IHMA
PATENT NEWSLETTER

Limited circulation patent news bulletin for the Holography Industry

JULY 2023 – 121 PATENTS

Published and granted patents

The IHMA PATENT NEWSLETTER
is exclusively dedicated to IHMA MEMBERS.

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ABOUT IHMA PATENT NEWSLETTER

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Please note that:

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

Even though the greatest care is taken in the preparation of this patent surveillance newsletter, some errors or oversights could have occurred. We are committed to making all reasonable efforts to ensure the reliability and a content of information as complete as possible without nevertheless being able to guarantee the exactitude or exhaustive character of the data used. We collect data from official or private sources of the best quality which themselves do not guarantee that the information provided is complete, up-to-date, pertinent, well-referenced … Please also accept our apologies for the poor quality translations of Asian abstracts which are machine translation.

APPLICANTS OF THE MONTH

Click on the title to return to table of contents

1. AMS INTERNATIONAL
2. ANHUI POLYTECHNIC UNIVERSITY
3. ANHUI UNIVERSITY
4. BANK OF CANADA | NRC - NATIONAL RESEARCH COUNCIL CANADA
5. BEIHANG UNIVERSITY OF AERONAUTICS & ASTRONAUTICS | THIRD HOSPITAL OF PEKING UNIVERSITY
6. BEIJING CHANGCHENG INSTITUTE OF METROLOGY & MEASUREMENT AVIATION INDUSTRY
7. BUNDESDRUCKEREI
8. CANADIAN BANK NOTE
9. CARL ZEISS JENA
10. CARL ZEISS SMT
11. CHENGDU BANKNOTE PRINTING | CHINA BANKNOTE PRINTING & MINT
12. CHINA RAILWAY FIRST | CHINA RAILWAY FIRST CONSTRUCTION & INSTALLATION ENGINEERING
13. CHONGQING INSTITUTE OF GREEN & INTELLIGENT TECHNOLOGY CHINESE ACADEMY OF SCIENCES | CHONGQING UNIVERSITY
14. CHUNGBUK NATIONAL UNIVERSITY INDUSTRY ACADEMIC COOPERATION FOUNDATION
15. CIVIL AVIATION UNIVERSITY OF CHINA
16. COVESTRO | COVESTRO DEUTSCHLAND
17. CUBIXEL | INDUSTRY ACADEMIA COOPERATION OF SEJONG UNIVERSITY
18. DIGILENS
19. DONGGUAN YIKE INTELLIGENT ADVERTISING
20. ECKART
21. ENVISICS
22. EPICOPTIX
23. FEDERALNOE GOSUDARSTVENNOE BYUDZHETNOE UCHREZHDENIE NAUKI FIZICHESKIJ INSTITUT IM P N LEBEDEVA ROSSIJSKOJ AKADEMII NAUK
24. GIESECKE & DEVRIENT CURRENCY TECHNOLOGY
25. GL BAJAJ INSTITUTE OF TECHNOLOGY & MANAGEMENT
26. GUANGDONG LOEN PHOTOELECTRIC TECHNOLOGY
27. GUANGDONG QIAOSHENG NEW MATERIAL TECHNOLOGY
28. GUANGNA SIWEI GUANGDONG PHOTOELECTRIC TECHNOLOGY
29. GUANGZHOU DAMAI CULTURE COMMUNICATION
30. GUANGZHOU FRONTOP DIGITAL ORIGINALITY TECHNOLOGY
31. GUIGAN FRANCK
32. HANGMENG EXPLORATION SUZHOU AEROSPACE TECHNOLOGY
33. HANGZHOU INSTITUTE FOR ADVANCED STUDY UCAS
34. HANGZHOU ZHONGKE AURORA TECHNOLOGY
35. HANWHA | PABLO AIR
36. HARBIN ENGINEERING UNIVERSITY
37. HARBIN UNIVERSITY OF SCIENCE & TECHNOLOGY
38. HAWTHORNE CULTURE COMMUNICATION WUHAN
39. HELLA
40. HICS
41. HUBEI HUAGONG IMAGE TECHNOLOGY DEVELOPMENT
42. HUBEI YIMEITE QUANXI TECHNOLOGY
43. HUEBNER
44. HUNAN MINTPACK NEW MATERIAL TECHNOLOGY
45. INHA INDUSTRY PARTNERSHIP INSTITUTE
46. JEONG, SO WON
47. JIANGNAN UNIVERSITY
48. JIANGXI GAORUI PHOTOELECTRIC
49. JIAXIONG PACKAGING MAT
50. JILIN UNIVERSITY
51. KOREA ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE
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53. KOREA PHOTONICS TECHNOLOGY INSTITUTE
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56. KWANGWOON UNIVERSITY INDUSTRY ACADEMIC COLLABORATION FOUNDATION
57. KYUNG HEE UNIVERSITY | SAMSUNG ELECTRONICS
58. LI SHUANGJIANG
59. META MEDIA
60. NANCHANG VIRTUAL REALITY RESEARCH INSTITUTE
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62. NATIONAL PRINTING BUREAU
63. NATIONAL UNIVERSITY OF DEFENSE TECHNOLOGY
64. NAUCHNO PROIZVODSTVENNOE OBEDINENIE KRIPTEN
65. NIPPON CARBIDE KOGYO
66. NIPPON HOSO KYOKAI
67. NORTHEASTERN UNIVERSITY OF CHINA
68. PENN STATE RESEARCH FOUNDATION
69. PERKOUS JIRI
70. PREH
71. QINGDAO CHENYUAN TECHNOLOGY INFORMATION
72. SAGE UNIVERSITY
73. SAMSUNG ELECTRONICS
74. SANYI PHOTOELECTRIC TECHNOLOGY SUZHOU
75. SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION
76. SEOUL OLYMPIC A MEMORIAL THE PEOPLE PHYSICAL EDUCATION ENCOURAGEMENT ASSOCIATION
77. SHANDONG FUYANG PACKAGING MATERIALS
78. SHANGHAI GUOJING MODEL DESIGN
79. SHENZHEN TECHNOLOGY UNIVERSITY
80. SHENZHEN TIANYITONG ANTI FORGERY PACKING MATERIALCO
81. SHENZHEN WANCHENGHUI ELECTRONICS
82. SOUTH CHINA NORMAL UNIVERSITY
83. SUZHOU XUANXIONG INTELLIGENT TECHNOLOGY
84. SUZHOU YUNTU VISUAL TECHNOLOGY
85. TIANMA
86. TSINGHUA UNIVERSITY
87. UNICORNVR ENTERTAINMENT
88. UNIVERSITY OF ARIZONA
89. UNIVERSITY OF CENTRAL FLORIDA RESEARCH FOUNDATION
90. WONKWANG UNIVERSITY INDUSTRY ACADEMIC COOPERATION FOUNDATION
91. WUXI KAICHUANG MOULD
92. YONGQING COUNTY YESHENGYA OFFSET PRINTING
93. ZHEJIANG CHUNYU PACKAGING MATERIAL
94. ZHEJIANG FUAO SOFTWARE DEVELOPMENT
95. ZHEJIANG KAYOU ANIMATION
96. ZHEJIANG SCI-TECH UNIVERSITY
97. ZHEJIANG TIANQI PACKAGING MATERIAL

P36589

SECURITY & OPTICAL EFFECTS' COLUMN
BANKNOTE – RELIEF – MICROLENS

WO2023115210

BANK OF CANADA | NRC - NATIONAL RESEARCH COUNCIL CANADA

Inventor(s): BRASSARD DANIEL | BOUTIN ALEX | MACPHERSON CHARLES DOUGLAS | OMRANE BADR

Application Nber / Date: WOCA2022/051875 2022-12-21

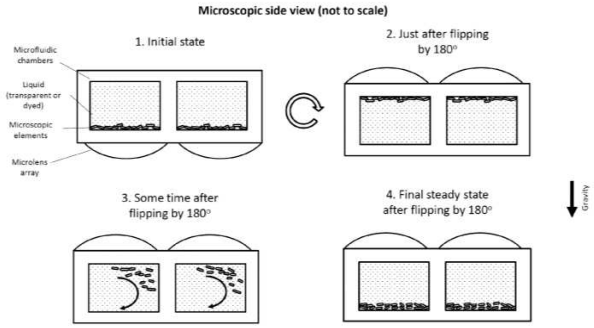
Priority Nber / Date / Country: CA3143656 2021-12-22

DYNAMIC MICRO-OPTIC SECURITY DEVICES, THEIR PRODUCTION AND USE

Disclosed are devices with dynamic optical properties suitable for use as security or authentication devices, for example for documents or items of importance or value, in order to help prevent counterfeit of the same. Such devices, at least in selected embodiments, enable observation of dynamic changes or moving entities within the device by collective or enhanced imaging of the dynamic changes or moveable entities, the motion or position of which may otherwise be difficult to observe, or indiscernible to, the naked eye.

DISPOSITIFS DE SÉCURITÉ MICRO-OPTIQUES DYNAMIQUES, LEUR PRODUCTION ET LEUR UTILISATION

Des dispositifs à propriétés optiques dynamiques adaptés à l'utilisation en tant que dispositifs de sécurité ou d'authentification, par exemple pour des documents ou des articles d'importance ou de valeur, afin d'aider à empêcher la contrefaçon de ces derniers, sont divulgués. De tels dispositifs, au moins dans des modes de réalisation sélectionnés, permettent l'observation de changements dynamiques ou d'entités mobiles à l'intérieur du dispositif par imagerie collective ou améliorée des changements dynamiques ou des entités mobiles, dont le mouvement ou la position peut sinon être difficile à observer, ou indiscernable à l'œil nu.



CLAIM 1. A device comprising: an array of compartments; one or more entities, with at least a majority of the compartments containing one or more of the entities therein, each entity moveable within the compartment within which it is contained when the device is subjected to an external influence or force, wherein resulting movement of at least some of the entities includes common, at least partially synchronized movement thereof, within and relative to their respective compartments, across at least a portion of the compartments; and an image generator to selectively combine at least some of the common, synchronized movement of the entities within and relative to their respective compartments into an observable image.

Equivalent: CA3143656 A

Status: Pending

Research Report:

INTERNATIONAL SEARCH REPORT

International application No. **PCT/CA2022/051875**

A. CLASSIFICATION OF SUBJECT MATTER

IPC: ***B42D 25/36*** (2014.01), ***B42D 25/30*** (2014.01)

CPC: , B42D 25/30 (2020.01), B42D 25/36 (2020.01)

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)
IPC: B42D 25/36 (2014.01), B42D 25/30 (2014.01), B42D 25/364 (2014.01), B42D 25/369 (2014.01), B42D 25/373 (2014.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
Questel Orbit FAMPAT; moire, magnification, capsule+, microcapsule, chamber+, microchamber+, movement, movable, move+, motion+, lens+, microlens+, mirror+, micromirror+.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 9908360 B2 (KECHT, J. et al.) 6 March 2018 (06-03-2018) *abstract; col. 2, l. 20 – col. 13, l. 35; claims*	1-30, 32-58
Y	US 8908276 B2 (HOLMES, B. W.) 9 December 2014 (09-12-2014) *abstract; par. 6, 9-17, 58-91;fig. 10*	1-30, 32-58
Y	US 2017/0368865 A1 (MACPHERSON, C. D. et al.) 28 December 2017 (28-12-2017) *abstract; claims*	5, 6, 17, 20, 24, 27, 32, 33, 42

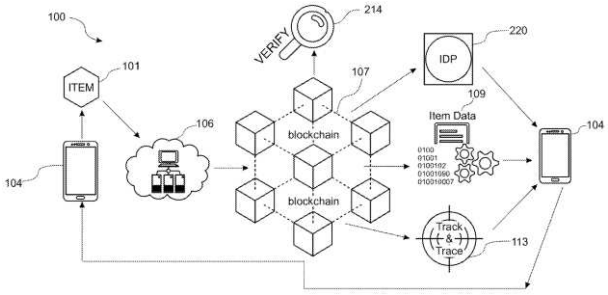
PATENT REFERENCE – See the table at the end of this document

P36593 **PRINTING – BRAND PROTECTION – TRACK & TRACE**

US20230221679 **PERKOUS JIRI**
Priority Date: **10/01/2022**

ITEM VERIFICATION AND AUTHENTICATION SYSTEM AND METHOD

Disclosed are a system and method to verify and authenticate an item. The system includes a memory and a processor. The processor includes a reader module, an optical character recognition (OCR) module, an image recognition module, a camera module, and an item digital passport (IDP) module. The reader module scans and processes a matrix barcode and other barcodes. The optical character recognition (OCR) module scans one or more of a micro size alphanumeric code, a nano size alphanumeric code, and a visible alphanumeric code present on a hologram that is embossed, printed, or lasered on the item and verifies the item by comparing the scanned data with the data corresponding to the item stored in the memory. The optical character recognition module authenticates the item if the scanned data matches with the data corresponding to the item stored in the memory. The optical character recognition module facilitates a user interface to display the comparison data and the authentication data. The image recognition module verifies and authenticates one or more of a micro size image, a nano size image, and a visible holographic image present on the hologram. The camera module analyzes the intricate details of one or more of the hologram features and elements, and a security print design features and elements captured by a camera lens. The camera module measures individual features and elements present in the hologram, and the security print design features and elements with an embedded ruler. The item digital passport (IDP) module captures data pertaining to the movement of the items from a source point to a destination point.



CLAIM 1. A system to authenticate an item, the system comprising: a memory to store machine-readable instructions; and a processor coupled to the memory and operable to execute the machine-readable instructions stored in the memory, wherein the processor comprises: a reader module configured to scan and process one or more of a matrix barcode and other barcodes; an optical character recognition (OCR) module configured to scan one or more of a micro size alphanumeric code, a nano size alphanumeric code, and a visible alphanumeric code present on a hologram that is embossed, printed, or lasered on the item and verifies the item by comparing the scanned data with the data corresponding to the item stored in the memory, wherein the optical character recognition module authenticates the item if the scanned data matches with the data corresponding to the item stored in the memory, wherein the optical character recognition module facilitates a user interface to display the comparison data and the authentication data; an image recognition module configured to verify and authenticate one or more of a micro size image, a nano size image, and a visible holographic image present on the hologram; a camera module configured to analyze the intricate details of one or more of the hologram, and a security print design features and elements captured by a camera lens, wherein the camera module measures individual features and elements present in the hologram, and the security print design features and elements with an embedded ruler; and an item digital passport (IDP) module configured to capture data pertaining to the movement of the items from a source point to a destination point.

P36600 **BANKNOTE**

RU2798122 **NAUCHNO PROIZVODSTVENNOE OBEDINENIE KRIPTEN**

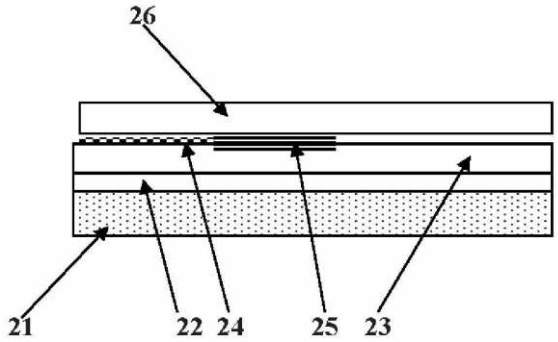
Priority Date: **21/12/2021**

OPTICAL PROTECTIVE DEVICE AND METHOD FOR ITS MANUFACTURING

FIELD: computer technology.

SUBSTANCE: invention relates to visually observable and/or machine-readable security elements based on multicolour relief-carrying holograms exhibiting diffraction-interference effects in combination with metallized elements observed “peek-a-boo”. Claimed multilayer protective device with a topological spatial areaψ (x, y) comprises security features that provide visually visible and invisible, but machine-readable security information for identifying authenticity and is placed on a temporary substrate in the form of a carrier film with a separating layer and two spatially aligned optical elements with sub-regions ζ (x, y) and χ (x, y) within the general area ψ (x, y). In this case, the optical element ζ (x, y) is made in the form of a image-based demetallized flat and smooth surface of a thermoplastic linear polymer layer, uniform in thickness, transparent to the light, deposited over the entire area ψ (x, y) of a security device, whereas another metallized holographic relief-structured optical element χ (x, y), spatially aligned with the optical element ζ (x, y) is located on the rest of the surface of the same thermoplastic layer within the region ψ (x, y) of the protective device, but on its holographic relief-structured section (sub-region) with a metal layer deposited on top of it, whereas the optical element itself χ (x, y) includes at least several metallized subsections, where each of the specified subsections of the optical element χ (x, y) has a metal surface consisting of two different non-ferrous metals 1 and 2, differing in the spectra of reflection and transmission, and spaced apart within one specified subsection. The thickness of the non-ferrous metals of these metallized layers of the optical element χ (x, y) is in the range from 10 to 100 nm, and the high-precision spatial alignment of the metallized-demetallized subregions ζ (x, y) and χ (x, y) located in a single micro-demetallized stencil ψ (x, y) of the protective device is carried out with an accuracy of about 5 μm. Spatial alignment of fragments of the same image made on layers of different metals was carried out without mutual overlap, transverse shifts and breaks with an alignment accuracy within 2-5 μm.

EFFECT: increased registration accuracy up to about 5 μm and increased security features for both visually readable and machine-readable verification of the security element, in particular on its both sides.



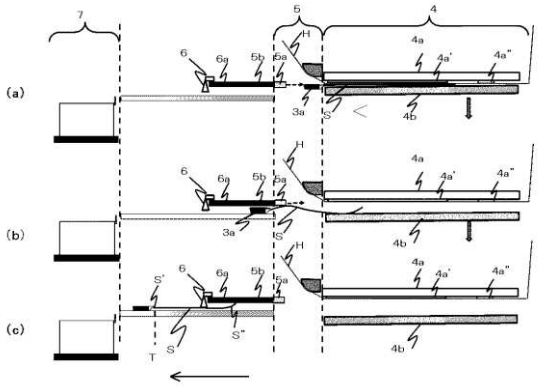
CLAIM 1. The laminated protective device with a topological area of ψ (x, s) containing the protective features providing visual visible and invisible but machine readable protective information for authentication and placed on the temporary substrate form of the dividing-layer film contains two spatially reciprocally incorporated optical elements with the sub-areas ζ (x,) and χ (x) (c) within the general area ψ (x, c), with the optical element ζ (x,) performed in the form of a schematically demetallized flat and smooth surface of homogeneous thickness, transparent to the thermoplastic linear polymer layer of the whole area ψ (x,(c) A protective device, while another metallized holographic χ unit (x, c), spatially reciprocally incorporated with the optical element ζ (x,), is located on the rest of the same thermoplastic layer within the area ψ (x,) of the protective device, but in the holographic and structurally structured section (s) thereof. with a metal layer from above, the optical element χ (x) itself includes at least a few metallized subsections where each of the sub-sections of the χ optical element (x,) has a metal surface consisting of two different non-ferrous metals 1 and 2 different for the spectrum of reflection and transmission, and spatially dispersed within a given subsection, because the non-ferrous metal thickness 1 or 2 of these metal layers of the χ optical element (x, c) is equal to between 10 nm and 100 nm, the same or different for different layers of metals, and the high-precision spatial combination of "metal-demetallized" sub-areas ζ (x, c) and χ (x, c), in a single microtetrametallized stencil of the ψ (x,) protective device, have been carried out with an accuracy of 5 um and the spatial balance of fragments of the same image carried out in different metals has been carried out without overlap, transverse shifts and 2-5 μ m accuracy gaps.

P36612 **PRINTING – BANKNOTE**

JP2023084719 **NATIONAL PRINTING BUREAU**
Priority Date: **08/12/2021**

APPLICATION DEVICE

TOPIC: To provide an adhering device capable of stably transporting a base material by eliminating transportation hindering factors caused by flopping of the base material, which are generated when separating and transporting the base material to which a foil material is adhered from a foil carrier tape. INVENTION: The present invention provides a manufacturing apparatus for a foil roll, comprising: a sheet feeding unit that feeds a base material; a transport unit that carries a leading end of the base material with a gripper and transports the base material in a transport direction; an application unit that thermocompression bonds a foil material from a foil carrier tape to the base material; a separation unit that separates the base material and the foil carrier tape by supplying a blower between the thermocompression bonded base material and the foil carrier tape; A discharge unit that discharges the separated base material; and a floss regulating unit that regulates floss in a transport process of the base material on an application unit side of a stopping position of the gripper between the separation unit and the discharge unit and on an upper portion of the base material being transported.



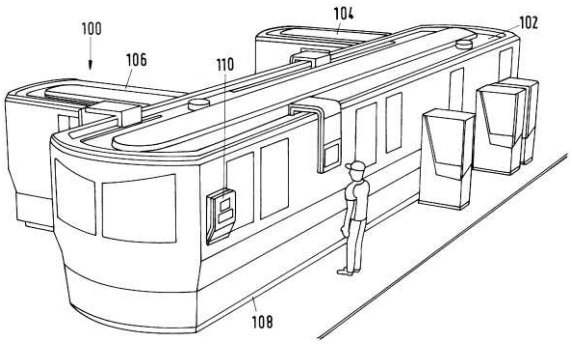
CLAIM 1. An X-ray device comprising: a sheet feeding unit that feeds a base material one by one; a transport unit that carries a leading end of the base material fed by the sheet feeding unit with a gripper and transports the base material in a transport direction; An application unit that thermocompresses a foil material from a foil carrier tape to the base material transported by the transport unit; and a blower that is located downstream of the application unit and supplies a blower between the thermocompressed-base material and the foil carrier tape from a direction opposite the transport direction, and At least one separation unit that separates the base material and the foil carrier tape, and a discharge unit that discharges the base material separated by the separation unit, wherein At least one floss regulating part on the application unit side with respect to a stopping position of the gripper between the separation part and the discharge part, on an upper part of the base material being conveyed, that regulates floss during a conveying process of the base material.

P36619 **PRINTING – CARD**

EP4212350 **BUNDESDRUCKEREI**
Priority Date: **13/01/2022**

PRODUCTION PLANT FOR PRODUCING IDENTIFICATION DOCUMENTS, VALUE DOCUMENTS OR SECURITY DOCUMENTS OR FOR PRODUCING A COMPOSITE OF A PLURALITY OF IDENTIFICATION DOCUMENTS, VALUE DOCUMENTS OR SECURITY DOCUMENTS

The invention relates to a production plant (100) for producing identity documents, value documents or security documents or for producing a composite of a plurality of identity documents, value documents or security documents, which is distinguished by a particularly compact structure on account of the configuration of its constituents and their mutual arrangement, but which can also be changed flexibly.

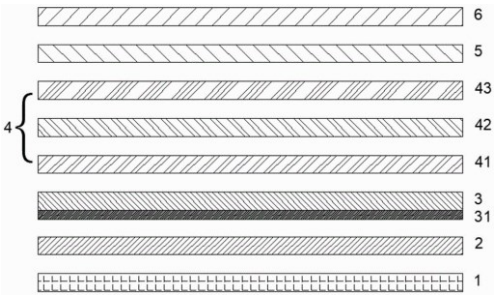


CLAIM 1. Production plant (100) for producing identity documents, value documents or security documents or for producing a composite of a plurality of identity documents, value documents or security documents, comprising: - a transport system (112) with at least one workpiece carrier (114), - a first provision device (144) adjoining the transport system (112), value or security document to the workpiece carrier (114), - a printing device (116) which is arranged downstream of the first provision device (144), adjoins the transport system (112) and comprises a stationarily held print head () in a printing region (), in particular a portrait image, onto a substrate () by the displacement of a printing table () together with the substrate () fixed thereto, and which is configured to transfer the printed substrate () individually to the workpiece carrier (114), - at least one printing device (116) arranged downstream of the printing device (116), further provision device (146) which adjoins the transport system (112) and is configured to transfer at least one further layer of the identification, value or security document to the workpiece carrier (114), - a second provision device (146) which is arranged downstream of the at least one further provision device (146), adjoining the transport system (112), for producing a welded raw card composite, - a final provision device (120) which is arranged downstream of the device (118) for producing a welded raw card composite, adjoins the transport system (112) and is configured to provide a further cover layer of the identification, Value document or security document to the workpiece carrier also in the further Te(114) for forming a film stack, - a stitching station (122) which is arranged downstream of the final provision device (120) and adjoins the transport system (112) and is configured to join the film stack to form a film stitching, - a laminating station (124) which is arranged downstream of the stitching station (122) and adjoins the transport system (112) and in which a heating device is integrated and which is configured to laminate the film stitching to form a laminate composite, and - a blank station (126) which is arranged downstream of the laminating station (124) and which is configured to form a laminate composite, wherein the cutting station (126) is assigned a handling device in order to remove the laminate composite from or from the workpiece carrier (114) and to feed the laminate composite, in particular cut into strips, back to the workpiece carrier (114).

P36630 **BRAND PROTECTION**

CN219409609U **SHENZHEN TIANYITONG ANTI FORGERY PACKING MATERIALCO**
Priority Date: **24/03/2023**

UV PRINTS HIGH TEMPERATURE RESISTANT HOLOGRAPHIC THERMOPRINT MEMBRANE



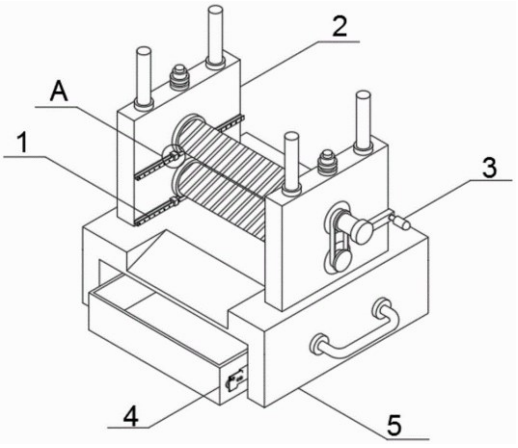
The utility model discloses a UV printing high-temperature-resistant holographic thermoprinting film, which comprises the following components: the high-temperature-resistant release layer is made of a membrane material. According to the utility model, the film material is used as the base layer, so that the transfer film has flexibility and can be attached to a curved surface, thereby transferring the pattern on the printing layer onto the surface of a product with uneven bending, and meeting the transfer requirement of a non-planar product. The high-temperature-resistant release layer is adopted to provide effective high-temperature protection for the printing layer, so that the problem that the color of the pattern on the printing layer becomes dumb under a high-temperature environment is avoided. The holographic positioning pattern is arranged on the upper surface of the imaging layer, so that the holographic positioning pattern is not covered by a coating, the holographic brightness is high compared with the traditional process, and better stereoscopic impression is provided from the aspects of vision and touch; and when the imaging layer material is selected, the molding property of the imaging layer is not required to be considered, the selection range is greatly improved, and the holographic thermoprinting film with higher hardness and better heat resistance is manufactured.

CLAIM 1. A UV printed high temperature resistant holographic hot stamping film comprising: the high-temperature-resistant release layer coated on the base layer, the imaging layer coated on the high-temperature-resistant release layer, the printing layer coated on the imaging layer and the adhesive layer coated on the printing layer, wherein the adhesive layer is attached to a plate, the base layer is made of a membrane material, a holographic microstructure is arranged on the upper surface of the imaging layer, and the holographic microstructure forms a holographic positioning pattern.

P36632

CN219405824U **ZHEJIANG TIANQI PACKAGING MATERIAL**
Priority Date: **10/04/2023**

RAINBOW SURFACE FILM COVERING DEVICE FOR PLAIN SURFACE HOLOGRAPHIC ANTI-COUNTERFEITING PAPERBOARD



The utility model relates to the technical field of rainbow surface film coating devices of plain surface holographic anti-counterfeiting paperboard, and discloses a rainbow surface film coating device of plain surface holographic anti-counterfeiting paperboard. The utility model has reasonable structure, the rotation film coating speed of the film coating rotary drum A and the film coating rotary drum B can be automatically adjusted by manually rotating the rocker, the problem of uneven film coating caused by improper operation between a worker and a machine is reduced, in addition, the air cylinder A and the air cylinder B penetrate through the inside of the fixed plate A and the fixed plate B, the proper height can be found by small-amplitude adjustment height according to the height and the operation height of the worker, the operation is convenient, and the fixed slide rail A and the fixed slide rail B can enable the film coating rotary drum A and the film coating rotary drum B to translate and adjust positions in front and back of the surface, and are also convenient to directly detach and replace.

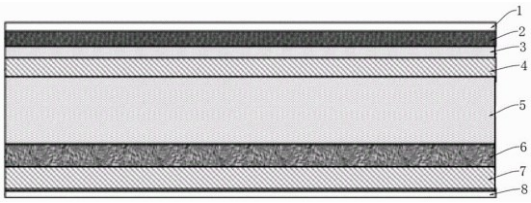
CLAIM 1. The utility model provides a rainbow face tectorial membrane device of plain face holographic anti-fake card paper, includes concave base subassembly (5), its characterized in that: the novel multifunctional portable multifunctional device is characterized in that a storage assembly (4) is arranged inside the bottom of the concave base assembly (5), lifting assemblies (2) are arranged on two sides of the top surface of the concave base assembly (5) respectively, a translation fixing assembly (1) is arranged on the inner side surface of each lifting assembly (2), and a manual rotation film covering assembly (3) is arranged on the outer side surface of each lifting assembly (2).

P36633 **BRAND PROTECTION**

CN219385810U **HUBEI YIMEITE QUANXI TECHNOLOGY**
Priority Date: **15/03/2023**

LASER HOLOGRAPHIC PACKAGING MATERIAL

The utility model relates to the technical field of packaging materials, in particular to a laser holographic packaging material. The material sequentially comprises a first waterproof layer, a fireproof layer, a laser information layer, an upper base layer, a sponge layer, a drying agent, a lower base layer and a second waterproof layer from top to bottom; the upper base layer and the lower base layer are both three layers of corrugated paper, the upper base layer is a B-type corrugated, the lower base layer is an A-type corrugated, and the fireproof layer is made of PET (polyethylene terephthalate) materials. According to the laser holographic packaging material, two layers of different corrugated paper layers are arranged, and the sponge layer and the drying agent layer are arranged between the two layers of corrugated paper layers, so that the shock resistance and water resistance of the material are improved, the overall quality of the material is ensured to be lighter, and the transportation cost is reduced; the laser information layer is arranged on the upper base layer, and the fireproof layer and the first waterproof layer of PET material are arranged on the laser information layer, so that the waterproof and fireproof effects of the laser information layer are ensured, and meanwhile, the definition of the laser information layer is not affected; meanwhile, waterproof layers are respectively arranged on the upper surface and the lower surface to form two layers of waterproof protection, so that the waterproof effect is excellent.



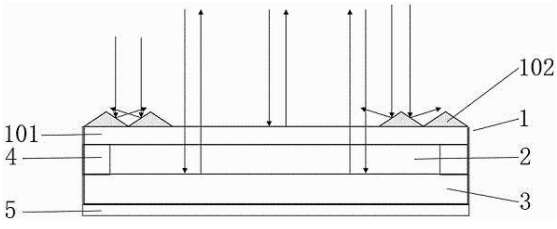
CLAIM 1. The laser holographic packaging material is characterized by sequentially comprising a first waterproof layer (1), a fireproof layer (2), a laser information layer (3), an upper base layer (4), a sponge layer (5), a drying agent (6), a lower base layer (7) and a second waterproof layer (8) from top to bottom; the upper base layer (4) and the lower base layer (7) are made of three layers of corrugated paper, the upper base layer (4) is a B-type corrugated paper, the lower base layer (7) is an A-type corrugated paper, and the fireproof layer is made of PET (polyethylene terephthalate) materials.

P36644 **OVD – LABEL – BRAND PROTECTION – RELIEF – MICROPRISM**

CN219267186U **HUNAN MINTPACK NEW MATERIAL TECHNOLOGY**
Priority Date: **01/08/2022**

GRATING LASER PACKAGING FILM

The utility model discloses a grating laser packaging film in the technical field of labels, which comprises a transparent protective layer, an image-text information layer and a metal reflecting layer, wherein the transparent protective layer is a grating layer and a lens array, the image-text information layer is a holographic material conveying film layer, a laser grating pattern information mould pressing layer and a transparent gloss oil layer, and the metal reflecting layer is an aluminum metal reflecting layer; the utility model has the advantages that the grating layer and the lens array are arranged, so that the whole image and text has a stereoscopic dynamic effect, the anti-counterfeiting performance is improved, and the image and text information layer is integrally displayed brightly under a visible light cover due to the aluminum metal reflecting layer; by arranging the protective layer, the situation that the laser grating pattern information is damaged due to the fact that the laser grating pattern information is placed in a wet environment for a long time and outside wet water vapor enters the image-text information layer can be further avoided.



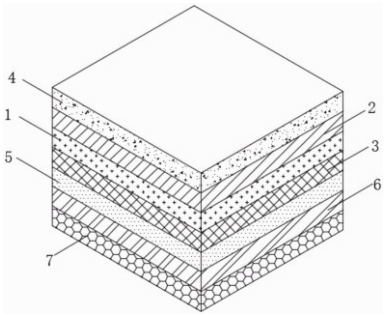
CLAIM 1. The grating laser packaging film is characterized in that: the image-text information processing device comprises a transparent protective layer (1), an image-text information layer (2) and a metal reflecting layer (3), wherein the transparent protective layer (1) is arranged on the upper surface of the image-text information layer (2), and the image-text information layer (2) is arranged on the upper surface of the metal reflecting layer (3); the transparent protective layer (1) is a grating layer (101) and a lens array (102), and the lens array (102) is arranged on the upper surface of the grating layer (101); the image-text information layer (2) is a holographic material conveying film layer (21), a laser grating pattern information mould pressing layer (22) and a transparent gloss oil layer (23), the laser grating pattern information mould pressing layer (22) is arranged on the upper surface of the holographic material conveying film layer (21), and the transparent gloss oil layer (23) is coated on the surface of the laser grating pattern information mould pressing layer (22); the metal reflecting layer (3) is an aluminum metal reflecting layer; wherein, a protective layer (4) is arranged at the outer edge position between the transparent protective layer (1) and the graphic information layer (2).

P36649 **PRINTING – LABEL**

CN219236429U **YONGQING COUNTY YESHENGYA OFFSET PRINTING**
Priority Date: **02/12/2022**

LASER HOLOGRAPHIC IRIS PRINTING LAYER

The utility model discloses a laser holographic iris printing layer, which comprises a printing base layer, wherein a laser holographic iris anti-counterfeiting layer is arranged on one side of the printing base layer, the laser holographic iris anti-counterfeiting layer comprises a laser holographic rainbow pattern film layer, an aluminized layer is arranged on one side of the laser holographic rainbow pattern film layer, a PET (polyethylene terephthalate) base film layer is arranged on one side of the aluminized layer, which is far away from the laser holographic rainbow pattern film layer, an anti-counterfeiting label layer is arranged on one side of the PET base film layer, which is far away from the aluminized layer, the anti-counterfeiting label layer is connected with the printing base layer, a mildew-proof antibacterial layer is arranged on one side of the printing base layer, which is far away from the laser holographic rainbow pattern film layer, the mildew-proof antibacterial layer is composed of bamboo charcoal fibers, and a transparent protective surface layer is arranged on the outer side surface of the laser holographic rainbow pattern film layer. The anti-counterfeiting label is positioned in the middle of the whole label, is not easy to tear, and has good anti-counterfeiting performance and good practicability.



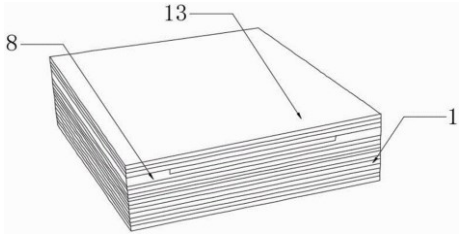
CLAIM 1. The utility model provides a laser hologram iris printing layer, includes printing basic unit (1), its characterized in that, one side of printing basic unit (1) is provided with laser hologram iris anti-fake layer (2), laser hologram iris anti-fake layer (2) are including laser hologram rainbow pattern film layer (201), one side of laser hologram rainbow pattern film layer (201) is provided with aluminizer layer (202), one side that aluminizer layer (202) kept away from laser hologram rainbow pattern film layer (201) is provided with PET basal lamina (203), one side that aluminizer layer (203) kept away from aluminizer layer (202) is provided with anti-fake label layer (204), anti-fake label layer (204) are connected with printing basic unit (1).

P36650 **PRINTING – BRAND PROTECTION**

CN219236369U **SHANDONG FUYANG PACKAGING MATERIALS**
Priority Date: **27/02/2023**

COLOR PRINTING HOLOGRAPHIC PATTERN LASER FILM

The utility model discloses a color printing holographic pattern laser film, which relates to the technical field of laser films, and comprises a PET (polyethylene terephthalate) base film layer and a waterproof non-woven fabric base material layer, wherein the waterproof non-woven fabric base material layer is arranged at the bottom of the PET base film layer, a polyurethane waterproof film is fixedly arranged at the top end of the waterproof non-woven fabric base material layer, an acrylic waterproof film is fixedly arranged at the top end of the polyurethane waterproof film, the top end of the acrylic waterproof film is fixedly connected with the bottom end of the PET base film layer, and a polyethylene waterproof breathable film is fixedly arranged at the bottom end of the waterproof non-woven fabric base material layer, and the color printing holographic pattern laser film has the beneficial effects that: the waterproof non-woven fabrics substrate layer that sets up cooperatees with the waterproof membrane of polyurethane, acrylic acid waterproof membrane and the waterproof ventilated membrane of polyethylene that sets up, is convenient for provide better waterproof to the holographic pattern laser membrane of colour printing, and the waterproof ventilated membrane of polyethylene that wherein sets up makes the holographic pattern laser membrane of colour printing possess certain gas permeability in improving waterproof, is convenient for provide better waterproof protect function.



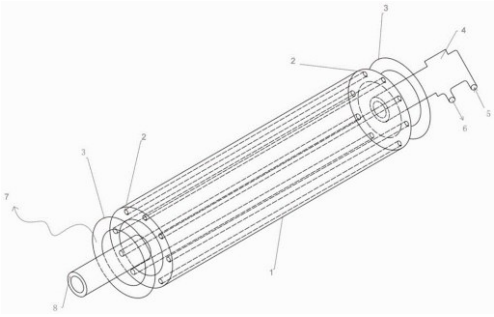
CLAIM 1. The utility model provides a colored printing holographic pattern laser membrane, includes PET base film layer (1) and waterproof non-woven fabrics substrate layer (2), its characterized in that, waterproof non-woven fabrics substrate layer (2) set up in the bottom of PET base film layer (1), the fixed polyurethane waterproof membrane (4) that is equipped with in top of waterproof non-woven fabrics substrate layer (2), the fixed acrylic acid waterproof membrane (5) that is equipped with in top of polyurethane waterproof membrane (4), the bottom fixed connection of the top of acrylic acid waterproof membrane (5) and PET base film layer (1), the bottom mounting of waterproof non-woven fabrics substrate layer (2) is equipped with waterproof ventilated membrane (7) of polyethylene, the top of PET base film layer (1) is equipped with aluminizer (8), mounting groove (9) have been seted up at the middle part on aluminizer (8) top, the inside of mounting groove (9) is fixed and is equipped with holographic pattern anti-fake subsides (10), the top of PET base film layer (1) is equipped with protection component (3).

P36668 **PRINTING – BRAND PROTECTION**

CN116373442 **HUBEI HUAGONG IMAGE TECHNOLOGY DEVELOPMENT**
Priority Date: **14/04/2023**

ELECTRIC HEATING MOULD PRESSING VERSION ROLLER

The invention belongs to the field of anti-counterfeiting package printing related equipment, and discloses an electric heating mould pressing plate roller which is used for laser holographic anti-counterfeiting package printing, wherein a plurality of electric heating pipes are arranged in the plate roller and regularly distributed along the axis direction, are respectively connected with a power line to be lengthened and converged at two ends of the plate roller, and are correspondingly provided with temperature controllers; the two ends of the plate roller are respectively provided with a conducting ring, and the conducting rings are connected with a power line of the electric heating pipe in a conducting way and are connected with an external power supply in a controllable way; in addition, a hollow passage for circulating a cooling medium is provided inside the plate roller. The invention can obtain the electric heating mould pressing plate roller which can effectively overcome various defects of the prior equipment in a manner of compact structure and convenient operation, has the advantages of more energy saving, convenient maintenance, difficult quality hidden trouble generation, better mould pressing temperature balance and the like, and is particularly suitable for printing occasions such as holographic anti-counterfeiting paper, especially holographic anti-counterfeiting positioning paper and the like.



CLAIM 1. The utility model provides an electrical heating mould pressing version roller, this electrical heating mould pressing version roller is used for laser holography anti-fake package printing, its characterized in that: a plurality of electric heating pipes are arranged in the plate roller main body, are regularly distributed along the axis direction, are respectively connected with power lines and are prolonged and converged to two ends of the plate roller main body, and are correspondingly provided with temperature controllers; the two ends of the plate roller main body are respectively provided with a conducting ring, the conducting rings are connected with a power line of the electric heating pipe in a conducting way and are controllably connected with an external power supply at the same time, and an electric heating loop is formed to replace heat conduction oil to execute the whole plate roller heating process; the inside of the plate roller body is also provided with a hollow passage for circulation of a cooling medium, thereby performing a cooling process of the plate roller.

P36676 **BRAND PROTECTION**

CN116284930 **JIAXIONG PACKAGING MAT**
Priority Date: **29/03/2023**

DEGRADABLE ENVIRONMENT-FRIENDLY ANTI-COUNTERFEITING PACKAGING MATERIAL AND PREPARATION METHOD THEREOF

The invention relates to the technical field of degradable environment-friendly anti-counterfeiting packaging materials, and discloses a degradable environment-friendly anti-counterfeiting packaging material and a preparation method thereof; by controlling the proportion of the raw materials of each component in the base material, the first coating and the second coating, a unique soft and hard structure is formed (the soft and hard degree is that the second coating is larger than the base material and larger than the first coating in sequence), so that the packaging material has excellent antibacterial property and rigidity as well as excellent toughness and heat resistance.

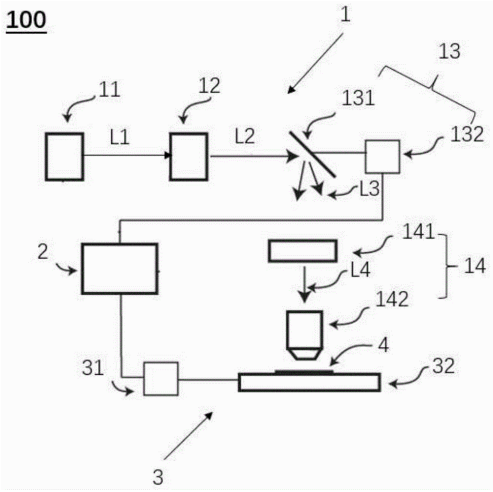
CLAIM 1. A preparation method of a degradable environment-friendly anti-counterfeiting packaging material is characterized by comprising the following steps of: s1: melting and blending polylactic acid composite monomer, tea polyphenol and acetyl tributyl citrate, adding polyethylene glycol and glycolic acid, continuously melting and blending, extruding, granulating and blow molding to obtain a base material; s2: dissolving polylactic acid composite monomers in tetrahydrofuran for preheating, sequentially adding sodium carboxymethyl cellulose, ammonium molybdate and sodium lignin sulfonate, uniformly stirring, and adding stannous octoate for reaction; adding polyethylene glycol and citric acid ester to obtain a coating A; s3: adding polyethylene glycol, modified titanium dioxide nano particles, N' -methylene bisacrylamide and potassium persulfate into a polylactic acid composite monomer to obtain a coating B; s4: coating the coating A on a substrate, and drying to obtain a first coating; coating the coating B on the first coating, and drying to obtain a second coating; and carrying out laser holographic mould pressing, vacuum evaporation and heat treatment on the second coating to obtain the degradable environment-friendly anti-counterfeiting packaging material.

