	
N9871	CN	220105521	28/11/2023	SHENZHEN IWIN VISUAL TECHNOLOGY	CN	14/06/2023	CN2023001519357	CN220105521U	HOLOGRAPHIC DISPLAY DEVICE	
N9872	CN	220085248	24/11/2023	SHANGHAI HEYI FUTURE CULTURE & TECHNOLOGY	CN	25/03/2023	CN2023000608305	CN220085248U	HOLOGRAPHIC IMAGING CABINET	
N9873	CN	220085182	24/11/2023	GANSU ZHITONG TECHNOLOGY ENGINEERING DETECTION CONSULTING GANSU ZHITONG YUNXIANG TRAFFIC TECHNOLOGY	CN	12/04/2022	CN2022000836649	CN220085182U	NAKED EYE 4D HOLOGRAPHIC IMAGE DEVICE	
N9874	CN	117247489	19/12/2023	UNIVERSITY HUANGHUI	CN	19/09/2023	CN2023001209133	CN117247489	HIGH-SENSITIVITY PHOTOPOLYMER HOLOGRAPHIC STORAGE MATERIAL BASED ON CYCLOTETRAILOXANE AND PREPARATION METHOD THEREOF	
N9875	CN	117234053	15/12/2023	KUNMING UNIVERSITY OF SCIENCE & TECHNOLOGY	CN	18/09/2023	CN2023001199819	CN117234053	HEAD-MOUNTED REAL-TIME THREE-DIMENSIONAL DETECTION DEVICE AND DETECTION METHOD BASED ON INFRARED DIGITAL HOLOGRAPHY	
N9876	CN	117229787	15/12/2023	JOURNEY TECHNOLOGY	CN	10/11/2023	CN2023001495800	CN117229787	HOLOGRAPHIC POLYMER DISPERSED LIQUID CRYSTAL MATERIAL, VOLUME HOLOGRAPHIC GRATING AND PREPARATION METHOD THEREOF	
N9877	CN	117221503	12/12/2023	BEIJING FENGHUO WANJIA TECHNOLOGY	CN	08/11/2023	CN2023001475636	CN117221503	HOLOGRAPHIC PROJECTION SYSTEM OF DIGITAL PERSONAL MOBILE TERMINAL	
N9878	CN	117218332	12/12/2023	HONG KONG CENTRE FOR CEREBRO CARDIOVASCULAR HEALTH ENGINEERING	CN	22/08/2023	CN2023001061271	CN117218332	CYCLIC NEURAL NETWORK AUXILIARY WAVEFRONT SENSING METHOD AND EQUIPMENT BASED ON HOLOGRAPHIC PROJECTION	
N9879	CN	117215416	12/12/2023	BEIJING FENGHUO WANJIA TECHNOLOGY	CN	08/11/2023	CN2023001475641	CN117215416	HOLOGRAPHIC COMMUNICATION METHOD AND DEVICE FOR MOBILE TERMINAL, COMPUTER EQUIPMENT AND STORAGE MEDIUM	
N9880	CN	117214987	12/12/2023	SHANGHAI UNIVERSITY	CN	05/09/2023	CN2023001139076	CN117214987	PREPARATION DEVICE AND PREPARATION METHOD FOR HOLOGRAPHIC OPTICAL ELEMENT FOR DIRECTIONAL BACKLIGHT THREE-DIMENSIONAL DISPLAY	
N9881	CN	117214986	12/12/2023	ALTIZAN OPTO CRYSTAL SHANGHAI DISPLAY TECHNOLOGY	CN	14/09/2023	CN2023001193646	CN117214986	PREPARATION SYSTEM AND METHOD OF REFLECTION TYPE HOLOGRAPHIC GRATING	
N9882	CN	117197386	08/12/2023	SHANDONG NORMAL UNIVERSITY	CN	06/09/2023	CN2023001146766	CN117197386	SINGLE CLICK LENS-FREE OPTICAL DIFFRACTION TOMOGRAPHY METHOD AND SYSTEM	
N9883	CN	117193533	08/12/2023	SIWEI OPTOELECTRONIC TECHNOLOGY SHANGHAI	CN	12/09/2023	CN2023001171354	CN117193533	WEARING SYSTEM AND METHOD FOR HOLOGRAPHIC AIR PROJECTION IMAGING	
N9884	CN	117192675	08/12/2023	SHANGHAI UNIVERSITY	CN	21/08/2023	CN2023001054168	CN117192675	HOLOGRAPHIC OPTICAL ELEMENT FOR COLOR SUSPENSION TRANSPARENT DISPLAY AND PREPARATION DEVICE AND PREPARATION METHOD THEREOF	
N9885	CN	117190849	08/12/2023	SICHUAN UNIVERSITY	CN	08/09/2023	CN2023001155847	CN117190849	HETERODYNE DIGITAL HOLOGRAPHIC MICROSCOPIC PHASE IMAGING SCHEME BASED ON MOVABLE GRATING	
N9886	CN	117170206	05/12/2023	GOOLTON TECHNOLOGY	CN	31/08/2023	CN2023001119793	CN117170206	HOLOGRAPHIC IMAGING METHOD AND DEVICE AND ELECTRONIC EQUIPMENT	

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N9887	CN	117153067	01/12/2023	MAXELL DIGITAL PRODUCTS	CN	09/03/2023	CN2023000220825	CN117153067	HOLOGRAPHIC PROJECTION STRUCTURE AND INTERACTIVE PROJECTION METHOD THEREOF	
N9888	CN	117147547	01/12/2023	CHINA JILIANG UNIVERSITY	CN	31/08/2023	CN2023001112845	CN117147547	COHERENT NOISE PROCESSING METHOD OF HOLOGRAPHIC MICRO-CHANNEL MEASUREMENT SYSTEM	
N9889	CN	117124762	28/11/2023	GUANGXI TECHNOLOGICAL COLLEGE OF MACHINERY & ELECTRICITY	CN	04/07/2023	CN2023000810697	CN117124762	NOVEL METHOD FOR MANUFACTURING ALDEHYDE-FREE STEREOSCOPIC ETHNIC PATTERN SOFT PORCELAIN	
N9890	CN	117111430	24/11/2023	LIMITED COMPANY OF FORCE PARTY DIGITAL SCIENCE & TECHNOLOGY GROUP	CN	13/07/2023	CN2023000861578	CN117111430	HOLOGRAPHIC DINING TABLE SYSTEM AND DISPLAY METHOD	
N9891	CN	117111429	24/11/2023	SICHUAN UNIVERSITY	CN	25/08/2023	CN2023001080676	CN117111429	CROSSTALK SUPPRESSION METHOD FOR MULTI-PLANE HOLOGRAPHIC DISPLAY	
N9892	CN	117111305	24/11/2023	SHANGHAI UNIVERSITY	CN	29/08/2023	CN2023001098549	CN117111305	LARGE-FIELD-ANGLE HOLOGRAPHIC NEAR-TO-EYE DISPLAY DEVICE AND DISPLAY METHOD	
N9893	CN	117111199	24/11/2023	SHANGHAI UNIVERSITY	CN	21/08/2023	CN2023001054169	CN117111199	SUSPENSION TRANSPARENT HOLOGRAPHIC OPTICAL ELEMENT AND PREPARATION DEVICE AND PREPARATION METHOD THEREOF	
N9894	CN	117107540	24/11/2023	JIANGSU JINHENG NEW PACKAGING MATERIAL	CN	18/07/2023	CN2023000882801	CN117107540	PRODUCTION PROCESS OF HOLOGRAPHIC DIRECT PLATING LASER ALUMINUM FOIL	