P36675

CN116300319 **GUANGDONG LOEN PHOTOELECTRIC TECHNOLOGY**
Priority Date: **21/12/2021**

PHOTOETCHING MACHINE AND METHOD FOR MANUFACTURING HOLOGRAPHIC MASTER PLATE, HOLOGRAPHIC MASTER PLATE AND ANTI-COUNTERFEITING ELEMENT

The invention relates to a photoetching machine and a method for manufacturing a naked eye 3D holographic master plate, the holographic master plate and an anti-counterfeiting element. The lithographic apparatus includes an optical projection system, a computer, and a motion system, and the optical projection system includes a light emitting diode, an optical processing device, a digital micromirror device, and a microscope device. The digital micromirror device includes a micromirror array and a chip, and light emitted from the light emitting diode is irradiated on and reflected by the micromirror array. The computer creates an image to be projected and transmits it in the form of a digital signal to the chip, which controls the micro-mirror array according to the digital signal to process the digital signal into an optical signal. The microscope device reduces the optical signal and projects the reduced signal onto a glass plate covered with a photoresist layer. The computer is further configured to create the image to be projected such that when the image to be projected is projected onto the photoresist layer, an array of microspheroidal bodies can be formed in the photoresist layer and simultaneously an array of micropatterns can be formed on the surface of the formed array of microspheroidal bodies.



CLAIM 1. A lithography machine for making a naked eye 3D holographic master, the lithography machine comprising an optical projection system, a computer, and a motion system, and the optical projection system comprising a light emitting diode, an optical processing device, a digital micromirror device, and a microscope device; the light emitting diode is configured to emit light having a preset wavelength, the emitted light being incident into the optical processing device and being processed by the optical processing device to obtain light irradiation of uniform intensity; the digital micro-mirror device comprises a micro-mirror array and a chip, wherein the light processed by the optical processing device irradiates on the micro-mirror array and is reflected into the microscope device by the micro-mirror array; the computer is configured to create an image to be projected having a first layer representing an array of microspheroidal bodies and a second layer representing an array of micropatterns superimposed with the first layer, and to transmit the created image to be projected as digital signals to a chip of the digital micromirror device, the chip of the digital micromirror device being configured to control the array of micromirrors in accordance with the received digital signals representing the image to be projected, to process the received digital signals into optical signals in coordination with light processed by the optical processing means for reflection into the microscope means; the microscope device comprises a tube lens and an objective lens, and is configured to reduce the optical signals reflected by the micro-mirror array by a preset multiple and then project the optical signals onto a glass plate covered with a photosensitive adhesive layer sensitive to light emitted by the light-emitting diode; the motion system is configured to move the glass sheet relative to the optical projection system such that the optical projection system projects optical signals representative of different portions of the image to be projected on different portions of the photoresist layer of the glass sheet; and the computer is further configured to create the image to be projected based on moire effects such that: when an optical signal representing the image to be projected is projected onto a photoresist layer of the glass plate by the optical projection system, a microspheroidal array can be formed by exposure in the photoresist layer and a micropattern array can be formed by exposure on the surface of the formed microspheroidal array at the same time, wherein the spacing between adjacent microspheroidal bodies in the microspheroidal array is different from the spacing between adjacent micropatterns in the micropattern array.

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

P36573

BANKNOTE – THREAD – LUMINESCENCE – RELIEF – MICROLENS

WO2023135029
Priority Date: **12/01/2022**

GIESECKE & DEVRIENT CURRENCY TECHNOLOGY

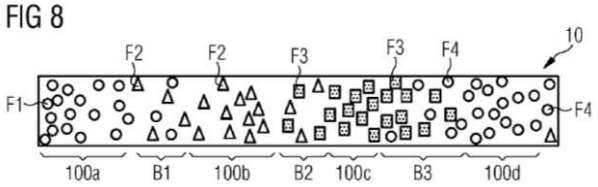
OPTICALLY VARIABLE SECURITY ELEMENT

The invention relates to an optically variable security element for securing information carriers (1), comprising at least two luminescent dyes (F) which at least partially cover a flat substrate on one side and/or two sides. The at least two luminescent dyes (F) comprise a fluorescent dye and a phosphorescent dye, wherein preferably the at least two luminescent dyes (F), preferably the fluorescent dye and the phosphorescent dye, are superimposed on one another at least in regions to produce a mixed color by luminescence. The invention also relates to a method for authenticating an information carrier (1) secured by means of an optically variable security element (10).

ÉLÉMENT DE SÉCURITÉ OPTIQUEMENT VARIABLE

L'invention se rapporte à un élément de sécurité optiquement variable pour protéger des supports d'informations (1), comprenant au moins deux colorants luminescents (F) qui recouvrent, au moins dans certaines régions, un et/ou deux côtés d'un substrat plan. Lesdits deux colorants luminescents (F) comprennent un colorant fluorescent et un colorant phosphorescent, de préférence lesdits deux colorants luminescents (F), de préférence le colorant fluorescent et le colorant phosphorescent, étant superposés l'un sur l'autre, au moins dans certaines régions, afin de produire une couleur mélangée par luminescence. L'invention se rapporte en outre à un procédé d'authentification d'un support d'informations (1) protégé au moyen d'un élément de sécurité optiquement variable (10).

FIG 8



CLAIM 1. An optically variable security element for securing information carriers (1), comprising at least two luminescent dyes (F) which at least regionally cover a planar substrate (12) on one side and/or two sides and which are contained in an ink layer or in a plurality of ink layers, wherein a first of the at least two luminescent dyes (F1) is a fluorescent dye and a second of the at least two luminescent dyes (F2) is a phosphorescent dye, wherein preferably the at least two luminescent dyes (F), particularly preferably the fluorescent dye and the phosphorescent dye, are superimposed at least in regions by luminescence in order to produce a mixed color.

P36574 **BANKNOTE – RELIEF – MICROLENS**

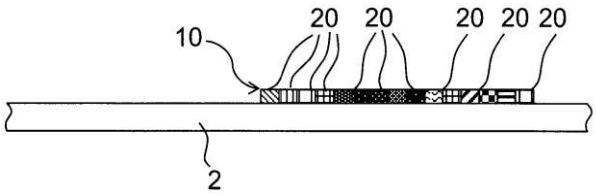
WO2023135028 **GIESECKE & DEVRIENT CURRENCY TECHNOLOGY**
Priority Date: **12/01/2022**

OPTICALLY VARIABLE SURFACE PATTERN

The invention relates to an optically variable surface pattern (10) which is configured to provide a multicoloured representation at least one predetermined viewing angle. said pattern comprises a plurality of surface elements (20) which are provided with relief structures, at least one of the relief structures having nanostructuring which acts as a colour filter. According to the invention, the relief structures are selected from a set of at least four relief structures which are different from one another and which in each case produce, at the predetermined viewing angle, a colour impression corresponding to a predetermined coloured colour, each of the coloured colours corresponding to a different basic colour. The surface elements are dimensioned in such a way that a color impression corresponding to a mixed color and deviating from the predetermined primary colors can be produced in at least one partial region of the surface pattern at the at least one predetermined viewing angle. In this case, positions of the relief structures in the optically variable surface pattern and/ or surface dimensioning of the relief structures within the surface elements are not fixedly predetermined, for example are not regularly predetermined or are not restricted with regard to a minimum extent.

MOTIF DE SURFACE OPTIQUEMENT VARIABLE ET PROCÉDÉ DE PRODUCTION CORRESPONDANT

L'invention concerne un motif de surface (10) optiquement variable, qui est conçu pour fournir une représentation multicolore sous au moins un angle d'observation prédéfini, comprenant une pluralité d'éléments de surface (20) qui sont pourvus de structures en relief, au moins l'une des structures en relief présentant une nanostructuration agissant en tant que filtre coloré. Selon l'invention, les structures en relief sont sélectionnées parmi un ensemble d'au moins quatre structures en relief différentes l'une de l'autre, qui produisent respectivement, sous l'angle d'observation prédéfini, une impression de couleur correspondant à une couleur chromatique prédéfinie, chacune des couleurs chromatiques correspondant à une autre couleur de base. Les éléments de surface (20) sont dimensionnés de sorte que dans au moins une zone partielle du motif de surface (10), sous l'angle ou les angles d'observation prédéfini(s), une impression de couleur différente des couleurs de base prédéfinies et correspondant à une couleur mixte peut être générée. Les positions des structures en relief dans le motif de surface (10) optiquement variable et/ou les dimensions de surface des structures en relief à l'intérieur des éléments de surface (20) ne sont pas prédéfinies de manière fixe, par exemple pas régulières ou pas limitées en ce qui concerne une extension minimale.



CLAIM 1. Optically variable surface pattern (10) which is designed to provide a multicolored representation at least one predetermined viewing angle, wherein the surface pattern (10) comprises a multiplicity of surface elements (20) which are provided with relief structures, wherein at least one of the relief structures has a nanostructuring which acts as a color filter, characterized in that In that the relief structures are selected from a set of at least four relief structures which are different from one another and which in each case produce a colour impression corresponding to a predetermined coloured colour at the predetermined viewing angle, wherein each coloured colour corresponds to a different basic colour, wherein the surface elements (20) are dimensioned in such a way that in at least one partial region of one of the surface elements (20) and/ or of the surface pattern (10) at the at least one predetermined viewing angle, a colour impression which differs from the predetermined primary colours and corresponds to a mixed colour can be produced, wherein an arrangement of the relief structures in the optically variable surface pattern (10) and/or a surface extent of the relief structures within the surface elements (20) is not fixedly predetermined.

P36575 **PLASTIC BANKNOTE – CARD – RELIEF – MICROLENS**

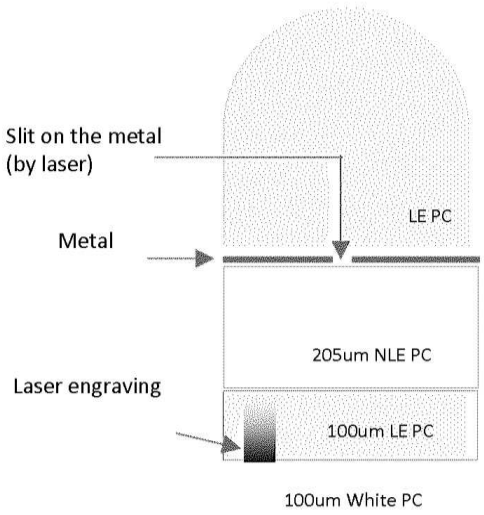
WO2023133632 **CANADIAN BANK NOTE**
Priority Date: **14/01/2022**

SECURITY FEATURE WITH METALLIZATION FOR SECURITY DOCUMENTS

Disclosed herein is a monolithic laminated multi-layer thermoplastic polymer security document and method of making same with an improved, difficult-to-counterfeit security device. The security device comprises at least one selective metallized feature located on an embedded or enclosed surface within the monolithic document, by virtue of the fact that the polymer layers are laminated together. The embedded or enclosed surface comprises a selectively metallized feature. In some embodiments, the security device may comprise the selectively metallized feature in combination with one or more laser engraved data.

ÉLÉMENT DE SÉCURITÉ AVEC MÉTALLISATION POUR DOCUMENTS DE SÉCURITÉ

La présente invention concerne un document de sécurité en polymère thermoplastique multicouche stratifié monolithique et un procédé de fabrication de celui-ci avec un dispositif de sécurité amélioré, difficile à contrefaire. Le dispositif de sécurité comprend au moins un élément métallisé sélectif situé sur une surface intégrée ou fermée à l'intérieur du document monolithique, grâce au fait que les couches de polymère sont stratifiées ensemble. La surface intégrée ou fermée comprend un élément métallisé de manière sélective. Dans certains modes de réalisation, le dispositif de sécurité peut comprendre l'élément métallisé de manière sélective en combinaison avec une ou plusieurs données gravées au laser.



CLAIM 1. A security document comprising a security device, the security document comprising at least three thermoplastic substrate layers, wherein the at least three thermoplastic substrate layers are fused together to form a monolithic document, wherein the at least three thermoplastic substrate layers comprise at least one transparent or semi-transparent laser engravable layer, a core layer and at least one embedded or enclosed surface within the monolithic document, the embedded or enclosed surface comprising a selectively metallized feature, and wherein the security device comprises the selectively metallized feature, optionally in combination with one or more laser engraved data orfeatures on the at least one laser engravable layer.

P36579 **BANKNOTE – CARD – BRAND PROTECTION**

WO2023122299 **PENN STATE RESEARCH FOUNDATION**
Priority Date: **22/12/2021**

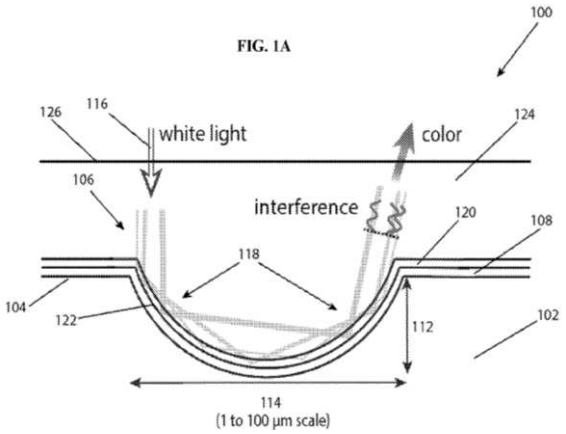
ARTICLES AND METHODS FOR GENERATING TUNABLE COLORATION AND INTERFERENCE UPON REFLECTION OF INCIDENT ELECTROMAGNETIC RADIATION

Disclosed are articles, embodiments, and methods of formation related substrates which exhibit a tunable interference pattern (e.g., structural color) upon reflection of incident electromagnetic radiation.

ARTICLES ET PROCÉDÉS POUR GÉNÉRER UNE COLORATION ET UNE INTERFÉRENCE ACCORDABLES LORS DE LA RÉFLEXION D'UN RAYONNEMENT ÉLECTROMAGNÉTIQUE INCIDENT

Sont divulgués des articles, des modes de réalisation et des procédés de formation de substrats associés qui présentent un motif d'interférence accordable (par exemple, une couleur structurelle) lors de la réflexion d'un rayonnement électromagnétique incident.

CLAIM 1. A substrate exhibiting in interference pattern upon illumination by incident electromagnetic radiation, the substrate comprising a first material having a surface and comprising plurality of microstructures disposed on or within the surface; and a reflective layer disposed on and abutting the first material, thereby forming a reflective surface on or within each of the plurality of microstructures; wherein each of the microstructures have a height and a width of at least 1 micron; wherein the reflective surface is structured such that a portion of electromagnetic radiation incident a surface of the substrate at an illumination angle undergoes two or more reflections within the microstructure, thereby generating an interference pattern upon incident illumination.



P36584 **INK**

WO2023119034 **ECKART**
Priority Date: **22/12/2021**

DIFFRACTIVE EFFECT PIGMENTS HAVING A REFLECTIVE CORE AND SEMICONDUCTOR COATINGS

The present invention relates to a flaky diffractive effect pigment having a diffractive structure and comprising a flake of a highly reflective material having a first major interface and opposed to this first interface a second major interface, and at least one side surface and directly adjacent on one or of both of these 5major interfaces a layer of a semiconducting material having a bandgap of 0.1 to 2.5 eV. The diffractive effect pigment may be further coated with a coating which is optically non-active in the visible wavelength region.

PIGMENTS À EFFET DIFFRACTIF AYANT UN CŒUR RÉFLÉCHISSANT ET DES REVÊTEMENTS SEMICONDUCTEURS

La présente invention concerne un pigment écailleux à effet diffractif ayant une structure diffractive et comprenant une écaille en un matériau hautement réfléchissant ayant une première interface principale et, opposée à cette première interface, une seconde interface principale, et au moins une surface latérale et, directement adjacente à l'une de ces interfaces principales ou aux deux, une couche d'un matériau semiconducteur ayant une largeur de bande interdite de 0,1 à 2,5 eV. Le pigment à effet diffractif peut en outre être revêtu d'un revêtement qui est optiquement non actif dans la région des longueurs d'onde visibles.

CLAIM 1. A flaky diffractive effect pigment having a diffractive structure and a 3-layer stack consisting of a core of a flake of a highly reflective material having a first major interface and opposed to this first interface a second major interface, and at least one side surface and directly adjacent on both of these major interfaces a layer of a semiconducting material having a bandgap of 0.1 to 2.5 eV.

P36589

PATENT OF THE MONTH
BANKNOTE – RELIEF – MICROLENS

WO2023115210
Priority Date: **22/12/2021**

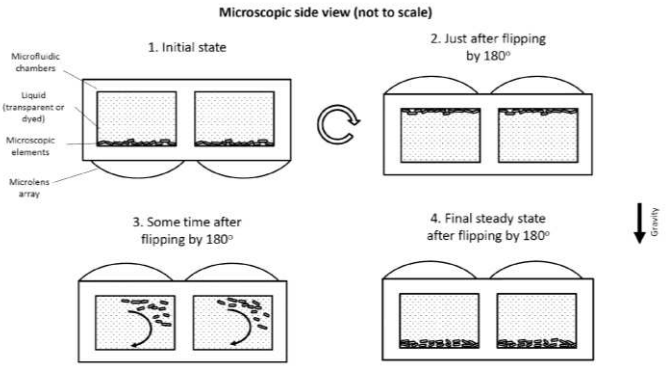
BANK OF CANADA | NRC - NATIONAL RESEARCH COUNCIL CANADA

DYNAMIC MICRO-OPTIC SECURITY DEVICES, THEIR PRODUCTION AND USE

Disclosed are devices with dynamic optical properties suitable for use as security or authentication devices, for example for documents or items of importance or value, in order to help prevent counterfeit of the same. Such devices, at least in selected embodiments, enable observation of dynamic changes or moving entities within the device by collective or enhanced imaging of the dynamic changes or moveable entities, the motion or position of which may otherwise be difficult to observe, or indiscernible to, the naked eye.

DISPOSITIFS DE SÉCURITÉ MICRO-OPTIQUES DYNAMIQUES, LEUR PRODUCTION ET LEUR UTILISATION

Des dispositifs à propriétés optiques dynamiques adaptés à l'utilisation en tant que dispositifs de sécurité ou d'authentification, par exemple pour des documents ou des articles d'importance ou de valeur, afin d'aider à empêcher la contrefaçon de ces derniers, sont divulgués. De tels dispositifs, au moins dans des modes de réalisation sélectionnés, permettent l'observation de changements dynamiques ou d'entités mobiles à l'intérieur du dispositif par imagerie collective ou améliorée des changements dynamiques ou des entités mobiles, dont le mouvement ou la position peut sinon être difficile à observer, ou indiscernable à l'œil nu.



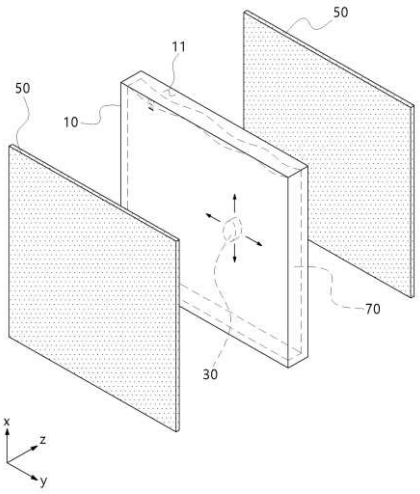
CLAIM 1. A device comprising: an array of compartments; one or more entities, with at least a majority of the compartments containing one or more of the entities therein, each entity moveable within the compartment within which it is contained when the device is subjected to an external influence or force, wherein resulting movement of at least some of the entities includes common, at least partially synchronized movement thereof, within and relative to their respective compartments, across at least a portion of the compartments; and an image generator to selectively combine at least some of the common, synchronized movement of the entities within and relative to their respective compartments into an observable image.

P36602 **MAGNETISM**

KR20230105917 **KOREA SECURITY PRINTING & MINTING**
Priority Date: **05/01/2022**

MOTION RESPONSIVE SECURITY DEVICE

The present invention relates to an operation-responsive security device, and more particularly, to an operation-responsive security device capable of truly differentiating according to a user's movement without a separate truly differentiating tool and having improved security. There is provided an operation responsive security device including: a main body including an enclosed accommodation space; a magnetic body positioned in the accommodation space in the main body and in an unfixed state so as to be freely movable; and a magnetically responsive identification unit positioned on at least one surface of the main body and including a magnetically variable material.



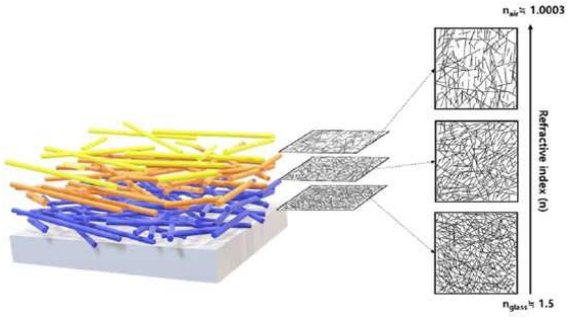
CLAIM 1. An operation-responsive security device, comprising: a main body including a hermetically sealed accommodation space; a magnetic body positioned in the accommodation space in the main body and in an unfixed state so as to be freely movable; and a magnetically responsive identification unit positioned on at least one surface of the main body and including a magnetically variable material.

P36603 **PRINTING**

KR20230102549 **INHA INDUSTRY PARTNERSHIP INSTITUTE**
Priority Date: **30/12/2021**

THE COATING WITH STRUCTURAL COLOR AND ANTI-COUNTERFEITING PATTERN SECURITY MADE BY LAYER-BY-LAYER ASSEMBLY BASED ON TUNICATE CELLULOSE NANO FIBERS AND ITS MANUFACTURING METHOD

The present invention relates to a coating having a structural color using layered assembly of cellulose nanofibers. According to the present invention, the coating having a structure color using layer-by-layer assembly of cellulose nanofibers is formed through a layer-by-layer assembly process of cellulose and chitosan extracted from a tunicate, thereby having an adjustable structure color, and an anti-counterfeit coating layer can be formed using the structure color.



CLAIM 1. (a) A method for producing a modified cellulose nanofiber dispersion by performing modification and dispersion of a surface of cellulose nanofibers extracted from a tunicate stream to produce a surface-modified cellulose nanofiber dispersion; (b) coating a cellulose nanofiber layer and an allele layer extracted from the tunicate stream with a layer-by-layer self-assembly process on an object in need of anti-counterfeiting coating; (c) Forming an anti-counterfeit design in the coating layer of step (b); wherein the surface modification converts hydroxyl groups on at least a portion of the cellulose surface to other functional groups.

P36615

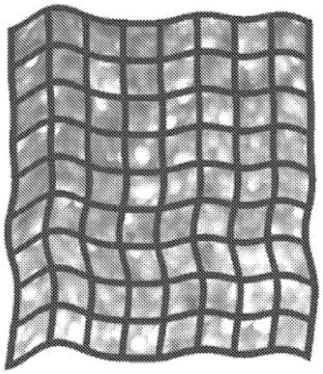
FR3131646 **GUIGAN FRANCK**
Priority Date: **03/01/2022**

AUTHENTICATION OF DISTORTED OPTICAL SECURITY DEVICES

The invention concerns an optical authentication device which can be deformed, characterised in that it comprises a so-called support deformation analysis graphic, whereof the deformation enables to determine the inclination and orientation of at least two parts of said device. This graphic is, for example, a flexible grid. the invention is also a method for authenticating such a device comprising a prior step of analyzing the distortion due to the perspective of the graphic for analyzing the deformation of the support, in order to analyze separately the various parts of the device as a function of their inclination and their orientation. In a preferred version, the authentication device comprises device parts 11 and 12 which are rigid and are separated by a flexible part 21 which serves at the same time as a graphic making it possible to analyse the deformation of the support.

AUTHENTIFICATION DE DISPOSITIFS DE SÉCURITÉ OPTIQUE DÉFORMÉS

Dispositif d'authentification optique qui peut être déformé, caractérisé en ce qu'il comporte un graphisme dit d'analyse de déformation du support, dont la déformation permet de déterminer l'inclinaison et l'orientation d'au moins deux parties dudit dispositif. Ce graphisme est par exemple une grille souple L'invention est aussi un procédé d'authentification d'un tel dispositif comprenant une étape préalable d'analyse de la distorsion due à la perspective du graphisme d'analyse de la déformation du support, pour analyser séparément les différentes parties du dispositif en fonction de leur inclinaison et de leur orientation. Dans une version préférée, le dispositif d'authentification comporte des parties de dispositif 11 et 12 qui sont rigides et sont séparées par une partie souple 21 qui sert en même temps de graphisme permettant d'analyser la déformation du support.



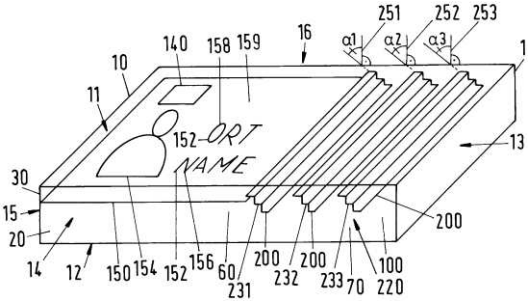
CLAIM 1. The invention concerns an optical authentication device, characterized in that it comprises a so-called support deformation analysis graphic, whereof the deformation characterizes the inclination and orientation of at least two parts of said device.

P36624 **CARD**

EP4209355 **BUNDESDRUCKEREI**
Priority Date: **06/01/2022**

SECURITY DOCUMENT WITH MICROGRID STRUCTURE

The invention relates to a security document (1) and to a method for the production thereof, wherein the security document (1) comprises a document body (10) having an upper side (11) and an opposite lower side (12), wherein the document body (10) has at least one transparent volume region (100), wherein the at least one transparent volume region (100) extends from the upper side (11) into the interior of the document body (10), and wherein laser-induced microstructures (200) are formed in the interior of the document body (10), wherein at least one micrograting structure (210) which diffracts light (300) is formed in the interior of the document body (10) by means of the microstructures (200).



CLAIM 1. Security document (1) comprising a document body (10) having an upper side (11) and an opposite lower side (12), wherein the document body (10) has at least one transparent volume region (100), wherein the at least one transparent volume region (100) extends from the upper side (11) into the interior of the document body (10), wherein laser-induced microstructures (200) are formed in the interior of the document body (10), characterized in that In that at least one micrograting structure (210) which diffracts light (300) is formed in the interior of the document body (10) by means of the microstructures (200).

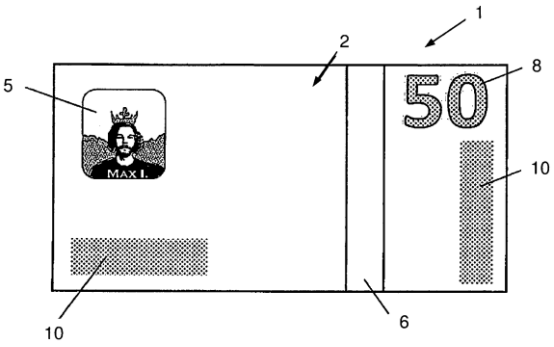
P36627 **BANKNOTE**

DE102022000312 **GIESECKE & DEVRIENT CURRENCY TECHNOLOGY**
Priority Date: **27/01/2022**

FILM, FILM WEB, VALUABLE DOCUMENT AND METHOD FOR PRODUCING THE SAME

Providing a film (1) for producing a multilayer hybrid banknote (34) or its non-rotatable precursor. The film (1) has an inner side (4) and an outer side (2), the inner side (4) being designed to be applied to a further layer of the subsequent hybrid banknote (34) or its non-rotatable precursor, and the outer side (2) being designed in such a way that it lies on the outside of the hybrid banknote (34) or its non-rotatable precursor. The film (1) has a matt layer (14) which is applied to the outer side (2). Furthermore, the film (1) has a security element (5, 6, 8, 10) which is applied to the inner side (4). The matt layer (14) has at least one gap (16 a-16 d) which at least partially covers the security element (5, 6, 8, 10) so that the security element (5, 6, 8, 10) is visible through the gap (16 a-16 d) in a plan view of the film (1).

CLAIM 1. Film for producing a hybrid banknote or its non-rotatable precursor, wherein the film - has an inner side (4) and an outer side (2), wherein the inner side (4) is designed for application to a further layer of the later hybrid banknote (34) or its non-rotatable precursor, and the outer side (2) is designed in such a way that it lies on the outside of the hybrid banknote (34) or its non-rotatable precursor, - has a matt layer (14) which is applied to the outer side (2), and - has a security element (5, 6, 8, 10) which is applied to the inner side (4), characterized in that Characterized in that - the matt layer (14) has a gap (16 a-16 d) which at least partially covers the security element (5, 6, 8, 10) so that the security element (5, 6, 8, 10) is visible through the gap (16 a-16 d) in a plan view of the film (1).

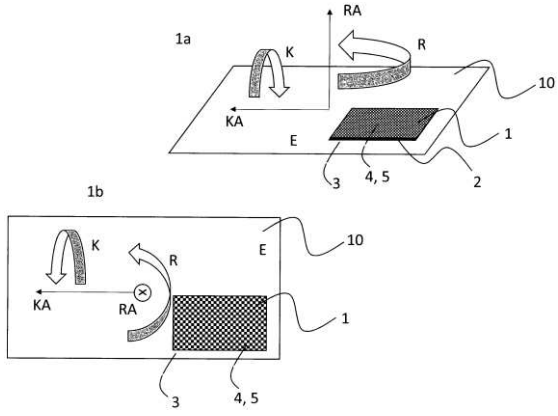


P36628 **BANKNOTE**

DE102022000212 **GIESECKE & DEVRIENT CURRENCY TECHNOLOGY**
Priority Date: **20/01/2022**

SECURITY FEATURE FOR A VERIFICATION SYSTEM, SYSTEM, METHOD AND COMPUTER PROGRAM PRODUCT FOR VERIFYING AN OBJECT PROVIDED WITH THE SECURITY FEATURE AND METHOD FOR PRODUCING A SECURITY FEATURE

A security feature for a verification system, comprising: a viewport, the viewport comprising: at least a first representation comprising a plurality of segments forming a predetermined target representation in encrypted form, wherein the first representation is detectable for at least a portion of the plurality of segments under at least a first viewing perspective or at least a first viewing perspective range, and wherein the first representation is configured to form the predetermined target representation using a predetermined decryption code on the plurality of segments.



CLAIM 1. Security feature (1) for a verification system, comprising: an optically variable representation field (3) which represents at least one first representation (4); wherein the first representation (4) comprises a plurality of segments (4 a) which form a predetermined target representation (4 c) in encrypted form (4 b), wherein the first representation (4) for at least some of the plurality of segments (4 a) is detectable under at least one first viewing perspective (6) or at least one first viewing perspective region, and wherein the first representation (4) is configured to form the predetermined target representation (4 c) using a predetermined decryption code on the plurality of segments (4 a).

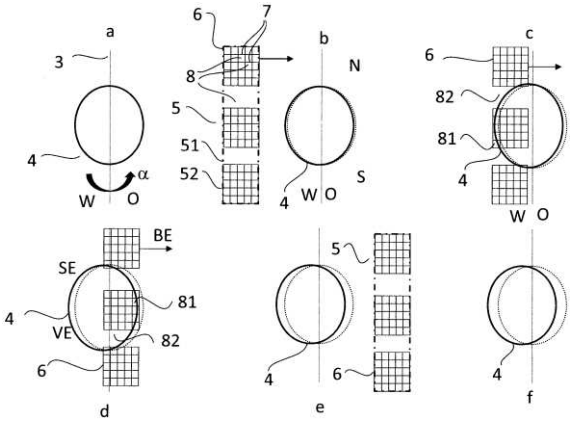
P36629 **BANKNOTE – RELIEF – MICROLENS**

DE102022000210 **GIESECKE & DEVRIENT CURRENCY TECHNOLOGY**

Priority Date: **20/01/2022**

SECURITY FEATURE FOR VALUABLE DOCUMENTS AND VALUABLE DOCUMENT HAVING SECURITY FEATURE

A security feature (1) for a value document (10). The security feature comprises a field (2) arranged in a main plane (E) of the security feature with, for example, micro-reflectors or micro-mirrors, or micro-lenses or micro-refractors, for displaying a floating motif (4), which appears (SE) to the observer to lie outside the main plane (E), in a first tilt angle range and a movement motif (5) in a second tilt angle range (Δα2). the second tilt angle range (Δα2) overlap at least partially, in an overlap region (Ü), with the first tilt angle region (Δα).1). the movement motif (5) overlaps areally at least partially with the levitation motif (4) and has a motif structure (6) with interruptions (8) and/or its second tilt angle range (Δα2) is smaller than the first tilt angle range (Δα1) of the suspended motif (4). The elements of the array can be interleaved with one another.



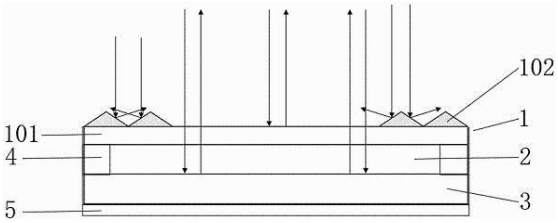
CLAIM 1. A security feature (1) for a value document (10), comprising: a field (2) arranged in a main plane (E) of the security feature, which field is configured to represent a floating motif (4), which appears (SE) to the observer to lie outside the main plane (E), and which is generated for the observer with a tilting of the main plane (E) about at least one first main plane axis (3) in a first tilt angle range, and a movement motif (5), wherein the impression of a movement effect (BE) running in the main plane (E) or parallel to the main plane (E) is associated with the tilting of the main plane (E) about the at least one first main plane axis (3) in a second tilt angle range (Δα2); wherein the second tilt angle range (Δα2) extends at least partially, in an overlap region (Ü), with the first tilt angle region (Δα1); wherein the movement motif (5) overlaps areally at least partially with the levitation motif (4) and has a motif structure (6) with interruptions (8) and/or the second tilt angle range (Δα2) of the movement motif (5) is smaller than the first tilt angle range (Δα1) of the suspended motif (4).

P36644 **HOLOGRAM – LABEL – BRAND PROTECTION – RELIEF – MICROPRISM**

CN219267186U **HUNAN MINTPACK NEW MATERIAL TECHNOLOGY**
Priority Date: **01/08/2022**

GRATING LASER PACKAGING FILM

The utility model discloses a grating laser packaging film in the technical field of labels, which comprises a transparent protective layer, an image-text information layer and a metal reflecting layer, wherein the transparent protective layer is a grating layer and a lens array, the image-text information layer is a holographic material conveying film layer, a laser grating pattern information mould pressing layer and a transparent gloss oil layer, and the metal reflecting layer is an aluminum metal reflecting layer; the utility model has the advantages that the grating layer and the lens array are arranged, so that the whole image and text has a stereoscopic dynamic effect, the anti-counterfeiting performance is improved, and the image and text information layer is integrally displayed brightly under a visible light cover due to the aluminum metal reflecting layer; by arranging the protective layer, the situation that the laser grating pattern information is damaged due to the fact that the laser grating pattern information is placed in a wet environment for a long time and outside wet water vapor enters the image-text information layer can be further avoided.



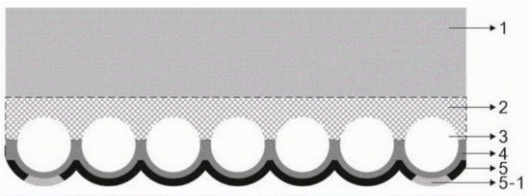
CLAIM 1. The grating laser packaging film is characterized in that: the image-text information processing device comprises a transparent protective layer (1), an image-text information layer (2) and a metal reflecting layer (3), wherein the transparent protective layer (1) is arranged on the upper surface of the image-text information layer (2), and the image-text information layer (2) is arranged on the upper surface of the metal reflecting layer (3); the transparent protective layer (1) is a grating layer (101) and a lens array (102), and the lens array (102) is arranged on the upper surface of the grating layer (101); the image-text information layer (2) is a holographic material conveying film layer (21), a laser grating pattern information mould pressing layer (22) and a transparent gloss oil layer (23), the laser grating pattern information mould pressing layer (22) is arranged on the upper surface of the holographic material conveying film layer (21), and the transparent gloss oil layer (23) is coated on the surface of the laser grating pattern information mould pressing layer (22); the metal reflecting layer (3) is an aluminum metal reflecting layer; wherein, a protective layer (4) is arranged at the outer edge position between the transparent protective layer (1) and the graphic information layer (2).

P36651 **RELIEF – MICROLENS**

CN116490805 **NIPPON CARBIDE KOGYO**
Priority Date: **16/11/2022**

ANTI-FAKE REFLECTING SHEET AND ITS MAKING PROCESS

The invention provides an anti-counterfeiting reflector plate and a manufacturing method thereof, wherein the anti-counterfeiting reflector plate comprises: a surface protection layer; a clamping layer located on a side surface of the surface protection layer; a focus forming layer located on a side of the chucking layer; and a specular reflection layer on a side surface of the focus forming layer, wherein glass beads are sandwiched between the sandwiching layer and the focus forming layer, a part of the glass beads being located in the sandwiching layer and another part being located in the focus forming layer; wherein, the specular reflection layer is provided with an anti-counterfeiting pattern. Thus, an anti-counterfeit reflecting sheet which is easy to observe and which is prevented from being imitated can be realized.



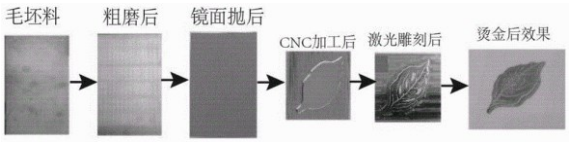
CLAIM 1. An anti-counterfeiting reflector sheet, comprising: a surface protection layer; a clamping layer located on a side surface of the surface protection layer; a focus forming layer located on a side of the chucking layer; and a specular reflection layer on a side surface of the focus-forming layer, wherein glass beads are sandwiched between the clamping layer and the focus forming layer, one part of the glass beads being located in the clamping layer and the other part being located in the focus forming layer; the anti-counterfeiting pattern is arranged on the specular reflection layer and hidden in the visible pattern.

P36653

CN116476558 **WUXI KAICHUANG MOULD**
Priority Date: **26/06/2023**

NANOMETER MICRO-ENGRAVING ANTI-COUNTERFEITING GOLD STAMPING PROCESS

The invention relates to the technical field of anti-counterfeiting gold stamping, and in particular provides a nano micro-engraving anti-counterfeiting gold stamping process, which comprises the following steps of: s1, designing and manufacturing an effect pattern according to a drawing; s2, selecting die steel as a blank; s3, grinding the blank until the surface of the blank reaches a mirror effect; s4, CNC processing is carried out on the mirror surface blank, redundant rim charge is removed on the mirror surface blank, and the pattern outline of the effect is reserved; s5, cleaning a mirror blank; s6, carving the effect pattern on the mirror blank by adopting a laser nano micro carving machine; s7, transferring an aluminum layer in the electrochemical aluminum to the surface of the mirror surface blank after carving so as to form a steel plate gold stamping plate with micro-carving patterns; s8, cleaning and drying the finished product nano micro-engraving gold stamping plate; compared with a copper plate gold stamping plate, the invention has the advantages of high hardness, long service life and difficult deformation; the mirror surface grinding procedure ensures that the gold stamping effect on the surface of the die steel is more exquisite and finer, the brightness is more obvious, and the effect of the design drawing can be reflected.



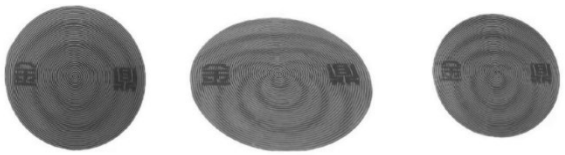
CLAIM 1. The nanometer micro-engraving anti-counterfeiting gold stamping process is characterized by comprising the following steps of: s1, designing and manufacturing an effect pattern according to a drawing; s2, selecting die steel as a blank; s3, grinding the blank until the surface of the blank reaches a mirror effect; s4, CNC processing is carried out on the mirror surface blank, redundant rim charge is removed on the mirror surface blank, and the pattern outline of the effect is reserved; s5, cleaning a mirror blank; s6, carving the effect pattern on the mirror blank by adopting a laser nano micro carving machine; s7, transferring an aluminum layer in the electrochemical aluminum to the surface of the mirror surface blank after carving so as to form a steel plate gold stamping plate with micro-carving patterns; and S8, cleaning and drying the finished product nanometer micro-engraving gold stamping plate.

P36659 **PRINTING – LABEL – RELIEF – MICROLENS**

CN116424007 **CHENGDU BANKNOTE PRINTING | CHINA BANKNOTE PRINTING & MINT**
Priority Date: **12/10/2022**

THREE-DIMENSIONAL DYNAMIC PATTERN ANTI-COUNTERFEITING LABEL AND PRINTING METHOD THEREOF

The application discloses a three-dimensional dynamic pattern anti-counterfeit label and a printing method thereof, which aim to solve the technical problem that the existing 3D grating film coating technology is difficult to realize local anti-counterfeit printing, and mainly relate to the technical field of anti-counterfeit printing. The anti-counterfeiting printing method comprises the following steps of: printing a layer of light-colored UV ink on paper in an offset printing manner, and printing a layer of UV high-gloss transparent oil on the light-colored UV ink to obtain a layer of UV high-gloss transparent oil layer; printing a dynamic target ground pattern on the upper side of the substrate by adopting UV offset printing ink to obtain a three-dimensional dynamic pattern ground pattern layer; printing a logo image-text on the stereoscopic dynamic pattern ground pattern layer to form a first anti-counterfeiting pattern; spraying and printing high-temperature transparent hot melt resin on the first anti-counterfeiting pattern to form a transparent spacing layer; and printing a silk screen micro-lens array on the transparent spacer layer by using transparent UV (ultraviolet) expansion ink to obtain a second anti-counterfeiting pattern with a stereoscopic dynamic pattern.



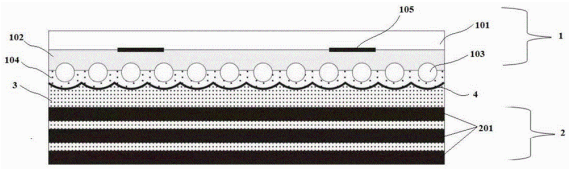
CLAIM 1. The printing method of the three-dimensional dynamic pattern anti-counterfeiting label is characterized by comprising the following steps of: printing a layer of light-colored UV ink on paper in an offset printing manner, and printing a layer of UV high-gloss transparent oil on the light-colored UV ink to obtain a layer of UV high-gloss transparent oil layer; printing a dynamic target ground pattern on the upper side of the substrate by adopting UV offset printing ink to obtain a three-dimensional dynamic pattern ground pattern layer; printing a logo image-text on the stereoscopic dynamic pattern ground pattern layer to form a first anti-counterfeiting pattern; spraying and printing high-temperature transparent hot melt resin on the first anti-counterfeiting pattern to form a transparent spacing layer; and printing a silk screen micro-lens array on the transparent spacer layer by using transparent UV (ultraviolet) expansion ink to obtain a second anti-counterfeiting pattern with a stereoscopic dynamic pattern.

P36672 **RELIEF – MICROPRISM**

CN116338841 **NIPPON CARBIDE KOGYO**
Priority Date: **22/12/2021**

RETROREFLECTIVE SHEET WITH BASE MATERIAL AND CAPABLE OF BEING PRINTED BY CARBON TAPE

The invention provides a carbon tape-printable retroreflective sheet with a base material, which comprises a retroreflective structural layer, a specular reflection layer and a base material layer, wherein the retroreflective structural layer is arranged on the retroreflective structural layer; wherein the specularly reflective layer is connected with the substrate layer by an adhesive layer, and the fracture strength of the adhesive layer is 1.7N/mm 2 The elongation is more than 220mm, and the peeling force at an angle of 90 degrees is more than 10N/25 mm; the base material layer is selected from laminated films of single-layer or multi-layer resin films, and the thickness of the base material layer is 188-1000 mu m.



CLAIM 1. The carbon tape-printable retroreflective sheet with the base material is characterized by sequentially comprising a retroreflective structural layer, a specular reflection layer and a base material layer from top to bottom; wherein, the liquid crystal display device comprises a liquid crystal display device, the specular reflection layer passes through the substrate layerThe adhesive layers were joined, and the breaking strength of the adhesive layers was 1.7N/mm 2 The elongation is more than 220mm, and the peeling force at an angle of 90 degrees is more than 10N/25 mm; the substrate layer is selected from a laminated film of a single-layer or multi-layer resin film, the thickness of the substrate layer is 188-1000 mu m.

P36673 **PRINTING – BRAND PROTECTION**

CN116330874 **ZHEJIANG KAYOU ANIMATION**
Priority Date: **10/03/2023**

OPTICALLY VARIABLE INK PRINTING METHOD FOR PLASTIC STATIONERY SURFACE

The invention discloses a photo-variable ink printing method for the surface of plastic stationery, which comprises the steps of preparing photo-variable ink, forming a printing film and hot-press printing. Based on the characteristics of the optically variable pigment, the optically variable pigment is prepared into optically variable ink suitable for a release film of a thermal transfer material, the optically variable ink is printed on the surface of the release film through gravure, and the optically variable ink on the release film is transferred onto a stationery pen holder through thermal transfer, so that the effect of changing color under different light angles is achieved. Compared with the traditional CMYK four-color printing, the color of the invention has more colorful appearance along with the change of the light angle, and has certain unique rarity aiming at rare products which are not easy to be simulated and copied by the same industry of the outside.

CLAIM 1. A method for optically variable ink printing on a plastic stationery surface, the method comprising the steps of: 1) And (3) forming a printing film: printing four-color printing ink, optically variable printing ink and hot melt adhesive on the surface of the release oil in sequence by printing on the PET film coated with the release oil to prepare a printing film of the image and text; 2) Hot press printing: and (3) sticking the printing film obtained in the step (1) on the surface of the plastic stationery, printing the printing film on the surface of the plastic stationery in a hot-pressing mode, stopping heat treatment after the hot melt adhesive is in a molten state, and separating from the PET film after the hot melt adhesive is solidified to obtain the plastic stationery printed with the optically variable ink.

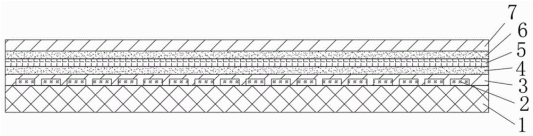
P36677 **PRINTING**

CN116278452 **GUANGDONG QIAOSHENG NEW MATERIAL TECHNOLOGY**

Priority Date: **21/12/2021**

OPTICALLY VARIABLE ANTI-COUNTERFEITING MATERIAL, AND MANUFACTURING METHOD AND APPLICATION THEREOF

The invention relates to the technical field of optically variable anti-counterfeiting materials, in particular to a manufacturing method of optically variable anti-counterfeiting materials, which comprises the following steps: printing water-based printing ink on one surface of the film, and drying to form a water-based ink layer; and under the vacuumizing condition, respectively evaporating a first medium material, a first absorption material, a reflecting material, a second absorption material and a second medium material on one surface of the film printed with the water-based ink layer by adopting a vacuum coating machine, respectively forming the first medium layer, the first absorption layer, the reflecting layer, the second absorption layer and the second medium layer, and removing the water-based ink layer on the evaporated film by ultrasonic washing to obtain the optically variable anti-counterfeiting material. The water-based ink layer is removed by ultrasonic water washing, so that the water-based ink layer and each coating attached to the water-based ink layer are hollowed out to form a gap with printing water-based ink traces, and the gap cooperates with the optically variable effect of the multi-layer coating to achieve remarkable anti-counterfeiting performance, and the reduction of stability caused by the adoption of the existing anti-counterfeiting coating is avoided.



CLAIM 1. A manufacturing method of optically variable anti-counterfeiting material is characterized by comprising the following steps: the method comprises the following steps: (S1) taking a film, water-based printing ink, a first medium material, a first absorption material, a reflection material, a second absorption material and a second medium material for standby; (S2) printing water-based printing ink on one surface of the film, and drying to form a water-based ink layer; (S3) evaporating a first medium material on one surface of the film printed with the water-based ink layer by using a vacuum coating machine under the vacuumizing condition to form a first medium layer; (S4) evaporating a first absorption material on the surface of the film plated with the first dielectric layer by adopting the vacuum coating machine under the vacuumizing condition to form a first absorption layer; (S5) evaporating a reflecting material on one surface of the film plated with the first absorption layer by adopting the vacuum coating machine under the vacuumizing condition to form a reflecting layer; (S6) evaporating a second absorption material on the surface of the film coated with the reflecting layer by adopting the vacuum coating machine under the vacuumizing condition to form a second absorption layer; (S7) evaporating a second medium material on the surface of the film, which is plated with the second absorption layer, by adopting the vacuum coating machine under the vacuumizing condition to form a second medium layer; (S8) removing the water-based ink layer from the film evaporated in the step (S7) by ultrasonic washing, and removing each coating attached to the water-based ink layer to obtain the optically variable anti-counterfeiting material.

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

N9501

WO2023141344 **UNIVERSITY OF ARIZONA**

Priority Date: **24/01/2022**

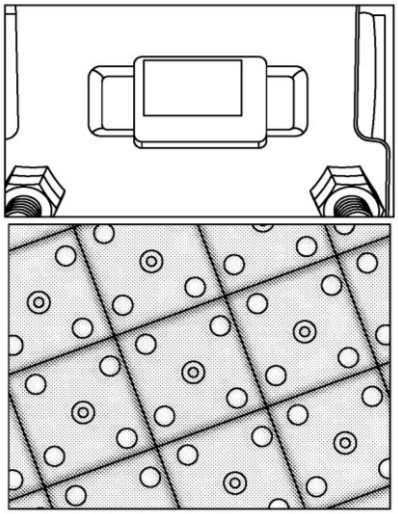
REAL-TIME COMPUTER GENERATED HOLOGRAM (CGH) GENERATION BY COMPUTE UNIFIED DEVICE ARCHITECTURE (CUDA)-OPEN-GL FOR ADAPTIVE BEAM STEERING

A system and method for real-time, simultaneous, and adaptive beam steering into multiple regions of interest replaces conventional raster scanning, where only regions of interest are scanned by a laser or other optical beam. CUDA-OpenGL interoperability with a computationally time-efficient computer-generated hologram (CGH) calculation algorithm enables such beam steering by employing a phase – spatial light modulator (SLM). The real-time CGH generation and display algorithm is incorporated into the beam steering system with variable power and scan resolution, which are adaptively controlled by camera-based object recognition.

GÉNÉRATION EN TEMPS RÉEL D'HOLOGRAMME GÉNÉRÉ PAR ORDINATEUR (CGH) PAR COMPUTE UNIFIED DEVICE ARCHITECTURE (CUDA)-OPEN-GL POUR ORIENTATION DE FAISCEAU ADAPTATIVE

Un système et un procédé destinés à l'orientation en temps réel, simultanée et adaptative d'un faisceau en de multiples régions d'intérêt remplacent un balayage de trame classique, dans lequel des régions d'intérêt sont balayées par un laser ou un autre faisceau optique. L'interopérabilité CUDA-OpenGL avec un algorithme de calcul d'hologramme généré par ordinateur (CGH) efficace en termes de temps de calcul permet une telle orientation de faisceau en utilisant un modulateur spatial de lumière (SLM) en phase. L'algorithme de génération et d'affichage en temps réel de CGH est incorporé dans le système d'orientation de faisceau avec une puissance et une résolution de balayage variables, qui sont commandées de manière adaptative par reconnaissance d'objet basée sur une caméra.

CLAIM 1. A method for performing adaptive beam steering to one or more objects of interest, comprising (i) detecting an object of interest in an image of a scene; (ii) defining a region of interest (ROI) in the image to be scanned by an optical beam, wherein the ROI includes the object of interest; (iii) determining a computer generated hologram (CGH) phase pattern to be applied to an optical beam by a phase Spatial Light Modulator (phase-SLM) to scan the optical beam over the ROI by diffractive beam steering, wherein the determining is performed by a CGH calculation algorithm that is executed in parallel for each of the pixels, wherein the determining includes determining the CGH phase pattern on a pixel-by-pixel-basis by assigning a phase value to each pixel in the phase-SLM based on the equation: $\Phi(x,y,a,b\sim) = \mathrm{mod}\{[2\pi(xa+yb)], 2\pi\}$, where Φ is the phase value, (x,y) represents a position of the pixel, and (a, b) represents a diffraction angle measured from a 0th order diffraction from the phase-SLM and $\mathrm{mod}(2\pi(xa+yb), 2\pi)$ represents a modulo 2π operation on a value $2\pi(xa+yb)$; (iv) displaying the CGH phase pattern on the phase-SLM using a graphic memory that is also used to determine the CGH phase pattern; and (v) directing the optical beam onto the phase-SLM while the CGH phase pattern is being displayed to thereby steer the optical beam to the ROI.



N9504

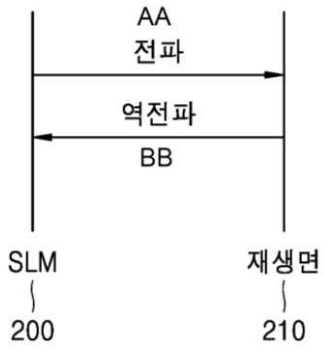
WO2023128088 **SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION**
Priority Date: **29/12/2021**

METHOD FOR OPTIMIZING HOLOGRAPHIC DISPLAY AND DEVICE THEREFOR

Disclosed are a method for optimizing a holographic display and a device therefor. A holographic display device generates a prediction hologram by back-propagating target field data composed of a plurality of planes in a depth direction to a complex plane of a spatial light modulator, converts the prediction hologram into a binary hologram, generates prediction field data obtained by propagating the binary hologram to a reproduction surface by means of an optical system simulation model, calculates a loss function of the prediction field data and the target field data, generates a new prediction hologram for the prediction field data by using stochastic gradient descent, and repeatedly performs generation of prediction holograms and generation of prediction field data until a value of the loss function is less than a predefined threshold.

PROCÉDÉ D'OPTIMISATION DE DISPOSITIF D'AFFICHAGE HOLOGRAPHIQUE ET DISPOSITIF ASSOCIÉ

L'invention concerne un procédé d'optimisation de dispositif d'affichage holographique et un dispositif associé. Un dispositif d'affichage holographique génère un hologramme de prédiction en rétropropageant des données de champ cible composées d'une pluralité de plans dans le sens de la profondeur vers un plan complexe d'un modulateur spatial de lumière, il convertit l'hologramme de prédiction en un hologramme binaire, il génère des données de champ de prédiction obtenues en propageant l'hologramme binaire vers une surface de reproduction au moyen d'un modèle de simulation de système optique, il calcule une fonction de perte des données de champ de prédiction et des données de champ cible, il génère un nouvel hologramme de prédiction pour les données de champ de prédiction à l'aide d'une descente de gradient stochastique, et il génère continuellement des hologrammes de prédiction et des données de champ de prédiction jusqu'à ce qu'une valeur de la fonction de perte soit inférieure à un seuil prédéfini.



210 ... Reproduction surface
AA ... Propagation
BB ... Back-propagation

CLAIM 1. Generating a predicted hologram by propagating target field data composed of a plurality of planes in a depth direction back to a complex plane of a spatial light modulator; Converting the predictive hologram to a binary hologram; Generating predicted field data obtained by propagating the binary hologram onto a reproduction plane using an optical system simulation model; Calculating a loss function of the predicted field data and the target field data; Generating a new predicted hologram for the predicted field data using a stochastic descent method; and And iteratively performing the step of converting to the binary hologram until the value of the loss function is below a predefined threshold value to the step of generating the new predicted hologram.

N9505

WO2023128011 **SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION**
Priority Date: **27/12/2021**

METHOD FOR CORRECTING ABERRATION OF HOLOGRAM, AND DEVICE THEREFOR

Disclosed are a method for correcting an aberration of a hologram and a device therefor. The device for correcting an aberration: generates a plurality of sub-holograms in a hologram as a matrix; performs singular value decomposition on the matrix to calculate a plurality of eigenmodes and eigenvalues and weights corresponding to the respective eigenmodes; selects a predefined number of the eigenmodes in order of the size of the eigenvalues; obtains a plurality of first results by multiplying a plurality of identical images by the respective weights corresponding to the plurality of eigenmodes; obtains a plurality of second results by means of the convolution multiplication of each of the plurality of first results and each of the plurality of eigenmodes; and generates an aberration-corrected hologram by summing the plurality of second results.

PROCÉDÉ DE CORRECTION D'ABERRATION D'HOLOGRAMME ET DISPOSITIF ASSOCIÉ

Sont divulgués un procédé de correction d'aberration d'hologramme et un dispositif associé. Le dispositif de correction d'aberration : génère une pluralité de sous-hologrammes dans un hologramme en tant que matrice ; réalise une décomposition en valeurs singulières sur la matrice pour calculer une pluralité de modes propres et de valeurs propres et de poids correspondant aux modes propres respectifs ; sélectionne un nombre prédéfini des modes propres dans l'ordre de la taille des valeurs propres ; obtient une pluralité de premiers résultats en multipliant une pluralité d'images identiques par les poids respectifs correspondant à la pluralité de modes propres ; obtient une pluralité de seconds résultats au moyen de la multiplication de convolution de chacun de la pluralité de premiers résultats et de chacun de la pluralité de modes propres ; et génère un hologramme à aberration corrigée en additionnant la pluralité de seconds résultats.

CLAIM 1. Creating a plurality of sub-holograms in a hologram in a matrix; Calculating a plurality of eigenmodes and eigenvalues and weights corresponding to each eigenmode by performing singular value decomposition on the matrix; Selecting a predefined number of eigenmodes in order of magnitude of eigenvalues; Obtaining a plurality of first results obtained by multiplying a plurality of identical images by respective weights corresponding to the selected plurality of eigenmodes; Obtaining a plurality of second results by compositionally multiplying the plurality of first results with the selected plurality of eigenmodes, respectively; and Adding said plurality of second results to generate an aberration corrected hologram.

N9506

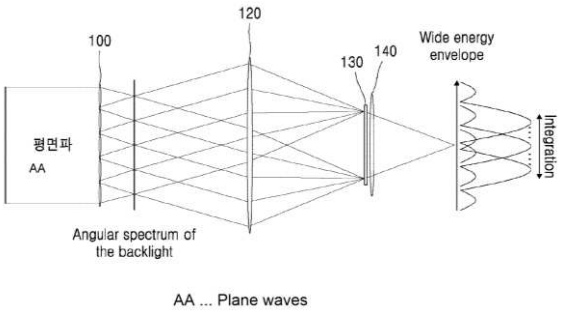
WO2023128010 **SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION**
Priority Date: **27/12/2021**

HOLOGRAPHIC DISPLAY DEVICE AND HOLOGRAM OPTIMIZATION METHOD THEREFOR

A holographic display device and a hologram optimization method for the device are disclosed. The holographic display device comprises: a focus-forming optical element that receives plane waves and forms a plurality of focal points; a collimating lens that propagates light incident through the plurality of focal points as plane waves; and a spatial light modulator that generates a holographic image by overlapping a plurality of plane waves incident from the collimating lens.

DISPOSITIF D'AFFICHAGE HOLOGRAPHIQUE ET PROCÉDÉ D'OPTIMISATION D'HOLOGRAMME ASSOCIÉ

L'invention concerne un dispositif d'affichage holographique et un procédé d'optimisation d'hologramme pour le dispositif. Le dispositif d'affichage holographique comprend : un élément optique de formation de foyer qui reçoit des ondes planes et qui forme une pluralité de points focaux; une lentille de collimation qui propage la lumière qui est incidente à travers la pluralité de points focaux en tant qu'ondes planes; et un modulateur spatial de lumière qui génère une image holographique en superposant une pluralité d'ondes planes incidentes à partir de la lentille de collimation.



CLAIM 1. A focusing optical element receiving a plane wave and forming a plurality of focal points; A collimating lens to propagate light incident through the plurality of foci into a plane wave; and And a spatial light modulator configured to generate a holographic image by superimposing a plurality of plane waves received from the collimating lens.

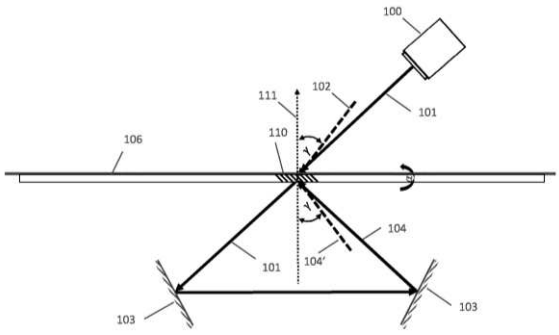
N9510

WO2023117562 **COVESTRO | COVESTRO DEUTSCHLAND**
Priority Date: **22/12/2021**

METHOD FOR PRODUCING VOLUME REFLECTION HOLOGRAMS WITH SUBSTRATE-GUIDED RECONSTRUCTION BEAMS AND/OR SUBSTRATE-GUIDED DIFFRACTED BEAMS IN A SINGLE-BEAM SET-UP

The invention relates to a method for producing volume reflection holograms with substrate- guided reconstruction beams and/or substrate-guided diffracted beams in a single-beam set- up, comprising the steps of (i) providing at least one laser beam source (100) producing a recording beam (101, 102) having a first wave vector (201, 302b, 307), (ii) providing a holographic recording medium (107, 200) on a transparent substrate (106), the substrate (106) having a first flat side facing the at least one laser beam source (100) and an second flat side facing away from the at least one laser beam source (100), wherein the holographic recording medium (107) is arranged on the first flat side or on the second flat side, (iii) providing a reflector arrangement (103, 103') arranged on the second flat side of the substrate (106), wherein the recording beam (101, 102) irradiates the holographic recording medium (107), wherein the recording beam (101, 102) passes through the holographic recording medium (107) and the substrate (106), and is reflected by the reflector arrangement (103, 103') towards the holographic recording medium (107) and the substrate (106) as a reflected beam (104) having a second wave vector (202, 303b, 306), wherein the reflected beam (104) produces an interference pattern with the recording beam in the holographic recording medium (107), the interference pattern having the form of a grating (110, 203) having a grating vector (305), the grating vector (305) being the difference vector of the wave vector (303b, 306) of the reflected beam (104) and the wave vector (302b, 307) of the recording beam (101, 102) and the grating vector (305) also being identical to the difference vector of the wave vector (303a) of a diffracted beam and the wave vector (302a) of a reconstruction beam, and wherein a first plane spanned by the recording beam and the reflected beam is different from a second plane spanned by the reconstruction beam and the diffracted beam and wherein the grating vector (305) of the grating (110, 203) is parallel to 30 the line of intersection of the first and the second plane. The invention further relates to an apparatus for producing volume reflection holograms with substrate-guided reconstruction beams and/or substrate-guided diffracted beams in a single-beam set-up..

PROCÉDÉ POUR LA PRODUCTION D'HOLOGRAMMES À RÉFLEXION VOLUMIQUE AVEC DES FAISCEAUX DE RECONSTRUCTION GUIDÉS PAR SUBSTRAT ET/OU DES FAISCEAUX DIFFRACTÉS GUIDÉS PAR SUBSTRAT DANS UNE CONFIGURATION À FAISCEAU UNIQUE



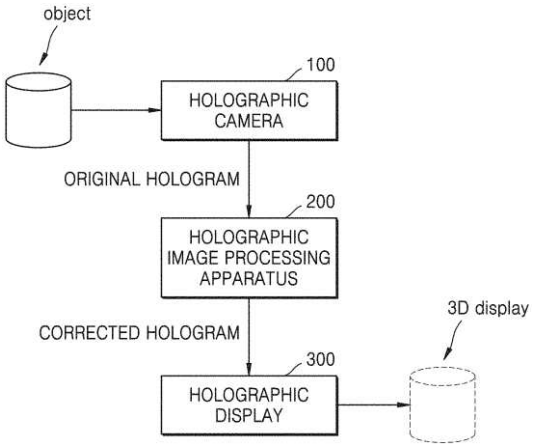
L'invention concerne un procédé pour la production d'hologrammes à réflexion volumique avec des faisceaux de reconstruction guidés par substrat et/ou des faisceaux diffractés guidés par substrat dans une configuration à faisceau unique, comprenant les étapes consistant à (i) fournir au moins une source de faisceau laser (100) produisant un faisceau d'enregistrement (101, 102) ayant un premier vecteur d'onde (201, 302b, 307), (ii) fournir un support d'enregistrement holographique (107, 200) sur un substrat transparent (106), le substrat (106) ayant un premier côté plat faisant face à l'au moins une source de faisceau laser (100) et un second côté plat tournant le dos à l'au moins une source de faisceau laser (100), le support d'enregistrement holographique (107) étant agencé sur le premier côté plat ou sur le second côté plat, (iii) fournir un agencement de réflecteur (103, 103') agencé sur le second côté plat du substrat (106), le faisceau d'enregistrement (101, 102) irradiant le support d'enregistrement holographique (107), le faisceau d'enregistrement (101, 102) traversant le support d'enregistrement holographique (107) et le substrat (106), et étant réfléchi par l'agencement de réflecteur (103, 103') vers le support d'enregistrement holographique (107) et le substrat (106) comme un faisceau réfléchi (104) ayant un second vecteur d'onde (202, 303b, 306), le faisceau réfléchi (104) produisant un motif d'interférence avec le faisceau d'enregistrement dans le support d'enregistrement holographique (107), le motif d'interférence ayant la forme d'un réseau de diffraction (110, 203) ayant un vecteur de réseau de diffraction (305), le vecteur de réseau de diffraction (305) étant le vecteur différence du vecteur d'onde (303b, 306) du faisceau réfléchi (104) et du vecteur d'onde (302b, 307) du faisceau d'enregistrement (101, 102) et le vecteur de réseau de diffraction (305) étant également identique au vecteur différence du vecteur d'onde (303a) d'un faisceau diffracté et du vecteur d'onde (302a) d'un faisceau de reconstruction, et un premier plan couvert par le faisceau d'enregistrement et le faisceau réfléchi étant différent d'un second plan couvert par le faisceau de reconstruction et le faisceau diffracté et le vecteur de réseau de diffraction (305) du réseau de diffraction (110, 203) étant parallèle à la ligne d'intersection du premier et du second plan. L'invention concerne en outre un appareil pour la production d'hologrammes à réflexion volumique avec des faisceaux de reconstruction guidés par substrat et/ou des faisceaux diffractés guidés par substrat dans une configuration à faisceau unique

N9514

US20230236545 **KYUNG HEE UNIVERSITY | SAMSUNG ELECTRONICS**
Priority Date: **21/01/2022**

HOLOGRAPHIC IMAGE PROCESSING METHOD AND HOLOGRAPHIC IMAGE PROCESSING APPARATUS

Provided is a holographic image processing apparatus including a memory configured to store at least one instruction, and a processor configured to execute the at least one instruction stored in the memory to generate a corrected holographic image by correcting an original holographic image captured by a holographic camera based on a neural network configured to learn hologram correction in advance.



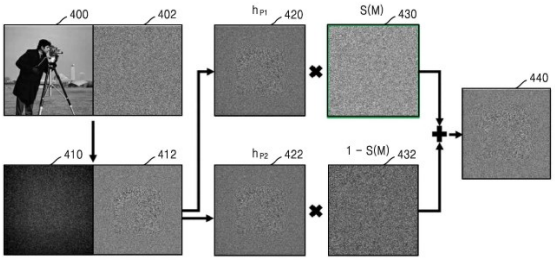
CLAIM 1. A holographic image processing apparatus comprising: a memory configured to store at least one instruction; and a processor configured to execute the at least one instruction stored in the memory to generate a corrected holographic image by correcting an original holographic image captured by a holographic camera based on a neural network configured to learn hologram correction in advance.

N9530

KR20230101593 **SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION**
Priority Date: **29/12/2021**

METHOD AND APPARATUS FOR OPTIMIZING HOLOGRAPHIC DISPLAY

A method and apparatus for optimizing a holographic display are provided. The holographic display optimization apparatus calculates a target holographic image by combining a random phase with an intensity of a target image, obtains a predicted complex light wave profile on a spatial light modulator plane by reverse propagating the target holographic image, generates first and second phase profiles having different phases from each other from the predicted complex light wave profile, Generating a hologram by multiplying the first phase profile and the second phase profile by the respective weights and summing the multiplied values, generating a predictive holographic image by propagating the hologram, calculating an error between the predictive holographic image and the target holographic image, and generating a predictive complex light profile and a predictive holographic image by using a tilt lowering method until the error becomes less than a predefined threshold value.



CLAIM 1. Calculating a target holographic image by combining a random phase with an intensity of the target image; obtaining a predicted complex light wave profile on a spatial light modulator plane by reverse propagating the target holographic image; Generating a first phase profile and a second phase profile having different phases from each other from the predicted complex light wave profile; generating a hologram by multiplying the first phase profile and the second phase profile by respective weights and summing the multiplied values; Calculating an error between the predicted holographic image and the target holographic image; generating a new predicted complex light wave profile by reverse propagating the predicted holographic image; And repeatedly performing the phase profile from the step of generating the phase profile to the step of generating the new predicted complex light wave profile by using a tilting method until the error becomes less than a predefined threshold.

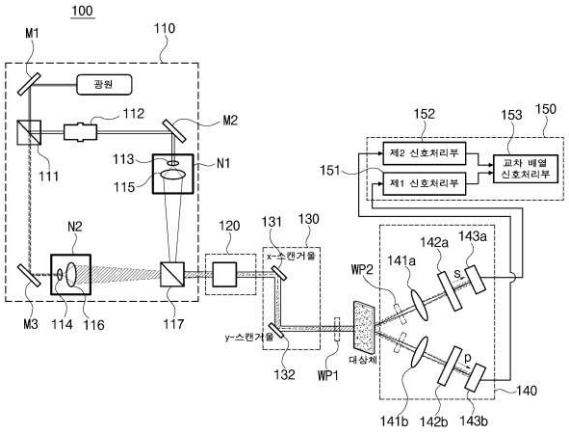
N9536

KR102551612
Priority Date: **28/09/2022**

CUBIXEL | INDUSTRY ACADEMIA COOPERATION OF SEJONG UNIVERSITY

POLARIZATION DIVISIONAL DOUBLE SCANNING HOLOGRAPHY SYSTEM FOR TRANSMISSIVE OBJECT

The present invention relates to a polarization splitting double scanning holographic system for a transmissive body. A polarization splitting double scanning holographic system for a transmission body according to the present invention includes modulating a phase of a first beam split by a light source to convert the phase of a first beam split by a light source into a first curvature beam through a first beam curvature generator and convert the second beam into a second curvature beam through a second beam curvature generator, A scan beam generation unit that interferes with the first and second curvature beams to form a scan beam, a scan beam division unit that divides the scan beam into a s-polarized beam and a p-polarized beam and emits two polarized beams that are divided to each other side by side, A scan unit configured to receive a scan beam composed of the two polarized beams emitted side by side from the scan beam splitting unit to project the scan beam onto a transmission body, the scan unit configured to control a scanning position of the scan beam with respect to the transmission body in horizontal and vertical directions and transmit the same to the transmission body, A light detection unit configured to separately detect the s-polarized beam and the p-polarized beam from the beam transmitted through the transmission unit, and a signal processing unit configured to process the separately detected s-polarized beam and p-polarized beam signals to generate a hologram for the transmission unit. According to the present invention, it is possible to obtain a hologram for a transmission body, which is a transmission type object, at a very high speed, faster than a scanning speed of a scan mirror.



CLAIM 1. A scanning beam generation unit that modulates a phase of a first beam divided by a light source, converts a first beam into a first curvature beam through the first beam curvature generation unit, converts a second beam into a second curvature beam through the second beam curvature generation unit, and interferes the first and second curvature beams to form a scanning beam; a scanning beam division unit that divides the scanning beam into an s-polarized beam and a p-polarized beam, and emits two divided polarized beams side by side with each other; A scan unit configured to receive a scan beam composed of the two polarized beams emitted side by side from the scan beam splitter and project the received scan beam onto a transmission body, the scan unit configured to control a scanning position of the scan beam with respect to the transmission body in horizontal and vertical directions to transmit the controlled scan beam to the transmission body; A light detector including a first photodetector separating and detecting the s-polarized beam from the beam transmitted through the transmitter and a second photodetector separating and detecting the p-polarized beam; And a signal processing unit configured to process the separated and detected signals of the s-polarized beam and the p-polarized beam to generate a hologram for the transmissive body, wherein the signal processing unit includes: a first signal processing unit configured to process the signal of the s-polarized beam detected by the first photodetector; a second signal processing unit configured to process the signal of the p-polarized beam detected by the second photodetector; And a cross-arrangement signal processing unit configured to generate a hologram for the transmission body by synthesizing the hologram signal processed by the first signal processing unit and the hologram signal processed by the second signal processing unit in a cross-arrangement manner one row by row.

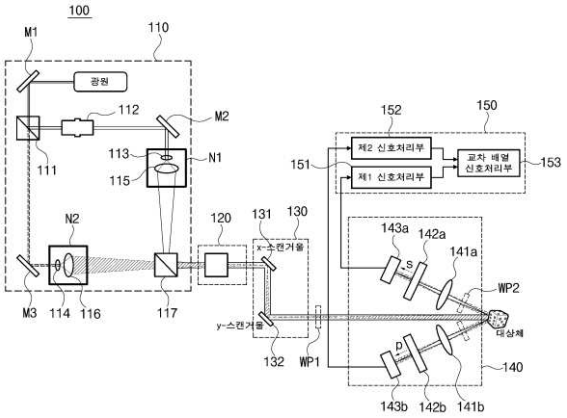
N9537

KR102551611
Priority Date: **28/09/2022**

CUBIXEL | INDUSTRY ACADEMIA COOPERATION OF SEJONG UNIVERSITY

POLARIZATION SPLITTING DOUBLE SCANNING HOLOGRAPHIC SYSTEM FOR REFLECTORS
POLARIZATION DIVISIONAL DOUBLE SCANNING HOLOGRAPHY SYSTEM FOR REFLECTIVE OBJECT

The invention relates to a polarization splitting double scanning holographic system for a reflector. A polarization splitting double scanning holographic system includes modulating a phase of a first beam split by a light source, converting the phase into a first curvature beam through a first beam curvature generator, converting the phase of a second beam into a second curvature beam through a second beam curvature generator, A scan beam generation unit that interferes with the first and second curvature beams to form a scan beam, a scan beam division unit that divides the scan beam into a s-polarized beam and a p-polarized beam and emits two polarized beams that are divided to each other side by side, A scan unit configured to receive a scan beam composed of the two polarized beams emitted side by side from the scan beam splitter and project the received scan beam onto an object, the scan unit configured to control a scanning position of the scan beam with respect to the object in horizontal and vertical directions and transmit the controlled scan beam to the object, an optical detector for separately detecting the s-polarized beam and the p-polarized beam from the beam reflected or fluorescent from the object, and a signal processor for processing the separately detected s-polarized beam and p-polarized beam signals to generate a hologram for the object. According to the present invention, it is possible to obtain a hologram of an object at a very high speed faster than a scanning speed of a scan mirror.



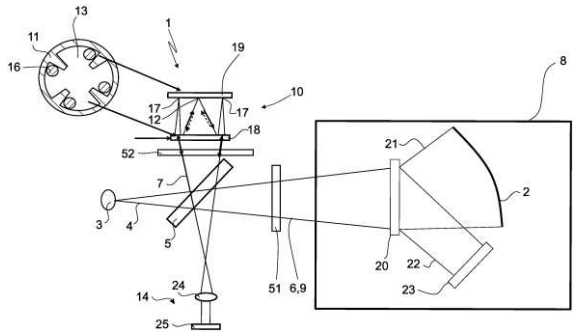
CLAIM 1. A scanning beam generation unit that modulates a phase of a first beam divided by a light source, converts a first beam into a first curvature beam through the first beam curvature generation unit, converts a second beam into a second curvature beam through the second beam curvature generation unit, and interferes the first and second curvature beams to form a scanning beam; a scanning beam division unit that divides the scanning beam into an s-polarized beam and a p-polarized beam, and emits two divided polarized beams side by side with each other; A scan unit configured to receive a scan beam including the two polarized beams emitted side by side from the scan beam splitter and project the received scan beam onto an object, the scan unit configured to control a scanning position of the scan beam with respect to the object in horizontal and vertical directions and transmit the controlled scan beam to the object; An optical detector including a first photodetector separating and detecting the s-polarized beam from the beam reflected or fluorescent from the object and a second photodetector separating and detecting the p-polarized beam; And a signal processing unit configured to process the separated and detected signals of the s-polarized beam and the p-polarized beam to generate a hologram of the object, wherein the signal processing unit includes: a first signal processing unit configured to process the signal of the s-polarized beam detected by the first photodetector; a second signal processing unit configured to process the signal of the p-polarized beam detected by the second photodetector; And a cross-arrangement signal processing unit configured to generate a hologram with respect to the object by combining the hologram signal processed by the first signal processing unit and the hologram signal processed by the second signal processing unit in a cross-arrangement manner one row by row.

N9545

DE102022213113 **CARL ZEISS SMT**
Priority Date: **18/01/2022**

METHOD FOR MONITORING AN ADJUSTMENT SETTING, INTERFEROMETRIC MEASURING DEVICE, HOLOGRAM DEVICE AND LITHOGRAPHY SYSTEM

The invention relates to a method for monitoring an adjustment setting of an interferometric measuring device (1) for measuring an optical surface (2), comprising - a radiation source (3) for forming a measuring radiation (4), - a beam splitter (5), with which in a calibration operation of the measuring device (1) the measuring radiation (4) emitted by the radiation source (3) is split into an input radiation (6) and a comparison radiation (7), - a test device (8), at which at least a part of the input radiation (6) is reflected as output radiation (9), and - a reflection device (10), by means of which the comparison radiation (7) is reflected back into itself, wherein the reflection device (10) has a point mirror region (11) which is configured to reflect the comparison radiation (7) back into itself in such a way that, characterized in that the wavefront of the comparison radiation (7) is point-reflected at a mirror point (12) and wherein the reflection device (10) has a surface mirror region (13) which is configured to reflect the comparison radiation (7) back into itself in such a way that the wavefront of the comparison radiation (7) is two-dimensionally reflected. According to the invention, provision is made for the input radiation (6) and/or the output radiation (9) to be masked in a first step.



CLAIM 1. Method for monitoring an adjustment setting of an interferometric measuring device (1) for measuring an optical surface (2), having - a radiation source (3) for forming a measuring radiation (4), - a beam splitter (5), with which in a calibration operation of the measuring device (1) the measuring radiation (4) emitted by the radiation source (3) is split into an input radiation (6) and a comparison radiation (7), - a test device (8), at which at least a part of the input radiation (6) is reflected as output radiation (9), and - a reflection device (10), by means of which the comparison radiation (7) is reflected back into itself, wherein the reflection device (10) has a point mirror region (11) which is configured to reflect the comparison radiation (7) back into itself in such a way that, characterized in that the wavefront of the comparison radiation (7) is point-reflected at a mirror point (12) and wherein the reflection device (10) has a surface mirror region (13) which is configured to reflect the comparison radiation (7) back into itself in such a way that the wavefront of the comparison radiation (7) is two-dimensionally reflected, characterized in that In such a way that - in a first step the input radiation (6) and/or the output radiation (9) is screened off, and - in a second step the comparison radiation (7) is reflected back into itself in one or more support regions (16) of the reflection device (10) in such a way that, characterized in that the wavefront of the comparison radiation (7) is point-mirrored at at least one supporting mirror point (17) spaced apart from the mirror point (12), and - in a third step, the input radiation (6) and the output radiation (9) are faded in, and the output radiation (9) emanating from the test device (8) is measured interferometrically against the comparison radiation (7) reflected by the reflection device (10), and - in a fourth step, the comparison radiation (7) is faded out.

N9558

CN116449670 **ANHUI UNIVERSITY**
Priority Date: **23/04/2023**

NON-ITERATIVE FRESNEL PURE PHASE HOLOGRAM GENERATION AND MULTIPLEXING METHOD, DEVICE AND MEDIUM

The invention relates to a non-iterative Fresnel pure-phase hologram generating and multiplexing method, equipment and a medium. The invention can directly realize the rapid generation of the phase-only hologram for three-dimensional holographic display. The method breaks through the limitation of the size and the position of the target amplitude fixed support of the original OFRAP method in the space domain, and can realize the rapid generation of the large-size 3DCGH in a non-iterative mode. Numerical experiments and optical experiments prove the superiority of the 3D-FS-OFRAP method.

CLAIM 1. A non-iterative Fresnel phase-only hologram generation and multiplexing method is characterized by comprising the following steps, firstly, generating FS-OFRAPs with different planes by using an iterative Fresnel method, then generating holograms corresponding to different layers in a non-iterative way by combining a 3D object layering strategy, obtaining a final phase hologram by superposition or multiplexing, and finally reconstructing the multiplexed holograms to obtain a three-dimensional target object.

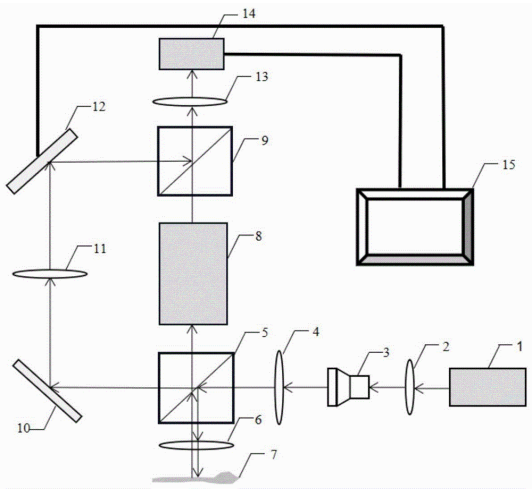
N9562

CN116429017 **NORTHEASTERN UNIVERSITY OF CHINA**
Priority Date: **10/05/2023**

PHASE SHIFT DIGITAL HOLOGRAPHIC THREE-DIMENSIONAL MEASUREMENT METHOD AND DEVICE FOR VIBRATION OF MEASURED BODY

The invention relates to a precise surface three-dimensional morphology measuring device and method based on phase shift digital holography, wherein the device comprises: a beam splitting module for generating an object beam irradiated to the surface of the object to be measured and returned and generating a reference beam; the reference beam adjusting module is used for receiving the generated reference light of the beam splitting module and generating different reference light beams of the object light beams with different brightness and range enhancement based on different voltage forces; a lens imaging system for receiving the object beam generated by the beam splitting module and amplifying the beam; a second polarization beam splitting prism for receiving different reference beams of the reference beam adjusting module and object beams amplified by the lens imaging system and respectively carrying out beam combination; linear polarizers that interfere with the combined light beams, respectively; an image acquisition module for acquiring a series of interference images; and a computer for receiving a series of interference images transmitted by the image acquisition module and adopting a phase shift algorithm to extract phase information of light to realize measurement of the three-dimensional appearance of the surface of the measured body.

CLAIM 1. A precise surface three-dimensional morphology measuring device based on phase shift digital holography is characterized in that: comprising the following steps: a beam splitting module for generating an object beam and a reference beam which are irradiated to the surface of the measured object and returned; a reference beam adjustment module for receiving the reference beam generated by the beam splitting module and generating different reference beams with different increased optical paths based on different applied voltage forces; a lens imaging system for receiving the object beam of the beam splitting module; a second polarization beam splitter prism for receiving the reference beam passing through the reference beam adjusting module and the object beam passing through the lens imaging system and combining the reference beam and the object beam; an image acquisition module for acquiring a series of interference images formed by the combined light passing through the linear polaroid; and a computer for receiving a series of interference images transmitted by the image acquisition module and adopting a phase shift algorithm to extract phase information of light to realize measurement of the three-dimensional appearance of the surface of the measured body.

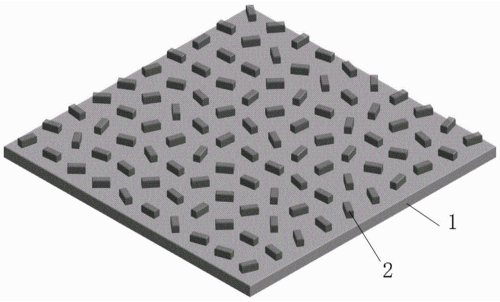


N9582

CN116300365 **SHENZHEN TECHNOLOGY UNIVERSITY**
Priority Date: **22/11/2022**

BROADBAND HOLOGRAPHIC GENERATION DEVICE WITH ARBITRARY WAVELENGTH CODES AND DESIGN METHOD

The invention discloses a broadband holographic generating device with arbitrary wavelength codes and a design method, which relate to the field of super-surface holographic imaging, wherein the design method comprises the steps of iteratively generating phase distribution of an arbitrary wavelength code pure-phase Fresnel hologram through a Fienup algorithm, and generating the pure-phase Fresnel hologram based on the phase distribution of the arbitrary wavelength code pure-phase Fresnel hologram; loading the phase of the pure-phase Fresnel hologram onto a P-B phase ultrasonic surface to obtain a broadband holographic generating device for realizing any wavelength encoding hologram; the device manufactured by the method has the advantages of flexible wavelength coding, high resolution, high capacity, large visual angle, low loss and the like.



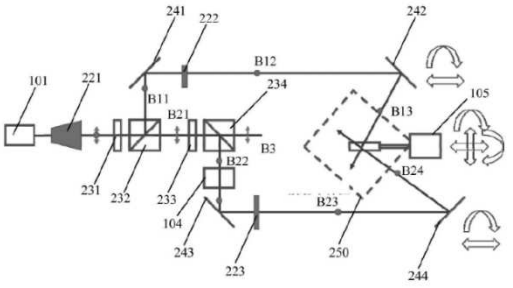
CLAIM 1. A method for designing a broadband hologram generating apparatus having an arbitrary wavelength code, comprising: generating phase distribution of the encoding pure-phase Fresnel hologram with any wavelength through iteration of a Fienup algorithm, and generating the pure-phase Fresnel hologram based on the phase distribution of the encoding pure-phase Fresnel hologram with any wavelength; and loading the phase of the pure-phase Fresnel hologram onto the P-B phase ultrasonic surface to obtain the broadband holographic generating device for realizing the encoding holographic of any wavelength.

N9587

CN116299811 **HANGZHOU ZHONGKE AURORA TECHNOLOGY**
Priority Date: **30/12/2022**

HOLOGRAPHIC GRATING PREPARATION SYSTEM AND PREPARATION METHOD

The present disclosure relates to the technical field of holographic optical waveguides, and provides a holographic grating preparation system and a preparation method. The holographic grating preparation system comprises: a laser light source for generating a laser beam; the polarization beam splitting assembly is used for splitting the laser beam into two beams and adjusting the light intensity of the split laser beam and the polarization direction of the beam so that the polarization direction of the split two laser beams is perpendicular to the horizontal plane and parallel to the rotating shaft of the reflecting mirror; the reflecting mirror group is used for carrying out specular reflection on the split laser beams output by the polarization beam splitting assembly to form two intersecting laser beams with a set included angle, and the set included angle is adjusted according to the rotation angle of the reflecting mirror group; and the recording medium is used for receiving the two intersecting laser beams which interfere with each other, and recording interference fringes of the two intersecting laser beams through the change of refractive index and/or transmittance along with the change of the two intersecting laser beams so as to form the holographic grating.



CLAIM 1. A holographic grating fabrication system, the holographic grating fabrication system comprising: a laser light source for generating a laser beam; the polarization beam splitting assembly is used for splitting the laser beam into two beams and adjusting the light intensity of the split laser beam, and adjusting the polarization direction of the beam so that the polarization direction of the split two laser beams is perpendicular to the horizontal plane and parallel to the rotating shaft of the reflecting mirror; the reflecting mirror group comprises the reflecting mirror and is used for carrying out specular reflection on the split laser beams output by the polarization beam splitting assembly to form two intersecting laser beams with a set included angle, and the set included angle is adjusted according to the rotation angle of the reflecting mirror group; and the recording medium is used for receiving the two intersected laser beams which interfere with each other, and recording interference fringes of the two intersected laser beams through refractive index and/or transmittance changes which change along with the two intersected laser beams, so as to form a holographic grating.

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

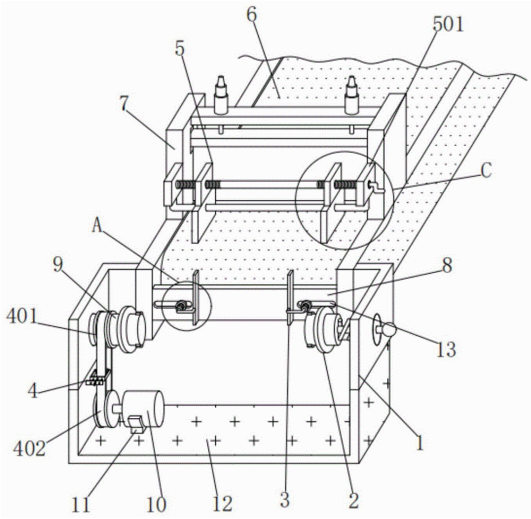
N9570

CN116371689 **ZHEJIANG CHUNYU PACKAGING MATERIAL**

Priority Date: **21/04/2023**

AUTOMATIC COATING SYSTEM OF AUTOMATIC COATING UNIT FOR MANUFACTURING HOLOGRAPHIC THERMOPRINT FILM

The invention relates to the technical field of automatic coating systems of automatic coating units for manufacturing of holographic thermoprinting films, in particular to an automatic coating system of an automatic coating unit for manufacturing of holographic thermoprinting films, which comprises a bent plate and an automatic coating machine, wherein the inner wall of the bent plate positioned on the right side is connected with a control structure, the front end of the automatic coating machine is fixedly connected with a transverse plate, the left side and the right side of the front surface of the transverse plate are respectively provided with a sliding groove, the use difficulty of the automatic coating system of the automatic coating unit for manufacturing of holographic thermoprinting films is reduced, the working efficiency is improved, a circular ring is abutted against the front surface of the transverse plate, the deviation of holographic thermoprinting films can be prevented, the use limitation of the automatic coating system of the automatic coating unit for manufacturing of holographic thermoprinting films is eliminated, the second inserted rod drives a roller arranged to rotate, the automatic coating system of the automatic coating unit for manufacturing of holographic thermoprinting films is ensured to be normally used, the holographic thermoprinting films are prevented from raising, and the functionality of the automatic coating system of the automatic coating unit for manufacturing of holographic thermoprinting films is improved.



CLAIM 1. The utility model provides a holographic thermoprint membrane makes with automatic coating unit automatic coating system, includes bent plate (1) and automatic coating machine (6), its characterized in that: the automatic coating machine is characterized in that the right side is positioned on the right side, a control structure (2) is connected with the inner wall of the bent plate (1), a transverse plate (8) is fixedly connected with the front end of the automatic coating machine (6), sliding grooves (13) are respectively formed in the left side and the right side of the front surface of the transverse plate (8), a limiting structure (3) is connected with the inner wall of the sliding grooves (13), a second inserting rod (9) is rotatably connected with the inner wall of the bent plate (1) and positioned on the left side, an adjusting structure (4) is connected with the outer wall of the second inserting rod (9), an automatic coating machine (7) is fixedly connected with the top of the automatic coating machine (6), a pressing structure (5) is connected with the front surface of the automatic coating machine (7), and a bottom frame (12) is fixedly connected with the bottom frame (1).

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

N9512

WO2023117211 **AMS INTERNATIONAL**

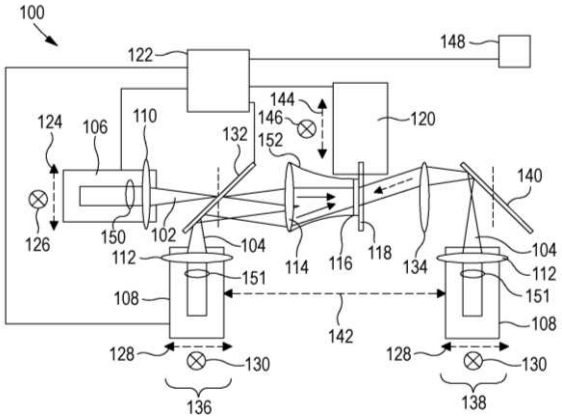
Priority Date: **22/12/2021**

HOLOGRAM RECORDING SYSTEM AND METHOD

A hologram recording system comprising an optical system configured to provide first and second beams of electromagnetic radiation. The optical system comprises a first lens configured to interact with the first beam. The hologram recording system comprises a photosensitive recording medium configured to receive the first and second beams and record an interference pattern formed by the first and second beams. The hologram recording system comprises an actuation system configured to move a component of the optical system to adjust a position of the first beam relative to the first lens and thereby control an angle of incidence of the first beam at the photosensitive recording medium.

SYSTÈME ET PROCÉDÉ D'ENREGISTREMENT D'HOLOGRAMME

L'invention concerne un système d'enregistrement d'hologramme comprenant un système optique conçu pour fournir un premier et un second faisceau de rayonnement électromagnétique. Le système optique comprend une première lentille conçue pour interagir avec le premier faisceau. Le système d'enregistrement d'hologramme comprend un support d'enregistrement photosensible conçu pour recevoir les premier et second faisceaux et enregistrer un motif d'interférence formé par ceux-ci. Le système d'enregistrement d'hologramme comprend un système d'actionnement conçu pour déplacer un composant du système optique afin de régler la position du premier faisceau par rapport à la première lentille, et régler ainsi l'angle d'incidence du premier faisceau sur le support d'enregistrement photosensible.



CLAIM 1. A hologram recording system comprising: an optical system configured to provide first and second beams of electromagnetic radiation, the optical system comprising a first lens configured to interact with the first beam; a photosensitive recording medium configured to receive the first and second beams and record an interference pattern formed by the first and second beams; and, an actuation system configured to move a component of the optical system to adjust a position of the first beam relative to the first lens and thereby control an angle of incidence of the first beam at the photosensitive recording medium.

N9515

US20230236494 **UNIVERSITY OF CENTRAL FLORIDA RESEARCH FOUNDATION**
Priority Date: **25/01/2022**

REFLECTIVE HOLOGRAPHIC PHASE MASKS

A phase transformation device may include a solid photosensitive material having a planar input facet and one or more reflective holographic phase masks (RHPMs) within a volume of the solid photosensitive material, where a particular one of the one or more RHPMs is formed as a periodic refractive index variation of the photosensitive material along a particular grating vector and further with a particular non-planar lateral phase profile, where at least one of a period of the refractive index variation along the grating vector or an orientation of the grating vector for each of the one or more RHPMs are arranged to reflect via Bragg diffraction light incident on the input facet that satisfies a Bragg condition, and where a phase distribution of the reflected light from a particular one of the one or more RHPMs is modified by the associated non-planar lateral phase profile.

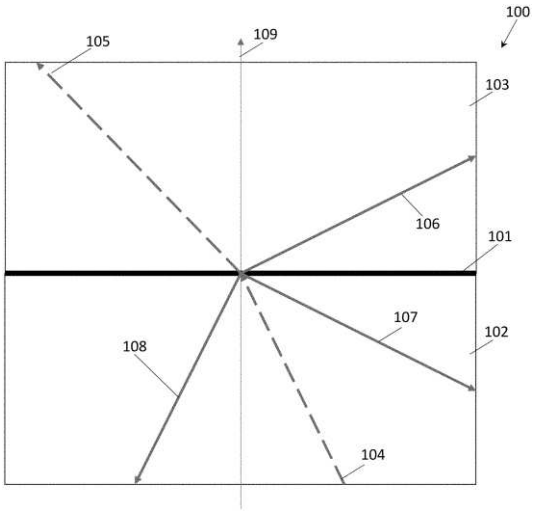
CLAIM 1. A device comprising: a solid photosensitive material having a planar input facet; and one or more reflective holographic phase masks (RHPMs) within a volume of the solid photosensitive material, wherein a particular one of the one or more RHPMs is formed as a periodic refractive index variation of the solid photosensitive material along a particular grating vector and further with a particular non-planar lateral phase profile in at least one plane perpendicular to the particular grating vector, wherein at least one of a period of the refractive index variation along the grating vector or an orientation of the grating vector for each of the one or more RHPMs are arranged to reflect via Bragg diffraction light incident on the input facet that satisfies a Bragg condition, wherein a phase distribution of the reflected light is modified by the non-planar lateral phase profiles of the one or more RHPMs.

N9521

US20230204841 **DIGILENS**
Priority Date: **29/12/2021**

METHOD AND SYSTEM UTILIZING INVERTED MASTER FOR HOLOGRAPHIC RECORDING

Disclosed herein is methods and apparatus for recording a holographic waveguide utilizing an inverted holographic master technique. In some embodiments, an apparatus for recording a holographic waveguide is provided. The apparatus may include a source of light configured to provide a recording beam; a master substrate with a non-grating modulated surface and a grating modulated surface, wherein the grating modulated surface is opposite to the non-grating modulated surface and is configured to diffract the recording beam; a bottom substrate with opposing light transmitting surfaces coated with anti-reflection coatings overlaying the grating modulated surface of the substrate and separated from the master substrate by a gap; and an exposure cell containing holographic recording material directly facing the non-grating modulated surface of the master substrate. Advantageously, the inverted holographic master technique mitigates the effects of unwanted reflected exposure light.



CLAIM 1. An apparatus for recording a holographic waveguide, comprising: a source of light configured to provide a recording beam; a master substrate with a non-grating modulated surface and a grating modulated surface, wherein the grating modulated surface is opposite to the non-grating modulated surface and is configured to diffract the recording beam; a bottom substrate with opposing light transmitting surfaces coated with anti-reflection coatings overlaying the grating modulated surface of the master substrate and separated from the master substrate by a gap; and an exposure cell containing holographic recording material directly facing the non-grating modulated surface of the master substrate.

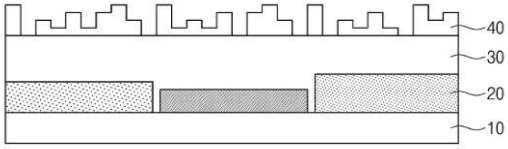
N9526

KR20230103834
Priority Date: **31/12/2021**

KOREA ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE

HIGH RESOLUTION COLOR HOLOGRAM DEVICE

A high resolution color hologram device is disclosed. The color filter device includes a substrate, a color filter layer on the substrate, diffraction patterns disposed above or below the color filter layer, and a flat layer disposed between the diffraction patterns and the color filter layer to maintain a separation distance between the substrate and the diffraction patterns or a separation distance between the substrate and the color filter layer to be constant.



CLAIM 1. A hologram device comprising: a substrate; a color filter layer on the substrate; diffraction patterns disposed above or below the color filter layer; and a flat layer disposed between the diffraction patterns and the color filter layer to maintain a separation distance between the substrate and the diffraction patterns or a separation distance between the substrate and the color filter layer constant.

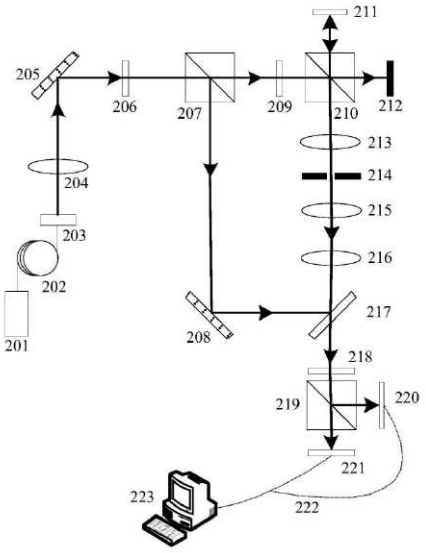
N9553

CN116486841
Priority Date: **28/04/2023**

TSINGHUA UNIVERSITY

HOLOGRAPHIC DATA STORAGE SYSTEM

The present disclosure relates to a holographic data storage system comprising: an illumination subsystem for determining a collimated plane wave having a preset polarization state; the object light arm is used for modulating the straight plane wave according to the phase-only hologram to obtain an object light wave and controlling the object light wave to be incident to the holographic polymer, wherein the phase-only hologram is obtained by encoding complex amplitude information to be stored; the reference light arm is used for determining a reference light wave according to the collimation plane wave and controlling the reference light wave to be incident to the holographic polymer; the holographic polymer is used for recording interference fringes generated by interference of the reference light wave and the object light wave so as to store complex amplitude information; and a deep learning network based reading subsystem. By the embodiment of the disclosure, the storage of complex amplitude information can be realized without constructing a complex amplitude coding optical path, so that the high-speed, large-capacity and high-density optical storage is realized; and combining with a deep learning network, rapidly decoding and reading the complex amplitude information.



CLAIM 1. A holographic data storage system, comprising: an illumination subsystem, an object light arm, a reference light arm, and a holographic polymer; The illumination subsystem is used for determining a collimation plane wave with a preset polarization state; the object light arm is used for modulating the collimation plane wave according to a pure phase type hologram to obtain an object light wave and controlling the object light wave to be incident to the holographic polymer, wherein the pure phase type hologram is obtained by encoding complex amplitude information to be stored; the reference light arm is used for determining a reference light wave according to the collimation plane wave and controlling the reference light wave to be incident to the holographic polymer; the holographic polymer is used for recording interference fringes generated by interference of the reference light wave and the object light wave so as to store the complex amplitude information.

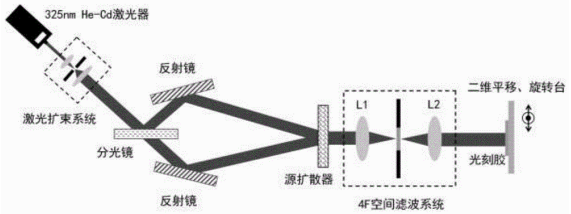
N9561

CN116430491
Priority Date: **28/02/2023**

CHONGQING INSTITUTE OF GREEN & INTELLIGENT TECHNOLOGY CHINESE ACADEMY OF SCIENCES | CHONGQING UNIVERSITY

PREPARATION DEVICE AND PREPARATION METHOD OF UNIFORM HOLOGRAPHIC DIFFUSION SHEET

The invention belongs to the field of diffusion sheets of HUD display systems, and particularly relates to a preparation device and a preparation method of a uniform holographic diffusion sheet; the preparation device comprises a 325nm He-Cd laser, a double-beam superposition exposure light path, a 4F space filtering system and a photoetching receiving device; the double-beam superposition exposure light path comprises a laser beam expanding system, a spectroscope, a reflecting mirror and a source diffuser; the ultraviolet laser is expanded by a laser beam expanding system, two beams with equal energy are obtained by the ultraviolet laser after the expansion through a spectroscope, and the two beams with equal energy are irradiated on the same position on the same surface of the source diffuser through a reflecting mirror; receiving scattered light emitted by a source diffuser by using a 4F spatial filtering system, performing spectrum filtering, and irradiating the scattered light after spectrum filtering to a photoetching receiving device; the invention can manufacture the holographic diffusion sheet with uniformly distributed scattered light field, and improve the display quality and the energy utilization rate of the HUD system.



CLAIM 1. The preparation device of the uniform holographic diffusion sheet is characterized by comprising a 325nm He-Cd laser, a double-beam superposition exposure light path, a 4F space filtering system and a photoetching receiving device, wherein: the 325nm He-Cd laser is used for emitting ultraviolet laser with an exposure light source of 325nm to a double-beam superposition exposure light path; the double-beam superposition exposure light path comprises a laser beam expanding system, a spectroscope, a reflecting mirror and a source diffuser; the double-beam superposition exposure light path is used for expanding the ultraviolet laser through the laser beam expanding system, the expanded ultraviolet laser is divided by a spectroscope to obtain two beams with equal energy, and the two beams with equal energy are irradiated to the same position on the same surface of the source diffuser through the reflecting mirror; the 4F spatial filtering system is used for receiving scattered light emitted by the source diffuser, performing spectrum filtering, and irradiating the scattered light after spectrum filtering to the photoetching receiving device; and the photoetching receiving device is used for recording the spectrum information of the scattered light after spectrum filtering.

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

N9500

WO2023141348 **META MEDIA**

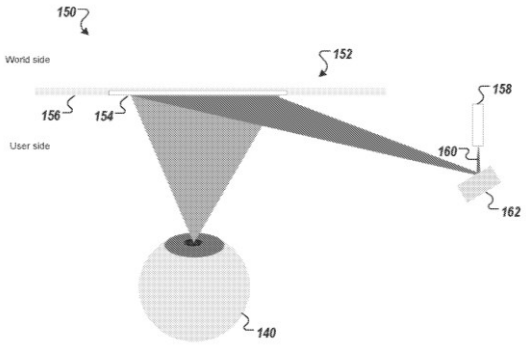
Priority Date: **24/01/2022**

SYSTEM AND PRODUCTION METHOD FOR CUSTOM FIT HOLOGRAPHIC OPTICAL ELEMENTS FOR OPTICAL COMBINERS

The disclosure is directed to a head mounted display including: eyeglass frames; an optical combiner according to the prior aspect mounted in the eyeglass frames; and a light source attached to the eyeglass frames and arranged to direct light along a path that intersects the optical combiner. A process includes calculating a best-form lens shape for the human subject with minimal distortion and supporting the combination with a holographic optical element (HOE) in an optical combiner as a component of a head mounted display (IMD).

SYSTÈME ET PROCÉDÉ DE PRODUCTION D'ÉLÉMENTS OPTIQUES HOLOGRAPHIQUES À AJUSTEMENT PERSONNALISÉ POUR COMBINATEURS OPTIQUES

L'invention concerne un visiocasque qui comprend : des montures de lunettes ; un combinateur optique, selon l'aspect antérieur de l'invention, qui est installé dans les montures de lunettes ; et une source de lumière fixée aux montures de lunettes et conçue pour diriger la lumière le long d'un trajet qui croise le combinateur optique. Un procédé consiste à calculer la meilleure forme de lentille qui présente une distorsion minimale pour le sujet humain et à soutenir cette combinaison avec un élément optique holographique (HOE) situé dans un combinateur optique en tant que composant d'un visiocasque (IMD).



CLAIM 1. A process of preparing an optical combiner, the method comprising: acquiring human subject data comprising anthropometric data and/or ophthalmic prescription (Rx) data for a human subject; calculating a lens shape for the human subject using the human subject data, the calculated lens shape: correcting refractive error of the human subject's vision according to the Rx data; and being combinable with a holographic optical element (HOE) in the optical combiner in a head mounted display (HMD) for use by the human subject; calculating a custom HOE optical function using the calculated lens shape, the custom HOE optical function defining a custom HOE for the optical combiner customized for the human subject; calculating one or more compensation factors, the compensation factors comprising parameters of the HOE that account for changes in a recorded HOE while forming optical combiner using the recorded HOE, parameters of the HOE that account for how the HOE is combined with a lens having the calculated lens shape, and parameters of the HMD that account for the position of a light source in the HMD and/or a position of the user's eye when the user wears the HMD, the compensation factors being calculated so that the recorded HOE has the custom HOE optical function after the optical combiner is formed; calculating a configuration of a recording tool based on the compensation factors and the custom HOE optical function; setting the recording tool to the calculated configuration; recording a hologram with the recording tool to provide the recorded HOE; and forming the optical combiner using the recorded HOE comprising combining the recorded HOE and the lens having the calculated lens shape, the recorded HOE having the custom HOE optical function after forming the optical combiner.

N9502

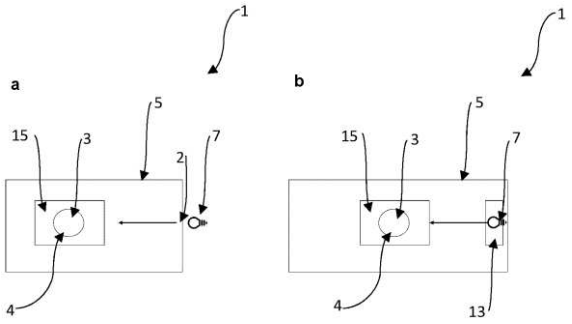
WO2023139205 **CARL ZEISS JENA**
Priority Date: **20/01/2022**

HAPTIC HOLOGRAM

In a first aspect, the invention relates to a system for generating a haptic perception and a holographic image. The system comprises a light source for emitting light and a base body comprising a substrate and at least one holographic-optical element. The light source and the base body comprising the holographic-optical element are designed to generate a holographic image in an interaction region. At the same time, the system comprises one or more sound transducers for emitting sound waves in the direction of the interaction region, so that pressure fluctuations within the interaction region can be haptically perceived. The system is characterized in that the substrate is located between the one or more sound transducers and the interaction region and has sound channels which are configured as openings through which the sound can propagate. In a further aspect, the invention relates to the use of the system according to the invention for generating a holographic image and a haptic perception.

HOLOGRAMME HAPTIQUE

L'invention concerne un système permettant de générer une perception haptique et un dispositif d'affichage holographique. Le système comprend une source de lumière servant à émettre de la lumière et un corps principal comprenant un substrat et au moins un élément optique holographique. La source de lumière et le corps principal comprenant l'élément optique holographique sont conçus pour générer un affichage holographique dans une région d'interaction. Le système comprend également un ou plusieurs transducteurs sonores servant à émettre simultanément des ondes sonores en direction de la région d'interaction, de telle sorte que des fluctuations de pression à l'intérieur de la région d'interaction peuvent être perçues de manière haptique. Le système est caractérisé en ce que le substrat est situé entre le ou les transducteurs sonores et la région d'interaction et comporte des canaux sonores se présentant sous la forme d'ouvertures à travers lesquelles le son peut se propager. L'invention concerne également l'utilisation du système selon l'invention pour générer un affichage holographique et une perception haptique.



CLAIM 1. System (1) for generating a haptic perception and a holographic image (3) in an interaction region, comprising a. a light source (7) for emitting light, b. a base body comprising a substrate (5) and at least one holographic-optical element (13, 15, 17, 19, 21, 23), wherein the light source (7) and the base body are designed to generate a holographic image (3) in the interaction region as well as one or more sound transducers (9) for emitting sound waves in the direction of the interaction region so that pressure fluctuations within the interaction region (3) can be haptically perceived, characterized in that In that the substrate (5) is located between the one or more sound transducers (9) and the interaction region and the substrate (5) has one or more sound channels (11), wherein the sound waves propagate at least partially through the one or more sound channels (9) in the direction of the holographic image (3).

N9509

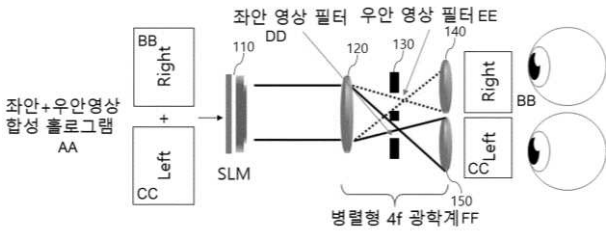
WO2023120744 **KOREA ELECTRONICS TECHNOLOGY INSTITUTE**
Priority Date: **20/12/2021**

BINOCULAR FULL-COLOR HOLOGRAPHIC NEAR-EYE DISPLAY DEVICE USING SINGLE SPATIAL LIGHT MODULATOR

Provided is a binocular full-color holographic near-eye display device using a single spatial light modulator. A holographic near-eye display device according to an embodiment of the present invention includes: a spatial light modulator for reproducing a hologram in which a left-eye image and a right-eye image are synthesized; and a filter for separating the left-eye image and the-right eye image synthesized in the hologram reproduced by the spatial light modulator to transfer same to the left eye and the right of an observer, respectively. Therefore, a binocular holographic near-eye display device is implemented by unifying two existing spatial light modulators and a module for driving the spatial light modulators, thereby reducing the weight of a device and simplifying the device, and reducing the manufacturing cost thereof.

DISPOSITIF D'AFFICHAGE PROCHE DE L'ŒIL HOLOGRAPHIQUE MULTICOLORE BINOCULAIRE UTILISANT UN SEUL MODULATEUR SPATIAL DE LUMIÈRE

L'invention concerne un dispositif d'affichage proche de l'œil proche holographique multicolore binoculaire utilisant un seul modulateur spatial de lumière. Un dispositif d'affichage holographique proche de l'œil selon un mode de réalisation de la présente invention comprend : un modulateur spatial de lumière pour reproduire un hologramme dans lequel une image d'œil gauche et une image d'œil droit sont synthétisées ; et un filtre pour séparer l'image d'œil gauche et l'image d'œil gauche synthétisées dans l'hologramme reproduit par le modulateur spatial de lumière pour le transférer à l'œil gauche et à à l'œil droit d'un observateur, respectivement. Par conséquent, un dispositif d'affichage binoculaire proche de l'œil est mis en œuvre par unification de deux modulateurs spatiaux de lumière existants et d'un module pour piloter les modulateurs spatiaux de lumière, ce qui permet de réduire le poids d'un dispositif et de simplifier le dispositif, et de réduire son coût de fabrication.



AA ... Left-eye + right-eye image synthesis hologram
BB ... Right
CC ... Left
DD ... Left-eye image filter
EE ... Right-eye image filter
FF ... Parallel type optical system

CLAIM 1. A spatial light modulator that reproduces a hologram in which a left-eye image and a right-eye image are synthesized; and And a filter for separating a left eye image and a right eye image combined with the hologram reproduced by the spatial light modulator and transferring the separated left eye image and the right eye to the left eye and the right eye of the observer, respectively.

N9511

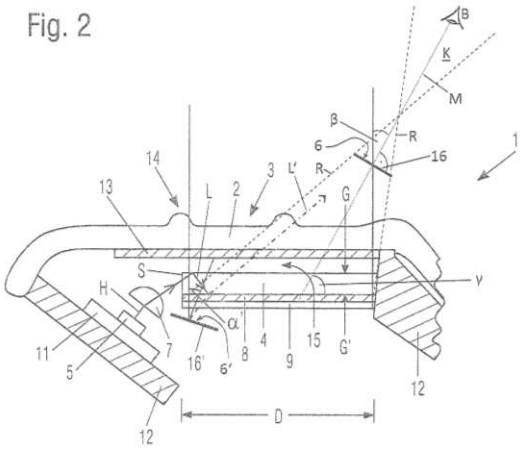
WO2023117336 **PREH**
Priority Date: **23/12/2021**

OPERATING OR VISUALISING ELEMENT WITH A LATERALLY ALIGNED HOLOGRAPHIC FUNCTIONAL DISPLAY FOR VISUALISING THE SWITCHING FUNCTION ASSOCIATED WITH THE OPERATING OR VISUALISING ELEMENT AND/OR THE RESPECTIVE SWITCH STATUS OF SAID OPERATING OR VISUALISING ELEME

The invention relates to an operating or visualising element, comprising: an input part or visualising part (2) forming a translucent or transparent input surface or visualising surface (3); a carrier (12) for securing the operating or visualising element to an external structure; a detection device (13) which is designed to detect an actuation and/or a contacting of the input surface or visualising surface (3) by the operator (B); a transparent light guide (4) which, as viewed by the operator (B), is arranged below the input surface or visualising surface (3) and secured to the carrier (12), and which has an upper boundary surface (G) facing the input surface or visualising surface (3) and a lower boundary surface (G') facing away from the input surface or visualising surface (3); at least one light source (5) which is arranged to couple an optical reproduction wave field (L) into the light guide (4) via a light entry surface (S); a holographic image carrier (8), including a hologram, which is arranged adjacent to the upper boundary surface (G) of the light guide (4) or adjacent to the lower boundary surface (G') of the light guide (4), wherein the reproduction wave field (L) coupled into the light guide (4) travels from the light entry surface (S) to the upper boundary surface (G) due to a light propagation brought about via internal reflection in the light guide (4), is out-coupled in the direction of the operator (B) and travels to the holographic image carrier (8), wherein the first reproduction wave field (L) is transformed into an image wave field (L') by the first holographic image carrier (8) and the image wave field (L') travels from the holographic image carrier (8) to the operator (B), in order to display the hologram stored in the holographic image carrier (8) to the operator (B) as a virtual image, which contains a symbol (6) in a display surface (16) for visualising the switching functionality associated with the operating or visualising element (1) and/or a current switching status of the operating or visualising element (1), wherein the display surface (16) extends non-parallel to the upper boundary surface (G) and non-parallel to the lower boundary surface (G').

ÉLÉMENT DE MANŒUVRE OU DE VISUALISATION AVEC AFFICHAGE FONCTIONNEL HOLOGRAPHIQUE ALIGNÉ LATÉRALEMENT POUR VISUALISER LA FONCTION DE COMMUTATION ASSOCIÉE À L'ÉLÉMENT DE MANŒUVRE OU DE VISUALISATION ET/OU L'ÉTAT DE COMMUTATION RESPECTIF DUDIT ÉLÉMENT DE MAN

Fig. 2



L'invention concerne un élément de manœuvre ou de visualisation, comportant: une partie d'entrée ou partie (2) de visualisation formant une surface d'entrée translucide ou transparente ou surface (3) de visualisation; un support (12) servant à fixer l'élément de manœuvre ou de visualisation à une structure externe; un dispositif (13) de détection qui est conçu pour détecter un actionnement et/ou un contact de la surface d'entrée ou surface (3) de visualisation par l'opérateur (B); un guide (4) de lumière transparent qui, vue par l'opérateur (B), est disposé au-dessous de la surface d'entrée ou surface (3) de visualisation et fixé au support (12), et qui présente une surface (G) de frontière supérieure faisant face à la surface d'entrée ou surface (3) de visualisation et une surface (G') de frontière inférieure orientée à l'opposé de la surface d'entrée ou surface (3) de visualisation; au moins une source lumineuse (5) qui est disposée pour coupler un champ (L) d'ondes de reproduction optique dans le guide (4) de lumière via une surface (S) d'entrée de lumière; un support (8) d'image holographique, comprenant un hologramme, qui est disposé de façon adjacente à la surface (G) de frontière supérieure du guide (4) de lumière ou adjacente à la surface (G') de frontière inférieure du guide (4) de lumière, le champ (L) d'ondes de reproduction couplé dans le guide (4) de lumière progressant de la surface (S) d'entrée de lumière à la surface (G) de frontière supérieure du fait d'une propagation de la lumière engendrée via une réflexion interne dans le guide (4) de lumière, étant couplé vers l'extérieur dans la direction de l'opérateur (B) et progressant jusqu'au support (8) d'image holographique, le premier champ (L) d'ondes de reproduction étant transformé en un champ (L') d'ondes d'image par le premier support (8) d'image holographique et le champ (L') d'ondes d'image progressant du support (8) d'image holographique à l'opérateur (B), afin de présenter à l'opérateur (B) l'hologramme conservé dans le support (8) d'image holographique sous la forme d'une image virtuelle, qui contient un symbole (6) dans une surface (16) d'affichage servant à visualiser la fonctionnalité de commutation associée à l'élément (1) de manœuvre ou de visualisation et/ou un état actuel de commutation de l'élément (1) de manœuvre ou de visualisation, la surface (16) d'affichage s'étendant de façon non parallèle à la surface (G) de frontière supérieure et non parallèle à la surface (G') de frontière inférieure.

N9513

WO2023117171 **PREH**
Priority Date: **23/12/2021**

OPERATING OR DISPLAY ELEMENT HAVING A TRANSFER HOLOGRAPHIC DISPLAY AND ASSOCIATED ARRANGEMENT

The invention relates to a visible or input part (2) forming a visible or input surface (3) that is translucent or transparent at least in some regions; a support (12) for securing the operating or display element to an external structure, in particular a motor vehicle component; an optional detection device (13, 18, 19) which is designed to detect an actuation and/or a contact of the visible or input surface (3) by an observer or operator (B); a transparent light guide (4) which, in the view of the observer or operator (B), is arranged below the visible or input surface (3), is secured to the support (12) and has an upper boundary surface (G) facing the visible or input surface (3) and a lower boundary surface (Gv) facing away from the visible or input surface (3); at least one light source (5) which is arranged to couple an optical reproduction wave field (L) into the light guide (4) via a light inlet surface (S); a first holographic image carrier (8) which contains a first transmission hologram and which is arranged adjacently to the upper boundary surface (G) of the light guide (4), wherein the reproduction wave field (L) coupled into the light guide (4) reaches the upper boundary surface (G) from the light inlet surface (S) on the basis of a light propagation produced by an internal reflection in the light guide (4), is coupled out in the direction of the observer or operator (B) and reaches the first holographic image carrier (8), wherein the reproduction wave field (L') is transformed into an image wave field (12) by the first holographic image carrier (8), and the image wave field (12) from the holographic image carrier (8) reaches the observer or operator (B) in order to display to the observer or operator (B) the first transmission hologram stored in the first holographic image carrier (8) in the form of a virtual image which visually symbolizes a switching functionality associated with the operating or display element (1) and/or an acute switching state.

ÉLÉMENT D'ACTIONNEMENT OU D'AFFICHAGE DOTÉ D'UN AFFICHAGE HOLOGRAPHIQUE À TRANSFERT ET AGENCEMENT ASSOCIÉ

La présente invention concerne une pièce visible ou d'entrée (2) formant une surface visible ou d'entrée (3) qui est translucide ou transparente au moins dans certaines régions ; un support (12) pour fixer l'élément d'actionnement ou d'affichage à une structure externe, en particulier un composant de véhicule automobile ; un dispositif de détection facultatif (13, 18, 19) qui est conçu pour détecter un actionnement et/ou un contact de la surface visible ou d'entrée (3) par un observateur ou un opérateur (B) ; un guide de lumière transparent (4) qui, vu par l'observateur ou l'opérateur (B), est disposé au-dessous de la surface visible ou d'entrée (3), est fixé au support (12) et présente une surface limite supérieure (G) faisant face à la surface visible ou d'entrée (3) et une surface limite inférieure (Gv) orientée à l'opposé de la surface visible ou d'entrée (3) ; au moins une source de lumière (5) qui est agencée pour accoupler un champ d'ondes de reproduction optique (L) dans le guide de lumière (4) par l'intermédiaire d'une surface d'entrée de lumière (S) ; un premier support d'image holographique (8) qui contient un premier hologramme de transmission et qui est disposé de manière adjacente à la surface limite supérieure (G) du guide de lumière (4), le champ d'ondes de reproduction (L) accouplé dans le guide de lumière (4) atteignant la surface limite supérieure (G) à partir de la surface d'entrée de lumière (S) sur la base d'une propagation de lumière produite par une réflexion interne dans le guide de lumière (4), étant extrait en direction de l'observateur ou de l'opérateur (B) et atteignant le premier support d'image holographique (8), le champ d'ondes de reproduction (L') étant transformé en un champ d'ondes d'image (12) par le premier support d'image holographique (8), et le champ d'ondes d'image (12) à partir du support d'image holographique (8) atteignant l'observateur ou l'opérateur (B) afin d'afficher à l'observateur ou à l'opérateur (B) le premier hologramme de transmission stocké dans le premier support d'image holographique (8) sous la forme d'une image virtuelle qui symbolise visuellement une fonctionnalité de commutation associée à l'élément d'actionnement ou d'affichage (1) et/ou à un état de commutation aigu.

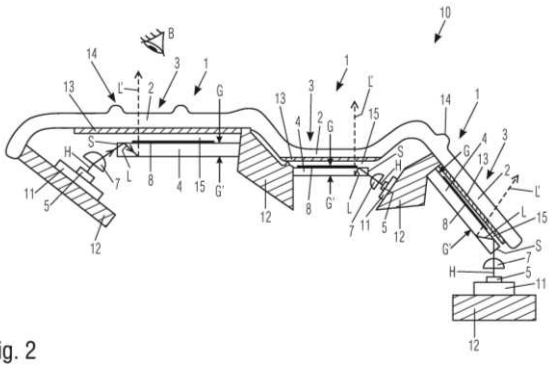


Fig. 2

N9520

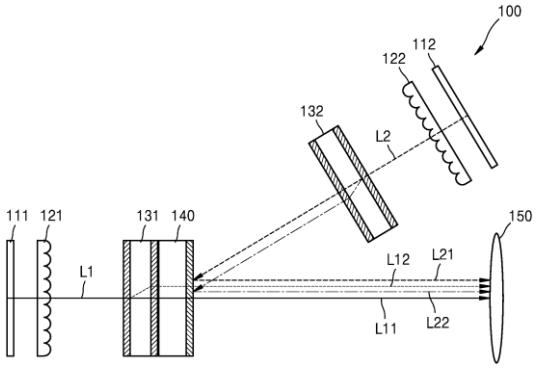
US20230205065 **SAMSUNG ELECTRONICS**
Priority Date: **24/12/2021**

PROJECTOR AND DISPLAY APPARATUS EMPLOYING HOLOGRAPHIC OPTICAL ELEMENT

A projector and display apparatus using a holographic optical element are provided. The projector includes a first display panel configured to emit a first beam of a first image, a second display panel configured to emit a second beam of a second image, a first transmissive holographic optical element configured to separate the first beam into a first diffracted beam and a second diffracted beam such that pixels of the first image overlap each other, a second transmissive holographic optical element configured to separate the second beam into a third diffracted beam and a fourth diffracted beam such that pixels of the second image overlap each other, a reflective holographic optical element configured to diffract and reflect the third and fourth diffracted beams in the same direction as the first and second diffracted beams such that the first image and the second image at least partially overlap each other, and a projection lens.

DISPOSITIF D'AFFICHAGE ET PROJECTEUR UTILISANT UN ÉLÉMENT OPTIQUE HOLOGRAPHIQUE

L'invention concerne un dispositif d'affichage et un projecteur utilisant un élément optique holographique. Le projecteur de l'invention comprend : une première unité d'affichage servant à émettre une première lumière d'une première image ; une deuxième unité d'affichage servant à émettre une deuxième lumière d'une deuxième image ; un premier élément optique holographique transmissif servant à séparer la première lumière en une première et une deuxième lumières diffractées de façon à ce que les pixels de la première image se chevauchent ; un deuxième élément optique holographique transmissif servant à séparer la deuxième lumière en une troisième et une quatrième lumières diffractées de façon à ce que les pixels de la deuxième image se chevauchent ; un élément optique holographique réfléchissant servant à diffracter et à réfléchir les troisième et quatrième lumières diffractées dans la même direction que les première et deuxième lumières diffractées de façon à ce que les première et deuxième images se chevauchent au moins partiellement ; et une lentille de projection.



CLAIM 1. A projector comprising: a first display panel configured to emit a first beam corresponding to a first image; a second display panel configured to emit a second beam corresponding to a second image; a first transmissive holographic optical element configured to separate the first beam into a first diffracted beam and a second diffracted beam and transmit the first diffracted beam and the second diffracted beam, such that pixels corresponding to the first diffracted beam and pixels corresponding to the second diffracted beam are shifted by a first distance to overlap each other, the first distance being shorter than a length of one pixel; a second transmissive holographic optical element configured to separate the second beam into a third diffracted beam and a fourth diffracted beam and transmit the third diffracted beam and the fourth diffracted beam, such that pixels corresponding to the third diffracted beam and pixels corresponding to the fourth diffracted beam are shifted by a second distance to overlap each other, the second distance being shorter than the length of one pixel; a reflective holographic optical element configured to transmit the first diffracted beam and the second diffracted beam, and diffract and reflect the third diffracted beam and the fourth diffracted beam in a same direction as the first diffracted beam and the second diffracted beam, such that the first image and the second image at least partially overlap each other; and a projection lens configured to project a beam corresponding to an overlapping image created by at least partially overlapping the first image and the second image with each other.

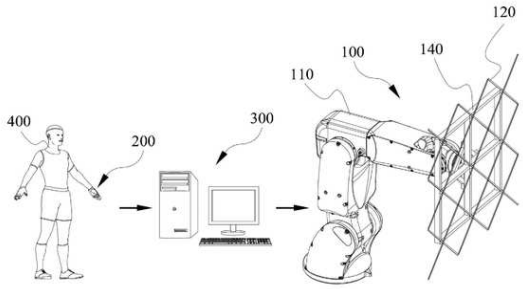
N9523

TWM643726 **UNICORNVR ENTERTAINMENT**
Priority Date: **14/02/2023**

REAL-TIME HOLOGRAPHIC REALITY DISPLAY SYSTEM.

The present invention is a real time holographic reality display system that synchronizes the real time motion coordinates of a performer to a virtual 3 D character in a computer device using an automatic motion capture device and transmits the final image data to the real time holographic reality display device for simultaneous performance. The present invention allows a performer wearing a motion capture device to transmit data to a virtual character in a computer device, the image data being transmitted to the holographic reality display device after the imaging of the real time image is completed, the display device consisting of a robot arm, a device holder, and a holographic led sector display to perform the function of real time holographic reality display.

CLAIM 1. A real time holographic context display system comprising: a display device having a mechanical arm and a holographic led sector display such that the mechanical arm can move up the holographic led sector display and present an image of a virtual character by the holographic led sector display; Computer means for receiving the motion coordinates transmitted by the motion capture means, calculating the virtual character skeleton coordinates and separating them into displacement data for transmission to the robot arm, and the motion data for transmission to the holographic led sector display for real-time presentation by the virtual character of the limb motion of the performer.

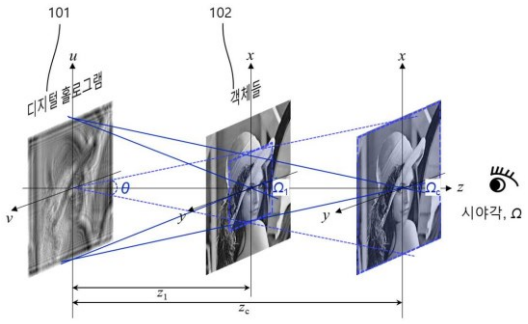


N9525

KR20230105302 **KOREA ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE**
Priority Date: **03/01/2022**

DIGITAL HOLOGRAM DISPLAY DEVICE

The present invention provides a digital hologram generating/converting unit configured to generate and convert a digital hologram, a backlight unit configured to generate coherent parallel light, A spatial light modulator including a plurality of pixels configured to record and reproduce the digital hologram as electrical signals, a noise removing filter provided on the spatial light modulator and including sub-pixels configured to remove an aliasing noise image, And an output optical system configured to implement a reconstruction image reproduced by the spatial light modulator, wherein each of the sub-pixels of the noise removing filter has an aperture, Wherein a distance between a center of each of the sub-pixels and a center of the opening is non-uniform in the noise removing filter.



CLAIM 1. A digital hologram generating/converting unit configured to generate and convert a digital hologram; a backlight unit configured to generate coherent parallel light; A spatial light modulator including a plurality of pixels configured to record and reproduce the digital hologram with electrical signals; a noise removing filter provided on the spatial light modulator and including sub-pixels configured to remove an aliasing noise image; And an output optical system configured to implement a reconstruction image reproduced by the spatial light modulator, wherein each of the subpixels of the noise removing filter has an aperture, and in the noise removing filter, distances between centers of each of the subpixels and the apertures are non-uniform.

N9528

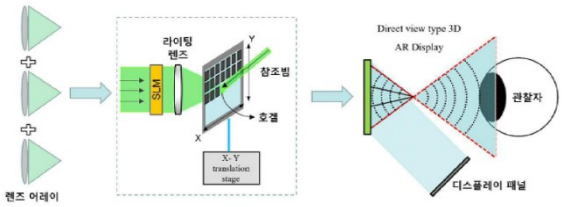
KR20230102429
Priority Date: **30/12/2021**

CHUNGBUK NATIONAL UNIVERSITY INDUSTRY ACADEMIC COOPERATION FOUNDATION

METHOD FOR PRODUCING HOLOGRAPHIC OPTICAL ELEMENT LENS ARRAY IN HOLOGRAM PRINTER

The present invention relates to a method of manufacturing a holographic optical element lens array in a hologram printer, the method comprising the steps of: generating a Fresnel zone plate (fzp) for recording an optical function in the lens array as a light wave, Designing a 2 D lens array, and writing a function of the FZP to the lens array according to a hologram printing method to fabricate a holographic optical element lens array. According to the present invention, a holographic optical element lens array can be implemented simply and easily by using a holographic printer.

CLAIM 1. A method of manufacturing a holographic optical element lens array in a hologram printer, the method comprising: generating a Fresnel zone plate (fzp) for recording an optical function on the lens array as light waves; designing the lens array according to a 2 D method; And writing the function of the FZP to the lens array in a holographic printing manner to produce a holographic optical element lens array.



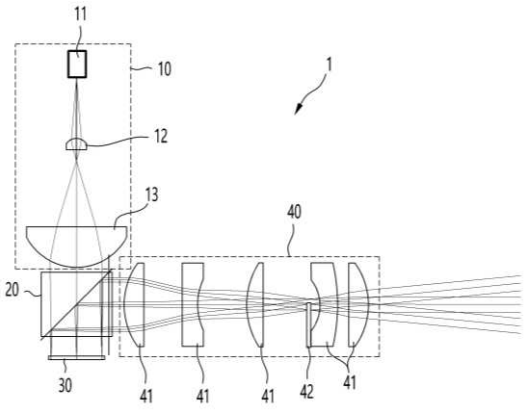
N9529

KR20230102059
Priority Date: **29/12/2021**

EPICOPTIX

HOLOGRAPHIC OPTICAL SYSTEM

The present invention relates to a holographic optical system. the holographic optical system includes an illumination unit including a light source and one or more lenses to collimate light output from the light source and irradiate the collimated light into parallel light, A display panel displaying an interference pattern for implementing a CGH image, wherein the parallel light emitted by the illumination unit passes through the interference pattern or is reflected by the interference pattern, and a projection unit disposed in a direction in which the light of the CGH image travels and projecting an image based on an image generated as the CGH image.



CLAIM 1. An illumination device comprising: an illumination unit configured with a light source and one or more lenses to collimate light output from the light source and irradiate the collimated light into parallel light; an illumination unit disposed on a light path of the parallel light irradiated by the illumination unit, A display panel displaying an interference pattern for implementing a CGH image, wherein the parallel light emitted by the illumination unit passes through the interference pattern or is reflected by the interference pattern; and a projection unit disposed in a direction in which the light of the CGH image travels and projecting an image based on an image generated as the CGH image.

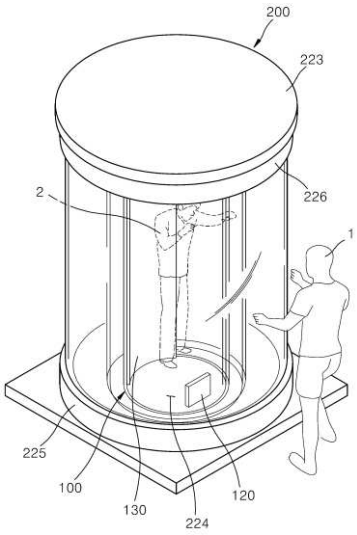
N9533

KR20230091329
Priority Date: **16/12/2021**

SEOUL OLYMPIC A MEMORIAL THE PEOPLE PHYSICAL EDUCATION ENCOURAGEMENT ASSOCIATION

FIGHTING TRAINING DEVICE USING HOLOGRAM

The present invention relates to a hologram generating apparatus for outputting a diaphragm as a hologram image, a striking unit installed around the hologram image, formed of a transparent material to project the hologram image, and formed to strike a user while viewing the projected hologram image, a striking unit installed in the striking unit to sense whether the user strikes, A sensor unit configured to sense a user's motion; and a controller configured to generate a hologram image according to hit information and motion information of the user received from the sensor unit and transmit an image signal to the hologram generating apparatus. Based on the total weight of the composition. According to the above described embodiment, it is possible to perform gap training by a user without a gap sparging partner of a hologram, and improve the effect of gap training by using a gap partner of a hologram.



CLAIM 1. An image processing apparatus comprising: a hologram generating device configured to output a diaphragm as a hologram image; a transparent material provided around the hologram generating device, formed of a transparent material so that the hologram image output from the hologram generating device is transmitted, A striking unit configured to strike a user while viewing the transmitted hologram image; a sensor unit configured to sense whether the user strikes the user when the user strikes the striking unit; and a control unit configured to control on/off operation information of the hologram generating device from the user, an input unit configured to receive the information of the diaphragm selected by the user; and a processor configured to generate the hologram image according to the strike information of the user received from the sensor unit and the information of the diaphragm received from the input unit and transmit an image signal to the hologram generator, And a control unit configured to control an operation of the hologram generating device according to on and off operation information received from the input unit.

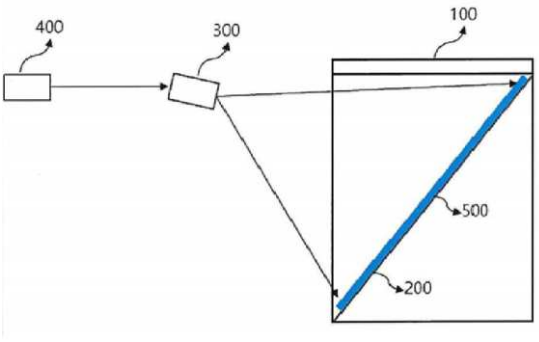
N9534

KR20230090666
Priority Date: **15/12/2021**

WONKWANG UNIVERSITY INDUSTRY ACADEMIC COOPERATION FOUNDATION

VOLUMETRIC 3D DISPLAY USED BY HOLOGRAPHIC OPTICAL ELEMENT

The present invention relates to a system (400) for generating holographic content in a system (400) for generating holographic content (400) comprising holographic optical elements and then transmitting holographic content (400) to holographic projectors (300), said holographic projectors (300) projecting said holographic content to holographic optical elements (500), The projected content is characterized in that it is diffracted by holographic optics (500) to reconstruct an image. The holographic optical element 500 diffracts content projected from a projector to reconstruct an image. the holographic optical element 500 exhibits a three-dimensional stereoscopic imaging system capable of expressing multiple depths using a holographic optical element and a semi-transmissive mirror, and thus exhibits remarkable effects of being variously used in fields such as ar and the like capable of interworking with the real world.



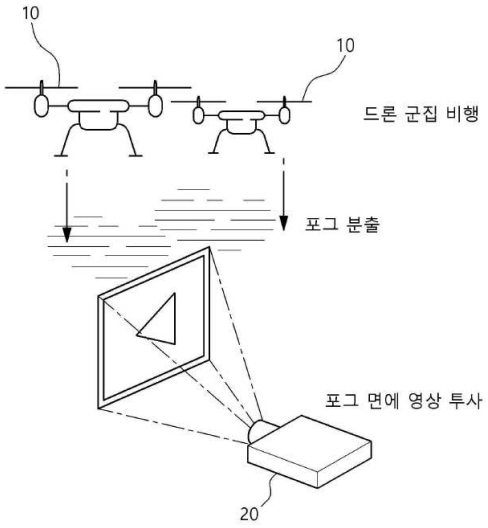
CLAIM 1. In a holographic content generating system (400), hologram content (400) is generated and transmitted to a holographic projector (300), the holographic projector (300) projects the hologram content to a holographic optical element (500), A multi-depth representation stereoscopic imaging system comprising a holographic optical element characterized in that the projected content is reconstructed via the holographic optical element (500).

N9535

KR20230088943 **HANWHA | PABLO AIR**
Priority Date: **13/12/2021**

APPARATUS AND METHOD FOR FORMING A FOG SCREEN AND DIRECTING A HOLOGRAM SHOW USING A DRONE

The present invention relates to an apparatus for forming a fog screen by using drones and for extracting a hologram show, and a method thereof. the apparatus includes a drone flight control unit provided for each of a plurality of drones for clustered flying and controlling a flight operation of the drones according to a control signal received from an administrator terminal, A fog screen forming unit configured to form a fog screen on the air by ejecting an internally generated fog to the outside according to a control signal received from the manager terminal, and a hologram content providing unit configured to provide hologram content by projecting laser graphic data toward the formed fog screen.



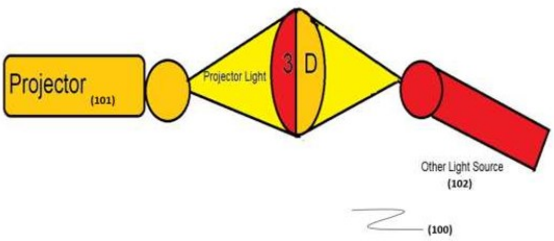
CLAIM 1. A drone flight control unit that is provided for each of a plurality of drones that are clustered and controls a flight operation of the drones in accordance with a control signal received from an administrator terminal; a fog screen forming unit that is coupled to the drones and ejects a fog generated therein to the outside according to the control signal received from the administrator terminal to form a fog screen in the air; And a hologram content providing unit configured to provide hologram content by projecting laser graphic data toward the formed fog screen.

N9540

IN202321032892 **SAGE UNIVERSITY**
Priority Date: **09/05/2023**

HOLOPORTATION DEVICE FOR MOVING OBJECTS AND MAKING 3-D IMAGE IN AIR

Disclosed is a holoportation device (100) for moving objects and making 3-d image in air, comprising a projector screen (101) for projecting an object on a projection screen and means for manipulating input data to add new directions and change a 2D view into a 3D view. It further includes a means for using mixed reality and providing high resolution. Said device is capable of creating 3D image in air between a projector light (102) and an externally sourced light. This device works with both online and offline devices. Because of its high resolution, this device can display more information at once, so the most interesting aspect of the projector is its display. In place of the projector screen or wall, we will replace it with some light. Light will penetrate and prevent projector output light from reaching the wall. External lighting is focused in front of the projector to create a 3D image in the air between the projector light and the external light.



CLAIM 1. A holoportation device (100) for moving objects and making 3- d image in air, comprising: a projector screen (101) for projecting an object on a projection screen; means for manipulating input data to add new directions and change a 2D view into a 3D view; means for using mixed reality and providing high resolution; wherein said device is capable of creating 3D image in air between a projector light (102) and an externally sourced light.

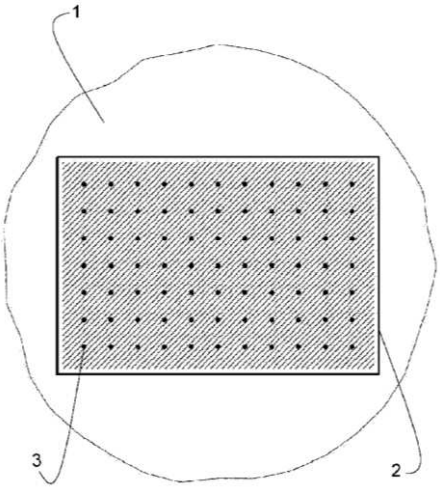
N9542

EP4216201 **HUEBNER**
Priority Date: **20/01/2022**

VEHICLE WITH HOLOGRAPHIC FILM

The present invention relates to a vehicle, in particular a rail vehicle or road vehicle, having a wall surface or a window pane, an imaging unit, a holographic film (2) applied to the wall surface or the window pane, and a computer, wherein the imaging unit is operatively connected to the computer in such a way that, characterized in that the image generation unit receives a control signal from the computer during operation of the vehicle, wherein the image generation unit, the holographic film (2) and the computer are set up and arranged in such a way that information visually perceptible to a viewer is generated during operation of the vehicle.

CLAIM 1. Vehicle, in particular rail vehicle or road vehicle, havinga wall surface (13) or window pane (10), an image forming unit (4) for forming an image, a holographic film (2) applied to the wall surface (13) or the window pane, a computer, and a sensor (3), wherein the image generation unit (4) is operatively connected to the computer in such a way that the image generation unit (4) receives a control signal from the computer during operation of the vehicle, wherein the imaging unit (4), the holographic film (2) and the computer are set up and arranged in such a way that, during operation of the vehicle, information which is visually perceptible to a viewer is generated, wherein the sensor (3) is operatively connected to the computer in such a way that the computer receives a measurement signal from the sensor (3) during operation of the vehicle, and wherein the computer is set up in such a way that, during operation of the vehicle, it changes the control command transmitted to the image generation unit as a function of the measurement signal, so that the image generated by the image generation unit and, as a result, the visually perceptible information is adapted to the measurement signal.

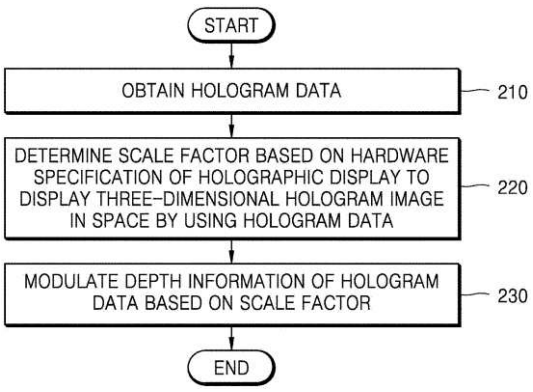


N9543

EP4215998 **SAMSUNG ELECTRONICS**
Priority Date: **21/01/2022**

METHOD AND APPARATUS FOR MODULATING THE IMAGE DEPTH OF A HOLOGRAM FOR ADAPTATING THE HOLOGRAM TO THE HARDWARE SPECIFICATIONS OF A HOLOGRAPHIC DISPLAY

A method of modulating a depth of a hologram, the method includes: obtaining hologram data; determining a scale factor based on a hardware specification of a holographic display to display a three-dimensional (3D) hologram image in a space by using the hologram data; and modulating depth information of the hologram data based on the scale factor.



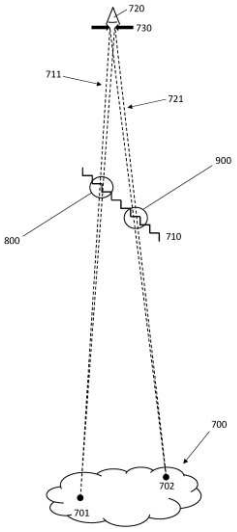
CLAIM 1. A method of modulating a depth of a hologram, the method comprising: obtaining hologram data; determining a scale factor based on an actual hardware specification of a holographic display to display a three-dimensional, 3D, hologram image in a space by using the hologram data; and modulating depth information of the hologram data based on the scale factor.

N9544

EP4202561 **ENVISICS**
Priority Date: **23/12/2021**

HOLOGRAM CALCULATION FOR COMPACT HEAD-UP DISPLAY

An optical system and a method of calculating a hologram of a virtual image for the optical system is described. The optical system comprises a display device arranged to display the hologram and a waveguide arranged to replicate the hologram. The method comprises determining a sub-hologram of a virtual image point within an area defined by straight line paths from the virtual image point to the perimeter of an entrance pupil of a viewer. The area comprises at least part of a virtual replica of the display device formed by the waveguide.



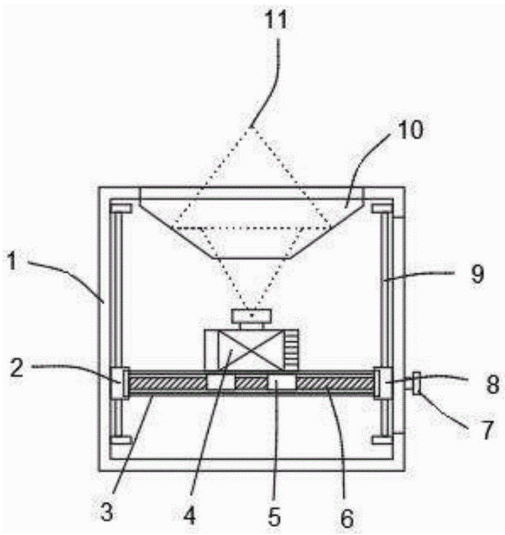
CLAIM 1. A method of calculating a hologram of a virtual image (700) for an optical system comprising a display device arranged to display the hologram and a waveguide arranged to replicate the hologram, wherein the method comprises: determining a sub-hologram (820, 920) of a virtual image point (701, 702) within an area (800, 900) defined by straight line paths (711, 721) from the virtual image point to the perimeter of an entrance pupil (730) of a viewer, wherein the area (800, 900) comprises at least part of a virtual replica of the display device formed by the waveguide.

N9546

CN219392476U **HAWTHORNE CULTURE COMMUNICATION WUHAN**
Priority Date: **27/12/2022**

HOLOGRAPHIC PROJECTION DEVICE

The utility model discloses a holographic projection device, which comprises a device main body, wherein an imaging cover is fixedly connected to the middle part of the top end of the interior of the device main body, projection equipment is arranged below the imaging cover, threaded blocks are fixedly connected to the two sides of the bottom end of the projection equipment, a threaded rod is connected to the interior of each threaded block in a threaded manner, one end of each threaded rod penetrates through a second clamping block, and a first clamping block is rotatably connected to the other end of each threaded rod; and square grooves are fixedly connected between the first clamping blocks and the second clamping blocks, threaded blocks are slidably matched in the square grooves, and the threaded blocks are in threaded fit with the threaded rods. Through the structure, the threaded rod and the threaded block are in threaded fit, so that threaded movement operation is achieved, the threaded rod and the threaded block control the transverse movement operation of the projection equipment, the square groove is moved by sliding through the handheld control rod, and pressure is applied to the square groove in the movement process, so that the antiskid plate and the square slide rod actively slide.

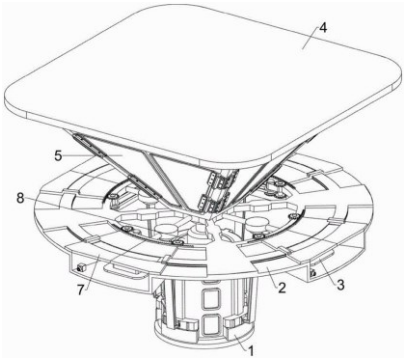


CLAIM 1. A holographic projection device, comprising: the device comprises a device main body (1), wherein an imaging cover (10) is fixedly connected to the middle of the top end of the interior of the device main body (1), a projection device (4) is arranged below the imaging cover (10), threaded blocks (5) are fixedly connected to two sides of the bottom end of the projection device (4), a threaded rod (6) is connected to the interior of each threaded block (5) in a threaded manner, a second clamping block (8) penetrates through one end of each threaded rod (6), and a first clamping block (2) is connected to the other end of each threaded rod (6) in a rotating manner; the clamping device is characterized in that square grooves (3) are fixedly connected between the first clamping blocks (2) and the second clamping blocks (8), threaded blocks (5) are slidably matched in the square grooves (3), and the threaded blocks (5) are in threaded fit with threaded rods (6).

N9547

CN219392451U **NANCHANG YIJING INFORMATION TECHNOLOGY**
Priority Date: **07/03/2023**

MAN-MACHINE REAL-TIME INTERACTIVE HOLOGRAPHIC PROJECTION EQUIPMENT



The utility model relates to the technical field of all-patient projection, in particular to human-computer real-time interactive all-patient projection equipment. The utility model provides man-machine real-time interactive holographic projection equipment which automatically monitors and protects an operation panel from dust and simultaneously avoids damage caused by false touch of the operation panel. The utility model provides a real-time interactive holographic projection equipment of human-computer, includes base, operation panel, projection room, apron and projection head etc. sliding connection has the operation panel on the base, and the operation panel top is connected with four operation panels, and the operation panel top has the projection room through bolted connection, and four equal rotation of projection room face are connected with the apron. According to the utility model, the monitoring probe controls the protection plate to automatically shield and protect the operation panel, so that the abnormal projection caused by the fact that the operation panel is used by being touched by mistake is avoided, and meanwhile, the rotary cover plate can assist light supplementing and is convenient for an operator to clean the projection chamber.

CLAIM 1. A man-machine real-time interactive holographic projection device is characterized in that: including base (1), operation panel (2), operating panel (3), projection room (4), apron (5), projection head (6) and protection machanism (7), sliding connection has operation panel (2) of carrying out the operation use on base (1), operation panel (2) top is connected with four operating panel (3), operation panel (2) top has projection room (4) of carrying out holographic projection through bolted connection, four equal swivelling type of faces of projection room (4) are connected with apron (5) that are used for spotlight protection, all be equipped with on projection head (6) operating panel (2) in projection room (4) bottom and be used for carrying out protection machanism (7) of protection to operating panel (3).

N9549

CN219320657U **SUZHOU YUNTU VISUAL TECHNOLOGY**
Priority Date: **16/08/2022**

HOLOGRAPHIC PROJECTION DISPLAY DEVICE

The utility model provides a holographic projection display device, which comprises a support base, wherein a computer host is fixed on the inner side of the support base through bolts, and a touch display screen is embedded on the left side of the front end of the support base; the upper part of the pure black plastic frame is provided with a display screen component. The beneficial effects of the utility model are as follows: through the setting of bottom positive square frame, top contact frame, side braced frame and ultra-thin transparent refraction board, be favorable to supporting ultra-thin transparent refraction board through the support that bottom positive square frame, top contact frame and side braced frame are constituteed to can reduce the thickness of ultra-thin transparent refraction board, prevent that the influence of projection from appearing the ghost image.

CLAIM 1. The holographic projection display device comprises a support base (1), wherein a computer host (2) is fixed on the inner side of the support base (1) through bolts, and a touch display screen (3) is inlaid on the left side of the front end of the support base (1), and the holographic projection display device is characterized in that a quadrangular pyramid reflecting component (4) and a transparent display cover (5) are fixed on the upper part of the support base (1), and a pure black plastic frame (6) is glued on the upper part of the transparent display cover (5); a display screen component (7) is arranged at the upper part of the pure black plastic frame (6); the rectangular pyramid reflecting component (4) comprises a bottom square frame (41), a top contact frame (42) is arranged at the middle position of the upper part of the bottom square frame (41), side support frames (43) are glued at four corners of the upper part of the bottom square frame (41), and ultrathin transparent refraction plates (44) are arranged at the periphery of the upper part of the bottom square frame (41); the display screen assembly (7) comprises a top sealing cover (71), a frame groove (72) is formed in the periphery of the lower part of the top sealing cover (71), and a bright display screen (73) is respectively inlaid in the four corners of the lower part of the top sealing cover (71); the lower part of the transparent display cover (5) is glued with the upper part of the supporting base (1), and the touch display screen (3) is sleeved on the outer side of the rectangular pyramid reflecting component (4); the upper part of the side supporting frame (43) is glued with the lower four corners of the top contact frame (42), and the bottom positive frame (41) is arranged on the upper part of the supporting base (1); the ultrathin transparent refraction plate (44) is positioned in a frame consisting of the bottom positive frame (41), the top contact frame (42) and the side support frame (43), and the periphery of the ultrathin transparent refraction plate (44) is mutually glued with the ultrathin transparent refraction plate.

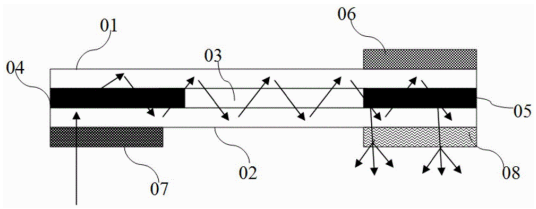
N9550

CN219302783U **NANCHANG VIRTUAL REALITY RESEARCH INSTITUTE**

Priority Date: **16/01/2023**

HOLOGRAPHIC BODY GRATING OPTICAL WAVEGUIDE DEVICE AND EQUIPMENT

The embodiment of the application provides a holographic body grating optical waveguide device and equipment, comprising a first glass layer and a second glass layer; a liquid crystal polymer is arranged between the first glass layer and the second glass layer, a first grating is arranged between the first end of the first glass layer and the first end of the second glass layer, and a second grating is arranged between the second end of the first glass layer and the second end of the second glass layer; an optical polarization state converter is arranged on the outer side surface of the first glass layer far away from the second glass layer so as to change the polarization state of light, and the position of the optical polarization state converter corresponds to the position of the second grating; the second glass layer is kept away from first glass layer lateral surface and is provided with the third grating, the position of third grating with the position of second grating corresponds, and the purpose that this application embodiment can realize expanding the angle of view and guaranteeing that light-emitting is even need not to handle holographic grating in the preparation of optical waveguide device, and the preparation is simpler, is favorable to promoting the efficiency and the yield of optical waveguide preparation.



CLAIM 1. A holographic volume grating optical waveguide device comprising a first glass layer and a second glass layer; a liquid crystal polymer is arranged between the first glass layer and the first glass layer, a first grating is arranged between the first end of the first glass layer and the first end of the second glass layer, and a second grating is arranged between the second end of the first glass layer and the second end of the second glass layer; an optical polarization state converter is arranged on the outer side surface of the first glass layer far away from the second glass layer so as to change the polarization state of light, and the position of the optical polarization state converter corresponds to the position of the second grating; and a third grating is arranged on the outer side surface of the second glass layer far away from the first glass layer so as to enlarge the angle of view, and the position of the third grating corresponds to the position of the second grating.

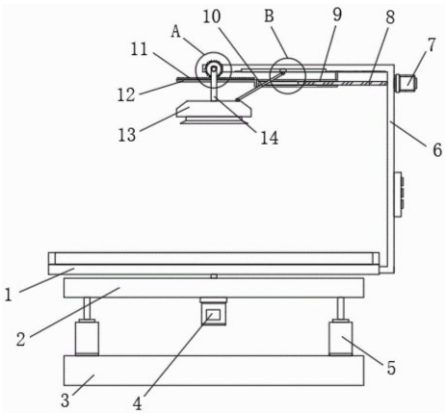
N9551

CN219285579U **SHANGHAI GUOJING MODEL DESIGN**

Priority Date: **06/12/2022**

HOLOGRAPHIC SAND TABLE OF STEREOSCOPIC PROJECTION

The utility model belongs to the technical field of holographic projection, and discloses a holographic sand table for stereoscopic projection, which comprises the following components: a base; the sand table comprises a fixed seat arranged on a base, wherein a sand table body is arranged at the top of the fixed seat, a supporting frame is fixed on one side of the sand table body, and a projector facing the sand table body is arranged at the top end of the supporting frame; the lifting assembly is arranged between the base and the fixed seat and is used for driving the sand table body to move up and down; the angle adjusting assembly comprises a rotating rod rotatably arranged at the top end of the supporting frame, and the rotating assembly is arranged on the fixed seat and used for driving the sand table body to rotate.



CLAIM 1. A stereoscopic projection holographic sand table, comprising: a base (3); the sand table comprises a fixed seat (2) arranged on a base (3), wherein a sand table body (1) is arranged at the top of the fixed seat (2), a support frame (6) is fixed on one side of the sand table body (1), and a projector (13) facing the sand table body (1) is arranged at the top end of the support frame (6); the lifting assembly is arranged between the base (3) and the fixed seat (2) and is used for driving the sand table body (1) to move up and down; the rotating assembly is arranged on the fixed seat (2) and is used for driving the sand table body (1) to rotate; the angle adjusting assembly comprises a rotating rod (15) rotatably installed at the top end of the supporting frame (6), one end of the rotating rod (15) is provided with a gear (16), the other end of the rotating rod (15) is fixedly provided with a fixing frame (14), and the bottom end of the fixing frame (14) is connected with the projector (13); the screw rod (8) is installed in the inboard rotation of support frame (6), and the one end cover of screw rod (8) is equipped with screwed pipe (9) towards mount (14), screwed pipe (9) are fixed with supporting seat (12) for the one end of screw rod (8), and the top side of supporting seat (12) is provided with rack (11) with gear (16) engaged with.

N9552

CN116489477 **QINGDAO CHENYUAN TECHNOLOGY INFORMATION**
Priority Date: **28/04/2023**

HOLOGRAPHIC VIDEO GENERATION METHOD, DEVICE, EQUIPMENT AND STORAGE MEDIUM

The application discloses a holographic video generation method, device, equipment and storage medium, wherein the method comprises the following steps: performing shot segmentation on the video to be processed to obtain a shot sequence; extracting a content frame corresponding to the shot according to the shot sequence to obtain a content frame sequence; calculating the difference rate and the time difference value between all adjacent two content frames, and generating an interpolation frame and a transition frame between the adjacent two content frames according to the difference rate and the time difference value between the adjacent two content frames; and forming a holographic frame sequence according to the content frame, the interpolation frame and the transition frame, and encoding and packaging according to the holographic frame sequence to obtain the holographic video. The holographic video extraction method effectively solves the problems of frame missing and redundancy in the key frames, the holographic video extracted according to the content frames can completely, accurately and accurately reflect the original video content, the playing time of the original video is shortened, the important content of the original video is not lost, and therefore the browsing efficiency of the monitoring video is improved.

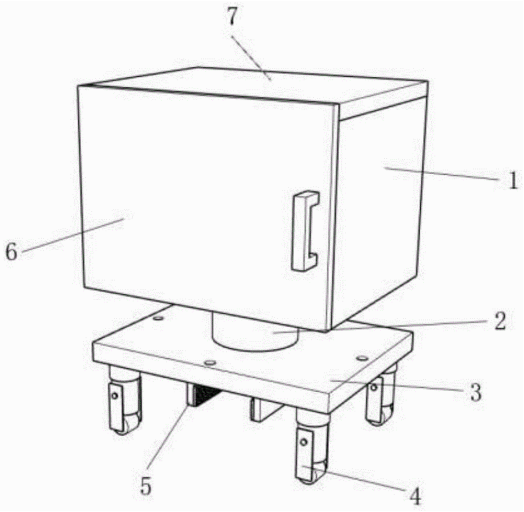
CLAIM 1. A method of generating a holographic video, comprising: performing shot segmentation on the video to be processed to obtain a shot sequence; extracting a content frame corresponding to a shot according to the shot sequence to obtain a content frame sequence, wherein the content frame is a frame representing the shot content and comprises a first frame, a tail frame and N intermediate frames, N is a natural number, and the intermediate frames are obtained when the difference rate is larger than a preset threshold value by calculating the difference rate of all sub-frames of one shot except the first frame and the tail frame and the previous content frame; calculating the difference rate and the time difference value between all two adjacent content frames, and generating interpolation frames and transition frames between the two adjacent content frames according to the difference rate and the time difference value between the two adjacent content frames; and forming a holographic frame sequence according to the content frame, the interpolation frame and the transition frame, and encoding and packaging according to the holographic frame sequence to obtain the holographic video.

N9554

CN116486723 **ZHEJIANG FUAO SOFTWARE DEVELOPMENT**
Priority Date: **14/03/2023**

WISDOM GARDEN HOLOGRAPHIC PROJECTION VISUALIZATION PLATFORM AND DEVICE

The invention relates to the technical field of holographic projection, and discloses a holographic projection visualization platform and device for an intelligent park, which comprises a protective cover, wherein the top of the protective cover is movably connected with an upper door, the front side of the protective cover is movably connected with a front door, the inside of the protective cover is movably connected with a fixed frame, the inner side of the fixed frame is fixedly connected with a holographic projection body, the rear side of the protective cover is fixedly connected with a radiator, the bottom of the protective cover is fixedly connected with an adjusting device, the bottom of the adjusting device is fixedly connected with a bottom plate, the middle of the bottom plate is fixedly connected with a fixing device, and the bottom of the bottom plate is movably connected with a moving device.



CLAIM 1. Holographic projection visualization platform and device in wisdom garden, including protection casing (1), its characterized in that: the utility model discloses a portable electronic device, including protection casing (1), fixed frame (8), holographic projection body (9) of inboard fixedly connected with, bottom fixedly connected with adjusting device (2) of protection casing (1), bottom fixedly connected with bottom plate (3) of adjusting device (2), middle fixedly connected with fixing device (5) of bottom plate (3), bottom swing joint of bottom plate (3) has mobile device (4).

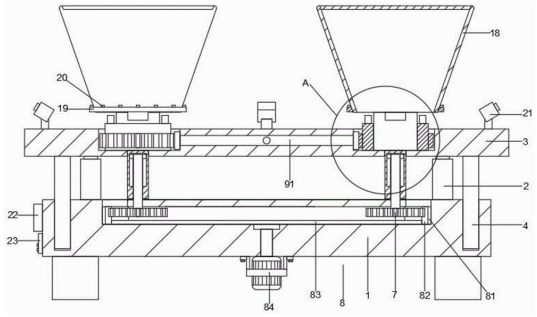
N9555

CN116482928 **GUANGZHOU DAMAI CULTURE COMMUNICATION**

Priority Date: **21/04/2023**

MULTIDIMENSIONAL HOLOGRAPHIC IMAGE DISPLAY PLATFORM

The invention discloses a multidimensional holographic image display platform, which comprises a supporting bottom box, wherein two hydraulic cylinders are symmetrically arranged at the top of the supporting bottom box, and the multidimensional holographic image display platform has the beneficial effects that: through having added actuating mechanism, realized when the output of motor drive rotation board rotates, the rotation board drives arc board and tooth and rotates, set up the rotation stroke of motor and carry out reciprocal rotation, carry out rotation range adjustment, drive dwang and dwang through a gear and rotate the post and rotate, rotate from driving a rolling barrel holographic glass and adjust, guarantee pivoted stability also adjusts the processing to the comprehensiveness of show, through having added adjustment mechanism, realized the output of motor No. two and driven reciprocal lead screw and rotate, thereby drive sliding plate and rack and remove, the rack removes and drives No. two gears and rotates the cover, thereby reach holographic projector pivoted purpose, carry out rotation processing to holographic projector projected image.



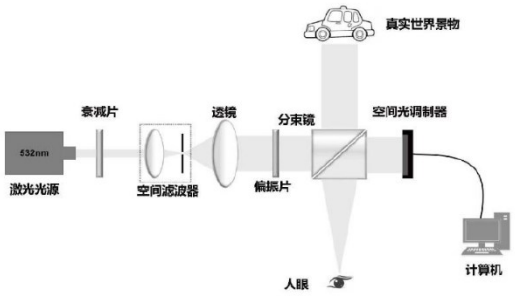
CLAIM 1. The utility model provides a multidimensional holographic image show platform, its characterized in that, including supporting base case (1), the top symmetry of supporting base case (1) is equipped with two pneumatic cylinders (2), two the output fixedly connected with brace table (3) of pneumatic cylinder (2), the inside symmetry of supporting base case (1) rotates and is connected with two dwang (5), the bottom fixedly connected with gear (7) of dwang (5), the inside of supporting base case (1) is equipped with and does not have a gear (7) complex actuating mechanism (8), the outside symmetry fixedly connected with two spacing slider (10) of dwang (5), the outside sliding connection of dwang (5) has dwang (6), two spacing spouts (11) have been seted up to the inside symmetry of dwang (6), spacing slider (10) and spacing spout (11) sliding connection, the inside symmetry of dwang (6) and brace table (3) swing joint, the top fixedly connected with rotary drum (12) of dwang (6), the outside symmetry of dwang (5) is equipped with two spacing slider (10) of a symmetry, the inside symmetry of dwang (6) has two side (17) of a holographic piece (17), the outside swing joint of a rotating cylinder (12) has a rotating sleeve (13), the rotating sleeve (13) is rotationally connected with a supporting table (3), a second gear (14) is fixedly connected to the outside of the rotating sleeve (13), an adjusting mechanism (9) matched with the second gear (14) is arranged inside the supporting table (3), two holographic projectors (15) are symmetrically arranged at the top of the rotating sleeve (13), and acquisition cameras (21) are arranged at the top equidistance of the supporting table (3).

N9557

CN116466484 **ANHUI POLYTECHNIC UNIVERSITY**
Priority Date: **23/04/2023**

HOLOGRAPHIC RETINA PROJECTION NEAR-TO-EYE DISPLAY METHOD AND SYSTEM BASED ON PHASE MASK OPTIMIZATION

The invention relates to the technical field of holographic retina projection near-eye display, in particular to a holographic retina projection near-eye display method and system based on phase mask optimization. Comprising the following steps: zero filling is carried out on rectangular apertures distributed by a target image to be used as input amplitude, and a random phase mask is overlapped to obtain initial input complex amplitude of a holographic plane; obtaining an optimized phase mask of the holographic plane according to the initial input complex amplitude of the holographic plane; obtaining holographic plane complex amplitude according to the optimized phase mask; extracting the phase of the holographic plane complex amplitude to obtain the phase of the holographic plane object light wave; superposing the phases of the holographic planar object light waves to converge spherical wave phases to obtain RPD phase distribution; encoding the RPD phase distribution to obtain a phase-only hologram; and inputting the pure phase hologram to a phase type spatial light modulator to obtain a holographic near-eye display result. The invention can realize high-quality holographic near-to-eye display effect in a short time.



CLAIM 1. A phase mask optimization-based holographic retinal projection near-to-eye display method, comprising: s1, performing zero filling by using rectangular apertures distributed by a target image as input amplitude, and superposing a random phase mask to obtain initial input complex amplitude of a holographic plane; s2, obtaining an optimized phase mask of the holographic plane according to the initial input complex amplitude of the holographic plane; s3, obtaining holographic plane complex amplitude according to the optimized phase mask; s4, extracting the phase of the complex amplitude of the holographic plane to obtain the phase of the holographic plane object light wave; s5, superposing the phases of the holographic planar object light waves to converge spherical wave phases to obtain RPD phase distribution; s6, encoding the RPD phase distribution to obtain a pure phase hologram; and S7, inputting the pure-phase hologram into a phase Spatial light modulator (Spatial LightModulator, SLM) to obtain a holographic near-eye display result.

N9559

CN116430702 **SHENZHEN WANCHENGHUI ELECTRONICS**
Priority Date: **26/04/2023**

HOLOGRAPHIC DISPLAY METHOD AND SYSTEM BASED ON SILICON-BASED LIQUID CRYSTAL DEVICE

The invention discloses a holographic display method and a holographic display system based on a silicon-based liquid crystal device, wherein the method comprises the following steps: acquiring a target optical signal of incident light and a corresponding signal image by using a liquid crystal on silicon device; acquiring hologram data based on the target optical signal; determining a pixel voltage value of each pixel point in the signal image according to the hologram data; and mapping the signal image to a window diffraction region according to the pixel voltage value of each pixel point, and generating a holographic image corresponding to the target light signal according to the mapping result. The projection light can be output through utilizing the silicon-based liquid crystal device, the light utilization rate can be maximally improved through the combination of the silicon-based circuit and the liquid crystal, the light quality and the light stability of the output light are ensured, meanwhile, the high definition and the high stability of the final 55-degree holographic image are also ensured, and the visual effect and the experience of a user are improved.

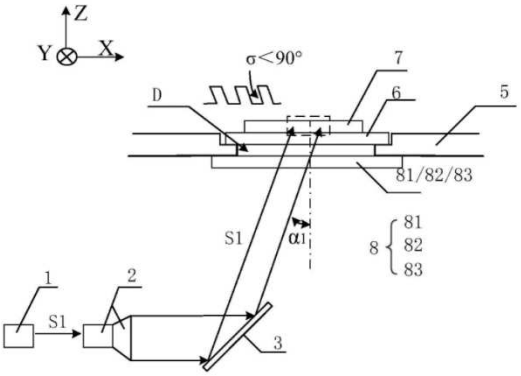
CLAIM 1. A holographic display method based on a liquid crystal on silicon device, comprising the steps of: acquiring a target optical signal of incident light and a corresponding signal image by using a liquid crystal on silicon device; acquiring hologram data based on the target optical signal; determining a pixel voltage value of each pixel point in the signal image according to the hologram data; and mapping the signal image to a window diffraction region according to the pixel voltage value of each pixel point, and generating a holographic image corresponding to the target light signal according to the mapping result.

N9560

CN116430495 **GUANGNA SIWEI GUANGDONG PHOTOELECTRIC TECHNOLOGY**
Priority Date: **27/04/2023**

EXPOSURE METHOD, EXPOSURE LIGHT PATH AND EXPOSURE SYSTEM OF VOLUME HOLOGRAPHIC OPTICAL WAVEGUIDE GRATING

The invention discloses an exposure method, an exposure light path and an exposure system of a volume holographic optical waveguide grating, wherein the exposure system of the volume holographic optical waveguide grating is adopted for exposure, the exposure method exposes at least two spaced areas to be exposed on a liquid crystal box, and the exposure method comprises the following steps: acquiring position information and grating direction information of an area to be exposed on a liquid crystal box; based on the position information and the grating direction information, adjusting the relative positions of the liquid crystal box and the light shielding plate so that the area to be exposed is positioned in the light passing hole of the light shielding plate, and enabling the reference direction of the liquid crystal box and the grating direction on the exposure template to meet a preset angle relation; and controlling exposure parameters of the exposure light beam according to the material characteristics in the liquid crystal box and the grating parameter information in the area to be exposed, exposing the area to be exposed, and forming a grating in the area to be exposed. Only one light path is used for exposing a plurality of grating areas, and the exposure light path has the characteristics of convenience in construction, accuracy in calibration and rapidness in exposure.



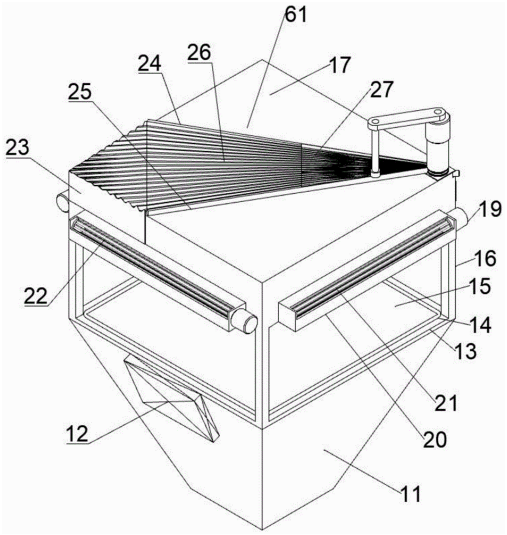
CLAIM 1. An exposure method of a volume holographic optical waveguide grating, which adopts an exposure system of the volume holographic optical waveguide grating to expose, is characterized in that at least two spaced areas to be exposed on a liquid crystal box are exposed, and the exposure method comprises the following steps: acquiring first position information and first grating direction information of a first area to be exposed on the liquid crystal box; based on the first position information and the first grating direction information, adjusting the relative position of the liquid crystal box and a first light shielding plate so that the first area to be exposed is positioned in a first light passing hole of the first light shielding plate, and the first reference direction of the liquid crystal box and the grating direction on the exposure template meet a first preset angle relation; according to the material characteristics in the liquid crystal box and the grating parameter information in the first area to be exposed, controlling the exposure parameters of the exposure light beam, exposing the first area to be exposed, and forming a first grating in the first area to be exposed; acquiring second position information and second grating direction information of a second area to be exposed on the liquid crystal box; based on the second position information and the second grating direction information, adjusting the relative positions of the liquid crystal box and a second light shielding plate so that the second area to be exposed is positioned in a second light through hole of the second light shielding plate, and enabling the first reference direction of the liquid crystal box and the grating direction on the exposure template to meet a second preset angle relation; according to the material characteristics in the liquid crystal box and the grating parameter information in the second area to be exposed, controlling the exposure parameters of the exposure light beam, exposing the second area to be exposed, and forming a second grating in the second area to be exposed; wherein the first reference direction is located in a plane where the liquid crystal cell is located.

N9564

CN116400576 **DONGGUAN YIKE INTELLIGENT ADVERTISING**
Priority Date: **31/03/2023**

HOLOGRAPHIC 3D DEVICE

The invention discloses a holographic 3D device, which relates to the holographic 3D related field and comprises a fan-shaped shading mechanism arranged on a top plate. The supporting rib of shading cloth also stretches in the lump to the shading cloth is expanded completely, and the shading cloth that expands constitutes a ring shape that covers certain scope, thereby covers certain scope bright, thereby reduces the overall brightness around the show cupboard, thereby promotes holistic bandwagon effect and image quality greatly, and also can show and sunshade under the outdoor weather of highlight, holistic 3D bandwagon effect is better, and above-mentioned structure is very simple and practice thrift the space, and area is very little also facilitate the use.



CLAIM 1. A holographic 3D device comprising a fan-shaped shading mechanism (61) arranged on a top plate (17), characterized in that: the fan-shaped shading mechanism (61) comprises a fixed plate (34) arranged on a top plate (17), fixed columns (33) are fixedly arranged on the fixed plate (34), edge plates (24) are fixedly arranged on the fixed columns (33), edge plate sliding grooves (36) are formed in the fixed columns (33), fixed rods (25) are slidably arranged on the edge plate sliding grooves (36), shading films (26) are fixedly arranged between the edge plates (24) and the fixed rods (25), supporting ribs (27) are fixedly arranged at each folding position on the shading films (26) in an equidistant mode, the other ends of the supporting ribs (27) are slidably arranged in corresponding supporting rib sliding grooves (37), and the movable range of the supporting ribs (27) is between the edge plates (24) and the fixed rods (25), and the supporting rib sliding grooves (37) are arranged on the fixed columns (33).

N9569

CN116382054 **CHINA RAILWAY FIRST | CHINA RAILWAY FIRST CONSTRUCTION & INSTALLATION ENGINEERING**
Priority Date: **28/03/2023**

HOLOGRAPHIC PROJECTION METHOD, HOLOGRAPHIC PROJECTION SYSTEM, ELECTRONIC EQUIPMENT AND READABLE STORAGE MEDIUM

The invention relates to a holographic projection method, a holographic projection system, electronic equipment and a readable storage medium, wherein the method comprises the steps of acquiring a three-dimensional model and a visual range instruction; determining an observation base point according to the observation point determining rule and the three-dimensional model; according to the vision distance instruction and the observation base point, setting four image shooting points and determining four observation images, wherein the image shooting points are used for shooting three-dimensional models with different angles, and the image shooting points correspond to the observation images one by one; and arranging the observed images according to an image arrangement rule to determine a projection image. The invention has the effect of improving the flexibility of the three-dimensional model.

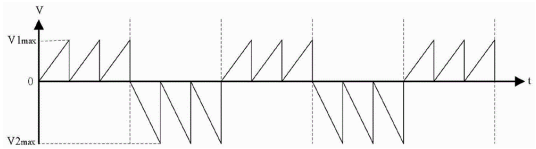
CLAIM 1. A holographic projection method, comprising: acquiring a three-dimensional model and a vision distance instruction; determining an observation base point according to the observation point determining rule and the three-dimensional model; setting four image shooting points and determining four observation images according to the sight distance instruction and the observation base points, wherein the image shooting points are used for shooting the three-dimensional models with different angles, and the image shooting points are in one-to-one correspondence with the observation images; and arranging the observed images according to an image arrangement rule to determine projection images.

N9573 **LIQUID CRYSTALS**

CN116360165 **TIANMA**
Priority Date: **31/03/2023**

LIQUID CRYSTAL GRATING AND HOLOGRAPHIC DISPLAY DEVICE

The invention discloses a liquid crystal grating and a holographic display device, and relates to the technical field of holographic display. The liquid crystal grating comprises a plurality of grating electrode groups, and one grating electrode group comprises a plurality of grating electrodes; the working state of the liquid crystal grating comprises a first mode and a second mode, wherein in the first mode, a first voltage with a first polarity is provided for the grating electrodes, and for one grating electrode group, the average voltage value of the first voltage is |V1|; in the second mode, a second voltage with a second polarity is provided for the grating electrodes, and the average voltage value of the second voltage is |V2| for one grating electrode group; wherein the first polarity is different from the second polarity, and |v1| < |v2|; the number of the first modes is N1, and the number of the second modes is N2; wherein N1 > N2, and N1 and N2 are positive integers. In the embodiment provided by the invention, the components of voltages with different polarities are made to be approximately the same by limiting the number of the first mode and the second mode in one working period of the liquid crystal grating.



CLAIM 1. A liquid crystal grating comprising a plurality of grating electrode sets, one of said grating electrode sets comprising a plurality of grating electrodes; the operating state of the liquid crystal grating comprises a first mode and a second mode, in the first mode, a first voltage with a first polarity is provided for the grating electrodes, and for one grating electrode group, the average voltage value of the first voltage is |v1|; in the second mode, a second voltage with a second polarity is provided for the grating electrodes, and for one grating electrode group, the average voltage value of the second voltage is |v2|; wherein the first polarity is different from the second polarity, and |v1| < |v2|; in one working cycle of the liquid crystal grating, light is modulated by the liquid crystal grating to obtain deflection light, the liquid crystal grating is switched between a first mode and a second mode, the number of the first modes is N1, and the number of the second modes is N2; Wherein N1 > N2, and N1 and N2 are positive integers.

N9575

CN116339503 **HANGMENG EXPLORATION SUZHOU AEROSPACE TECHNOLOGY**
Priority Date: **09/09/2022**

HOLOGRAPHIC INTERACTIVE DISPLAY SYSTEM

The invention discloses a holographic interactive display system which comprises an induction module, an information center module, a storage center module and a holographic throwing module, wherein the induction module comprises a human body judgment front end and an information transmission module, the human body judgment front end comprises a human body induction module, a mood judgment module, a face recognition module and a human body limb recognition module, and the information transmission module comprises a first conveying module and a second conveying module. According to the invention, the voice recognizer and the human body camera are utilized to collect the voice, facial expression, limb movement and other information of the crowd, so that the display requirement of the crowd is obtained, the required display information is transmitted to the holographic putting module, and the display information is put into the front end of the crowd; the human body interaction recognition module is used for collecting and judging the number of people and the interaction condition, when the display requirements of the people change, the human body interaction recognition module transmits the change information to the second conveying module, and finally the display information of the throwing module is replaced.

CLAIM 1. The utility model provides a holographic interactive display system, includes response module (1), information center module (2), stores center module (3) and holographic throwing module (4), its characterized in that, response module (1) is including human judgement front end (11) and information transmission module (12), human judgement front end (11) are including human response module (111), emotion judgement module (112), face identification module (113) and human limbs identification module (114), information transmission module (12) are including first transport module (121) and second transport module (122).

N9580

CN116310005 **GUANGZHOU FRONTOP DIGITAL ORIGINALITY TECHNOLOGY**
Priority Date: **31/03/2023**

HOLOGRAPHIC CABINET, DYNAMIC VIRTUAL IMAGE VIDEO PROCESSING METHOD AND IMAGE PROCESSING METHOD

A processing method of a video with a shadow dynamic virtual image, a processing method of an image with a shadow dynamic virtual image and a holographic cabinet, wherein the processing method of the video with the shadow dynamic virtual image comprises the following steps: step (1), obtaining an initial video of an virtual dynamic image; step (2), generating a shadow corresponding to the dynamic gesture of the virtual dynamic image in the initial video in the step (1) through processing software, and obtaining a shadow video corresponding to the dynamic image; step (3), the shadow video of the step (2) and the initial video of the step (1); synchronously projecting to the holographic cabinet, and displaying the virtual dynamic image with the shadow on the holographic cabinet. The virtual dynamic image of the initial video is correspondingly added with the shadow in the display process, so that the virtual dynamic image is displayed more truly, and the 3D effect is more realistic when the virtual dynamic image is watched by naked eyes.

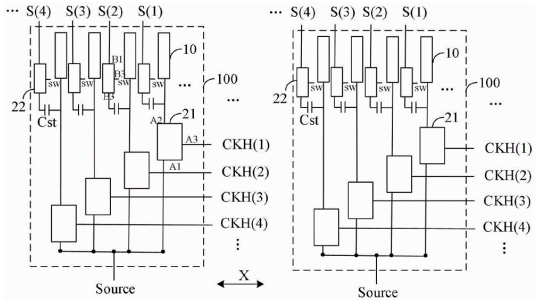
CLAIM 1. A processing method of a dynamic virtual image video with a shadow is characterized by comprising the following steps: step (1), obtaining an initial video of an virtual dynamic image; step (2), generating a shadow corresponding to the dynamic gesture of the virtual dynamic image in the initial video in the step (1) through processing software, and obtaining a shadow video corresponding to the dynamic image; step (3), the shadow video of the step (2) and the initial video of the step (1); synchronously projecting to the holographic cabinet, and displaying the virtual dynamic image with the shadow on the holographic cabinet.

N9584 **LIQUID CRYSTALS**

CN116300243 **TIANMA**
Priority Date: **21/04/2023**

LIQUID CRYSTAL GRATING AND HOLOGRAPHIC THREE-DIMENSIONAL DISPLAY DEVICE

The application discloses liquid crystal grating and holographic three-dimensional display device, liquid crystal grating includes: a plurality of first electrodes; a first driving circuit that supplies a driving signal to the first electrode; the first driving circuit comprises a first switch unit, a second switch unit and a storage unit, wherein a first input end of the first switch unit receives a data signal, and a second input end of the second switch unit receives a first signal; the first polar plate of the storage unit is electrically connected with the first electrode, the first polar plate is also electrically connected with the first output end of the first switch unit, and the second polar plate is electrically connected with the second output end of the second switch unit; in a charging stage in a driving period of the liquid crystal grating, the second switch unit transmits a first level signal to the second electrode plate; in a charge pumping stage in a driving period of the liquid crystal grating, the second switch unit transmits a second level signal to the second electrode plate; the first level signal and the second level signal have different potentials. The circuit structure can be simplified.



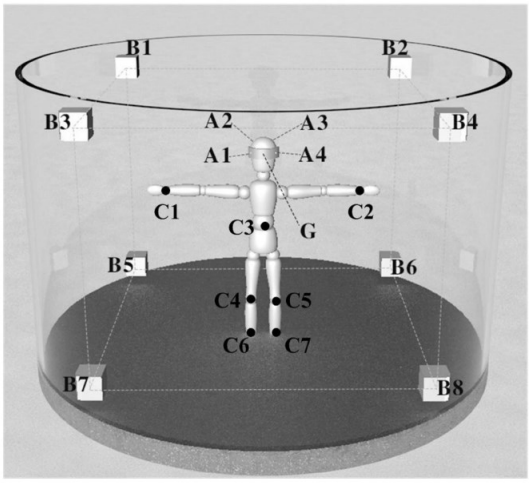
CLAIM 1. A liquid crystal grating, comprising: a plurality of first electrodes; a first driving circuit that supplies a driving signal to the first electrode; the first driving circuit includes: the first input end of the first switch unit receives a data signal, and the second input end of the second switch unit receives a first signal; the storage unit comprises a first polar plate and a second polar plate, the first polar plate is electrically connected with the first electrode, the first polar plate is also electrically connected with the first output end of the first switch unit, and the second polar plate is electrically connected with the second output end of the second switch unit; the liquid crystal grating comprises a charging stage and a charge pumping stage in a driving period; in the charging stage, the second switch unit transmits a first level signal to the second pole plate; in the charge pumping stage, the second switching unit transmits a second level signal to the second diode board; the first level signal is different from the second level signal in potential.

N9581

CN116301379 **LI SHUANGJIANG**
Priority Date: **21/03/2023**

HOLOGRAPHIC DISPLAY METHOD, DEVICE, SYSTEM, EQUIPMENT AND STORAGE MEDIUM FOR 3D SCENE IMAGE

The invention discloses a 3D scene image holographic display method, device, system, equipment and storage medium, and relates to the technical field of virtual display. According to the method, on one hand, user body position information and 3D glasses position information are obtained in real time based on an environment positioning sensor, a body positioning sensor and a glasses positioning sensor, on the other hand, after 3D scene image data are input, 3D surrounding close-range image data are segmented from the 3D scene image data according to the user body position information, new 3D surrounding close-range image data after interaction is updated, then 3D eye foreground close-range image data are segmented from the new 3D surrounding close-range image data according to the 3D glasses position information, and finally the new 3D eye close-range image data are transmitted to 3D holographic glasses for output and display, so that 3D holographic display effects with better effect, stronger immersion feeling, lower delay and more comprehensive functions can be achieved by replacing a gyroscope with the positioning sensor, and user experience is improved.



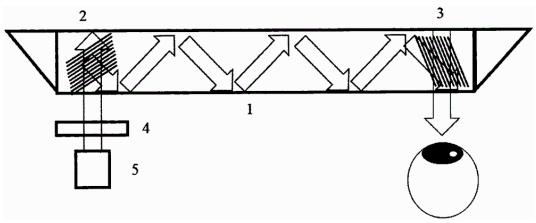
CLAIM 1. A 3D scene image holographic display method, performed by a computing host device communicatively connected to an environmental positioning sensor and 3D holographic glasses, respectively, comprising: acquiring user body position information and 3D glasses position information from an environment positioning sensor in real time, wherein the number of the environment positioning sensors is multiple and the environment positioning sensors are respectively and fixedly arranged in the surrounding environment of a user, the user body position information is first relative position information of the user body position relative to the environment position, the 3D glasses position information is second relative position information of the 3D glasses position relative to the environment position, the environment position is acquired by the environment positioning sensor, the user body position is acquired by a plurality of body positioning sensors fixedly arranged on all parts of the user body, the user wears 3D holographic glasses, the 3D glasses position is acquired by a plurality of glasses positioning sensors fixedly arranged on all parts of the body of the 3D holographic glasses, and the body positioning sensors and the glasses positioning sensors are respectively in communication connection with the environment positioning sensor; After 3D scene image data is input, determining the virtual position of the user according to the body position information of the user, and dividing 3D surrounding close-range image data for presenting a close-range image around the virtual position from the 3D scene image data; determining the interaction influence of the user on the 3D surrounding close-range image data according to the user body position information, and updating to obtain new 3D surrounding close-range image data after the interaction influence; determining a virtual field of view of the 3D holographic glasses according to the 3D glasses position information, and dividing 3D near-field image data for presenting near object images in the virtual field of view from the new 3D surrounding near-field image data; and transmitting the 3D eye front close-range image data to the 3D holographic glasses for output display.

N9585

CN116300078 **CIVIL AVIATION UNIVERSITY OF CHINA**
Priority Date: **10/12/2021**

INTEGRATED HOLOGRAPHIC WAVEGUIDE NEAR-TO-EYE DISPLAY SYSTEM

An integrated holographic waveguide near-eye display system, comprising: high thickness, high transparency photopolymer waveguides and holographic grating recording media, waveguide coupling in gratings, waveguide coupling out gratings, transmissive microdisplays for loading images, and semiconductor lasers. The integrated holographic waveguide near-to-eye display system provided by the invention can respectively interfere light transmitted by total internal reflection of one beam of waveguide with external input and output light beams, respectively record two holographic volume gratings in the photosensitive polymer, and use the two holographic volume gratings as image information input and output elements of the holographic waveguide display system. A beam of light meeting the grating matching condition is transmitted through the transmission type micro display, image information is loaded to an input beam, and the image is coupled into the waveguide through grating diffraction for total reflection transmission. At the output end of the waveguide, the transmission light beam carrying the image information in the waveguide is diffracted by the output grating and coupled to the human eye, so that the integrated holographic waveguide near-eye information display is realized. The integrated holographic waveguide near-to-eye display system can directly write the coupling grating through the high-transparency photosensitive polymer without pasting the input coupling grating and the output coupling grating on the surface of the waveguide. The device is simple and compact, the output angle of the holographic body grating can be adjusted through the direction of the writing light beam, so that the current near-to-eye display system is simplified, and the device has good application prospect.



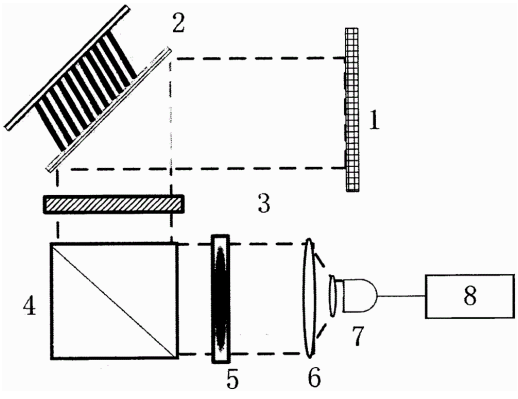
CLAIM 1. An integrated holographic waveguide near-eye display system. It comprises the following steps: the high-thickness high-transparency photosensitive polymer waveguide and holographic grating recording medium (1), a waveguide coupling-in bulk grating (2), a waveguide coupling-out bulk grating (3), a transmission type micro display (4) for loading images and a semiconductor laser (5).

N9586

CN116300077 **CIVIL AVIATION UNIVERSITY OF CHINA**
Priority Date: **10/12/2021**

COLOR TUNABLE DIFFRACTION HEAD-UP DISPLAY DEVICE BASED ON ELASTIC POLYMER HOLOGRAPHIC BODY GRATING

A color tunable diffraction head-up display device based on an elastomeric polymer holographic volume grating. The device comprises a diffraction screen, an elastic polymer recording medium with a reflective holographic body grating recorded therein, a transparent hard glass pressure loading device for generating uniform pressure outside the medium, a liquid crystal light modulator, a beam splitting prism, an adjustable attenuation sheet, a beam expanding lens group, a supercontinuum light source and a supercontinuum light source driving power supply. The color tunable diffraction head-up display device based on the elastic polymer holographic body grating provided by the invention can interfere two beams of coherent light and record the reflective holographic body grating in the photosensitive elastic polymer. The liquid crystal light modulator is used for loading images, and the images or video information to be displayed are diffracted to a screen through the reflective grating. In the process of color adjustment, external force is applied to enable the elastic polymer to generate compression micro deformation along the thickness direction, and the peak wavelength of the diffraction spectrum of the grating is obviously blue shifted. Releasing the pressure, the peak wavelength will shift red with it. Therefore, the color of the diffracted light can be tuned through external mechanical pressure deformation, and the color-tunable clear diffraction image display is realized. The diffraction head-up display device with the tunable color can be suitable for displaying information under different ambient background light conditions, and contrast is increased through color tuning, so that the display effect is improved, and the diffraction head-up display device has a good application prospect.



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

N9507

WO2023120990 **HICS**

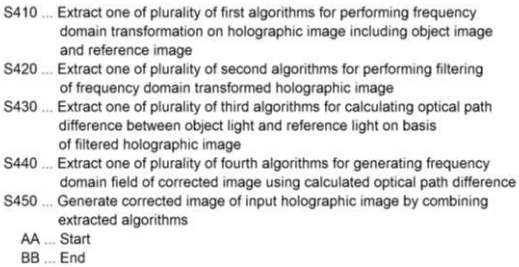
Priority Date: **24/12/2021**

METHOD AND DEVICE FOR TESTING HOLOGRAM PATTERN ANALYSIS SOFTWARE OF DIGITAL HOLOGRAPHIC MICROSCOPE

The present invention relates to a method for testing hologram pattern analysis software of a digital holographic microscope. The method for testing hologram pattern analysis software of a digital holographic microscope comprises the steps of: (a) extracting one of a plurality of first algorithms for performing frequency domain transformation on a holographic image including an object image and a reference image; (b) extracting one of a plurality of second algorithms for performing filtering of the frequency domain transformed holographic image; (c) extracting one of a plurality of third algorithms for calculating the optical path difference between an object light and a reference light on the basis of the filtered holographic image; (d) extracting one of a plurality of fourth algorithms for generating a frequency domain field of a corrected image by using the calculated optical path difference; and (e) generating a corrected image of the input holographic image by combining the algorithms extracted in steps (a) to (d).

PROCÉDÉ ET DISPOSITIF DESTINÉS À TESTER UN LOGICIEL D'ANALYSE DE MOTIF D'HOLOGRAMME D'UN MICROSCOPE HOLOGRAPHIQUE NUMÉRIQUE

La présente invention concerne un procédé destiné à tester un logiciel d'analyse de motif d'hologramme d'un microscope holographique numérique. Le procédé destiné à tester un logiciel d'analyse de motif d'hologramme d'un microscope holographique numérique comprend les étapes consistant à : (A) extraire un algorithme d'une pluralité de premiers algorithmes pour effectuer une transformation de domaine fréquentiel sur une image holographique comprenant une image d'objet et une image de référence ; (b) extraire un algorithme d'une pluralité de deuxièmes algorithmes pour effectuer un filtrage de l'image holographique transformée dans le domaine fréquentiel ; (c) extraire un algorithme d'une pluralité de troisièmes algorithmes pour calculer la différence de trajet optique entre une lumière d'objet et une lumière de référence sur la base de l'image holographique filtrée ; (d) extraire un algorithme d'une pluralité de quatrièmes algorithmes pour générer un champ de domaine fréquentiel d'une image corrigée à l'aide de la différence de trajet optique calculée ; et (e) générer une image corrigée de l'image holographique d'entrée par combinaison des algorithmes extraits dans les étapes (a) à (d).



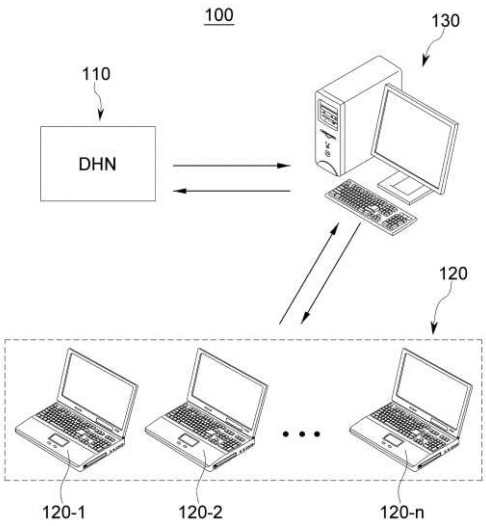
CLAIM 1. A method of testing hologram pattern analysis software of a digital holographic microscope performed by at least one processor, the method comprising: (a) Extracting one of a plurality of first algorithms for performing frequency domain transformation on a hologram image including an object image and a reference image; (b) Extracting one of a plurality of second algorithms performing filtering on the frequency domain transformed hologram image; (c) Extracting one of a plurality of third algorithms for calculating an optical path difference between the object light and the reference light based on the filtered hologram image; (d) Extracting one of a plurality of fourth algorithms for generating a frequency domain field of a correction image using the calculated optical path difference; and (e) Combining the algorithms extracted by the steps (a) to (d) to generate a corrected image for the input hologram image; And a method of testing hologram pattern analysis software in a digital holographic microscope.

N9508

WO2023120832 **HICS**
Priority Date: **24/12/2021**

PARALLEL PROCESSING METHOD AND HIGH-SPEED PROCESSING SYSTEM USING SAME

The present invention relates to a parallel processing method and a high-speed processing system using same, and, more specifically, to: a parallel processing method for more rapidly restoring shape data through parallel processing of hologram pattern images; and a high-speed processing system using same.



PROCÉDÉ DE TRAITEMENT PARALLÈLE ET SYSTÈME DE TRAITEMENT À GRANDE VITESSE L'UTILISANT

La présente invention concerne un procédé de traitement parallèle et un système de traitement à grande vitesse l'utilisant, et, plus spécifiquement, un procédé de traitement parallèle permettant de restaurer plus rapidement des données de forme par le biais d'un traitement parallèle d'images de motif d'hologramme; et un système de traitement à grande vitesse l'utilisant.

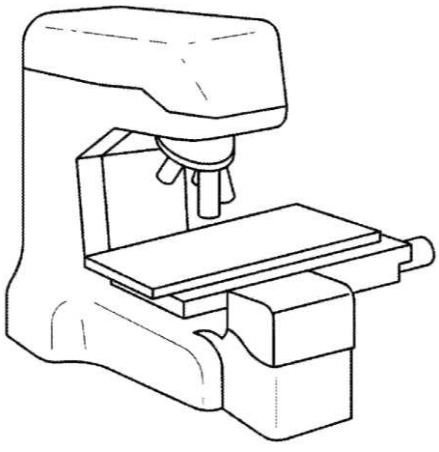
CLAIM 1. A high-speed processing system using parallel processing, comprising: A digital holographic microscope that generates hologram pattern images for an object, the hologram pattern images having different locations; Slave processing devices that parallel-process the hologram pattern images to extract depth information of each of the hologram pattern images; and And a master processing device which integrates the depth information and restores shape data for the entire area of the object.

N9517

US20230213890 **KOREA PHOTONICS TECHNOLOGY INSTITUTE**
Priority Date: **30/12/2021**

HOLOGRAPHIC MICROSCOPE INCLUDING HOLOGRAPHIC IMAGE SENSOR

According to an embodiment, a holographic microscope comprises a light source emitting light to an object, a beam splitter reflecting the light emitted from the light source to the object and transmitting object light reflected from the object, a holographic image sensor sensing information, including a holographic image, by receiving the object light and allowing the object light to coherently interfere with reference light, and an image processor obtaining three-dimensional (3D) information about the object based on the information sensed by the holographic image sensor. The holographic image sensor includes a lens focusing the object light to the holographic image sensor, a filter transmitting a predetermined wavelength band of light of the focused object light, a light receiving unit receiving interference light to sense a holographic image, and a reference light source directly emitting the reference light having the predetermined wavelength band to the light receiving unit.



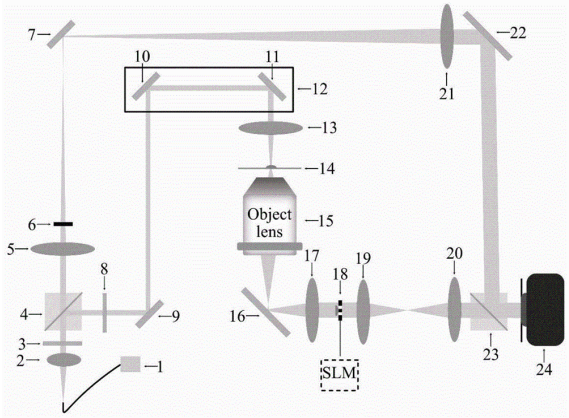
CLAIM 1. A holographic microscope, comprising: a light source emitting light to an object; a beam splitter reflecting the light emitted from the light source to the object and transmitting object light reflected from the object; a holographic image sensor sensing information, including a holographic image, by receiving the object light and allowing the object light to coherently interfere with reference light; and an image processor obtaining three-dimensional (3D) information about the object based on the information sensed by the holographic image sensor, wherein the holographic image sensor includes: a lens focusing the object light to the holographic image sensor; a filter transmitting a predetermined wavelength band of light of the focused object light; a light receiving unit receiving interference light to sense a holographic image; and a reference light source directly emitting the reference light having the predetermined wavelength band to the light receiving unit.

N9565

CN116400575 **JIANGXI GAORUI PHOTOELECTRIC**
Priority Date: **09/03/2023**

MULTIMODE DIGITAL HOLOGRAPHIC MICROSCOPIC IMAGING DEVICE

The invention discloses a multimode digital holographic microscopic imaging device, which comprises: the device comprises a light source, a collimating lens, a first half-wave plate, a polarization cube beam splitter prism, a second half-wave plate, a first plane reflector, a first lens and a baffle plate. The light beam emitted by the light source is collimated and transmitted through the collimating lens, and is divided into a transmission light path and a reflection light path through the first half-wave plate and the polarization cube beam splitting prism. The light beam propagation path and the object information are respectively regulated and controlled by controlling the baffle and the spatial light modulator, so that the switching of four imaging modes of on-axis holography, off-axis holography, bright field and dark field is realized. The device can be used for three-dimensional measurement of samples such as cells and organisms, can also be used for photosensitive particle flow analysis, has the characteristics of convenience in measurement and multiple modes, and can be widely applied to the field of actual measurement.



CLAIM 1. The utility model provides a multimode digital holographic microscopic imaging device, including light source (1), collimating lens (2), first half-wave plate (3), polarization cube beam splitter prism (4), second half-wave plate (8), first plane mirror (9), first lens (5), baffle (6), second plane mirror (7), second lens (21), third plane mirror (22), fourth plane mirror (10), fifth plane mirror (11), third lens (13), microscope objective (15), sixth plane mirror (16), first achromatic lens (17), spatial light modulator (18), second achromatic lens (19), third achromatic lens (20), cube beam splitter prism (23) and camera device (24), its characterized in that: the light beam emitted by the light source (1) is collimated and propagated through the collimating lens (2), is divided into a transmission light path and a reflection light path through the polarizing cube beam splitting prism (4) after passing through the first half-wave plate (3), the light beam propagation path and the object information are respectively controlled through the control baffle (6) and the spatial light modulator (18), the light beam transmitted by the polarizing cube beam splitting prism (4) is allowed to pass through the spatial light modulator (18), the light beam transmitted through the polarizing cube beam splitting prism (4) is converged after passing through the first lens (5), the converged light beam is collimated after being reflected by the second plane reflecting mirror (7) to the second lens (21), the collimated light beam is reflected by the third plane reflecting mirror (22) and then enters the cube beam splitting prism (23), the cube beam splitting prism (23) does not contain object information and the parallel object light beam emitted from the third achromatic lens (20) meet the off-axis interference condition, and the off-axis interference fringes are formed on the target surface of the camera device (24); the light path folding system (12) formed by the fourth plane reflecting mirror (10) and the fifth plane reflecting mirror (11) can be adjusted in an up-and-down moving mode, light beams reflected by the polarization cube beam splitting prism (4) enter the light path folding system (12) after passing through the second half wave plate (8) and being reflected by the first plane reflecting mirror (9), parallel light beams emitted by the folding system (12) irradiate a sample (14) after being focused by the third lens (13), the sample (14) is imaged at the conjugate back focal plane of the microscope objective (15) through the microscope objective (15), the sixth plane reflecting mirror (16) and the first achromatic lens (17), and a dark field pattern can be formed on the target surface of the image pickup device (24) after the light beams pass through the 4f system formed by the second achromatic lens (19) and the third achromatic lens (20) by placing a spatial light modulator (18) at the conjugate back focal plane, namely information under the background with the lowest frequency spectrum is blocked in the non-scattered illumination light beams.

N9572

CN116360229
Priority Date: **03/03/2023**

BEIHANG UNIVERSITY OF AERONAUTICS & ASTRONAUTICS | THIRD HOSPITAL OF PEKING UNIVERSITY

REAL-TIME QUANTITATIVE DETECTION METHOD FOR THREE-DIMENSIONAL STRUCTURE OF INTERNAL VACUOLE OF CANCER CELL BASED ON DIGITAL HOLOGRAPHIC MICROSCOPIC CHROMATOGRAPHY

The invention provides a quantitative analysis method of a three-dimensional structure of internal vacuoles of cancer cells based on digital holographic microscopic chromatography, which can be used for real-time monitoring of three-dimensional morphological changes of the internal vacuoles and quantitative calculation of related morphological parameters in the apoptosis process of the cancer cells. Firstly, collecting multi-angle holograms of cancer cells with cavitation structures at all times by utilizing a digital holographic microscopic imaging system in combination with a rotary scanning motor, diffracting and reconstructing each hologram image to obtain a two-dimensional complex light field of the cancer cells at all angles at all times, then combining a diffraction chromatography reconstruction algorithm and non-negative constraint iteration to obtain three-dimensional refractive index distribution of the cancer cells at all times, finally, finding cavitation positions from the three-dimensional refractive index distribution of the cancer cells, calculating corresponding morphological parameters, and analyzing the change of all parameters along with time. The invention provides a nondestructive and non-marked in-situ three-dimensional quantitative measurement method for real-time monitoring of cancer cell cavitation, which is suitable for research on aspects of cancer cell apoptosis progress, related treatment strategies and the like.

N9574

CN116359175
Priority Date: **03/03/2023**

BEIHANG UNIVERSITY OF AERONAUTICS & ASTRONAUTICS | THIRD HOSPITAL OF PEKING UNIVERSITY

EARLY URINARY TRACT EPITHELIAL CANCER CELL SCREENING METHOD BASED ON DIGITAL HOLOGRAPHIC FLOW MICROSCOPIC IMAGING

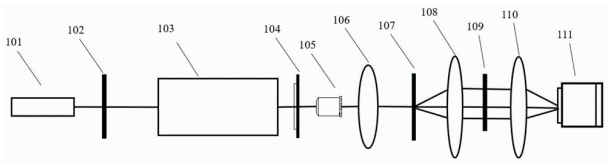
The invention discloses a urinary tract epithelial cancer cell early screening method based on digital holographic flow microscopic imaging. The invention combines digital holographic microscopic imaging and microfluidic chip technology to realize detection of urothelial cancer cells in urine. The clinical urine sample is driven to flow in the microfluidic chip by using the injection pump, the holographic interference image acquisition of the flowing cells is carried out by using the off-axis digital holographic microscopic imaging system, the holographic image is further subjected to numerical diffraction reproduction and is divided into single-cell focusing and continuous quantitative phase image composition data sets, the image data sets are extracted to form high-dimensional characteristic data sets by using morphological characteristics, optical phase characteristics and texture characteristic parameters, a machine learning algorithm support vector machine is used for training to obtain an artificial intelligent model for classifying the urine cells, and finally, cancer cells in the clinical urine sample are identified and screened by using the established classification model. The invention provides a low-cost, rapid and convenient detection method for urine cytology examination, and is suitable for early screening of urothelial cancer in clinical urine samples without staining marks.

N9577

CN116339097
Priority Date: **23/02/2023**

SOUTH CHINA NORMAL UNIVERSITY

DUAL-WAVELENGTH DIGITAL HOLOGRAPHIC SYSTEM AND METHOD



The invention relates to a dual-wavelength digital holographic system and a method, wherein the system comprises an LED illumination module, a polarizer, a polarization filter device, an objective table device, an infinite imaging microscope objective lens, a lens barrel lens, an orthogonal grating, a first lens, a spatial filter, a second lens and a monochromatic black-and-white image sensor which are sequentially connected. According to the technical scheme provided by the invention, the holographic imaging precision is improved under the condition of simplifying the system architecture.

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

N9503

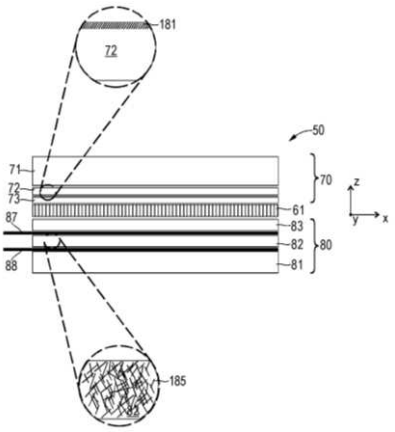
WO2023135247 **CARL ZEISS JENA**
Priority Date: **14/01/2022**

HOLOGRAPHIC OPTICAL ELEMENT AND TEMPERATURE STABILIZATION

Various examples relate to techniques for actively or passively stabilizing the temperature of a holographic optical element. For this purpose, heat-conducting elements are provided, for example silver nanowires or carbon nanotubes.

ÉLÉMENT OPTIQUE HOLOGRAPHIQUE ET STABILISATION DE TEMPÉRATURE

Divers exemples concernent des techniques de stabilisation active ou passive de la température d'un élément optique holographique. À cet effet, il est prévu des éléments thermoconducteurs, par exemple des nanofils d'argent ou des nanotubes de carbone.



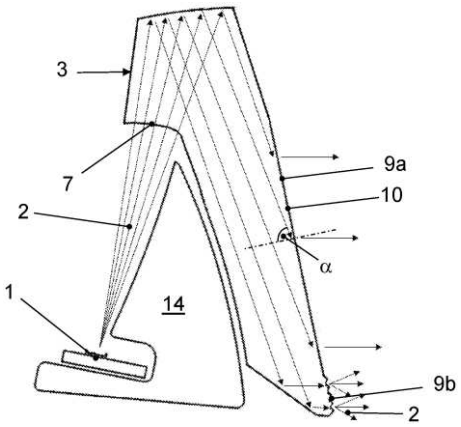
CLAIM 1. A system (50) comprising:
- at least one substrate (71, 81),
- at least one first layer (72, 73) deposited on the at least one substrate (71, 81), each of the at least one first layer (72, 73) comprising a respective holographic optical element, and
- at least one second layer (82, 83) deposited on the at least one substrate (71, 81), each of the at least one second layer (82, 83) comprising at least one respective thermally conductive element (185).

N9516

US20230228398 **HELLA**
Priority Date: **14/01/2022**

LIGHTING DEVICE FOR A MOTOR VEHICLE

A lighting device for a motor vehicle having a light source, a light guide with an entrance surface, and a hologram disposed on or in the light guide. The lighting device is configured such that light emanating from the light source enters the entrance surface of the light guide and interacts with the hologram so that an image stored in the hologram is reconstructed and is visible to an observer of the lighting device. The light guide has a first exit surface and a second exit surface. The lighting device is configured such that light that has interacted with the hologram exits through the first exit surface and that light that has not interacted with the hologram exits through the second exit surface.



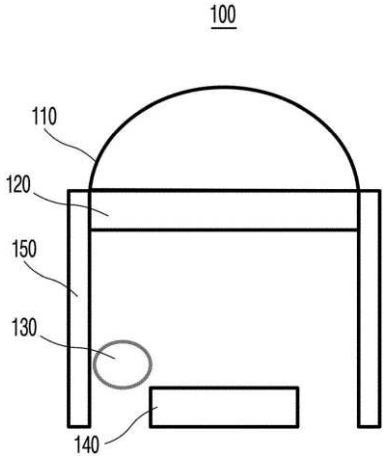
CLAIM 1. A lighting device for a motor vehicle, the lighting device comprising: a light source; a light guide with an entrance surface; and a hologram disposed on or in the light guide; wherein the lighting device is configured such that light emanating from the light source enters the entrance surface of the light guide and interacts with the hologram so that an image stored in the hologram is reconstructed and is visible to an observer of the lighting device, wherein the light guide has a first exit surface and a second exit surface, wherein the lighting device is configured such that light that has interacted with the hologram or interacts with the hologram during an exit or after the exit from the first exit surface exits through the first exit surface, and that light that has not interacted with the hologram and also does not interact with the hologram during the exit or after the exit from the second exit surface exits through the second exit surface.

N9518

US20230213889 **KOREA PHOTONICS TECHNOLOGY INSTITUTE**
Priority Date: **30/12/2021**

HOLOGRAPHIC IMAGE SENSOR

According to an embodiment, a holographic image sensor comprises a lens focusing object light incident from outside of the holographic image sensor to the holographic image sensor, a filter transmitting a predetermined wavelength band of light of the focused object light, a light receiving unit receiving interference light to sense a holographic image, and a reference light source directly emitting reference light having the predetermined wavelength band to the light receiving unit.



CLAIM 1. A holographic image sensor, comprising: a lens focusing object light incident from outside of the holographic image sensor to the holographic image sensor; a filter transmitting a predetermined wavelength band of light of the focused object light; a light receiving unit receiving interference light to sense a holographic image; and a reference light source directly emitting reference light having the predetermined wavelength band to the light receiving unit

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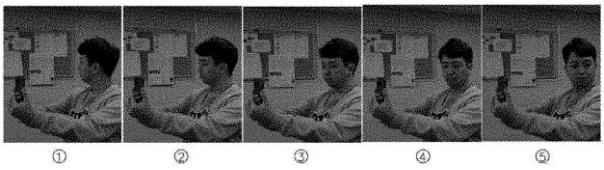
N9519

US20230205134 **KWANGWOON UNIVERSITY INDUSTRY ACADEMIC COLLABORATION FOUNDATION**
Priority Date: **27/12/2021**

WEBSERVER-BASED VIDEO CONTENT PRODUCTION SYSTEM AND METHOD FOR PRINTING HOLOGRAPHIC STEREOGRAM PHOTO

Provided are a webserver-based video content production system and method for printing a holographic stereogram photo. According to the webserver-based video content production system and method, an encoding process is performed on image data under a web environment to prevent data loss in a network communication process, and then the encoded image data is transmitted to a webserver. The webserver decodes the encoded image data and performs a second-half task (postprocessing) on the decoded image data using deep learning such that a high-quality hologram photo can be printed within a relatively short time without any unnecessary process.



CLAIM 1. A webserver-based video content production method for printing a holographic stereogram photo, the webserver-based video content production method comprising: providing image data acquired by imaging a subject through a user terminal to a web; providing the received image data to a webserver; performing a second-half task on the received image data using deep learning to produce video content; and providing the produced video content to the user terminal through the web.

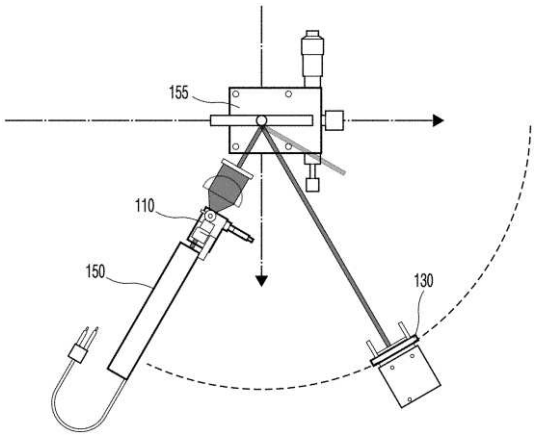
N9522

US20230204454 **KOREA PHOTONICS TECHNOLOGY INSTITUTE**
Priority Date: **29/12/2021**

SPATIAL PROPERTY OR COLOR IMPLEMENTATION PROPERTY MEASUREMENT DEVICE OF HOLOGRAPHIC IMAGES

Disclosed is a spatial property measurement device or color implementation property of a holographic image. According to an aspect of the present embodiment, a spatial property measurement device or color implementation property of a holographic image reproduced by a holographic display device is provided.

CLAIM 1. A spatial property measurement device of a holographic image output from a holographic display device, the spatial property measurement device comprising: a light receiver receiving and sensing light output from a light source within the holographic display device and diffracted from a spatial light modulator within the holographic display device; a diffraction element disposed in front of the light receiver in a direction in which the light diffracted from the spatial light modulator is incident and re-diffracting the light diffracted from the spatial light modulator; a rotation element fixed within a predetermined range from the spatial light modulator at one end and fixed to the light receiver at the other end to rotate the light receiver and adjusting a distance between the light receiver and the spatial light modulator; and a controller adjusting the rotation angle of the rotation element and the distance between the light receiver and the spatial light modulator and analyzing the sensed value by the light receiver, thereby determining whether there is an abnormality in the arrangement of the spatial light modulator or the diffraction property of the spatial light modulator in the holographic display device.



N9524

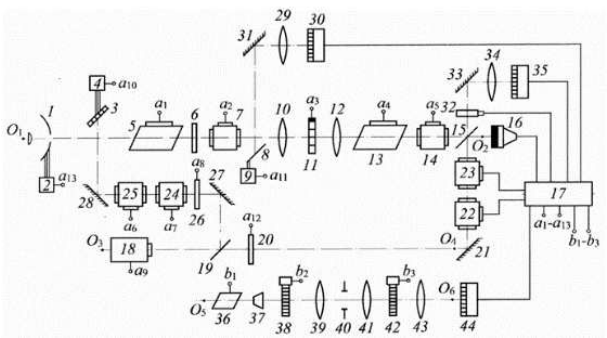
RU2799499 **FEDERALNOE GOSUDARSTVENNOE BYUDZHETNOE UCHREZHDENIE NAUKI FIZICHESKIJ INSTITUT IM P N LEBEDEVA ROSSIJSKOJ AKADEMII NAUK**
Priority Date: **06/12/2022**

LASER HOLOGRAPHIC RECEIVING SYSTEM

FIELD: laser technology.

SUBSTANCE: invention is intended for registration of holograms of space objects. Registration of a hologram of a remote space object with high sensitivity is provided by using a highly efficient two-stage laser amplifier in the laser holographic receiving system, which consists of two laser amplifiers. When observing a space object from the Earth's surface through a layer of turbulent surface atmosphere, the laser receiving system additionally provides compensation for atmospheric turbulence and limiting diffraction resolution of the telescope by compensating for turbulent atmospheric distortions in the registered hologram during its processing using controlled optical transparencies without using complex and inefficient adaptive optics.

EFFECT: increased sensitivity of the receiving system when registering a hologram of a space object and increased efficiency of its operation in tracking remote space objects from the earth's surface.



N9527

KR20230103372 **JEONG, SO WON**
Priority Date: **31/12/2021**

GAN-BASED ARTIFICIAL INTELLIGENCE HOLOGRAM IMAGE RECONSTRUCTION METHOD AND SYSTEM THEREFOR

A GAN-based artificial intelligence hologram image reconstruction method and system thereof are provided. A Gan based artificial intelligence hologram image reconstruction system includes: an input unit configured to receive a single hologram image missing optical field information; and an output unit configured to generate a reconstruction image by applying a Gan algorithm to the hologram image input to the input unit.

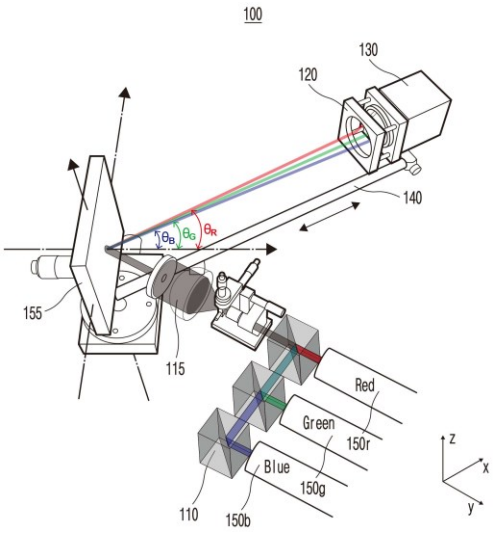
CLAIM 1. A Gan based artificial intelligence hologram image reconstruction system, comprising: an input unit configured to receive a single hologram image missing optical field information; and an output unit configured to generate a reconstruction image by applying a Gan algorithm to the hologram image input to the input unit.

N9531

KR20230100985 **KOREA PHOTONICS TECHNOLOGY INSTITUTE**
Priority Date: **29/12/2021**

DEVICE FOR MEASURING COLOR IMPLEMENTATION CHARACTERISTICS OF HOLOGRAPHIC IMAGES

An apparatus for measuring a color implementation characteristic of a holographic image is provided. According to one aspect of the present embodiment, an embolization characteristic measuring apparatus for measuring embolization characteristics of a holographic image reproduced by a holographic display apparatus is provided.



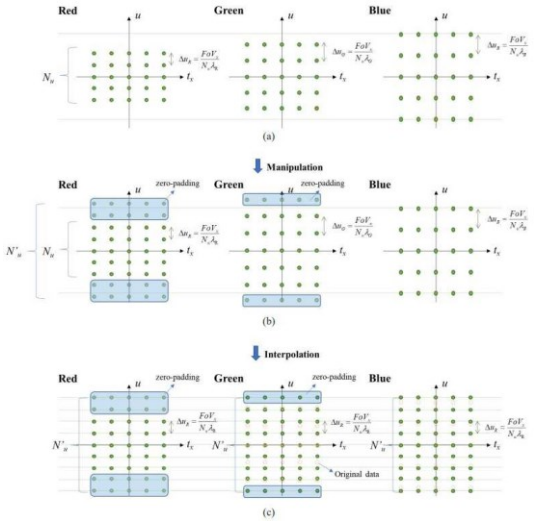
CLAIM 1. An embolization characteristic measuring device for measuring embolization characteristic of a holographic image output from the holographic display device, the embolization characteristic measuring device comprising: an optical path adjusting unit for adjusting paths of light of different wavelength bands output from a light source in the holographic display device to be the same; A light receiving unit configured to receive and sense a plurality of lights having different wavelength bands, diffracted from a spatial light modulator in the holographic display device via the light path adjusting unit; A rotation unit fixed to the light receiving unit at one end within a predetermined range from the spatial light modulator by the other end to rotate the light receiving unit; and a controller configured to adjust a rotation angle of the rotation unit and a distance between the light receiving unit and the spatial light modulator and analyze a sensing value of the sensed light receiving unit, And a controller configured to determine whether a light source in the holographic display device is abnormal, wherein the spatial light modulator does not have a modulation characteristic.

N9532

KR20230092162 **INHA INDUSTRY PARTNERSHIP INSTITUTE**
Priority Date: **17/12/2021**

COMPUTER ARRANGEMENT AND METHOD FOR SYNTHESIZING A NONHOGEL LIGHT FIELD BASED COMPUTER GENERATED HOLOGRAM WITHOUT COLOR ABERRATION FOR ALL COLOR CHANNELS

Various embodiments relate to a computer apparatus and method thereof for synthesizing a nonhogel light field based computer generated hologram without color aberration for all color channels, wherein in light field data for all color channels, Set the same hologram pixel pitch for the color channels, in the light field data, set the same spatial frequency sampling grid for the color channels, and synthesize a color nohogel-based computer generated hologram from the light field data.



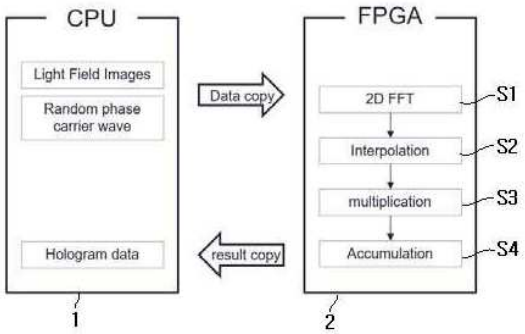
CLAIM 1. A method of computer arrangement, comprising: in light field data for all color channels, setting the same hologram pixel pitch for the color channels; in the light field data, Establishing a same spatial frequency sampling grid for the color channels; and synthesizing a color nohogel-based computer generated hologram from the light field data.

N9538

KR102550328 **INHA INDUSTRY PARTNERSHIP INSTITUTE**
Priority Date: **07/09/2022**

FPGA ACCELERATION METHOD OF COMPUTER GENERATED HOLOGRAMS USING HIGH-LEVEL SYNTHESIS ON FPGA

The present invention relates to a method for accelerating the computation of an fpga based computer generated hologram using high-level synthesis, and more particularly, to a method for accelerating the computation of an fpga based computer generated hologram using high-level synthesis, which is capable of accelerating a synthesis speed of the computer generated hologram by twice or more compared to an existing GPUs by synthesizing the computer generated hologram based on an fpga.



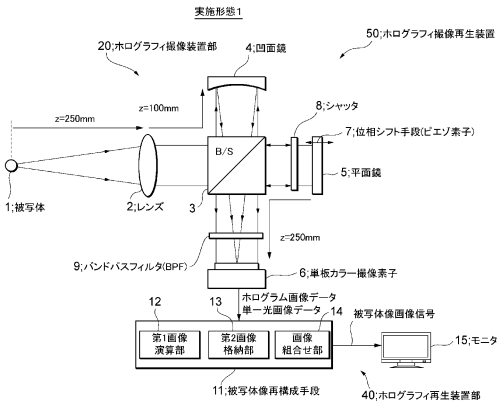
CLAIM 1. A method of accelerating computation of an fpga based computer generated hologram using a light field image, the method comprising: a first step of retrieving a light field image into an FPGA; a second step of calculating a 2 D FFT for the light field image by the FPGA, A second step of performing interpolation to the resolution of the hologram to be generated; and a second step of performing pixel-wise multiplication by the FPGA with a carrier wave having a random phase necessary for hologram generation, Accumulating results of each light field image into one matrix, wherein the FPGA generates a core dedicated to hologram synthesis through high-level synthesis to accelerate hologram synthesis, Wherein the first step is a step of retrieving a light field image stored in the CPU into a global memory of the FPGA.

N9539

JP2023097562 **NIPPON HOSO KYOKAI**
Priority Date: **28/12/2021**

INCOHERENT DIGITAL HOLOGRAPHIC IMAGING DEVICE AND METHOD OF IMAGING

TOPIC: To provide an incoherent digital holographic imaging apparatus and an imaging method capable of easily and accurately forming a new color reconstructed image of a subject having a desired image quality by using a reconstructed image of the subject obtained by holographic technology. INVENTION: An imaging device, comprising: a first imaging function unit that captures a hologram image by incoherent light from a subject 1 and forms a first image that is a reconstructed color image of the subject 1; and a second imaging function unit that forms an image of a single luminous flux from the subject 1 and captures a second image that is a color image of the subject 1; Provided is an image combining unit (14) configured to acquire position information of each portion of a subject (1) based on a first image, cut out each portion of a second image corresponding to each portion of the first image based on the acquired position information, set a position of each portion of the subject (1), and form a new first image.



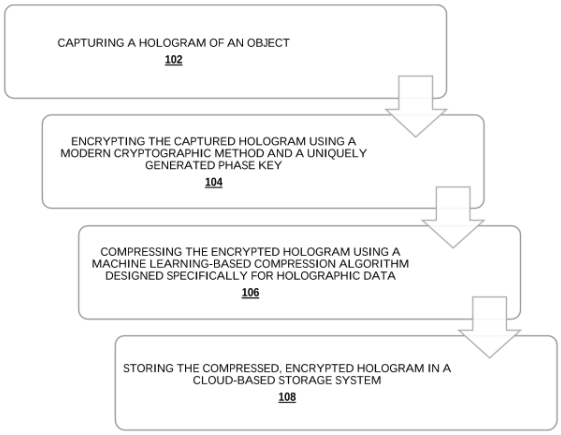
CLAIM 1. An imaging device comprising: a first imaging function unit configured to capture a hologram image formed by causing incoherent light from a subject split into two systems to interfere with each other and form a first image that is a reconstructed image of the subject; and a second imaging function unit configured to form an image of a single luminous flux from the subject and obtain a second image that is a color image of the subject simultaneously or sequentially with the first image; An image combining unit that combines image information of the first image with color image information of the second image to newly form a color reconstructed image of the subject.

N9541

IN202311038433 **GL BAJAJ INSTITUTE OF TECHNOLOGY & MANAGEMENT**
Priority Date: **05/06/2023**

ADVANCED DIGITAL HOLOGRAPHY SYSTEM UTILIZING MACHINE LEARNING-BASED COMPRESSION, SECURE ENCRYPTION, AND CLOUD PROCESSING

The invention provides a system for enhancing digital holography by integrating advanced technologies in encryption, compression, and cloud storage. The system begins with a digital holography device that captures a hologram. This hologram is then secured through a state-of-the-art encryption module, utilizing a modern cryptographic method and a uniquely generated phase key to protect the data. Further, the system incorporates a machine learning-based compression module specifically designed for holographic data, ensuring efficient size reduction without significant quality loss. The compressed and encrypted hologram is subsequently stored in a cloud-based storage system, promoting easy accessibility and secure archival. This system integrates secure encryption, efficient compression, and cloud-based storage to advance digital holography, leading to improved data security, reduced storage requirements, and seamless accessibility.



CLAIM 1. A method of enhancing digital holography, comprising the steps of. capturing a hologram of an object; encrypting the captured hologram using a modern cryptographic method and a uniquely generated phase key; compressing the encrypted hologram using a machine learning-based compression algorithm designed specifically for holographic data; and storing the compressed, encrypted hologram in a cloud-based storage system.

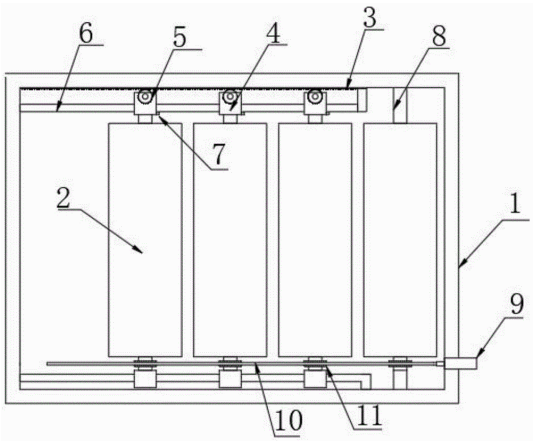
N9548

CN219392348U **SANYI PHOTOELECTRIC TECHNOLOGY SUZHOU**

Priority Date: **06/02/2023**

HOLOGRAPHIC DIFFRACTION GRATING

The utility model discloses a holographic diffraction grating, which comprises an outer frame, wherein an adjustable grating is arranged in the outer frame side by side, central shafts are fixed in the middle parts of two ends of the adjustable grating, sliding blocks are arranged at two ends of the central shafts, sliding rods matched with the sliding blocks are arranged at two sides of the inner part of the outer frame, an angle adjusting gear is fixed at one end of the central shaft, rack plates matched with the angle adjusting gear are arranged above the outer frame, a telescopic cylinder capable of driving the rack plates to transversely move is arranged at one side of the outer frame, and a lifting cylinder capable of driving the rack plates to lift is arranged above the outer frame. According to the adjustable light grating adjusting device, the distance adjusting gear and the distance adjusting rack are arranged, so that when the distance adjusting gear rotates, a biting force can be generated between the distance adjusting gear and the distance adjusting rack, further movement of the distance adjusting gear is achieved, and further the adjustable light grating can be moved by driving the sliding block to move, so that the distance between the adjustable light gratings can be adjusted.



CLAIM 1. A holographic diffraction grating comprising an outer frame (1), characterized in that: the adjustable grating is characterized in that the adjustable grating (2) is arranged in the outer frame (1) side by side, the middle parts of the two ends of the adjustable grating (2) are respectively fixed with a central shaft (8), sliding blocks (4) are respectively arranged at the two ends of the central shaft (8), sliding rods (6) matched with the sliding blocks (4) are respectively arranged at the two sides of the inner part of the outer frame (1), an angle adjusting gear (11) is fixed at one end of the central shaft (8), rack plates (10) matched with the angle adjusting gear (11) are arranged above the outer frame (1), telescopic cylinders (9) capable of driving the rack plates (10) to transversely move are arranged on one side of the outer frame (1), and lifting cylinders (13) capable of driving the rack plates (10) to lift are arranged above the outer frame (1).

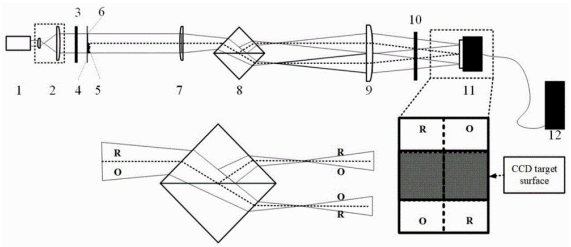
N9556

CN116482059 **HARBIN ENGINEERING UNIVERSITY**

Priority Date: **27/04/2023**

DUAL-CHANNEL POLARIZED CARRIER PHASE SHIFT COMMON-PATH DIGITAL HOLOGRAPHIC MEASUREMENT DEVICE AND METHOD

The invention discloses a double-channel polarized carrier phase shift common-path digital holographic measurement device and a method, wherein the device comprises a light source, a collimation beam expanding system, a first polaroid, a 1/4 glass slide, a rectangular diaphragm, a first lens, a polarization beam splitting prism, a second lens, a second polaroid, a CCD camera and a computer; the light beam emitted by the light source forms a plane light beam through the beam expanding and collimating system, 45-degree linear polarized light is formed through the first polarizing plate, the plane light beam reaches the rectangular diaphragm, 1/2 light beam carrying object information of the window for placing the tested sample propagates in a 45-degree linear polarization state, 1/2 light beam without sample information of the window for placing the 1/4 glass propagates in a circular polarization state, the light beam propagates to the first lens, the light beam is copied into two light beams which are mirror images through the polarizing beam splitting prism, the two light beams propagate to the second lens, two carrier holograms are acquired on the CCD camera after passing through the second polarizing plate, and the two carrier holograms are transmitted to the computer. The invention has the characteristics of compact structure, simple operation, less acquisition times and high imaging resolution.



CLAIM 1. the utility model provides a binary channels polarization carrier phase shift common way digital holographic measurement device which characterized in that includes: the system comprises a light source with wavelength lambda, a collimation beam expanding system, a first polaroid, a 1/4 glass slide, a rectangular diaphragm, a first lens, a polarization beam splitter prism, a second lens, a second polaroid, a CCD camera and a computer; the method comprises the steps that a light source emits light beams, the light beams form plane light beams after passing through a beam expanding and collimating system, 45-degree linearly polarized light is formed after passing through a first polarizing plate, then the plane light beams reach a rectangular diaphragm, 1/2 light beams carrying object information of a window for placing a sample to be tested continue to propagate in a 45-degree linear polarization state, 1/2 light beams without sample information passing through a window for placing a 1/4 glass slide propagate in a circular polarization state, the light beams propagate to a first lens in the same path, the light beams are duplicated into two light beams which are mirror images, the two light beams continue to propagate to a second lens in the same path, and then two carrier holograms with phase shift are simultaneously acquired on a CCD camera after passing through the second polarizing plate and are transmitted to a computer; the first lens and the second lens form a 4f system, and a sample to be measured and a quarter glass slide are respectively placed at two windows of the rectangular diaphragm; the first polaroid and the second polaroid are both arranged perpendicular to the optical axis; the CCD camera is placed on the back focal plane of the second lens.

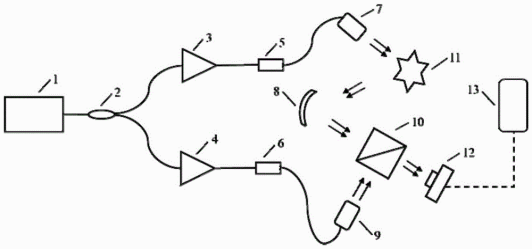
N9563

CN116428968
Priority Date: **07/03/2023**

BEIJING CHANGCHENG INSTITUTE OF METROLOGY & MEASUREMENT AVIATION INDUSTRY

DIGITAL HOLOGRAPHIC THREE-DIMENSIONAL RECONSTRUCTION SYSTEM AND METHOD BASED ON SINGLE-CAVITY DOUBLE-OPTICAL COMB

The invention discloses a digital holographic three-dimensional reconstruction system and method based on a single-cavity double-optical comb, and belongs to the technical field of digital holographic three-dimensional measurement. The invention comprises the following steps: the single-cavity double-optical comb comprises a single-cavity double-optical comb body, a coarse wavelength division multiplexer, a first optical fiber amplifier, a second optical fiber amplifier, a first optical fiber filter, a second optical fiber filter, a first optical fiber beam expander, a concave reflector, a second optical fiber beam expander, a spectroscope, an image sensor and a computer, wherein the single-cavity double-optical comb body emits two pulses, and interference fringes are generated between measuring light and reference light after beam splitting, amplification and filtering to form a hologram. The invention uses the single-cavity double-light comb as a light source to realize separation of zero-order image, twin image and target re-phenomenon in coaxial holography, improves the quality of holographic imaging, and is convenient for realizing engineering; the invention is based on a multi-wavelength heterodyne technology, combines the wide spectral bandwidth and high time coherence of an optical comb, suppresses the influence of noise, realizes large-size object measurement, and expands the application scene of digital holography.



CLAIM 1. A digital holographic three-dimensional reconstruction system based on a single-cavity double-optical comb is characterized in that: comprising the following steps: a single-cavity double-optical comb (1), a coarse wavelength division multiplexer (2), a first optical fiber amplifier (3), a second optical fiber amplifier (4), a first optical fiber filter (5), a second optical fiber filter (6) the device comprises a first optical fiber beam expander (7), a concave reflector (8), a second optical fiber beam expander (9), a spectroscope (10), an image sensor (12) and a computer (13); the single-cavity double-optical comb (1) is used for emitting a high-stability pulse beam, and the pulse beam comprises two pulse lasers with different center wavelengths and different heavy frequency differences; the coarse wavelength division multiplexer (2) divides a pulse beam emitted by the single-cavity double-optical comb (1) into two beams according to the difference of the central wavelengths of two pulse lasers: one beam is used as reference light, and the other beam is used as measuring light; the first optical fiber amplifier (3) and the second optical fiber amplifier (4) amplify pulse energy and reconstruct pulse spectrum of reference light and measuring light respectively; the first optical fiber filter (5) and the second optical fiber filter (6) respectively filter the reference light and the measuring light amplified by the first optical fiber amplifier (3) and the second optical fiber amplifier (4) so as to make the spectrums of the reference light and the measuring light consistent; the first optical fiber beam expander (7) expands the measuring light passing through the first optical fiber filter (5) and irradiates the measuring light to an object to be measured; the concave reflector (8) collects the measuring light reflected by the object to be measured, compresses the divergence angle of the light beam and transmits the light beam to the spectroscope (10); the second optical fiber beam expander (9) expands the reference light passing through the second optical fiber filter (6) and transmits the reference light to the spectroscope (10); the spectroscope (10) combines the measuring light emitted by the concave reflecting mirror (8) and the reference light emitted by the second optical fiber beam expander (9) to cause the measuring light and the reference light to interfere; the image sensor (12) is used for recording interference fringes generated by interference of the reference light and the measuring light, and performing discretization and digitization on the interference fringes to form a digital hologram; the computer (13) is used for carrying out noise reduction treatment on the digital hologram, carrying out numerical simulation on the diffraction process, reproducing the intensity and phase information of the measuring light and realizing the three-dimensional reconstruction of the appearance of the object to be measured.

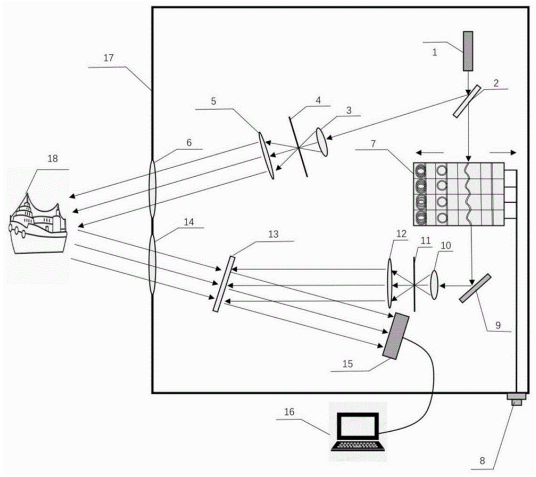
N9566

CN116399826 **KUNMING UNIVERSITY OF SCIENCE & TECHNOLOGY**

Priority Date: **09/05/2023**

FOG PENETRATING DETECTION DEVICE AND METHOD BASED ON INFRARED LASER DIGITAL HOLOGRAPHY

The invention discloses a fog penetrating detection device and method based on infrared laser digital holography, and belongs to the technical field of infrared holography. The fog penetration detection device comprises: the infrared pulse laser, a beam splitter I, a beam expander I, a pinhole filter I, a lens I, an infrared optical fiber optical path compensation device, an optical path compensation knob, a total reflection mirror, a beam expander II, a pinhole filter II, a lens II, a beam splitter II, an infrared lens II, an infrared CCD, a computer, an outer layer protection device and a target to be measured; the optical path compensation knob is connected with the infrared optical fiber optical path compensation device through a connecting rod. The device has an optical path compensation effect, can cover a circular area with a radius reaching the maximum optical path compensation distance, combines the advantages of a holographic method and infrared light to show a three-dimensional effect with large information quantity, overcomes the defect that the traditional imaging monitoring equipment encounters large fog, night or haze monitoring range is reduced, and improves detection accuracy, identification efficiency and visualization degree.



CLAIM 1. The utility model provides a fog penetrating detection device based on infrared laser digital holography which characterized in that includes: the infrared pulse laser, a beam splitter I, a beam expander I, a pinhole filter I, a lens I, an infrared optical fiber optical path compensation device, an optical path compensation knob, a total reflection mirror, a beam expander II, a pinhole filter II, a lens II, a beam splitter II, an infrared lens II, an infrared CCD, a computer, an outer layer protection device and a target to be measured; the infrared pulse laser, the beam splitter I, the beam expander I, the pinhole filter I, the lens I, the infrared optical path compensation device, the total reflection mirror, the beam expander II, the pinhole filter II, the lens II, the beam splitter II and the infrared CCD are arranged in the outer layer protection device, and the infrared lens I and the infrared lens II are arranged on the side wall of the outer layer protection device; the optical path compensation knob is positioned on the outer surface of the outer layer protection device and is connected with the infrared optical fiber optical path compensation device through a connecting rod; the infrared laser emits laser beams, and the laser beams are divided into two laser beams, namely a reference beam and an object beam, through a beam splitter I; the reference beam passes through an infrared optical path compensation device and then is reflected by a total reflection mirror, and then sequentially passes through a beam expander II, a pinhole filter II and a lens II to form a parallel beam; the parallel light beam reaches a beam splitter II; the object beam sequentially passes through a beam expander I, a pinhole filter I and a lens I to form a parallel beam, the parallel beam irradiates the surface of a target to be detected through an infrared lens I to generate diffuse reflection, the reflected beam is received by an infrared lens II and filtered to reach a beam splitter II, the reference beam and the object beam generate interference on the beam splitter II to form an interference hologram, then the interference hologram is transmitted to an infrared CCD and then transmitted to a computer, and the computer completes the reproduction process and displays the interference hologram in real time.

N9567

CN116386061 **SUZHOU XUANXIONG INTELLIGENT TECHNOLOGY**
Priority Date: **09/04/2023**

PRODUCT CHARACTER RECOGNITION METHOD BASED ON HOLOGRAM CHARACTERISTICS

The invention relates to a product character recognition method based on hologram characteristics, which comprises the following steps: constructing a holographic characteristic information acquisition system; constructing a holographic characteristic information identification system; constructing holographic characteristic information base of different characters; character object recognition. Compared with the existing recognition mode, the device and the method for recognizing the characters of the product based on the hologram feature firstly construct a holographic database aiming at the characters on the product and recognize the characters by utilizing optical correlation matching, and the method greatly increases character feature information and improves recognition accuracy on one hand; on the other hand, based on the optical correlation strategy, no matter how conditions of a product, materials, a light source and the like of character recognition are changed, complex parameter adjustment is not needed, so that the workload of a character recognition software engineer is greatly reduced, and the working efficiency is improved.

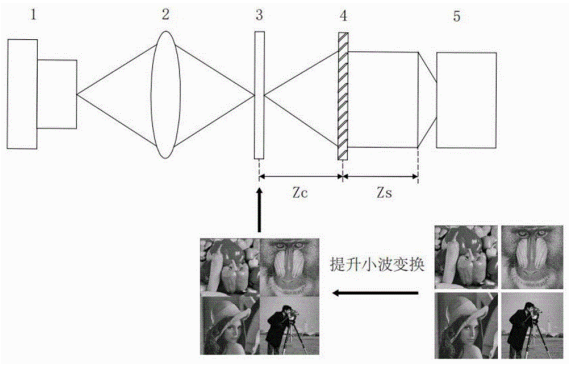
CLAIM 1. A method for character recognition of a product based on hologram features, comprising the steps of: constructing a holographic characteristic information acquisition system; constructing a holographic characteristic information identification system; constructing holographic characteristic information base of different characters; character object recognition.

N9568

CN116383843 **HARBIN UNIVERSITY OF SCIENCE & TECHNOLOGY**
Priority Date: **31/03/2023**

MULTI-IMAGE ENCRYPTION METHOD BASED ON LENS-FREE INTERFERENCE-FREE CODED APERTURE CORRELATION HOLOGRAPHY

The invention discloses a multi-image encryption method based on lens-free interference-free coded aperture correlation holography, and relates to the technical fields of information security and optical image encryption. The main processes of the invention include the generation of point spread holograms, the fusion of multiple images by integer lifting wavelet transform, the generation of encrypted images and digital decryption. To improve reconstruction quality, different encoding phase masks are used to generate the point spread holograms and the encrypted images. And in the digital decryption process, an adaptive phase filtering reconstruction algorithm and an integer lifting wavelet inverse transformation are used for decrypting the encrypted image. Compared with the existing optical multi-image encryption method, the method can improve the efficiency and the safety of multi-image encryption under the conditions of avoiding the problems of complex optical system devices, alignment sensitivity, coherent artifact noise and the like.

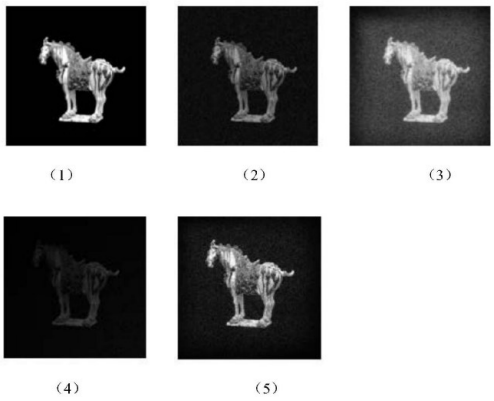


CLAIM 1. The multi-image encryption method based on the lens-free interference-free coded aperture correlation holography is characterized by comprising the following steps of: step one, generating four different point spread holograms PSH (Point Spread Hologram) by utilizing a lens-free and interference-free coded aperture related holographic LI-COACH (Lensless Interferenceless Coded Aperture Correlation Holography) system and combining four different coded phase masks CPM (Coded Phase Mask) generated by a G-S (Gerchberg-Saxton) algorithm; synthesizing four different point diffusion holograms to obtain a synthesized PSH; extracting effective information of a plurality of images by utilizing integer lifting wavelet transformation and integrating the effective information into one image; step four, encrypting the synthesized image by adopting four different CPMs used in the construction of the PSH respectively, so as to obtain four different encrypted images; step five, combining four different encrypted images to obtain a final encrypted image; step six, digitally decrypting by using the synthesized PSH generated in the step two and the synthesized encrypted image generated in the step five and using an adaptive phase filtering reconstruction algorithm; and seventhly, reconstructing each image through integer lifting wavelet inverse transformation.

N9571

CN116362997 **JILIN UNIVERSITY**
Priority Date: **28/02/2023**

METHOD FOR IMPROVING QUALITY OF DIGITAL HOLOGRAPHIC REPRODUCTION IMAGE

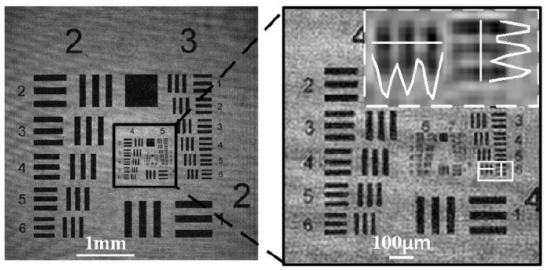


The invention discloses a method for improving the quality of digital holographic reproduction images, which comprises the following steps: acquiring a digital hologram to be processed, wherein the digital holograms are respectively a digital hologram containing speckle noise and a digital hologram not containing speckle noise, and a data set required by neural network training is obtained; denoising the digital hologram according to a neural network method with an image denoising function by using a deep learning algorithm; carrying out preset reproduction processing on the denoised digital hologram to obtain a reproduction image of the digital hologram; and denoising the reproduced image according to a preset image processing algorithm to obtain a final result. The method based on the combination of the deep learning and the multi-sub hologram reconstruction reduces the influence of speckle noise on the quality of the hologram reconstruction image, can solve the defects of the prior art and improve the quality of the reconstruction image, and has better effect in the field of removing the speckle noise of the digital hologram compared with the traditional algorithm.

N9576

CN116339098 **ZHEJIANG SCI-TECH UNIVERSITY**
Priority Date: **28/02/2023**

LIGHT OFF-AXIS DIGITAL HOLOGRAPHIC ZERO-ORDER ITEM ELIMINATION RECONSTRUCTION METHOD FOR SYMMETRICAL DEFLECTION OF REFERENCE LIGHT



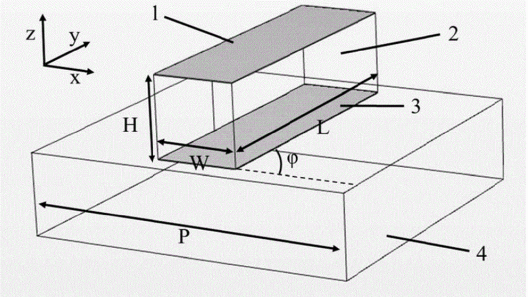
The invention discloses a light off-axis digital holographic zero-order item elimination reconstruction method for symmetrical deflection of reference light. Calculating to obtain two object parameter angles when +1-level items of the two holographic spectrograms are separated from each other and do not interfere with each other; the object light angle is unchanged, and the angle of the reference light is adjusted twice to collect holograms of the measured object; obtaining a composite spectrogram and a binary mask by hologram processing; and obtaining a target spectrogram according to the binary mask and the composite spectrogram, extracting +1-level spectral information, and reconstructing an image of the measured object. The invention utilizes the light intensity symmetry of Gaussian laser beams, and can obtain the hologram for eliminating the zero-order frequency spectrum by making difference between two light off-axis holograms obtained by symmetrically deflecting reference beams, thereby improving the frequency domain bandwidth utilization rate of a holographic optical path system and simultaneously inhibiting imaging artifacts caused by aliasing of the zero-order term frequency spectrum.

CLAIM 1. A light off-axis digital holographic zero-order item elimination reconstruction method for symmetrical deflection of reference light is characterized in that: step one: aiming at a holographic optical path system, before an experiment, according to parameters such as laser wavelength in the holographic optical path system, pixel number and pixel size of a CCD camera, frequency domain bandwidth of a +1 level item and the like, calculating to obtain a feasible range of a secondary object parameter angle required by the holographic optical path system under the constraint condition that the space between the central points of the +1 level item and the frequency spectrum of two holograms acquired by using CCD in sequence meets the frequency domain bandwidth of the +1 level item; step two: in an experiment, the incidence angle of object light of a holographic light path system to a CCD is unchanged, the two incidence angles of reference light to the CCD are adjusted according to the feasible range of the two object parameter angles calculated in the first step, and then two holograms obtained by interference of a measured object with different object parameter angles are sequentially collected through the CCD; step three: processing the two holograms obtained in the second step to obtain a composite spectrogram F 3 Binary mask B 1 ; Step four: composite spectrogram F obtained from step three 3 Binary mask B of (2) 1 Extracting another binary mask B by the process 2 And combine the composite spectrogram F 3 Obtaining a target spectrogram F 4 In the target spectrogram F 4 And extracting +1-level spectrum information to reconstruct an image of the measured object.

N9578

CN116338827 **HANGZHOU INSTITUTE FOR ADVANCED STUDY UCAS**
Priority Date: **23/02/2023**

TOPOLOGICAL INSULATOR-BASED PLASMA HOLOGRAPHIC SUPER SURFACE AND CONSTRUCTION METHOD THEREOF



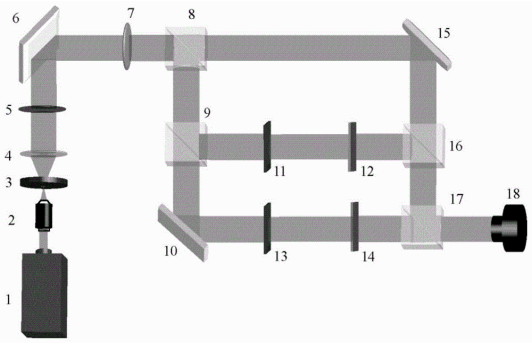
The invention discloses a topological insulator-based plasma holographic super surface and a construction method thereof. The super surface comprises a substrate and structural units which are arranged on the substrate periodically; the structural units are composed of one or more nanobricks having topological insulator properties that are anisotropic. The invention utilizes the broad spectrum surface plasmon resonance of the topological insulator in the visible light wave band to avoid extremely high ohmic loss of the traditional metal plasma super surface, and simultaneously utilizes the surface plasmon resonance excited by the topological insulator in the visible light wave band and the complex amplitude type hologram design to realize the broad spectrum polarization independent holographic imaging of the whole visible light wave band. In addition, the nanostructure unit designed based on the plasma super surface is of sub-wavelength level, and has the advantages of simple structure, small volume, light weight and high integration degree.

CLAIM 1. A topological insulator-based plasma holographic subsurface, characterized by: comprises a substrate and structural units which are arranged on the substrate periodically; the structural units are composed of anisotropic one or more nano bricks with topological insulator characteristics, and the direction angles of all the structural units are not identical and are determined by the complex amplitude distribution of the target image hologram.

N9579

CN116320196 **HARBIN UNIVERSITY OF SCIENCE & TECHNOLOGY**
Priority Date: **26/10/2022**

DIGITAL HOLOGRAPHIC OPTICAL MULTI-IMAGE ENCRYPTION METHOD BASED ON KRAMERS-KRONIG RELATION



The invention discloses a digital holographic optical multi-image encryption method based on a Kramers-Kronig relationship, and relates to the technical fields of information security and information optics. The invention mainly comprises an encryption process and a decryption process, wherein the encryption process comprises the following steps: the multipath object light is subjected to Fresnel diffraction with a certain distance respectively, modulated by a random phase key and interfered with reference light to obtain an encrypted hologram. The encrypted hologram conceals the information of the original image and the number of the original image, and has higher security in the storage and transmission process. Decryption: and the object light item is directly extracted from the positive frequency part of the frequency spectrum by utilizing the resolution of the signal. Compared with the traditional image encryption method based on off-axis digital holography, the method can realize the decryption of the image under the condition of spectrum overlapping, and the space bandwidth utilization rate is improved to a greater extent.

CLAIM 1. A digital holographic optical multi-image encryption method based on the Kramers-Kronig relationship, comprising the following two steps: step one, an image encryption part: the encryption of two images is realized by single exposure; step two, the image deciphering part: and the object light item is directly extracted from the positive frequency part of the frequency spectrum by utilizing the resolution of the signal, and the decryption of the image is realized under the condition of overlapping the frequency spectrums.

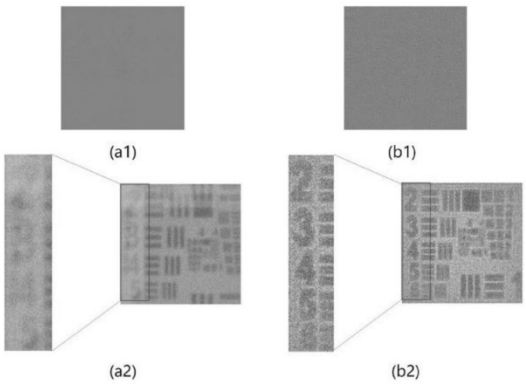
N9583

CN116300363 **JIANGNAN UNIVERSITY**

Priority Date: **17/01/2023**

SYSTEM AND METHOD FOR ACQUIRING LIVE-ACTION HOLOGRAM

The invention discloses a system and a method for acquiring a live-action hologram, and belongs to the technical field of holographic generation. The invention improves the view field of an integrated imaging system through a main lens of a light field camera, records a three-dimensional scene with a wide view field, and aims at the problem of non-uniform depth compression caused by a main lens group, and provides a depth calibration and recovery method combined with camera metadata parameters; in addition, a reflective Fourier laminated hologram generating algorithm is also provided, holograms with high resolution and wide view fields can be rapidly acquired and generated, and finally holographic three-dimensional stereoscopic display is realized through simulation of a fluctuation optical numerical reconstruction model. The invention can realize the acquisition and reproduction of the three-dimensional scene with wide view field, enhances the parallax of the reconstructed three-dimensional scene, enables a user to observe the reconstructed scene with full parallax, increases the depth perception of the three-dimensional scene, improves the resolution of holographic display, and is suitable for the acquisition and optimization of the hologram of the complex scene under natural light.



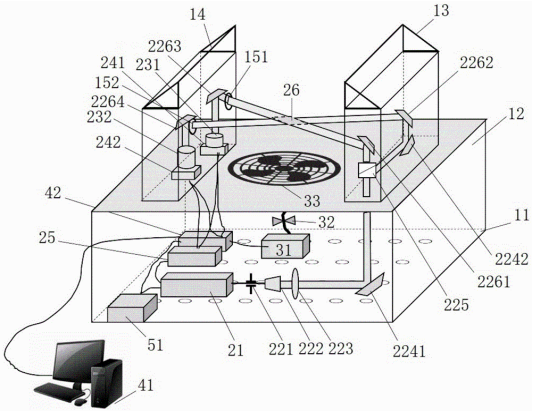
CLAIM 1. A method of acquiring a live-action hologram, the method comprising: step 1: shooting a three-dimensional scene image to be detected by using a light field camera, decoding the obtained image to obtain a light field image, and converting the light field image into a standard light field description form; step 2: converting the standard light field image obtained in the step 1 into a sub-aperture image array, and obtaining light field image slices at different depths; step 3: using a shift addition algorithm to sub-aperture image arrays corresponding to the light field image slices at different depths to obtain a refocused image stack and a focused image and a corresponding depth coefficient a, namely the number of pixels of spatial shift; step 4: estimating the depth d of each object in the three-dimensional scene to be measured according to the parameters of the light field camera and the depth coefficients a corresponding to the light field image slices with different depths obj Parameters of the light field camera include: a main lens focal length, a distance from a main lens main plane to a microlens array, a microlens array focal length, a sensor pixel size, a microlens size; step 5: estimating depth d from camera external reference object obj The ratio of the depth of the camera to the estimated depth of the reference object is adjusted to calculate the internal recovery depth of each depth slice except the reference plane, the estimated depth of the camera is obtained by the difference between the image distance calculated by a Gaussian formula and the main lens and the microlens array, and the relation between the internal estimated depth and the recovery depth is compared to obtain the depth recovery coefficient a E The reference depth can be the depth of any object in the depth slice, the light field image slice is repositioned by using a weighted intelligent pixel algorithm to obtain all the depth restored light field image slices, and the depth restored light field image slices and the reference depth light field image slices are fused into a complete light field image subjected to depth restoration; step 6: and (3) carrying out Fourier lamination iterative operation on the light field image with the depth restored in the step (5) to generate a high-resolution hologram.

N9588

CN116297040 **NATIONAL UNIVERSITY OF DEFENSE TECHNOLOGY**
Priority Date: **17/05/2023**

THREE-DIMENSIONAL FOG DROP MEASURING DEVICE AND METHOD BASED ON DIGITAL COAXIAL HOLOGRAPHIC IMAGING

The application relates to a three-dimensional fog drop measuring device and method based on digital coaxial holographic imaging, comprising a body, wherein a double-light-path holographic imaging unit and a particle suction unit are arranged on the body; the double-light-path holographic imaging unit is used for generating oblique coaxial double light paths in the sampling area and capturing a fogdrop hologram; the particle suction unit is arranged between the double-light-path holographic imaging units and is used for updating the flow rate of fog-containing particles in the sampling area. The invention measures the fogdrop particles based on the digital holographic technology, and can synchronously acquire the characteristic parameters of the fogdrop particles such as the space position, the size, the concentration, the shape, the spectrum distribution and the like; the particle suction unit can increase the sampling efficiency of the fog drops and acquire fog drop structure evolution observation data with higher time resolution; and through setting up the coaxial double light paths of bias, increased the effective sampling volume size of instrument by a wide margin, be fit for carrying out the structural instrument design.



CLAIM 1. A three-dimensional fog drop measurement device based on digital coaxial holographic imaging, the device comprising: a body; the double-light-path holographic imaging unit is arranged on the body and is used for generating oblique coaxial double light paths in the sampling area and capturing a fogdrop hologram; the particle suction unit is arranged on the body and positioned between the double-light-path holographic imaging units and is used for updating the flow rate of fog-containing particles in the sampling area; the control unit is arranged in the double-light-path holographic imaging unit and is used for monitoring the temperature of the double-light-path holographic imaging unit and the humidity inside the body and heating the double-light-path holographic imaging unit; the data acquisition component is arranged on the body, is electrically connected with the double-light-path holographic imaging unit, the power supply voltage stabilizing unit and the data processing unit respectively, and acquires the fogdrop hologram after receiving the trigger signal of the double-light-path holographic imaging unit; the data processing unit is electrically connected with the data acquisition component and is used for sending a working instruction and acquiring, storing and analyzing the fog drop hologram; the power supply voltage stabilizing unit is arranged on the body, and is respectively and electrically connected with the double-light-path holographic imaging unit and the data acquisition component, and is used for stabilizing and outputting electric energy; the particle suction unit comprises an air pump, a flowmeter and a fan which are electrically connected in sequence; the air pump and the flowmeter are both arranged in the cavity of the body, wherein the air pump is used for controlling the particle updating rate of the sampling area, and the flowmeter is used for monitoring the flow of the airflow containing fog drops when the air pump is used for pumping; the fan is arranged on the top plate of the body and is opposite to the sampling area, and the fan is used for increasing the air extraction area of the sampling area.

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REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
P36593	US	20230221679	13/07/2023	PERKOUS JIRI	US	10/01/2022	US2022017571556	US20230221679	ITEM VERIFICATION AND AUTHENTICATION SYSTEM AND METHOD	
P36600	RU	2798122	15/06/2023	NAUCHNO PROIZVODSTVENNOE OBEDINENIE KRIPTEN	RU	21/12/2021	RU2021000138107	RU2798122	OPTICAL PROTECTIVE DEVICE AND METHOD FOR ITS MANUFACTURING	
P36612	JP	2023084719	20/06/2023	NATIONAL PRINTING BUREAU	JP	08/12/2021	JP2021000198940	JP2023084719	APPLICATION DEVICE	
P36619	EP	4212350	19/07/2023	BUNDESDRUCKEREI	DE	13/01/2022	DE202210100767	EP4212350 DE102022100767	PRODUCTION PLANT FOR PRODUCING IDENTIFICATION DOCUMENTS, VALUE DOCUMENTS OR SECURITY DOCUMENTS OR FOR PRODUCING A COMPOSITE OF A PLURALITY OF IDENTIFICATION DOCUMENTS, VALUE DOCUMENTS OR SECURITY DOCUMENTS	
P36630	CN	219409609	25/07/2023	SHENZHEN TIANYITONG ANTI FORGERY PACKING MATERIALCO	CN	24/03/2023	CN2023000685056	CN219409609U	UV PRINTS HIGH TEMPERATURE RESISTANT HOLOGRAPHIC THERMOPRINT MEMBRANE	
P36632	CN	219405824	25/07/2023	ZHEJIANG TIANQI PACKAGING MATERIAL	CN	10/04/2023	CN2023000771751	CN219405824U	RAINBOW SURFACE FILM COVERING DEVICE FOR PLAIN SURFACE HOLOGRAPHIC ANTI-COUNTERFEITING PAPERBOARD	
P36633	CN	219385810	21/07/2023	HUBEI YIMEITE QUANXI TECHNOLOGY	CN	15/03/2023	CN2023000534453	CN219385810U	LASER HOLOGRAPHIC PACKAGING MATERIAL	
P36644	CN	219267186	27/06/2023	HUNAN MINTPACK NEW MATERIAL TECHNOLOGY	CN	01/08/2022	CN2022002007155	CN2192671860U	GRATING LASER PACKAGING FILM	OVD - Microprism
P36649	CN	219236429	23/06/2023	YONGQING COUNTY YESHENGYA OFFSET PRINTING	CN	02/12/2022	CN2022003228561	CN219236429U	LASER HOLOGRAPHIC IRIS PRINTING LAYER	
P36650	CN	219236369	23/06/2023	SHANDONG FUYANG PACKAGING MATERIALS	CN	27/02/2023	CN2023000323926	CN219236369U	COLOR PRINTING HOLOGRAPHIC PATTERN LASER FILM	
P36668	CN	116373442	04/07/2023	HUBEI HUAGONG IMAGE TECHNOLOGY DEVELOPMENT	CN	14/04/2023	CN2023000413380	CN116373442	ELECTRIC HEATING MOULD PRESSING VERSION ROLLER	
P36675	CN	116300319	23/06/2023	GUANGDONG LOEN PHOTOELECTRIC TECHNOLOGY	CN	21/12/2021	CN2021001573994	CN116300319	PHOTOETCHING MACHINE AND METHOD FOR MANUFACTURING HOLOGRAPHIC MASTER PLATE, HOLOGRAPHIC MASTER PLATE AND ANTI-COUNTERFEITING ELEMENT	
P36676	CN	116284930	23/06/2023	JIAXIONG PACKAGING MAT	CN	29/03/2023	CN2023000314951	CN116284930	DEGRADABLE ENVIRONMENT-FRIENDLY ANTI-COUNTERFEITING PACKAGING MATERIAL AND PREPARATION METHOD THEREOF	

VARIOUS OPTICAL EFFECTS - 20 PATENTS

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
P36573	WO	2023135029	20/07/2023	GIESECKE & DEVRIENT CURRENCY TECHNOLOGY	DE	12/01/2022	DE202210000101	WO2023135029 DE102022000101	OPTICALLY VARIABLE SECURITY ELEMENT	Microlens
P36574	WO	2023135028	20/07/2023	GIESECKE & DEVRIENT CURRENCY TECHNOLOGY	DE	12/01/2022	DE202210000102	WO2023135028 DE102022000102	OPTICALLY VARIABLE SURFACE PATTERN	Microlens
P36575	WO	2023133632	20/07/2023	CANADIAN BANK NOTE	CA	14/01/2022	CA2022003145610	WO2023133632 CA3145610	SECURITY FEATURE WITH METALLIZATION FOR SECURITY DOCUMENTS	Microlens
P36579	WO	2023122299	29/06/2023	PENN STATE RESEARCH FOUNDATION	US	22/12/2021	US2021063292837	WO2023122299	ARTICLES AND METHODS FOR GENERATING TUNABLE COLORATION AND INTERFERENCE UPON REFLECTION OF INCIDENT ELECTROMAGNETIC RADIATION	
P36584	WO	2023119034	29/06/2023	ECKART	EP	22/12/2021	EP2021000216797	WO2023119034	DIFFRACTIVE EFFECT PIGMENTS HAVING A REFLECTIVE CORE AND SEMICONDUCTOR COATINGS	
P36589	WO	2023115210	29/06/2023	BANK OF CANADA | NRC - NATIONAL RESEARCH COUNCIL CANADA	CA	22/12/2021	CA2021003143656	WO2023115210 CA3143656	DYNAMIC MICRO-OPTIC SECURITY DEVICES, THEIR PRODUCTION AND USE	Microlens
P36602	KR	20230105917	12/07/2023	KOREA SECURITY PRINTING & MINTING	KR	05/01/2022	KR2022000001543	KR20230105917	MOTION RESPONSIVE SECURITY DEVICE	

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VARIOUS OPTICAL EFFECTS - 20 PATENTS (continuation)

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P36603	KR	20230102549	07/07/2023	INHA INDUSTRY PARTNERSHIP INSTITUTE	KR	30/12/2021	KR2021000192757	KR20230102549	THE COATING WITH STRUCTURAL COLOR AND ANTI-COUNTERFEITING PATTERN SECURITY MADE BY LAYER-BY-LAYER ASSEMBLY BASED ON TUNICATE CELLULOSE NANO FIBERS AND ITS MANUFACTURING METHOD	
P36615	FR	3131646	07/07/2023	GUIGAN FRANCK	FR	03/01/2022	FR2022000000021	FR3131646	AUTHENTICATION OF DISTORTED OPTICAL SECURITY DEVICES	
P36624	EP	4209355	12/07/2023	BUNDESDRUCKEREI	DE	06/01/2022	DE202210200099	EP4209355 DE102022200099	SECURITY DOCUMENT WITH MICROGRID STRUCTURE	
P36627	DE	102022000312	27/07/2023	GIESECKE & DEVRIENT CURRENCY TECHNOLOGY	DE	27/01/2022	DE202210000312	DE102022000312	FILM, FILM WEB, VALUABLE DOCUMENT AND METHOD FOR PRODUCING THE SAME	
P36628	DE	102022000212	20/07/2023	GIESECKE & DEVRIENT CURRENCY TECHNOLOGY	DE	20/01/2022	DE202210000212	DE102022000212	SECURITY FEATURE FOR A VERIFICATION SYSTEM, SYSTEM, METHOD AND COMPUTER PROGRAM PRODUCT FOR VERIFYING AN OBJECT PROVIDED WITH THE SECURITY FEATURE AND METHOD FOR PRODUCING A SECURITY FEATURE	
P36629	DE	102022000210	20/07/2023	GIESECKE & DEVRIENT CURRENCY TECHNOLOGY	DE	20/01/2022	DE202210000210	DE102022000210	SECURITY FEATURE FOR VALUABLE DOCUMENTS AND VALUABLE DOCUMENT HAVING SECURITY FEATURE	Microlens
P36644	CN	219267186	27/06/2023	HUNAN MINTPACK NEW MATERIAL TECHNOLOGY	CN	01/08/2022	CN2022002007155	CN219267186U	GRATING LASER PACKAGING FILM	Hologram - Microprism
P36651	CN	116490805	25/07/2023	NIPPON CARBIDE KOGYO	CN	16/11/2022	CN2022080006933	CN116490805	ANTI-FAKE REFLECTING SHEET AND ITS MAKING PROCESS	Microlens
P36653	CN	116476558	25/07/2023	WUXI KAICHUANG MOULD	CN	26/06/2023	CN2023000460620	CN116476558	NANOMETER MICRO-ENGRAVING ANTI-COUNTERFEITING GOLD STAMPING PROCESS	
P36659	CN	116424007	14/07/2023	CHENGDU BANKNOTE PRINTING | CHINA BANKNOTE PRINTING & MINT	CN	12/10/2022	CN2022001245998	CN116424007	THREE-DIMENSIONAL DYNAMIC PATTERN ANTI-COUNTERFEITING LABEL AND PRINTING METHOD THEREOF	Microlens
P36672	CN	116338841	27/06/2023	NIPPON CARBIDE KOGYO	CN	22/12/2021	CN2021001582225	CN116338841	RETROREFLECTIVE SHEET WITH BASE MATERIAL AND CAPABLE OF BEING PRINTED BY CARBON TAPE	Microprism
P36673	CN	116330874	27/06/2023	ZHEJIANG KAYOU ANIMATION	CN	10/03/2023	CN2023000229181	CN116330874	OPTICALLY VARIABLE INK PRINTING METHOD FOR PLASTIC STATIONERY SURFACE	
P36677	CN	116278452	23/06/2023	GUANGDONG QIAOSHENG NEW MATERIAL TECHNOLOGY	CN	21/12/2021	CN2021001572327	CN116278452	OPTICALLY VARIABLE ANTI-COUNTERFEITING MATERIAL, AND MANUFACTURING METHOD AND APPLICATION THEREOF	

NON SECURITY HOLOGRAMS - 89 PATENTS

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
N9500	WO	2023141348	27/07/2023	META MEDIA	US	24/01/2022	US2022063302529	WO2023141348	SYSTEM AND PRODUCTION METHOD FOR CUSTOM FIT HOLOGRAPHIC OPTICAL ELEMENTS FOR OPTICAL COMBINERS	
N9501	WO	2023141344	27/07/2023	UNIVERSITY OF ARIZONA	US	24/01/2022	US2022063302190	WO2023141344	REAL-TIME COMPUTER GENERATED HOLOGRAM (CGH) GENERATION BY COMPUTE UNIFIED DEVICE ARCHITECTURE (CUDA)-OPEN-GL FOR ADAPTIVE BEAM STEERING	
N9502	WO	2023139205	27/07/2023	CARL ZEISS JENA	DE	20/01/2022	DE202210101316	WO2023139205 DE102022101316	HAPTIC HOLOGRAM	
N9503	WO	2023135247	20/07/2023	CARL ZEISS JENA	DE	14/01/2022	DE202210100805	WO2023135247 DE102022100805	HOLOGRAPHIC OPTICAL ELEMENT AND TEMPERATURE STABILIZATION	
N9504	WO	2023128088	06/07/2023	SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION	KR	29/12/2021	KR2021000191826	WO2023128088 KR20230101592	METHOD FOR OPTIMIZING HOLOGRAPHIC DISPLAY AND DEVICE THEREFOR	
N9505	WO	2023128011	06/07/2023	SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION	KR	27/12/2021	KR2021000188867	WO2023128011 KR20230099475	METHOD FOR CORRECTING ABERRATION OF HOLOGRAM, AND DEVICE THEREFOR	
N9506	WO	2023128010	06/07/2023	SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION	KR	27/12/2021	KR2021000188990	WO2023128010 KR20230099537	HOLOGRAPHIC DISPLAY DEVICE AND HOLOGRAM OPTIMIZATION METHOD THEREFOR	

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N9507	WO	2023120990	29/06/2023	HICS	KR	24/12/2021	KR2021000187116	WO2023120990	METHOD AND DEVICE FOR TESTING HOLOGRAM PATTERN ANALYSIS SOFTWARE OF DIGITAL HOLOGRAPHIC MICROSCOPE	
N9508	WO	2023120832	29/06/2023	HICS	KR	24/12/2021	KR2021000187109	WO2023120832	PARALLEL PROCESSING METHOD AND HIGH-SPEED PROCESSING SYSTEM USING SAME	
N9509	WO	2023120744	29/06/2023	KOREA ELECTRONICS TECHNOLOGY INSTITUTE	KR	20/12/2021	KR2021000182359	WO2023120744 KR20230093597	BINOCULAR FULL-COLOR HOLOGRAPHIC NEAR-EYE DISPLAY DEVICE USING SINGLE SPATIAL LIGHT MODULATOR	
N9510	WO	2023117562	29/06/2023	COVESTRO | COVESTRO DEUTSCHLAND	US	22/12/2021	US2021063293042	WO2023117562	METHOD FOR PRODUCING VOLUME REFLECTION HOLOGRAMS WITH SUBSTRATE-GUIDED RECONSTRUCTION BEAMS AND/OR SUBSTRATE-GUIDED DIFFRACTED BEAMS IN A SINGLE-BEAM SET-UP	
N9511	WO	2023117336	29/06/2023	PREH	DE	23/12/2021	DE202110134491	WO2023117336 DE102021134491	OPERATING OR VISUALISING ELEMENT WITH A LATERALLY ALIGNED HOLOGRAPHIC FUNCTIONAL DISPLAY FOR VISUALISING THE SWITCHING FUNCTION ASSOCIATED WITH THE OPERATING OR VISUALISING ELEMENT AND/OR THE RESPECTIVE SWITCH STATUS OF SAID OPERATING OR VISUALISING ELEMENT	
N9512	WO	2023117211	29/06/2023	AMS INTERNATIONAL	GB	22/12/2021	GB2021000018856	WO2023117211	HOLOGRAM RECORDING SYSTEM AND METHOD	
N9513	WO	2023117171	29/06/2023	PREH	DE	23/12/2021	DE202110134492	WO2023117171 DE102021134492	OPERATING OR DISPLAY ELEMENT HAVING A TRANSFER HOLOGRAPHIC DISPLAY AND ASSOCIATED ARRANGEMENT	
N9514	US	20230236545	27/07/2023	KYUNG HEE UNIVERSITY | SAMSUNG ELECTRONICS	KR	21/01/2022	KR2022000009149	US20230236545	HOLOGRAPHIC IMAGE PROCESSING METHOD AND HOLOGRAPHIC IMAGE PROCESSING APPARATUS	
N9515	US	20230236494	27/07/2023	UNIVERSITY OF CENTRAL FLORIDA RESEARCH FOUNDATION	US	25/01/2022	US2022063302735	US20230236494	REFLECTIVE HOLOGRAPHIC PHASE MASKS	
N9516	US	20230228398	20/07/2023	HELLA	DE	14/01/2022	DE202210100799	US20230228398 DE102022100799 CN116447539	LIGHTING DEVICE FOR A MOTOR VEHICLE	
N9517	US	20230213890	06/07/2023	KOREA PHOTONICS TECHNOLOGY INSTITUTE	KR	30/12/2021	KR2021000192126	US20230213890 KR20230102187	HOLOGRAPHIC MICROSCOPE INCLUDING HOLOGRAPHIC IMAGE SENSOR	
N9518	US	20230213889	06/07/2023	KOREA PHOTONICS TECHNOLOGY INSTITUTE	KR	30/12/2021	KR2021000192124	US20230213889 KR20230102186	HOLOGRAPHIC IMAGE SENSOR	
N9519	US	20230205134	29/06/2023	KWANGWOON UNIVERSITY INDUSTRY ACADEMIC COLLABORATION FOUNDATION	KR	27/12/2021	KR2021000188827	US20230205134	WEBSERVER-BASED VIDEO CONTENT PRODUCTION SYSTEM AND METHOD FOR PRINTING HOLOGRAPHIC STEREOGRAM PHOTO	
N9520	US	20230205065	29/06/2023	SAMSUNG ELECTRONICS	KR	24/12/2021	KR2021000187768	US20230205065 WO2023121290	PROJECTOR AND DISPLAY APPARATUS EMPLOYING HOLOGRAPHIC OPTICAL ELEMENT	
N9521	US	20230204841	29/06/2023	DIGILENS	US	29/12/2021	US2021063266162	US20230204841 WO2023129952	METHOD AND SYSTEM UTILIZING INVERTED MASTER FOR HOLOGRAPHIC RECORDING	
N9522	US	20230204454	29/06/2023	KOREA PHOTONICS TECHNOLOGY INSTITUTE	KR	29/12/2021	KR2021000190709	US20230204454	SPATIAL PROPERTY OR COLOR IMPLEMENTATION PROPERTY MEASUREMENT DEVICE OF HOLOGRAPHIC IMAGES	
N9523	TW	643726	11/07/2023	UNICORNVR ENTERTAINMENT	TW	14/02/2023	TW2023000201250	TWM643726	REAL-TIME HOLOGRAPHIC REALITY DISPLAY SYSTEM.	
N9524	RU	2799499	05/07/2023	FEDERALNOE GOSUDARSTVENNOE BYUDZHETNOE UCHREZHDENIE NAUKI FIZICHESKIJ INSTITUT IM P N LEBEDEVA ROSSIJSKOJ AKADEMII NAUK	RU	06/12/2022	RU2022000131822	RU2799499	LASER HOLOGRAPHIC RECEIVING SYSTEM	
N9525	KR	20230105302	11/07/2023	KOREA ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE	KR	03/01/2022	KR2022000000586	KR20230105302	DIGITAL HOLOGRAM DISPLAY DEVICE	
N9526	KR	20230103834	07/07/2023	KOREA ELECTRONICS & TELECOMMUNICATIONS RESEARCH INSTITUTE	KR	31/12/2021	KR2021000193865	KR20230103834	HIGH RESOLUTION COLOR HOLOGRAM DEVICE	
N9527	KR	20230103372	07/07/2023	JEONG, SO WON	KR	31/12/2021	KR2021000194227	KR20230103372	GAN-BASED ARTIFICIAL INTELLIGENCE HOLOGRAM IMAGE RECONSTRUCTION METHOD AND SYSTEM THEREFOR	

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NON SECURITY HOLOGRAMS - 89 PATENTS (continuation)

REFERENCE	COUNTRY	PATENT NUMBER	PUBLICATION DATE Day-Month-Year	APPLICANT	PRIORITY	PRIORITY DATE Day-Month-Year	PRIORITY NUMBER	EQUIVALENTS	TITLE	KEY WORDS
N9528	KR	20230102429	07/07/2023	CHUNGBUK NATIONAL UNIVERSITY INDUSTRY ACADEMIC COOPERATION FOUNDATION	KR	30/12/2021	KR2021000192539	KR20230102429	METHOD FOR PRODUCING HOLOGRAPHIC OPTICAL ELEMENT LENS ARRAY IN HOLOGRAM PRINTER	
N9529	KR	20230102059	07/07/2023	EPICOPTIX	KR	29/12/2021	KR2021000191890	KR20230102059	HOLOGRAPHIC OPTICAL SYSTEM	
N9530	KR	20230101593	06/07/2023	SEOUL NATIONAL UNIVERSITY R&DB FOUNDATION	KR	29/12/2021	KR2021000191827	KR20230101593	METHOD AND APPARATUS FOR OPTIMIZING HOLOGRAPHIC DISPLAY	
N9531	KR	20230100985	06/07/2023	KOREA PHOTONICS TECHNOLOGY INSTITUTE	KR	29/12/2021	KR2021000190713	KR20230100985	DEVICE FOR MEASURING COLOR IMPLEMENTATION CHARACTERISTICS OF HOLOGRAPHIC IMAGES	
N9532	KR	20230092162	26/06/2023	INHA INDUSTRY PARTNERSHIP INSTITUTE	KR	17/12/2021	KR2021000181292	KR20230092162	COMPUTER ARRANGEMENT AND METHOD FOR SYNTHESIZING A NONHOGEL LIGHT FIELD BASED COMPUTER GENERATED HOLOGRAM WITHOUT COLOR ABERRATION FOR ALL COLOR CHANNELS	
N9533	KR	20230091329	23/06/2023	SEOUL OLYMPIC A MEMORIAL THE PEOPLE PHYSICAL EDUCATION ENCOURAGEMENT ASSOCIATION	KR	16/12/2021	KR2021000180348	KR20230091329	FIGHTING TRAINING DEVICE USING HOLOGRAM	
N9534	KR	20230090666	22/06/2023	WONKWANG UNIVERSITY INDUSTRY ACADEMIC COOPERATION FOUNDATION	KR	15/12/2021	KR2021000179628	KR20230090666	VOLUMETRIC 3D DISPLAY USED BY HOLOGRAPHIC OPTICAL ELEMENT	
N9535	KR	20230088943	20/06/2023	HANWHA | PABLO AIR	KR	13/12/2021	KR2021000177207	KR20230088943	APPARATUS AND METHOD FOR FORMING A FOG SCREEN AND DIRECTING A HOLOGRAM SHOW USING A DRONE	
N9536	KR	102551612	06/07/2023	CUBIXEL | INDUSTRY ACADEMIA COOPERATION OF SEJONG UNIVERSITY	KR	28/09/2022	KR2022000123460	KR102551612	POLARIZATION DIVISIONAL DOUBLE SCANNING HOLOGRAPHY SYSTEM FOR TRANSMISSIVE OBJECT	
N9537	KR	102551611	06/07/2023	CUBIXEL | INDUSTRY ACADEMIA COOPERATION OF SEJONG UNIVERSITY	KR	28/09/2022	KR2022000123459	KR102551611	POLARIZATION DIVISIONAL DOUBLE SCANNING HOLOGRAPHY SYSTEM FOR REFLECTIVE OBJECT	
N9538	KR	102550328	03/07/2023	INHA INDUSTRY PARTNERSHIP INSTITUTE	KR	07/09/2022	KR2022000113298	KR102550328	FPGA ACCELERATION METHOD OF COMPUTER GENERATED HOLOGRAMS USING HIGH-LEVEL SYNTHESIS ON FPGA	
N9539	JP	2023097562	10/07/2023	NIPPON HOSO KYOKAI	JP	28/12/2021	JP2021000213754	JP2023097562	INCOHERENT DIGITAL HOLOGRAPHIC IMAGING DEVICE AND METHOD OF IMAGING	
N9540	IN	202321032892	16/06/2023	SAGE UNIVERSITY	IN	09/05/2023	IN2023021032892	IN202321032892	HOLOPORTATION DEVICE FOR MOVING OBJECTS AND MAKING 3-D IMAGE IN AIR	
N9541	IN	202311038433	07/07/2023	GL BAJAJ INSTITUTE OF TECHNOLOGY & MANAGEMENT	IN	05/06/2023	IN2023011038433	IN202311038433	ADVANCED DIGITAL HOLOGRAPHY SYSTEM UTILIZING MACHINE LEARNING-BASED COMPRESSION, SECURE ENCRYPTION, AND CLOUD PROCESSING	
N9542	EP	4216201	26/07/2023	HUEBNER	EP	20/01/2022	EP2022000152513	EP4216201	VEHICLE WITH HOLOGRAPHIC FILM	
N9543	EP	4215998	26/07/2023	SAMSUNG ELECTRONICS	KR	21/01/2022	KR2022000009231	EP4215998 US20230236544	METHOD AND APPARATUS FOR MODULATING THE IMAGE DEPTH OF A HOLOGRAM FOR ADAPTATING THE HOLOGRAM TO THE HARDWARE SPECIFICATIONS OF A HOLOGRAPHIC DISPLAY	
N9544	EP	4202561	28/06/2023	ENVISICS	GB	23/12/2021	GB2021000018911	EP4202561 US20230204953 GB202118911 GB2614286 CN116339099 KR20230096898	HOLOGRAM CALCULATION FOR COMPACT HEAD-UP DISPLAY	
N9545	DE	102022213113	20/07/2023	CARL ZEISS SMT	DE	18/01/2022	DE202210200472	DE102022213113	METHOD FOR MONITORING AN ADJUSTMENT SETTING, INTERFEROMETRIC MEASURING DEVICE, HOLOGRAM DEVICE AND LITHOGRAPHY SYSTEM	
N9546	CN	219392476	21/07/2023	HAWTHORNE CULTURE COMMUNICATION WUHAN	CN	27/12/2022	CN2022003487592	CN219392476U	HOLOGRAPHIC PROJECTION DEVICE	
N9547	CN	219392451	21/07/2023	NANCHANG YIJING INFORMATION TECHNOLOGY	CN	07/03/2023	CN2023000408965	CN219392451U	MAN-MACHINE REAL-TIME INTERACTIVE HOLOGRAPHIC PROJECTION EQUIPMENT	
N9548	CN	219392348	21/07/2023	SANYI PHOTOELECTRIC TECHNOLOGY SUZHOU	CN	06/02/2023	CN2023000118629	CN219392348U	HOLOGRAPHIC DIFFRACTION GRATING	
N9549	CN	219320657	07/07/2023	SUZHOU YUNTU VISUAL TECHNOLOGY	CN	16/08/2022	CN2022002153369	CN2193206570	HOLOGRAPHIC PROJECTION DISPLAY DEVICE	

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N9550	CN	219302783	04/07/2023	NANCHANG VIRTUAL REALITY RESEARCH INSTITUTE	CN	16/01/2023	CN2023000129103	CN219302783U	HOLOGRAPHIC BODY GRATING OPTICAL WAVEGUIDE DEVICE AND EQUIPMENT	
N9551	CN	219285579	30/06/2023	SHANGHAI GUOJING MODEL DESIGN	CN	06/12/2022	CN2022003257954	CN219285579U	HOLOGRAPHIC SAND TABLE OF STEREOSCOPIC PROJECTION	
N9552	CN	116489477	25/07/2023	QINGDAO CHENYUAN TECHNOLOGY INFORMATION	CN	28/04/2023	CN2023000490715	CN116489477	HOLOGRAPHIC VIDEO GENERATION METHOD, DEVICE, EQUIPMENT AND STORAGE MEDIUM	
N9553	CN	116486841	25/07/2023	TSINGHUA UNIVERSITY	CN	28/04/2023	CN2023000485201	CN116486841	HOLOGRAPHIC DATA STORAGE SYSTEM	
N9554	CN	116486723	25/07/2023	ZHEJIANG FUAO SOFTWARE DEVELOPMENT	CN	14/03/2023	CN2023000261313	CN116486723	WISDOM GARDEN HOLOGRAPHIC PROJECTION VISUALIZATION PLATFORM AND DEVICE	
N9555	CN	116482928	25/07/2023	GUANGZHOU DAMAI CULTURE COMMUNICATION	CN	21/04/2023	CN2023000433455	CN116482928	MULTIDIMENSIONAL HOLOGRAPHIC IMAGE DISPLAY PLATFORM	
N9556	CN	116482059	25/07/2023	HARBIN ENGINEERING UNIVERSITY	CN	27/04/2023	CN2023000470814	CN116482059	DUAL-CHANNEL POLARIZED CARRIER PHASE SHIFT COMMON-PATH DIGITAL HOLOGRAPHIC MEASUREMENT DEVICE AND METHOD	
N9557	CN	116466484	21/07/2023	ANHUI POLYTECHNIC UNIVERSITY	CN	23/04/2023	CN2023000439359	CN116466484	HOLOGRAPHIC RETINA PROJECTION NEAR-TO-EYE DISPLAY METHOD AND SYSTEM BASED ON PHASE MASK OPTIMIZATION	
N9558	CN	116449670	18/07/2023	ANHUI UNIVERSITY	CN	23/04/2023	CN2023000450000	CN116449670	NON-ITERATIVE FRESNEL PURE PHASE HOLOGRAM GENERATION AND MULTIPLEXING METHOD, DEVICE AND MEDIUM	
N9559	CN	116430702	14/07/2023	SHENZHEN WANCHENGHUI ELECTRONICS	CN	26/04/2023	CN2023000470380	CN116430702	HOLOGRAPHIC DISPLAY METHOD AND SYSTEM BASED ON SILICON-BASED LIQUID CRYSTAL DEVICE	
N9560	CN	116430495	14/07/2023	GUANGNA SIWEI GUANGDONG PHOTOELECTRIC TECHNOLOGY	CN	27/04/2023	CN2023000479001	CN116430495	EXPOSURE METHOD, EXPOSURE LIGHT PATH AND EXPOSURE SYSTEM OF VOLUME HOLOGRAPHIC OPTICAL WAVEGUIDE GRATING	
N9561	CN	116430491	14/07/2023	CHONGQING INSTITUTE OF GREEN & INTELLIGENT TECHNOLOGY CHINESE ACADEMY OF SCIENCES | CHONGQING UNIVERSITY	CN	28/02/2023	CN2023000176064	CN116430491	PREPARATION DEVICE AND PREPARATION METHOD OF UNIFORM HOLOGRAPHIC DIFFUSION SHEET	
N9562	CN	116429017	14/07/2023	NORTHEASTERN UNIVERSITY OF CHINA	CN	10/05/2023	CN2023000523010	CN116429017	PHASE SHIFT DIGITAL HOLOGRAPHIC THREE-DIMENSIONAL MEASUREMENT METHOD AND DEVICE FOR VIBRATION OF MEASURED BODY	
N9563	CN	116428968	14/07/2023	BEIJING CHANGCHENG INSTITUTE OF METROLOGY & MEASUREMENT AVIATION INDUSTRY	CN	07/03/2023	CN2023000211369	CN116428968	DIGITAL HOLOGRAPHIC THREE-DIMENSIONAL RECONSTRUCTION SYSTEM AND METHOD BASED ON SINGLE-CAVITY DOUBLE-OPTICAL COMB	
N9564	CN	116400576	07/07/2023	DONGGUAN YIKE INTELLIGENT ADVERTISING	CN	31/03/2023	CN2023000338482	CN116400576	HOLOGRAPHIC 3D DEVICE	
N9565	CN	116400575	07/07/2023	JIANGXI GAORUI PHOTOELECTRIC	CN	09/03/2023	CN2023000223150	CN116400575	MULTIMODE DIGITAL HOLOGRAPHIC MICROSCOPIC IMAGING DEVICE	
N9566	CN	116399826	07/07/2023	KUNMING UNIVERSITY OF SCIENCE & TECHNOLOGY	CN	09/05/2023	CN2023000516848	CN116399826	FOG PENETRATING DETECTION DEVICE AND METHOD BASED ON INFRARED LASER DIGITAL HOLOGRAPHY	
N9567	CN	116386061	04/07/2023	SUZHOU XUANXIONG INTELLIGENT TECHNOLOGY	CN	09/04/2023	CN2023000368281	CN116386061	PRODUCT CHARACTER RECOGNITION METHOD BASED ON HOLOGRAM CHARACTERISTICS	
N9568	CN	116383843	04/07/2023	HARBIN UNIVERSITY OF SCIENCE & TECHNOLOGY	CN	31/03/2023	CN2023000338433	CN116383843	MULTI-IMAGE ENCRYPTION METHOD BASED ON LENS-FREE INTERFERENCE-FREE CODED APERTURE CORRELATION HOLOGRAPHY	
N9569	CN	116382054	04/07/2023	CHINA RAILWAY FIRST | CHINA RAILWAY FIRST CONSTRUCTION & INSTALLATION ENGINEERING	CN	28/03/2023	CN2023000318093	CN116382054	HOLOGRAPHIC PROJECTION METHOD, HOLOGRAPHIC PROJECTION SYSTEM, ELECTRONIC EQUIPMENT AND READABLE STORAGE MEDIUM	
N9570	CN	116371689	04/07/2023	ZHEJIANG CHUNYU PACKAGING MATERIAL	CN	21/04/2023	CN2023000432347	CN116371689	AUTOMATIC COATING SYSTEM OF AUTOMATIC COATING UNIT FOR MANUFACTURING HOLOGRAPHIC THERMOPRINT FILM	
N9571	CN	116362997	30/06/2023	JILIN UNIVERSITY	CN	28/02/2023	CN2023000172943	CN116362997	METHOD FOR IMPROVING QUALITY OF DIGITAL HOLOGRAPHIC REPRODUCTION IMAGE	

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N9573	CN	116360165	30/06/2023	TIANMA	CN	31/03/2023	CN2023000341525	CN116360165	LIQUID CRYSTAL GRATING AND HOLOGRAPHIC DISPLAY DEVICE	
N9574	CN	116359175	30/06/2023	BEIHANG UNIVERSITY OF AERONAUTICS & ASTRONAUTICS | THIRD HOSPITAL OF PEKING UNIVERSITY	CN	03/03/2023	CN2023000197045	CN116359175	EARLY URINARY TRACT EPITHELIAL CANCER CELL SCREENING METHOD BASED ON DIGITAL HOLOGRAPHIC FLOW MICROSCOPIC IMAGING	
N9575	CN	116339503	27/06/2023	HANGMENG EXPLORATION SUZHOU AEROSPACE TECHNOLOGY	CN	09/09/2022	CN2022001103538	CN116339503	HOLOGRAPHIC INTERACTIVE DISPLAY SYSTEM	
N9576	CN	116339098	27/06/2023	ZHEJIANG SCI-TECH UNIVERSITY	CN	28/02/2023	CN2023000198301	CN116339098	LIGHT OFF-AXIS DIGITAL HOLOGRAPHIC ZERO-ORDER ITEM ELIMINATION RECONSTRUCTION METHOD FOR SYMMETRICAL DEFLECTION OF REFERENCE LIGHT	
N9577	CN	116339097	27/06/2023	SOUTH CHINA NORMAL UNIVERSITY	CN	23/02/2023	CN2023000162481	CN116339097	DUAL-WAVELENGTH DIGITAL HOLOGRAPHIC SYSTEM AND METHOD	
N9578	CN	116338827	27/06/2023	HANGZHOU INSTITUTE FOR ADVANCED STUDY UCAS	CN	23/02/2023	CN2023000154620	CN116338827	TOPOLOGICAL INSULATOR-BASED PLASMA HOLOGRAPHIC SUPER SURFACE AND CONSTRUCTION METHOD THEREOF	
N9579	CN	116320196	23/06/2023	HARBIN UNIVERSITY OF SCIENCE & TECHNOLOGY	CN	26/10/2022	CN2022001317009	CN116320196	DIGITAL HOLOGRAPHIC OPTICAL MULTI-IMAGE ENCRYPTION METHOD BASED ON KRAMERS-KRONIG RELATION	
N9580	CN	116310005	23/06/2023	GUANGZHOU FRONTOP DIGITAL ORIGINALITY TECHNOLOGY	CN	31/03/2023	CN2023000333450	CN116310005	HOLOGRAPHIC CABINET, DYNAMIC VIRTUAL IMAGE VIDEO PROCESSING METHOD AND IMAGE PROCESSING METHOD	
N9581	CN	116301379	23/06/2023	LI SHUANGJIANG	CN	21/03/2023	CN2023000278755	CN116301379	HOLOGRAPHIC DISPLAY METHOD, DEVICE, SYSTEM, EQUIPMENT AND STORAGE MEDIUM FOR 3D SCENE IMAGE	
N9582	CN	116300365	23/06/2023	SHENZHEN TECHNOLOGY UNIVERSITY	CN	22/11/2022	CN2022001464210	CN116300365	BROADBAND HOLOGRAPHIC GENERATION DEVICE WITH ARBITRARY WAVELENGTH CODES AND DESIGN METHOD	
N9583	CN	116300363	23/06/2023	JIANGNAN UNIVERSITY	CN	17/01/2023	CN2023000057970	CN116300363	SYSTEM AND METHOD FOR ACQUIRING LIVE-ACTION HOLOGRAM	
N9584	CN	116300243	23/06/2023	TIANMA	CN	21/04/2023	CN2023000439041	CN116300243	LIQUID CRYSTAL GRATING AND HOLOGRAPHIC THREE-DIMENSIONAL DISPLAY DEVICE	
N9585	CN	116300078	23/06/2023	CIVIL AVIATION UNIVERSITY OF CHINA	CN	10/12/2021	CN2021001513564	CN116300078	INTEGRATED HOLOGRAPHIC WAVEGUIDE NEAR-TO-EYE DISPLAY SYSTEM	
N9586	CN	116300077	23/06/2023	CIVIL AVIATION UNIVERSITY OF CHINA	CN	10/12/2021	CN2021001513563	CN116300077	COLOR TUNABLE DIFFRACTION HEAD-UP DISPLAY DEVICE BASED ON ELASTIC POLYMER HOLOGRAPHIC BODY GRATING	
N9587	CN	116299811	23/06/2023	HANGZHOU ZHONGKE AURORA TECHNOLOGY	CN	30/12/2022	CN2022001728438	CN116299811	HOLOGRAPHIC GRATING PREPARATION SYSTEM AND PREPARATION METHOD	
N9588	CN	116297040	23/06/2023	NATIONAL UNIVERSITY OF DEFENSE TECHNOLOGY	CN	17/05/2023	CN2023000556137	CN116297040	THREE-DIMENSIONAL FOG DROP MEASURING DEVICE AND METHOD BASED ON DIGITAL COAXIAL HOLOGRAPHIC IMAGING	